TEST REPORT

Project No.: TM-2403000347P
Applicant: PERFECTRON Co., Ltd.
Address: 2F., No.190, Sec 2, Zhongxing Rd., Xindian Dist., New Taipei City, 23146, Taiwan.
Manufacturer: PERFECTRON Co., Ltd.
Address: 2F., No.190, Sec 2, Zhongxing Rd., Xindian Dist., New Taipei City, 23146, Taiwan.
Equipment Under Test (EUT):
Name: MICRO-GRID COMPUTER
Brand Name: PERFECTRON
Model No.: SCH3X2-D7
Added Model(s): N/A

Standards:

IEC 61850-3: 2013 (Ed 2.0) Clause 6.7 CISPR 22: 2008	
EN IEC 61000-3-2: 2019 + A1: 2021	
EN 61000-3-3: 2013 + A1: 2019 + A2: 2021 + AC: 2022	
IEC 61000-4-2: 2008	IEC 61000-4-11: 2020 + COR1: 2020 + COR2: 2022 (Ed. 3.0)
IEC 61000-4-3: 2020 (Ed. 4.0)	IEC 61000-4-16: 2015 (Ed. 2.0)
IEC 61000-4-4: 2012	IEC 61000-4-17: 1999 + AMD1:2001 + AMD2: 2008 (Ed. 1.2)
IEC 61000-4-5: 2014 + A1: 2017	IEC 61000-4-18: 2019 + COR1:2019
IEC 61000-4-6: 2023	IEC 61000-4-29: 2000 (Ed. 1.0)
IEC 61000-4-8: 2009	

Date of Sample Receipt : March 20, 2024
Date of Test : November 13, 2024 ~ December 30, 2024
Date of Issue : January 2, 2025

Remarks:

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Disclaimer

Variants information between/among model numbers / trademarks is provided by the applicant, test results of this test report are applicable to the sample EUT received of main test model name.

Approved By Stanley Cheng ***Date*** **January 2, 2025**

Stanley Cheng (Supervisor of engineering dept.)

Revision History			
Revision	**Report Number**	**Description**	**Issue Date**
00	TMXD2403001051DE	Original.	January 2, 2025

Note:

Contents

1. General Description

1.1 General Description of EUT

Name of EUT	MICRO-GRID COMPUTER
Brand Name	PERFECTRON
Model No.(s)	SCH3X2-D7
Added Model(s)	N/A
Variant Description	N/A

1.2 Details of EUT

EUT Power Rating	Rated Input: DC 16-31V Rated output: DC 12V~12.5A
Highest internal frequency	1100MHz

Accessories Cable List

Cable Type	Core	Length	Category	Shielding/Non-shielding

1.3 Description of Support Units

EUT Devices:

No.	PRODUCT	MODEL NO.	MANUFACTURER
1	MB	INS8367A	Perfectron
2	CPU (1.10GHz)	i7-13700TE	Intel
3	Memory (32GB / DDR4)	SO-DIMM	Samsung
4	Storage (128GB)	SATAIII SSD	Phison
5	Power	RSD-150B-12	Meanwell

Peripherals Devices:

No.	PRODUCT	MANUFACTURER	MODEL NO.	SERIAL NO.
1-4	USB HDD	Transcend	TS1TSJ25MC	N/A
5	USB Mouse	Logitech	M-U0026	N/A
6	USB Keyboard	Logitech	YU0036	2325SC30W728
7	Monitor	ASUS	MX27UC	K8LMR024567
8	Monitor	ASUS	PA289Q	R7LMTF011289
9	Server PC	Dell	T3610	57TT032
10	Server PC	DELL	Precision 3640 Tower	G3LLFF3
11-12	Battery	GS	GTH75DL	N/A
13	Ground Wire	N/A	N/A	N/A

Support Equipment Used in Tested Cable

No.	Cable Type	Core	Length	Shielding/Non-shielding
1-4	USB	N/A	1.4m	Shielding
5-6	USB	N/A	1.8m	Shielding
7-8	DP	N/A	1.8m	Shielding
9-10	RJ45 (CAT 6A)	N/A	20m	Non-shielding
11-12	Power	N/A	1.8m	Non-shielding
13	Ground	N/A	1.8m	Non-shielding

1.4 I/O Port Description

I/O Port Types	Q'TY
1. USB 2.0 Port	2
2. USB 3.0 Port	2
3. USB 3.2 Port	2
4. LAN Port	2
5. DP Port	2

1.5 Decision of Test Mode

The test configuration/ modes are as the following:

Conduction Mode (Power port):

1	**DP*2 3840*2160@60Hz**	**24VDC**

Conduction Modes (Telecom ports):

1	**LAN 1**	**10Mpbs**
2		**100Mpbs**
3		**1Gbps**
4	**LAN 2**	**10Mpbs**
5		**100Mpbs**
6		**1Gbps**

Radiation Mode:

1	**DP*2 3840*2160@60Hz**	**24VDC**
	DP*2 3840*2160@60Hz / 1-5.5GHz	

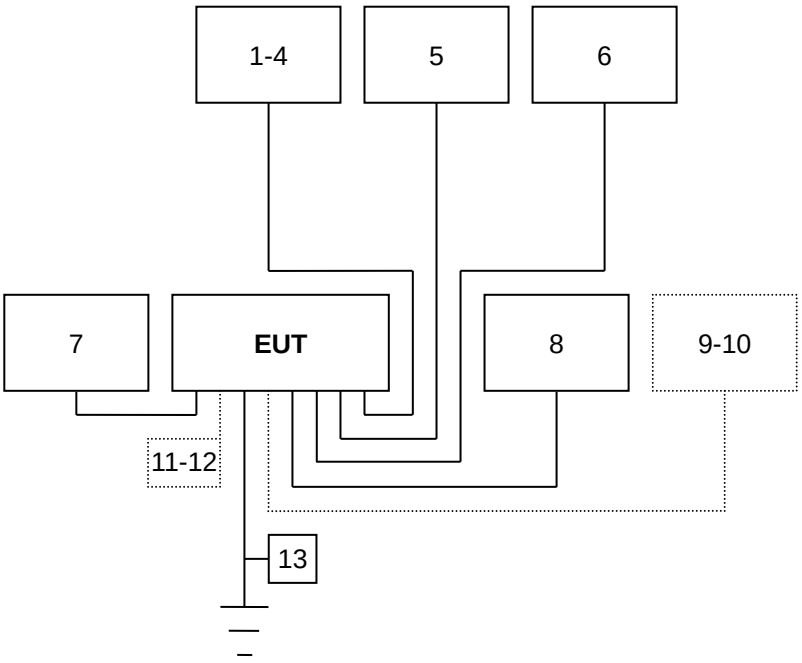
1.6 The Final Test Mode of the EUT

After the preliminary scan, the following test mode was found to produce the highest emission level.

Final Test Mode	
Conducted Emission	**Mode 1**
ISN	**Mode 4**
Radiated Emission Below 1GHz	**Mode 1**
Radiated Emission Above 1GHz	**Mode 1**
Harmonics & Flicker	**N/A**
Immunity	**Mode 1**

Then, the above highest emission mode of the configuration of the EUT and cable was chosen for all final test items.

1.7 Configuration of Tested System



1.8 Operation Procedure

1. Windows 10 boots system.
2. Run Burnin.exe to activate all peripherals to test EUT.
3. Run LANTEST.exe to ping 192.168.1.60&42 –t (EUT), ping 192.168.1.1&10 –t (Server PC).

1.9 Summary of Results

Emission		
Standard	**Test Type**	**Result**
IEC 61850-3: 2013 (Ed 2.0) Clause 6.7 CISPR 22: 2008	Conducted Emission	PASS
	ISN	PASS
	Radiated Emission	PASS
EN IEC 61000-3-2: 2019 + A1: 2021	Harmonic current emissions	N/A
EN 61000-3-3: 2013 + A1: 2019 + A2: 2021 + AC: 2022	Voltage changes, voltage fluctuations & flicker	N/A

Immunity		
Standard	**Test Type**	**Result**
IEC 61000-4-2: 2008	ESD	PASS
IEC 61000-4-3: 2020 (Ed. 4.0)	RS	PASS
IEC 61000-4-4: 2012	EFT	PASS
IEC 61000-4-5: 2014 + A1: 2017	Surge	PASS
IEC 61000-4-6: 2023	CS	PASS
IEC 61000-4-8: 2009	PFMF	PASS
IEC 61000-4-11: 2020 + COR1: 2020 + COR2: 2022 (Ed. 3.0)	DIP	N/A
IEC 61000-4-16: 2015 (Ed. 2.0)	Power frequency immunity	PASS
IEC 61000-4-17: 1999 + AMD1:2001 + AMD2: 2008 (Ed. 1.2)	Ripple on DC Power immunity	PASS
IEC 61000-4-18: 2019 + COR1:2019	Damped Oscillatory wave immunity	PASS
IEC 61000-4-29: 2000 (Ed. 1.0)	DC Input power voltage dip and interruptions	PASS

1.10 Reporting Statements of Conformity

The conformity statement in this report is based solely on the test results, measurement uncertainty is excluded.

1.11 Deviation

No deviation from the mentioned test methods and applicable standards.

2. EMISSION

2.1 Limit

Maximum permissible level of Line Conducted Emission

FREQUENCY (MHz)	Quasi-peak	Average
0.15 - 0.5	79	66
0.50 - 5.0	73	60
5.0 - 30.0	73	60

Note: The lower limit shall apply at the transition frequency.

Maximum permissible level of Common Mode Conducted Emission (Telecommunication Ports)

FREQUENCY (MHz)	Voltage Limit(dBuV)		Current Limit(dBuA)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	97 - 87	84 - 74	53 - 43	40 - 30
0.5 - 30.0	87	74	43	30

Note: The lower limit shall apply at the transition frequency.

Maximum permissible level of Radiated Emission measured at 10 meter

FREQUENCY (MHz)	Quasi - peak
30 - 230	40
230 - 1000	47

Note: The lower limit shall apply at the transition frequency.

Limits above 1 GHz
Limits for radiated disturbance at a measurement distance of 3m

Frequency range (GHz)	Average Limit dB(μV/m)	Peak Limit dB(μV/m)
1 - 3	56	76
3 - 6	60	80

Note: The lower limit applies at the transition frequency.

2.2 Conducted Emission

2.2.1 Test Instruments

Conducted Emission Room # B					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
Attenuator	MCL	HAT-10	SD-C012	03/18/2024	03/17/2025
BNC Cable	EMEC	CFD300-NL	SD-C020	12/28/2023	12/27/2024
EMI Test Receiver	R&S	ESR3	102166	03/05/2024	03/04/2025
ISN	Teseq	ISN T800	30847	03/13/2024	03/12/2025
LISN	Schwarzbeck	NSLK 8127	01082	03/13/2024	03/12/2025
LISN(EUT)	Schwarzbeck	NSLK 8127	01084	03/13/2024	03/12/2025
Thermo-Hygro Meter	NDr.AV	GM-108A	SD-R100	08/19/2024	08/18/2025
Test S/W	EZ-EMC Ver.CCS-03A1				

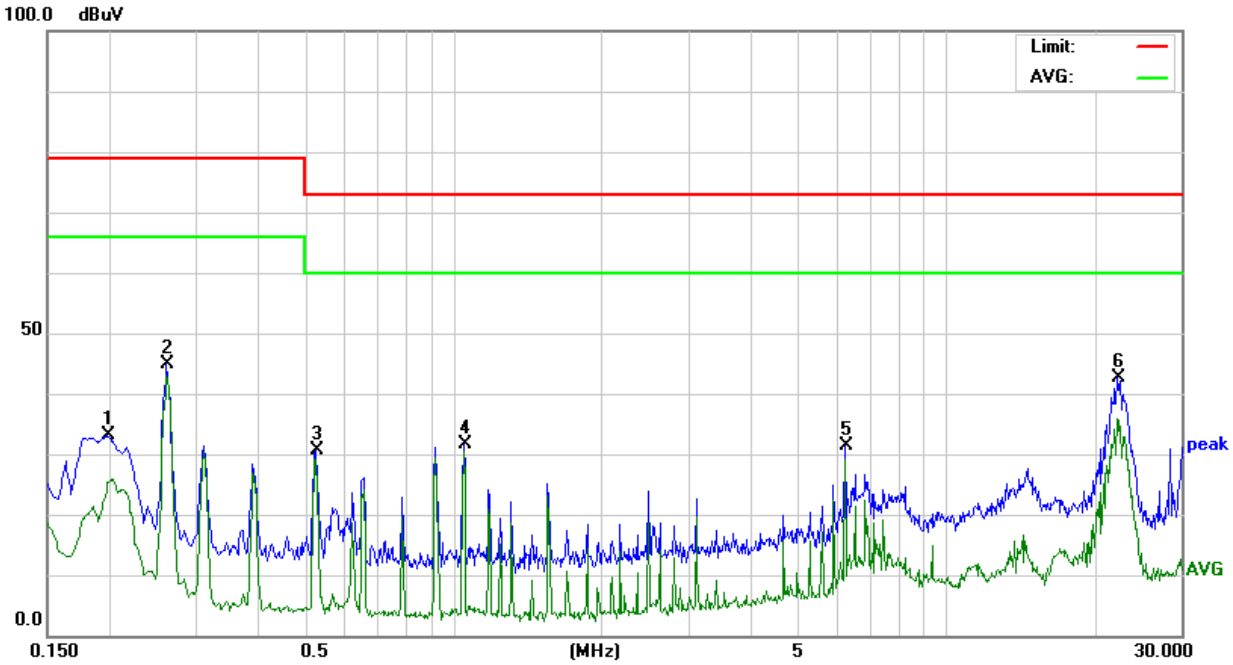
Testing Site : No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan
Measurement Uncertainty of Conducted Emission
Expanded uncertainty Ulab (k=2) of Conducted Emission is 2.8 dB.
Expanded uncertainty Ulab (k=2) of ISN Conducted Emission is 3.1 dB.
Expanded uncertainty CISPR 16-4-2:2011+A1:2014+A2:2018 (k=2) of Conducted Emission measurement is 3.8 dB.
Expanded uncertainty CISPR 16-4-2:2011+A1:2014+A2:2018 (k=2) of ISN Conducted Emission measurement is 5.0 dB.

2.2.2 Measurement Level Calculation

Factor = LISN insertion loss + Cable loss + Pulse Limiter insertion loss
Measurement Level = Reading Level + Factor
Over (Margin) = Measurement Level – Limit

2.2.3 Measurement Data (CE)

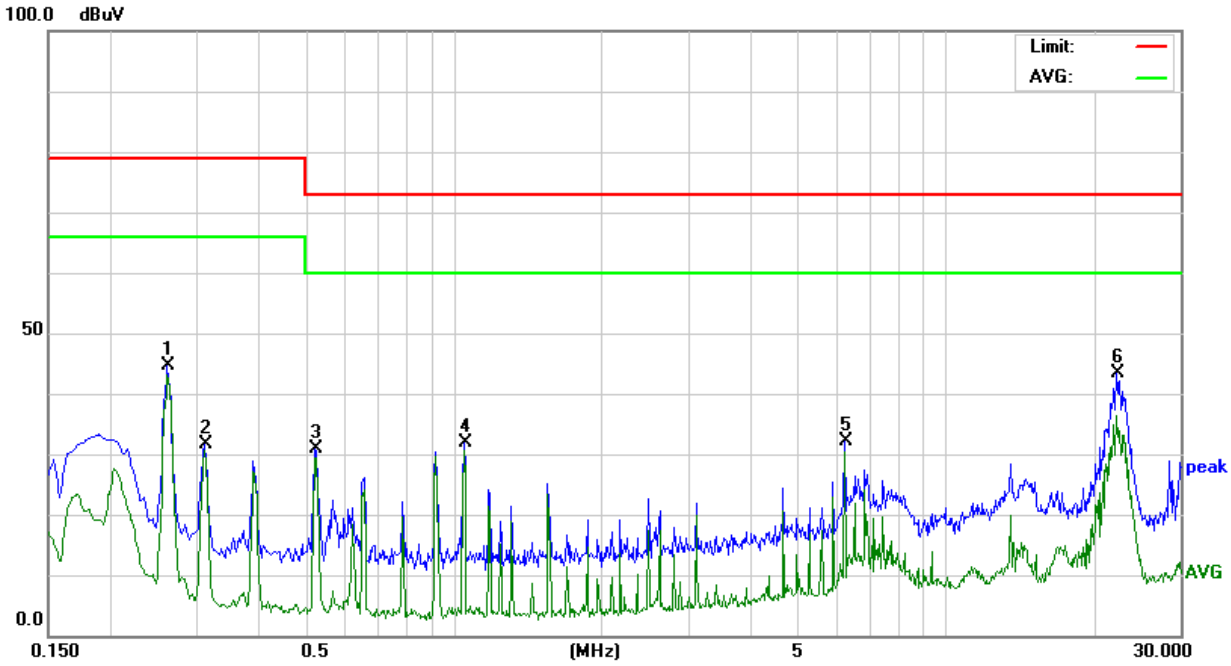
Model No.	SCH3X2-D7	**6dB Bandwidth**	9 kHz
Environmental Conditions	23.2°C, 57% RH	**Test Mode**	Mode 1
Tested by	Kevin Chang	**Phase**	L1
Test Date	2024/12/4		



Conducted Emission Readings							
Frequency Range Investigated				**150 kHz to 30 MHz**			
Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector (P/Q/A)	Line (L1/L2)
0.1995	**23.03**	**9.98**	**33.01**	**79.00**	**-45.99**	**P**	**L1**
0.2625	**34.81**	**9.99**	**44.80**	**79.00**	**-34.20**	**P**	**L1**
0.5280	**20.67**	**9.98**	**30.65**	**73.00**	**-42.35**	**P**	**L1**
1.0500	**21.61**	**10.10**	**31.71**	**73.00**	**-41.29**	**P**	**L1**
6.2385	**20.89**	**10.39**	**31.28**	**73.00**	**-41.72**	**P**	**L1**
22.2405	**31.46**	**11.14**	**42.60**	**73.00**	**-30.40**	**P**	**L1**

Note: 1. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line).

Model No.	SCH3X2-D7	6dB Bandwidth	9 kHz
Environmental Conditions	23.2°C, 57% RH	Test Mode	Mode 1
Tested by	Kevin Chang	Phase	L2
Test Date	2024/12/4		

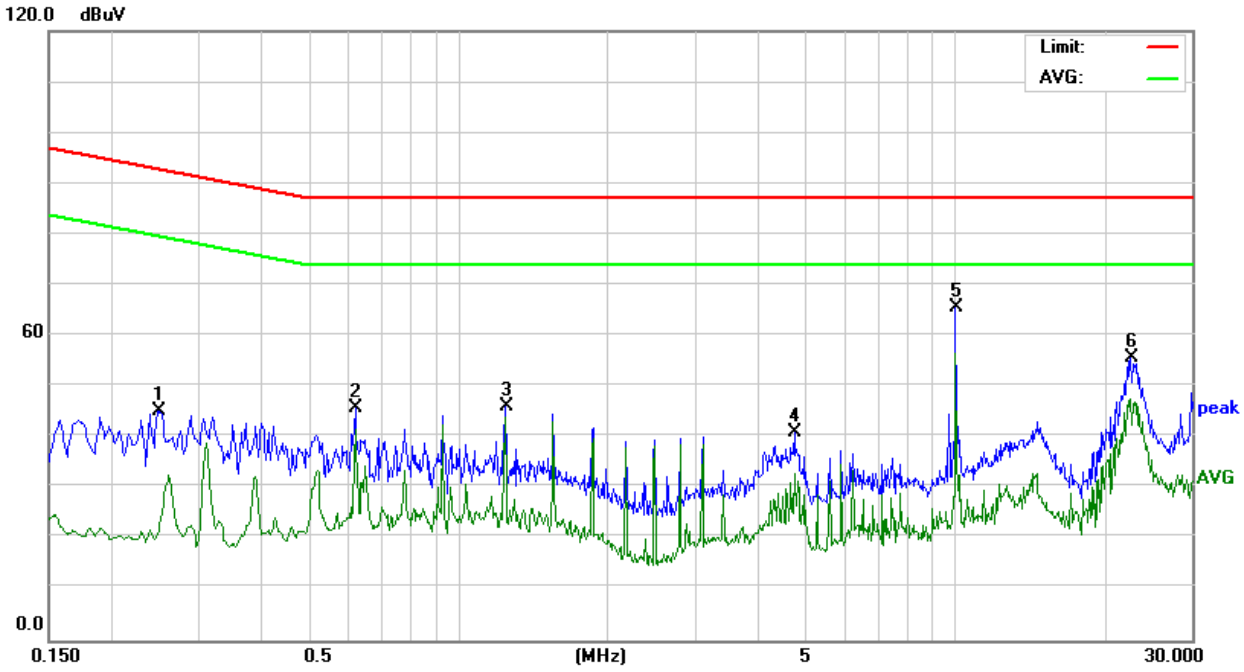


Conducted Emission Readings							
Frequency Range Investigated				150 kHz to 30 MHz			
Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector (P/Q/A)	Line (L1/L2)
0.2625	34.58	9.99	44.57	79.00	-34.43	P	L2
0.3120	21.56	9.99	31.55	79.00	-47.45	P	L2
0.5235	21.02	9.97	30.99	73.00	-42.01	P	L2
1.0500	21.66	10.11	31.77	73.00	-41.23	P	L2
6.2340	21.62	10.40	32.02	73.00	-40.98	P	L2
22.2405	32.29	11.06	43.35	73.00	-29.65	P	L2

Note: 1. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line).

2.2.4 Measurement Data (ISN)

Model No.	SCH3X2-D7	**6dB Bandwidth**	9 kHz
Environmental Conditions	23.2°C, 57% RH	**Test Mode**	Mode 4
Tested by	Kevin Chang	**Test Date**	2024/12/4



Conducted Emission Readings						
Frequency Range Investigated				**150 kHz to 30 MHz**		
Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector (P/Q/A)
0.2490	**25.40**	**19.88**	**45.28**	**92.79**	**-47.51**	**P**
0.6225	**26.03**	**19.66**	**45.69**	**87.00**	**-41.31**	**P**
1.2435	**26.44**	**19.68**	**46.12**	**87.00**	**-40.88**	**P**
4.7625	**21.18**	**19.71**	**40.89**	**87.00**	**-46.11**	**P**
10.0320	**45.76**	**19.78**	**65.54**	**87.00**	**-21.46**	**P**
22.6365	**35.43**	**20.08**	**55.51**	**87.00**	**-31.49**	**P**

2.3 Radiated Emission

2.3.1 Test Instruments

Below 1GHz

Open Area Test Site # H					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
Bilog Antenna	Teseq	CBL 6112D	36995	05/29/2024	05/28/2025
Cable	EMEC	CFD400E-LW	SD-R074	08/08/2024	08/07/2025
EMI Test Receiver	R&S	ESCI	101340	01/22/2024	01/21/2025
Pre-Amplifier	HP	8447D	1937A01554	09/20/2024	09/19/2025
Thermo-Hygro Meter	Wisewind	201A	No. 03	04/29/2024	04/28/2025
Test S/W	EZ-EMC Ver.CCS-03A1				
Testing Site : No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan Measurement Uncertainty of Radiated Emission Expanded uncertainty Ulab (k=2) of Radiated Emission is 5.1 dB.(30MHz-1000MHz) Expanded uncertainty CISPR 16-4-2:2011+A1:2014+A2:2018 (k=2) of Radiated Emission measurement is 5.2 dB.(30MHz-1000MHz)					

Above 1GHz

Chamber # E					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
Horn Antenna	ETS-Lindgren	3117	00139062	05/30/2024	05/29/2025
Microflex Cable x 7m	JMT	LF01	SD-R097	05/30/2024	05/29/2025
K-Type Cable x 1m	JMT	LK01	SD-R087	05/29/2024	05/28/2025
Pre-Amplifier	Com-Power	PAM-118A	551041	05/29/2024	05/28/2025
Signal Analyzer	R&S	FSV40	101269	05/28/2024	05/27/2025
Thermo-Hygro Meter	NDr.AV	GM-108A	SD-R099	07/15/2024	07/14/2025
Test S/W	EZ-EMC Ver.CCS-03A1				
Testing Site : No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan Measurement Uncertainty of Radiated Emission Expanded uncertainty (k=2) of Radiated Emission measurement is 4.6 dB.(1-6GHz) Expanded uncertainty CISPR 16-4-2:2011+A1:2014+A2:2018 (k=2) of Radiated Emission measurement is 5.5 dB.(1-6GHz)					

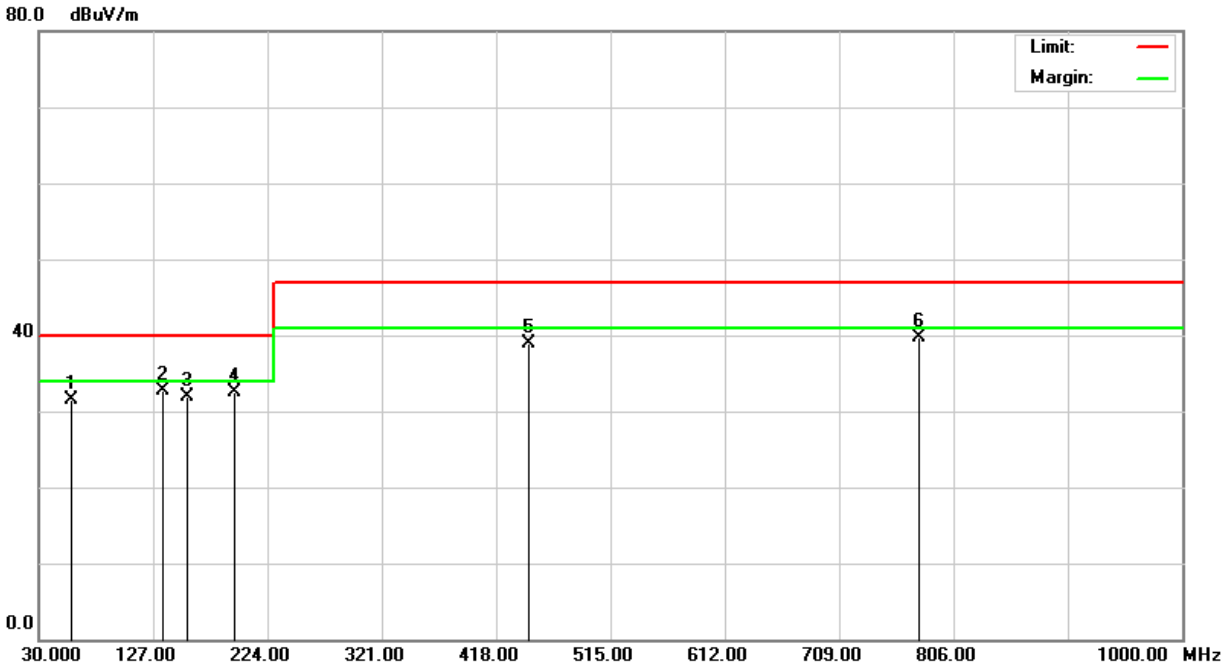
2.3.2 Measurement Level Calculation

Correction Factor = Antenna Factor + Cable loss- Amplifier Gain
Measurement Level = Reading Level + Correction Factor
Over (Margin) = Measurement Level – Limit

2.3.3 Measurement Data

Below 1GHz

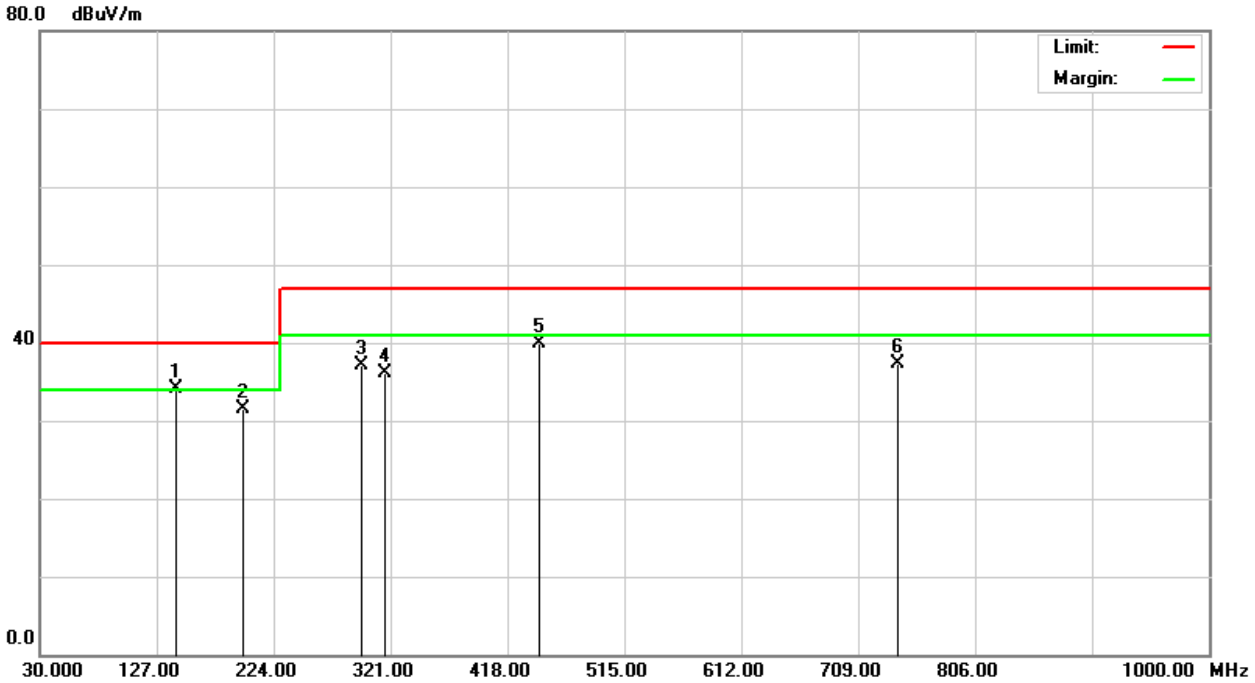
Model No.	SCH3X2-D7	Test Mode	Mode 1
Environmental Conditions	28.7ºC, 64% RH	6dB Bandwidth	120 kHz
Antenna Pole	Vertical	Antenna Distance	10m
Detector Function	Quasi-peak.	Tested by	Jack Chen
Test Date	2024/11/13		



Radiated Emission Readings									
Frequency Range Investigated				30 MHz to 1000 MHz at 10m					
Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Detector (P/Q)	Pol. (H/V)
57.6500	45.30	-13.87	31.43	40.00	-8.57	100	115	Q	V
135.2600	40.80	-8.02	32.78	40.00	-7.22	100	316	Q	V
156.4900	41.20	-9.26	31.94	40.00	-8.06	100	185	Q	V
195.7800	42.50	-9.97	32.53	40.00	-7.47	100	341	Q	V
445.1600	40.20	-1.29	38.91	47.00	-8.09	400	189	Q	V
776.5200	35.40	4.24	39.64	47.00	-7.36	400	52	Q	V

Note: 1. P= Peak Reading; Q= Quasi-peak Reading.

Model No.	SCH3X2-D7	Test Mode	Mode 1
Environmental Conditions	28.7°C, 64% RH	6dB Bandwidth	120 kHz
Antenna Pole	Horizontal	Antenna Distance	10m
Detector Function	Quasi-peak.	Tested by	Jack Chen
Test Date	2024/11/13		



Radiated Emission Readings									
Frequency Range Investigated				30 MHz to 1000 MHz at 10m					
Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Degree (°)	Detector (P/Q)	Pol. (H/V)
142.5600	42.60	-8.55	34.05	40.00	-5.95	400	115	Q	H
199.2300	41.20	-9.74	31.46	40.00	-8.54	400	284	Q	H
297.5600	42.50	-5.36	37.14	47.00	-9.86	400	25	Q	H
315.8400	40.90	-4.83	36.07	47.00	-10.93	400	189	Q	H
445.0200	41.20	-1.30	39.90	47.00	-7.10	100	345	Q	H
742.1900	33.20	4.03	37.23	47.00	-9.77	100	12	Q	H

Note: 1. P= Peak Reading; Q= Quasi-peak Reading.

Above 1GHz

Model No.	SCH3X2-D7	Test Mode	Mode 1
Environmental Conditions	22.9ºC, 61% RH	6dB Bandwidth	1 MHz
Antenna Pole	Vertical / Horizontal	Antenna Distance	3m
Highest frequency generated or used	1100MHz	Upper frequency	5500MHz
Detector Function	Peak and average.	Tested by	Jack Chen
Test Date	2024/12/30		

Radiated Emission Readings							
Frequency Range Investigated				Above 1GHz at 3m			
Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (P/A)	Pol. (H/V)
1400.000	49.38	-7.75	41.63	76.00	-34.37	P	V
1595.000	51.26	-8.67	42.59	76.00	-33.41	P	V
1875.000	48.14	-4.87	43.27	76.00	-32.73	P	V
2255.000	49.04	-4.80	44.24	76.00	-31.76	P	V
2420.000	47.57	-4.48	43.09	76.00	-32.91	P	V
5400.000	49.32	-1.16	48.16	80.00	-31.84	P	V

Radiated Emission Readings							
Frequency Range Investigated				Above 1GHz at 3m			
Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector (P/A)	Pol. (H/V)
2265.000	50.70	-4.81	45.89	76.00	-30.11	P	H
2440.000	49.02	-4.48	44.54	76.00	-31.46	P	H
2985.000	48.15	-3.90	44.25	76.00	-31.75	P	H
3095.000	47.61	-3.74	43.87	80.00	-36.13	P	H
3305.000	48.98	-4.02	44.96	80.00	-35.04	P	H
5400.000	51.17	-1.16	50.01	80.00	-29.99	P	H

Note: 1. P= Peak Reading; A= Average Reading.

3. Harmonics

3.1 Test Instruments

Immunity A					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
Testing Site : No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan					

3.2 Measurement Data

Remark: N/A: The subject equipment is not intended to be connected to AC mains supply. Therefore, this test is not applicable.

4. Flicker

4.1 Test Instruments

Immunity A					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
Testing Site : No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan					

4.2 Measurement Data

Remark: N/A: The subject equipment is not intended to be connected to AC mains supply. Therefore, this test is not applicable.

5. IMMUNITY

5.1 CONDITIONS TO BE MET BY CLASS 1 AND CLASS 2 DEVICES

a) No hardware damage occurs.

b) No loss or corruption of stored memory or data, including active or stored settings, occurs.

c) Device resets do not occur, and manual resetting is not required.

d) No changes in the states of the electrical, mechanical, or communication status outputs occur. This includes alarms, status outputs, or targets.

e) No erroneous, permanent change of state of the visual, audio, or message outputs results. Momentary changes of these outputs during the tests are permitted.

f) During the tests, SCADA analog values shall not change by more than 2 % of full-scale values. After the test, accuracy shall revert to the manufacturer-claimed accuracy.

5.1.1 Communication conditions during tests

For reliability class 1 equipment, the manufacturer shall declare the communications Conditions during testing. Although the bit rate and frame size of the communications conditions are not specified in this standard, there shall be communications underway in order to verify that, if disrupted, communications recover.

5.1.2 Additional condition to be met by class 1 devices

Established communications in accordance with 5.1.1 may be disrupted or sustain errors during the period of the tests. If disrupted, the communications recovers within the manufacturer’s specified time period.

5.1.3 Additional condition to be met by class 2 devices

Established communications in accordance with 5.1.1 shall NOT be disrupted or experience errors during the period the tests are applied.

5.2 Test of IEC 61000-4-2

5.2.1 Test Instruments

Immunity Shielded Room					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
Aneroid Barometer	SATO	7610-20	89090	07/23/2024	07/22/2025
ESD Simulator	Teseq	NSG 438	1581	07/03/2024	07/02/2025
Thermo-Hygro Meter	Wisewind	201A	SD-S041	12/12/2023	12/11/2024
Testing Site : No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan					

5.2.2 EUT Operating Condition

Environment:

Temperature	Humidity	Air Pressure
18.7 °C	47 %RH	1009 hpa

5.2.3 Results of Electrostatic Discharge (ESD)

Model No. : SCH3X2-D7
Tested By : Jacky Lin
Tested Date : December 10, 2024
Test Mode : Mode 1
Basic Standard : IEC 61000-4-2
Discharge Impedance : 330 ohm / 150 pF
Discharge Voltage : Air Discharge: ±2, 4, 8 kV
Contact Discharge: ±2, 4, 6 kV
HCP/VCP: ±2, 4, 6 kV
Polarity : Positive/Negative
Number of Discharge : 10 times at each test point
Discharge Mode : Single Discharge
Discharge Period : 1 second

A.Observations:

Test points: 1. Front side. 2. Back side. 3. Left side. 4. Right side. 5. Top side. 6. Bottom side.

Direct Application			Test Results	
Discharge Level (kV)	Polarity (+/-)	Test Point	Contact Discharge	Air Discharge
2, 4, 8 (Air.)	+/-	1, 2	N/A	Class 1 / Remark 1
2, 4, 6 (Cont.)	+/-	1, 3~5	Class 1 / Remark 1	N/A
2, 4, 6 (Cont.)	+/-	2	Class 1 / Remark 2	N/A

Remark: 1: No degradation of performance or loss of function.
2: The transmitting was interrupted during test. It could become normal after test stop.
N/A: Not Applicable.

B.Observations:

Test points: 1. Front side. 2. Back side. 3. Left side. 4. Right side.

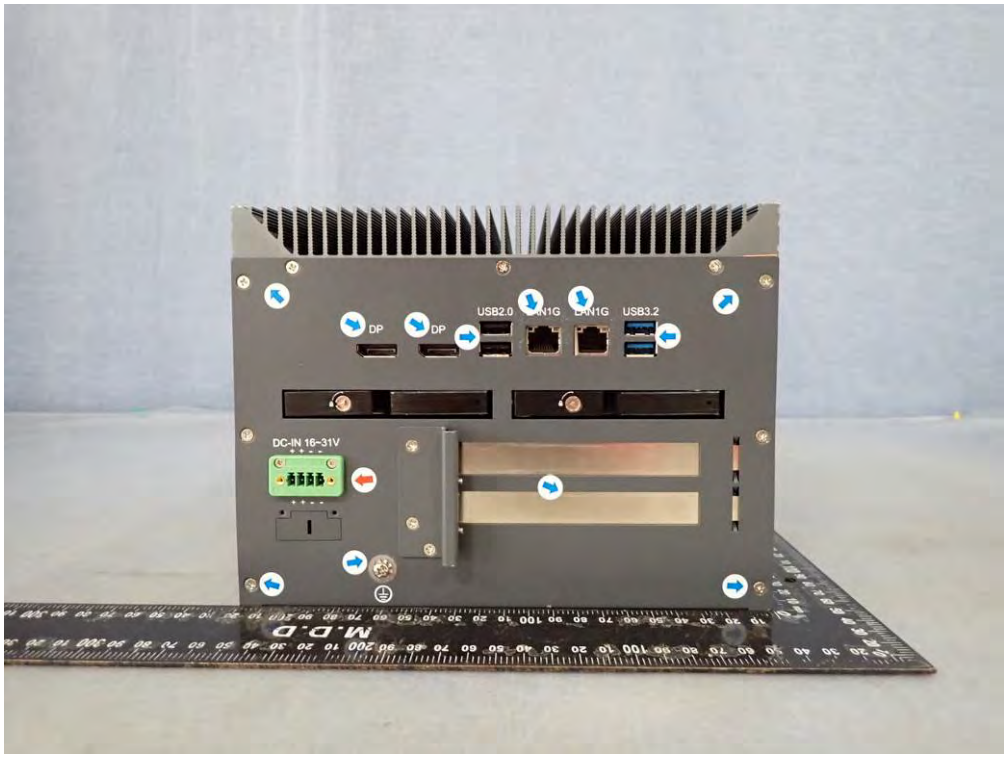
Indirect Application			Test Results	
Discharge Level (kV)	Polarity (+/-)	Test Point	Horizontal Coupling	Vertical Coupling
2, 4, 6	+/-	1~4	Class 1 / Remark 1	Class 1 / Remark 1

Remark: 1: No degradation of performance or loss of function.

ESD Test point

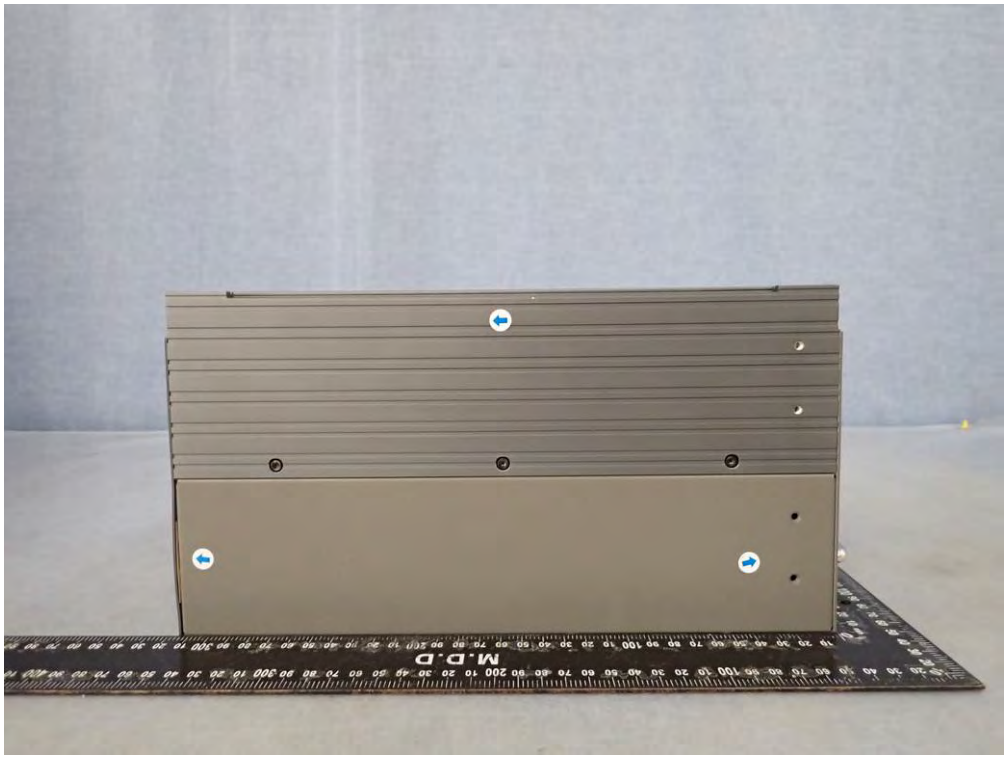
Front

Back

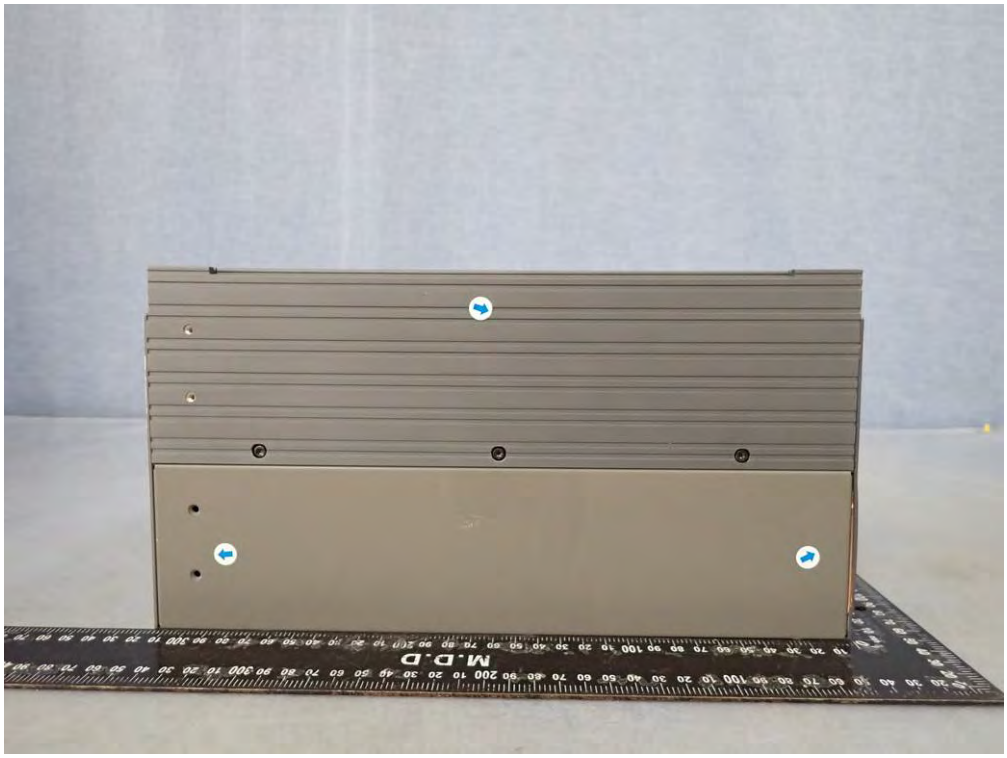


Air Discharge:
Contact Discharge:

Left



Right



Air Discharge:
Contact Discharge:

Top

Air Discharge:
Contact Discharge:

5.3 Test of IEC 61000-4-3

5.3.1 Test Instruments

844 RS Chamber					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
Electric Field Probe	AR	FL7006	0356656	03/06/2024	03/07/2025
Field of Calibration	CCS	Chamber#RS	80-1000MHz	02/16/2024	02/15/2025
RF Power Meter	Boonton	4242	17419	01/29/2024	01/28/2025
Power Sensor	Boonton	51011A-EMC	36833	01/29/2024	01/28/2025
Power Sensor	Boonton	51011A-EMC	36834	01/29/2024	01/28/2025
Thermo-Hygro Meter	Wisewind	201A	SD-S019	09/10/2024	09/09/2025
Broadband Antenna	AR	AT1080	311819	N.C.R	N.C.R
Power Amplifier	Teseq	CBA1G-600D	1098099	N.C.R	N.C.R
Analog Signal Generator	Agilent	E8257D	MY48051214	05/28/2024	05/27/2025
Field of Calibration	CCS	Chamber#RS	1000-6000MHz	02/15/2024	02/14/2025
Microwave Antenna	Schwarzbeck	STLP 9149	767	N.C.R	N.C.R
Power Amplifier	Teseq	CBA6G-100D	1087370	N.C.R	N.C.R
Test Software	EmcwareVer. 3.2				
Testing Site : No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan					

5.3.2 EUT Operating Condition

Environment:

Temperature	Humidity	Air Pressure
23.6 °C	56 %RH	1009 hpa

5.3.3 Results of Radiated Radio Frequency Electromagnetic (RS)

Model No. : SCH3X2-D7
Tested By : Kevin Chang
Tested Date : November 14, 2024
Test Mode : Mode 1
Basic Standard : IEC 61000-4-3
Frequency range : 80 MHz - 3000 MHz
Field strength : 10 V/m
Modulation : 80% AM (1kHz)
Frequency step : 1 % of the preceding frequency
Polarity of Antenna : Horizontal and Vertical
Dwell Time : 3 seconds
Test distance : 3 m

No.	Frequency (MHz)	Antenna Orientation	Observation	EUT Orientation
1	80 - 3000	Vertical/Horizontal	Class 1 / Remark 1	0 degree
2	80 - 3000	Vertical/Horizontal	Class 1 / Remark 1	90 degree
3	80 - 3000	Vertical/Horizontal	Class 1 / Remark 1	180 degree
4	80 - 3000	Vertical/Horizontal	Class 1 / Remark 1	270 degree

Remark: 1: No degradation of performance or loss of function.

5.4 Test of IEC 61000-4-4

5.4.1 Test Instruments

Immunity Shield Room					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
Capacitive Clamp	EMC-Partner	CN-EFT1000	589	02/20/2024	02/19/2025
EMC Test System	EMC-Partner	IMU-MGE	109937-1545	05/27/2024	05/26/2025
DIP	EMC-Partner	VAR-EXT1000	103470-1724	05/27/2024	05/26/2025
Test Software	TEMA3000 v4.7.3				
Testing Site : No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan					

5.4.2 EUT Operating Condition

Environment:

Temperature	Humidity	Air Pressure
22.7 °C	52 %RH	1009 hpa

5.4.3 Results of Electrical Fast Transient (EFT)

Model No. : SCH3X2-D7
Tested By : James Chou
Tested Date : December 14, 2024
Test Mode : Mode 1
Basic Standard : IEC 61000-4-4
Test Voltage : DC Input: ± 2 kV
Signal/Comm. : ± 4 kV
Earth : ± 2 kV
Polarity : Positive/Negative
Impulse Frequency : 5 kHz
Tr/Th : 5/50ns
Burst : 15ms/300ms

Observation:

Test Point	Polarity	Test Level (kV)	Results
L	+/-	2	Class 1 / Remark 2
N	+/-	2	Class 1 / Remark 2
PE	+/-	2	Class 1 / Remark 2
L-N	+/-	2	Class 1 / Remark 2
L-PE	+/-	2	Class 1 / Remark 2
N-PE	+/-	2	Class 1 / Remark 2
L-N-PE	+/-	2	Class 1 / Remark 2
RJ45	+/-	4	Class 1 / Remark 3
Functional Earth	+/-	2	Class 1 / Remark 4

Remark: 1: No degradation of performance or loss of function
2: The screen of monitor was flickered and the transmitting was interrupted during test. It could become normal after test stop.
3: The transmitting was interrupted during test. It could become normal after test stop.
4: The screen of monitor was flickered during test. It could become normal after test stop.

5.5 Test of IEC 61000-4-5

5.5.1 Test Instruments

Immunity Shield Room					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
CDN	EMC-Partner	CDN-UTP8	1505	11/23/2023	11/22/2024
EMC Test System	EMC-Partner	IMU-MGE	109937-1545	05/27/2024	05/26/2025
DIP	EMC-Partner	VAR-EXT1000	103470-1724	05/27/2024	05/26/2025
Test Software	TEMA3000 v4.7.3				
Testing Site : No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan					

5.5.2 EUT Operating Condition

Environment:

Temperature	Humidity	Air Pressure
22.7 °C	52 %RH	1009 hpa

5.5.3 Results of Surge Test

Model No. : SCH3X2-D7
Tested By : Jacky Lin
Tested Date : November 14, 2024
Test Mode : Mode 1
Basic Standard : IEC 61000-4-5
Test Rate : 1 pulse every minute
No. of Tests : 5 positive and 5 negative pulses
Waveform : 1.2/50μs (8/20μs)

Observation Description

DC input line:

Test Point	Phase Angle (degree)	Polarity (+/-)	Test Level (kV)	Observation
L – N	0	+/-	1	Class 1 / Remark 1
L – PE	0	+/-	2	Class 1 / Remark 1
N – PE	0	+/-	2	Class 1 / Remark 1

Remark: 1: No degradation of performance or loss of function.

Signal line:
Test Rate : 1 pulse every minute
No. of Tests : 5 positive and 5 negative pulses
Waveform : 1.2/50μs (8/20μs)

Observation Description

Signal line:

Test Point	Phase Angle (degree)	Polarity (+/-)	Test Level (kV)	Observation
RJ45	No phase angle (degree)	+/-	2, 4	Class 1 / Remark 2

Remark: 1: No degradation of performance or loss of function.
2: The transmitting was interrupted during test. It could become normal after test stop.

5.6 Test of IEC 61000-4-6

5.6.1 Test Instruments

CS Room					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
Attenuator	EMCI	SA3NL	10006F	N.C.R	N.C.R
CDN	Teseq	CDN M016	35820	11/30/2023	11/29/2024
CDN	SCHAFFNER	CDN M325	17457	11/30/2023	11/29/2024
CDN	Teseq	CDN T8-10	40378	07/15/2024	07/14/2025
Compact Immunity Test System	Teseq	NSG 4070B-35	39581	09/19/2024	09/18/2025
EM Clamp	Schaffner	KEMZ 801	19227	11/30/2023	11/29/2024
Test Software	NSG 4070 Control Program Version: V1.2.0				
Testing Site : No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan					

5.6.2 EUT Operating Condition

Environment:

Temperature	Humidity	Air Pressure
23.1 °C	53 %RH	1009 hpa

5.6.3 Results of Immunity to Conducted Disturbances (CS)

Model No. : SCH3X2-D7
Tested By : Kevin Chang
Tested Date : November 14, 2024
Test Mode : Mode 1
Basic Standard : IEC 61000-4-6
Frequency range : 0.15 MHz - 80 MHz
Field strength : 10 Vrms
Modulation : 80% AM, 1 kHz Sinewave
Frequency step : 1 % of the preceding frequency
Dwell Time : 3 seconds
Coupling Method : CDN-M2; CDN-T8; EM-Clamp

Cable Description	Frequency (MHz)	Observation
DC input	0.15 – 80	Class 1 / Remark 1

Signal Ports

Cable Description	Frequency (MHz)	Observation
RJ45	0.15 – 80	Class 1 / Remark 1
Functional Earth	0.15 – 80	Class 1 / Remark 1

Remark: 1: No degradation of performance or loss of function.

5.7 Test of IEC 61000-4-8

5.7.1 Test Instruments

Immunity Shield Room					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
5kVA Power Source	Teseq	5001IX-208-SCH	1207A03643	09/19/2024	09/18/2026
AC/DC Clamp Meter	Fluke	353	33360025	06/03/2024	06/02/2025
Magnetic Field Coil	Teseq	INA 703 W/ 2141	1976 / 1413	02/23/2024	02/22/2025
Magnetic Field Meter	AARONIA	NF-5035	01879	12/08/2023	12/07/2024
Test Software	Win2120Ver. 5.0				
Testing Site : No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan					

5.7.2 EUT Operating Condition

Environment:

Temperature	Humidity	Air Pressure
23.1 °C	53 %RH	1009 hpa

5.7.3 Result of Immunity to Power Frequency Magnetic Field

Model No. : SCH3X2-D7
Tested By : Jim Lian
Tested Date : November 14, 2024
Test Mode : Mode 1
Basic Standard : IEC 61000-4-8
Power Frequency : 50 Hz / 60Hz
Field Strength : 100A/m at Continuous; 1000A/m 1s
Inductance Coil : Rectangular type, 1mx1m

Direction	Field Strength (A/m)	Observation
X	100	Class 1 / Remark 1
	1000	Class 1 / Remark 1
Y	100	Class 1 / Remark 1
	1000	Class 1 / Remark 1
Z	100	Class 1 / Remark 1
	1000	Class 1 / Remark 1

Remark: 1: No degradation of performance or loss of function.

5.8 Test of IEC 61000-4-11

5.8.1 Test Instruments

Immunity Shielded Room					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
Testing Site : No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan					

5.8.2 EUT Operating Condition

Environment:

Temperature	Humidity	Air Pressure
N/A	N/A	N/A

5.8.3 Results of Voltage Dips Immunity

Model No. : SCH3X2-D7
Tested By : N/A
Tested Date : N/A
Test Mode : N/A
Basic Standard : IEC 61000-4-11
Reduction Voltage : 30, 60, 100 % Ut
Phase Angle : 0, 180 degree
Test cycle : 3 times

Environmental phenomena	Test specification (% reduction)	Duration (Cycle)	Observation
Voltage Interruptions	100	50	Remark 1
Voltage dips	30	1	Remark 1
	60	50	Remark 1
	100	5	Remark 1

Remark: 1: The subject equipment is not intended to be connected to AC mains supply. Therefore, this test is not applicable.

5.9 Test of IEC 61000-4-16

5.9.1 Test Instruments

Immunity Shield Room					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
5kVA Power Source	Teseq	5001IX-208-SCH	1207A03643	09/19/2024	09/18/2026
Coupling Network	EM Test	CN 16-L8	P1646187589	09/18/2024	09/17/2026
Oscilloscope	Tektronix	TDS 3054C	C013600	04/23/2024	04/22/2025
10MHz Function / Arbitrary Waveform Generator	Agilent	33210A	MY48000881	09/19/2024	09/18/2025
Power Amplifier	B&K	WQ 1105	96615	09/19/2024	09/18/2025
CDN	EM Test	CDN 16-T2	P1721199241	09/18/2024	09/17/2026
Switch Box	CCSRF	4-16-01	SD-S039	09/19/2024	09/18/2025
Resistor	CCSRF	4-16-02	SD-S040	09/19/2024	09/18/2025
CDN	EMC PARTNER	CN16	103538-1580	05/27/2024	05/26/2025
CDN	EMC PARTNER	CN16DC	106900-1537	05/27/2024	05/26/2025
Software	win2110S II Ver. 4.7.1				
Testing Site : No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan					

5.9.2 EUT Operating Condition

Environment:

Temperature	Humidity	Air Pressure
23.1 °C	53 %RH	1009 hpa

5.9.3 Result of Power Frequency Immunity

Model No. : SCH3X2-D7
Tested By : Jacky Lin
Tested Date : November 14, 2024
Test Mode : Mode 1
Basic Standard : IEC 61000-4-16
Main frequency : 0Hz; 16.7Hz; 50Hz; 60Hz
Continuous disturbance : 30 V
Short duration disturbance : 300 V

Main frequency	Voltage Applied dBuV(V)	Observation
0Hz	30V	Class 1 / Remark 1
	300V	Class 1 / Remark 1
16.7Hz	30V	Class 1 / Remark 1
	300V	Class 1 / Remark 1
50Hz	30V	Class 1 / Remark 1
	300V	Class 1 / Remark 1
60Hz	30V	Class 1 / Remark 1
	300V	Class 1 / Remark 1

Remark: 1: No degradation of performance or loss of function.

5.10 Test of IEC 61000-4-17

5.10.1 Test Instruments

Immunity Shield Room					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
5kVA Power Source	Teseq	5001IX-208-SCH	1207A03643	09/19/2024	09/18/2026
Oscilloscope	Tektronix	TDS 3054C	C013600	04/23/2024	04/22/2025
Software	win2110S II Ver. 4.7.1				
Testing Site : No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan					

5.10.2 EUT Operating Condition

Environment:

Temperature	Humidity	Air Pressure
23.1 °C	53 %RH	1009 hpa

5.10.3 Result of Ripple on DC Power Immunity

Model No. : SCH3X2-D7
Tested By : Jim Lian
Tested Date : November 14, 2024
Test Mode : Mode 1
Basic Standard : IEC 61000-4-17
DC input Power : 10% normal DC Voltage
Observation : Class 1 / Remark 1

Remark: 1: No degradation of performance or loss of function.

5.11 Test of IEC 61000-4-18

5.11.1 Test Instruments

Immunity Shield Room					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
Damped Oscillatory Generator	EM Test	OCS 500N6.14	P1637183852	09/18/2024	09/17/2026
CDN	EM Test	CNV 504N5.1	P1615178440	09/18/2024	09/17/2026
Capacitive Clamp	Haefely	CCL-4/S	080421-13	01/31/2024	01/30/2025
Software	IEC Control Ver.6.0.1				
Testing Site : No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan					

5.11.2 EUT Operating Condition

Environment:

Temperature	Humidity	Air Pressure
23.1 °C	53 %RH	1009 hpa

5.11.3 Results of Damped Oscillatory Wave Immunity

Model No. : SCH3X2-D7
Tested By : Jacky Lin
Tested Date : November 14, 2024
Test Mode : Mode 1
Basic Standard : IEC 61000-4-18
Voltage rise time : 75 ns ± 20 %
Voltage oscillation frequencies : 1 MHz ± 10 %
Damped Oscillatory wave : DC Power Port (1MHz)
Differential mode: 0.5kV
Common mode: 1kV
Signal Port (1MHz)
Differential mode: 1kV
Common mode: 2.5kV

Power Port:

Test Point	Polarity	Voltage oscillation frequencies	Test Level (kV)	Results
Diff	+/-	1MHz	0.5	Class 1 / Remark 1
Comm	+/-	1MHz	1	Class 1 / Remark 1

Signal Port:

Test Point	Polarity	Voltage oscillation frequencies	Test Level (kV)	Results
Diff	+/-	1MHz	1	Class 1 / Remark 1
Comm	+/-	1MHz	2.5	Class 1 / Remark 1

Remark: 1: No degradation of performance or loss of function.

5.12 Test of IEC 61000-4-29

5.12.1 Test Instruments

Immunity Shield Room					
EQUIPMENT TYPE	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due
Timebase Switch	CCSRF	29-02	SD-S042	03/27/2024	03/26/2025
Oscilloscope	Tektronix	TDS 3054C	C013600	04/23/2024	04/22/2025
Testing Site : No.163-1, Jhongsheng Rd., Xindian Dist., New Taipei City, Taiwan					

5.12.2 EUT Operating Condition

Environment:

Temperature	Humidity	Air Pressure
19.1 °C	55 %RH	1008 hpa

5.12.3 Result of DC Input Power Voltage Dip and Interruptions

Model No. : SCH3X2-D7
Tested By : Jacky Lin
Tested Date : December 20, 2024
Test Mode : Mode 1
Basic Standard : IEC 61000-4-29
Test cycle : 3 times

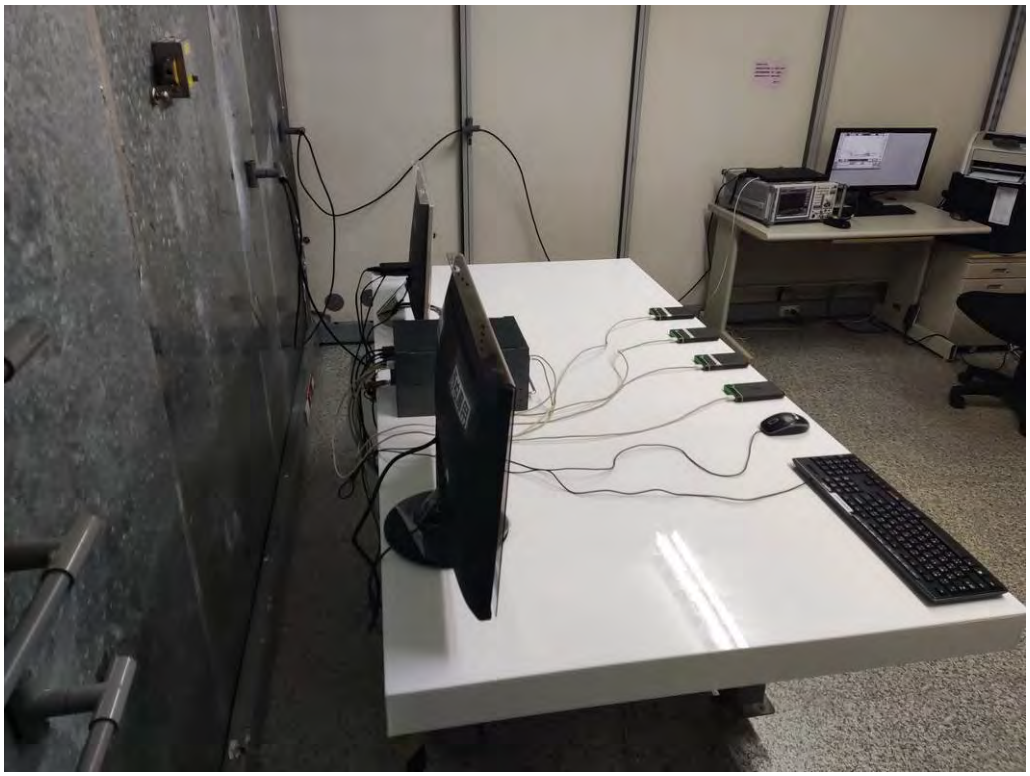
Test specification (% reduction)	Duration (Sec)	Observation
30	0.1	Class 1 / Remark 1

Remark: 1: No degradation of performance or loss of function.

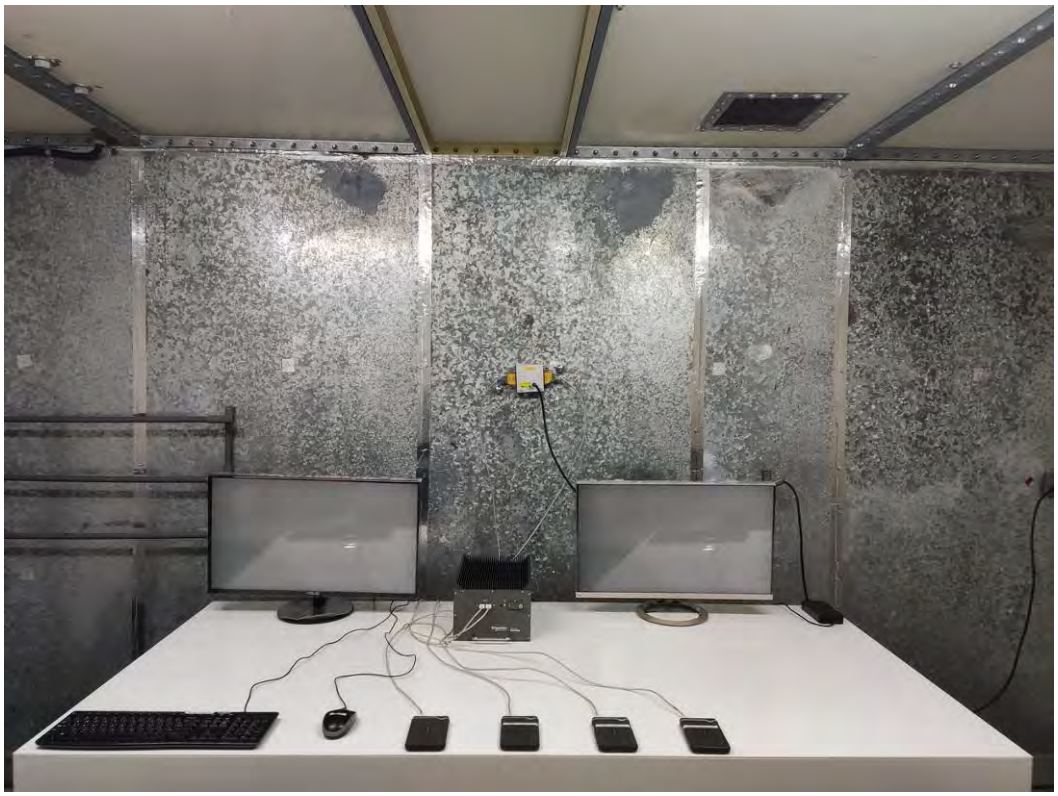
APPENDIX

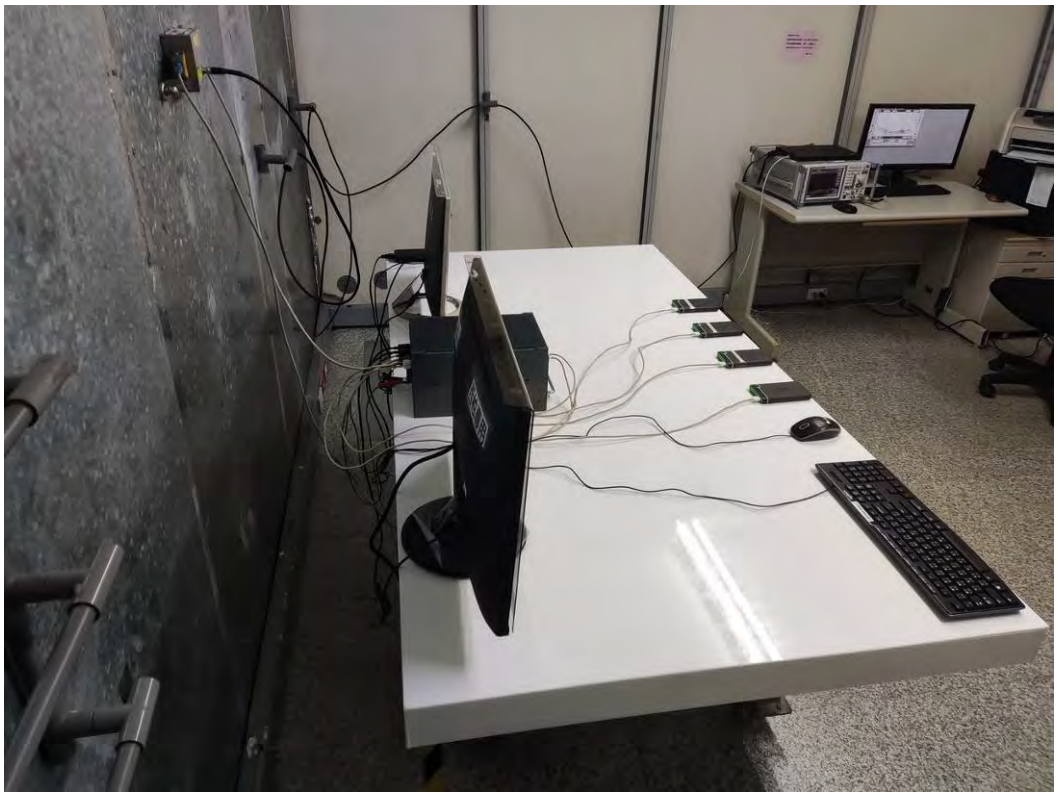
Photograph of Testing General Set-up

CE Testing Set-up



ISN Testing Set-up

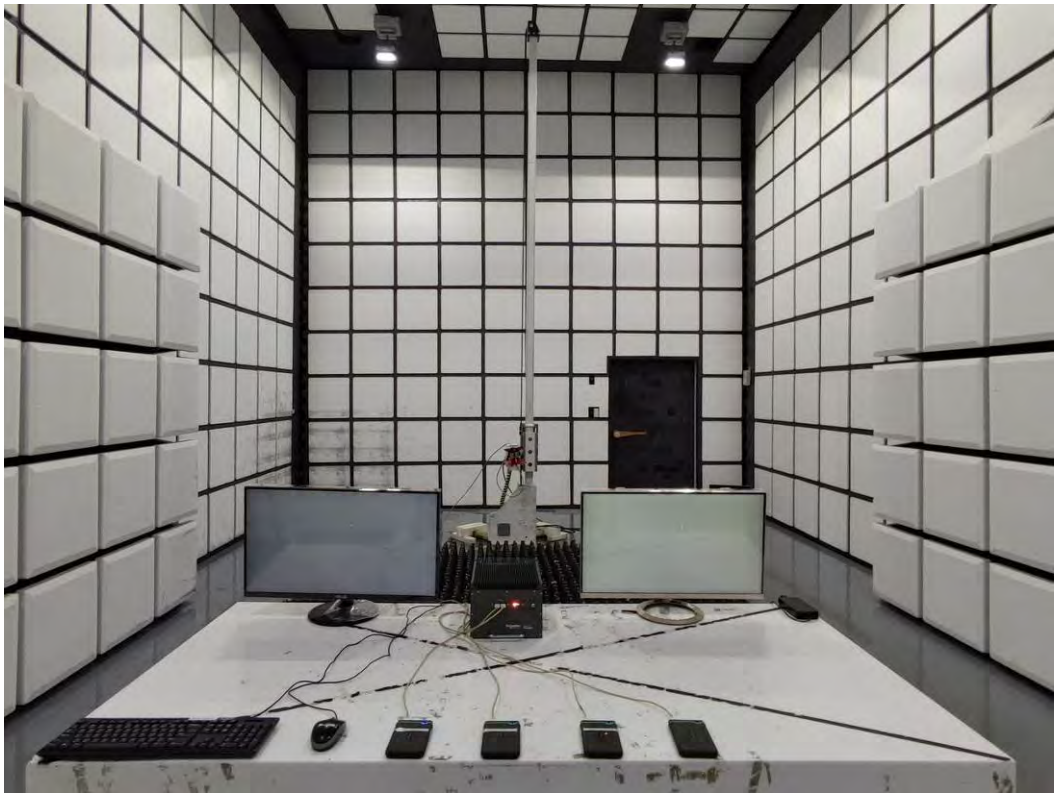


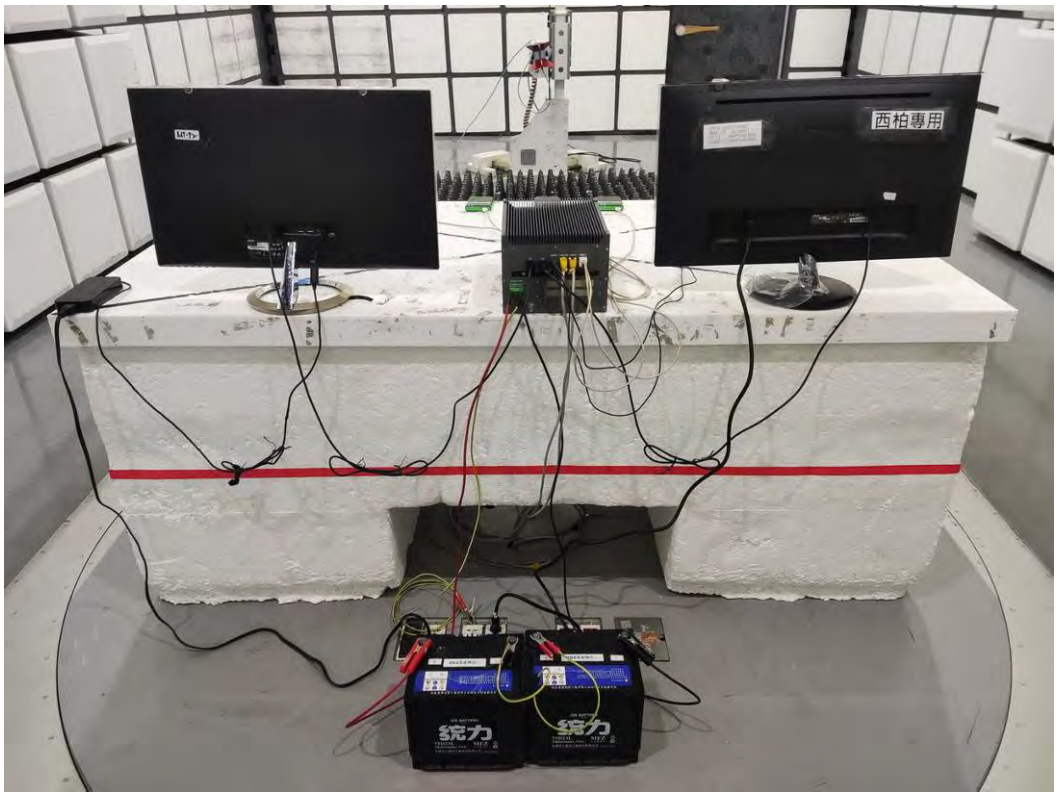


RE Testing Set-up

Below 1GHz

Above 1GHz

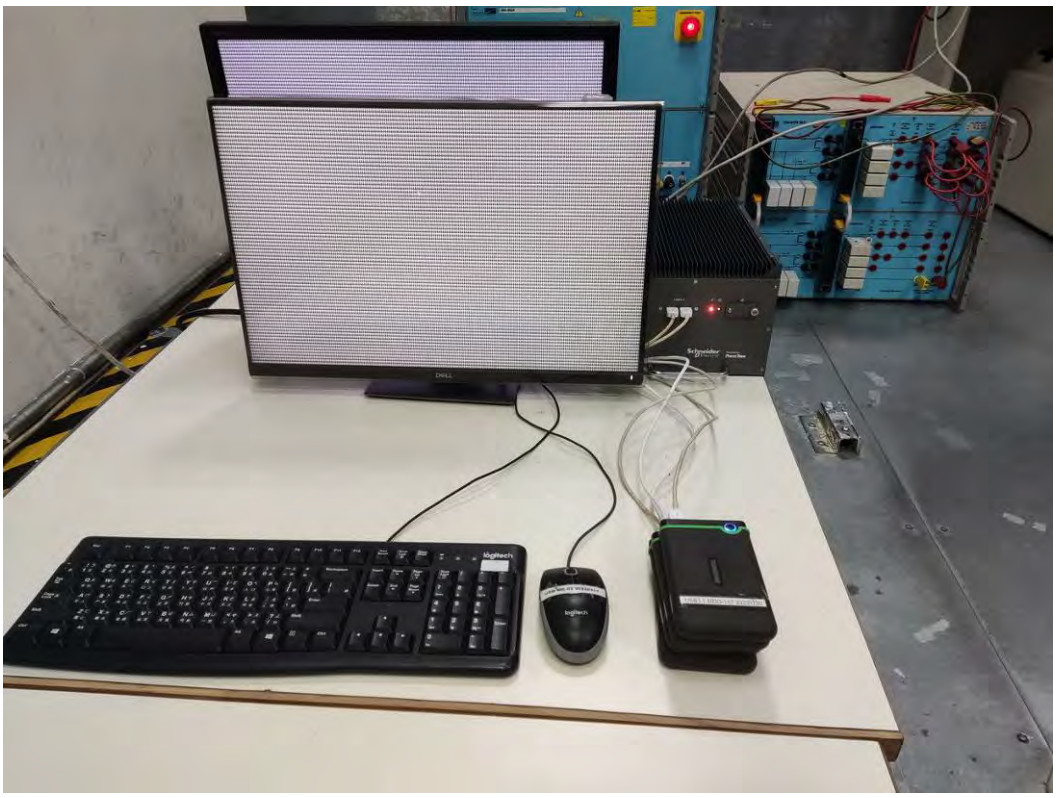




ESD Testing Set-up

RS Testing Set-up

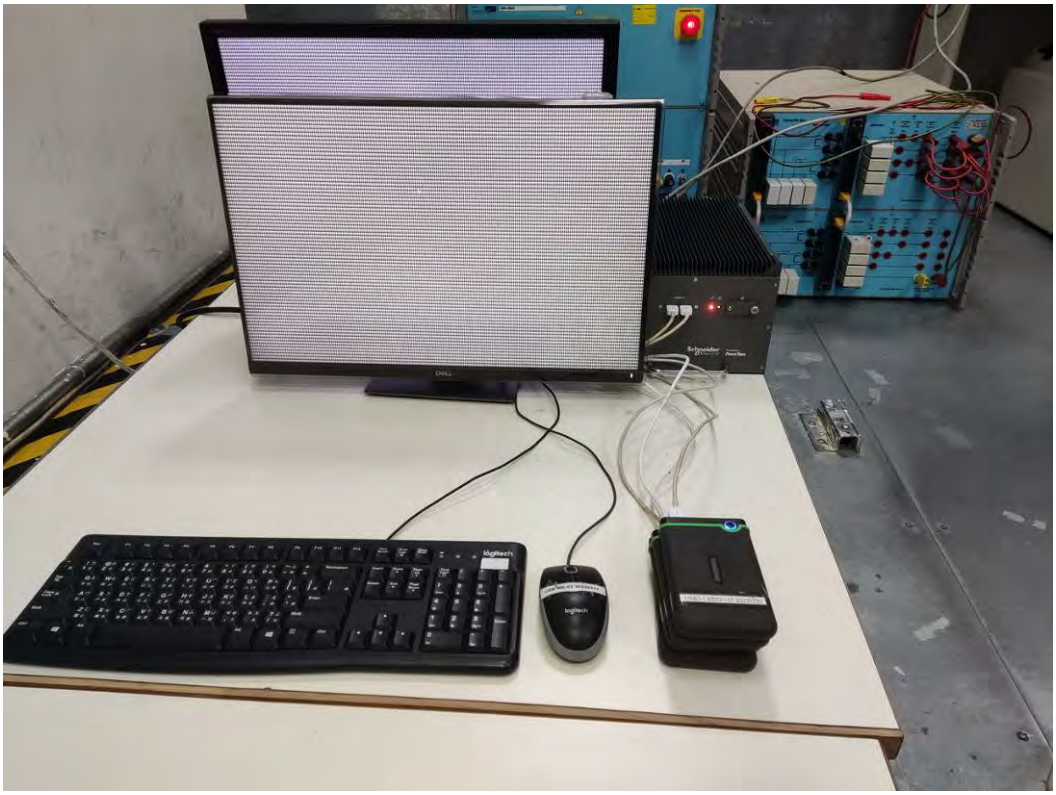
EFT Testing Set-up



EFT For I/O Testing Set-up

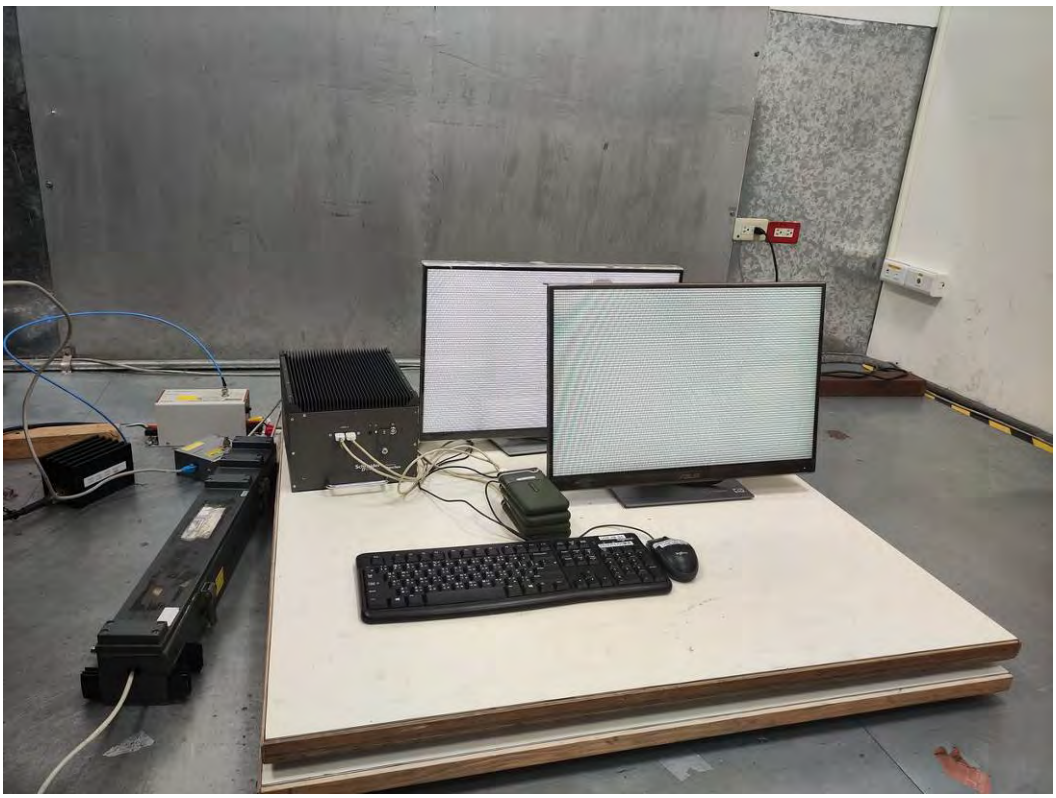
EFT For Functional Earth Testing Set-up

Surge Testing Set-up



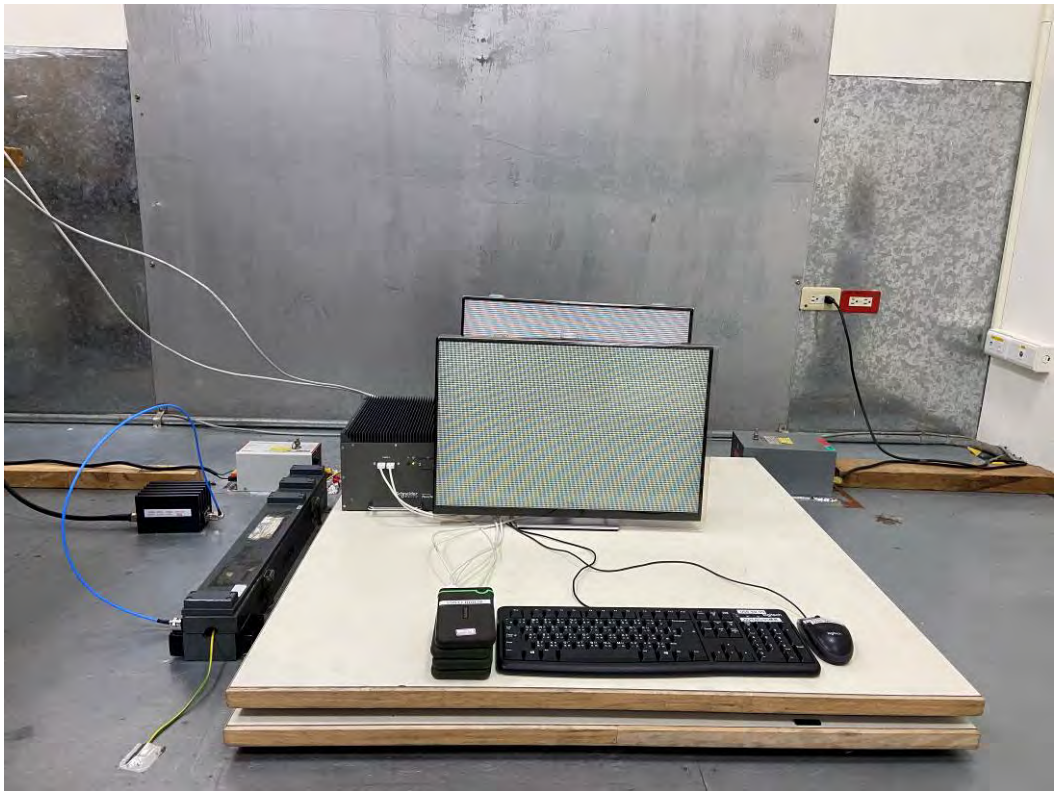
Surge For I/O Testing Set-up

CS Testing Set-up

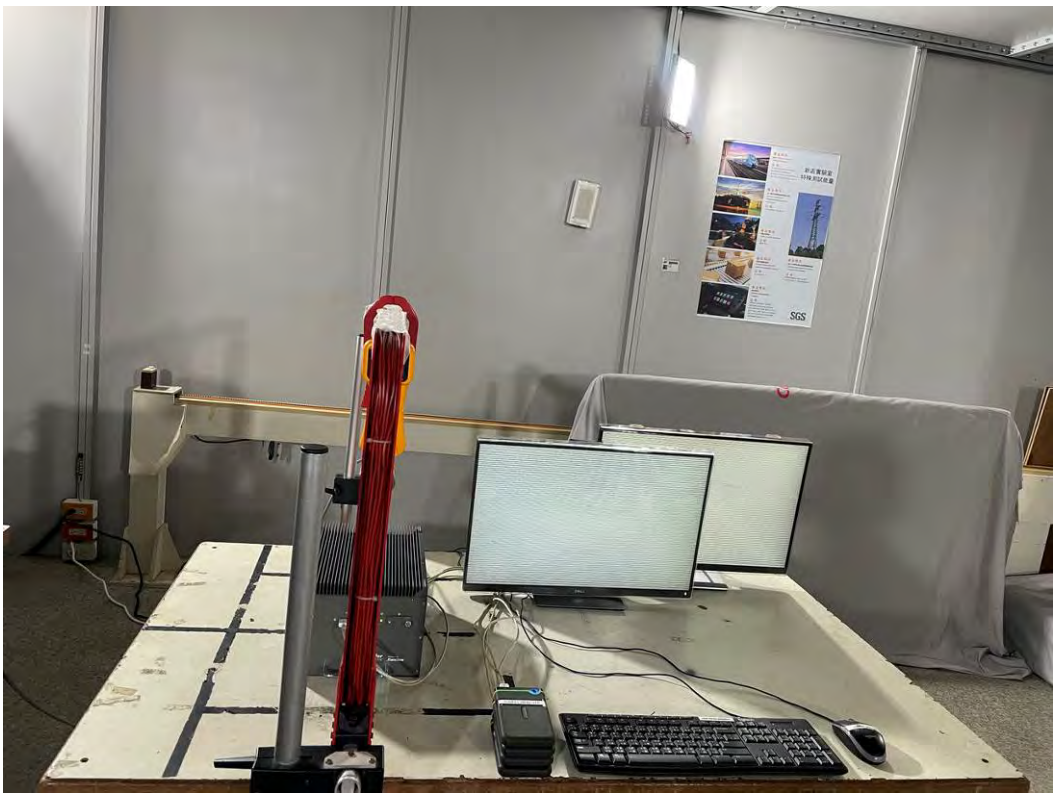


CS For I/O Testing Set-up

CS For Functional Earth Testing Set-up



PFMF Testing Set-up

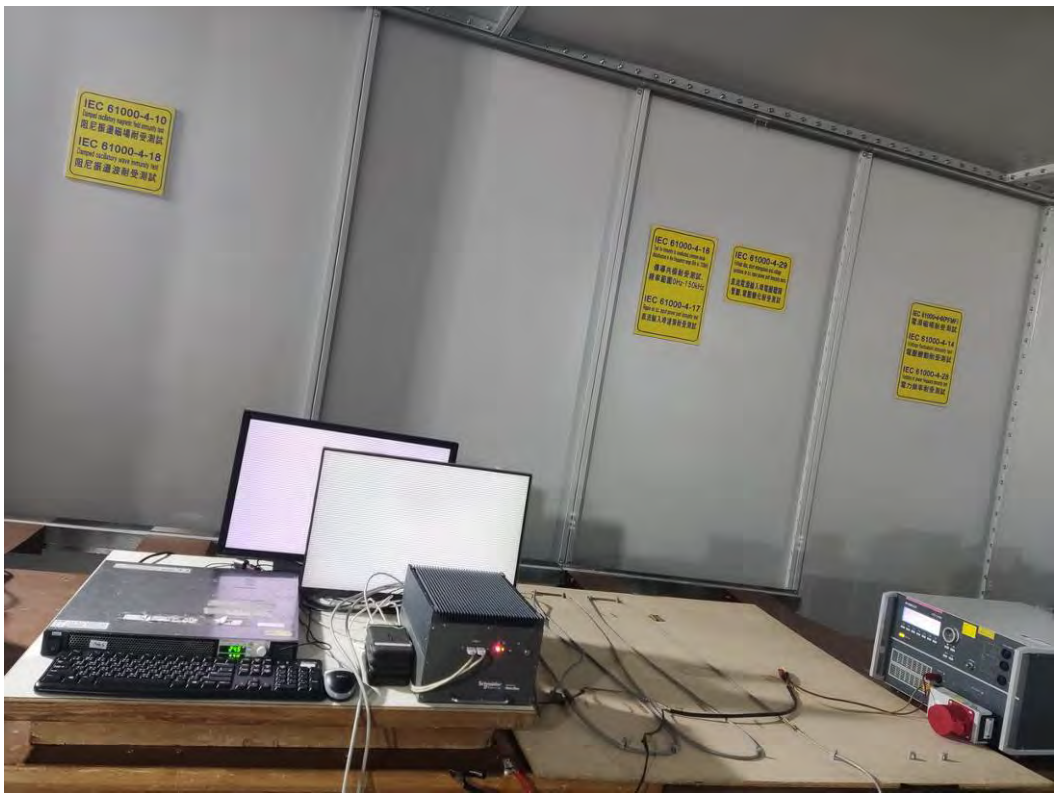


Power Frequency Immunity Testing Set-up

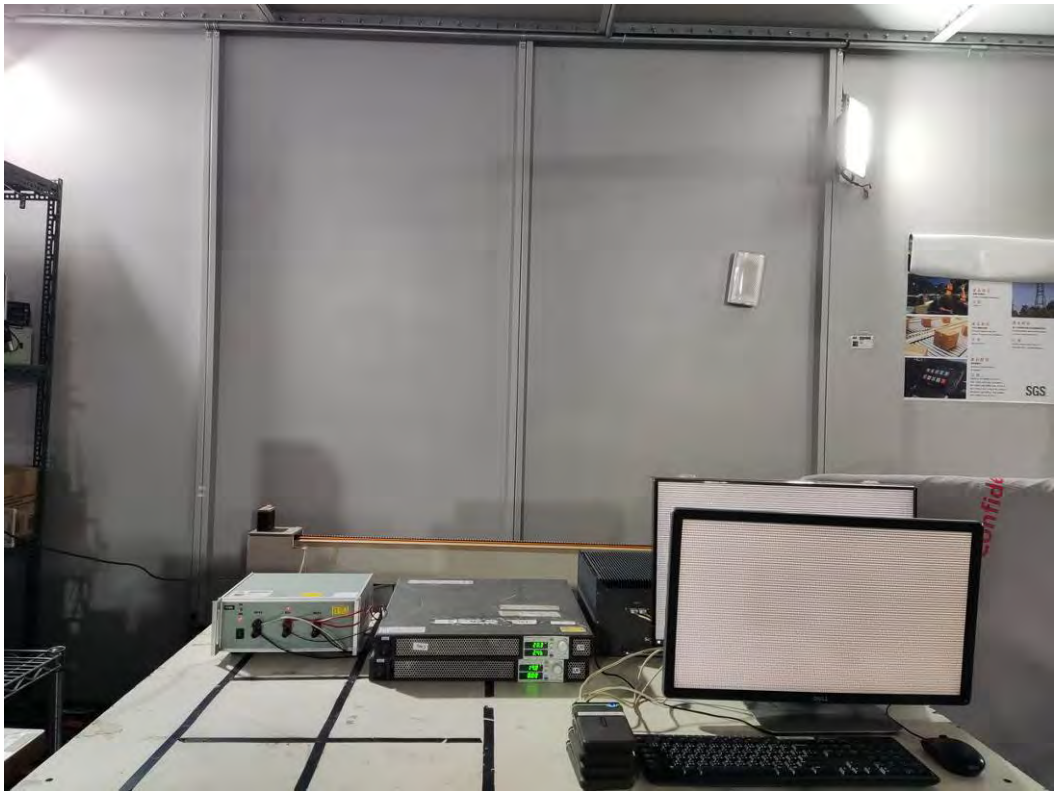
Ripple on DC Power Immunity Testing Set-up

Damped Oscillatory Wave Immunity Testing Set-up

Damped Oscillatory Wave Immunity For RJ45 Testing Set-up

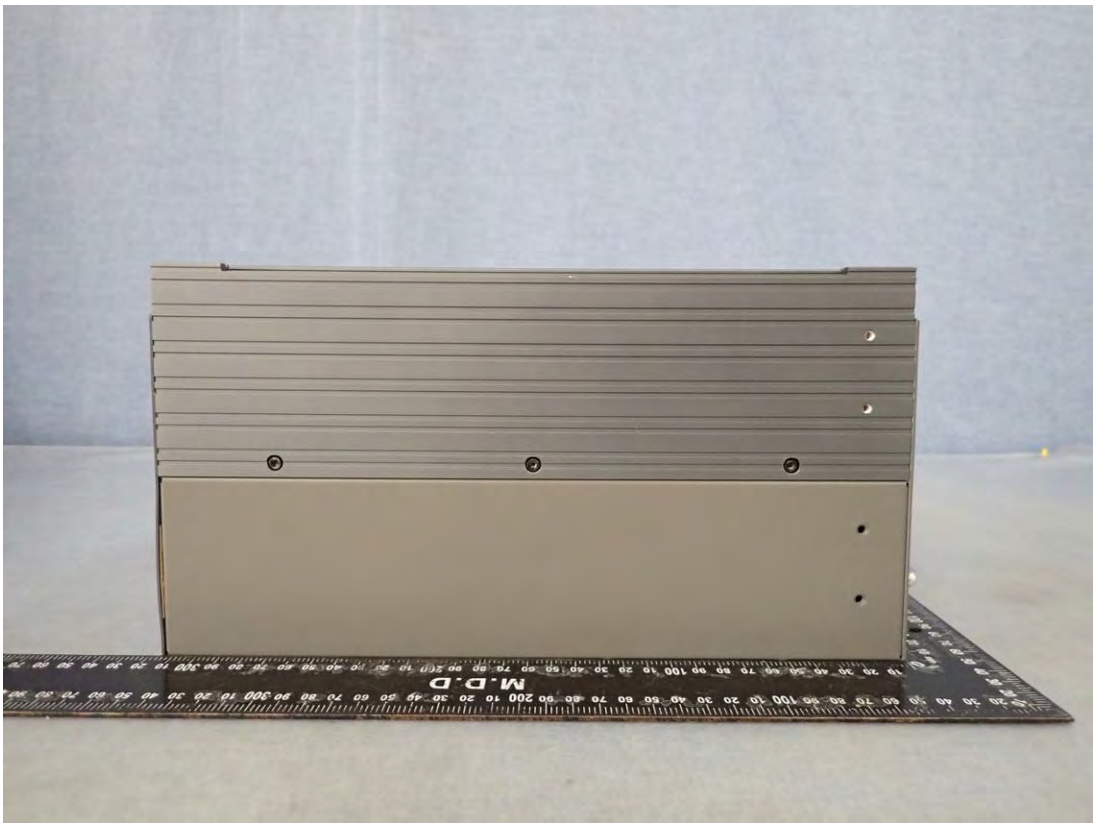


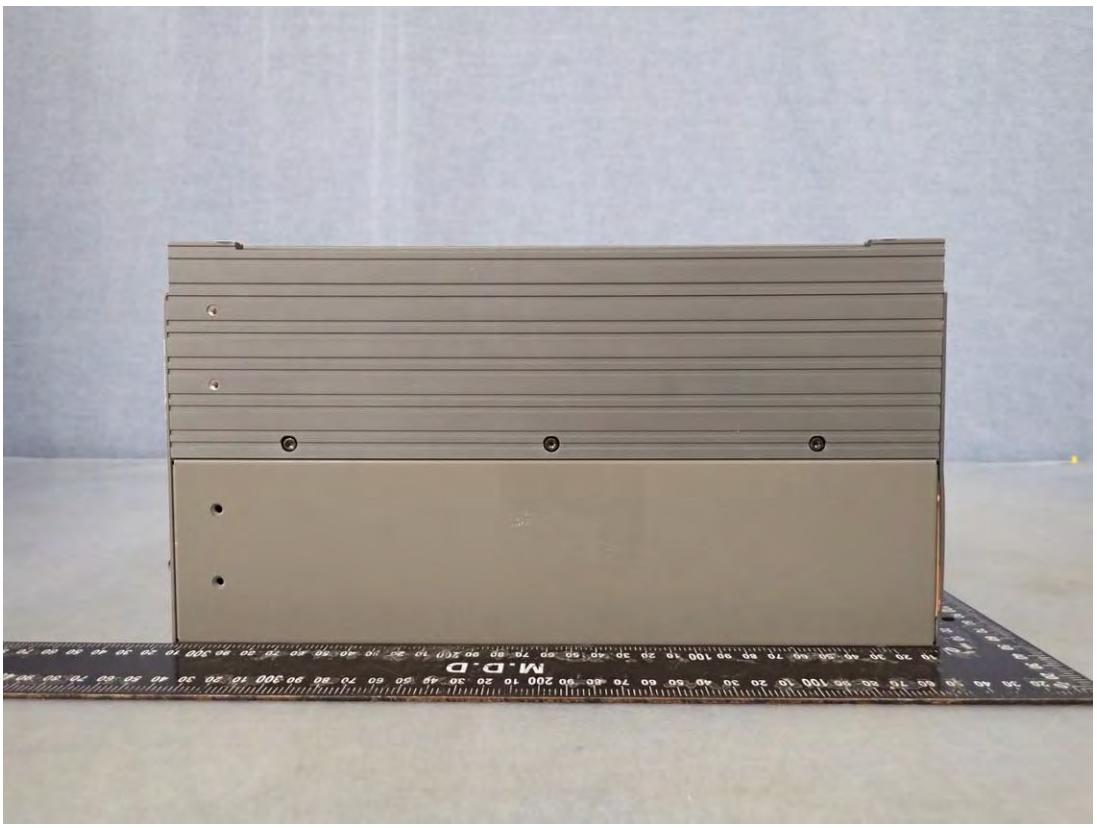
DC Input Power Voltage Dip and Interruptions Testing Set-up

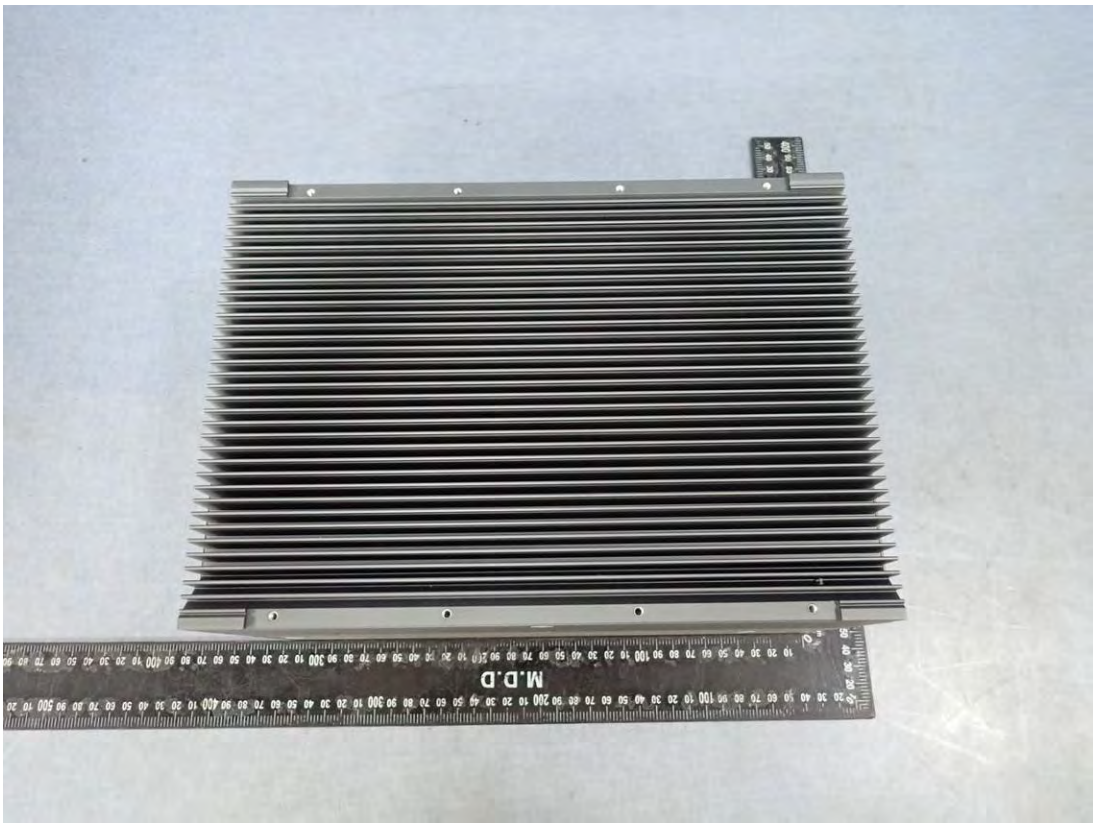


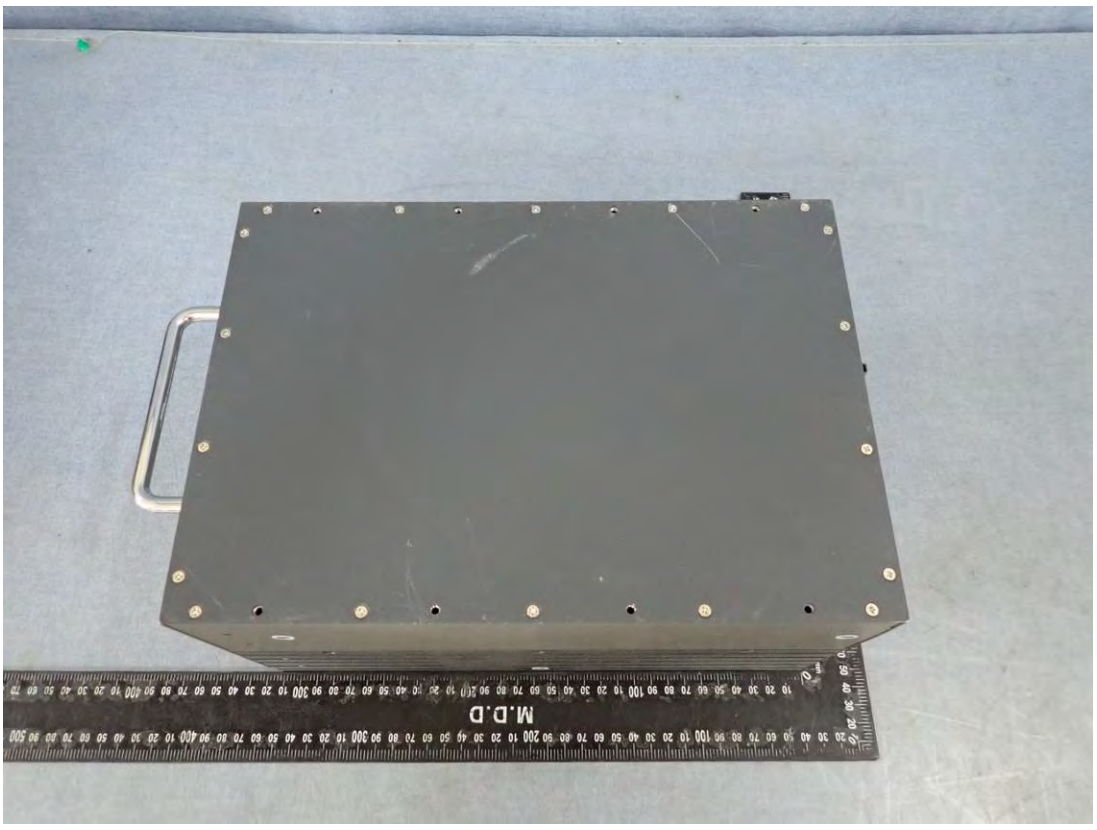
Photographs of EUT Unit

Exterior









** End of Report **