CE EMC Test Report

Issued date: Jun. 27, 2025

Project No.: 24Q122002

Product : Panel PC

Model : MTA-1010W

Series Model : MTA-1XXXXXXXXXXXXX (“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-250198-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
EN 61000-3-2: 2014	IEC 61000-4-11: 2020 + COR2: 2022
EN IEC 61000-3-2: 2019 + A2: 2024	EN 61000-4-2: 2009
EN 61000-3-3: 2013 + A2: 2021 + AC: 2022	EN IEC 61000-4-3: 2020
BS EN 61000-3-2: 2014	EN 61000-4-4: 2012
BS EN IEC 61000-3-2: 2019 + A2: 2024	EN 61000-4-5: 2014 + A1: 2017
BS EN 61000-3-3: 2013 + A2: 2021	EN IEC 61000-4-6: 2023
EN 55035: 2017 + A11: 2020	EN 61000-4-8: 2010
BS EN 55035: 2017 + A11: 2020	EN IEC 61000-4-11: 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.

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History of this test report

Report No.	Issue date	Description
WD-EE-R-250198-A0	Jun. 27, 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-250198-A0	Jun. 27, 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:	Panel PC
Brand Name:	Vecow
Model:	MTA-1010W
Series Model:	MTA-1XXXXXXXXXXXXXX (“X” can be 0-9, A-Z or blank)
Applicant:	Vecow Co., Ltd
Tested:	Jun. 13 ~ Jun. 23, 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** **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: MTA-1010W) 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	The power consumption of EUT is less than 75W and no limits apply
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 B
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 B
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	Panel PC
Brand	Vecow
Model	MTA-1010W
Series Model	MTA-1XXXXXXXXXXXXXX (“X” can be 0-9, A-Z or blank)
Applicant	Vecow Co., Ltd
Received Date	Mar. 25, 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	Ubuntu 22.04.1 LTS
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	MEAN WELL
Model	GST160A24
Input Power	100-240Vac, 2.0A, 50/60Hz
Output Power	24Vdc, 6.67A
Power line	Input: 1.8m non-shielded cable Output: 1m non-shielded cable with 1 core

2. The EUT contains following components.

Item	**Brand**	**Model**	**Spec.**	**Qty.**
CPU	NXP	i.MX 8M PLUS	1.8GHz	1
Memory	Kingston	4 EMMC32G-TX29	32G	1

3. The EUT’s highest operating frequency is 1.8GHz. 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 (10Mbps/100Mbps/1Gbps)
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 Micro SD card.
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.

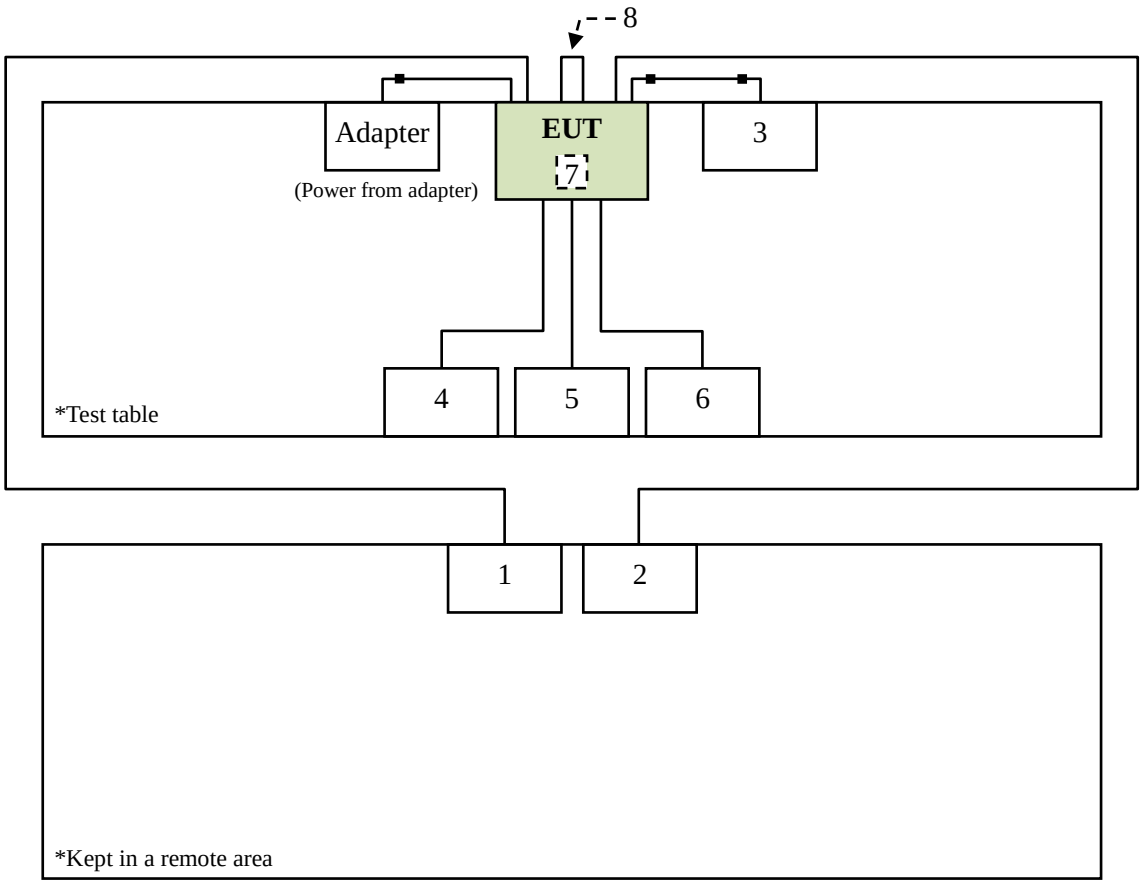
3.4 Description of Associated Equipment

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	Desktop PC	DELL	D24M	N/A	PD93165NG	15m CAT.6A shielded LAN cable	AC: 1.8m non-shielded cable	-
3	4K Monitor	HP	HP 27f 4k Display	3CM01935TF	FCC SDoC Approved	1.5m shielded HDMI cable with 2 cores	AC: 1.8m non-shielded cable DC: 1.4m non-shielded cable with 1 core	-
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	Micro SD Card	N/A	N/A	N/A	N/A	N/A	N/A	Supplied by client
8	RS232 Loop Cable	N/A	N/A	N/A	N/A	0.2m non-shielded cable	N/A	Supplied by client

Note: 1. The core(s) is(are) originally attached to the cable(s).
2. Item 1-2 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	Apr. 26, 2025
2	Pulse limiter	R&S	ESH3-Z2	CT-2-015	Apr. 23, 2025
3	EMI Test Receiver	R&S	ESCI	CT-1-024	Apr. 18, 2025
4	Artificial Mains Network (AMN)	SCHWARZBECK	NSLK 8127	CT-1-104-1	Apr. 26, 2025
5	RF Cable	MVE	200200.400LL .500A	CT-9-101	Apr. 23, 2025
6	50ohm Termination	N/A	N/A	CT-1-065-1	Apr. 26, 2025
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	May 25, 2025
2	RF Cable	EMCI	EMCCFD300-BM-BM-5000	CT-1-107-2	May 21, 2025
3	EMI Test Receiver	R&S	ESR3	CT-1-103	May 20, 2025
4	Artificial Mains Network (AMN)	SCHWARZBECK	NSLK 8127 RC	CT-1-104-1RC	May 25, 2025
5	Transient Limiter	Electro-Metrics	EM-7600	CT-1-026	May 21, 2025
6	50ohm Termination	N/A	N/A	CT-1-109-1	May 26, 2025
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.

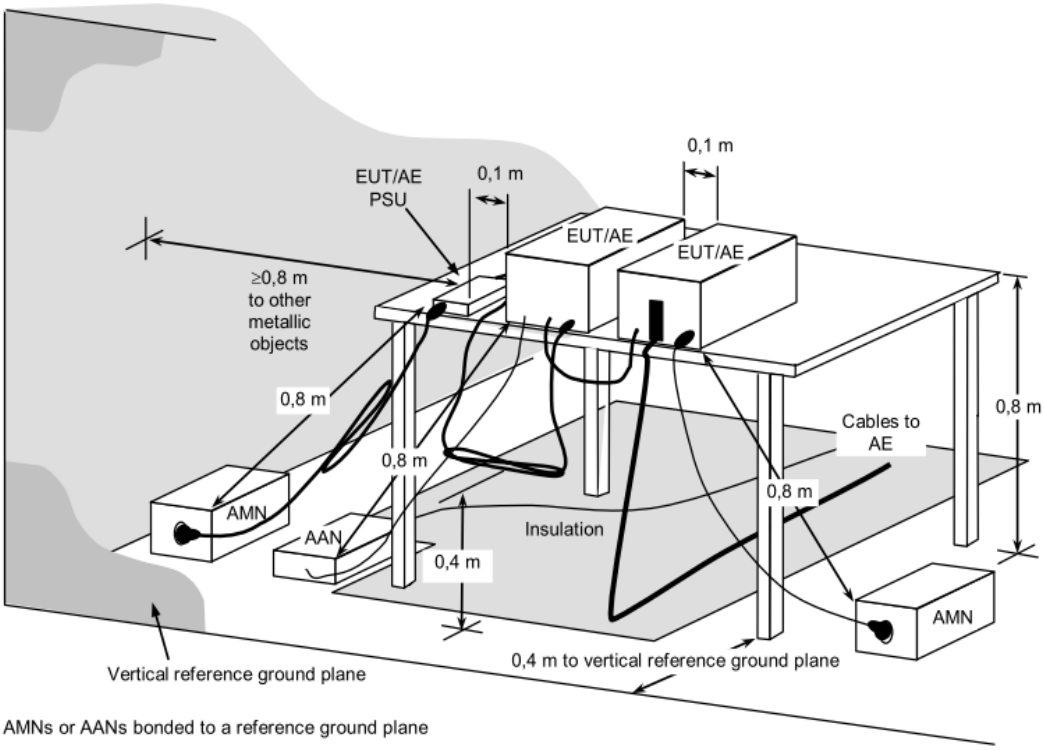
g. The equipment under test and cable configuration of the above highest emission amplitude were recorded.

4.1.4 Deviation from Standard

No deviation

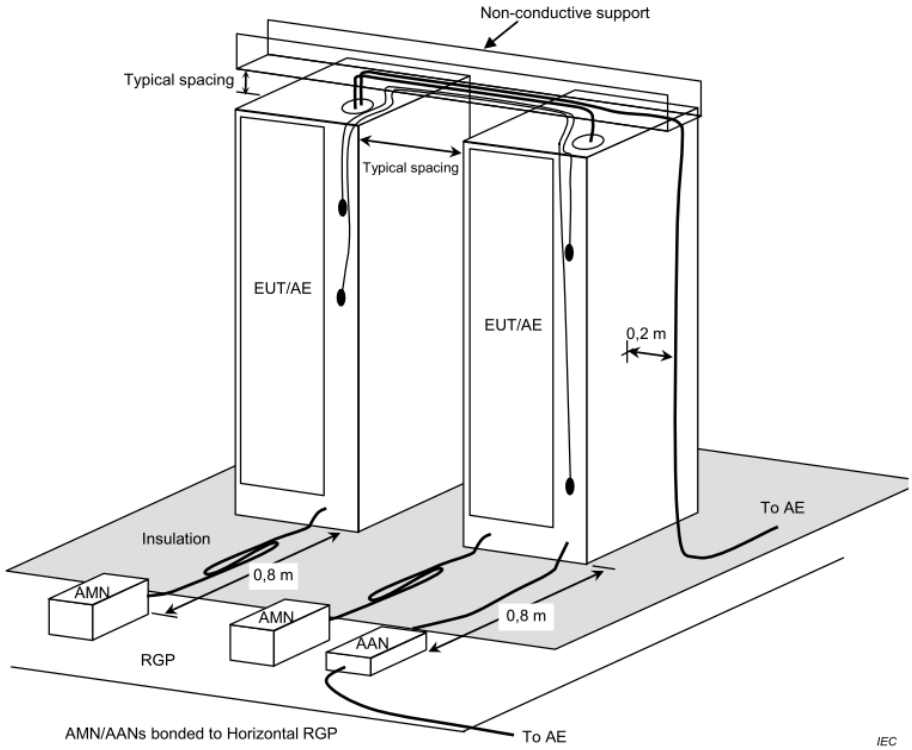
4.1.5 Measurement Configuration

< Table-Top equipment under test >



AMNs or AANs bonded to a reference ground plane

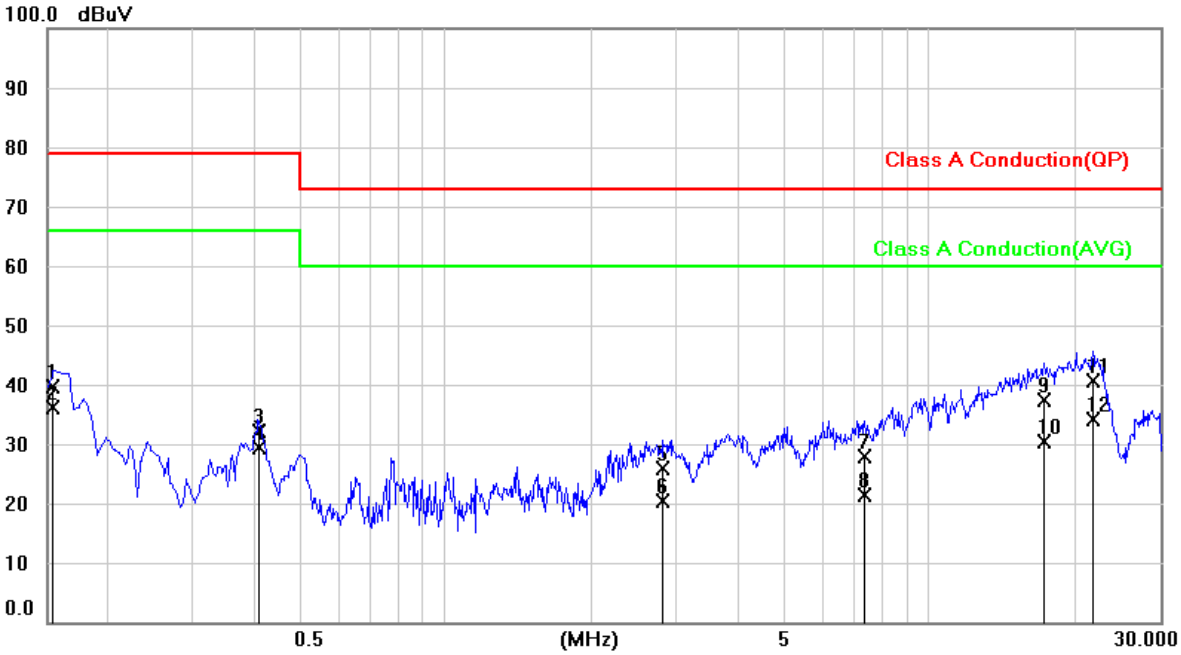
< Floor-Standing equipment under test >



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

4.1.6 Measurement Result

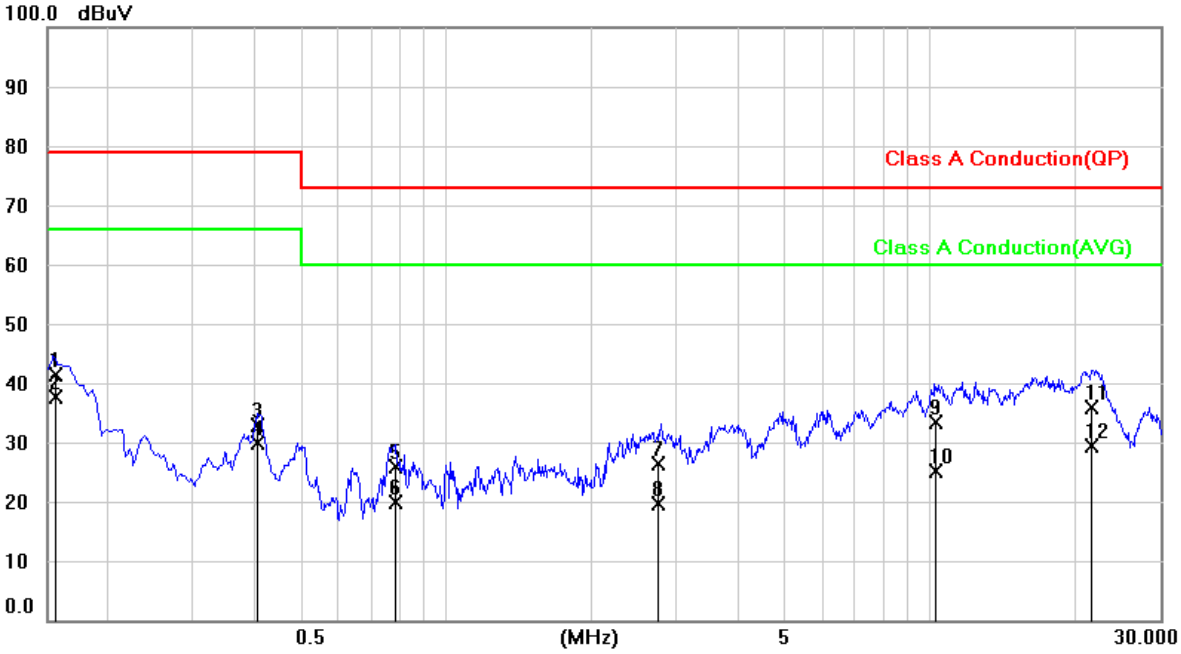
Test Voltage	230Vac, 50Hz	**Frequency Range**	0.15 ~ 30 MHz
Environmental Conditions	23.2℃, 43% RH	**6dB Bandwidth**	9 kHz
Test Date	2025/06/17	**Phase**	L
Tested by	Wayne Yang	**Test Site**	W08-CE



No.	Frequency (MHz)	Reading Level (dBµV)	Correct Factor (dB)	Measurement (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.1538	29.78	9.83	39.61	79.00	-39.39	QP
2	0.1538	26.21	9.83	36.04	66.00	-29.96	AVG
3	0.4122	22.28	9.83	32.11	79.00	-46.89	QP
4	0.4122	19.45	9.83	29.28	66.00	-36.72	AVG
5	2.8079	15.87	9.92	25.79	73.00	-47.21	QP
6	2.8079	10.41	9.92	20.33	60.00	-39.67	AVG
7	7.3593	17.91	10.07	27.98	73.00	-45.02	QP
8	7.3593	11.31	10.07	21.38	60.00	-38.62	AVG
9	17.3584	27.20	10.26	37.46	73.00	-35.54	QP
10	17.3584	20.22	10.26	30.48	60.00	-29.52	AVG
11	21.8381	30.23	10.35	40.58	73.00	-32.42	QP
12	21.8381	23.70	10.35	34.05	60.00	-25.95	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

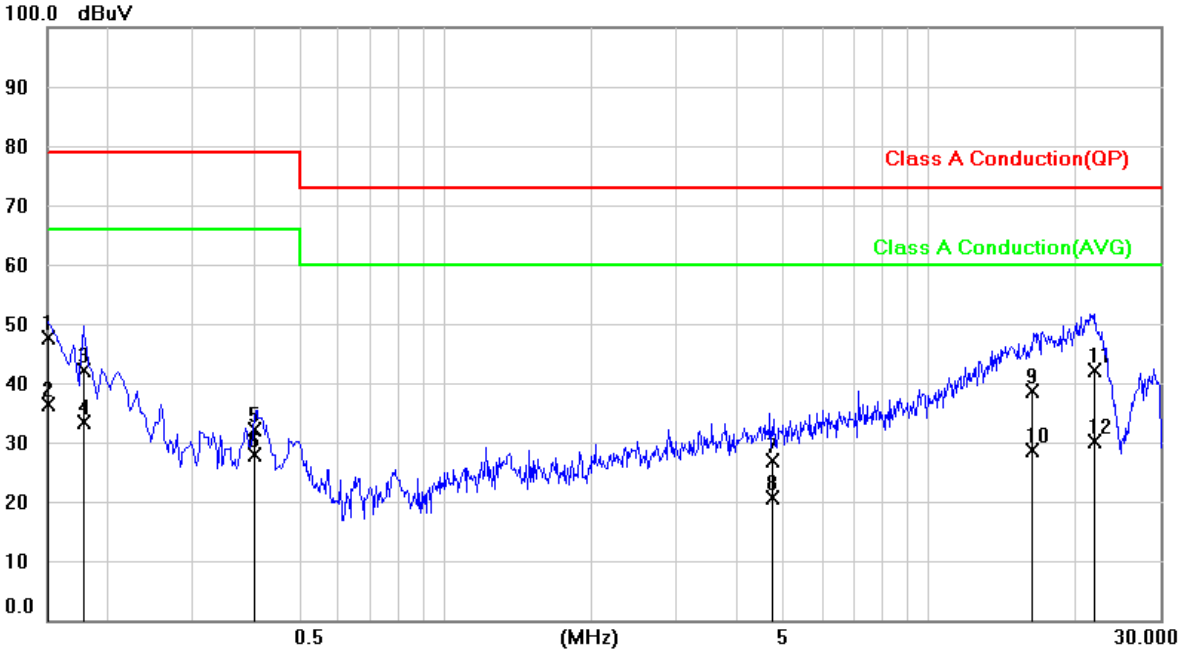
Test Voltage	230Vac, 50Hz	**Frequency Range**	0.15 ~ 30 MHz
Environmental Conditions	23.2℃, 43% RH	**6dB Bandwidth**	9 kHz
Test Date	2025/06/17	**Phase**	N
Tested by	Wayne Yang	**Test Site**	W08-CE



No.	Frequency (MHz)	Reading Level (dBµV)	Correct Factor (dB)	Measurement (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.1560	31.56	9.82	41.38	79.00	-37.62	QP
2	0.1560	27.72	9.82	37.54	66.00	-28.46	AVG
3	0.4082	23.00	9.82	32.82	79.00	-46.18	QP
4	0.4082	20.01	9.82	29.83	66.00	-36.17	AVG
5	0.7870	16.11	9.83	25.94	73.00	-47.06	QP
6	0.7870	10.05	9.83	19.88	60.00	-40.12	AVG
7	2.7608	16.54	9.91	26.45	73.00	-46.55	QP
8	2.7608	9.76	9.91	19.67	60.00	-40.33	AVG
9	10.3328	23.38	10.11	33.49	73.00	-39.51	QP
10	10.3328	14.98	10.11	25.09	60.00	-34.91	AVG
11	21.7038	25.57	10.34	35.91	73.00	-37.09	QP
12	21.7038	19.03	10.34	29.37	60.00	-30.63	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

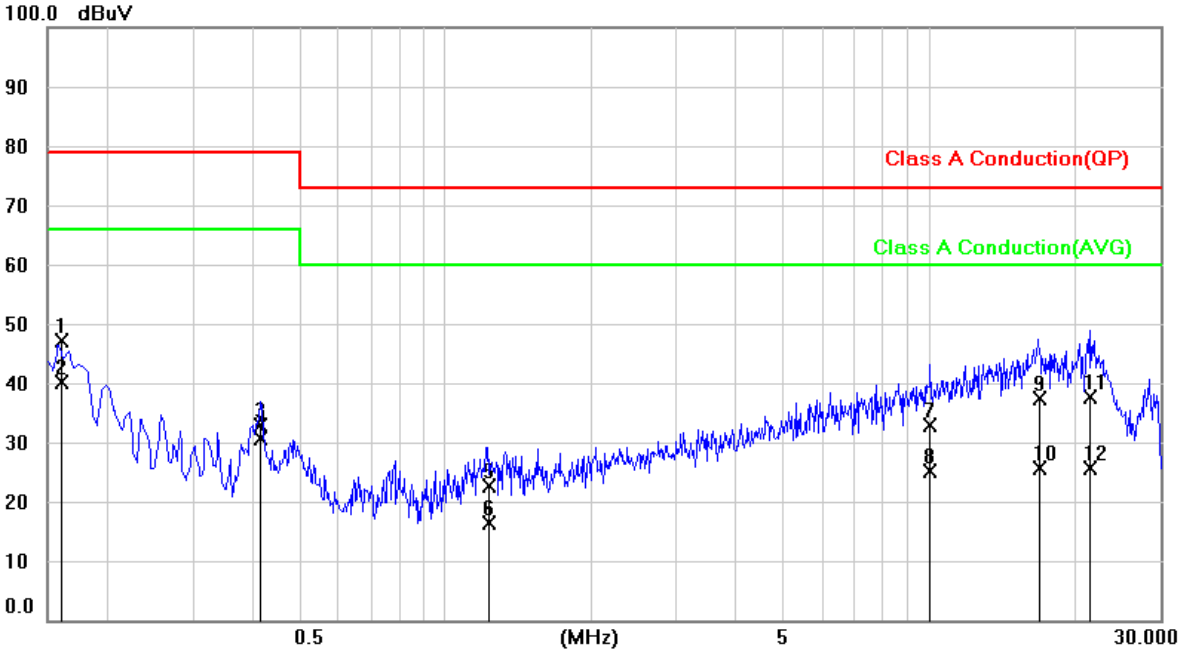
Test Voltage	110Vac, 60Hz	Frequency Range	0.15 ~ 30 MHz
Environmental Conditions	23.2℃, 43% RH	6dB Bandwidth	9 kHz
Test Date	2025/06/17	Phase	L
Tested by	Wayne Yang	Test Site	W08-CE



No.	Frequency (MHz)	Reading Level (dBµV)	Correct Factor (dB)	Measurement (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.1508	37.93	9.82	47.75	79.00	-31.25	QP
2	0.1508	26.67	9.82	36.49	66.00	-29.51	AVG
3	0.1790	32.19	9.82	42.01	79.00	-36.99	QP
4	0.1790	23.53	9.82	33.35	66.00	-32.65	AVG
5	0.4020	22.38	9.83	32.21	79.00	-46.79	QP
6	0.4020	18.06	9.83	27.89	66.00	-38.11	AVG
7	4.7500	16.82	9.99	26.81	73.00	-46.19	QP
8	4.7500	10.57	9.99	20.56	60.00	-39.44	AVG
9	16.3758	28.27	10.25	38.52	73.00	-34.48	QP
10	16.3758	18.31	10.25	28.56	60.00	-31.44	AVG
11	22.0458	31.69	10.36	42.05	73.00	-30.95	QP
12	22.0458	19.71	10.36	30.07	60.00	-29.93	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

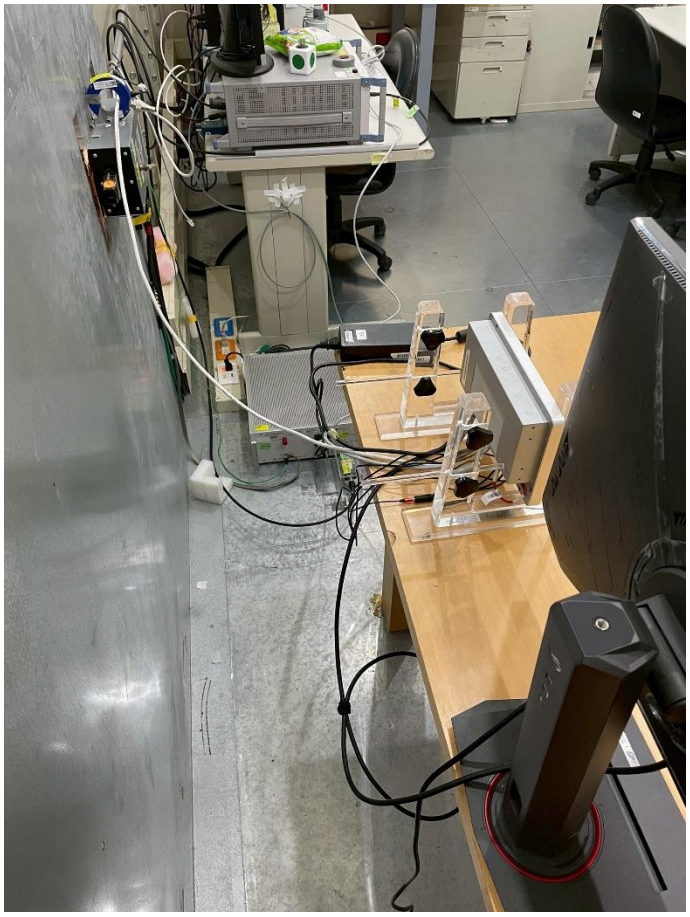
Test Voltage	110Vac, 60Hz	**Frequency Range**	0.15 ~ 30 MHz
Environmental Conditions	23.2℃, 43% RH	**6dB Bandwidth**	9 kHz
Test Date	2025/06/17	**Phase**	N
Tested by	Wayne Yang	**Test Site**	W08-CE



No.	Frequency (MHz)	Reading Level (dBµV)	Correct Factor (dB)	Measurement (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.1602	37.22	9.82	47.04	79.00	-31.96	QP
2	0.1602	30.30	9.82	40.12	66.00	-25.88	AVG
3	0.4107	23.12	9.82	32.94	79.00	-46.06	QP
4	0.4107	20.69	9.82	30.51	66.00	-35.49	AVG
5	1.2338	12.67	9.85	22.52	73.00	-50.48	QP
6	1.2338	6.46	9.85	16.31	60.00	-43.69	AVG
7	10.0817	22.65	10.11	32.76	73.00	-40.24	QP
8	10.0817	15.03	10.11	25.14	60.00	-34.86	AVG
9	16.8727	27.04	10.24	37.28	73.00	-35.72	QP
10	16.8727	15.45	10.24	25.69	60.00	-34.31	AVG
11	21.5076	27.32	10.34	37.66	73.00	-35.34	QP
12	21.5076	15.37	10.34	25.71	60.00	-34.29	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	Apr. 26, 2025
2	EMI Test Receiver	R&S	ESCI	CT-1-024	Apr. 18, 2025
3	Impedance Stabilization Network	TESEQ	T8-CAT6	CT-1-105	May 09, 2025
4	Artificial Mains Network (AMN)	SCHWARZBECK	NSLK 8127	CT-1-104-1	Apr. 26, 2025
5	RF Cable	MVE	200200.400LL .500A	CT-9-101	Apr. 23, 2025
6	50ohm Termination	N/A	N/A	CT-1-065-1	Apr. 26, 2025
7	Measurement Software	EZ-EMC	Ver: EMC-CON 3A1	CT-3-012	No calibration request
8	Current Probe	TESEQ	CSP 9160A	CT-1-106	Apr. 17, 2025

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	May 25, 2025
2	RF Cable	EMCI	EMCCFD300-BM-BM-5000	CT-1-107-2	May 21, 2025
3	EMI Test Receiver	R&S	ESR3	CT-1-103	May 20, 2025
4	Artificial Mains Network (AMN)	SCHWARZBECK	NSLK 8127 RC	CT-1-104-1RC	May 25, 2025
5	Four Balanced Pair ISN	FCC	F-071115-1057-1-09	CT-1-027	May 21, 2025
6	50ohm Termination	N/A	N/A	CT-1-109-2	May 26, 2025
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.

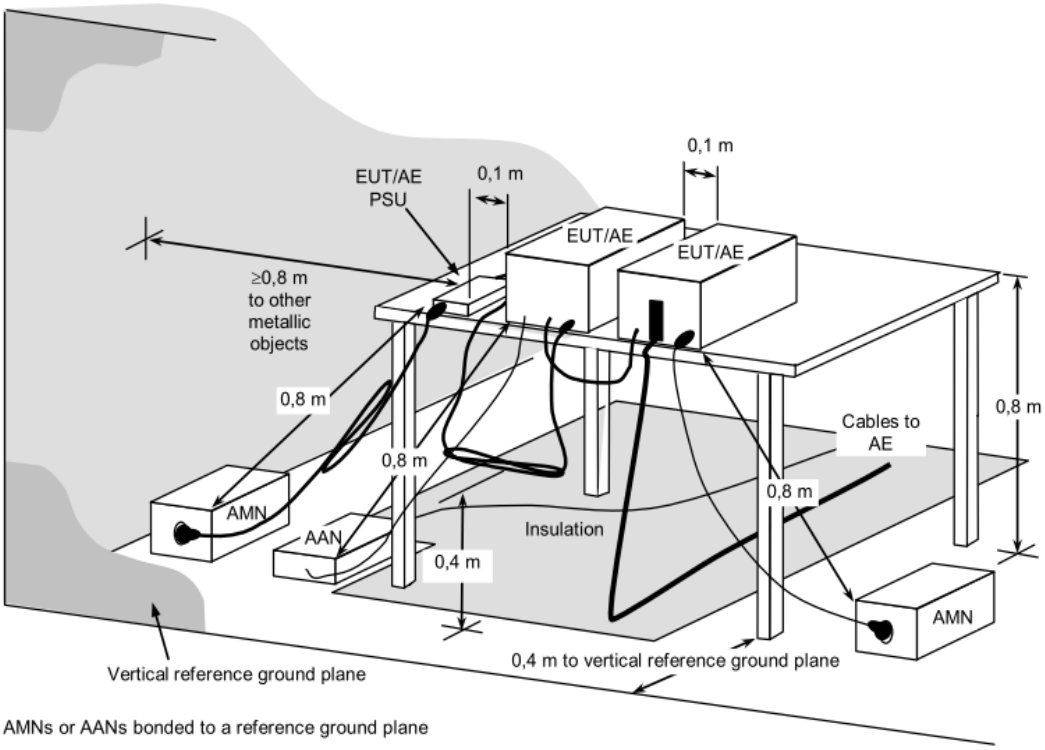
h. The equipment under test and cable configuration of the above highest emission amplitude were recorded.

4.2.4 Deviation from Standard

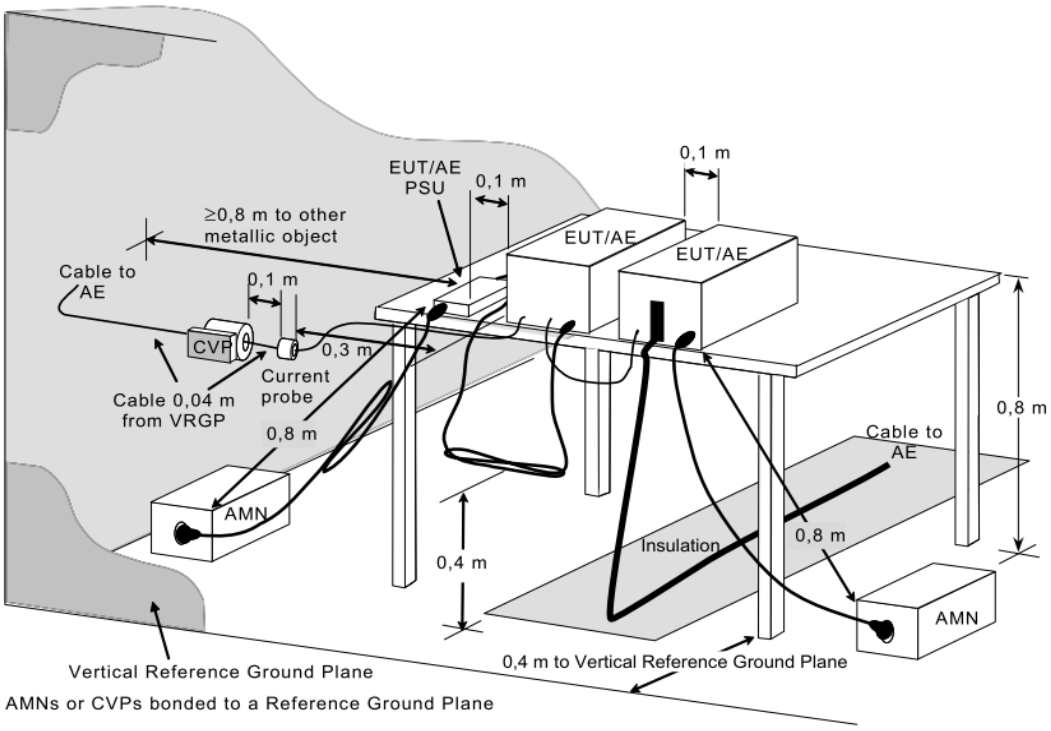
No deviation

4.2.5 Measurement Configuration

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



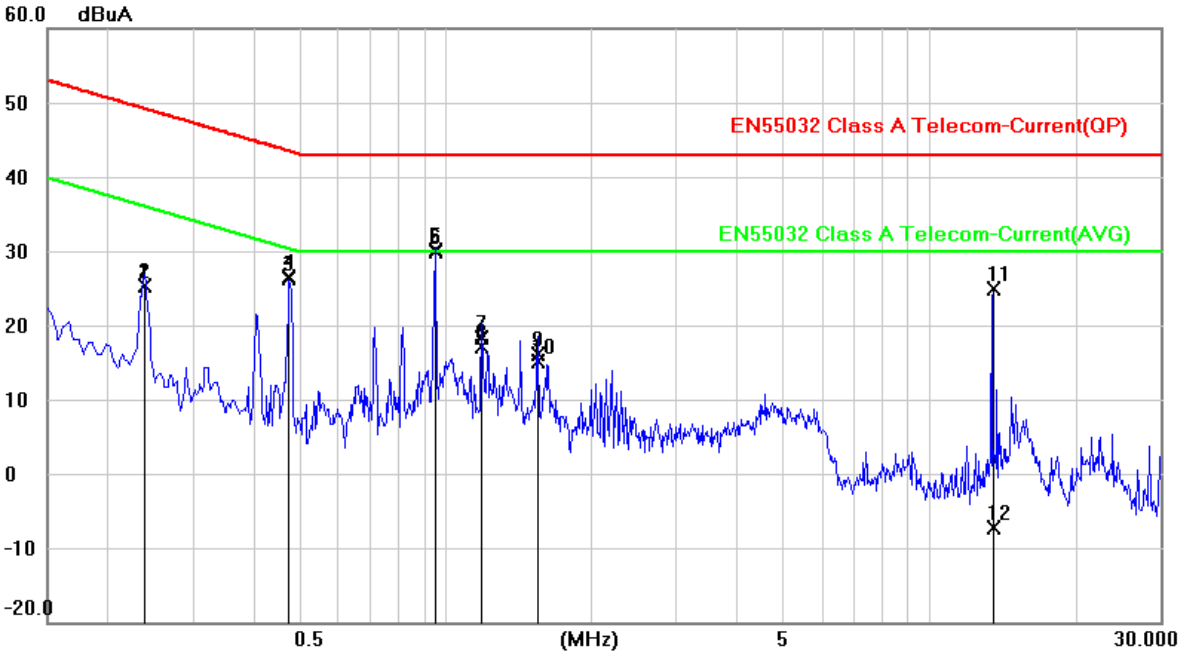
< Table-Top equipment under test for shielded / shielded twisted pair >



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

4.2.6 Measurement Result

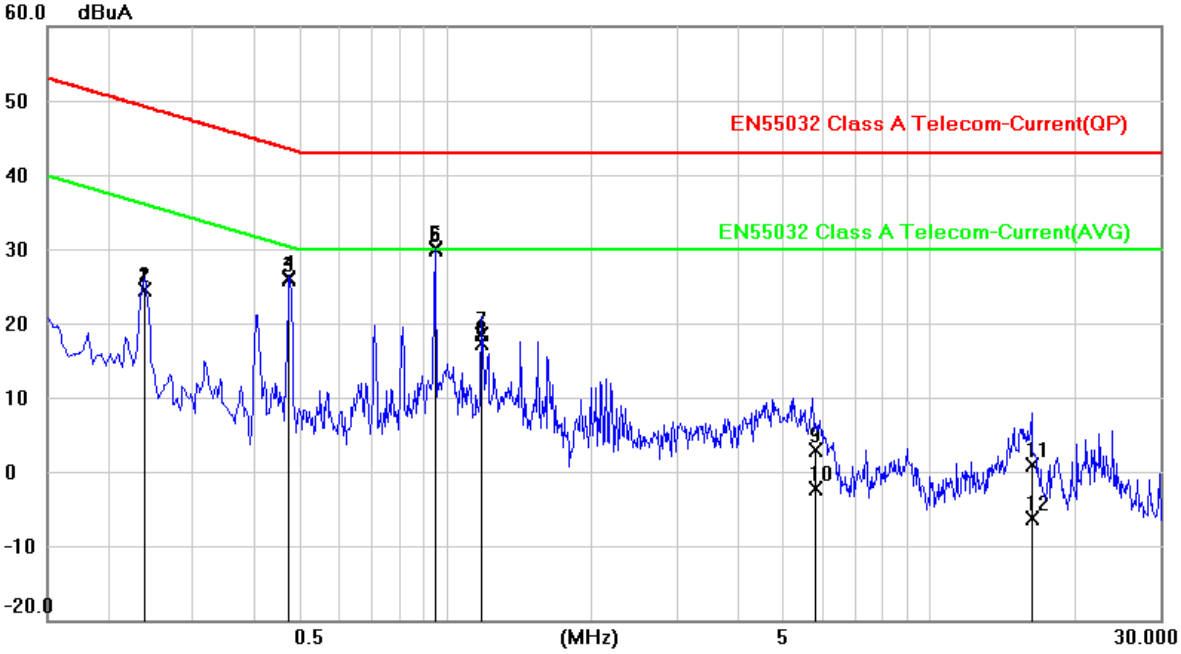
Test Voltage	230Vac, 50Hz	Frequency Range	0.15 ~ 30 MHz
Environmental Conditions	23.2℃, 43% RH	6dB Bandwidth	9 kHz
Test Date	2025/06/17	Test Condition	LAN port (10Mbps)
Tested by	Wayne Yang	Test Site	W08-CE



No.	Frequency (MHz)	Reading Level (dBµA)	Correct Factor (dB)	Measurement (dBµA)	Limit (dBµA)	Margin (dB)	Detector
1	0.2383	13.77	11.54	25.31	49.16	-23.85	QP
2	0.2383	13.80	11.54	25.34	36.16	-10.82	AVG
3	0.4758	21.04	5.32	26.36	43.41	-17.05	QP
4	0.4758	21.11	5.32	26.43	30.41	-3.98	AVG
5	0.9508	30.65	-0.60	30.05	43.00	-12.95	QP
6	0.9508	30.52	-0.60	29.92	30.00	-0.08	AVG
7	1.1892	20.35	-2.08	18.27	43.00	-24.73	QP
8	1.1892	19.20	-2.08	17.12	30.00	-12.88	AVG
9	1.5508	20.05	-4.01	16.04	43.00	-26.96	QP
10	1.5508	19.11	-4.01	15.10	30.00	-14.90	AVG
11	13.5601	37.92	-13.06	24.86	43.00	-18.14	QP
12	13.5601	5.72	-13.06	-7.34	30.00	-37.34	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

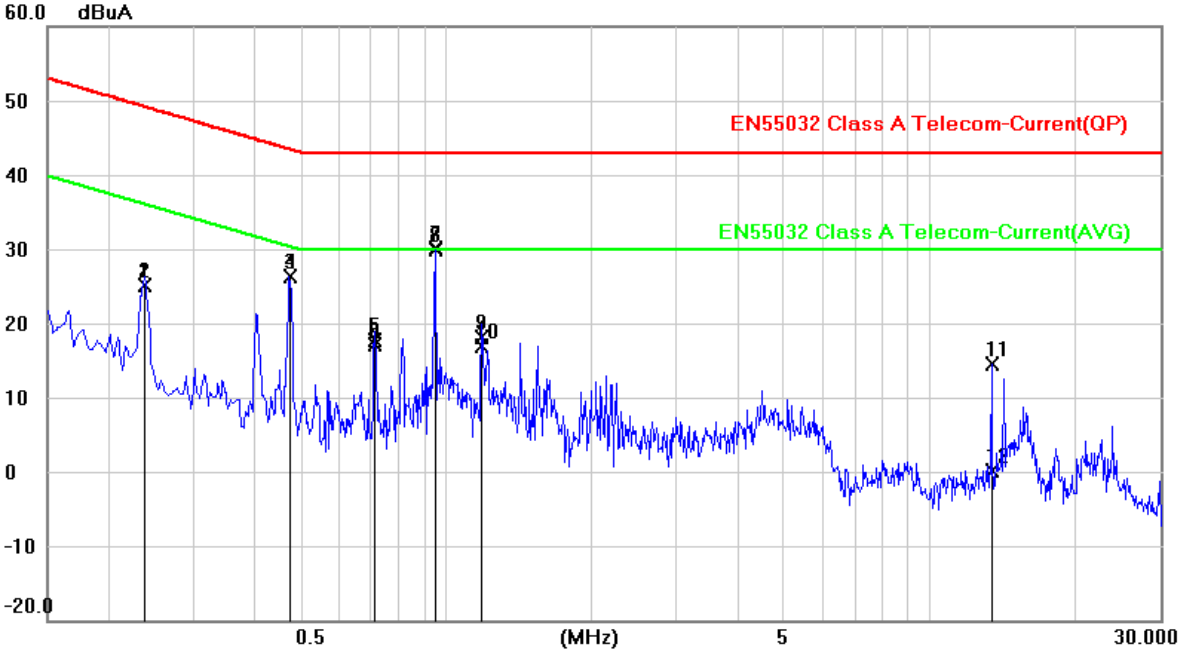
Test Voltage	230Vac, 50Hz	Frequency Range	0.15 ~ 30 MHz
Environmental Conditions	23.2℃, 43% RH	6dB Bandwidth	9 kHz
Test Date	2025/06/17	Test Condition	LAN port (100Mbps)
Tested by	Wayne Yang	Test Site	W08-CE



No.	Frequency (MHz)	Reading Level (dBµA)	Correct Factor (dB)	Measurement (dBµA)	Limit (dBµA)	Margin (dB)	Detector
1	0.2369	12.92	11.58	24.50	49.20	-24.70	QP
2	0.2369	12.91	11.58	24.49	36.20	-11.71	AVG
3	0.4756	20.62	5.32	25.94	43.42	-17.48	QP
4	0.4756	20.69	5.32	26.01	30.42	-4.41	AVG
5	0.9513	30.64	-0.60	30.04	43.00	-12.96	QP
6	0.9513	30.57	-0.60	29.97	30.00	-0.03	AVG
7	1.1894	20.50	-2.08	18.42	43.00	-24.58	QP
8	1.1894	19.39	-2.08	17.31	30.00	-12.69	AVG
9	5.7828	14.54	-11.69	2.85	43.00	-40.15	QP
10	5.7828	9.36	-11.69	-2.33	30.00	-32.33	AVG
11	16.1488	14.17	-13.17	1.00	43.00	-42.00	QP
12	16.1488	6.78	-13.17	-6.39	30.00	-36.39	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

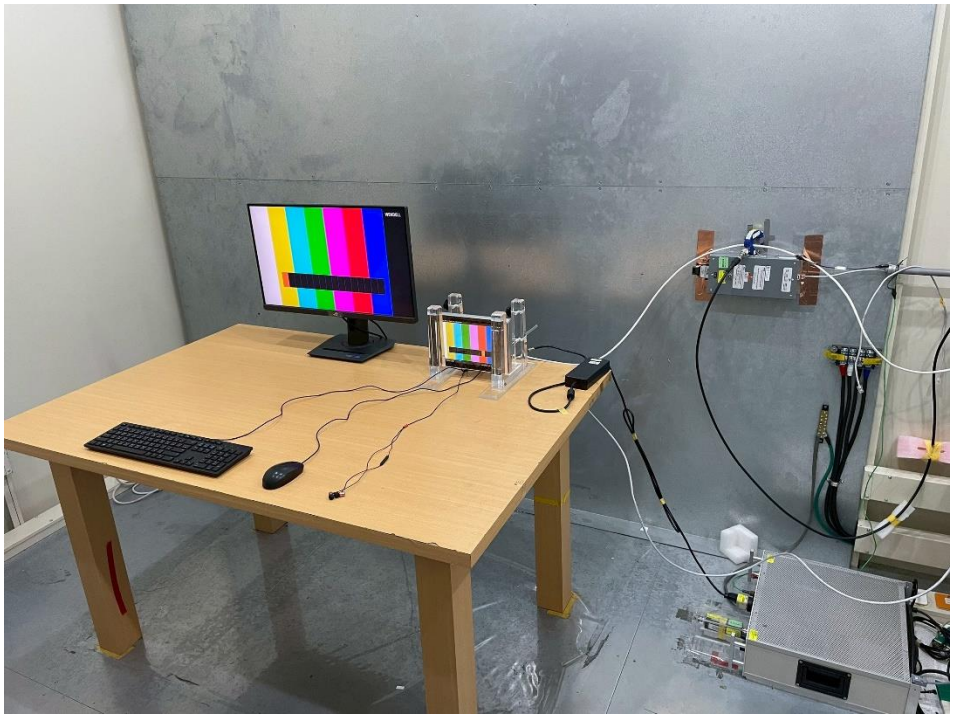
Test Voltage	230Vac, 50Hz	Frequency Range	0.15 ~ 30 MHz
Environmental Conditions	23.2℃, 43% RH	6dB Bandwidth	9 kHz
Test Date	2025/06/17	Test Condition	LAN port (1Gbps)
Tested by	Wayne Yang	Test Site	W08-CE

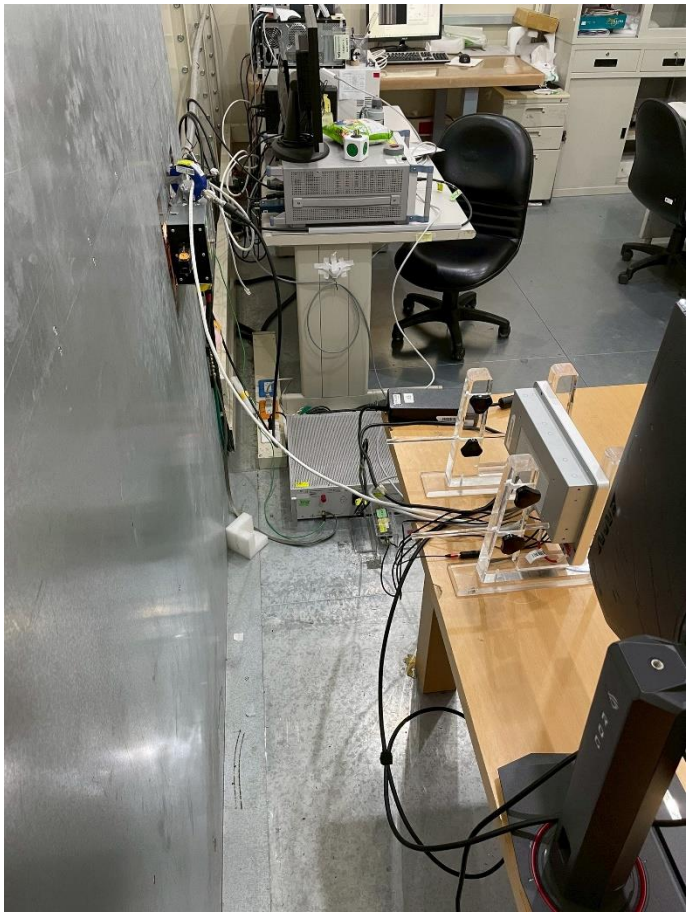


No.	Frequency (MHz)	Reading Level (dBµA)	Correct Factor (dB)	Measurement (dBµA)	Limit (dBµA)	Margin (dB)	Detector
1	0.2374	13.56	11.57	25.13	49.19	-24.06	QP
2	0.2374	13.52	11.57	25.09	36.19	-11.10	AVG
3	0.4761	20.95	5.31	26.26	43.41	-17.15	QP
4	0.4761	21.02	5.31	26.33	30.41	-4.08	AVG
5	0.7133	15.88	1.73	17.61	43.00	-25.39	QP
6	0.7133	15.42	1.73	17.15	30.00	-12.85	AVG
7	0.9509	30.68	-0.60	30.08	43.00	-12.92	QP
8	0.9509	30.58	-0.60	29.98	30.00	-0.02	AVG
9	1.1892	20.15	-2.08	18.07	43.00	-24.93	QP
10	1.1892	19.06	-2.08	16.98	30.00	-13.02	AVG
11	13.4138	27.50	-13.05	14.45	43.00	-28.55	QP
12	13.4138	13.20	-13.05	0.15	30.00	-29.85	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	Apr. 29, 2025
4	Spectrum Analyzer	Agilent	E4407B	CT-1-003(1)	May 06, 2025
5	EXA Signal Analyzer	Keysight	N9010A	CT-1-093	Aug. 18, 2024
6	EMI Test Receiver	Keysight	N9038A	CT-9-007	May 06, 2025
7	Preamplifier	EM	EMC330	CT-9-024	May 06, 2025
8	Preamplifier	SGH & MCL	SGH118 & BW-S15W2+	CT-9-071	May 06, 2025
9	Preamplifier	EMCI	EMC184045SE	CT-9-013	Aug. 16, 2024
10	Test Cable	EMCI	EMCCFD400-NM-NM-1000	CT-1-132	May 07, 2025
11	Test Cable	PEWC	CFD400NL-LW-NM-NM-3000	CT-1-141	May 07, 2025
12	Test Cable	EMCI	EMCCFD400-NM-NM-15000	CT-1-133	May 07, 2025
13	Test Cable	EMCI	EMC104-SM-35M-600	CT-1-134	May 07, 2025
14	Test Cable	MVE	280280.LL266.1400	CT-9-106	May 07, 2025
15	Test Cable	EMCI	EMC102-KM-KM-600	CT-1-136	Aug. 21, 2024
16	Test Cable	MVE	140140.LL404.700	CT-9-100	May 07, 2025
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.

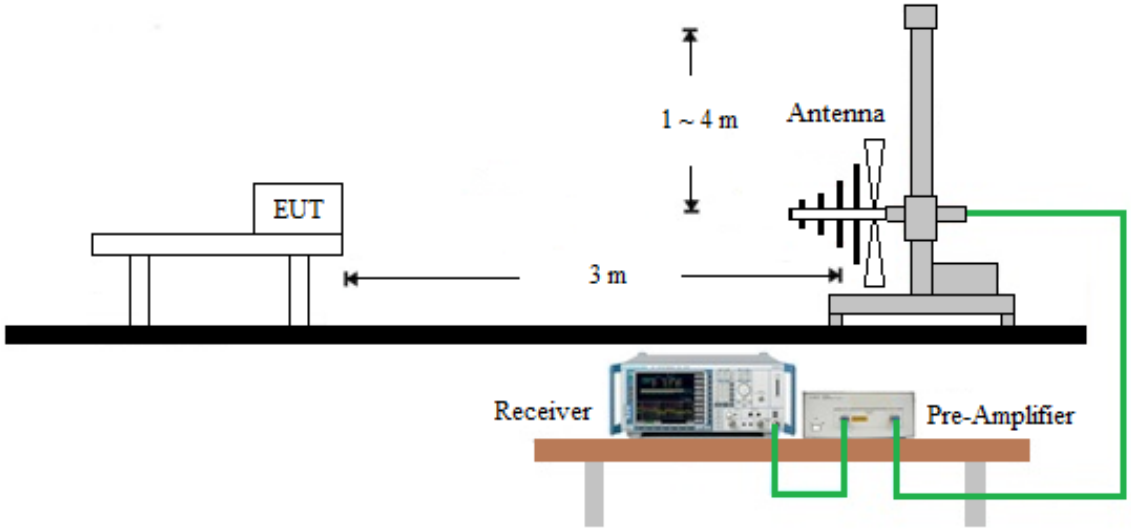
e. Emission frequency and amplitude were recorded, recording at least six highest emissions. The equipment under test and cable configuration of the above highest emission amplitude were recorded.

4.3.4 Deviation from Standard

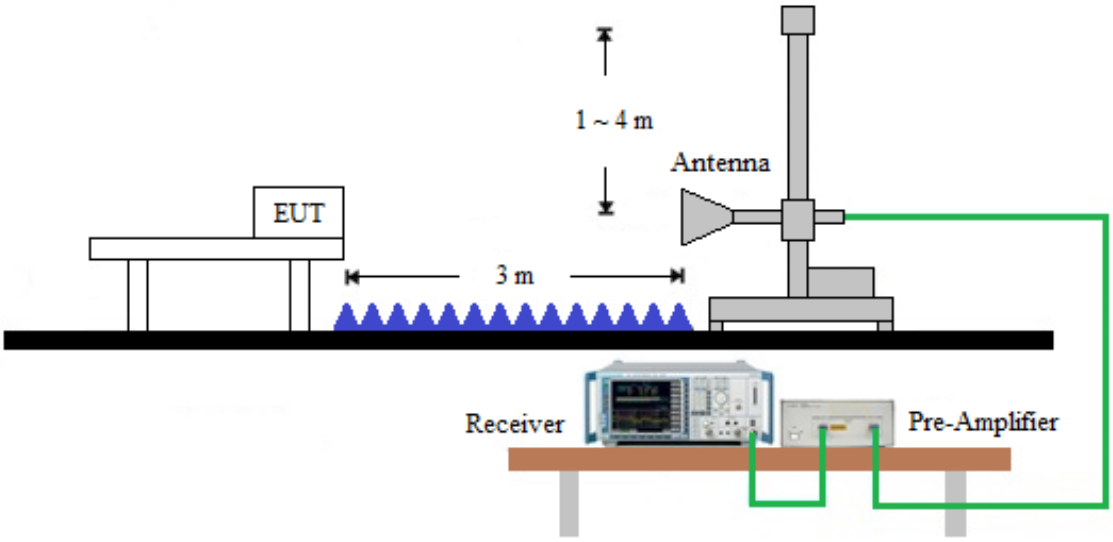
No deviation

4.3.5 Measurement Configuration

< Radiated Emissions Frequency: 30 MHz to 1000 MHz >



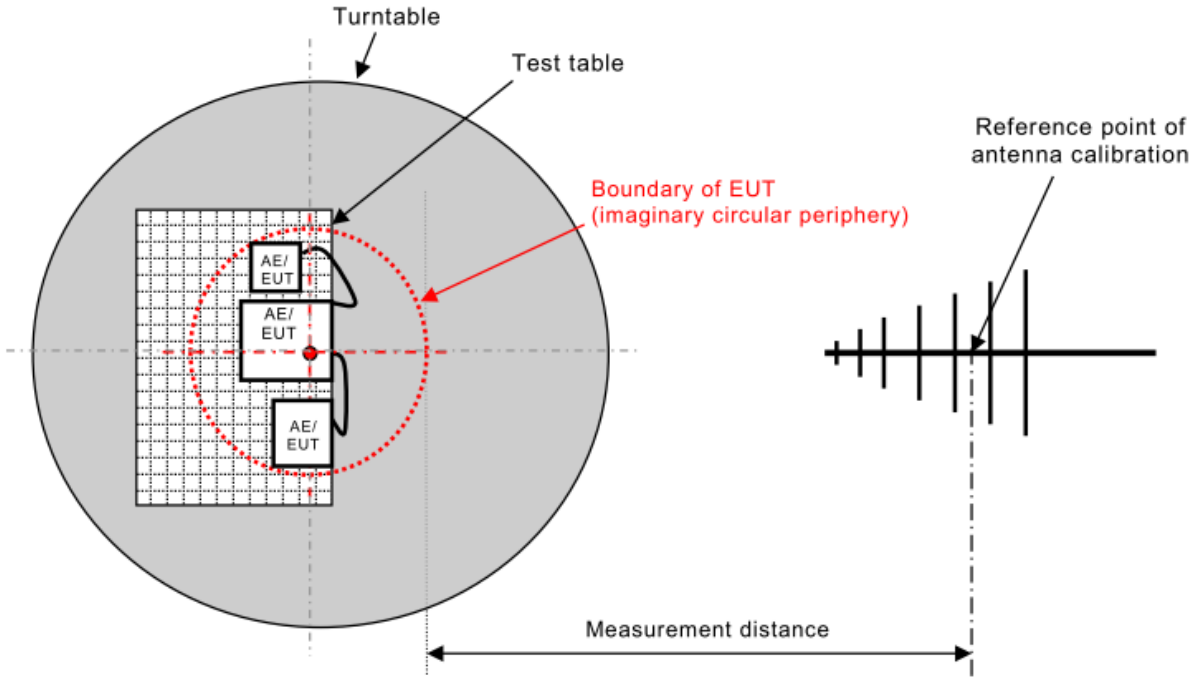
< Radiated Emissions Frequency: above 1GHz >



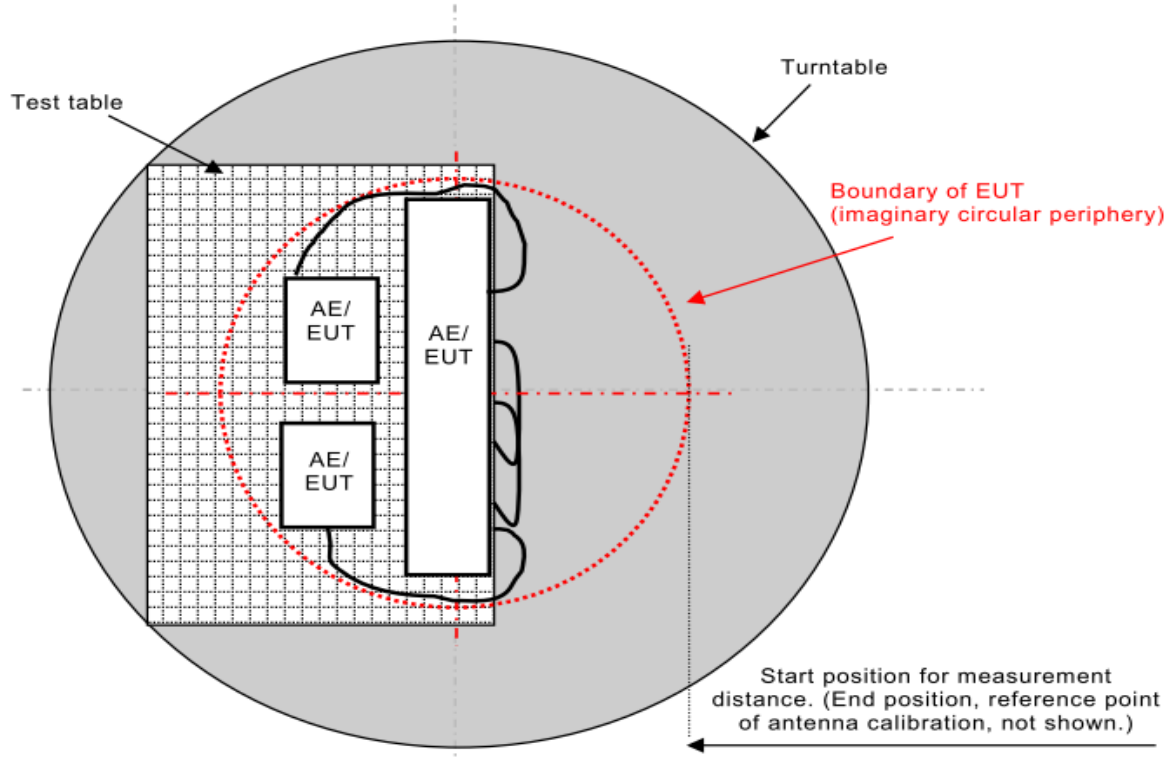
Note:

(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

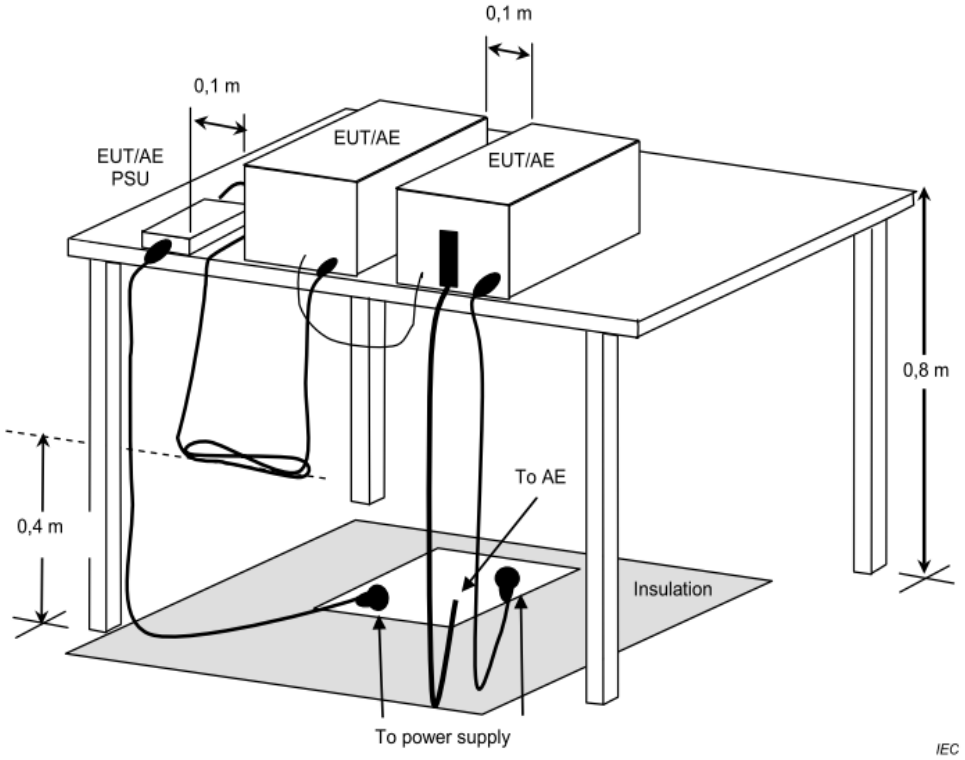
< EUT placement top view and measurement distance >



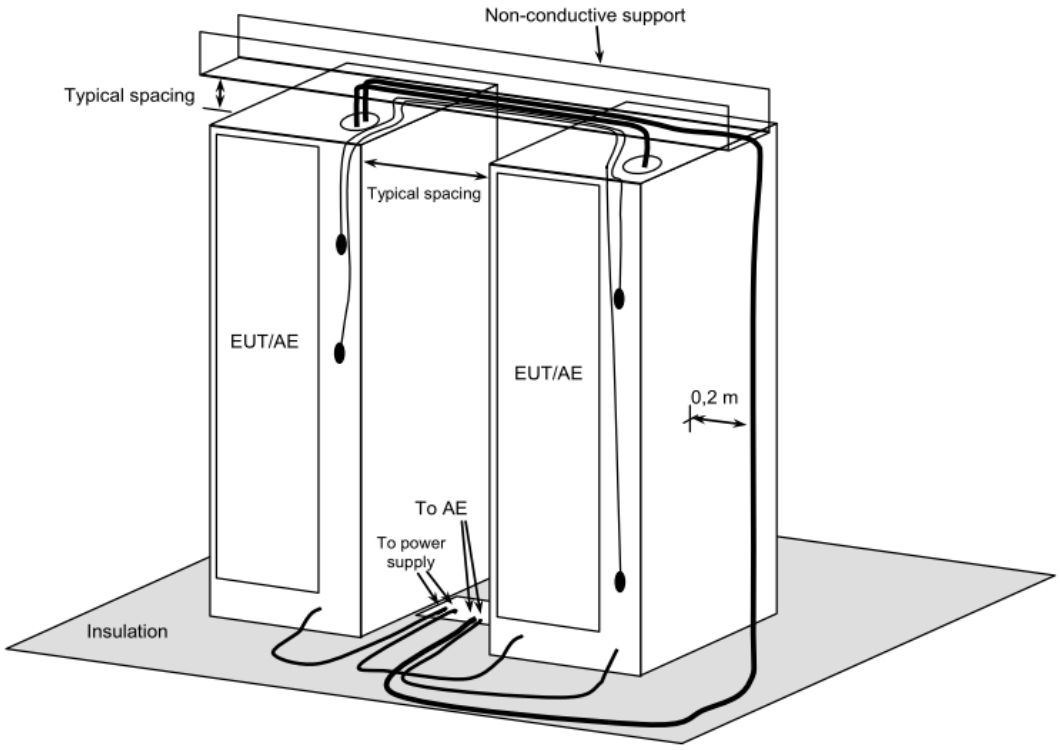
< Boundary of EUT, Local AE and associated cabling >



< Table-Top equipment under test >



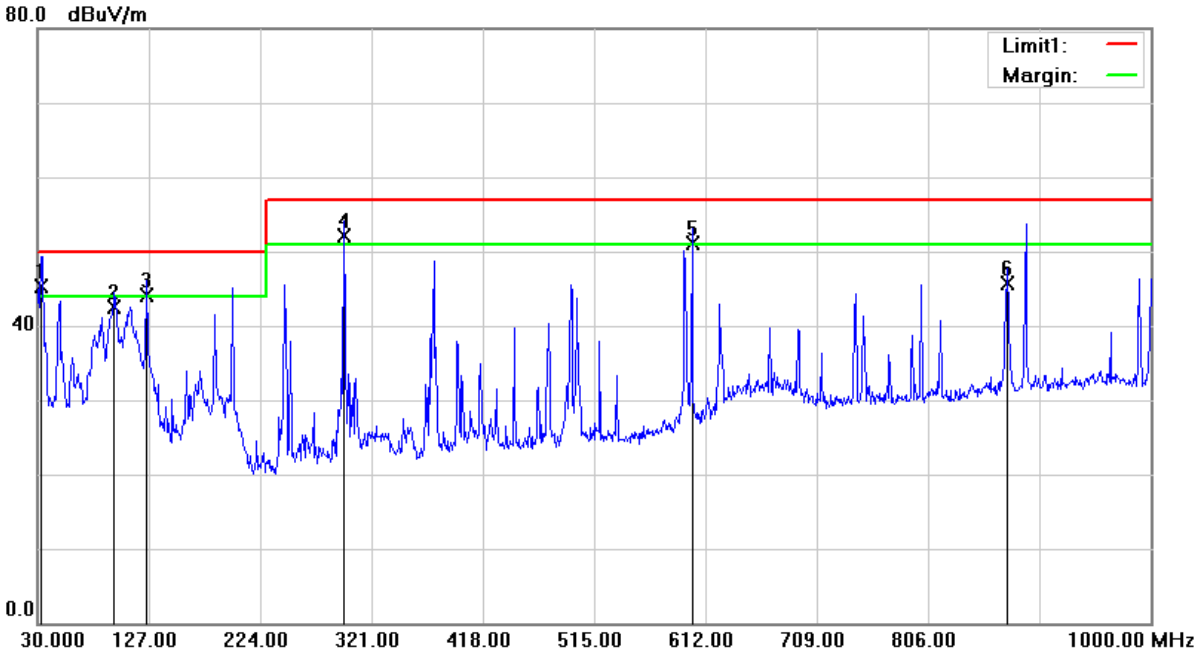
< Floor-Standing equipment under test >



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

4.3.6 Measurement Result

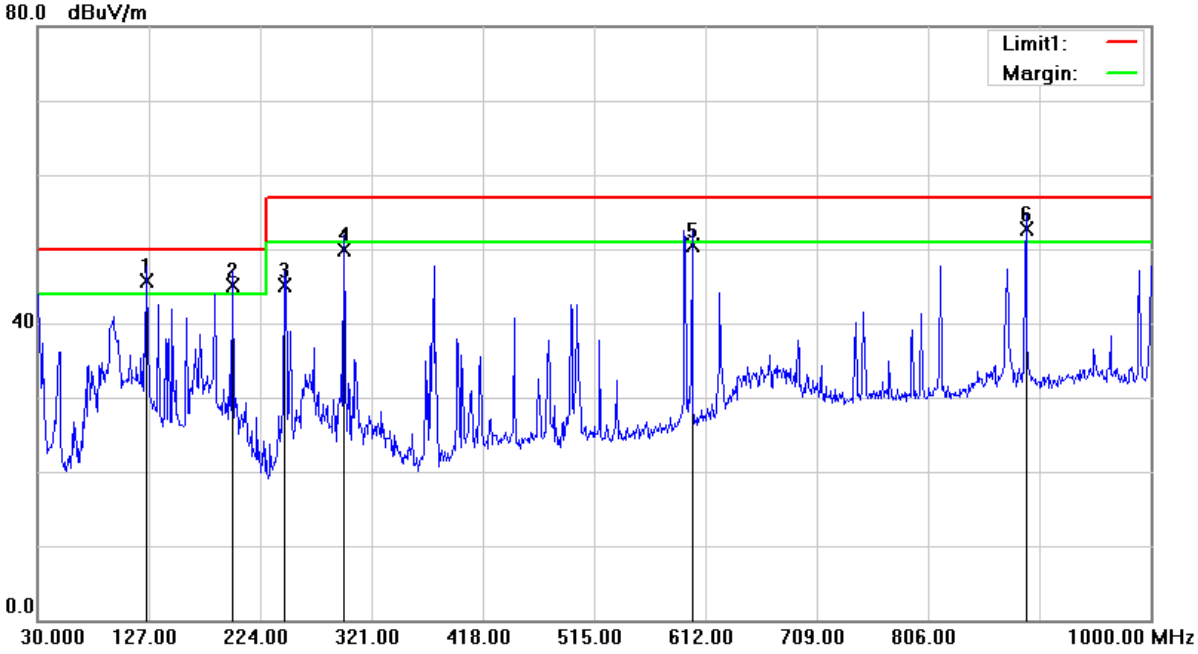
Test Voltage	230Vac, 50Hz	**Frequency Range**	30 ~ 1000 MHz
Environmental Conditions	24℃, 48% RH	**6dB Bandwidth**	120 kHz
Test Date	2025/06/14	**Test Distance**	3m
Tested by	Karwin Kao	**Polarization**	Vertical
Test Site	W08-966-1		



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	32.9100	56.85	-11.52	45.33	50.00	-4.67	162	100	QP
2	96.9300	57.25	-14.77	42.48	50.00	-7.52	256	100	QP
3	125.0600	55.74	-11.72	44.02	50.00	-5.98	129	100	QP
4	296.7500	60.72	-8.56	52.16	57.00	-4.84	359	200	QP
5	600.3600	51.40	-0.30	51.10	57.00	-5.90	192	100	QP
6	874.8700	41.39	4.29	45.68	57.00	-11.32	125	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

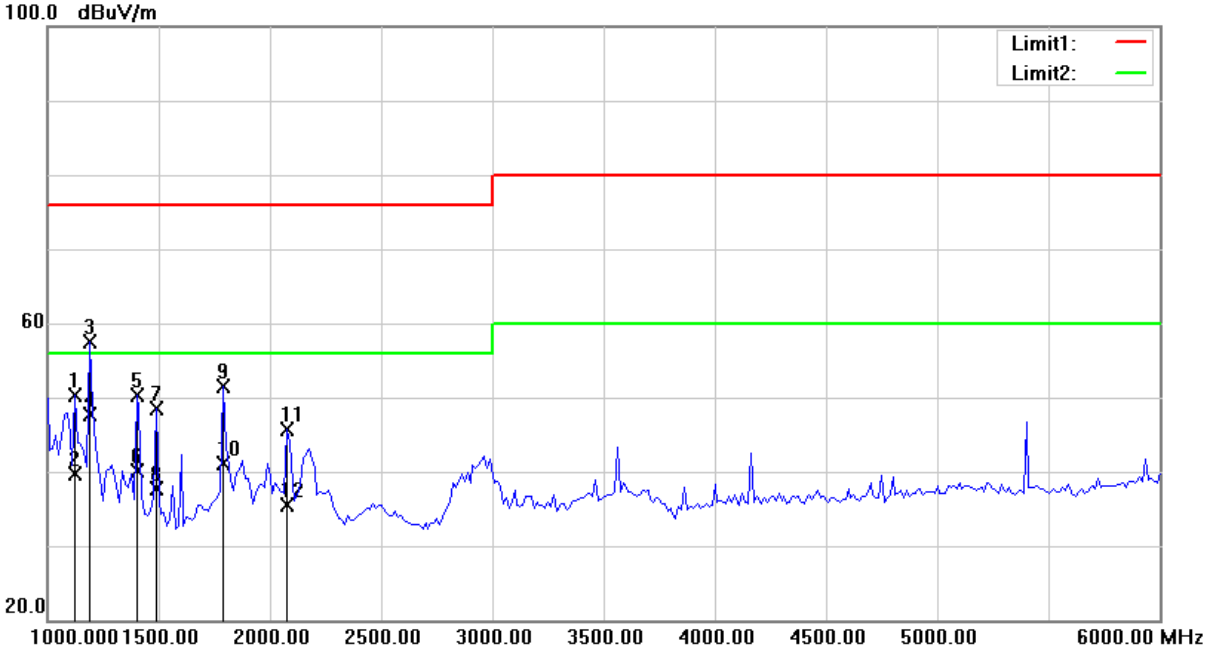
Test Voltage	230Vac, 50Hz	**Frequency Range**	30 ~ 1000 MHz
Environmental Conditions	24℃, 48% RH	**6dB Bandwidth**	120 kHz
Test Date	2025/06/14	**Test Distance**	3m
Tested by	Karwin Kao	**Polarization**	Horizontal
Test Site	W08-966-1		



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	125.0600	57.48	-11.72	45.76	50.00	-4.24	35	200	QP
2	199.7500	57.61	-12.51	45.10	50.00	-4.90	234	100	QP
3	245.3400	55.63	-10.54	45.09	57.00	-11.91	301	100	QP
4	296.7500	58.42	-8.56	49.86	57.00	-7.14	347	100	QP
5	600.3600	50.90	-0.30	50.60	57.00	-6.40	227	100	QP
6	891.3600	48.11	4.54	52.65	57.00	-4.35	177	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

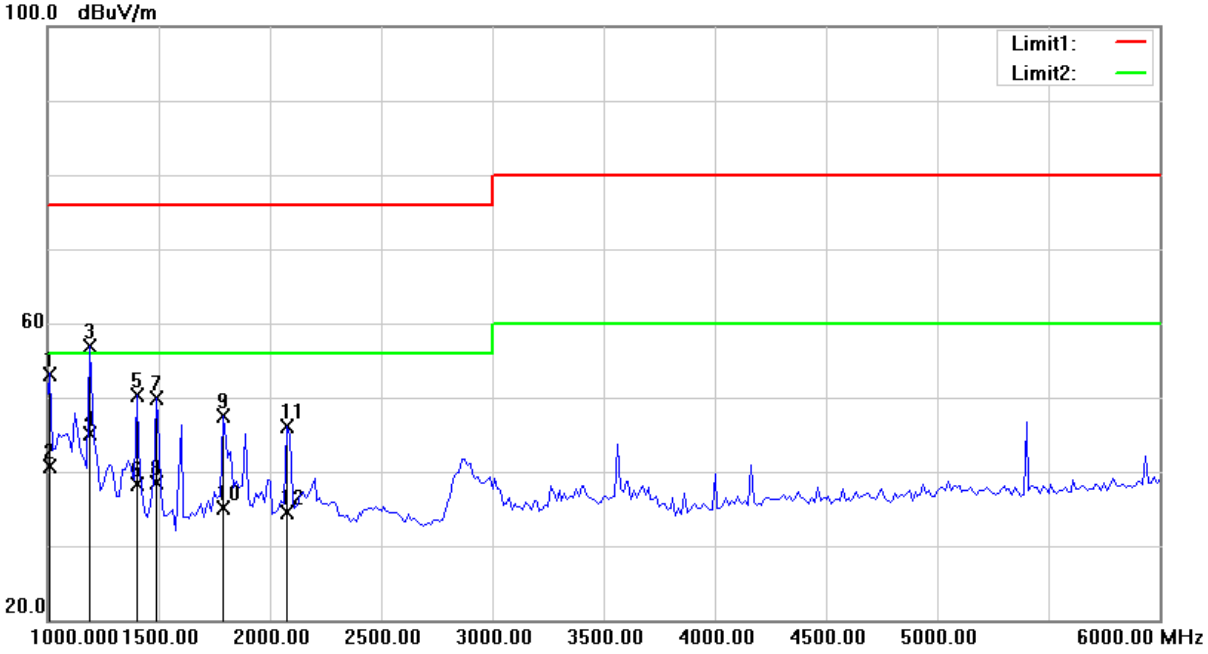
Test Voltage	230Vac, 50Hz	Frequency Range	1 ~ 6 GHz
Environmental Conditions	24℃, 48% RH	6dB Bandwidth	1MHz
Test Date	2025/06/13	Test Distance	3m
Tested by	Karwin Kao	Polarization	Vertical
Test Site	W08-966-1		



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	1125.000	69.81	-19.60	50.21	76.00	-25.79	51	100	peak
2	1125.000	59.31	-19.60	39.71	56.00	-16.29	51	100	AVG
3	1187.500	76.71	-19.16	57.55	76.00	-18.45	33	100	peak
4	1187.500	66.78	-19.16	47.62	56.00	-8.38	33	100	AVG
5	1400.000	68.36	-18.06	50.30	76.00	-25.70	221	100	peak
6	1400.000	58.07	-18.06	40.01	56.00	-15.99	221	100	AVG
7	1487.500	66.91	-18.36	48.55	76.00	-27.45	212	100	peak
8	1487.500	56.09	-18.36	37.73	56.00	-18.27	212	100	AVG
9	1787.500	69.79	-18.20	51.59	76.00	-24.41	177	100	peak
10	1787.500	59.34	-18.20	41.14	56.00	-14.86	177	100	AVG
11	2075.000	61.97	-16.20	45.77	76.00	-30.23	177	100	peak
12	2075.000	51.77	-16.20	35.57	56.00	-20.43	177	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	24℃, 48% RH	**6dB Bandwidth**	1MHz
Test Date	2025/06/13	**Test Distance**	3m
Tested by	Karwin Kao	**Polarization**	Horizontal
Test Site	W08-966-1		

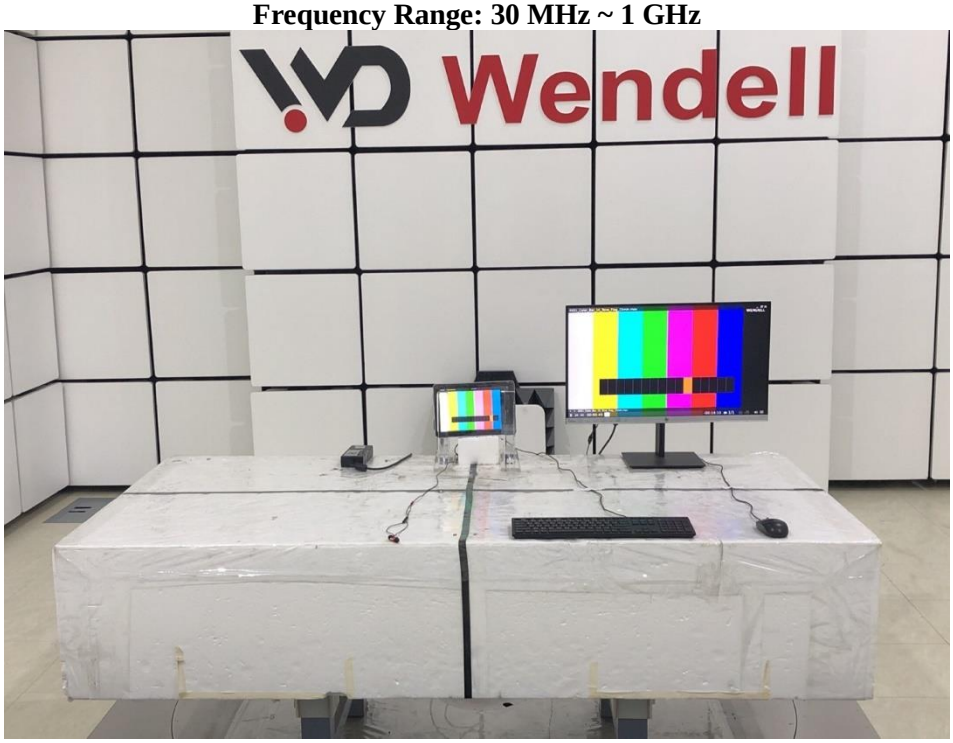


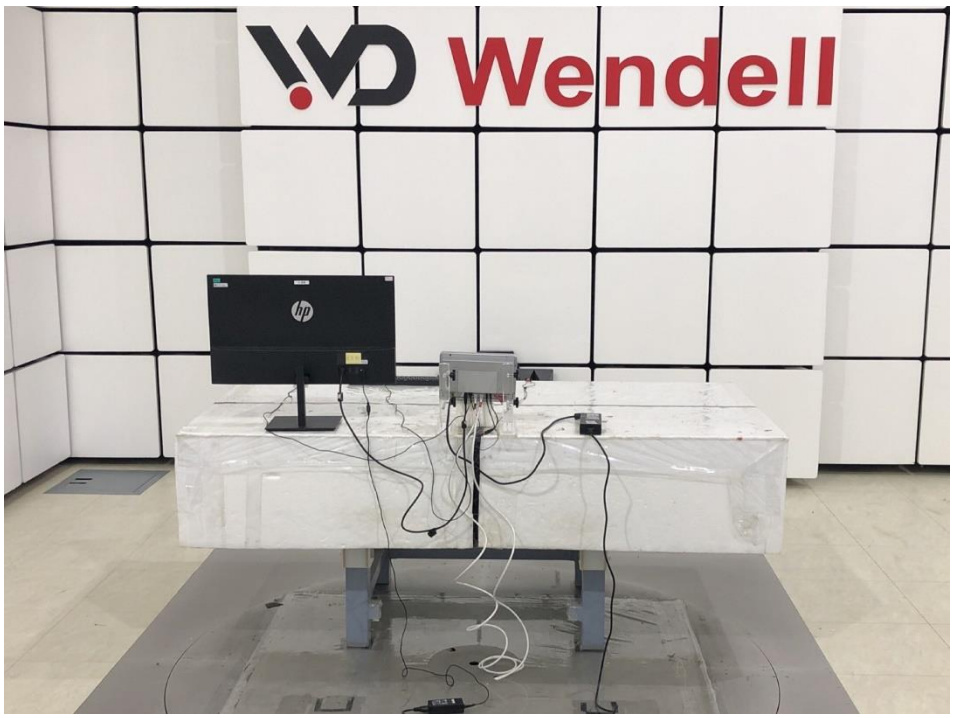
No.	Frequency (MHz)	Reading Level (dBµV)	Correct Factor (dB/m)	Measurement (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Table Degree (degree)	Antenna Height (cm)	Detector
1	1012.500	73.61	-20.41	53.20	76.00	-22.80	213	100	peak
2	1012.500	61.08	-20.41	40.67	56.00	-15.33	213	100	AVG
3	1187.500	76.09	-19.16	56.93	76.00	-19.07	99	100	peak
4	1187.500	64.28	-19.16	45.12	56.00	-10.88	99	100	AVG
5	1400.000	68.43	-18.06	50.37	76.00	-25.63	143	100	peak
6	1400.000	56.32	-18.06	38.26	56.00	-17.74	143	100	AVG
7	1487.500	68.26	-18.36	49.90	76.00	-26.10	150	100	peak
8	1487.500	56.78	-18.36	38.42	56.00	-17.58	150	100	AVG
9	1787.500	65.64	-18.20	47.44	76.00	-28.56	206	100	peak
10	1787.500	53.21	-18.20	35.01	56.00	-20.99	206	100	AVG
11	2075.000	62.40	-16.20	46.20	76.00	-29.80	203	100	peak
12	2075.000	50.75	-16.20	34.55	56.00	-21.45	203	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

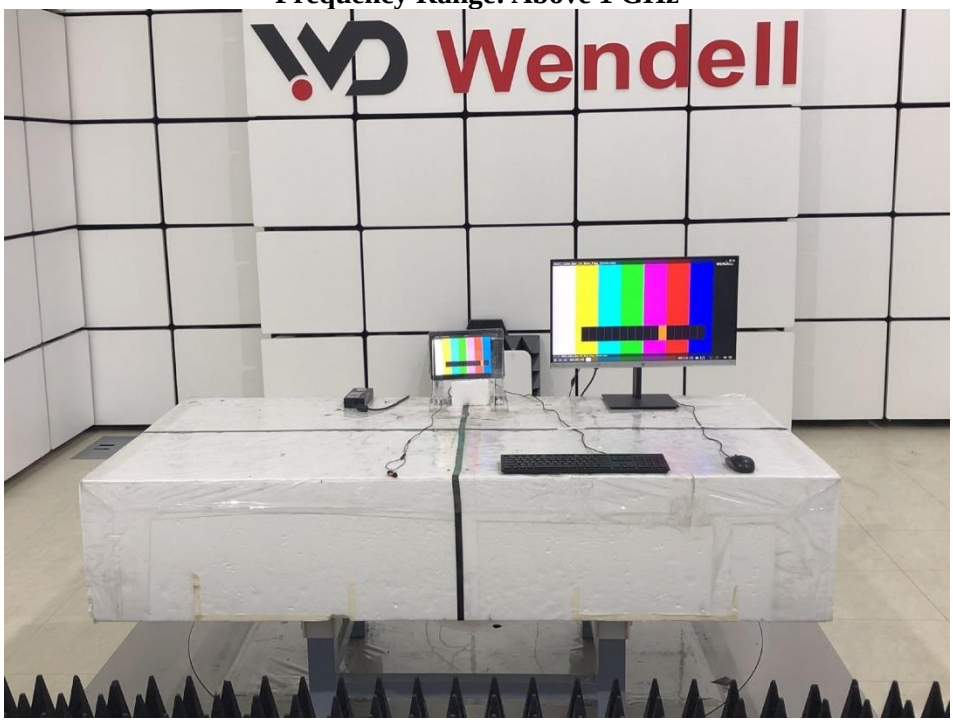
4.3.7 Photographs of Measurement Configuration

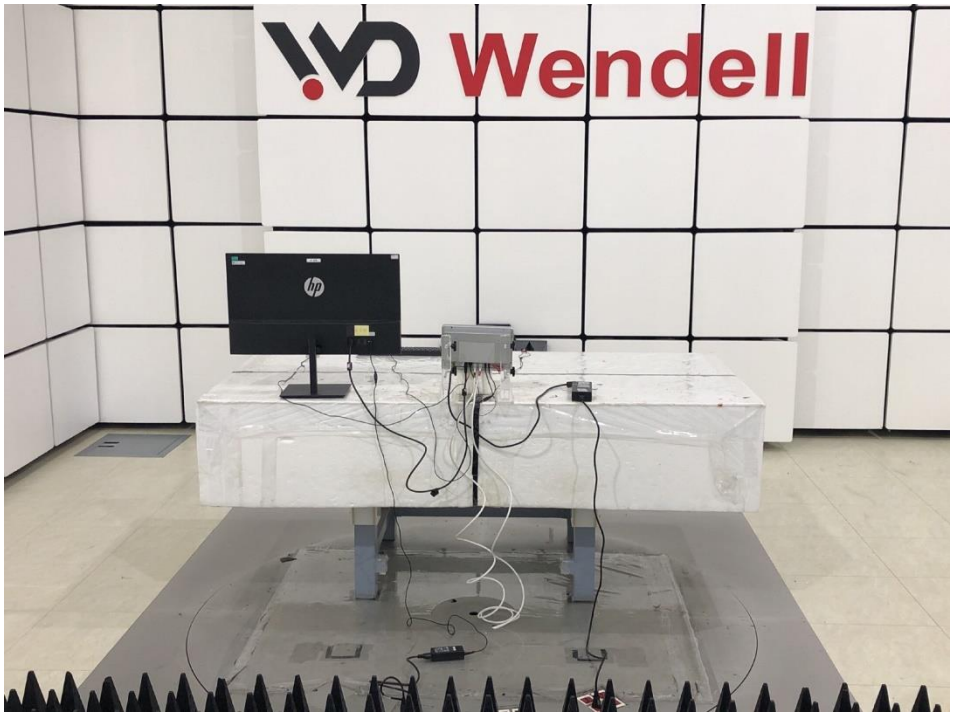
Frequency Range: 30 MHz ~ 1 GHz





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:

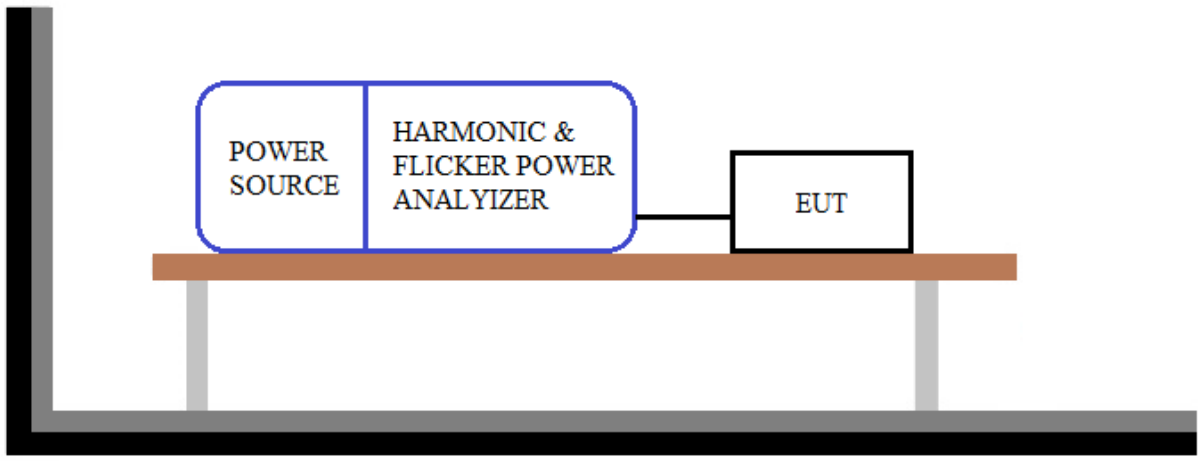
- Personal computers and personal computer monitors;
- Television receivers;
- Refrigerators and freezers having one or more variable-speed drives to control compressor motor(s).

4.4.4 Deviation from Standard

No deviation

4.4.5 Measurement Configuration

< Table-Top equipment under test >



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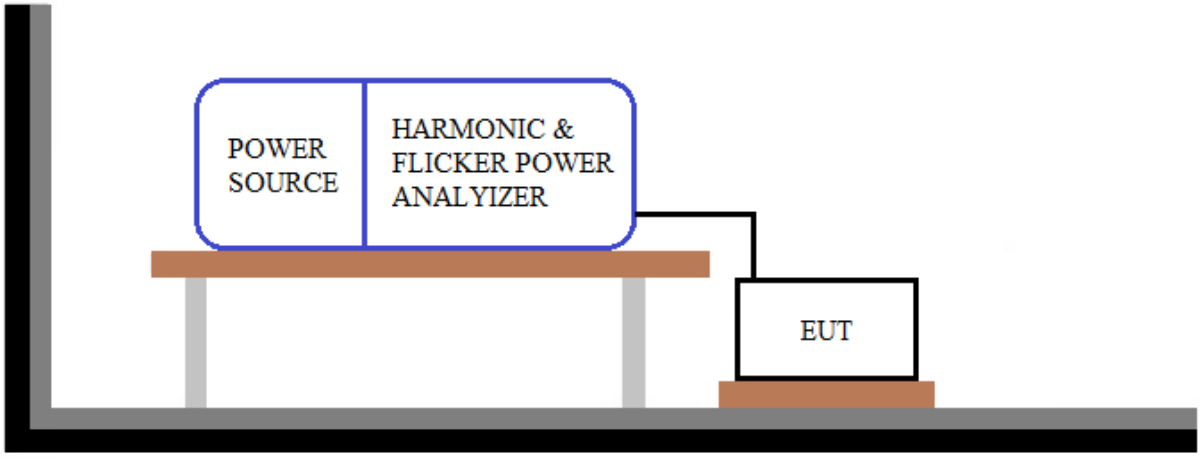


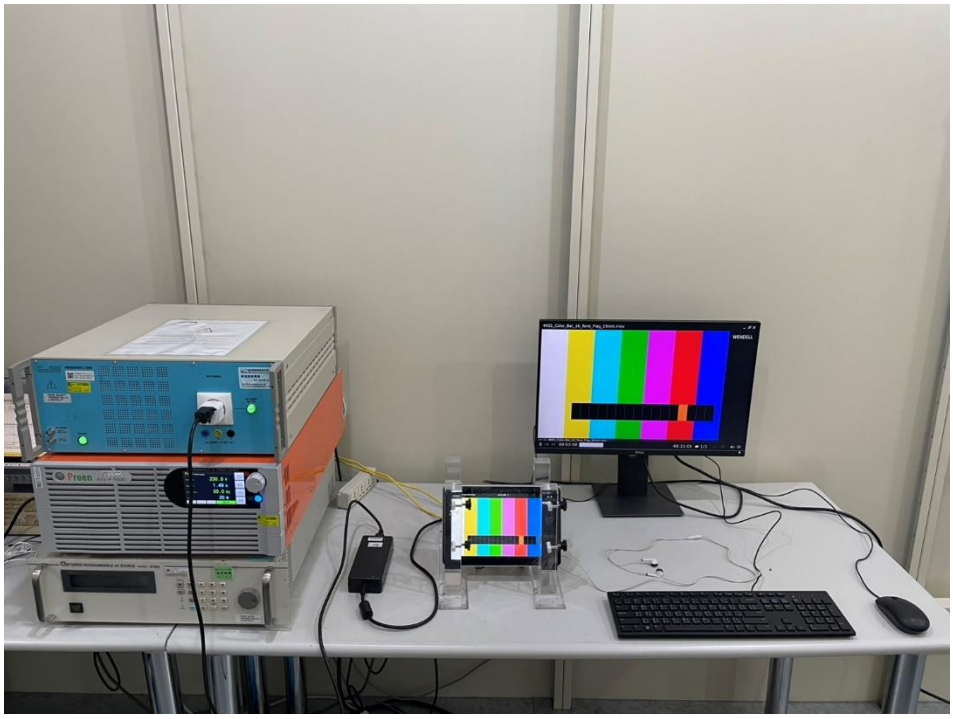
4.4.6 Measurement Result

Supply Voltage / Ampere	229.5 Vrms / 0.121 Arms	**Test Date**	2025/06/18
Test Duration	5 min	**Power Consumption**	16.00W
Power Frequency	50.013Hz	**Power Factor**	0.575
Environmental Conditions	23℃, 50% RH	**Tested by**	Tim Chao

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.

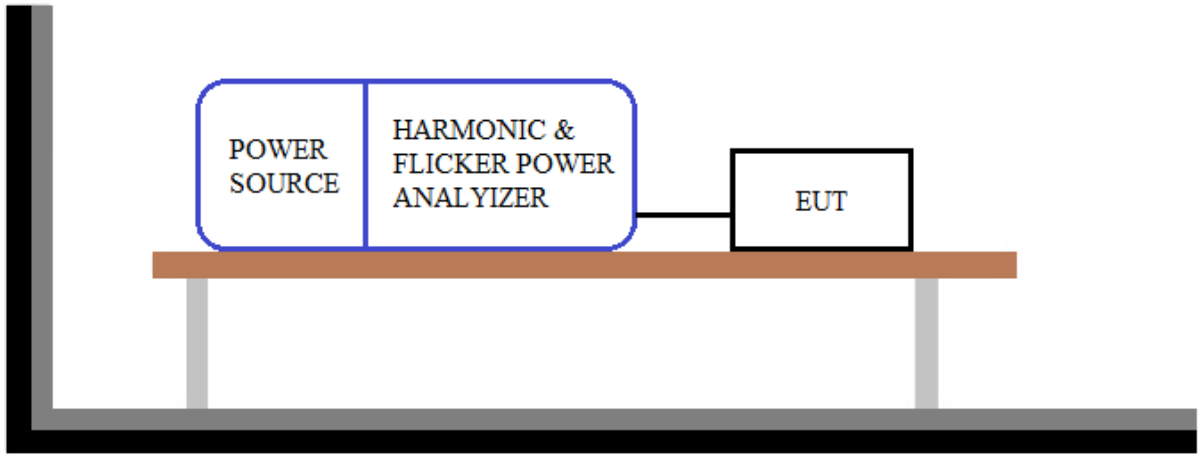
During the flick measurement, the measure time shall include that part of whole operation cycle in which the EUT produce the most unfavorable sequence of voltage changes. The observation period for short-term flicker indicator is 10 min and the observation period for long-term flicker indicator is 2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

4.5.4 Deviation from Standard

No deviation

4.5.5 Measurement Configuration

< Table-Top equipment under test >



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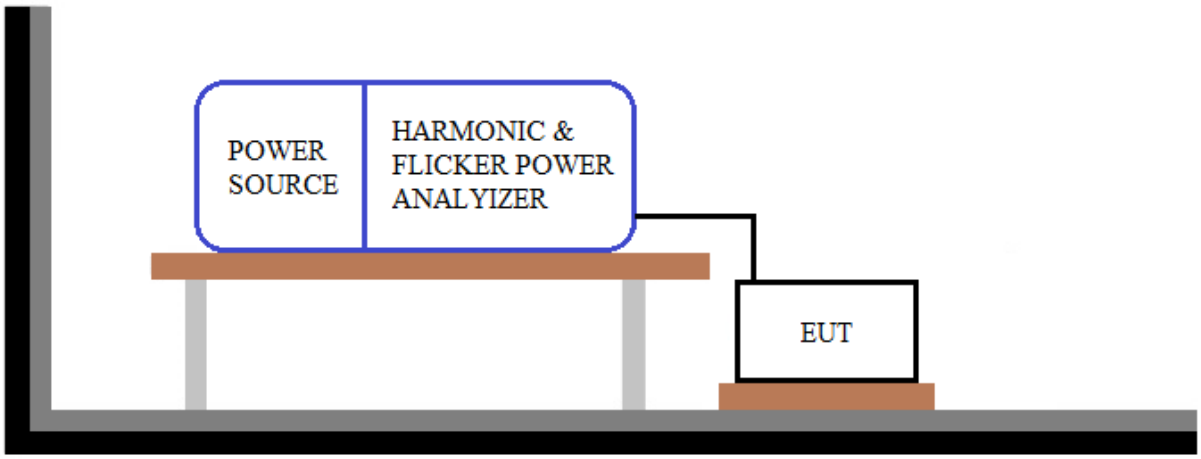


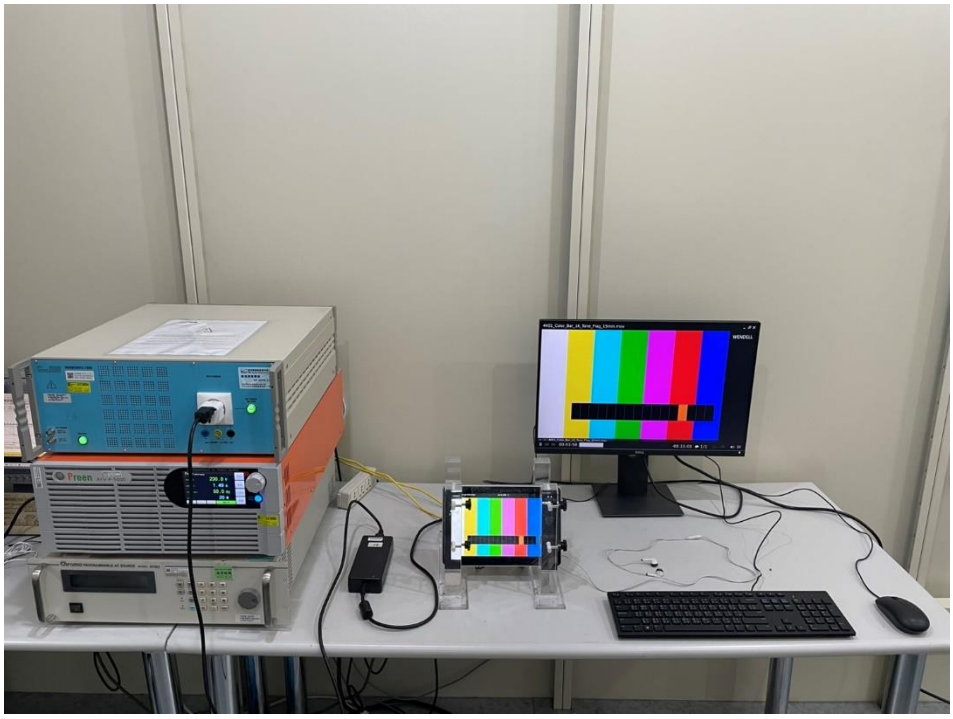
4.5.6 Measurement Result

Supply Voltage / Ampere	229.5 Vrms / 0.115 Arms	**Test Date**	2025/06/18
Observation (Tp)	30 min	**Environmental Conditions**	23℃, 50% RH
Power Frequency	50.013Hz	**Tested by**	Tim Chao

Test Parameter	Measurement Value	Test Limit	Remarks
P_{st}	0.07	1.00	Pass
P_{lt}	0.07	0.65	Pass
T_{dt} (ms)	0.00	500	Pass
d_{max} (%)	0.00	4%	Pass
d_c (%)	0.01	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. 13, 2025
2	ESD Generator	NoiseKen	ESS-S3011 & GT-30R	CT-1-214	Nov. 01, 2024
3	Digital Thermo-Hygro Meter	N/A	HTC-8	CT-2-047	Jun. 09, 2025
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:

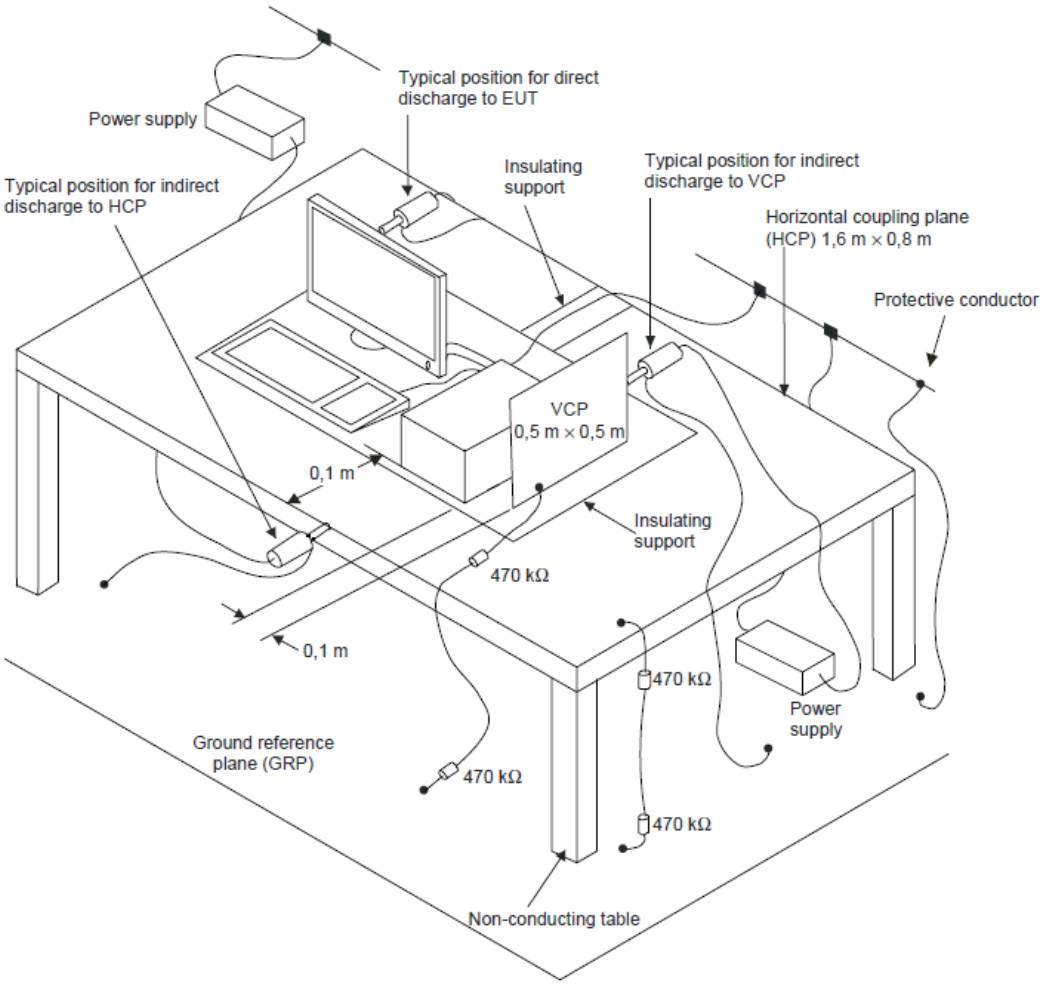
On those surfaces of the equipment under test where it is not possible to perform contact discharge testing, the equipment should be investigated to identify user accessible points where breakdown may occur. Such points are tested using the air discharge method. This investigation should be restricted 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

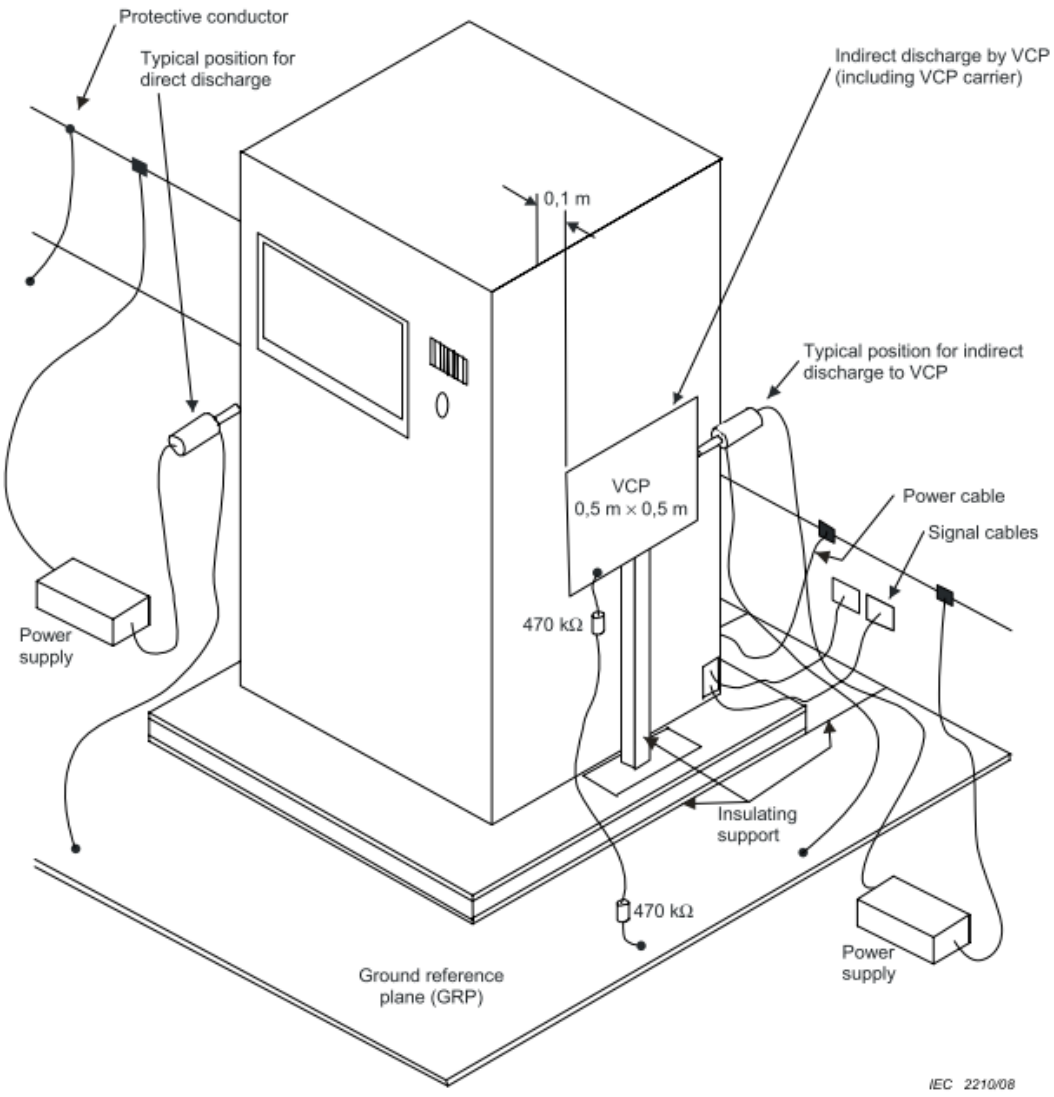
No deviation

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**	2025/06/23
Environmental Conditions	24℃, 48% RH	**Pressure**	1020 mbar
Tested by	Dennis Chen	**Test Site**	W01

Test Results of Direct Application

Air Discharge				
Test Point	**Discharge Level (kV)**			**Result**
	±2	**±4**	**±8**	
Front	B (#1)	B (#1)	B (#1)	B
Back	N/A	N/A	N/A	N/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	A	A	A	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	N/A	N/A
Back	A	A
Left	A	A
Right	A	A
Top	A	A
Bottom	A	A
Other	A	A

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

Test Results of Indirect Application

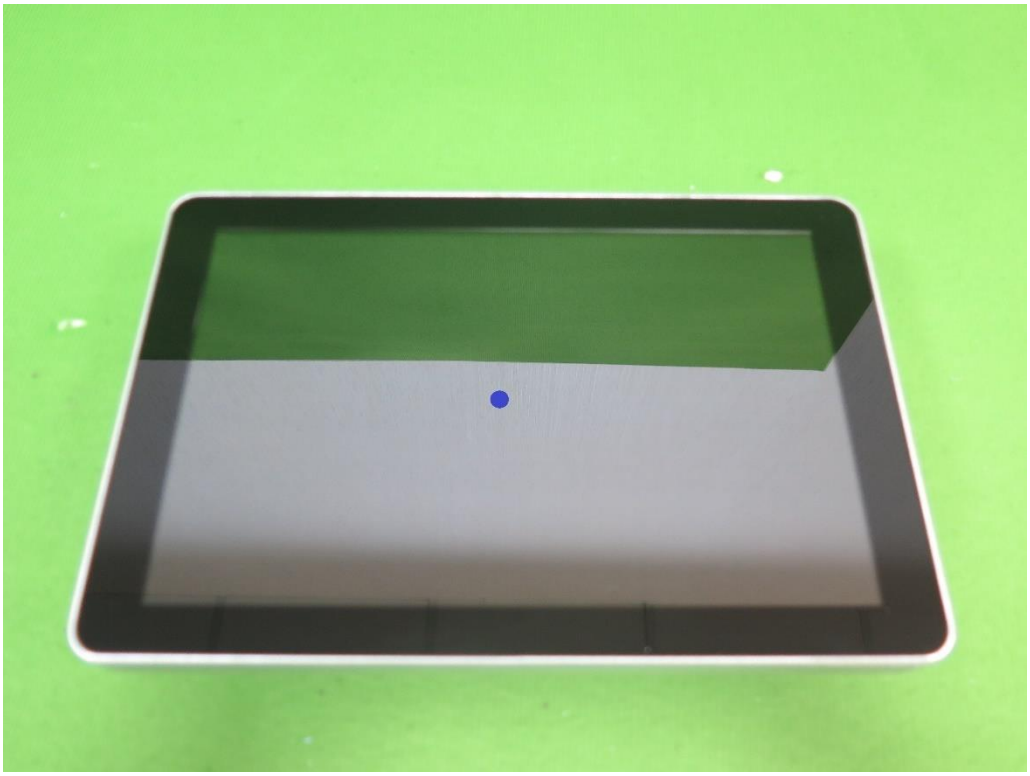
HCP Discharge		
Test Point	**Discharge Level (kV)**	**Result**
	±4	
Front	A	A
Back	A	A
Left	A	A
Right	A	A

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

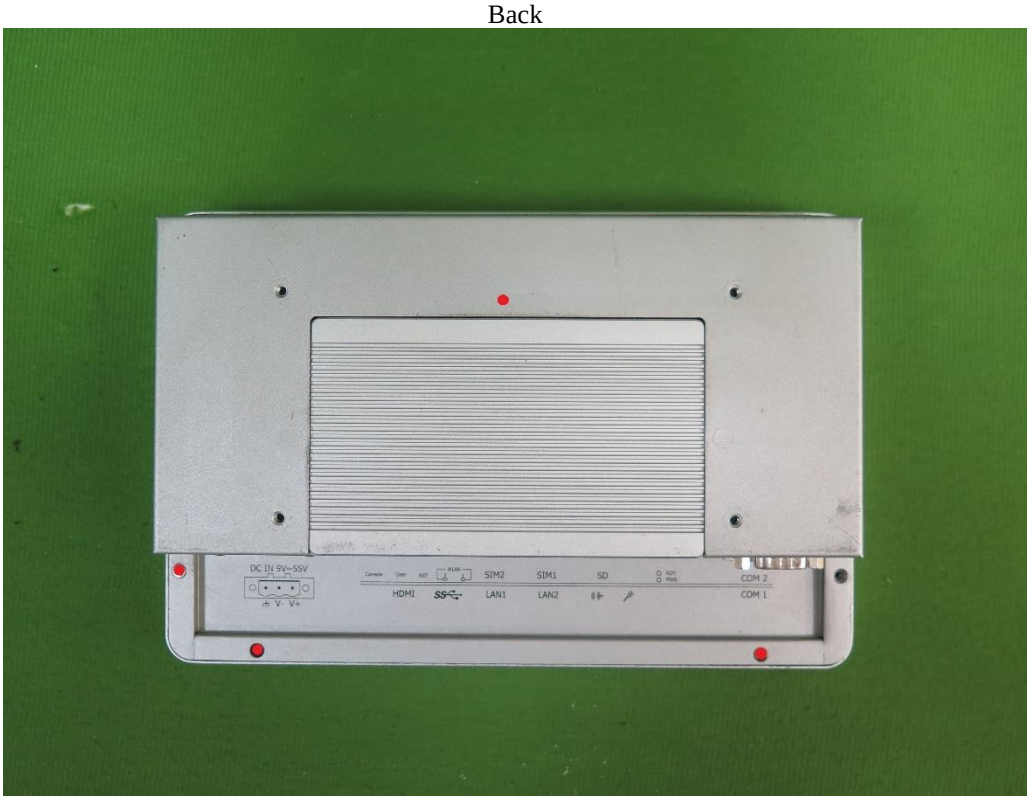
Note:
N/A: Not applicable
Criteria A: The EUT function was correct during the test.
Criteria A: (#1) No occur arcing.
Criteria B: (#1) The EUT was interrupted during the test, but could self-recover to the normal mode after the test.

Description of Test Points

Front

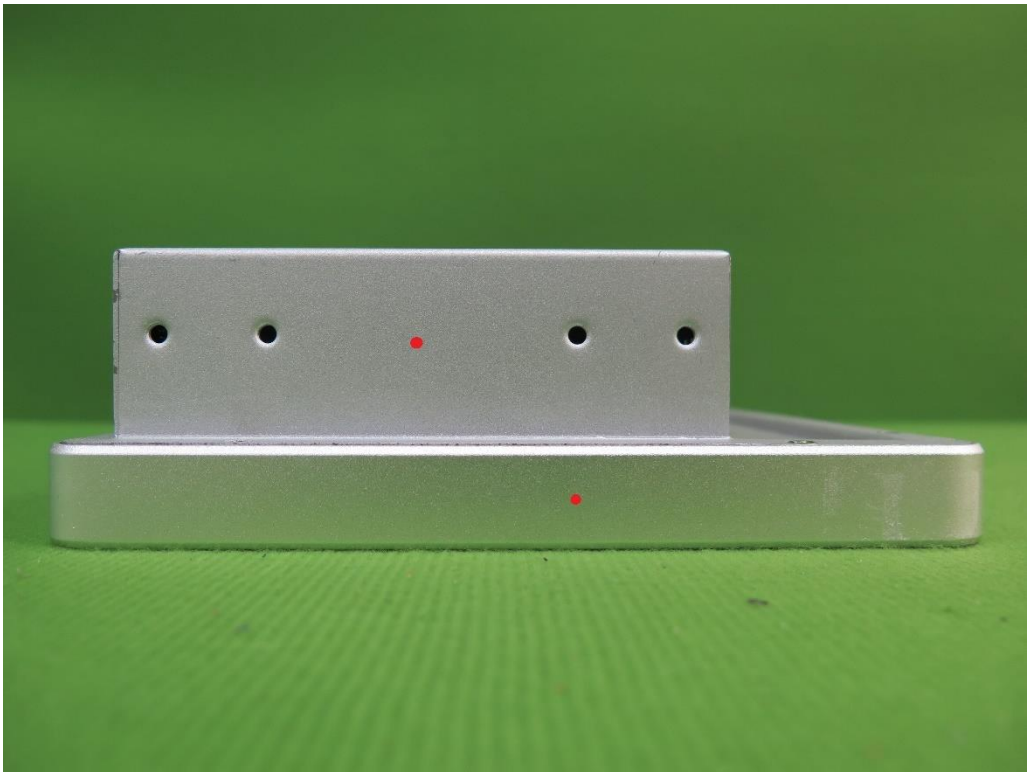


Back

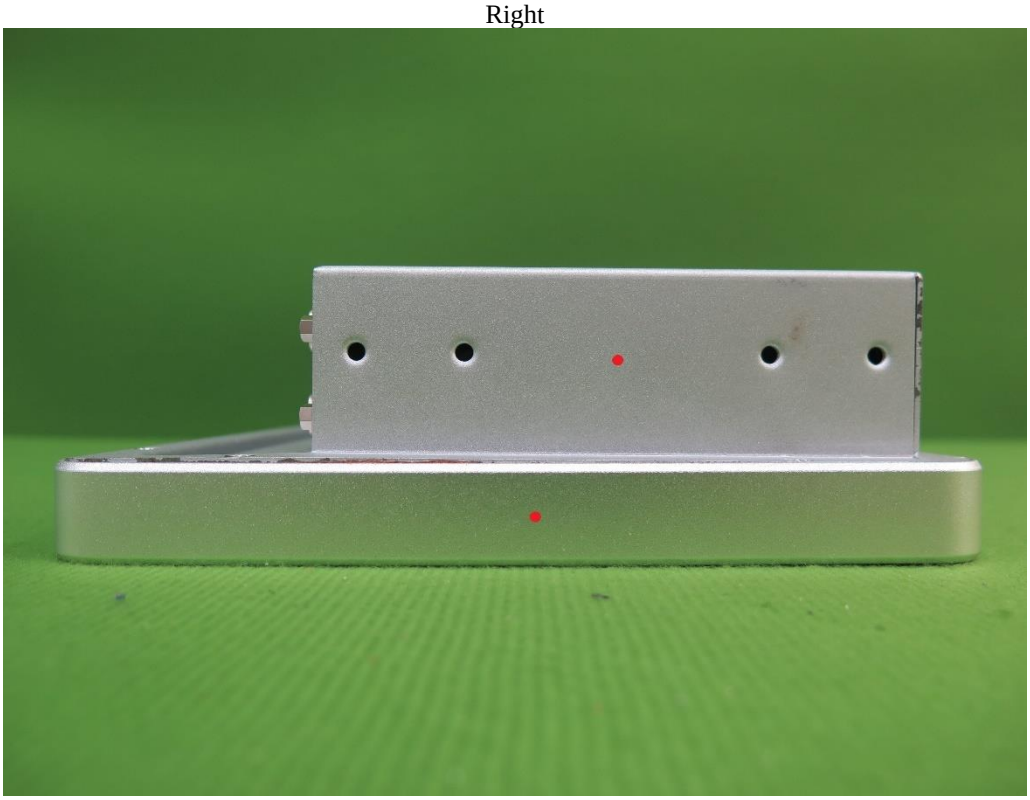


*Red Dot - Contact Discharged
Blue Dot - Air Discharged

Left

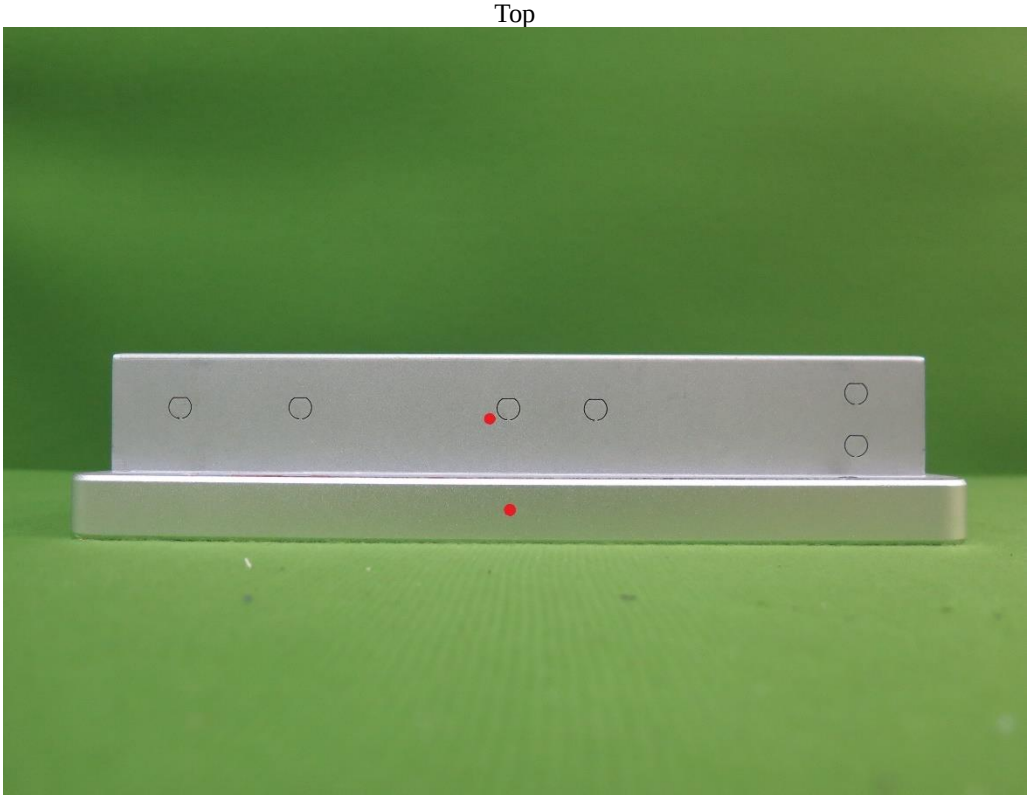


Right

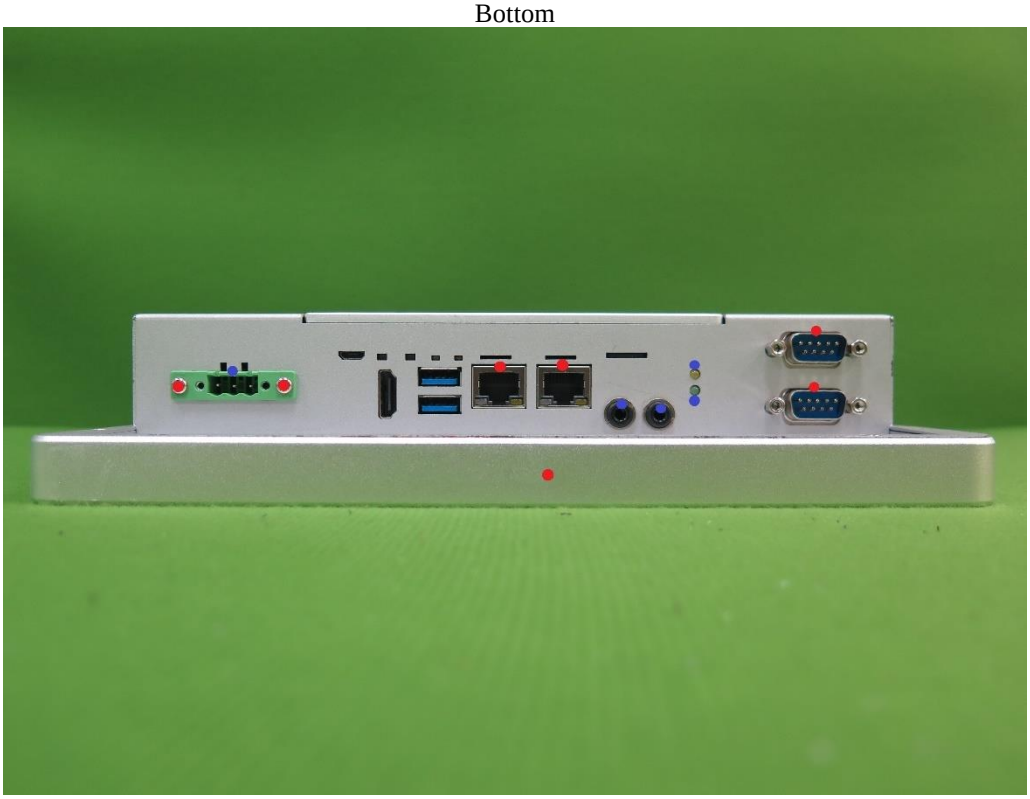


*Red Dot - Contact Discharged
Blue Dot - Air Discharged

Top

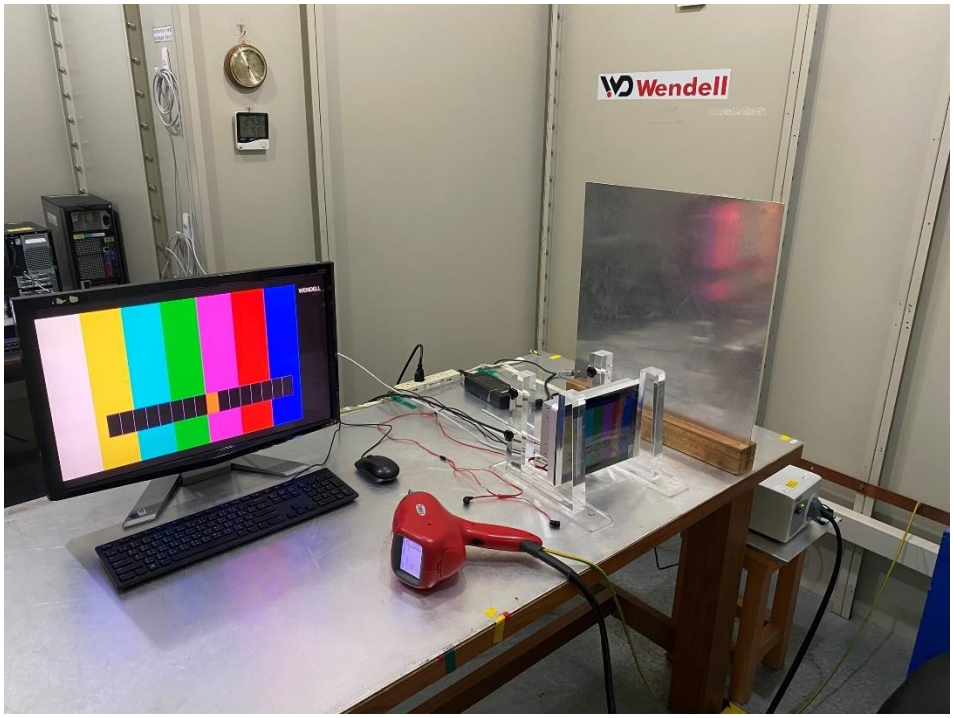


Bottom



*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 27, 2025
11	Sound Level Calibrator	B & K	4231	CT-1-156	Jun. 04, 2025
12	Sound Analyer	VGT	ABT CB0	CT-1-159	May 23, 2025
13	Frequency Counter	HEWLETT PACKARD	53181A	CT-1-158	May 26, 2025
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.

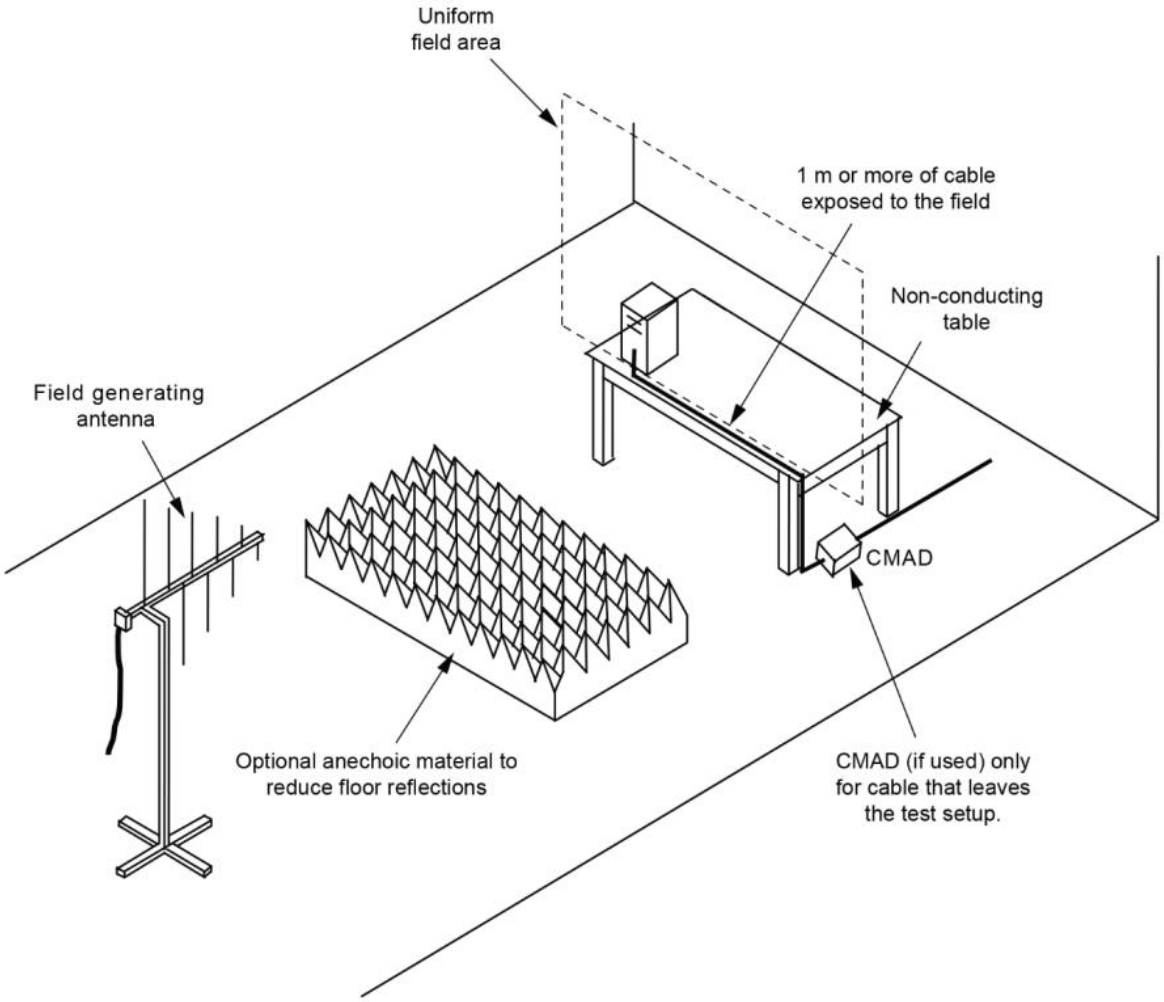
e. If the equipment under test is too large such that it cannot be fully illuminated by the radiating antenna, or exceeds the size of the Uniform Field Area (UFA) then partial illumination shall be used. The equipment under test can be repositioned so that the front surface remains within the Uniform 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**	25°C, 54% RH
Tested by	Eric Hsieh	**Test Date**	2025/06/18

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

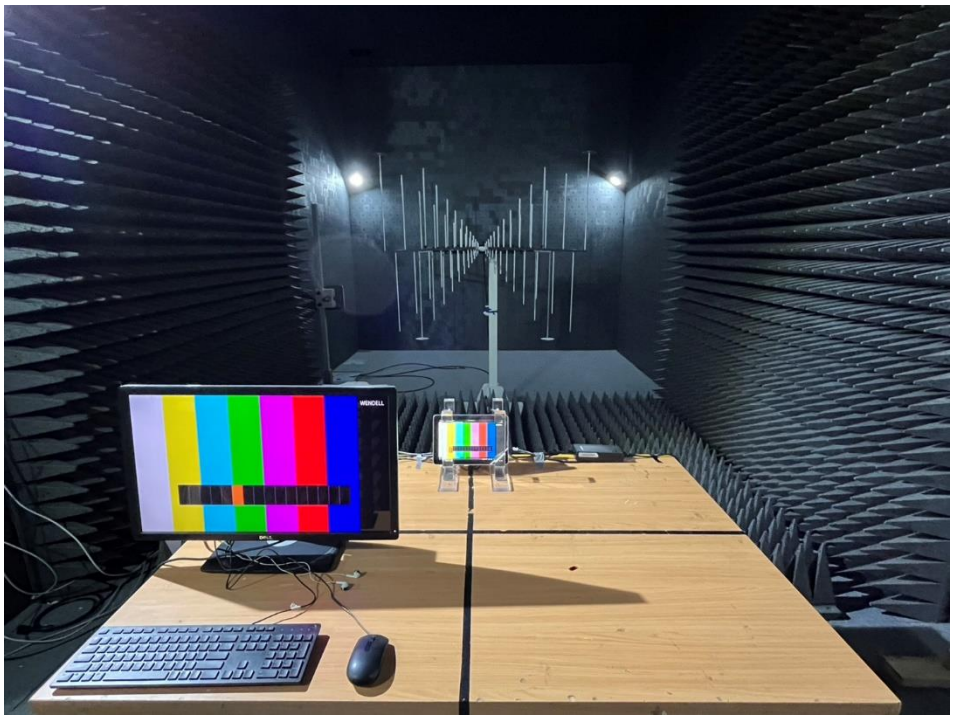
Note:
Criteria A: The EUT function was correct during the test.

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.

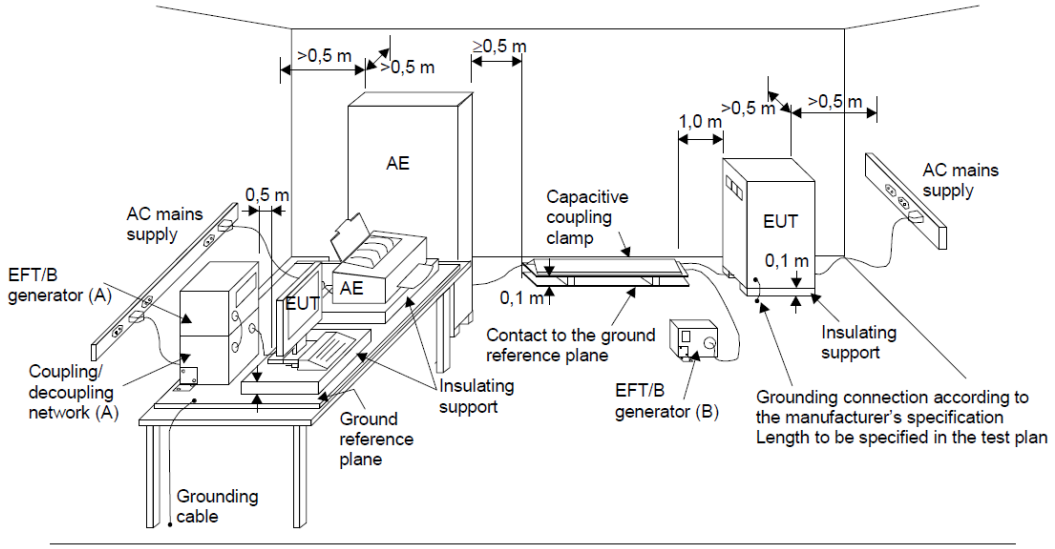
   For signal / data ports:

   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

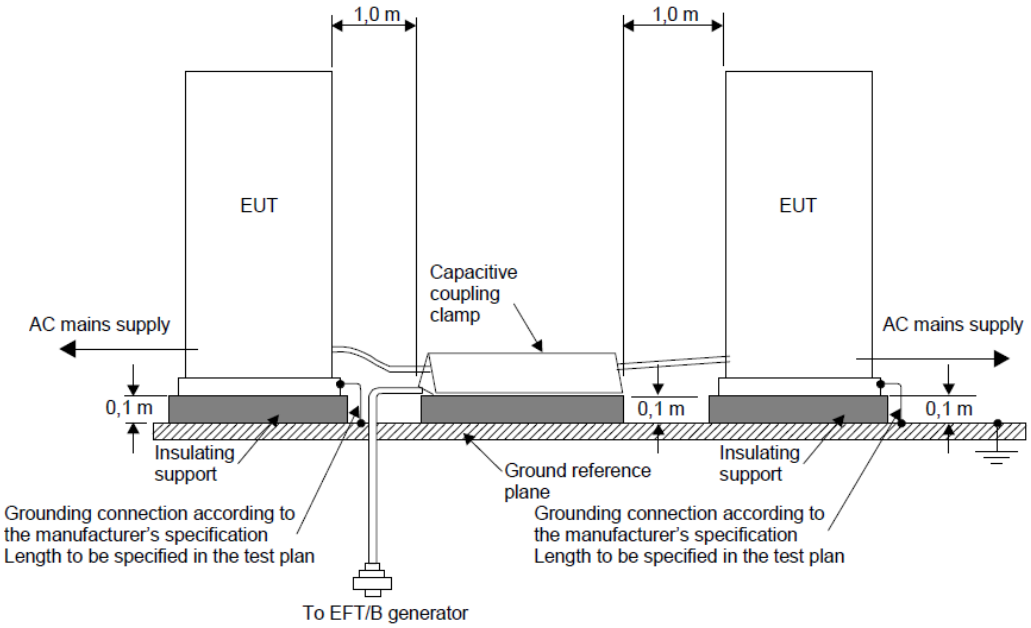
No deviation

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**	25℃, 54% RH
Tested by	Tim Chao	**Test Date**	2025/06/18

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

Note:
Criteria A: The EUT function was correct during the test.
Criteria B: (#1) The EUT was interrupted during the test, but could self-recover to the normal mode after the test.

5.5.7 Photographs of Test Configuration

Power

LAN

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 15, 2025

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.

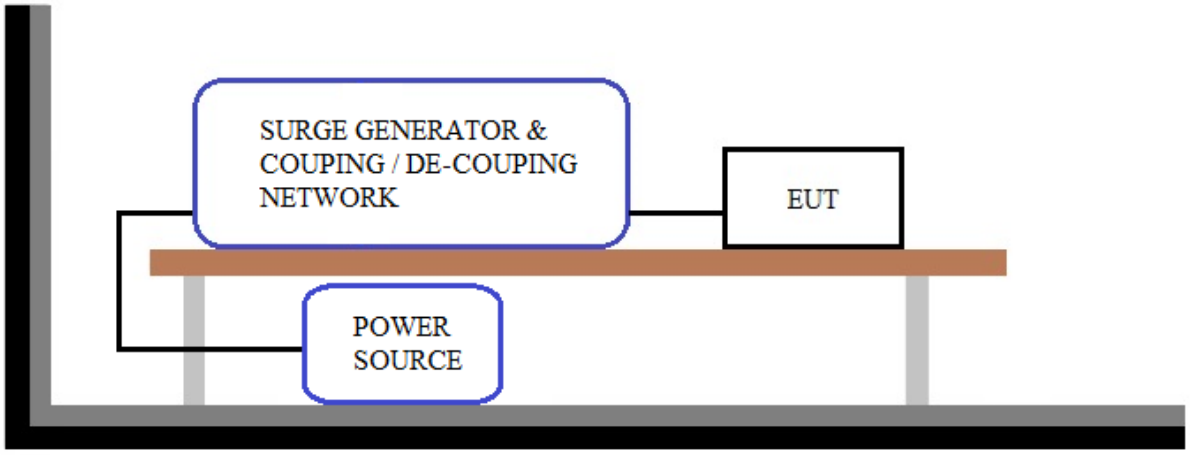
No test shall be required for cables which according to the manufacturer's specification are ≤ 10 m.

5.6.4 Deviation from Standard

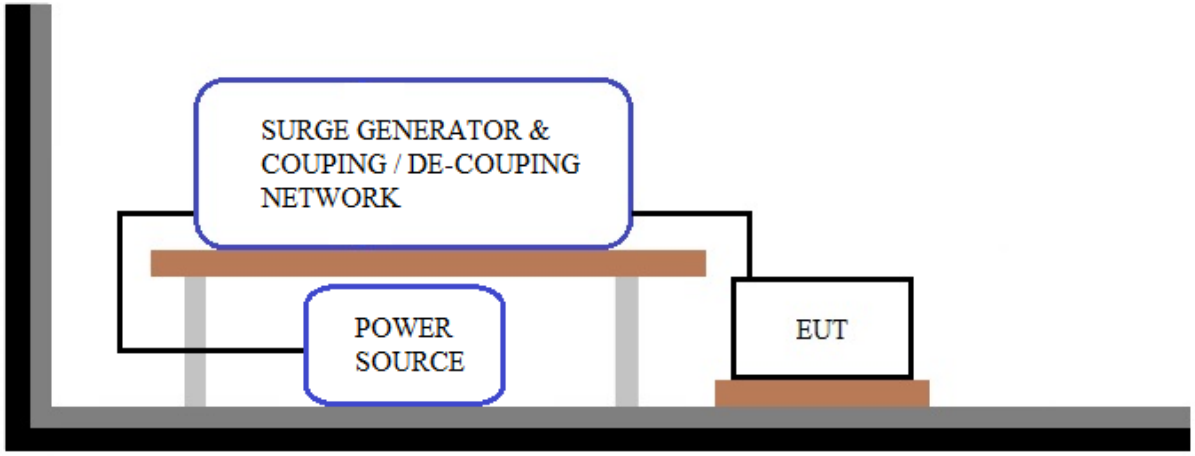
No deviation

5.6.5 Test Configuration

< Table-Top equipment under test >



< Floor-Standing equipment under test >



5.6.6 Test Result

Test Voltage	230Vac, 50Hz	**Environmental Conditions**	25℃, 55% RH
Tested by	Guanwei Liao	**Test Date**	2025/06/25
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 28, 2025
2	CDN for power supply lines	FRANKONIA	CDN M2+M3	CT-1-054	May 28, 2025
3	6 dB Attenuator	BIRD	75-A-FFN-06	CT-1-056	May 28, 2025
4	Compact Immunity Test System acc	FRANKONIA	CIT-10/75	CT-1-057	May 28, 2025
5	CDN for screened lines	FRANKONIA	RJ45S	CT-1-052 (1)	May 28, 2025
6	50ohm Termination	N/A	N/A	CT-1-065-2	Jun. 06, 2025
7	CDN Four Balanced Pairs-unscreened	Com-Power	CDN-T8E	CT-1-130	May 28, 2025
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 27, 2025
10	Sound Level Calibrator	B & K	4231	CT-1-156	Jun. 04, 2025
11	Sound Analyer	VGT	ABT CB0	CT-1-159	May 23, 2025
12	Frequency Counter	HEWLETT PACKARD	53181A	CT-1-158	May 26, 2025

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.

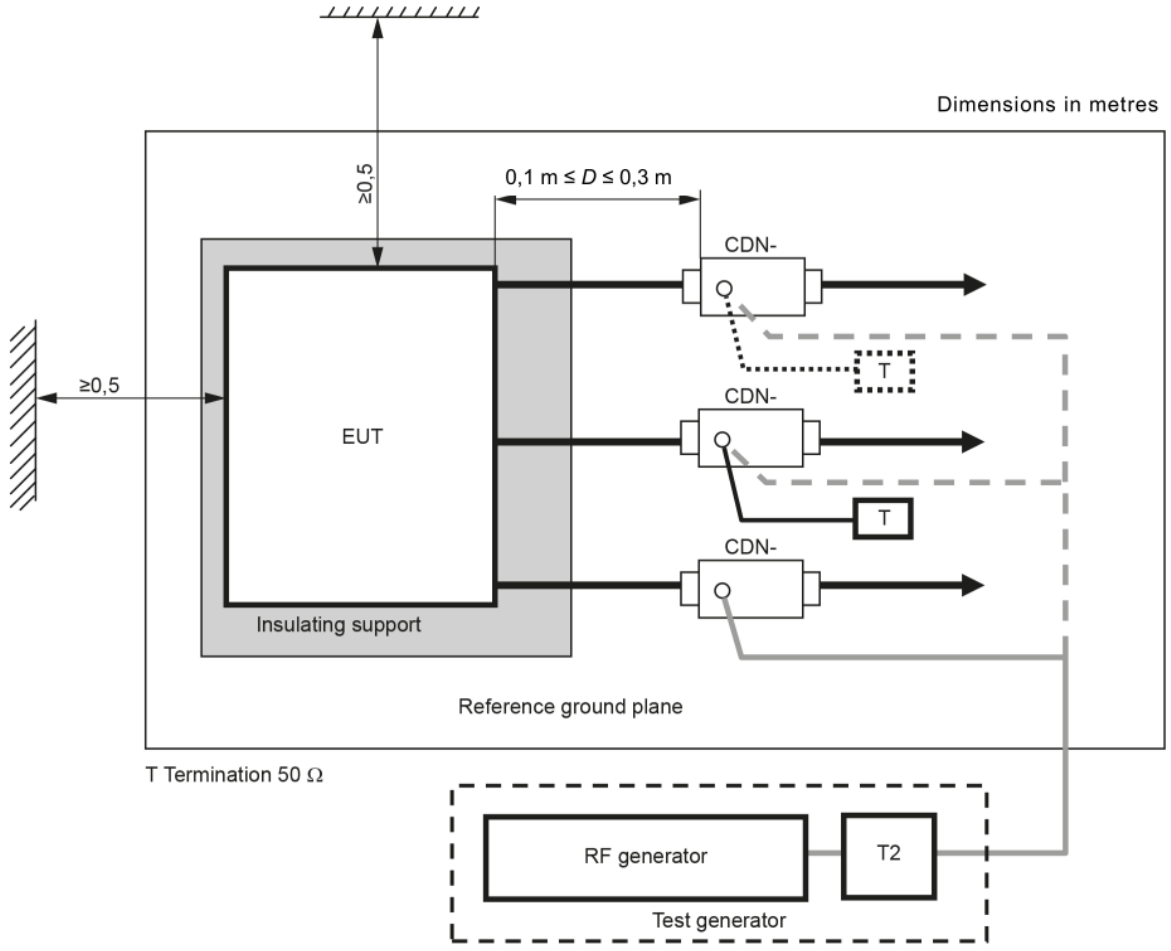
   For signal / data ports:

   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°C, 56% RH
Tested by	Eric Hsieh	Test Date	2025/06/19

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	CDN RJ45S	3	80% AM, 1kHz	A
10 - 30	LAN	CDN RJ45S	3 - 1	80% AM, 1kHz	A
30 - 80	LAN	CDN RJ45S	1	80% AM, 1kHz	A

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

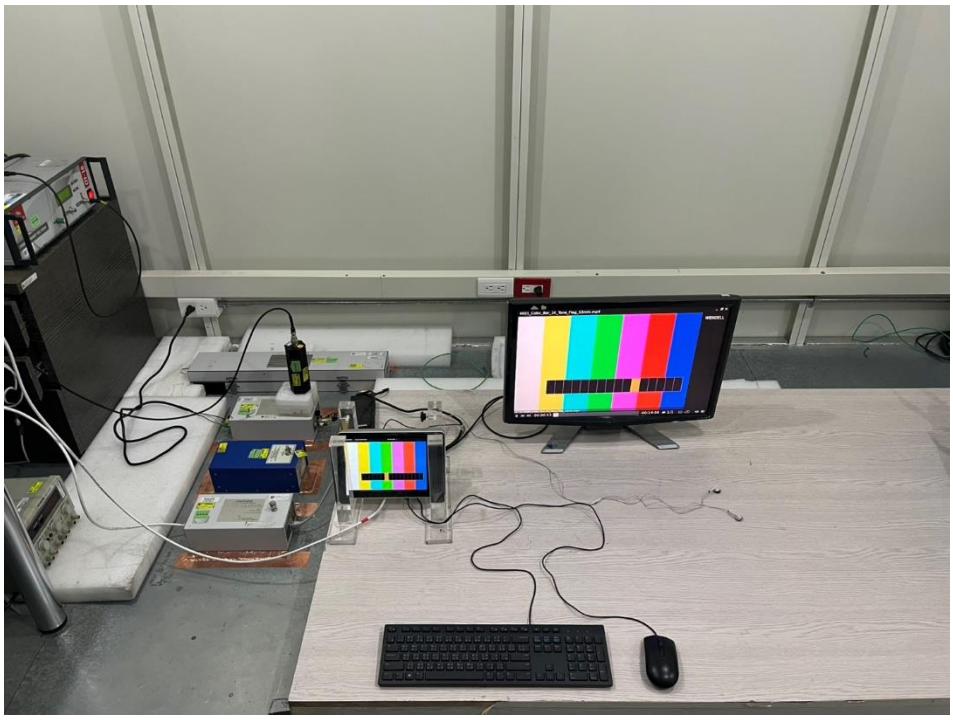
Not supporting telephony audio output function acoustic/electrical measurements

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

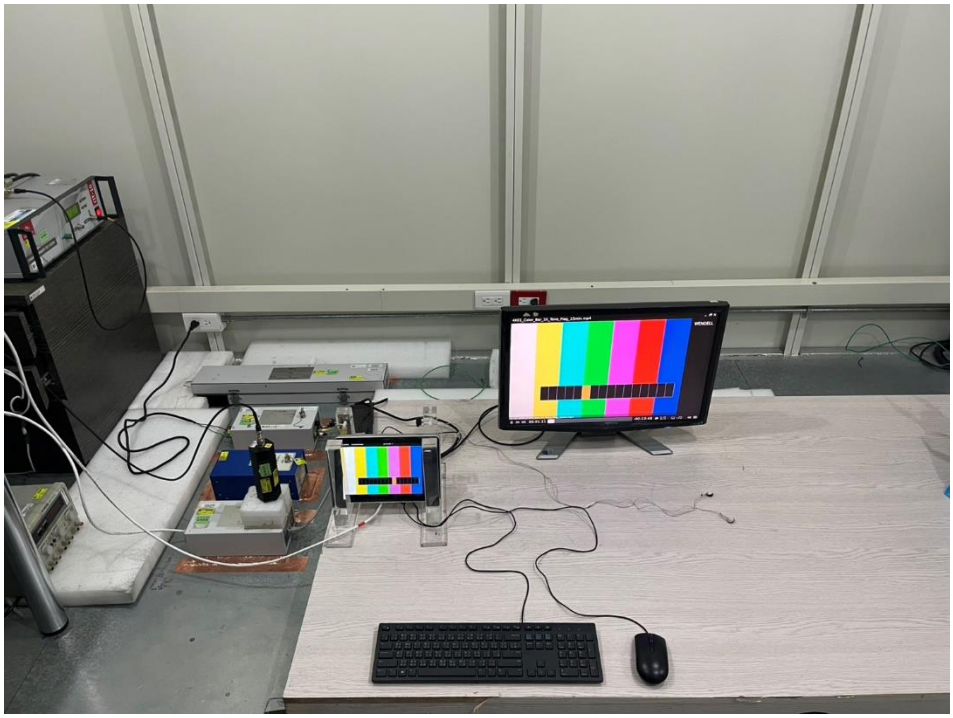
Note:
Criteria A: The audio output performance evaluation criteria were satisfied. The interference ratio is -20 dB or better.

5.7.7 Photographs of Test Configuration

Power



LAN



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.

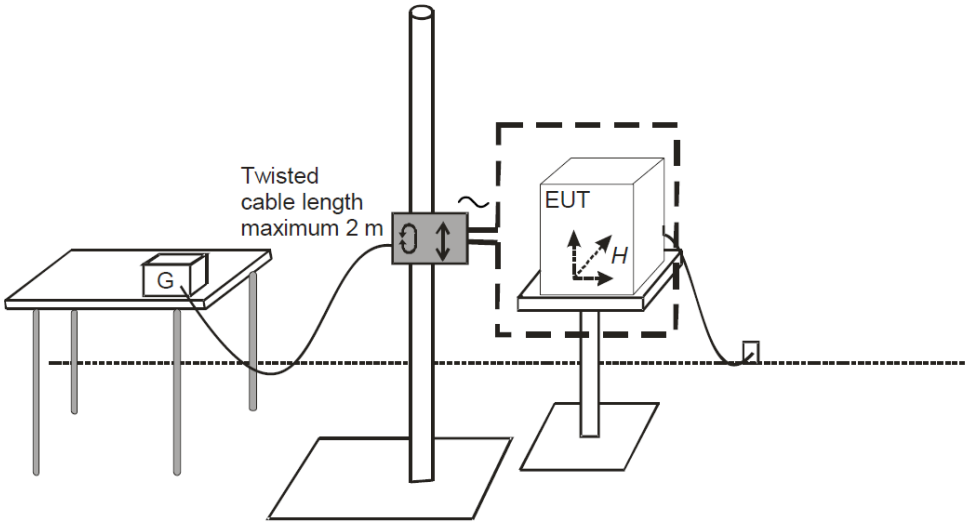
a. The table-top equipment under test was placed on a table which is 0.8 meter above a metal ground plane measured at least 1m × 1m minimum. The test magnetic field shall be placed at central of the induction coil. The floor-standing equipment under test was placed on 0.1m insulation support unit between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

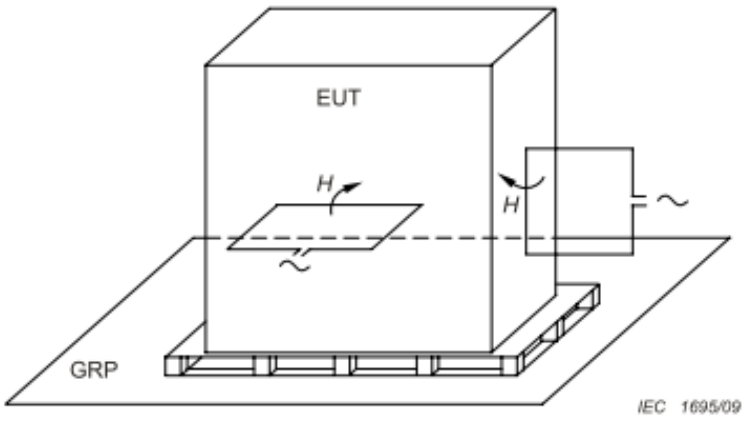
b. The test magnetic Field shall be applied 10 minutes by the immersion method to the table-top equipment under test, and the induction coil shall be rotated by 90° in order to expose the equipment under test to the test field with different orientation (X, Y, Z Orientations). The test magnetic Field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

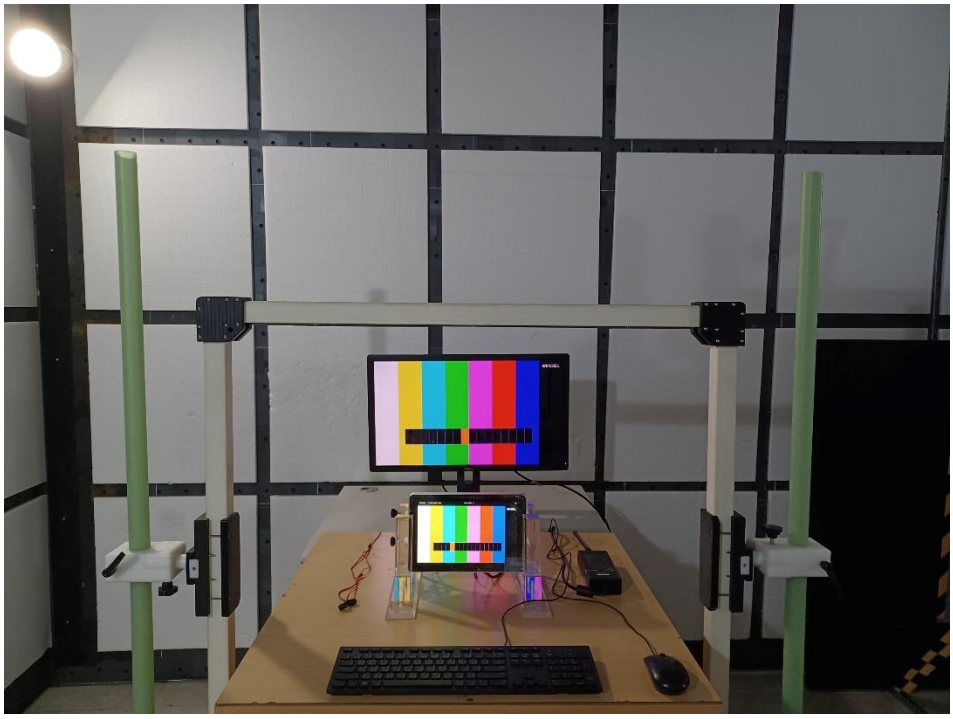
5.8.6 Test Result

Test Voltage	230Vac, 50Hz	**Environmental Conditions**	22℃, 52% RH
Tested by	Guanwei Liao	**Test Date**	2025/06/17

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.

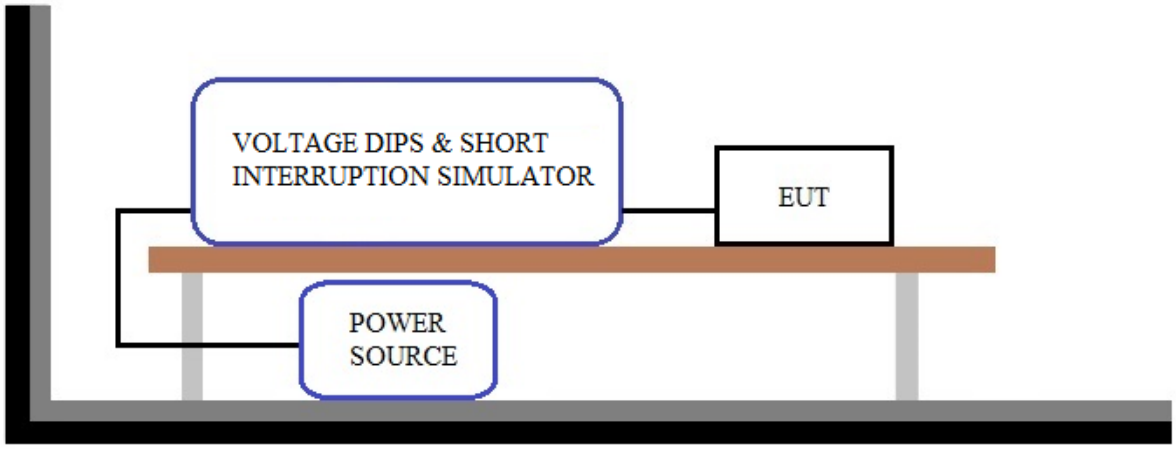
c. For each test, any degradation of performance shall be recorded. The monitoring equipment should be capable of displaying the status of the operational mode of the equipment under test during and after the tests. After each group of tests, a full functional check shall be performed.

5.9.4 Deviation from Standard

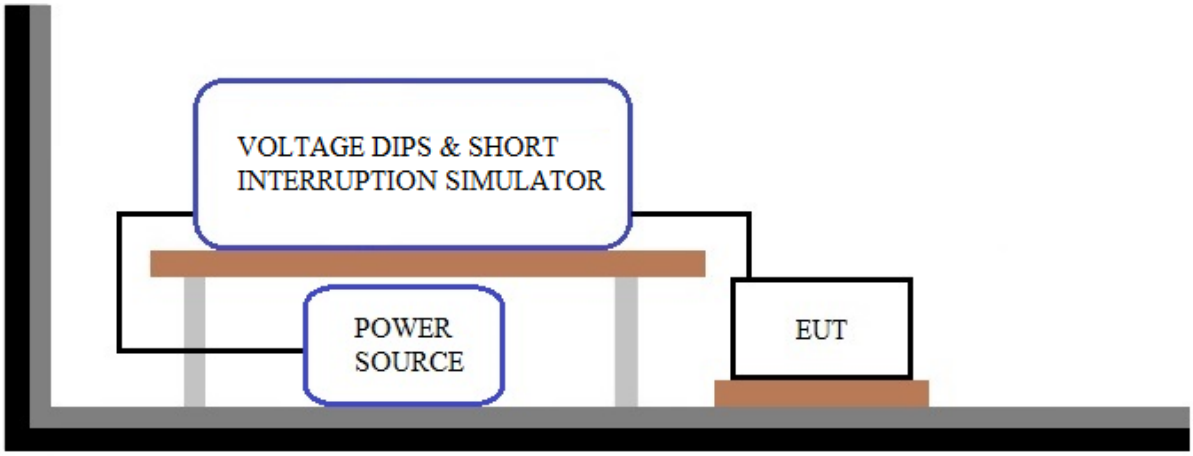
No deviation

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**	25℃, 54% RH
Tested by	Tim Chao	**Test Date**	2025/06/18

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 >