TEST REPORT

Applicant	:	Jinhua Ainuo Machinery Equipment Co.,ltd
Address	:	No.42 South Huanzhen Road, ZhiYing town, Yongkang city, Zhejiang province
Manufacturer	:	Jinhua Ainuo Machinery Equipment Co.,ltd
Address	:	No.42 South Huanzhen Road, ZhiYing town, Yongkang city, Zhejiang province
Product Name	:	SANDBLASTING MACHINE
Model Number	:	Refer to section 1.1 Model Number
Trademark	:	N/A
Date of Receipt	:	Jul. 08, 2025
Test Date	:	Jul. 08, 2025 - Jul. 15, 2025
Date of Report	:	Jul. 15, 2025
Test Result	:	The equipment under test was found to be compliance with the requirements of the standards applied.

Test Procedure Used:

Standards : EN IEC 61000-6-3:2021
EN IEC 61000-3-2:2019+A1:2021+A2:2024
EN 61000-3-3:2013+A1:2019+A2:2021
EN IEC 61000-6-1:2019

Prepared by(Test Engineer): Sten Huang
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SHENZHEN BKC TESTING CO.,LTD. BKC APPROVED

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Revision History of This Test Report		
Report Number	Description	Issued Date
BKC25072779GE	Initial Issue	2024-07-15

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT	:	SANDBLASTING MACHINE
Trademark	:	N/A
Model Number	:	SBC90, SBC150, SBC200, SBC220, SBC350, SBC450, SBC990, SBP50
Model Difference	:	Only the model names are different.
Power Supply	:	AC 110-240V 50/60Hz
Work Frequency	:	Below 108MHz

Note:
1) EUT: Equipment under test
2) SBC90 was selected as the test model and the datas have been recorded in this report.

1.2. Independent Operation Modes

Test Voltage: AC 230V/50Hz

Test Mode:A ON Mode

Remark: The test data of the worst case condition(s) was reported on the following page.

1.3. TEST SUMMARY

Test Procedures According To The Technical Standards:

EMC Emission				
Standard	Test Item	Limit	Judgment	Remark
EN IEC 61000-6-3:2021	AC Port Conducted Emission	Class B	PASS	
	Radiated Emission	Class B	PASS	
	Asymmetric Mode Conducted Emissions	Class B	N/A	
EN IEC 61000-3-2: 2019+A1:2021+A2:2024	Harmonic Current Emission	Class A or D NOTE (2)	PASS	
EN 61000-3-3:2013+ A1:2019+A2:2021	Voltage Fluctuations & Flicker	------	PASS	
EMC Immunity				
Standard EN IEC 61000-6-1:2019	Test Item	Performance Criteria	Judgment	Remark
IEC 61000-4-2:2008	Electrostatic Discharge	B	PASS	
IEC 61000-4-3: 2020	RF electromagnetic field	A	PASS	
IEC 61000-4-4:2012	Fast transients	B	PASS	
IEC 61000-4-5:2014+ A1:2017	Surges	B	PASS	
IEC 61000-4-6:2013	Injected Current	A	PASS	
IEC 61000-4-8:2009	Power Frequency Magnetic Field	A	N/A	Note(3)
IEC 61000-4-11:2020	VoltInterruptions Volt. Dips	B / C / C NOTE (4)	PASS	

NOTE:
(1)"N/A" denotes test is not applicable in this Test Report
(2) The power consumption of EUT is less than 75W and no limits apply.
(3) The EUT don't containing magnetic field sensitive components.
(4) Voltage dip: 100% reduction – Performance Criteria B
Voltage dip: 30% reduction – Performance Criteria C
Voltage Interruption: 100% Interruption – Performance Criteria C
(5) For client's request and manual description, the test will not be executed.

1.4. Special Accessories and Auxiliary Equipment

Description	Manufacturer	Model No.	Serial No.
/	/	/	/

1.5. Test Uncertainty

The reported uncertainty of measurement y ± U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

A. Conducted Measurement :

Method	Measurement Frequency Range	U,(dB)	NOTE
CISPR 16-4-2:2018	150 KHz ~ 30MHz	3.01	

B. Radiated Measurement :

Method	Measurement Frequency Range	U,(dB)	NOTE
CISPR 16-4-2:2018	30MHz ~ 1000MHz	4.25	
	1GHz ~6GHz	5.1	

1.6. Test Facility

Site Description

Name of Firm : Shenzhen BKC Testing Co., Ltd.

Site Location : Room103, 1/F, Huaya Building, Huaya Industrial Park, Yousong Community, Longhua Subdistrict, Longhua District, Shenzhen, Guangdong, China

2. TEST INSTRUMENT USED

2.1 CONDUCTED TEST SITE

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	LISN	R&S	ENV216	102762	Mar. 09. 2026
2	EMI Test Receiver	R&S	ESCI	101424	Mar. 09. 2026
3	Rf cables	HTEC	HCE 2M-CE	N/A	Mar. 09. 2026
4	Coupling/ Decoupling Network	Diamond	CX210	N/A	Mar. 09. 2026
5	Testing software	EZ	EZ-EMC	/	/

2.2 Radiated Test Site(Below 1G and Above 1G)

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Antenna	Schwarzbeck	VULB 9168	01321	Mar. 19. 2028
2	EMI Test Receiver	R&S	ESRP	101478	Mar. 09. 2026
3	Preamplifier	HP	8447D	2727A05345	Mar. 09. 2026
4	Double Ridged Broadband	SCHWARZBECK	BBHA 9120D	02621	Mar. 19. 2028
5	Preamplifier	Schwarzbeck	BBV 9718D	00041	Mar. 09. 2026
6	Rf cables	HUBER+SUHNER	8M-RE	N/A	Mar. 09. 2026
7	Rf cables	HUBER+SUHNER	1.5M-RE	N/A	Mar. 09. 2026
8	Rf cables	HUBER+SUHNER	1.5M-AP-RE	N/A	Mar. 09. 2026
9	Testing software	EZ	EZ-EMC	/	/

2.3 HARMONICS AND FLICKER

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Harmonic & Flicker	Laplace	AC2000A	550507	Mar. 11. 2026
2	AC Power Source	Laplace	HPHF4010	N/A	Mar. 09. 2026

2.4 Electrostatic Discharge

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	ESD TEST GENERATOR	HTEC	HESD16	N/A	Mar. 12. 2026

2.5 RS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Signal Generator	R&S	SMT 06	832080/007	Mar .14 .2026
2	Log-Bicon Antenna	Schwarzbeck	VULB9161	4022	Mar .14 .2026
3	Power Amplifier	AR	150W1000M1	320946	Mar .14 .2026

4	Microwave Horn Antenna	AR	AT4002A	321467	Mar .14 .2026
5	Power Amplifier	AR	25S1G4A	308598	Mar .14 .2026

2.6 SURGE, EFT/BURST, VOLTAGE INTERRUPTION/DIPS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Surge /DIPS /EFT Generator	HTEC	ECOMPACT5	216201	Mar .10 .2026
2	Programmable AC power supply	HTEC	HV1P16T	204102	Mar .10 .2026
3	Capacitive coupling pliers	HTEC	H3C	213602	Mar .10 .2026
4	Single phase isolating transformer	HTEC	BK-5KVA	N/A	Mar .10 .2026

2.7 INJECTION CURRENT

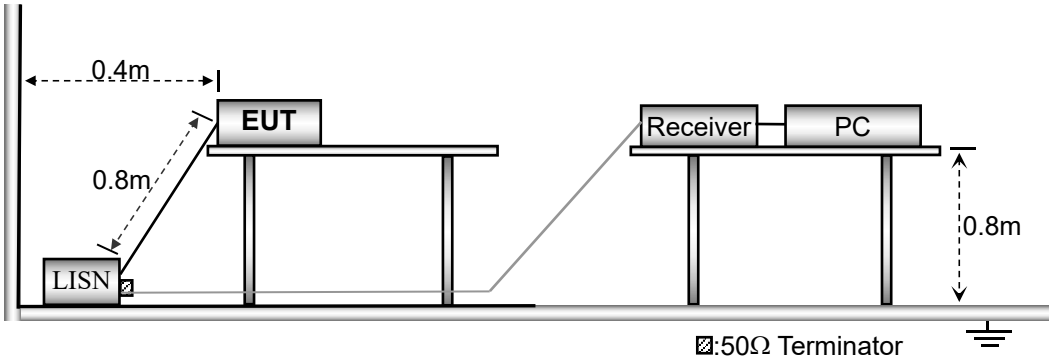
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Signal Generator	HTEC	HCS 75+	232002	Mar. 11. 2026
2	CDN	HTEC	CDN-M2+3	231002	Mar. 09. 2026
3	Attenuator	HTEC	CDG7006-100W+	220308033	Mar. 09. 2026
4	Testing software	HTEC	CS5045	/	/

Test software

Software name	RE EMI Testing software
Software version	EMEC-03A2 RE+
Software name	CE EMI Testing software
Software version	EMEC-3A1+
Software name	CS5045
Software version	2.01

3. CONDUCTED EMISSION AT THE MAINS TERMINALS TEST

3.1. Block Diagram Of Test Setup



3.2. Test Standard

EN IEC 61000-6-3:2021

3.3. Power Line Conducted Emission Limit

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

Notes: 1. *Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

3.4. EUT Configuration on Test

The following equipments are installed on conducted emission test to meet EN IEC 61000-6-3 requirement and operating in a manner which tends to maximize its emission characteristics in a normal application.

3.5. Operating Condition of EUT

3.5.1 Setup the EUT and simulators as shown in Section 3.1.
3.5.2 Turn on the power of all equipments.
3.5.3 Let the EUT work in test modes and test it.

3.6. Test Procedure

The EUT is put on the ground and connected to the AC mains through a Artificial Mains Network (AMN). This provided a 50ohm coupling impedance for the tested equipments. Both sides of AC line are checked to find out the maximum conducted emission levels according to the EN IEC 61000-6-3 regulations during conducted emission test.

The bandwidth of the test receiver (R&S Test Receiver ESCI) is set at 9KHz.

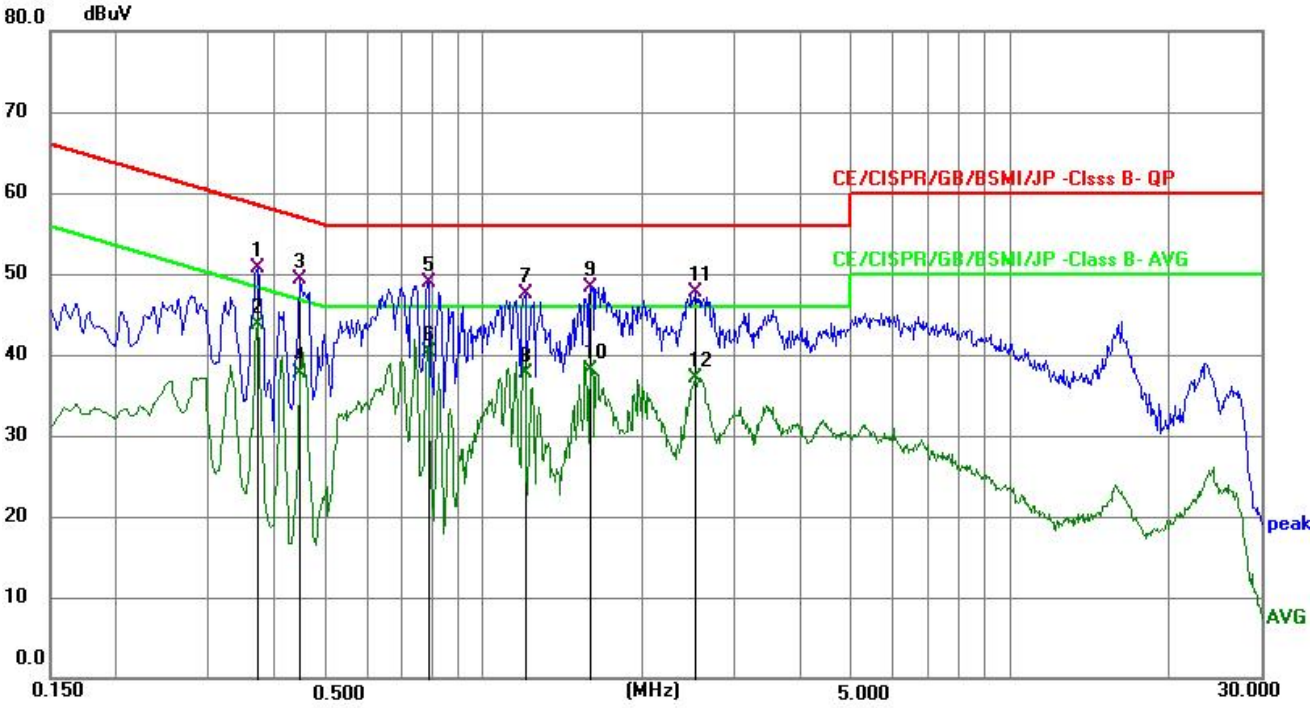
The frequency range from 150 KHz to 30 MHz is investigated.

3.7. Test Result

PASS

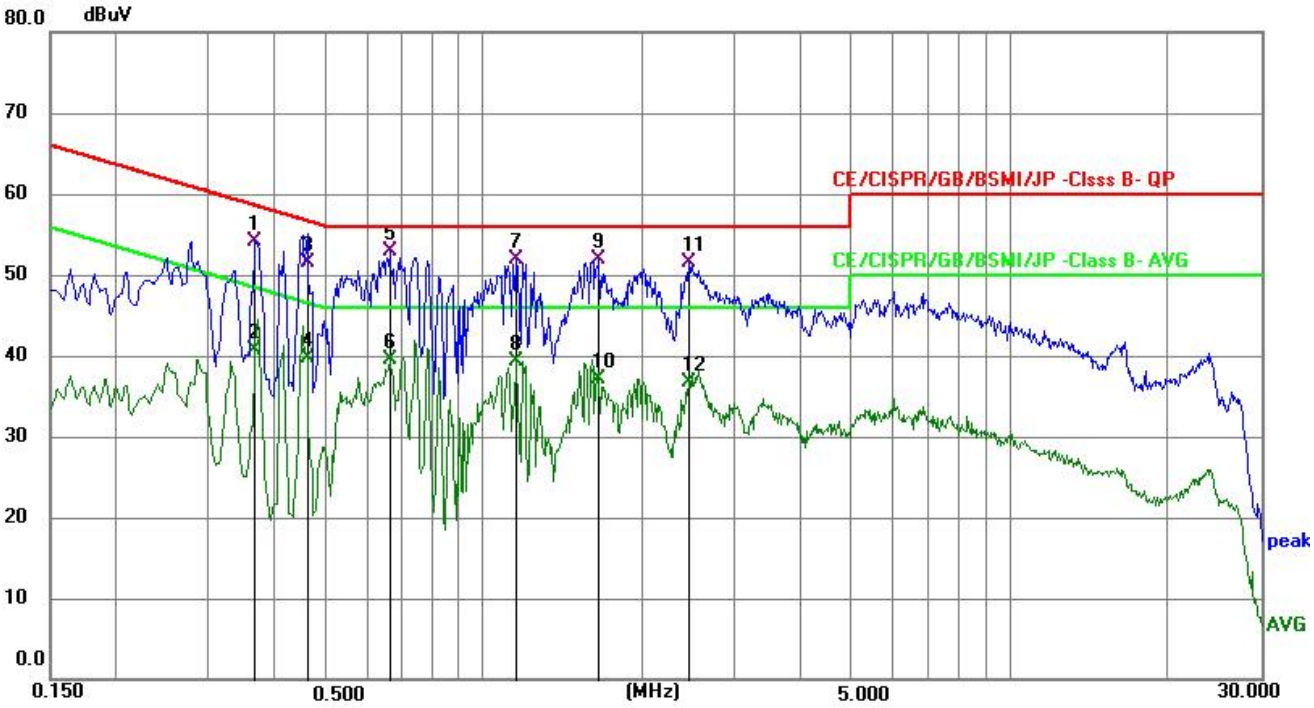
Please refer to the following page.

Conducted Emission At The Mains Terminals Test Data			
Temperature:	25.1℃	Relative Humidity:	56%
Pressure:	1008hPa	Phase :	Line
Test Voltage :	AC 230V/50Hz	Test Mode:	ON Mode



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.3704	40.96	9.77	50.73	58.49	-7.76	QP	P	
2 *	0.3704	33.97	9.77	43.74	48.49	-4.75	AVG	P	
3	0.4470	39.46	9.77	49.23	56.93	-7.70	QP	P	
4	0.4470	27.93	9.77	37.70	46.93	-9.23	AVG	P	
5	0.7845	39.15	9.76	48.91	56.00	-7.09	QP	P	
6	0.7845	30.45	9.76	40.21	46.00	-5.79	AVG	P	
7	1.1985	37.76	9.74	47.50	56.00	-8.50	QP	P	
8	1.1985	27.94	9.74	37.68	46.00	-8.32	AVG	P	
9	1.5990	38.62	9.75	48.37	56.00	-7.63	QP	P	
10	1.5990	28.38	9.75	38.13	46.00	-7.87	AVG	P	
11	2.5260	37.85	9.78	47.63	56.00	-8.37	QP	P	
12	2.5260	27.38	9.78	37.16	46.00	-8.84	AVG	P	

Conducted Emission At The Mains Terminals Test Data			
Temperature:	25.1℃	Relative Humidity:	56%
Pressure:	1008hPa	Phase :	Neutral
Test Voltage :	AC 230V/50Hz	Test Mode:	ON Mode

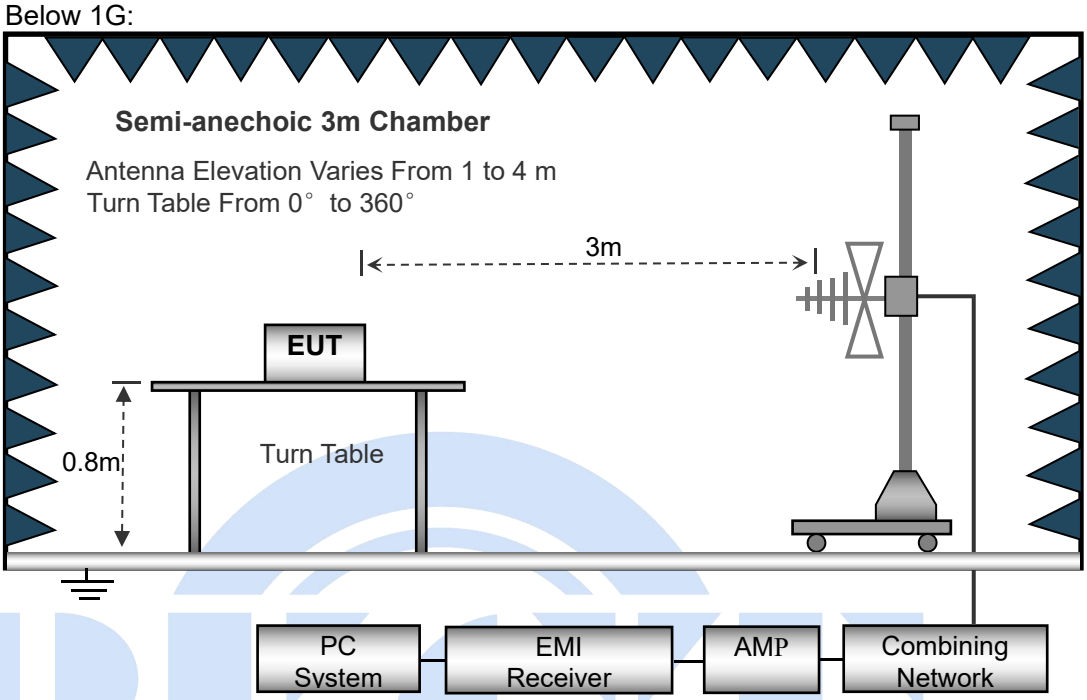


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.3660	44.50	9.70	54.20	58.59	-4.39	QP	P	
2	0.3660	31.10	9.70	40.80	48.59	-7.79	AVG	P	
3	0.4605	41.80	9.70	51.50	56.68	-5.18	QP	P	
4	0.4605	30.09	9.70	39.79	46.68	-6.89	AVG	P	
5 *	0.6630	43.21	9.69	52.90	56.00	-3.10	QP	P	
6	0.6630	29.83	9.69	39.52	46.00	-6.48	AVG	P	
7	1.1490	42.16	9.68	51.84	56.00	-4.16	QP	P	
8	1.1490	29.71	9.68	39.39	46.00	-6.61	AVG	P	
9	1.6575	42.12	9.69	51.81	56.00	-4.19	QP	P	
10	1.6575	27.36	9.69	37.05	46.00	-8.95	AVG	P	
11	2.4585	41.72	9.69	51.41	56.00	-4.59	QP	P	
12	2.4585	27.04	9.69	36.73	46.00	-9.27	AVG	P	

4. RADIATION EMISSION TEST

4.1. Block Diagram of Test Setup

Below 1G:



4.2. Test Standard

EN IEC 61000-6-3:2021

4.3. Radiation Limit

Frequency MHz	Distance (Meters)	Field Strengths Limits dB(μV)/m	Detector
30 ~ 230	3	40.0	QP
230 ~ 1000	3	47.0	QP

Remark:

(1) Emission level (dB(μV)/m) = 20 log Emission level (μV/m)

(2) The smaller limit shall apply at the cross point between two frequency bands.

(3) Distance refers to the distance in meters between the measuring instrument, antenna and the closed point of any part of the device or system.

4.4. EUT Configuration on Test

The EN IEC 61000-6-3 regulations test method must be used to find the maximum emission during radiated emission test.
The configuration of EUT is the same as used in conducted emission test.
Please refer to Section 3.4

4.5. Operating Condition of EUT

Same as conducted emission test, which is listed in Section 2.2 except the test set up replaced as Section 4.1.

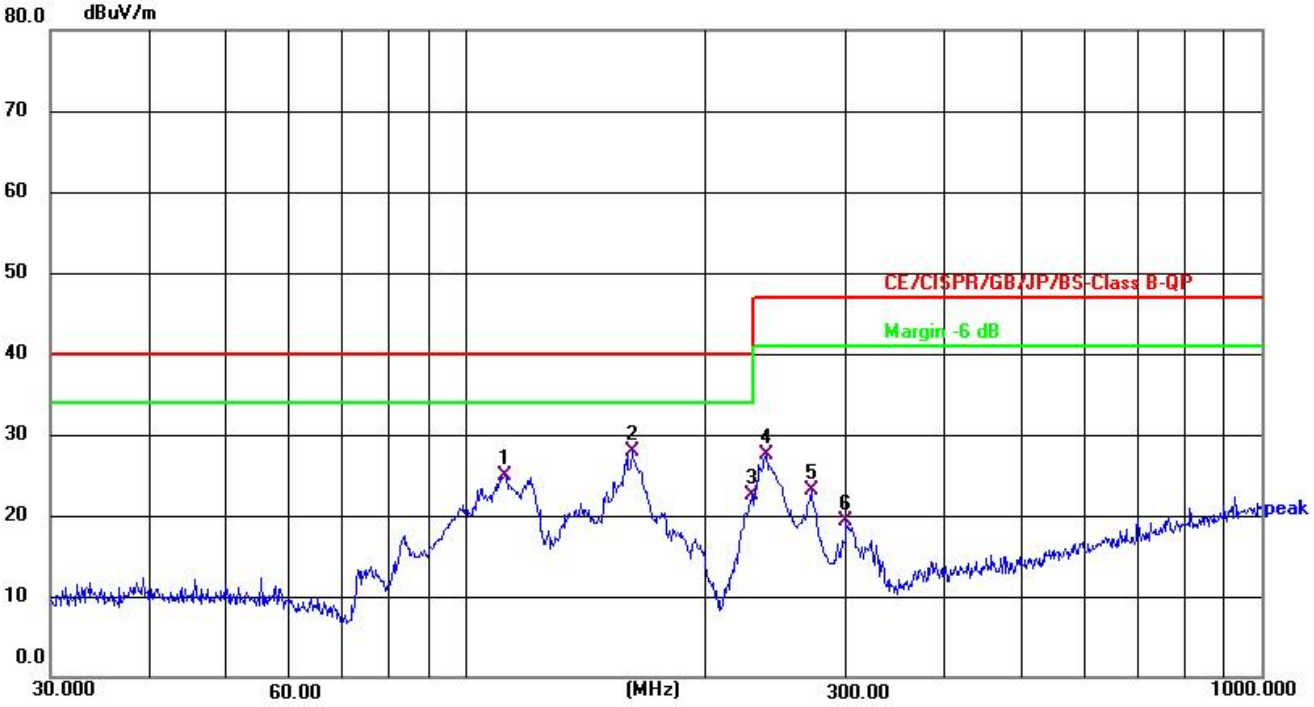
4.6. Test Procedure

The EUT and its simulators are placed on a turned table that is 0.8 meter above the ground. The turned table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna that is mounted on the antenna tower. The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated biconical and log periodical antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna is set on test. In order to find the maximum emission levels, the interface cable must be manipulated according to EN IEC 61000-6-3 on radiated emission test.
The bandwidth setting on the field strength meter (R&S Test Receiver ESCI) is set at 120KHz below 1GHz, set at 1MHz above 1GHz
The frequency range from 30MHz to 1000MHz is checked.

4.7. Test Result

PASS
Please refer to the following page.

Radiation Emission Test Data			
Temperature:	25.1℃	Relative Humidity:	56%
Pressure:	1008hPa	Phase :	Horizontal
Test Voltage :	AC 230V/50Hz	Test Mode:	ON Mode



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	111.7380	43.76	-18.87	24.89	40.00	-15.11	QP	100	219	P	
2 *	161.4742	43.80	-15.96	27.84	40.00	-12.16	QP	100	155	P	
3	228.4904	41.22	-18.71	22.51	40.00	-17.49	QP	100	34	P	
4	238.3102	45.69	-18.21	27.48	47.00	-19.52	QP	100	244	P	
5	271.3246	40.40	-17.27	23.13	47.00	-23.87	QP	100	155	P	
6	300.3672	35.78	-16.38	19.40	47.00	-27.60	QP	100	131	P	

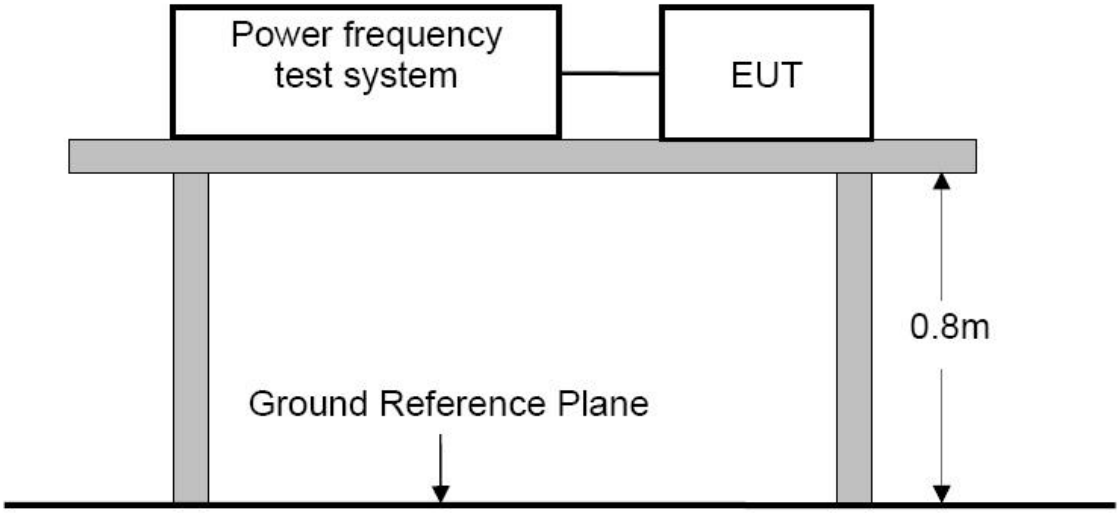
Radiation Emission Test Data			
Temperature:	25.1℃	Relative Humidity:	56%
Pressure:	1008hPa	Phase :	Vertical
Test Voltage :	AC 230V/50Hz	Test Mode:	ON Mode



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	34.3964	41.37	-16.85	24.52	40.00	-15.48	QP	100	213	P	
2	57.5940	37.04	-17.31	19.73	40.00	-20.27	QP	100	301	P	
3	82.9384	46.66	-20.91	25.75	40.00	-14.25	QP	100	12	P	
4 *	112.5243	55.58	-18.77	36.81	40.00	-3.19	QP	100	187	P	
5	162.0413	45.81	-16.01	29.80	40.00	-10.20	QP	100	220	P	
6	228.4904	44.33	-18.71	25.62	40.00	-14.38	QP	100	60	P	

5. HARMONIC CURRENT EMISSION TEST

5.1. Block Diagram of Test Setup



5.2. Test Standard

EN IEC 61000-3-2:2019+A1:2021+A2:2024

5.3. Operating Condition of EUT

5.3.1 Setup the EUT as shown in Section 5.1.

5.3.2 Turn on the power of all equipments.

5.3.3 Let the EUT work in test mode and test it.

5.4. Test Procedure

The power cord of the EUT is connected to the output of the test system. Turn on the power of the EUT and use the test system to test the harmonic current level.

5.5. Test Results

PASS

Please refer to the following page.

Harmonics Test Summary

Test category: IEC/EN 61000-3-2:2019+A1:2021 Class A **Model/Type:**
Measurement standard: IEC 61000-4-7 Ed2:1:2009 **Serial number:**
Test date:2025-07-10 **Start time: 16:25:15** **End time: 16:27:53**
Test duration (sec):150
Describe:
Test Result: pass **Source qualification(Power Off Load): Idle - Pass**

THC(mA): 397.400 **I - THD(%): 13.8** **POHC(mA):6.400** **POHC Limit(mA):251.353**

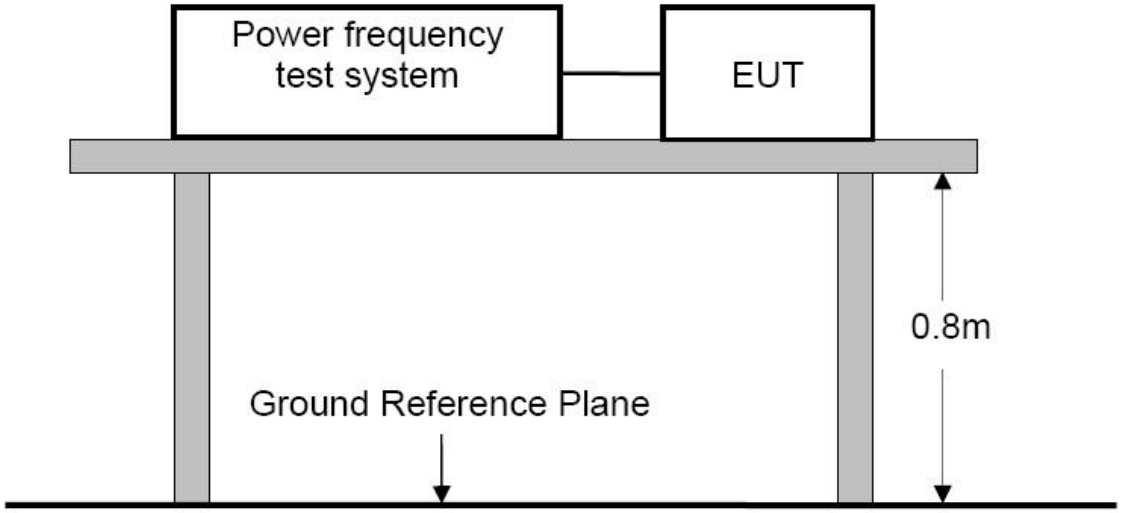
Parameter values during test:
V_RMS (Volts): 220.1 **Frequency(Hz): 50.0**
I_RMS(A): 2.9 **Crest Factor: 1.446**
Power (Watts): 180.6 **Power Factor: 0.582**

Harm#	Harms(filtered) (mA)	Limit (mA)	Harms(avg) (mA)	100%Limit	Harms(max) (mA)	150%Limit	Status
I_Fund	2884.000						
2	12.900	1080.000	13.600	1.259	15.600	0.963	Pass
3	384.400	2300.000	388.600	16.896	398.800	11.559	Pass
4	3.500	430.000	3.800	0.884	4.100	0.636	Pass
5	88.400	1140.000	89.700	7.868	93.100	5.444	Pass
6	4.300	300.000	4.200	1.400	4.300	0.956	Pass
7	40.600	770.000	40.500	5.260	41.500	3.593	Pass
8	3.200	230.000	3.000	1.304	3.200	0.928	Pass
9	17.200	400.000	17.000	4.250	17.200	2.867	Pass
10	1.400	184.000	1.400	0.761	1.600	0.580	Pass
11	6.400	330.000	6.400	1.939	6.400	1.293	Pass
12	1.700	153.300	1.900	1.239	2.100	0.913	Pass
13	6.800	210.000	6.900	3.286	7.300	2.317	Pass
14	1.200	131.400	1.300	0.989	1.400	0.710	Pass
15	1.900	150.000	1.900	1.267	1.900	0.844	Pass
16	0.700	115.000	0.800	0.696	0.800	0.464	Pass
17	2.500	132.400	2.600	1.964	2.600	1.309	Pass
18	0.800	102.200	1.000	0.978	1.000	0.652	Pass
19	3.000	118.400	3.000	2.534	3.000	1.689	Pass
20	0.700	92.000	0.800	0.870	0.800	0.580	Pass
21	1.400	107.100	1.400	1.307	1.600	0.996	Pass
22	0.500	83.600	0.600	0.718	0.700	0.558	Pass
23	2.800	97.800	3.000	3.067	3.000	2.045	Pass
24	0.700	76.700	0.600	0.782	0.700	0.608	Pass
25	4.600	90.000	4.600	5.111	4.600	3.407	Pass
26	0.500	70.800	0.500	0.706	0.500	0.471	Pass
27	0.700	83.300	0.600	0.720	0.700	0.560	Pass
28	0.300	65.700	0.300	0.457	0.500	0.507	Pass
29	2.100	77.600	2.300	2.964	2.500	2.148	Pass
30	0.100	61.300	0.100	0.163	0.100	0.109	Pass
31	0.700	72.600	0.800	1.102	0.800	0.735	Pass
32	0.100	57.500	0.100	0.174	0.100	0.116	Pass
33	0.700	68.200	0.700	1.026	0.700	0.684	Pass
34	0.100	54.100	0.100	0.185	0.100	0.123	Pass
35	0.300	64.300	0.400	0.622	0.500	0.518	Pass
36	0.100	51.100	0.100	0.196	0.300	0.391	Pass
37	0.100	60.800	0.200	0.329	0.300	0.329	Pass
38	0.100	48.400	0.100	0.207	0.100	0.138	Pass
39	0.100	57.700	0.100	0.173	0.100	0.116	Pass
40	0.000	46.000	0.100	0.217	0.100	0.145	Pass

Note: All harmonics are below the minimum limits and are ignored.

6. VOLTAGE FLUCTUATIONS & FLICKER TEST

6.1. Block Diagram of Test Setup



6.2. Test Standard

EN 61000-3-3:2013+A1:2019+A2:2021

6.3. Operating Condition of EUT

Same as Section 5.3.. The power cord of the EUT is connected to the output of the test system. Turn on the power of the EUT and use the test system to test the harmonic current level.

Flicker Test Limit

Test items	Limits
Pst	1.0
dc	3.3%
dmax	4.0%
dt	Not exceed 3.3% for 500ms

6.4. Test Procedure

The power cord of the EUT is connected to the output of the test system. Turn on the power of the EUT and use the test system to test the harmonic current level.

6.5. Test Results

PASS

Note:

The EUT does not contain any automatic switching component and the power consumption is low.

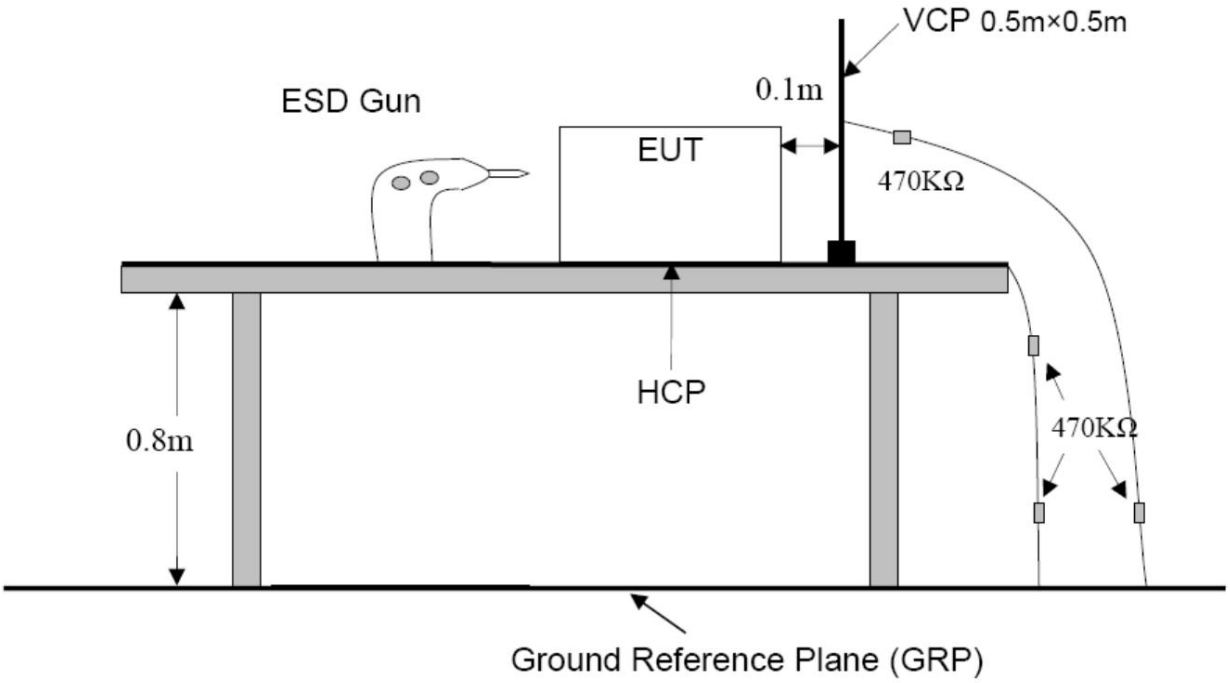
According to the electrical construction, the EUT does not produce inrush current, which may exceed 20A. The supply current will not fluctuate more than 1.5A either.

According to EN 61000-3-3:2013+A1:2019+A2:2021, clause 6.1*, the EUT deems to fulfil the requirement without further testing.

*) EN 61000-3-3:2013+A1:2019+A2:2021, clause 6.1: “For voltage changes caused by manual switching, equipment is deemed to comply without further testing if the maximum r.m.s. input current evaluated over each 10ms half-period between zero-crossings does not exceed 20A, and the supply current after inrush is within a variation band of 1,5A.”

7. ELECTROSTATIC DISCHARGE IMMUNITY TEST

7.1. Block Diagram of Test Setup



7.2. Test Standard

EN IEC 61000-6-1:2019, IEC 61000-4-2:2008

Severity Level: 3 / Air Discharge:±8KV
Level: 2 / Contact Discharge:±4KV

7.3. Severity Levels and Performance Criterion

7.3.1 Severity level

Level	Test Voltage Contact Discharge (KV)	Test Voltage Air Discharge (KV)
1.	±2	±2
2.	±4	±4
3.	±6	±8
4.	±8	±15
X	Special	Special

7.3.2 Performance criterion : B

A. The apparatus shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended.

B. The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.

C. Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

7.4. EUT Configuration

The following equipments are installed on Electrostatic Discharge Immunity test to meet EN IEC 61000-6-1:2019, IEC 61000-4-2:2008, requirement and operating in a manner which tends to maximize its emission characteristics in a normal application. The configuration of EUT is the same as used in conducted emission test.
Please refer to Section 3.4.

7.5. Operating Condition of EUT

Same as conducted emission measurement, which is listed in Section 3.5 except the test setup replaced by Section 7.1

7.6. Test Procedure

7.6.1 Air Discharge**:**

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

7.6.2 Contact Discharge**:**

All the procedure shall be same as Section 7.6.1. Except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

7.6.3 Indirect discharge for horizontal coupling plane

At least 10 single discharges (in the most sensitive polarity) shall be applied at the front edge of each HCP opposite the center point of each unit (if applicable) of the EUT and 0.1m from the front of the EUT. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.

7.6.4 Indirect discharge for vertical coupling plane

At least 10 single discharges (in the most sensitive polarity) shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are complete illuminated.

7.7.Test Results

PASS

Please refer to the following page.

ESD Test Data			
Temperature:	25.1℃	Humidity:	54%
Power Supply :	AC 230V/50Hz	Test Mode:	ON Mode

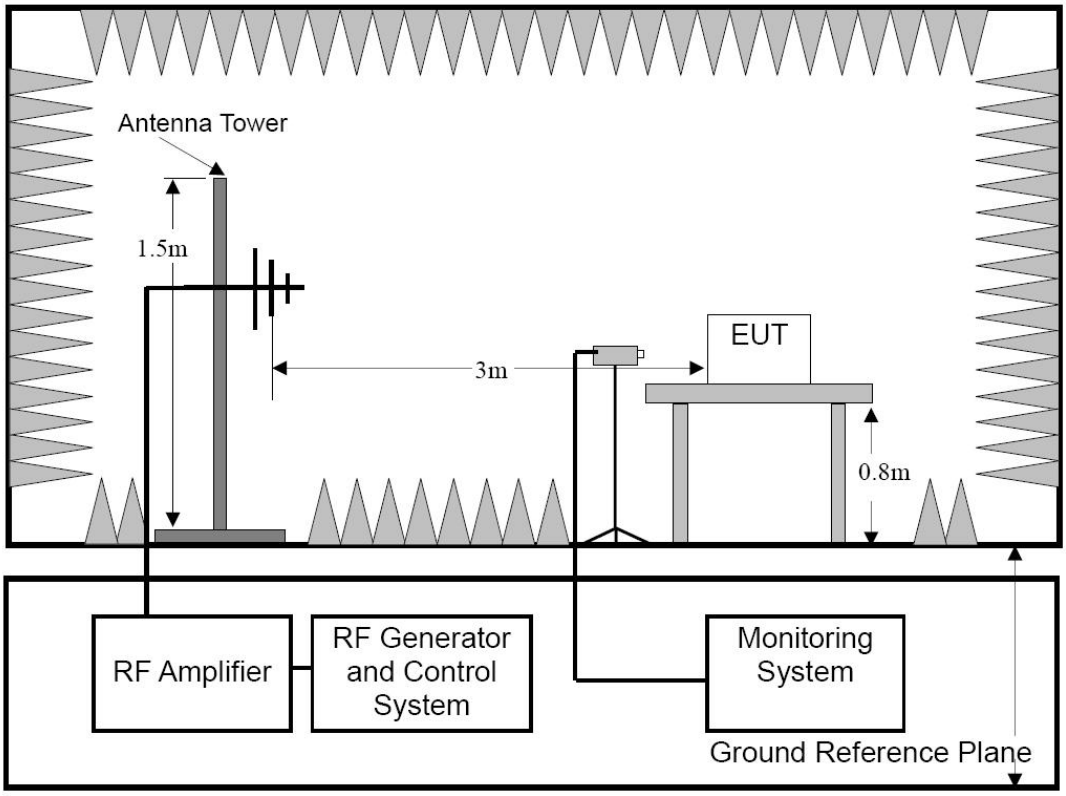
Air Discharge: ± 8KV
Contact Discharge: ± 4KV
For each point positive 25 times and negative 25 times discharge

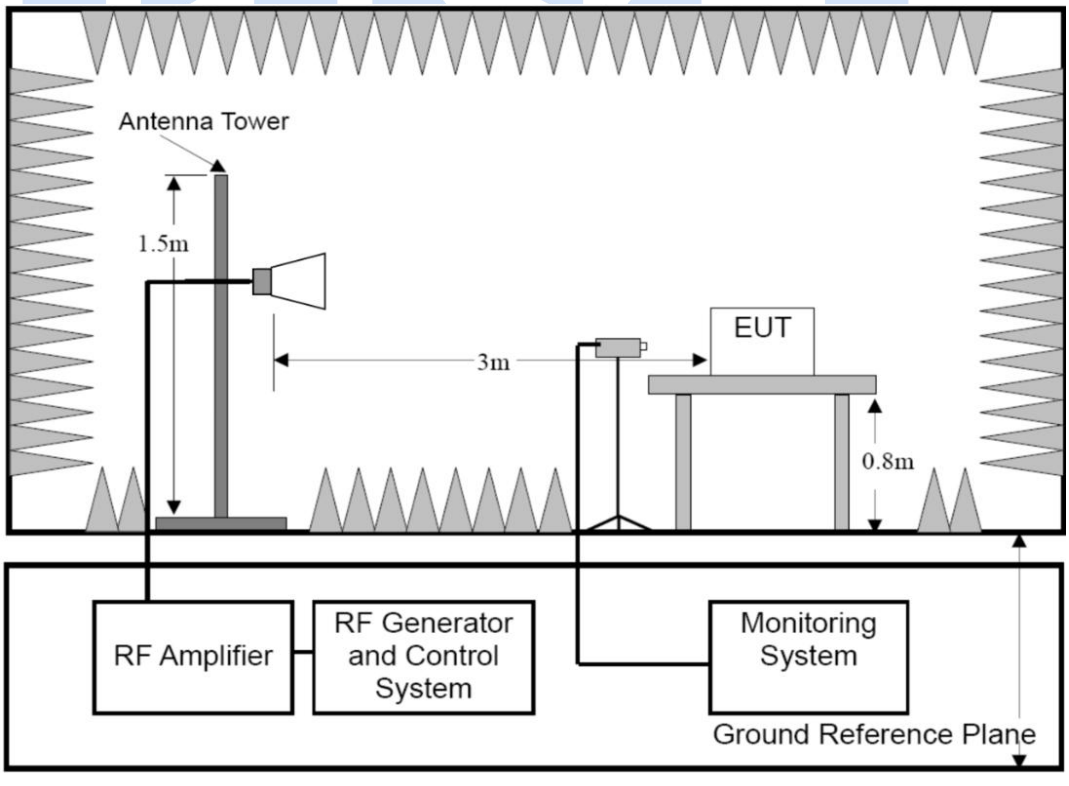
Test Points	Air Discharge	Contact Discharge	Performance Criterion	Result
Enclosure	±8 KV	N/A	B	PASS
Slit	±8 KV	N/A	B	PASS
Screw	N/A	±4 KV	B	PASS
VCP	N/A	±4 KV	B	PASS
HCP	N/A	±4 KV	B	PASS

Note: N/A

8. RF FIELD STRENGTH SUSCEPTIBILITY TEST

8.1. Block Diagram of Test Setup





8.2. Test Standard

EN IEC 61000-6-1:2019,IEC 61000-4-3:2020
Severity Level 2, 3V / m

8.3. Severity Levels and Performance Criterion

8.3.1. Severity level

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

8.3.2. **Performance criterion: A**

A、 The apparatus shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended.

B、 The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.

C、 Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

8.4. EUT Configuration on Test

The following equipments are installed on Electrical Fast Transient/Burst Immunity test to meet IEC 61000-4-3:2020, requirement and operating in a manner which tends to maximize its emission characteristics in a normal application. The configuration of EUT is the same as used in conducted emission test.
Please refer to Section 3.4.

8.5. Operating Condition of EUT

Same as conducted emission measurement, which is listed in Section 2.5 except the test setup replaced by Section 8.1.

8.6. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. EUT is set 3 meter away from the transmitting antenna which is mounted on an antenna tower. Both horizontal and vertical polarization of the antenna are set on test. Each of the four sides of EUT must be faced this transmitting antenna and measured individually.

All the scanning conditions are as follows :

Condition of Test	Remarks
1. Fielded Strength	3 V/m (Severity Level 2)
2. Radiated Signal	Modulated
3. Scanning Frequency	80 – 1000Mhz
4. Dwell time of radiated	0.0015 decade/s
5. Waiting Time	1 Sec.

8.7. Test Results

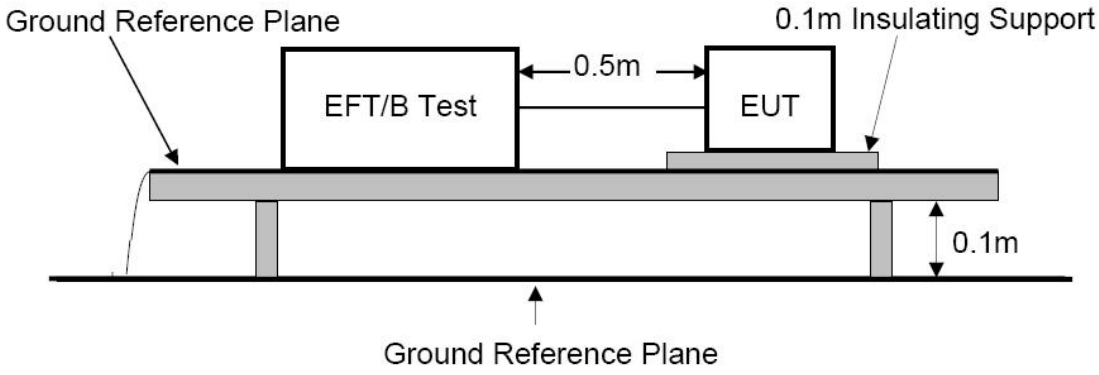
PASS

Please refer to the following page.

R/S Test Data			
Temperature : 25.1℃		Humidity : 53%	
Field Strength: 3 V/m		Criterion: A	
Power Supply: AC 230V/50Hz		Frequency Range: 80 MHz to 1000 MHz, 1.4GHz to 6GHz	
Modulation: ☑ AM ☐ Pulse ☐none 1 KHz 80%			
Test Mode : On			
	Frequency Range : 80-1000MHz		
Steps	1 %		
	Horizontal	Vertical	Result
Front	A	A	Pass
Right	A	A	Pass
Rear	A	A	Pass
Left	A	A	Pass
Note: N/A			

9. ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST

9.1. Block Diagram of EUT Test Setup



9.2. Test Standard

EN IEC 61000-6-1:2019, IEC 61000-4-4:2012

9.3. Severity Levels and Performance Criterion

Severity Level 2 at 1KV, Pulse Rise time & Duration: 5 nS / 50 nS
Severity Level:

Open Circuit Output Test Voltage ±10%		
Level	On power ports	On I/O(Input/Output) Signal data and control ports
1.	0.5KV	0.25KV
2.	1KV	0.5KV
3.	2KV	1KV
4.	4KV	2KV
X.	Special	Special

Performance criterion: B

A. The apparatus shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended.

B. The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.

C. Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

9.4. EUT Configuration on Test

The following equipments are installed on Electrical Fast Transient/Burst Immunity test to meet EN IEC 61000-6-1:2019, IEC 61000-4-4:2012, requirement and operating in a manner which tends to maximize its emission characteristics in a normal application. The configuration of EUT is the same as used in conducted emission test.
Please refer to Section 3.4.

9.5. Operating Condition of EUT

Same as conducted emission measurement, which is listed in Section 3.5 except the test setup replaced by Section 8.1.

9.6. Test Procedure

EUT shall be placed 0.8m high above the ground reference plane which is a min.1m*1m metallic sheet with 0.65mm minimum thickness. This reference ground plane shall project beyond the EUT by at least 0.1m 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

8.6.1. For input and output AC power ports:

The EUT is connected to the power mains by using a coupling device which couples the EFT interference signal to AC power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 2 minutes.

9.7. Test Results

PASS
Please refer to the following page.

EFT Test Data			
Temperature:	24.5℃	Humidity:	53%
Power Supply :	AC 230V/50Hz	Test Mode:	ON Mode

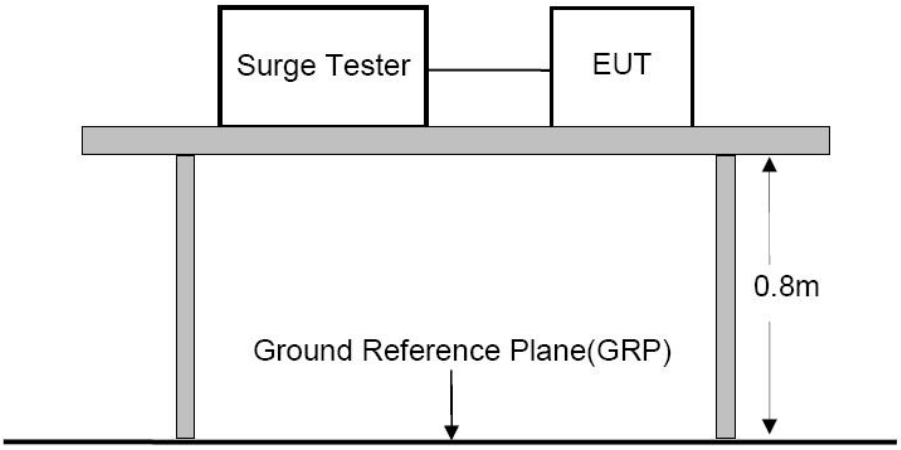
Coupling Line	Test Voltage		Performance Criterion	Result
	±0.5kV	±1kV		
L	±0.5kV	±1kV	B	PASS
N	±0.5kV	±1kV	B	PASS
L-N	±0.5kV	±1kV	B	PASS
PE	±0.5kV	±1kV	B	PASS
L-PE	±0.5kV	±1kV	B	PASS
N-PE	±0.5kV	±1kV	B	PASS
L-N-PE	±0.5kV	±1kV	B	PASS
DC ports*	±0.5kV	/	B	N/A
Signal ports*	±0.5kV	/	B	N/A
Control ports*	±0.5kV	/	B	N/A

Note: '*' Applicable only to cables which according to the manufacturer's specification supports communication on cable lengths greater than 3 m.

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10. SURGE TEST

10.1. Block Diagram of EUT Test Setup



10.2. Test Standard

EN IEC 61000-6-1:2019, IEC 61000-4-5:2014+A1:2017

10.3. Severity Levels and Performance Criterion

Severity Level: Line to Line, Level 2 at 1KV;
Severity Level: Line to Earth, Level 3 at 2KV.

Severity Level	Open-Circuit Test Voltage (KV)
1.	0.5
2.	1.0
3.	2.0
4.	4.0
X.	Special

Performance criterion: B

A. The apparatus shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended.

B. The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.

C. Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

10.4. EUT Configuration on Test

The following equipments are installed on Electrical Fast Transient/Burst Immunity test to meet EN IEC 61000-6-1:2019, IEC 61000-4-5:2014+A1:2017 requirement and operating in a manner which tends to maximize its emission characteristics in a normal application

The configuration of EUT is the same as used in conducted emission test. Please refer to Section 3.4.

10.5. Operating Condition of EUT

Same as conducted emission measurement, which is listed in Section 3.5 except the test setup replaced by Section 9.1.

10.6. Test Procedure

1) Set up the EUT and test generator as shown on section 9.1
2) For line to line coupling mode, provide a 1KV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points.
3) At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.
4) Different phase angles are done individually.
5) Repeat procedure 2) to 4) except the open-circuit test voltage change from 1KV to 2KV for line to earth coupling mode test.
6) Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

10.7. Test Result

PASS

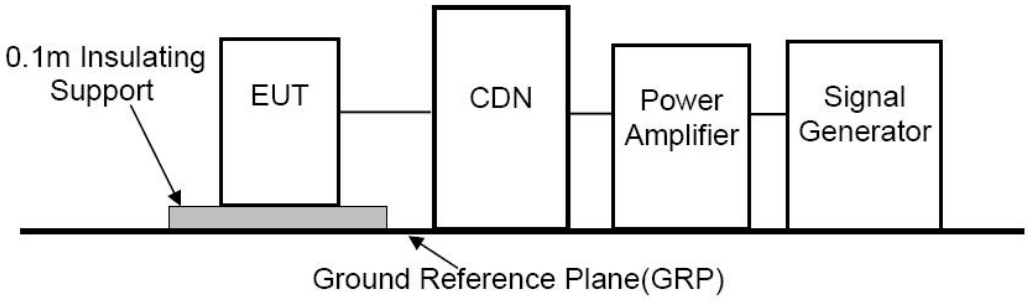
Please refer to the following page.

Surge Test Data						
Temperature:	24.5℃		Humidity:	53%		
Power Supply :	AC 230V/50Hz		Test Mode:	ON Mode		
Location	Polarity	Phase Angle	No of Pulse	Pulse Voltage (KV)	Performance Criterion	Result
L-N	+	90	5	1	B	Pass
	-	270	5	1		Pass
L-PE	+	90	5	2		Pass
	-	270	5	2		Pass
N-PE	-	90	5	2		Pass
	+	270	5	2		Pass
DC Ports*	-	90	5	0.5/1		N/A
	+	270	5	0.5/1		
Signal Ports*	-	90	5	1		N/A
	+	270	5	1		
Control Ports*	-	90	5	1		N/A
	+	270	5	1		
Note: '*' Applicable only to cables which according to the manufacturer's specification supports communication on cable lengths greater than 3 m.						

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11. INJECTED CURRENTS SUSCEPTIBILITY TEST

11.1. Block Diagram of EUT Test Setup



11.2. Test Standard

EN IEC 61000-6-1:2019, IEC 61000-4-6:2013

11.3. Severity Levels and Performance Criterion

Severity Level 2: 3V(rms), 150KHz ～ 80MHz

Severity Level:

Level	Field Strength V
1.	1
2.	3
3.	10
X.	Special

Performance criterion: A

A. The apparatus shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended.

B. The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.

C. Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

11.4. EUT Configuration on Test

The configuration of EUT is the same as used in conducted emission test. Please refer to Section 3.4.

11.5. Operating Condition of EUT

Same as conducted emission test, which is listed in Section 3.5 except the test set up replaced as Section 11.1.

11.6. Test Procedure

1) Set up the EUT, CDN and test generator as shown on section 11.1

2) Let EUT work in test mode and measure.

3) The EUT and supporting equipments are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane at above 0.1-0.3m 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).

4) The disturbance signal described below is injected to EUT through CDN.

5) The EUT operates within its operational mode(s) under intended climatic conditions after power on.

6) The frequency range is swept from 150KHz to 80MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1KHz sine wave

7) The rate of sweep shall not exceed 1.5×10^{-3} decades/s. Where the frequency is swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.

8) Recording the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

11.7. Test Result

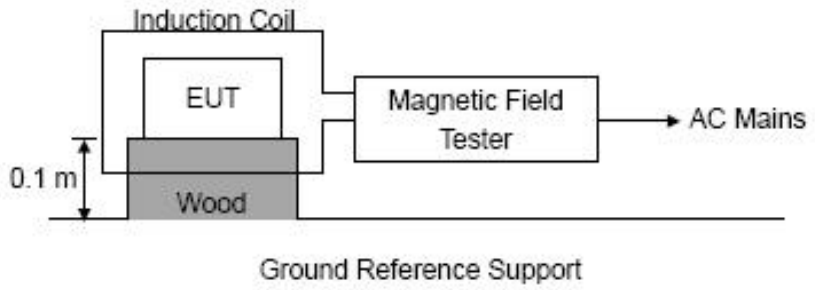
PASS

Please refer to the following page.

CS Test Data						
Temperature:		24.5℃		Humidity:		53%
Power Supply :		AC 230V/50Hz		Test Mode:		ON Mode
Frequency Range(MHz)	Injected Position	Strength	Modulation Signal	Freq. Step	Performance Criterion	Result
0.15~80	AC Line	3V(rms), Unmodulated	AM 80%, 1kHz sine wave	1%	A	Pass
0.15~80	DC Port*	3V(rms), Unmodulated	AM 80%, 1kHz sine wave	1%	A	N/A
0.15~80	Signal Port*	3V(rms), Unmodulated	AM 80%, 1kHz sine wave	1%	A	N/A
Note: '*' Applicable only to cables which according to the manufacturer's specification supports communication on cable lengths greater than 3 m.						

12. MAGNETIC FIELD IMMUNITY TEST

12.1. Block Diagram of Test Setup



12.2. Test Standard

EN IEC 61000-6-1:2019, IEC 61000-4-8:2009
Severity Level 2 at 3A/m

12.3. Severity Levels and Performance Criterion

11.3.1 Severity level

Level	Magnetic Field Strength A/m
1.	1
2.	3
3.	10
4.	30
5.	100
X.	Special

11.3.2 Performance criterion: B

A. The apparatus shall continue to operate as intended during and after the test.
B. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended.
C. The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.

D. Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

12.4. EUT Configuration on Test

The configuration of EUT is listed in Section 3.4

12.5. Operating Condition of EUT

Same as conducted emission test, which is listed in Section 3.5 except the test set up replaced as Section 12.1.

12.6. Test Procedure

The EUT shall be subjected to the test magnetic field by using the induction coil of standard dimensions (1m*1m) and shown in Section 12.1. The induction coil shall then be rotated by 90° in order to expose the EUT to the test field with different orientations.

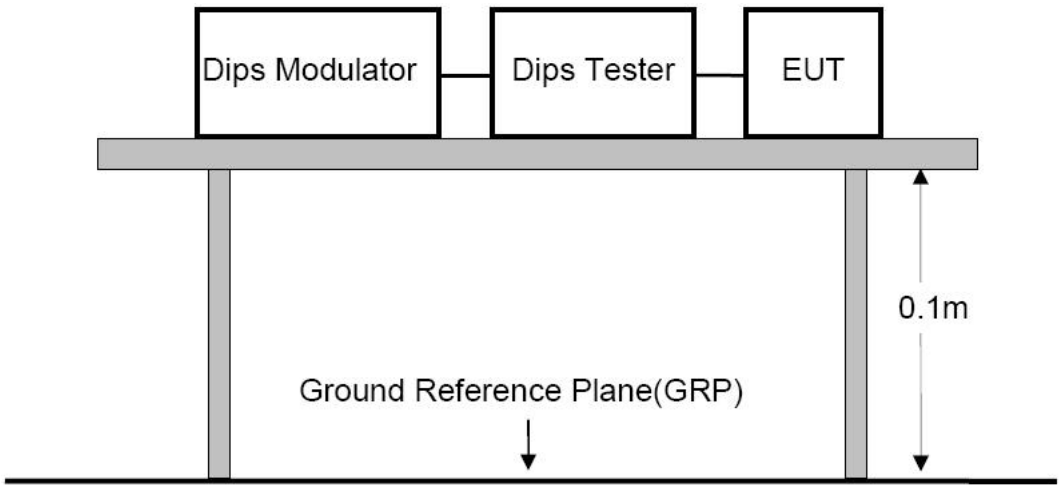
12.7. Test Results

N/A

The EUT don’t containing magnetic field sensitive components.

13. VOLTAGE DIPS AND INTERRUPTIONS TEST

13.1. Block Diagram of EUT Test Setup



13.2. Test Standard

EN IEC 61000-6-1:2019, IEC 61000-4-11:2020

13.3. Severity Levels and Performance Criterion

Severity Level:
Input and Output AC Power Ports.
☑ Voltage Dips.
☑ Voltage Interruptions.

Environmental Phenomena	Test Specification	Units	Performance Criterion
Voltage Dips	>95 0.5/1	% Reduction period	B
	30 25/30	% Reduction period	C
Voltage Interruptions	>95 250/300	% Reduction period	C

Performance criterion: B, C, C

A. The apparatus shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended.

B. The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.

C. Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

13.4. EUT Configuration on Test

The configuration of EUT is the same as used in conducted emission test. Please refer to Section 3.4.

13.5. Operating Condition of EUT

Same as conducted emission test, which is listed in Section 3.5 except the test set up replaced as Section 13.1.

13.6. Test Procedure

1) Set up the EUT and test generator as shown on section 13.1
2) The interruption is introduced at selected phase angles with specified duration. There is a 3mins minimum interval between each test event.
3) After each test a full functional check is performed before the next test.
4) Repeat procedures 2 & 3 for voltage dips, only the level and duration is changed.
5) Record any degradation of performance.

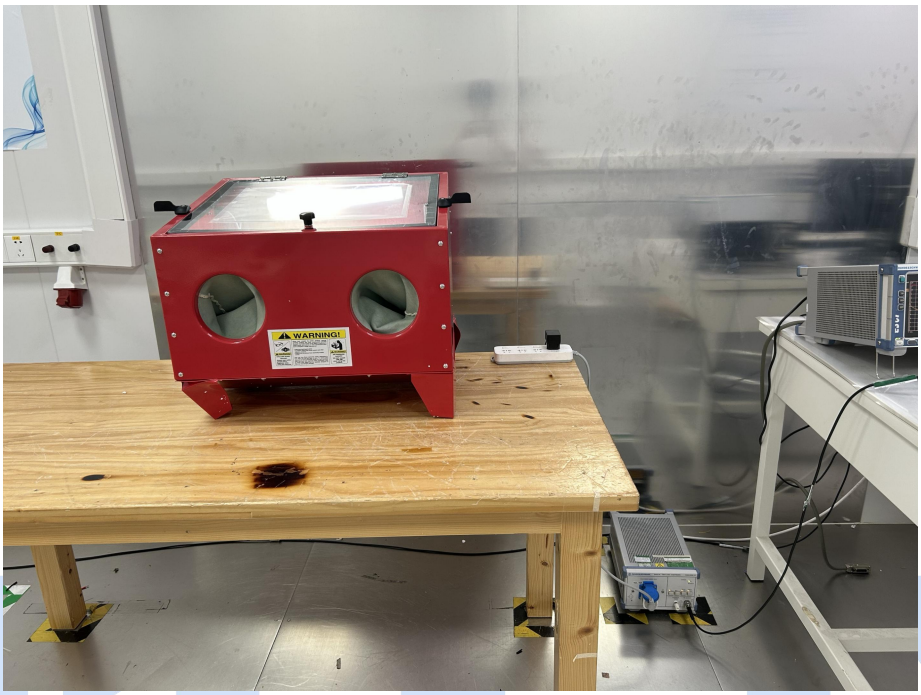
13.7. Test Result

PASS

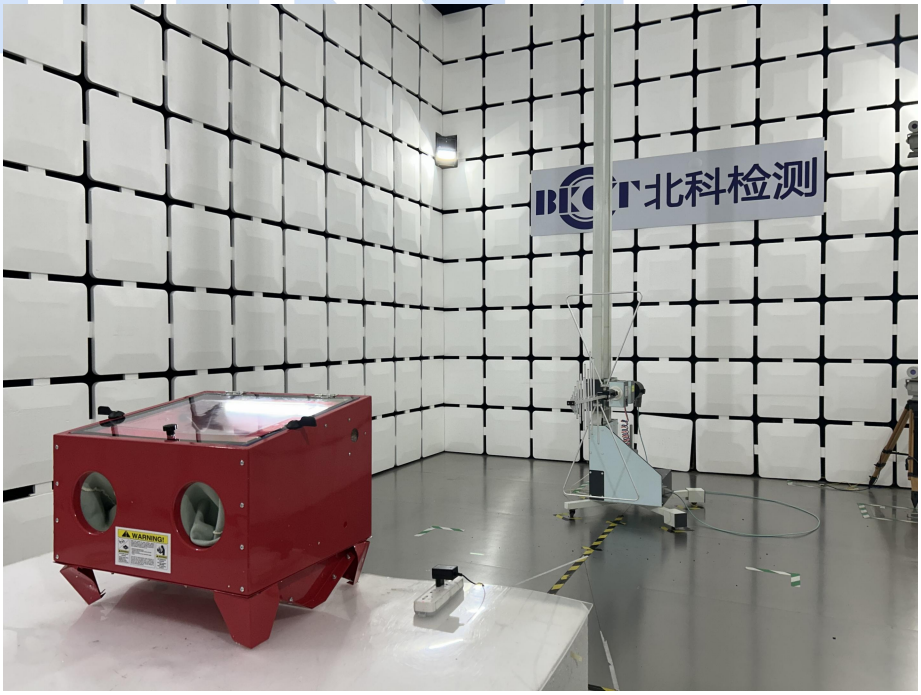
Please refer to the following page.

DIPS Test Data			
Temperature:	24.5℃	Humidity:	53%
Power Supply :	AC 230V/50Hz	Test Mode:	ON Mode
Environmental Phenomena	Test Specification	Units	Performance Criterion
Voltage Dips	>95 0.5	% Reduction period	B
	30 25/30	% Reduction period	C
Voltage Interruptions	>95 250/300	% Reduction period	C

14. TEST PHOTOGRAPHS



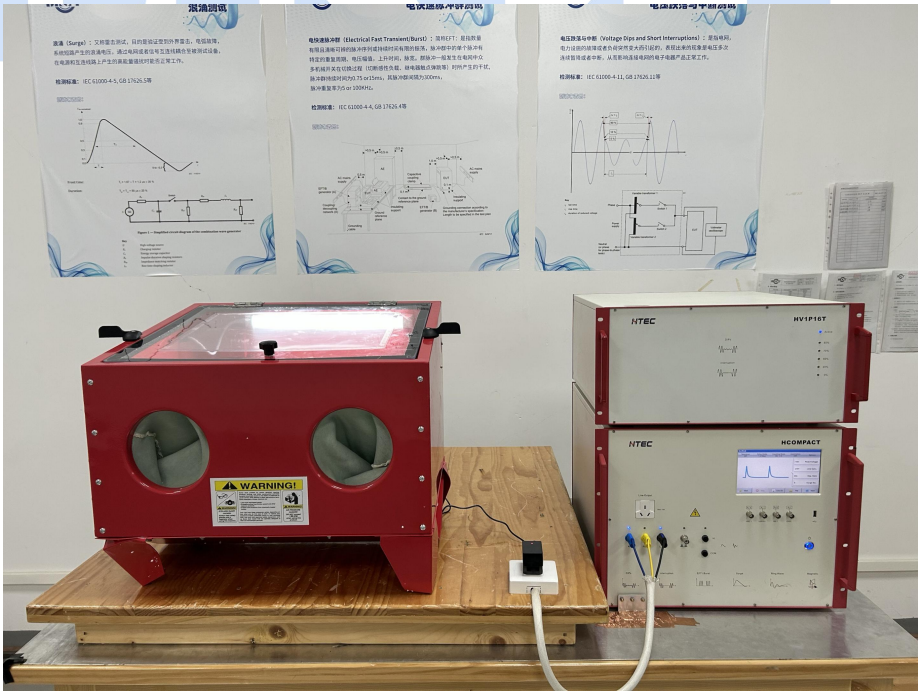
Conduction Emission Test



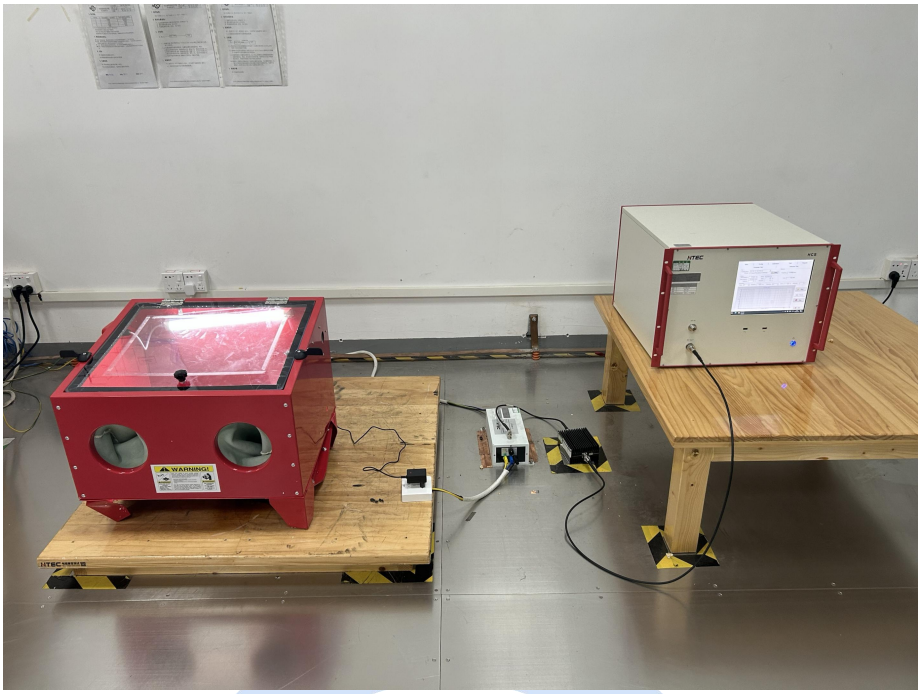
Radiated Emission Test



ESD Immunity Test



EFT&Surges&Dips Immunity AC Mains Test



Conducted Immunity(C/S)

15. PHOTOGRAPHS

Photo 1

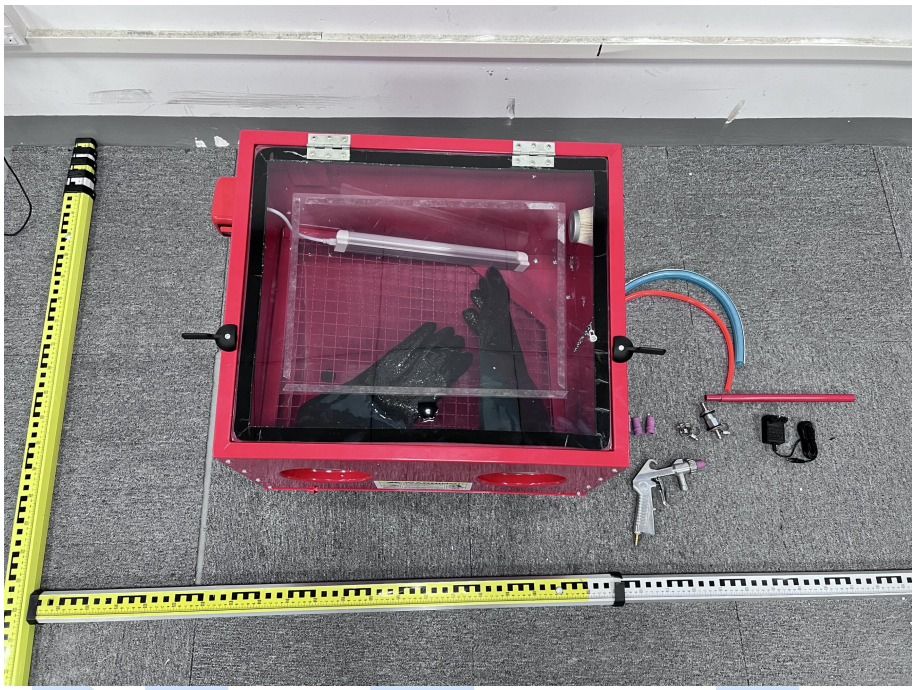


Photo 2



Photo 3

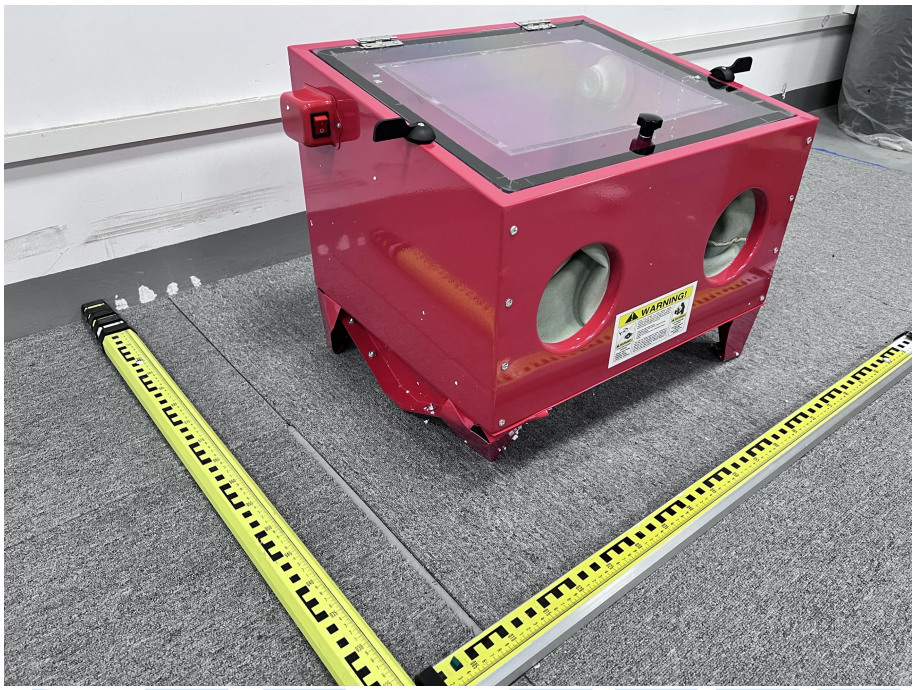


Photo 4



※※※※※ END OF REPORT ※※※※※