



Test Report

EN 61326-2-3 Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 2-3: Particular requirements - Test configuration, operational conditions and performance criteria for transducers with integrated or remote signal conditioning

Report Reference No. : GM2205188011-E
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 Date of issue : June 7, 2022
 Testing Laboratory Name : Shenzhen CTL Testing Technical Services Co., Ltd.
 Address : No. 101, Building 1, Phase 1, Longbang Industrial Park, No. 8 Tianyuan Road, Shutianpu Community, Matian Street, Guangming District, Shenzhen, China.
 Testing location/ procedure : Full application of Harmonised standards
 Partial application of Harmonised standards
 Other standard testing methods



Applicant's name : AUTOMATION TECHNOLOGY (HK) LIMITED
 Address : FLAT/RM 1108 BLK 3 11/F PHASE 1 ENTERPRISE SQUARE 9 SHEUNG YUET ROAD KOWLOON BAY KL

Test specification:
 Standard : EN 61326-2-3: 2013
 Non-standard test method..... : /

Test Report Form No. :
 TRF Originator : Shenzhen CTL Testing Technical Services Co., Ltd

Shenzhen CTL Testing Technical Services Co., Ltd.

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Test item description..... : FIRE CONTROL POWER SUPPLY
 Trade Mark : ATM
 Result..... : Pass

EMC -- Test Report

Test Report No. :	GM2205188011-E	June 7, 2022
		Date of issue

Equipment under Test : FIRE CONTROL POWER SUPPLY

Type / Model : AFP-10A

Listed Models : AFP-20A, AFP-30A, AFP-40A

Applicant : **AUTOMATION TECHNOLOGY (HK) LIMITED**

Address : FLAT/RM 1108 BLK 3 11/F PHASE 1 ENTERPRISE SQUARE 9
SHEUNG YUET ROAD KOWLOON BAY KL

Manufacturer : **AUTOMATION TECHNOLOGY (HK) LIMITED**

Address : FLAT/RM 1108 BLK 3 11/F PHASE 1 ENTERPRISE SQUARE 9
SHEUNG YUET ROAD KOWLOON BAY KL

Test Result	Pass
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The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

History of this test report

Report No.	Version	Description	Issued Date
GM2205188011-E	V1.0	Initial Issued Report	June 7, 2022

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1. TEST STANDARDS

The tests were performed according to following standards:

[EN 61326-2-3: 2013](#) Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 2-3: Particular requirements - Test configuration, operational conditions and performance criteria for transducers with integrated or remote signal conditioning

2. SUMMARY

2.1. General Remarks:

Date of receipt of test sample : May 29, 2022

Sampling and Testing commenced on : May 29, 2022

Testing concluded on : June 6, 2022

2.2. Equipment Under Test

Power Rating

Input Power : AC 230V/50Hz
 Output Power : 1KW
 Adaptor information : N/A

2.3. Description of test modes

The EUT were tested under the following modes, the final worst mode was marked in bold face and recorded in this report.

RADIATED EMISSION TEST:

Description of Test Mode	Test Voltage
WORKING	AC 230V/50Hz

IMMUNITY TESTS:

Description of Test Mode	Test Voltage
WORKING	AC 230V/50Hz

Emissions tests.....: According to EN 61326-2-3, searching for the highest disturbance.

Immunity tests: According to EN 61326-2-3, searching for the highest susceptibility.

Note:

For the test results, the EUT had been tested with all conditions. But only the worst case was showed in test report.

The tests are carried out with surge protective devices disconnected

2.4. Short description of the Equipment under Test (EUT)

The EUT is a FIRE CONTROL POWER SUPPLY

2.5. Description of Support units

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

■ - supplied by the manufacturer

o - supplied by the lab

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.

2.6. Performance Criteria

Definition related to the performance level:

- based on the used product standard
- o based on the declaration of the manufacturer, requestor or purchaser

Criterion A:

Definition: normal performance within limits specified by the manufacturer, requestor or purchaser:

The apparatus shall continue to operate as intended during the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. 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 from what the user may reasonably expect from the apparatus if used as intended.

Criterion B:

Definition: temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the equipment under test recovers its normal performance, without operator intervention:

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 (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. During the test, degradation of performance is allowed, however. No change of actual operating state or stored data is allowed. 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 from what the user may reasonably expect from the apparatus if used as intended.

Criterion C:

Definition: temporary loss of function or degradation of performance, the correction of which requires operator intervention:

Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls, or by any operation specified in the instructions for use.

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Shenzhen CTL Testing Technical Services Co., Ltd.

No. 101, Building 1, Phase 1, Longbang Industrial Park, No. 8 Tianyuan Road, Shutianpu Community, Matian Street, Guangming District, Shenzhen, China.

3.2. Test Description

Emission Measurement			
Test Item	Standard	Limit	Conclusion
Radiated Emission	EN 61326-2-3: 2013	Class A	PASS
Conduction Emission	EN 61326-2-3: 2013	Class A	PASS
Immunity Measurement			
Test Item	Standard	Test Result	Conclusion
Electrostatic Discharge	EN 61326-2-3: 2013 IEC 61000-4-2: 2008	Criterion B	PASS
RF Field Strength Susceptibility	EN 61326-2-3: 2013 IEC 61000-4-3: 2020	Criterion A	PASS
Electrical Fast Transient/Burst Test	EN 61326-2-3: 2013 IEC 61000-4-4: 2012	Criterion B	PASS
Surge Test	EN 61326-2-3: 2013 IEC 61000-4-5: 2014	Criterion B	PASS
Conducted Susceptibility Test	EN 61326-2-3: 2013 IEC 61000-4-6: 2013	Criterion A	PASS
Power Frequency Magnetic Field Susceptibility Test	EN 61326-2-3: 2013 IEC 61000-4-8: 2009	Criterion A	PASS
Voltage Dips and Interruptions Test	EN 61326-2-3: 2013 IEC 61000-4-11: 2020	0% 1P B 40% 10P C 70% 25P C 0% 250P C	PASS

Remark:

1. The test result PASS and /or FAIL has no relationship with the measurement uncertainty.

3.3. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen CTL Testing Technical Services Co., Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for CTL laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission(chamber 1)	30~1000MHz	±3.42dB	(1)
Radiated Emission(chamber 2)	30~1000MHz	±3.56dB	(1)
Conducted Emission	0.15~30MHz	±2.46dB	(1)
Disturbance Power	30~300MHz	±1.96dB	(1)

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

3.4. Equipments Used during the Test

Radiated Emission (966 Chamber 2)						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1.	ULTRA-BROADBAND ANTENNA	SCHWARZBECK	VULB 9162	00342	2020/09/11	2023/09/10
2.	Horn antenna	SCHWARZBECK	BBHA 9120 D	02192	2020/09/11	2023/09/10
3.	EMI Test Receiver	ROHDE & SCHWARZ	ESPI	101131	2021/08/12	2022/08/11
4.	RF Pre-amplifier	Emtrace	RP01A	46917	2021/08/12	2022/08/11
5.	RF Pre-amplifier	Emtrace	RP06A	01517	2021/08/12	2022/08/11

Conducted Emission						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1.	EMI Test Receiver	ROHDE & SCHWARZ	ESU	100485	2021/08/12	2022/08/11
2.	LISN	SCHWARZBECK	NNLK 8129 RC	5019	2021/08/11	2022/08/10
3.	Limitator	ROHDE & SCHWARZ	ESH3-Z2	100028	2021/08/11	2022/08/10

Electrostatic Discharge						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1.	ESD Simulator	AMETEK CTS	esd NX30.1	11905	2021/09/07	2022/09/06

Electrical Fast Transient/Surge/Dips						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1.	Ultra Compact Simulator	HAEFELY	AXOS8	186722	2021/08/11	2022/08/10
2.	Three-phase coupling network	HAEFELY	FP-COMB32	188210	2021/08/11	2022/08/10
3.	Voltage regulator	HAEFELY	DIP 116	187723	2021/08/11	2022/08/10

Conducted Susceptibility (CS) :						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1.	Signal Generator	ROHDE & SCHWARZ	SML01	103218	2021/08/11	2022/08/10
2.	Attenuator	FiberHome	6dB 200W	N/A	2021/08/04	2022/08/03
3.	Amplifier	Micotop	MPA-0.01-400-200	MPA2007233	2021/08/11	2022/08/10
4.	Power meter	Agilent	E4419B	GB43312263	2021/08/11	2022/08/10
5.	CDN	Dr.Hubert GmbH	CDN M2+3	20102650-0104	2021/08/19	2022/08/18
6.	CDN	Dr.Hubert GmbH	CDN-M5-32A	20902542-0201	2021/08/10	2022/08/09

RF Field Strength Susceptibility						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1.	SIGNAL GENERATOR	Agilent	N5181A	MY47420649	2021/08/11	2022/08/10
2.	Power Amplifier	Micotop	MPA-1000-6000-75	MPA2006215	2021/08/11	2022/08/10
3.	Power Amplifier	Micotop	MPA-1000-3200-500	MPA2007234	2021/08/11	2022/08/10
4.	Power Amplifier	Micotop	MPA-80-1000-1000-A	MPA2007228	2021/08/12	2022/08/11
5.	Power Amplifier	Micotop	MPA-80-	MPA2007229	2021/08/12	2022/08/11

			1000-1000-B			
6.	Power Amplifier	Micotop	MPA-80-1000-1000	MPA2007227	2021/08/12	2022/08/11
7.	Power Amplifier	Micotop	MPA-80-1000-1000-C	MPA2007230	2021/08/12	2022/08/11
8.	Power Amplifier	Micotop	MPA-80-1000-1000-D	MPA2007231	2021/08/12	2022/08/11
9.	Power Amplifier	Micotop	MPA-80-1000-1000-E	MPA2007232	2021/08/12	2022/08/11
10.	Power Meter	Agilent	E4419B	GB43312510	2021/08/11	2022/08/10
11.	Test Antenna-Bi-Log	Schwarzbeck	STLP 9128 E special	3142	2020/09/11	2023/09/10
12.	Horn Antenna	Schwarzbeck	BBHA 9120 J	00270	2020/09/11	2023/09/10
13.	Power transmitter	KEYSIGHT	E9301A	MY41069009	2021/08/11	2022/08/10
14.	Power transmitter	KEYSIGHT	E9301A	MY41069011	2021/08/11	2022/08/10

Power Frequency Magnetic Field Susceptibility						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1.	Magnetic field generator	PMI	MAG100	/	2021/08/10	2022/08/09

Remark:

1. The test result PASS and /or FAIL has no relationship with the measurement uncertainty.

4. TEST CONDITIONS AND RESULTS

4.1. Radiated Emission

For test instruments and accessories used see section 3.5.

4.1.1. Description of the test location

Test location: 966 Chamber 2

4.1.2. Limits of disturbance

For frequency below 1000MHz

Frequency (MHz)	Class A(at 3m)	Class B(at 3m)
	Quasi-Peak dB μ V/m	Quasi-Peak dB μ V/m
30 ~ 230	50	40
230 ~ 1000	57	47

NOTE: 1.The tighter limit shall apply at the edge between two frequency bands.

2.Distance refers to the distance in meters between the test instrument antenna and the closest point of any part of the E.U.T.

Frequency range of radiated measurement

Highest internal frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes(MHz)	Range(MHz)
Below 108	1000
108-500	2000
500-1000	5000
Above 1000	Up to 5 times of the highest frequency or 6GHz, whichever is less

For frequency above 1000MHz

Frequency (GHz)	Class A(dB μ V/m)(at 3m)		Class B(dB μ V/m)(at 3m)	
	Peak	Average	Peak	Average
1.0-3.0	76	56	70	50
3.0-6.0	80	60	74	54

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

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

3.All emanation from a class A/B digital device or system, including any net work of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

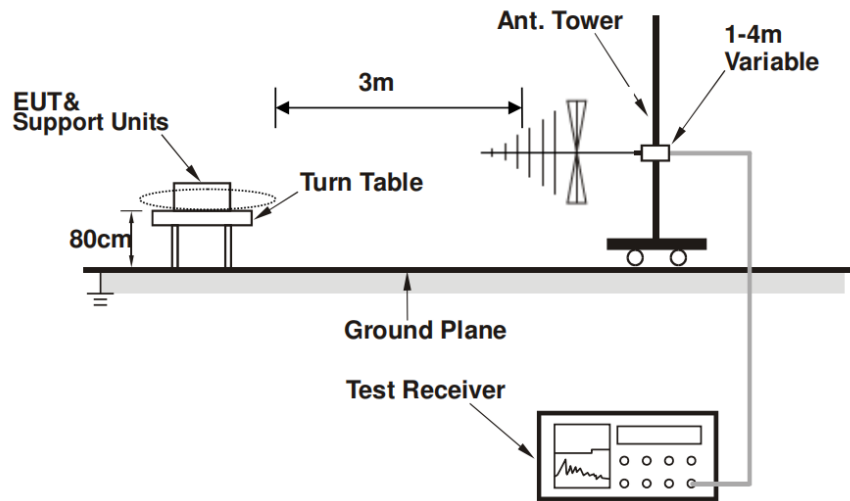
4.1.3. Description of the test set-up

4.1.3.1. Operating Condition

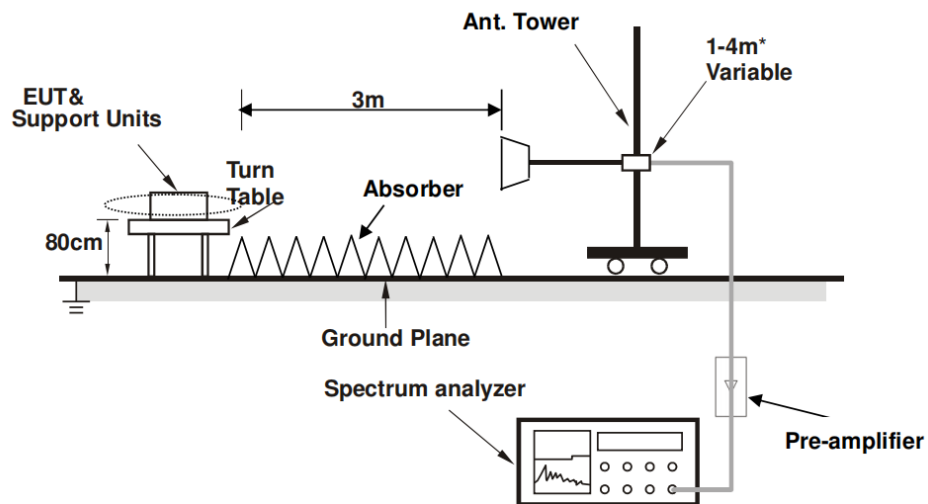
The EUT is set to work shall be carried out with full load mode during the test, and the maximum emanating results are recorded.

4.1.3.2. Test setup

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



4.1.4. Test procedure

<Frequency range 30MHz-1000MHz>

- a. The EUT was placed on the top of a rotating table 0.8meters above the ground at a 10 m eter semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from 1meter to 4 meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is 30MHz-1000MHz.

NOTE:

1. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection(QP) at frequency 30MHz-1000MHz.
2. Emission level(dB μ V/m) = Raw Value(dB μ V) + Correction Factor(dB/m).
3. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)(if the raw value not contains the amplifier).
4. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) - Amplifier Gain(dB)(if the raw value contains the amplifier)
5. Margin value = Limit value - Emission level.

4.1.5. Test result

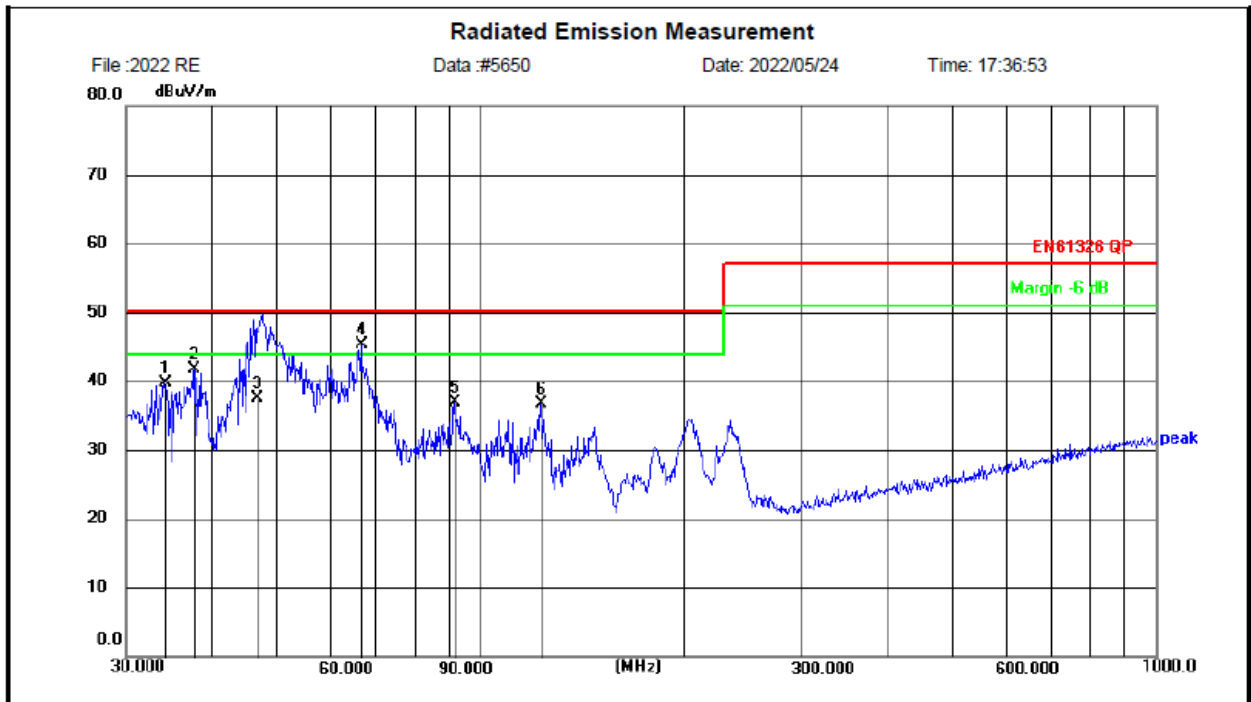
Frequency range	30-1000MHz	Environmental conditions	Temperature	25°C
Detector function& Resolution bandwidth	Quasi-Peak, 120kHz		Humidity	55.0%RH
Frequency range	1GHz-6GHz			
Detector function& Resolution bandwidth	Peak,Average 1MHz			

The requirements are **Fulfilled**

Remarks: The limits are kept. For detailed results, please see the following page(s).



SHENZHEN CTL TESTING TECHNICAL SERVICES CO., LTD.
 Longbang Industrial Park, No. 8 Tianyuan Road, Guangming District, Shenzhen.
<http://www.sz-ctl.com> Tel: 0755-21380337



Site CTL 966 Chamber 2 Polarization: **Vertical** Temperature: 26(C)
 Limit: EN61326 QP Test Voltage: AC230V/50Hz Humidity: 60 %
 EUT: FIRE CONTROL POWER SUPPLY Distance: 3m
 M/N: AFP-10A
 Mode: WORKING
 Note: AC mode
 Comany name: AUTOMATION TECHNOLOGY (HK) LIMITED

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	34.1561	58.66	-18.87	39.79	50.00	10.21	peak	100	85	P	
2	37.8121	59.58	-17.85	41.73	50.00	8.27	peak	100	113	P	
3	46.7685	53.81	-16.35	37.46	50.00	12.54	QP	200		P	
4	66.7325	64.72	-19.36	45.36	50.00	4.64	peak	300	86	P	
5	91.4949	56.85	-19.86	36.99	50.00	13.01	peak	300	130	P	
6	122.8340	57.45	-20.74	36.71	50.00	13.29	peak	200	153	P	

4.2. Conducted disturbance

For test instruments and accessories used see section 3.5.

4.2.1. Description of the test location

Test location: EMC Test Room 4#

4.2.2. Limits of disturbance

Limit of disturbance voltage at the mains terminals

Frequency Range (MHz)	Limits (dBuV)	
	Quasi-Peak	Average
0.150~0.500	79	66
0.500~30.00	73	60

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

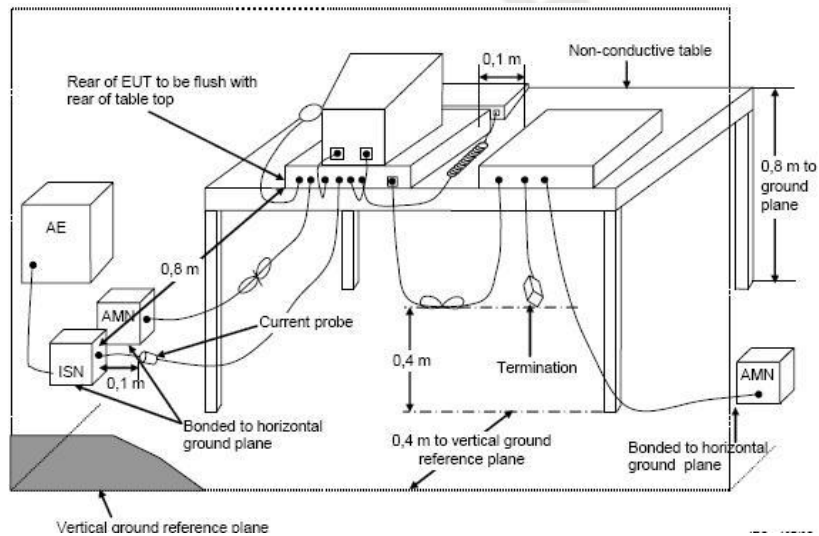
4.2.3. Description of the test set-up

4.2.3.1. Operating Condition

The EUT is set to work shall be carried out full load mode during the test, and the maximum emanating results are recorded.

4.2.3.2. Configuration of test setup

Mains terminals:



4.2.4. Test result

Frequency range	0.15-30MHz	Environmental conditions	Temperature	25°C
Resolution bandwidth	9kHz		Humidity	55.0%RH

The requirements are **Fulfilled**

Remarks: The limits are kept. For detailed results, please see the following page(s).

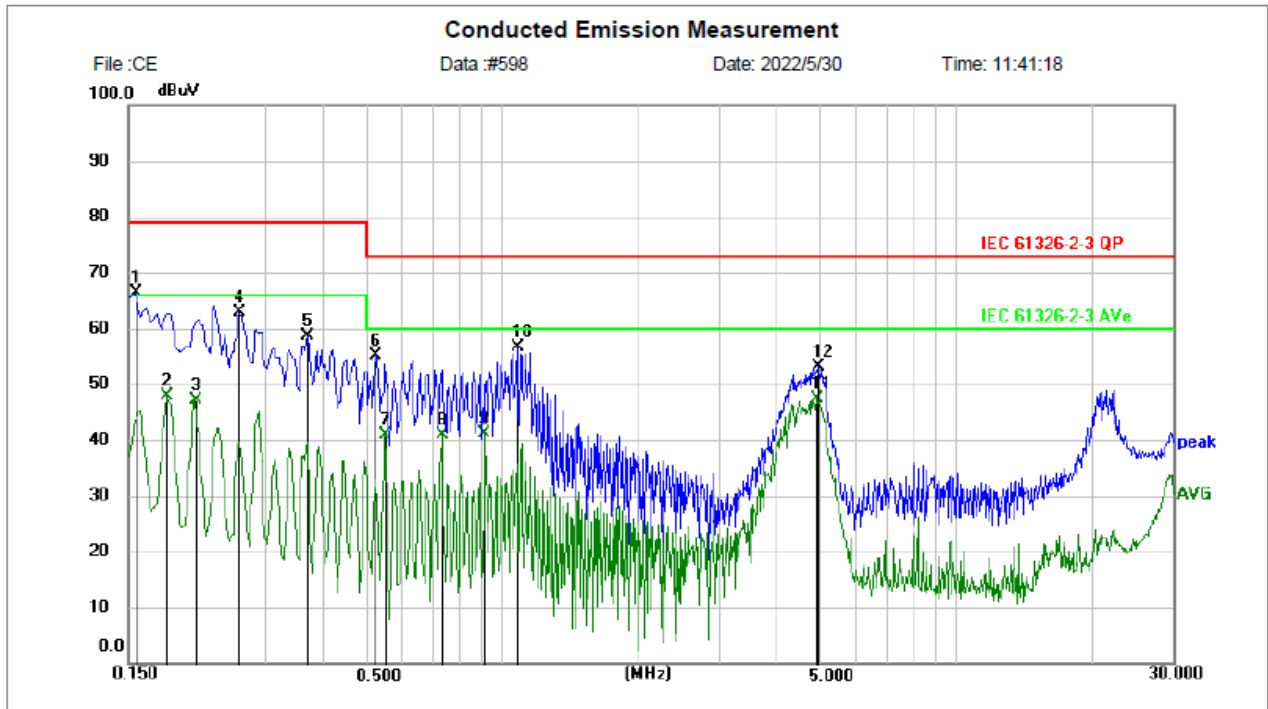


SHENZHEN CTL TESTING TECHNICAL SERVICES CO., LTD.

<http://www.sz-ctl.com>

Tel: 0755-21380337

Longbang Industrial Park, No. 8 Tianyuan Road, Guangming District, Shenzhen.



Site EMC 1# Phase: **N** Temperature: 26(C)
 Limit: IEC 61326-2-3 QP Power: AC 230V/50Hz Humidity: 54 %RH
 EUT: FIRE CONTROL POWER SUPPLY
 M/N: AFP-10A
 Mode: WORKING
 Note:
 AUTOMATION TECHNOLOGY (HK) LIMITED

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1 *	0.1545	56.26	10.05	66.31	79.00	12.69	peak	P	
2	0.1815	37.86	10.05	47.91	66.00	18.09	AVG	P	
3	0.2085	37.16	10.05	47.21	66.00	18.79	AVG	P	
4	0.2625	52.92	10.05	62.97	79.00	16.03	peak	P	
5	0.3704	48.62	10.05	58.67	79.00	20.33	peak	P	
6	0.5235	45.18	10.05	55.23	73.00	17.77	peak	P	
7	0.5505	30.89	10.05	40.94	60.00	19.06	AVG	P	
8	0.7350	30.87	10.06	40.93	60.00	19.07	AVG	P	
9	0.9150	31.09	10.06	41.15	60.00	18.85	AVG	P	
10	1.0770	46.55	10.06	56.61	73.00	16.39	peak	P	
11	4.9290	37.14	10.12	47.26	60.00	12.74	AVG	P	
12	4.9560	42.92	10.12	53.04	73.00	19.96	peak	P	

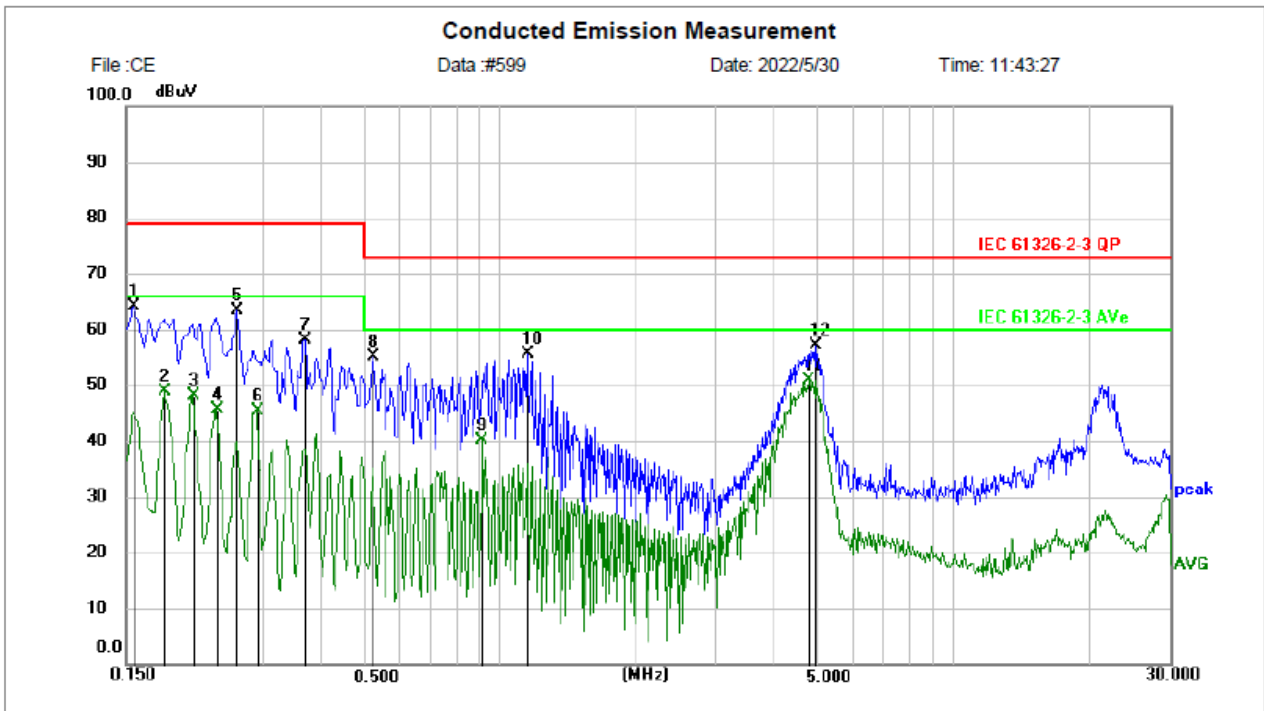


SHENZHEN CTL TESTING TECHNICAL SERVICES CO., LTD.

<http://www.sz-ctl.com>

Tel: 0755-21380337

Longbang Industrial Park, No. 8 Tianyuan Road, Guangming District, Shenzhen.



Site EMC 1#

Phase: **L1**

Temperature: 26(C)

Limit: IEC 61326-2-3 QP

Power: AC 230V/50Hz

Humidity: 54 %RH

EUT: FIRE CONTROL POWER SUPPLY

M/N: AFP-10A

Mode: WORKING

Note:

AUTOMATION TECHNOLOGY (HK) LIMITED

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1545	53.99	10.05	64.04	79.00	14.96	peak	P	
2	0.1815	38.81	10.04	48.85	66.00	17.15	AVG	P	
3	0.2085	38.15	10.04	48.19	66.00	17.81	AVG	P	
4	0.2355	35.50	10.04	45.54	66.00	20.46	AVG	P	
5	0.2625	53.23	10.04	63.27	79.00	15.73	peak	P	
6	0.2895	35.35	10.04	45.39	66.00	20.61	AVG	P	
7	0.3704	48.17	10.04	58.21	79.00	20.79	peak	P	
8	0.5235	45.02	10.04	55.06	73.00	17.94	peak	P	
9	0.9150	30.04	10.05	40.09	60.00	19.91	AVG	P	
10	1.1490	45.59	10.06	55.65	73.00	17.35	peak	P	
11 *	4.8075	40.84	10.11	50.95	60.00	9.05	AVG	P	
12	4.9650	46.96	10.11	57.07	73.00	15.93	peak	P	

4.3. Electrostatic discharge

For test instruments and accessories used see section 3.5.

4.3.1. Description of the test location and date

Test location: EMC Test Room 1#

Date of test: June 1, 2022

Operator: WIZ

4.3.2. Severity levels of electrostatic discharge

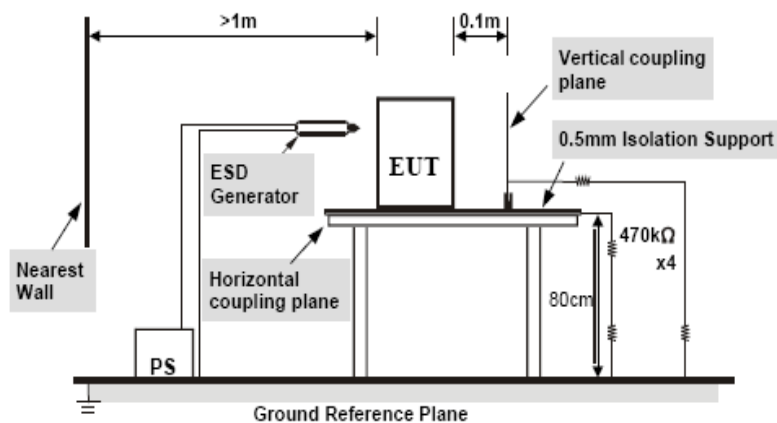
Level	Test Voltage Contact Discharge (KV)	Test Voltage Air Discharge (KV)
1	2	2
2	4	4
3	6	8
4	8	15
X	Special	Special

4.3.3. Description of the test set-up

4.3.3.1. Operating Condition

The EUT is set to work shall be carried out with normal working mode during the test, and the results of the maximum susceptible results are recorded.

4.3.3.2. Test setup



4.3.4. Test specification:

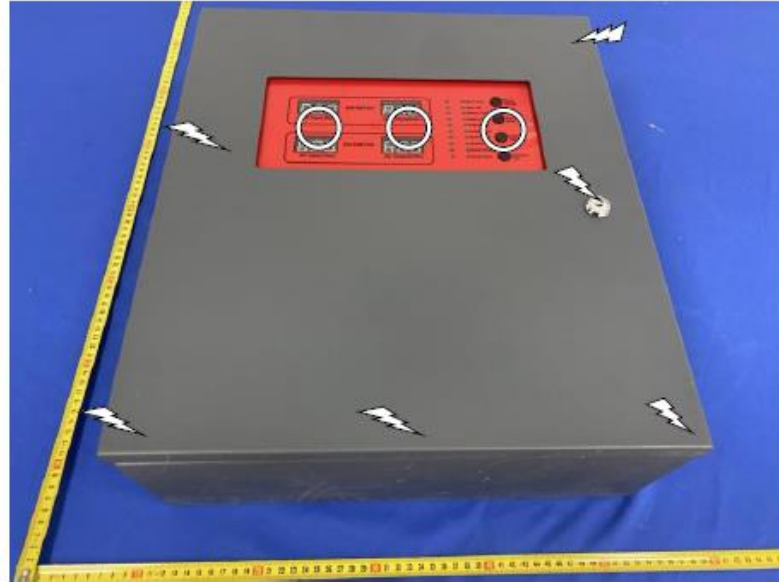
<u>Contact discharge voltage:</u>	<input checked="" type="checkbox"/> 2 kV	<input checked="" type="checkbox"/> 4 kV	
<u>Air discharge voltage:</u>	<input checked="" type="checkbox"/> 2 kV	<input checked="" type="checkbox"/> 4 kV	<input checked="" type="checkbox"/> 8 kV
<u>Number of discharges:</u>	<input checked="" type="checkbox"/> ≥ 10	<input type="checkbox"/> ≥ 25	
<u>Type of discharge:</u>	Direct discharge	<input checked="" type="checkbox"/> Air discharge	
		<input checked="" type="checkbox"/> Contact discharge	
	Indirect discharge	<input checked="" type="checkbox"/> Contact discharge	
<u>Polarity:</u>	<input checked="" type="checkbox"/> Positive	<input checked="" type="checkbox"/> Negative	
<u>Discharge location:</u>	<input checked="" type="checkbox"/> see photo documentation of the test set-up		
	<input checked="" type="checkbox"/> all external locations accessible by hand		
	<input checked="" type="checkbox"/> horizontal plate (HCP)		
	<input checked="" type="checkbox"/> vertical coupling plate (VCP)		

4.3.5. Test procedure

The basis test procedure was in accordance with IEC 61000-4-2:

- a. Electrostatic discharges were applied only to those points and surfaces of the EUT that are accessible to users during normal operation.
- b. The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.
- c. The time interval between two successive single discharges was at least 1 second.
- d. The discharge return cable of the generator shall be kept at a distance of at least 0.2m from the EUT whilst the discharge is being applied and should not be held by the operator.
- e. Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
- f. 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.
- g. At least ten single discharges (in the most sensitive polarity) were applied to the Horizontal Coupling Plane at points on each side of the EUT. The ESD generator was positioned horizontally at a distance of 0.1 meters from the EUT with the discharge electrode touching the HCP.
- h. At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the Vertical Coupling Plane in sufficiently different positions that four faces of the EUT were completely illuminated. The VCP (dimensions 0.5m *0.5m) was placed vertically to and 0.1 meters from the EUT.

4.3.6. Discharge position



ESD discharge locations



– Contact Discharge



– Air Discharge

4.3.7. Test result

Environmental conditions	Temperature	25°C
	Humidity	55.0%RH

The requirements are **Fulfilled**

Performance Criterion: **B**

Remarks: During the test no deviation was detected to the selected operation mode(s).

4.4. Radiated, radio-frequency, electromagnetic field

For test instruments and accessories used see section 3.5.

4.4.1. Description of the test location and date

Test location: Chamber 964

Date of test: June 1, 2022

Operator: WIZ

4.4.2. Severity levels of radiated, radio-frequency, electromagnetic field

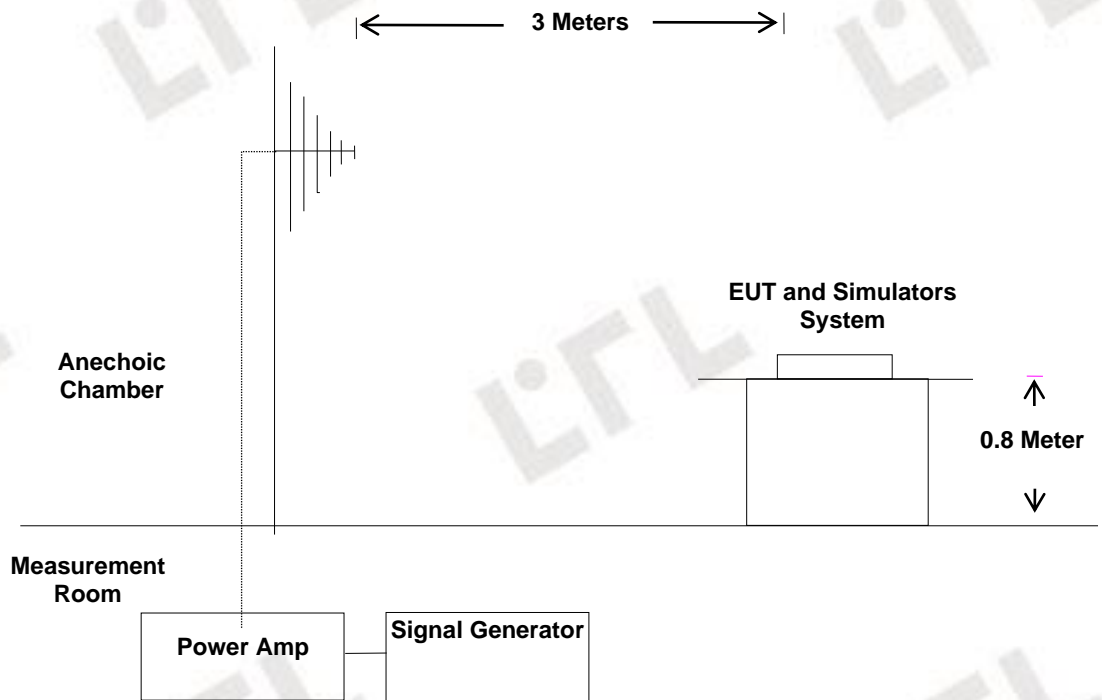
Level	Field Strength (V/m)
1.	1
2.	3
3.	10
X	Special

4.4.3. Description of the test set-up

4.4.3.1. Operating Condition

The EUT is set to work shall be carried out normal working mode during the test, and the results of the maximum susceptible results are recorded.

4.4.3.2. Test setup



4.4.4. Test specification:

<u>Frequency range:</u>	■ 80 MHz to 1000 MHz, 1400 MHz to 6000 MHz
<u>Field strength:</u>	■ 10 V/m, 3 V/m
<u>EUT - antenna separation:</u>	■ 3 m
<u>Modulation:</u>	■ AM: 80 % ■ sinusoidal 1000Hz
<u>Frequency step:</u>	■ 1 % with 3 s dwell time
<u>Antenna polarisation:</u>	■ horizontal ■ vertical

4.4.5. Test procedure

The test procedure was in accordance with IEC 61000-4-3

- a. The testing was performed in a fully-anechoic chamber.
- b. The frequency range is swept from 80MHz to 1000MHz, 1800MHz, 2600MHz, 3500MHz, 5000MHz, with the signal 80% amplitude modulated with a 1kHz sine wave.
- c. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised and to respond, but shall in no case be less than 1s.
- d. The field strength levels were 10V/m.
- e. The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

4.4.6. Test result

Environmental conditions	Temperature	25°C
	Humidity	55.0%RH

The requirements are **Fulfilled**

Performance Criterion: **A**

Remarks: During the test no deviation was detected to the selected operation mode(s).

4.5. Electrical fast transients / Burst

For test instruments and accessories used see section 3.5.

4.5.1. Description of the test location

Test location: EMC Test Room 3#

Date of test: June 2, 2022

Operator: WIZ

4.5.2. Severity levels of electrical fast transients / Burst

Severity level: ±1000V for AC power supply lines

Open Circuit Output Test Voltage ±10%				
Level	For Power Supply Lines		For I / O (Input / Output) Signal Data and Control Lines	
	V peak(KV)	Repetition Frequency (KHz)	V peak(KV)	Repetition Frequency (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

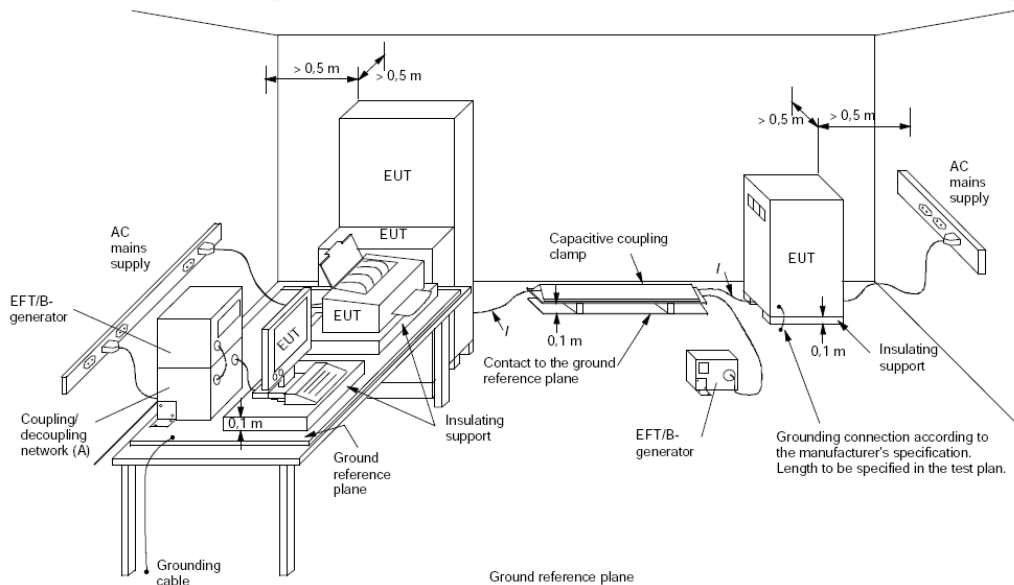
Performance criterion: B

4.5.3. Description of the test set-up

4.5.3.1. Operating Condition

The EUT is set to work shall be carried out with normal working mode during the test, and the results of the maximum susceptible results are recorded.

4.5.3.2. Configuration of test setup



4.5.4. Test specification:

Coupling network: 0.5 kV 1 kV 2 kV

Coupling clamp: 0.5 kV 1 kV 2 kV

Burst frequency: 5.0 kHz 100 kHz

Coupling duration: ≥ 60 s

Polarity: positive negative

4.5.5. Coupling points

Cable description: AC power line : L, N, PE, L+N, L+PE, N+PE, L+N+PE,

Screening: screened unscreened

Status: passive active

Signal transmission: analogue digital

Length: 1.5 m

4.5.6. Test result

Environmental conditions	Temperature	25°C
	Humidity	55.0%RH

The requirements are **Fulfilled**

Performance Criterion: **B**

Remarks: During the test no deviation was detected to the selected operation mode(s).

4.6. Surge

For test instruments and accessories used see section 3.5.

4.6.1. Description of the test location

Test location: EMC Test Room 3#

Date of test: June 2, 2022

Operator: WIZ

4.6.2. Severity levels of surge

Level	Test Voltage (KV)
1	0.5
2	1.0
3	2.0
4	4.0
*	Special

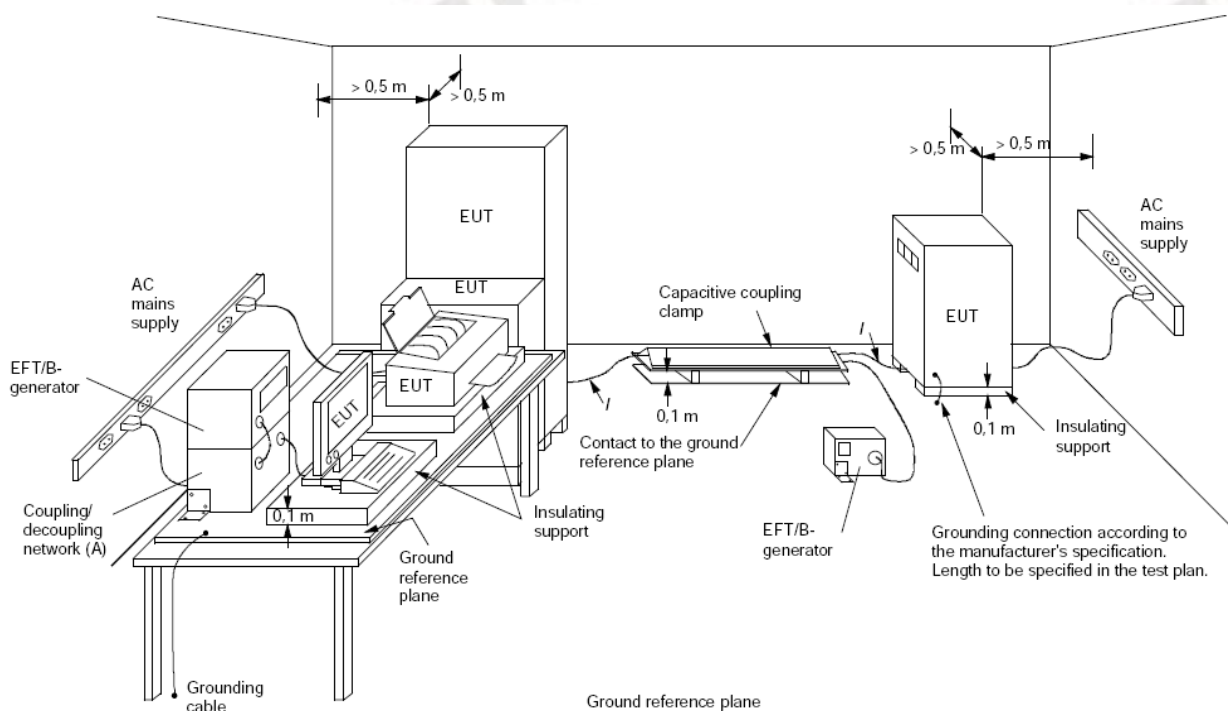
Performance criterion: B

4.6.3. Description of the test set-up

4.6.3.1. Operating Condition

The EUT is set to work shall be carried out with normal working mode during the test, and the results of the maximum susceptible results are recorded.

4.6.3.2. Configuration of test setup



4.6.4. Test specification:

Pulse amplitude-Power line sym.: 0.5 kV 1 kV 2 kV 4 kV
 Source impedance: 2 Ω

Pulse amplitude-Power line un sym: 0.5 kV 1 kV 2 kV 4 kV
 Source impedance: 12 Ω

Signal line: 0.5 kV 1 kV 2 kV 4 kV

Number of surges: 5 Surges/Phase angle

Phase angle: 0 ° 90 ° 180 ° 270 °

Repetition rate: 60 s

Polarity: positive negative

4.6.5. Coupling points

Cable description: AC power line: L+N, L+PE, N+PE

Screening: screened unscreened
 Status: passive active
 Signal transmission: analogue digital
 Length: 1.5 m

4.6.6. Test result

Environmental conditions	Temperature	25°C
	Humidity	55.0%RH

The requirements are **Fulfilled**

Performance Criterion: **B**

Remarks: During the test no deviation was detected to the selected operation mode(s).

4.7. Conducted disturbances induced by radio-frequency fields

For test instruments and accessories used see section 3.5.

4.7.1. Description of the test location

Test location: EMC Test Room 5#

Date of test: June 1, 2022

Operator: WIZ

4.7.2. Severity levels of conducted Susceptibility

Severity Level: 3V

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

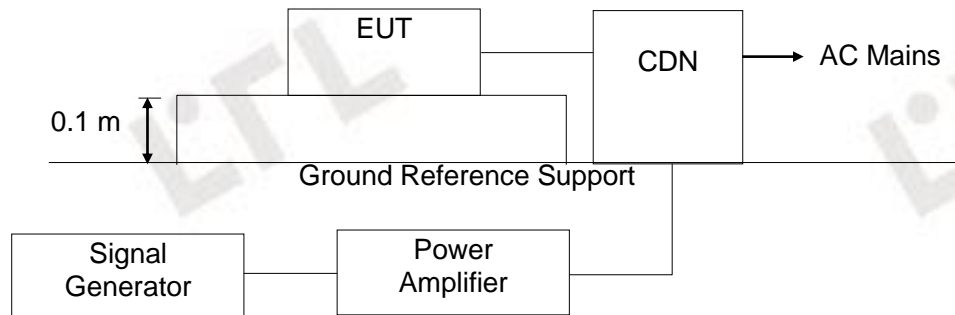
Performance criterion: A

4.7.3. Description of the test set-up

4.7.3.1. Operating Condition

The EUT is set to work shall be carried out with normal working mode during the test, and the results of the maximum susceptible results are recorded.

4.7.3.2. Configuration of test setup



4.7.4. Test specification:

Frequency range:

■ 0.15 MHz to 80 MHz

Test voltage:

■ 3 V

Modulation:

■ AM: 80 %
 ■ sinusoidal 1000Hz

Frequency step:

■ 1 % with 3 s dwell time

4.7.5. Coupling points

Cable description

AC power line

Screening:

screened

unscreened

Status:

passive

active

Signal transmission:

analogue

digital

Length:

1.5 m

4.7.6. Test result

Environmental conditions	Temperature	25°C
	Humidity	55.0%RH

The requirements are **Fulfilled**

Performance Criterion: **A**

Remarks: During the test no deviation was detected to the selected operation mode(s).

4.8. Magnetic Field Immunity

For test instruments and accessories used see section 3.5.

4.8.1. Description of the test location

Test location: EMC Test Room 3#

Date of test: June 1, 2022

Operator: WIZ

4.8.2. Severity levels of magnetic field immunity

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

4.8.3. Description of the test set-up

4.8.3.1. Operating Condition

The EUT is set to work shall be carried out with normal working mode during the test, and the results of the maximum susceptible results are recorded.

4.8.4. Test specification:

Test frequency: 50 Hz, 60 Hz

Continuous field: 30 A/m

Test duration: 5 m

Antenna factor: 0.917 A/m

Axis: x-axis y-axis z-axis

4.8.5. Test procedure

- The equipment is configured and connected to satisfy its functional requirements.
- The power supply, input and output circuits shall be connected to the sources of power supply, control and signal.
- The cables supplied or recommended by the equipment manufacturer shall be used. 1 meter of all cables used shall be exposed to the magnetic field.

4.8.6. Test result

Environmental conditions	Temperature	25°C
	Humidity	55.0%RH

The requirements are **Fulfilled**

Performance Criterion: **A**

Remarks: During the test no deviation was detected to the selected operation mode(s).

4.9. Voltage Dips and Interruptions

For test instruments and accessories used see section 3.6.

4.9.1. Description of the test location

Test location: EMC Test Room 3#

Date of test: June 1, 2022

Operator: WIZ

4.9.2. Severity levels of electrostatic discharge

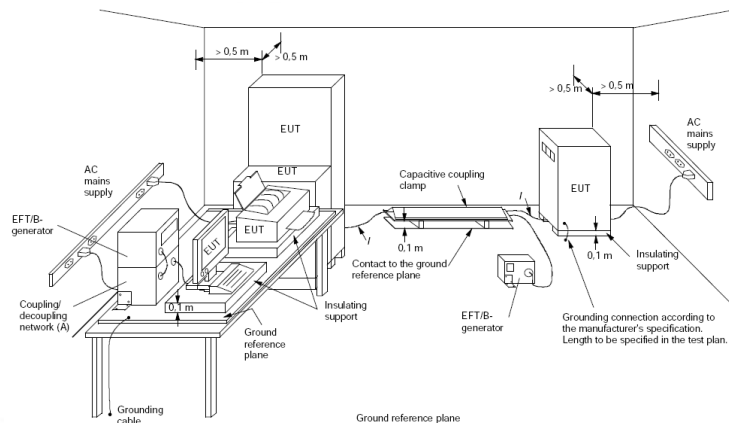
Test Level (%Ut)	Voltage Dip And Short Interruptions (%Ut)	Performance Criterion	Duration (In Period)
0	100	B	1
40	60	C	10
70	30	C	25
0	100	C	250

4.9.3. Description of the test set-up

4.9.3.1. Operating Condition

The EUT is set to work shall be carried out normal working mode during the test, and the results of the maximum susceptible results are recorded.

4.9.3.2. Configuration of test setup



4.9.4. Test specification:

Nominal Mains Voltage (V_N): ■ 230 V AC

Number of voltage fluctuations: ■ 3

Level of reduction(dip) / duration: ■ 100 % / 20ms ■ 60 % / 200ms ■ 30 % / 500ms

Nominal Mains Voltage (V_N): ■ 230 V AC

Number of Interruptions: ■ 3

Duration of the Interruption: ■ 100%/5000 ms

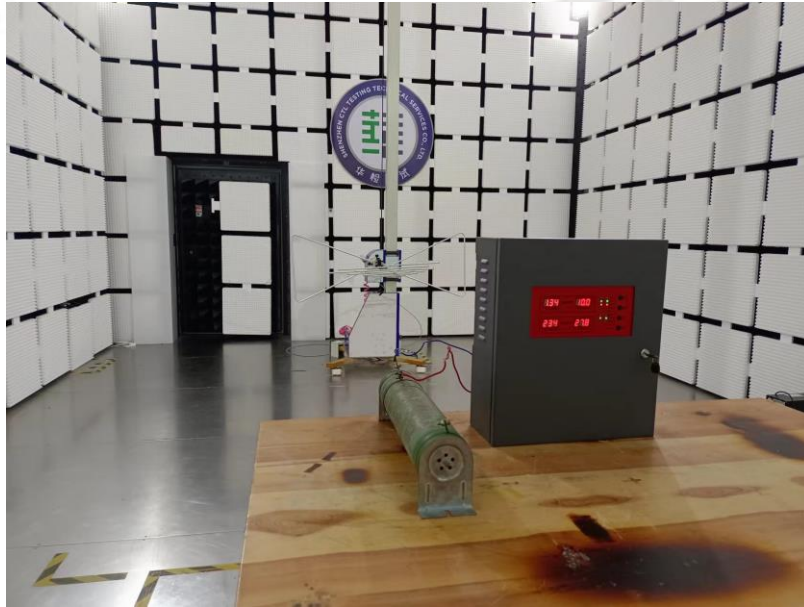
4.9.5. Test result

Environmental conditions	Temperature	25°C
	Humidity	55.0%RH

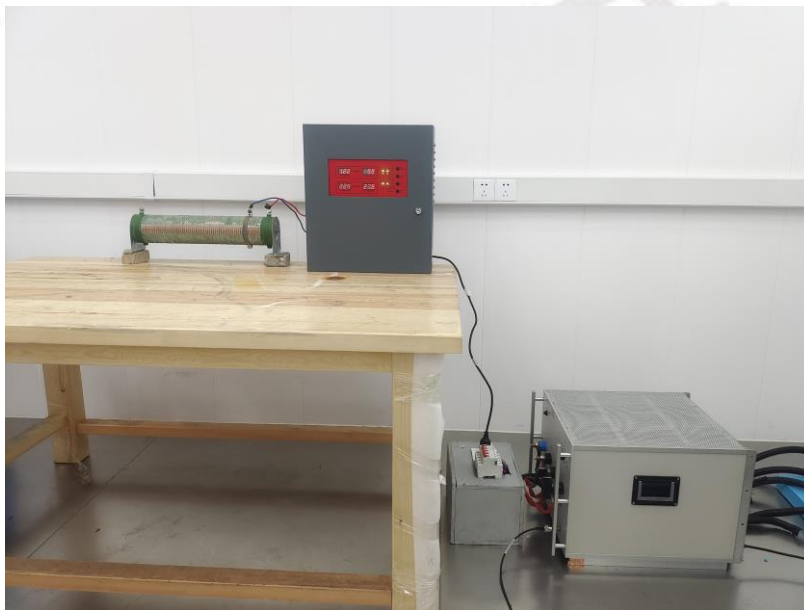
The requirements are **Fulfilled**
Performance Criterion **See section 4.11.2**

Remarks: During the test no deviation was detected to the selected operation mode(s).

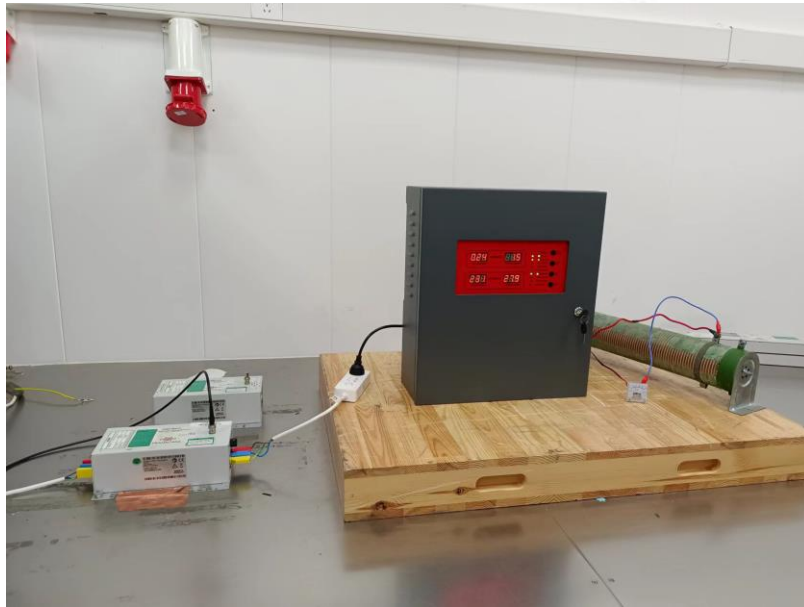
5. Test Setup Photos



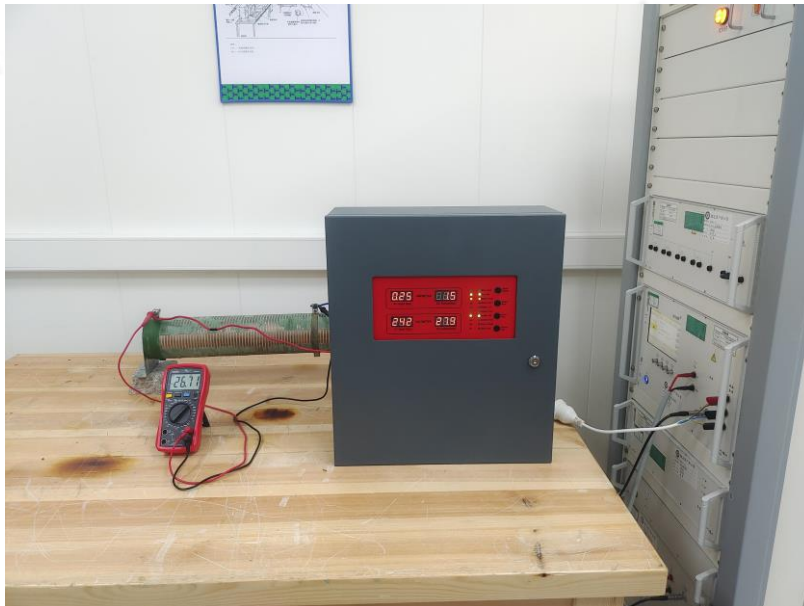
RADIATED EMISSION TEST(30MHz-1GHz)



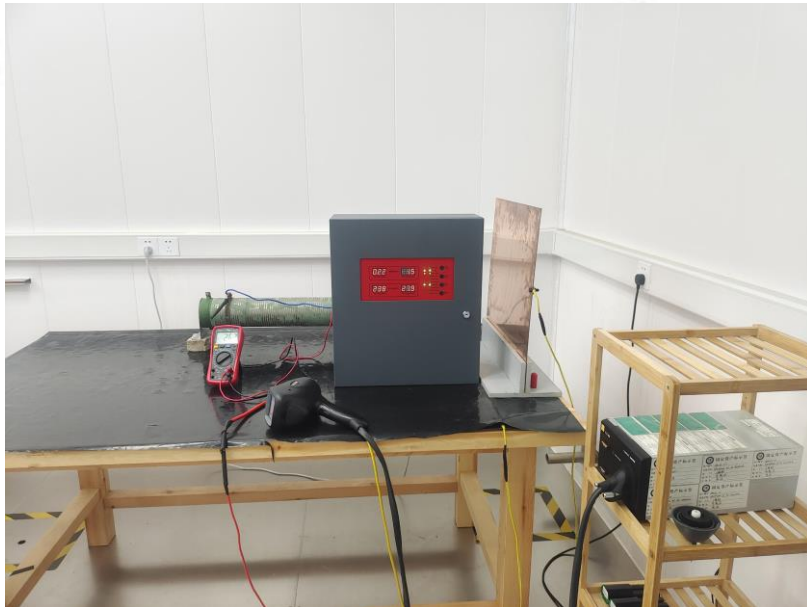
CONDUCTION EMISSION TEST(0.15MHz-30MHz)



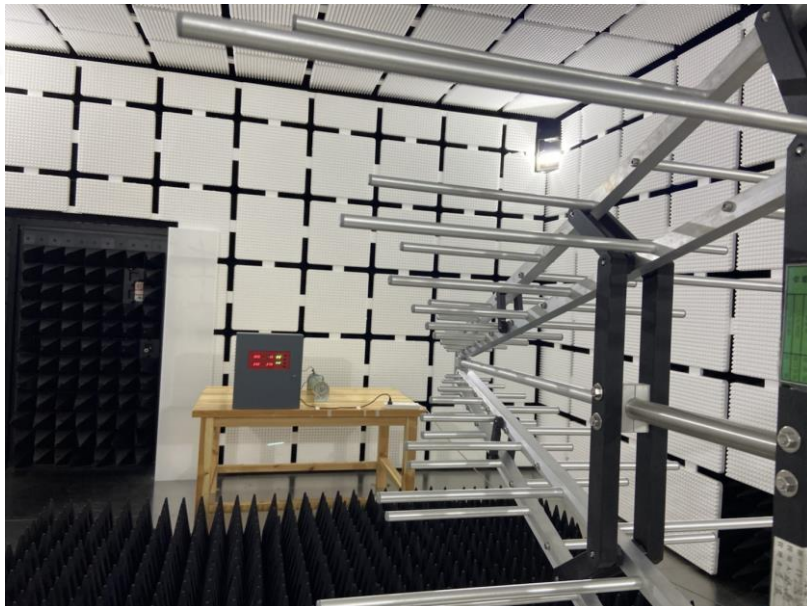
CONDUCTED SUSCEPTIBILITY TEST



SURGE TEST&VOLTAGE DIPS AND INTERRUPTIONS TEST



ESD TEST



RS TEST

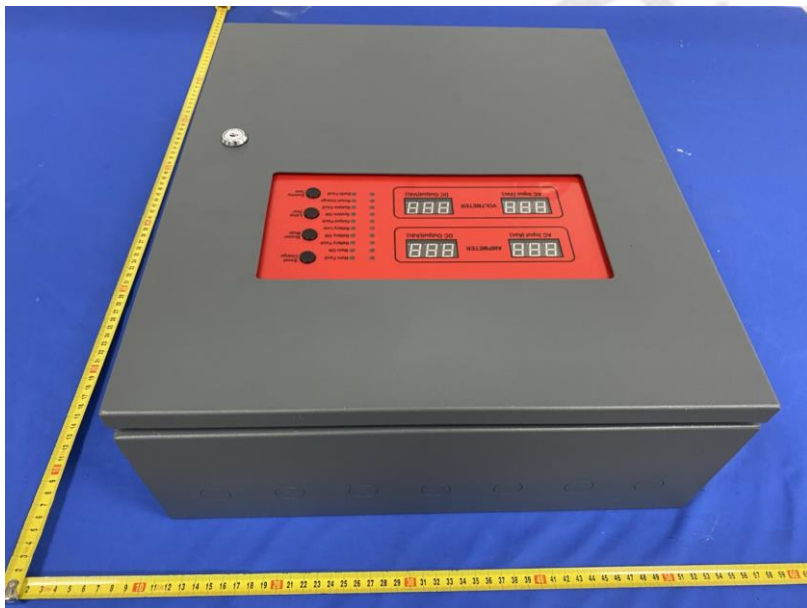
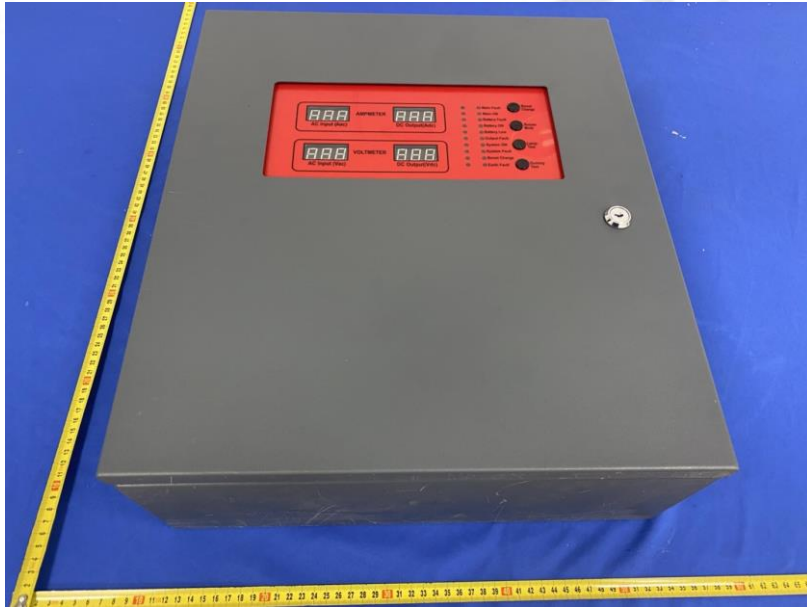


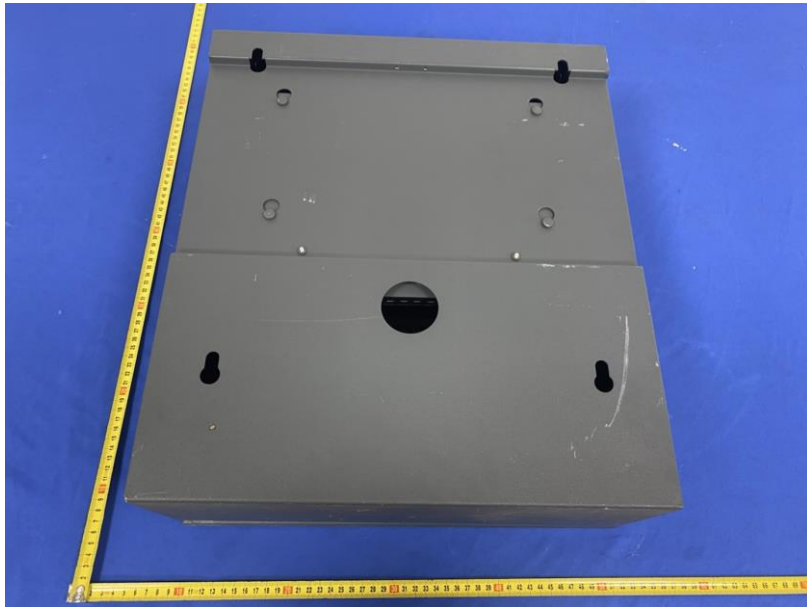
EFT/B TEST



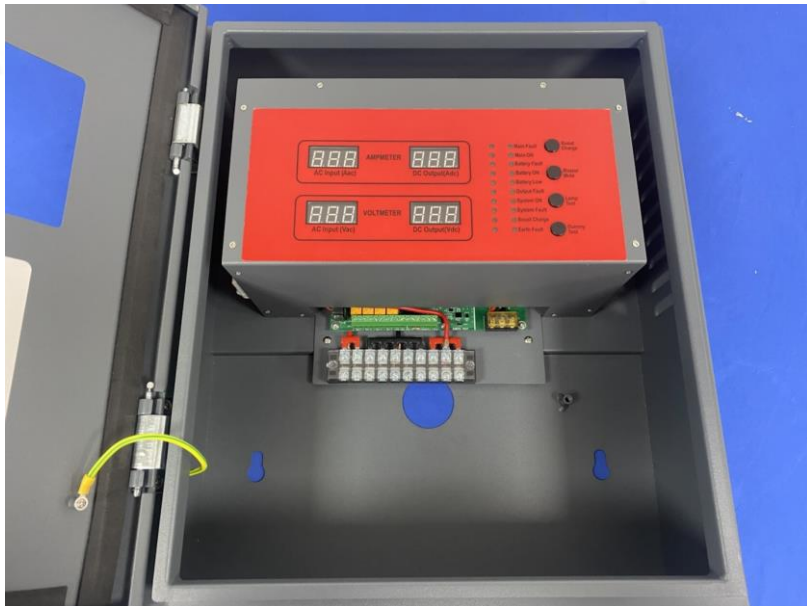
POWER-FREQUENCY MAGNETIC FIELDS TEST

6. External and Internal Photos of the EUT









..... End Of Report.....