CE EMC Test Report

Issued date: May 12, 2025

Project No.: 25Q021403

Product : Expandable AI Computing System

Model : TGS-1000

Series Model : TGS-1XXXXXXXXXXXX ("X" can be 0-9, A-Z or blank)

Applicant : Vecow Co., Ltd

Address : 3F, No. 10, Jiankang Rd., Zhonghe Dist., New Taipei City 23586, Taiwan

Report No: WD-EE-R-250153-A0

According to

EN 55032: 2015 + A11: 2020, Class A	IEC 61000-4-2: 2008
BS EN 55032: 2015 + A11: 2020	IEC 61000-4-3: 2020
CISPR 32: 2015 + COR1: 2016	IEC 61000-4-4: 2012
EN 55032: 2015 + A1: 2020, Class A	IEC 61000-4-5: 2014 + A1: 2017
BS EN 55032: 2015 + A1: 2020	IEC 61000-4-6: 2023
CISPR 32: 2015 + A1: 2019	IEC 61000-4-8: 2009
AS/NZS CISPR 32: 2015 + A1: 2020	IEC 61000-4-11: 2020 + COR2: 2022
EN 61000-3-2: 2014	EN 61000-4-2: 2009
EN IEC 61000-3-2: 2019 + A2: 2024	EN IEC 61000-4-3: 2020
EN 61000-3-3: 2013 + A2: 2021 + AC: 2022	EN 61000-4-4: 2012
BS EN 61000-3-2: 2014	EN 61000-4-5: 2014 + A1: 2017
BS EN IEC 61000-3-2: 2019 + A2: 2024	EN IEC 61000-4-6: 2023
BS EN 61000-3-3: 2013 + A2: 2021	EN 61000-4-8: 2010
EN 55035: 2017 + A11: 2020	EN IEC 61000-4-11: 2020
BS EN 55035: 2017 + A11: 2020	

Authorized Signatory : / Ken Huang

Wendell Industrial Co., Ltd
Wendell EMC & RF Laboratory
Add: 5F-1, No. 188, Baoqiao Road, Xindian District, New Taipei City 23145, Taiwan R.O.C.

Table of Contents

History of this test report

Report No.	Issue date	Description
WD-EE-R-250153-A0	May 12, 2025	Initial Issue

Declaration

This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us.

History of supplementary report

Report No.	Issue date	Description
WD-EE-R-250153-A0	May 12, 2025	Original report

Declaration

This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us.

1 Certification

Product:	Expandable AI Computing System
Brand Name:	Vecow
Model:	TGS-1000
Series Model:	TGS-1XXXXXXXXXXXX ("X" can be 0-9, A-Z or blank)
Applicant:	Vecow Co., Ltd
Tested:	Apr. 18 ~ May 05, 2025
Standard:	**EN 55032: 2015 + A11: 2020, Class A** **BS EN 55032: 2015 + A11: 2020** **CISPR 32: 2015 + COR1: 2016** **EN 55032: 2015 + A1: 2020, Class A** **BS EN 55032: 2015 + A1: 2020** **CISPR 32: 2015 + A1: 2019** **AS/NZS CISPR 32: 2015 + A1: 2020** **EN 61000-3-2: 2014** **EN IEC 61000-3-2: 2019 + A2: 2024** **EN 61000-3-3: 2013 + A2: 2021 + AC: 2022** **BS EN 61000-3-2: 2014** **BS EN IEC 61000-3-2: 2019 + A2: 2024** **BS EN 61000-3-3: 2013 + A2: 2021** **EN 55035: 2017 + A11: 2020** **BS EN 55035: 2017 + A11: 2020** IEC 61000-4-2: 2008 IEC 61000-4-3: 2020 IEC 61000-4-4: 2012 IEC 61000-4-5: 2014 + A1: 2017 IEC 61000-4-6: 2023 IEC 61000-4-8: 2009 IEC 61000-4-11: 2020 + COR2: 2022 EN 61000-4-2: 2009 EN IEC 61000-4-3: 2020 EN 61000-4-4: 2012 EN 61000-4-5: 2014 + A1: 2017 EN IEC 61000-4-6: 2023 EN 61000-4-8: 2010 EN IEC 61000-4-11: 2020

The above equipment (Model: TGS-1000) has been tested by **Wendell EMC & RF Laboratory**, and found compliance with the requirement of the above standards. The test record, data evaluation and Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Please note that the measurement uncertainty are provided for informational purpose only and are not used in determining the Pass/Fail results.

1.1 Summary of Result

The EUT has been tested according to the following specifications:

Emission				
Standard	**Test Item**	**Limit**	**Result**	**Remark**
EN 55032 CISPR 32	Conducted disturbance at mains power ports	Class A	Pass	Meets the requirements
	Conducted disturbance at telecommunication port	Class A	Pass	Meets the requirements
	Radiated disturbance	Class A	Pass	Meets the requirements
EN IEC 61000-3-2	Harmonic current emission	Class A	Pass	Meets the requirements
EN 61000-3-3	Voltage fluctuations and flicker	-	Pass	Meets the requirements

Immunity			
Standard	**Test Item**	**Result**	**Remark**
IEC 61000-4-2	Electrostatic discharge	Pass	Meets the requirements of Performance Criterion A
IEC 61000-4-3	Radiated, radio-frequency electromagnetic field	Pass	Meets the requirements of Performance Criterion A
IEC 61000-4-4	Electrical fast transient / burst	Pass	Meets the requirements of Performance Criterion A
IEC 61000-4-5	Surge	Pass	Meets the requirements of Performance Criterion A
IEC 61000-4-6	Conducted disturbances	Pass	Meets the requirements of Performance Criterion A
IEC 61000-4-8	Power frequency magnetic field	Pass	Meets the requirements of Performance Criterion A
IEC 61000-4-11	Voltage dips and short interruptions	Pass	Meets the requirements of Voltage Dips: ✧ >95% reduction – Performance Criterion A ✧ 30% reduction - Performance Criterion A Voltage Interruptions: ✧ >95% reduction – Performance Criterion C

Note: Test record contained in the referenced test report relate only to the EUT sample and test item.

2 Laboratory Information

2.1 Measurement / Test Facility

Conducted disturbance at main power port, Conducted disturbance at telecommunication port, Harmonics, Flicker, ESD, EFT, Surge, CS, PFMF, DIP and Close Proximity Radiated fields test

W01: 5F-1, No.188, Baoqiao Rd., Xindian Dist., New Taipei City 23145, Taiwan (R.O.C)

RS, ESD and Surge test

W05: 1F-7, No.188, Baoqiao Rd., Xindian Dist., New Taipei City 23145, Taiwan (R.O.C)

Conducted disturbance at main power port, Conducted disturbance at telecommunication port, Radiated disturbance (9*6*6 Chamber) and ESD test

W08: No.119, Wugong 3rd Rd., Wugu Dist., New Taipei City 248, Taiwan (R.O.C)

ACCREDITATIONS

The laboratories are accredited and approved by the TAF according to ISO/IEC 17025.

2.2 Measurement Uncertainty

The measurement instrumentation uncertainty is evaluated according to CISPR 16-4-2.

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

Wendell EMC & RF Laboratory U_{lab} is less than U_{cispr}, therefore compliance or non-compliance with a disturbance limit shall be determined in the following manner.

– compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;

– non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

Please note that the measurement uncertainty (U_{lab}) is provided for informational purpose only and is not used in determining the Pass/Fail results.

2.2.1 Conducted Emission Measurement

Test Site	Frequency Range	dB (U_{lab})	Note
W01-CE	150 kHz ~ 30 MHz	2.84	LISN
W08-CE	150 kHz ~ 30 MHz	2.72	LISN

2.2.2 Conducted Emission at Telecommunication Port Measurement

Test Site	Frequency Range	dB (U_{lab})	Note
W01-CE	150 kHz ~ 30 MHz	2.85	ISN
W01-CE	150 kHz ~ 30 MHz	2.11	Current Probe
W08-CE	150 kHz ~ 30 MHz	2.64	ISN

2.2.3 Radiated Emission Measurement

Test Site	Frequency Range	Ant	dB (U_{lab})	Note
W08-966-1	30 MHz ~ 200 MHz	V	3.50	N/A
	30 MHz ~ 200 MHz	H	2.96	N/A
	200 MHz ~ 1000 MHz	V	5.09	N/A
	200 MHz ~ 1000 MHz	H	3.41	N/A
	1 GHz ~ 6 GHz	V	4.37	N/A
	1 GHz ~ 6 GHz	H	4.30	N/A

3 General Information

3.1 Description of Equipment Under Test

Product	Expandable AI Computing System
Brand	Vecow
Model	TGS-1000
Series Model	TGS-1XXXXXXXXXXXX ("X" can be 0-9, A-Z or blank)
Applicant	Vecow Co., Ltd
Received Date	Feb. 27, 2025
EUT Power Rating	24Vdc (from adapter)
Model Differences	The models are electrically identical, different models no. are for marketing purpose. The series model information is provided by client.
Operating System	Windows 11 Pro version: 23H2
Data Cable Supplied	N/A
Accessory Device	N/A
I/O Port	Please refer to the User's Manual

Note:

1. The EUT uses the follow adapter:

Adapter (support unit only)	
Brand	LITEON
Model	PA-1331-92E
Input Power	100-240Vac, 4.4A, 50-60Hz
Output Power	24.0Vdc, 13.75A
Power line	Input: 1.8m non-shielded cable Output: 1.4m non-shielded cable with 2 cores

2. The EUT contains following components.

Item	**Brand**	**Model**	**Spec.**	**Qty.**
Main Board	-	TGS-1000	Rev. B	1
CPU	Intel	Intel® Core™ Ultra 7 processor 165H	up to 5.00 GHz	1
RAM	innodisk	M5S0-GGMZO5ZQ	48GB DDR5 5600 W/T SODIMM	2
M.2 SSD	innodisk	DEM24-C12DD1KWCQF	M.2 (P42) 3TE6 512GB	1
	Transcend	TS2TMTE712A-I	2TB	1
GPU Board	NVIDIA	RTX 5000 Ada	-	1

3. The EUT's highest operating frequency is 1000MHz. Therefore the radiated emission is tested up to 6GHz.

3.2 Description of Measurement / Test Modes

Test results are presented in the report as below.

Test Mode	Measurement / Test Condition
Conducted Emission Measurement	
-	AC-DC Adapter mode
Conducted Emission at Telecommunication Port Measurement	
-	AC-DC Adapter mode, LAN (100Mbps/1Gbps/2.5Gbps)
Radiated Emission 30MHz ~ 1GHz Measurement	
-	AC-DC Adapter mode
Radiated Emission above 1GHz Measurement	
-	AC-DC Adapter mode
Harmonic & Flicker Measurement	
-	AC-DC Adapter mode
Immunity Test	
-	AC-DC Adapter mode

3.3 Description of Operating Condition

a. Placed the EUT on the test table.
b. Prepare PC to act as a communication partner and placed it outside of testing area.
c. The EUT was connected to the PC with LAN cable.
d. The communication partner sent data to EUT by command "ping" via LAN.
e. The EUT read / write data with Internal SSD & External SSD.
f. The EUT run test program "BurnIN.exe" to enable all functions.
g. The EUT sent Color Bar ITU-R.BT471-1 signal to monitor and displayed on screen.
h. The microphone sent voice signal to EUT.
i. The EUT sent voice signal to earphone.

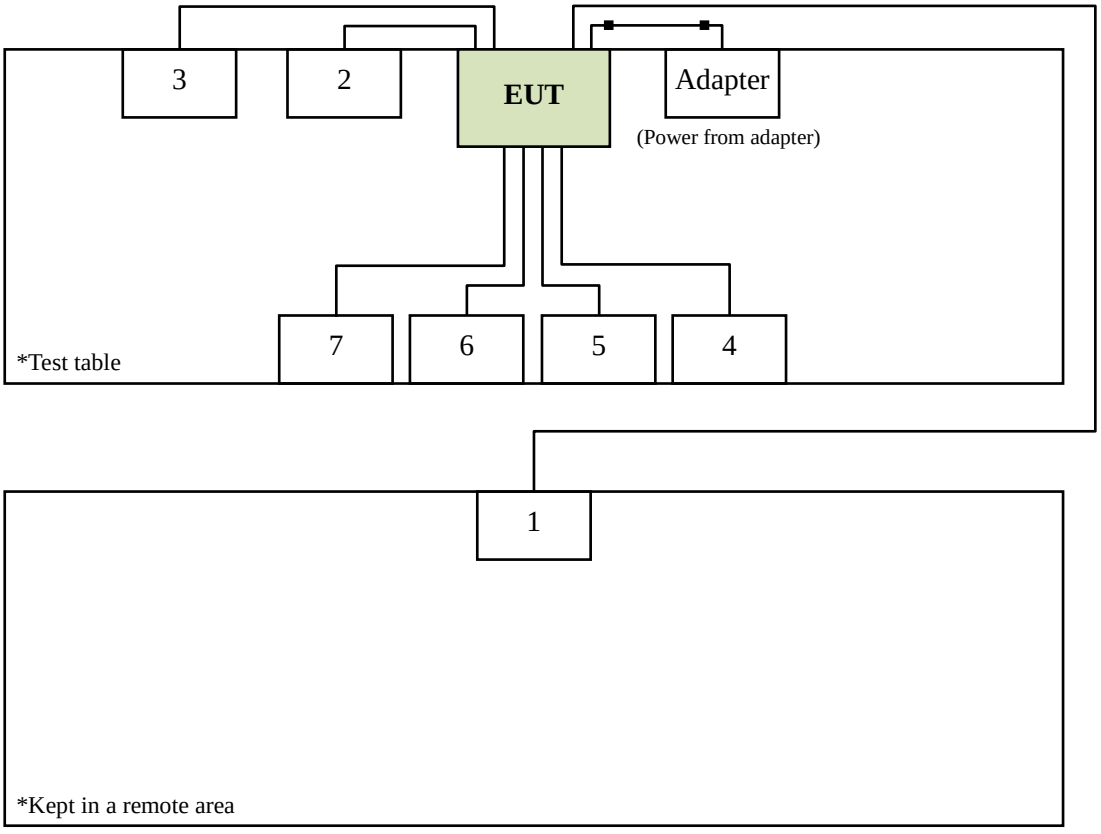
3.4 Description of Associated Equipment

The EUT has been conducted testing with other necessary accessories or support units.

Item	Equipment	Brand	Model No.	Serial No.	FCC ID	Data Cable	Power Cable	Remark
1	Desktop PC	DELL	D19M	N/A	PPD-QCNFA335	15m CAT.6A shielded LAN cable	AC: 1.8m non-shielded cable	-
2	4K Monitor	ASUS	XG27UCS	S5LMTF200765	FCC SDoC Approved	1.7m shielded DP cable	AC: 1.8m non-shielded cable	-
3	4K Monitor	ASUS	XG27UCS	S7LMT011954	FCC SDoC Approved	1.7m shielded DP cable	AC: 1.8m non-shielded cable	-
4	Keyboard	DELL	KB216t	CN-0W33XP-L0300-7C1-15UP	FCC SDoC Approved	1.5m non-shielded USB cable	N/A	-
5	Mouse	DELL	MS116	CN-0DV0RH-L0300-7C1-15UP	FCC SDoC Approved	1.5m non-shielded USB cable	N/A	-
6	Earphone & Microphone	Avier	AEP-MM	N/A	N/A	1.2m non-shielded Audio cable	N/A	-
7	External Portable SSD (x3)	Transcend	TS120GESD240C	F96474-0001	FCC SDoC Approved	1m shielded USB cable	N/A	-

Note: 1. The core(s) is(are) originally attached to the cable(s).
2. Item 1 acted as communication partners to transfer data.

3.5 Configuration of Equipment Under Test



4 Emission Measurement

4.1 Conducted Emission Measurement

4.1.1 Limit of Conducted Emission Measurement

Class A equipment:

Requirements for conducted emissions from the AC mains power ports of Class A equipment			
Frequency (MHz)	**Measurement**		**Class A limits dB(μV)**
	Coupling device	**Detector type/ bandwidth**	
0.15 to 0.5	AMN	Quasi Peak / 9 kHz	79
0.5 to 30			73
0.15 to 0.5	AMN	Average / 9 kHz	66
0.5 to 30			60

Class B equipment:

Requirements for conducted emissions from the AC mains power ports of Class B equipment			
Frequency (MHz)	**Measurement**		**Class B limits dB(μV)**
	Coupling device	**Detector type/ bandwidth**	
0.15 to 0.5	AMN	Quasi Peak / 9 kHz	66 to 56*
0.5 to 5			56
5 to 30			60
0.15 to 0.5	AMN	Average / 9 kHz	56 to 46*
0.5 to 5			46
5 to 30			50

***** Decreases with the logarithm of the frequency.

Note: 1. The lower limit shall apply at the transition frequencies.
2. Detector function in the form: QP = Quasi Peak, AVG = Average
3. The result calculated as following:
Measurement Value = Reading Level + Correct Factor
Correct Factor = LISN Factor + Cable Loss + Transient Limiter (If use)
Margin Level = Measurement Value – Limit Value
4. Applicable to AC mains power ports.

4.1.2 Measurement Instrument

Test Site: W01-CE					
Item	**Equipment**	**Manufacturer**	**Model**	**Meter No.**	**Calibration Date**
1	TWO-LINE V-NETWORK	R&S	ENV216	CT-1-025-1	Jun. 05, 2024
2	Pulse limiter	R&S	ESH3-Z2	CT-2-015	Jun. 06, 2024
3	EMI Test Receiver	R&S	ESCI	CT-1-024	Jun. 06, 2024
4	Artificial Mains Network (AMN)	SCHWARZBECK	NSLK 8127	CT-1-104-1	Jun. 06, 2024
5	RF Cable	MVE	200200.400LL .500A	CT-9-101	Jun. 06, 2024
6	50ohm Termination	N/A	N/A	CT-1-065-1	May 30, 2024
7	Measurement Software	EZ-EMC	Ver: EMC-CON 3A1	CT-3-012	No calibration request

Note: 1. The calibration interval of the above test instruments is 12 months.

Test Site: W08-CE					
Item	**Equipment**	**Manufacturer**	**Model**	**Meter No.**	**Calibration Date**
1	TWO-LINE V-NETWORK	R&S	ENV216	CT-1-025-2	Jun. 20, 2024
2	RF Cable	EMCI	EMCCFD300-BM-BM-5000	CT-1-107-2	Jun. 24, 2024
3	EMI Test Receiver	R&S	ESR3	CT-1-103	Jun. 20, 2024
4	Artificial Mains Network (AMN)	SCHWARZBECK	NSLK 8127 RC	CT-1-104-1RC	Jun. 20, 2024
5	Transient Limiter	Electro-Metrics	EM-7600	CT-1-026	Jun. 24, 2024
6	50ohm Termination	N/A	N/A	CT-1-109-1	Jun. 20, 2024
7	Measurement Software	EZ-EMC	Ver: EMC-CON 3A1	CT-3-012	No calibration request

Note: 1. The calibration interval of the above test instruments is 12 months.

4.1.3 Measurement Procedure

a. The table-top equipment under test was placed 0.8 meter height wooden table from the horizontal ground plane with EUT being connected to power source through a line impedance stabilization network (LISN). The floor-standing equipment under test was placed insulation support unit from the horizontal ground plane. The LISN at least be 0.8 meter from nearest chassis of equipment under test.

b. The line impedance stabilization network (LISN) provides 50 ohm/50uH of coupling impedance for the measuring instrument. All associated equipment powered from additional LISN(s).

c. Interrelating cables that hang closer than 0.4 meter to the ground plane shall be folded back and forth in the center forming a bundle. All I/O cables were positioned to simulate typical usage.

d. The loads and/or devices simulating typical operating conditions shall be connected to at least one of each type of interface port of the equipment under test. If loading (or terminating) with a device of actual usage is not feasible, the port should be loaded with a simulator. Where these options are not practical the port shall be loaded by the application of a typical impedance considering both the common and differential modes.

e. The EMI test receiver connected to the line impedance stabilization network (LISN) powering the equipment. The measurements shall be limited to the operating ranges of voltage and frequency as specified for the equipment under test, having regard to the supply voltage and frequency for the intended market of the equipment under test.

f. The EMI test receiver scanned from 150kHz to 30MHz for emissions in each of modes. A scan was taken on both power lines, Line and Neutral, recording at least six highest emission amplitude.

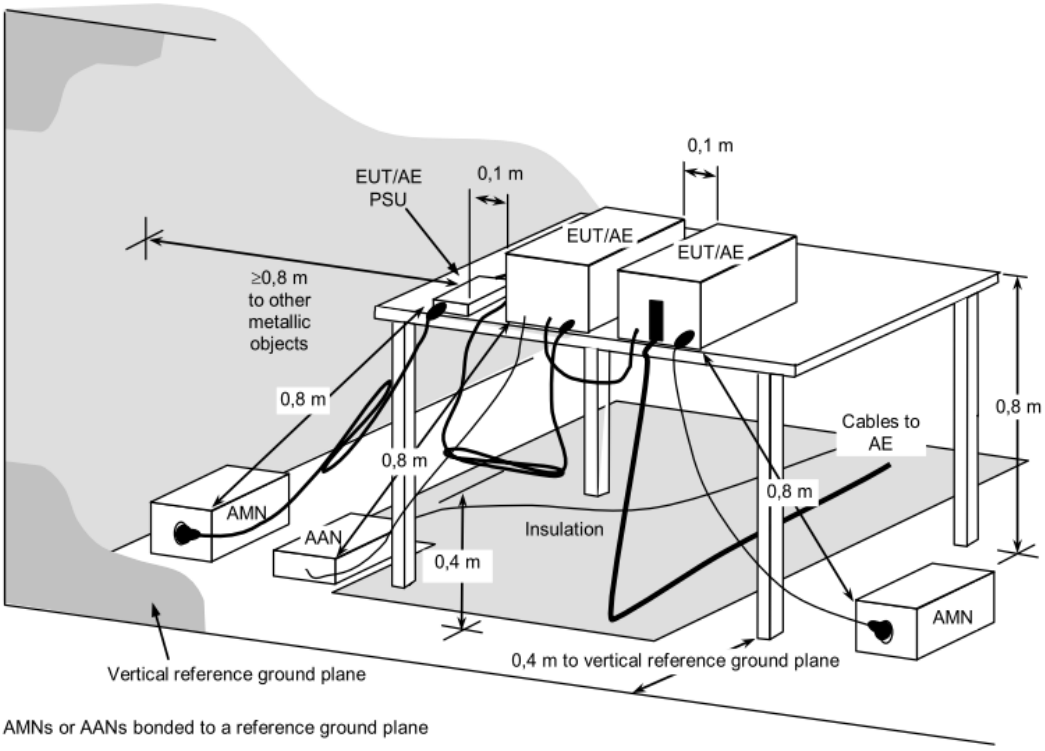
g. The equipment under test and cable configuration of the above highest emission amplitude were recorded.

4.1.4 Deviation from Standard

No deviation

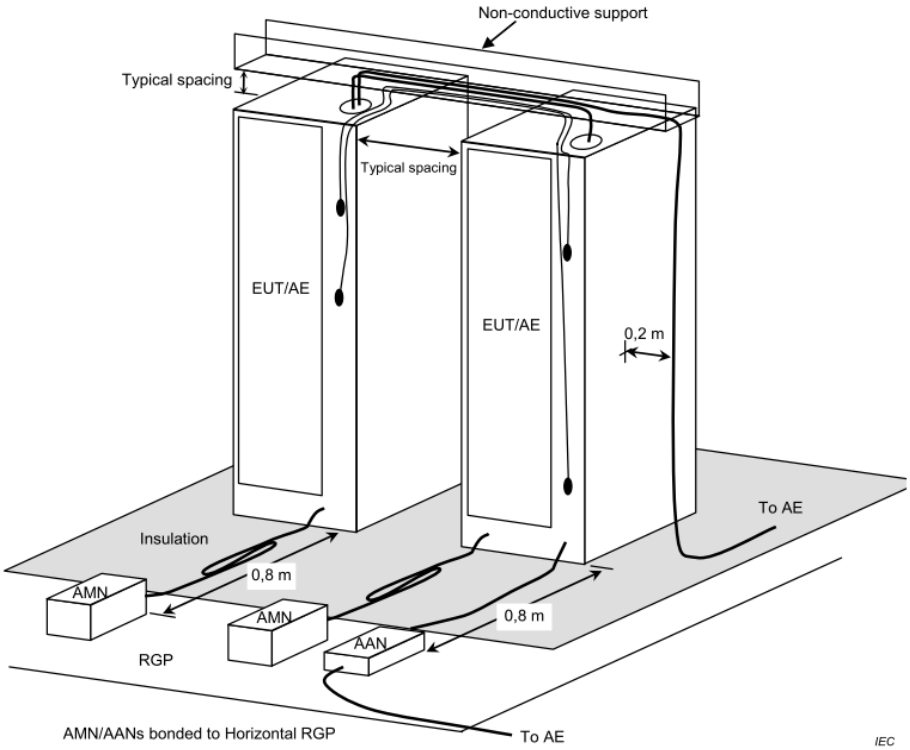
4.1.5 Measurement Configuration

< Table-Top equipment under test >



AMNs or AANs bonded to a reference ground plane

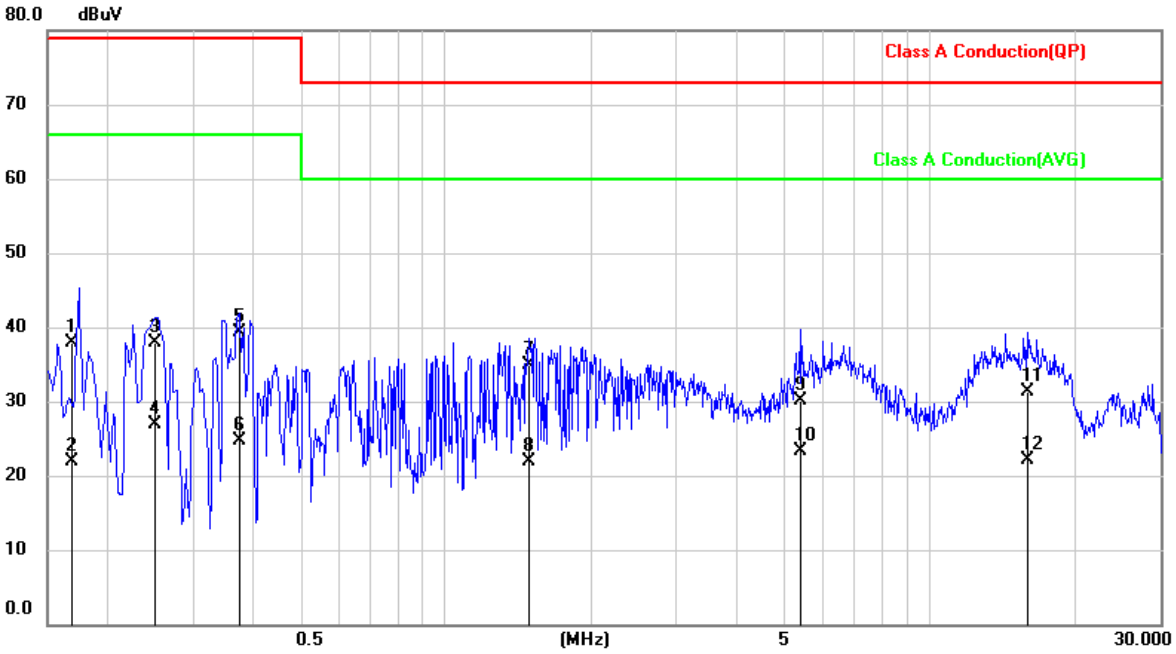
< Floor-Standing equipment under test >



Note: Please refer to 4.1.7 for the actual test configuration.

4.1.6 Measurement Result

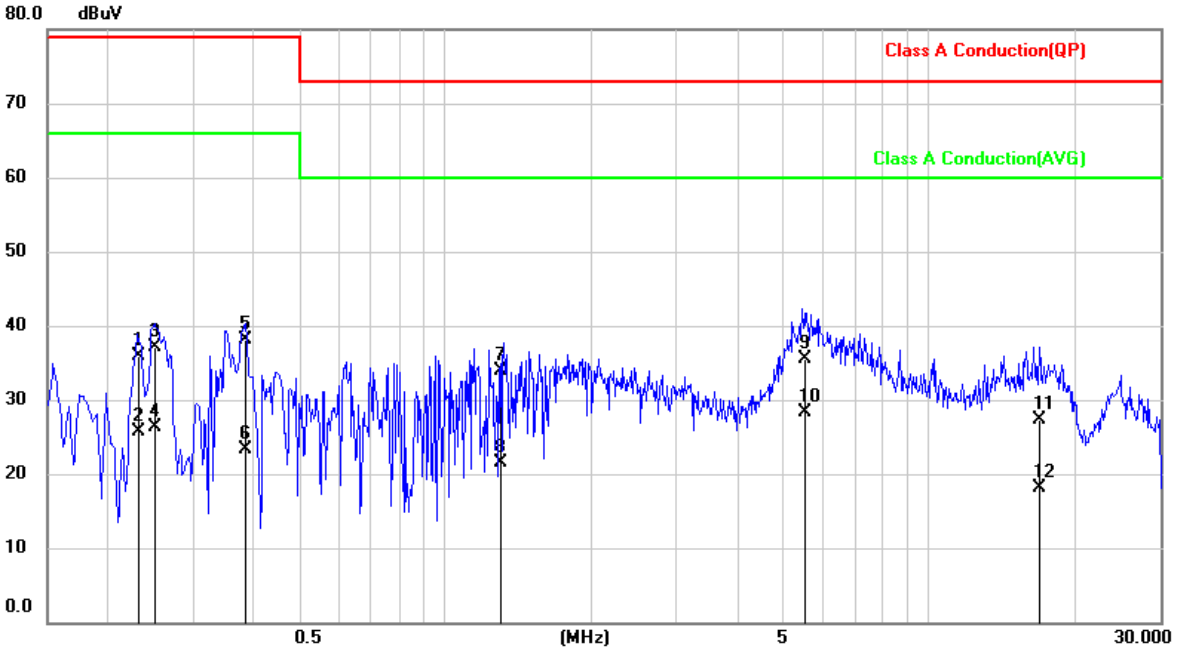
Test Voltage	230Vac, 50Hz	Frequency Range	0.15 ~ 30 MHz
Environmental Conditions	24℃, 50% RH	6dB Bandwidth	9 kHz
Test Date	2025/04/30	Phase	L
Tested by	Andy Li	Test Site	W01-CE



No.	Frequency (MHz)	Reading Level (dBµV)	Correct Factor (dB)	Measurement (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.1696	28.07	9.91	37.98	79.00	-41.02	QP
2	0.1696	12.01	9.91	21.92	66.00	-44.08	AVG
3	0.2505	28.04	9.92	37.96	79.00	-41.04	QP
4	0.2505	17.08	9.92	27.00	66.00	-39.00	AVG
5	0.3769	29.41	9.93	39.34	79.00	-39.66	QP
6	0.3769	14.82	9.93	24.75	66.00	-41.25	AVG
7	1.4824	24.87	9.96	34.83	73.00	-38.17	QP
8	1.4824	12.02	9.96	21.98	60.00	-38.02	AVG
9	5.4273	20.03	10.06	30.09	73.00	-42.91	QP
10	5.4273	13.29	10.06	23.35	60.00	-36.65	AVG
11	15.9261	21.07	10.23	31.30	73.00	-41.70	QP
12	15.9261	11.79	10.23	22.02	60.00	-37.98	AVG

Remark: 1. QP = Quasi Peak, AVG = Average
2. Correct Factor = LISN Factor + Cable Loss + Transient Limiter (If use)
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value – Limit Value

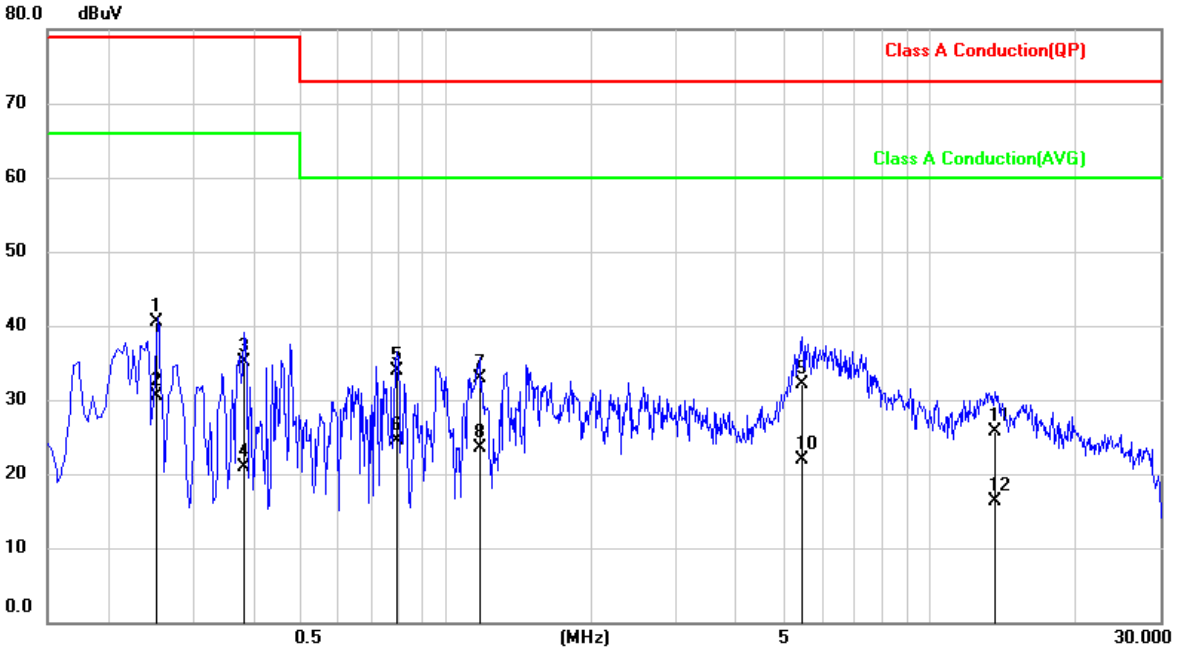
Test Voltage	230Vac, 50Hz	Frequency Range	0.15 ~ 30 MHz
Environmental Conditions	24℃, 50% RH	6dB Bandwidth	9 kHz
Test Date	2025/04/30	Phase	N
Tested by	Andy Li	Test Site	W01-CE



No.	Frequency (MHz)	Reading Level (dBµV)	Correct Factor (dB)	Measurement (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.2330	26.07	9.89	35.96	79.00	-43.04	QP
2	0.2330	15.75	9.89	25.64	66.00	-40.36	AVG
3	0.2511	27.14	9.89	37.03	79.00	-41.97	QP
4	0.2511	16.51	9.89	26.40	66.00	-39.60	AVG
5	0.3854	28.17	9.91	38.08	79.00	-40.92	QP
6	0.3854	13.43	9.91	23.34	66.00	-42.66	AVG
7	1.3005	23.91	9.95	33.86	73.00	-39.14	QP
8	1.3005	11.49	9.95	21.44	60.00	-38.56	AVG
9	5.5347	25.47	10.07	35.54	73.00	-37.46	QP
10	5.5347	18.15	10.07	28.22	60.00	-31.78	AVG
11	16.8248	16.99	10.24	27.23	73.00	-45.77	QP
12	16.8248	7.94	10.24	18.18	60.00	-41.82	AVG

Remark: 1. QP = Quasi Peak, AVG = Average
2. Correct Factor = LISN Factor + Cable Loss + Transient Limiter (If use)
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value – Limit Value

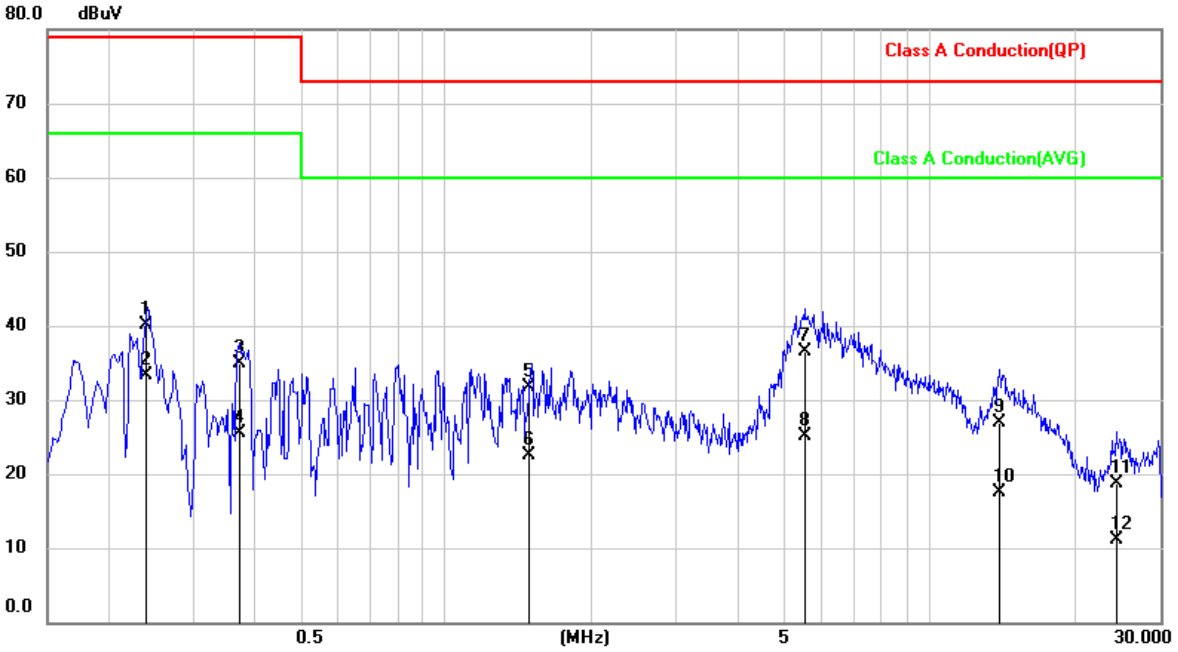
Test Voltage	110Vac, 60Hz	Frequency Range	0.15 ~ 30 MHz
Environmental Conditions	24℃, 50% RH	6dB Bandwidth	9 kHz
Test Date	2025/04/30	Phase	L
Tested by	Andy Li	Test Site	W01-CE



No.	Frequency (MHz)	Reading Level (dBµV)	Correct Factor (dB)	Measurement (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.2519	30.50	9.92	40.42	79.00	-38.58	QP
2	0.2519	20.56	9.92	30.48	66.00	-35.52	AVG
3	0.3837	25.23	9.93	35.16	79.00	-43.84	QP
4	0.3837	10.89	9.93	20.82	66.00	-45.18	AVG
5	0.7955	23.94	9.95	33.89	73.00	-39.11	QP
6	0.7955	14.48	9.95	24.43	60.00	-35.57	AVG
7	1.1743	22.91	9.95	32.86	73.00	-40.14	QP
8	1.1743	13.52	9.95	23.47	60.00	-36.53	AVG
9	5.4498	21.97	10.06	32.03	73.00	-40.97	QP
10	5.4498	11.83	10.06	21.89	60.00	-38.11	AVG
11	13.6527	15.49	10.19	25.68	73.00	-47.32	QP
12	13.6527	6.21	10.19	16.40	60.00	-43.60	AVG

Remark: 1. QP = Quasi Peak, AVG = Average
2. Correct Factor = LISN Factor + Cable Loss + Transient Limiter (If use)
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value – Limit Value

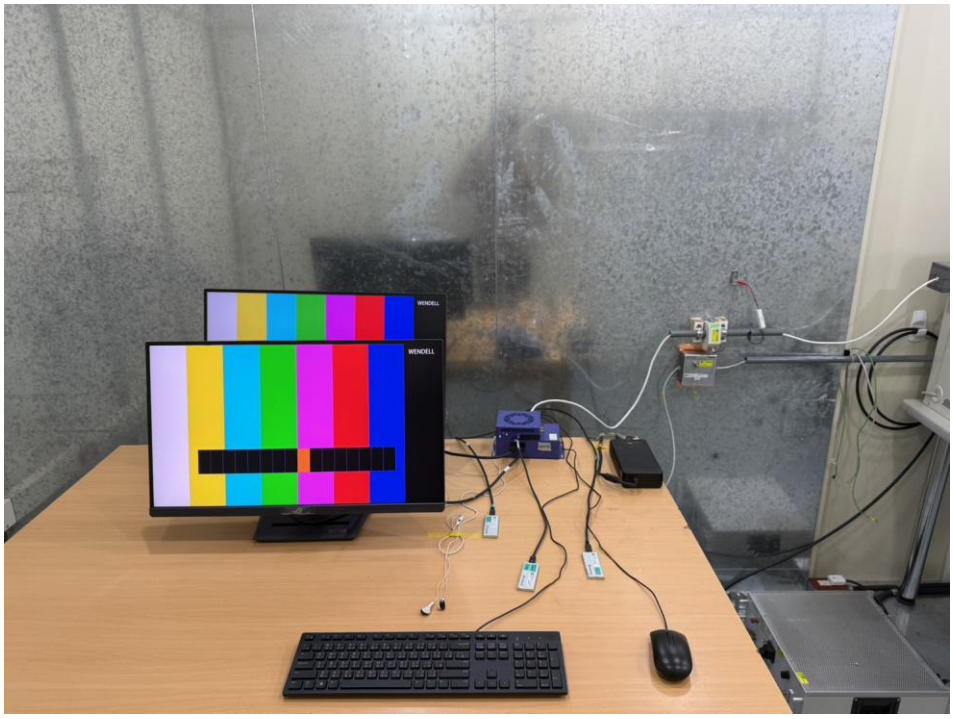
Test Voltage	110Vac, 60Hz	Frequency Range	0.15 ~ 30 MHz
Environmental Conditions	24℃, 50% RH	6dB Bandwidth	9 kHz
Test Date	2025/04/30	Phase	N
Tested by	Andy Li	Test Site	W01-CE

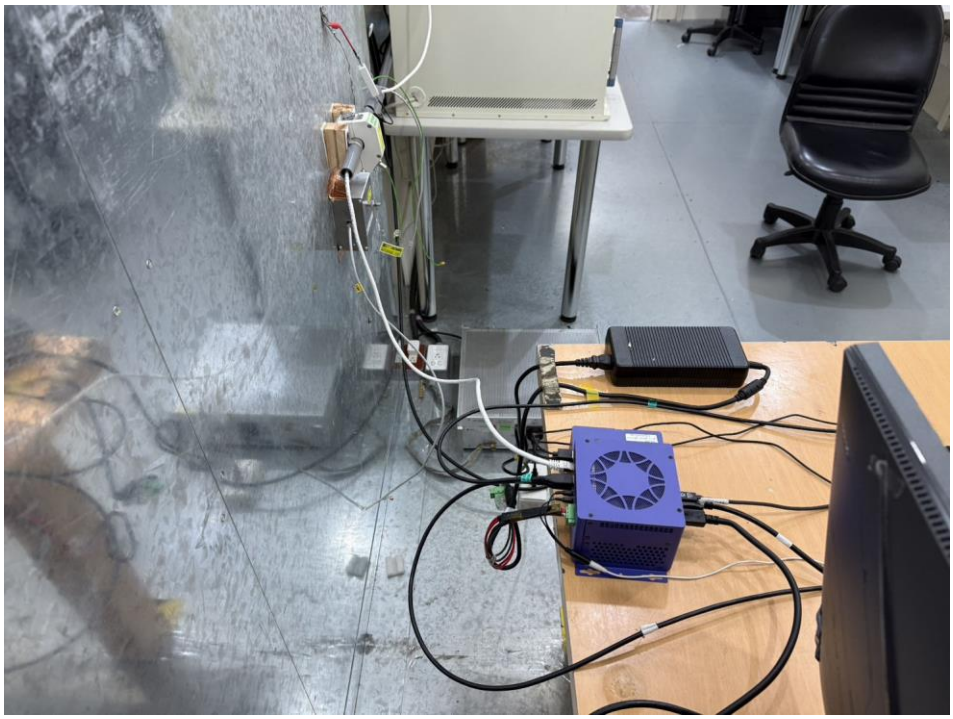


No.	Frequency (MHz)	Reading Level (dBµV)	Correct Factor (dB)	Measurement (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.2383	30.19	9.89	40.08	79.00	-38.92	QP
2	0.2383	23.33	9.89	33.22	66.00	-32.78	AVG
3	0.3762	25.06	9.91	34.97	79.00	-44.03	QP
4	0.3762	15.58	9.91	25.49	66.00	-40.51	AVG
5	1.4915	21.66	9.95	31.61	73.00	-41.39	QP
6	1.4915	12.46	9.95	22.41	60.00	-37.59	AVG
7	5.5550	26.46	10.07	36.53	73.00	-36.47	QP
8	5.5550	14.97	10.07	25.04	60.00	-34.96	AVG
9	13.9965	16.69	10.21	26.90	73.00	-46.10	QP
10	13.9965	7.27	10.21	17.48	60.00	-42.52	AVG
11	24.3035	8.30	10.32	18.62	73.00	-54.38	QP
12	24.3035	0.85	10.32	11.17	60.00	-48.83	AVG

Remark: 1. QP = Quasi Peak, AVG = Average
2. Correct Factor = LISN Factor + Cable Loss + Transient Limiter (If use)
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value – Limit Value

4.1.7 Photographs of Measurement Configuration





4.2 Conducted Emission at Telecommunication Port Measurement

4.2.1 Limit of Conducted Emission at Telecommunication Port Measurement

Class A equipment:

Requirements for asymmetric mode conducted emissions from Class A equipment			
Frequency (MHz)	**Measurement**		**Class A limits dB(μV)**
	Coupling device	**Detector type/ bandwidth**	
0.15 to 0.5	AAN	Quasi Peak / 9 kHz	97 to 87*
0.5 to 30			87
0.15 to 0.5	AAN	Average / 9 kHz	84 to 74*
0.5 to 30			74

***** Decreases with the logarithm of the frequency.

Class B equipment:

Requirements for asymmetric mode conducted emissions from Class B equipment			
Frequency (MHz)	**Measurement**		**Class B limits dB(μV)**
	Coupling device	**Detector type/ bandwidth**	
0.15 to 0.5	AAN	Quasi Peak / 9 kHz	84 to 74*
0.5 to 30			74
0.15 to 0.5	AAN	Average / 9 kHz	74 to 64*
0.5 to 30			64

***** Decreases with the logarithm of the frequency.

Note: 1. The lower limit shall apply at the transition frequencies.
2. Detector function in the form: QP = Quasi Peak, AVG = Average
3. The result calculated as following:
Measurement Value = Reading Level + Correct Factor
Correct Factor = ISN Factor + Cable Loss + Transient Limiter (If use)
Margin Level = Measurement Value – Limit Value
4. Applicable to wired network ports, optical fiber ports with metallic shield or tension members and antenna ports.

Class A equipment:

Requirements for asymmetric mode conducted emissions from Class A equipment			
Frequency (MHz)	**Measurement**		**Class A limits dB(μA)**
	Coupling device	**Detector type/ bandwidth**	
0.15 to 0.5	Current Probe	Quasi Peak / 9 kHz	53 to 43*
0.5 to 30			43
0.15 to 0.5	Current Probe	Average / 9 kHz	40 to 30*
0.5 to 30			30

***** Decreases with the logarithm of the frequency.

Class B equipment:

Requirements for asymmetric mode conducted emissions from Class B equipment			
Frequency (MHz)	**Measurement**		**Class B limits dB(μA)**
	Coupling device	**Detector type/ bandwidth**	
0.15 to 0.5	Current Probe	Quasi Peak / 9 kHz	40 to 30*
0.5 to 30			30
0.15 to 0.5	Current Probe	Average / 9 kHz	30 to 20*
0.5 to 30			20

***** Decreases with the logarithm of the frequency.

Note: 1. The lower limit shall apply at the transition frequencies.
2. Detector function in the form: QP = Quasi Peak, AVG = Average
3. The test result calculated as following:
Measurement Value = Reading Level + Correct Factor
Correct Factor = Current Probe Factor + Cable Loss + Transient Limiter (If use)
Margin Level = Measurement Value – Limit Value
4. Applicable to wired network ports, optical fiber ports with metallic shield or tension members and antenna ports.

4.2.2 Measurement Instrument

Test Site: W01-CE					
Item	**Equipment**	**Manufacturer**	**Model**	**Meter No.**	**Calibration Date**
1	TWO-LINE V-NETWORK	R&S	ENV216	CT-1-025-1	Jun. 05, 2024
2	EMI Test Receiver	R&S	ESCI	CT-1-024	Jun. 06, 2024
3	Impedance Stabilization Network	TESEQ	T8-CAT6	CT-1-105	Jun. 12, 2024
4	Artificial Mains Network (AMN)	SCHWARZBECK	NSLK 8127	CT-1-104-1	Jun. 06, 2024
5	RF Cable	MVE	200200.400LL .500A	CT-9-101	Jun. 06, 2024
6	50ohm Termination	N/A	N/A	CT-1-065-2	Jun. 06, 2024
7	Measurement Software	EZ-EMC	Ver: EMC-CON 3A1	CT-3-012	No calibration request
8	Current Probe	TESEQ	CSP 9160A	CT-1-106	Jun. 12, 2023

Note: 1. The calibration interval of the above test instruments is 12 months.
2. The calibration interval of the current probe is 24 months.

Test Site: W08-CE					
Item	**Equipment**	**Manufacturer**	**Model**	**Meter No.**	**Calibration Date**
1	TWO-LINE V-NETWORK	R&S	ENV216	CT-1-025-2	Jun. 20, 2024
2	RF Cable	EMCI	EMCCFD300-BM-BM-5000	CT-1-107-2	Jun. 24, 2024
3	EMI Test Receiver	R&S	ESR3	CT-1-103	Jun. 20, 2024
4	Artificial Mains Network (AMN)	SCHWARZBECK	NSLK 8127 RC	CT-1-104-1RC	Jun. 20, 2024
5	Four Balanced Pair ISN	FCC	F-071115-1057-1-09	CT-1-027	Jun. 24, 2024
6	50ohm Termination	N/A	N/A	CT-1-109-2	Jun. 20, 2024
7	Measurement Software	EZ-EMC	Ver: EMC-CON 3A1	CT-3-012	No calibration request

Note: 1. The calibration interval of the above test instruments is 12 months.

4.2.3 Measurement Procedure

a. The table-top equipment under test was placed 0.8 meter height wooden table from the horizontal ground plane with EUT being connected to power source through a line impedance stabilization network (LISN). The floor-standing equipment under test was placed insulation support unit from the horizontal ground plane. The LISN at least be 0.8 meter from nearest chassis of equipment under test.

b. The line impedance stabilization network (LISN) provides 50 ohm/50uH of coupling impedance for the measuring instrument. All associated equipment powered from additional LISN(s).

c. Interrelating cables that hang closer than 0.4 meter to the ground plane shall be folded back and forth in the center forming a bundle. All I/O cables were positioned to simulate typical usage.

d. The loads and/or devices simulating typical operating conditions shall be connected to at least one of each type of interface port of the equipment under test. If loading (or terminating) with a device of actual usage is not feasible, the port should be loaded with a simulator. Where these options are not practical the port shall be loaded by the application of a typical impedance considering both the common and differential modes.

e. For unshielded / unshielded twisted pair measurement:
The impedance stabilization network (ISN) at least 0.8 meter from nearest chassis of equipment under test. The communication function of equipment under test was executed in normal condition. ISN was connected between EUT and associated equipment and ISN was connected directly to reference ground plane.

f. For shielded / shielded twisted pair measurement:
The current probe to EUT horizontal distance may be increased to 0.8 meter. Break the external protective insulation (exposing the shield) and connect a 150 Ω resistor with a physical connection between the cable screen and the RGP. The 150 Ω resistor shall be ≤ 0.3 meter from the outside surface of the screen to ground.

g. The EMI test receiver scanned from 150kHz to 30MHz for emissions in each of modes. For wired network ports supporting Ethernet traffic, that can operate at multiple rates, measurements may be limited to mode in which the EUT operates at its maximum rate. Emission frequency and amplitude were recorded, recording at least six highest emissions.

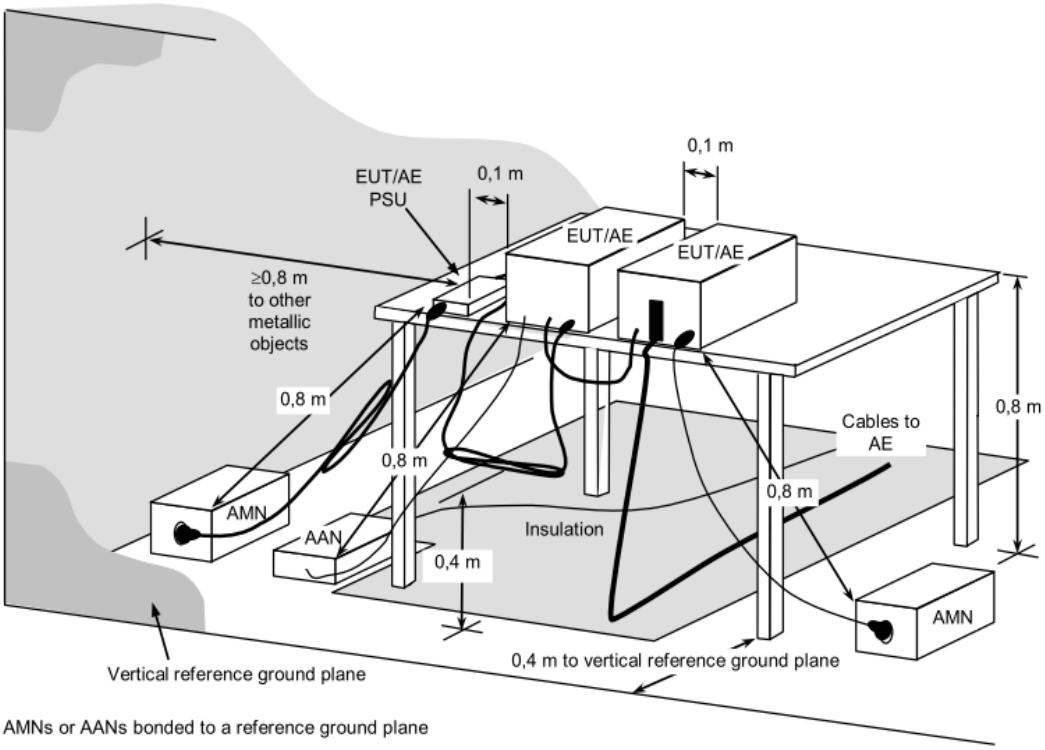
h. The equipment under test and cable configuration of the above highest emission amplitude were recorded.

4.2.4 Deviation from Standard

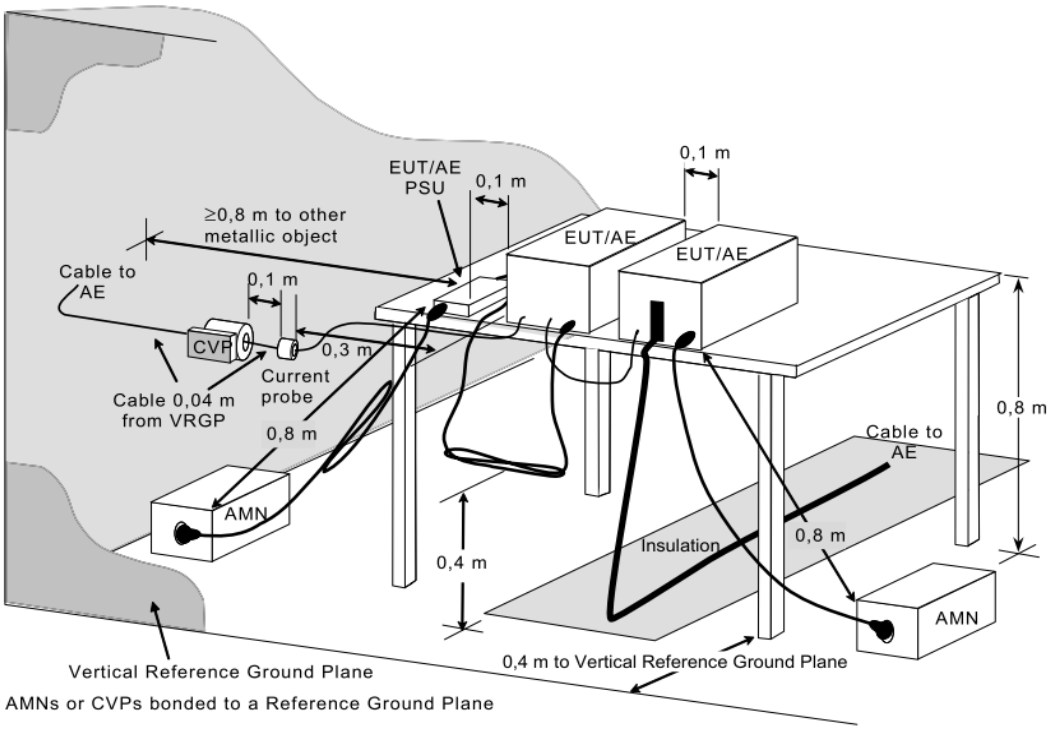
No deviation

4.2.5 Measurement Configuration

< Table-Top equipment under test for unshielded / unshielded twisted pair >



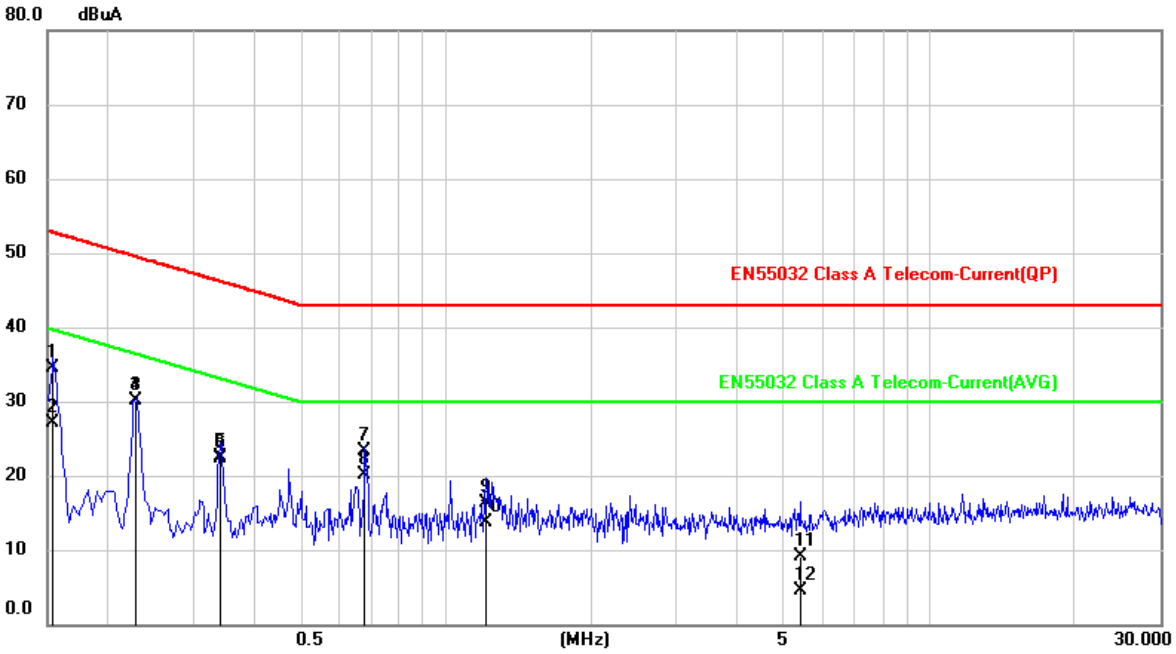
< Table-Top equipment under test for shielded / shielded twisted pair >



Note: Please refer to the 4.2.7 for the actual test configuration.

4.2.6 Measurement Result

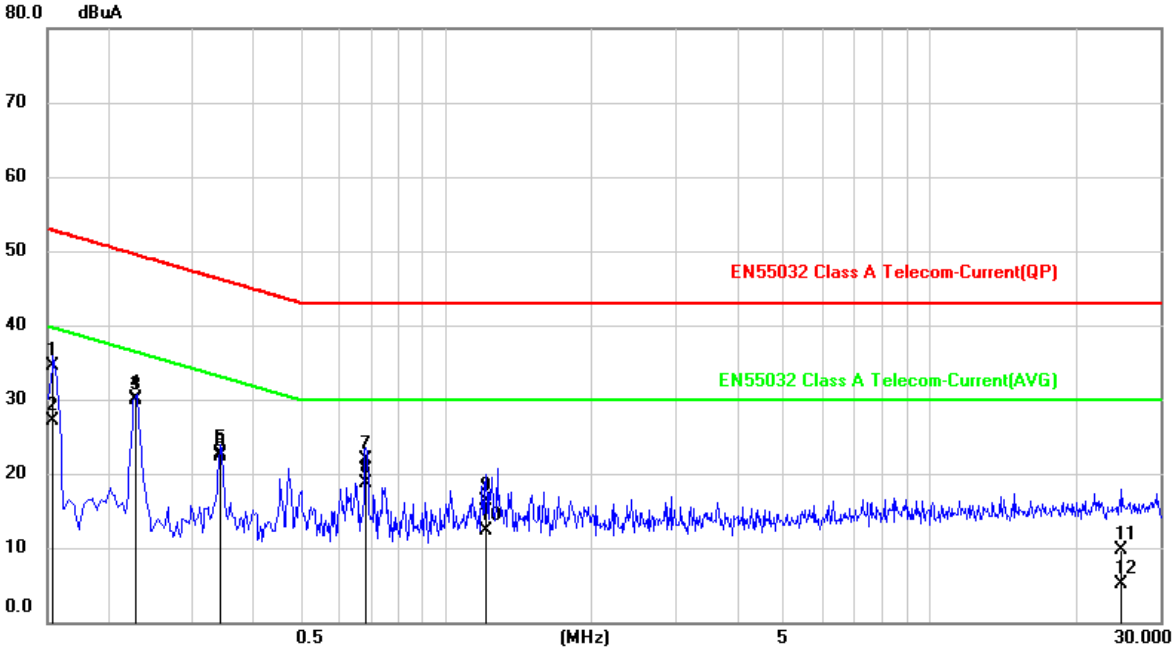
Test Voltage	230Vac, 50Hz	Frequency Range	0.15 ~ 30 MHz
Environmental Conditions	24℃, 50% RH	6dB Bandwidth	9 kHz
Test Date	2025/04/30	Test Condition	LAN port (100Mbps)
Tested by	Andy Li	Test Site	W01-CE



No.	Frequency (MHz)	Reading Level (dBµA)	Correct Factor (dB)	Measurement (dBµA)	Limit (dBµA)	Margin (dB)	Detector
1	0.1537	24.52	10.00	34.52	52.80	-18.28	QP
2	0.1537	17.10	10.00	27.10	39.80	-12.70	AVG
3	0.2277	20.01	10.00	30.01	49.53	-19.52	QP
4	0.2277	20.08	10.00	30.08	36.53	-6.45	AVG
5	0.3422	12.55	10.00	22.55	46.15	-23.60	QP
6	0.3422	12.23	10.00	22.23	33.15	-10.92	AVG
7	0.6838	13.26	10.02	23.28	43.00	-19.72	QP
8	0.6838	10.02	10.02	20.04	30.00	-9.96	AVG
9	1.2133	6.18	10.04	16.22	43.00	-26.78	QP
10	1.2133	3.61	10.04	13.65	30.00	-16.35	AVG
11	5.3961	-1.07	10.13	9.06	43.00	-33.94	QP
12	5.3961	-5.70	10.13	4.43	30.00	-25.57	AVG

Remark: 1. QP = Quasi Peak, AVG = Average
2. Correct Factor = ISN Factor (or Current Probe Factor) + Cable Loss + Transient Limiter (If use)
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value – Limit Value

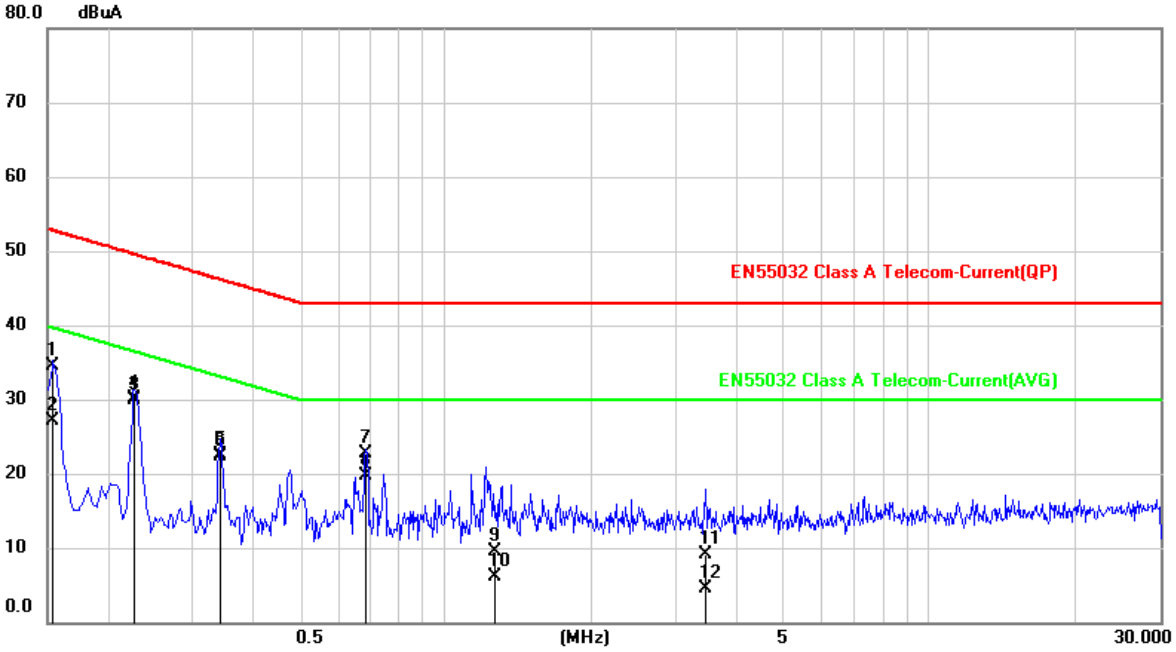
Test Voltage	230Vac, 50Hz	Frequency Range	0.15 ~ 30 MHz
Environmental Conditions	24℃, 50% RH	6dB Bandwidth	9 kHz
Test Date	2025/04/30	Test Condition	LAN port (1Gbps)
Tested by	Andy Li	Test Site	W01-CE



No.	Frequency (MHz)	Reading Level (dBµA)	Correct Factor (dB)	Measurement (dBµA)	Limit (dBµA)	Margin (dB)	Detector
1	0.1539	24.46	10.00	34.46	52.79	-18.33	QP
2	0.1539	17.03	10.00	27.03	39.79	-12.76	AVG
3	0.2279	19.95	10.00	29.95	49.53	-19.58	QP
4	0.2279	20.04	10.00	30.04	36.53	-6.49	AVG
5	0.3418	12.62	10.00	22.62	46.16	-23.54	QP
6	0.3418	12.29	10.00	22.29	33.16	-10.87	AVG
7	0.6851	11.83	10.02	21.85	43.00	-21.15	QP
8	0.6851	8.67	10.02	18.69	30.00	-11.31	AVG
9	1.2092	6.26	10.04	16.30	43.00	-26.70	QP
10	1.2092	2.22	10.04	12.26	30.00	-17.74	AVG
11	25.0236	-0.52	10.32	9.80	43.00	-33.20	QP
12	25.0236	-5.21	10.32	5.11	30.00	-24.89	AVG

Remark: 1. QP = Quasi Peak, AVG = Average
2. Correct Factor = ISN Factor (or Current Probe Factor) + Cable Loss + Transient Limiter (If use)
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value – Limit Value

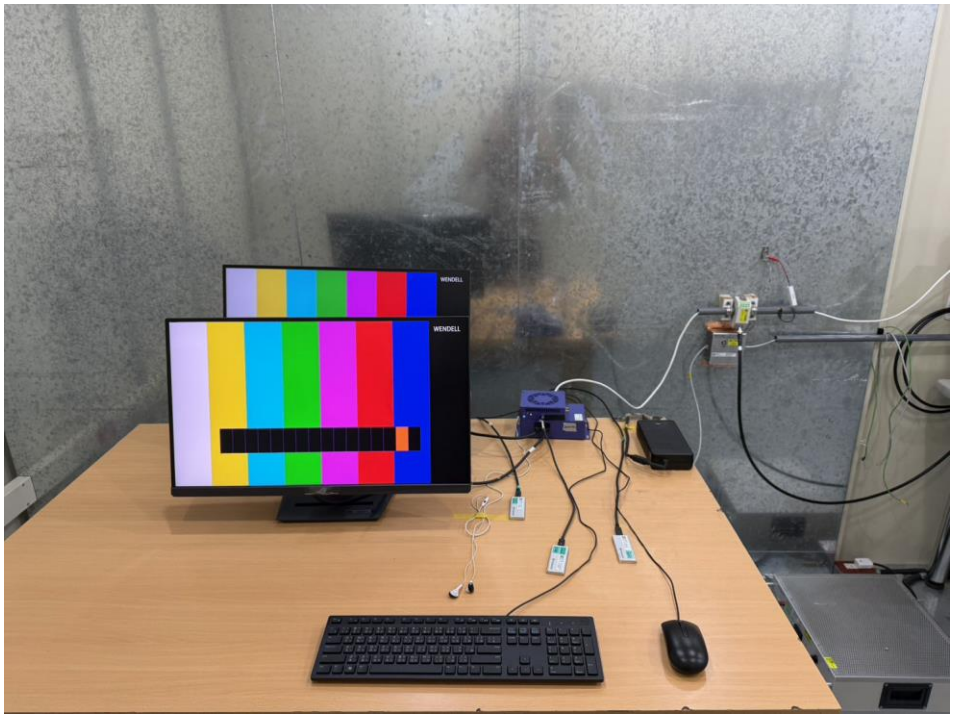
Test Voltage	230Vac, 50Hz	Frequency Range	0.15 ~ 30 MHz
Environmental Conditions	24℃, 50% RH	6dB Bandwidth	9 kHz
Test Date	2025/04/30	Test Condition	LAN port (2.5Gbps)
Tested by	Andy Li	Test Site	W01-CE

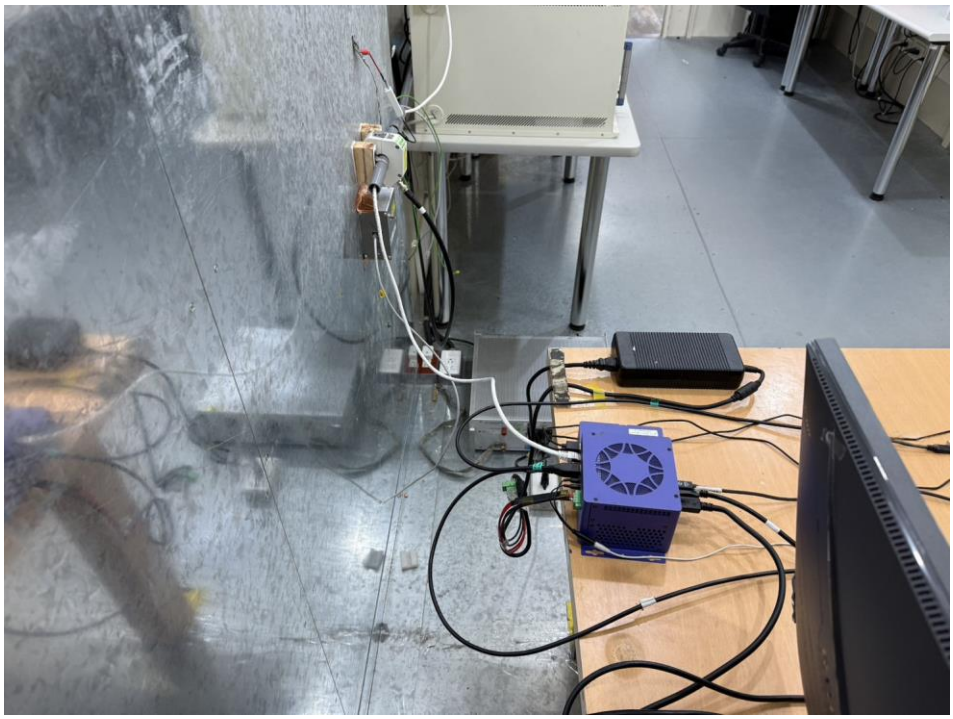


No.	Frequency (MHz)	Reading Level (dBµA)	Correct Factor (dB)	Measurement (dBµA)	Limit (dBµA)	Margin (dB)	Detector
1	0.1533	24.53	10.00	34.53	52.82	-18.29	QP
2	0.1533	17.08	10.00	27.08	39.82	-12.74	AVG
3	0.2277	19.97	10.00	29.97	49.53	-19.56	QP
4	0.2277	20.04	10.00	30.04	36.53	-6.49	AVG
5	0.3422	12.58	10.00	22.58	46.15	-23.57	QP
6	0.3422	12.25	10.00	22.25	33.15	-10.90	AVG
7	0.6832	12.75	10.02	22.77	43.00	-20.23	QP
8	0.6832	9.64	10.02	19.66	30.00	-10.34	AVG
9	1.2724	-0.51	10.04	9.53	43.00	-33.47	QP
10	1.2724	-3.91	10.04	6.13	30.00	-23.87	AVG
11	3.4474	-0.97	10.09	9.12	43.00	-33.88	QP
12	3.4474	-5.58	10.09	4.51	30.00	-25.49	AVG

Remark: 1. QP = Quasi Peak, AVG = Average
2. Correct Factor = ISN Factor (or Current Probe Factor) + Cable Loss + Transient Limiter (If use)
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value – Limit Value

4.2.7 Photographs of Measurement Configuration





4.3 Radiated Emission Measurement

4.3.1 Limit of Radiated Emission Measurement

According to EN 55032 table1 - Required highest frequency for radiated measurement:

Highest internal frequency (F_x)	Highest measured frequency
$F_x \leq 108$ MHz	1 GHz
108 MHz < $F_x \leq 500$ MHz	2 GHz
500 MHz < $F_x \leq 1$ GHz	5 GHz
$F_x > 1$ GHz	$5 \times F_x$ up to a maximum of 6 GHz

Remark:

1. Fx : highest fundamental frequency generated or used within the EUT or highest frequency at which it operates.

2. Where Fx is unknown, the radiated emission measurements shall be performed up to 6 GHz.

Class A equipment:

Requirements for radiated emissions at frequencies up to 1 GHz for Class A equipment			
Frequency (MHz)	Measurement		Class A limits dB(μV/m)
	Distance (m)	Detector type/ bandwidth	OATS/SAC
30 to 230	10	Quasi Peak / 120 kHz	40
230 to 1000			47
30 to 230	3		50
230 to 1000			57

Requirements for radiated emissions at frequencies above 1 GHz for Class A equipment			
Frequency (MHz)	Measurement		Class A limits dB(μV/m)
	Distance (m)	Detector type/ bandwidth	FSOATS
1000 to 3000	3	Average / 1 MHz	56
3000 to 6000			60
1000 to 3000		Peak / 1 MHz	76
3000 to 6000			80

Class B equipment:

Requirements for radiated emissions at frequencies up to 1 GHz for Class B equipment			
Frequency (MHz)	**Measurement**		**Class B limits dB(μV/m)**
	Distance (m)	**Detector type/ bandwidth**	**OATS/SAC**
30 to 230	10	Quasi Peak / 120 kHz	30
230 to 1000			37
30 to 230	3		40
230 to 1000			47

Requirements for radiated emissions at frequencies above 1 GHz for Class B equipment			
Frequency (MHz)	**Measurement**		**Class B limits dB(μV/m)**
	Distance (m)	**Detector type/ bandwidth**	**FSOATS**
1000 to 3000	3	Average / 1 MHz	50
3000 to 6000			54
1000 to 3000		Peak / 1 MHz	70
3000 to 6000			74

Note: 1. The lower limit shall apply at the transition frequency.
2. Detector function in the form: PK = Peak, QP = Quasi Peak, AVG = Average
3. The result calculated as following:
Measurement Value = Reading Level + Correct Factor
Correct Factor = Antenna Factor + Cable Loss (Antenna to Pre-Amplifier) - Pre-Amplifier Gain + Cable Loss (Pre-Amplifier to Receiver)
Margin Level = Measurement Value - Limit Value

At the same test procedures, due to the limits of EN 55032: 2015 + A11: 2020 are severe than EN 55032: 2015 + A1: 2020, When the requirements of EN 55032: 2015 + A11: 2020 are satisfied, the requirement of EN 55032: 2015 + A1: 2020 could be considered satisfied.

At the same test procedures, due to the limits of CISPR 32: 2015 + COR1: 2016 are severe than CISPR 32: 2015 + A1: 2019, When the requirements of CISPR 32: 2015 + COR1: 2016 are satisfied, the requirement of CISPR 32: 2015 + A1: 2019 could be considered satisfied.

4.3.2 Measurement Instrument

Test Site: W08-966-1					
Item	**Equipment**	**Manufacturer**	**Model**	**Meter No.**	**Calibration Date**
1	Horn Antenna	Schwarzbeck	BBHA 9120D	CT-9-031	Jul. 29, 2024
2	Horn Antenna	Schwarzbeck	BBHA 9170	CT-9-032	Aug. 15, 2024
3	TRILOG Broadband Antenna with 6 dB Attenuator	Schwarzbeck & MVE	VULB 9168 & MVE2251-06	CT-1-096-1	May 06, 2024
4	Spectrum Analyzer	Agilent	E4407B	CT-1-003(1)	Aug. 08, 2024
5	EXA Signal Analyzer	Keysight	N9010A	CT-1-093	Aug. 18, 2024
6	EMI Test Receiver	Keysight	N9038A	CT-9-007	Aug. 09, 2024
7	Preamplifier	EM	EMC330	CT-9-024	Aug. 08, 2024
8	Preamplifier	SGH & MCL	SGH118 & BW-S15W2+	CT-9-071	Aug. 08, 2024
9	Preamplifier	EMCI	EMC184045SE	CT-9-013	Aug. 16, 2024
10	Test Cable	EMCI	EMCCFD400-NM-NM-1000	CT-1-132	Aug. 10, 2024
11	Test Cable	PEWC	CFD400NL-LW-NM-NM-3000	CT-1-141	Aug. 10, 2024
12	Test Cable	EMCI	EMCCFD400-NM-NM-15000	CT-1-133	Aug. 10, 2024
13	Test Cable	EMCI	EMC104-SM-35M-600	CT-1-134	Aug. 09, 2024
14	Test Cable	MVE	280280.LL266.1400	CT-9-106	Aug. 09, 2024
15	Test Cable	EMCI	EMC102-KM-KM-600	CT-1-136	Aug. 21, 2024
16	Test Cable	MVE	140140.LL404.700	CT-9-100	Aug. 09, 2024
17	Measurement Software	EZ-EMC	Ver :WD-03A1-1	CT-3-012	No calibration request

Note: 1. The calibration interval of the above test instruments is 12 months.

4.3.3 Measurement Procedure

a. The table-top equipment under test was placed on the top of a turntable 0.8 meter above the ground at 3 m 966 chamber. The floor-standing equipment under test was placed insulation support unit from the horizontal ground plane. The turntable was rotated 360 degrees to determine the position of the highest radiation emissions.

b. The height of the antenna shall vary between 1 m to 4 m. Both vertical and horizontal polarizations of the antenna were set to make the measurement.

c. The loads and/or devices simulating typical operating conditions shall be connected to at least one of each type of interface port of the equipment under test. If loading (or terminating) with a device of actual usage is not feasible, the port should be loaded with a simulator. Where these options are not practical the port shall be loaded by the application of a typical impedance considering both the common and differential modes.

d. The initial step in collecting radiated emission data is a spectrum mode scanning the measurement frequency range.

   Below 1GHz:

   Reading in which marked as QP means measurements by using receiver mode with detector setting in RBW = 120 kHz.

   If the spectrum mode measured peak value compliance with and lower than QP Limit, the equipment under test shall be deemed to meet QP Limits.

   Above 1GHz:

   Reading in which marked as Peak & AVG means measurements by using spectrum mode with setting in RBW = 1 MHz.

   If the spectrum mode measured value compliance with the Peak Limits and lower than AVG Limits, the equipment under test shall be deemed to meet both Peak and AVG Limits.

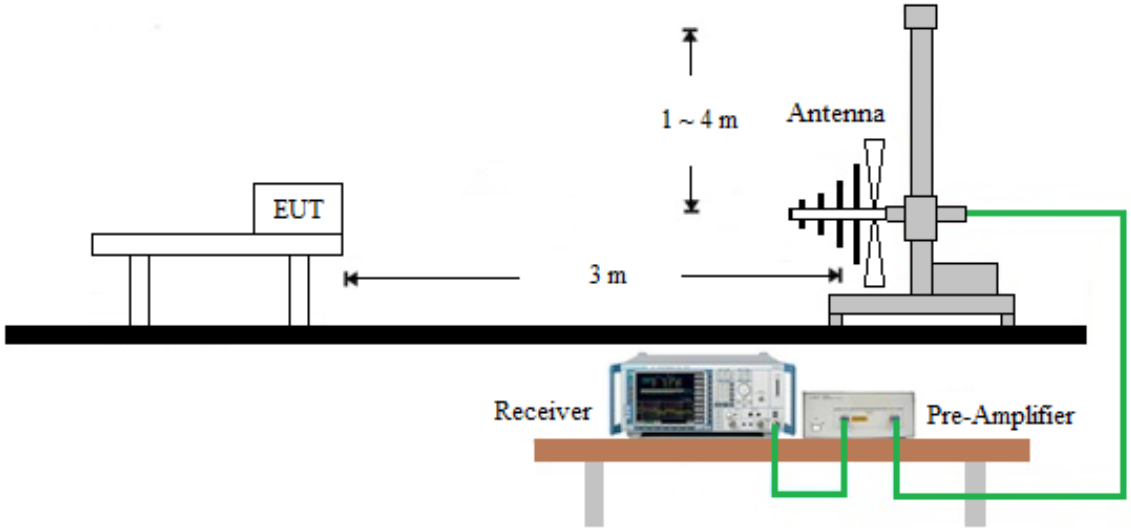
e. Emission frequency and amplitude were recorded, recording at least six highest emissions. The equipment under test and cable configuration of the above highest emission amplitude were recorded.

4.3.4 Deviation from Standard

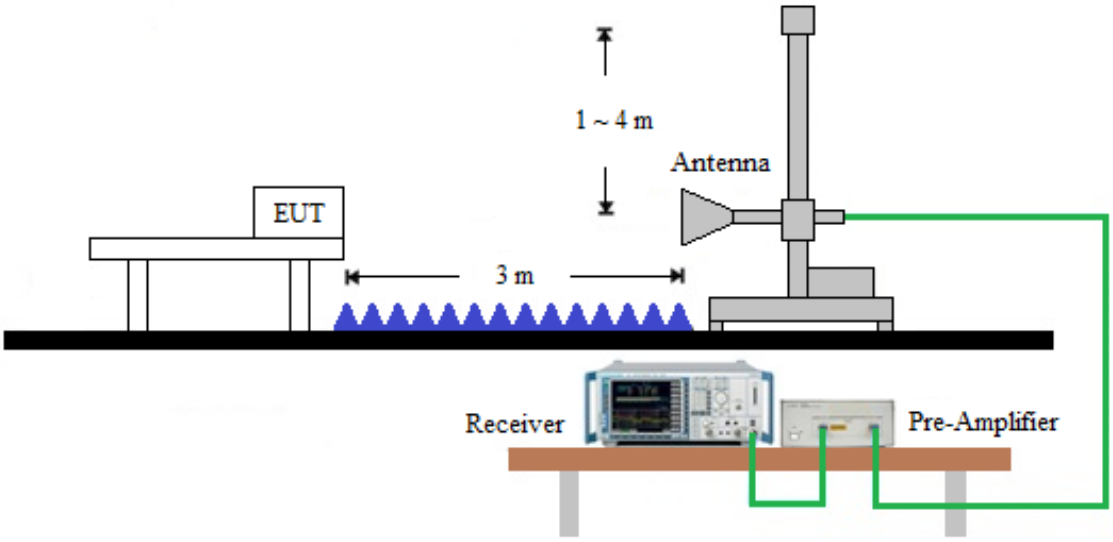
No deviation

4.3.5 Measurement Configuration

< Radiated Emissions Frequency: 30 MHz to 1000 MHz >



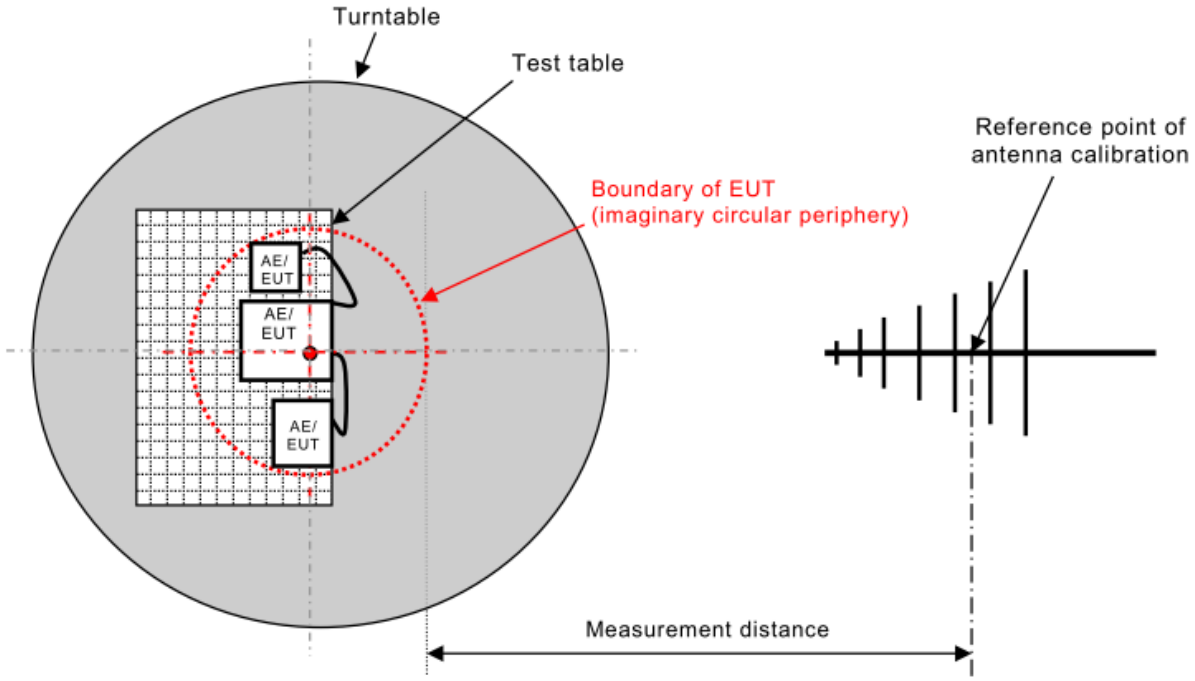
< Radiated Emissions Frequency: above 1GHz >



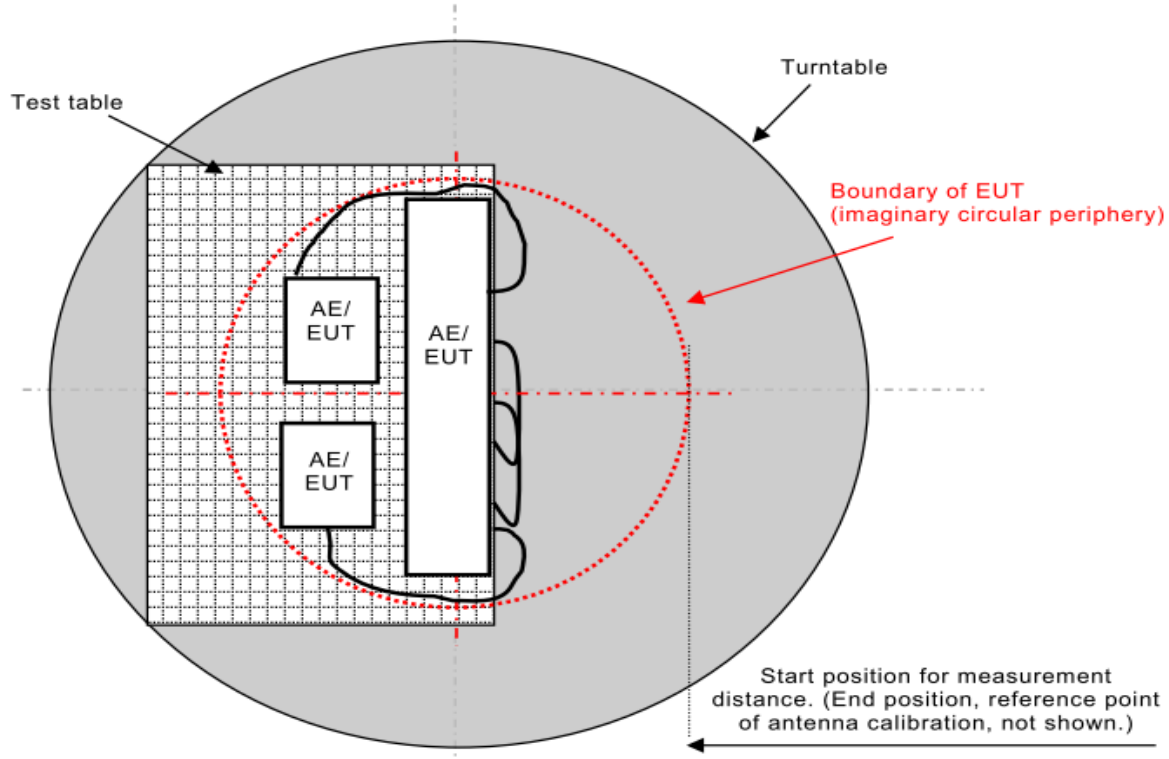
Note:

(1) Please refer to the 4.3.7 for the actual test configuration.
(2) Detector function in the form: PK = Peak, QP = Quasi Peak, AVG = Average
(3) The test result calculated as following:
Measurement Value = Reading Level + Correct Factor
Correct Factor = Antenna Factor + Cable Loss – Pre-Amplifier Gain (if use)
Margin Level = Measurement Value - Limit Value

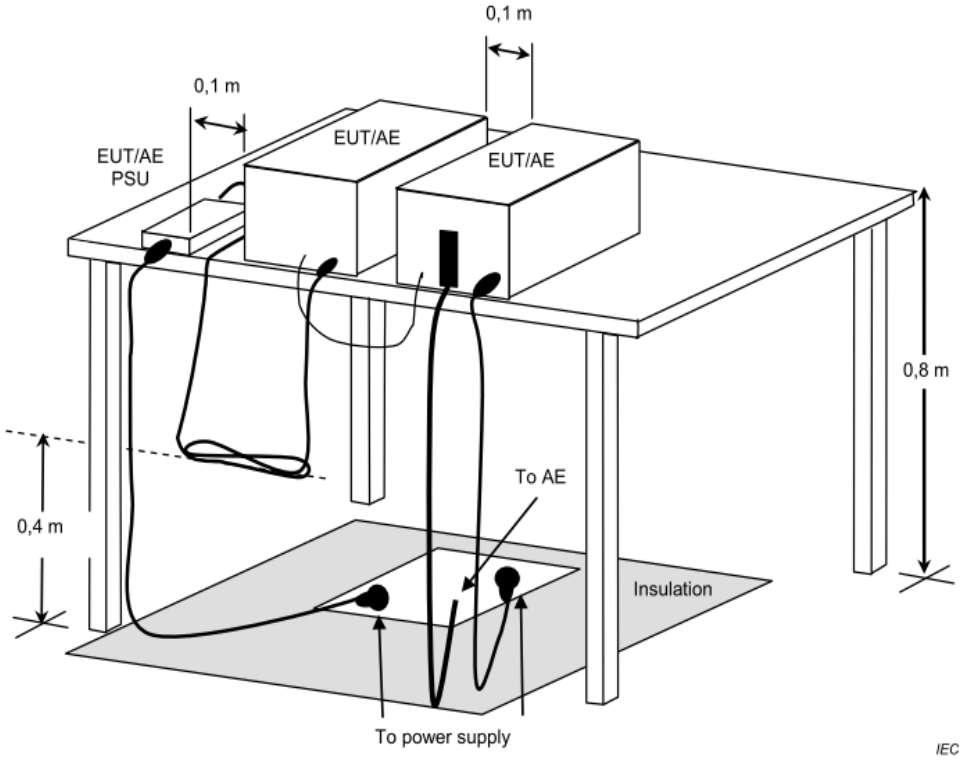
< EUT placement top view and measurement distance >



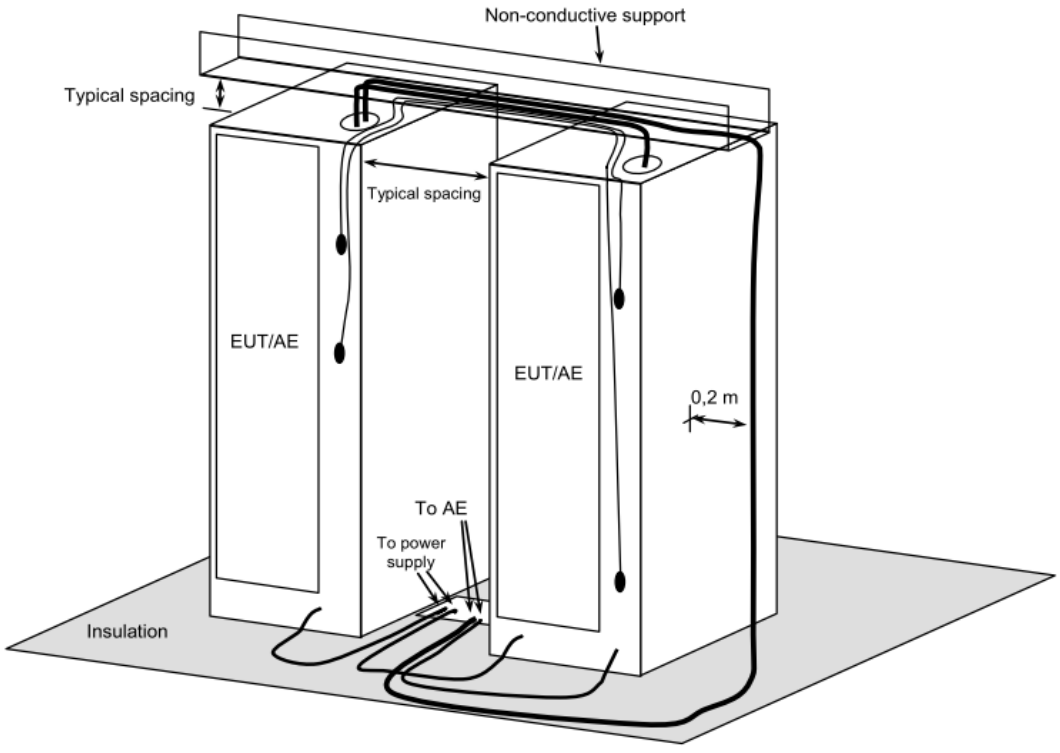
< Boundary of EUT, Local AE and associated cabling >



< Table-Top equipment under test >



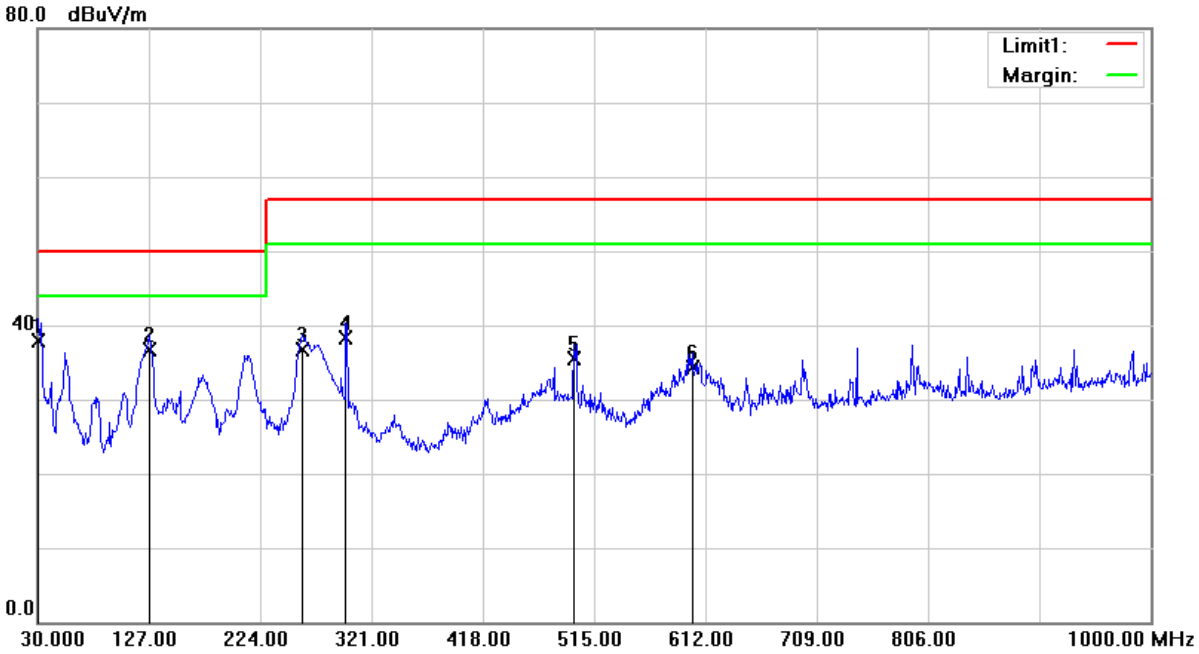
< Floor-Standing equipment under test >



Note: Please refer to the 4.3.7 for the actual test configuration.

4.3.6 Measurement Result

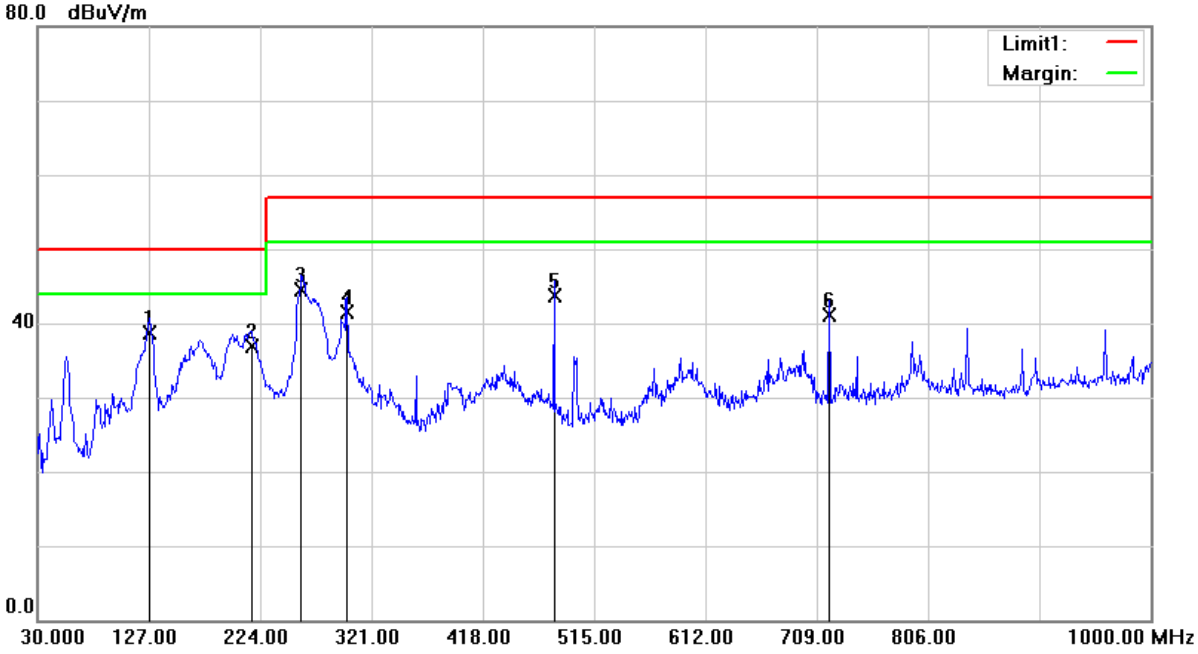
Test Voltage	230Vac, 50Hz	**Frequency Range**	30 ~ 1000 MHz
Environmental Conditions	26℃, 41% RH	**6dB Bandwidth**	120 kHz
Test Date	2025/04/22	**Test Distance**	3m
Tested by	Karwin Kao	**Polarization**	Vertical
Test Site	W08-966-1		



No.	Frequency (MHz)	Reading Level (dBµV)	Correct Factor (dB/m)	Measurement (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	30.0000	49.39	-11.50	37.89	50.00	-12.11	96	100	QP
2	127.9700	47.92	-11.25	36.67	50.00	-13.33	228	100	QP
3	260.8600	46.74	-9.98	36.76	57.00	-20.24	124	200	QP
4	298.6900	46.65	-8.41	38.24	57.00	-18.76	168	200	QP
5	497.5400	38.46	-2.95	35.51	57.00	-21.49	157	100	QP
6	600.3600	34.47	-0.19	34.28	57.00	-22.72	204	100	QP

Remark: 1. QP = Quasi Peak
2. Correct Factor = Antenna Factor + Cable Loss (Antenna to Pre-Amplifier) – Pre-Amplifier Gain + Cable Loss (Pre-Amplifier to Receiver)
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value – Limit Value

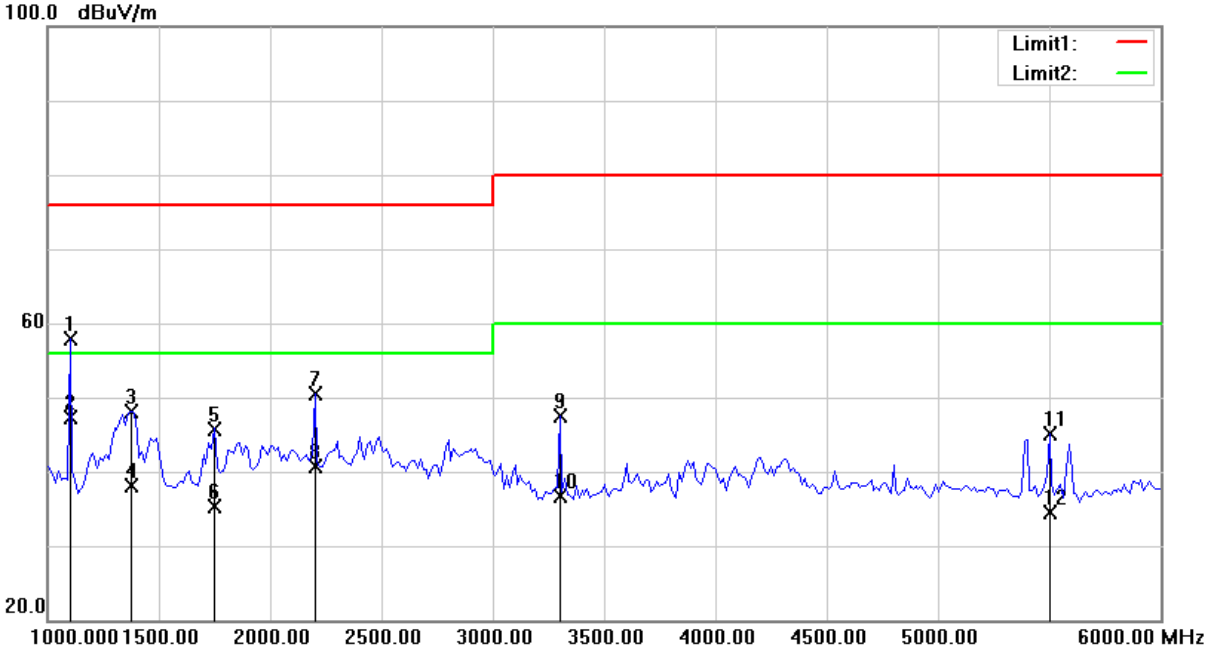
Test Voltage	230Vac, 50Hz	**Frequency Range**	30 ~ 1000 MHz
Environmental Conditions	26°C, 41% RH	**6dB Bandwidth**	120 kHz
Test Date	2025/04/22	**Test Distance**	3m
Tested by	Karwin Kao	**Polarization**	Horizontal
Test Site	W08-966-1		



No.	Frequency (MHz)	Reading Level (dBµV)	Correct Factor (dB/m)	Measurement (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	127.9700	49.89	-11.25	38.64	50.00	-11.36	144	200	QP
2	216.2400	49.15	-12.23	36.92	50.00	-13.08	324	100	QP
3	259.8900	54.59	-10.01	44.58	57.00	-12.42	314	100	QP
4	299.6600	49.82	-8.38	41.44	57.00	-15.56	192	100	QP
5	480.0800	47.03	-3.31	43.72	57.00	-13.28	138	100	QP
6	719.6700	38.98	2.20	41.18	57.00	-15.82	134	200	QP

Remark: 1. QP = Quasi Peak
2. Correct Factor = Antenna Factor + Cable Loss (Antenna to Pre-Amplifier) – Pre-Amplifier Gain + Cable Loss (Pre-Amplifier to Receiver)
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value – Limit Value

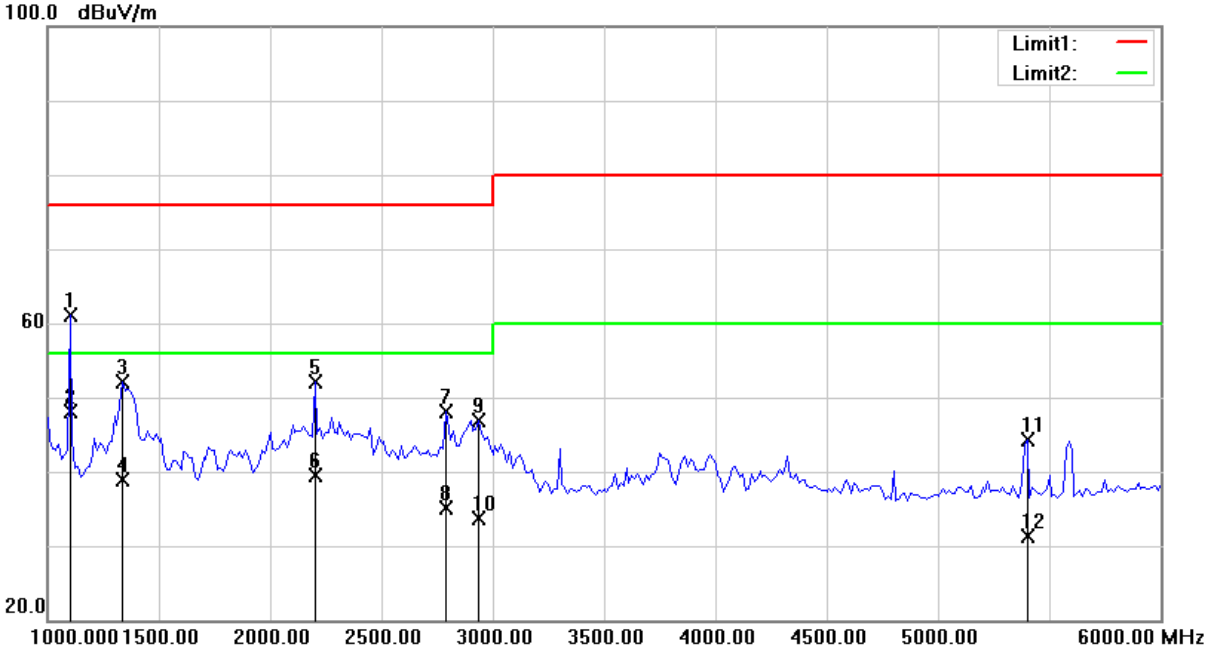
Test Voltage	230Vac, 50Hz	**Frequency Range**	1 ~ 6 GHz
Environmental Conditions	26°C, 41% RH	**6dB Bandwidth**	1MHz
Test Date	2025/04/23	**Test Distance**	3m
Tested by	Karwin Kao	**Polarization**	Vertical
Test Site	W08-966-1		



No.	Frequency (MHz)	Reading Level (dBµV)	Correct Factor (dB/m)	Measurement (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	1100.000	77.99	-20.17	57.82	76.00	-18.18	247	100	peak
2	1100.000	67.54	-20.17	47.37	56.00	-8.63	247	100	AVG
3	1375.000	66.67	-18.51	48.16	76.00	-27.84	272	100	peak
4	1375.000	56.59	-18.51	38.08	56.00	-17.92	272	100	AVG
5	1750.000	64.48	-18.68	45.80	76.00	-30.20	247	100	peak
6	1750.000	54.00	-18.68	35.32	56.00	-20.68	247	100	AVG
7	2200.000	65.59	-15.14	50.45	76.00	-25.55	234	100	peak
8	2200.000	55.92	-15.14	40.78	56.00	-15.22	234	100	AVG
9	3300.000	60.98	-13.46	47.52	80.00	-32.48	127	100	peak
10	3300.000	50.11	-13.46	36.65	60.00	-23.35	127	100	AVG
11	5500.000	52.98	-7.97	45.01	80.00	-34.99	162	100	peak
12	5500.000	42.50	-7.97	34.53	60.00	-25.47	162	100	AVG

Remark: 1. peak = Peak, AVG = Average
2. Correct Factor = Antenna Factor + Cable Loss (Antenna to Pre-Amplifier) – Pre-Amplifier Gain + Cable Loss (Pre-Amplifier to Receiver)
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value – Limit Value

Test Voltage	230Vac, 50Hz	**Frequency Range**	1 ~ 6 GHz
Environmental Conditions	26°C, 41% RH	**6dB Bandwidth**	1MHz
Test Date	2025/04/23	**Test Distance**	3m
Tested by	Karwin Kao	**Polarization**	Horizontal
Test Site	W08-966-1		

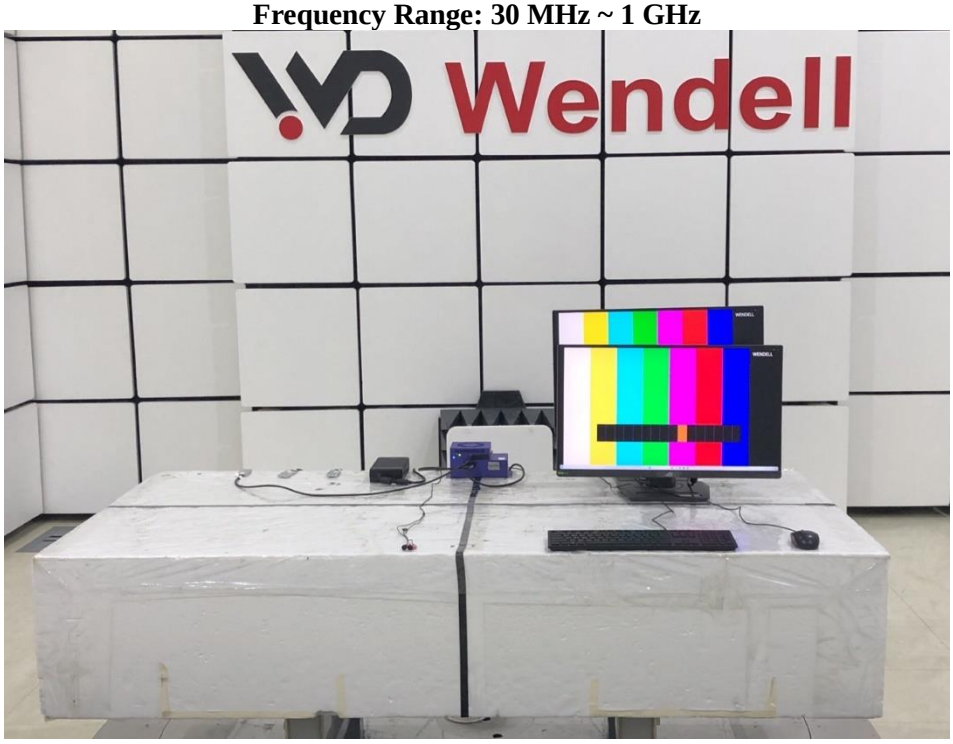


No.	Frequency (MHz)	Reading Level (dBµV)	Correct Factor (dB/m)	Measurement (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	1100.000	81.32	-20.17	61.15	76.00	-14.85	0	100	peak
2	1100.000	68.24	-20.17	48.07	56.00	-7.93	0	100	AVG
3	1337.500	70.78	-18.62	52.16	76.00	-23.84	273	100	peak
4	1337.500	57.44	-18.62	38.82	56.00	-17.18	273	100	AVG
5	2200.000	67.30	-15.14	52.16	76.00	-23.84	144	100	peak
6	2200.000	54.60	-15.14	39.46	56.00	-16.54	144	100	AVG
7	2787.500	62.23	-14.20	48.03	76.00	-27.97	286	100	peak
8	2787.500	49.33	-14.20	35.13	56.00	-20.87	286	100	AVG
9	2937.500	60.48	-13.64	46.84	76.00	-29.16	305	100	peak
10	2937.500	47.28	-13.64	33.64	56.00	-22.36	305	100	AVG
11	5400.000	52.82	-8.46	44.36	80.00	-35.64	179	100	peak
12	5400.000	39.86	-8.46	31.40	60.00	-28.60	179	100	AVG

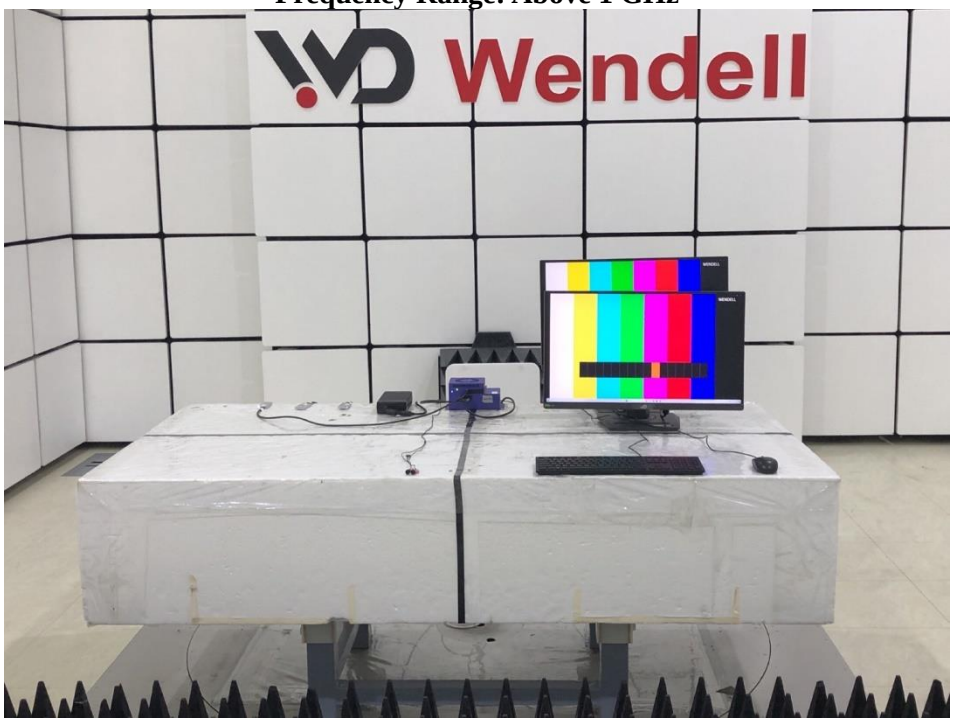
Remark: 1. peak = Peak, AVG = Average
2. Correct Factor = Antenna Factor + Cable Loss (Antenna to Pre-Amplifier) – Pre-Amplifier Gain + Cable Loss (Pre-Amplifier to Receiver)
3. Measurement Value = Reading Level + Correct Factor
4. Margin Level = Measurement Value – Limit Value

4.3.7 Photographs of Measurement Configuration

Frequency Range: 30 MHz ~ 1 GHz



Frequency Range: Above 1 GHz



4.4 Harmonic Current Measurement

4.4.1 Limit of Harmonic Current Measurement

Limit for Class A equipment	
Harmonic Order *n*	**Max. permissible harmonics current** A
Odd harmonic	
3	2.30
5	1.14
7	0.77
9	0.40
11	0.33
13	0.21
$15 \leq n \leq 39$	0.15*(15/*n*)
Even harmonic	
2	1.08
4	0.43
6	0.30
$8 \leq n \leq 40$	0.23*(8/*n*)

Limit for Class D equipment		
Harmonic Order *n*	**Max. permissible harmonics current per watt** mA/W	**Max. permissible harmonics current** A
Odd Harmonic only		
3	3.4	2.30
5	1.9	1.14
7	1.0	0.77
9	0.5	0.40
11	0.35	0.33
13	0.30	0.21
$15 \leq n \leq 39$	3.85/*n*	0.15*(15/*n*)

Note: 1. Class A and Class D are classified according to item section 5 of EN IEC 61000-3-2.
2. According to section 7 of EN IEC 61000-3-2, the above limits for all equipment except for Class B or C equipment and no limits apply for equipment with a rated power of 75W or less.

4.4.2 Measurement Instrument

Item	Equipment	Manufacturer	Model	Meter No.	Calibration Date
1	Harmonic & Flicker Analyizer	EMC PARTNER	HAR-1000-1P	CT-1-090(1)	Oct. 17, 2024
2	Power Source	APC	AFV-P-5000B	CT-1-210	Oct. 17, 2024

Note: 1. The calibration interval of the above test instruments is 12 months.

4.4.3 Measurement Procedure

The table-top equipment under test was placed on the top of a wooden table 0.8 meter above the ground and operated to produce the maximum harmonic under normal operating conditions for each successive harmonic component in turn. The floor-standing equipment under test was placed insulation support unit from the horizontal ground plane.

The classification of equipment is according to section 5 of EN IEC 61000-3-2.

The equipment is classified as follows:

Class A:

Equipment not specified as belonging to Class B, C or D shall be considered as Class A equipment.

Some example of Class A equipment are:

- Balanced three-phase equipment;
- Household appliances, excluding those specified as belonging to Class B, C or D;
- Vacuum cleaners;
- High pressure cleaners;
- Tools, excluding portable tools;
- Independent phase control dimmers;
- Audio equipment;
- Professional luminaires for stage lighting and studios.

Class B:

- Portable tools;
- Arc welding equipment which is not professional equipment.

Class C:

- Lighting equipment;
- Integrated lamps, integrated luminaires, non-integrated luminaires, separate lighting control gear;
- Lighting part of multi-function equipment where one the primary function of this is illumination;
- Ultraviolet (UV) and infrared (IR) radiation equipment;
- Illuminated advertising signs;
- Independent dimmers, other than phase control type, for lighting equipment;
- DLT control device.

Class D:

Equipment having a specified power less than or equal to 600W, of the following types:

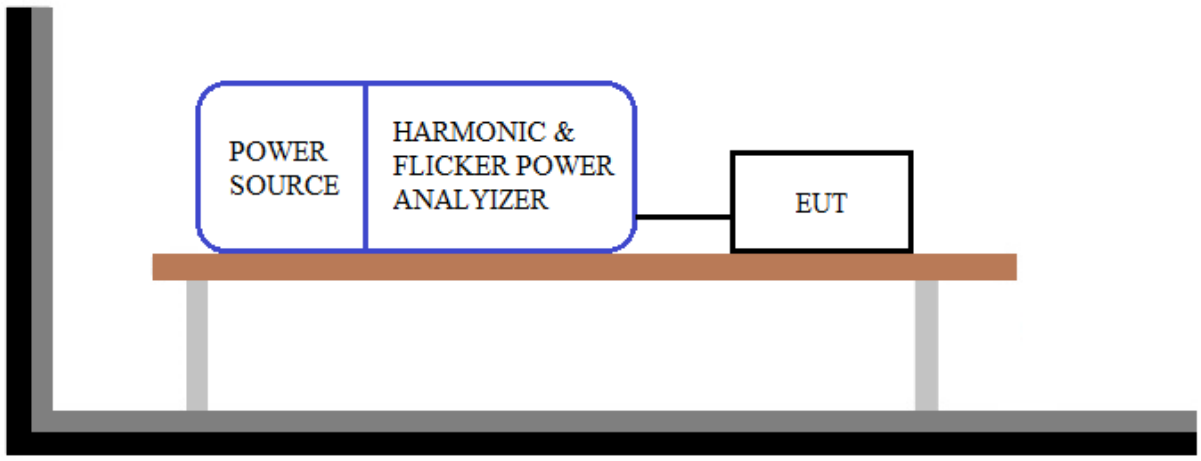
- Personal computers and personal computer monitors;
- Television receivers;
- Refrigerators and freezers having one or more variable-speed drives to control compressor motor(s).

4.4.4 Deviation from Standard

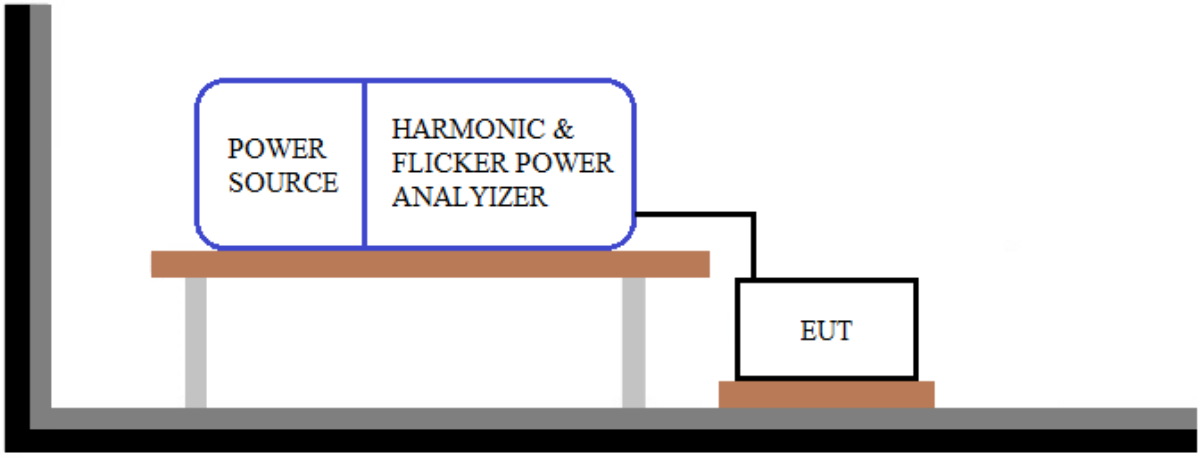
No deviation

4.4.5 Measurement Configuration

< Table-Top equipment under test >



< Floor-Standing equipment under test >



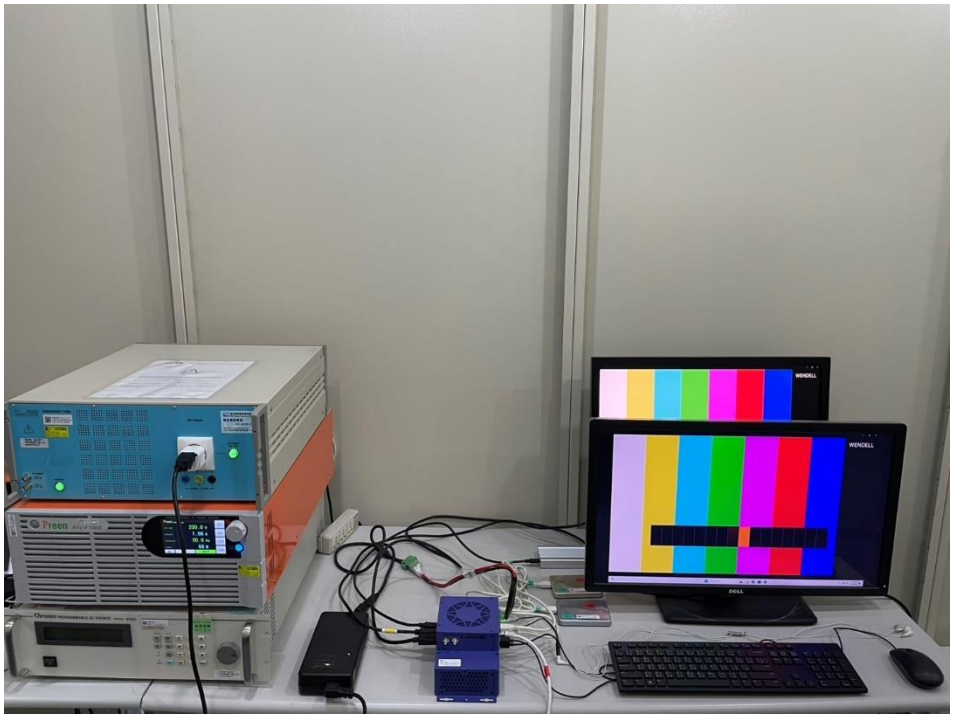
4.4.6 Measurement Result

Supply Voltage / Ampere	229.5 Vrms / 0.559 Arms	**Test Date**	2025/04/21
Test Duration	5 min	**Power Consumption**	115.1W
Power Frequency	50.000Hz	**Power Factor**	0.897
Environmental Conditions	23℃, 55% RH	**Tested by**	Tim Chao

Order	Freq. [Hz]	Iavg [A]	Irms [A]	Irms% [%]	Irms%L [%]	Imax [A]	Limit [A]	Vrms [V]	Vrms% [%]
1	50	0.5073	0.5248	93.947	-	0.5824	-	229.54	100.01
2	100	0.0071	0.0087	1.5516	0.8025	0.0135	1.0800	0.1718	0.0749
3	150	0.1563	0.1615	28.912	7.0217	0.1840	2.3000	0.1227	0.0535
4	200	0.0014	0.0052	0.9397	1.2207	0.0067	0.4300	0.0736	0.0321
5	250	0.0463	0.0470	8.4135	4.1226	0.0516	1.1400	0.0736	0.0321
6	300	0.0001	0.0043	0.7649	1.4242	0.0052	0.3000	0.0982	0.0428
7	350	0.0291	0.0292	5.2229	3.7889	0.0338	0.7700	0.0736	0.0321
8	400	0.0000	0.0039	0.6993	1.6984	0.0051	0.2300	0.0491	0.0214
9	450	0.0188	0.0188	3.3654	4.6997	0.0214	0.4000	0.0491	0.0214
10	500	0.0002	0.0043	0.7649	2.3220	0.0057	0.1840	0.0736	0.0321
11	550	0.0148	0.0153	2.7316	4.6239	0.0177	0.3300	0.0736	0.0321
12	600	0.0003	0.0039	0.6993	2.5476	0.0056	0.1533	0.0491	0.0214
13	650	0.0138	0.0140	2.5131	6.6848	0.0149	0.2100	0.0491	0.0214
14	700	0.0003	0.0033	0.5900	2.5077	0.0057	0.1314	0.0491	0.0214
15	750	0.0133	0.0131	2.3383	8.7077	0.0148	0.1500	0.0491	0.0214
16	800	0.0002	0.0033	0.5900	2.8660	0.0054	0.1150	0.0736	0.0321
17	850	0.0153	0.0167	2.9939	12.636	0.0190	0.1324	0.0491	0.0214
18	900	0.0000	0.0032	0.5682	3.1048	0.0052	0.1022	0.0736	0.0321
19	950	0.0063	0.0067	1.2019	5.6695	0.0138	0.1184	0.0736	0.0321
20	1000	0.0000	0.0028	0.5026	3.0518	0.0042	0.0920	0.0491	0.0214
21	1050	0.0086	0.0084	1.5079	7.8613	0.0093	0.1071	0.0736	0.0321
22	1100	0.0000	0.0024	0.4371	2.9191	0.0038	0.0836	0.0736	0.0321
23	1150	0.0084	0.0082	1.4642	8.3605	0.0094	0.0978	0.0736	0.0321
24	1200	0.0000	0.0022	0.3934	2.8660	0.0034	0.0767	0.0736	0.0321
25	1250	0.0084	0.0089	1.5953	9.9013	0.0098	0.0900	0.0736	0.0321
26	1300	0.0000	0.0024	0.4371	3.4498	0.0032	0.0708	0.0736	0.0321
27	1350	0.0047	0.0057	1.0271	6.8848	0.0071	0.0833	0.0736	0.0321
28	1400	0.0000	0.0024	0.4371	3.7152	0.0031	0.0657	0.0736	0.0321
29	1450	0.0061	0.0057	1.0271	7.3947	0.0071	0.0776	0.0736	0.0321
30	1500	0.0000	0.0027	0.4808	4.3786	0.0034	0.0613	0.0736	0.0321
31	1550	0.0063	0.0065	1.1582	8.9138	0.0072	0.0726	0.0736	0.0321
32	1600	0.0000	0.0026	0.4589	4.4582	0.0037	0.0575	0.0736	0.0321
33	1650	0.0057	0.0061	1.0927	8.9518	0.0065	0.0682	0.0736	0.0321
34	1700	0.0000	0.0022	0.3934	4.0602	0.0034	0.0541	0.0736	0.0321
35	1750	0.0033	0.0054	0.9615	8.3550	0.0063	0.0643	0.0982	0.0428
36	1800	0.0000	0.0021	0.3715	4.0602	0.0032	0.0511	0.0982	0.0428
37	1850	0.0045	0.0052	0.9397	8.6317	0.0063	0.0608	0.0982	0.0428
38	1900	0.0000	0.0023	0.4152	4.7899	0.0033	0.0484	0.0982	0.0428
39	1950	0.0042	0.0050	0.8960	8.6751	0.0057	0.0577	0.0982	0.0428
40	2000	0.0000	0.0020	0.3497	4.2459	0.0031	0.0460	0.0982	0.0428

Note:
1. Limits are not specified for equipment with a rated power of 75W or less.
2. According to EN IEC 61000-3-2 the manufacturer shall specify the power of the apparatus. This value shall be used for establishing limits. The specified power shall be within +/-10% of the measured power.

4.4.7 Photographs of Measurement Configuration



4.5 Voltage Fluctuations and Flicker Measurement

4.5.1 Limit for Voltage Functions and Flicker Measurement

Tests Item	Limits	Remark
	IEC/EN 61000-3-3	
P_{st}	1.0, T_p= 10 min.	P_{st} means short-term flicker indicator.
P_{lt}	0.65, T_p=2 hr.	P_{lt} means long-term flicker indicator.
d_c (%)	3.3%	d_c means relative steady-state voltage change.
d_{max} (%)	4%	d_{max} means maximum relative voltage change.
T_{dt} (ms)	500 ms	T_{dt} means maximum time that d(t) exceeds 3.3 %.

4.5.2 Measurement Instrument

Item	Equipment	Manufacturer	Model	Meter No.	Calibration Date
1	Harmonic & Flicker Analyizer	EMC PARTNER	HAR-1000-1P	CT-1-090(1)	Oct. 17, 2024
2	Power Source	APC	AFV-P-5000B	CT-1-210	Oct. 17, 2024

Note: 1. The calibration interval of the above test instruments is 12 months.

4.5.3 Measurement Procedure

The table-top equipment under test was placed on the top of a wooden table 0.8 meter above the ground and operated to produce the most unfavorable sequence of voltage changes under normal operating condition. The floor-standing equipment under test was placed insulation support unit from the horizontal ground plane.

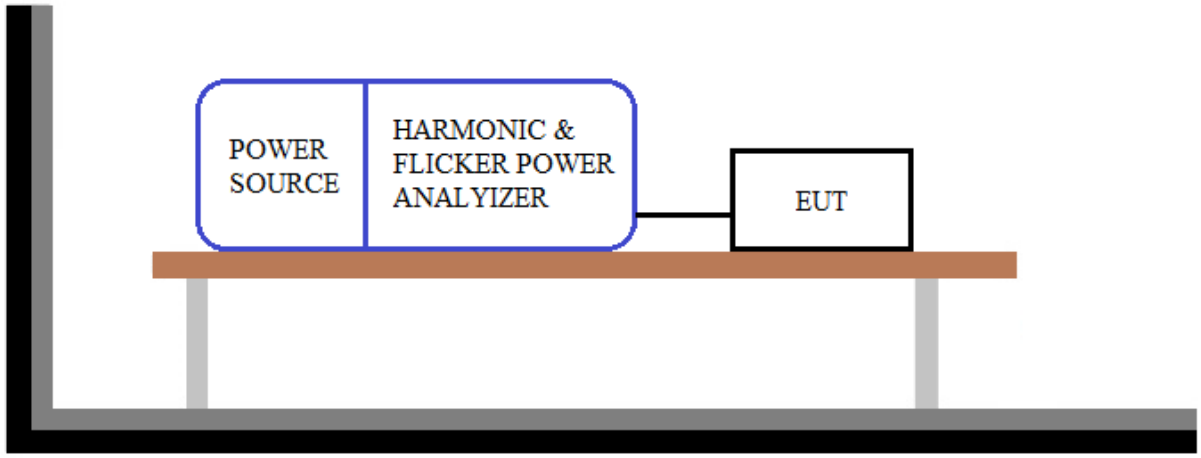
During the flick measurement, the measure time shall include that part of whole operation cycle in which the EUT produce the most unfavorable sequence of voltage changes. The observation period for short-term flicker indicator is 10 min and the observation period for long-term flicker indicator is 2 hours.

4.5.4 Deviation from Standard

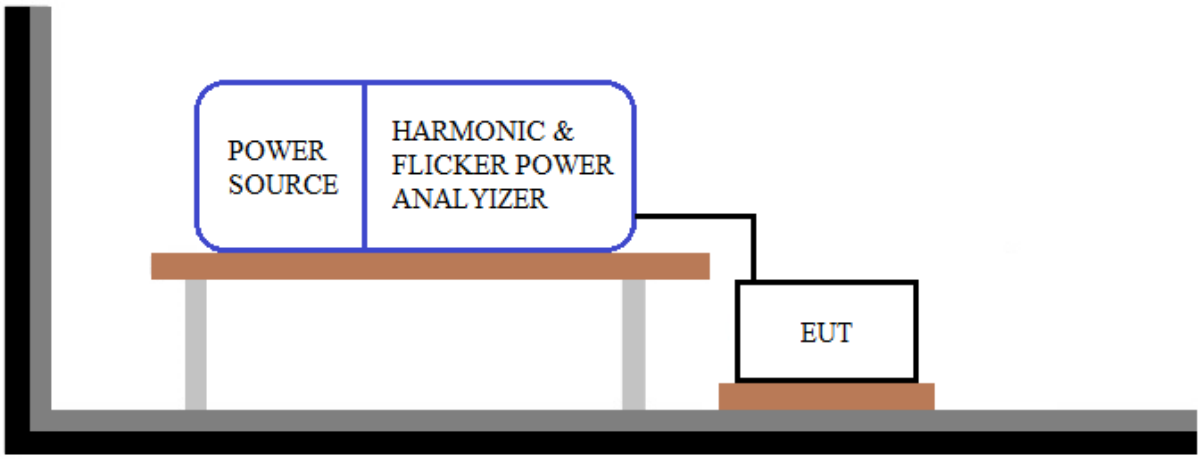
No deviation

4.5.5 Measurement Configuration

< Table-Top equipment under test >



< Floor-Standing equipment under test >



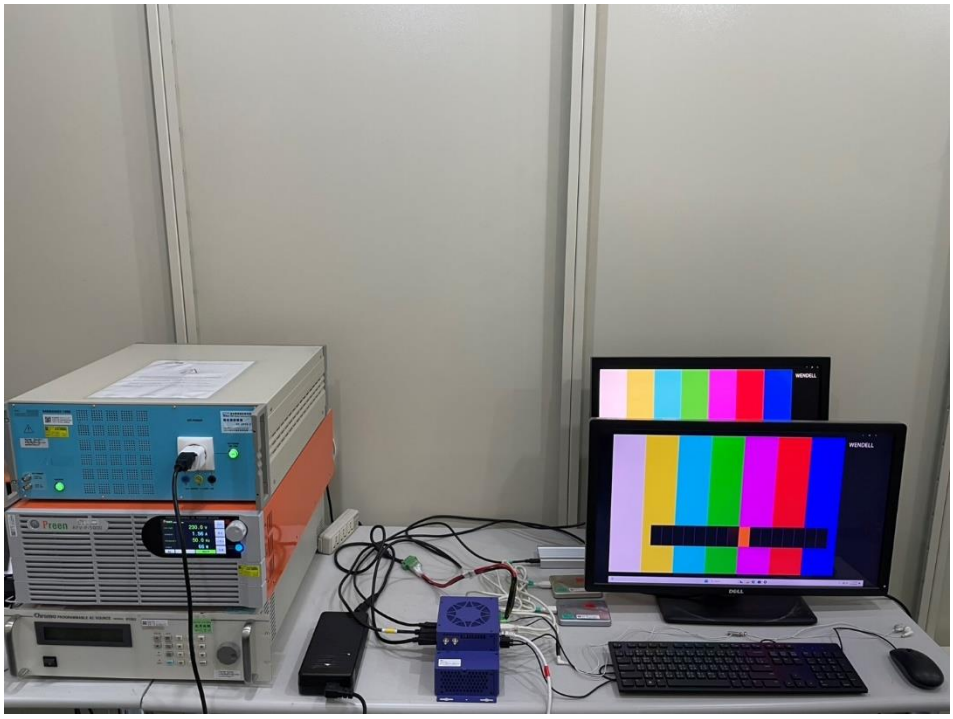
4.5.6 Measurement Result

Supply Voltage / Ampere	229.3 Vrms / 0.479 Arms	**Test Date**	2025/04/21
Observation (Tp)	30 min	**Environmental Conditions**	24℃, 50% RH
Power Frequency	50.000Hz	**Tested by**	Tim Chao

Test Parameter	Measurement Value	Test Limit	Remarks
P_{st}	0.09	1.00	Pass
P_{lt}	0.09	0.65	Pass
T_{dt} (ms)	0.00	500	Pass
d_{max} (%)	0.00	4%	Pass
d_c (%)	0.11	3.3%	Pass

Note: 1. P_{st} means short-term flicker indicator.
2. P_{lt} means long-term flicker indicator.
3. T_{dt} means maximum time that dt exceeds 3.3 %.
4. d_{max} means maximum relative voltage change.
5. d_c means relative steady-state voltage change.

4.5.7 Photographs of Measurement Configuration



5 Immunity Test

5.1 Standard Description

Product standard	EN 55035	
Basic Standard and Performance Criterion required	IEC 61000-4-2 (ESD)	Contact discharge: ±4 kV, Air discharge: ±8 kV Performance Criterion B
	IEC 61000-4-3 (RS)	Field Strength: 3 V/m, Test Signal: 80% AM with 1 kHz sine wave Frequency Range: 80 M ~ 1000 MHz, 1800 MHz, 2600 MHz, 3500 MHz, 5000 MHz for spot test Performance Criterion A
	IEC 61000-4-4 (EFT)	AC Main Power Port: ±1 kV DC Network Power Port (cable length > 3m): ±0.5 kV Analogue/Digital Data Port (cable length > 3m): ±0.5 kV Repetition Frequency: 5 kHz Performance Criterion B
	IEC 61000-4-5 (Surge)	AC Main Power Port - Line to Line: ±1 kV, Line to Ground: ±2 kV DC Network Power Port (cable length > 3m) - Line to Ground: ±0.5 kV Performance Criteria B Analogue/Digital Data Port (unshielded symmetrical): Line to Ground Apply where primary protection is intended: ±1 kV and ±4 kV Apply where primary protection is not intended: ±1 kV Performance Criteria C Analogue/Digital Data Ports (coaxial or shielded) - Shielded to Ground: ±0.5 kV Performance Criteria B
	IEC 61000-4-6 (CS)	Voltage Level: 3 V, 3 ~ 1 V, 1 V Test Signal: 80% AM with 1 kHz sine wave Frequency Range: 0.15 M ~ 10 MHz, 10 M ~ 30 MHz, 30 M ~ 80 MHz Applicable to port: AC Main Power Port, DC Network Power Port (cable length > 3m) & Analogue/Digital Data Port (cable length > 3m) Performance Criterion A
	IEC 61000-4-8 (PFMF)	1 A/m, 50/60 Hz Performance Criterion A
	IEC 61000-4-11 (Dips)	Voltage Dips: >95% reduction, 0.5 cycle, Performance Criterion B 30% reduction, 25 cycle, Performance Criterion C Voltage Interruptions: >95% reduction, 250 cycle, Performance Criterion C

5.2 Performance Criteria

According to Clause 8 of EN 55035 standard, the general performance criteria as following:

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

5.3 Electrostatic Discharge Immunity Test

5.3.1 Test Specification

Standard	IEC/EN 61000-4-2
Discharge Impedance	330 ohm / 150 pF
Discharge Voltage	Air Discharge: ±2 kV, ±4 kV, ±8 kV (Direct) Contact Discharge: ±4 kV (Direct/Indirect)
Number of Discharge	Air: Minimum 10 times at each polarity Contact: Minimum 10 times at each polarity
Discharge Mode	Single Discharge
Discharge Period	1 second minimum

5.3.2 Test Instrument

Item	Equipment	Manufacturer	Model	Meter No.	Calibration Date
1	ESD Generator	TESEQ	NSG 437	CT-1-140	Jun. 15, 2024
2	ESD Generator	NoiseKen	ESS-B3011	CT-1-089	Jul. 23, 2024
3	Digital Thermo-Hygro Meter	N/A	HTC-8	CT-2-047	Jun. 06, 2023
4	Atmosphere pressure meter	TES	TES-1161	CT-5-094	Aug. 10, 2023

Note: 1. The calibration interval of the test instruments is 12 months.
2. The calibration interval of thermo hygrometer/ Atmosphere pressure meter is 24 months.

5.3.3 Test Procedure

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

The test generator necessary to perform direct and indirect application of discharge to the equipment under test in following methods:

a. Contact discharges to the conductive surface and coupling planes:

For table-top equipment under test one of the test points shall be the centre front edge of the horizontal coupling plane, which shall be subjected to at least 20 indirect discharges (10 of each polarity).

All other test points shall each receive at least 20 direct contact discharges (10 of each polarity).

All surfaces normally touched by the user should be tested. Test shall be performed at a maximum repetition rate of one discharge per second.

Vertical Coupling Plane (VCP):

The coupling plane, of dimensions 0.5 m × 0.5 m, is placed parallel to, and positioned at a distance 0.1 m from the equipment under test, with the discharge electrode touching the coupling plane. The four faces of the equipment under test will be performed with electrostatic discharge.

Horizontal Coupling Plane (HCP):

The coupling plane, of dimensions 1.6 m × 0.8 m, is placed under the equipment under test. The generator shall be positioned vertically a distance of 0.1 m from the equipment under test, with the discharge electrode touching the coupling plane. The four faces of the equipment under test will be performed with electrostatic discharge.

b. Air discharge at apertures and slots and insulating surface:

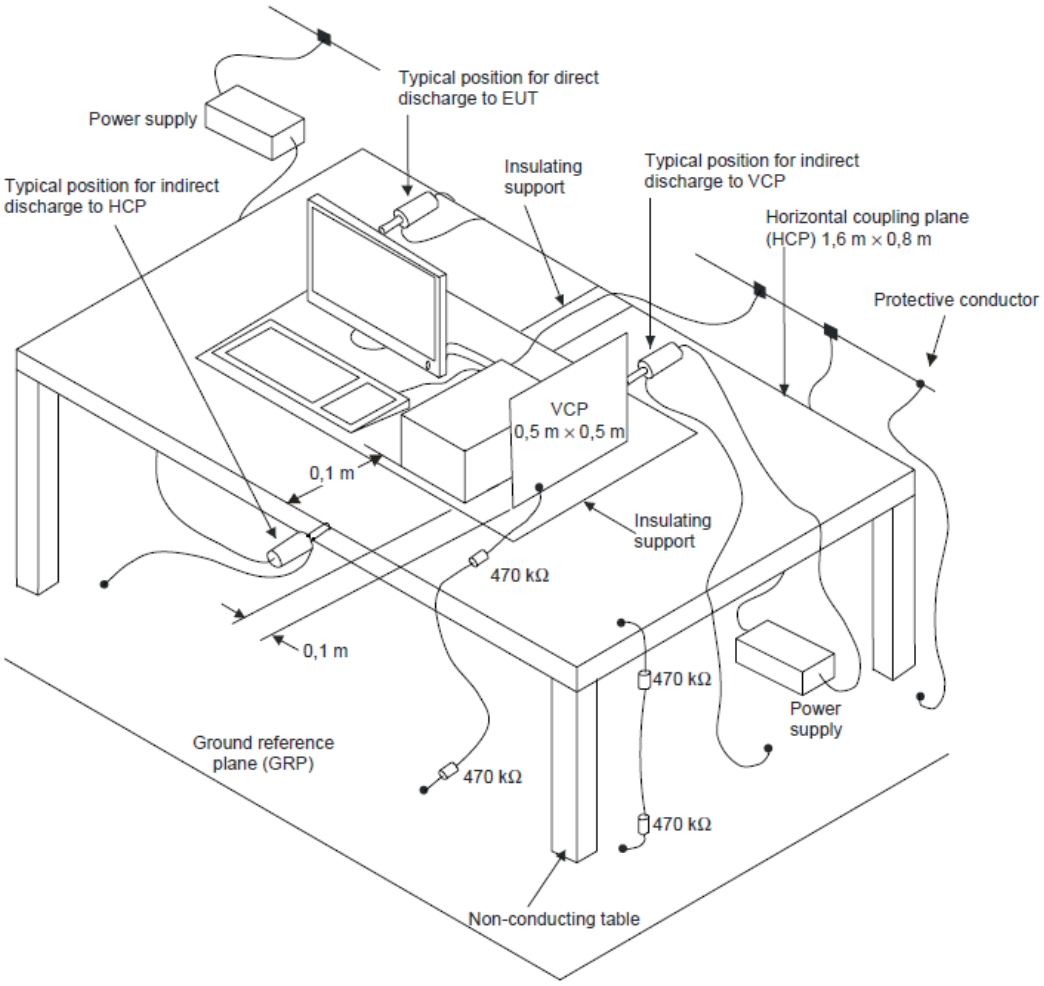
On those surfaces of the equipment under test where it is not possible to perform contact discharge testing, the equipment should be investigated to identify user accessible points where breakdown may occur. Such points are tested using the air discharge method. This investigation should be restricted to those area normally handled by the user. A minimum 20 single air discharges (10 of each polarity) shall be applied to the selected test point for each such area.

5.3.4 Deviation from Standard

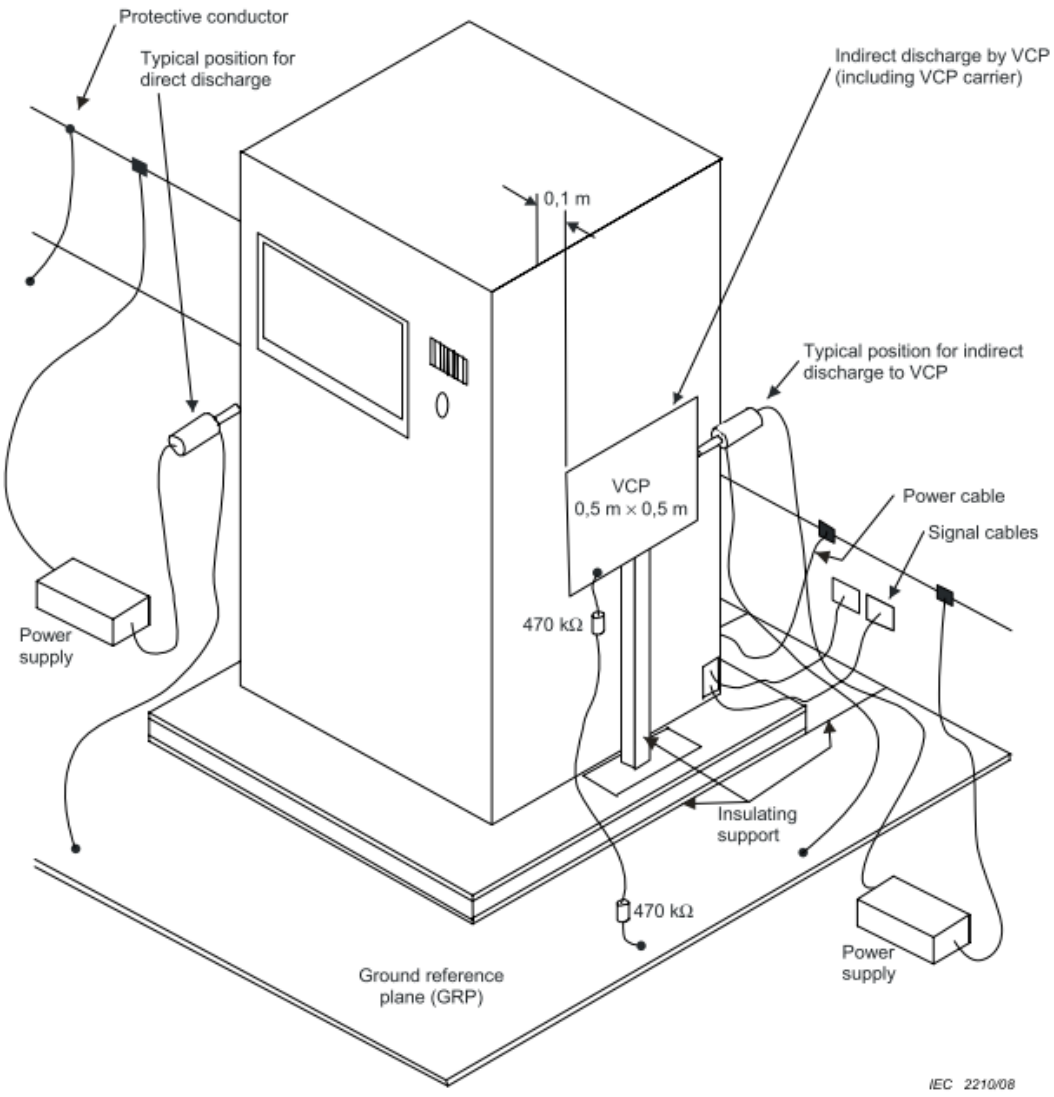
No deviation

5.3.5 Test Configuration

< Table-Top equipment under test >



< Floor-Standing equipment under test >



5.3.6 Test Result

Test Voltage	230Vac, 50Hz	**Test Date**	2025/05/02
Environmental Conditions	22°C, 55% RH	**Pressure**	1000 mbar
Tested by	Andy Li	**Test Site**	W01

Test Results of Direct Application

Air Discharge				
Test Point	**Discharge Level (kV)**			**Result**
	±2	**±4**	**±8**	
Front	N/A	N/A	N/A	N/A
Back	A	A	A	A
Left	N/A	N/A	N/A	N/A
Right	N/A	N/A	N/A	N/A
Top	N/A	N/A	N/A	N/A
Bottom	N/A	N/A	N/A	N/A
Other	N/A	N/A	N/A	N/A

* Test location(s) in which discharge to be applied illustrated by photos shown in next page(s).

Contact Discharge		
Test Point	**Discharge Level (kV)**	**Result**
	±4	
Front	A	A
Back	A	A
Left	A	A
Right	A	A
Top	A	A
Bottom	A	A
Other	N/A	N/A

* Test location(s) in which discharge to be applied illustrated by photos shown in next page(s).

Test Results of Indirect Application

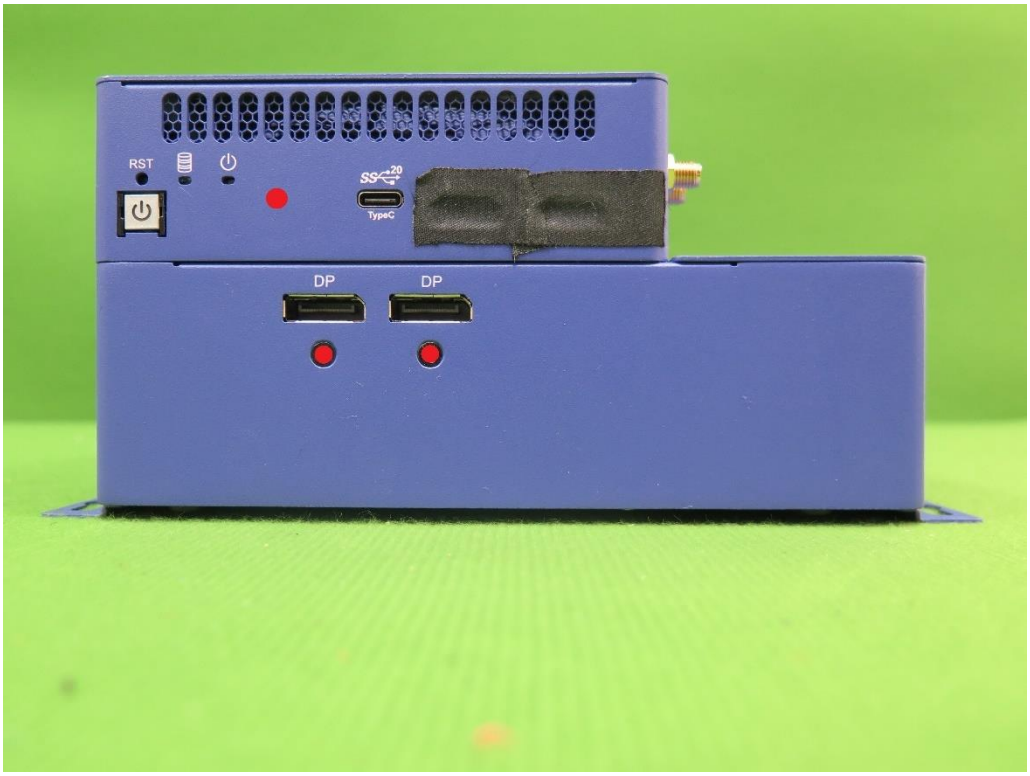
HCP Discharge		
Test Point	**Discharge Level (kV)**	**Result**
	±4	
Front	A	A
Back	A	A
Left	A	A
Right	A	A

VCP Discharge		
Test Point	**Discharge Level (kV)**	**Result**
	±4	
Front	A	A
Back	A	A
Left	A	A
Right	A	A

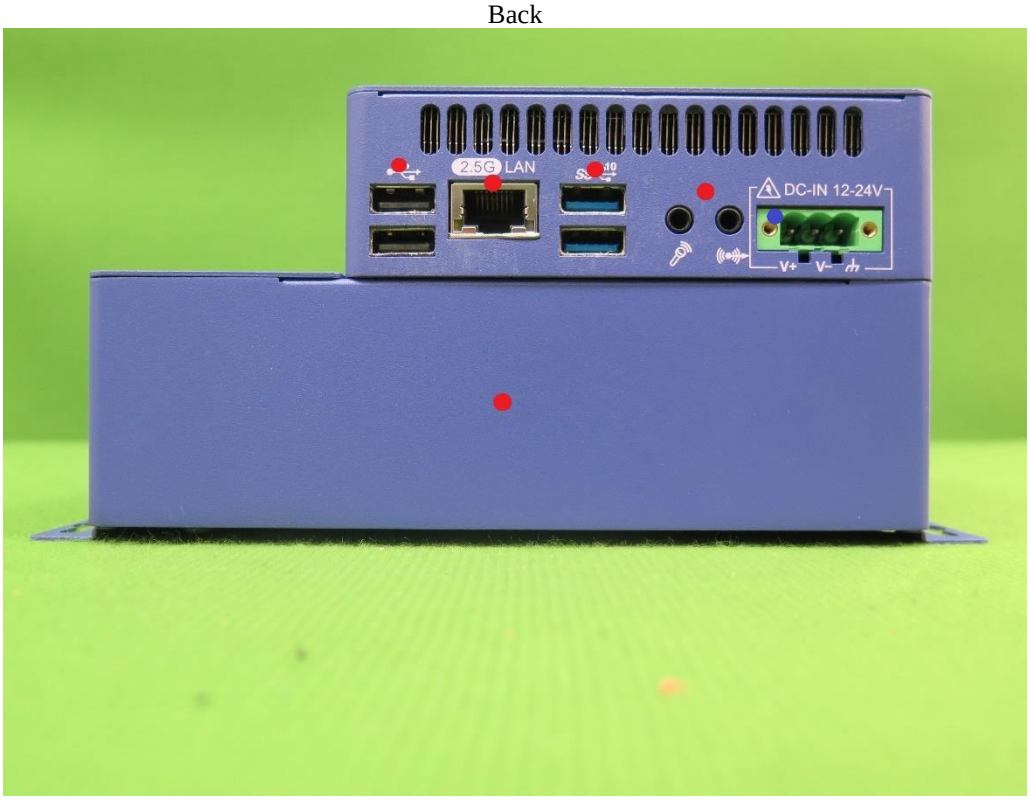
Note:
N/A: Not applicable
Criteria A: The EUT function was correct during the test.
Criteria A: (#1) No occur arcing.

Description of Test Points

Front

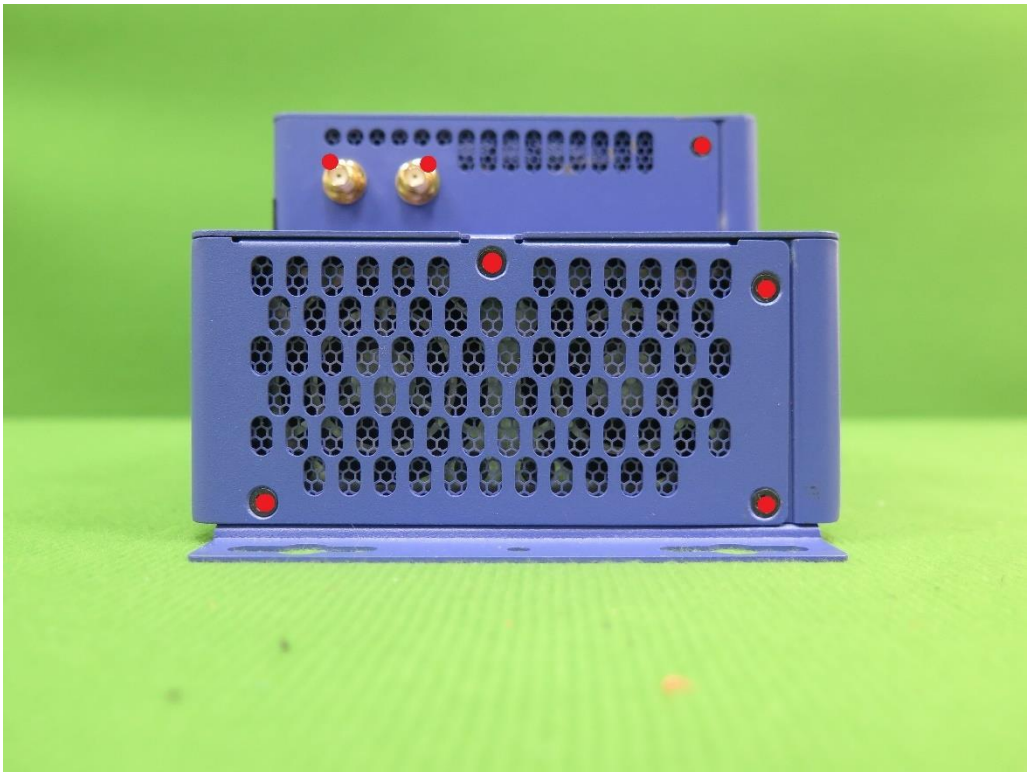


Back

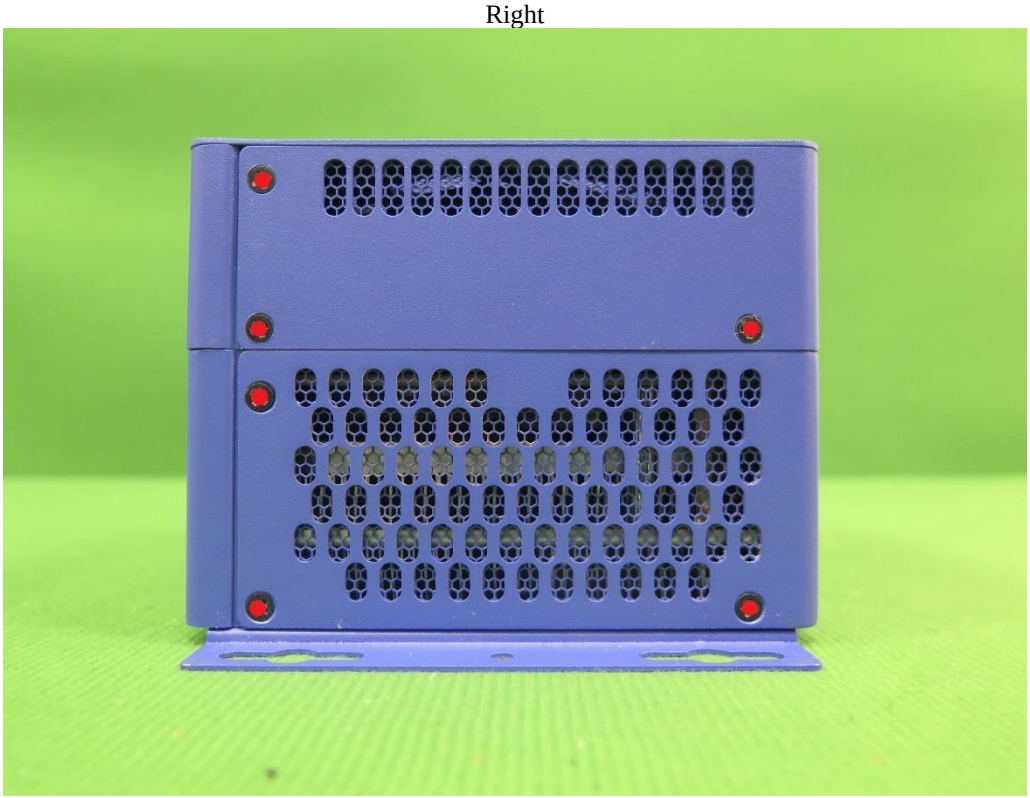


*Red Dot - Contact Discharged
Blue Dot - Air Discharged

Left

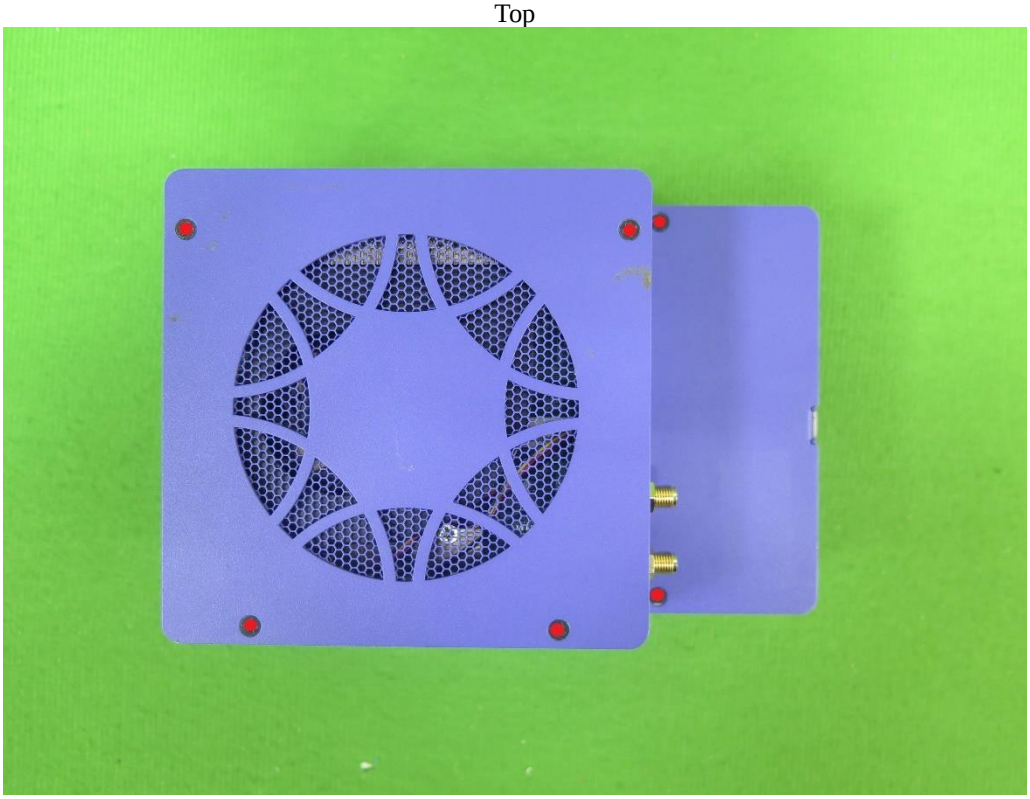


Right

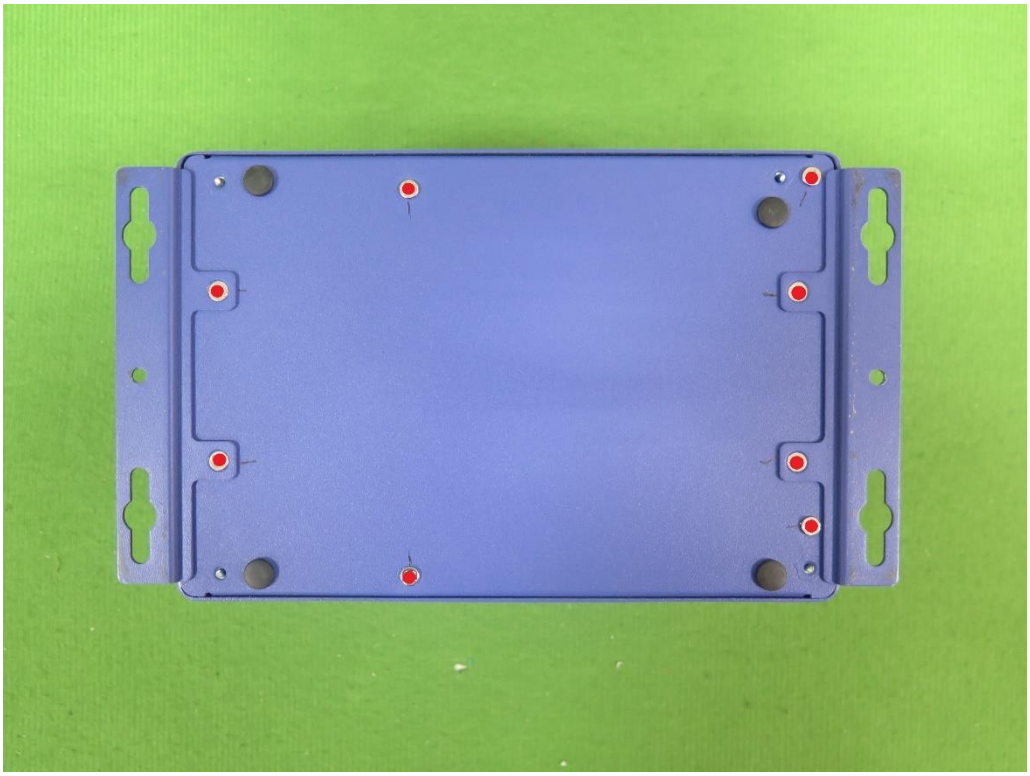


*Red Dot - Contact Discharged
Blue Dot - Air Discharged

Top

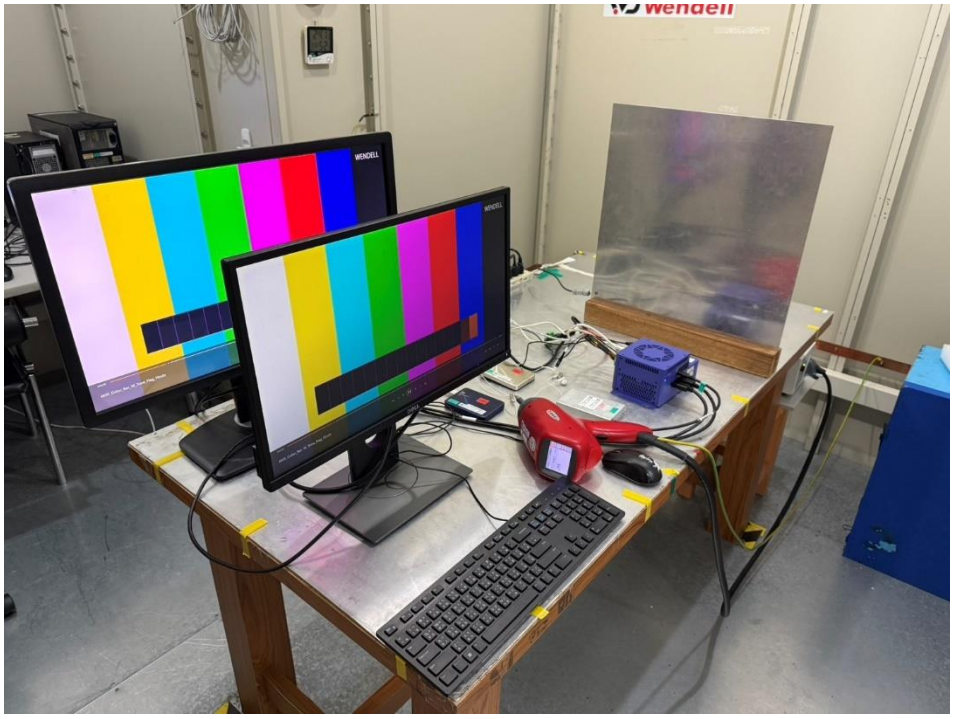


Bottom



*Red Dot - Contact Discharged
Blue Dot - Air Discharged

5.3.7 Photographs of Test Configuration



5.4 Radiated, Radio-frequency Electromagnetic Field Immunity Test

5.4.1 Test Specification

Standard	IEC/EN 61000-4-3
Frequency Range	80 MHz ~ 1000 MHz, 1800 MHz, 2600 MHz, 3500 MHz, 5000 MHz for spot test
Field Strength	3 V/m
Modulation	80% AM Modulation with 1 kHz Sine Wave
Frequency Step	1%
Polarity of Antenna	Horizontal and Vertical
Test Distance	2.15 m (80 MHz ~ 1000 MHz) 1 m (1 GHz ~ 6 GHz)
Antenna Height	1.55 m (80 MHz ~ 1000 MHz) 1.05 m (1 GHz ~ 6 GHz)
Dwell Time	3 seconds or not exceed 5 seconds

5.4.2 Test Instrument

Item	Equipment	Manufacturer	Model	Meter No.	Calibration Date
1	RadiCentre ® Modular EMC Test Systems	DARE	CTR1004B	CT-1-080	No calibration request
2	RF Signal Generator	DARE	RGN6000B	CT-1-080	Aug. 06, 2024
3	LINEAR POWER RF AMPLIFIER	TESEQ	CBA1G-300 D	CT-1-163	Aug. 06, 2024
4	LINEAR POWER RF AMPLIFIER	OPHIR	5193	CT-1-083	Aug. 06, 2024
5	LINEAR POWER RF AMPLIFIER	FRANKONIA	FLG-30C	CT-1-061	Aug. 06, 2024
6	Periodic Test-Antenna	Schwarzbeck Mess - Elektronik	STLP 9128 E	CT-1-085	No calibration request
7	Stacked Microwave Log.-Per. Antenna	Schwarzbeck Mess - Elektronik	STLP 9149	CT-1-086	No calibration request
8	E-Field Probe	Narda	EP-601	CT-1-212	Sep. 26, 2024
9	Measurement Software	EMC-RS	Ver: 2.0.1.3	N/A	No calibration request
10	Conditioning Amplifier / Microphone	B & K	2690-OS2 / 4192-L-001	CT-1-157	May 29, 2024
11	Sound Level Calibrator	B & K	4231	CT-1-156	May 29, 2024
12	Sound Analyer	VGT	ABT CB0	CT-1-159	May 28, 2024
13	Frequency Counter	HEWLETT PACKARD	53181A	CT-1-158	May 25, 2024
14	Audio output Measurement Software	VGT	V1.2-WD	N/A	No calibration request

Note: 1. The calibration interval of the above test instruments is 12 months.

5.4.3 Test Procedure

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

a. The table-top equipment under test and load, which are placed on a table that is 0.8 meter above ground, are placed with one coincident with the Uniform Field Are (UFA) such that the distance from antenna to the EUT was 2.15 meter at test frequency 80M ~ 1GHz & 1 meter at test frequency 1G ~ 6GHz. Both horizontal and vertical polarization of the antenna and four sides of the equipment under test are set on measurement. All cables shall be connected to the equipment under test and arranged on the test site in accordance with the installation instructions and shall replicate typical installations and use as much as possible.

b. The specified wiring types and connectors shall be used. If the wiring to and from the equipment under test is not specified, unshielded parallel conductors shall be used. If the product specification require a wiring length of less than or equal to 1 m, then the specified length shall be used. If the length specified is greater than 1 m, or is not specified, then the length of cable used shall be chosen in accordance with typical installation practices. Unless otherwise specified above, a minimum of 1 m of cable shall be exposed to the electromagnetic field in one orientation, either vertical or horizontal.

c. Each cable does not need to be exposed to the field during the exposure of each face of the equipment under test. But each cable shall, at least during one of the equipment under test orientations, be positioned within the Uniform Field Are (UFA), and thus exposed to the field.

d. If a product committee determines excess cable length needs to be decoupled (for cables leaving the test area), then the decoupling method used shall not impair the operation of the equipment under test. If cable decoupling is performed, CMADs may be used. The CMAD shall always be placed flat on the floor. Each cable to be decoupled should be treated with a separate CMAD.

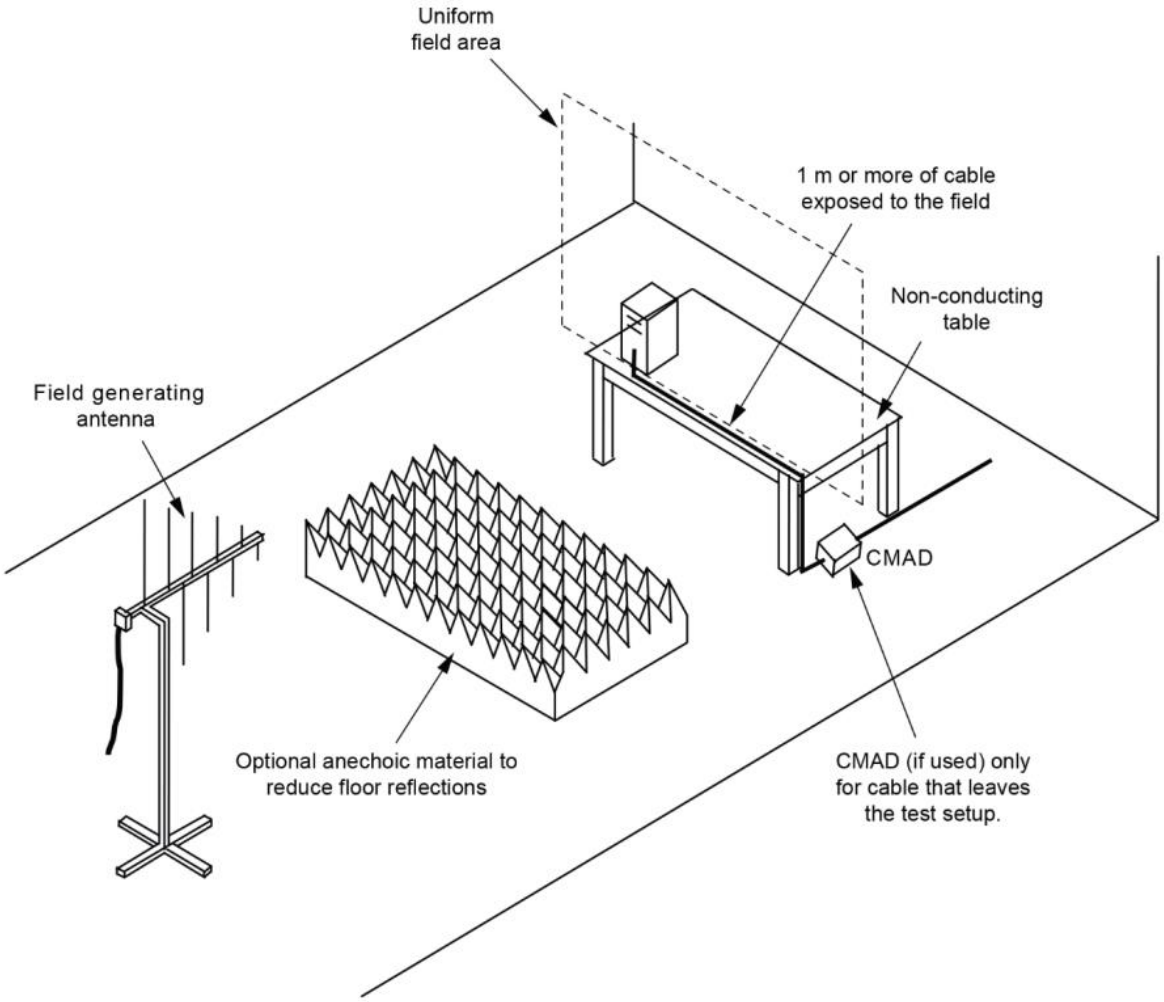
e. If the equipment under test is too large such that it cannot be fully illuminated by the radiating antenna, or exceeds the size of the Uniform Field Area (UFA) then partial illumination shall be used. The equipment under test can be repositioned so that the front surface remains within the Uniform Field Area (UFA) in order to illuminate those sections of the equipment under test that were previously outside the Uniform Field Area (UFA).

f. The frequency range shall be swept, with the signal 80% amplitude modulated with a 1kHz sine wave. If multiple test signals were used during testing, care should be taken to ensure that any recorded performance degradation was caused by a single test signal and was not caused by the combination of multiple test signals.

5.4.4 Deviation from Standard

No deviation

5.4.5 Test Configuration



5.4.6 Test Result

Test Voltage	230Vac, 50Hz	**Environmental Conditions**	22°C, 50% RH
Tested by	Alan Chung	**Test Date**	2025/04/18

Frequency Range (MHz)	Azimuth	Polarity	Field Strength (V/m)	Modulation	Result
80-1000	0, 90, 180, 270	H/V	3	80% AM (1kHz)	A
1800	0, 90, 180, 270	H/V	3	80% AM (1kHz)	A
2600	0, 90, 180, 270	H/V	3	80% AM (1kHz)	A
3500	0, 90, 180, 270	H/V	3	80% AM (1kHz)	A
5000	0, 90, 180, 270	H/V	3	80% AM (1kHz)	A

Note:
Criteria A: The EUT function was correct during the test.

Not supporting telephony audio output function acoustic/electrical measurements

Frequency Range (MHz)	Azimuth	Polarity	Field Strength (V/m)	Modulation	Result
80-1000	0, 90, 180, 270	H/V	3	80% AM (1kHz)	A
1800	0, 90, 180, 270	H/V	3	80% AM (1kHz)	A
2600	0, 90, 180, 270	H/V	3	80% AM (1kHz)	A
3500	0, 90, 180, 270	H/V	3	80% AM (1kHz)	A
5000	0, 90, 180, 270	H/V	3	80% AM (1kHz)	A

Note:
Criteria A: The audio output performance evaluation criteria were satisfied. The interference ratio is -20 dB or better.

5.4.7 Photographs of Test Configuration

5.5 Electrical Fast Transient / Burst Immunity Test

5.5.1 Test Specification

Standard	IEC/EN 61000-4-4
Test Voltage	AC Main Power Port: ±1 kV DC Network Power Port (Note 1) (cable length > 3m): ±0.5 kV Analogue/Digital Data Ports (Note 1) (cable length > 3m): ±0.5 kV
Polarity	Positive & Negative
Impulse Frequency	CPE xDSL Ports: 100 kHz Other: 5 kHz
Impulse Wave	5/50 ns
Burst Duration	15 ms
Burst Period	300 ms
Test Duration	Not less than 1 min.

Note: 1. Applicable only to port which, according to the manufacturer's specification, support cabled lengths greater than 3m.

5.5.2 Test Instrument

Item	Equipment	Manufacturer	Model	Meter No.	Calibration Date
1	EFT Generator	3ctest	EFT500S	CT-1-165	Sep. 27, 2024
2	Clamp	3ctest	CCC100	CT-1-166	Sep. 27, 2024

Note: 1. The calibration interval of the above test instruments is 12 months.

5.5.3 Test Procedure

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

a. The table-top equipment under test was placed on a table that is 0.8 meter height. A ground reference plane is placed on the table, and uses 0.1 m insulation between the equipment under test and ground reference plane. The floor-standing equipment under test was placed on 0.1 m insulation support unit between the equipment under test and ground reference plane.

b. The minimum area of the ground reference plane is 1 m × 1 m, and 0.65 mm thick min, and projected beyond the equipment under test by at least 0.1 m on all sides. The equipment under test shall be arranged and connected to satisfy its functional requirements, according to the equipment installation specifications.

   For input power ports:

   The equipment under test is connected to the power ports through a coupling device that directly couples the EFT/B interference signal. Each of the line conductors is impressed with burst noise for 1 minute. The distance between the coupling device and the table-top equipment under test is 0.5 m.

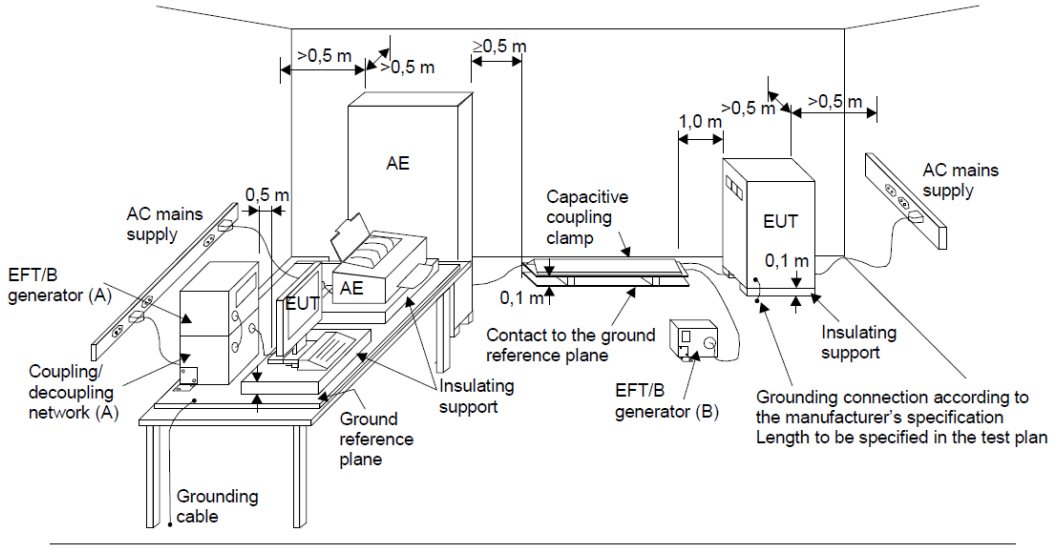
   For signal / data ports:

   The capacitive coupling clamp shall be used for the application of the test voltages. The test voltages shall be coupled to all of the equipment under test ports in turn including those between two units of equipment involved in the test, unless the length of the interconnecting cable makes it impossible to test.

5.5.4 Deviation from Standard

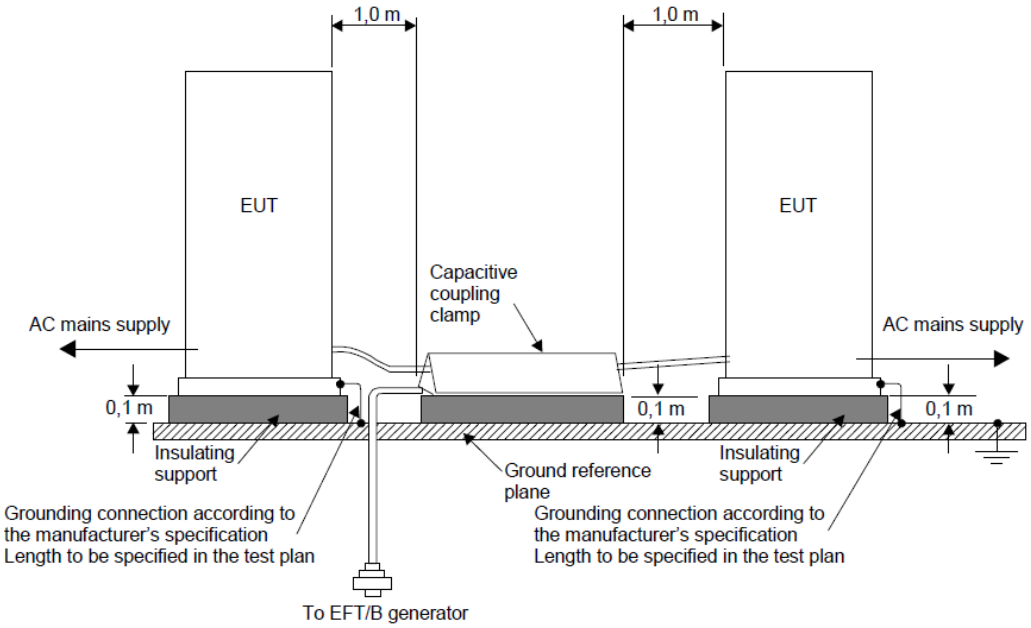
No deviation

5.5.5 Test Configuration



(A) location for supply line coupling

(B) location for signal lines coupling



5.5.6 Test Result

Test Voltage	230Vac, 50Hz	**Environmental Conditions**	23℃, 50% RH
Tested by	Tim Chao	**Test Date**	2025/04/21

Test Point		**Test Level (kV)**	**Polarity (+/-)**	**Result**
AC Power Port	L	1	+/-	A
	N	1	+/-	A
	PE	1	+/-	A
	L + N	1	+/-	A
	L + PE	1	+/-	A
	N + PE	1	+/-	A
	L + N + PE	1	+/-	A
Signal Ports Telecommunication Ports	LAN (2.5G)	0.5	+/-	A

Note:
Criteria A: The EUT function was correct during the test.

5.5.7 Photographs of Test Configuration

Power

LAN (2.5G)

5.6 Surge Immunity Test

5.6.1 Test Specification

Standard	IEC/EN 61000-4-5
Wave- Shape	AC Main Power Port: 1.2/50 μs Open Circuit Voltage, 8/20 μs Short Circuit Current DC Network Power Port (Note 1): 1.2/50 μs Open Circuit Voltage, 8/20 μs Short Circuit Current Analogue/Digital Data Ports (unshielded symmetrical) (Direct to outdoor cables(Note 2, 3)): 10/700 μs Open Circuit Voltage, 5/320 μs Short Circuit Current Analogue/Digital Data Ports (coaxial or shielded) (Direct to outdoor cables(Note 2, 3)): 1.2/50 μs Open Circuit Voltage, 8/20 μs Short Circuit Current
Test Voltage	AC Main Power Port - Line to Line: ±1 kV, Line to Ground: ±2 kV DC Network Power Port (cable length > 3m) - Line to Ground: ±0.5 kV Analogue/Digital Data Port (unshielded symmetrical): Line to Ground Apply where primary protection is intended: ±1 kV and ±4 kV Apply where primary protection is not intended: ±1 kV Analogue/Digital Data Ports (coaxial or shielded) - Shielded to Ground: ±0.5 kV
Polarity	Positive/Negative
Phase Angle	0˚/90˚/180˚/270˚ (For AC Main Power Port)
Pulse Repetition Rate	1 time / min. (maximum)
Times	5 Positive and 5 Negative at selected points

Note: 1. Applicable only to port which, according to the manufacturer's specification, support cabled lengths greater than 3 m.

2 Surges are applied with primary protection fitted. Where possible, use the actual primary protector intended to be use in the installation. Where the surge coupling network for the 10/700 (5/320) μs wave affects the functioning of high speed data ports, the test shall be carried out using 1.2/50 (8/20) μs wave and appropriate coupling network.

3. Surges are applicable to ports which satisfy all the following conditions:
May connect directly to cables that leave the building structure.
Defined as an antenna port, a wired network, or a broadcast receiver tuner port.
Typical port covered include xDSL, PSTN, CATV, antenna and similar. Exclude ports are LAN and similar.

5.6.2 Test Instrument

Item	Equipment	Manufacturer	Model	Meter No.	Calibration Date
1	Surge Generator	HAEFELY	AXOS8	CT-1-059(1)	Aug. 12, 2024
2	Surge CDN	3cTest	CDN-405T8A1	CT-1-074(5)	May 27, 2024

Note: 1. The calibration interval of the above test instruments is 12 months.

5.6.3 Test Procedure

The test procedure was in accordance with IEC 61000-4-5.

a. The table-top equipment under test was placed on a table that is 0.8 meter height. A ground reference plane is placed on the table, and uses 0.1m insulation between the equipment under test and ground reference plane.

b. If not otherwise specified the power cord between the EUT and the coupling network shall not exceed 2 m in length.

For input power ports:

The table-top equipment under test was connected to the power ports through a coupling device that directly couples the surge interference signal. The surge noise shall be applied synchronized to the peak value of the voltage wave (Positive and negative). Each of Line to Earth and Line to Line is impressed with a sequence of five surge voltages with interval of 1 minute.

For signal / data ports:

The table-top equipment under test was connected to the signal ports of associated equipment through a Coupling / De-coupling Network (CDN). The surge noise shall be applied synchronized to the peak value of the voltage wave (Positive and negative). Each of Line to Earth is impressed with a sequence of five surge voltages with interval of 1 minute.

For shielded lines:

The table-top equipment under test is isolated from ground and the surge is applied to its metallic enclosure; the termination (or auxiliary equipment) at the port under test is grounded. The length of the cable between the port under test and the device attached to the other end of the cable shall be 20 m (preferred length) or, the shortest length over 10 m, where the manufacturer provides pre-assembled cables used in actual installations. For EUTs which do not have metallic enclosures, the surge is applied directly to the shielded cable at the EUT side.

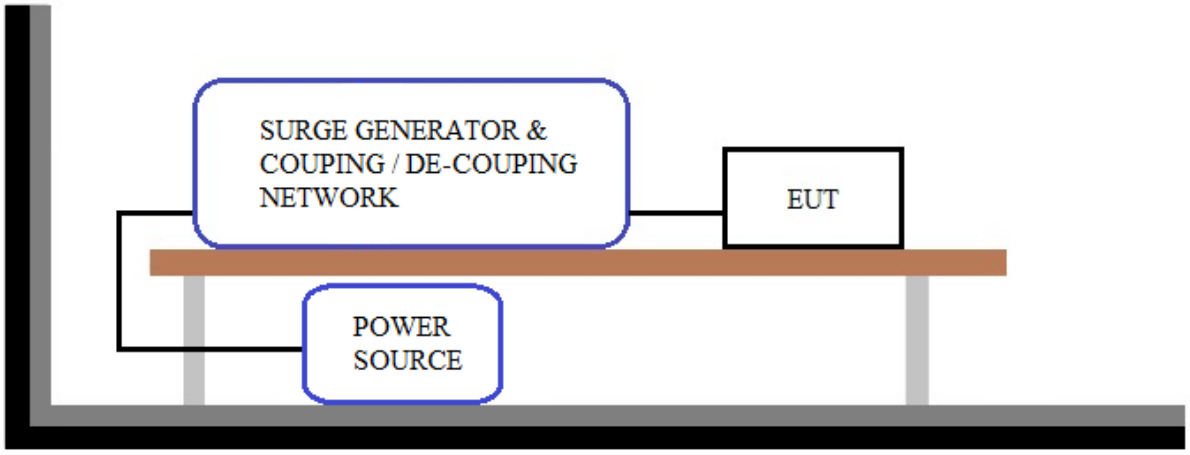
No test shall be required for cables which according to the manufacturer's specification are ≤ 10 m.

5.6.4 Deviation from Standard

No deviation

5.6.5 Test Configuration

< Table-Top equipment under test >



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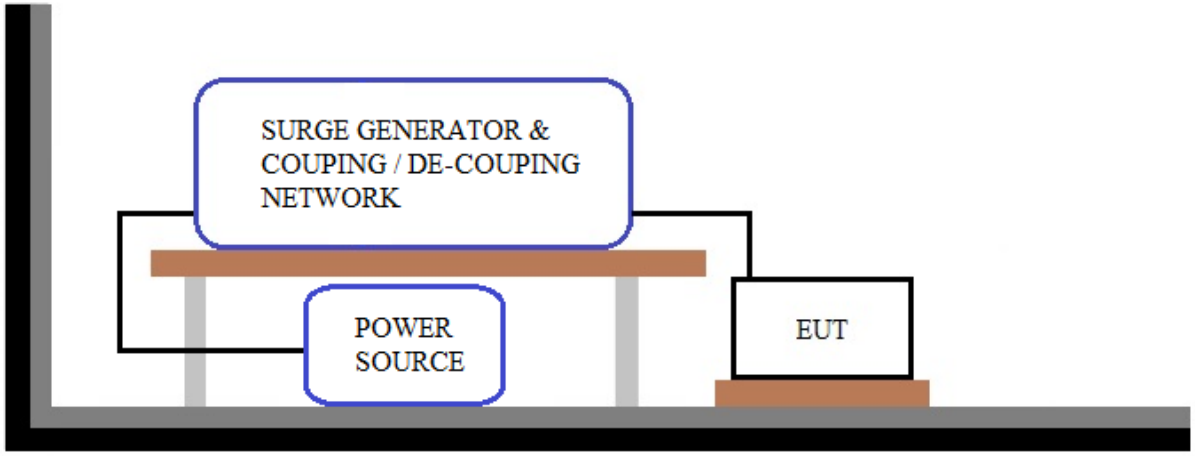


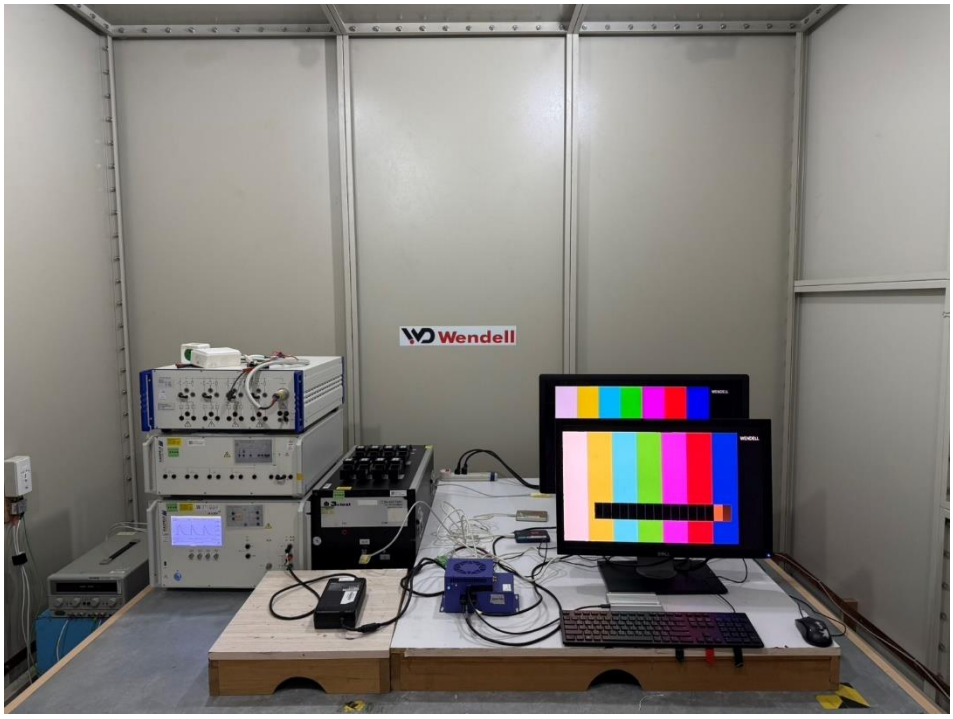
5.6.6 Test Result

Test Voltage	230Vac, 50Hz	**Environmental Conditions**	22℃, 55% RH
Tested by	Andy Li	**Test Date**	2025/05/05
Test Site	W01		

AC Power Port						
Test Point	**Phase**	**Polarity (+/-)**	**Test Voltage (kV)**			**Result**
			0.5	**1**	**2**	
L to N	0°	+/-	A	A	-	A
	90°	+/-	A	A	-	
	180°	+/-	A	A	-	
	270°	+/-	A	A	-	
L to PE	0°	+/-	A	A	A	A
	90°	+/-	A	A	A	
	180°	+/-	A	A	A	
	270°	+/-	A	A	A	
N to PE	0°	+/-	A	A	A	A
	90°	+/-	A	A	A	
	180°	+/-	A	A	A	
	270°	+/-	A	A	A	

Note:
Criteria A: The EUT function was correct during the test.

5.6.7 Photographs of Test Configuration



5.7 Conducted Disturbances Immunity Test

5.7.1 Test Specification

Standard	IEC/EN 61000-4-6
Frequency Range	0.15 ~ 10 MHz, 10 ~ 30 MHz, 30 ~ 80 MHz
Voltage Level	3 V, 3 - 1 V, 1 V
Modulation	80% AM Modulation with 1 kHz Sine Wave
Frequency Step	1%
Dwell Time	3 seconds

5.7.2 Test Instrument

Item	Equipment	Manufacturer	Model	Meter No.	Calibration Date
1	Coupling clamp according to IEC 6100-4-6	FRANKONIA	EMCL-20	CT-1-049	May 30, 2024
2	CDN for power supply lines	FRANKONIA	CDN M2+M3	CT-1-054	May 30, 2024
3	6 dB Attenuator	BIRD	75-A-FFN-06	CT-1-056	May 30, 2024
4	Compact Immunity Test System acc	FRANKONIA	CIT-10/75	CT-1-057	May 30, 2024
5	CDN for screened lines	FRANKONIA	RJ45S	CT-1-052 (1)	May 30, 2024
6	50ohm Termination	N/A	N/A	CT-1-065-1	May 30, 2024
7	CDN Four Balanced Pairs-unscreened	Com-Power	CDN-T8E	CT-1-130	May 30, 2024
8	Measurement Software	HUBERT	Ver: 1.1.2	N/A	No calibration request
9	Conditioning Amplifier / Microphone	B & K	2690-OS2 / 4192-L-001	CT-1-157	May 29, 2024
10	Sound Level Calibrator	B & K	4231	CT-1-156	May 29, 2024
11	Sound Analyer	VGT	ABT CB0	CT-1-159	May 28, 2024
12	Frequency Counter	HEWLETT PACKARD	53181A	CT-1-158	May 25, 2024
13	Audio output Measurement Software	VGT	V1.2-WD	N/A	No calibration request

Note: 1. The calibration interval of the above test instruments is 12 months.

5.7.3 Test Procedure

The test procedure was in accordance with IEC 61000-4-6.

a. The table-top equipment under test was placed on an insulating support of 0.1 m height above a reference ground plane. If the equipment is designed to be mounted in a panel, rack or cabinet, then it shall be tested in this configuration. Grounding of the equipment shall be consistent with the EUT's installation instructions. The Coupling/De-coupling Network (CDN) shall be located between 0.1 m and 0.3 m from the equipment under test.

b. The frequency range shall be swept, using the signal level established during the setting process and with a disturbance signal of 80 % amplitude. The signal is modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or the switch coupling devices as necessary. Where the frequency is swept incrementally, the step size shall not exceed 1 % of the preceding frequency value.

   For input power ports:

   The table-top equipment under test was connected to the power ports through a Coupling/De-coupling Network (CDN) for power supply lines. And directly couples the disturbances signal into equipment under test.

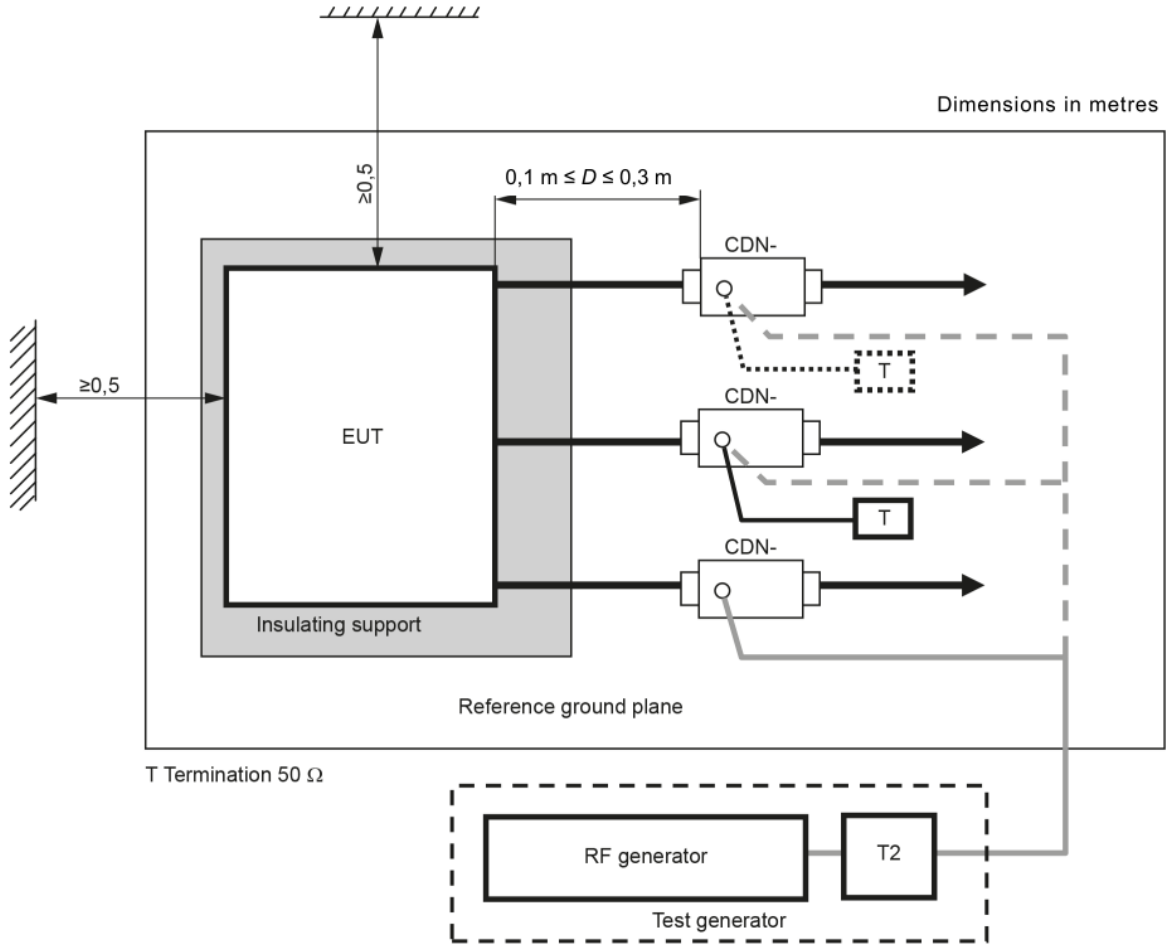
   For signal / data ports:

   The table-top equipment under test was connected to the signal ports of associated equipment through a Coupling/De-coupling Network (CDN). And directly couples the disturbances signal into equipment under test.

5.7.4 Deviation from Standard

No deviation

5.7.5 Test Configuration



Note:

1. The EUT clearance from any metallic objects other than test equipment shall be at least 0.5 m.
2. Only one of the CDNs not used for injection shall be terminated with 50 Ω, providing only a single return path. All other CDNs shall be configured as decoupling networks.

5.7.6 Test Result

Test Voltage	230Vac, 50Hz	**Environmental Conditions**	24℃, 55% RH
Tested by	Tim Chao	**Test Date**	2025/04/21

Frequency Range (MHz)	Tested Port	Injection Method	Test Level ($V_{r.m.s.}$)	Modulation	Result
0.15 - 10	AC Power	CDN-M2 +M3(M3)	3	80% AM, 1kHz	A
10 - 30	AC Power	CDN-M2 +M3(M3)	3 - 1	80% AM, 1kHz	A
30 - 80	AC Power	CDN-M2 +M3(M3)	1	80% AM, 1kHz	A
0.15 - 10	LAN (2.5G)	CLAMP	3	80% AM, 1kHz	A
10 - 30	LAN (2.5G)	CLAMP	3 - 1	80% AM, 1kHz	A
30 - 80	LAN (2.5G)	CLAMP	1	80% AM, 1kHz	A

Note:
Criteria A: The EUT function was correct during the test.

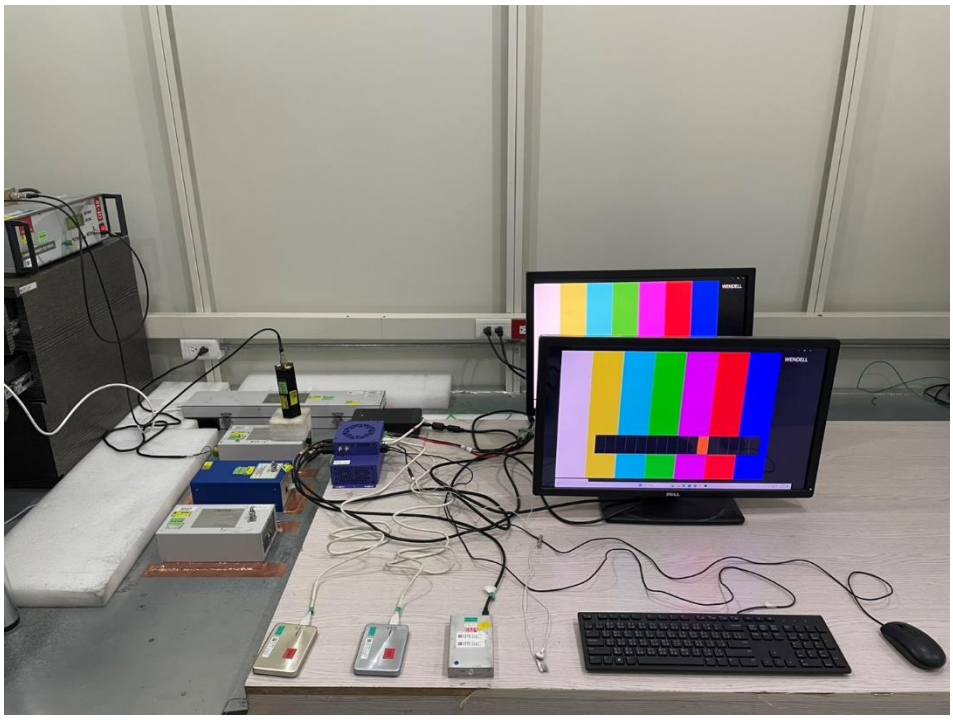
Not supporting telephony audio output function acoustic/electrical measurements

Frequency Range (MHz)	Tested Port	Injection Method	Test Level ($V_{r.m.s.}$)	Modulation	Result
0.15 - 10	AC Power	CDN-M2 +M3(M3)	3	80% AM, 1kHz	A
10 - 30	AC Power	CDN-M2 +M3(M3)	3 - 1	80% AM, 1kHz	A
30 - 80	AC Power	CDN-M2 +M3(M3)	1	80% AM, 1kHz	A

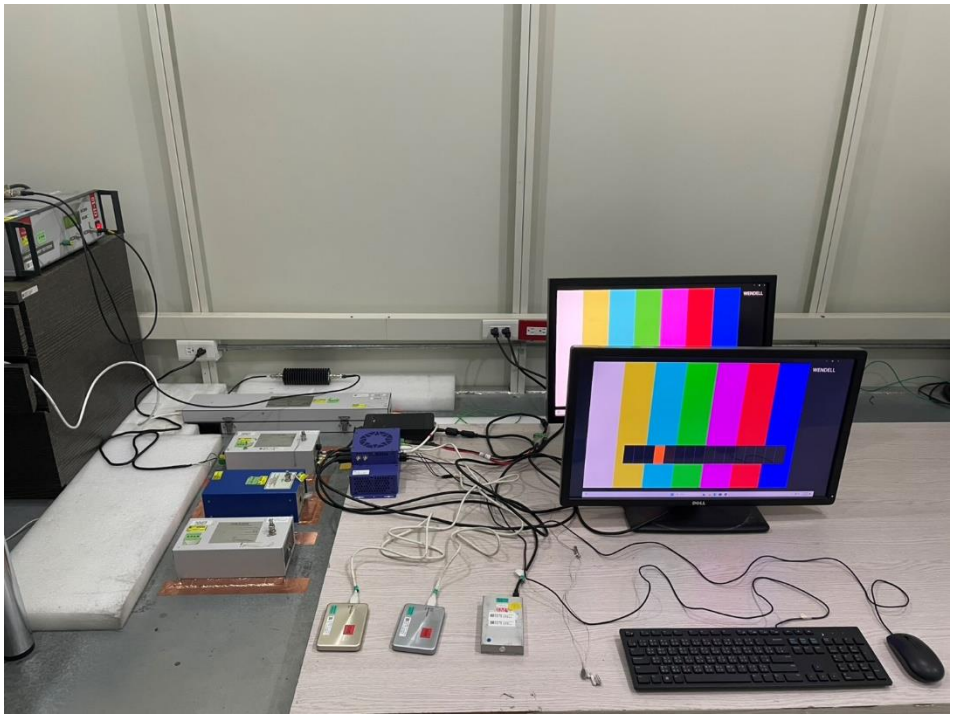
Note:
Criteria A: The audio output performance evaluation criteria were satisfied. The interference ratio is -20 dB or better.

5.7.7 Photographs of Test Configuration

Power



LAN (2.5G)



5.8 Power Frequency Magnetic Field Immunity Test

5.8.1 Test Specification

Standard	IEC/EN 61000-4-8
Frequency Range	50/60Hz
Field Strength	1 A/m
Observation Time	1 minute
Inductance Coil	Rectangular type, 1mx1m

Note: 1. Applicable only to equipment containing devices intrinsically susceptible to magnetic field, such as CRT monitors, Hall effect elements, electron-dynamic microphones, magnetic field sensors or audio frequency transformers.

5.8.2 Test Instrument

Item	Equipment	Manufacturer	Model	Meter No.	Calibration Date
1	PFMF	SGH	HMFG1000	CT-1-164	Sep. 28, 2023

Note: 1. The calibration interval of the above test instruments is 24 months.

5.8.3 Test Procedure

The test procedure was in accordance with IEC 61000-4-8.

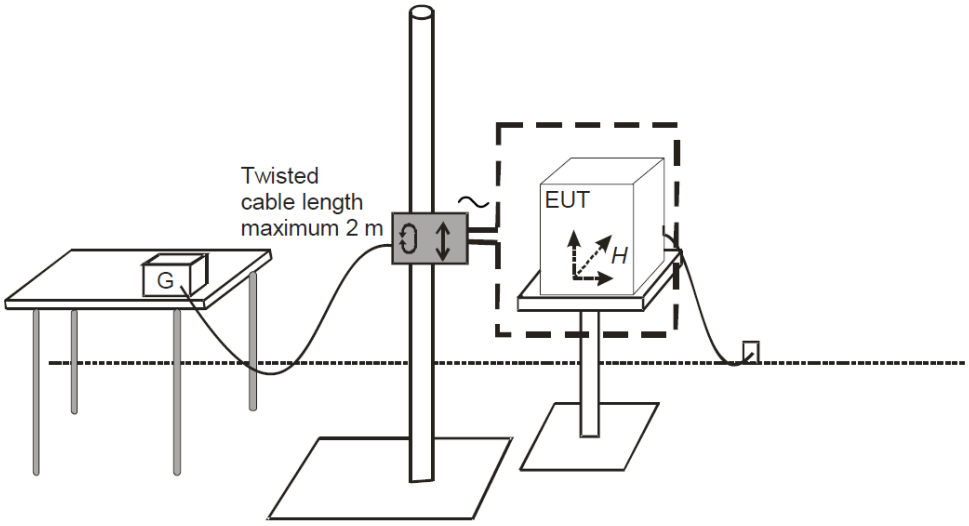
a. The table-top equipment under test was placed on a table which is 0.8 meter above a metal ground plane measured at least 1m × 1m minimum. The test magnetic field shall be placed at central of the induction coil. The floor-standing equipment under test was placed on 0.1m insulation support unit between the EUT and ground reference plane.

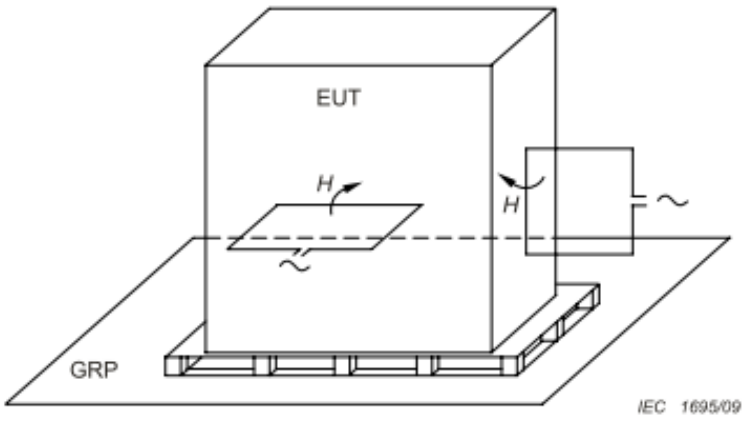
b. The test magnetic Field shall be applied 10 minutes by the immersion method to the table-top equipment under test, and the induction coil shall be rotated by 90° in order to expose the equipment under test to the test field with different orientation (X, Y, Z Orientations). The test magnetic Field shall be applied 10 minutes by the proximity method to the floor-standing equipment under test, and the induction coil shall be rotated by 90° in order to expose the equipment under test to the test field with different orientation (X, Y, Z Orientations).

5.8.4 Deviation from Standard

No deviation

5.8.5 Test Configuration





For the actual test configuration, please refer to 5.8.7.

NOTE:

TABLETOP EQUIPMENT
The equipment shall be subjected to the test magnetic field by using the induction coil of standard dimension (1 m x 1 m). The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.

FLOOR-STANDING EQUIPMENT
The equipment shall be subjected to the test magnetic field by using induction coils of suitable dimensions. The test shall be repeated by moving and shifting the induction coils, in order to test the whole volume of the EUT for each orthogonal direction. The test shall be repeated with the coil shifted to different positions along the side of the EUT, in steps corresponding to 50 % of the shortest side of the coil. The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.

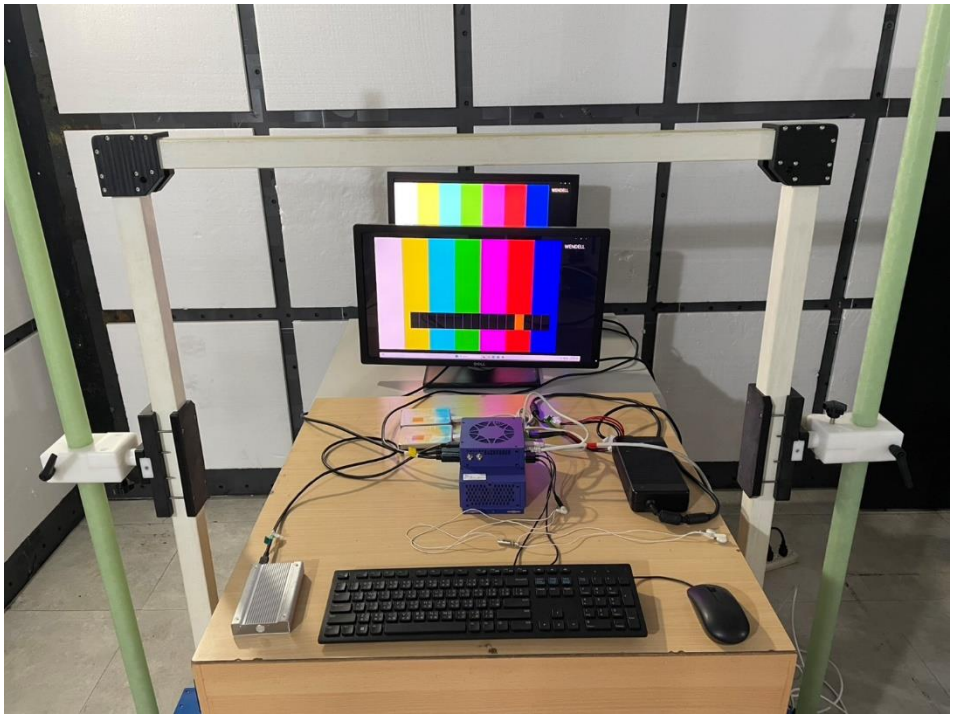
5.8.6 Test Result

Test Voltage	230Vac, 50Hz	**Environmental Conditions**	23℃, 60% RH
Tested by	Tim Chao	**Test Date**	2025/04/21

Test Coil Position	Frequency (Hz)	Magnetic Strength (A/m)	Result
X - Axis	50/60	1	A
Y - Axis	50/60	1	A
Z - Axis	50/60	1	A

Note:
Criteria A: The EUT function was correct during the test.

5.8.7 Photographs of Test Configuration



5.9 Voltage Dips & Short Interruptions Immunity Test

5.9.1 Test Specification

Basic Standard	IEC/EN 61000-4-11
Test Level	Voltage Dips: >95% reduction, 0.5 cycle 30% reduction, 25 cycle Voltage Interruptions: >95% reduction, 250 cycle
Test Duration Time	Minimum 3 test events in sequence
Interval between Event	Minimum 10 seconds
Phase Angle	0° / 180°
Test Cycle	3 times

Note: 1. Changes to occur at 0 degree crossover point of the voltage waveform. If the EUT does not demonstrate compliance when tested with 0 degree switching, the test shall be repeated with the switching occurring at both 90 degrees and 270 degrees. If the EUT satisfies these alternative requirements, then it fulfils the requirements. This condition shall be recorded in the test report.

5.9.2 Test Instrument

Item	Equipment	Manufacturer	Model	Meter No.	Calibration Date
1	DIP Simulator	3ctest	PFS2216S	CT-1-167	Sep. 27, 2024

Note: 1. The calibration interval of the above test instruments is 12 months.

5.9.3 Test Procedure

The test procedure was in accordance with IEC 61000-4-11.

a. The test shall be performed with the equipment under test connected to the test generator with the shortest power supply cable as specified by the equipment under test manufacturer. If no cable length is specified, it shall be the shortest possible length suitable to the application of the equipment under test. For equipment under test with more than one power cord, each power cord should be tested individually.

b. The equipment under test shall be tested for each selected combination of test levels and duration with a sequence of 3 dips/interruptions with intervals of 10 s minimum (between each test event). Each representative mode of operation shall be tested. Abrupt changes in supply voltage shall occur at 0 voltage crossover point of the voltage waveform.

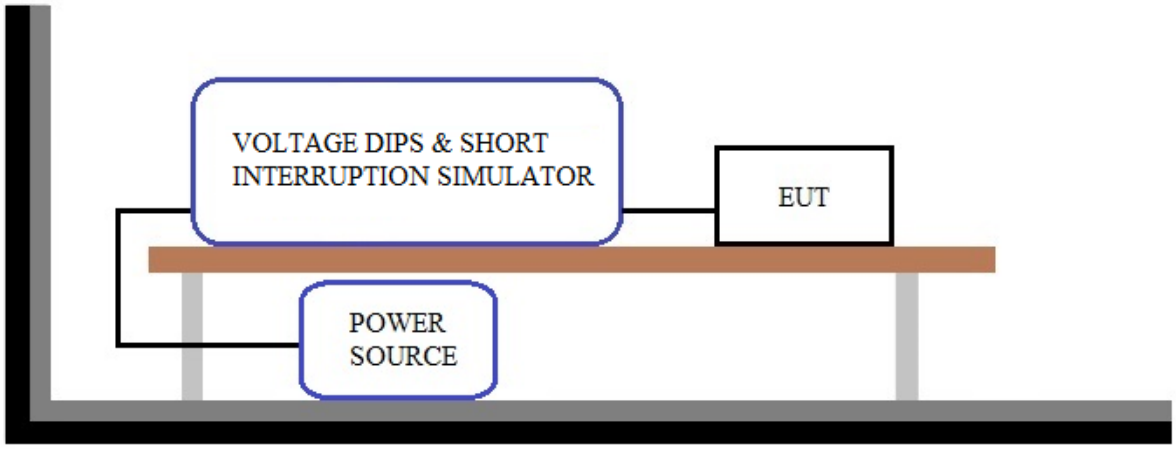
c. For each test, any degradation of performance shall be recorded. The monitoring equipment should be capable of displaying the status of the operational mode of the equipment under test during and after the tests. After each group of tests, a full functional check shall be performed.

5.9.4 Deviation from Standard

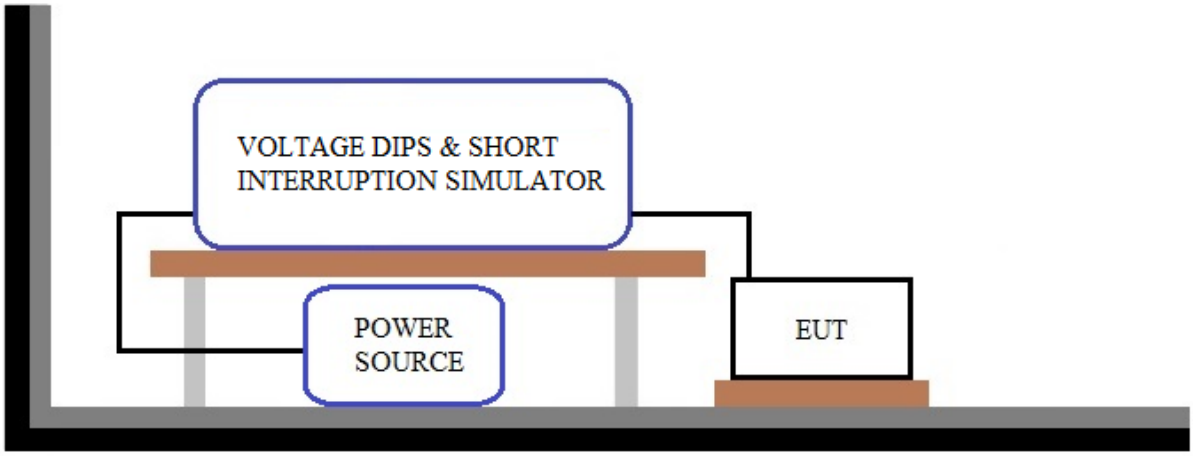
No deviation

5.9.5 Test Configuration

< Table-Top equipment under test >



< Floor-Standing equipment under test >



5.9.6 Test Result

Test Voltage	100-240Vac, 50Hz	**Environmental Conditions**	24℃, 60% RH
Tested by	Tim Chao	**Test Date**	2025/04/21

230Vac, 50Hz			
Test Item	**% Reduction**	**Duration (Period)**	**Result**
Voltage Dips	>95	0.5	A
	30	25	A
Voltage interruptions	>95	250	C (#1)

240Vac, 50Hz			
Test Item	**% Reduction**	**Duration (Period)**	**Result**
Voltage Dips	>95	0.5	A
	30	25	A
Voltage interruptions	>95	250	C (#1)

100Vac, 50Hz			
Test Item	**% Reduction**	**Duration (Period)**	**Result**
Voltage Dips	>95	0.5	A
	30	25	A
Voltage interruptions	>95	250	C (#1)

Note:
Criteria A: The EUT function was correct during the test.
Criteria C: (#1) The EUT was shut down during the test, and must be recovered manually.

5.9.7 Photographs of Test Configuration

< End Page >