EMC TEST REPORT

For

Shenzhen SoStron Technology Co., Ltd.

Product Name: LED Display

Test Model(s).: P3.9mm

Report Reference No.	:	**DACE240929001EC001**
Applicant's Name	:	Shenzhen SoStron Technology Co., Ltd.
Address	:	Building D, Hongfa Science Park, 2035 Songbai Road, Baoan District, Shenzhen City.
Testing Laboratory	:	Shenzhen DACE Testing Technology Co., Ltd.
Address	:	102, Building H1, & 1/F., Building H, Hongfa Science & Technology Park, Tangtou Connunity, Shiyan Subdistrict, Bao'an District, Shenzhen, Guangdong, China
Test Specification Standard	:	**EN 55032:2015+A1:2020** **EN IEC 61000-3-2:2019+A1:2021** **EN 61000-3-3:2013+A1:2019+A2:2021** **EN 55035:2017+A11:2020**
Date of Receipt	:	September 29, 2024
Date of Test	:	September 29, 2024 to October 10, 2024
Data of Issue	:	October 10, 2024
Result	:	**Pass**

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Revision History Of Report

Version	Description	REPORT No.	Issue Date
V1.0	Original	DACE240929001EC001	October 10, 2024

NOTE1:

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EC Declaration of Conformity and compliance with all relevant EU Directives.

CE

NOTE2:

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

Compiled by:	Supervised by:	Approved by:
Amy Zhu / Test Engineer	Stone Yin / Project Engineer	Tom Chen / Manager

Shenzhen DACE Testing Technology Co., LTD. APPROVED

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1 TEST SUMMARY

1.1 Test Standards

The tests were performed according to following standards:

EN 55032:2015+A1:2020: Electromagnetic compatibility of multimedia equipment - Emission requirements
EN IEC 61000-3-2:2019+A1:2021: Electromagnetic compatibility (EMC) -- Part 3-2: Limits - Limits for harmonic current emissions (equipment input current up to and including 16A per phase)
EN 61000-3-3:2013+A1:2019+A2:2021: Electromagnetic compatibility (EMC) -- Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16A per phase and not subject to conditional connection
EN 55035:2017+A11:2020: Electromagnetic compatibility of multimedia equipment - Immunity requirements.

1.2 Summary of Test Result

Item	Standard	Method	Requirement	Result
Conducted emissions from AC mains power ports (150kHz-30MHz)	EN 55032:2015+A1:2020	Clause 7 of CISPR 16-2-1:2014/AMD1:2017	Class A	Pass
Radiated emissions (30MHz-1GHz)	EN 55032:2015+A1:2020	Clause 7.3 of CISPR 16-2-3:2016	Class A	Pass
Harmonic current emission	EN IEC 61000-3-2:2019+A1:2021	EN IEC 61000-3-2:2019+A1:2021	Class A	Pass
Voltage fluctuations and flicker		EN 61000-3-3:2013+A1:2019+A2:2021		Pass
Electrostatic discharges	EN 55035:2017+A11:2020	EN 61000-4-2: 2009	Contact Discharge: +/- 4kV Air Discharge: +/- 8kV	Pass
RF electromagnetic field disturbances	EN 55035:2017+A11:2020	EN IEC 61000-4-3: 2020	3V/m, 80%, 1kHz Amp. Mod.	Pass
Electrical fast transients / burst for AC mains power ports	EN 55035:2017+A11:2020	EN 61000-4-4: 2012	1kV; 5/50ns Tr/Th; 5kHz Repetition Frequency	Pass
Surges for AC mains power ports	EN 55035:2017+A11:2020	EN 61000-4-5: 2014 +A1: 2017	1.2/50μs Tr/Td; 1kV Line to Line; 2kV Line to Ground	Pass
Continuous induced RF disturbances for AC mains power ports (150kHz-80MHz)	EN 55035:2017+A11:2020	EN 61000-4-6: 2014	0,15 to 10MHz 3Vrms (emf), 10 to 30MHz 3V to 1Vrms(emf), 30 to 80MHz 1Vrms(emf), 80%,1kHz Amp. Mod.	Pass
Power frequency magnetic field	EN 55035:2017+A11:2020	EN 61000-4-8: 2010	50 or 60Hz, 1 A/m	Pass
Voltage dips and interruptions	EN 55035:2017+A11:2020	EN IEC 61000-4-11:2020	<5% residual voltage for 0.5 periods: B, 70% residual voltage for 25 periods: C, <5% residual voltage for 250 periods: C	Pass

2 GENERAL INFORMATION

2.1 Client Information

Applicant's Name : Shenzhen SoStron Technology Co., Ltd.
Address : Building D, Hongfa Science Park, 2035 Songbai Road, Baoan District, Shenzhen City.

Manufacturer : Shenzhen SoStron Technology Co., Ltd.
Address : Building D, Hongfa Science Park, 2035 Songbai Road, Baoan District, Shenzhen City.

2.2 Description of Device (EUT)

Product Name:	LED Display
Model/Type reference:	P3.9mm
Series Model:	sPad Pro2 P1.9, P2.6, P2.9 , P3.9mm
Trade Mark:	SoStron
Power Supply:	100-240V~ 50/60Hz 2A
Highest Internal Frequency:	f ≤ 108MHz
Classification of Equipment:	Class A

2.3 Description of Test Modes

No	Title	Description
TM1	O n	AC 230 V /50Hz

2.4 Description of Support Units

The EUT was tested as an independent device.

2.5 Equipments Used During The Test

Conducted emissions from AC mains power ports (150kHz-30MHz)					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
loop antenna	EVERFINE	LLA-2	80900L-C	2024-02-19	2025-02-18
Power absorbing clamp	SCHWARZ BECK	MESS-ELEKTRONIK	/	2024-03-25	2025-03-24
Electric Network	SCHWARZ BECK	CAT5 8158	CAT5 8158#207	/	/
Cable	SCHWARZ BECK	/	/	2024-03-20	2025-03-19
Pulse Limiter	SCHWARZ BECK	VTSD 9561-F Pulse limiter 10dB Attenuation	561-G071	2023-12-12	2024-12-11
50ΩCoaxial Switch	Anritsu	MP59B	M20531	/	/
Test Receiver	Rohde & Schwarz	ESPI TEST RECEIVER	ID:1164.6607 K03-102109-MH	2024-06-12	2025-06-11
L.I.S.N	R&S	ESH3-Z5	831.5518.52	2023-12-12	2024-12-11
L.I.S.N	SCHWARZ BECK	NSLK 8126	05055	2024-06-14	2025-06-13
Pulse Limiter	CYBERTEK	EM5010A	/	2024-09-27	2025-09-26
EMI test software	EZ -EMC	EZ	V1.1.42	/	/

Radiated emissions (30MHz-1GHz)					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Cable(HF)2	SCHWARZ BECK	50Ω	/	2024-03-20	2025-03-19
Cable(HF)1	SCHWARZ BECK	50Ω	/	2024-03-20	2025-03-19
Cable(LF)2	SCHWARZ BECK	50Ω	/	2024-03-20	2025-03-19
Cable(LF)1	SCHWARZ BECK	50Ω	/	2024-03-20	2025-03-19
control	Positioning Controller	Model MF-7802	MF780208362	2023-12-27	2024-12-26
Test Receiver	Rohde & Schwarz	ESPI TEST RECEIVER	ID:1164.6607 K03-102109-MH	2024-06-12	2025-06-11
EMI Test software	Farad	EZ -EMC	V1.1.42	/	/
Positioning Controller	/	MF-7802	/	/	/
Amplifier(18-40G)	COM-POWER	AH-1840	10100008-1	2022-04-05	2025-04-04
Horn antenna	COM-POWER	AH-1840 (18-40G)	10100008	2023-04-05	2025-04-04
Loop antenna	ZHINAN	ZN30900C	ZN30900C	2024-06-14	2026-06-13
Power amplifier(LF)	Schwarzbeck	BBV9743	9743-151	2024-06-12	2025-06-11
Power amplifier(HF)	Schwarzbeck	BBV9718	9718-282	2024-06-12	2025-06-11
Test Receiver	R&S	ESCI 3	1166.5950K03 -101431-Jq	2024-06-13	2025-06-12
Horn Antenna	Sunol Sciences	DRH-118	A091114	2023-05-13	2025-05-12
Broadband Antenna	Sunol Sciences	JB6 Antenna	A090414	2023-05-21	2025-05-20

Harmonic current emission Voltage fluctuations and flicker					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Harmonic current/scintillation analyzer	TTI	AC 2000A	72314	2023-12-12	2024-12-11
PC	/	P2L97	N/A	/	/

Electrostatic discharges					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
ESD Tester	Prima	ESD61002A	144305	2023-12-11	2024-12-10

RF electromagnetic field disturbances					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
PC	/	486DX2	/	/	/
Log-periodic Antenna	AR	AT1080	16812	/	/
Biconic Antenna	EMCO	3108	9507-2534	/	/
Isotropic Field Probe	AR	FP2000	16755	2023-12-12	2024-12-11
Isotropic Field Monitor	AR	FM2000	16829	/	/
Amplifier	AR	100W/1000M1	17028	/	/
Amplifier	AR	500A100	17034	/	/
Signal Generator	HP	8648A	3625U00573	2023-12-12	2024-12-11

Electrical fast transients / burst for AC mains power ports					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Coupling Clamp	HTEC	H3C	147147	2023-12-12	2024-12-11
Burst Tester	HTEC	HEFT 51	144303	2023-12-12	2024-12-11

Surges for AC mains power ports					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Surge Tester	Prima	SUG61005TB	PR160351170	2023-12-12	2024-12-11
CDN coupling/decoupling network	Prima	DATA-CDN-8B	PR201254826	/	/

Continuous induced RF disturbances for AC mains power ports (150kHz-80MHz)					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Attenuator	SCHLODER	DC-1GHz	HA1606	2023-12-12	2024-12-11
Injection Clamp	Rohde & Schwarz	F-2031-23MM	368	2024-03-25	2025-03-24
C/S Test Software	HUBERT	1.5.0	17901493	/	/
CDN	SCHLODER	CDN-M2+M3	17101238-0106/2017	2023-12-12	2024-12-11
Conducted Disturbances Test System	SCHLODER	CDG 6000-25	17901493-0101	2023-12-12	2024-12-11

Power frequency magnetic field					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Magnetic Field Tester	HTEC	HPFM T	144301	2023-12-12	2024-12-11

Voltage dips and interruptions					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Dips Tester	HTEC	HPFS	144304	2023-12-12	2024-12-11

2.6 Statement Of The Measurement Uncertainty

Test Item	Measurement Uncertainty
Conducted Disturbance (0.15~30MHz)	±3.41dB
Radiated Emission (Below 1GHz)	±5.79dB
Note: (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

3 Emission Test Results (EMI)

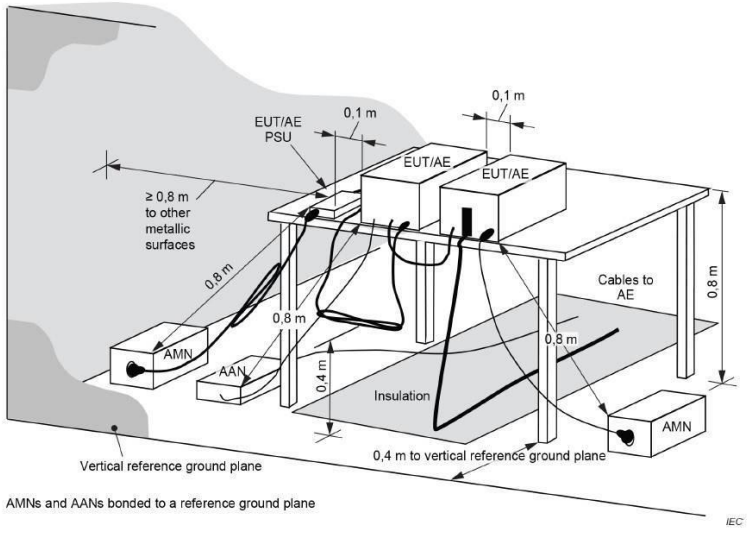
3.1 Conducted emissions from AC mains power ports (150kHz-30MHz)

Test Requirement:	Class A
Test Limit:	**Frequency Range** / **Limit (Quasi-Peak)** / **Limit (Average)** 0.15MHz to 0.5MHz / 79dB(μV) / 66dB(μV) 0.5MHz to 30MHz / 73dB(μV) / 60dB(μV) Detector: / Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz
Test Method:	Clause 7 of CISPR 16-2-1:2014/AMD1:2017
Procedure:	An initial pre-scan was performed with peak detector.Quasi-Peak or Average measurement were performed at the frequencies with maximized peak emission were detected. Remark: Level= Read Level+ Cable Loss+ LISN Factor

3.1.1 E.U.T. Operation:

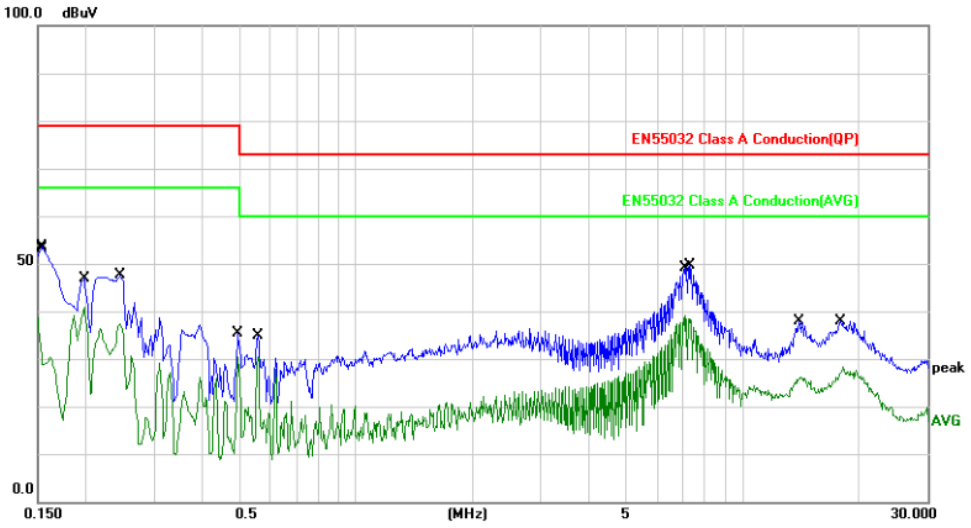
Operating Environment:					
Temperature:	22.6 °C	Humidity:	53 %	Atmospheric Pressure:	102 kPa
Pretest mode:	TM1				
Final test mode:	TM1				

3.1.2 Test Setup Diagram:



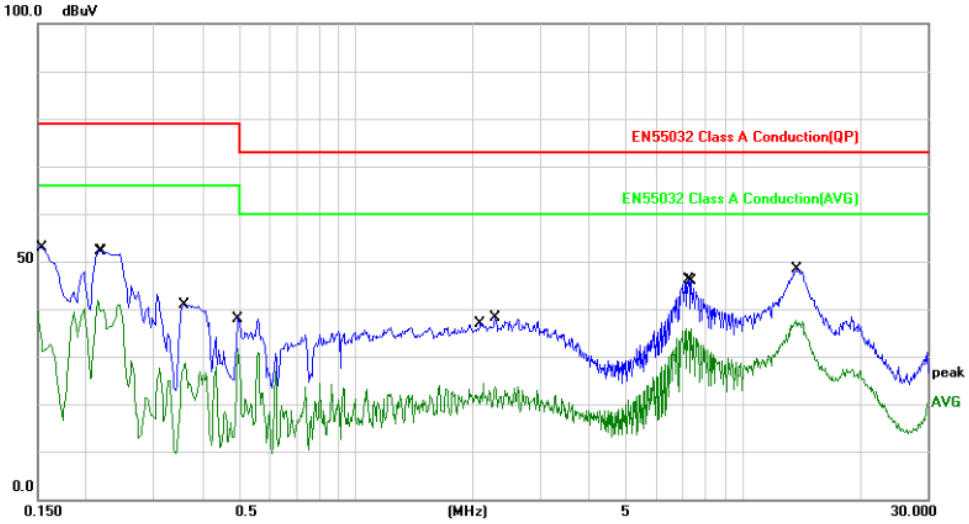
3.1.3 Test Data:

TM1 / Line: Line



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1499	28.41	10.10	38.51	66.00	-27.49	AVG	
2		0.1539	43.48	10.10	53.58	79.00	-25.42	QP	
3		0.1980	30.71	10.10	40.81	66.00	-25.19	AVG	
4		0.2460	37.47	10.09	47.56	79.00	-31.44	QP	
5		0.4940	20.35	10.08	30.43	66.00	-35.57	AVG	
6		0.5580	24.85	10.08	34.93	73.00	-38.07	QP	
7	*	7.0939	28.86	10.23	39.09	60.00	-20.91	AVG	
8		7.2899	39.37	10.24	49.61	73.00	-23.39	QP	
9		13.9219	27.31	10.44	37.75	73.00	-35.25	QP	
10		14.1139	15.68	10.44	26.12	60.00	-33.88	AVG	
11		17.9219	27.44	10.54	37.98	73.00	-35.02	QP	
12		18.1858	17.71	10.55	28.26	60.00	-31.74	AVG	

TM1 / Line: Neutral



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1500	29.51	10.10	39.61	66.00	-26.39	AVG	
2		0.1539	42.79	10.10	52.89	79.00	-26.11	QP	
3		0.2140	31.83	10.10	41.93	66.00	-24.07	AVG	
4		0.2220	41.81	10.10	51.91	79.00	-27.09	QP	
5		0.3580	30.81	10.08	40.89	79.00	-38.11	QP	
6		0.4940	21.48	10.08	31.56	66.00	-34.44	AVG	
7		2.1300	14.27	10.01	24.28	60.00	-35.72	AVG	
8		2.2900	28.10	10.02	38.12	73.00	-34.88	QP	
9		7.2140	36.00	10.23	46.23	73.00	-26.77	QP	
10		7.3460	25.64	10.24	35.88	60.00	-24.12	AVG	
11	*	13.6420	27.08	10.42	37.50	60.00	-22.50	AVG	
12		13.7100	38.04	10.42	48.46	73.00	-24.54	QP	

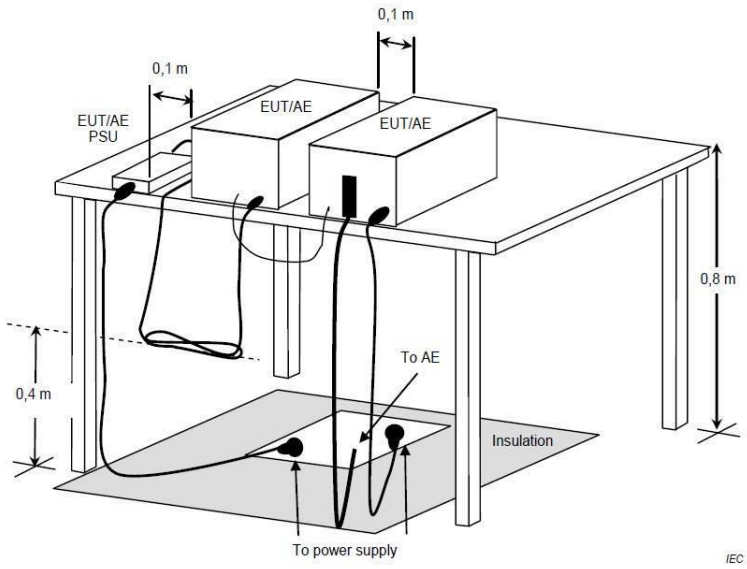
3.2 Radiated emissions (30MHz-1GHz)

Test Requirement:	Class A
Test Limit:	**Frequency (MHz)** / **Limit [dB(uV/m) at 10m]** / **Limit [dB(uV/m) at 3m]** 30 to 230 / 40 / 50 230 to 1000 / 47 / 57 Detector: / Peak for pre-scan (120kHz resolution bandwidth) 30M to 1000MHz
Test Method:	Clause 7.3 of CISPR 16-2-3:2016
Procedure:	An initial pre-scan was performed in the chamber using the spectrum analyser in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by BiConiLog antenna with 2 orthogonal polarities. Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

3.2.1 E.U.T. Operation:

Operating Environment:					
Temperature:	23 °C	Humidity:	55 %	Atmospheric Pressure:	102 kPa
Pretest mode:	TM1				
Final test mode:	TM1				

3.2.2 Test Setup Diagram:



3.2.3 Test Data:

TM1 / Polarization: Horizontal



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	110.5686	49.64	-5.96	43.68	50.00	-6.32	QP			P	
2	125.0065	48.31	-5.48	42.83	50.00	-7.17	QP			P	
3	135.5061	49.76	-5.81	43.95	50.00	-6.05	QP			P	
4 !	145.8610	51.70	-6.22	45.48	50.00	-4.52	QP			P	
5 !	156.4576	51.31	-6.83	44.48	50.00	-5.52	QP			P	
6 *	167.2366	53.50	-7.41	46.09	50.00	-3.91	QP			P	

TM1 / Polarization: Vertical



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 *	30.1053	45.98	0.67	46.65	50.00	-3.35	QP			P	
2 !	109.4116	51.82	-6.10	45.72	50.00	-4.28	QP			P	
3	120.6991	48.03	-5.36	42.67	50.00	-7.33	QP			P	
4 !	135.5061	51.74	-5.78	45.96	50.00	-4.04	QP			P	
5 !	166.6513	53.24	-7.48	45.76	50.00	-4.24	QP			P	
6	176.8878	50.62	-8.15	42.47	50.00	-7.53	QP			P	

3.3 Harmonic current emission

Test Requirement:	Class A
Test Limit:	

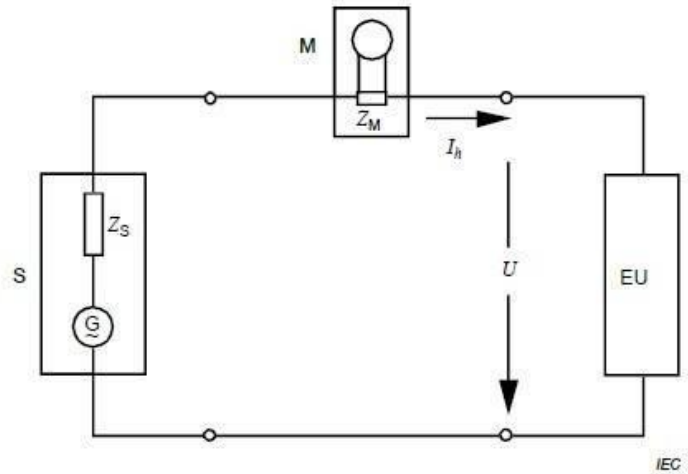
Harmonic order h	Maximum permissible harmonic current A
Odd harmonics	
3	2,30
5	1,14
7	0,77
9	0,40
11	0,33
13	0,21
$15 \le h \le 39$	$0{,}15\frac{15}{h}$
Even harmonics	
2	1,08
4	0,43
6	0,30
$8 \le h \le 40$	$0{,}23\frac{8}{h}$

Test Method:	EN IEC 61000-3-2:2019+A1:2021

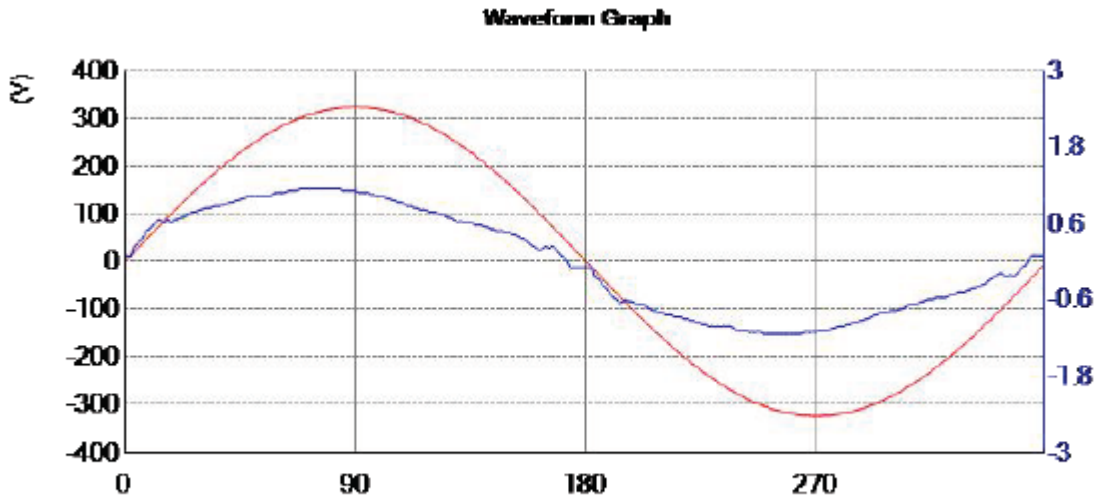
3.3.1 E.U.T. Operation:

Operating Environment:					
Temperature:	23 °C	Humidity:	55 %	Atmospheric Pressure:	102 kPa
Pretest mode:	TM1				
Final test mode:	TM1				

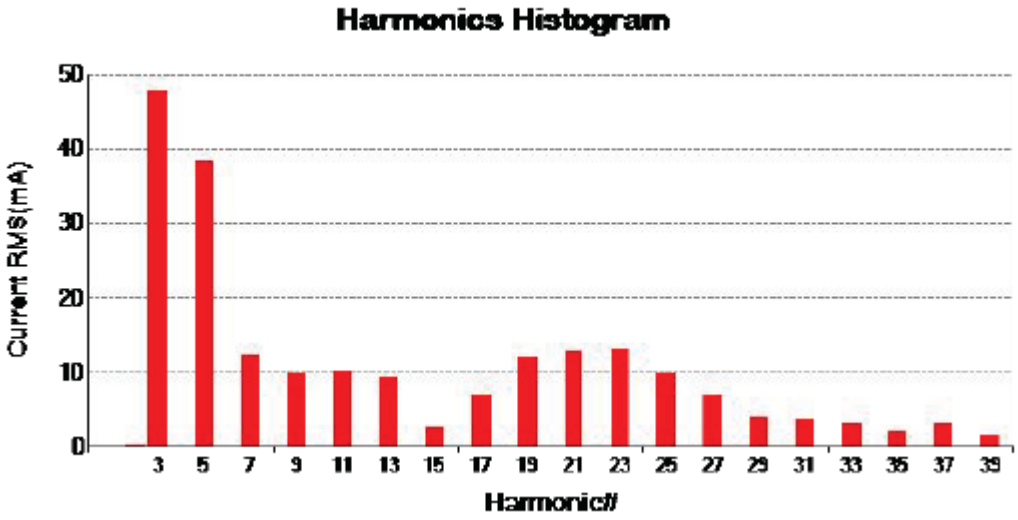
3.3.2 Test Setup Diagram:



3.3.3 Test Data:



Harmonics and Class A



Harm#	Harms(filtered) (mA)	Limit (mA)	Harms(avg) (mA)	100%Limit	Harms(max) (mA)	150%Limit	Status
I_Fund	800.500						
2	0.400	1080.000	0.400	0.037	0.400	0.025	Pass
3	47.800	2300.000	47.600	2.070	47.900	1.388	Pass
4	0.000	430.000	0.200	0.047	0.200	0.031	Pass
5	38.300	1140.000	38.100	3.342	38.300	2.240	Pass
6	0.100	300.000	0.100	0.033	0.100	0.022	Pass
7	12.300	770.000	12.300	1.597	12.400	1.074	Pass
8	0.000	230.000	0.100	0.043	0.100	0.029	Pass
9	9.800	400.000	9.900	2.475	10.000	1.667	Pass
10	0.000	184.000	0.100	0.054	0.100	0.036	Pass
11	10.400	330.000	10.600	3.212	10.800	2.182	Pass
12	0.000	153.300	0.000	0.000	0.000	0.000	Pass
13	9.200	210.000	9.500	4.524	9.700	3.079	Pass
14	0.000	131.400	0.000	0.000	0.000	0.000	Pass
15	2.600	150.000	2.700	1.800	2.800	1.244	Pass
16	0.000	115.000	0.000	0.000	0.000	0.000	Pass
17	6.900	132.400	7.000	5.287	7.100	3.575	Pass
18	0.000	102.200	0.100	0.098	0.100	0.065	Pass
19	11.900	118.400	12.100	10.220	12.200	6.869	Pass
20	0.000	92.000	0.100	0.109	0.000	0.000	Pass
21	12.800	107.100	12.800	11.951	12.900	8.030	Pass
22	0.000	83.600	0.000	0.000	0.000	0.000	Pass
23	13.100	97.800	13.100	13.395	13.200	8.998	Pass
24	0.000	76.700	0.000	0.000	0.000	0.000	Pass
25	9.800	90.000	9.700	10.778	9.800	7.259	Pass
26	0.000	70.800	0.000	0.000	0.000	0.000	Pass
27	6.900	83.300	6.900	8.283	7.000	5.602	Pass
28	0.000	65.700	0.000	0.000	0.000	0.000	Pass
29	3.900	77.600	3.800	4.897	3.900	3.351	Pass
30	0.000	61.300	0.000	0.000	0.000	0.000	Pass
31	3.800	72.600	3.800	5.234	3.900	3.581	Pass
32	0.000	57.500	0.100	0.174	0.000	0.000	Pass
33	3.200	68.200	3.300	4.839	3.300	3.226	Pass
34	0.000	54.100	0.000	0.000	0.000	0.000	Pass
35	2.200	64.300	2.100	3.266	2.200	2.281	Pass
36	0.000	51.100	0.000	0.000	0.000	0.000	Pass
37	3.000	60.800	3.000	4.934	3.100	3.399	Pass
38	0.000	48.400	0.000	0.000	0.000	0.000	Pass
39	1.400	57.700	1.400	2.426	1.400	1.618	Pass
40	0.000	46.000	0.000	0.000	0.000	0.000	Pass

Harm#	Harmonics Voltage	Harmonic Ratio	Limit	Result
2	0.030	0.031	0.200	Pass
3	0.100	0.053	0.900	Pass
4	0.020	0.018	0.200	Pass
5	0.020	0.013	0.400	Pass
6	0.020	0.013	0.200	Pass
7	0.070	0.037	0.300	Pass
8	0.010	0.010	0.200	Pass
9	0.020	0.012	0.200	Pass
10	0.010	0.004	0.100	Pass
11	0.030	0.017	0.100	Pass
12	0.000	0.001	0.100	Pass
13	0.020	0.011	0.100	Pass
14	0.000	0.000	0.100	Pass
15	0.020	0.011	0.100	Pass
16	0.000	0.000	0.100	Pass
17	0.020	0.013	0.100	Pass
18	0.000	0.000	0.100	Pass
19	0.020	0.010	0.100	Pass
20	0.000	0.000	0.100	Pass
21	0.020	0.009	0.100	Pass
22	0.000	0.000	0.100	Pass
23	0.020	0.014	0.100	Pass
24	0.000	0.000	0.100	Pass
25	0.010	0.010	0.100	Pass
26	0.000	0.000	0.100	Pass
27	0.020	0.010	0.100	Pass
28	0.000	0.000	0.100	Pass
29	0.000	0.003	0.100	Pass
30	0.000	0.000	0.100	Pass
31	0.000	0.005	0.100	Pass
32	0.000	0.000	0.100	Pass
33	0.010	0.008	0.100	Pass
34	0.000	0.000	0.100	Pass
35	0.020	0.008	0.100	Pass
36	0.000	0.000	0.100	Pass
37	0.020	0.008	0.100	Pass
38	0.000	0.000	0.100	Pass
39	0.000	0.005	0.100	Pass
40	0.000	0.000	0.100	Pass

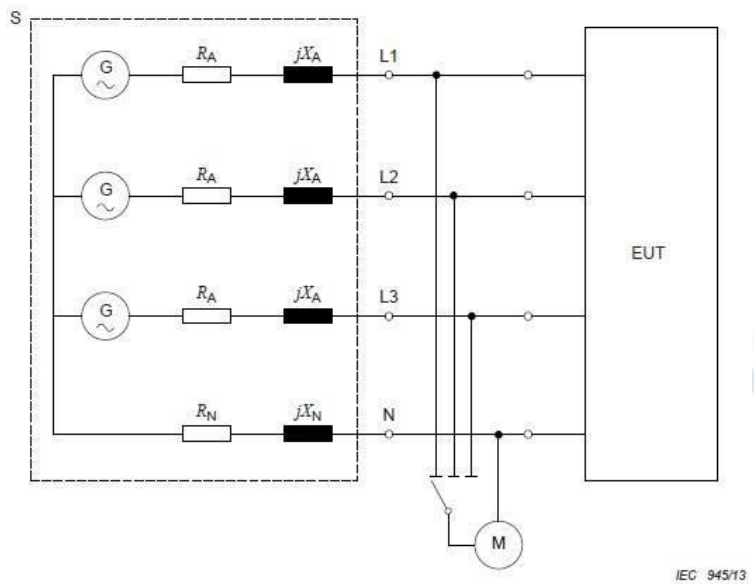
3.4 Voltage fluctuations and flicker

Test Limit:	EN 61000-3-3, Clause 5
Test Method:	EN 61000-3-3:2013+A1:2019+A2:2021

3.4.1 E.U.T. Operation:

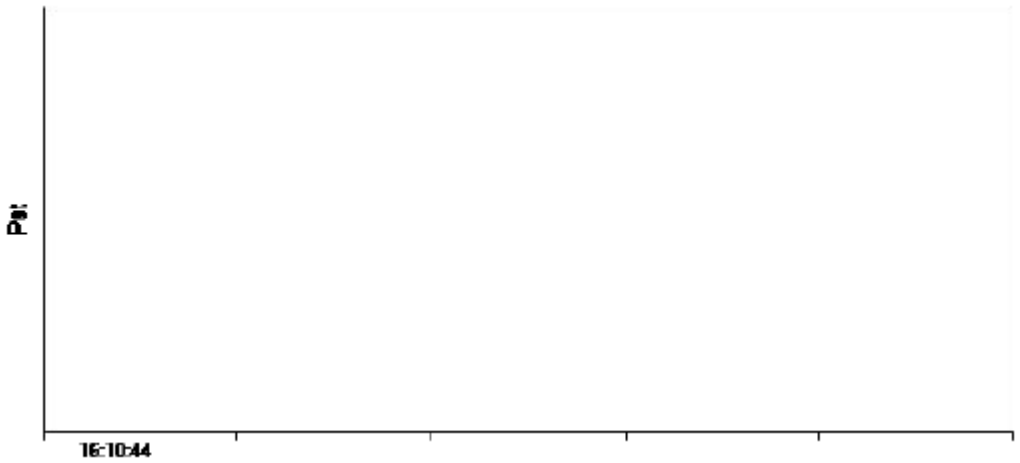
Operating Environment:					
Temperature:	23 °C	Humidity:	55 %	Atmospheric Pressure:	102 kPa
Pretest mode:	TM1				
Final test mode:	TM1				

3.4.2 Test Setup Diagram:



3.4.3 Test Data:

TM1



Result:

T-max (ms):	0.00	Test limit (ms):	500.00	Pass
Highest dc (%):	0.00	Test limit (%):	3.30	Pass
Highest dmax (%):	0.00	Test limit (%):	4.00	Pass
Highest Pst (10 min. period):	0.00	Test limit:	1.00	Pass
Highest Plt (2 hr. period):	0.00	Test limit:	0.65	Pass

4 Immunity Test Results (EMS)

General Performance Criteria

Performance Criteria A
The equipment shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed below a performance level specified by the manufacturer when the equipment is used as intended.
The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
Performance Criteria B
During the application of the disturbance, degradation of performance is allowed. However, no unintended change of actual operating state or stored data is allowed to persist after the test.
After the test, the equipment shall continue to operate as intended without operator intervention; no degradation of performance or loss of function is allowed, below a performance level specified by the manufacturer, when the equipment is used as intended.
The performance level may be replaced by a permissible loss of performance.
If the minimum performance level (or the permissible performance loss), or recovery time, is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
Performance Criteria C
Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A reboot or re-start operation is allowed. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

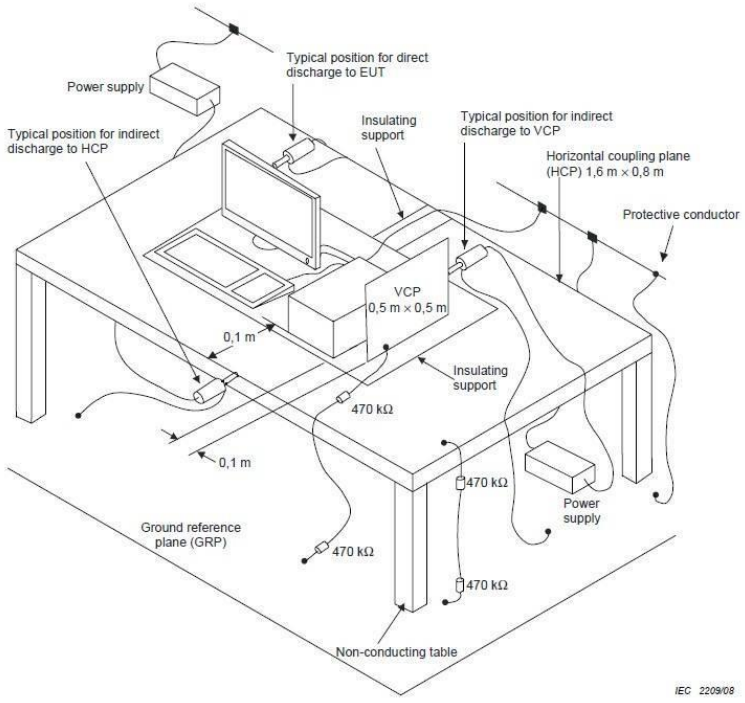
4.1 Electrostatic discharges

Test Requirement:	Contact Discharge: +/- 4kV Air Discharge: +/- 8kV
Test Method:	EN 61000-4-2: 2009
Procedure:	Discharge Impedance: 330Ω/150pF Number of Discharge: Minimum 10 times at each test point Discharge Mode: Single Discharge Discharge Period: 1 second minimum
Performance Criteria:	B

4.1.1 E.U.T. Operation:

Operating Environment:					
Temperature:	23 °C	Humidity:	55 %	Atmospheric Pressure:	102 kPa
Pretest mode:	TM1				
Final test mode:	TM1				

4.1.2 Test Setup Diagram:



4.1.3 Test Data:

Discharge type	Volt (kV)	Polarity	Test Point	Result/ Observations
Air discharge	2,4,8	+	18	B
Air discharge	2,4,8	-	18	B
Contact discharge	4	+	20	B
Contact discharge	4	-	20	B
Horizontal Coupling	4	+	22	B
Horizontal Coupling	4	-	22	B
Vertical Coupling	4	+	22	B
Vertical Coupling	4	-	22	B

Test Point: 1. All insulated enclosure and seams.
2. All accessible metal parts of the enclosure.
3. All side.
A: No degradation in the performance of the EUT was observed.

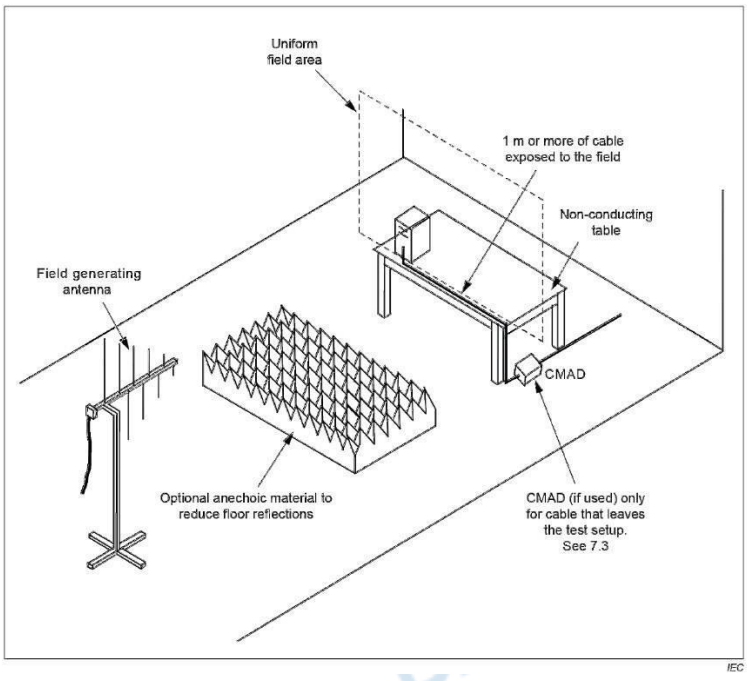
4.2 RF electromagnetic field disturbances

Test Requirement:	3V/m, 80%, 1kHz Amp. Mod.
Test Method:	EN IEC 61000-4-3: 2020
Procedure:	Frequency Range: 80MHz to 1GHz, 1800MHz, 2600MHz, 3500MHz, 5000MHz Antenna Polarisation: Vertical and Horizontal Modulation: 1kHz,80% Amp. Mod,1% increment
Performance Criteria:	A

4.2.1 E.U.T. Operation:

Operating Environment:					
Temperature:	22.9 °C	Humidity:	49 %	Atmospheric Pressure:	102 kPa
Pretest mode:	TM1				
Final test mode:	TM1				

4.2.2 Test Setup Diagram:



4.2.3 Test Data:

Frequency	Field Strength (V/m)	EUT face	Dwell time	Result/ Observations
80MHz-1GHz	3	Front	3s	A
80MHz-1GHz	3	Back	3s	A
80MHz-1GHz	3	Left	3s	A
80MHz-1GHz	3	Right	3s	A
80MHz-1GHz	3	Top	3s	A
80MHz-1GHz	3	Bottom	3s	A
1800MHz	3	Front	3s	A
1800MHz	3	Back	3s	A
1800MHz	3	Left	3s	A
1800MHz	3	Right	3s	A
1800MHz	3	Top	3s	A
1800MHz	3	Bottom	3s	A
2600MHz	3	Front	3s	A
2600MHz	3	Back	3s	A
2600MHz	3	Left	3s	A
2600MHz	3	Right	3s	A
2600MHz	3	Top	3s	A
2600MHz	3	Bottom	3s	A
3500MHz	3	Front	3s	A
3500MHz	3	Back	3s	A
3500MHz	3	Left	3s	A
3500MHz	3	Right	3s	A
3500MHz	3	Top	3s	A
3500MHz	3	Bottom	3s	A
5000MHz	3	Front	3s	A
5000MHz	3	Back	3s	A
5000MHz	3	Left	3s	A
5000MHz	3	Right	3s	A
5000MHz	3	Top	3s	A
5000MHz	3	Bottom	3s	A

A: No degradation in the performance of the EUT was observed.

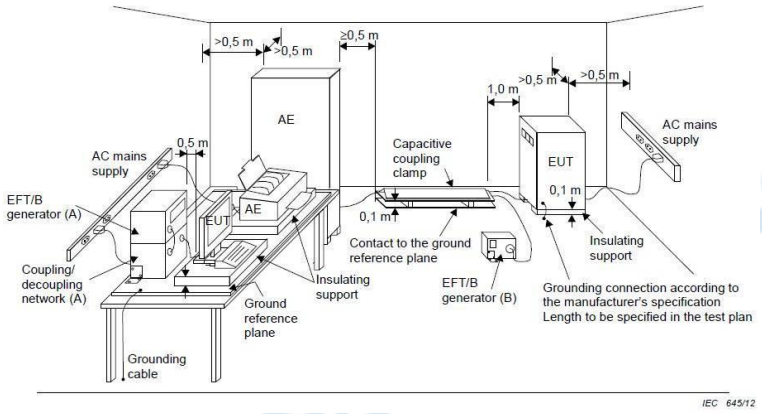
4.3 Electrical fast transients / burst for AC mains power ports

Test Requirement:	1kV; 5/50ns Tr/Th; 5kHz Repetition Frequency
Test Method:	EN 61000-4-4: 2012
Procedure:	Repetition Frequency: 5kHz Burst Period: 300ms Test Duration: 2 minute per level & polarity
Performance Criteria:	B

4.3.1 E.U.T. Operation:

Operating Environment:					
Temperature:	22.9 °C	Humidity:	49 %	Atmospheric Pressure:	102 kPa
Pretest mode:	TM1				
Final test mode:	TM1				

4.3.2 Test Setup Diagram:



4.3.3 Test Data:

Port	Volt (kV)	Polarity	CDN/ Clamp	Result/ Observations
AC power port	1	+	CDN	B
AC power port	1	-	CDN	B

A: No degradation in the performance of the EUT was observed.

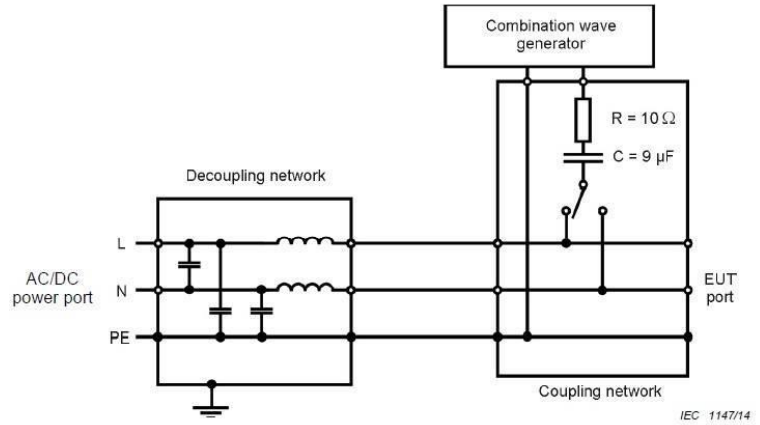
4.4 Surges for AC mains power ports

Test Requirement:	1.2/50μs Tr/Td; 1kV Line to Line; 2kV Line to Ground
Test Method:	EN 61000-4-5: 2014 +A1: 2017
Procedure:	Interval: 60s between each surge No. of surges: 5 positive, 5 negative at 90°, 270°
Performance Criteria:	B

4.4.1 E.U.T. Operation:

Operating Environment:					
Temperature:	22.9 °C	Humidity:	49 %	Atmospheric Pressure:	102 kPa
Pretest mode:	TM1				
Final test mode:	TM1				

4.4.2 Test Setup Diagram:



4.4.3 Test Data:

Port	Volt (kV)	Polarity	Phase(degree)	Result/ Observations
L-N	1	+	90°	B
L-N	1	-	270°	B
L-PE	2	+	90°	B
L-PE	2	-	270°	B
N-PE	2	-	90°	B
N-PE	2	+	270°	B

A: No degradation in the performance of the EUT was observed.

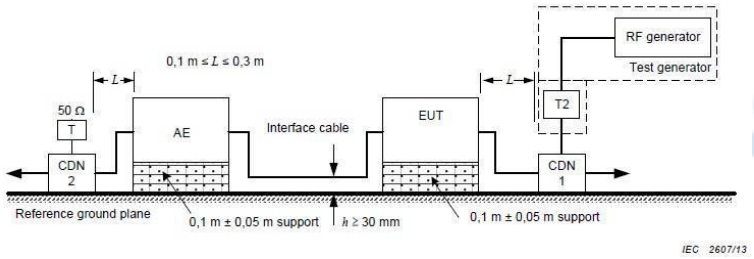
4.5 Continuous induced RF disturbances for AC mains power ports (150kHz-80MHz)

Test Requirement:	0,15 to 10MHz 3Vrms (emf), 10 to 30MHz 3V to 1Vrms(emf), 30 to 80MHz 1Vrms(emf), 80%,1kHz Amp. Mod.
Test Method:	EN 61000-4-6: 2014
Procedure:	Frequency Range: 0.15MHz to 80MHz Modulation: 80%, 1kHz Amplitude Modulation Step Size: 1%
Performance Criteria:	A

4.5.1 E.U.T. Operation:

Operating Environment:					
Temperature:	22 °C	Humidity:	48 %	Atmospheric Pressure:	102 kPa
Pretest mode:	TM1				
Final test mode:	TM1				

4.5.2 Test Setup Diagram:



4.5.3 Test Data:

Port	Strength (Vrms)	CDN/Clamp	Dwell time	Result/ Observations
AC power port	3(0.15MHz-10MHz)	CDN	3s	A
AC power port	3 to 1(10MHz-30MHz, Lines)	CDN	3s	A
AC power port	1(30MHz-80MHz)	CDN	3s	A

A: No degradation in the performance of the EUT was observed.

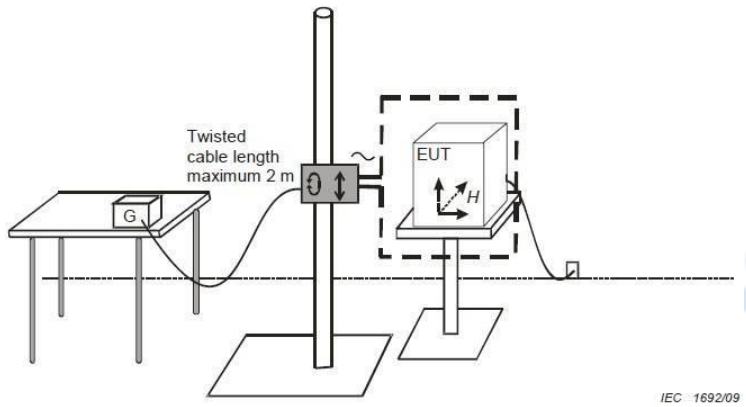
4.6 Power frequency magnetic field

Test Requirement:	50 or 60Hz, 1 A/m
Test Method:	EN 61000-4-8: 2010
Procedure:	50 or 60Hz, 1 A/m
Performance Criteria:	A

4.6.1 E.U.T. Operation:

Operating Environment:					
Temperature:	22 °C	Humidity:	48 %	Atmospheric Pressure:	102 kPa
Pretest mode:	TM1				
Final test mode:	TM1				

4.6.2 Test Setup Diagram:



4.6.3 Test Data:

Frequency	Strength (A/m)	Axial	Magnetic Field Type	Result/ Observations
50Hz/ 60Hz	1	X	Continuous filed	A
50Hz/ 60Hz	1	Y	Continuous filed	A
50Hz/ 60Hz	1	Z	Continuous filed	A

A: No degradation in the performance of the EUT was observed.

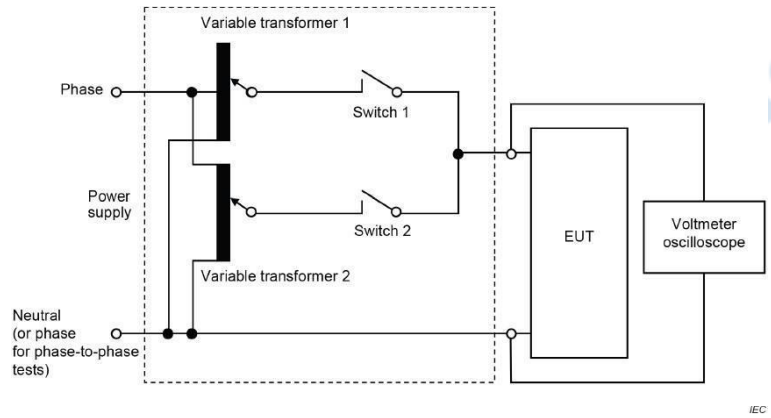
4.7 Voltage dips and interruptions

Test Requirement:	<5% residual voltage for 0.5 periods 70% residual voltage for 25 periods <5% residual voltage for 250 periods
Test Method:	EN IEC 61000-4-11:2020
Procedure:	<5% residual voltage for 0.5 period 70% residual voltage for 25 period <5% residual voltage for 250 period No. of Dips / Interruptions: 3 per Level Time between dropout: 10s
Performance Criteria:	B, C

4.7.1 E.U.T. Operation:

Operating Environment:					
Temperature:	23.8 °C	Humidity:	54 %	Atmospheric Pressure:	102 kPa
Pretest mode:	TM1				
Final test mode:	TM1				

4.7.2 Test Setup Diagram:



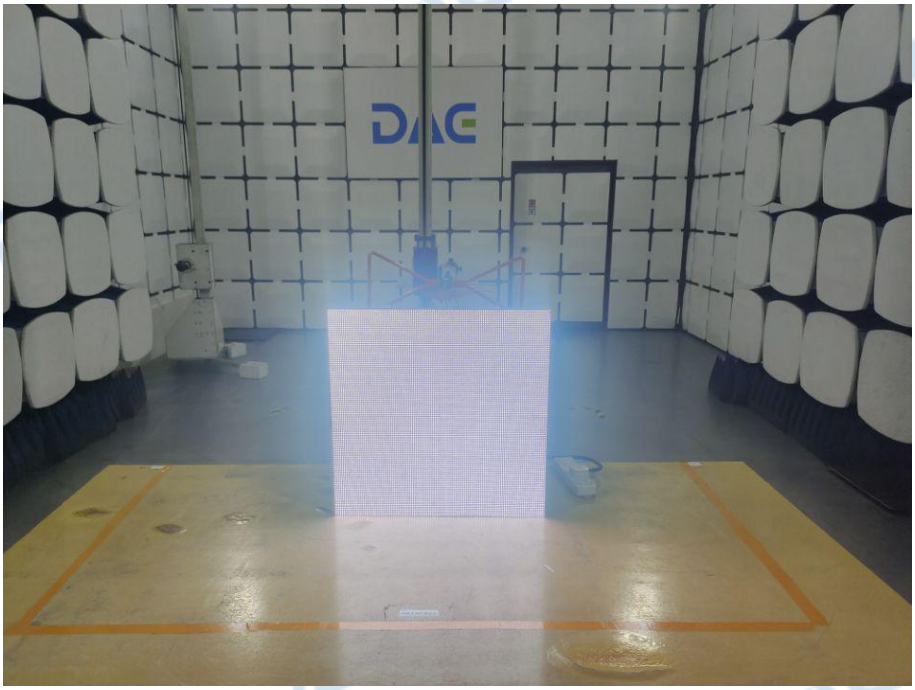
4.7.3 Test Data:

Level %UT	Phase (degree)	Duration	No. of Dips/ Interruptions	Result/ Observations
0	0°	0.5 Cycles	3	B
0	0°	250 Cycles	3	B
70	0°	25 Cycles	3	B

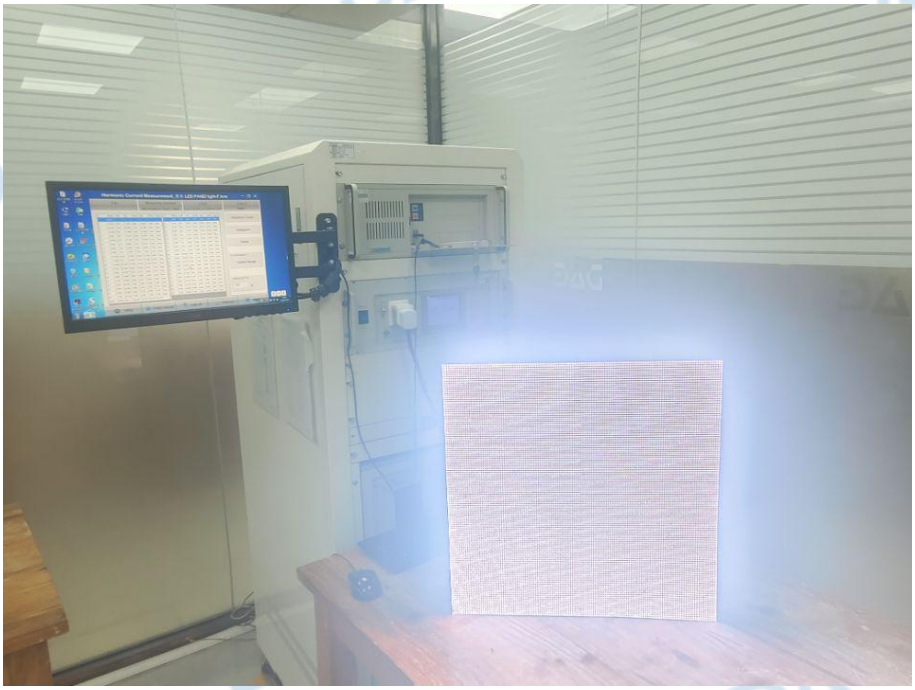
A: No degradation in the performance of the EUT was observed.

5 TEST SETUP PHOTOS

Conducted emissions from AC mains power ports (150kHz-30MHz)

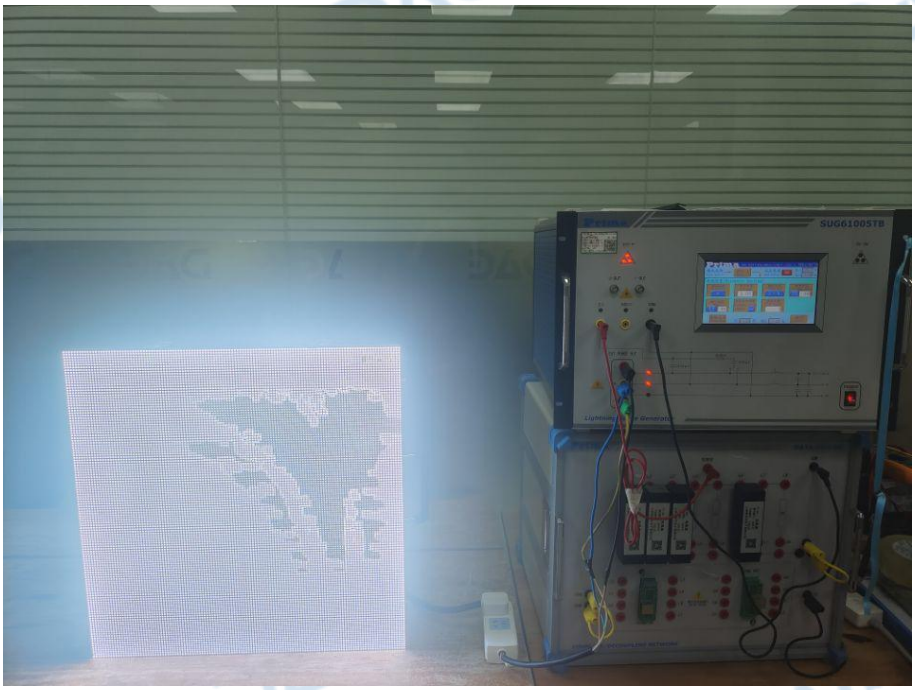

Radiated emissions (30MHz-1GHz)


Harmonic current emission
Voltage fluctuations and flicker

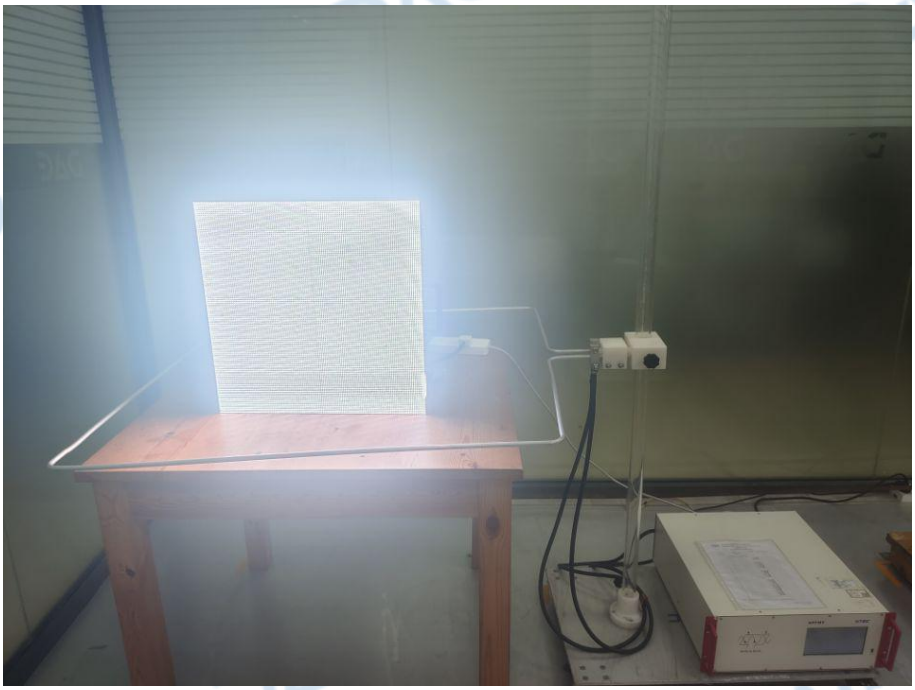


Electrostatic discharges

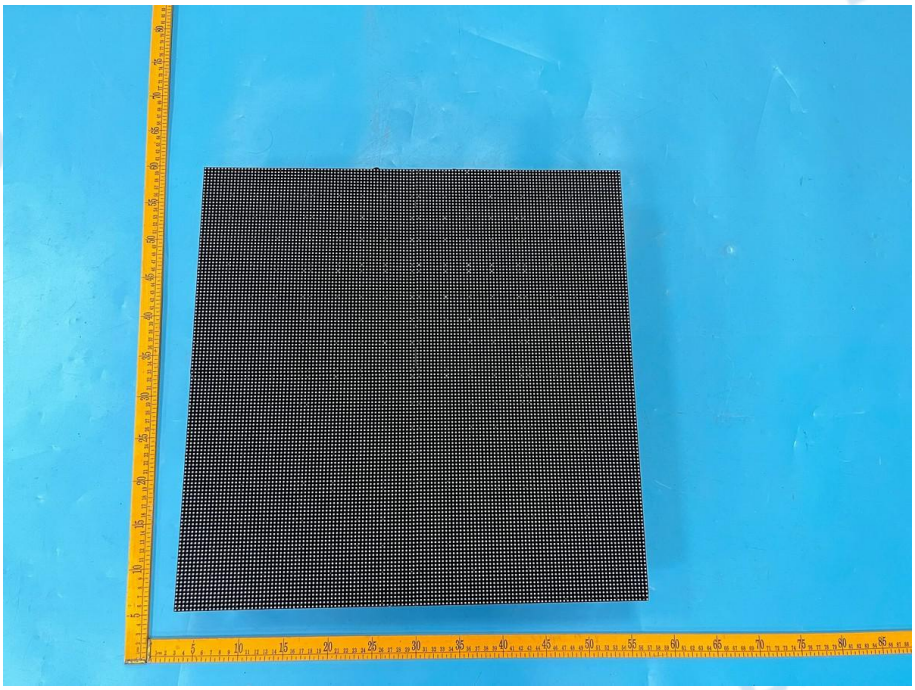


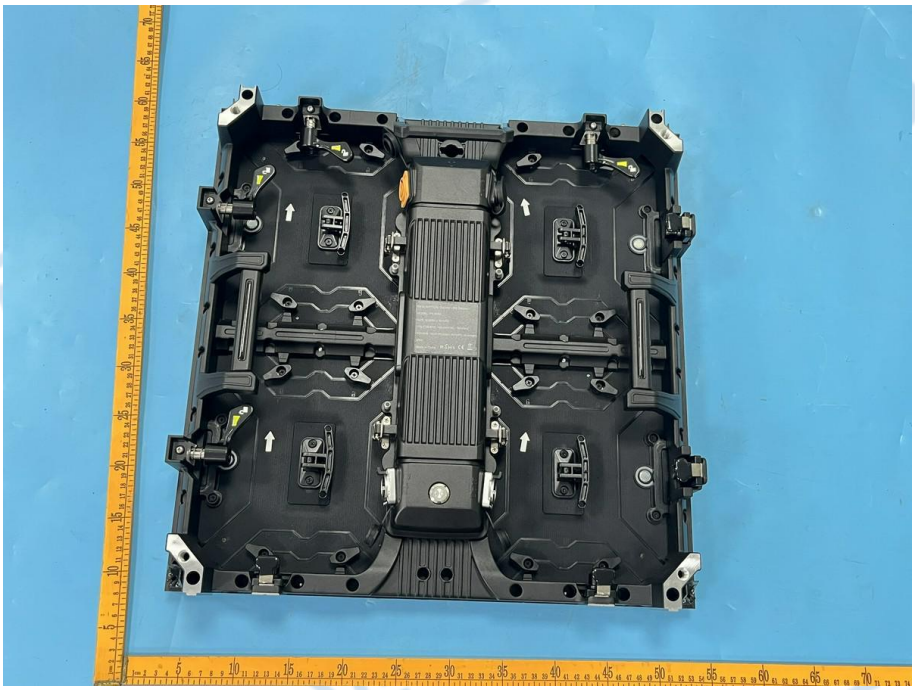
Surges for AC mains power ports


Continuous induced RF disturbances for AC mains power ports (150kHz-80MHz)

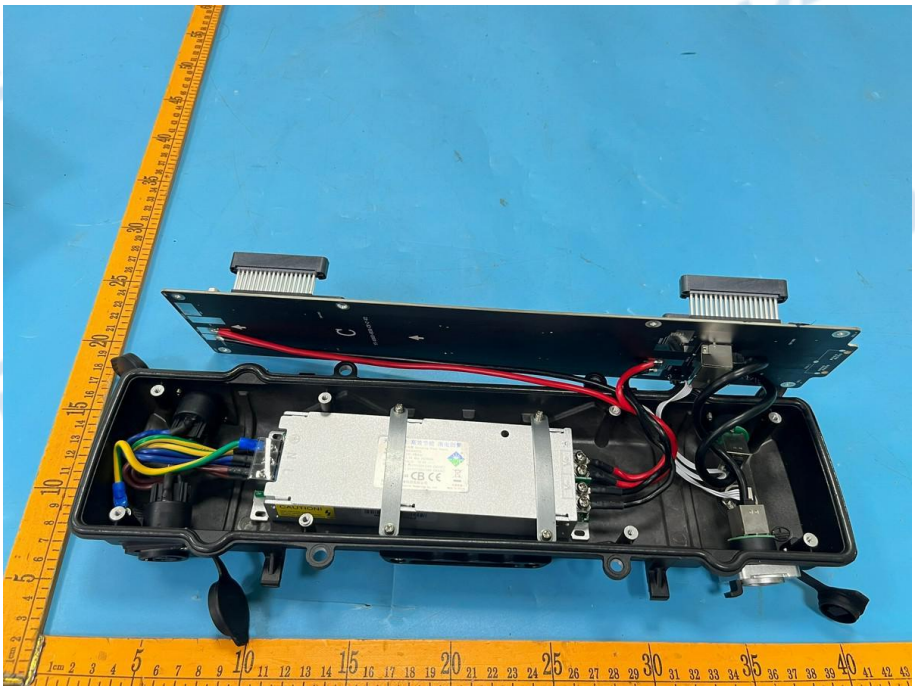

Power frequency magnetic field


6 PHOTOS OF THE EUT

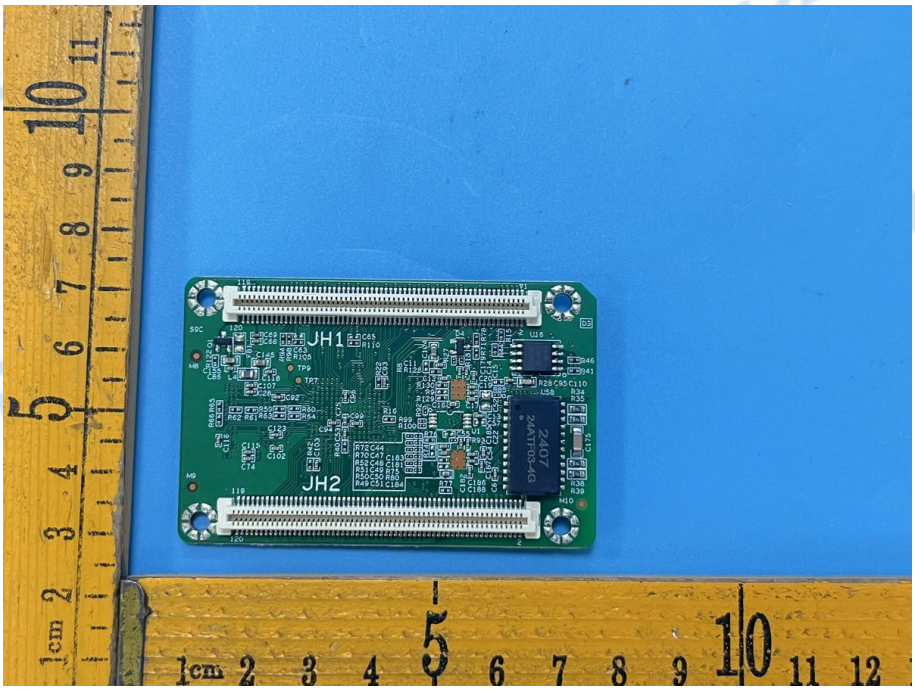












********** End of Report **********