Test Report issued under the responsibility of:

EMC TEST REPORT

Report Reference No. ..... :	EP2210079E01
Engineer (name + signature) ..... :	Dora Ning
Approved by (name + signature) ..... :	Eric Liu
Date of Receipt of EUT ..... :	2022-10-13
Date of Test ..... :	2022-10-14 to 2022-10-20
Date of issue ..... :	2022-10-21
Testing Laboratory..... :	Dongguan Pubiao Testing Technology Co., Ltd.
Address ..... :	No. 3, First Floor, Building A, No.30, Minghua Road, Juzhou village, Shijie Town, Dongguan City Guangdong China.
Applicant's name..... :	Ninghai Yingjiao Electrical Co., Ltd.
Address ..... :	Cuijia Village, Xidian Town, Ninghai County, Ningbo, 315613 Zhejiang, P.R. China.
Manufacturer's name ..... :	Same as applicant
Address ..... :	Same as applicant
Factory's name..... :	Same as applicant
Address..... :	Same as applicant

Test specification:

EUT description .....:	Din Rail power supply
Trade Mark.....:	YINGJIAO®
Model/Type reference .....:	YSD15S-vvvaaaa (“vvv”, “aaaa” are variables, refer to section 1.1 for details)
Test Sample……..…….:	YSD15S-0602500
Ratings.....:	Input: 100-240V~, 50/60Hz, 0.6A Max Output: see section 1.1 for details
Standards .....:	EN 55032:2015+A11:2020+A1:2020 EN 55035:2017+A11:2020 EN IEC 61000-3-2:2019+A1:2021 EN 61000-3-3:2013+A1:2019+A2:2021

The device described above was tested by Dongguan Pubiao Testing Technology Co., Ltd. to determine the maximum emission levels emanated from the device and severity levels of the device endure and its performance criterion. The measurement results are contained in this test report and Dongguan Pubiao Testing Technology Co., Ltd. assumes full responsibility for the accuracy and completeness of these measurements. This report shows the EUT is technically compliance with the above official standards.

This report applies to the above sample only and shall not be reproduced in part without written approval of Dongguan Pubiao Testing Technology Co., Ltd.

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1 .GENERAL INFORMATION

1.1 PRODUCT INFORMATION

Table A:Definition of variable

Variable	Range of variable	Content
vvv	050-480	3 digits, indicates 10 times of output voltage in V and in step of 0.1V. eg.050=5.0V, 480=48.0V.
aaaa	0010-2500	4 digits, indicates 100 times of output current in A and in step of 0.001A. eg. 0010=0.01A, 2500=2.5A.

Table B :Model list:

Model NO.	Input rating	Voltage range (VDC)	Current range (A)	Max. Power (W)
YSD15S-vvvaaaa	100-240V~, 50/60Hz, 0.6A Max	5.0-48.0	0.01-2.5	15

All tests were performed on model YSD15S-0602500.

The EUT passed the test.

1.2 DETAILS ABOUT THE TEST LABORATORY

Test Site 1:

Company name: Dongguan Pubiao Testing Technology Co., Ltd

No. 3, First Floor, Building A, No.30, Minghua Road, Juzhou village, Shijie Town, Dongguan City Guangdong China.

Test Site 2:

Company name: SLG-CPC Testlaboratory Co., Ltd.

No. 11, Wu Song Road, Dongcheng District, Dongguan, Guangdong Province, China 523117

2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

Standard	Test Item	Result	Comments/Base Standard	Test Site
EN 55032:2015+A11:2020+A1:2020	Conducted Emissions at Mains Power Ports	PASS	/	1
	Conducted Emissions at Communication Ports	N/A	/	2
	Radiated Emission Below 1 GHz	PASS	/	1
	Radiated Emission Above 1 GHz	N/A	/	2
EN IEC 61000-3-2:2019+A1:2021	Harmonic Current Emission	N/A	/	1
EN 61000-3-3:2013+A1:2019+A2:2021	Voltage Fluctuations & Flicker	N/A	/	1
EN 55035:2017+A11:2020	Electrostatic Discharge	PASS	IEC 61000-4-2	1
	RF electromagnetic field	PASS	IEC 61000-4-3	2
	Fast transients	PASS	IEC 61000-4-4	1
	Surges	PASS	IEC 61000-4-5	1
	Injected Current	PASS	IEC 61000-4-6	1
	Power Frequency Magnetic Field	N/A	IEC 61000-4-8	2
	Volt. Interruptions Volt. Dips	PASS	IEC 61000-4-11	1

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) Voltage dip: ＞95% reduction – Performance Criteria **B**

Voltage dip: 30% reduction – Performance Criteria **C**

Voltage Interruption: ＞95% reduction – Performance Criteria **C**

(4) If the highest frequency of the internal sources of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz. If the highest frequency of the internal sources of the EUT is between 108 MHz and 500 MHz, the measurement shall only be made up to 2GHz. If the highest frequency of the internal sources of the EUT is between 500 MHz and 1GHz, measurement shall only be made up to 5 GHz. If the highest frequency of the internal sources of the EUT is above 1 GHz, the measurement shall be made up to 5 times the highest frequency or 40 GHz, whichever is less.

(5) Test in the shielding room.

2.1 MEASUREMENT 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 :

Test Site	Method	Measurement Frequency Range	U (dB)	NOTE
Conducted Emission	ANSI	150 KHz ~ 30MHz	3.19	

B. Radiated Measurement :

Test Site	Method	Measurement Frequency Range	Ant. H / V	U(dB)	NOTE
Radiated Emission	ANSI	30MHz ~ 1000MHz	V	4.70	
		30MHz ~ 1000MHz	H	4.84	

Test Site	Method	Measurement Frequency Range	Ant. H / V	U(dB)	NOTE
Radiated Emission	ANSI	1GHz ~ 6MHz	V	4.48	
		1GHz ~ 6MHz	H	4.48	

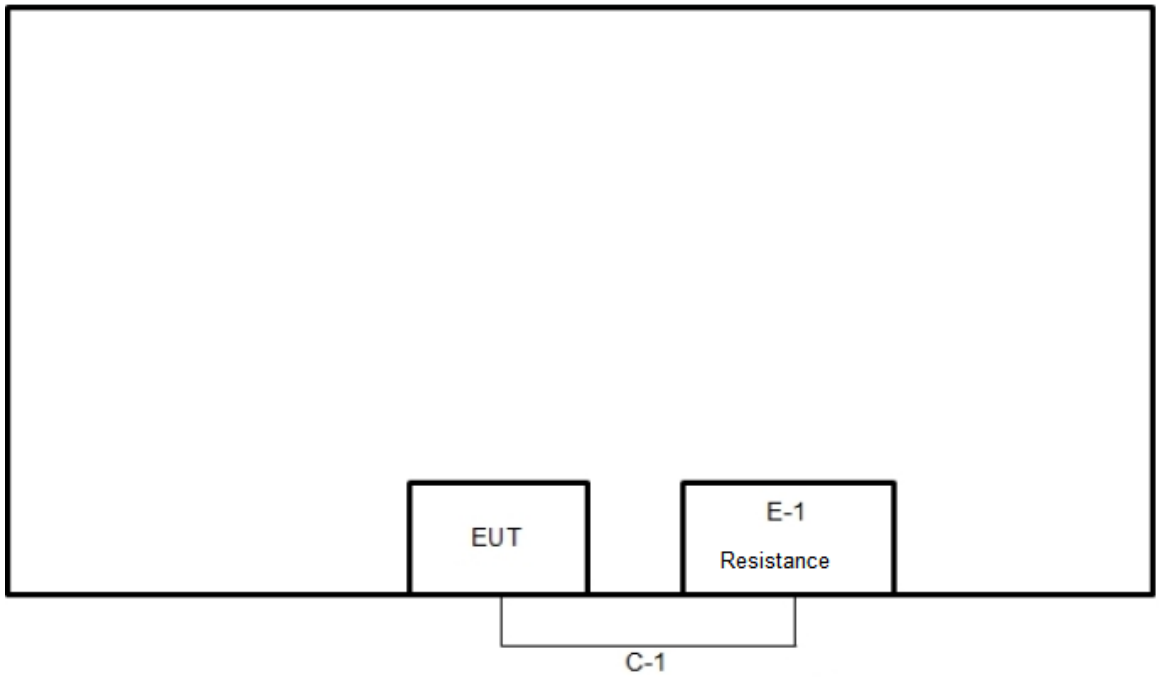
2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	Full Load
Mode 2	Half load
Mode 3	No load

Remark: All test modes were pre-mtested, but we only recorded the worst case in this report.

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



The EUT has been tested as an independent 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.

Equipment	Specification
Rheostat	60Ω

Type of cable
DC Cable

3. EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 LIMITS OF CONDUCTED EMISSION(MAINS PORT) (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *
0.50 -5.0	73.00	60.00	56.00	46.00
5.0 -30.0	73.00	60.00	60.00	50.00

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

(3) The test result calculated as following:

Factor = insertion loss (dB) + Cable Loss (dB)

Measurement (dBuV)= Factor (dB)+ Reading Level (dBuV)

Margin (dB) = Limit (dBuV) – QuasiPeak/Average Measurement (dBuV)

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.1.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EMI Test Receiver	ROHDE&SCHWARZ	ESCI	101315	2023-07-01
2	LISN	ROHDE&SCHWARZ	ENV216	102331	2023-07-01
3	Test Cable	HUBER+SUHNER	RG 223/U	1-1#	2023-07-01

Remark: ” N/A” denotes No Model No. , Serial No. or No Calibration specified.

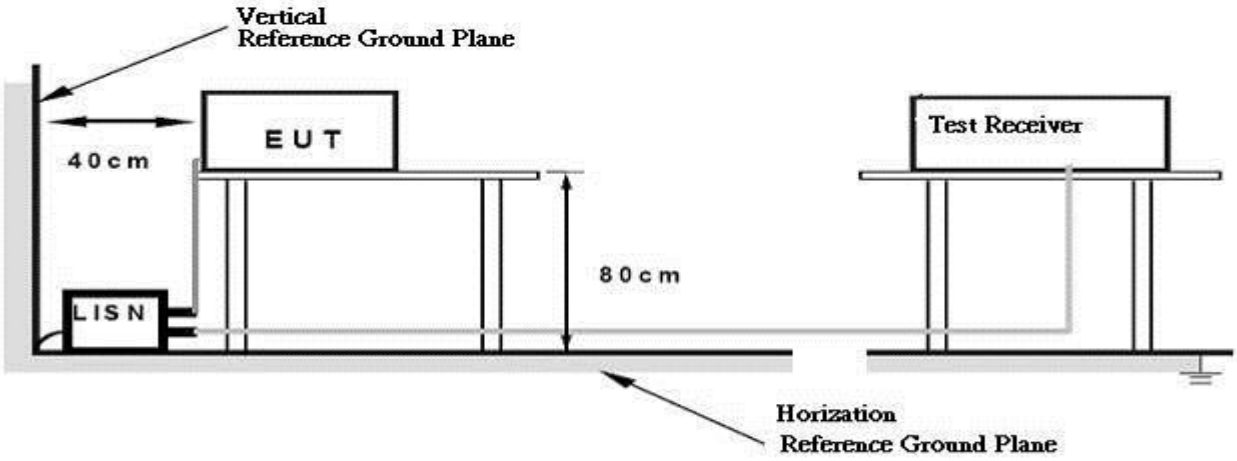
3.1.3 TEST PROCEDURE

a. The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN at least 80 cm from nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.4 DEVIATION FROM TEST STANDARD

No deviation

3.1.5 TEST SETUP



3.1.6 EUT OPERATING CONDITIONS

The EUT exercise program used during radiated and/or conducted emission measurement was designed to exercise the various system components in a manner similar to a typical use.

3.1.7 TEST RESULTS

Model No.:	YSD15S-0602500
Temperature:	24℃
Relative Humidity:	55 %
Pressure:	1009 hPa

Remark:

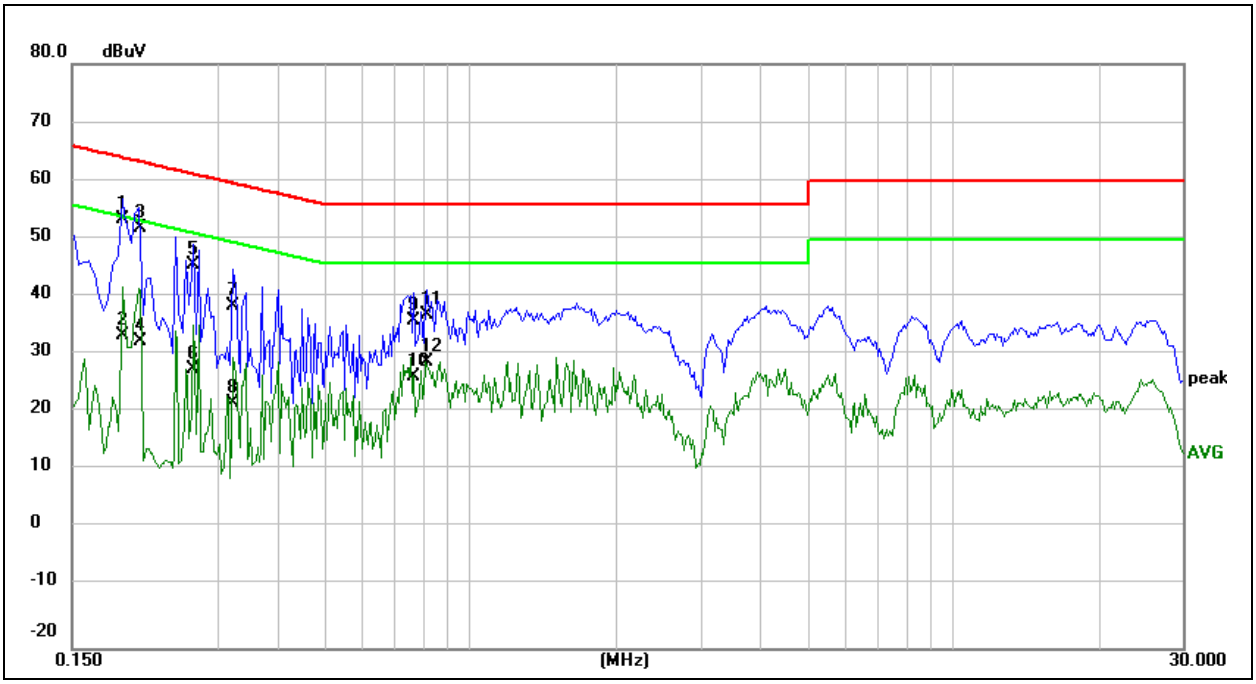
(1) Reading in which marked as QP means measurements by using Quasi-Peak Detector ,and AV means measurements by using Average Detector.

(2) All readings are QP Mode value unless otherwise stated AVG in column of『Note』. If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform. In this case, a " * " marked in AVG Mode column of Interference Voltage Measured.

(3) Measuring frequency range from 150KHz to 30MHz.

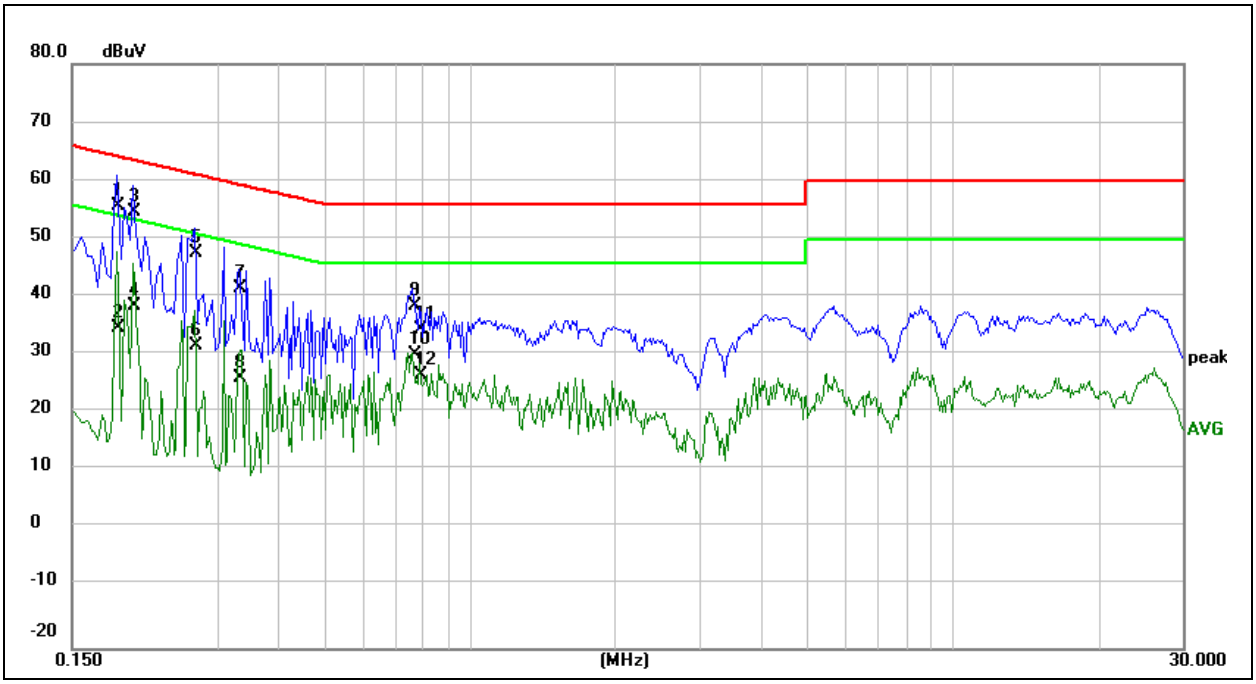
(4) This test was carried out in conducted emission shielded room.

Model No.:	YSD15S-0602500
Phase:	L1
Test Power :	AC 230V/50Hz
Standard:	EN 55032 Conduction
Operating Mode :	Mode 1



No.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB)	Measure-ment(dBuV)	Limit (dBuV)	Margin (dB)	Detector
1 *	0.1900	43.60	9.88	53.48	64.04	-10.56	QP
2	0.1900	23.77	9.88	33.65	54.04	-20.39	AVG
3	0.2060	42.13	9.88	52.01	63.37	-11.36	QP
4	0.2060	22.82	9.88	32.70	53.37	-20.67	AVG
5	0.2660	35.80	9.89	45.69	61.24	-15.55	QP
6	0.2660	17.87	9.89	27.76	51.24	-23.48	AVG
7	0.3220	28.90	9.88	38.78	59.66	-20.88	QP
8	0.3220	12.18	9.88	22.06	49.66	-27.60	AVG
9	0.7660	26.12	9.99	36.11	56.00	-19.89	QP
10	0.7660	16.60	9.99	26.59	46.00	-19.41	AVG
11	0.8139	27.05	10.01	37.06	56.00	-18.94	QP
12	0.8139	19.22	10.01	29.23	46.00	-16.77	AVG

Model No.:	YSD15S-0602500
Phase:	N
Test Power :	AC 230V/50Hz
Standard:	EN 55032 Conduction
Operating Mode :	Mode 1



No.	Frequency (MHz)	Reading Level(dBuV)	Factor (dB)	Measure-ment(dBuV)	Limit (dBuV)	Margin (dB)	Detector
1 *	0.1860	45.77	9.89	55.66	64.21	-8.55	QP
2	0.1860	24.93	9.89	34.82	54.21	-19.39	AVG
3	0.2020	44.84	9.88	54.72	63.53	-8.81	QP
4	0.2020	28.70	9.88	38.58	53.53	-14.95	AVG
5	0.2700	37.92	9.89	47.81	61.12	-13.31	QP
6	0.2700	21.98	9.89	31.87	51.12	-19.25	AVG
7	0.3339	31.67	9.89	41.56	59.35	-17.79	QP
8	0.3339	16.44	9.89	26.33	49.35	-23.02	AVG
9	0.7620	28.62	9.99	38.61	56.00	-17.39	QP
10	0.7620	20.45	9.99	30.44	46.00	-15.56	AVG
11	0.7900	24.73	10.00	34.73	56.00	-21.27	QP
12	0.7900	16.90	10.00	26.90	46.00	-19.10	AVG

3.2 RADIATED EMISSION MEASUREMENT

3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT (Below 1000MHz)

FREQUENCY (MHz)	Class A (at 3m)	Class B (at 3m)
	dBuV/m	dBuV/m
30 – 230	50	40
230 – 1000	57	47

Notes:

(1) Specification Reference: EN 55032.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

(4) The test result calculated as following:

Factor = Absorbing clamp insertion loss (dB) + Cable Loss (dB)

Level (dBuV/m)= Factor (dB)+ Reading Level (dBpW)

Margin (dB) = Limit (dBpW) – Level (dBuV/m)

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (GHz)	Class A (dBuV/m) (at 3m)		Class B (dBuV/m) (at 3m)	
	PEAK	AVERAGE	PEAK	AVERAGE
1 ~ 3	76	56	74	54
3 ~ 6	80	60	70	50

Notes:

(1) Specification Reference: EN 55032.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

3.2.2 MEASUREMENT INSTRUMENTS LIST

3m Radiated Emission Measurement 30M-1G

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EMI Test Receiver	Rohde & Schwarz	ESPI	101109	2023-07-01
2	preamplifier	ROHDE & SCHWARZ	8447E	2945A02763	2023-07-01
3	Antenna	Schwarzbeck	CBL6111C	N/A	2023-07-04
4	The RF cable	HUBER+SUHNER	RG 223/U	1-3#	2023-07-01
5	The RF cable	HUBER+SUHNER	RG 223/U	1-4#	2023-07-01
6	The RF cable	HUBER+SUHNER	RG 223/U	1-5#	2023-07-01
7	Antenna Mast	N/A	N/A	N/A	N/A
8	Turn Table	N/A	N/A	N/A	N/A

3m Radiated Emission Measurement 1G-6G

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	RF Preamp Amplifier	Rohde & Schwarz	SCU18F	180118	2023-04-20
2	Horn Antenna	EMCO	3115	9710-5291	2025-04-20
3	EMI Test Receiver	Schwarzbeck	FSV40	101511	2023-04-20
4	Test Software	Farad	EZ-EMC	Ver.CPC-3A1	/

Remark: ” N/A” denotes No Model No. / Serial No. and No Calibration specified.

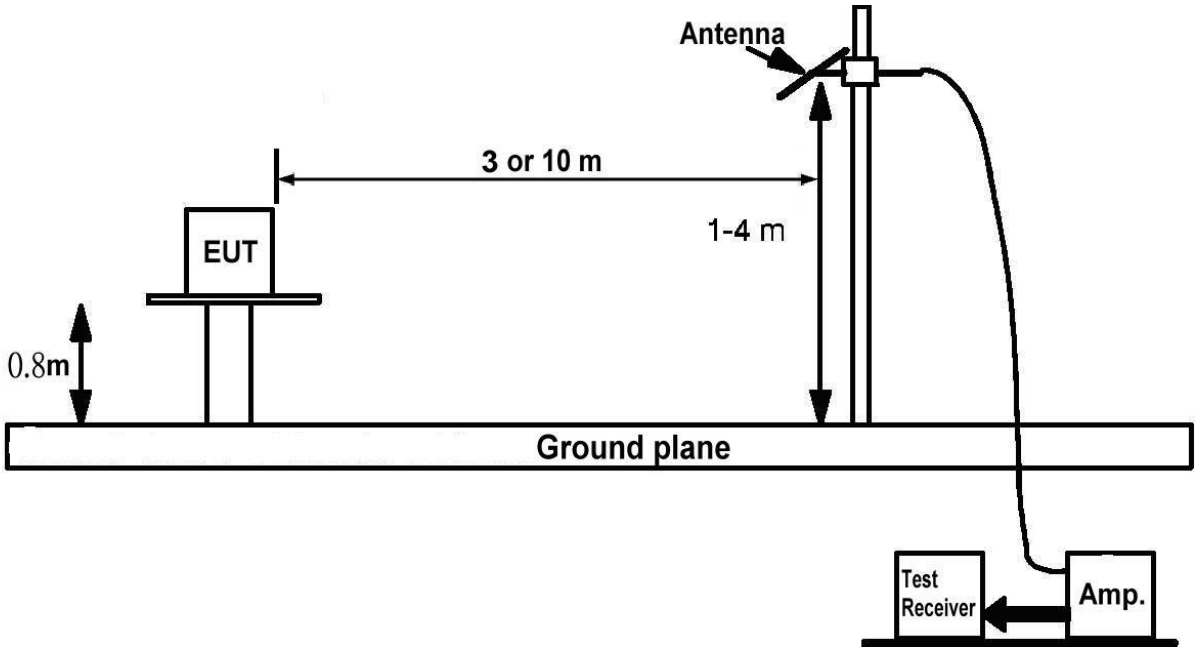
3.2.3 TEST PROCEDURE

a. The measuring distance of at 3m or 10 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3m or 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.2.4 DEVIATION FROM TEST STANDARD

No deviation

3.2.5 TEST SETUP



3.2.6 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 3.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

3.2.7 TEST RESULTS

Model No.:	YSD15S-0602500
Temperature:	24℃
Relative Humidity:	55 %
Pressure:	1009 hPa

Remark :

(1) Reading in which marked as QP or Peak means measurements by using are Quasi-Peak Detector or Peak Detector.

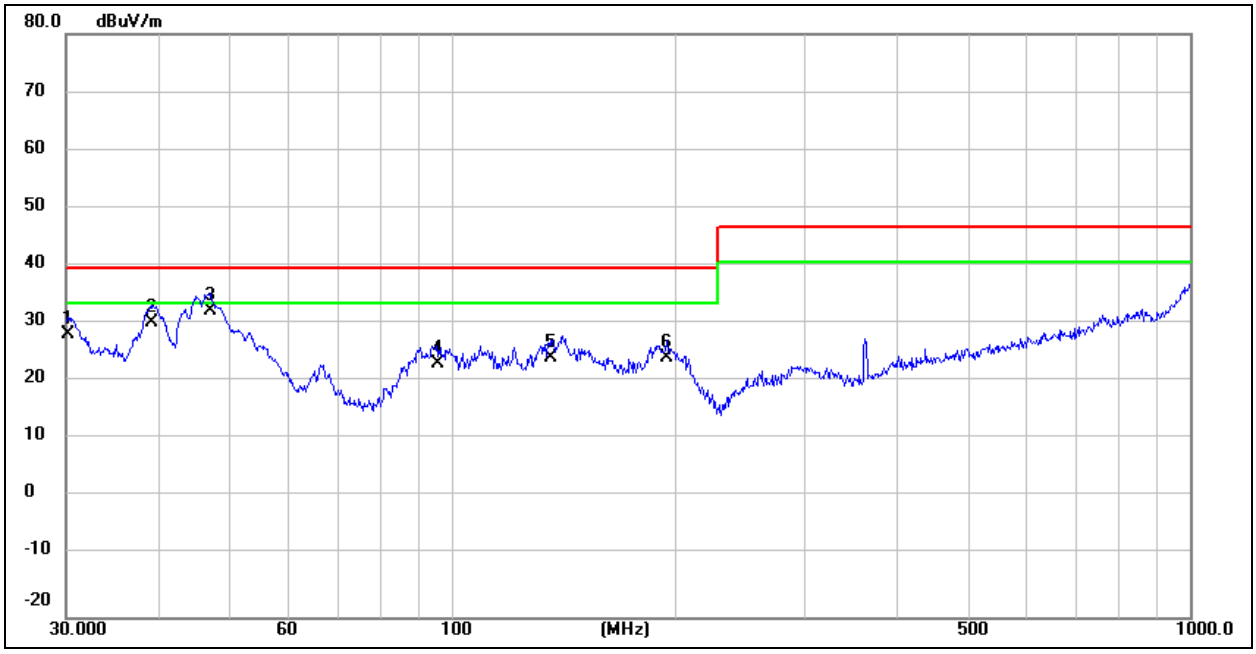
(2) All readings are Peak unless otherwise stated QP in column of 『Note』. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform.

(3) Measuring frequency range from 30MHz to 1000MHz.

(4) If the peak scan value lower limit more than 20dB, then this signal data does not show in table.

(5) This test was carried out in 3m anechoic chamber.

Model No.:	YSD15S-0602500
Phase:	Vertical
Test Power :	AC 230V/50Hz
Standard:	EN 55032 Radiation
Operating Mode :	Mode 1



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.
1	30.2111	28.40	0.14	28.54	40.00	-11.46	QP
2	39.1616	35.65	-5.03	30.62	40.00	-9.38	QP
3 *	46.9948	40.37	-7.72	32.65	40.00	-7.35	QP
4	95.4270	30.24	-6.65	23.59	40.00	-16.41	QP
5	135.9822	27.35	-2.86	24.49	40.00	-15.51	QP
6	195.1365	31.59	-7.06	24.53	40.00	-15.47	QP

Model No.:	YSD15S-0602500
Phase:	Horizontal
Test Power :	AC 230V/50Hz
Standard:	EN 55032 Radiation
Operating Mode :	Mode 1



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Det.
1	31.9546	22.47	-1.75	20.72	40.00	-19.28	QP
2	39.4371	24.03	-5.04	18.99	40.00	-21.01	QP
3	45.5348	26.45	-7.17	19.28	40.00	-20.72	QP
4	105.2718	25.75	-4.46	21.29	40.00	-18.71	QP
5	127.2176	26.02	-3.24	22.78	40.00	-17.22	QP
6 *	205.6751	34.02	-6.95	27.07	40.00	-12.93	QP

3.3 HARMONICS CURRENT MEASUREMENT

3.3.1 LIMITS OF HARMONICS CURRENT MEASUREMENT

Table 1 – 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
$15 \le n \le 39$	$0,15 \frac{15}{n}$
Even harmonics	
2	1,08
4	0,43
6	0,30
$8 \le n \le 40$	$0,23 \frac{8}{n}$

Table 2 – Limits for Class C equipment

Harmonic order n	Maximum permissible harmonic currrent expressed as a percentage of the input current at the fundamental frequency %
2	2
3	$30 \cdot \lambda$ *
5	10
7	7
9	5
$11 \le n \le 39$ (odd harmonics only)	3
* λ is the circuit power factor	

Table 3 – Limits for Class D equipment

Harmonic order n	Maximum permissible harmonic current per watt mA/W	Maximum permissible harmonic current A
3	3,4	2,30
5	1,9	1,14
7	1,0	0,77
9	0,5	0,40
11	0,35	0,33
$13 \le n \le 39$ (odd harmonics only)	$\frac{3,85}{n}$	See Table 1

3.3.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Harmonic and Flicker Analyzer	EMC-PARTNER	HAR1000-1P	103488-0264	2023-07-01

Remark: ” N/A” denotes No Model No. / Serial No. and No Calibration specified.

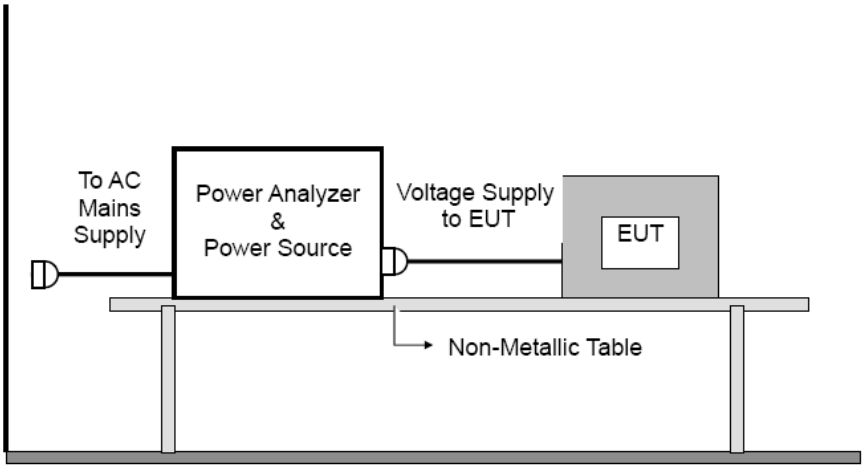
3.3.3 TEST PROCEDURE

a. Specification Reference: EN IEC 61000-3-2.
b. All types of harmonic current and/or voltage fluctuation in this report are assessed by direct measurement using flicker-meter.
c. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.3.4 DEVIATION FROM TEST STANDARD

No deviation

3.3.5 TEST SETUP



3.3.6 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 3.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

3.3.7 TEST RESULTS

The power consumption is less than 75W, so no limit is applicable.

3.4 VOLTAGE FLUCTUATION AND FLICKS MEASUREMENT

3.4.1 LIMITS OF VOLTAGE FLUCTUATION AND FLICKSMEASUREMENT

Tests	Limits		Descriptions
	IEC555-3	IEC/EN 61000-3-3	
Pst	≤ 1.0, Tp= 10 min.	≤ 1.0, Tp= 10 min.	Short Term Flicker Indicator
Plt	N/A	≤ 0.65, Tp=2 hr.	Long Term Flicker Indicator
dc	≤ 3 %	≤ 3.3 %	Relative Steady-State V-Chang
dmax	≤ 4 %	≤ 4 %	Maximum Relative V-change
d (t)	N/A	≤ 3.3% for > 500 ms	Relative V-change characteristic

3.4.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Harmonic and Flicker Analyzer	EMC-PARTNER	HAR1000-1P	103488-0264	2023-07-01

Remark: ” N/A” denotes No Model No. / Serial No. and No Calibration specified.

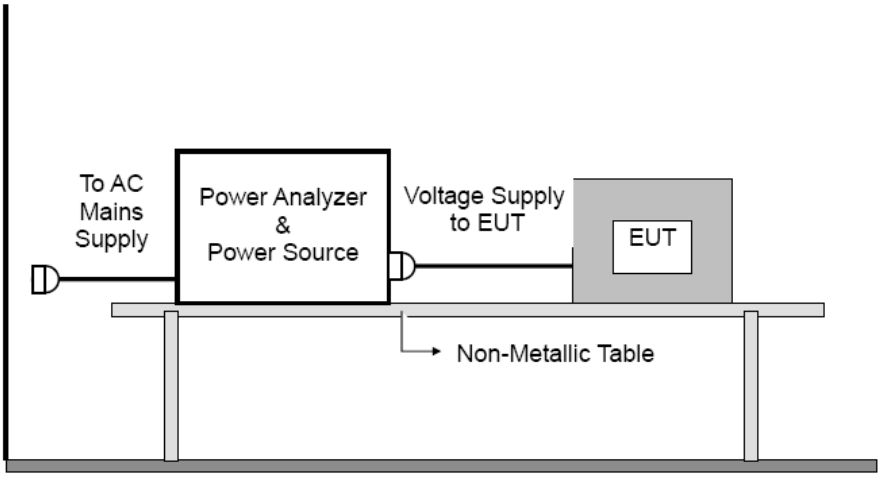
3.4.3 TEST PROCEDURE

a. Specification Reference: EN 61000-3-3.
b. All types of harmonic current and/or voltage fluctuation in this report are assessed by direct measurement using flicker-meter.
c. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.4.4 DEVIATION FROM TEST STANDARD

No deviation

3.4.5 TEST SETUP



3.4.6 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 3.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

3.4.7 TEST RESULTS

According EN 61000-3-3 Clause 6.1:" ... Tests need not be made on equipment which is unlikely to produce significant voltage fluctuations or flicker. ..."

The EUT unlikely to produce significant voltage fluctuation. Therefore no test was applied.

4. IMMUNITY TEST

4.1 STANDARD COMPLIANCE/SERVRITY LEVEL/CRITERIA

Tests Standard No.	Test Specification	Test Mode Test Ports	Perform. Criteria	Remark
1. ESD IEC 61000-4-2	8KV air discharge 4KV contact discharge	Direct Mode	B	PASS
	4KV HCP discharge 4KV VCP discharge	Indirect Mode	B	PASS
2. RS IEC 61000-4-3	80 MHz to 1000 MHz, 1800, 2600, 3500, 5000 MHz 3V/m(rms), 1 KHz, 80%, AM modulated	Enclosure	A	PASS
3. EFT/Burst IEC 61000-4-4	1.0KV(peak) 5/50ns Tr/Th 5KHz Repetition Freq.	AC Power Port	B	PASS
	0.5 KV(peak) 5/50ns Tr/Th 5KHz Repetition Freq.	CTL/Signal Data Line Port	B	N/A
4. Surges IEC 61000-4-5	1 KV(5P/5N) 1.2/50(8/20) Tr/Th us	L-N	B	PASS
	2 KV(5P/5N) 1.2/50(8/20) Tr/Th us	L-PE N-PE	B	N/A
5 Injected Current IEC 61000-4-6	0.15 MHz to 10 MHz 3V (rms), 10 MHz to 30 MHz 3V ~1V (rms), 30 MHz to 80 MHz 1V(rms), 1KHz 80%, AM Modulated 150Ω source impedance	CTL/Signal Port	A	N/A
		AC Power Port	A	PASS
		DC Power Port	A	N/A
6. Power Frequency Magnetic Field IEC 61000-4-8	50Hz or 60Hz, 1A/m	Enclosure	A	N/A
7. Volt. Interruptions Volt. Dips IEC 61000-4-11	Voltage dip > 95% / 30% Interruption > 95%	AC Power Port	B / C C See Remark(2)	PASS

* Remark:

(1) "N/A": denotes test is not applicable in this Test Report.

(2) Voltage dip: ＞95% reduction – Performance Criteria **B**
Voltage dip: 30% reduction – Performance Criteria **C**
Voltage Interruption: ＞95% reduction – Performance Criteria **C**

4.2 GENERAL PERFORMANCE CRITERIA

According to **EN 55035** standard, the general performance criteria as following:

Criterion A	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 is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
Criterion B	After the test, the equipment shall continue to operate as intended without operator Intervention. No degradation of performance or loss of function is allowed, after the application of the phenomenon 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. During the test, degradation of performance is allowed. However, no change of operating state if stored data allowed to persist after the test. 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.
Criterion 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. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

4.3 GENERAL PERFORMANCE CRITERIA TEST SETUP

The EUT tested system was configured as the statements of **3.1.6** Unless otherwise a special operating condition is specified in the follows during the testing.

4.4 ESD TESTING

4.4.1 TEST SPECIFICATION

Basic Standard:	EN 55035 (IEC 61000-4-2)
Discharge Impedance:	330 ohm / 150 pF
Required Performance	B
Discharge Voltage:	Air Discharge: 2kV/4kV/8kV (Direct) Contact Discharge: 2kV/4kV (Direct/Indirect)
Polarity:	Positive & Negative
Number of Discharge:	Air Discharge: min. 20 times at each test point Contact Discharge: min. 200 times in total
Discharge Mode:	Contact and Air
Discharge Period:	1 second minimum

4.4.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Electrostatic discharge generator	Noiseken	ESS-2002EX	ESS1111157	2023-07-01

Remark: ” N/A” denotes No Model No. / Serial No. and No Calibration specified.

4.4.3 TEST PROCEDURE

The equipment under test including associated cabling was configured on but insulted from, using a 0.5mm isolator, a horizontal coupling plane fitted to the top of a 0.8 m non-conductive table for table-top equipment; and on a 0.1 m insulated support for floor standing equipment; above a ground reference plane all within a test laboratory.

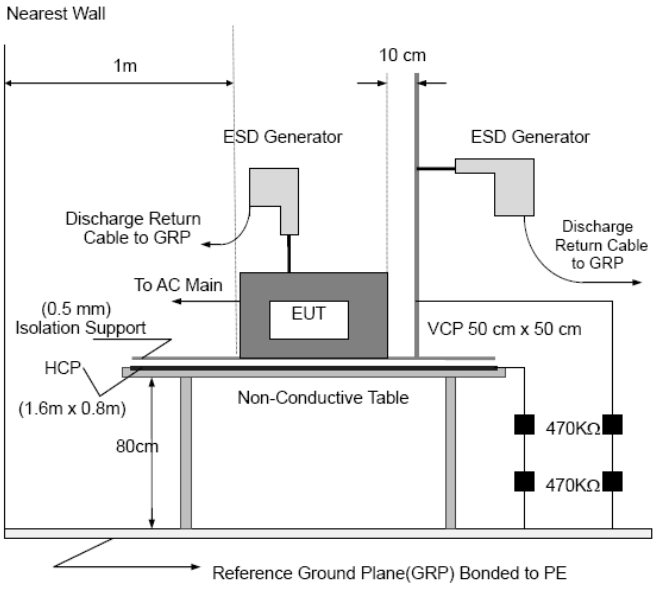
Using the air discharge method for non-metallic parts, contact discharge method for metallic parts with both vertical and horizontal couple plane discharge methods for the sides of the equipment under test, the required electrostatic discharge voltage levels in both voltage polarities were applied at the detailed pulse repartition rate.

During this testing any anomalies in the equipment under tests performance was recorded.

4.4.4 DEVIATION FROM TEST STANDARD

No deviation

4.4.5 TEST SETUP



For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.4.6 TEST RESULTS

Mode	Air Discharge								Contact Discharge							
	2KV		4KV		8KV		15KV		2KV		4KV		6KV		8KV	
Location	P	N	P	N	P	N	P	N	P	N	P	N	P	N	P	N
1	--	--	A	A	A	A	--	--	--	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--	--	A	A	A	A	--	--	--	--
3	-	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6	-	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
8	--	--	--	--	-	--	--	--	--	--	--	--	--	--	--	--
9	--	--	--	--	-	--	--	--	--	--	--	--	--	--	--	--
Criteria	**B**								**B**							
Result	**A**								**A**							
Judgment	**PASS**								**PASS**							

Mode	HCP Discharge								VCP Discharge							
	2KV		4KV		6KV		8KV		2KV		4KV		6KV		8KV	
Location	P	N	P	N	P	N	P	N	P	N	P	N	P	N	P	N
1	-	--	A	A	--	--	--	--	-	--	A	A	--	--	--	--
2	--	--	A	A	--	--	--	--	--	--	A	A	--	--	--	--
3	--	--	A	A	--	--	--	--	--	--	A	A	--	--	--	--
4	-	--	A	A	--	--	--	--	-	--	A	A	--	--	--	--
Criteria	**B**								**B**							
Result	**A**								**A**							
Judgment	**PASS**								**PASS**							

Note:

1) P/N denotes the Positive/Negative polarity of the output voltage.
2) Test condition:
   Direct discharges: Minimum 50 times (Positive/Negative) at each point. Air discharges / Indirect (HCP/VCP): Minimum 20 times (Positive/Negative) at each point.
3) Test location(s) in which discharge (Air and contact discharge) to be described as following
4) The Indirect (HCP/VCP) discharges description of test point as following:
   1.left side 2.right side 3.front side 4.rear side
5) N/A - denotes test is not applicable in this test report
7) Criteria B: The EUT function loss during the test, but self-recoverable after the test.

Test location description:

No	Description
1	Each nonconductive location touchable by hand
2	Each conductive location touchable by hand

4.5 RS TESTING

4.5.1 TEST SPECIFICATION

Basic Standard:	EN 55035 (IEC 61000-4-3)
Required Performance	A
Frequency Range:	80 MHz - 1000 MHz, 1800, 2600, 3500, 5000 MHz
Field Strength:	3 V/m
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of fundamental
Polarity of Antenna:	Horizontal and Vertical
Test Distance:	3 m
Antenna Height:	1.5 m
Dwell Time:	at least 3 seconds

4.5.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Signal Generator	Aglilet	N5171B-50B	MY53050160	2023-07-01
2	Amplifier	A&R	150W1000M3	313157	2023-07-01
3	Amplifier	A&R	50SIG6M1	0342835	2023-07-01
4	Power Meter	Boonton	4232A	150102	2023-07-01
5	Isotropic Field Probe	A&R	FL7006	0342652	2023-07-01
6	Log-periodic Antenna	SCHWARZBECK	STLP 9128E	9128E-012	2023-07-01
7	Microwave Log-periodic Antenna	SCHWARZBECK	STLP9149	9149.222	2023-07-01

Remark: ” N/A” denotes No Model No. / Serial No. and No Calibration specified.

4.5.3 TEST PROCEDURE

The equipment under test including associated cabling was configured, on a 0.8 m non-conductive table for table-top equipment and on a 0.1 m insulated support for floor standing equipment; with a pre-calibrated semi anechoic chamber.

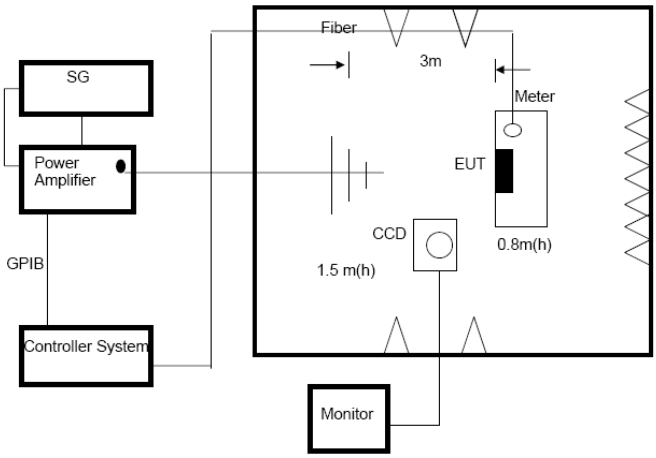
All four sides of the equipment under test were subjected to the required RF field strength, modulated as described, swept over the frequency range of test with the antenna positioned in both horizontal and vertical polarizations.

During this testing any anomalies in the equipment under tests performance was recorded.

4.5.4 DEVIATION FROM TEST STANDARD

No deviation

4.5.5 TEST SETUP



For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.5.6 TEST RESULTS

Frequency Range (MHz)	Polarity of Antenna	R.F. Field Strength	Azimuth	Perform. Criteria	Results	Judgment
80MHz - 1000MHz	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	A	A	PASS
			Rear			
			Left			
			Right			

Frequency Range (MHz)	Polarity of Antenna	R.F. Field Strength	Azimuth	Perform. Criteria	Results	Judgment
1800, 2600, 3500, 5000 MHz	H / V	3 V/m (rms) AM Modulated 1000Hz, 80%	Front	A	A	PASS
			Rear			
			Left			
			Right			

Note:

1) H/V denotes the Horizontal/Vertical polarity of Antenna.
2) N/A - denotes test is not applicable in this test report.
3) Criteria A: There was no change operated with initial operating during the test.
4) Criteria B: The EUT function loss during the test, but self-recoverable after the test.
5) Criteria C: The system shut down during the test.

4.6 EFT/BURST TESTING

4.6.1 TEST SPECIFICATION

Basic Standard:	EN 55035 (IEC 61000-4-4)
Required Performance	B
Test Voltage:	Power Line：±1 kV
Polarity:	Positive & Negative
Impulse Frequency:	5 kHz
Impulse Wave shape :	5/50 ns
Burst Duration:	15 ms
Burst Period:	300 ms
Test Duration:	Not less than 1 min.

4.6.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EMC Immunity Test System	EMC-PARTNER	TRANSIENT 2000	1129	2023-07-01

Remark: ” N/A” denotes No Model No. / Serial No. and No Calibration specified.

4.6.3 TEST PROCEDURE

The equipment under test including associated cabling was configured on but insulted from, using a 0.1m isolator, a horizontal coupling plane fitted to the top of a 0.8 m non-conductive table for table-top equipment; and on a 0.1 m insulated support for floor standing equipment; above a ground reference plane all within a test laboratory.

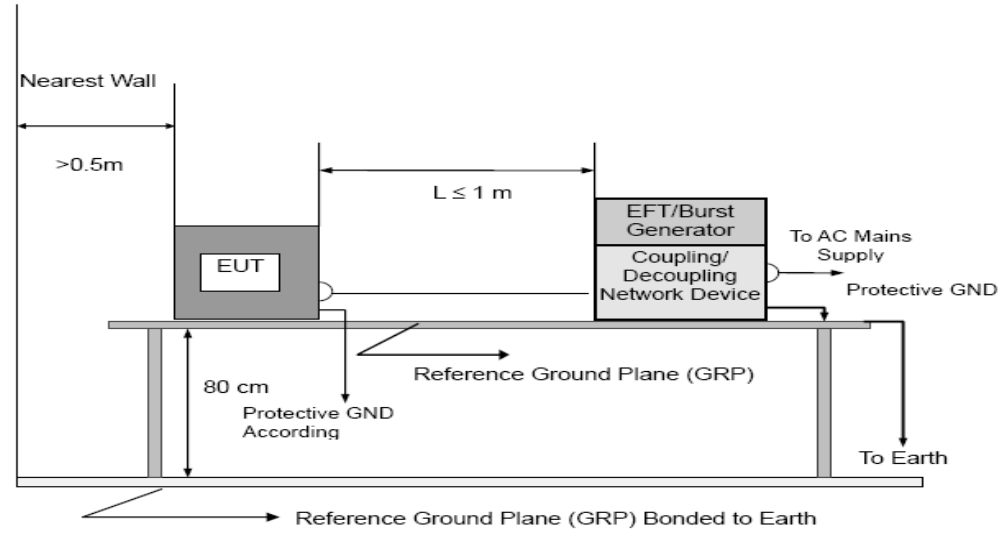
Using a CDN for power ports, capacitive coupling clamp for signal and control ports and a 33 nF coupling capacitor for earth ports, the required fast transient burst voltage levels in both voltage polarities were applied at the detailed pulse repartition rate and duration of test.

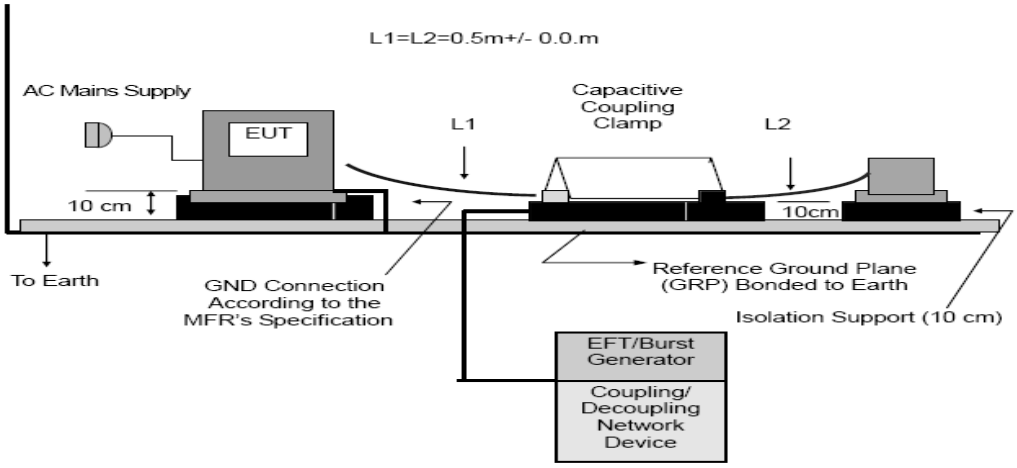
During this testing any anomalies in the equipment under tests performance was recorded.

4.6.4 DEVIATION FROM TEST STANDARD

No deviation

4.6.5 TEST SETUP





For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.6.6 TEST RESULTS

Mode	AC Power Line		DC Power Line		Signal/Control Line	
Test Level	1KV		0.5KV		0.5KV	
Port(s)	Polarity	Results	Polarity	Results	Polarity	Results
Line (L)	P	A	P		P	
	N	A	N		N	
Neutral (N)	P	A	P		P	
	N	A	N		N	
Ground (PE)	P		P		P	
	N		N		N	
Signal/Control Line	P		P		P	
	N		N		N	
Criteria	**B**		**B**		**B**	
Result	**A**		**--**		**--**	
Judgment	**PASS**		**N/A**		**N/A**	

1) P/N denotes the Positive/Negative polarity of the output voltage.

2) N/A - denotes test is not applicable in this test report

3) Criteria A: There was no change operated with initial operating during the test.

4) Criteria B: The EUT function loss during the test, but self-recoverable after the test.

5) Criteria C: The system shut down during the test.

4.7 SURGE TESTING

4.7.1 TEST SPECIFICATION

Basic Standard:	EN 55035 (IEC 61000-4-5)
Required Performance	B
Wave-Shape:	Combination Wave 1.2/50 us Open Circuit Voltage 8 /20 us Short Circuit Current
Test Voltage:	Power Line：0.5 kV, 1 kV, 2 kV
Surge Input/Output:	L-N, L-PE, N-PE
Generator Source:	2 ohm between networks
Impedance:	12 ohm between network and ground
Polarity:	Positive/Negative
Phase Angle:	0 /90/180/270
Pulse Repetition Rate:	1 time / min. (maximum)
Number of Tests:	5 positive and 5 negative at selected points

4.7.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	EMC Immunity Test System	EMC-PARTNER	TRANSIENT 2000	1129	2023-07-01

Remark: ” N/A” denotes No Model No. / Serial No. and No Calibration specified.

4.7.3 TEST PROCEDURE

The equipment under test including associated cabling was configured, on a 0.8 m non-conductive table for table-top equipment and on a 0.1 m insulated support for floor standing equipment above a ground reference plane all within a test laboratory.

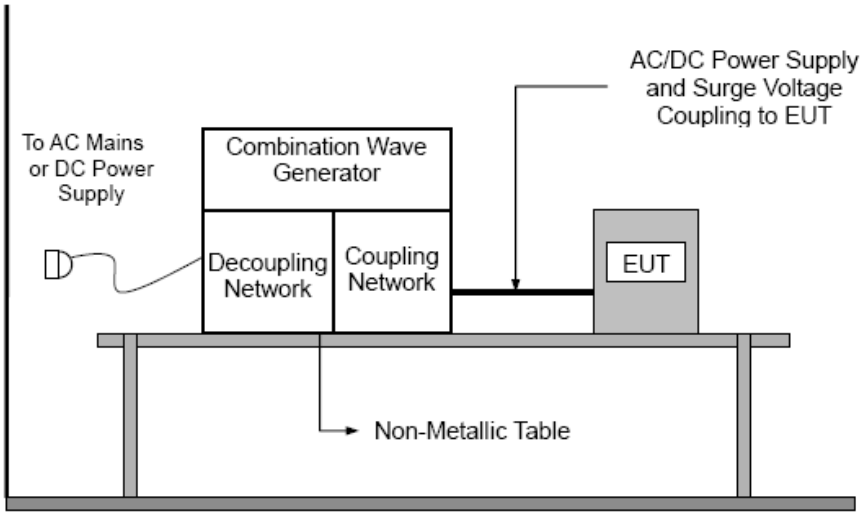
Using CDNs for power ports and appropriate coupling methods for applicable signal and control ports, the required number of surges was applied for each surge voltage level using both positive and negative surge voltage polarities. Surges were applied at the power line frequency phase angles and repartition rates detailed.

During this testing any anomalies in the equipment under tests performance was recorded.

4.7.4 DEVIATION FROM TEST STANDARD

No deviation

4.7.5 TEST SETUP



For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.7.6 TEST RESULTS

Wave Form / EUT Ports Tested	1.2/50(8/20) us						Criteria	Judgment
	Polarity	Phase	Voltage					
			0.5kV	1kV	1.5kV	2kV		
L - N	+/-	0°		B			B	PASS
	+/-	90°		B				
	+/-	180°		B				
	+/-	270°		B				
L - PE	+/-	0°					B	N/A
	+/-	90°						
	+/-	180°						
	+/-	270°						
N - PE	+/-	0°					B	N/A
	+/-	90°						
	+/-	180°						
	+/-	270°						
Signal Line (N/A)	+/-	0°					B	N/A
	+/-	90°						
	+/-	180°						
	+/-	270°						
Signal Line (N/A)	+/-	0°					B	N/A
	+/-	90°						
	+/-	180°						
	+/-	270°						

Note:

1) N/A - denotes test is not applicable in this Test Report

4.8 INJECTION CURRENT TESTING

4.8.1 TEST SPECIFICATION

Basic Standard:	EN 55035 (IEC 61000-4-6)
Required Performance	A
Frequency Range:	3V (rms), 0.15MHz ~ 10MHz; 3V ~1V (rms), 10MHz ~ 30MHz; 1V (rms), 30MHz ~ 80MHz;
Field Strength:	3V (rms), 3V ~1V (rms), 1V (rms)
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of fundamental
Dwell Time:	at least 3 seconds

4.8.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Signal generator	PMM	PMM 3010	020WX30201	2023-07-01
2	Power amplifier	ROHDE&SCHWARZ	PMM6000N	21044	2023-07-01
3	COUPLING DECOUPLING NETWORK	ROHDE&SCHWARZ	FCC-801-M3-16A	121804	2023-07-01
4	6 db attenuator	Bird	25-A-MFB-06	1249877	2023-07-01

Remark: ” N/A” denotes No Model No. / Serial No. and No Calibration specified.

4.8.3 TEST PROCEDURE

The equipment under test was configured, on but insulted from, using a 0.1 m isolator, a horizontal coupling plane fitted to the top of a 0.8 m non-conductive table for table-top equipment; and on a 0.1 m insulated support for floor standing equipment; above a ground reference plane all within a test laboratory.

All associated cabling was configured, on but insulted from, using a 50 mm isolator, the same horizontal coupling plane as the equipment under test.

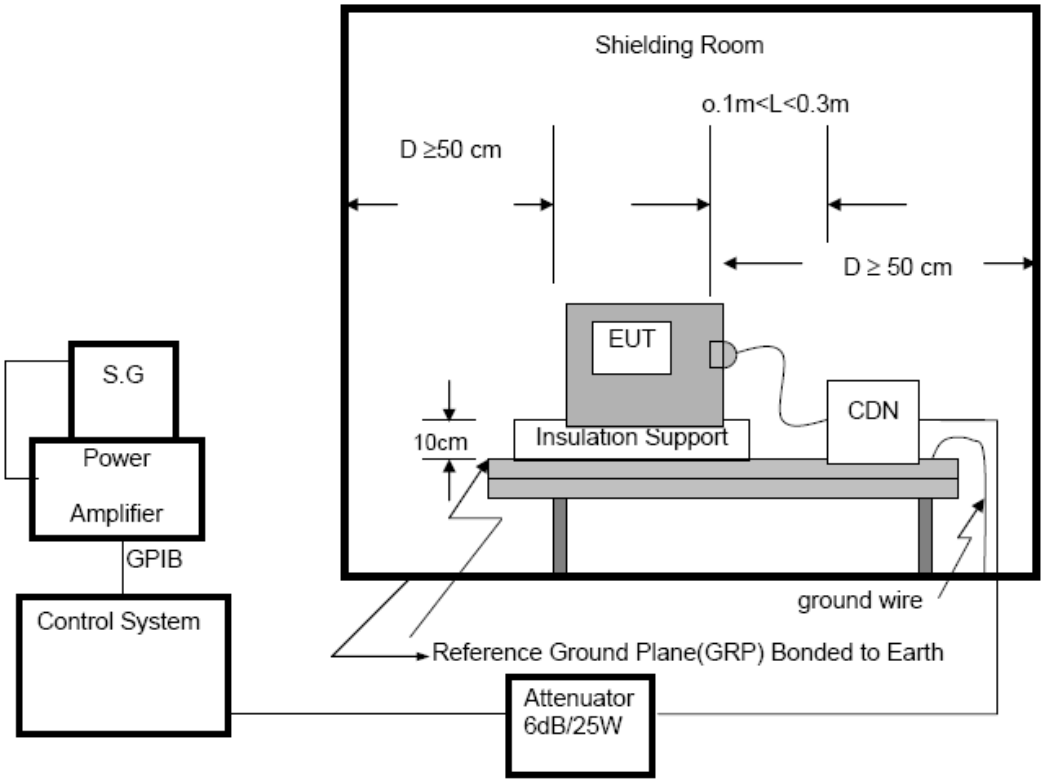
Using CDNs, EM Clamps or current clamps as appropriate, the power ports and applicable signal and control ports were subjected to required, pre calibrated RF injected signal strength, modulated as described, swept over the frequency range of test.

During this testing any anomalies in the equipment under tests performance was recorded.

4.8.4 DEVIATION FROM TEST STANDARD

No deviation

4.8.5 TEST SETUP



For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.8.6 TEST RESULTS

Test Ports (Mode)	Freq. Range MHz)	Field Strength	Perform. Criteria	Results	Judgment
Input/ Output AC. Power Port	0.15 ---10	3V(rms) AM Modulated	**A**	**A**	**PASS**
	10 ---30	3V~1V (rms) AM Modulated	**A**	**A**	**PASS**
	30 ---80	1V(rms) AM Modulated	**A**	**A**	**PASS**
Input/ Output DC. Power Port	0.15 ---10	3V(rms) AM Modulated	**A**	**--**	**N/A**
	10 ---30	3V~1V (rms) AM Modulated	**A**	**--**	**N/A**
	30 ---80	1V(rms) AM Modulated	**A**	**--**	**N/A**
Signal Line (N/A)	0.15 ---10	3V(rms) AM Modulated	**A**	**--**	**N/A**
	10 ---30	3V~1V (rms) AM Modulated	**A**	**--**	**N/A**
	30 ---80	1V(rms) AM Modulated	**A**	**--**	**N/A**

Note:

1) N/A - denotes test is not applicable in this Test Report.

4.9 VOLTAGE INTERRUPTION/DIPS TESTING

4.9.1 TEST SPECIFICATION

Basic Standard:	EN 55035 (IEC 61000-4-11)
Required Performance**:**	B (For 100% Voltage Dips) C (For 0% Voltage Dips) C (For 100% Voltage Interruptions)
Test Duration Time:	Minimum three test events in sequence
Interval between Event:	Minimum ten seconds
Phase Angle:	0°
Test Cycle:	3 times

4.9.2 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Multifunction Immunity tester	EMC-PARTNER	TRANSIENT 2000	1129	2023-07-01

Remark: ” N/A” denotes No Model No. / Serial No. and No Calibration specified.

4.9.3 TEST PROCEDURE

The equipment under test including associated cabling was configured, on a 0.8 m non-conductive table for table-top equipment and on a 0.1 m insulated support for floor standing equipment above a ground reference plane all within a test laboratory.

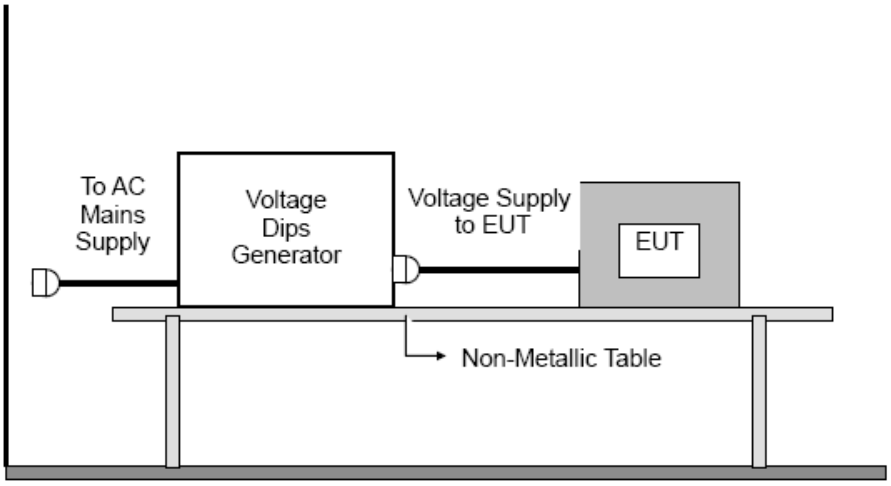
Using a programmable power supply the equipment under test was subjected to the detailed supply voltage dips and interruptions. The required supply phase synchronization and test repetition rate, detailed, was controlled by the programmable power supply.

During this testing any anomalies in the equipment under tests performance was recorded.

4.9.4 DEVIATION FROM TEST STANDARD

No deviation

4.9.5 TEST SETUP



For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.9.6 TEST RESULTS

Input Rating:230V/50Hz

Voltage Reduction	Periods	Perform Criteria	Results	Judgment
100	0.5	B	A	PASS
0	25	C	B	PASS
100	250	C	C	PASS

Input Rating:120V/60Hz

Voltage Reduction	Periods	Perform Criteria	Results	Judgment
100	0.5	B	A	PASS
0	30	C	B	PASS
100	300	C	C	PASS

Note:

1) N/A - denotes test is not applicable in this test report.

4.10 POWER-FREQUENCY MAGNETIC FILDS

4.10.1 MEASUREMENT INSTRUMENTS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	IMU4000 Test System	IMU4000 Test System	IMU4000 F-D-V	1501	2022-12-10
2	Induction coil	Induction coil	MF1000-1	1560	2022-12-10

Remark: ” N/A” denotes No Model No. / Serial No. and No Calibration specified.

4.10.2 TEST LEVEL AND PERFORMANCE CRITERION

Level	Magnetic Field Strength A/m	Performance criterion
1	1	A

Performance criteria A description: During and after the test the EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a minimum performance level specified by the manufacturer when the EUT is used as intended

.

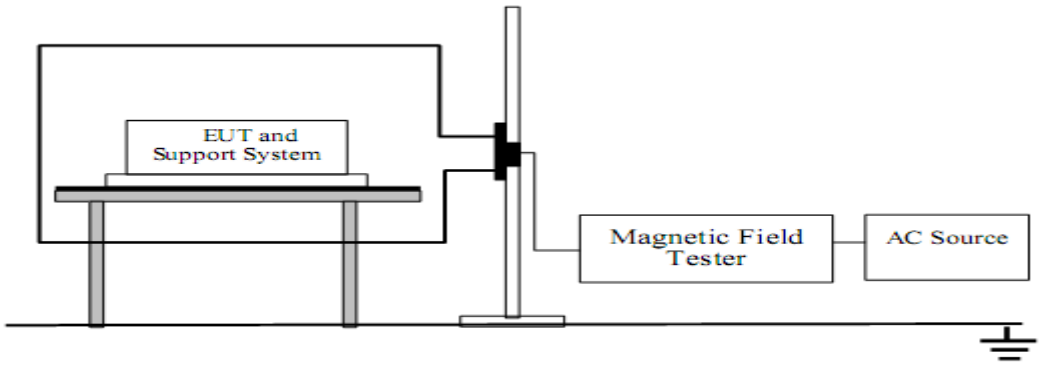
4.10.3 TEST PROCEDURE

The EUT shall be subjected to the test magnetic field by using the induction coil of standard dimensions (1m*1m) and shown in Section 13.3 The induction coil shall then be rotated by 90 ein order to expose the EUT to the test field with different orientations. .

4.10.4 DEVIATION FROM TEST STANDARD

No deviation

4.10.5 TEST SETUP



4.10.6 TEST RESULTS

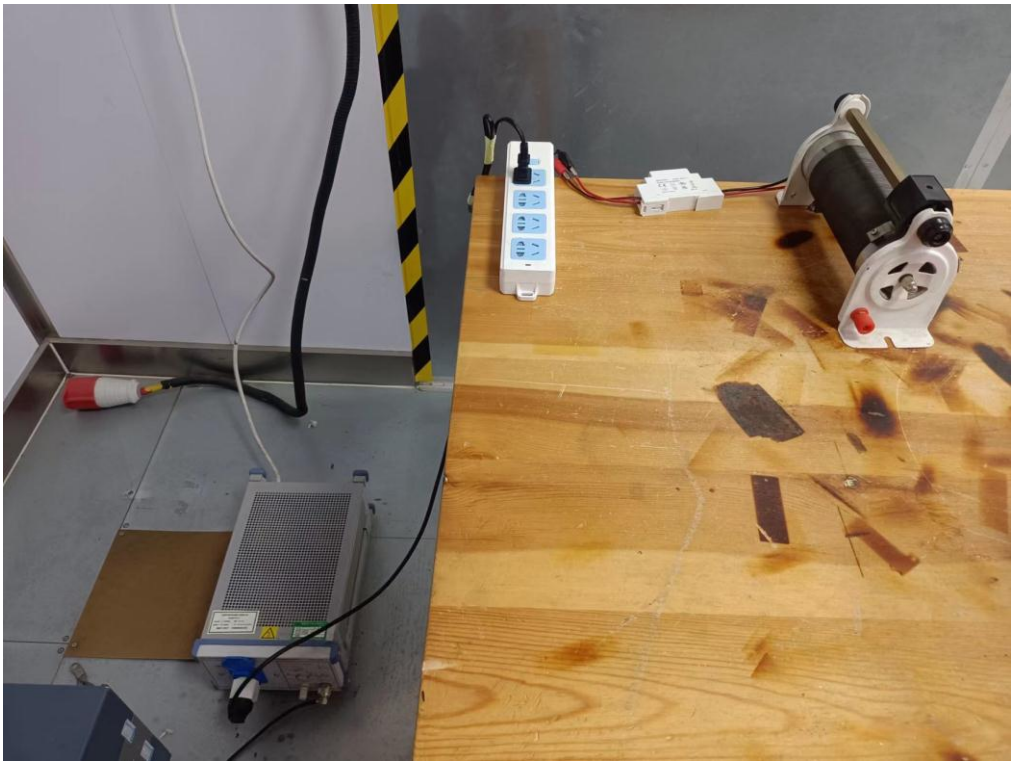
Operation Mode	Test Level	Testing Duration	Coil Orientation	Required	Observation	Result (Pass/Fail)
Full Load	1A/m	5 min / coil	**X**	**A**	**--**	**N/A**
	1A/m	5 min / coil	**Y**	**A**	**--**	**N/A**
	1A/m	5 min / coil	**Z**	**A**	**--**	**N/A**

Note:

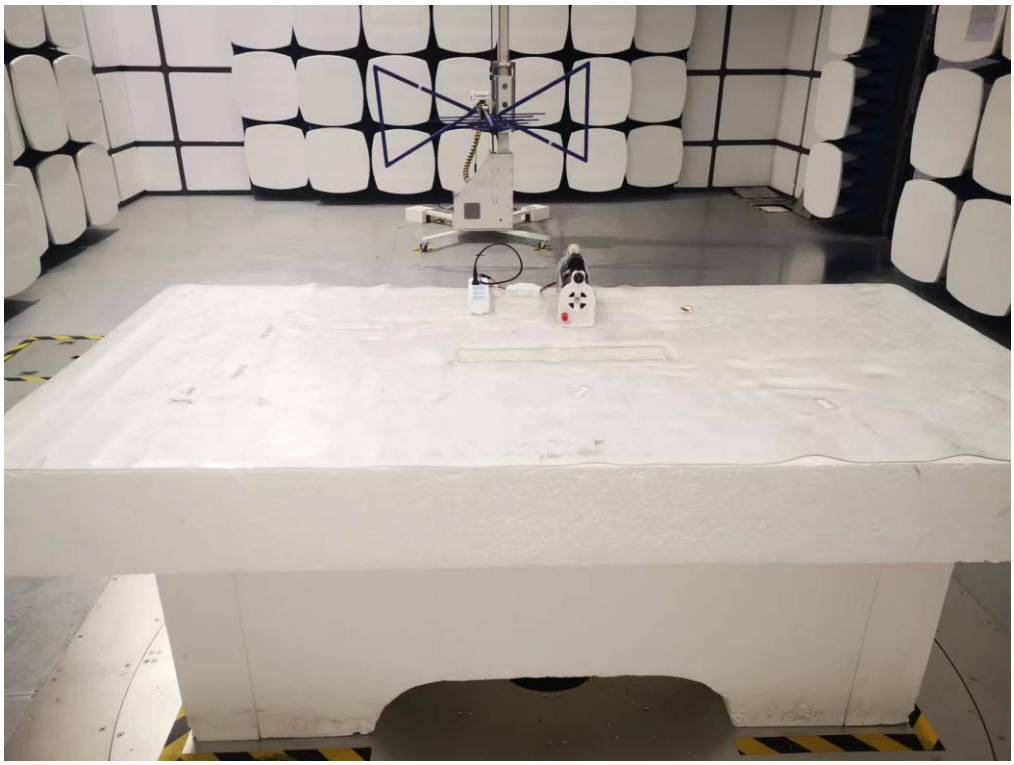
N/A - denotes test is not applicable in this test report.

5. ATTACHMENT
5.1 EUT TEST PHOTO

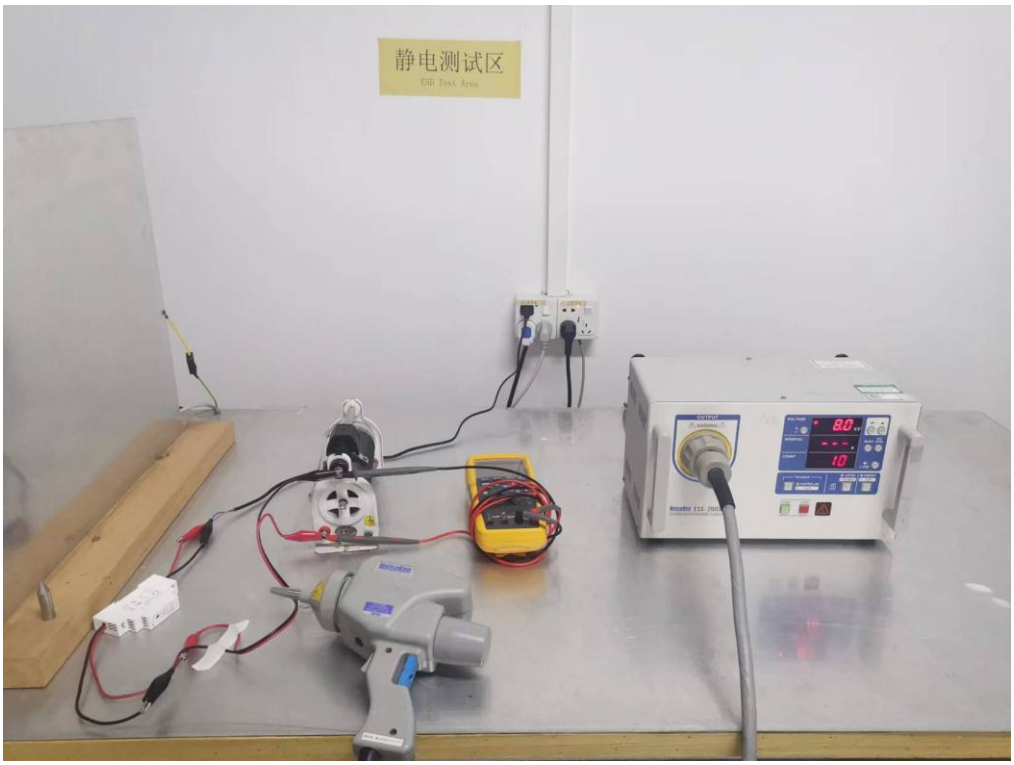
Conducted Emission Measurement Photo



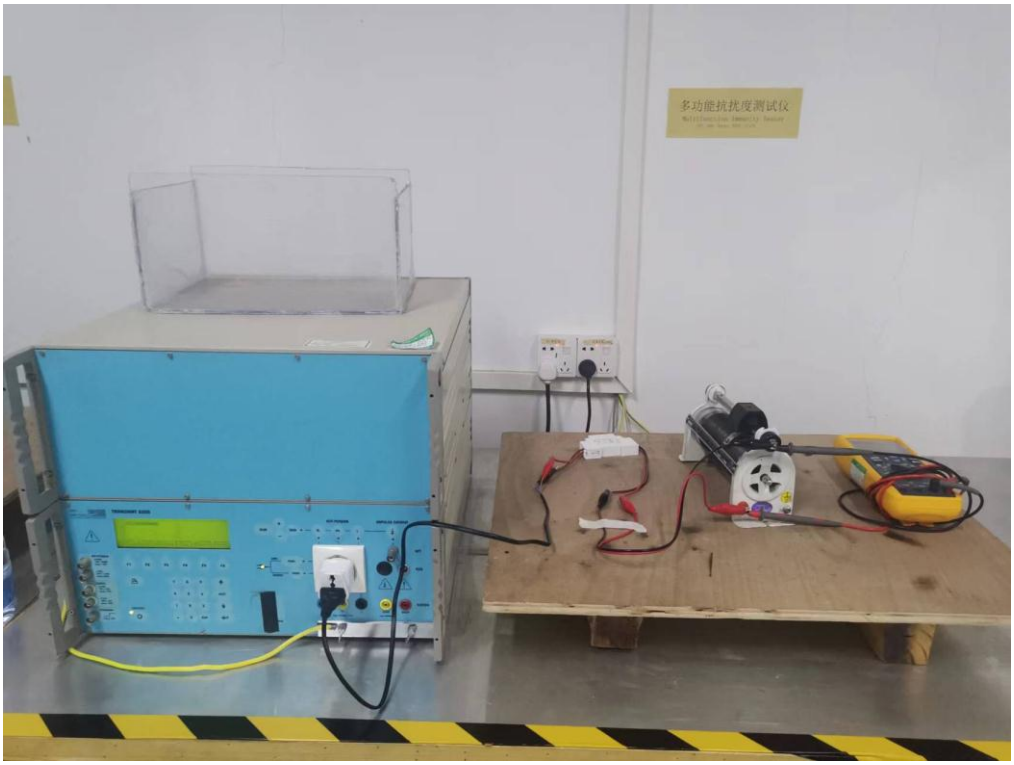
Radiated Measurement Photo



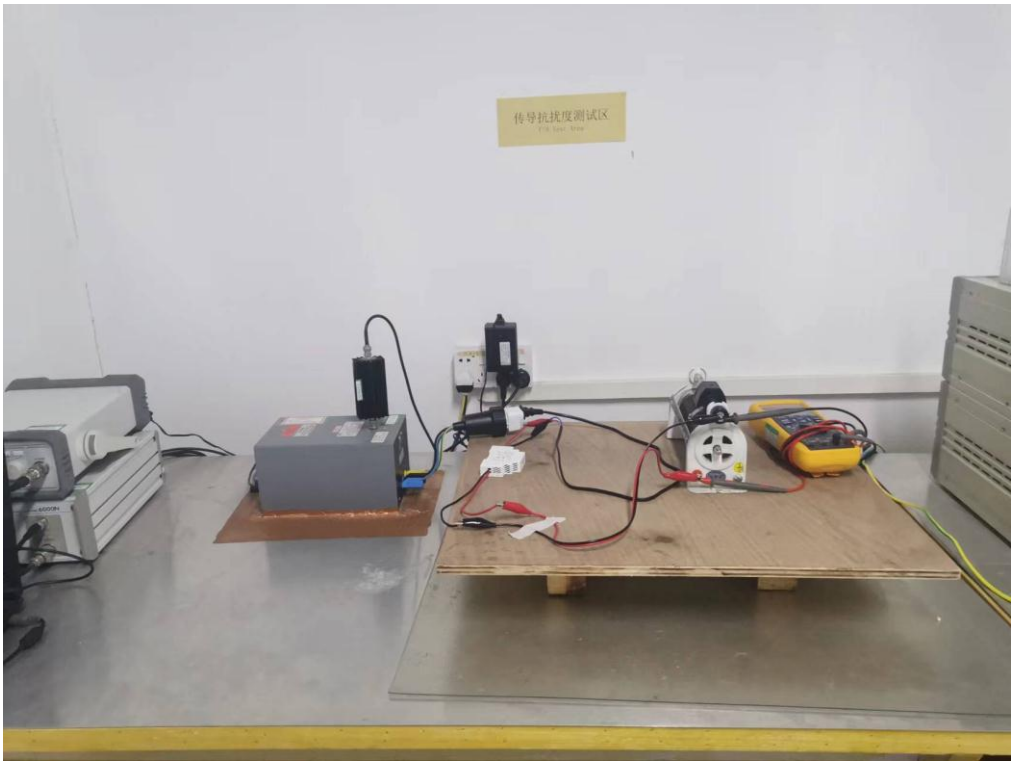
ESD Measurement Photos



Surge, EFT, DIP Measurement Photos



CS Measurement Photos



5.2 EUT PHOTO

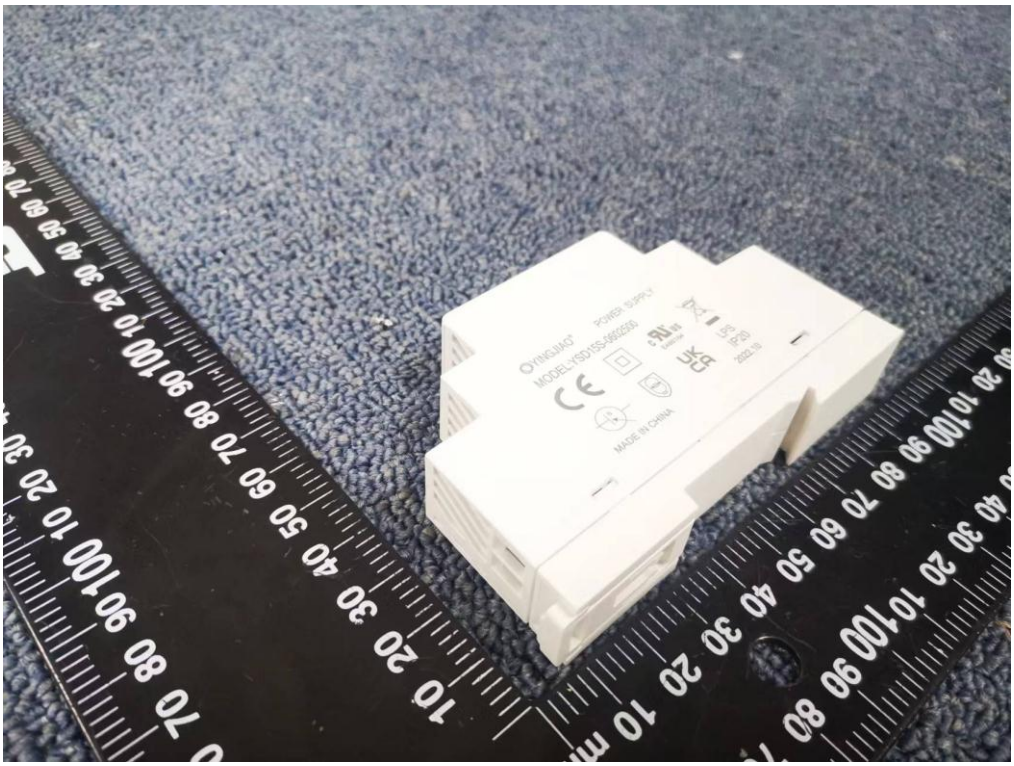


Figure 1 External view

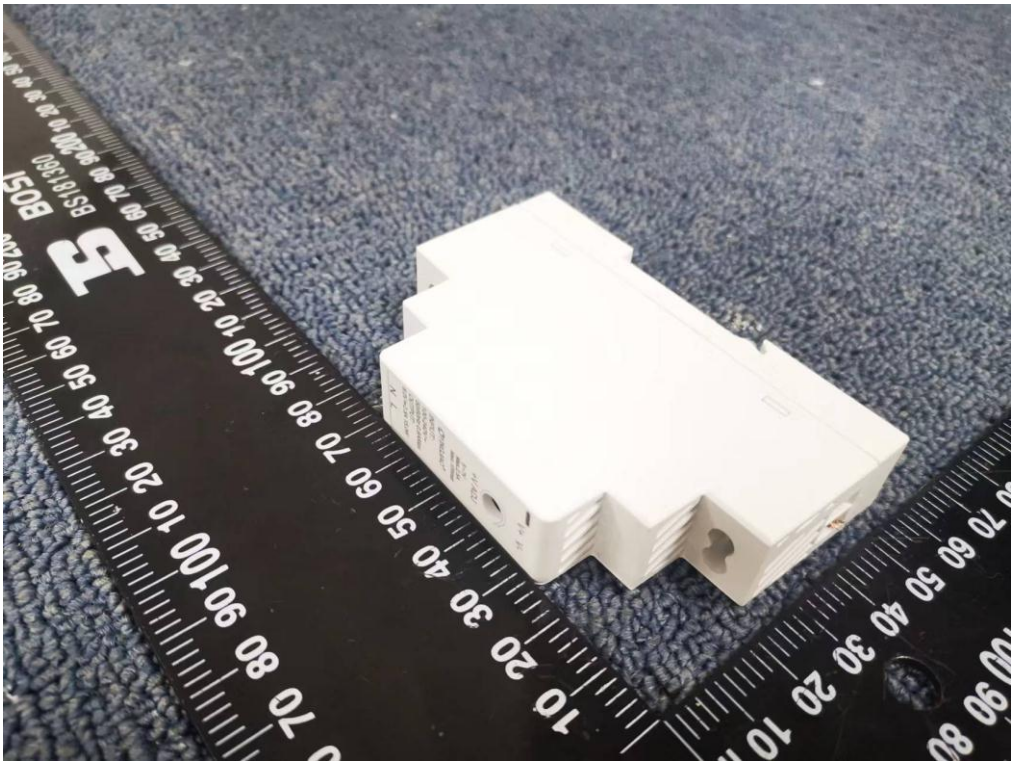


Figure 2 External view

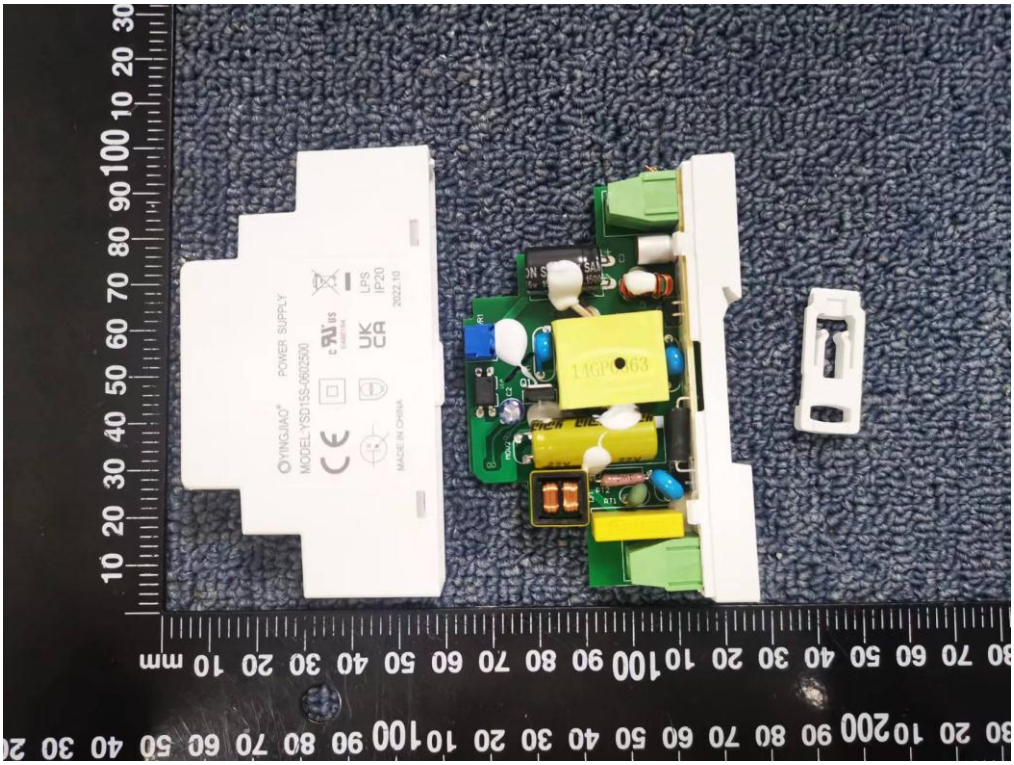


Figure 3 Internal view

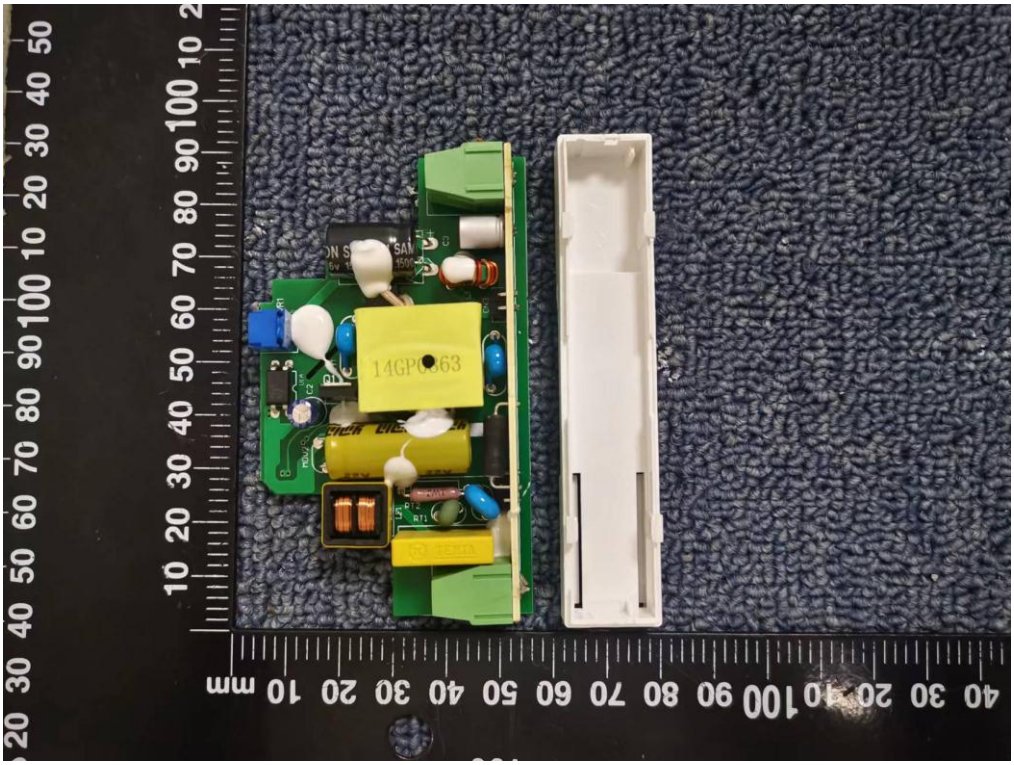


Figure 4 Internal view

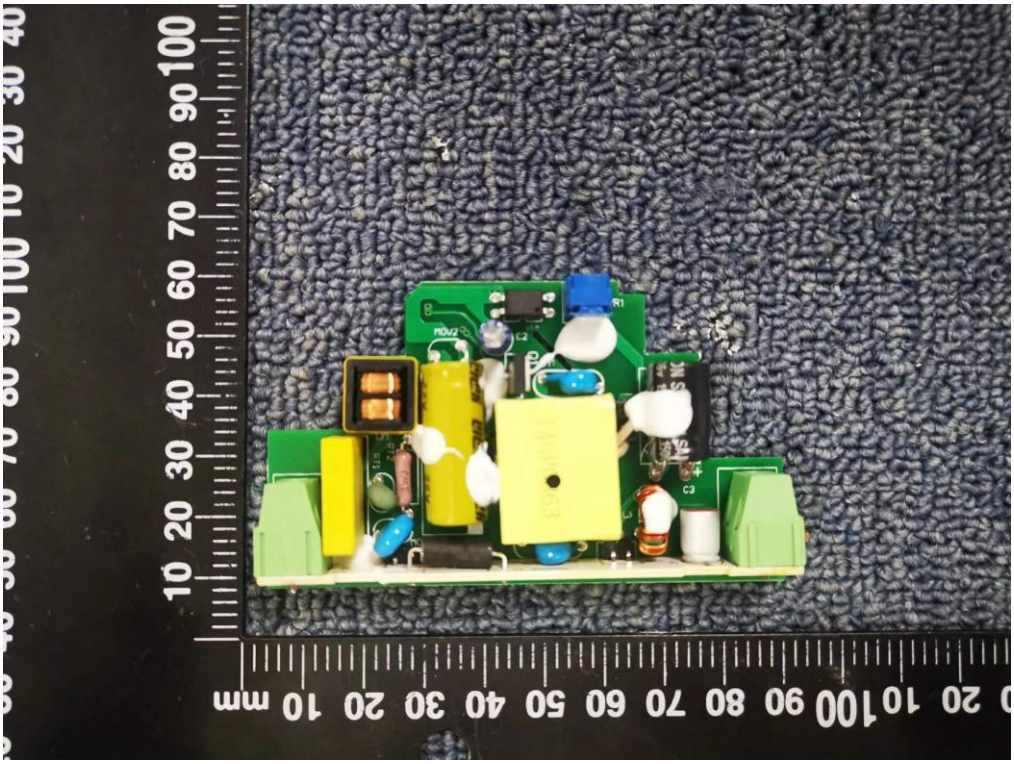


Figure 5. Top view of PCB

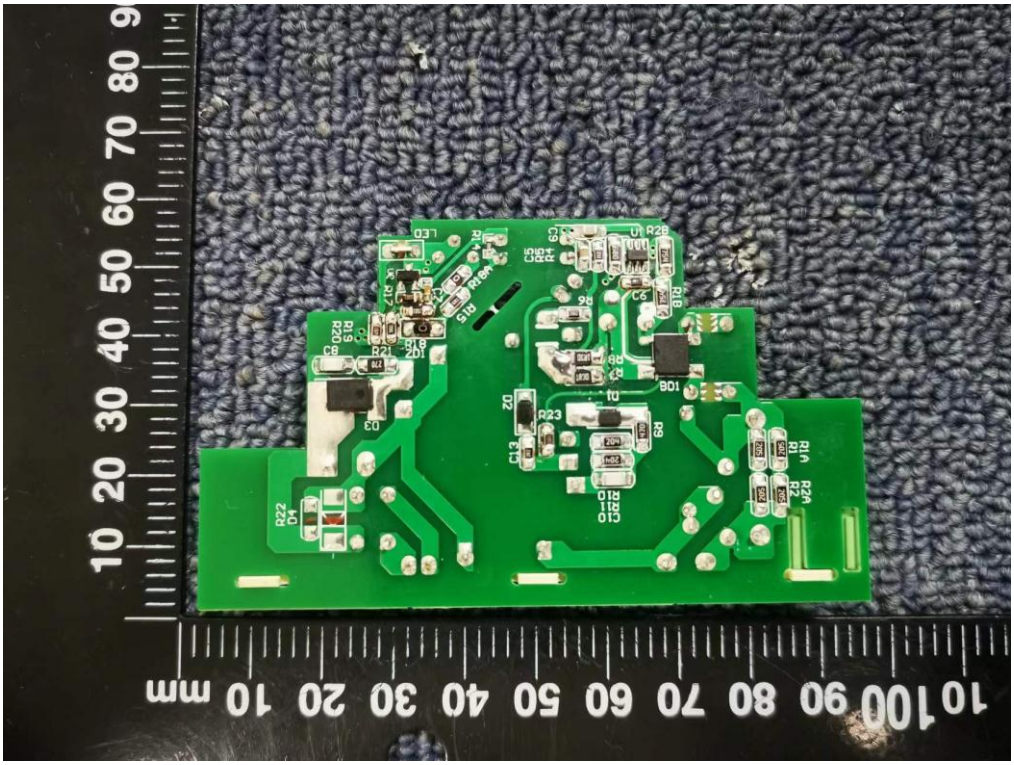


Figure 6. Bottom view of PCB

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