TEST REPORT

CERTIFICATE OF CONFORMITY

Standard:	**EN 50121-1: 2017** **EN 50121-3-2: 2016+A1:2019** **EN 50155: 2021 (EMC Part only)** **EN 61000-3-2: 2014, Class A** **EN IEC 61000-3-2: 2019+A1:2021+A2:2024, Class A** **EN 61000-3-3: 2013+A1:2019+A2:2021+AC:2022**
Report No.:	CEBDBO-WTW-P25120122-1
Product:	Edge Server
Brand:	Vecow
Model No.:	ICS-1000
Series Model:	ICS-1XXXXXXXXXXXXXXX ("X" can be 0-9, A-Z or blank for marketing purpose)
Received Date:	2025/12/4
Test Date:	2025/12/12 ~ 2025/12/31
Issued Date:	2026/1/20
Applicant:	Vecow Co., Ltd.
Address:	3F., No.10, Jiankang Rd., Zhonghe Dist., New Taipei City 23586, Taiwan
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

Approved by: Jim Hsiang , **Date:** 2026/1/20

Jim Hsiang / Associate Technical Manager

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Prepared by : Vivian Chen / Senior Specialist

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Release Control Record

Issue No.	Description	Date Issued
CEBDBO-WTW-P25120122-1	Original release.	2026/1/20

1 Certificate

Product:	Edge Server
Brand:	Vecow
Test Model:	ICS-1000
Series Model:	ICS-1XXXXXXXXXXXXXXX ("X" can be 0-9, A-Z or blank for marketing purpose)
Sample Status:	Engineering sample
Applicant:	Vecow Co., Ltd.
Test Date:	2025/12/12 ~ 2025/12/31
Standard:	EN 50121-1: 2017 EN 50121-3-2: 2016+A1:2019 EN 50155: 2021 (EMC Part only) EN 61000-3-2: 2014, Class A EN IEC 61000-3-2: 2019+A1:2021+A2:2024, Class A EN 61000-3-3: 2013+A1:2019+A2:2021+AC:2022
Measurement procedure:	EN 61000-4-2: 2009 / IEC 61000-4-2: 2008 ED. 2.0 EN IEC 61000-4-3: 2020 / IEC 61000-4-3: 2020 ED. 4.0 EN 61000-4-4: 2012 / IEC 61000-4-4: 2012 ED. 3.0 EN 61000-4-5: 2014+A1:2017 / IEC 61000-4-5: 2017 ED. 3.1 EN IEC 61000-4-6: 2023 / IEC 61000-4-6: 2023 ED. 5.0

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & 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.

2 Summary of Test Results

The test items that the EUT need to perform in accordance with its interfaces, evaluated functions, are as follows:

Standard	Test Item	Result	Remark
EN 50121-3-2, clause 7	Conducted Emissions from Power Ports	Pass	Minimum passing margin is -44.73 dB at 5.02700 MHz
EN 50121-3-2, clause 7	Radiated Emissions up to 1 GHz	Pass	Minimum passing margin is -1.21 dB at 900.01 MHz
EN 50121-3-2, clause 7	Radiated Emissions above 1 GHz	Pass	Minimum passing margin is -5.85 dB at 1700.06 MHz
EN 61000-3-2 EN IEC 61000-3-2	Harmonic Current Measurement	Pass	Meets Class A Limit
EN 61000-3-3	Voltage Fluctuations and Flicker Measurement	Pass	$P_{st} \leqq 1.00$ $d_{max} \leqq 4.00\%$ $P_{lt} \leqq 0.65$ $d_c \leqq 3.30\%$ $T_{max} \leqq 500$ ms
IEC 61000-4-2	Electrostatic Discharges (ESD)	Pass	For EN 50121-3-2 Performance Criteria B
IEC 61000-4-3	Radio Frequency Electromagnetic Field (RS)	Pass	For EN 50121-3-2 Performance Criteria A
IEC 61000-4-4	Fast Transients Common Mode (EFT)	Pass	For EN 50121-3-2 Performance Criteria A
IEC 61000-4-5	Surges	Pass	For EN 50121-3-2 Performance Criteria A
IEC 61000-4-6	Radio Frequency Common Mode (CS)	Pass	For EN 50121-3-2 Performance Criteria C

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Performance Criteria

General Performance Criteria

The general performance criteria apply for those ports for which no specific performance criteria are defined (e.g. auxiliary ports) in the report.

Performance criterion A: The apparatus shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus 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, either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

Performance criterion B: The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

Performance criterion C: Temporary loss of function is allowed, provided the function is selfrecoverable or can be restored by the operation of the controls.

2.2 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Specification	Expanded Uncertainty (k=2) (±)	Maximum allowable uncertainty (±)
Conducted Emissions from Power Ports	9 kHz ~ 30 MHz	2.9 dB	3.4 dB (U_{cispr})
Radiated Emissions up to 1 GHz	30 MHz ~ 1 GHz	3m : 5.54 dB 10m : 4.16 dB	6.3 dB (U_{cispr})
Radiated Emissions above 1 GHz	1 GHz ~ 6 GHz	4.64 dB	5.2 dB (U_{cispr})

The other instruments specified are routine verified to remain within the calibrated levels, no measurement uncertainty is required to be calculated.

2.3 Supplementary Information

There is not any deviation from the test standards for the test method, and no modifications required for compliance.

3 General Information

3.1 Description of EUT

Product	Edge Server
Brand	Vecow
Test Model	ICS-1000
Series Model	ICS-1XXXXXXXXXXXXXX ("X" can be 0-9, A-Z or blank for marketing purpose)
Sample Status	Engineering sample
Power Supply Rating	24Vdc from adapter

Note:

The EUT consumes power from the following adapter:

Brand	Model	Specification
LITEON	PA-1331-92E	AC Input: 100-240VAC 4.4A, 50-60Hz DC Output: 24V, 13.75A, 330W

3.2 Primary Clock Frequencies of Internal Source

The highest frequency generated or used within the EUT or on which the EUT operates or tunes is 2.8 GHz, provided by Vecow Co., Ltd., for detailed internal source, please refer to the manufacturer's specifications.

3.3 Features of EUT

The tests reported herein were performed according to the method specified by Vecow Co., Ltd., for detailed feature description, please refer to the manufacturer's specifications or user's manual.
Please refer to appendix of the report if the applicant has provided additional descriptions of the EUT.

The EUT was configured with the following key components:

Item	Description
CPU	Intel® Xeon® D-2752TER CPU@ 1.8GHz
SSD	Innodisk M.2(P80)4TG2-P 1TB
RAM	Innodisk DDR4 2666 8GB

3.4 Operating Modes of EUT and Determination of Worst Case Operating Mode

Test modes are presented in the report as below.

Test Condition	
Mode	Conducted Emissions from Power Ports
A	Full system,VGA:1920x1080,60Hz + Input Power(230 Vac, 50 Hz)
Mode	Radiated Emissions up to 1 GHz
A	Full system,VGA:1920x1080,60Hz + Input Power(230 Vac, 50 Hz)
Mode	Radiated Emissions above 1 GHz
A	Full system,VGA:1920x1080,60Hz + Input Power(230 Vac, 50 Hz)
Mode	Harmonic Current Measurement
A	Full system,VGA:1920x1080,60Hz + Input Power(230 Vac, 50 Hz)
Mode	Voltage Fluctuations and Flicker Measurement
A	Full system,VGA:1920x1080,60Hz + Input Power(230 Vac, 50 Hz)
Mode	Electrostatic Discharges (ESD)
A	Full system,VGA:1920x1080,60Hz + Input Power(230 Vac, 50 Hz)
Mode	Radio Frequency Electromagnetic Field (RS)
A	Full system,VGA:1920x1080,60Hz + Input Power(230 Vac, 50 Hz)
Mode	Fast Transients Common Mode (EFT)
A	Full system,VGA:1920x1080,60Hz + Input Power(230 Vac, 50 Hz)
Mode	Surges
A	Full system,VGA:1920x1080,60Hz + Input Power(230 Vac, 50 Hz)
Mode	Radio Frequency Common Mode (CS)
A	Full system,VGA:1920x1080,60Hz + Input Power(230 Vac, 50 Hz)

3.5 Test Program Used and Operation Descriptions

For Emission test (Harmonics & Flicker excluded)

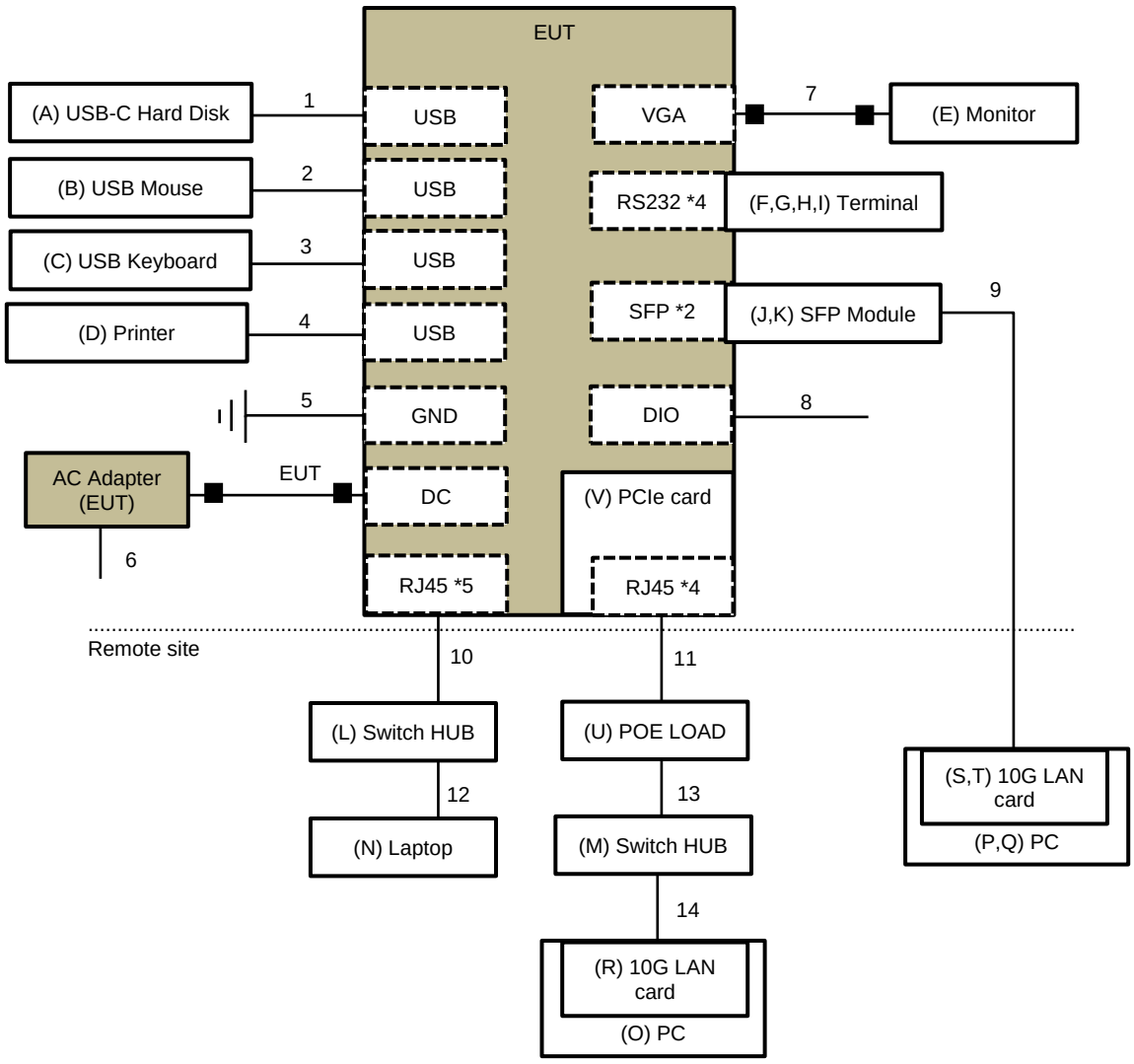
a. Turned on the power of all equipments.
b. EUT ran test program (BurnIntest) to enable all functions.
c. EUT read and wrote messages to/ from internal and external storage devices.
d. Laptop and PC sent and received messages to/ from EUT via wired cable.
e. EUT sent (ITU-R BT 471-1) messages to monitor. Then they displayed messages on their screens simultaneously.
f. EUT sent messages to printer and printed them out.

For Harmonics, Flicker & Immunity test

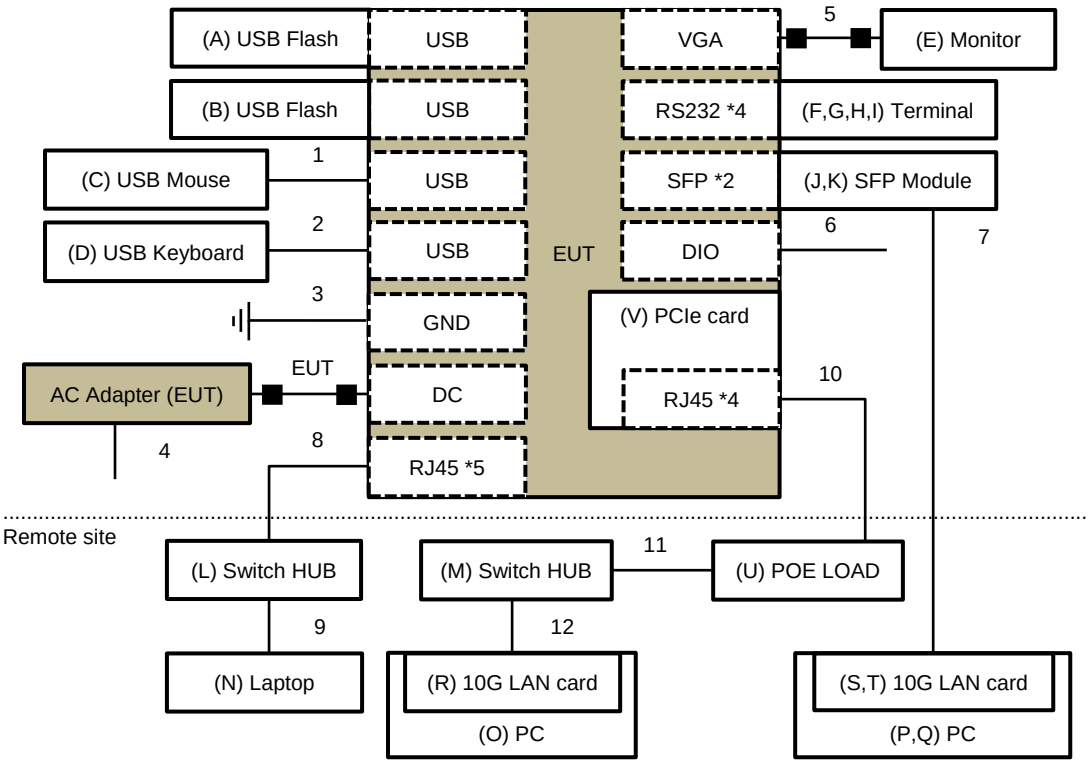
a. Turned on the power of all equipment.
b. EUT ran test program (BurnIntest) to enable all functions.
c. EUT read and wrote messages to/ from internal storage devices, external storage devices.
d. PC, Laptop sent and received messages to/ from EUT via wired cable.
e. EUT sent (color bars with moving element) messages to monitor. Then they displayed messages on their screens simultaneously.

3.6 Connection Diagram of EUT and Peripheral Devices

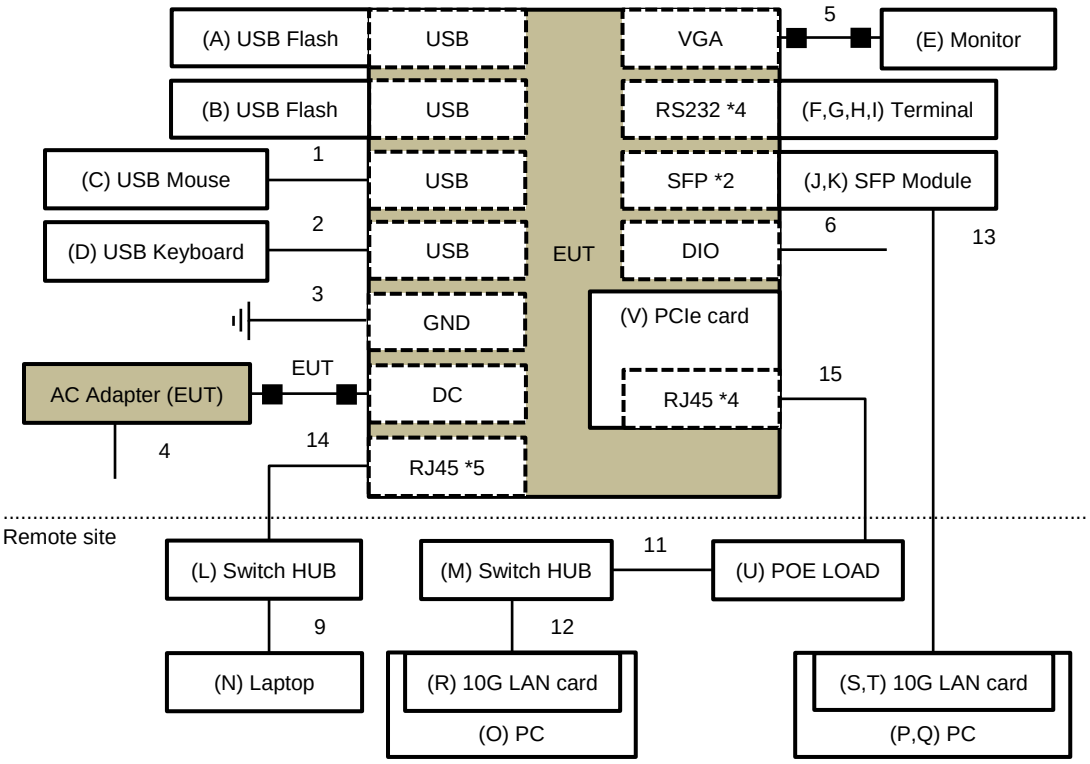
For Emission test (Harmonics & Flicker excluded)



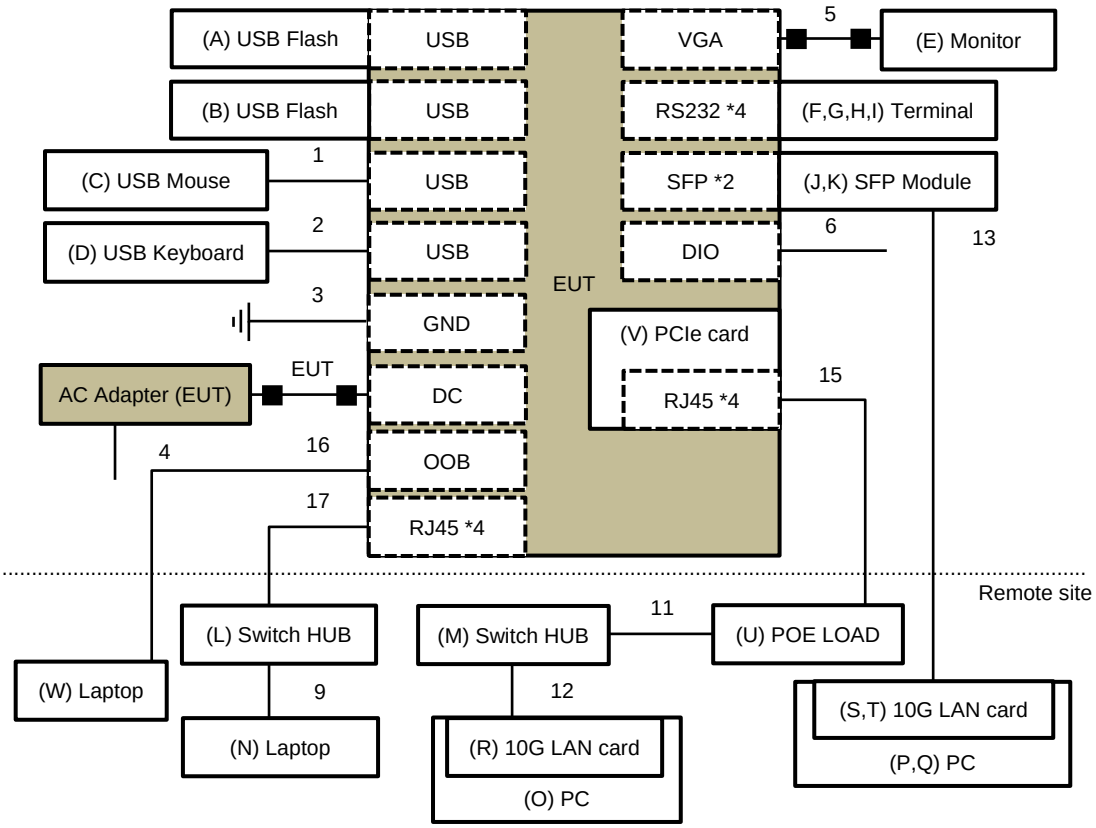
For Harmonic & Flicker & Immunity tests (ESD & RS & CS excluded)



For ESD test (Shielding LAN)



For RS, CS tests (Shielding LAN)



3.7 Configuration of Peripheral Devices and Cable Connections

For Emission test (Harmonics & Flicker excluded)

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	USB-C Hard Disk	G-DRIVE	0G04878	620XJ6RW	DoC	Provided by Lab
B	USB Mouse	DELL	MOCZUL	CN-049TWY-PRC00-77B-007E	N/A	Provided by Lab
C	USB Keyboard	Dell	KB216t	CN-0W33XP-LO300-7CL-1909	N/A	Provided by Lab
D	Printer	HP	HP Officejet Pro 251dW	N/A	B94SDGOB1191	Provided by Lab
E	Monitor	DELL	U2410	CN082WXD728720CC0KCL	DoC	Provided by Lab
F	Terminal	N/A	N/A	N/A	N/A	Supplied by applicant
G	Terminal	N/A	N/A	N/A	N/A	Supplied by applicant
H	Terminal	N/A	N/A	N/A	N/A	Supplied by applicant
I	Terminal	N/A	N/A	N/A	N/A	Supplied by applicant
J	SFP Module	Han Electronics	HE-P1ARJ-30M	2024110003	N/A	Supplied by applicant
K	SFP Module	Han Electronics	HE-P1ARJ-30M	2024110002	N/A	Supplied by applicant
L	Switch HUB	DELL	PowerConnect 2608	CN-0N3857-28298-515-0504	DoC	Provided by Lab
M	Switch HUB	TP-LINK	TL-SX105	221C7A9000993	N/A	Provided by Lab
N	Laptop	LENOVO	T480	PF1EK03U	N/A	Provided by Lab
O	PC	DELL	VOSTRO 470	N/A	DoC	Provided by Lab
P	PC	DELL	VOSTRO 470	N/A	DoC	Provided by Lab
Q	PC	DELL	VOSTRO 470	N/A	DoC	Provided by Lab
R	10G LAN card	ASUS	XG-C100C	N/A	DoC	Provided by Lab
S	10G LAN card	ASUS	XG-C100C	N/A	DoC	Provided by Lab
T	10G LAN card	ASUS	XG-C100C	N/A	DoC	Provided by Lab
U	POE LOAD	KORENIX	N/A	N/A	N/A	Supplied by applicant
V	PCIe card	Vecow	PE-6004HF	N/A	N/A	Supplied by applicant

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	USB	1	1	Y	0	Provided by Lab
2	USB	1	1.8	Y	0	Provided by Lab
3	USB	1	1.8	Y	0	Provided by Lab
4	USB	1	1.8	Y	0	Provided by Lab
5	GND (PE)	1	1.8	N	0	Provided by Lab
6	Power	1	1.8	N	0	Provided by Lab
7	VGA	1	1.8	Y	2	Provided by Lab
8	Data	1	0.6	N	0	Supplied by applicant
9	Cat. 6a	2	10	N	0	Provided by Lab
10	Cat. 5e	5	10	N	0	Provided by Lab
11	Cat. 5e	4	10	N	0	Provided by Lab
12	Cat. 5e	1	2	N	0	Provided by Lab
13	Cat. 5e	4	2	N	0	Provided by Lab
14	Cat. 5e	1	2	N	0	Provided by Lab

For Harmonics, Flicker & Immunity test

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	USB Flash	Transcend	JetFlash 710	N/A	N/A	Provided by Lab
B	USB Flash	Transcend	JetFlash 710	N/A	N/A	Provided by Lab
C	USB Mouse	DELL	MOCZUL	N/A	N/A	Provided by Lab
D	USB Keyboard	DELL	KB4021	N/A	N/A	Provided by Lab
E	Monitor	DELL	P2418HZM	CN-079XVV-TV200-8CP-071T	N/A	Provided by Lab
F	Terminal	N/A	N/A	N/A	N/A	Supplied by applicant
G	Terminal	N/A	N/A	N/A	N/A	Supplied by applicant
H	Terminal	N/A	N/A	N/A	N/A	Supplied by applicant
I	Terminal	N/A	N/A	N/A	N/A	Supplied by applicant
J	SFP Module	Han Electronics	HE-P1ARJ-30M	2024110003	N/A	Supplied by applicant
K	SFP Module	Han Electronics	HE-P1ARJ-30M	2024110002	N/A	Supplied by applicant
L	Switch HUB	DELL	PowerConnect 2608	CN-0N3857-28298-515-0504	DoC	Provided by Lab
M	Switch HUB	TP-LINK	TL-SX105	221C7A9000993	N/A	Provided by Lab
N	Laptop	LENOVO	T480	PF1EK03U	N/A	Provided by Lab
O	PC	DELL	VOSTRO 470	N/A	DoC	Provided by Lab
P	PC	DELL	VOSTRO 470	N/A	DoC	Provided by Lab
Q	PC	DELL	VOSTRO 470	N/A	DoC	Provided by Lab
R	10G LAN card	ASUS	XG-C100C	N/A	DoC	Provided by Lab
S	10G LAN card	ASUS	XG-C100C	N/A	DoC	Provided by Lab
T	10G LAN card	ASUS	XG-C100C	N/A	DoC	Provided by Lab
U	POE LOAD	KORENIX	N/A	N/A	N/A	Supplied by applicant
V	PCIe card	Vecow	PE-6004HF	N/A	N/A	Supplied by applicant
W	Laptop	DELL	Latitude 5420	8L733F3	N/A	Provided by Lab

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	USB	1	1.8	Y	0	Provided by Lab
2	USB	1	1.8	Y	0	Provided by Lab
3	GND (PE)	1	1.5	N	0	Provided by Lab
4	Power	1	1.8	N	0	Provided by Lab
5	VGA	1	1.8	Y	2	Provided by Lab
6	Data	1	0.6	N	0	Supplied by applicant
7	Cat. 6a	2	10	N	0	Provided by Lab
8	Cat. 5e	5	10	N	0	Provided by Lab
9	Cat. 5e	1	3	N	0	Provided by Lab
10	Cat. 5e	4	10	N	0	Provided by Lab
11	Cat. 5e	1	3	N	0	Provided by Lab
12	Cat. 5e	1	3	N	0	Provided by Lab
13	Cat. 6a	2	10	Y	0	Provided by Lab
14	Cat. 5e	5	10	Y	0	Provided by Lab
15	Cat. 5e	4	10	Y	0	Provided by Lab
16	Cat. 5e	1	10	N	0	Provided by Lab
17	Cat. 5e	4	10	Y	0	Provided by Lab

4 Test Instruments

The calibration interval of the all test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.1 Conducted Emissions from Power Ports

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
50 ohm terminal resistance LYNICS	0900510	E1-01-299	2025/1/14	2026/1/13
		E1-011286	2025/9/24	2026/9/23
DC LISN R&S	ESH3-Z6	100219	2025/7/10	2026/7/9
		844950/018	2025/7/10	2026/7/9
Diode Pulse Limiter Schwarzbeck	VTSD 9561 F-N	01587	2025/5/2	2026/5/1
EMI Test Receiver R&S	EPL 1000	101064	2025/4/17	2026/4/16
		101065	2025/4/22	2026/4/21
	ESR3	102414	2025/12/9	2026/12/8
High Pass Filter EMCI	150HPF-ME	114005	2025/5/2	2026/5/1
		114006	2025/5/2	2026/5/1
	150HPF-MF	113009	2025/5/2	2026/5/1
LISN R&S	ENV216	101195	2025/7/18	2026/7/17
		101196	2025/5/19	2026/5/18
		101197	2025/7/4	2026/7/3
	ESH2-Z5	100104	2025/12/11	2026/12/10
	ESH3-Z5	847265/023	2025/10/21	2026/10/20
LISN Schwarzbeck	NNLK 8121	8121-731	2025/6/10	2026/6/9
		8121-00759	2025/8/12	2026/8/11
		8121-808	2025/4/23	2026/4/22
	NNLK 8129	00624	2025/10/9	2026/10/8
		8129229	2025/10/14	2026/10/13
RF Coaxial Cable PEWC	5D-FB	Cable-CO9-01	2025/7/4	2026/7/3
Software BVADT	Cond_V7.4.1.0	N/A	N/A	N/A

Notes:

1. The test was performed in Linkou Conduction 9.
2. The VCCI Site Registration No. C-11312.
3. Tested Date: 2025/12/16

4.2 Radiated Emissions up to 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
ADT. Tower	AT100	0205	N/A	N/A
ADT. Turn Table	TT100	0205	N/A	N/A
Bi_Log Antenna schaffner	CBL 6111D	22270	2025/9/19	2026/9/18
Coupling / Decoupling Network Schwarzbeck	CDNE-M2	00097	2025/5/28	2026/5/27
	CDNE-M3	00091	2025/3/20	2026/3/19
EMI Test Receiver R&S	ESCS 30	100276	2025/4/18	2026/4/17
		100292	2025/9/24	2026/9/23
Fixed Attenuator Mini-Circuits	UNAT-5+	PAD-ST2-01	2025/10/16	2026/10/15
Preamplifier HP	8447D	2727A05786	2025/2/14	2026/2/13
RF Coaxial Cable Pacific	8D-FB	Cable-ST2-01	2025/10/16	2026/10/15
Software BVADT	Radiated_V8.8.09	N/A	N/A	N/A

Notes:

1. The test was performed in Linkou Open Site2 , The test site validated date: 2025/7/12 (NSA)
2. The VCCI Site Registration No. R-10237.
3. Tested Date: 2025/12/16

4.3 Radiated Emissions above 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Fix tool for Boresight antenna tower BV	BAF-01	9	N/A	N/A
Fixed Attenuator Mini-Circuits	BW-K3-2W44+	PAD-CH7-03	2025/7/4	2026/7/3
	BW-N4W5+	PAD-CH10-02	2025/7/4	2026/7/3
Horn Antenna EMCO	3115	6714	2025/11/9	2026/11/8
Horn Antenna ETS-Lindgren	3117-PA	00215857	2025/11/9	2026/11/8
Horn Antenna Schwarzbeck	BBHA 9170	BBHA9170190	2025/11/9	2026/11/8
MXA Signal Analyzer Keysight	N9020B	MY60110438	2025/12/4	2026/12/3
		MY60112260	2025/5/26	2026/5/25
Notch Filter Micro-Tronics	BRC50703-01	010	2025/5/22	2026/5/21
	BRM17690	005	2025/5/22	2026/5/21
Preamplifier EMCI	EMC0126545	980076	2025/2/14	2026/2/13
	EMC184045B	980235	2025/2/14	2026/2/13
Preamplifier HP	8449B	3008A01292	2025/2/14	2026/2/13
RF Coaxial Cable EMEC	EM102-KMKM-100	02	2025/7/4	2026/7/3
	EM102-KMKM-350	01	2025/7/4	2026/7/3
Software BVADT	Radiated_V8.8.09	N/A	N/A	N/A
Turn Table & Tower Max Full	MF7802	MF780208216	N/A	N/A

Notes:

1. The test was performed in Linkou 966 Chamber 3 (CH 10).
2. The VCCI Site Registration No. G-10427.
3. Tested Date: 2025/12/17

4.4 Harmonic Current Measurement

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Harmonics & Flicker Test System AMETEK	DPA 500N/NETWAVE 7-208	P2428289530/P2443293206	2025/10/15	2026/10/14
Software AMETEK	Compliance Test Studio 23.3.9260.31770	N/A	N/A	N/A

Notes:

1. The test was performed in Linkou EMS Room No.1.
2. Tested Date: 2025/12/19

4.5 Voltage Fluctuations and Flicker Measurement

Refer to section 4.4 to get the tested date and information of the instruments.

4.6 Electrostatic Discharges (ESD)

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Electrostatic Analog Tester TESEQ	NSG 438	1875	2025/11/6	2026/11/5
ESD Generator EM TEST	Dito	V0701102114	2025/11/3	2026/11/2
ESD Simulator EM TEST	Dito	V1203111608	2025/7/21	2026/7/20
ESD Simulator TESEQ	NSG 438	1364	2025/11/7	2026/11/6

Notes:

1. The test was performed in Linkou ESD Room No.01.
2. Tested Date: 2025/12/26

4.7 Radio Frequency Electromagnetic Field (RS)

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Audio analyzer R&S	UPV	103095	2025/9/18	2026/9/17
Band Pass Filter B&K	WH3278	N/A	2025/11/6	2026/11/5
CHANCE MOST Full Anechoic Chamber (9x5x3m)	Chance Most	RS-002	2025/1/20	2026/1/19
Controller Amplifier Research	SC1000M3	305910	N/A	N/A
High Gain Horn Antenna Amplifier Research	AT4010	0329800	N/A	N/A
Isotropic EM Field Probe+EM Field Meter Wavecontrol	WPF18+SMP2	21WP090492+21SN1691	2025/1/21	2026/1/20
Log Periodic Antenna Amplifier Research	AT6080	0329465	N/A	N/A
Power Sensor Boonton	51011-EMC	32807	2025/6/3	2026/6/2
		32832	2025/6/3	2026/6/2
Pressure-field Microphone B&K	4192	3190854	2025/12/17	2026/12/16
		3190855	2025/12/17	2026/12/16
PSG Analog Signal Generator Agilent	E8257D	MY48050465	2025/6/24	2026/6/23
RF Power Amplifier Amplifier Research	35S4G8AM4	0326094	N/A	N/A
RF Power Amplifier BONN	BLMA 1060-150	2214325C-02	N/A	N/A
	BLWA 0810-250	2214325A-01	N/A	N/A
	BSA 0125-800	1912556	N/A	N/A
RF Power Meter Boonton	4232A	94901	2025/6/4	2026/6/3
Software BVADT	ABMS_Audio V7.4.10	N/A	N/A	N/A
	RS_V7.6.15	N/A	N/A	N/A
Stacked Log Periodic Antenna Schwarzbeck	STLP 9149	9149-260	N/A	N/A
Two channel microphone conditioning amplifier B&K	2690-OS2	3001996	2025/11/6	2026/11/5
Wireless Connectivity Tester R&S	CMW270	101075	2025/7/14	2026/7/13

Notes:

1. The test was performed in Linkou RS Room No.02.
2. Tested Date: 2025/12/22

4.8 Fast Transients Common Mode (EFT)

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Burst generator Haefely	PEFT 4010	154954	2025/3/14	2026/3/13
Capacitive Coupling clamp Haefely	IP4A	155173	2025/3/14	2026/3/13

Notes:

1. The test was performed in Linkou EFT Room .
2. Tested Date: 2025/12/12

4.9 Surges

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
CDN for Unshielded Unsymmetrical Signal & Data Lines TESEQ	CDN117	40144	2025/8/12	2026/8/11
Coupling / Decoupling Network TESEQ	CDN 118-T8	40386	2025/8/12	2026/8/11
	CDN HSS-2	41009	2025/4/14	2026/4/13
Surge & EFT Generators TESEQ	NSG 3060 / CDN 3061	1572 / 1463	2025/4/14	2026/4/13
Surge CDN TESEQ	CDN 3083-S100	1215	2025/4/14	2026/4/13

Notes:

1. The test was performed in Linkou EMS Room No.02.
2. Tested Date: 2025/12/15

4.10 Radio Frequency Common Mode (CS)

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Audio analyzer R&S	UPV	104934	2025/8/19	2026/8/18
Band Pass Filter B&K	WH3278	N/A	2025/6/9	2026/6/8
CDN Calibration Kit TESEQ	CDN T8S	29459	2025/2/18	2026/2/17
Coupling / Decoupling Network EM TEST	CDN M1/32A	306508	2025/2/18	2026/2/17
	CDN T2	306509	2025/2/18	2026/2/17
Coupling / Decoupling Network FCC	FCC-801-M2-16A	01047	2025/2/18	2026/2/17
	FCC-801-M5-50A	100018	2025/1/15	2026/1/14
Coupling / Decoupling Network TESEQ	CDN M3-100-750V	69836	2025/10/9	2026/10/8
	CDN M5-100-750V	69834	2025/10/9	2026/10/8
	CDN M232	37702	2025/2/18	2026/2/17
	CDN M332	41256	2025/2/18	2026/2/17
		41258	2025/2/18	2026/2/17
	CDN M432S	56519	2025/2/18	2026/2/17
	CDN S751A	56435	2025/2/18	2026/2/17
		56436	2025/2/18	2026/2/17
	CDN ST08A	56525	2025/2/18	2026/2/17

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
		56527	2025/2/18	2026/2/17
	CDN T8-10	40376	2025/2/18	2026/2/17
	CDN T8-230	56641	2025/9/23	2026/9/22
		56642	2025/9/23	2026/9/22
	CDN T400A	49918	2025/2/18	2026/2/17
	CDN T800	34428	2025/2/18	2026/2/17
Current Clamp FCC	F-120-9A	361	2025/8/18	2026/8/17
FCC EM Injection Clamp FCC	F-203I-23mm	455	N/A	N/A
Fixed Attenuator SGH	VFA_Z-06H20-N2-06	01	N/A	N/A
Power Sensor Boonton	51011-EMC	30028	2025/7/30	2026/7/29
		33029	2025/7/30	2026/7/29
Pressure-field Microphone B&K	4192	3190854	2025/12/17	2026/12/16
		3190855	2025/12/17	2026/12/16
RF Power Amplifier BONN	BSA 0125-125	2314648	N/A	N/A
RF Power Meter Boonton	4232A	104302	2025/7/30	2026/7/29
Signal Generator R&S	SMB100A	109279	2025/10/15	2026/10/14
Software BVADT	ABMS_Audio V7.4.10	N/A	N/A	N/A
	BVADT_CS_V7.6.6	N/A	N/A	N/A
Two channel microphone conditioning amplifier B&K	2690-OS2	2645274	2025/6/9	2026/6/8
Wireless Connectivity Tester R&S	CMW270	101075	2025/7/14	2026/7/13

Notes:

1. The test was performed in Linkou CS Room No.1.
2. Tested Date: 2025/12/27 ~ 2025/12/31

5 Limits of Test Items

5.1 Conducted Emissions from Power Ports

Frequency (MHz)	AC or DC power ports
	Quasi-peak, (dBuV)
0.15 - 0.5	99
0.5 - 30	93

Notes: The lower limit shall apply at the transition frequencies.

5.2 Radiated Emissions up to 1 GHz

Frequency (MHz)	Quasi-peak (dBuV/m)	
	at 3m	at 10m
30 - 230	50	40
230 - 1000	57	47

Notes: 1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. All emanations from a digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

5.3 Radiated Emissions above 1 GHz

Frequency (GHz)	dBuV/m (at 3m)	
	Average	Peak
1 - 3	56	76
3 - 6	60	80

Notes: 1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).

Frequency Range of Radiated Measurement (For unintentional radiators)

Highest internal frequency (*Fx*) (MHz)	**Highest measurement frequency (*FM*)** (GHz)
Fx *≤ 108 MHz*	1
108 MHz < ***Fx*** ≤ 500 MHz	2
500 MHz < ***Fx*** ≤ 1 GHz	5
Fx *> 1 GHz*	5 x ***Fx*** up to a maximum of 6 GHz
Fx is the highest fundamental frequency generated and/or used in the ITE or digital apparatus under test.	

5.4 Harmonic Current Measurement

Limits for Class A equipment	
Harmonic Order n	Max. permissible harmonics current A
Odd harmonics	
3	2.30
5	1.14
7	0.77
9	0.40
11	0.33
13	0.21
15≦n≦39	0.15x15/n
Even harmonics	
2	1.08
4	0.43
6	0.30
8≦n≦40	0.23x8/n

Limits for Class D equipment		
Harmonic Order n	Max. permissible harmonics current per watt mA/W	Max. permissible harmonics current A
Odd Harmonics 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≦n≦39	3.85/n	0.15x15/n

Notes: 1. Class A and Class D are classified according to section 5 of EN 61000-3-2.

2. According to section 7 of EN 61000-3-2, the above limits for all equipment except for lighting equipment having an active input power > 75 W and no limits apply for equipment with an active input power up to and including 75 W.

Classification of equipment

Class A	Class B	Class C	Class D
Balanced three-phase equipment; Household appliances excluding equipment as Class D; Tools excluding portable tools; Dimmers for incandescent lamps; Audio equipment; Equipment not specified in one of the three other classes.	Portable tools; Arc welding equipment which is not professional equipment.	Lighting equipment.	Equipment having a specified power less than or equal to 600 W 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).

5.5 Voltage Fluctuations and Flicker Measurement

Test Item	Limit	Note
P_{st}	1.0	P_{st} means short-term flicker indicator.
P_{lt}	0.65	P_{lt} means long-term flicker indicator.
T_{dt} (ms)	500	T_{dt} means maximum time that d(t) exceeds 3.3 %.
d_c (%)	3.3%	d_c means relative steady-state voltage change
d_{max} (%)		d_{max} means maximum relative voltage change. Control Method of Equipment (see below)
	4%	■ - without additional conditions
	6%	□ - switched manually, or - switched automatically more frequently than twice per day, and also has either a delayed restart (the delay not less than a few tens of seconds), or manual restart, after a power supply interruption
	7%	□ - attended whilst in use (for example: hair dryers, vacuum cleaners, kitchen equipment such as mixers, garden equipment such as lawn mowers, portable tools such as electric drills), or switched on automatically, or - is intended to be switched on manually, no more than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds) or manual restart, after a power supply interruption.

5.6 General immunity requirements

Port	Basic Standard	Test item	Test specification	Performance criteria
Power input	IEC 61000-4-4	Fast Transients, Common Mode (EFT)	±2 kV 5/50 ns 5 kHz, repetition frequency	A
	IEC 61000-4-5	Surge	Line to line: ±1 kV, 42 Ω, 0,5 µF, 1.2/50 µs Line to earth: ±2 kV, 42 Ω, 0,5 µF, 1.2/50 µs	B
	IEC 61000-4-6	Radio Frequency, Common Mode (CS)	0.15~80(MHz), 10 V, 80% AM (1 kHz)	A
Signal and communication, process measurement and control ports	IEC 61000-4-4	Fast Transients, Common Mode (EFT)	±2 kV 5/50 ns 5 kHz, repetition frequency	A
	IEC 61000-4-6	Radio Frequency, Common Mode (CS)	0.15~80 MHz, 10 V, 80% AM (1 kHz),	A
Enclosure	IEC 61000-4-2	Electrostatic Discharge (ESD)	±6 kV (contact) ±8 kV (Air)	B
	IEC 61000-4-3	Radio Frequency Electromagnetic Field (RS)	80~800 MHz, 20V/m*, 80% AM (1kHz) 800~1000 MHz, 20V/m, 80% AM (1kHz) 1400~2000 MHz, 10V/m, 80% AM (1kHz) 2000~2700 MHz, 5V/m, 80% AM (1kHz) 5100~6000 MHz, 3V/m, 80% AM (1kHz)	A

*: This limit applies to equipment mounted in the passenger compartments, drivers cab or external to the rolling stock (roof, underframe). For equipment mounted in all other areas a severity level of 10 V/m may be used.

6 Test Arrangements

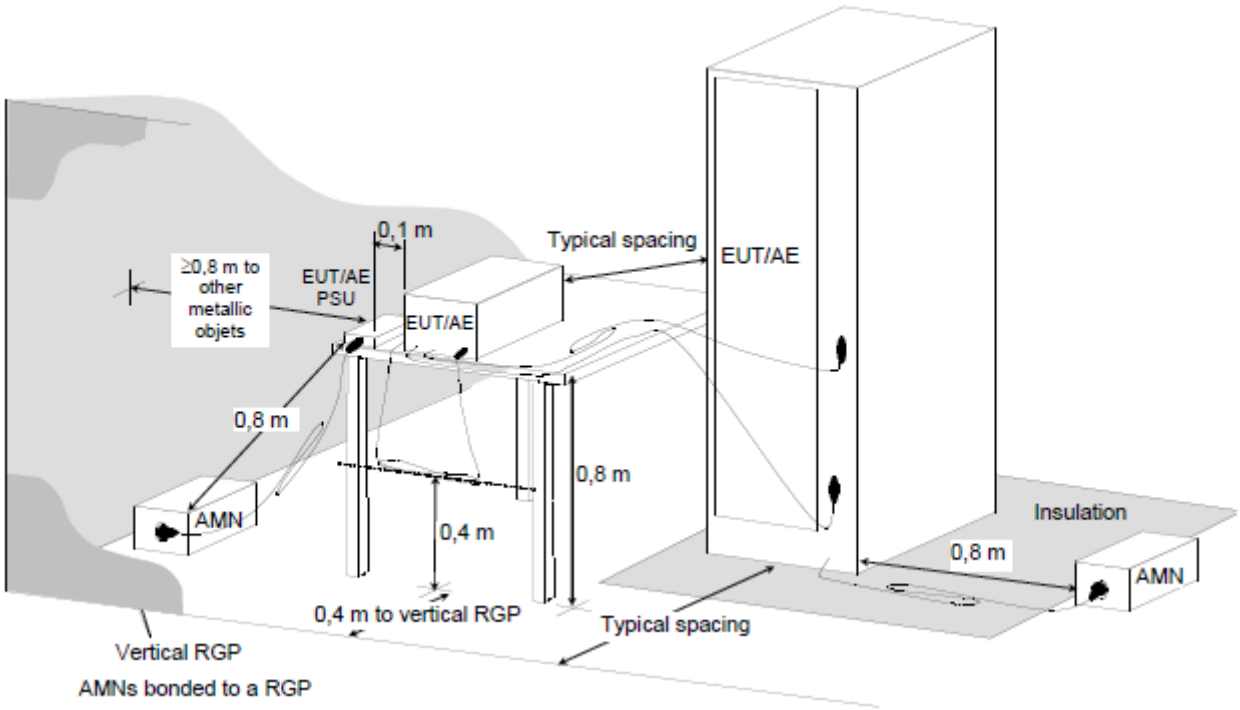
6.1 Conducted Emissions from Power Ports

a. The EUT is placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN), or an Artificial Network (AN) as specified in CISPR 25 if uses in a vehicle. Other support units are connected to the power mains through another LISN and/or AN. They provide coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

c. The test results of conducted emissions at mains ports are recorded of six worst margins for quasi-peak (mandatory) [and average (if necessary)] values against the limits at frequencies of interest unless the margin is 20 dB or greater.

Note: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

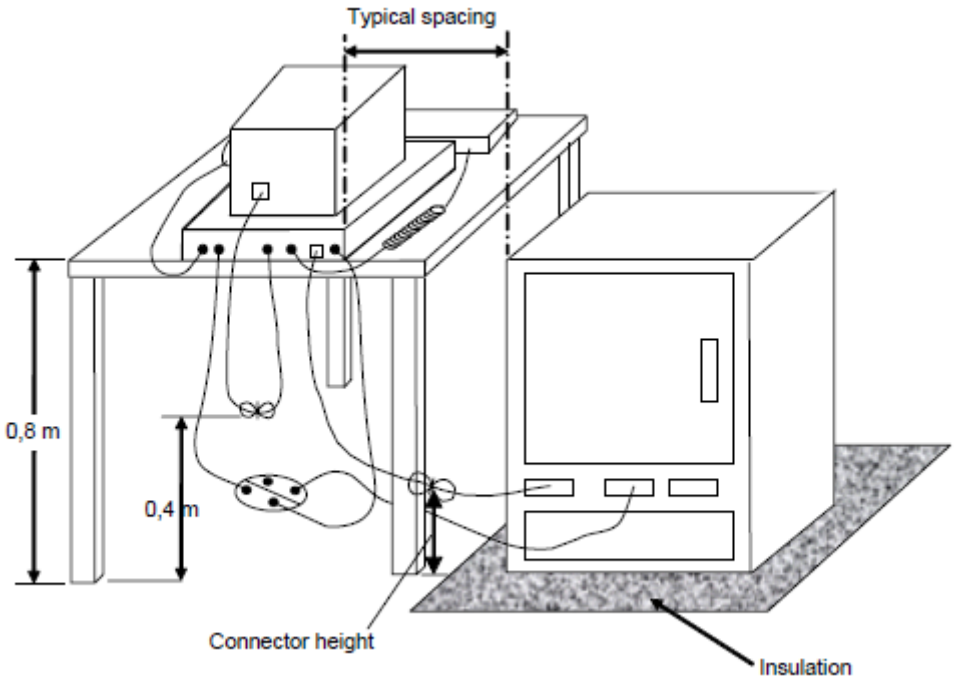


For the actual test configuration, please refer to the related Item – Photographs of the Test Configuration.

6.2 Radiated Emissions up to 1 GHz

a. For the table-top EUT is placed on a 0.8 meter to the top of rotating table; for the floor standing EUT shall be insulated (by insulation of maximum thickness of 150 mm) from the horizontal reference ground plane. The rotating table is rotated 360 degrees to determine the position of the highest radiation. If the equipment requires a dedicated ground connection, this shall be provided and bonded to the RGP.
b. The EUT is set 10 meters away from the interference-receiving antenna, which is mounted on the top of a variable-height antenna tower.
c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is up to 1 GHz.

Note: The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for quasi-peak detection (QP) at frequency up to 1GHz.

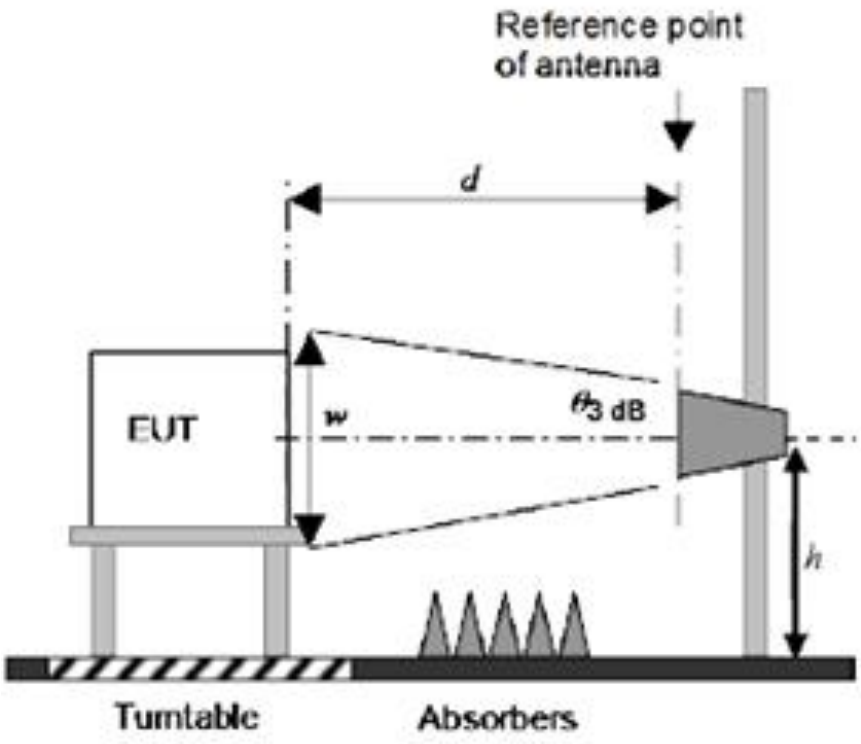


For the actual test configuration, please refer to the related Item – Photographs of the Test Configuration.

6.3 Radiated Emissions above 1 GHz

a. For the table-top EUT is placed on a 0.8 meter to the top of rotating table; for the floor standing EUT shall be insulated (by insulation of maximum thickness of 150 mm) from the horizontal reference ground plane. The rotating table is rotated 360 degrees to determine the position of the highest radiation. If the equipment requires a dedicated ground connection, this shall be provided and bonded to the RGP.
b. The EUT was set *d* = 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The height of antenna can be varied from one meter to four meters, the height of adjustment depends on the EUT height and the antenna 3 dB beamwidth both, to detect the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The spectrum analyzer system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz.

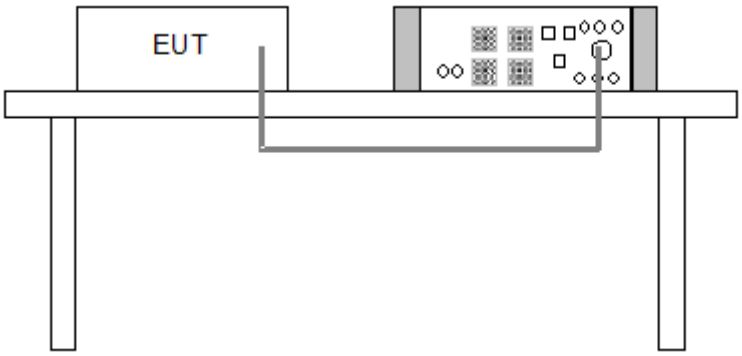
Note: The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz for Average detection (AV) at frequency above 1 GHz.



For the actual test configuration, please refer to the related Item – Photographs of the Test Configuration.

6.4 Harmonic Current Measurement

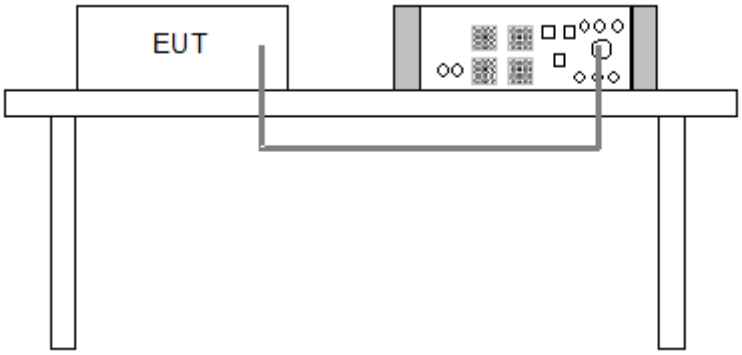
a. The harmonic current limits apply to line currents and not to currents in the neutral conductor. Nevertheless, for single-phase equipment, it is permissible to measure the currents in the neutral conductor instead of the currents in the line.
b. The EUT is tested as presented by, and in accordance with information provided by, the manufacturer. Preliminary operation of motor drives by the manufacturer may be needed before the tests are undertaken to ensure that results correspond with normal use.
c. In all configurations, the use of additional load shall not cause the total output power available to be exceeded.
d. The correspondent test program of test instrument to measure the current harmonics emanated from EUT is chosen. The measure time shall be not less than the time necessary for the EUT to be exercised.



For the actual test configuration, please refer to the related Item – Photographs of the Test Configuration.

6.5 Voltage Fluctuations and Flicker Measurement

a. Controls or automatic programs of the EUT shall be set to produce the most unfavourable sequence of voltage changes, using only those combinations of controls and programmes which are mentioned by the manufacturer in the instruction manual, or are otherwise likely to be used.
b. Preliminary operation of motor drives may be needed before the tests to ensure that results corresponding to those of normal use are obtained.
c. 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 minutes and the observation period for long-term flicker indicator is 2 hours.



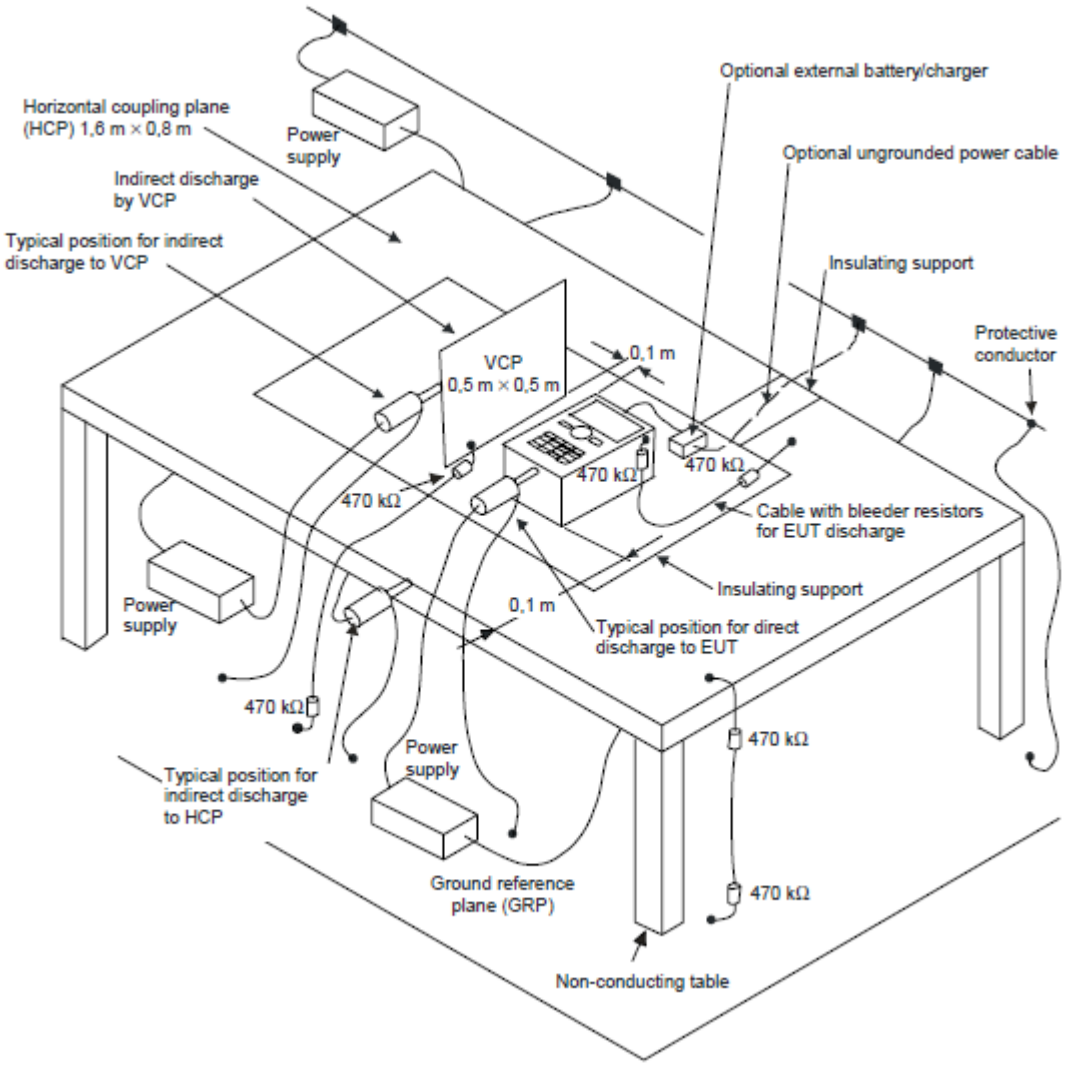
For the actual test configuration, please refer to the related Item – Photographs of the Test Configuration.

6.6 Electrostatic Discharges (ESD)

Discharge Impedance:	330 ohm / 150 pF
Number of Discharge:	Air – Direct: 10 discharges per location (each polarity) Contact – Direct & Indirect: 10 discharges per location (each polarity)
Discharge Period:	1-second minimum

The basic test procedure was in accordance with EN/IEC 61000-4-2:

a. Electrostatic discharges were applied only to those points and surfaces of the EUT that are accessible to users during normal operation.
b. The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.
c. The time interval between two successive single discharges was at least 1 second.
d. The ESD generator was held perpendicularly to the surface to which the discharge was applied and the return cable was at least 0.2 meters from the EUT.
e. Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
f. Air discharges were applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator was removed from the EUT and re-triggered for a new single discharge. The test was repeated until all discharges were complete.
g. At least ten single discharges (in the most sensitive polarity) were applied to the **H**orizontal **C**oupling **P**lane at points on each side of the EUT. The ESD generator was positioned at a distance of 0.1 meters from the EUT with the discharge electrode touching the **HCP.**
h. At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the **V**ertical **C**oupling **P**lane in sufficiently different positions that the four faces of the EUT were completely illuminated. The **VCP** (dimensions 0.5m x 0.5m) was placed vertically to and 0.1 meters from the EUT.



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

NOTE:

TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table 0.8 meters high standing on the **G**round **R**eference **P**lane. The **GRP** consisted of a sheet of aluminum at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system. A **H**orizontal **C**oupling **P**lane (1.6m x 0.8m) was placed on the table and attached to the **GRP** by means of a cable with 940kΩ total impedance. The equipment under test, was installed in a representative system as described in section 7 of EN/IEC 61000-4-2, and its cables were placed on the **HCP** and isolated by an insulating support of 0.5mm thickness. A distance of 1-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

FLOOR-STANDING EQUIPMENT

The equipment under test was installed in a representative system as described in section 7 of IEC 61000-4-2, and its cables were isolated from the Ground Reference Plane by an insulating support of 0.1-meter thickness. The GRP consisted of a sheet of aluminum that is at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system and extended at least 0.5 m.

6.7 Radio Frequency Electromagnetic Field (RS)

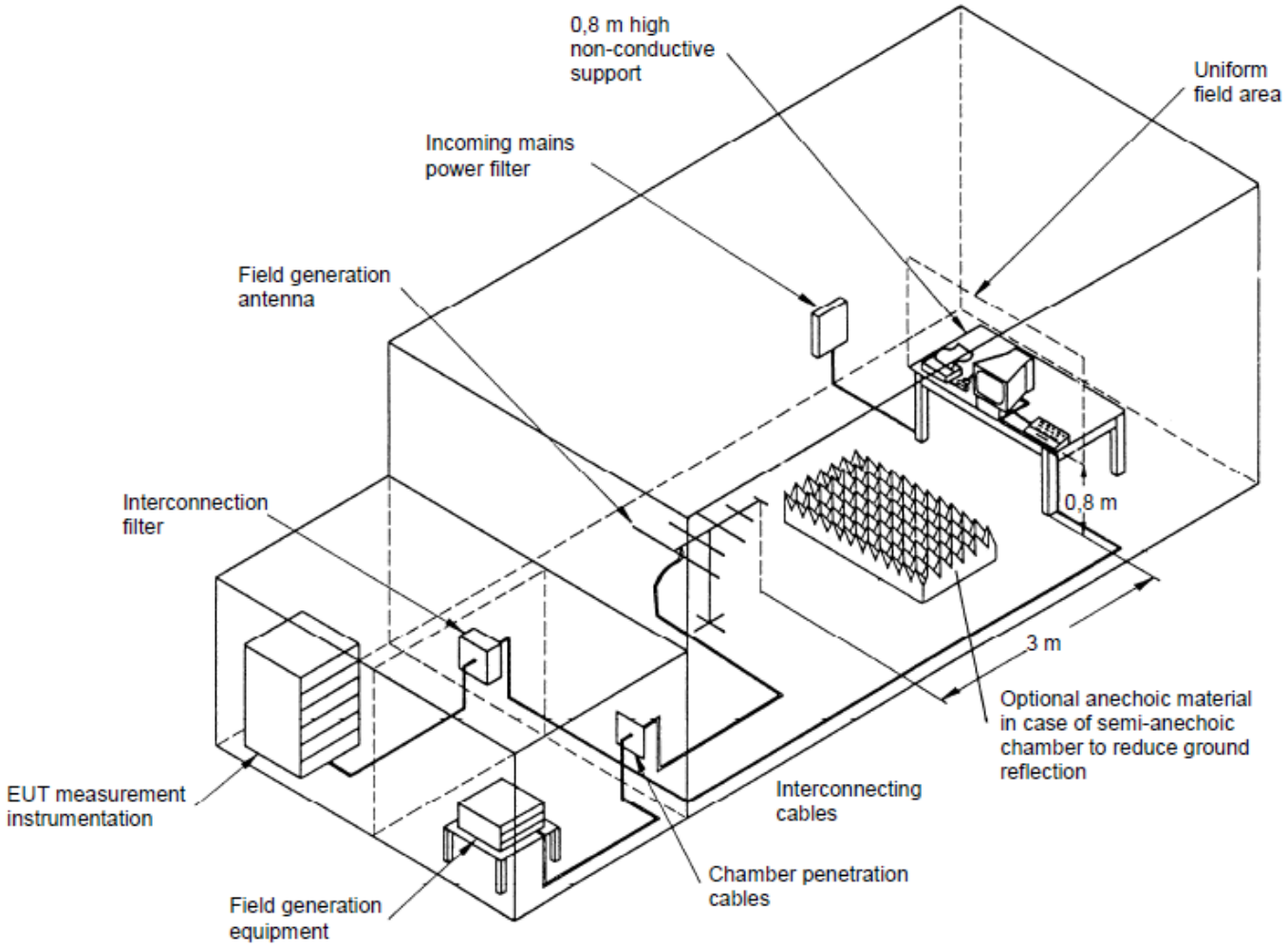
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of preceding frequency value
Dwell Time:	3 seconds

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

a. The testing was performed in a modified semi-anechoic chamber.

b. The frequency range shall be swept, with the signal 80% amplitude modulated with a 1kHz sine wave.

c. The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

NOTE:

TABLETOP EQUIPMENT

The EUT installed in a representative system as described in section 7 of EN/IEC 61000-4-3 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

FLOOR STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of EN/IEC 61000-4-3 was placed on a non-conductive wood support 0.1 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

6.8 Fast Transients Common Mode (EFT)

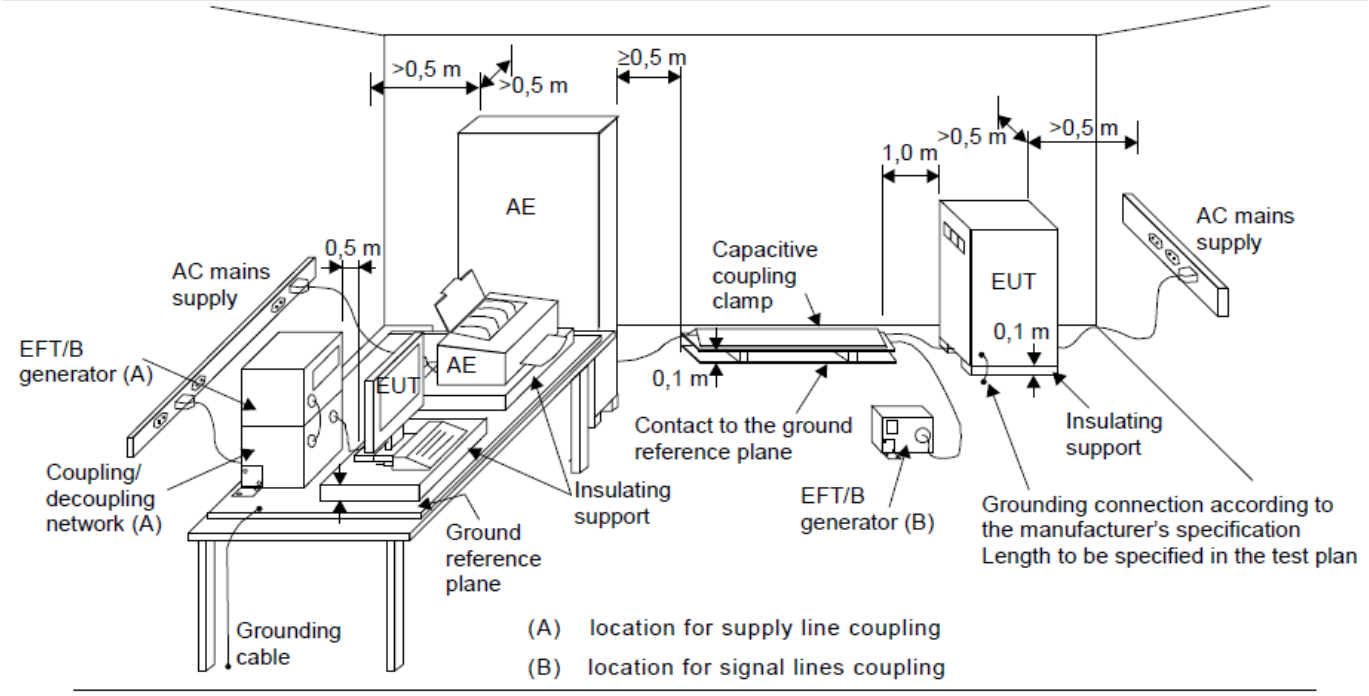
Impulse Repetition Frequency:	5kHz
Impulse Wave Shape:	5/50 ns
Burst Duration:	15 ms
Burst Period:	300 ms
Test Duration:	1 min.

a. Both positive and negative polarity discharges were applied.

b. The distance between any coupling devices and the EUT should be 0.5 m for table-top equipment testing, and 1.0 m for floor standing equipment.

c. The duration time of each test sequential was 1 minute.

d. The transient/burst waveform was in accordance with EN/IEC 61000-4-4, 5/50 ns.



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

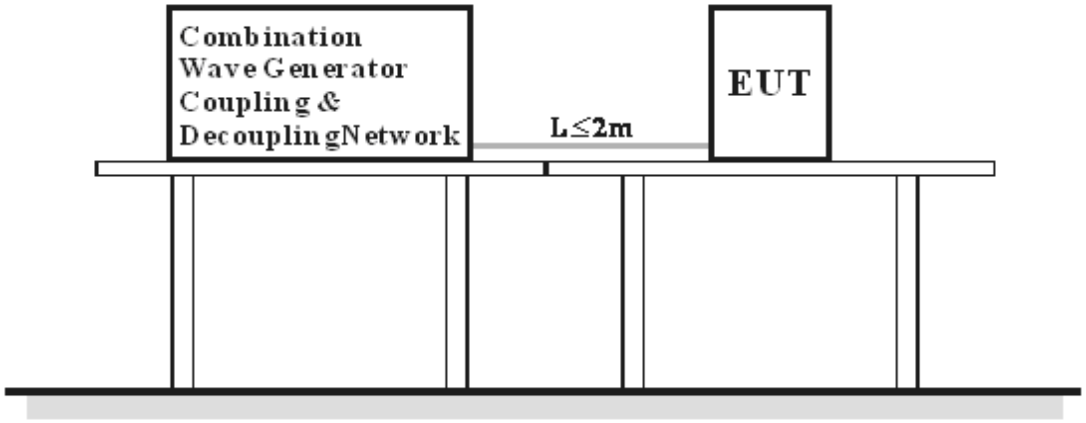
6.9 Surges

Wave-Shape:	**Battery referenced ports (except at the output of energy sources), auxiliary AC power input ports:** 1.2/50 µs Open Circuit Voltage 8/20 µs Short Circuit Current
Pulse Repetition Rate:	60 sec.
Number of Tests:	5 positive and 5 negative at selected points

a. EUT Power ports:

The surge shall be applied to the EUT power supply terminals via the capacitive coupling network. Decoupling networks are required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines and to provide sufficient decoupling impedance to the surge wave. The power cord between the EUT and the coupling network shall not exceed 2 meters in length.

For double-insulated products without PE or external earth connections, the test shall be done in a similar way as for grounded products but without adding any additional external grounded connections. If there are no other possible connections to earth, line-to-ground tests may be omitted.



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

6.10 Radio Frequency Common Mode (CS)

Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of preceding frequency value
Dwell Time	3 seconds

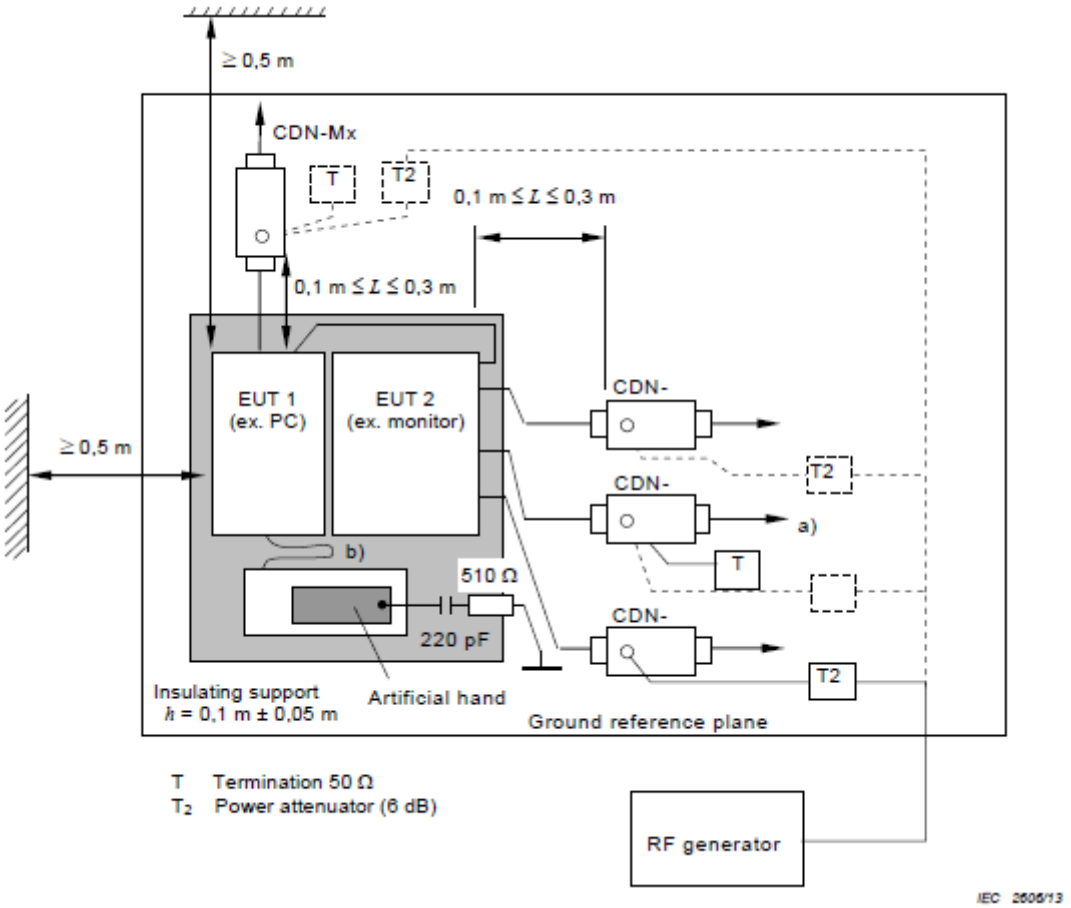
a. The EUT shall be tested within its intended operating and climatic conditions.

b. An artificial hand was placed on the hand-held accessory and connected to the ground reference plane.

c. One of the CDNs not used for injection was terminated with 50 ohm, providing only one return path. All other CDNs were coupled as decoupling networks.

d. 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.

e. Attempts should be made to fully exercise the EUT during testing, and to fully interrogate all exercise modes selected for susceptibility.



Note: 1.The EUT clearance from any metallic obstacles shall be at least 0,5 m.
2. Interconnecting cables (≦1 m) belonging to the EUT shall remain on the insulating support.

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

7 Test Results of Test Item

7.1 Conducted Emissions from Power Ports

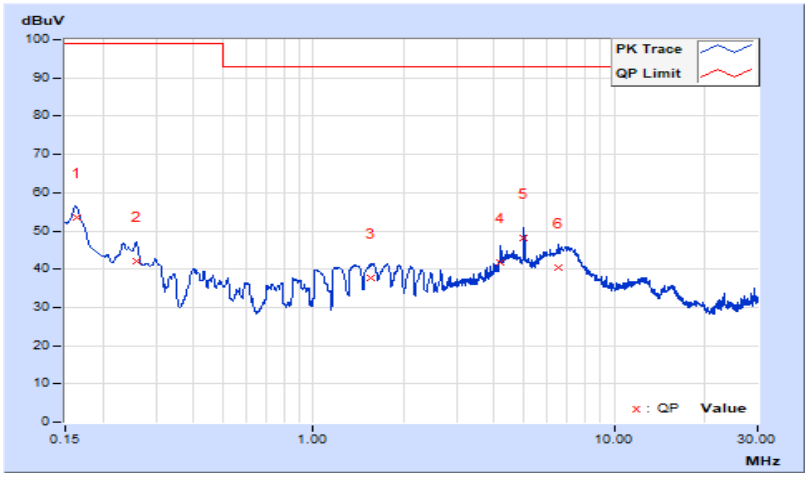
Mode A

Frequency Range	150 kHz ~ 30 MHz	**Detector Function & Resolution Bandwidth**	Quasi-Peak (QP), 9 kHz
Input Power	230 Vac, 50 Hz	**Environmental Conditions**	20 °C, 65% RH, 1012 mbar
Tested by	Paul Chen		

Phase Of Power : Line (L)						
No	**Frequency (MHz)**	**Correction Factor (dB)**	**Reading Value (dBuV)**	**Emission Level (dBuV)**	**Limit (dBuV)**	**Margin (dB)**
			Q.P.	**Q.P.**	**Q.P.**	**Q.P.**
1	0.16350	9.83	43.66	53.49	99.00	-45.51
2	0.25800	9.81	32.14	41.95	99.00	-57.05
3	1.55750	9.83	27.82	37.65	93.00	-55.35
4	4.18775	9.86	31.86	41.72	93.00	-51.28
5	**5.02700**	**9.88**	**38.39**	**48.27**	**93.00**	**-44.73**
6	6.54350	9.92	30.34	40.26	93.00	-52.74

Remarks:

1. Q.P. is abbreviations of quasi-peak individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

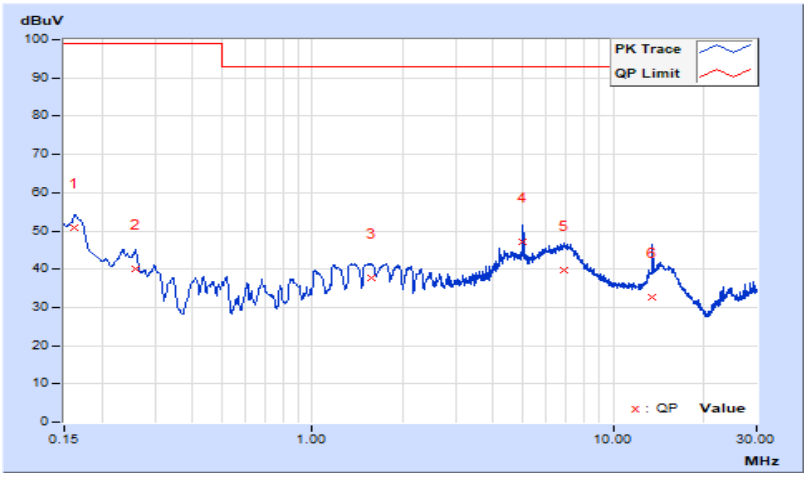


Frequency Range	150 kHz ~ 30 MHz	**Detector Function & Resolution Bandwidth**	Quasi-Peak (QP), 9 kHz
Input Power	230 Vac, 50 Hz	**Environmental Conditions**	20 °C, 65% RH, 1012 mbar
Tested by	Paul Chen		

Phase Of Power : Neutral (N)						
No	**Frequency (MHz)**	**Correction Factor (dB)**	**Reading Value (dBuV) Q.P.**	**Emission Level (dBuV) Q.P.**	**Limit (dBuV) Q.P.**	**Margin (dB) Q.P.**
1	0.16221	9.78	41.02	50.80	99.00	-48.20
2	0.25800	9.78	30.24	40.02	99.00	-58.98
3	1.56425	9.82	27.75	37.57	93.00	-55.43
4	5.02409	9.92	37.29	47.21	93.00	-45.79
5	6.85400	9.97	29.73	39.70	93.00	-53.30
6	13.55900	10.18	22.56	32.74	93.00	-60.26

Remarks:

1. Q.P. is abbreviations of quasi-peak individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



7.2 Radiated Emissions up to 1 GHz

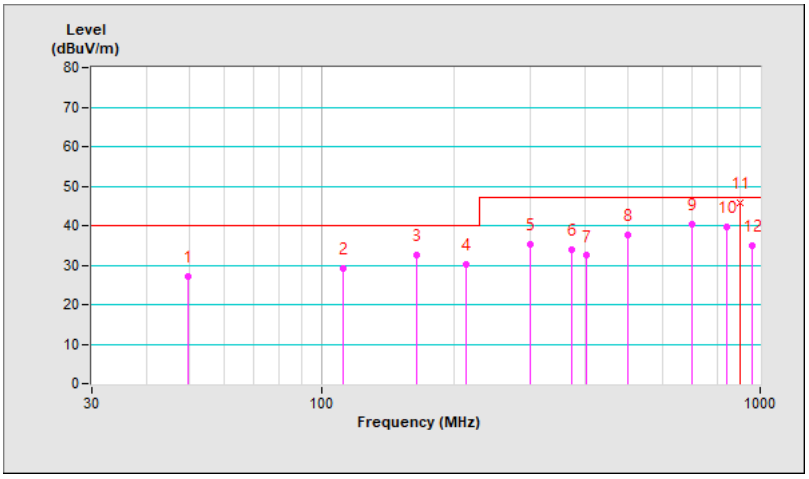
Mode A

Frequency Range	30 MHz ~ 1 GHz	**Detector Function & Resolution Bandwidth**	Quasi-Peak (QP), 120 kHz
Input Power	230 Vac, 50 Hz	**Environmental Conditions**	19 °C, 72% RH, 1000 mbar
Tested By	Paul Chen		

Antenna Polarity & Test Distance : Horizontal at 10 m								
No	**Frequency (MHz)**	**Emission Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	49.58	27.22 QP	40.00	-12.78	4.00 H	225	40.52	-13.30
2	112.24	29.08 QP	40.00	-10.92	4.00 H	33	38.37	-9.29
3	165.28	32.52 QP	40.00	-7.48	4.00 H	196	42.42	-9.90
4	213.43	30.09 QP	40.00	-9.91	4.00 H	245	40.46	-10.37
5	300.02	35.19 QP	47.00	-11.81	4.00 H	177	40.55	-5.36
6	372.25	33.87 QP	47.00	-13.13	4.00 H	145	37.67	-3.80
7	402.21	32.39 QP	47.00	-14.61	2.45 H	182	35.19	-2.80
8	500.02	37.66 QP	47.00	-9.34	1.89 H	220	38.80	-1.14
9	700.02	40.42 QP	47.00	-6.58	1.00 H	357	37.44	2.98
10	840.22	39.65 QP	47.00	-7.35	1.00 H	48	33.42	6.23
11	**900.01**	**45.79 QP**	**47.00**	**-1.21**	**1.00 H**	**169**	**38.76**	**7.03**
12	960.02	34.91 QP	47.00	-12.09	1.00 H	24	25.99	8.92

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Pre-Amplifier Factor (dB)
3. Margin value = Emission level – Limit value
4. The other emission levels were very low against the limit.

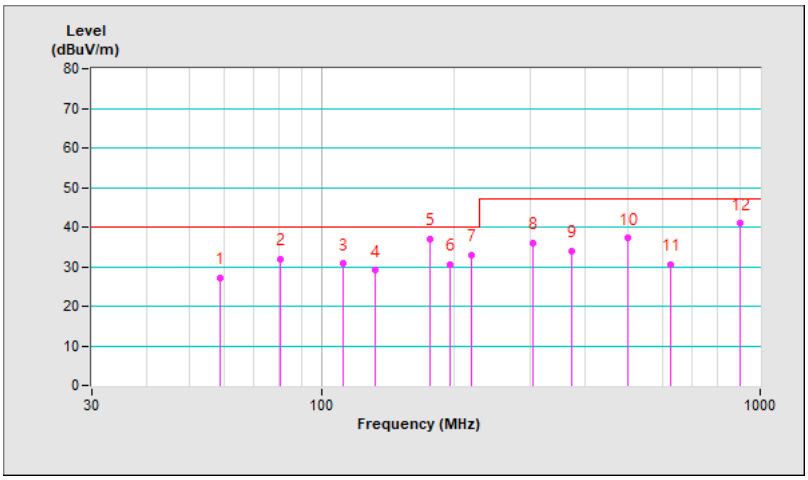


Frequency Range	30 MHz ~ 1 GHz	**Detector Function & Resolution Bandwidth**	Quasi-Peak (QP), 120 kHz
Input Power	230 Vac, 50 Hz	**Environmental Conditions**	19 °C, 72% RH, 1000 mbar
Tested By	Paul Chen		

Antenna Polarity & Test Distance : Vertical at 10 m								
No	**Frequency (MHz)**	**Emission Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	58.63	27.21 QP	40.00	-12.79	1.28 V	96	42.45	-15.24
2	80.72	31.83 QP	40.00	-8.17	1.69 V	340	45.42	-13.59
3	112.52	30.69 QP	40.00	-9.31	1.00 V	245	39.92	-9.23
4	132.63	28.99 QP	40.00	-11.01	1.00 V	228	37.70	-8.71
5	176.36	37.08 QP	40.00	-2.92	1.00 V	96	47.75	-10.67
6	196.24	30.49 QP	40.00	-9.51	1.00 V	153	41.15	-10.66
7	220.13	32.93 QP	40.00	-7.07	1.00 V	271	42.80	-9.87
8	304.21	35.86 QP	47.00	-11.14	1.00 V	19	41.18	-5.32
9	372.41	33.86 QP	47.00	-13.14	1.00 V	230	37.66	-3.80
10	500.00	37.19 QP	47.00	-9.81	1.00 V	280	38.33	-1.14
11	625.01	30.66 QP	47.00	-16.34	3.43 V	174	28.42	2.24
12	900.00	40.86 QP	47.00	-6.14	2.19 V	345	33.83	7.03

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Pre-Amplifier Factor (dB)
3. Margin value = Emission level – Limit value
4. The other emission levels were very low against the limit.



7.3 Radiated Emissions above 1 GHz

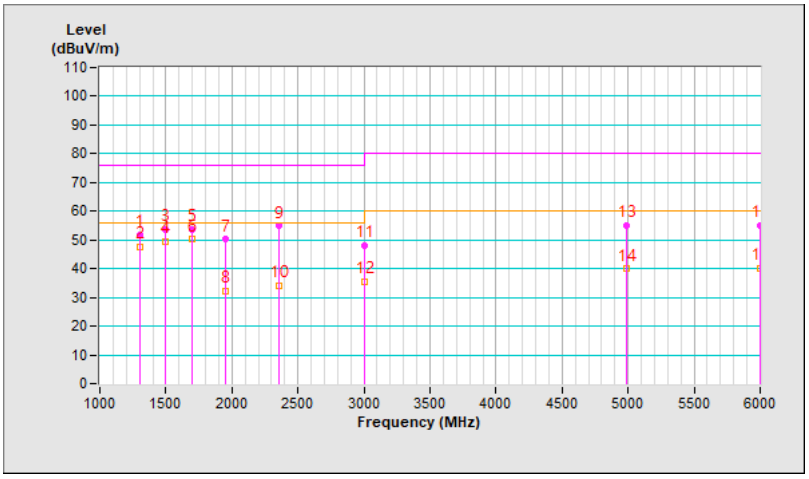
Mode A

Frequency Range	1 GHz ~ 6 GHz	**Detector Function & Resolution Bandwidth**	Peak (PK) / Average (AV), 1 MHz
Input Power	230 Vac, 50 Hz	**Environmental Conditions**	20 °C, 67% RH, 1011.5 mbar
Tested By	Desmond Chen		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	**Frequency (MHz)**	**Emission Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	1300.05	51.94 PK	76.00	-24.06	1.27 H	339	55.72	-3.78
2	1300.05	47.54 AV	56.00	-8.46	1.27 H	339	51.32	-3.78
3	1500.02	53.60 PK	76.00	-22.40	1.31 H	192	56.60	-3.00
4	1500.02	49.35 AV	56.00	-6.65	1.31 H	192	52.35	-3.00
5	1700.06	53.67 PK	76.00	-22.33	1.52 H	177	56.14	-2.47
6	**1700.06**	**50.15 AV**	**56.00**	**-5.85**	**1.52 H**	**177**	**52.62**	**-2.47**
7	1954.08	50.15 PK	76.00	-25.85	1.04 H	33	51.74	-1.59
8	1954.08	32.34 AV	56.00	-23.66	1.04 H	33	33.93	-1.59
9	2361.16	54.86 PK	76.00	-21.14	1.45 H	333	54.63	0.23
10	2361.16	34.13 AV	56.00	-21.87	1.45 H	333	33.90	0.23
11	2999.35	48.13 PK	76.00	-27.87	1.94 H	2	45.58	2.55
12	2999.35	35.55 AV	56.00	-20.45	1.94 H	2	33.00	2.55
13	4990.18	55.06 PK	80.00	-24.94	1.02 H	201	47.81	7.25
14	4990.18	39.96 AV	60.00	-20.04	1.02 H	201	32.71	7.25
15	5999.42	54.97 PK	80.00	-25.03	1.56 H	178	46.43	8.54
16	5999.42	39.99 AV	60.00	-20.01	1.56 H	178	31.45	8.54

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB) – Pre-Amplifier Factor (dB)
3. Margin value = Emission level – Limit value
4. The other emission levels were very low against the limit.

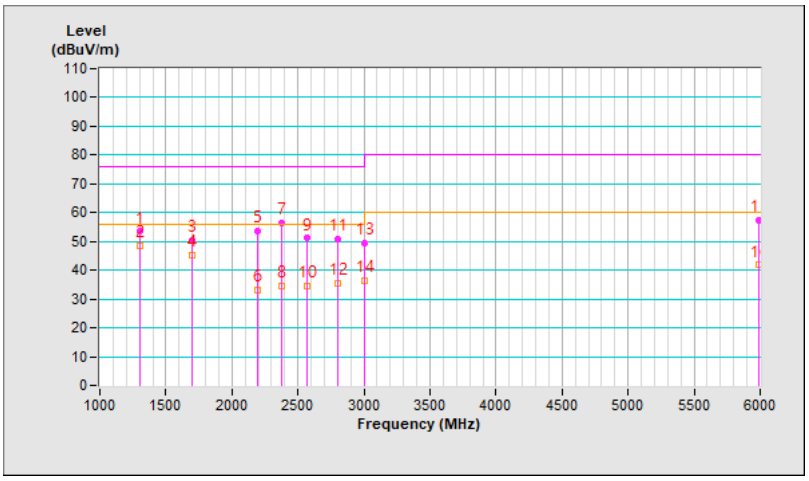


Frequency Range	1 GHz ~ 6 GHz	**Detector Function & Resolution Bandwidth**	Peak (PK) / Average (AV), 1 MHz
Input Power	230 Vac, 50 Hz	**Environmental Conditions**	20 °C, 67% RH, 1011.5 mbar
Tested By	Desmond Chen		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	**Frequency (MHz)**	**Emission Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	1299.97	53.43 PK	76.00	-22.57	1.73 V	196	57.21	-3.78
2	1299.97	48.49 AV	56.00	-7.51	1.73 V	196	52.27	-3.78
3	1699.98	50.46 PK	76.00	-25.54	1.36 V	163	52.93	-2.47
4	1699.98	45.28 AV	56.00	-10.72	1.36 V	163	47.75	-2.47
5	2192.15	53.83 PK	76.00	-22.17	1.95 V	83	54.97	-1.14
6	2192.15	33.19 AV	56.00	-22.81	1.95 V	83	34.33	-1.14
7	2372.13	56.30 PK	76.00	-19.70	1.51 V	111	56.10	0.20
8	2372.13	34.49 AV	56.00	-21.51	1.51 V	111	34.29	0.20
9	2566.35	51.06 PK	76.00	-24.94	1.62 V	63	50.41	0.65
10	2566.35	34.48 AV	56.00	-21.52	1.62 V	63	33.83	0.65
11	2797.43	50.87 PK	76.00	-25.13	1.20 V	352	49.66	1.21
12	2797.43	35.55 AV	56.00	-20.45	1.20 V	352	34.34	1.21
13	2999.49	49.36 PK	76.00	-26.64	1.55 V	352	46.81	2.55
14	2999.49	36.26 AV	56.00	-19.74	1.55 V	352	33.71	2.55
15	5993.75	57.55 PK	80.00	-22.45	1.92 V	304	49.01	8.54
16	5993.75	41.84 AV	60.00	-18.16	1.92 V	304	33.30	8.54

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
   – Pre-Amplifier Factor (dB)
3. Margin value = Emission level – Limit value
4. The other emission levels were very low against the limit.



7.4 Harmonic Current Measurement

Mode A

Test Duration	5 min	**Fundamental Voltage / Ampere**	229.766 Vrms / 1.919 Arms
Power Consumption	438.717 W	**Power Frequency**	50 Hz
Power Factor	0.976	**Environmental Conditions**	24 °C, 71% RH
Tested By	Xun Lee		

Harm#	Harms (avg) (A)	100% Limit (A)	Harms (max) (A)	150% Limit (A)
1	1.847	-	1.919	-
2	0.003	1.080	0.003	1.620
3	0.341	2.300	0.343	3.450
4	0.001	0.430	0.002	0.645
5	0.155	1.140	0.159	1.710
6	0.001	0.300	0.001	0.450
7	0.035	0.770	0.038	1.155
8	0.003	0.230	0.003	0.345
9	0.025	0.400	0.027	0.600
10	0.001	0.184	0.001	0.276
11	0.023	0.330	0.025	0.495
12	0.001	0.153	0.001	0.230
13	0.010	0.210	0.019	0.315
14	0.001	0.131	0.001	0.197
15	0.020	0.150	0.020	0.225
16	0.001	0.115	0.001	0.173
17	0.014	0.132	0.017	0.199
18	0.001	0.102	0.001	0.153
19	0.026	0.118	0.028	0.178
20	0.001	0.092	0.001	0.138
21	0.009	0.107	0.015	0.161
22	0.001	0.084	0.001	0.125
23	0.019	0.098	0.022	0.147
24	0.001	0.077	0.001	0.115
25	0.010	0.090	0.014	0.135
26	0.001	0.071	0.001	0.106
27	0.005	0.083	0.005	0.125
28	0.001	0.066	0.001	0.099
29	0.007	0.078	0.009	0.116
30	0.001	0.061	0.001	0.092
31	0.013	0.073	0.014	0.109
32	0.001	0.058	0.001	0.086
33	0.007	0.068	0.009	0.102
34	0.001	0.054	0.001	0.081
35	0.013	0.064	0.014	0.096
36	0.001	0.051	0.001	0.077
37	0.005	0.061	0.010	0.091
38	0.001	0.048	0.001	0.073
39	0.006	0.058	0.007	0.087
40	0.001	0.046	0.001	0.069

Note: Dynamic limits were applied for this test. The highest harmonics values in the above table may not occur at the same window as the maximum harmonics/limit ratio.

7.5 Voltage Fluctuations and Flicker Measurement

Mode A

Observation (Tp)	10 min		
Input Power	230 Vac, 50 Hz	**Environmental Conditions**	24 °C, 71% RH
Tested By	Xun Lee		

Test Parameter	Measurement Value	Limit	Remarks
P_{st}	0.141	1.00	Pass
P_{lt}	0.061	0.65	Pass
T_{max} (ms)	0.000	500	Pass
d_{max} (%)	0.222	4.00	Pass
d_c (%)	0.010	3.30	Pass

Notes:

1. P_{st} means short-term flicker indicator.
2. P_{lt} means long-term flicker indicator.
3. T_{max} means accumulated time value of d(t) with a deviation exceeding 3.3 %.
4. d_{max} means maximum relative voltage change.
5. d_c means maximum relative steady-state voltage change.

7.6 Electrostatic Discharges (ESD)

Mode A

For EN 50121-3-2

Input Power	AC 230V / 50Hz	Environmental conditions	18 °C, 49 % RH 1005 mbar
Tested by	Eric Liao		

Test Results of Direct Application					
Discharge Level (kV)	Polarity (+/-)	Test Point	Contact Discharge	Air Discharge	Performance Criteria
2	+/-	1 - 20	Note 1 Remark	---	A
4, 6	+/-	1 - 7, 9 - 16, 19	Note 1 Remark	---	A
4, 6	+/-	8, 17, 18, 20	Note 2 Remark	---	B
2, 4, 8	+/-	21 - 29	---	Note 1 Remark	A

Description of test points of direct application: Please refer to following page for representative mark only.

Test Results of Indirect Application					
Discharge Level (kV)	Polarity (+/-)	Test Point	Horizontal Coupling Plane	Vertical Coupling Plane	Performance Criteria
2, 4, 6	+/-	Four sides	Note 1 Remark	Note 1 Remark	A

Description of test points of indirect application:

1. Front side 2. Rear side 3. Right side 4. Left side

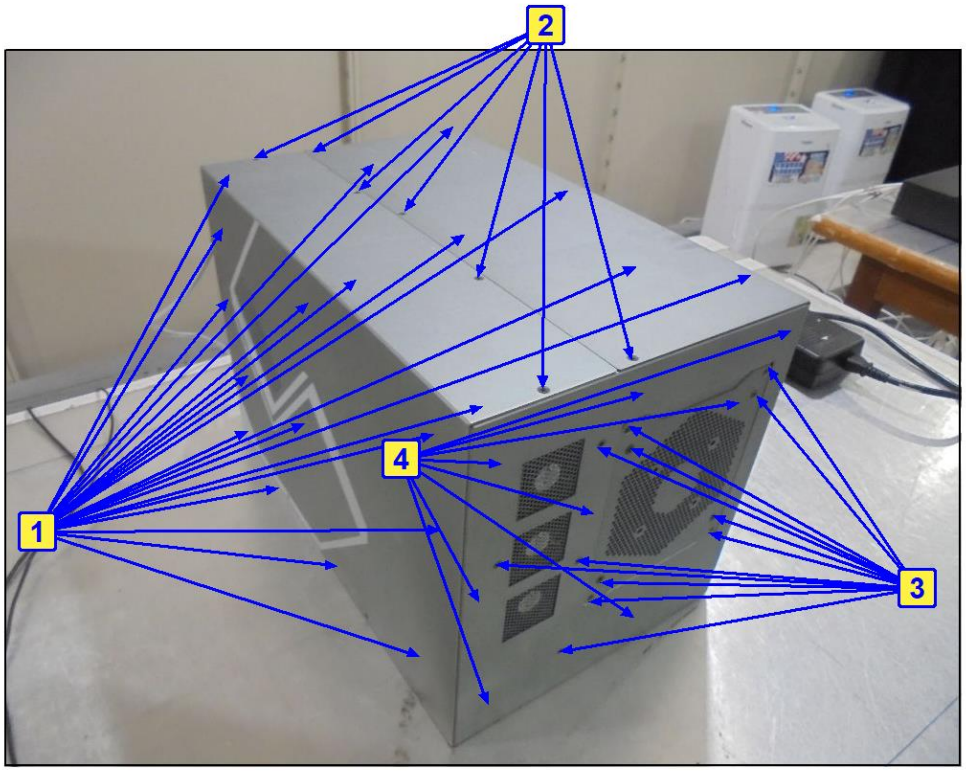
Please refer to the attached page for description of test points.

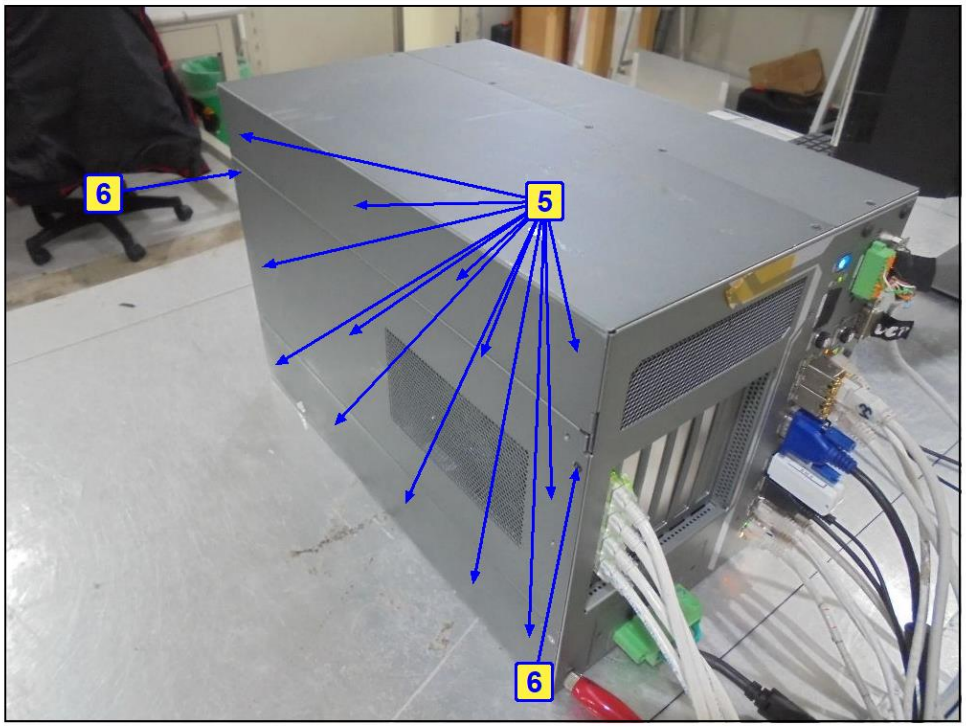
Notes:

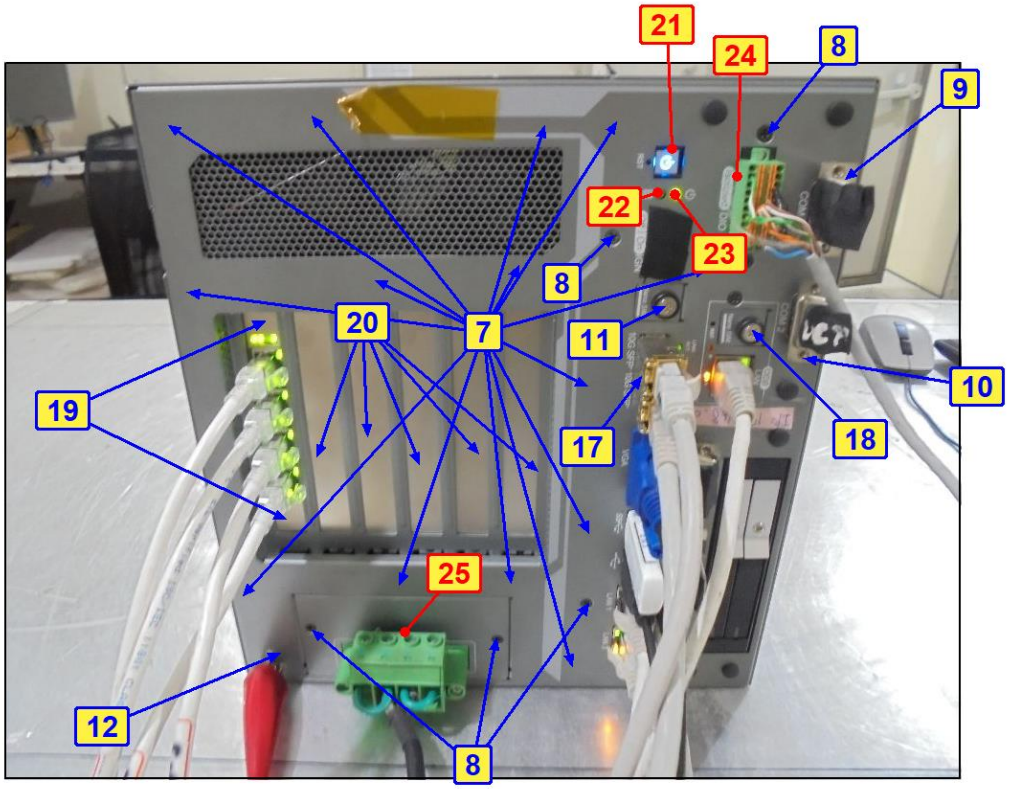
1. The EUT is operated normal during the test.
2. LAN ping delay 1-3 seconds during the test, but it can be self-recoverable after the test.

Remark : Use shielded lan cable (10G LAN Port*2 & 2.5G LAN Port*4 & OOB LAN)

Description of test point



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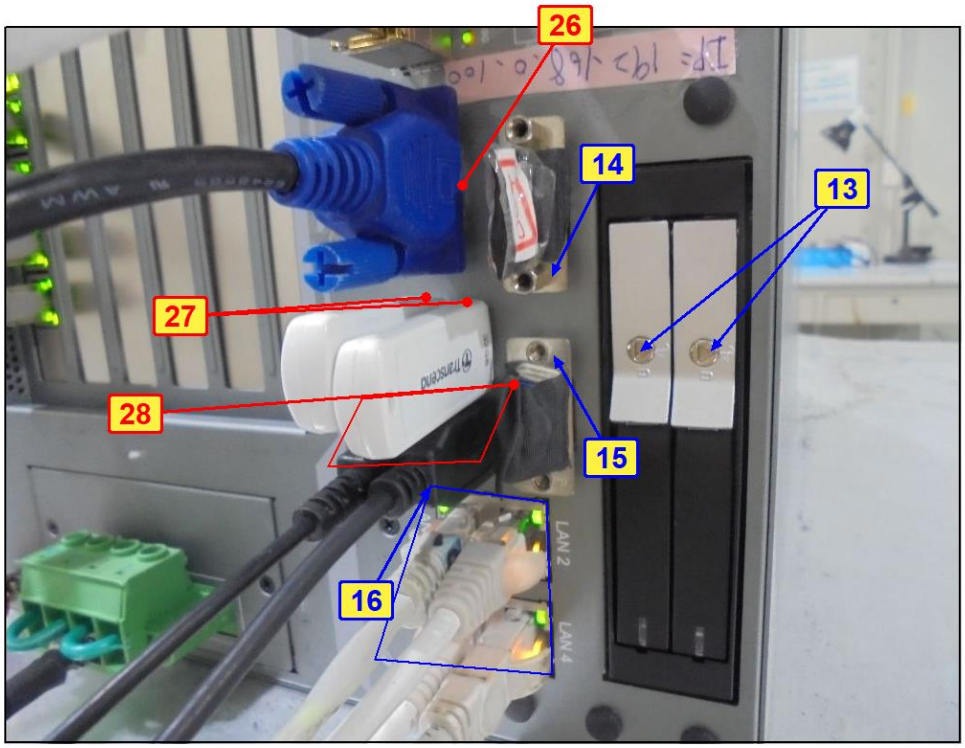
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LAN 2
LAN 4

29

7.7 Radio Frequency Electromagnetic Field (RS)

Mode A

For EN 50121-3-2

Input Power	AC 230V / 50Hz	Environmental conditions	21 °C, 66 % RH 1010 mbar
Tested by	Eric Liao		

Frequency (MHz)	Polarity	Azimuth(°)	Applied Field Strength		Observation	Performance Criteria
			(V/m)	Modulation		
80 - 800	V&H	0, 90, 180, 270	20	80% AM (1kHz)	Note Remark	A
800 - 1000	V&H	0, 90, 180, 270	20	80% AM (1kHz)	Note Remark	A
1400 - 2000	V&H	0, 90, 180, 270	10	80% AM (1kHz)	Note Remark	A
2000 - 2700	V&H	0, 90, 180, 270	5	80% AM (1kHz)	Note Remark	A
5100 - 6000	V&H	0, 90, 180, 270	3	80% AM (1kHz)	Note Remark	A

Note: The EUT is operated normal during the test.

Remark : Use shielded lan cable (10G LAN Port*2 & 2.5G LAN Port*4)

7.8 Fast Transients Common Mode (EFT)

Mode A

For EN 50121-3-2

Input Power	AC 230V / 50Hz	Environmental conditions	20 °C, 74 % RH 1010 mbar
Tested by	Eric Liao		

Input AC power port				
Voltage (kV)	Test Point	Polarity (+/-)	Observation	Performance Criteria
2	L	+/-	Note	A
2	N	+/-	Note	A
2	PE	+/-	Note	A
2	L-N-PE	+/-	Note	A

Wired network and signal/ control port				
Voltage (kV)	Test Point	Polarity (+/-)	Observation	Performance Criteria
2	LAN 1-1G	+/-	Note	A
2	LAN 5-10G	+/-	Note	A
2	OOB LAN	+/-	Note	A
2	PE-6004HF LAN 1-2.5G	+/-	Note	A

Note: The EUT is operated normal during the test.

7.9 Surges

Mode A

For EN 50121-3-2

Input Power	AC 230V / 50Hz	Environmental conditions	21 °C, 71 % RH 1013 mbar
Tested by	Eric Liao		

Input AC power port					
Voltage (kV)	Test Point	Azimuth(°)	Polarity (+/-)	Observation	Performance Criteria
0.5, 1(42 Ω+0.5μF)	L-N	0, 90, 180, 270	+/-	Note	A
0.5, 1, 2(42 Ω+0.5μF)	L-PE	0, 90, 180, 270	+/-	Note	A
0.5, 1, 2(42 Ω+0.5μF)	N-PE	0, 90, 180, 270	+/-	Note	A

Note: The EUT is operated normal during the test.

7.10 Radio Frequency Common Mode (CS)

Mode A

For EN 50121-3-2

Input Power	AC 230V / 50Hz	Environmental conditions	22 °C, 74 % RH 1012 mbar
Tested by	Todd Chang		

Input AC power port							
Frequency (MHz)	Level (V rms)	Modulation	Tested Line	Injection Method	Return Path	Observation	Performance Criteria
0.15 - 80	10	80% AM (1kHz)	AC Remark 1	CDN-M3	CDN-M1	Note 1	A

Wired network and signal/ control port							
Frequency (MHz)	Level (V rms)	Modulation	Tested Line	Injection Method	Return Path	Observation	Performance Criteria
0.15 - 80	10	80% AM (1kHz)	LAN1-1G Remark 1	CDN ST08A	CDN-M1	Note 2	C
0.15 - 80	10	80% AM (1kHz)	LAN5-10G Remark 1	CDN ST08A	CDN-M1	Note 2	C
0.15 - 80	10	80% AM (1kHz)	OOB LAN Remark 1	CDN T8	CDN-M1	Note 2	C
0.15 - 80	10	80% AM (1kHz)	PE-6004HF LAN1-2.5G Remark 1	EM-CLAMP	CDN-M1	Note 2	C

Notes:

1. The EUT is operated normal during the test.
2. 2.5G LAN link down and speed down at 33-45MHz & 56-80MHz during the test, but it need to recovered by operator after the test.

Remark 1: Use shielded LAN cable (10G LAN Port*2 (speed: 10Gbps) & PE-6004HF LAN card 2.5G*4 (speed: 2.5Gbps)) during the test.

Input Power	AC 230V / 50Hz	Environmental conditions	22 °C, 73 % RH 1006 mbar
Tested by	Michael Cheng		

Input AC power port							
Frequency (MHz)	Level (V rms)	Modulation	Tested Line	Injection Method	Return Path	Observation	Performance Criteria
0.15 - 80	10	80% AM (1kHz)	AC Remark 2	CDN-M3	CDN-M1	Note	A

Wired network and signal/ control port							
Frequency (MHz)	Level (V rms)	Modulation	Tested Line	Injection Method	Return Path	Observation	Performance Criteria
0.15 - 80	10	80% AM (1kHz)	LAN1-1G Remark 2	CDN ST08A	CDN-M1	Note	A
0.15 - 80	10	80% AM (1kHz)	LAN5-10G Remark 2	CDN ST08A	CDN-M1	Note	A
0.15 - 80	10	80% AM (1kHz)	OOB LAN Remark 2	CDN T8	CDN-M1	Note	A
0.15 - 80	10	80% AM (1kHz)	PE-6004HF LAN1-2.5G Remark 2	EM-CLAMP	CDN-M1	Note	A

Note: The EUT is operated normal during the test.

Remark 2: As client's request, during the test the EUT's LAN(PE-6004HF LAN Card 2.5G*4 & 10G*2) test speed: 1Gbps, all LAN port with shielding LAN cable.

8 Pictures of Test Arrangements

8.1 Conducted Emissions from Power Ports

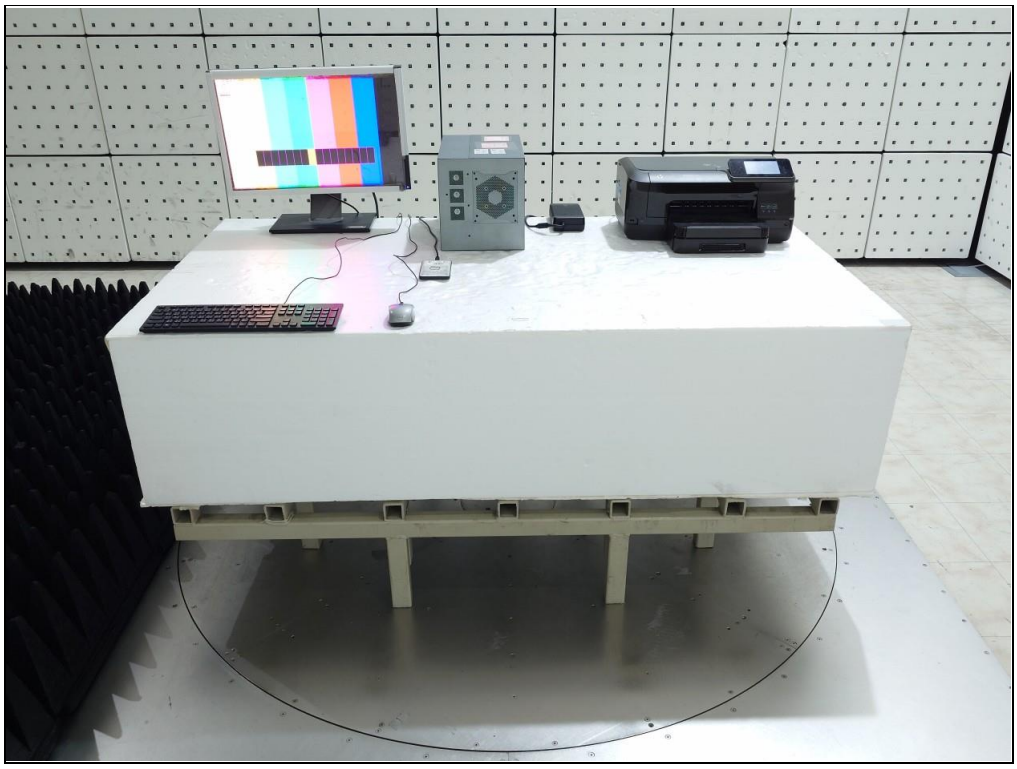
Mode A

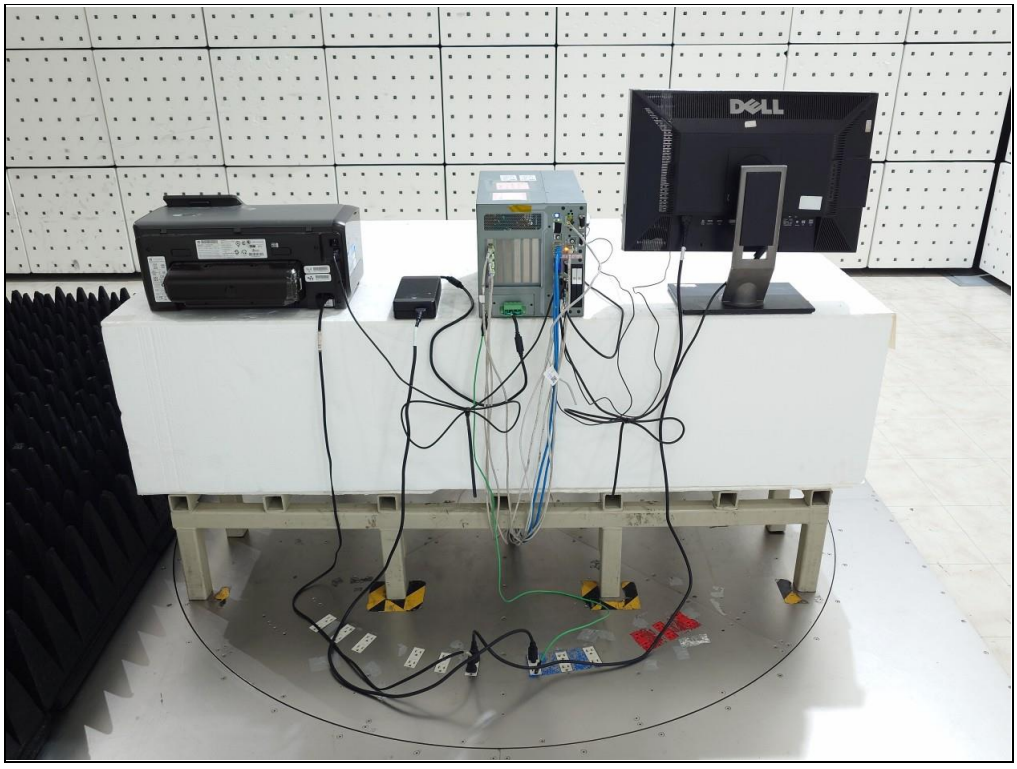
8.2 Radiated Emissions up to 1 GHz

Mode A

8.3 Radiated Emissions above 1 GHz

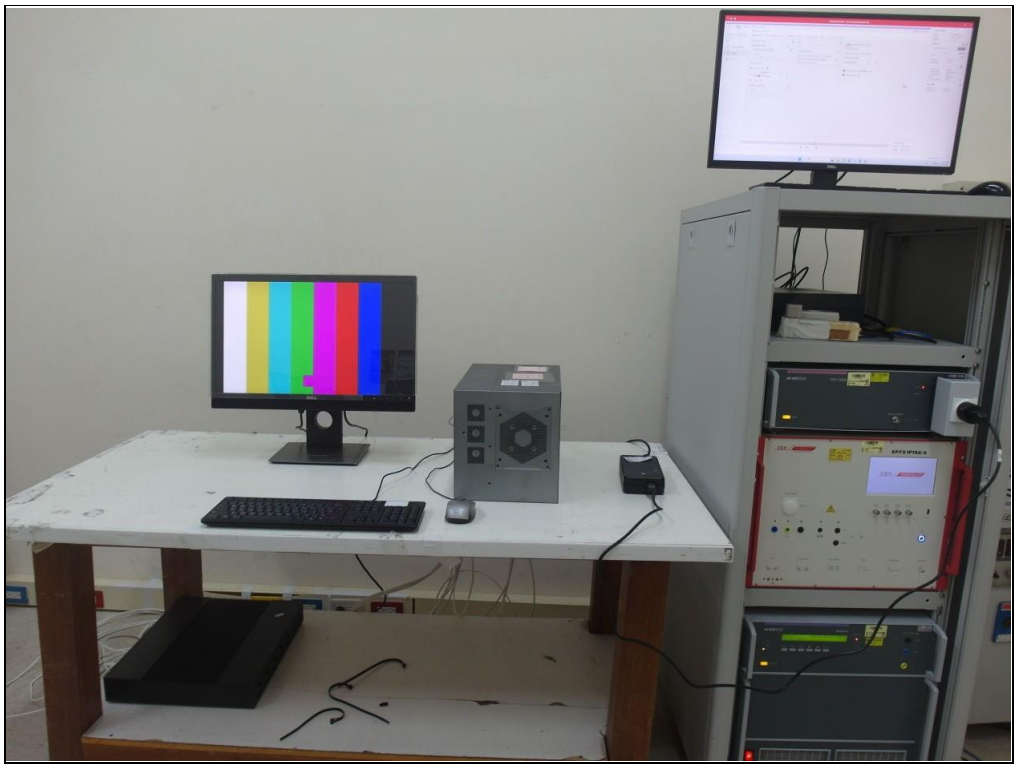
Mode A





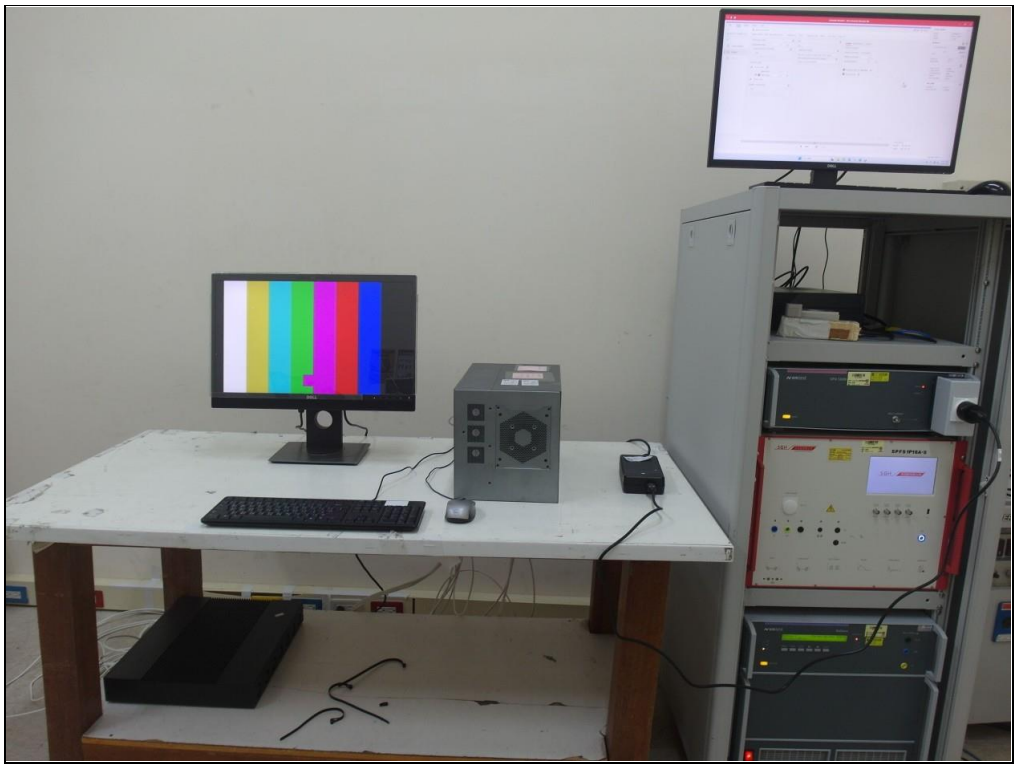
8.4 Harmonic Current Measurement

Mode A



8.5 Voltage Fluctuations and Flicker Measurement

Mode A

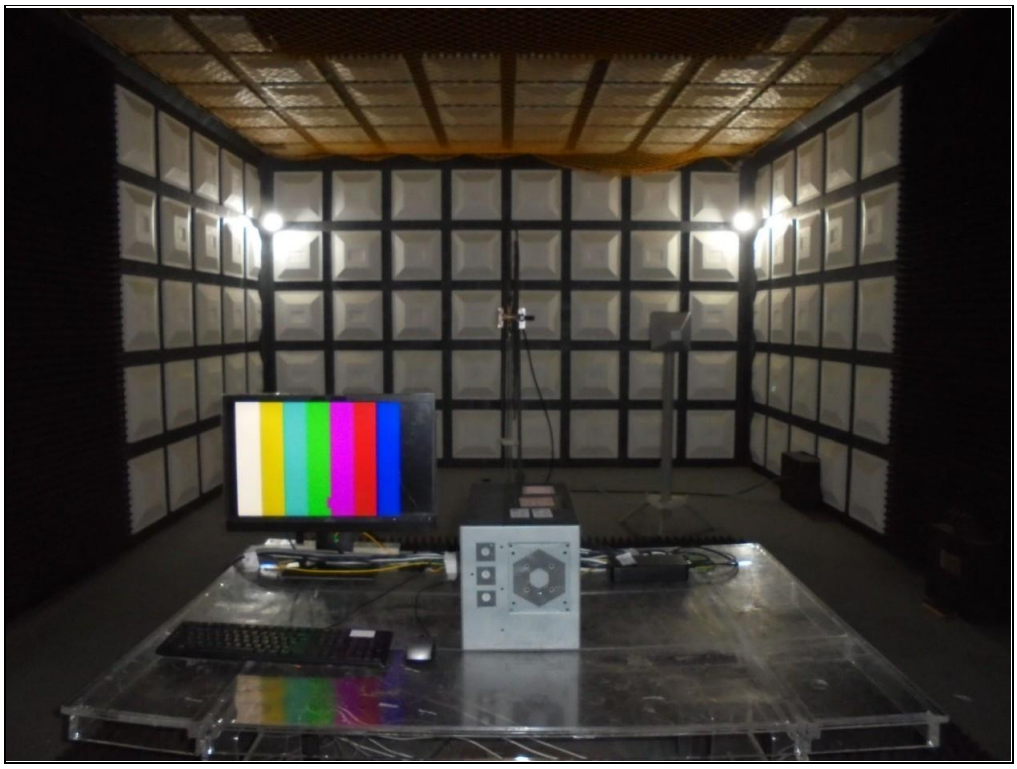


8.6 Electrostatic Discharges (ESD)

Mode A

8.7 Radio Frequency Electromagnetic Field (RS)

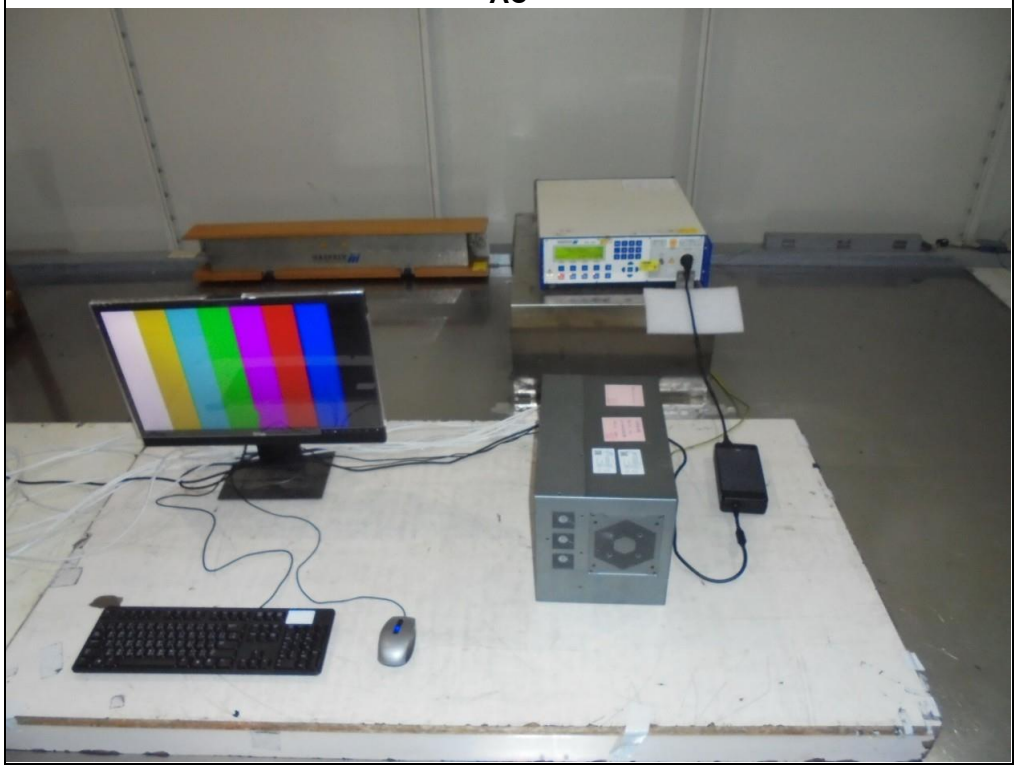
Mode A



8.8 Fast Transients Common Mode (EFT)

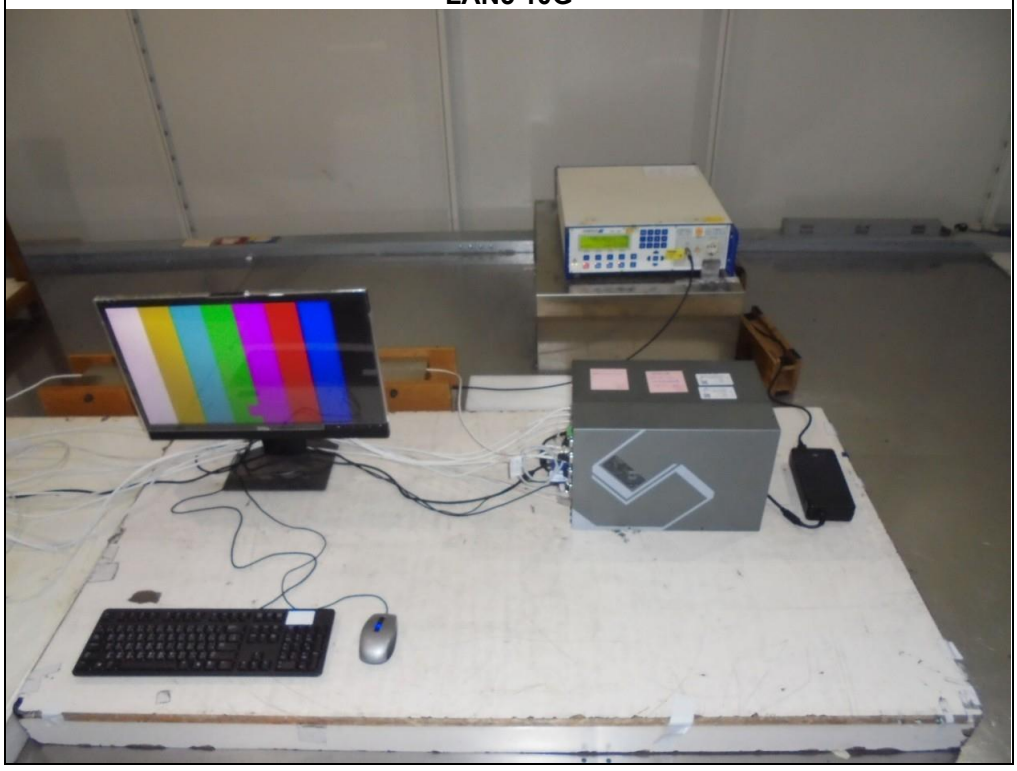
Mode A

AC

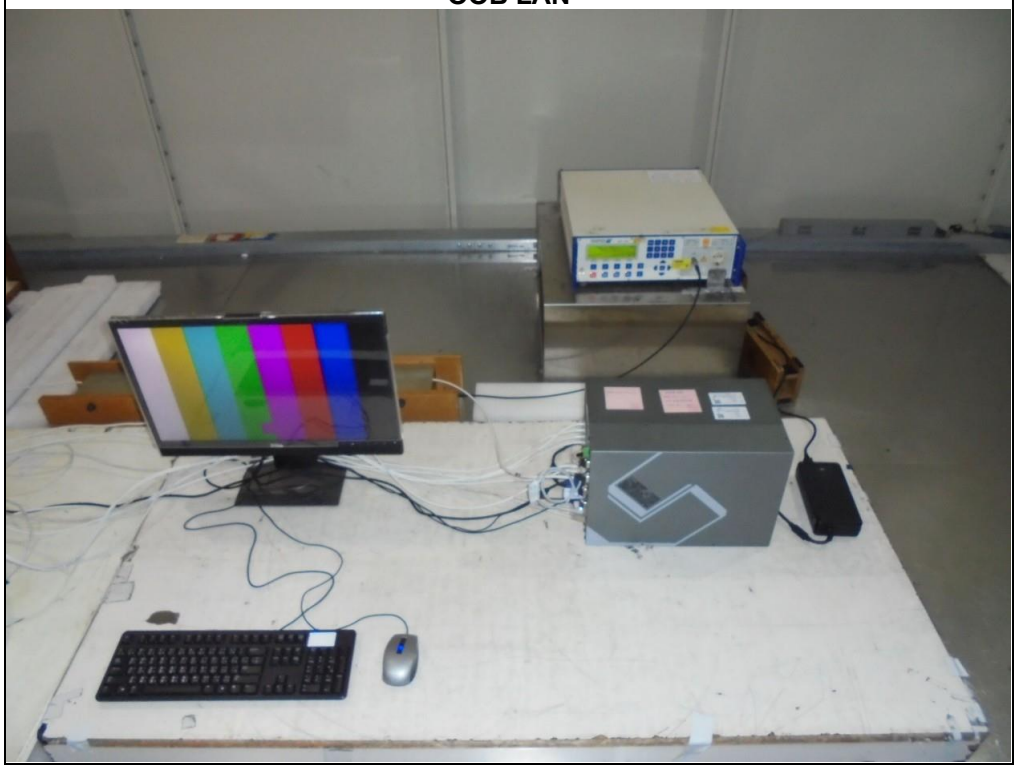


LAN1 1G

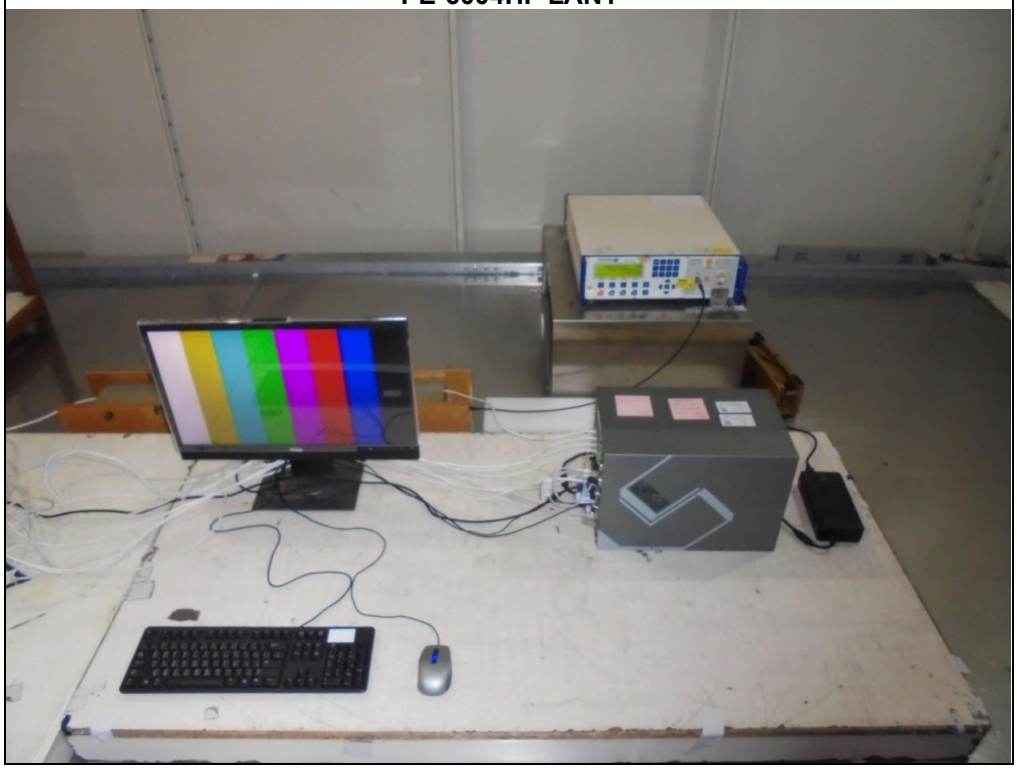
LAN5 10G



OOB LAN



PE-6004HF LAN1



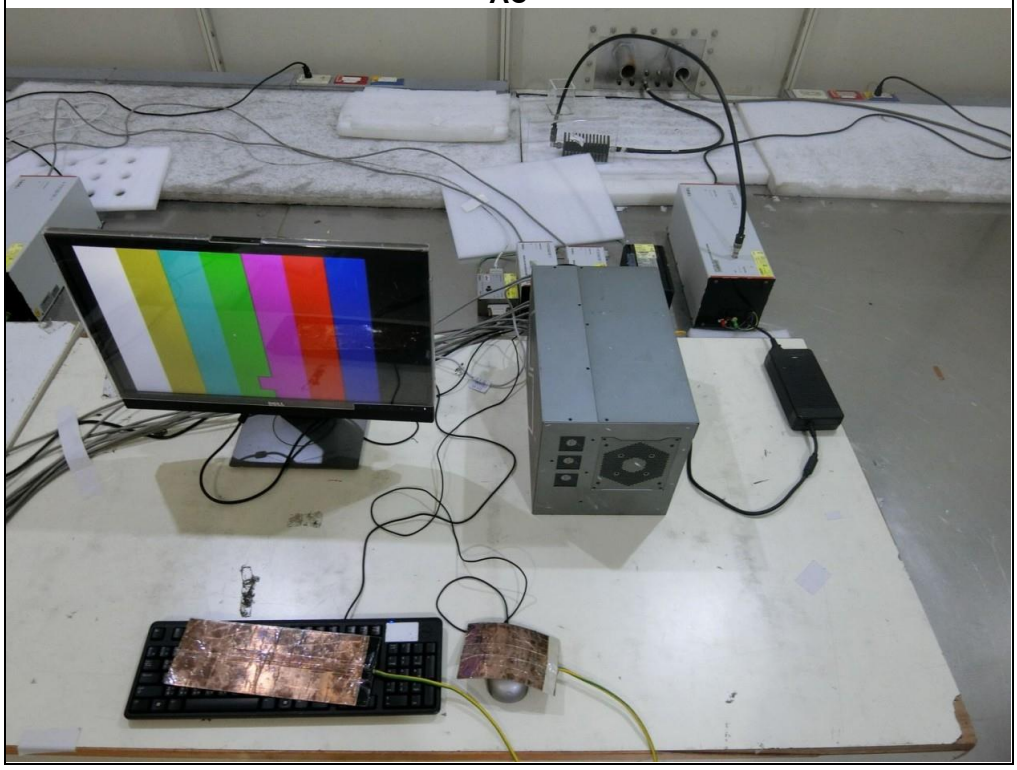
8.9 Surges

Mode A

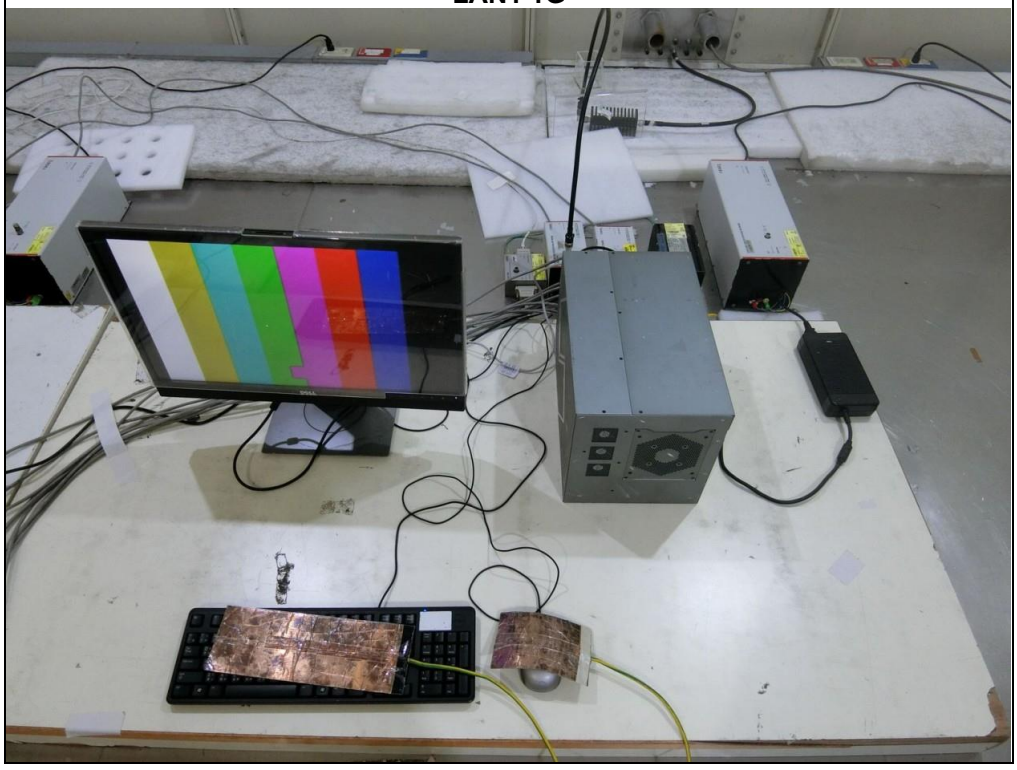
8.10 Radio Frequency Common Mode (CS)

Mode A

AC



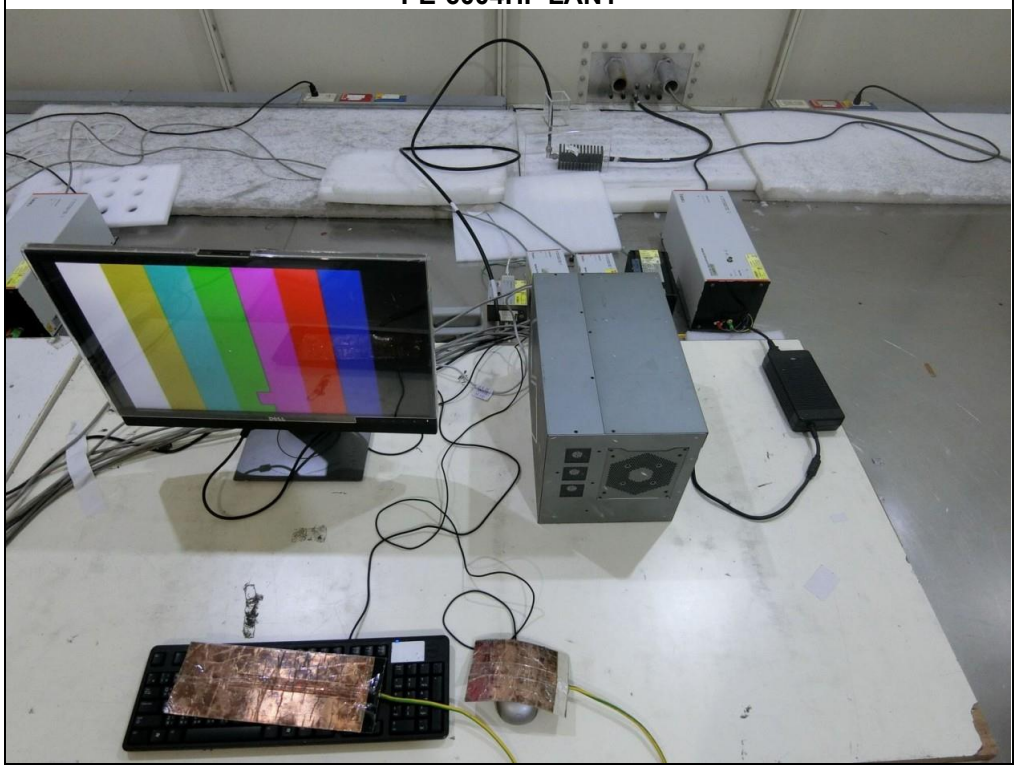
LAN1 1G



LAN5 10G

OOB

PE-6004HF LAN1



9 Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

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The address and road map of all our labs can be found in our web site also.

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