TEST REPORT

Product Name	:	X1-Micro 2 in 1
Model Number	:	X1-Micro 800, X1-Micro 900, X1-Micro 1000, X1-Micro 1200

Prepared for	:	SOLAX POWER NETWORK TECHNOLOGY (ZHEJIANG) CO., LTD.
Address	:	No.288, Shizhu Road, Tonglu Economic Development Zone, Tonglu City, Zhejiang Province 310000, P. R. China
Prepared by	:	EMTEK (NINGBO) CO., LTD.
Address	:	No. 8, Building 8, Lane 216, Qingyi Road, Hi-Tech Zone, Ningbo, Zhejiang, China Tel: +86-574-27907998 Fax: +86-574-27721538

Report Number	:	ENB2401310128E00101R
Date of Test	:	January 31, 2024 to February 03, 2024
Date of Report	:	February 19, 2024

TABLE OF CONTENT

TEST REPORT DESCRIPTION

Applicant	:	SOLAX POWER NETWORK TECHNOLOGY (ZHEJIANG) CO., LTD.
Manufacturer	:	SOLAX POWER NETWORK TECHNOLOGY (ZHEJIANG) CO., LTD.
Trade Mark	:	SolaX Power
EUT	:	X1-Micro 2 in 1
Model Number	:	X1-Micro 800, X1-Micro 900, X1-Micro 1000, X1-Micro 1200
Power supply	:	Input: DC 33V, 2*19.5A Output: AC 220V/AC 230V/ AC 240V/AC 180-264V, 50Hz/45–55Hz or 60Hz/55–65Hz, 1200W

Measurement Procedure Used:

EN 55011:2016/A2:2021
EN 62920:2017/A1:2021, IEC 62920:2017+AMD1:2021
EN IEC 61000-3-2:2019/A1:2021, EN 61000-3-12:2011
EN 61000-3-3:2013/A2:2021/AC:2022-01, EN IEC 61000-3-11:2019
(CISPR 11:2015+AMD1:2016+AMD2:2019, IEC 61000-4-2:2008, IEC 61000-4-3:2020, IEC 61000-4-4:2012, IEC 61000-4-5:2014+AMD1:2017, IEC 61000-4-6:2013, IEC 61000-4-11:2020, IEC 61000-4-34:2005+A1:2009)

The device described above is tested by EMTEK (NINGBO) CO., LTD. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and EMTEK (NINGBO) CO., LTD. is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment under Test) is technically compliant with the EN 55011, EN 62920, EN IEC 61000-3-2, EN 61000-3-3, EN IEC 61000-3-11, EN 61000-3-12 requirements
This report applies to above tested sample only and shall not be reproduced in part without written approval of EMTEK (NINGBO) CO., LTD.

Date of Test : January 31, 2024 to February 03, 2024

Prepared by : June Gao/Engineer

Reviewer : Ade Wang/Supervisor

Approved & Authorized Signer : Tony Wei/Manager

Modified Information

Version	Report No.	Revision Date	Summary
	ENB2401310128E00101R	/	Original Report

1. DESCRIPTION OF STANDARDS AND RESULTS (EUT)

EMISSION			
Description of Test Item	Standard	Limits	Results
Disturbance Voltage at the AC Power Port	EN 62920:2017/A1:2021	Class B	Pass
	EN 55011:2016/A2:2021	Group 1, Class B	Pass
Disturbance Voltage at the DC Power Port	EN 62920:2017/A1:2021	Class B	N/A
	EN 55011:2016/A2:2021	Group 1, Class B	N/A
Disturbance Voltage at the Wired Network Port and the Signal and Control Port	EN 62920:2017/A1:2021	Class B	N/A
Radiated emissions	EN 62920:2017/A1:2021	Class B	Pass
	EN 55011:2016/A2:2021	Group 1, Class B	Pass
Harmonic Current Emissions	EN 61000-3-12:2011	Table 2	N/A
	EN IEC 61000-3-2:2019/A1:2021	Class A	Pass
Voltage Fluctuation and Flicker	EN IEC 61000-3-11:2019	--	N/A
	EN 61000-3-3:2013/A2:2021/ AC:2022-01	Section 5	Pass

IMMUNITY				
Description of Test Item		Basic Standard	Performance Criteria	Results
Electrostatic Discharge	Enclosure ports	IEC 61000-4-2:2008	B	Pass
Continuous RF electromagnetic field disturbances	Enclosure ports	IEC 61000-4-3:2020	A	Pass
Electrical fast transients/burst	AC mains power ports	IEC61000-4-4:2012	B	Pass
	Wired Network Port and the Signal and Control Port		B	N/A
	DC network power ports		B	N/A
Surges	AC mains power ports	IEC 61000-4-5:2014/AMD1:2017	B	Pass
	Wired Network Port and the Signal and Control Port		B	N/A
	DC network power ports		B	N/A
Continuous induced RF disturbances	AC mains power ports	IEC 61000-4-6:2013	A	Pass
	Wired Network Port and the Signal and Control Port		A	N/A
	DC network power ports		A	N/A
Voltage dips and interruptions	AC mains power ports	IEC 61000-4-11:2020	B,C	N/A
		IEC 61000-4-34:2005+A1:2009		Pass
Note: N/A is an abbreviation for Not Applicable.				

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

EUT	:	X1-Micro 2 in 1
Model Number	:	X1-Micro 800, X1-Micro 900, X1-Micro 1000, X1-Micro 1200 (Note: All models arethe same except the power. We prepared model X1-Micro 1200 for EMC test.)
Test Voltage	:	AC 230V/50Hz
Sample number	:	ENB2401310128E001-1-1
Applicant	:	SOLAX POWER NETWORK TECHNOLOGY (ZHEJIANG) CO., LTD.
Address	:	No.288, Shizhu Road, Tonglu Economic Development Zone, Tonglu City, Zhejiang Province 310000, P. R. China
Manufacturer	:	SOLAX POWER NETWORK TECHNOLOGY (ZHEJIANG) CO., LTD.
Address	:	No.288, Shizhu Road, Tonglu Economic Development Zone, Tonglu City, Zhejiang Province 310000, P. R. China
Date of Received	:	January 31, 2024
Date of Test	:	January 31, 2024 to February 03, 2024

2.2. Input / Output Ports

Port #	Name	Type*	Cable Max. >3m	Cable Shielded	Comments
1	Enclosure	N/E	--	--	None
2	AC Port	AC	--	--	None
3	PV Port	DC	No	Unshielded	None

*Note: Use abbreviations:
AC= AC Power port
DC= DC Power port
N/E= Non-Electrical
A/D=Analogue/digital data port (signal/control port, antenna port, wired network port, broadcast receiver tuner port, optical fibre port)

2.3. Independent Operation Modes

A. PC-AC (25%)
B. PC-AC (50%)
C. PC-AC (100%)
D. Standby

2.4. Test Manner

Test Items	Test Voltage	Operation Modes	Worst case
Disturbance Voltage at the AC Power Port	AC 230V/50Hz	Mode A Mode B Mode C	Mode A Mode B Mode C
Radiated emissions	AC 230V/50Hz	Mode A Mode B Mode C	Mode A Mode B Mode C
Harmonics	AC 230V/50Hz	Mode A Mode B Mode C	Mode A Mode B Mode C
Voltage fluctuation and flicker	AC 230V/50Hz	Mode A Mode B Mode C	Mode A Mode B Mode C
Electrostatic Discharge	AC 230V/50Hz	Mode C Mode D	Mode C Mode D
Continuous RF electromagnetic field disturbances	AC 230V/50Hz	Mode C	Mode C
Electrical fast transients/burst	AC 230V/50Hz	Mode C	Mode C
Surges	AC 230V/50Hz	Mode C Mode D	Mode C Mode D
Continuous induced RF disturbances	AC 230V/50Hz	Mode C	Mode C
Voltage dips and interruptions	AC 230V/50Hz	Mode C	Mode C

2.5. Description of Test Facility

Site Description

EMC Lab. : **Accredited by CNAS**
The Certificate Registration Number is L6666.
The Laboratory has been assessed and proved to be in compliance with CNAS-CL01:2018 (identical to ISO/IEC 17025:2017)

Designation by FCC
Designation Number: CN1354
Test Firm Registration Number: 427606

Accredited by A2LA
The Certificate Number is 4321.03.
The certificate isvalid until May 31, 2025

Designation by Industry Canada
The Conformity Assessment Body Identifier is CN0114

Name of Firm : EMTEK (NINGBO) CO., LTD.
Site Location : No. 8, Building 8, Lane 216, Qingyi Road, Hi-Tech Zone, Ningbo, Zhejiang, China

2.6. Support Device

N/A

2.7. Test Software

Item		Software
Conducted Emission	:	JSDEMC-EMI(V 3.3)
Radiated Emission	:	JSDEMC-EMI(V 3.3)

2.8. Measurement Uncertainty

Test Item		Uncertainty
Conducted Emission Uncertainty	:	2.08dB (9 k-150 kHz) 2.40dB (150 k-30 MHz)
Radiated Emission Uncertainty (3m Chamber)	:	4.30dB (Polarize: H) (30 MHz-1000 MHz) 4.90dB (Polarize: V) (30 MHz-1000 MHz) 3.70dB (Polarize: H) (1~18 GHz) 3.60dB (Polarize: V) (1~18 GHz)
Uncertainty for Harmonic test	:	4.16% mA
Uncertainty for Flicker test	:	0.43% V
Uncertainty for ESD Test	:	6.00% kV
Uncertainty for EFT/B Test	:	3.84% kV
Uncertainty for Surge Test	:	0.53% kV
Uncertainty for C/S Test	:	1.45(Using CDN Test) 2.37(Using EM Clamp Test)
Uncertainty for DIPS Test	:	2.12% V
Uncertainty for R/S Test	:	2.10dB(80 MHz-200 MHz) 2.36dB(200 MHz-1000 MHz) 2.57dB(1000 MHz-6000 MHz)

3. MEASURING DEVICE AND TEST EQUIPMENT

3.1. For Disturbance Voltage at the AC Power Port Measurement

Equ. No.	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
ENE-001	EMI Test Receiver	R & S	ESCI	101108	Dec 14, 2023	1 Year
ENE-158	L.I.S.N	Schwarzbeck	NNLK 8129	0373	Nov 17, 2023	1 Year
ENE-004	L.I.S.N	Schwarzbeck	NSLK 8126	8126-462	July 06, 2023	1 Year
ENE-006	Pulse Limiter	MTS-systemtechnik	IMP-136	2611115-001-0033	July 06, 2023	1 Year
ENE-278	RF Switching Unit	HTEC	HRSU	222101	July 06, 2023	1 Year
ENE-083	RF Cable	Hubber Suhner/Swiss	CBL-RE-3	/	May 31, 2023	1 Year
ENE-162-2	RF Cable	TIMES	2M(N-N)	605236-0002	May 31, 2023	1 Year
ENE-149	Conduction Test Room 1#	SKET	11.5*5*4m	/	Dec 17, 2021	3 Year

3.2. For Radiated Emission Measurement (Up to 1 GHz)

Equ. No.	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
ENE-185	EMI Test Receiver	R&S	ESR7	102480	Apr 28, 2023	1 Year
ENE-190	Antenna Multiple	Schwarzbeck	VULB 9163	01499	May 21, 2022	2 Year
ENE-195	Pre-Amplifier	JS Denki	PA09K03-40	JSPA21019	Apr 28, 2023	1 Year
ENE-204	Low Frequency Notch Filter RF Switching	JS Denki	JSDSW-F	JSDSW2211D02	Apr 28, 2023	1 Year
ENE-251	6dB Attenuator	Mini-Circuits	UNAT-6+	11542	July 06, 2023	1 Year
ENE-279-1	RF Cable	Rosenberger	L17-C001-7000	/	May 31, 2023	1 Year
ENE-279-2	RF Cable	Rosenberger	L17-C001-3500	/	May 31, 2023	1 Year
ENE-279-3	RF Cable	Rosenberger	L17-C001-1500	/	May 31, 2023	1 Year
ENE-279-4	RF Cable	Rosenberger	/	/	May 31, 2023	1 Year
ENE-279-5	RF Cable	Rosenberger	/	/	May 31, 2023	1 Year
ENE-279-6	RF Cable	Rosenberger	L08-C446-1500	/	May 31, 2023	1 Year
ENE-144	3-Meter Anechoic Chamber2#	SKET	9*6*6m	/	June 19, 2022	3 Year

3.3. For Harmonic Current / Voltage Fluctuation And Flicker Measurement

Equ. No.	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
ENE-157	Harmonic/ flicker analyzer	PACIFIC	ECTS2-3300Z-M18012	550128	Nov 17, 2023	1 Year
ENE-157-1	AC Power source	PACIFIC	330AZX-CE	140250014	Nov 17, 2023	1 Year

3.4. For Electrostatic Discharge Immunity Test

Equ. No.	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
ENE-139	ESD Tester	TESEQ	NSG 437	1732	Nov 17, 2023	1 Year
ENE-152	ESD test Room	SKET	5.5*4*3m	/	Apr 18, 2023	3 Year

3.5. For RF Strength Susceptibility Test

Equ. No.	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
ENE-173	RF Signal generator	Keysight	N5171B	MY61252820	Apr 28, 2023	1 Year
ENE-174	SW-RF	JS Denki	JSDSW-BS02	JSDSW2120D01	Apr 28, 2023	1 Year
ENE-175	Power Amplifier	Vectawave	VBA 1000-600c	132035	Apr 28, 2023	1 Year
ENE-176	Power Amplifier	Vectawave	VBA 1060-200	132120	Apr 28, 2023	1 Year
ENE-177	Directional couplers	Bonn	BDC 0810-50/1500	2129259-01	Apr 28, 2023	1 Year
ENE-178	Directional couplers	Bonn	BDC 1060-40/500	2129304-03	Apr 28, 2023	1 Year
ENE-179	Multilayer periodic Antenna	Schwarzbeck	STLP9129-7/16	03043	Apr 28, 2023	1 Year
ENE-182	power meter	Lumiloop	LSPM	86	Apr 28, 2023	1 Year
ENE-153	RS anechoic chamber	SKET	7.6*5*4m	/	Dec 15, 2021	3 Year

3.6. For Electrical Fast Transient / Burst Immunity Test

Equ. No.	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
ENE-011	Burst Tester	HAEFELY	PEFT4010	173964	July 06, 2023	1 Year
ENE-012	Coupling Clamp	HAEFELY	IP-4A	147399	July 06, 2023	1 Year
ENE-168	Coupling and Decoupling Network Three Phase	HAEFELY	FP-EFT 32M	190170	Dec 14, 2023	1 Year

3.7. For Surge Immunity Test

Equ. No.	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
ENE-097-1	Combination Wave Generator	HTEC	HCWG 100	204303	Nov 17, 2023	1 Year
ENE-097-2	Three Phase Coupling/Decoupling Network	HTEC	HCOUPLER 30S	204103	Nov 17, 2023	1 Year
ENE-097-3	High Pressure Option	HTEC	Options-10KDC	/	Nov 17, 2023	1 Year
ENE-097-4	40 ohm Impedance	HTEC	Options-40ohm	/	Nov 17, 2023	1 Year
ENE-097-5	10 ohm Impedance	HTEC	Options-10ohm	/	Nov 17, 2023	1 Year
ENE-097-6	Combination Wave Generator	HTEC	HTSG 70	204304	Nov 17, 2023	1 Year
ENE-097-7	Coupling Network	HTEC	HCN 8	204901	Nov 17, 2023	1 Year
ENE-097-8	Decoupling Network	HTEC	HDEC 8	204902	Nov 17, 2023	1 Year
ENE-097-9	Isolated Power Supply	HTEC	SBK-30KVA	/	Nov 17, 2023	1 Year

3.8. For Injected Current Susceptibility Test

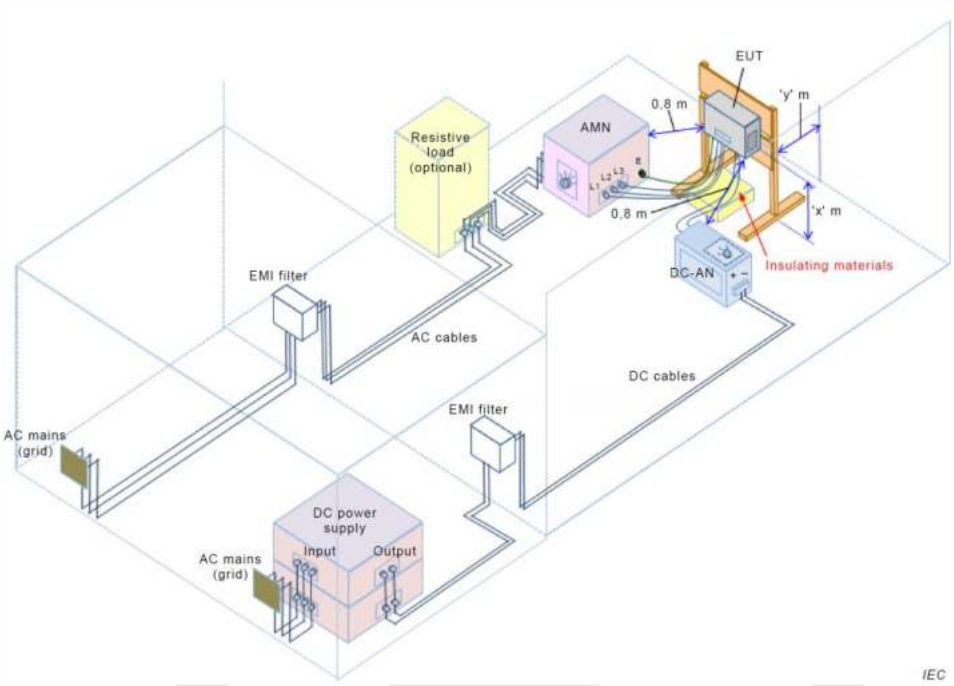
Equ. No.	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
ENE-057	Simulator	SCHLODER	CDG-6000-75	126B1404/2016	July 06, 2023	1 Year
ENE-058	CDN	SCHLODER	CDN-M2+3	A2210415/2016	July 06, 2023	1 Year
ENE-056	Attenuator	SCHLODER	6dB 100W	HA1615	July 06, 2023	1 Year
ENE-098	Current Injection Probe	SCHLODER	CDN BCI-P1	19102314-0101	Nov 17, 2023	1 Year
ENE-099	EM-clamp	SCHLODER	CDN EMCL-20	20102817-0103	Nov 17, 2023	1 Year
ENE-160	Three phase CDN	SCHLODER	CDN M3-L32 HV	10749-1	Nov 17, 2023	1 Year
ENE-160-1	Three phase CDN	SCHLODER	CDN M5-N32 HV	10751-1	Nov 17, 2023	1 Year
ENE-160-2	Three phase CDN	SCHLODER	CDN M4-32 HV	10750-1	Nov 17, 2023	1 Year
ENE-160-3	Three phase CDN	SCHLODER	CDN M4-32A	10982-1	Apr 28, 2023	1 Year

3.9. For Voltage Dips and Interruption Immunity Test

Equ. No.	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
ENE-157-2	ICE VOLTAGE DIPS Module/ICE	PACIFIC	EPTS-75A-3	20027	Nov 17, 2023	1 Year
ENE-157-1	AC Power source	PACIFIC	330AZX-CE	140250014	Nov 17, 2023	1 Year

4. DISTURBANCE VOLTAGE AT THE AC POWER PORT

4.1. Block Diagram of Test Setup



4.2. Measurement Standard

EN 62920:2017/A1:2021(CISPR 11:2015+AMD1:2016+AMD2:2019), Class B, Table 7
EN 55011:2016/A2:2021, Group 1, Class B

4.3. Limits

Frequency range MHz	Quasi-peak dB(μV)	Aversge dB(μV)
0.15 to 0.50	66 Decreasing linearly with logarithm of frequency to 56	56 Decreasing linearly with logarithm of frequency to 56
0.50 to 5	56	46
5 to 30	60	50
At the transition frequency, the more stringent limit shall apply.		

4.4. Test Procedure

The EUT was placed on an insulating support 0.8 m height from the metal ground plane and 0.4 m from the conducting wall of the shielding room and it was kept at least 0.8 m from any other grounded conducting surface.

The rear of the arrangement shall be flush with the back of the supporting tabletop unless that would not be possible or typical of normal use.

All units of equipment forming the system under test (includes the EUT as well as connected peripherals and associated equipment or devices) shall be arranged such that a nominal 0.1 m separation is achieved between the neighboring units.

Connect EUT to the power mains through a artificial mains network (AMN). Where the mains cable supplied by the manufacturer is longer than 1 m, the excess should be folded at the centre into a bundle no longer than 0.4 m, so that its length is shortened to 1 m.

The AMN provides 50 ohm coupling impedance for the measuring instrument.

The CISPR states that the AMN with 50 ohm and 50 microhenry should be used.

Both sides of AC line were checked for maximum conducted interference.

The frequency range from 150 kHz to 30 MHz was sweep.

Set the test-receiver system to quasi peak detect function and average detect function, and to measure the conducted emissions values.

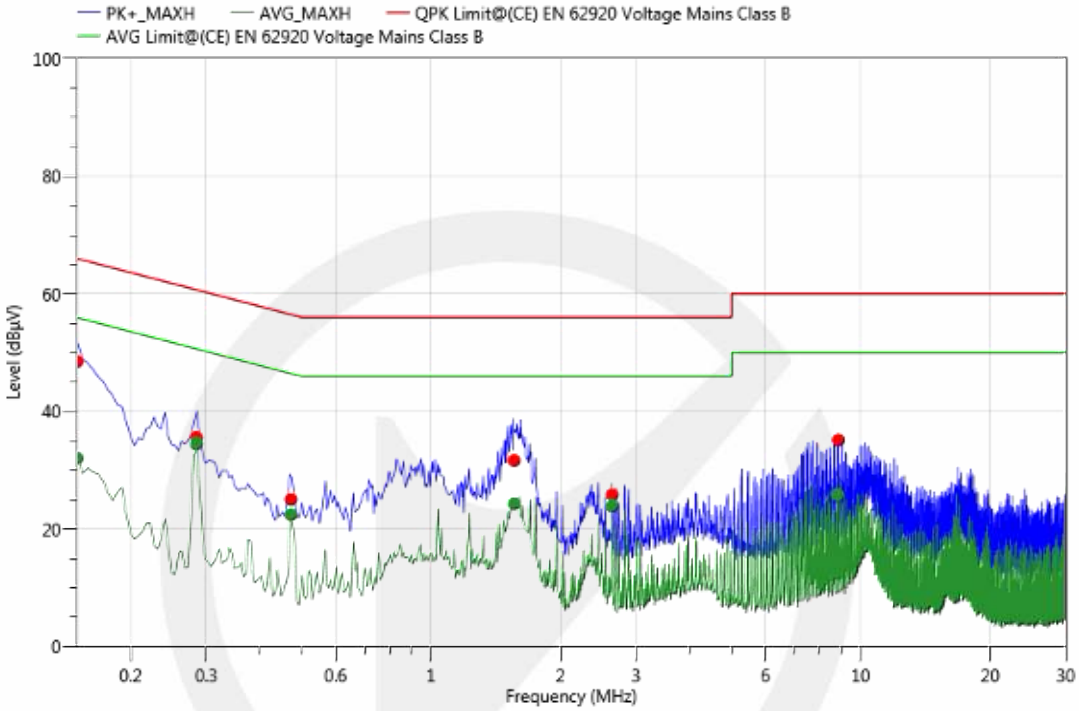
Test results were obtained from the following equation:

4.5. Measuring Results

Pass.

Please see the attached page.

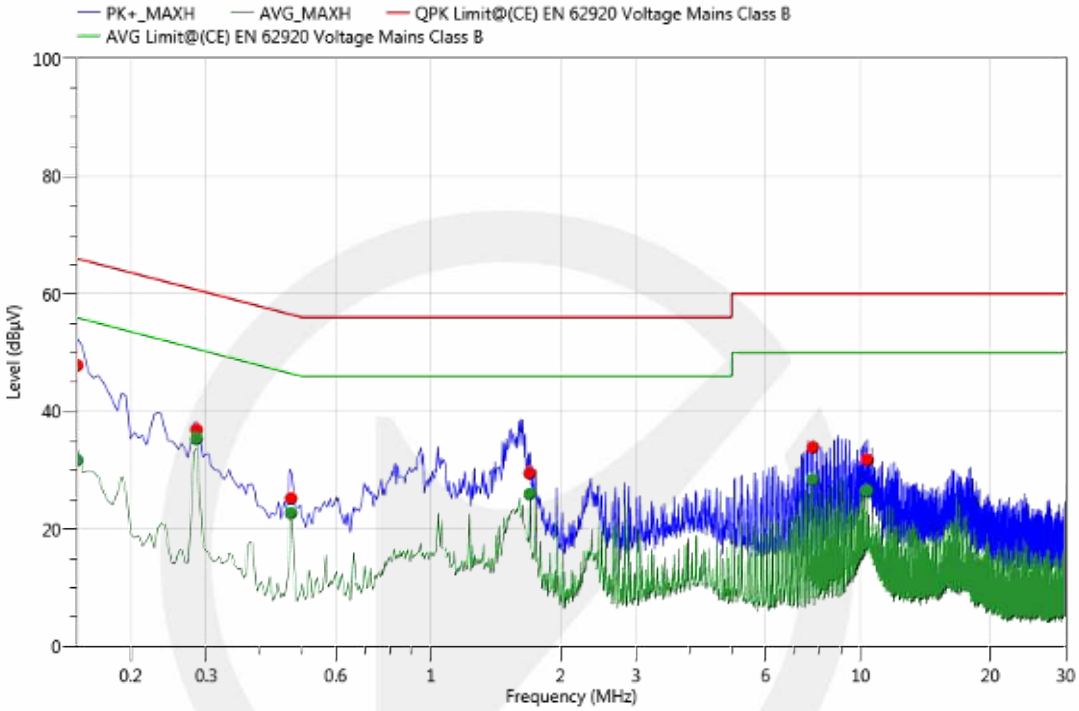
Project Information			
Model：	X1-Micro 1200	Mode：	PV-AC (100%)
Voltage：	AC 230V/50Hz	Engineer：	WK Luo
Temp：	22℃	Humi：	35%



Final Result (Margin=Limit-Meas.(Reading +Corr.))

No.	Freq. (MHz)	Reading (dBµV)	Corr. (dB)	Meas. (dBµV)	Limit (dBµV)	Margin (dB)	Det.	Line	PE	Verdict
1	0.150	40.71	7.78	48.49	66.00	17.51	QPK	N	GND	Pass
2	0.150	24.31	7.78	32.09	56.00	23.91	AVG	N	GND	Pass
3	0.284	27.77	7.79	35.56	60.70	25.14	QPK	N	GND	Pass
4	0.284	26.67	7.79	34.46	50.70	16.24	AVG	N	GND	Pass
5	0.472	17.24	7.79	25.03	56.48	31.45	QPK	N	GND	Pass
6	0.472	14.65	7.79	22.44	46.48	24.04	AVG	N	GND	Pass
7	1.560	23.81	7.8	31.61	56.00	24.39	QPK	N	GND	Pass
8	1.560	16.51	7.8	24.31	46.00	21.69	AVG	N	GND	Pass
9	2.639	18.00	7.81	25.81	56.00	30.19	QPK	N	GND	Pass
10	2.639	16.07	7.81	23.88	46.00	22.12	AVG	N	GND	Pass
11	8.867	27.23	7.86	35.09	60.00	24.91	QPK	N	GND	Pass
12	8.867	17.78	7.86	25.64	50.00	24.36	AVG	N	GND	Pass

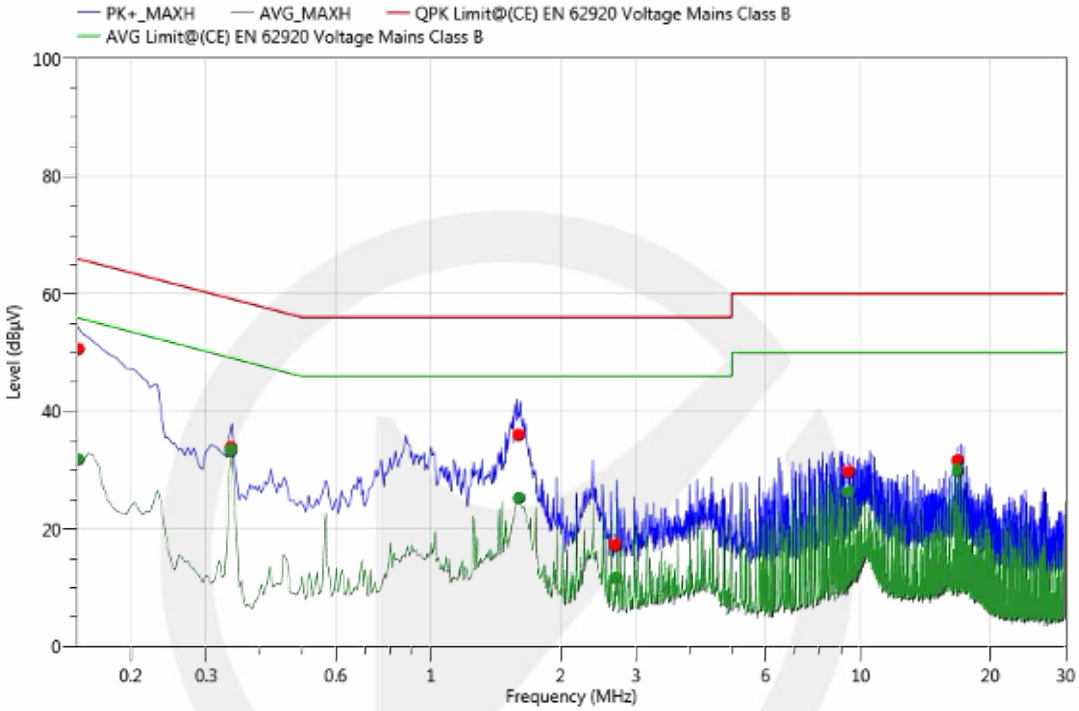
Project Information			
Model：	X1-Micro 1200	Mode：	PV-AC (100%)
Voltage：	AC 230V/50Hz	Engineer：	WK Luo
Temp：	22℃	Humi：	35%



Final Result (Margin=Limit-Meas.(Reading +Corr.))

No.	Freq. (MHz)	Reading (dBµV)	Corr. (dB)	Meas. (dBµV)	Limit (dBµV)	Margin (dB)	Det.	Line	PE	Verdict
1	0.150	39.66	8.16	47.82	66.00	18.18	QPK	L1	GND	Pass
2	0.150	23.56	8.16	31.72	56.00	24.28	AVG	L1	GND	Pass
3	0.284	28.77	8.07	36.84	60.70	23.86	QPK	L1	GND	Pass
4	0.284	27.27	8.07	35.34	50.70	15.36	AVG	L1	GND	Pass
5	0.472	17.14	8.02	25.16	56.48	31.32	QPK	L1	GND	Pass
6	0.472	14.67	8.02	22.69	46.48	23.79	AVG	L1	GND	Pass
7	1.694	21.43	8	29.43	56.00	26.57	QPK	L1	GND	Pass
8	1.694	17.94	8	25.94	46.00	20.06	AVG	L1	GND	Pass
9	7.734	25.86	7.98	33.84	60.00	26.16	QPK	L1	GND	Pass
10	7.734	20.34	7.98	28.32	50.00	21.68	AVG	L1	GND	Pass
11	10.376	23.74	7.93	31.67	60.00	28.33	QPK	L1	GND	Pass
12	10.376	18.40	7.93	26.33	50.00	23.67	AVG	L1	GND	Pass

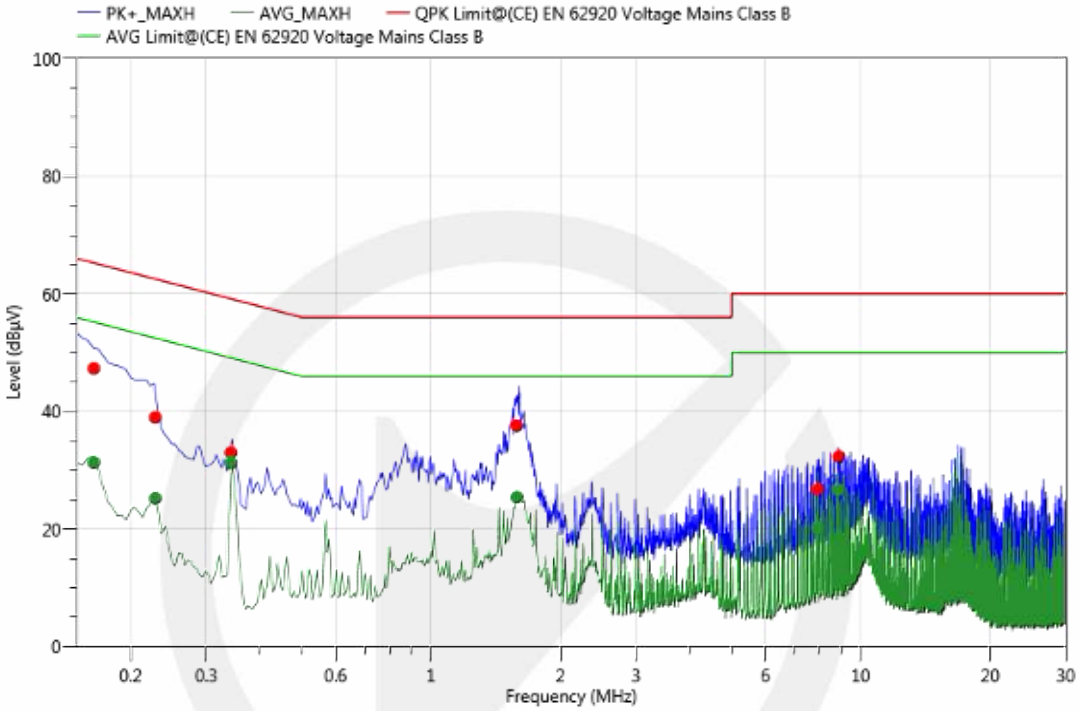
Project Information			
Model：	X1-Micro 1200	Mode：	PV-AC (50%)
Voltage：	AC 230V/50Hz	Engineer：	WK Luo
Temp：	22℃	Humi：	35%



Final Result (Margin=Limit-Meas.(Reading +Corr.))

No.	Freq. (MHz)	Reading (dBµV)	Corr. (dB)	Meas. (dBµV)	Limit (dBµV)	Margin (dB)	Det.	Line	PE	Verdict
1	0.151	42.43	8.16	50.59	65.94	15.35	QPK	L1	GND	Pass
2	0.151	23.69	8.16	31.85	55.94	24.09	AVG	L1	GND	Pass
3	0.342	25.84	8.05	33.89	59.15	25.26	QPK	L1	GND	Pass
4	0.342	25.22	8.05	33.27	49.15	15.88	AVG	L1	GND	Pass
5	1.600	27.96	8	35.96	56.00	20.04	QPK	L1	GND	Pass
6	1.600	17.28	8	25.28	46.00	20.72	AVG	L1	GND	Pass
7	2.688	9.07	8.03	17.10	56.00	38.90	QPK	L1	GND	Pass
8	2.688	3.66	8.03	11.69	46.00	34.31	AVG	L1	GND	Pass
9	9.396	21.60	7.96	29.56	60.00	30.44	QPK	L1	GND	Pass
10	9.396	18.21	7.96	26.17	50.00	23.83	AVG	L1	GND	Pass
11	16.801	23.75	7.86	31.61	60.00	28.39	QPK	L1	GND	Pass
12	16.801	22.00	7.86	29.86	50.00	20.14	AVG	L1	GND	Pass

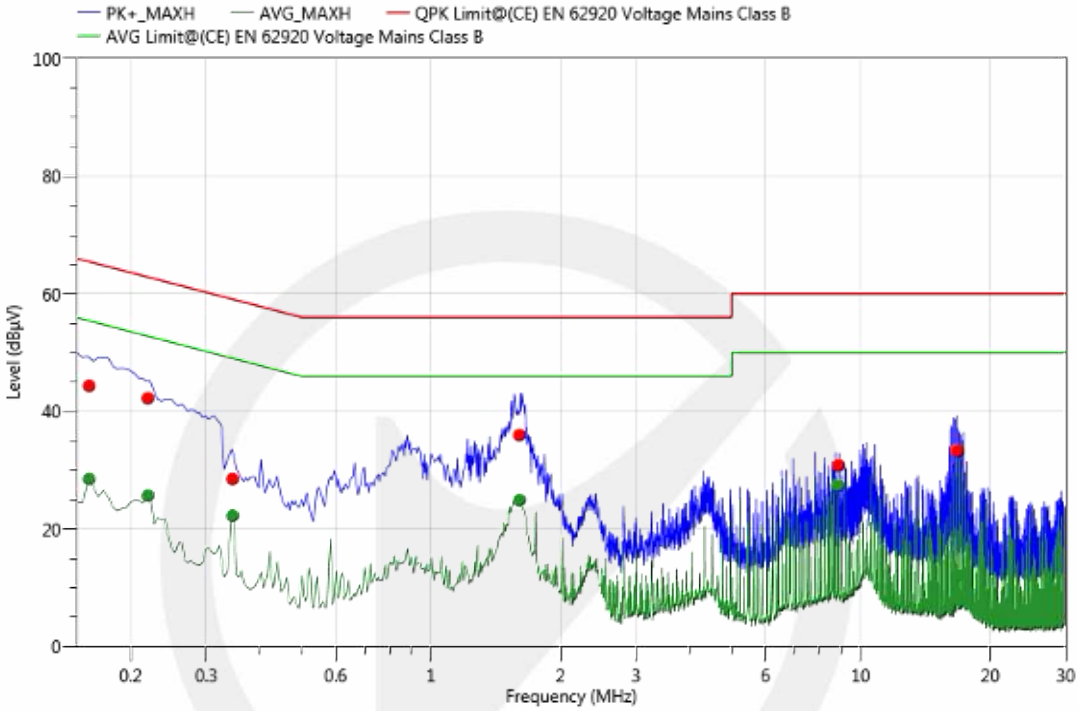
Project Information			
Model：	X1-Micro 1200	Mode：	PV-AC (50%)
Voltage：	AC 230V/50Hz	Engineer：	WK Luo
Temp：	22℃	Humi：	35%



Final Result (Margin=Limit-Meas.(Reading +Corr.))

No.	Freq. (MHz)	Reading (dBµV)	Corr. (dB)	Meas. (dBµV)	Limit (dBµV)	Margin (dB)	Det.	Line	PE	Verdict
1	0.164	39.51	7.78	47.29	65.26	17.97	QPK	N	GND	Pass
2	0.164	23.55	7.78	31.33	55.26	23.93	AVG	N	GND	Pass
3	0.228	31.18	7.78	38.96	62.52	23.56	QPK	N	GND	Pass
4	0.228	17.46	7.78	25.24	52.52	27.28	AVG	N	GND	Pass
5	0.342	25.19	7.79	32.98	59.15	26.17	QPK	N	GND	Pass
6	0.342	23.43	7.79	31.22	49.15	17.93	AVG	N	GND	Pass
7	1.582	29.75	7.8	37.55	56.00	18.45	QPK	N	GND	Pass
8	1.582	17.61	7.8	25.41	46.00	20.59	AVG	N	GND	Pass
9	7.967	18.76	7.85	26.61	60.00	33.39	QPK	N	GND	Pass
10	7.967	12.08	7.85	19.93	50.00	30.07	AVG	N	GND	Pass
11	8.898	24.43	7.86	32.29	60.00	27.71	QPK	N	GND	Pass
12	8.898	18.56	7.86	26.42	50.00	23.58	AVG	N	GND	Pass

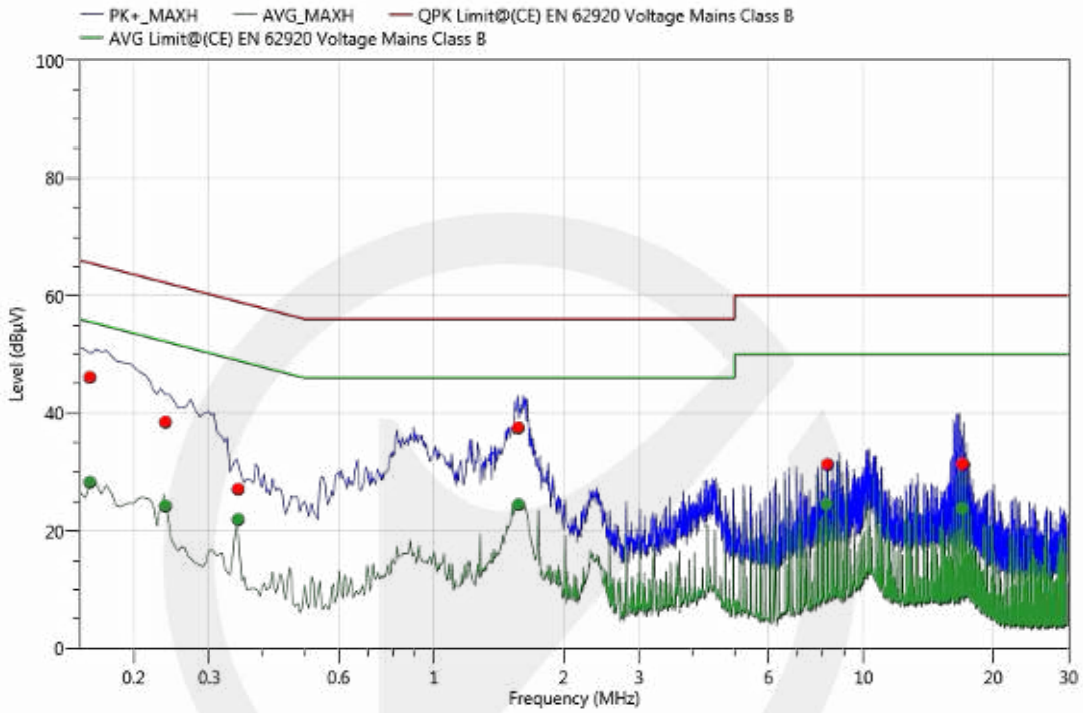
Project Information			
Model：	X1-Micro 1200	Mode：	PV-AC (25%)
Voltage：	AC 230V/50Hz	Engineer：	WK Luo
Temp：	22℃	Humi：	35%



Final Result (Margin=Limit-Meas.(Reading +Corr.))

No.	Freq. (MHz)	Reading (dBµV)	Corr. (dB)	Meas. (dBµV)	Limit (dBµV)	Margin (dB)	Det.	Line	PE	Verdict
1	0.160	36.56	7.78	44.34	65.46	21.12	QPK	N	GND	Pass
2	0.160	20.74	7.78	28.52	55.46	26.94	AVG	N	GND	Pass
3	0.219	34.45	7.78	42.23	62.86	20.63	QPK	N	GND	Pass
4	0.219	17.93	7.78	25.71	52.86	27.15	AVG	N	GND	Pass
5	0.345	20.68	7.79	28.47	59.08	30.61	QPK	N	GND	Pass
6	0.345	14.48	7.79	22.27	49.08	26.81	AVG	N	GND	Pass
7	1.604	28.12	7.81	35.93	56.00	20.07	QPK	N	GND	Pass
8	1.604	17.11	7.81	24.92	46.00	21.08	AVG	N	GND	Pass
9	8.885	22.90	7.86	30.76	60.00	29.24	QPK	N	GND	Pass
10	8.885	19.44	7.86	27.30	50.00	22.70	AVG	N	GND	Pass
11	16.819	25.28	7.93	33.21	60.00	26.79	QPK	N	GND	Pass
12	16.819	4.11	7.93	12.04	50.00	37.96	AVG	N	GND	Pass

Project Information			
Model：	X1-Micro 1200	Mode：	PV-AC (25%)
Voltage：	AC 230V/50Hz	Engineer：	WK Luo
Temp：	22℃	Humi：	35%

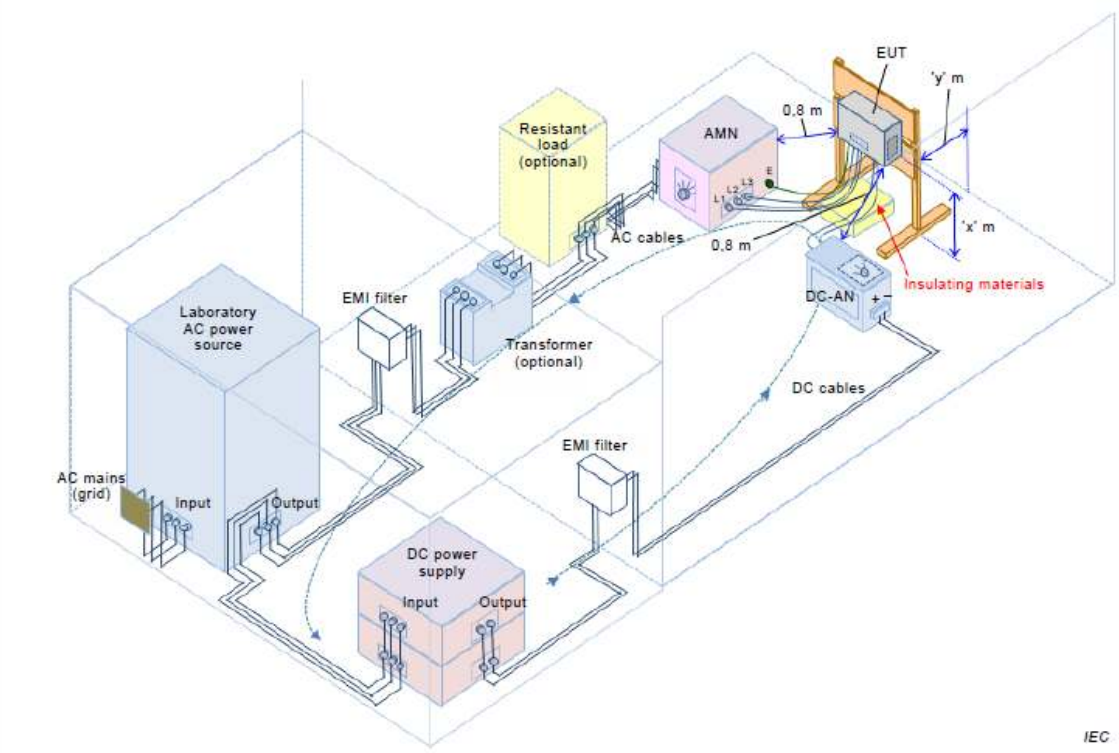


Final Result (Margin=Limit-Meas.(Reading +Corr.))

No.	Freq. (MHz)	Reading (dBµV)	Corr. (dB)	Meas. (dBµV)	Limit (dBµV)	Margin (dB)	Det.	Line	PE	Verdict
1	0.158	37.91	8.16	46.07	65.57	19.50	QPK	L1	GND	Pass
2	0.158	20.10	8.16	28.26	55.57	27.31	AVG	L1	GND	Pass
3	0.237	30.37	8.1	38.47	62.20	23.73	QPK	L1	GND	Pass
4	0.237	16.09	8.1	24.19	52.20	28.01	AVG	L1	GND	Pass
5	0.350	19.01	8.05	27.06	58.96	31.90	QPK	L1	GND	Pass
6	0.350	13.88	8.05	21.93	48.96	27.03	AVG	L1	GND	Pass
7	1.571	29.50	8	37.50	56.00	18.50	QPK	L1	GND	Pass
8	1.571	16.43	8	24.43	46.00	21.57	AVG	L1	GND	Pass
9	8.240	23.26	7.98	31.24	60.00	28.76	QPK	L1	GND	Pass
10	8.240	16.34	7.98	24.32	50.00	25.68	AVG	L1	GND	Pass
11	17.079	23.34	7.85	31.19	60.00	28.81	QPK	L1	GND	Pass
12	17.079	15.75	7.85	23.60	50.00	26.40	AVG	L1	GND	Pass

5. DISTURBANCE VOLTAGE AT THE DC POWER PORT

5.1. Block Diagram of Test Setup



5.2. Measurement Standard

EN 62920:2017/A1:2021(CISPR 11:2015+AMD1:2016+AMD2:2019), Class B, Table 9
EN 55011:2016/A2:2021, Group 1, Class B

5.3. Measurement Limits

Frequency (MHz)	Limit (dBμV)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	84 Decreasing linearly with logarithm of frequency to 74	74 Decreasing linearly with logarithm of frequency to 64
0.50 ~ 30.00	74	64
NOTE-The lower limit shall apply at the transition frequencies.		

5.4. Test Procedure

The EUT was placed on a desk 0.1m height from the metal ground plane and 0.4 m from the conducting wall of the shielding room and it was kept at least 0.8 m from any other grounded conducting surface. The size of the table will nominally be 1.5 m x1.0 m.

The rear of the arrangement shall be flush with the back of the supporting tabletop unless that would not

be possible or typical of normal use.

All units of equipment forming the system under test (includes the EUT as well as connected peripherals and associated equipment or devices) shall be arranged such that a nominal 0.1 m separation is achieved between the neighboring units.

Connect EUT to the DC power port through a artificial mains network (AMN). Where the mains cable supplied by the manufacturer is longer than 1 m, the excess should be folded at the centre into a bundle no longer than 0.4 m, so that its length is shortened to 1 m.

All the support units are connecting to the other AMN.

The AMN provides 50 ohm coupling impedance for the measuring instrument.

The CISPR states that the AMN with 50 ohm and 5 microhenry should be used.

Both sides of DC power port were checked for maximum conducted interference.

For frequency band 150 kHz to 30 MHz, the bandwidth is set at 9 kHz. The frequency range from 150 kHz to 30 MHz is investigated.

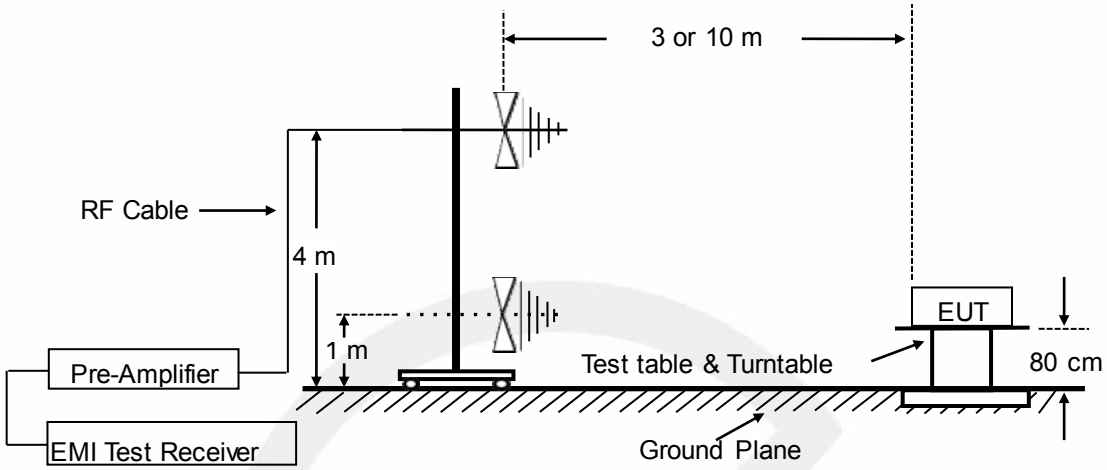
Set the test-receiver system to quasi peak detect function and average detect function, and to measure the conducted emissions values.

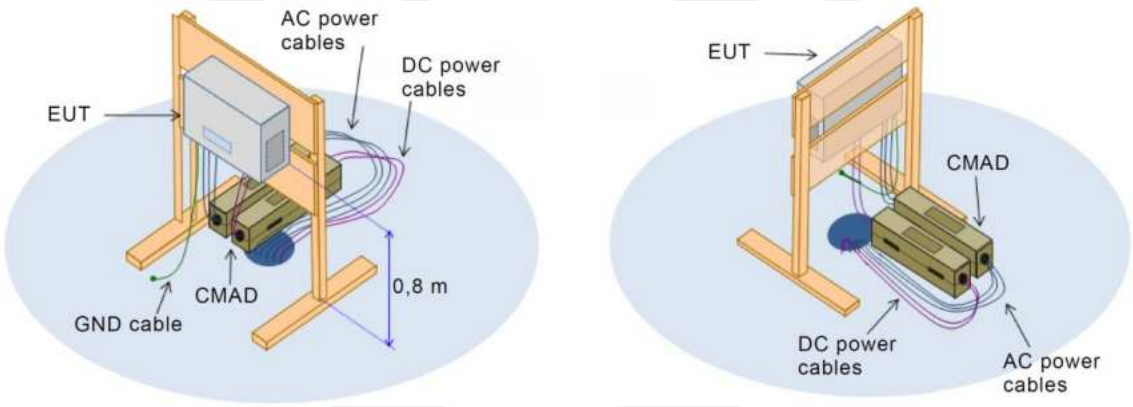
5.5. Measuring Results

N/A.

6. RADIATED EMISSION MEASUREMENT

6.1. Block Diagram of Test Setup





6.2. Measurement Standard

EN 62920:2017/A1:2021(CISPR 11:2015+AMD1:2016+AMD2:2019), Class B, Table 13
EN 55011:2016/A2:2021, Group 1, Class B

6.3. Limit

Frequency range MHz	☐10 m measuring distance	☒3 m measuring distance [a]
	Quasi-peak dB(μV/m)	Quasi-peak dB(μV/m)
30 to 230 230 to 1000	30 37	40 47
On a test site, class B equipment can be measuring at a nominal distance of 3 m or 10 m. At the transition frequency, the more stringent limit shall apply.		
[a] The 3 m separation distance applies only to small equipment meeting the size criterion defined in 3.16.		

6.4. Test Procedure

The EUT was placed on an insulating support whose total height equaled 80cm. All units of equipment forming the system under test (includes the EUT as well as connected peripherals and associated equipment or devices) shall be arranged such that a nominal 0.1 m separation is achieved between the neighboring units. Where the mains cable supplied by the manufacturer is longer than 1 m, the excess should be folded at the centre into a bundle no longer than 0.4 m, so that its length is shortened to 1 m.

The EUT was set 3 meters (or 10 meters) away from the receiving antenna that was mounted on a non-conductive mast. The antenna can move up and down between 1 to 4 meters to find out the maximum emission level.

The turntable can rotate 360 degree to determine the position of the maximum emission level.

The initial testing identified the frequency that has the highest disturbance relative to the limit while operating the EUT in typical modes of operation and cable positions in a test setup representative of typical system configuration.

The identification of the frequency of highest emission with respect to the limit was found by investigating emissions at a number of significant frequencies. The probable frequency of maximum emission had been found and that the associated cable and EUT configuration and mode of operation had been identified.

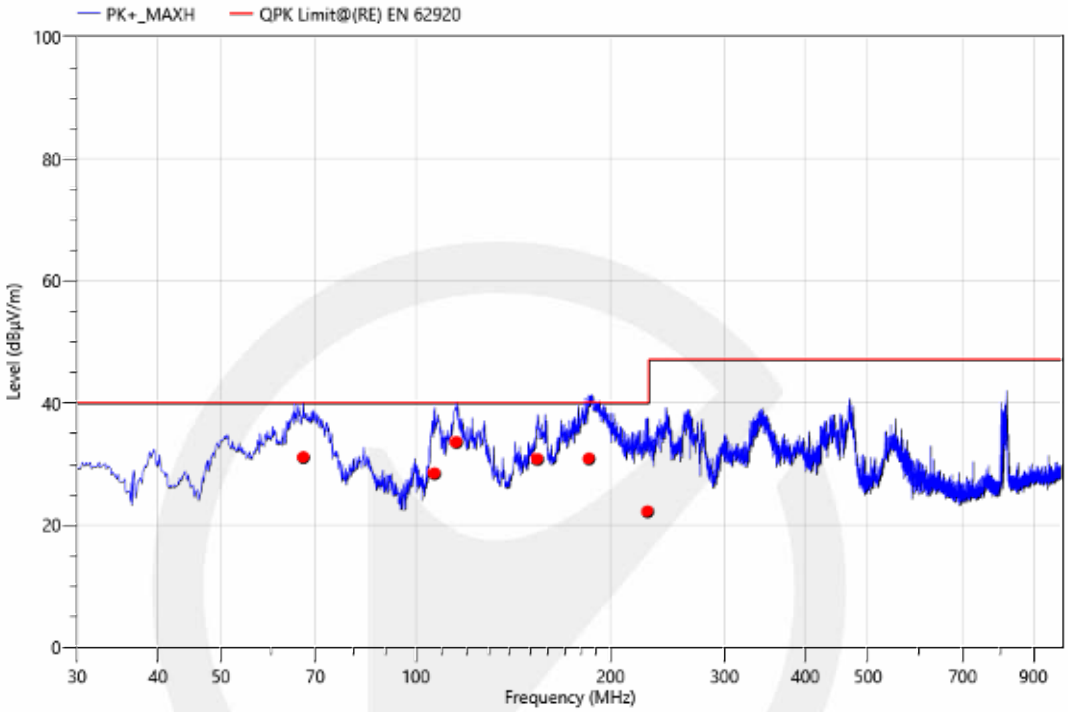
The bandwidth of the Receiver is set at 120 kHz.

6.5. Measuring Results

Pass.

Please see the attached page.

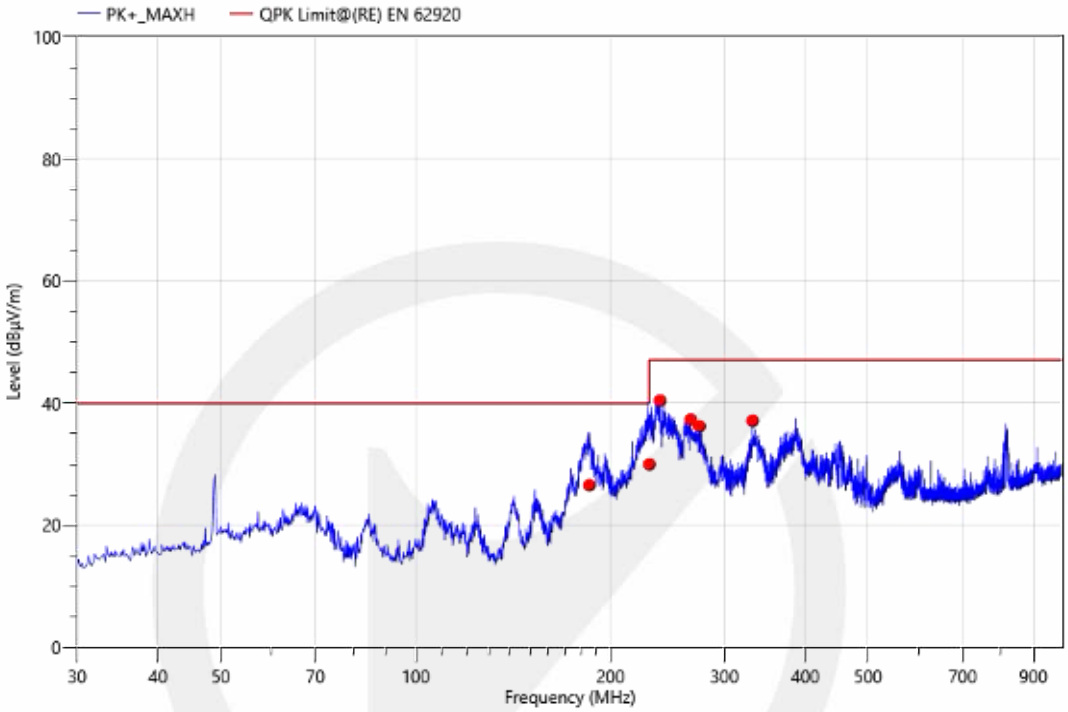
Project Information			
Model：	X1-Micro 1200	Mode：	PV-AC (100%)
Voltage：	AC 230V/50Hz	Engineer：	Elvis Xia
Temp：	20℃	Humi：	54%



Final Result (Margin=Limit-Meas.(Reading +Corr.))

No.	Freq. (MHz)	Reading (dBµV)	Corr. (dB)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Det.	Height (cm)	Pol.	Azimuth (deg)	Verdict
1	67.106	57.77	-26.71	31.06	40.00	8.94	QPK	100.0	V	163.6	Pass
2	107.001	54.20	-25.81	28.39	40.00	11.61	QPK	100.0	V	75.6	Pass
3	115.663	60.15	-26.64	33.51	40.00	6.49	QPK	100.0	V	177.1	Pass
4	154.337	57.68	-26.94	30.74	40.00	9.26	QPK	100.0	V	112.1	Pass
5	185.331	56.51	-25.67	30.84	40.00	9.16	QPK	100.0	V	75.6	Pass
6	228.259	46.02	-23.82	22.20	40.00	17.80	QPK	100.0	V	55.6	Pass

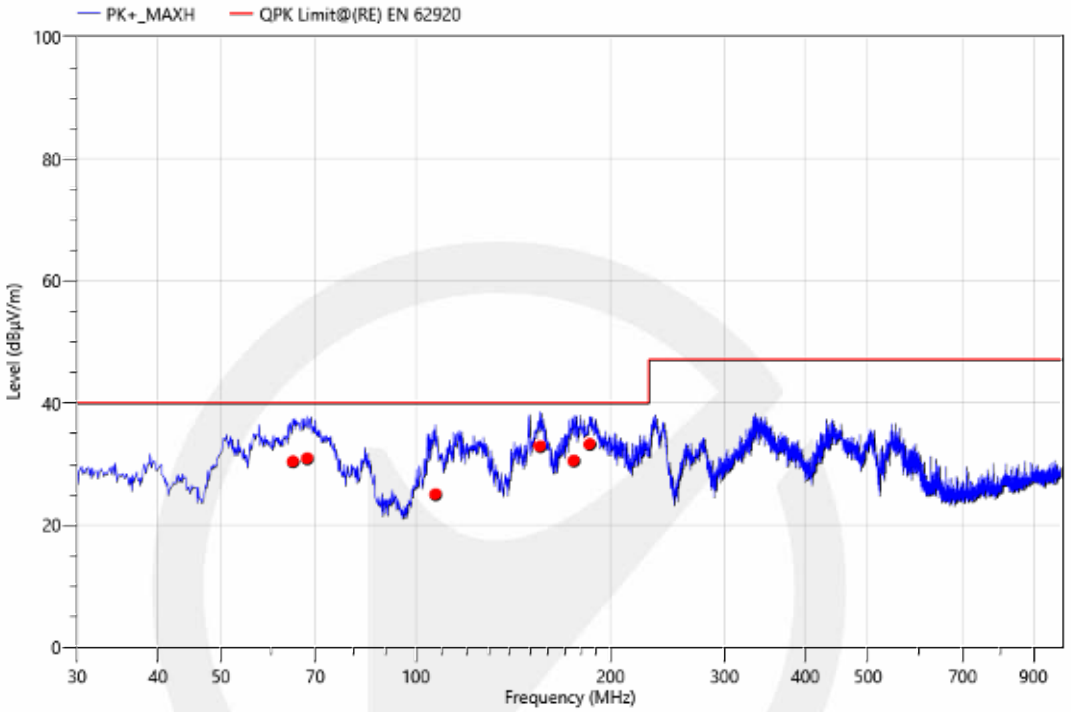
Project Information			
Model：	X1-Micro 1200	Mode：	PV-AC (100%)
Voltage：	AC 230V/50Hz	Engineer：	Elvis Xia
Temp：	20℃	Humi：	54%



Final Result (Margin=Limit-Meas.(Reading +Corr.))

No.	Freq. (MHz)	Reading (dBµV)	Corr. (dB)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Det.	Height (cm)	Pol.	Azimuth (deg)	Verdict
1	185.546	52.19	-25.66	26.53	40.00	13.47	QPK	200.0	H	170.6	Pass
2	229.697	53.73	-23.76	29.97	40.00	10.03	QPK	100.0	H	177.4	Pass
3	238.529	63.73	-23.34	40.39	47.00	6.61	QPK	100	H	156.9	Pass
4	265.977	60.06	-22.77	37.29	47.00	9.71	QPK	100	H	0	Pass
5	274.416	59.00	-22.82	36.18	47.00	10.82	QPK	100	H	142.9	Pass
6	331.543	57.98	-20.89	37.09	47.00	9.91	QPK	100	H	207.4	Pass

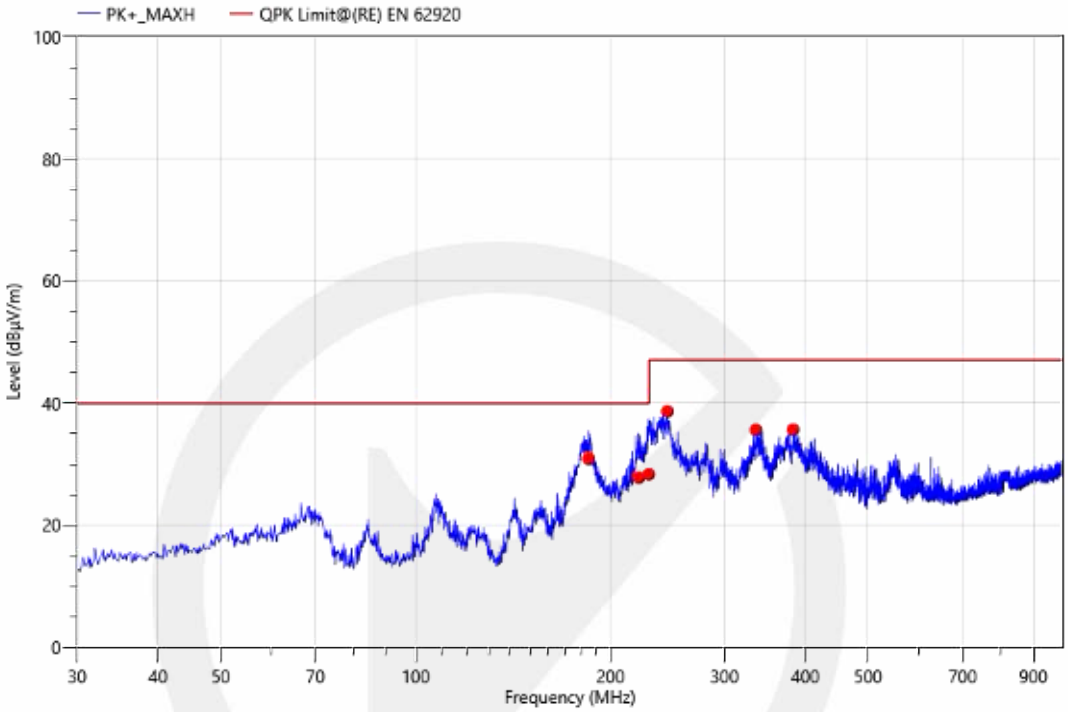
Project Information			
Model：	X1-Micro 1200	Mode：	PV-AC (50%)
Voltage：	AC 230V/50Hz	Engineer：	Elvis Xia
Temp：	20℃	Humi：	54%



Final Result (Margin=Limit-Meas.(Reading +Corr.))

No.	Freq. (MHz)	Reading (dBµV)	Corr. (dB)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Det.	Height (cm)	Pol.	Azimuth (deg)	Verdict
1	64.655	56.77	-26.42	30.35	40.00	9.65	QPK	100.0	V	16.1	Pass
2	68.051	57.69	-26.82	30.87	40.00	9.13	QPK	100.0	V	184.1	Pass
3	107.424	50.83	-25.84	24.99	40.00	15.01	QPK	100.0	V	86.6	Pass
4	155.918	59.80	-26.96	32.84	40.00	7.16	QPK	100.0	V	244.1	Pass
5	175.602	56.68	-26.21	30.47	40.00	9.53	QPK	100.0	V	207.1	Pass
6	185.869	58.85	-25.65	33.20	40.00	6.80	QPK	100.0	V	31.1	Pass

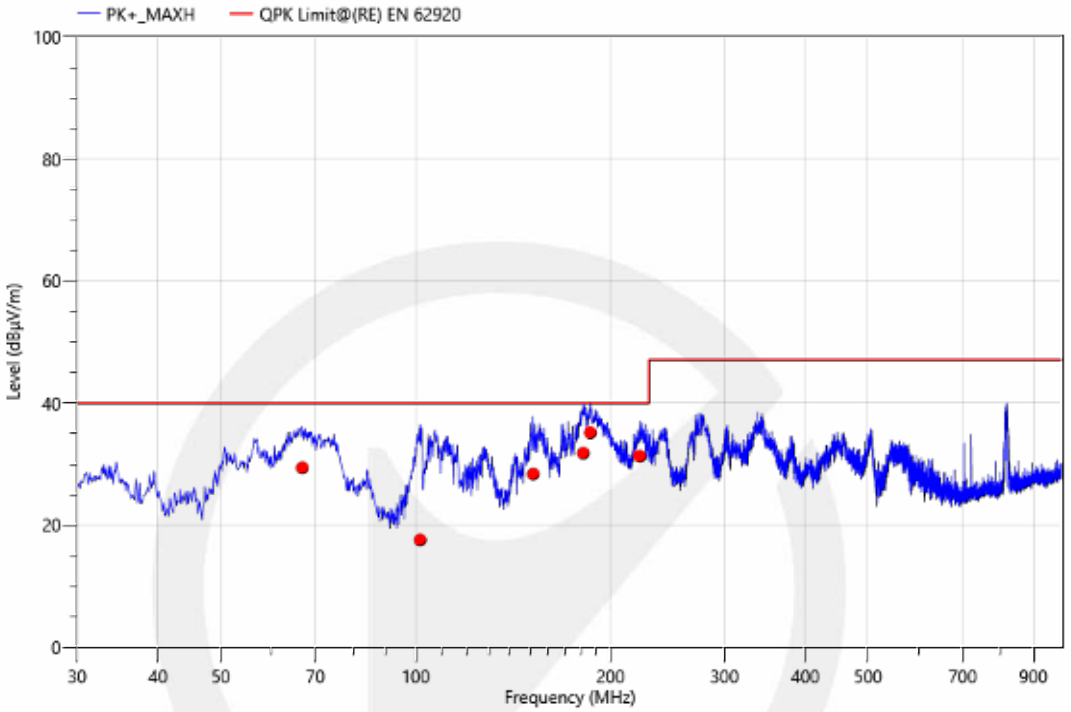
Project Information			
Model：	X1-Micro 1200	Mode：	PV-AC (50%)
Voltage：	AC 230V/50Hz	Engineer：	Elvis Xia
Temp：	20℃	Humi：	54%



Final Result (Margin=Limit-Meas.(Reading +Corr.))

No.	Freq. (MHz)	Reading (dBµV)	Corr. (dB)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Det.	Height (cm)	Pol.	Azimuth (deg)	Verdict
1	185.087	56.54	-25.68	30.86	40.00	9.14	QPK	200.0	H	144.1	Pass
2	221.160	51.84	-24.06	27.78	40.00	12.22	QPK	100.0	H	355.8	Pass
3	229.209	52.12	-23.78	28.34	40.00	11.66	QPK	100.0	H	176.3	Pass
4	244.931	61.63	-22.99	38.64	47.00	8.36	QPK	100	H	171.8	Pass
5	335.228	56.46	-20.84	35.62	47.00	11.38	QPK	100	H	332.3	Pass
6	382.754	55.99	-20.35	35.64	47.00	11.36	QPK	200	H	360	Pass

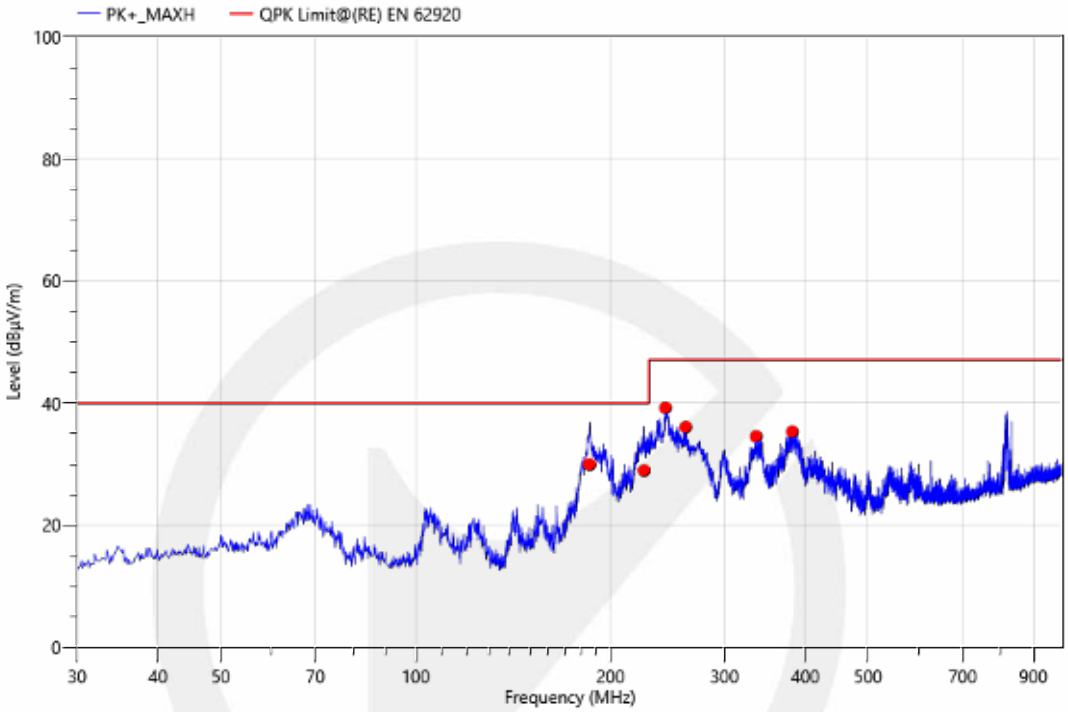
Project Information			
Model：	X1-Micro 1200	Mode：	PV-AC (25%)
Voltage：	AC 230V/50Hz	Engineer：	Elvis Xia
Temp：	20℃	Humi：	54%



Final Result (Margin=Limit-Meas.(Reading +Corr.))

No.	Freq. (MHz)	Reading (dBµV)	Corr. (dB)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Det.	Height (cm)	Pol.	Azimuth (deg)	Verdict
1	66.842	56.07	-26.68	29.39	40.00	10.61	QPK	100.0	V	102.8	Pass
2	101.614	42.97	-25.4	17.57	40.00	22.43	QPK	100.0	V	54.3	Pass
3	151.966	55.30	-26.93	28.37	40.00	11.63	QPK	100.0	V	340.9	Pass
4	181.565	57.56	-25.79	31.77	40.00	8.23	QPK	100.0	V	306.4	Pass
5	186.184	60.76	-25.64	35.12	40.00	4.88	QPK	100.0	V	284.9	Pass
6	222.191	55.30	-24.03	31.27	40.00	8.73	QPK	100.0	V	317.4	Pass

Project Information			
Model：	X1-Micro 1200	Mode：	PV-AC (25%)
Voltage：	AC 230V/50Hz	Engineer：	Elvis Xia
Temp：	20℃	Humi：	54%

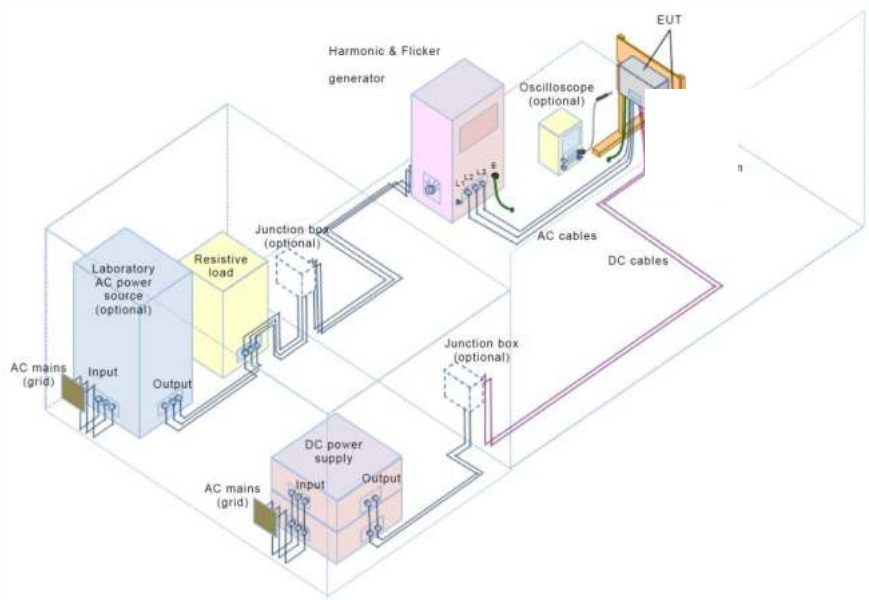


Final Result (Margin=Limit-Meas.(Reading +Corr.))

No.	Freq. (MHz)	Reading (dBµV)	Corr. (dB)	Meas. (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Det.	Height (cm)	Pol.	Azimuth (deg)	Verdict
1	185.830	55.55	-25.65	29.90	40.00	10.10	QPK	100.0	H	187.6	Pass
2	225.453	52.88	-23.94	28.94	40.00	11.06	QPK	100.0	H	28.6	Pass
3	243.185	62.30	-23.09	39.21	47.00	7.79	QPK	100	H	172.6	Pass
4	261.419	58.82	-22.76	36.06	47.00	10.94	QPK	100	H	160.6	Pass
5	335.713	55.35	-20.83	34.52	47.00	12.48	QPK	100	H	222.6	Pass
6	381.784	55.62	-20.34	35.28	47.00	11.72	QPK	200	H	358.3	Pass

7. HARMONIC CURRENT EMISSION MEASUREMENT

7.1. Block Diagram of Test Setup



7.2. Measuring Standard

☒EN IEC 61000-3-2:2019/A1:2021, Class A, Table 1
☐EN 61000-3-12:2011, Table 2

7.3. Measurement Limits

☒Table 1 - Limits for Class A equipment

Harmonic order n	Maximum permissible harmonic current (A)
Odd harmonics	
3 5 7 9 11 13 15 ≤ n ≤ 39	2.30 1.14 0.77 0.40 0.33 0.21 $0.15 \frac{0.15}{n}$
Even harmonics	
2 4 6 8 ≤ n ≤ 40	1.08 0.43 0.30 $0.23 \frac{8}{n}$

☐Table 2 – Current emission limits for equipment other than balanced three-phase equipment

Minimum R_{sce}	Admissible individual harmonic current I_h/I_{ref} [a] %						Admissible harmonic parameters %	
	I_3	I_5	I_7	I_9	I_{11}	I_{13}	THC/I_{ref}	$PWHC/I_{ref}$
33	21,6	10,7	7,2	3,8	3,1	2	23	23
66	24	13	8	5	4	3	26	26
120	27	15	10	6	5	4	30	30
250	35	20	13	9	8	6	40	40
≥350	41	24	15	12	10	8	47	47
The relative values of even harmonics up to order 12 shall not exceed 16/h %. Even harmonics above order 12 are taken into account in THC and $PWHC$ in the same way as odd order harmonics. Linear interpolation between successive R_{sce} values is permitted.								
[a] I_{ref} = reference current; I_h = harmonic current component.								

☐Table 3 – Current emission limits for balanced three-phase equipment

Minimum R_{sce}	Admissible individual harmonic current I_h/I_{ref} [a]				Admissible harmonic parameters %	
	I_5	I_7	I_{11}	I_{13}	THC/I_{ref}	$PWHC/I_{ref}$
33	10,7	7,2	3,1	2	13	22
66	14	9	5	3	16	25
120	19	12	7	4	22	28
250	31	20	12	7	37	38
≥350	40	25	15	10	48	46
The relative values of even harmonics up to order 12 shall not exceed 16/h %. Even harmonicsabove order 12 are taken into account in THC and $PWHC$ in the same way as odd order harmonics. Linear interpolation between successive R_{sce} values is permitted.						
[a] I_{ref} = reference current; I_h = harmonic current component.						

☐Table 4 –Current emission limits for balanced three-phase equipment under specified conditions (a, b, c)

Minimum R_{sce}	Admissible individual harmonic current I_h/I_{ref} [a] %				Admissible harmonic parameters %	
	I_5	I_7	I_{11}	I_{13}	THC/I_{ref}	$PWHC/I_{ref}$
33	10,7	7,2	3,1	2	13	22
≥120	40	25	15	10	48	46
The relative values of even harmonics up to order 12 shall not exceed 16/h %. Even harmonics above order 12 are taken into account in THC and $PWHC$ in the same way as odd order harmonics. Linear interpolation between both R_{sce} values is permitted.						
[a] I_{ref} = reference current; I_h = harmonic current component.						

☐Table 5 –Current emission limits for balanced three-phase equipment under specified conditions (d, e, f)

Minimum R_{sce}	Admissible individual harmonic current I_h/I_{ref} [a] %												Admissible harmonic parameters %	
	I_5	I_7	I_{11}	I_{13}	I_{17}	I_{19}	I_{23}	I_{25}	I_{29}	I_{31}	I_{35}	I_{37}	THC / I_{ref}	$PWHC/ I_{ref}$
33	10,7	7,2	3,1	2	2	1,5	1,5	1,5	1	1	1	1	13	22
≥250	25	17,3	12,1	10,7	8,4	7,8	6,8	6,5	5,4	5,2	4,9	4,7	35	70
For R_{sce} equal to 33, the relative values of even harmonics up to order 12 shall not exceed 16/h %. The relative values of all harmonics from I_{14} to I_{40} not listed above shall not exceed 1 % of I_{ref} For R_{sce}≥ 250, the relative values of even harmonics up to order 12 shall not exceed 16/h %. The relative values of all harmonics from I_{14} to I_{40} not listed above shall not exceed 3 % of I_{ref}. Linear interpolation between both R_{sce} values is permitted.														
a I_{ref} = reference current; I_h = harmonic current component.														

7.4. Test Procedure

The measurement of harmonic currents shall be performed as follows: i. For each harmonic order, measure the 1.5 s smoothed r.m.s. harmonic current in each DFT time window as defined in EN / IEC 61000-4-7:2009. ii. Calculate the arithmetic average of the measured values from the DFT time windows, over the entire observation period Short cyclic (T cycle≤2.5 min). Because of synchronisation to meet the requirements for repeatability in 5%.

7.5. Test Results

Pass.

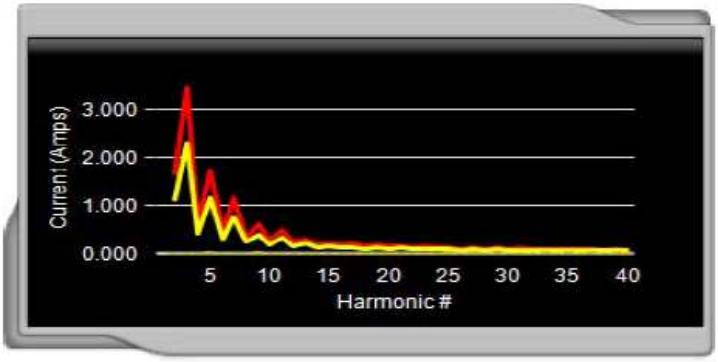
Please see the attached page.

EUT:	X1-Micro 2 in 1 (X1-Micro 1200)
Test Standard:	Test per IEC 61000-3-2
Test Class:	(Class A Test) - No inter-harmonics
Test Result:	**PASS**
Test Date:	2024/2/1
Start Time:	10:37:37
Stop Time:	10:40:18
Test Duration (min):	2.5
Source Qualification:	Compliance with IEC 61000-3-2
Power Source Distortion:	**OK**
Temp (°C) :	19.0
Hum. (% RH) :	54.0
Customer:	Customer
Test By:	Jackson Xue
Comments:	PV-AC(25%)

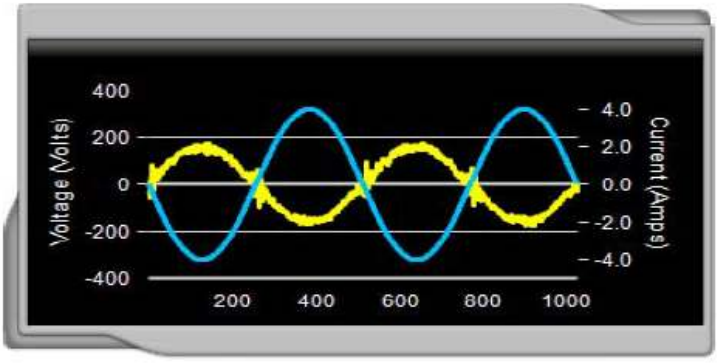
General Test Data: (Phase A)

Vrms (Volts)/V-pk/V-CF:	229.33 / 325.5 / 1.419	Frequency (Hz):	50.0001
I_rms (Amps):	1.412	Power (VA)/VAR:	324.17 / 43.27
I_fund/I_ref (Amps):	1.400 / 1.400	Power (W):	-320.78
I_peak (Amps)/I-CF:	2.413 / 1.604	Power Factor:	-0.991
V-THD (%):	0.06	I-THD (%):	5.84
POHC (A):	0.062 (method C.3)	POHC Limit (A):	0.250
I-THC (A):	0.082	Meas. Pwr (Min / Max)	-322.02W/0.00W
Phase angle of H5 (deg):	37.24		

Harmonic Spectrum



Voltage & Current Waveform



Current Harmonics (values at the end of test)

Harm No.	Harm. Ave.	Limit (100%)	% Of Limits	Result (Ave.)	Result (Max.)	Harm. Win.	Win. (150%)	% Of Max
2	0.0116	1.0800	1.1	PASS	PASS	0.0126	1.6200	0.8
3	0.0072	2.3000	0.3	PASS	PASS	0.0083	3.4500	0.2
4	0.0144	0.4300	3.4	PASS	PASS	0.0164	0.6450	2.5
5	0.0357	1.1400	3.1	PASS	PASS	0.0367	1.7100	2.1
6	0.0057	0.3000	1.9	PASS	PASS	0.0071	0.4500	1.6
7	0.0044	0.7700	0.6	PASS	PASS	0.0057	1.1550	0.5
8	0.0073	0.2300	3.2	PASS	PASS	0.0087	0.3450	2.5
9	0.0162	0.4000	4.0	PASS	PASS	0.0173	0.6000	2.9
10	0.0026	0.1840	1.4	PASS	PASS	0.0036	0.2760	1.3
11	0.0094	0.3300	2.9	PASS	PASS	0.0107	0.4950	2.2
12	0.0059	0.1530	3.9	PASS	PASS	0.0071	0.2295	3.1
13	0.0084	0.2100	4.0	PASS	PASS	0.0098	0.3150	3.1
14	0.0032	0.1310	2.4	PASS	PASS	0.0043	0.1965	2.2
15	0.0093	0.1500	6.2	PASS	PASS	0.0105	0.2250	4.7
16	0.0061	0.1150	5.3	PASS	PASS	0.0071	0.1725	4.1
17	0.0138	0.1320	10.5	PASS	PASS	0.0148	0.1980	7.5
18	0.0039	0.1020	3.8	PASS	PASS	0.0051	0.1530	3.3
19	0.0149	0.1180	12.7	PASS	PASS	0.0165	0.1770	9.3
20	0.0049	0.0920	5.3	PASS	PASS	0.0058	0.1380	4.2
21	0.0118	0.1070	11.1	PASS	PASS	0.0128	0.1605	8.0
22	0.0060	0.0830	7.2	PASS	PASS	0.0069	0.1245	5.6
23	0.0154	0.0970	15.9	PASS	PASS	0.0165	0.1455	11.3
24	0.0029	0.0760	3.8	PASS	PASS	0.0038	0.1140	3.3
25	0.0210	0.0900	23.3	PASS	PASS	0.0221	0.1350	16.3
26	0.0062	0.0700	8.8	PASS	PASS	0.0073	0.1050	7.0
27	0.0202	0.0830	24.3	PASS	PASS	0.0213	0.1245	17.1
28	0.0035	0.0650	5.4	PASS	PASS	0.0045	0.0975	4.6
29	0.0146	0.0770	19.0	PASS	PASS	0.0165	0.1155	14.3
30	0.0046	0.0610	7.5	PASS	PASS	0.0057	0.0915	6.2
31	0.0115	0.0720	16.0	PASS	PASS	0.0128	0.1080	11.9
32	0.0061	0.0570	10.7	PASS	PASS	0.0072	0.0855	8.4
33	0.0168	0.0680	24.6	PASS	PASS	0.0182	0.1020	17.8
34	0.0058	0.0540	10.6	PASS	PASS	0.0072	0.0810	8.9
35	0.0210	0.0640	32.8	PASS	PASS	0.0227	0.0960	23.6
36	0.0091	0.0510	17.8	PASS	PASS	0.0103	0.0765	13.5
37	0.0256	0.0600	42.7	PASS	PASS	0.0270	0.0900	30.0
38	0.0089	0.0480	18.5	PASS	PASS	0.0102	0.0720	14.2
39	0.0301	0.0570	52.9	PASS	PASS	0.0314	0.0855	36.8
40	0.0095	0.0460	20.6	PASS	PASS	0.0108	0.0690	15.7

Power Source Verification Data

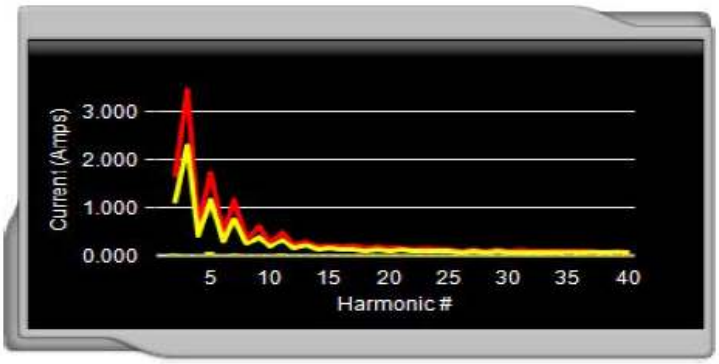
Harm No.	Harm. Value	Harm. Limit	% Of Limits	% Of Vfund	Result
2	0.032	0.460	6.912	0.014	OK
3	0.092	2.070	4.451	0.040	OK
4	0.019	0.460	4.078	0.008	OK
5	0.063	0.920	6.887	0.028	OK
6	0.024	0.460	5.318	0.011	OK
7	0.030	0.690	4.402	0.013	OK
8	0.043	0.460	9.421	0.019	OK
9	0.020	0.460	4.253	0.009	OK
10	0.028	0.460	6.195	0.012	OK
11	0.026	0.230	11.101	0.011	OK
12	0.024	0.230	10.489	0.011	OK
13	0.013	0.230	5.827	0.006	OK
14	0.034	0.230	14.858	0.015	OK
15	0.018	0.230	7.839	0.008	OK
16	0.013	0.230	5.857	0.006	OK
17	0.019	0.230	8.446	0.008	OK
18	0.015	0.230	6.620	0.007	OK
19	0.019	0.230	8.345	0.008	OK
20	0.025	0.230	10.756	0.011	OK
21	0.020	0.230	8.852	0.009	OK
22	0.022	0.230	9.775	0.010	OK
23	0.028	0.230	12.075	0.012	OK
24	0.017	0.230	7.205	0.007	OK
25	0.030	0.230	13.166	0.013	OK
26	0.019	0.230	8.075	0.008	OK
27	0.027	0.230	11.653	0.012	OK
28	0.015	0.230	6.629	0.007	OK
29	0.022	0.230	9.649	0.010	OK
30	0.018	0.230	8.033	0.008	OK
31	0.021	0.230	9.025	0.009	OK
32	0.029	0.230	12.493	0.013	OK
33	0.029	0.230	12.679	0.013	OK
34	0.024	0.230	10.510	0.011	OK
35	0.034	0.230	14.963	0.015	OK
36	0.025	0.230	10.795	0.011	OK
37	0.039	0.230	16.813	0.017	OK
38	0.024	0.230	10.272	0.010	OK
39	0.046	0.230	19.951	0.020	OK
40	0.026	0.230	11.286	0.011	OK

EUT:	X1-Micro 2 in 1 (X1-Micro 1200)
Test Standard:	Test per IEC 61000-3-2
Test Class:	(Class A Test) - No inter-harmonics
Test Result:	**PASS**
Test Date:	2024/2/1
Start Time:	10:21:59
Stop Time:	10:24:40
Test Duration (min):	2.5
Source Qualification:	Compliance with IEC 61000-3-2
Power Source Distortion:	**OK**
Temp (°C) :	19.0
Hum. (% RH) :	54.0
Customer:	Customer
Test By:	Jackson Xue
Comments:	PV-AC(50%)

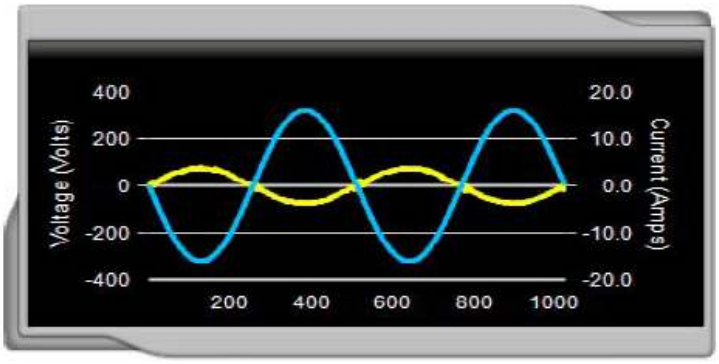
General Test Data: (Phase A)

Vrms (Volts)/V-pk/V-CF:	229.33 / 325.5 / 1.419	Frequency (Hz):	50.0001
I_rms (Amps):	2.669	Power (VA)/VAR:	612.37 / 40.70
I_fund/I_ref (Amps):	2.665 / 2.666	Power (W):	-610.78
I_peak (Amps)/I-CF:	4.220 / 1.561	Power Factor:	-0.998
V-THD (%):	0.05	I-THD (%):	3.46
POHC (A):	0.038 (method C.3)	POHC Limit (A):	0.250
I-THC (A):	0.092	Meas. Pwr (Min / Max)	-612.15W/0.00W
Phase angle of H5 (deg):	44.95		

Harmonic Spectrum



Voltage & Current Waveform



Current Harmonics (values at the end of test)

Harm No.	Harm. Ave.	Limit (100%)	% Of Limits	Result (Ave.)	Result (Max.)	Harm. Win.	Win. (150%)	% Of Max
2	0.0160	1.0800	1.5	PASS	PASS	0.0174	1.6200	1.1
3	0.0112	2.3000	0.5	PASS	PASS	0.0122	3.4500	0.4
4	0.0023	0.4300	0.5	PASS	PASS	0.0032	0.6450	0.5
5	0.0621	1.1400	5.4	PASS	PASS	0.0631	1.7100	3.7
6	0.0056	0.3000	1.9	PASS	PASS	0.0065	0.4500	1.4
7	0.0360	0.7700	4.7	PASS	PASS	0.0375	1.1550	3.2
8	0.0071	0.2300	3.1	PASS	PASS	0.0084	0.3450	2.4
9	0.0066	0.4000	1.7	PASS	PASS	0.0079	0.6000	1.3
10	0.0054	0.1840	2.9	PASS	PASS	0.0063	0.2760	2.3
11	0.0171	0.3300	5.2	PASS	PASS	0.0181	0.4950	3.7
12	0.0031	0.1530	2.0	PASS	PASS	0.0039	0.2295	1.7
13	0.0125	0.2100	5.9	PASS	PASS	0.0135	0.3150	4.3
14	0.0022	0.1310	1.7	PASS	PASS	0.0031	0.1965	1.6
15	0.0043	0.1500	2.9	PASS	PASS	0.0053	0.2250	2.3
16	0.0058	0.1150	5.1	PASS	PASS	0.0069	0.1725	4.0
17	0.0117	0.1320	8.9	PASS	PASS	0.0128	0.1980	6.4
18	0.0044	0.1020	4.4	PASS	PASS	0.0059	0.1530	3.9
19	0.0135	0.1180	11.5	PASS	PASS	0.0147	0.1770	8.3
20	0.0027	0.0920	2.9	PASS	PASS	0.0036	0.1380	2.6
21	0.0087	0.1070	8.1	PASS	PASS	0.0098	0.1605	6.1
22	0.0031	0.0830	3.7	PASS	PASS	0.0041	0.1245	3.3
23	0.0027	0.0970	2.8	PASS	PASS	0.0037	0.1455	2.5
24	0.0043	0.0760	5.6	PASS	PASS	0.0057	0.1140	5.0
25	0.0035	0.0900	3.9	PASS	PASS	0.0046	0.1350	3.4
26	0.0051	0.0700	7.3	PASS	PASS	0.0062	0.1050	5.9
27	0.0041	0.0830	4.9	PASS	PASS	0.0052	0.1245	4.1
28	0.0045	0.0650	6.9	PASS	PASS	0.0056	0.0975	5.8
29	0.0066	0.0770	8.6	PASS	PASS	0.0080	0.1155	7.0
30	0.0034	0.0610	5.5	PASS	PASS	0.0044	0.0915	4.8
31	0.0097	0.0720	13.4	PASS	PASS	0.0111	0.1080	10.3
32	0.0021	0.0570	3.7	PASS	PASS	0.0029	0.0855	3.4
33	0.0144	0.0680	21.2	PASS	PASS	0.0155	0.1020	15.2
34	0.0033	0.0540	6.1	PASS	PASS	0.0045	0.0810	5.5
35	0.0172	0.0640	26.8	PASS	PASS	0.0186	0.0960	19.3
36	0.0032	0.0510	6.2	PASS	PASS	0.0042	0.0765	5.5
37	0.0175	0.0600	29.1	PASS	PASS	0.0187	0.0900	20.8
38	0.0039	0.0480	8.2	PASS	PASS	0.0051	0.0720	7.1
39	0.0189	0.0570	33.1	PASS	PASS	0.0204	0.0855	23.9
40	0.0025	0.0460	5.4	PASS	PASS	0.0039	0.0690	5.6

Power Source Verification Data

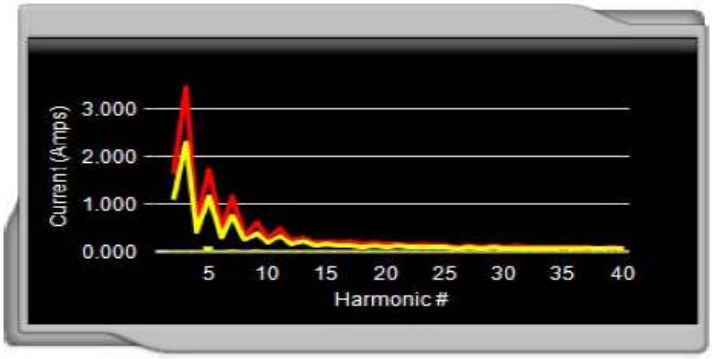
Harm No.	Harm. Value	Harm. Limit	% Of Limits	% Of Vfund	Result
2	0.030	0.460	6.496	0.013	OK
3	0.094	2.070	4.530	0.041	OK
4	0.018	0.460	3.875	0.008	OK
5	0.070	0.920	7.638	0.031	OK
6	0.026	0.460	5.742	0.012	OK
7	0.031	0.690	4.499	0.014	OK
8	0.048	0.460	10.404	0.021	OK
9	0.020	0.460	4.454	0.009	OK
10	0.028	0.460	6.032	0.012	OK
11	0.022	0.230	9.620	0.010	OK
12	0.026	0.230	11.406	0.011	OK
13	0.017	0.230	7.328	0.007	OK
14	0.032	0.230	13.824	0.014	OK
15	0.017	0.230	7.351	0.007	OK
16	0.016	0.230	7.106	0.007	OK
17	0.018	0.230	7.928	0.008	OK
18	0.016	0.230	6.841	0.007	OK
19	0.017	0.230	7.594	0.008	OK
20	0.019	0.230	8.207	0.008	OK
21	0.020	0.230	8.625	0.009	OK
22	0.019	0.230	8.263	0.008	OK
23	0.018	0.230	7.795	0.008	OK
24	0.019	0.230	8.071	0.008	OK
25	0.018	0.230	7.884	0.008	OK
26	0.016	0.230	7.147	0.007	OK
27	0.014	0.230	6.123	0.006	OK
28	0.018	0.230	7.659	0.008	OK
29	0.018	0.230	7.875	0.008	OK
30	0.018	0.230	7.893	0.008	OK
31	0.021	0.230	8.991	0.009	OK
32	0.021	0.230	9.345	0.009	OK
33	0.027	0.230	11.748	0.012	OK
34	0.023	0.230	10.172	0.010	OK
35	0.029	0.230	12.467	0.013	OK
36	0.023	0.230	9.950	0.010	OK
37	0.031	0.230	13.470	0.014	OK
38	0.017	0.230	7.180	0.007	OK
39	0.038	0.230	16.698	0.017	OK
40	0.019	0.230	8.117	0.008	OK

EUT:	X1-Micro 2 in 1 (X1-Micro 1200)
Test Standard:	Test per IEC 61000-3-2
Test Class:	(Class A Test) - No inter-harmonics
Test Result:	**PASS**
Test Date:	2024/2/1
Start Time:	10:04:46
Stop Time:	10:07:26
Test Duration (min):	2.5
Source Qualification:	Compliance with IEC 61000-3-2
Power Source Distortion:	**OK**
Temp (°C) :	19.0
Hum. (% RH) :	54.0
Customer:	Customer
Test By:	Jackson Xue
Comments:	PV-AC(100%)

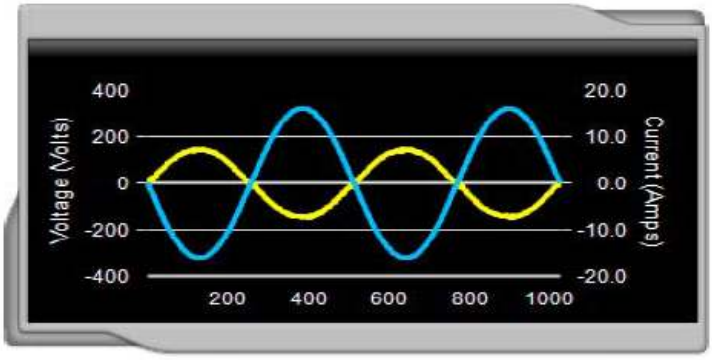
General Test Data: (Phase A)

Vrms (Volts)/V-pk/V-CF:	229.35 / 325.6 / 1.420	Frequency (Hz):	50.0001
I_rms (Amps):	5.139	Power (VA)/VAR:	1177.81 / 39.79
I_fund/I_ref (Amps):	5.135 / 5.138	Power (W):	-1177.99
I_peak (Amps)/I-CF:	7.749 / 1.468	Power Factor:	-0.999
V-THD (%):	0.05	I-THD (%):	2.13
POHC (A):	0.041 (method C.3)	POHC Limit (A):	0.250
I-THC (A):	0.109	Meas. Pwr (Min / Max)	-1179.57W/0.00W
Phase angle of H5 (deg):	17.17		

Harmonic Spectrum



Voltage & Current Waveform



Current Harmonics (values at the end of test)

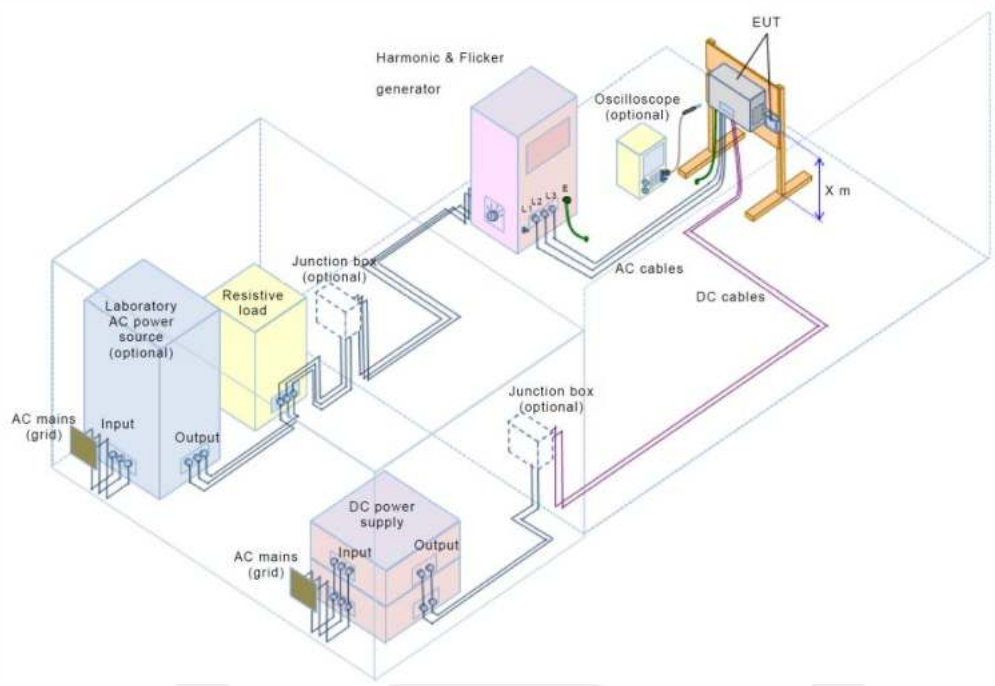
Harm No.	Harm. Ave.	Limit (100%)	% Of Limits	Result (Ave.)	Result (Max.)	Harm. Win.	Win. (150%)	% Of Max
2	0.0140	1.0800	1.3	PASS	PASS	0.0150	1.6200	0.9
3	0.0110	2.3000	0.5	PASS	PASS	0.0120	3.4500	0.3
4	0.0085	0.4300	2.0	PASS	PASS	0.0094	0.6450	1.5
5	0.0895	1.1400	7.8	PASS	PASS	0.0911	1.7100	5.3
6	0.0054	0.3000	1.8	PASS	PASS	0.0069	0.4500	1.5
7	0.0356	0.7700	4.6	PASS	PASS	0.0384	1.1550	3.3
8	0.0019	0.2300	0.8	PASS	PASS	0.0027	0.3450	0.8
9	0.0292	0.4000	7.3	PASS	PASS	0.0313	0.6000	5.2
10	0.0049	0.1840	2.7	PASS	PASS	0.0062	0.2760	2.2
11	0.0099	0.3300	3.0	PASS	PASS	0.0123	0.4950	2.5
12	0.0032	0.1530	2.1	PASS	PASS	0.0044	0.2295	1.9
13	0.0099	0.2100	4.7	PASS	PASS	0.0123	0.3150	3.9
14	0.0026	0.1310	2.0	PASS	PASS	0.0037	0.1965	1.9
15	0.0111	0.1500	7.4	PASS	PASS	0.0132	0.2250	5.8
16	0.0024	0.1150	2.1	PASS	PASS	0.0034	0.1725	2.0
17	0.0066	0.1320	5.0	PASS	PASS	0.0088	0.1980	4.4
18	0.0034	0.1020	3.3	PASS	PASS	0.0044	0.1530	2.9
19	0.0060	0.1180	5.1	PASS	PASS	0.0078	0.1770	4.4
20	0.0037	0.0920	4.1	PASS	PASS	0.0047	0.1380	3.4
21	0.0094	0.1070	8.8	PASS	PASS	0.0111	0.1605	6.9
22	0.0029	0.0830	3.5	PASS	PASS	0.0041	0.1245	3.3
23	0.0115	0.0970	11.8	PASS	PASS	0.0134	0.1455	9.2
24	0.0022	0.0760	2.9	PASS	PASS	0.0030	0.1140	2.7
25	0.0092	0.0900	10.3	PASS	PASS	0.0111	0.1350	8.3
26	0.0026	0.0700	3.8	PASS	PASS	0.0038	0.1050	3.6
27	0.0085	0.0830	10.3	PASS	PASS	0.0102	0.1245	8.2
28	0.0022	0.0650	3.3	PASS	PASS	0.0030	0.0975	3.0
29	0.0084	0.0770	10.8	PASS	PASS	0.0102	0.1155	8.8
30	0.0023	0.0610	3.8	PASS	PASS	0.0031	0.0915	3.4
31	0.0108	0.0720	15.0	PASS	PASS	0.0127	0.1080	11.8
32	0.0024	0.0570	4.2	PASS	PASS	0.0033	0.0855	3.8
33	0.0132	0.0680	19.4	PASS	PASS	0.0150	0.1020	14.7
34	0.0024	0.0540	4.5	PASS	PASS	0.0034	0.0810	4.2
35	0.0157	0.0640	24.5	PASS	PASS	0.0175	0.0960	18.2
36	0.0024	0.0510	4.7	PASS	PASS	0.0033	0.0765	4.3
37	0.0176	0.0600	29.3	PASS	PASS	0.0197	0.0900	21.9
38	0.0022	0.0480	4.6	PASS	PASS	0.0031	0.0720	4.2
39	0.0189	0.0570	33.2	PASS	PASS	0.0208	0.0855	24.3
40	0.0021	0.0460	4.6	PASS	PASS	0.0031	0.0690	4.4

Power Source Verification Data

Harm No.	Harm. Value	Harm. Limit	% Of Limits	% Of Vfund	Result
2	0.033	0.460	7.096	0.014	OK
3	0.096	2.070	4.643	0.042	OK
4	0.020	0.460	4.346	0.009	OK
5	0.073	0.920	7.961	0.032	OK
6	0.026	0.460	5.606	0.011	OK
7	0.033	0.690	4.825	0.015	OK
8	0.046	0.460	9.981	0.020	OK
9	0.021	0.460	4.531	0.009	OK
10	0.031	0.460	6.700	0.013	OK
11	0.028	0.230	12.136	0.012	OK
12	0.025	0.230	11.022	0.011	OK
13	0.024	0.230	10.276	0.010	OK
14	0.032	0.230	13.887	0.014	OK
15	0.021	0.230	9.004	0.009	OK
16	0.014	0.230	6.161	0.006	OK
17	0.016	0.230	6.990	0.007	OK
18	0.015	0.230	6.387	0.006	OK
19	0.015	0.230	6.310	0.006	OK
20	0.019	0.230	8.471	0.008	OK
21	0.020	0.230	8.684	0.009	OK
22	0.019	0.230	8.260	0.008	OK
23	0.027	0.230	11.560	0.012	OK
24	0.021	0.230	9.165	0.009	OK
25	0.022	0.230	9.655	0.010	OK
26	0.018	0.230	7.760	0.008	OK
27	0.019	0.230	8.384	0.008	OK
28	0.017	0.230	7.532	0.008	OK
29	0.020	0.230	8.654	0.009	OK
30	0.019	0.230	8.457	0.008	OK
31	0.023	0.230	10.042	0.010	OK
32	0.022	0.230	9.749	0.010	OK
33	0.027	0.230	11.549	0.012	OK
34	0.023	0.230	9.837	0.010	OK
35	0.033	0.230	14.341	0.014	OK
36	0.022	0.230	9.521	0.010	OK
37	0.037	0.230	16.250	0.016	OK
38	0.022	0.230	9.352	0.009	OK
39	0.037	0.230	16.021	0.016	OK
40	0.017	0.230	7.531	0.008	OK

8. VOLTAGE FLUCTUATION AND FLICKER MEASUREMENT

8.1. Block Diagram of Test Setup



8.2. Standard Limits

☐EN IEC 61000-3-11 Limits

The limits shall be applicable to voltage fluctuations and flicker at the supply terminals of the equipment under test, measured or calculated according to clause 4 under test conditions described in clause 6. Tests made to prove the compliance with the limits are considered to be type tests.

The following limits apply:

— the value of the short-term flicker indicator, P_{st} shall not be greater than 1,0;
— the value of the long-term flicker indicator, P_{lt} shall not be greater than 0,65;
— the value of d(t) during a voltage change shall not exceed 3,3 % for more than 500 ms;
— the relative steady-state voltage change, d_c, shall not exceed 3,3 %;
— the maximum relative voltage change d_{max}, shall not exceed:

☒EN 61000-3-3 Limits

The objective of voltage changes, voltage fluctuations and flicker in public low voltage supply systems during equipment with rated current≤16 A per phase, ensures that home appliances and certain other electrical equipment do not adversely affect lighting equipment when connected to the same power system.

Voltage Fluctuation and Flicker Limits:

— the value of Pst shall not be greater than 1.0;
— the value of Plt shall not be greater than 0.65;
— the value of d(t) during a voltage change shall not exceed 3.3 % for more than 500 ms;
— the relative steady-state voltage change, dc, shall not exceed 3.3 %;
— the maximum relative voltage change, dmax, shall not exceed 4.0 %;

8.3. Test Procedure

The total impedance of the test circuit, excluding the appliance under test, but including the internal impedance of the supply source, shall be equal to the reference impedance. The stability and tolerance of the reference impedance shall be adequate to ensure that the overall accuracy of 8% is achieved during the whole assessment procedure.

8.4. Test Results

Pass.

Please see the attached page.

.

EUT:	X1-Micro 2 in 1 (X1-Micro 1200)
Test Standard:	Test per IEC 61000-3-3
Test Class:	Flicker Test, Pst-dc-dmax-Tmax
Test Result:	**PASS**
Test Date:	2024/2/1
Start Time:	10:41:36
Stop Time:	10:51:57
Test Duration (min):	10
Source Qualification:	Compliance with IEC 61000-3-3
Temp (°C) :	19.0
Hum. (% RH) :	54.0
Customer:	Customer
Test By:	Jackson Xue
Comments:	PV-AC(25%)

Last Test Parameters:

Phase A

Vrms (Volts):	229.86	Frequency (Hz):	50.00
I_rms (Amps):	1.403	Power (W):	-320.75
V-THD (%):	0.319	T-Max (ms):	0 (500)
dmax (%):	0.000 (4.000)	Hi dmax (%):	0.000 (4.000)
dc (%):	0.000 (3.300)	Hi dc (%):	0.000 (3.300)
Pst-001 :	0.147 (1.000)		
Plt :	0.065 (0.650)		

Pst Spectrum

Plt Spectrum

EUT:	X1-Micro 2 in 1 (X1-Micro 1200)
Test Standard:	Test per IEC 61000-3-3
Test Class:	Flicker Test, Pst-dc-dmax-Tmax
Test Result:	**PASS**
Test Date:	2024/2/1
Start Time:	10:25:02
Stop Time:	10:35:21
Test Duration (min):	10
Source Qualification:	Compliance with IEC 61000-3-3
Temp (°C) :	19.0
Hum. (% RH) :	54.0
Customer:	Customer
Test By:	Jackson Xue
Comments:	PV-AC(50%)

Last Test Parameters:

Phase A

Vrms (Volts):	230.33	Frequency (Hz):	50.00
I_rms (Amps):	2.655	Power (W):	-610.85
V-THD (%):	0.249	T-Max (ms):	0 (500)
dmax (%):	0.000 (4.000)	Hi dmax (%):	0.000 (4.000)
dc (%):	0.000 (3.300)	Hi dc (%):	0.000 (3.300)
Pst-001 :	0.147 (1.000)		
Plt :	0.065 (0.650)		

Pst Spectrum

Plt Spectrum

EUT:	X1-Micro 2 in 1 (X1-Micro 1200)
Test Standard:	Test per IEC 61000-3-3
Test Class:	Flicker Test, Pst-dc-dmax-Tmax
Test Result:	PASS
Test Date:	2024/2/1
Start Time:	10:07:58
Stop Time:	10:18:17
Test Duration (min):	10
Source Qualification:	Compliance with IEC 61000-3-3
Temp (°C) :	19.0
Hum. (% RH) :	54.0
Customer:	Customer
Test By:	Jackson Xue
Comments:	PV-AC(100%)

Last Test Parameters:

Phase A

Vrms (Volts):	231.28	Frequency (Hz):	50.00
I_rms (Amps):	5.091	Power (W):	-1176.97
V-THD (%):	0.181	T-Max (ms):	0 (500)
dmax (%):	0.000 (4.000)	Hi dmax (%):	0.000 (4.000)
dc (%):	0.000 (3.300)	Hi dc (%):	0.000 (3.300)
Pst-001 :	0.093 (1.000)		
Plt :	0.041 (0.650)		

Pst Spectrum

Plt Spectrum

9. IMMUNITY GENERAL PERFORMANCE CRITERIA DESCRIPTION

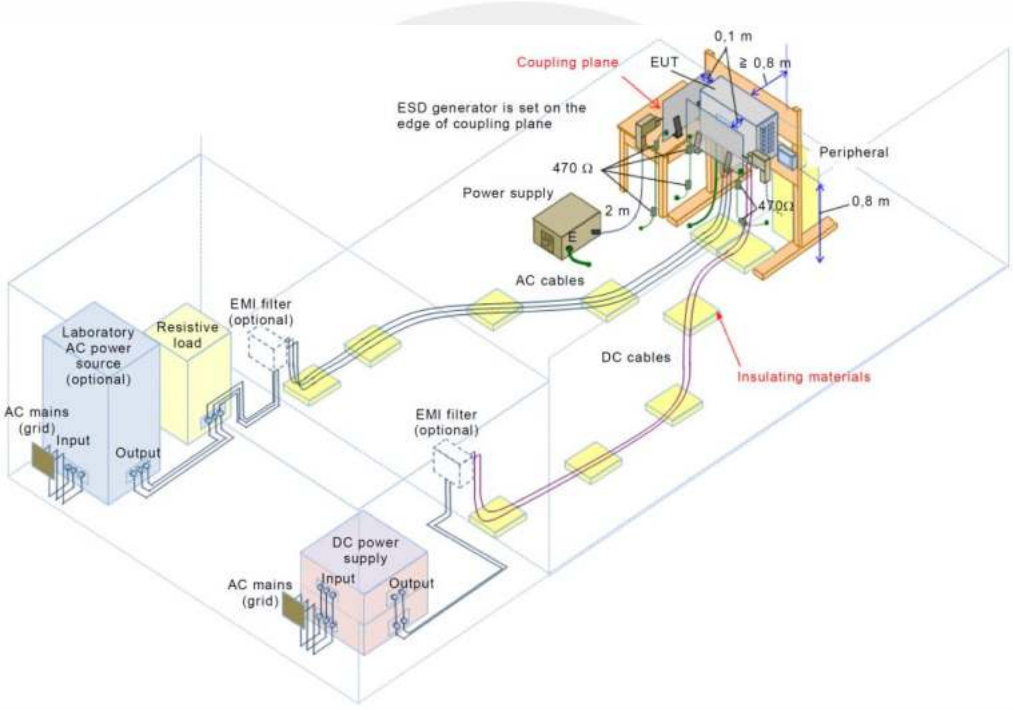
Item	Criterion A	Criterion B	Criterion C
Operating status	No noticeable change of the operating atatus. Operating as intended.	Noticeable changes of the operating characteristic. Self-recoverable	Shutdown, changes in operating status. Triggering of protective devices. Not self-recoverable
Power output	Power output permitted to vary only within ±25%.	Power output permitted to temporarily vary outside ±25% Self-recoverable	Loss of power output. Not self-recoverable
External and internal Indications and metering	No noticeable change of the operating atatus.	Changes only during test	Shutdown, triggering of protective devices. Not self-recoverable
Control signal to external devices	Undisturbed Communication and data exchange to external devices	Temporarily disturbed communication, but no error reports of the internal or external devices which could cause shut-down	Errors in communication, loss of data and information. No loss of stored program, no loss of user program. Not self-recoverable

10.ELECTROSTATIC DISCHARGE

10.1.Test Specification

Test standard	:	EN 62920, IEC 62920
Basic standard	:	IEC 61000-4-2
Performance criterion	:	B
Test level	:	±8.0kV (Air discharge) ±4.0kV (Contact discharge)

10.2.Block Diagram of Test Setup



10.3.Test Procedure

a. In the case of air discharge testing, the climatic conditions shall be within the following ranges:
- ambient temperature: 15°C to 35°C;
- relative humidity : 30% to 60%;
- atmospheric pressure : 86 kPa (860 mbar) to 106 kPa (1060 mbar)

b. Test programs and software shall be chosen so as to exercise all normal modes of operation of the EUT. The use of special exercising software is encouraged, but permitted only where it can be shown that the EUT is being comprehensively exercised.

c. In the case of contact discharges, the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

d. In the case of painted surface covering a conducting substrate, the following procedure shall be adopted : - If the coating is not declared to be an insulating coating by the equipment manufacturer, then the pointed tip of the generator shall penetrate the coating so as to make contact with the conducting substrate. - Coating declared as insulating by the manufacturer shall only be submitted to the air discharge. - The contact discharge test shall not be applied to such surfaces.

e. In the case of air discharges, the round discharge tip of the discharge electrode shall be approached as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator (discharge electrode) shall be removed from the EUT. The generator is then retriggered for a new single discharge. This procedure shall be repeated until the discharges are completed. In the case of an air discharge test, the discharge switch, which is used for contact discharge, shall be closed.
f. The test voltage shall be increased from the minimum to the selected test severity level, in order to determine any threshold of failure. The final test level should not exceed the product specification value in order to avoid damage to the equipment.
g. The test shall be performed with both air discharge and contact discharge. The test shall be performed with single discharges. On each pre-selected point at least 10 single discharges (in the most sensitive polarity) shall be applied. For the time interval between successive single discharges an initial value of 1 s is recommended. Longer intervals may be necessary to determine whether a system failure has occurred.
h. Ensure that the applied charge on the EUT has been dis-charged before next ESD pulse.

10.4. Test Results

Pass

Temperature	:	23°C
Humidity	:	44%
Atmospheric Pressure	:	101kpa
Test Engineer	:	Jackson Xue
Test Date	:	2024-02-01

Air Discharge:

Test Voltage	Location	Actual criterion	Required performance criterion	Result (Pass/Fail)
± 8 kV	All slots of the EUT	A	B	Pass
± 8 kV	Non-Conducted Enclosure	A	B	Pass

Contact Discharge

Test Voltage	Location	Actual criterion	Required performance criterion	Result (Pass/Fail)
± 4kV	Conducted Enclosure	A	B	Pass
± 4kV	Screw	A	B	Pass

Indirect Discharge

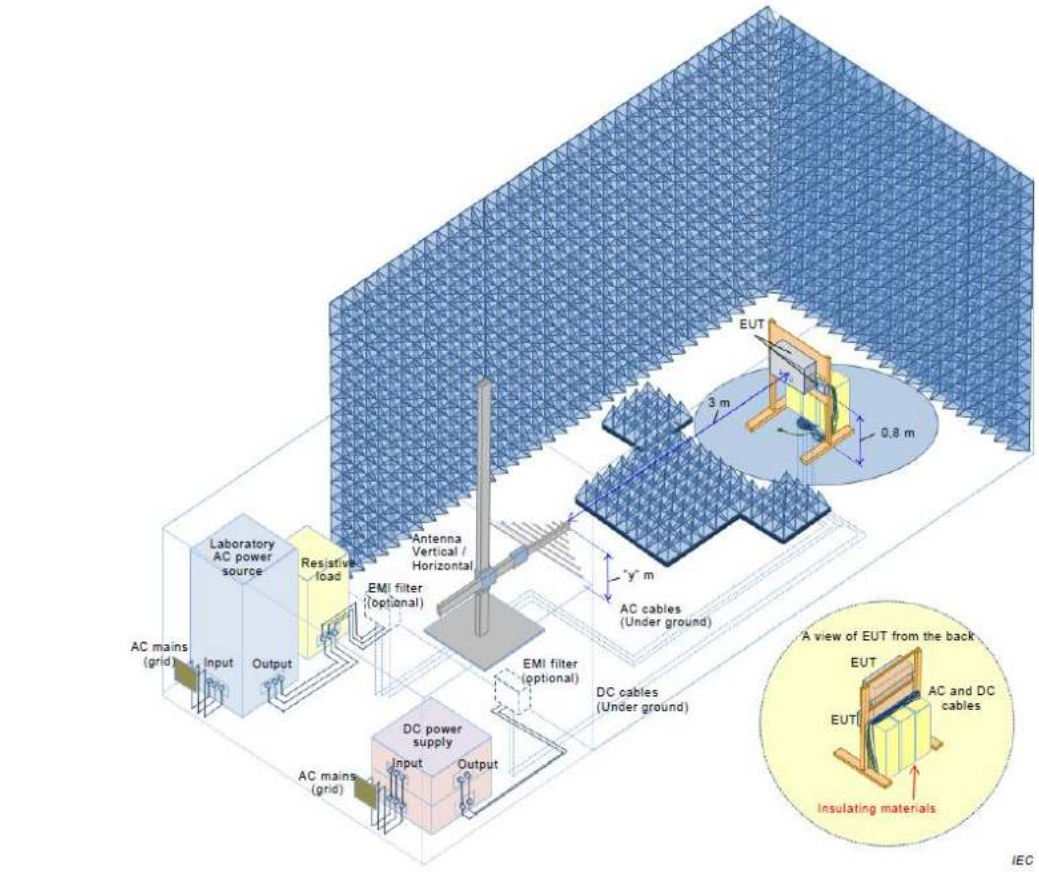
Test Voltage	Location	Actual criterion	Required performance criterion	Result (Pass/Fail)
± 4kV	HCP	A	B	Pass
± 4kV	VCP	A	B	Pass

11.CONTINUOUS RF ELECTROMAGNETIC FIELD DISTURBANCES

11.1.Test Specification

Test standard	:	EN 62920, IEC 62920	
Basic standard	:	IEC 61000-4-3	
Performance criterion	:	A	
Frequency range & Test level	:	☒80M-1000MHz, 1400M-6000MHz	3V/m
Modulation	:	AM, 80%, 1kHz sine-wave	

11.2.Block Diagram of Test Setup



11.3.Test procedure

The procedure defined in this part requires the generation of electromagnetic fields within which the test sample is placed and its operation observed. To generate fields that are useful for simulation of actual (field) conditions may require significant antenna drive power and the resultant high field strength levels. To comply with local regulations and to prevent biological hazards to the testing personnel, it is recommended that these tests be carried out in a shielded enclosure or semi-anechoic chamber.

a. The antenna which is enabling the complete frequency range of 80-6000 MHz is placed 3m (or 1m) away from the equipment. The required field strength is determined by placing the field strength meter(s) on top of or directly alongside the equipment under test and monitoring the field strength meter via a remote field strength indicator outside the enclosure while adjusting the continuous-wave to the antenna.
b. The test is performed with the antenna facing the front and back sides of the EUT with. Both vertical and horizontal polarizations from antenna are tested.

11.4. Test results

Pass

Temperature	:	21°C
Humidity	:	60%
Atmospheric Pressure	:	101kpa
Test Engineer	:	Jackson Xue
Test Date	:	2024-02-01

☒ 80M-6000MHz:

Freq. Range (MHz)	Field	Modulation	Polarity	Position (°)	Actual criterion	Required performance criterion	Result
80-1000	3V/m	AM, 80%	H / V	0, 90,180, 270	A	A	Pass
1400-6000	3V/m	AM, 80%	H / V	0, 90,180, 270	A	A	Pass

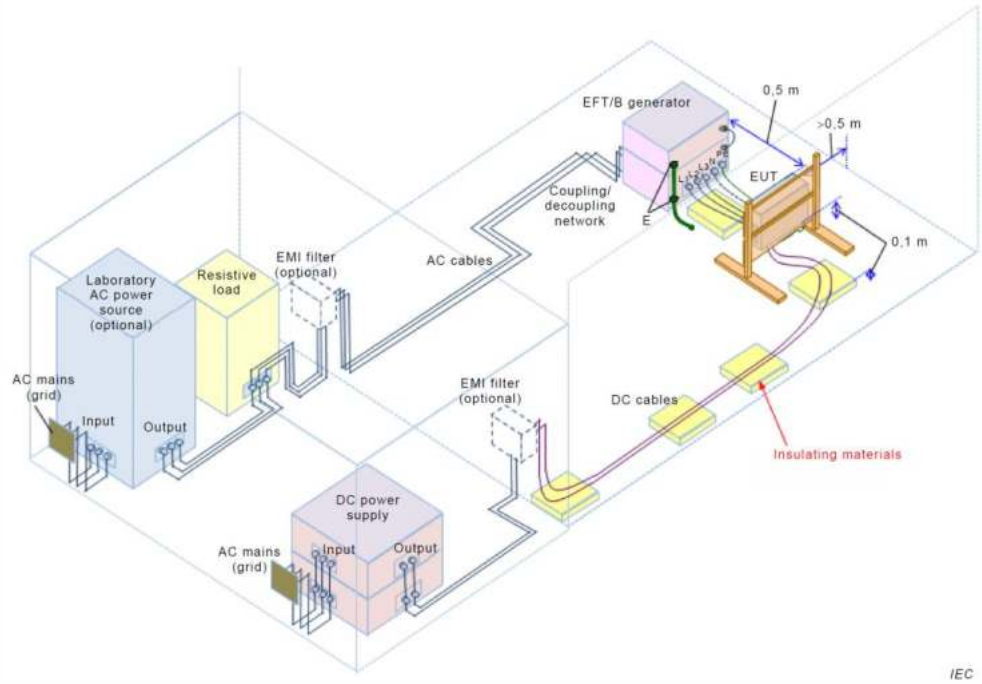
12.ELECTRICAL FAST TRANSIENTS/BURST

12.1.Test Specification

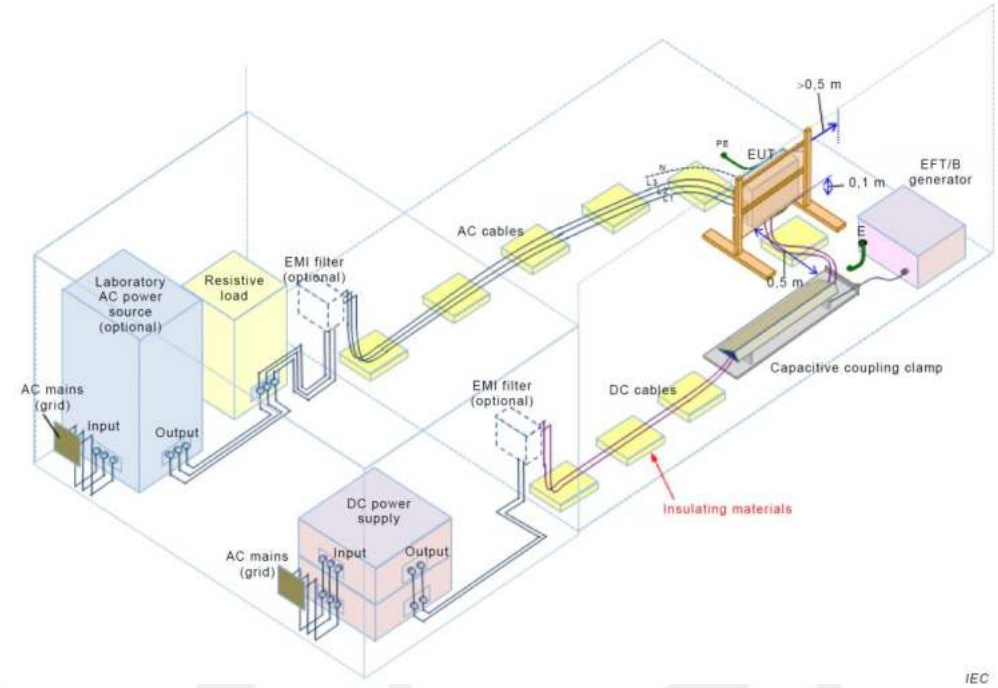
Test standard	:	EN 62920, IEC 62920
Basic standard	:	IEC 61000-4-4
Performance criterion	:	B
Test level	:	☒1kV, AC mains power ports ☐0.5kV, DC network power ports ☐0.5kV, Signal and control (wired network) ports
Repetition frequency	:	☐5kHz, ☒100kHz
Tr/Th:	:	5/50ns
Burst period	:	300ms
Test time :	:	120s

12.2.Block Diagram of Test Setup

AC Lines:



DC lines:



12.3. Test Procedure

The EUT is put on the insulating support that is 0.1 meter high above the ground. This reference ground plane shall project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane beneath the EUT, shall be more than 0.5m.

12.4. Test Results

Pass

Temperature	:	19°C
Humidity	:	54%
Atmospheric Pressure	:	101kpa
Test Engineer	:	Jackson Xue
Test Date	:	2024-02-01

Injection Line	Voltage (kV)	Injected Method	Actual criterion	Required performance criterion	Result (Pass/Fail)
☒ AC mains power ports	± 1	☒ CDN ☐ Direct injection ☐ Capacitive coupling clamp	A	B	Pass
☐ DC network power ports	± 0.5	☐ CDN ☐ Direct injection ☒ Capacitive coupling clamp	N/A	B	N/A
☐ Signal and control (wired network) ports	± 0.5	☐ CDN ☐ Direct injection ☒ Capacitive coupling clamp	N/A	B	N/A

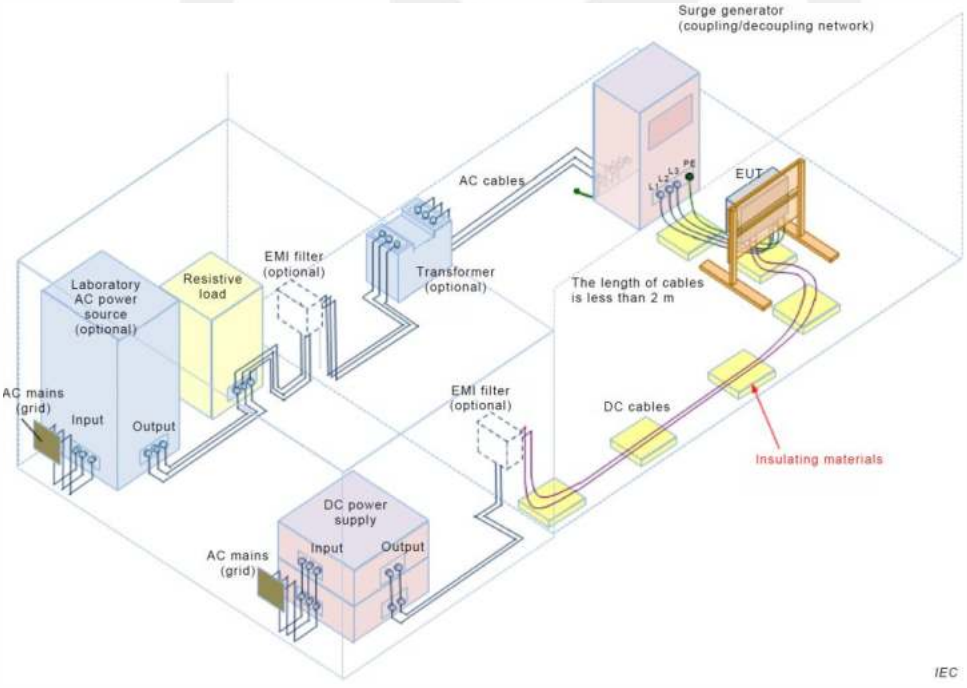
13.SURGES

13.1.Test Specification

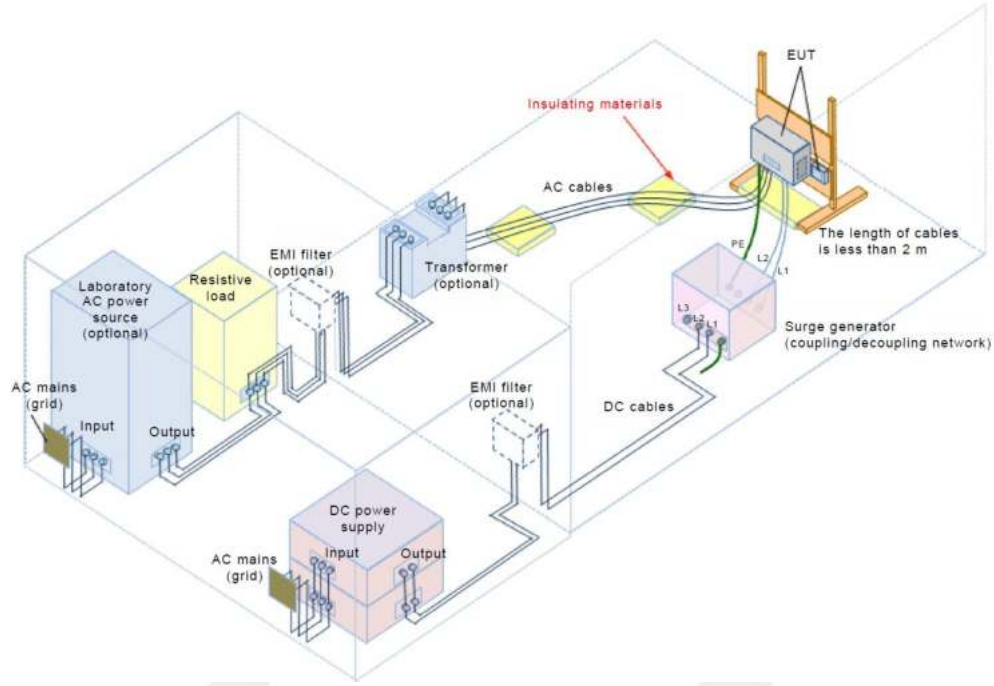
Test standard	:	EN 62920, IEC 62920
Basic standard	:	IEC 61000-4-5
Test level	:	☒1kV, Line to Line, AC mains power ports, Criterion B ☒2kV, Line to Earth, AC mains power ports, Criterion B ☐0.5kV, Line to Reference Line, DC network power ports, Criterion B ☐1kV, Line to Reference ground, DC network power ports, Criterion B ☐0.5kV, Lines to Ground, Signal and control (wired network) ports, Criterion B
Number of surges	:	5 (for each combination of parameters)
Repetition rate	:	1 minute / time
Polarity:	:	Positive / Negative
Phase angle:	:	0º, 90º, 180º, 270º (Only AC mains power ports)

13.2.Block Diagram of Test Setup

AC Lines:



DC Lines:



13.3. Test Procedure

This test simulates a lightning event by inducing transients onto the AC/DC power supply lines in common mode (Line to Ground) and differential mode (Line to Line). Each device was tested in a total of two surge configurations: Line to Ground (L-G): Combination Wave, Line to Protective Earth with 9uF and 10Ohm and Neutral to Protective Earth with 9uF and 10Ohm, common mode, generator earthed.
Line to Line (L-L): Combination Wave,
Line to Neutral with 18uF, differential mode, generator floated.
2 ohm : the source impedance of the low-voltage power supply network.
12 ohm : the source impedance of the low-voltage power supply network and ground.

a. If not otherwise specified the surges have to be applied synchronized to the voltage phase at the zero-crossing and the peak value of the a.c. voltage wave (positive and negative).
b. The surges have to be applied line to line and line to earth. When testing line to earth, the test voltage has to be applied successively between each of the lines and earth, if there is no other specification.
c. The test procedure shall also consider the non-linear current-voltage characteristics of the equipment under test. Therefore the test voltage has to be increased by steps up to the test level specified in the product standard or test plan. All lower levels including the selected test level shall be satisfied.
d. For testing the secondary protection, the output voltage of the generator shall be increased up to the worst-case voltage breakdown level (let-through level) of the primary protection.
e. Testing shall be performed according to a Test Plan, which shall be included in the test report.
f. To find all critical points of the duty cycle of the equipment, a sufficient number of positive and negative test pulses shall be applied.

13.4.Test results

Pass

Temperature	:	19°C
Humidity	:	54%
Atmospheric Pressure	:	101kpa
Test Engineer	:	Jackson Xue
Test Date	:	2024-02-01

☒ AC mains power ports:

Coupling Line	Voltage (kV)	Waveform (μs)	Polarity	Actual criterion	Required performance criterion	Result (Pass/Fail)
☒ Line to line	1	1.2/50 (8/20)	Pos./ Neg.	A	B	Pass
☒ Line to earth	2	1.2/50 (8/20)	Pos./ Neg.	A	B	Pass

☐ DC network power ports:

Coupling Line	Voltage (kV)	Waveform (μs)	Polarity	Actual criterion	Required performance criterion	Result (Pass/Fail)
☐ Line to Reference line	0.5	1.2/50 (8/20)	Pos./ Neg.	N/A	B	N/A
☐ Line to Reference ground	1	1.2/50 (8/20)	Pos./ Neg.	N/A	B	N/A

☐ Signal and control (wired network) ports:

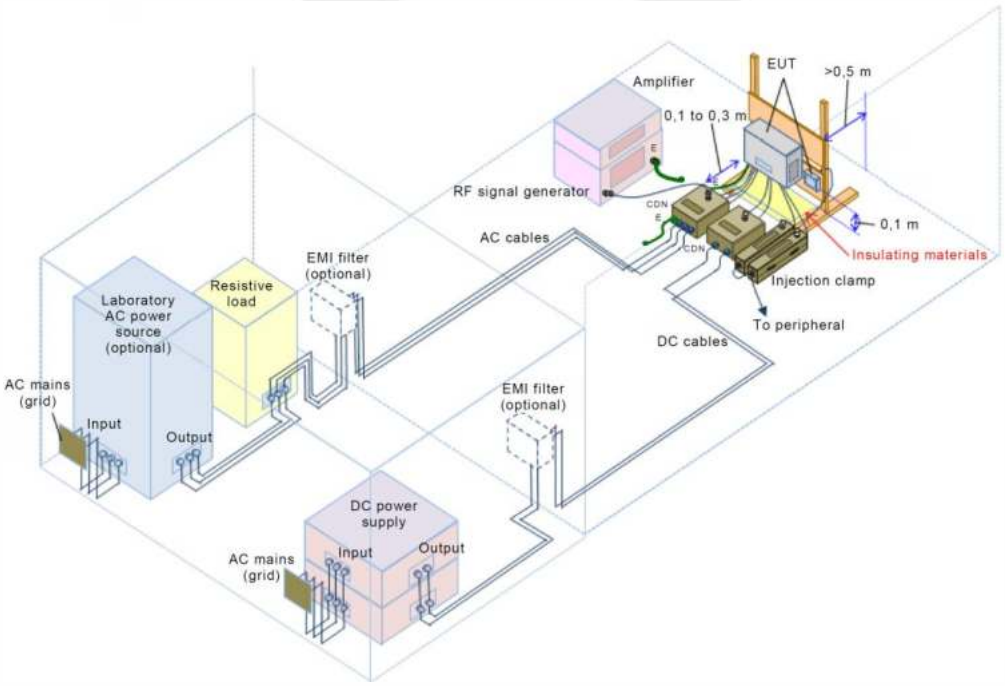
Port type	Coupling Line	Voltage (kV)	Waveform (μs)	Polarity	Actual criterion	Required performance criterion	Result (Pass/Fail)
☐ Signal and control (wired network) ports	Lines to ground	1	10/700 (5/320)	Pos./ Neg.	N/A	B	N/A

14.CONTINUOUS INDUCED RF DISTURBANCES

14.1.Test Specification

Test standard	:	EN 62920, IEC 62920
Basic standard	:	IEC 61000-4-6
Performance criterion	:	A
Frequency range & Test level	:	0.15M to 80MHz, 3V
Modulation	:	AM 80%, 1kHz sine-wave
Frequency Step	:	1% of fundamental

14.2.Block Diagram of Test Setup



14.3.Test Procedure

a. The EUT shall be operated within its intended climatic conditions. The temperature and relative humidity should be recorded.
b. The EUT is placed on a 0.1m high insulating support, and a well grounded cable is connected to metallic plane above the test table.
c. All cables/wires must be laid out on test plate (3cm in thickness),and the EUT is set up on test plate (10 cm in thickness) as shown in test setup photo. Ensure that the EUT is properly connected to the accessory equipment. d. The test shall be performed with the test generator connected to each of the coupling and decoupling devices in turn while the other non-excited RF-input ports of the coupling devices are terminated by a 50 ohm load resistor.
e. The frequency range is swept from 150 kHz to 80 MHz, using the signal levels established during the setting process, and with the disturbance signal 80% amplitude modulated with a 1 kHz sine wave, pausing to adjust the RF-signal level or to switch coupling devices as necessary. The rate of sweep shall

no exceed 1.5 x 10-3 decades/s. Where the frequency is swept incrementally, the step size shall no exceed 1% of the start and thereafter 1% of the preceding frequency value.
f. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies e.g. clock frequency (ies) and harmonics or frequencies of dominant interest shall be analyzed separately.
g. Attempts should be made to fully exercise the EUT during testing, and to fully interrogate all exercise modes selected for susceptibility
h. Testing shall be performed according to a Test Plan, which shall be included in the test report.

14.4. Test results

Pass

Temperature	:	19°C
Humidity	:	54%
Atmospheric Pressure	:	101kpa
Test Engineer	:	Jackson Xue
Test Date	:	2024-02-01

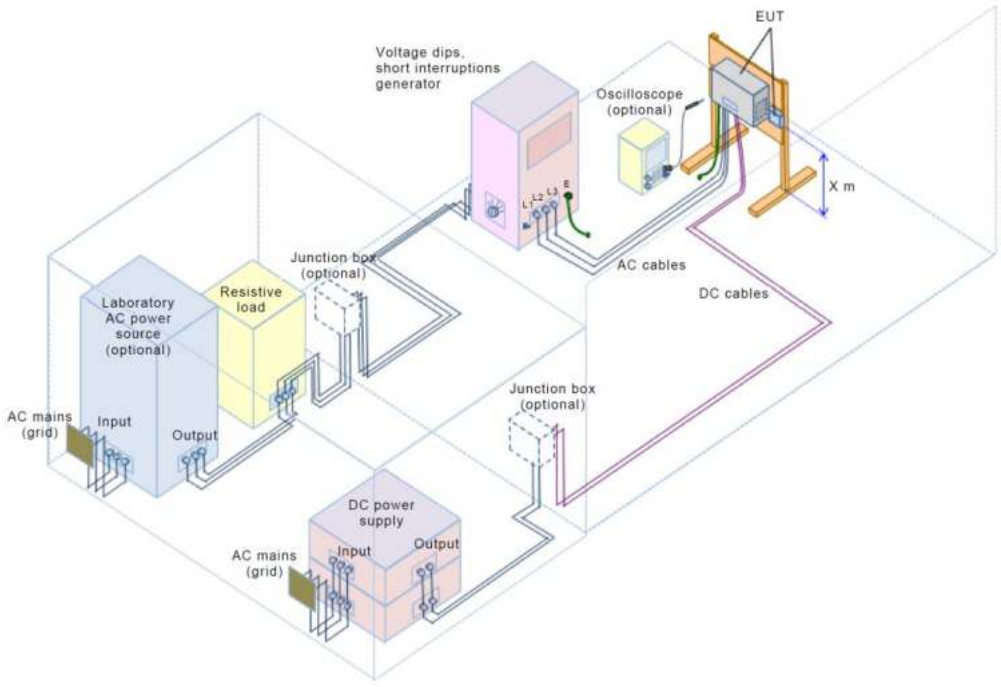
Range (MHz)	Levers (V)	Injection port	Coupling type	Actual criterion	Required performance criterion	Result (Pass/Fail)
0.15-80	3	☒AC mains power ports	☒CDN ☐EM Clamp ☐Current Clamp ☐Direct injection	A	A	Pass
0.15-80	3	☐DC network power ports	☐CDN ☒EM Clamp ☐Current Clamp ☐Direct injection	N/A	A	N/A
0.15-80	3	☐Signal and control (wired network) ports	☐CDN ☒EM Clamp ☐Current Clamp ☐Direct injection	N/A	A	N/A

15. VOLTAGE DIPS AND INTERRUPTIONS

15.1. Test Specification

Test standard	:	EN 62920, IEC 62920
Basic standard	:	IEC 61000-4-34
Test level	:	☒0%, 0.5 period, Criterion B
		☒0%, 1 periods, Criterion B
		☒70%, 25 periods for 50Hz, Criterion C
		☐70%, 30 periods for 60Hz, Criterion C
		☒0%, 250 periods for 50Hz, Criterion C
		☐0%, 300 periods for 60Hz, Criterion C

15.2. Block Diagram of Test Setup



15.3. Test Procedure

a. Where the equipment has a rated voltage the following shall apply - If the voltage range does not exceed 20% of the lower voltage specified for the rated voltage range, a single voltage within that range may be specified as a basis for test level specification.
- In all other cases, the test procedure shall be applied for both the lowest and highest voltages declared in the voltage range.
b. Test Conditions
- Select operated voltage and frequency of EUT - Test of interval : 10 sec.
- Level and duration : Sequence of 3 dips/interrupts.
- Voltage rise (and fall) time : 1.5 μs.

15.4. Test results

Pass

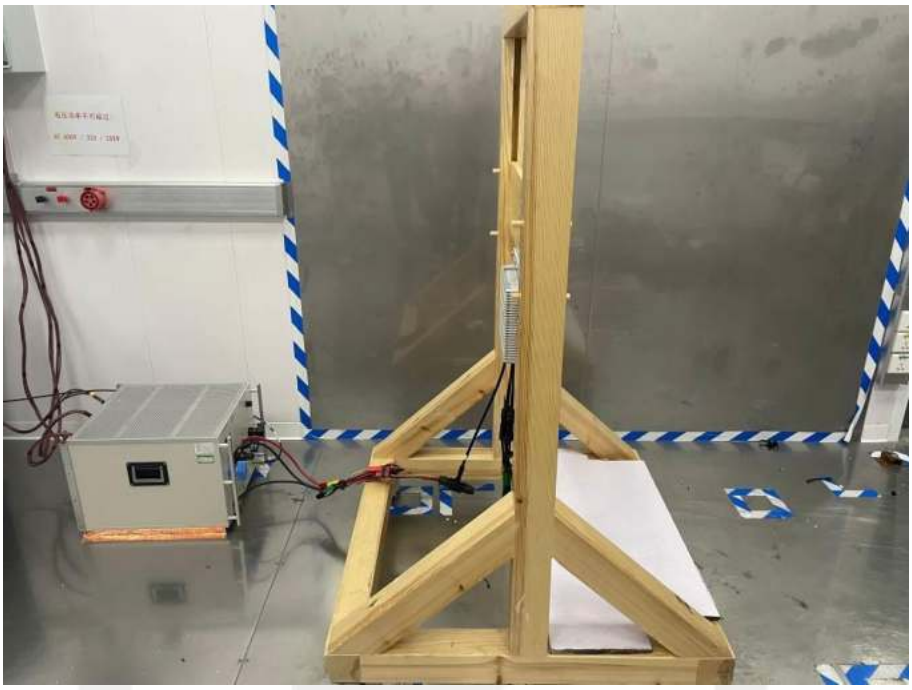
Temperature	:	19°C
Humidity	:	54%
Atmospheric Pressure	:	101kpa
Test Engineer	:	Jackson Xue
Test Date	:	2024-02-01

	Test Level (% UT)	Phase angle (°)	Input Voltage (V)	Freq (Hz)	Duration (periods)	Actual criterion	Required performance criterion	Result (Pass /Fail)
☒Voltage dips	0%	0°~315°	AC 230V	50	0.5	A	B	Pass
☒Voltage dips	0%	0°~315°	AC 230V	50	1	A	B	Pass
☒Voltage dips	70%	0°~315°	AC 230V	50	25	A	C	Pass
☐Voltage dips	70%	0°~315°	AC 230V	60	30	N/A	N/A	N/A
☒Voltage interruptions	0%	0°~315°	AC 230V	50	250	B	C	Pass
☐Voltage interruptions	0%	0°~315°	AC 230V	60	300	N/A	N/A	N/A

Note: 1. Dips to 0%, Duration 250P, EUT stopped operation, but can be automatically restored.

16.PHOTOGRAPHS

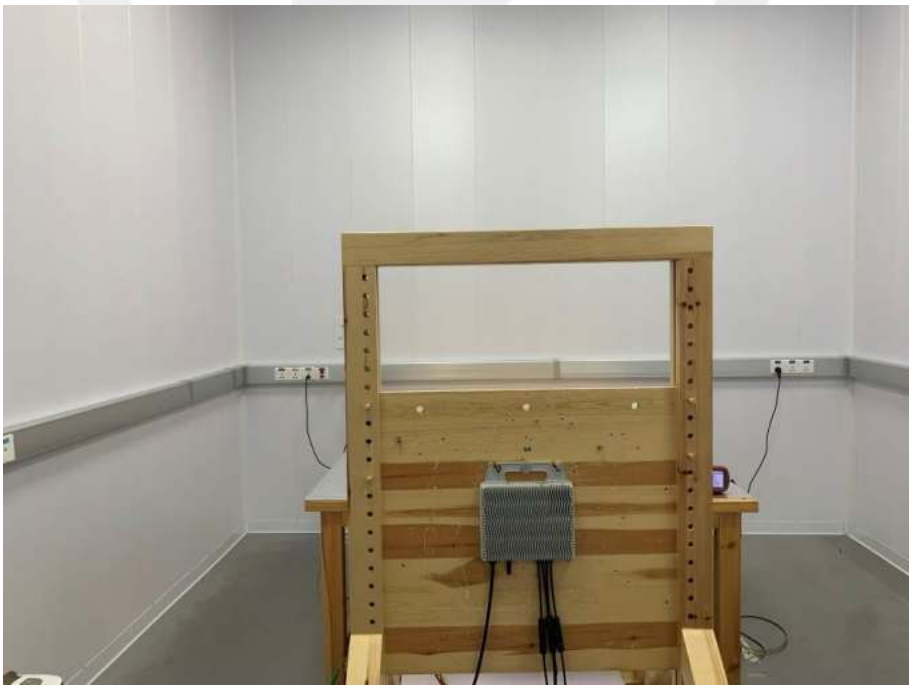
16.1.Photos of Disturbance Voltage Test



16.2.Photo of Radiation Emission Measurement (Up to 1 GHz)

16.3.Photo of Harmonics and Flicker Test

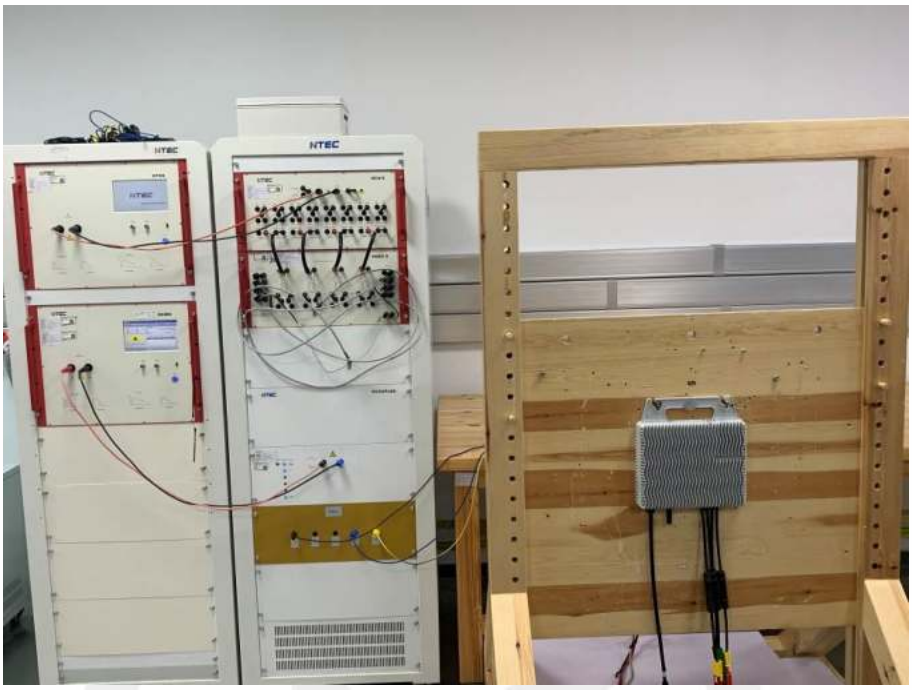
16.4.Photo of Electrostatic Discharge Immunity Test



16.5.Photo of Radio-Frequency Electromagnetic Field Immunity Test

16.6.Photo of Electrical Fast Transient / Burst Test

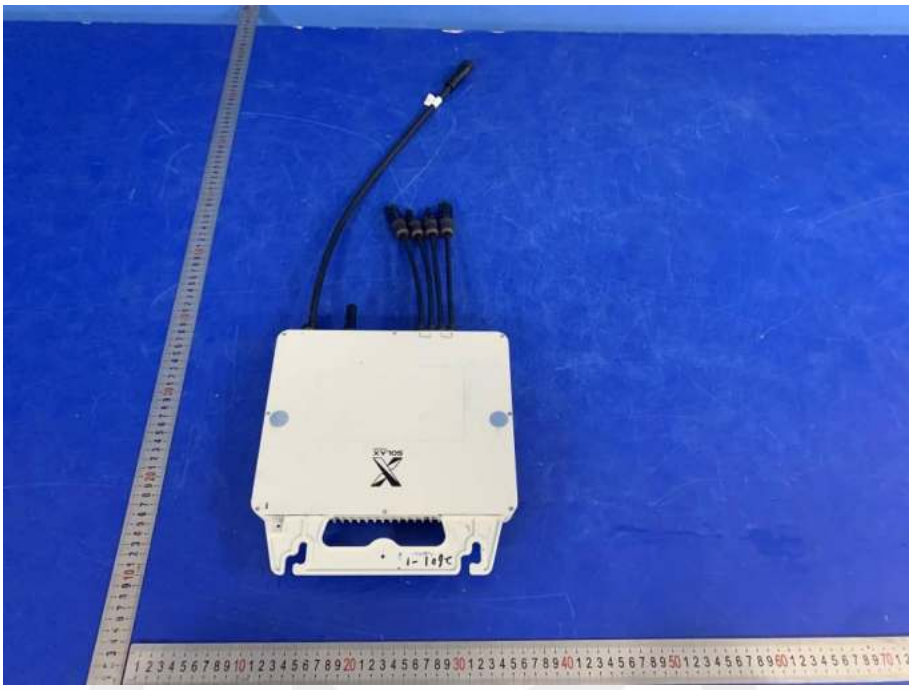
16.7.Photo of Surge Test

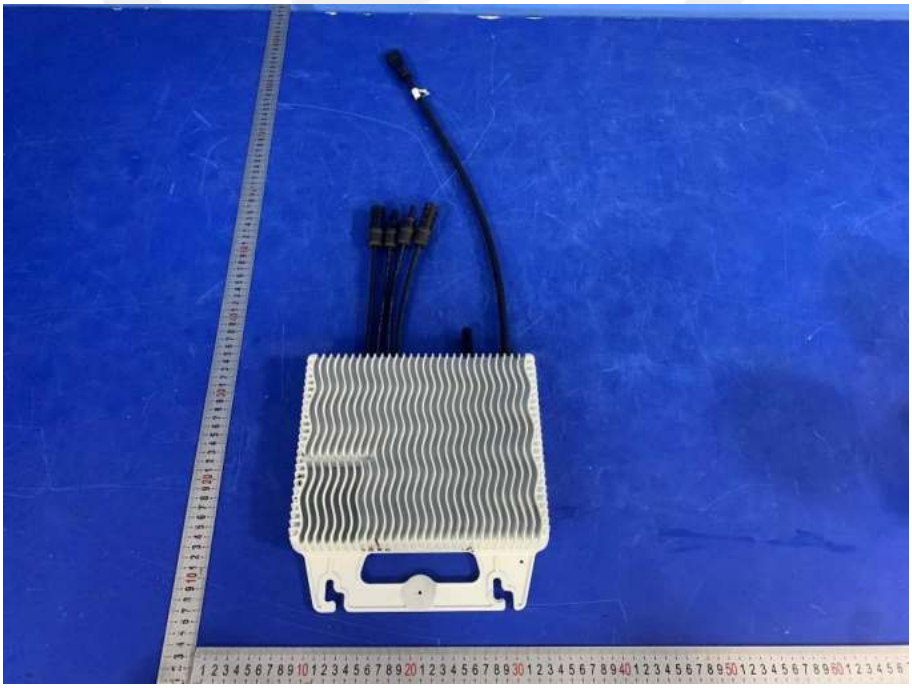


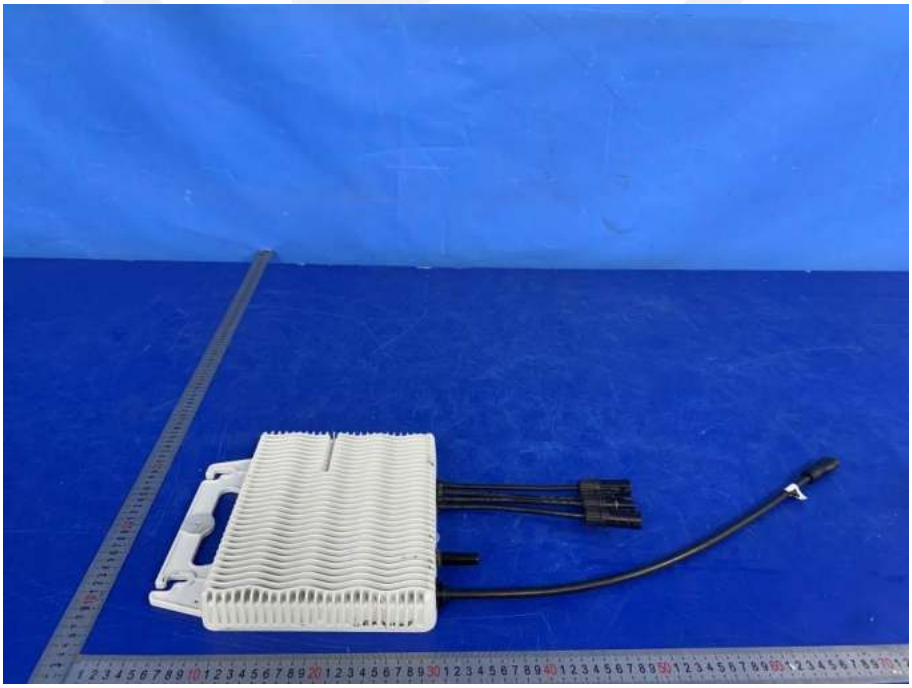
16.8.Photo of Injected Currents Susceptibility Test

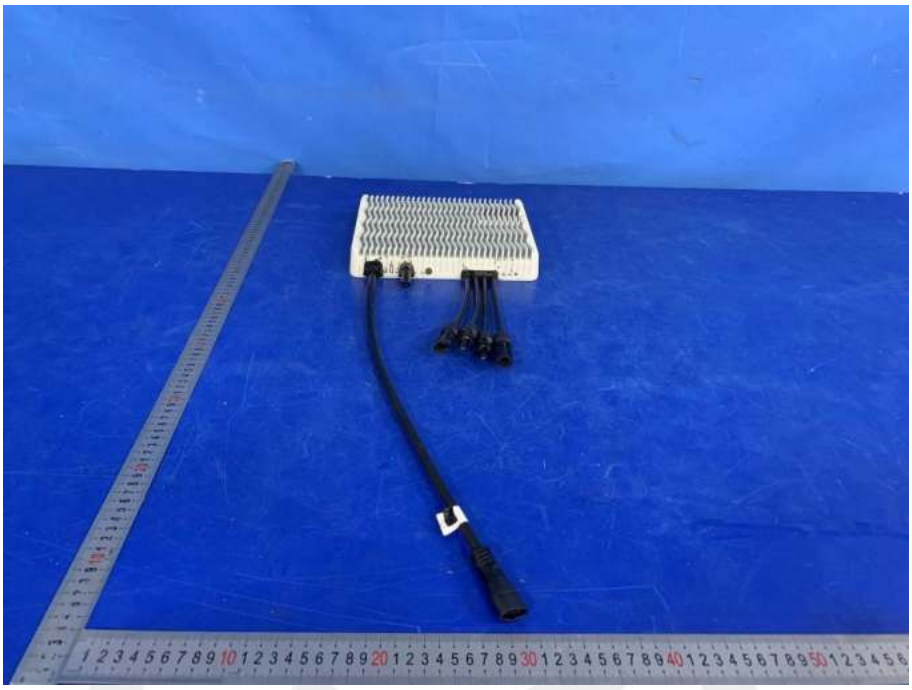
16.9. Photo of Voltage Dips and Interruption Immunity Test

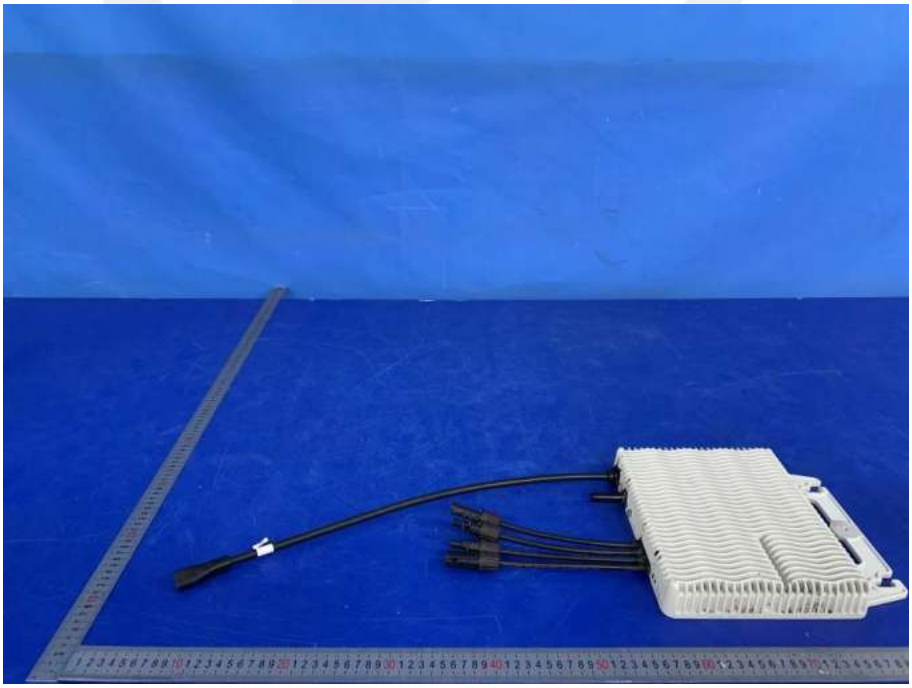
APPENDIX I
(Photo of EUT)











*** End of Report ***

声 明
Statement

1．本报告无授权批准人签字及“检验检测专用章”无效；

This report will be void without authorized signature or special seal for testing report.

2．未经许可本报告不得部分复制；

This report shall not be copied partly without authorization.

3．本报告的检测结果仅对送测样品有效，委托方对样品的代表性和资料的真实性负责；

The test results or observations are applicable only to tested sample. Client shall be responsible for representativeness of the sample and authenticity of the material.

4．本检测报告中检测项目标注有特殊符号则该项目不在资质认定范围内，仅作为客户委托、科研、教学或内部质量控制等目的使用；

The observations or tests with special mark fall outside the scope of accreditation, and are only used for purpose of commission, research, training, internal quality control etc.

5．本检测报告以实测值进行符合性判定，未考虑不确定度所带来的风险，本实验室不承担相关责任，特别约定、标准或规范中有明确规定的除外；

The test results or observations are provided in accordance with measured value, without taking risks caused by uncertainty into account. Without explicit stipulation in special agreements, standards or regulations, EMTEK shall not assume any responsibility.

6．对本检测报告若有异议，请于收到报告之日起 20 日内提出；

Objections shall be raised within 20 days from the date receiving the report.