Test Report

Report No.:	CEBEEO-WTW-P21051050A
Test Model:	ESOM-MT-500
Serial Model:	ESOM-MT-500 Series, ESOM-MT-5XXXXXXXXXXXXXX (“X” can be 0-9, A-Z, or blank for marketing purposes) (refer to item 3.1 for more details)
Received Date:	May 27, 2021
Test Date:	Jun. 28 ~ Jul. 16, 2021
Issued Date:	Mar. 18, 2022
Applicant:	Vecow Co., Ltd.
Address:	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. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN

Testing Laboratory
2021

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Release Control Record

Issue No.	Description	Date Issued
CEBEEO-WTW-P21051050A	Original release.	Mar. 18, 2022

1 Certificate of Conformity

Product:	Arm-Based System on Module
Brand:	Vecow
Test Model:	ESOM-MT-500
Serial Model:	ESOM-MT-500 Series, ESOM-MT-5XXXXXXXXXXXXXXX (“X” can be 0-9, A-Z, or blank for marketing purposes) (refer to item 3.1 for more details)
Sample Status:	Engineering sample
Applicant:	Vecow Co., Ltd.
Test Date:	Jun. 28 ~ Jul. 16, 2021
Standards:	**EN 55032:2015 +A11:2020, Class B**
	EN 61000-3-2:2014
	EN 61000-3-3:2013
	EN 55024:2010
	EN 55024:2010 +A1:2015
	EN 55035:2017 +A11:2020
	EN 61000-4-2:2009 / IEC 61000-4-2:2008 ED. 2.0
	EN 61000-4-3:2006 +A1:2008 +A2:2010 / IEC 61000-4-3:2010 ED. 3.2
	EN 61000-4-4:2012 / IEC 61000-4-4:2012 ED. 3.0
	EN 61000-4-5:2014 +A1:2017 / IEC 61000-4-5:2014 +A1:2017 ED. 3.0
	EN 61000-4-6:2014 +AC:2015 / IEC 61000-4-6:2013 ED. 4.0
	EN 61000-4-8:2010 / IEC 61000-4-8:2009 ED. 2.0
	EN 61000-4-11:2004 +A1:2017 / IEC 61000-4-11:2004 +A1:2017 ED. 2.0
	BS EN 55032:2015 +A11:2020, Class B
	BS EN 61000-3-2:2014
	BS EN 61000-3-3:2013
	BS EN 55024:2010 / BS EN 55024:2010 +A1:2015
	BS EN 55035:2017 +A11:2020
	BS EN 61000-4-2:2009
	BS EN 61000-4-3:2006 +A2:2010
	BS EN 61000-4-4:2012
	BS EN 61000-4-5:2014 +A1:2017
	BS EN 61000-4-6:2014
	BS EN 61000-4-8:2010
	BS EN 61000-4-11:2004 +A1:2017

Approval signature – on next page

Certificate of Conformity – Continued

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.

Prepared by : Jessie Kuo , **Date:** **Mar. 18, 2022**

Jessie Kuo / Specialist

Approved by : Ace Wu , **Date:** **Mar. 18, 2022**

Ace Wu / Project Engineer

2 Summary of Test Results

Emission				
Standard	Clause	Test Item	Result/Remarks	Verdict
EN 55032:2015 +A11:2020	A.3	Conducted emission from the AC mains power port	Minimum passing Class B margin is -11.75 dB at 23.13000 MHz	Pass
	A.3	Asymmetric mode conducted emission at wired network ports	Minimum passing Class B margin is -4.57 dB at 23.13000 MHz	Pass
	A.2	Radiated emission 30-1000 MHz	Minimum passing Class B margin is -2.22 dB at 66.28 MHz	Pass
	A.2	Radiated emission above 1GHz	Minimum passing Class B margin is -5.13 dB at 2078.99 MHz	Pass
EN 61000-3-2:2014	-	Harmonic current emissions	The power consumption of EUT is less than 75W and no limits apply.	Pass
EN 61000-3-3:2013	-	Voltage fluctuations and flicker	$P_{st} \leqq 1.0$ $d_{max} \leqq 4\%$ $P_{lt} \leqq 0.65$ $d_c \leqq 3.3\%$ $T_{max} \leqq 500ms$	Pass

Immunity, EN 55024:2010 +A1:2015				
EN 55024 Clause	Basic standard	Test Item	Result/Remarks	Verdict
4.2.1	EN 61000-4-2:2009 / IEC 61000-4-2:2008 ED. 2.0	Electrostatic discharges (ESD)	Performance Criterion A	Pass
4.2.3.2	EN 61000-4-3:2006 +A1:2008 +A2:2010 / IEC 61000-4-3:2010 ED. 3.2	Continuous radiated disturbances (RS)	Performance Criterion A	Pass
4.2.2	EN 61000-4-4:2012 / IEC 61000-4-4:2012 ED. 3.0	Electrical fast transients (EFT)	Performance Criterion B	Pass
4.2.5	EN 61000-4-5:2014 +A1:2017 / IEC 61000-4-5:2014 +A1:2017 ED. 3.0	Surges	Performance Criterion A	Pass
4.2.3.3	EN 61000-4-6:2014 +AC:2015 / IEC 61000-4-6:2013 ED. 4.0	Continuous conducted disturbances (CS)	Performance Criterion A	Pass
4.2.4	EN 61000-4-8:2010 / IEC 61000-4-8:2009 ED. 2.0	Power-frequency magnetic fields (PFMF)	Performance Criterion A	Pass
4.2.6	EN 61000-4-11:2004 +A1:2017 / IEC 61000-4-11:2004 +A1:2017 ED. 2.0	Voltage dips and interruptions	Voltage Dips: >95% reduction – 0.5 period, Performance Criterion A 30% reduction – 25 periods, Performance Criterion A Voltage Interruptions: >95% reduction – 250 periods, Performance Criterion C	Pass

Immunity, EN 55035:2017 +A11:2020				
EN 55035 Clause	Basic standard	Test Item	Result/Remarks	Verdict
4.2.1	EN 61000-4-2:2009 / IEC 61000-4-2:2008 ED. 2.0	Electrostatic discharges (ESD)	Performance Criterion A	Pass
4.2.2.2	EN 61000-4-3:2006 +A1:2008 +A2:2010 / IEC 61000-4-3:2010 ED. 3.2	Continuous radiated disturbances (RS)	Performance Criterion A	Pass
4.2.4	EN 61000-4-4:2012 / IEC 61000-4-4:2012 ED. 3.0	Electrical fast transients (EFT)	Performance Criterion B	Pass
4.2.5	EN 61000-4-5:2014 +A1:2017 / IEC 61000-4-5:2014 +A1:2017 ED. 3.0	Surges	Performance Criterion A	Pass
4.2.2.3	EN 61000-4-6:2014 +AC:2015 / IEC 61000-4-6:2013 ED. 4.0	Continuous conducted disturbances (CS)	Performance Criterion A	Pass
4.2.3	EN 61000-4-8:2010 / IEC 61000-4-8:2009 ED. 2.0	Power-frequency magnetic fields (PFMF)	Performance Criterion A	Pass
4.2.6	EN 61000-4-11:2004 +A1:2017 / IEC 61000-4-11:2004 +A1:2017 ED. 2.0	Voltage dips and interruptions	Voltage Dips: <5% residual – 0.5 cycle, Performance Criterion A 70% residual – 25 cycles, Performance Criterion A Voltage Interruptions: <5% residual – 250 cycles, Performance Criterion C	Pass
4.2.7	EN 61000-4-6:2014 +AC:2015 / IEC 61000-4-6:2013 ED. 4.0	Broadband impulse noise disturbances, **Repetitive** (Applicable only to xDSL ports.)	Without CPE xDSL port of the EUT	N/A
		Broadband impulse noise disturbances, **Isolated** (Applicable only to xDSL ports.)	Without CPE xDSL port of the EUT	N/A

N/A: Not Applicable

Note:

1. There is no deviation to the applied test methods and requirements covered by the scope of this report.
2. The above EN/IEC basic standards are applied with latest version if customer has no special requirement.
3. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 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	Expanded Uncertainty (k=2) (±)	Maximum allowable uncertainty (±)
Conducted emission from the AC mains power port using AMN, 150kHz ~ 30MHz	2.79 dB	3.4 dB (U_{cispr})
Asymmetric mode conducted emission using AAN, 150 kHz ~ 30 MHz	4.29 dB	5.0 dB (U_{cispr})
Radiated disturbance, 30MHz ~ 1GHz	4.14 dB	6.3 dB (U_{cispr})
Radiated disturbance, 1GHz ~ 6GHz	5.04 dB	5.2 dB (U_{cispr})

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 Description of EUT

Product	Arm-Based System on Module
Brand	Vecow
Test Model	ESOM-MT-500
Series Model:	ESOM-MT-500 Series, ESOM-MT-5XXXXXXXXXXXXXX (“X” can be 0-9, A-Z, or blank for marketing purposes)
Model Difference	Refer to note
Status of EUT	Engineering sample
Operating Software	N/A
Power Supply Rating	Refer to note
Accessory Device	Adapter
Data Cable Supplied	N/A

Note: The EUT consumes power from the following adapter.

Brand	FSP GROUP INC.
Model	FSP036-RBBN2
Input Power	100-240Vac,1.2A, 50-60Hz
Output Power	12Vdc, 3.0A
Power Line	1.48m shielded power cable with one core

Note:

1. This report is issued as a duplicate report to BV CPS report no.: CEBEEO-WTW-P21051050. The difference compared with original report are changing applicant, model, and product name. Due to no effect on any test item, no re-test is performed.
2. All models are listed as below. Model ESOM-MT-500 is the representative for final test.

Brand	Model	Description
Vecow	ESOM-MT-500	“X” can be 0-9, A-Z, or blank for marketing purposes
	ESOM-MT-500 Series	
	ESOM-MT-5XXXXXXXXXXXXXX	

3.2 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.

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

The EUT consumes power from adapter of rating 100-240Vac, 50-60Hz.

For radiated emission test, the EUT has been pre-tested under following test modes, and test mode 2 was the worst case for final test.

Mode	Test Condition
1	EUT + HDMI with Monitor + LAN Link + USB Mouse + Earphone + adapter, 110Vac/60Hz
2	EUT + HDMI with Monitor + LAN Link + USB Mouse + Earphone + adapter, 230Vac/50Hz

Test modes are presented in the report as below.

Mode	Test Condition
Conducted emission test	
-	EUT + HDMI with Monitor + LAN Link + USB Mouse + Earphone + adapter
Asymmetric mode conducted emission at wired network ports test	
-	EUT + HDMI with Monitor + **LAN Left port 100Mbps Link** + USB Mouse + Earphone + adapter
	EUT + HDMI with Monitor + **LAN Right port 100Mbps Link** + USB Mouse + Earphone + adapter
The idle mode of conducted emission test at telecom port was pre-tested based on the worst case of link mode. Due to emissions of idle mode being very low compared to link mode, only the link mode data were presented in the test report.	
Radiated emission up to 1GHz test	
-	EUT + HDMI with Monitor + LAN Link + USB Mouse + Earphone + adapter
Radiated emission above 1GHz test	
-	EUT + HDMI with Monitor + LAN Link + USB Mouse + Earphone + adapter
Harmonics, Flicker, Immunity tests	
-	EUT + HDMI with Monitor + LAN Link + USB Mouse + Earphone + adapter

3.4 Test Program Used and Operation Descriptions

a. Placed the EUT on the test table and it was powered by adapter.
b. EUT linked with earphone via audio cable and linked with monitor via HDMI cable.
c. Prepared notebooks and AP, which act as communication partners and placed them outside of test area.
d. The communication partners sent data via LAN by command “Ping”.
e. Notebook sent “ITU-R BT 471-1” patterns to monitor via EUT, and monitor displayed them.

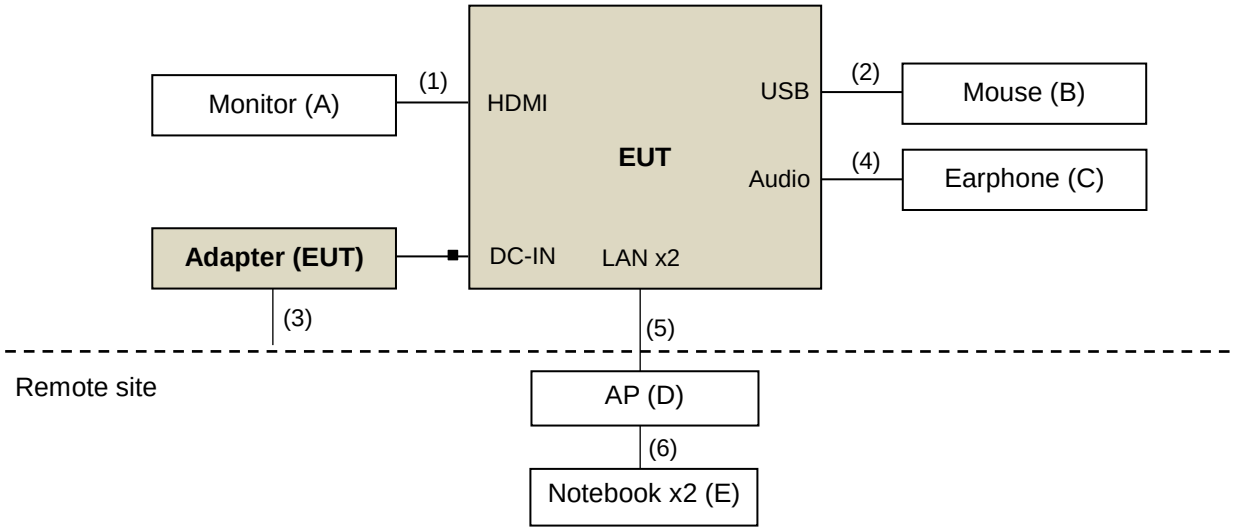
3.5 Primary Clock Frequencies of Internal Source

The highest frequency generated or used within the EUT or on which the EUT operates or tunes is 2GHz, provided by Vecow Co., Ltd., for detailed internal source, please refer to the manufacturer's specifications.

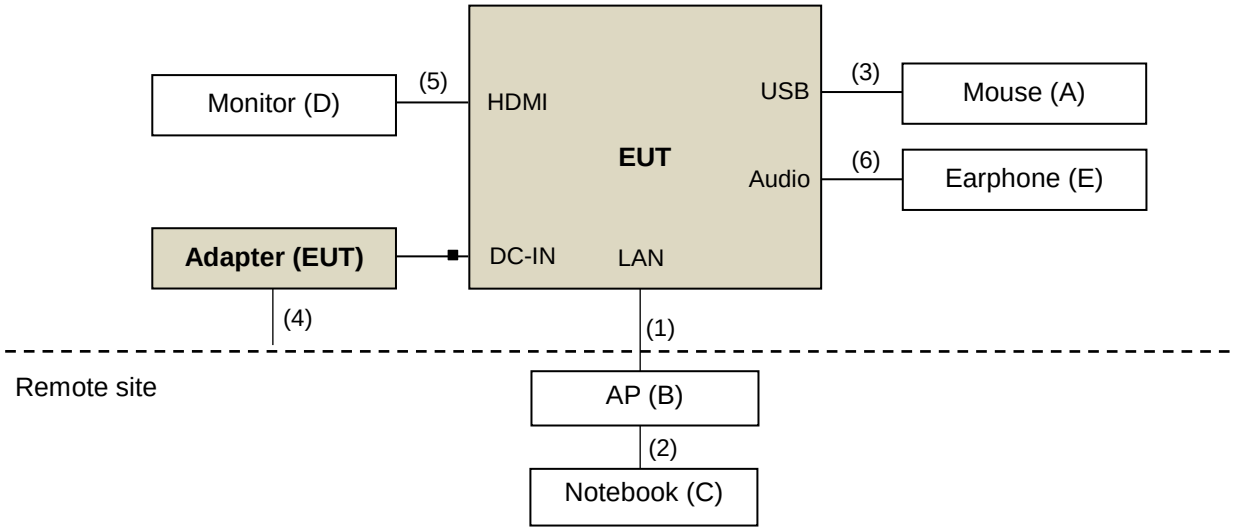
4 Configuration and Connections with EUT

4.1 Connection Diagram of EUT and Peripheral Devices

Emission tests (Harmonics & Flicker excluded):



Harmonics & Flicker, Immunity tests:



4.2 Configuration of Peripheral Devices and Cable Connections

Emission tests (Harmonics & Flicker excluded):

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Monitor	DELL	U2713HM	CN-07JNY5-74445-38T-400S	FCC DoC Approved	--
B.	Mouse	DELL	MOCZUL	CN-049TWY-PRC00-79E-02GB	FCC DoC Approved	--
C.	Earphone	APPLE	MB770FE/B	NA	NA	--
D.	AP	D-link	DIR-810L	QBXP1D4002040	NA	--
E.	Notebook x2	DELL	E6440	6QLNM32	FCC DoC Approved	--
				FMLNM32		--

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Items E acted as communication partners to transfer data.

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	HDMI cable	1	1.8	Y	0	HDMI 2.0 (Brand: Amber, Model: HDMI-AA120), Provided by Lab
2.	USB cble	1	1.8	Y	0	--
3.	AC power cable	1	1.8	N	0	Provided by client
4.	Audio cable	1	1.2	N	0	--
5.	LAN cable	2	10	N	0	RJ45 Cat.5e Provided by Lab
6.	LAN cable	2	1	N	0	RJ45 Cat.5e Provided by Lab

Harmonics & Flicker, Immunity tests:

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Mouse	DELL	MOCZUL	CN-049TWY-PRC00-79E-02FU	FCC DoC Approved	--
B.	AP	D-LINK	DIR-859	RZNW2GA000229	NA	--
C.	Notebook	DELL	Inspiron 15 3000	JBXSD82	FCC DoC Approved	--
D.	Monitor	ASUS	MX27U	K1LMRS022996	FCC DoC Approved	--
E.	Earphone	HTC	Merry HS260	NA	NA	--

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item C acted as communication partner to transfer data.

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	LAN cable	1	3	N	0	RJ45 Cat.5e Provided by Lab
2.	LAN cable	1	3	N	0	RJ45 Cat.5e Provided by Lab
3.	USB cable	1	2	Y	0	--
4.	Power cable	1	1.5	N	0	--
5.	HDMI cable	1	1.5	N	0	HDMI 2.0 (Brand: ULT-unite/DCAC75-A9007Q5Z2-000)
6.	Audio cable	1	2	N	0	--

5 Conducted Emission from the AC Mains Power Port

5.1 Limits

Frequency (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

Notes: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases linearly with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

5.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Dec. 04, 2020	Dec. 03, 2021
RF signal cable Woken	5D-FB	Cable-cond1-01	Jan. 16, 2021	Jan. 15, 2022
AMN ROHDE & SCHWARZ (EUT)	ENV216	101826	Feb. 25, 2021	Feb. 24, 2022
AMN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Aug. 28, 2020	Aug. 27, 2021
Software ADT	BV ADT_Cond_ V7.3.7.4	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Shielded Room 1 (Conduction 1).
3. The VCCI Site Registration No. is C-12040.

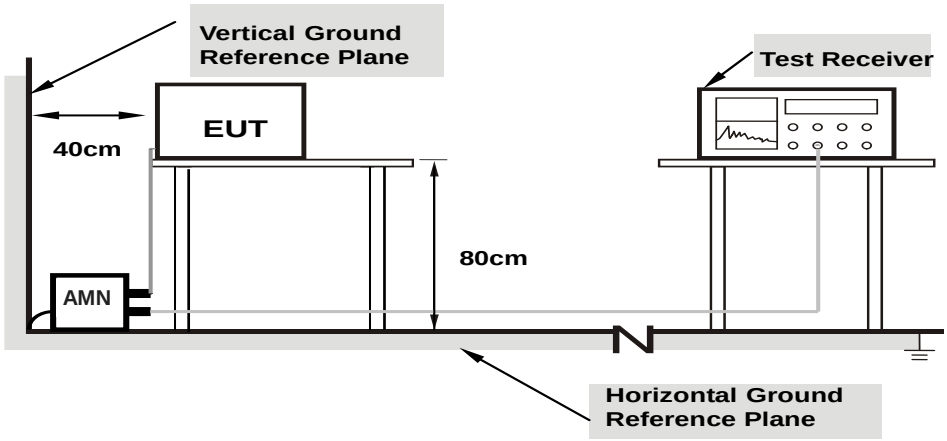
5.3 Test Arrangement

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through an Artificial Mains Network (AMN). Other support units were connected to the power mains through another AMN. The two AMNs provide 50 Ohm/ 50uH of 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.



Note: 1. Support units were connected to second AMN.
2. The distance specified between EUT/AE and other metallic objects is ≥ 0.8 m in the measurement arrangement for table-top EUT.
3. According to EN 55032 standard, cables on the RGP must be insulated.

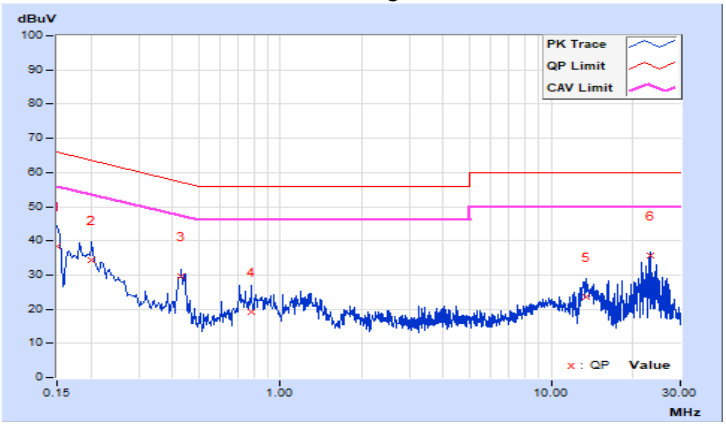
5.4 Test Results

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	230Vac, 50Hz	Environmental Conditions	21℃, 62%RH
Tested by	Daniel Lin	Test Date	2021/7/1

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.71	28.59	13.75	38.30	23.46	66.00	56.00	-27.70	-32.54
2	0.20200	9.71	24.77	16.25	34.48	25.96	63.53	53.53	-29.05	-27.57
3	0.43000	9.73	20.03	13.56	29.76	23.29	57.25	47.25	-27.49	-23.96
4	0.78200	9.75	9.50	3.35	19.25	13.10	56.00	46.00	-36.75	-32.90
5	13.48200	9.84	13.86	8.17	23.70	18.01	60.00	50.00	-36.30	-31.99
6	23.13000	9.81	25.99	25.24	35.80	35.05	60.00	50.00	-24.20	-14.95

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average 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

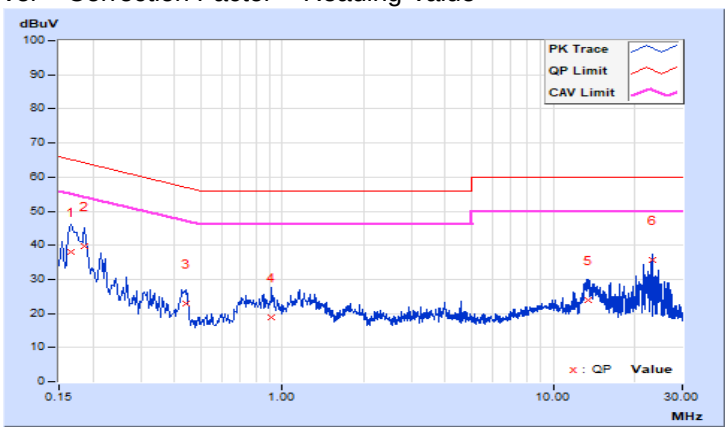


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	230Vac, 50Hz	Environmental Conditions	21℃, 62%RH
Tested by	Daniel Lin	Test Date	2021/7/1

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16579	9.77	28.42	19.52	38.19	29.29	65.17	55.17	-26.98	-25.88
2	0.18600	9.77	29.94	21.00	39.71	30.77	64.21	54.21	-24.50	-23.44
3	0.44177	9.79	12.98	5.20	22.77	14.99	57.03	47.03	-34.26	-32.04
4	0.91400	9.82	9.19	2.45	19.01	12.27	56.00	46.00	-36.99	-33.73
5	13.48200	9.94	13.99	8.12	23.93	18.06	60.00	50.00	-36.07	-31.94
6	23.13000	9.99	25.69	24.88	35.68	34.87	60.00	50.00	-24.32	-15.13

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average 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

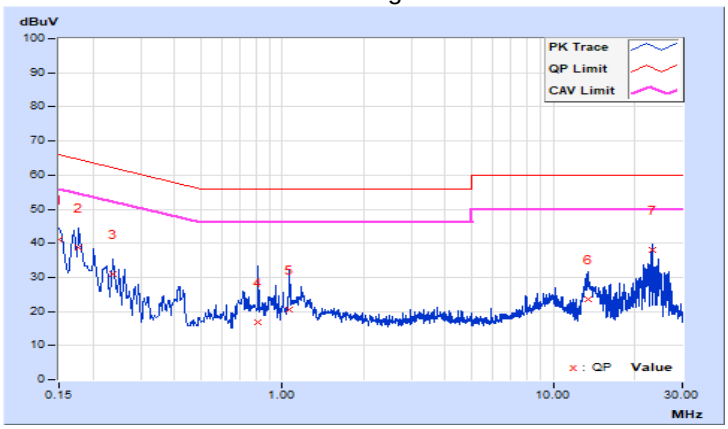


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	110Vac, 60Hz	Environmental Conditions	21℃, 62%RH
Tested by	Daniel Lin	Test Date	2021/7/1

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.71	31.50	15.04	41.21	24.75	66.00	56.00	-24.79	-31.25
2	0.17800	9.71	29.10	18.38	38.81	28.09	64.58	54.58	-25.77	-26.49
3	0.23785	9.71	21.16	6.88	30.87	16.59	62.17	52.17	-31.30	-35.58
4	0.81400	9.75	7.22	1.49	16.97	11.24	56.00	46.00	-39.03	-34.76
5	1.06600	9.76	10.78	5.67	20.54	15.43	56.00	46.00	-35.46	-30.57
6	13.42200	9.84	13.81	8.02	23.65	17.86	60.00	50.00	-36.35	-32.14
7	23.13000	9.81	28.33	27.99	38.14	37.80	60.00	50.00	-21.86	-12.20

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average 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

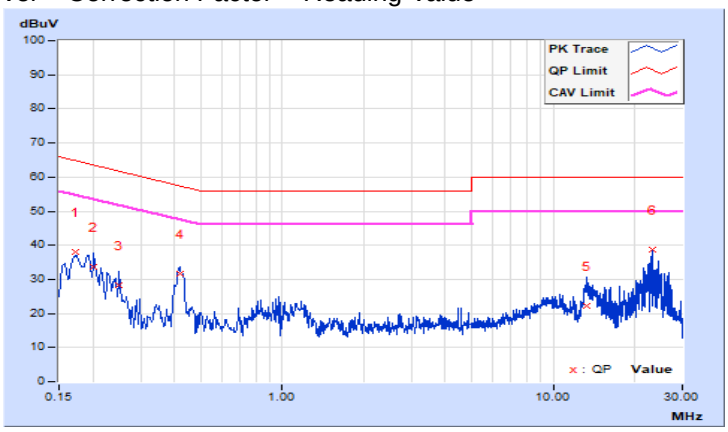


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	110Vac, 60Hz	Environmental Conditions	21℃, 62%RH
Tested by	Daniel Lin	Test Date	2021/7/1

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17247	9.77	28.34	18.38	38.11	28.15	64.84	54.84	-26.73	-26.69
2	0.20200	9.77	23.96	10.78	33.73	20.55	63.53	53.53	-29.80	-32.98
3	0.25000	9.77	18.63	6.13	28.40	15.90	61.76	51.76	-33.36	-35.86
4	0.41799	9.79	21.83	14.92	31.62	24.71	57.49	47.49	-25.87	-22.78
5	13.24200	9.94	12.39	4.70	22.33	14.64	60.00	50.00	-37.67	-35.36
6	**23.13000**	**9.99**	**28.60**	**28.26**	**38.59**	**38.25**	**60.00**	**50.00**	**-21.41**	**-11.75**

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average 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



6 Asymmetric Mode Conducted Emission at Wired Network Ports

6.1 Limits

Class A					
Frequency (MHz)	Coupling Device	Voltage Limit (dBuV)		Current limits (dBuA)	
		Quasi-peak	Average	Quasi-peak	Average
0.15-0.5	AAN	97-87	84-74	-	-
0.5-30		87	74	-	-
0.15-0.5	CVP and Current probe	97-87	84-74	53-43	40-30
0.5-30		87	74	43	30
0.15-0.5	Current Probe	-	-	53-43	40-30
0.5-30		-	-	43	30
Class B					
Frequency (MHz)	Coupling Device	Voltage Limit (dBuV)		Current limits (dBuA)	
		Quasi-peak	Average	Quasi-peak	Average
0.15-0.5	AAN	84-74	74-64	-	-
0.5-30		74	64	-	-
0.15-0.5	CVP and Current probe	84-74	74-64	40-30	30-20
0.5-30		74	64	30	20
0.15-0.5	Current Probe	-	-	40-30	30-20
0.5-30		-	-	30	20

Note: The limits decrease linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

6.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Dec. 04, 2020	Dec. 03, 2021
RF signal cable Woken	5D-FB	Cable-cond1-01	Jan. 16, 2021	Jan. 15, 2022
AMN ROHDE & SCHWARZ (EUT)	ENV216	101826	Feb. 25, 2021	Feb. 24, 2022
AMN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Aug. 28, 2020	Aug. 27, 2021
Software ADT	BV ADT_Cond_ V7.3.7.4	NA	NA	NA
AAN	ISN T200A	38321	Jul. 09, 2020	Jul. 08, 2021
AAN	F-071115-1057-1-09	100855	Aug. 18, 2020	Aug. 17, 2021
Impedance-stabilization-network TESEQ	ISN ST08	41211	Sep. 01, 2020	Aug. 31, 2021
Impedance-stabilization-network TESEQ	ISN S751	40600	Sep. 01, 2020	Aug. 31, 2021

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Shielded Room 1 (Conduction 1).
3. The VCCI Site Registration No. is T-11653.

6.3 Test Arrangement

Method of Using AANs:

a. The EUT is placed 0.4 meters from the conducting wall of the shielded room and connected to AAN directly to reference ground plane.

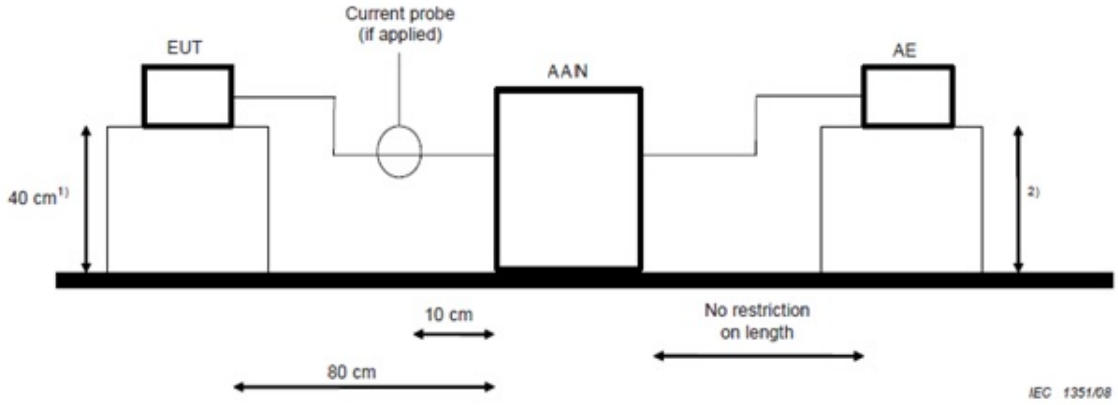
b. If voltage measurement is used, measure voltage at the measurement port of the AAN, correct the reading by adding the AAN voltage division factor, and compare to the voltage limit.

c. If current measurement is used, measure current with the current probe and compare to the current limit. A 50 Ω load has to be connected to the measurement port of the AAN during the current measurement.

d. It is not necessary to apply the voltage and the current limit if a AAN is used.

e. The test results of disturbance at wired network 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.



Note: 1. Distance to the reference ground plane (vertical or horizontal).

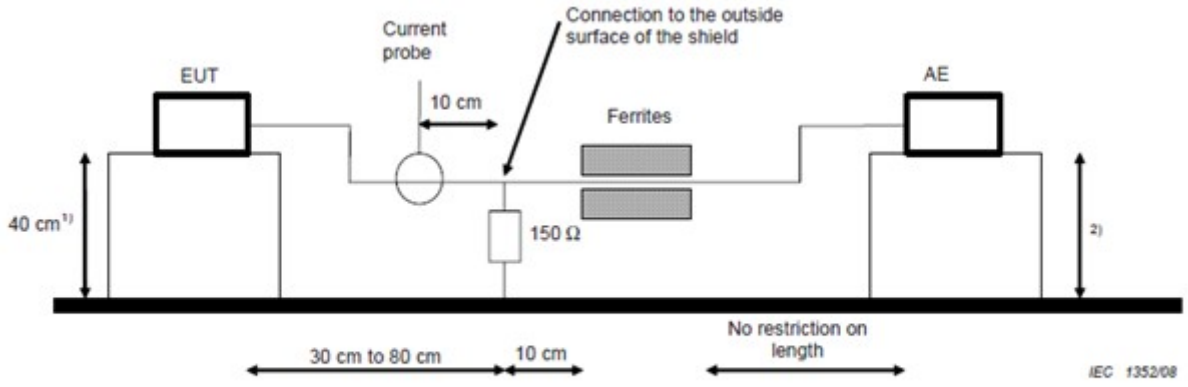
2. Distance to the reference ground plane is not critical.

3. According to EN 55032 standard, cables on the RGP must be insulated.

Method of Using a 150 Ω load to the outside surface of the shield:

a. Break the insulation and connect a 150Ω resistor from the outside surface of the shield to ground.
b. Apply a clamp between 150Ω connection and associated equipment.
c. Current probe shall be placed at 0.1 m from the AAN.
d. Measure current with a current probe and compare to the current limit.
e. Voltage measurement is also possible either in parallel with the 150 Ω resistor with a high impedance probe. (only for a high impedance probe applied, replaced d. if this is the case)
f. Voltage measurement by using a "50 Ω to 150 Ω adaptor" described in IEC 61000-4-6 as 150 Ω load, and applying the appropriate correction factor (9,6 dB in case of the "50 Ω to 150 Ω adaptor"). (only for 50 Ω to 150 Ω adaptor applied, replaced d. if this is the case.)
g. The test results of disturbance at telecommunication 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 9 kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15 MHz - 30 MHz.



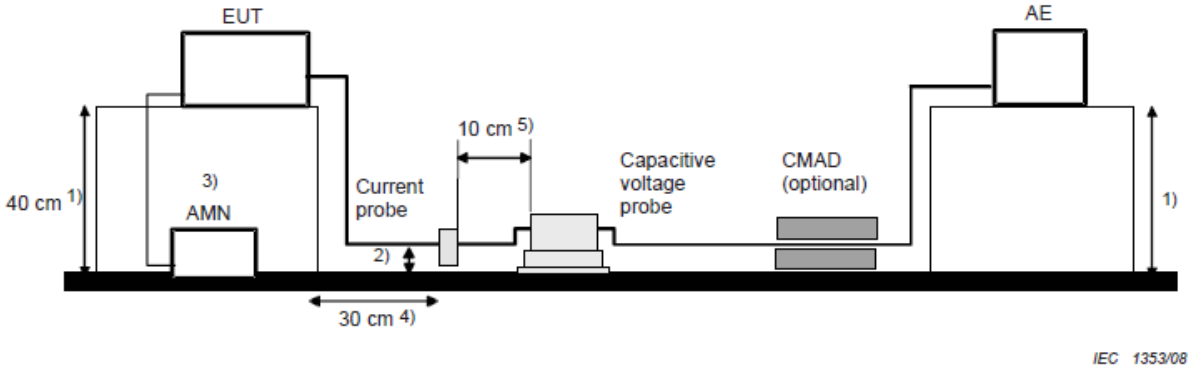
AE = Associated equipment
EUT = Equipment under test

Note: 1. Distance to the reference ground plane (vertical or horizontal).
2. Distance to the reference ground plane is not critical.
3. According to EN 55032 standard, cables on the RGP must be insulated.

Method of Using a combination of current probe and capacitive voltage probe:

a. Measure current with a current probe.
b. Compare the measured current with the applicable current limit.
c. Measure voltage with a capacitive probe as specified in 5.2.2 of CISPR 16-1-2.
d. Adjust the measured voltage as follows:
   - current margin ≤ 6 dB – subtract the actual current margin from measured voltage;
   - current margin > 6 dB – subtract 6 dB from measured voltage.
e. Compare adjusted voltage with the applicable voltage limit
f. Both the measured current and the adjusted voltage shall be below the applicable
g. The test results of disturbance at telecommunication 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 9 kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15 MHz – 30 MHz.



AE = Associated equipment
EUT = Equipment under test
CMAD = Common mode Absorbing Device

Note: According to EN 55032 standard, cables on the RGP must be insulated.

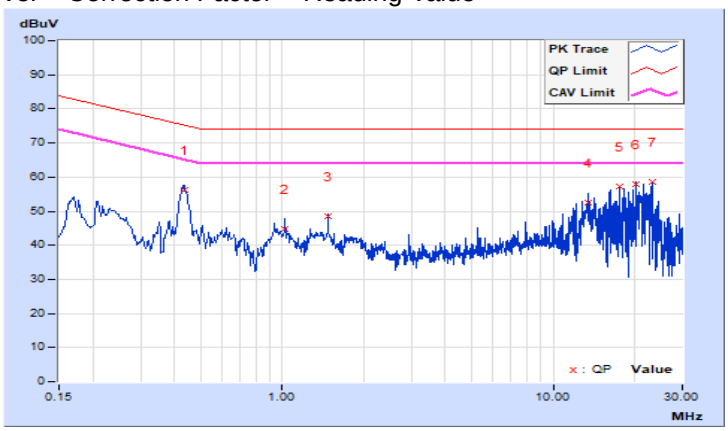
6.4 Test Results

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	230Vac, 50Hz	Environmental Conditions	21℃, 62%RH
Tested by	Daniel Lin	Test Date	2021/7/1
Test Mode	LAN right port with AAN (100Mbps, Traffic)		

No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.43370	9.48	46.91	40.99	56.39	50.47	75.18	65.18	-18.79	-14.71
2	1.02200	9.33	35.56	30.46	44.89	39.79	74.00	64.00	-29.11	-24.21
3	1.47649	9.28	39.32	37.47	48.60	46.75	74.00	64.00	-25.40	-17.25
4	13.48200	9.20	43.25	40.28	52.45	49.48	74.00	64.00	-21.55	-14.52
5	17.69400	9.24	47.87	45.66	57.11	54.90	74.00	64.00	-16.89	-9.10
6	20.25800	9.27	48.63	46.71	57.90	55.98	74.00	64.00	-16.10	-8.02
7	23.12600	9.33	49.10	47.28	58.43	56.61	74.00	64.00	-15.57	-7.39

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average 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

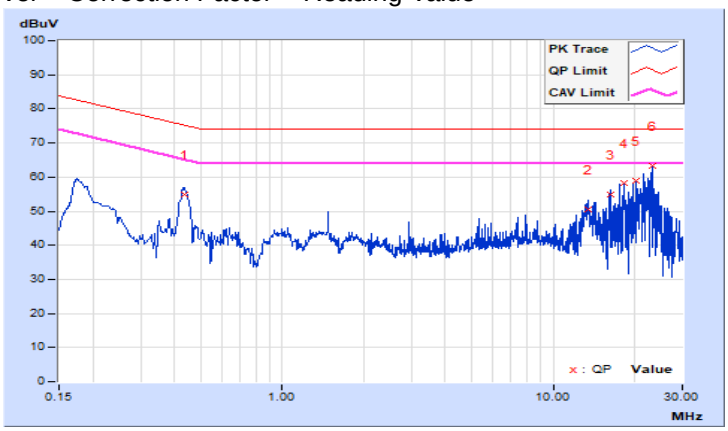


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	230Vac, 50Hz	Environmental Conditions	21℃, 62%RH
Tested by	Daniel Lin	Test Date	2021/7/1
Test Mode	LAN left port with AAN (100Mbps, Traffic)		

No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.43370	9.48	45.55	39.75	55.03	49.23	75.18	65.18	-20.15	-15.95
2	13.47800	9.20	41.30	39.01	50.50	48.21	74.00	64.00	-23.50	-15.79
3	16.23000	9.23	45.80	44.99	55.03	54.22	74.00	64.00	-18.97	-9.78
4	18.24200	9.25	48.85	47.87	58.10	57.12	74.00	64.00	-15.90	-6.88
5	20.25800	9.27	49.54	48.55	58.81	57.82	74.00	64.00	-15.19	-6.18
6	**23.13000**	**9.33**	**53.96**	**50.10**	**63.29**	**59.43**	**74.00**	**64.00**	**-10.71**	**-4.57**

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average 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 Radiated Emission at Frequencies up to 1GHz

7.1 Limits

Frequency (MHz)	Class A (dBuV/m)		Class B (dBuV/m)	
	at 10m	at 3m	at 10m	at 3m
30 - 230	40	50	30	40
230 - 1000	47	57	37	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 class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

7.2 Test Instruments

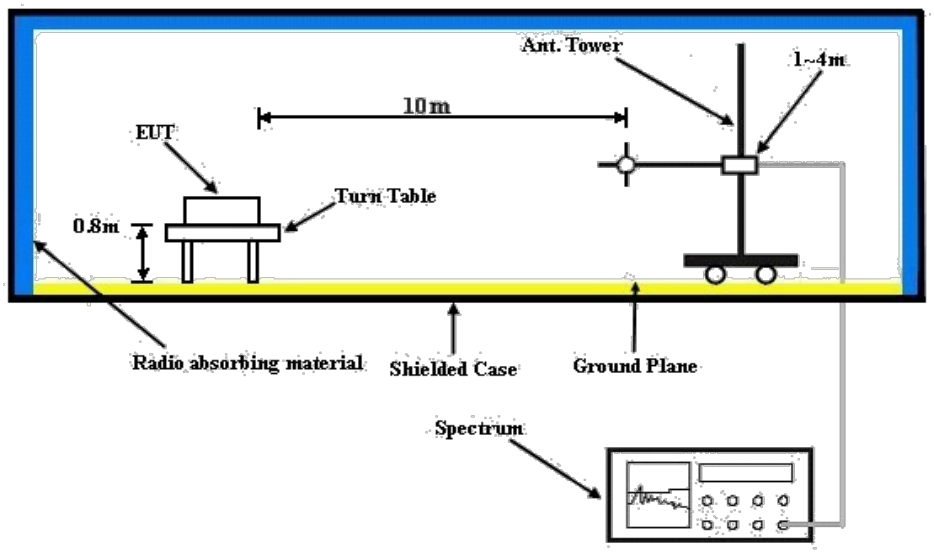
Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ (V)	ESR	101240	Oct. 30, 2020	Oct. 29, 2021
Test Receiver ROHDE & SCHWARZ (H)	ESR	101264	Apr. 09, 2021	Apr. 08, 2022
BILOG Antenna SCHWARZBECK (V)	VULB9168	9168-148	Nov. 05, 2020	Nov. 04, 2021
BILOG Antenna SCHWARZBECK (H)	VULB9168	9168-156	Nov. 05, 2020	Nov. 04, 2021
Preamplifier Sonoma (V)	310N	352924	Jun. 05, 2021	Jun. 04, 2022
Preamplifier Sonoma (H)	310N	352923	Jun. 05, 2021	Jun. 04, 2022
RF signal cable (with 5dB PAD) Times (V)	LMR-600 (18M) +LMR-400 (7M)	CABLE-CH1 (VER) -01	Sep. 04, 2020	Sep. 03, 2021
RF signal cable (with 5dB PAD) Times (H)	LMR-600 (11.8M) +LMR-400 (7M)	CABLE-CH1 (HOR) -01	Sep. 04, 2020	Sep. 03, 2021
Software BV ADT	BV ADT_Radiated_ V8.7.08	NA	NA	NA
Antenna Tower (V)	MFA-440	9707	NA	NA
Antenna Tower (H)	MFA-440	970705	NA	NA
Turn Table	DS430	50303	NA	NA
Controller (V)	MF7802	074	NA	NA
Controller (H)	MF7802	08093	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 1.
3. The VCCI Site Registration No. is R-11893.

7.3 Test Arrangement

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at an accredited test facility. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 10 meters away from the interference-receiving antenna, which was 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 below 1 GHz.

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



Note: According to EN 55032 standard, cables on the RGP must be insulated.

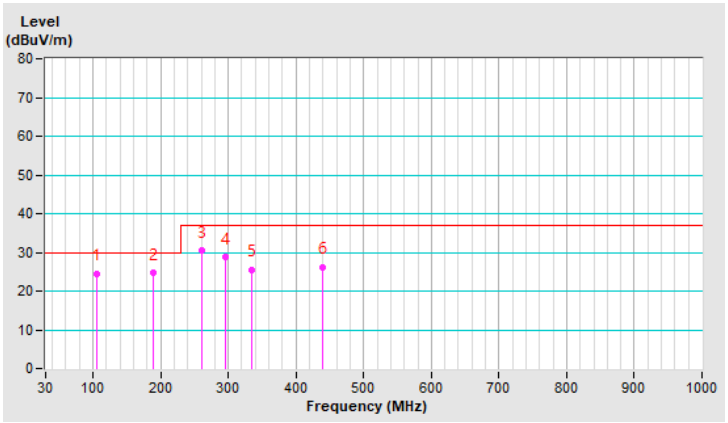
7.4 Test Results

Frequency Range	30MHz ~ 1GHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP), 120kHz
Tested By	Slash Huang	Environmental Conditions	23℃, 68%RH
Test Date	2021/6/28		

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	104.69	24.53 QP	30.00	-5.47	4.00 H	321	41.50	-16.97
2	188.55	24.60 QP	30.00	-5.40	3.00 H	220	39.62	-15.02
3	261.07	30.40 QP	37.00	-6.60	4.00 H	217	44.15	-13.75
4	296.47	28.70 QP	37.00	-8.30	3.50 H	343	41.16	-12.46
5	334.74	25.49 QP	37.00	-11.51	4.00 H	299	36.93	-11.44
6	440.28	26.23 QP	37.00	-10.77	1.50 H	68	34.85	-8.62

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. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value

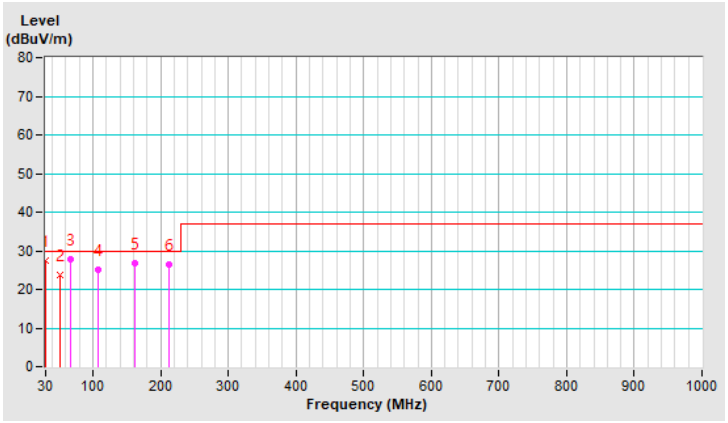


Frequency Range	30MHz ~ 1GHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP), 120kHz
Tested By	Slash Huang	Environmental Conditions	23℃, 68%RH
Test Date	2021/6/28		

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	30.63	27.42 QP	30.00	-2.58	3.50 V	314	42.71	-15.29
2	50.42	23.65 QP	30.00	-6.35	3.50 V	103	37.24	-13.59
3	**66.28**	**27.78 QP**	**30.00**	**-2.22**	**3.50 V**	**191**	**42.51**	**-14.73**
4	106.68	25.22 QP	30.00	-4.78	2.50 V	200	42.23	-17.01
5	162.51	26.85 QP	30.00	-3.15	1.50 V	133	40.12	-13.27
6	212.61	26.52 QP	30.00	-3.48	1.00 V	24	42.60	-16.08

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. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value



8 Radiated Emission at Frequencies above 1GHz

8.1 Limits

Frequency (GHz)	Class A (dBuV/m) (at 3m)		Class B (dBuV/m) (at 3m)	
	Average	Peak	Average	Peak
1 to 3	56	76	50	70
3 to 6	60	80	54	74

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 class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

Frequency Range (For unintentional radiators)

Highest frequency generated or used in the EUT or on which the EUT operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 108	1000
108-500	2000
500-1000	5000
Above 1000	Up to 5 times of the highest frequency or 6 GHz, whichever is less

8.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer Agilent	E4446A	MY51100039	Dec. 01, 2020	Nov. 30, 2021
PXA S Analyzer KEYSIGHT	N9030B	MY57141885	Jun. 07, 2021	Jun. 06, 2022
BILOG Antenna SCHWARZBECK	VULB9168	9168-149	Nov. 04, 2020	Nov. 03, 2021
RF signal cable (with 5dB PAD) Times	LMR-400 (18M)	CABLE-CH2-01	Mar. 22, 2021	Mar. 21, 2022
HORN Antenna (with 4dB PAD) SCHWARZBECK	BBHA 9120 D	9120D-405	Nov. 22, 2020	Nov. 21, 2021
Pre-Amplifier Agilent (Above 1GHz)	8449B	3008A01961	Sep. 04, 2020	Sep. 03, 2021
Software BV ADT	BV ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower BV ADT	AT100	AT93021702	NA	NA
Turn Table BV ADT	TT100	TT93021702	NA	NA
Controller BV ADT	SC100	SC93021702	NA	NA
BandPass Filter (2.4G) MICRO-TRONICS	BRM17690-01	003	Sep. 04, 2020	Sep. 03, 2021
BandPass Filter (5G) MICRO-TRONICS	BRM50716-01	G011	Sep. 04, 2020	Sep. 03, 2021
RF Coaxial Cable EMCI	EMC102-KM-KM-1000	170819	Sep. 04, 2020	Sep. 03, 2021
RF Coaxial Cable Rosnol	K1K50-UP0279-K1K50-3000	181129-1	Sep. 04, 2020	Sep. 03, 2021
RF Coaxial Cable JUNFLON+EMC	JUNFLON+EMC104-SM-SM-6000	Cable-CH2-02(MWX3221308G003+130710)	Jan. 16, 2021	Jan. 15, 2022

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Chamber 2. (966 Chamber 1)

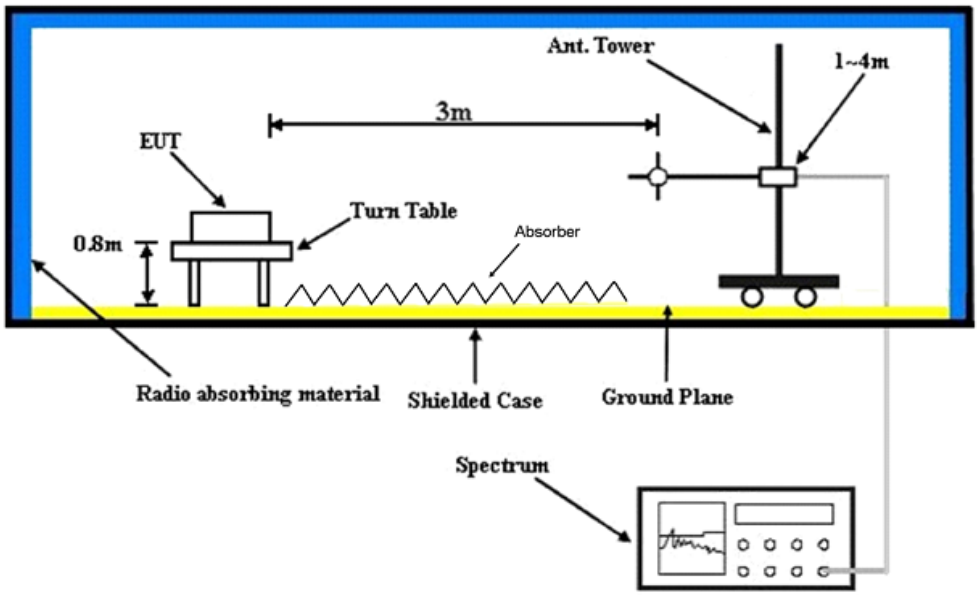
3. The VCCI Site Registration No. is G-10018.

4. The 3 dB beamwidth of the horn antenna is minimum 30 degree (or w = 1.6 m at 3 m distance) for 1~6 GHz.

8.3 Test Arrangement

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at an accredited chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 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 3dB 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 detect 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 1MHz and video bandwidth is 3MHz for Peak detection (PK) at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz for Average detection (AV) at frequency above 1GHz.



Note: According to EN 55032 standard, cables on the RGP must be insulated.

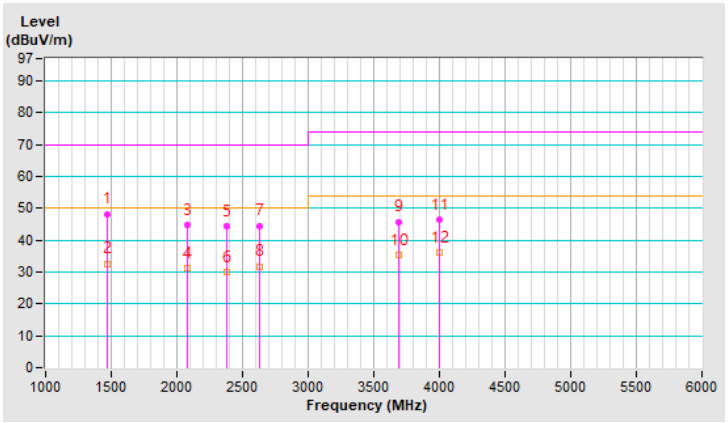
8.4 Test Results

Frequency Range	1GHz ~ 6GHz	Detector Function & Resolution Bandwidth	Peak (PK) / Average (AV), 1MHz
Tested By	Rolan Zheng	Environmental Conditions	26℃, 62%RH
Test Date	2021/7/3		

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	1467.37	48.29 PK	70.00	-21.71	1.56 H	211	50.29	-2.00
2	1467.37	32.63 AV	50.00	-17.37	1.56 H	211	34.63	-2.00
3	2079.62	44.73 PK	70.00	-25.27	1.00 H	38	44.30	0.43
4	2079.62	31.12 AV	50.00	-18.88	1.00 H	38	30.69	0.43
5	2384.23	44.44 PK	70.00	-25.56	1.44 H	45	43.07	1.37
6	2384.23	30.13 AV	50.00	-19.87	1.44 H	45	28.76	1.37
7	2629.01	44.59 PK	70.00	-25.41	1.18 H	360	43.05	1.54
8	2629.01	31.79 AV	50.00	-18.21	1.18 H	360	30.25	1.54
9	3692.76	45.81 PK	74.00	-28.19	1.38 H	11	42.25	3.56
10	3692.76	35.45 AV	54.00	-18.55	1.38 H	11	31.89	3.56
11	4001.24	46.31 PK	74.00	-27.69	1.00 H	215	41.96	4.35
12	4001.24	36.29 AV	54.00	-17.71	1.00 H	215	31.94	4.35

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. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value

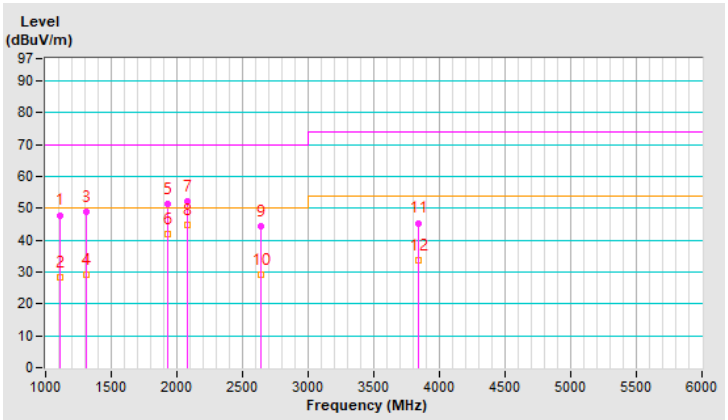


Frequency Range	1GHz ~ 6GHz	Detector Function & Resolution Bandwidth	Peak (PK) / Average (AV), 1MHz
Tested By	Rolan Zheng	Environmental Conditions	26℃, 62%RH
Test Date	2021/7/3		

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	1112.87	47.83 PK	70.00	-22.17	1.15 V	189	51.25	-3.42
2	1112.87	28.48 AV	50.00	-21.52	1.15 V	189	31.90	-3.42
3	1308.25	48.86 PK	70.00	-21.14	1.06 V	150	51.08	-2.22
4	1308.25	29.23 AV	50.00	-20.77	1.06 V	150	31.45	-2.22
5	1930.32	51.27 PK	70.00	-18.73	1.56 V	150	52.07	-0.80
6	1930.32	41.97 AV	50.00	-8.03	1.56 V	150	42.77	-0.80
7	2078.99	52.09 PK	70.00	-17.91	1.06 V	352	51.68	0.41
8	**2078.99**	**44.87 AV**	**50.00**	**-5.13**	**1.06 V**	**352**	**44.46**	**0.41**
9	2642.83	44.50 PK	70.00	-25.50	1.00 V	183	42.96	1.54
10	2642.83	29.13 AV	50.00	-20.87	1.00 V	183	27.59	1.54
11	3840.70	45.35 PK	74.00	-28.65	1.22 V	211	41.31	4.04
12	3840.70	33.65 AV	54.00	-20.35	1.22 V	211	29.61	4.04

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. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value



9 Harmonics Current Measurement

9.1 Limits

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	0.15 x 15/n
Even harmonics	
2	1.08
4	0.43
6	0.30
8≦n≦40	0.23 x 8/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	0.15 x 15/n

Note: 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.

9.2 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).

9.3 Test Instruments

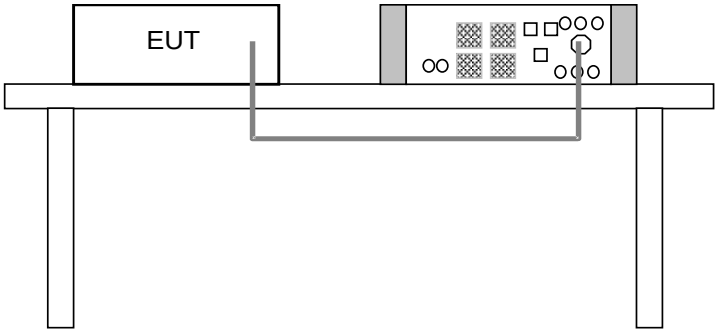
Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Schaffner AC Power Source	NSG1007	55616	Jun. 02, 2021	Jun. 01, 2022
Schaffner Signal Conditioning Unit- Lumped Impedance	CCN1000-1-LR1	72224	Jun. 02, 2021	Jun. 01, 2022
Software	CTS 4 V4.19.0	NA	NA	NA

Note: 1. The test was performed in HwaYa EMS Room.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

9.4 Test Arrangement

a. The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn.

b. 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.



9.5 Test Results

Test Duration (mins)	3	Power Frequency	50 Hz
Fundamental Voltage/Ampere	230.29 Vrms / 0.085 Arms	Power Factor	0.244
Power Consumption	4.3 W	Environmental Conditions	23 ˚C, 56% RH
Tested by	Water Su	Test Date	2021/7/15

Note: 1. Limits are not specified for equipment with a rated power of 75W or less (other than lighting equipment).
2. According to EN 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.

10 Voltage Fluctuations and Flicker Measurement

10.1 Limits

Test item	Limit	Note
P_{st}	1.0	P_{st}: short-term flicker severity.
P_{lt}	0.65	P_{lt}: long-term flicker severity.
T_{max} (ms)	500	T_{max}: maximum time duration during the observation period that the voltage deviation d(t) exceeds the limit for d_c .
d_{max} (%)	4	d_{max}: maximum absolute voltage change during an observation period.
d_c (%)	3.3	d_c: maximum steady state voltage change during an observation period.

10.2 Test Instruments

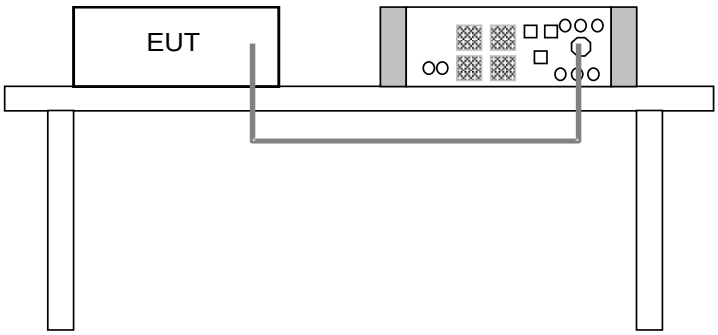
Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Schaffner AC Power Source	NSG1007	55616	Jun. 02, 2021	Jun. 01, 2022
Schaffner Signal Conditioning Unit- Lumped Impedance	CCN1000-1-LR1	72224	Jun. 02, 2021	Jun. 01, 2022
Software	CTS 4 V4.19.0	NA	NA	NA

Note: 1. The test was performed in HwaYa EMS Room.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

10.3 Test Arrangement

a. The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the most unfavorable sequence of voltage changes under normal operating conditions.

b. 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.



10.4 Test Results

Test Duration (mins)	10 min	Power Frequency	50 Hz
Fundamental Voltage/Ampere	230.18 Vrms / 0.085 Arms	Power Factor	0.244
Power Consumption	4.3 W	Environmental Conditions	23 ℃, 56% RH
Tested by	Water Su	Test Date	2021/7/15

Test Parameter	Measurement Value	Limit	Remarks
P_{st}	0.064	1.00	Pass
P_{lt}	0.028	0.65	Pass
T_{max} (ms)	0	500	Pass
d_{max} (%)	0	4	Pass
d_c (%)	0	3.3	Pass

Note: (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.

11 General Immunity Requirements

EN 55024:2010 +A1:2015, Immunity requirements				
Clause	Reference standard	Table	Test specification	Performance Criterion
4.2.1	EN 61000-4-2 ESD	1.3	Enclosure port: ±8kV Air discharge, ±4kV Contact discharge	B
4.2.3.2	EN 61000-4-3 RS	1.2	Enclosure port: 80-1000 MHz, 3V/m, 80% AM (1kHz)	A
4.2.2	EN 61000-4-4 EFT	2.3	Signal ports and telecommunication ports: xDSL equipment: ±0.5kV, 5/50 (t_r/t_w) ns, 100kHz others: ±0.5kV, 5/50 (t_r/t_w) ns, 5kHz	B
		3.3	Input DC power port: ±0.5kV, 5/50 (t_r/t_w) ns, 5kHz	
		4.5	Input AC power port: ±1kV, 5/50 (t_r/t_w) ns, 5kHz	
4.2.5	EN 61000-4-5 Surge	2.2	Signal and telecommunication ports (direct to outdoor cables): 10/700 (5/320) (T_f/T_d) μs w/o primary protectors: ±1kV, or with primary protectors fitted: ±4kV	C
		3.2	Input DC power port (direct to outdoor cables): 1.2/50 (8/20) (T_f/T_d) μs Line to earth: ±0.5kV	B
		4.4	Input AC power port: 1.2/50 (8/20) (T_f/T_d) μs, Line to line: ±1kV Line to earth: ±2kV	
4.2.3.3	EN 61000-4-6 CS	2.1	Signal and telecommunication ports (cable length > 3m): 0.15-80 MHz, 3V, 80% AM (1kHz)	A
		3.1	Input DC power port: 0.15-80 MHz, 3V, 80% AM (1kHz)	
		4.1	Input AC power port: 0.15-80 MHz, 3V, 80% AM (1kHz)	
4.2.4	EN 61000-4-8 PFMF	1.1	Enclosure port: 50 or 60 Hz, 1A/m	A
4.2.6	EN 61000-4-11 Dips & Interruptions	4.2	Input AC power port: Voltage Dips: >95% reduction – 0.5 period 30% reduction – 25 periods	B C
		4.3	Input AC Power ports: Voltage Interruptions: >95% reduction – 250 periods	C

EN 55035:2017 +A11:2020, Immunity requirements			
Clause	Reference standard	Test specification	Performance Criterion
4.2.1	EN/IEC 61000-4-2 ESD	Enclosure port: ±8kV Air discharge, ±4kV Contact discharge	B
4.2.2.2	EN/IEC 61000-4-3 RS	Enclosure port: Swept freq. test : 80-1000 MHz, 3V/m, 80% AM (1kHz), Spot freq. test : 1800, 2600, 3500, 5000 MHz (±1 %), 3V/m, 80% AM (1kHz)	A
4.2.4	EN/IEC 61000-4-4 EFT	Analogue/digital data ports (cable length > 3m): xDSL equipment: ±0.5kV, 5/50 (t_r/t_w) ns, 100kHz others: ±0.5kV, 5/50 (t_r/t_w) ns, 5kHz	B
		DC network power port (cable length > 3m): ±0.5kV, 5/50 (t_r/t_w) ns, 5kHz	
		AC mains power ports: ±1.0kV, 5/50 (t_r/t_w) ns, 5kHz	
4.2.5	EN/IEC 61000-4-5 Surge	Analogue/digital data ports (direct to outdoor cables): Port type: unshielded symmetrical 10/700(5/320) (T_f/T_d) μs, w/o primary protectors (line to ground): ±1.0kV, or with primary protectors (line to ground): ±1.0kV, ±4.0kV Port type: coaxial or shielded 1.2/50 (8/20) (T_f/T_d) µs, shield to ground: ±0.5kV	C
		DC network power port (direct to outdoor cables): 1.2/50(8/20) (T_f/T_d) μs, Line to ground: ±0.5kV	B
		AC mains power ports: 1.2/50(8/20) (T_f/T_d) μs, Line to line: ±1kV, Line to ground: ±2kV	B
4.2.2.3	EN/IEC 61000-4-6 CS	Analogue/digital data ports (cable length > 3m) ; DC network power ports (cable length > 3m) ; AC mains power ports 0.15-10 MHz, 3V, 80% AM (1kHz), 10-30 MHz, 3V-1V, 80% AM (1kHz), 30-80 MHz, 1V, 80% AM (1kHz)	A
4.2.3	EN/IEC 61000-4-8 PFMF	Enclosure port: 50 or 60 Hz, 1A/m	A
4.2.6	EN/IEC 61000-4-11 Voltage Dips & Interruptions	AC mains power ports: Voltage Dips: <5% residual – 0.5 cycle 70% residual – 25/30 cycles at 50/60 Hz	B C
		AC mains power ports: Voltage Interruptions: <5% residual – 250/300 cycles at 50/60 Hz	C

General Performance Criteria

EN 55024

Performance criterion A

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 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.

Performance criterion B

After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena 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. During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test. 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.

Performance criterion 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. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

Product Specific Performance Criteria

The particular performance criteria which are specified in the normative annexes of EN 55024 take precedence over the corresponding parts of the general performance criteria.

Where particular performance criteria for specific functions are not given, then the general performance criteria shall apply.

Function	Performance criteria A	Performance criteria B	Performance criteria C
Local area networks (LAN)	During and after the test, the EUT shall operate without: – error rate beyond the figure defined by the manufacturer; – requests for retry beyond the figure defined by the manufacturer; – speed of data transmission rate beyond the figure defined by the manufacturer; – protocol failure; – loss of link.	Error rate, request for retry and speed of data transmission rate may be degraded during the application of the test. During testing degradation of the performance as described in criteria A is permitted provided that after testing the normal operation of the EUT is self-recoverable to the condition immediately before the application of the test. In these cases, operator response is permitted to re-initiate an operation.	During testing degradation of the performance as described in criteria A and B is permitted provided that after testing the normal operation of the EUT is self-recoverable to the condition immediately before the application of the test or can be restored after the test by the operator.

EN 55035
These criterions shall be used during the testing of primary functions where no specified in the normative annexes of EN 55035 is applicable.

Performance criterion 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.

Performance criterion 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.

Performance criterion 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.

Product Specific Performance Criteria

Performance criterion A

Where relevant, during the application of the test the network function shall, as a minimum, operate ensuring that:

- established connections shall be maintained throughout the application of the test;
- no change of operational state or corruption of stored data occurs;
- no increase in error rate above the figure defined by the manufacturer occurs. The manufacturer should select the most appropriate performance measurement criteria for the product or system, for example bit error rate, block error rate;
- no request for retry above the figure defined by the manufacturer;
- the data transmission rate does not reduce below the figure defined by the manufacturer;
- no protocol failure occurs;
- the audio noise level at a two-wire analogue interface (supporting telephony) shall satisfy
- the requirements of Table G.3. The audio level measurements shall be performed at the demodulated frequency of the disturbance using a narrowband filter with a 3 dB bandwidth of 100 Hz using the method defined in table clause G.1.4. See G.6.1.

As described in the example given in J.3.5 the networking function is monitored during testing using direct functions specified elsewhere in this document.

If needed to verify the operation of the protocol, the following functions shall be verified as described in Table H.1 when performing the additional spot frequency tests contained in Clause 5:

- ability to establish a connection,
- ability to clear a connection.

Where an EUT has supervisory functions they shall not be affected. Elements that should be monitored include, but are not limited to:

- alarms,
- signalling lamps,
- printer output errors,
- network traffic rates,
- network monitor errors,
- measured network parameters.

Performance criterion B

Established connections shall be maintained throughout the test, or shall self-recover in a way and timescale that is imperceptible to the user.

The error rate, request for retry and data transmission rates may be degraded during the application of the test. Degradation of the performance as described in criterion A is permitted, provided that the normal operation of the EUT is self-recoverable to the condition established prior to the application of the test.

Where required, as defined in Clause 5, the acceptable operation of the function shall be verified at the completion of the test as described in Table H.1, by confirming the following:

- the EUT's ability to establish a connection,
- the EUT's ability to clear a connection.

During surge testing disconnection is allowed on the analogue/digital data port being tested.

If the EUT is a supervisory equipment, it shall not impact the normal operation of the network being monitored. In addition, any supervisory functions impacted during the period of the test shall return to the state prior to the test. Elements to consider include:

- alarms,
- signalling lamps,
- printer output,
- network traffic rates,
- network monitoring,

Performance criterion C

Degradation of performance as described in criteria A and B is permitted provided that the normal operation of the EUT is self-recoverable to the condition immediately before the application of the test, or can be restored after the test by the operator.

12 Electrostatic Discharge Immunity Test (ESD)

12.1 Test Specification

Product Standard:	EN 55024
Basic Standard:	EN/IEC 61000-4-2
Discharge Impedance:	330 ohm / 150 pF
Discharge Voltage:	Air Discharge: ±2, ±4, ±8kV (Direct) Contact Discharge: ±2, ±4kV (Direct/Indirect)
Number of Discharge:	Air – Direct: 10 discharges per location (each polarity) Contact – Direct & Indirect: 25 discharges per location (each polarity) and min. 200 times in total
Discharge Mode:	Single Discharge
Discharge Period:	1-second minimum

Product Standard:	EN 55035
Basic Standard:	EN/IEC 61000-4-2
Discharge Impedance:	330 ohm / 150 pF
Discharge Voltage:	Air Discharge: ±2, ±4, ±8kV (Direct) Contact Discharge: ±2, ±4kV (Direct/Indirect)
Number of Discharge:	Air – Direct: 10 discharges per location (each polarity) Contact – Direct & Indirect: 10 discharges per location (each polarity)
Discharge Mode:	Single Discharge
Discharge Period:	1-second minimum

12.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Electrostatic Analog Tester TESEQ	NSG 438	1614	Aug. 12, 2020	Aug. 11, 2021

Note: 1. The test was performed in HwaYa ESD Room 3.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

12.3 Test Arrangement

The discharges shall be applied in two ways:

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

The EUT shall be exposed to at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four test points. One of the test points shall be subjected to at least 50 indirect discharges to the center of the front edge of the horizontal coupling plane. The remaining three test points shall each receive at least 50 direct contact discharges. If no direct contact test points are available, then at least 200 indirect discharges shall be applied in the indirect mode. Test shall be performed at a maximum repetition rate of one discharge per second.

b. Air discharges at slots and apertures and insulating surfaces:

On those parts of the EUT 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 of 10 single air discharges shall be applied to the selected test point for each such area.

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.

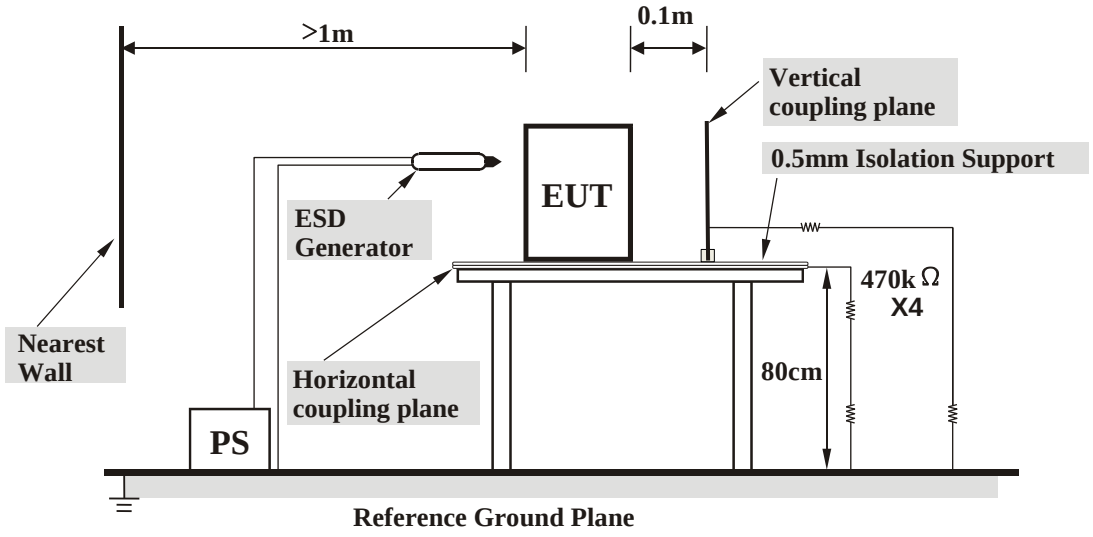


Table-top Equipment

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.

12.4 Test Results

Input Power	230Vac, 50Hz	Test Date	2021/7/14
Environmental Conditions	23 ˚C, 42% RH, 988 mbar	Tested by	Water Su
Product Standard	EN 55024		

Test Results of Direct Application					
Discharge Level (kV)	Polarity (+/-)	Test Point	Contact Discharge	Air Discharge	Performance Criterion
2, 4, 8	+/-	1, 2	NA	Note 1	A
2, 4	+/-	3	Note 1	NA	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 Criterion
2, 4	+/-	Four Sides	Note 1	Note 1	A

Description of test points of indirect application:

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

Note: 1. The EUT function was correct during the test.

Input Power	230Vac, 50Hz	Test Date	2021/7/14
Environmental Conditions	23 ˚C, 42% RH, 988 mbar	Tested by	Water Su
Product Standard	EN 55035		

Test Results of Direct Application					
Discharge Level (kV)	Polarity (+/-)	Test Point	Contact Discharge	Air Discharge	Performance Criterion
2, 4, 8	+/-	1, 2	NA	Note 1	A
2, 4	+/-	3	Note 1	NA	A

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

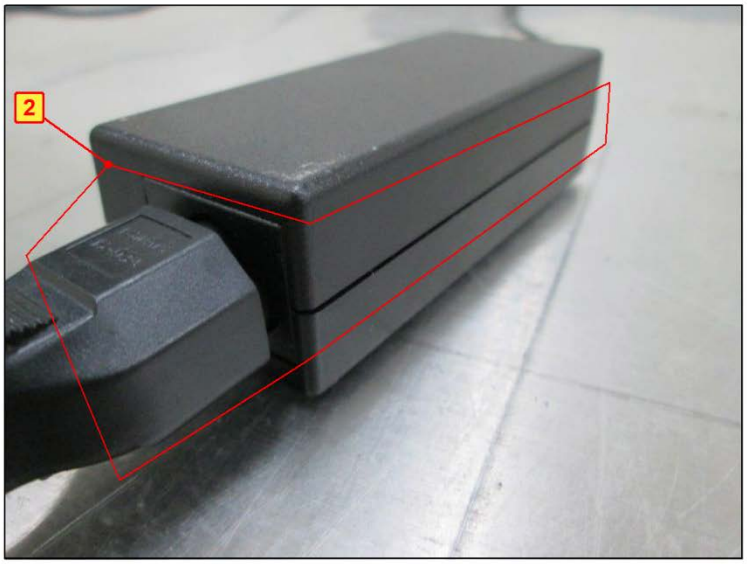
Test Results of Indirect Application					
Discharge Level (kV)	Polarity (+/-)	Test Point	Horizontal Coupling Plane	Vertical Coupling Plane	Performance Criterion
2, 4	+/-	Four Sides	Note 1	Note 1	A

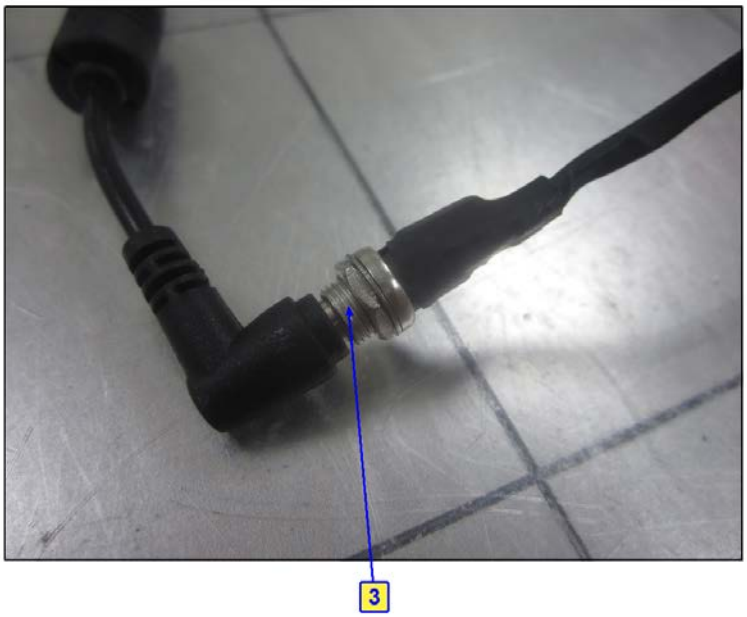
Description of test points of indirect application:

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

Note: 1. The EUT function was correct during the test.

Description of Test Points




3

13 Radiated, Radio-frequency, Electromagnetic Field Immunity Test (RS)

13.1 Test Specification

Product Standard:	EN 55024
Basic Standard:	EN/IEC 61000-4-3
Frequency Range, Field Strength:	80-1000 MHz, 3V/m
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of preceding frequency value
Polarity of Antenna:	Horizontal and Vertical
Antenna Height:	1.55m
Dwell Time:	3 seconds

Product Standard:	EN 55035
Basic Standard:	EN/IEC 61000-4-3
Swept Frequency Range:	80 MHz - 1000 MHz
Spot Frequencies:	1800, 2600, 3500, 5000 MHz
Field Strength:	3 V/m
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of preceding frequency value
Polarity of Antenna:	Horizontal and Vertical
Antenna Height:	1.55m
Dwell Time:	3 seconds

13.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
BONN Power Amp	BLMA 1060-100/50D	118694	NA	NA
BBA Power Amp	B250C125	101011	NA	NA
Power Sensor	NRP-Z91	101572	May 21, 2021	May 20, 2022
Power Sensor	NRP-Z91	101573	May 21, 2021	May 20, 2022
Signal Generator	SMB100A	105801	Dec. 01, 2020	Nov. 30, 2021
R&S Software	EMC32 Version 8.52.0	NA	NA	NA
Stacked Log-Per Antenna	STLP9149	9149-141	NA	NA
High GAIN LOG-Periodic Antenna	HL046E	100114	NA	NA

Note: 1. The test was performed in HwaYa RS Room 2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The transmit antenna was located at a distance of 3 meters from the EUT.

13.3 Test Arrangement

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 is swept from 80 MHz to 1000 MHz, 1800MHz, 2600MHz, 3500MHz, 5000MHz, with the signal 80% amplitude modulated with a 1kHz sine wave.

c. The field strength level was 3 V/m.

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

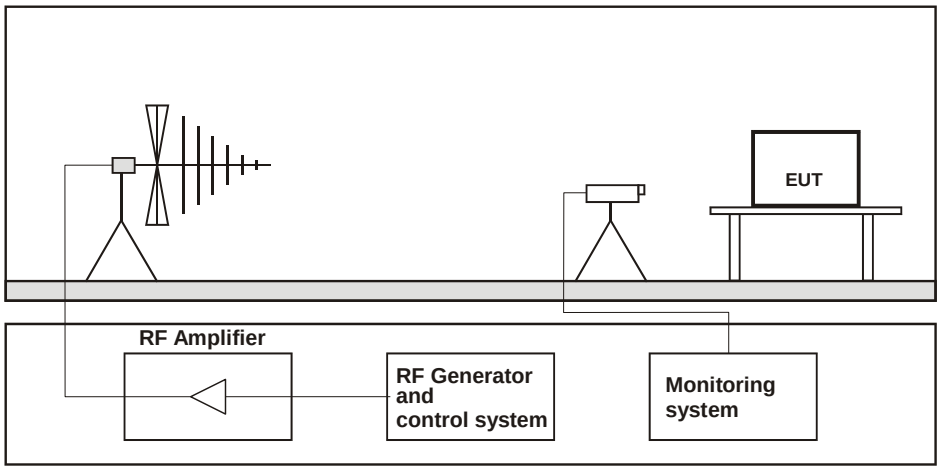


Table-top Equipment

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.

13.4 Test Results

Input Power	230Vac, 50Hz	Test Date	2021/7/15
Environmental Conditions	24°C, 57 % RH	Tested by	Matt Lan
Product Standard	EN 55024		

Frequency (MHz)	Polarity	Azimuth (°)	Applied Field Strength		Observation	Performance Criterion
			(V/m)	Modulation		
80-1000	V&H	0, 90, 180, 270	3	80% AM (1kHz)	Note 1	A

Note: 1. The EUT function was correct during the test.

Input Power	230Vac, 50Hz	Test Date	2021/7/15
Environmental Conditions	24°C, 57 % RH	Tested by	Matt Lan
Product Standard	EN 55035		

Frequency (MHz)	Polarity	Azimuth(°)	Applied Field Strength		Observation	Performance Criterion
			(V/m)	Modulation		
80 -1000	V&H	0, 90, 180, 270	3	80% AM (1 kHz)	Note 1	A
1800, 2600, 3500, 5000	V&H	0, 90, 180, 270	3	80% AM (1 kHz)	Note 1	A
80 -1000	V&H	0, 90, 180, 270	3	80% AM (1 kHz)	Note 2	PASS
1800, 2600, 3500, 5000	V&H	0, 90, 180, 270	3	80% AM (1 kHz)	Note 2	PASS

Note: 1. The EUT function was correct during the test.
2. The measured acoustic interference ratio and/or the measured electrical interference ratio during the test shall be -20dB or better.

14 Electrical Fast Transient/Burst Immunity Test (EFT)

14.1 Test Specification

Product Standard:	EN 55024
Basic Standard:	EN/IEC 61000-4-4
Test Voltage:	Signal / telecommunication port: ±0.5kV Input DC power port: NA Input AC power port: ±1kV
Impulse Repetition Frequency:	xDSL telecommunication port: 100kHz others: 5kHz
Impulse Wave Shape:	5/50 ns
Burst Duration:	0.75 ms for 100kHz Repetition Frequency 15 ms for 5kHz Repetition Frequency
Burst Period:	300 ms
Test Duration:	1 min.

Product Standard:	EN 55035
Basic Standard:	EN/IEC 61000-4-4
Test Voltage:	Analogue/digital data port (cable length > 3m): ±0.5kV DC network power port (cable length > 3m): NA AC mains power port: ±1kV
Impulse Repetition Frequency:	xDSL telecommunication port: 100kHz others: 5kHz
Impulse Wave Shape :	5/50 ns
Burst Duration:	0.75 ms for 100kHz Repetition Frequency 15 ms for 5kHz Repetition Frequency,
Burst Period:	300 ms
Test Duration:	1 min.

14.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
EMC Immunity Test System	NSG 3060/ CDN 3061/ VAR 3005-S16/ CDN 3425	1385/1355/857/1763	Jun. 23, 2021	Jun. 22, 2022

Notes: 1. The test was performed in HwaYa EMS Room 2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

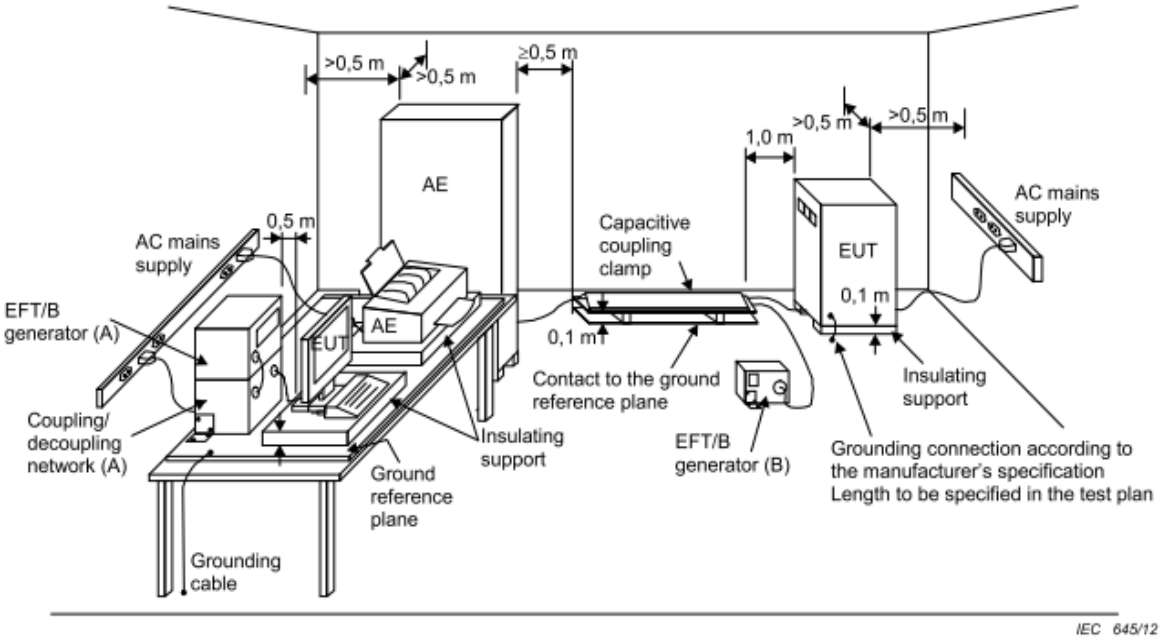
14.3 Test Arrangement

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.



Note:
(A) location for supply line coupling
(B) location for signal lines coupling

14.4 Test Results

Input Power	230 Vac, 50Hz	Test Date	2021/7/16
Environmental Conditions	23 ˚C, 58% RH	Tested by	Shawn Huang
Product Standard	EN 55024		

Input AC power port:

Voltage (kV)	Test Point	Polarity (+/-)	Observation	Performance Criterion
1	L1	+/-	Note 2	B
1	L2	+/-	Note 2	B
1	PE	+/-	Note 2	B
1	L1-L2-PE	+/-	Note 2	B

Signal / telecommunication ports

Voltage (kV)	Test Point	Polarity (+/-)	Observation	Performance Criterion
0.5	LAN 1	+/-	Note 1	A

Note: 1. The EUT function was correct during the test.
2. The earphone had disturbing noise during the test, but could self-recover to the initial operation after the test.

Input Power	230 Vac, 50Hz	Test Date	2021/7/16
Environmental Conditions	23 ˚C, 58% RH	Tested by	Shawn Huang
Product Standard	EN 55035		

Input AC power port:

Voltage (kV)	Test Point	Polarity (+/-)	Observation	Performance Criterion
1	L1	+/-	Note 2	B
1	L2	+/-	Note 2	B
1	PE	+/-	Note 2	B
1	L1-L2-PE	+/-	Note 2	B

Signal / telecommunication ports

Voltage (kV)	Test Point	Polarity (+/-)	Observation	Performance Criterion
0.5	LAN 1	+/-	Note 1	A

Note: 1. The EUT function was correct during the test.
2. The earphone had disturbing noise during the test, but could self-recover to the initial operation after the test.

15 Surge Immunity Test

15.1 Test Specification

Product Standard:	EN 55024
Basic Standard:	EN/IEC 61000-4-5
Wave-Shape:	Signal / telecommunication port: 10/700 µs Open Circuit Voltage 5/320 µs Short Circuit Current 1.2/50 µs Open Circuit Voltage 8/20 µs Short Circuit Current Input DC power port (direct to outdoor cables*): 1.2/50 µs Open Circuit Voltage 8/20 µs Short Circuit Current Input AC power port: 1.2/50 µs Open Circuit Voltage 8/20 µs Short Circuit Current
Test Voltage:	Signal and telecommunication ports**: w/o primary protectors: ±0.5kV with primary protectors fitted: NA Input DC power port: Line to earth or ground: NA Input AC power ports: Line to line: ±0.5, ±1kV Line to earth or ground: ±0.5, ±1, ±2kV
AC Phase Angle (degree):	0°, 90°, 180°, 270°
Pulse Repetition Rate:	5 time / 60 sec.
Number of Tests:	5 positive and 5 negative at selected points

Product Standard:	EN 55035
Basic Standard:	EN/IEC 61000-4-5
Wave-Shape:	Analogue/digital data ports: Port type: unshielded symmetrical 10/700 µs Open Circuit Voltage 5/320 µs Short Circuit Current 1.2/50 µs Open Circuit Voltage 8/20 µs Short Circuit Current Port type: coaxial or shielded 1.2/50 µs Open Circuit Voltage 8/20 µs Short Circuit Current DC network power port (direct to outdoor cables*): 1.2/50 µs Open Circuit Voltage 8/20 µs Short Circuit Current AC mains power port: 1.2/50 µs Open Circuit Voltage 8/20 µs Short Circuit Current
Test Voltage:	Analogue/digital data ports: Port type: unshielded symmetrical** w/o primary protectors (line to ground): ±0.5kV with primary protectors (line to ground): NA Port type: coaxial or shielded shield to ground: NA DC network power port: NA AC mains power ports: Line to line : ±0.5, ±1kV Line to ground : ±0.5, ±1, ±2kV
AC Phase Angle (degree):	Line to neutral: positive pulses at 90° / negative pulses at 270° Line to ground: positive pulses at 90° / negative pulses at 270° Neutral to ground: negative pulses at 90° / positive pulses at 270°
Pulse Repetition Rate:	5 time / 60 sec.
Number of Tests:	5 positive and 5 negative at selected points

* This test is only applicable only to ports, which according to the manufacturer's specification, may connect directly to outdoor cables.

** For ports where primary protection is intended, surges are applied at voltages up to 4 kV with the primary protectors fitted. Otherwise the 1 kV test level is applied without primary protection in place.

15.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
EMC Immunity Test System	NSG 3060	1385	Jun. 23, 2021	Jun. 22, 2022
EMC Immunity Test System	CDN 3061	1355	Jun. 23, 2021	Jun. 22, 2022
EMC Immunity Test System	VAR 3005-S16	857	Jun. 23, 2021	Jun. 22, 2022
Surge CDN	CDN HSS-2	36541	Jun. 23, 2021	Jun. 22, 2022
CDN for Unshielded symmetrical signal & Data Lines	CDN 118 / INA 172 / INA 175 / INA 180 / INA 181 / INA 182 / INA 183	33882 / 33245 / 35809 / 35806 / 35909 / 35912 / 35917 / 35927	Jun. 23, 2021	Jun. 22, 2022

Notes: 1. The test was performed in HwaYa EMS Room 2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

15.3 Test Arrangement

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.

b. Wired network ports

- Unshielded unsymmetrical interconnection lines:

The coupling / decoupling networks shall not influence the specified functional conditions of the EUT. The interconnection line between the EUT and the coupling network shall not exceed 2 meters in length.

No line-to-ground surges are applied for double-insulated products (i.e. products without any dedicated earth terminal).

- Unshielded symmetrical interconnection lines:

For symmetrical interconnection lines and high-speed interconnection lines, the CDN shall be selected to match the number of lines/pairs existing the cable. If coupling arrestors are use, test levels below the ignition point of the coupling arrestor cannot be specified.

The interconnection line between the EUT and the coupling/decoupling networks shall not exceed 2 meters in length.

In order to avoid the coupling and decoupling capacitors having a filtering effect on the data transfer, a balanced high frequency design associating the coupling capacitors with coupling chokes is required. Where normal functioning of high speed communications lines cannot be achieved because of the impact of the CDN on the EUT, product committees should specify appropriate operation or that no surge immunity test is required.

- Shielded lines:

The EUT is isolated from ground and the surge is applied to its metallic enclosure; the termination (or auxiliary equipment) at the port(s) under test is grounded. This test applies to equipment with one or more shielded cables.

The length of the cable between the port(s) under test and the device attached to the other end of the cable (AE in Figure 12) shall be:

- 20 m (preferred length) or,
- the shortest length over 10 m, where the manufacturer provides pre-assembled cables used in actual installations.

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

Rules for application of the surge to shielded lines:

a) Shields grounded at both ends:
- the test shall be carried out.

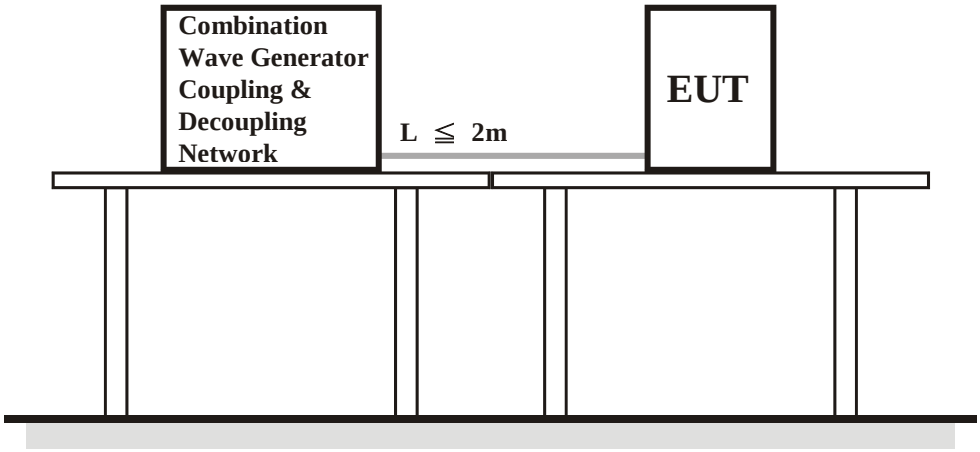
The test level is applied on shields with a 2 Ω generator source impedance and with the 18 μF

capacitor.

b) Shields grounded at one end:
- the test shall be carried out according to unshielded unsymmetrical interconnection lines or unshielded symmetrical interconnection lines because the shield does not provide any protection against surges induced by magnetic fields.

For EUTs which do not have metallic enclosures, the surge is applied directly to the shielded cable at

the EUT side.


Combination
Wave Generator
Coupling &
Decoupling
Network
L ≦ 2m
EUT

15.4 Test Results

Input Power	230Vac, 50Hz	Test Date	2021/7/16
Environmental Conditions	23 ˚C, 58% RH	Tested by	Shawn Huang
Product Standard	EN 55024		

Input AC power port:

Voltage (kV)	Test Point	Polarity (+/-)	Observation				Performance Criterion
			0°	90°	180°	270°	
0.5, 1	L1-L2	+	Note 1	Note 1	Note 1	Note 1	A
		-	Note 1	Note 1	Note 1	Note 1	A
0.5, 1, 2	L1-PE	+	Note 1	Note 1	Note 1	Note 1	A
		-	Note 1	Note 1	Note 1	Note 1	A
0.5, 1, 2	L2-PE	+	Note 1	Note 1	Note 1	Note 1	A
		-	Note 1	Note 1	Note 1	Note 1	A

Signal / telecommunication ports

Voltage (kV)	Wave-Shape (μs)	Test Point	Polarity (+/-)	Observation	Performance Criterion
0.5	1.2/50	LAN 1	+/-	Note 1	A

Note: 1. The EUT function was correct during the test.

Input Power	230Vac, 50Hz	Test Date	2021/7/16
Environmental Conditions	23 ˚C, 58% RH	Tested by	Shawn Huang
Product Standard	EN 55035		

Input AC power port:

Voltage (kV)	Test Point	Polarity (+/-)	Observation				Performance Criterion
			0°	90°	180°	270°	
0.5, 1	L1-L2	+	NA	Note 1	NA	NA	A
		-	NA	NA	NA	Note 1	A
0.5, 1, 2	L1-PE	+	NA	Note 1	NA	NA	A
		-	NA	NA	NA	Note 1	A
0.5, 1, 2	L2-PE	+	NA	NA	NA	Note 1	A
		-	NA	Note 1	NA	NA	A

Signal / telecommunication ports

Voltage (kV)	Wave-Shape (μs)	Test Point	Polarity (+/-)	Observation	Performance Criterion
0.5	1.2/50	LAN 1	+/-	Note 1	A

Note: 1. The EUT function was correct during the test.

16 Immunity to Conducted Disturbances Induced by RF Fields (CS)

16.1 Test Specification

Product Standard:	EN 55024
Basic Standard:	EN/IEC 61000-4-6
Frequency Range:	0.15 MHz - 80 MHz
Voltage Level:	3 V
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of preceding frequency value
Dwell Time	3 seconds

Product Standard:	EN 55035
Basic Standard:	EN/IEC 61000-4-6
Frequency Range, Voltage Level :	0.15 MHz - 10 MHz : 3 V 10 MHz - 30 MHz : 3 to 1 V 30 MHz - 80 MHz : 1 V
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of preceding frequency value
Dwell Time	3 seconds

16.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
FCC POWER LINE COUPLING DECOUPLING NETWORK	FCC-801-M1-25A	03030	Mar. 03, 2021	Mar. 02, 2022
FCC POWER LINE COUPLING DECOUPLING NETWORK	FCC-801-M2-25A	03049	Mar. 04, 2021	Mar. 03, 2022
FCC POWER LINE COUPLING DECOUPLING NETWORK	FCC-801-M2-25A	03050	Mar. 03, 2021	Mar. 02, 2022
FCC POWER LINE COUPLING DECOUPLING NETWORK	FCC-801-M3-25A	03056	Mar. 03, 2021	Mar. 02, 2022
FCC SIGNAL LINE POWER LINE COUPLING DECOUPLING NETWORK	CDN T200A	38295	Mar. 03, 2021	Mar. 02, 2022
FCC SIGNAL LINE POWER LINE COUPLING DECOUPLING NETWORK	CDN T200A	41298	Mar. 03, 2021	Mar. 02, 2022
FCC SIGNAL LINE POWER LINE COUPLING DECOUPLING NETWORK	FCC-801-T4	03031	Mar. 03, 2021	Mar. 02, 2022
Coupling Decoupling Network TESEQ	CDN S150	34832	Mar. 04, 2021	Mar. 03, 2022
Coupling Decoupling Network TESEQ	CDN USB3.0	37041	Mar. 04, 2021	Mar. 03, 2022
Coupling Decoupling Network TESEQ	CDN HDMI	36670	Mar. 04, 2021	Mar. 03, 2022
Coupling Decoupling Network TESEQ	CDN T400A	28577	Mar. 03, 2021	Mar. 02, 2022
FCC SIGNAL LINE POWER LINE COUPLING DECOUPLING NETWORK	F-090407-1004-1	100923	Mar. 03, 2021	Mar. 02, 2022
Coupling Decoupling Network TESEQ	CDN T8-10	43230	Mar. 03, 2021	Mar. 02, 2022
Coupling Decoupling Network TESEQ	CDN T8-10	43229	Mar. 03, 2021	Mar. 02, 2022
Coupling Decoupling Network TESEQ	CDN S751S	35791	Mar. 04, 2021	Mar. 03, 2022
Coupling Decoupling Network TESEQ	CDN ST08A	56526	Feb. 26, 2021	Feb. 25, 2022
EMI Injection Clamp	F203I-23MM	434	Apr. 09, 2021	Apr. 08, 2022
Amplifier Research Power Amplifier	75A250AM2	307804	NA	NA
Signal Generator ROHDE & SCHWARZ	SMB 100A	105489	Aug. 24, 2020	Aug. 23, 2021
POWER METER BOONTON	4232A	107402	Jul. 12, 2021	Jul. 11, 2022
POWER SENSOR BOONTON	51011-EMC	33105	Jul. 12, 2021	Jul. 11, 2022
POWER SENSOR BOONTON	51011-EMC	33107	Jul. 12, 2021	Jul. 11, 2022
Software	ADT_CS_V37	NA	NA	NA
6dB Attenuator	6NFNF150ATT	NA	NA	NA

Note: 1. The test was performed in HwaYa CS Room 1.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

16.3 Test Arrangement

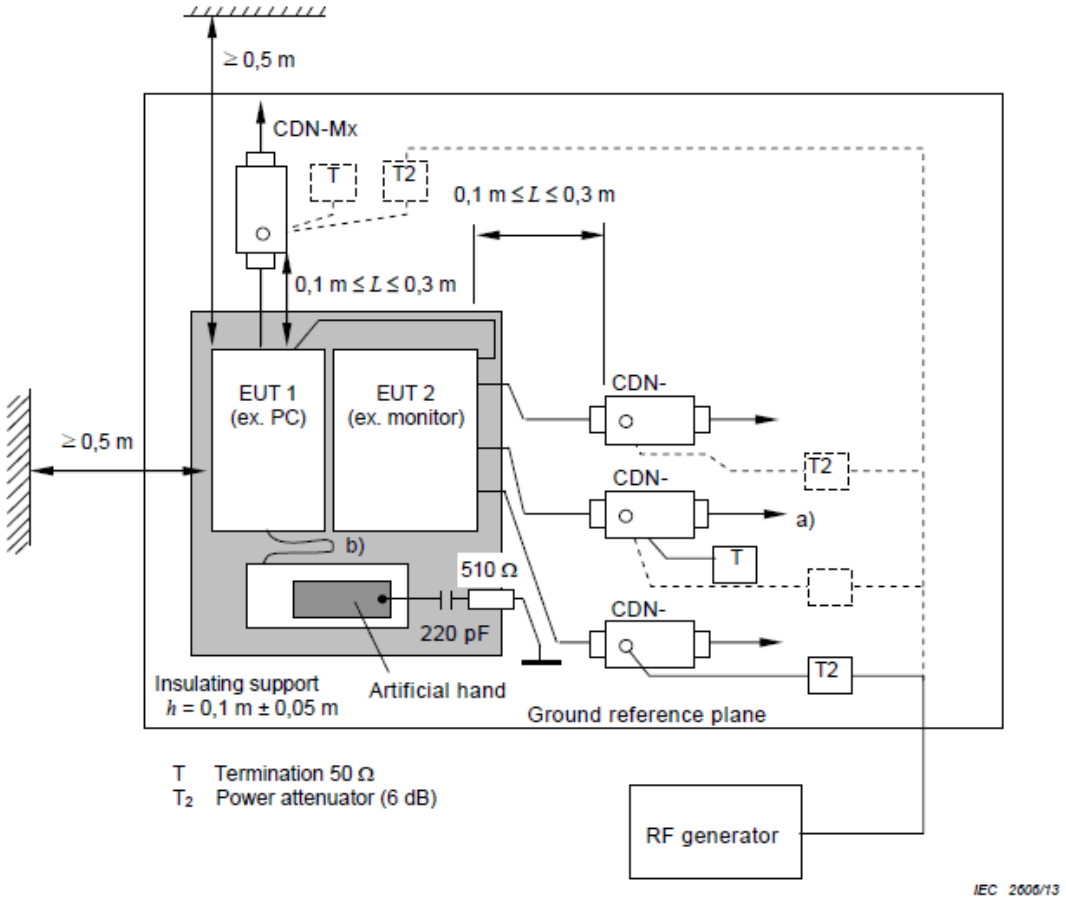
a. The EUT shall be tested within its intended operating and climatic conditions.

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 is swept from 150 kHz to 80 MHz, 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.



a) Only one of the CDNs not used for injection shall be terminated with 50 Ω, providing only one return path. All other CDNs shall be configured as decoupling networks.

b) Interconnecting cables (≤ 1 m) belonging to the EUT shall remain on the insulating support.

16.4 Test Results

Input Power	230Vac, 50Hz	Test Date	2021/7/13
Environmental Conditions	25 ˚C, 55% RH	Tested by	Vison Tseng
Product Standard	EN 55024		

Frequency (MHz)	Level (Vrms)	Tested Line	Injection Method	Return Path	Observation	Performance Criterion
0.15-80	3	AC	CDN-M3	CDN-T4	Note 1	A
0.15-80	3	LAN 1	CDN-T4	CDN-M3	Note 1	A

Note: 1. The EUT function was correct during the test.

Input Power	230Vac, 50Hz	Test Date	2021/7/13
Environmental Conditions	25 ˚C, 55% RH	Tested by	Vison Tseng
Product Standard	EN 55035		

Frequency (MHz)	Level (Vrms)	Tested Line	Injection Method	Return Path	Observation	Performance Criterion
0.15 – 10	3	AC	CDN-M3	CDN-T4	Note 1	A
10 – 30	3 – 1	AC	CDN-M3	CDN-T4	Note 1	A
30 – 80	1	AC	CDN-M3	CDN-T4	Note 1	A
0.15 – 10	3	LAN 1	CDN-T4	CDN-M3	Note 1	A
10 – 30	3 – 1	LAN 1	CDN-T4	CDN-M3	Note 1	A
30 – 80	1	LAN 1	CDN-T4	CDN-M3	Note 1	A
0.15 – 10	3	AC	CDN-M3	CDN-T4	Note 2	PASS
10 – 30	3 – 1	AC	CDN-M3	CDN-T4	Note 2	PASS
30 – 80	1	AC	CDN-M3	CDN-T4	Note 2	PASS
0.15 – 10	3	LAN 1	CDN-T4	CDN-M3	Note 2	PASS
10 – 30	3 – 1	LAN 1	CDN-T4	CDN-M3	Note 2	PASS
30 – 80	1	LAN 1	CDN-T4	CDN-M3	Note 2	PASS

Note: 1. The EUT function was correct during the test.
2. The measured acoustic interference ratio and/or the measured electrical interference ratio during the test shall be -20dB or better.

17 Power Frequency Magnetic Field Immunity Test

17.1 Test Specification

Product Standard:	EN 55024
Basic Standard:	EN/IEC 61000-4-8
Frequency Range:	50Hz
Field Strength:	1 A/m
Observation Time:	1 minute
Inductance Coil:	Rectangular type, 1mx1m

Product Standard:	EN 55035
Basic Standard:	EN/IEC 61000-4-8
Frequency Range:	50Hz
Field Strength:	1 A/m
Observation Time:	1 minute
Inductance Coil:	Rectangular type, 1mx1m

17.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
F.W.BELL 4190 Gaussmeter	4190	0743043	Apr. 08, 2021	Apr. 07, 2022
Schaffner AC Power Source	NSG1007	55616	Jun. 02, 2021	Jun. 01, 2022
\Multi turn Magnetic TESEQ	INA702/INA2141	268/1427	May 10, 2021	May 09, 2022

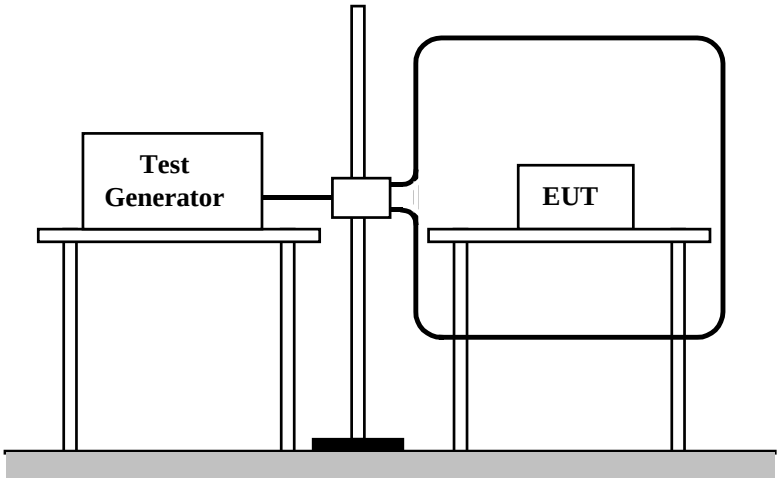
Note: 1. The test was performed in HwaYa EMS Room 1.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

17.3 Test Arrangement

a. The equipment is configured and connected to satisfy its functional requirements.

b. The power supply, input and output circuits shall be connected to the sources of power supply, control and signal.

c. The cables supplied or recommended by the equipment manufacturer shall be used. 1 meter of all cables used shall be exposed to the magnetic field.



Tabletop equipment
The equipment shall be subjected to the test magnetic field (see example as above).
The plane of the inductive coil shall then be rotated by 90° in order to expose the EUT to the test field with different orientations.

17.4 Test Results

Input Power	230Vac, 50Hz	Test Date	2021/7/15
Environmental Conditions	25 ˚C, 55% RH	Tested by	Water Su
Product Standard	EN 55024		

Application	Frequency (Hz)	Field Strength (A/m)	Observation	Performance Criterion
X - Axis	50	1	Note 1	A
Y - Axis	50	1	Note 1	A
Z - Axis	50	1	Note 1	A

Note: 1. The EUT function was correct during the test.

Input Power	230Vac, 50Hz	Test Date	2021/7/15
Environmental Conditions	25 ˚C, 55% RH	Tested by	Water Su
Product Standard	EN 55035		

Application	Frequency (Hz)	Field Strength (A/m)	Observation	Performance Criterion
X - Axis	50	1	Note 1	A
Y - Axis	50	1	Note 1	A
Z - Axis	50	1	Note 1	A

Note: 1. The EUT function was correct during the test.

18 Voltage Dips and Interruptions

18.1 Test Specification

Product Standard:	EN 55024
Basic Standard:	EN/IEC 61000-4-11
Test levels:	Voltage Dips: >95% reduction – 0.5 period 30% reduction – 25 periods Voltage Interruptions: >95% reduction – 250 periods
Interval between Event:	Minimum ten seconds
Sync Angle (degrees):	0° / 180°
Test Cycle:	3 times

Product Standard:	EN 55035
Basic Standard:	EN/IEC 61000-4-11
Test levels:	Voltage Dips: <5% residual – 0.5 period 70% residual – for 25 periods at 50 Hz Voltage Interruptions: <5% residual – for 250 periods at 50 Hz
Interval between Event:	Minimum ten seconds
Sync Angle (degrees):	0° & 180°
Test Cycle:	3 times

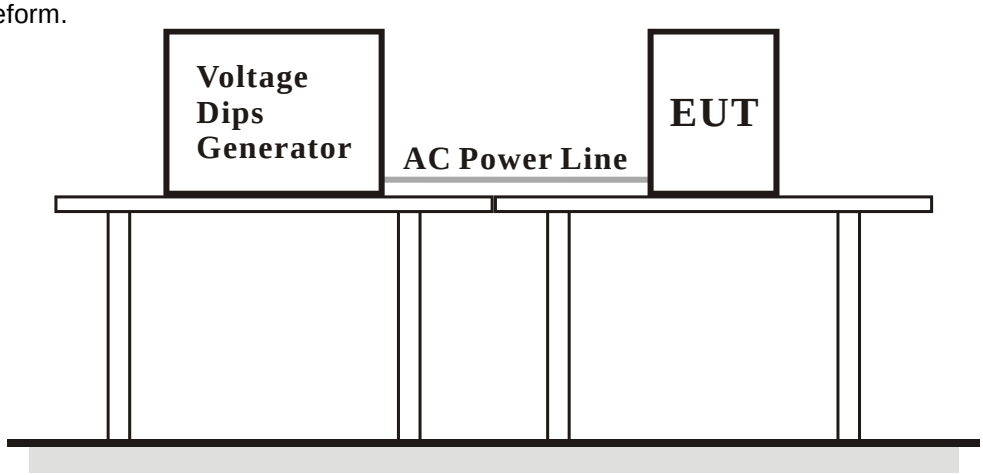
18.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
EMC Immunity Test System	NSG 3060	1385	Jun. 23, 2021	Jun. 22, 2022
EMC Immunity Test System	CDN 3061	1355	Jun. 23, 2021	Jun. 22, 2022
EMC Immunity Test System	VAR 3005-S16	857	Jun. 23, 2021	Jun. 22, 2022

Notes: 1. The test was performed in HwaYa EMS Room 2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

18.3 Test Arrangement

The EUT 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 degree crossover point of the voltage waveform.



18.4 Test Results

Input Power	100-240 Vac, 50 Hz	Test Date	2021/7/16
Environmental Conditions	23 ˚C, 58% RH	Tested by	Shawn Huang
Product Standard	EN 55024		

Input Power for testing: 230 Vac, 50 Hz (Nominal input Voltage)					
Voltage Reduction (%)	Duration (period)	Interval (sec)	Times	Observation	Performance Criterion
>95	0.5	10	3	Note 1	A
30	25	10	3	Note 1	A
>95	250	10	3	Note 2	C

Input Power for testing: 240 Vac, 50 Hz (Maximum input voltage)					
Voltage Reduction (%)	Duration (period)	Interval (sec)	Times	Observation	Performance Criterion
>95	0.5	10	3	Note 1	A
30	25	10	3	Note 1	A
>95	250	10	3	Note 2	C

Input Power for testing: 100 Vac, 50 Hz (Minimum input voltage)					
Voltage Reduction (%)	Duration (period)	Interval (sec)	Times	Observation	Performance Criterion
>95	0.5	10	3	Note 1	A
30	25	10	3	Note 1	A
>95	250	10	3	Note 2	C

Note: 1. The EUT function was correct during the test.
2. The EUT could not operate normally due to voltage dipped suddenly during the test, and must be recovered manually.

Input Power	100-240 Vac, 50 Hz	Test Date	2021/7/16
Environmental Conditions	23 ˚C, 58% RH	Tested by	Shawn Huang
Product Standard	EN 55035		

Input Power for testing: 230 Vac, 50 Hz (Nominal input Voltage)					
Voltage Residual (%)	Duration (period)	Interval (sec)	Times	Observation	Performance Criterion
<5	0.5	10	3	Note 1	A
70	25	10	3	Note 1	A
<5	250	10	3	Note 2	C

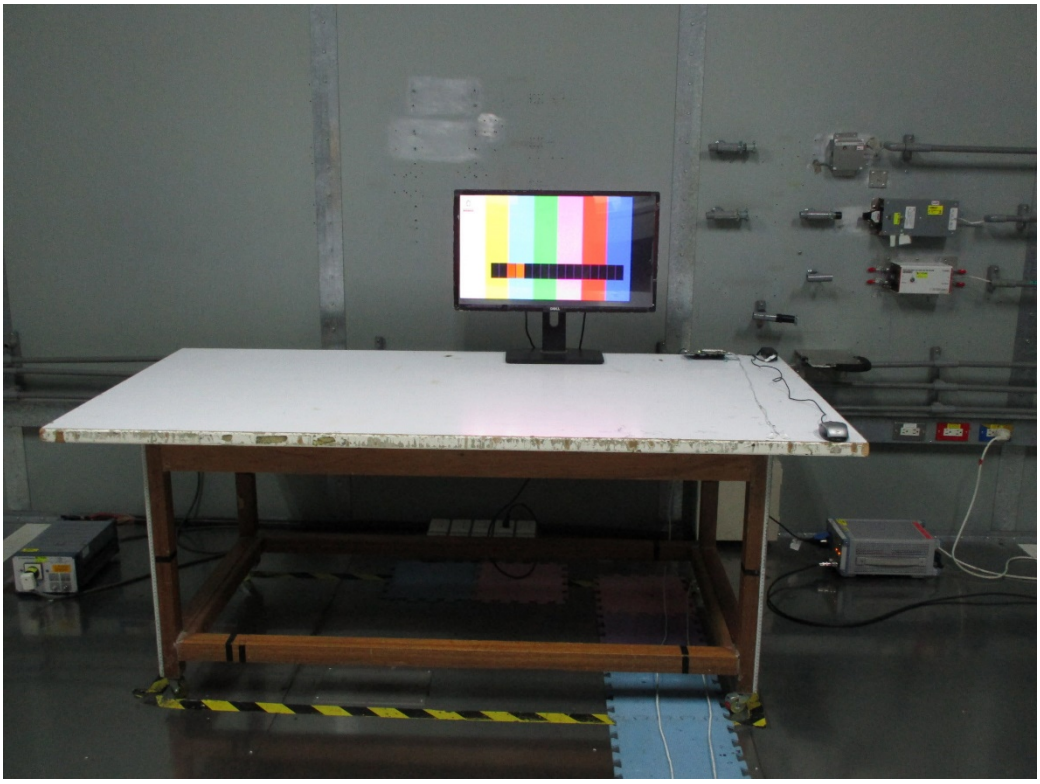
Input Power for testing: 240 Vac, 50 Hz (Maximum input voltage)					
Voltage Residual (%)	Duration (period)	Interval (sec)	Times	Observation	Performance Criterion
<5	0.5	10	3	Note 1	A
70	25	10	3	Note 1	A
<5	250	10	3	Note 2	C

Input Power for testing: 100 Vac, 50 Hz (Minimum input voltage)					
Voltage Residual (%)	Duration (period)	Interval (sec)	Times	Observation	Performance Criterion
<5	0.5	10	3	Note 1	A
70	25	10	3	Note 1	A
<5	250	10	3	Note 2	C

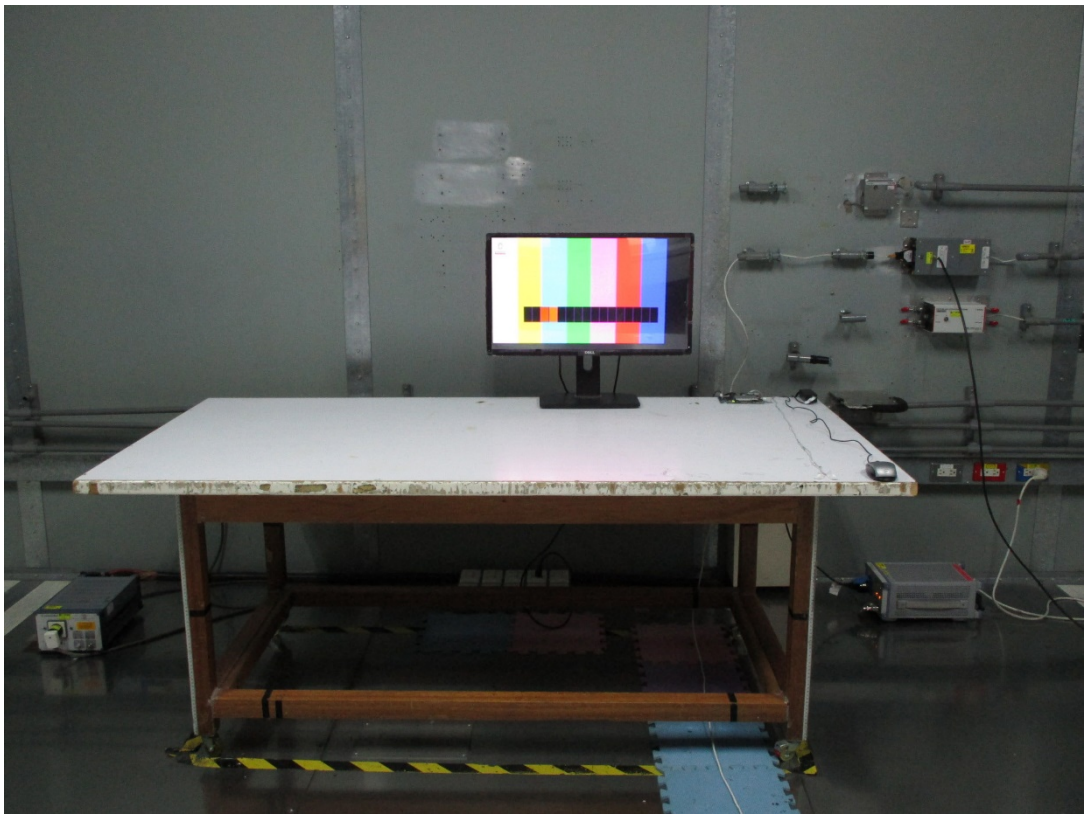
Note: 1. The EUT function was correct during the test.
2. The EUT could not operate normally due to voltage dipped suddenly during the test, and must be recovered manually.

19 Pictures of Test Arrangements

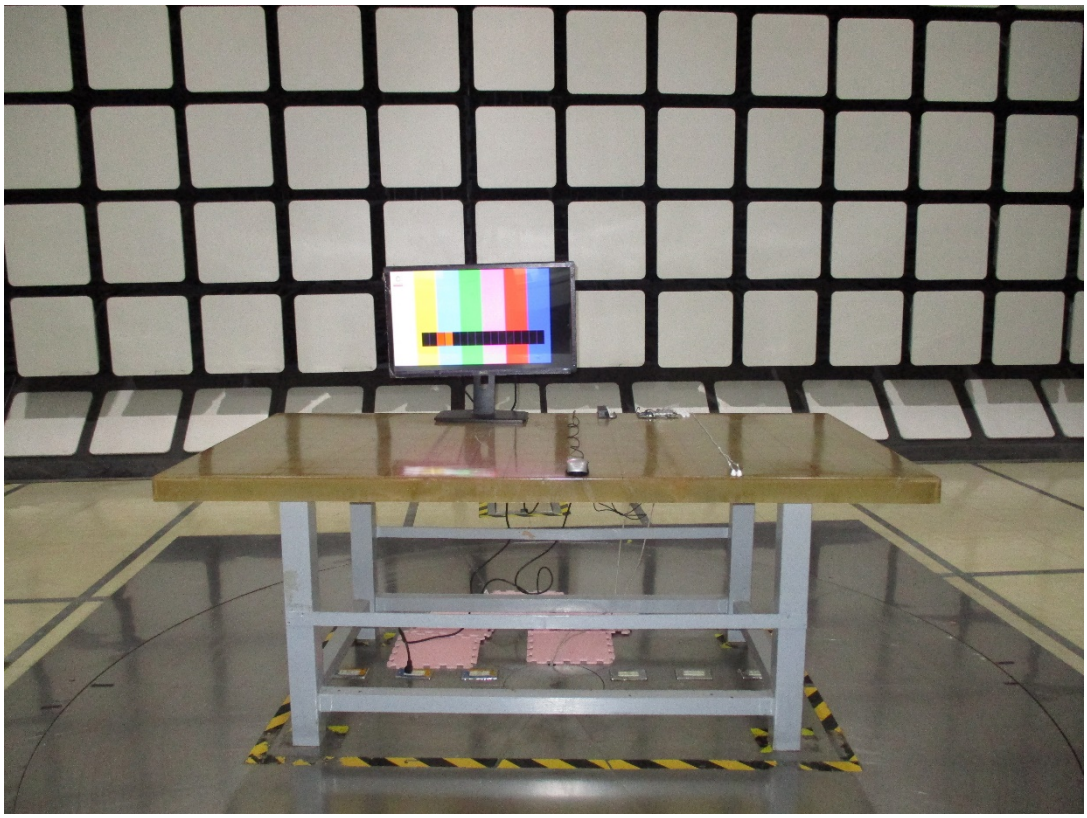
19.1 Conducted Emission from the AC Mains Power Port



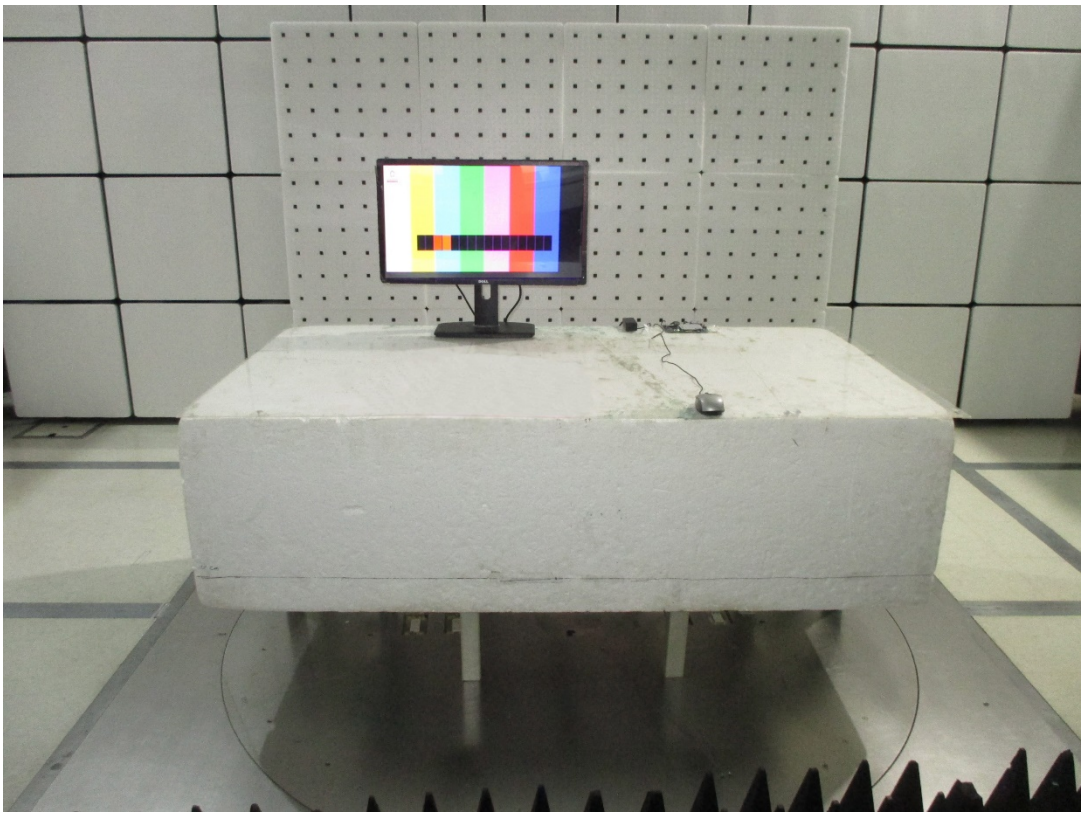
19.2 Asymmetric mode conducted emission at wired network ports

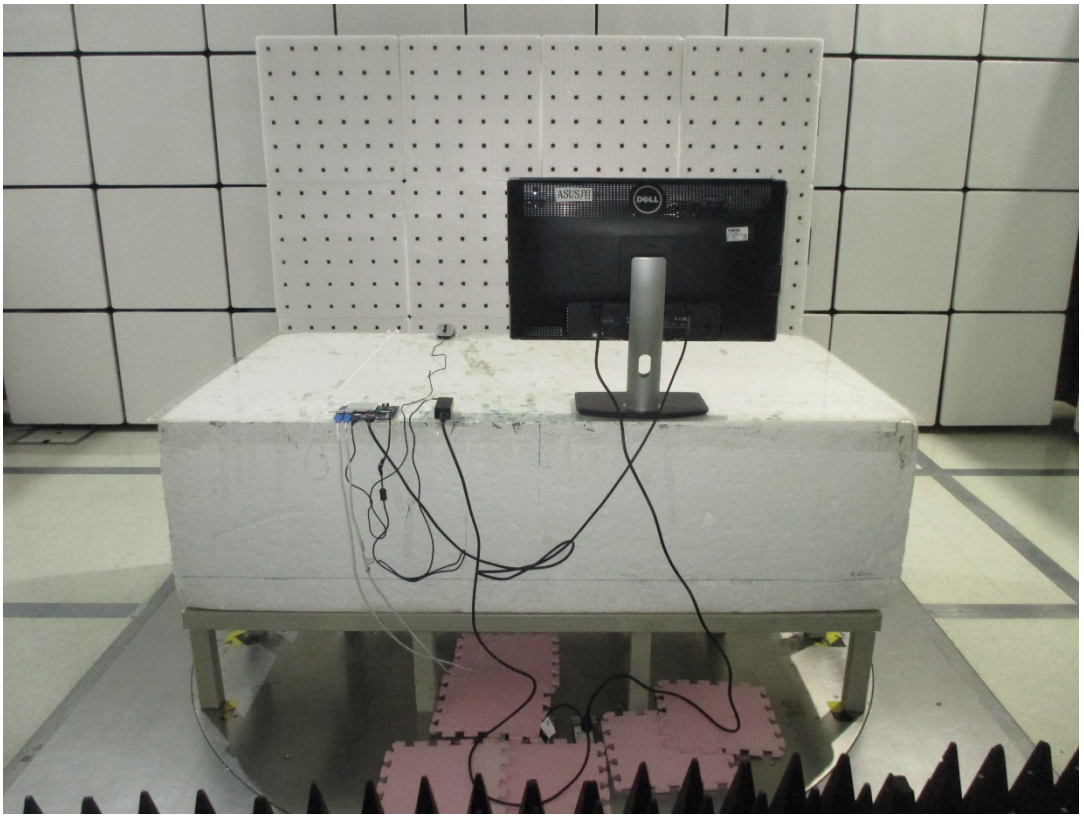


19.3 Radiated Emission at Frequencies up to 1GHz

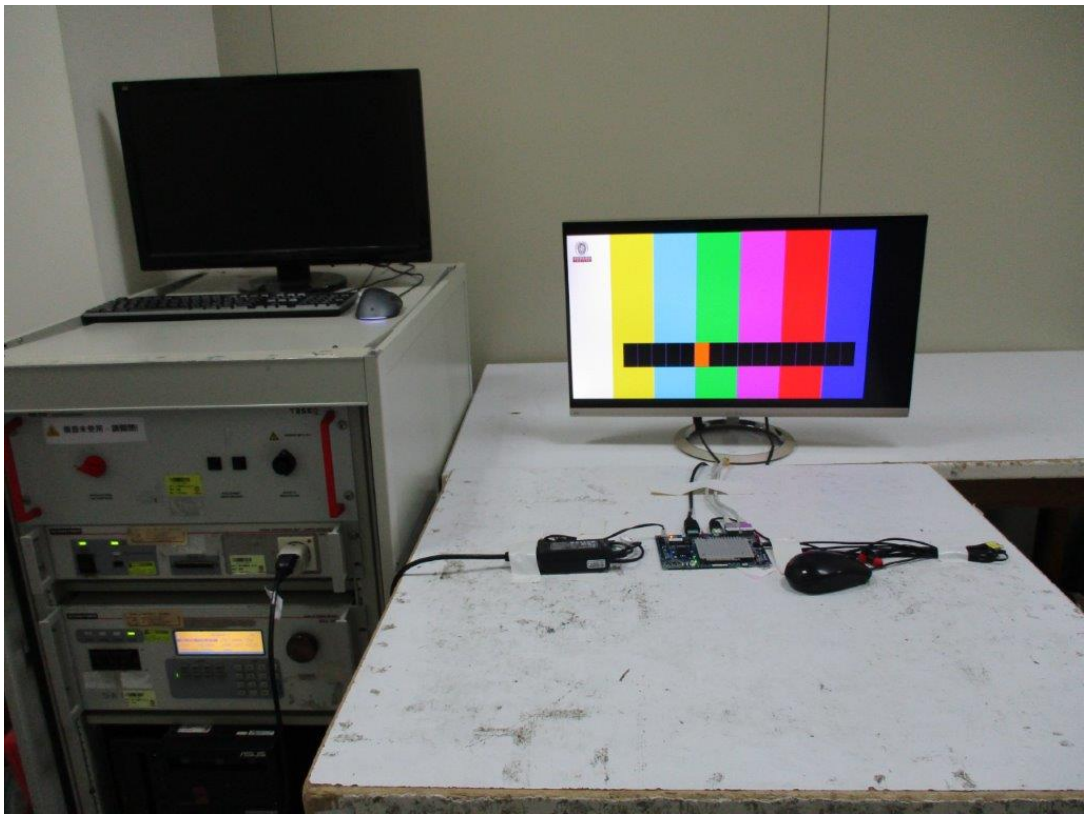


19.4 Radiated Emission at Frequencies above 1GHz

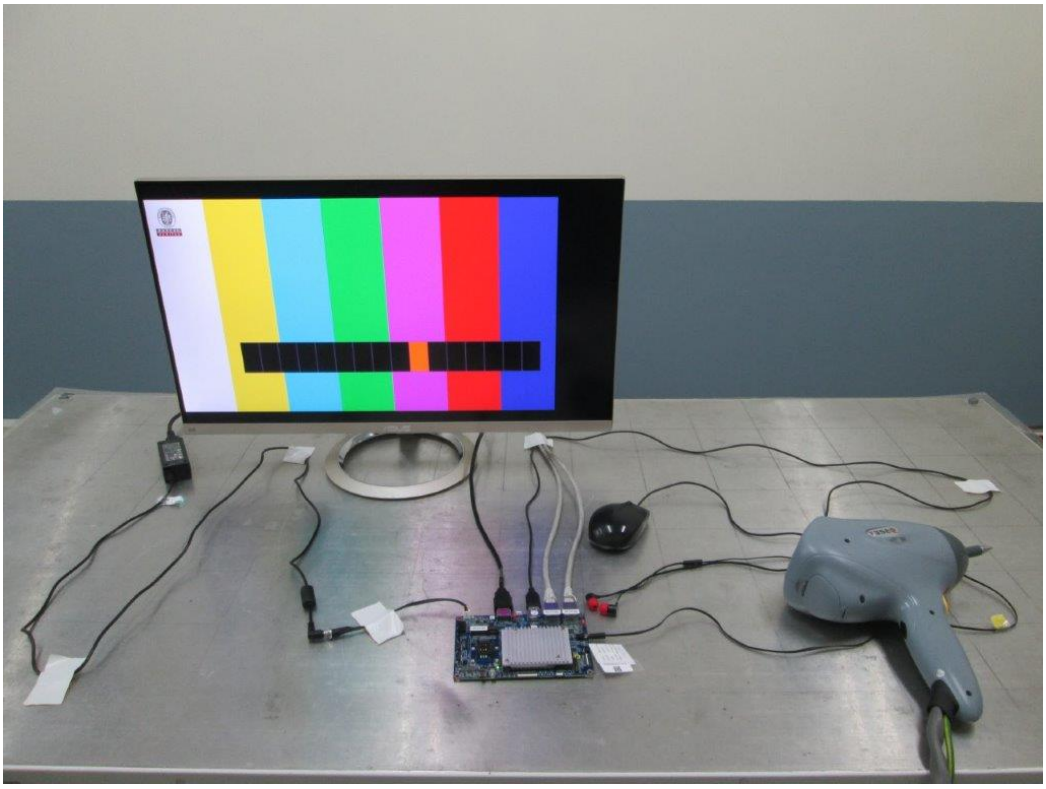




19.5 Harmonics Current, Voltage Fluctuations and Flicker Measurement



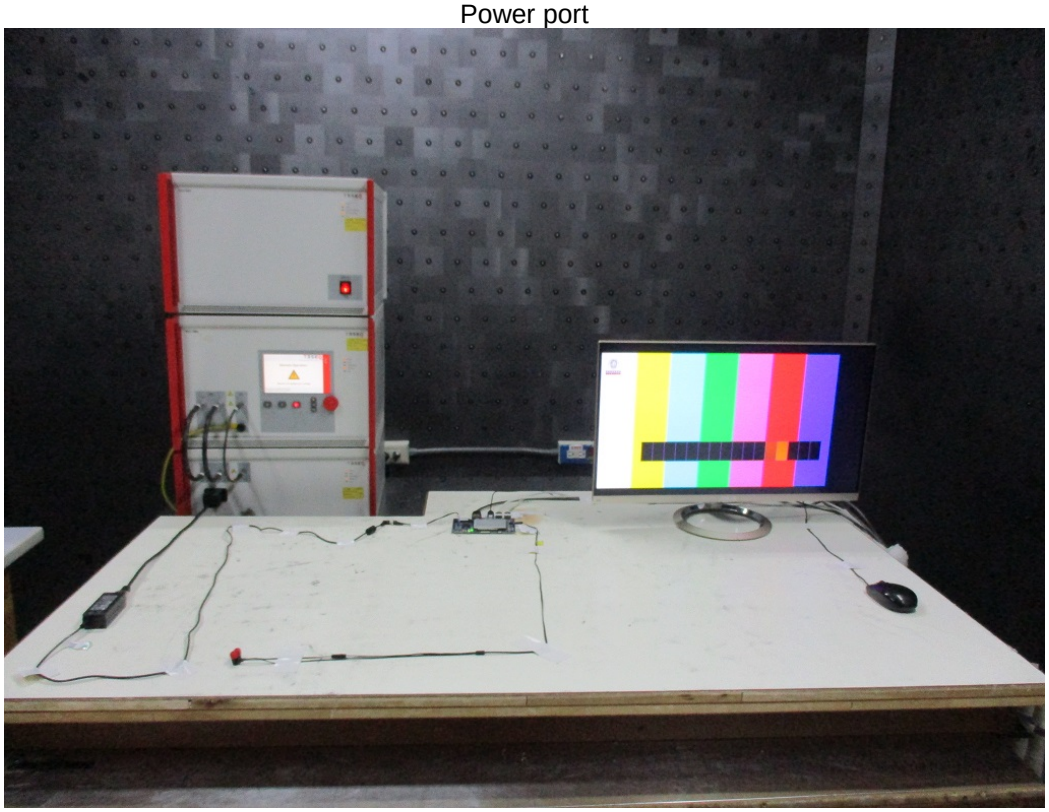
19.6 Electrostatic Discharge Immunity Test (ESD)



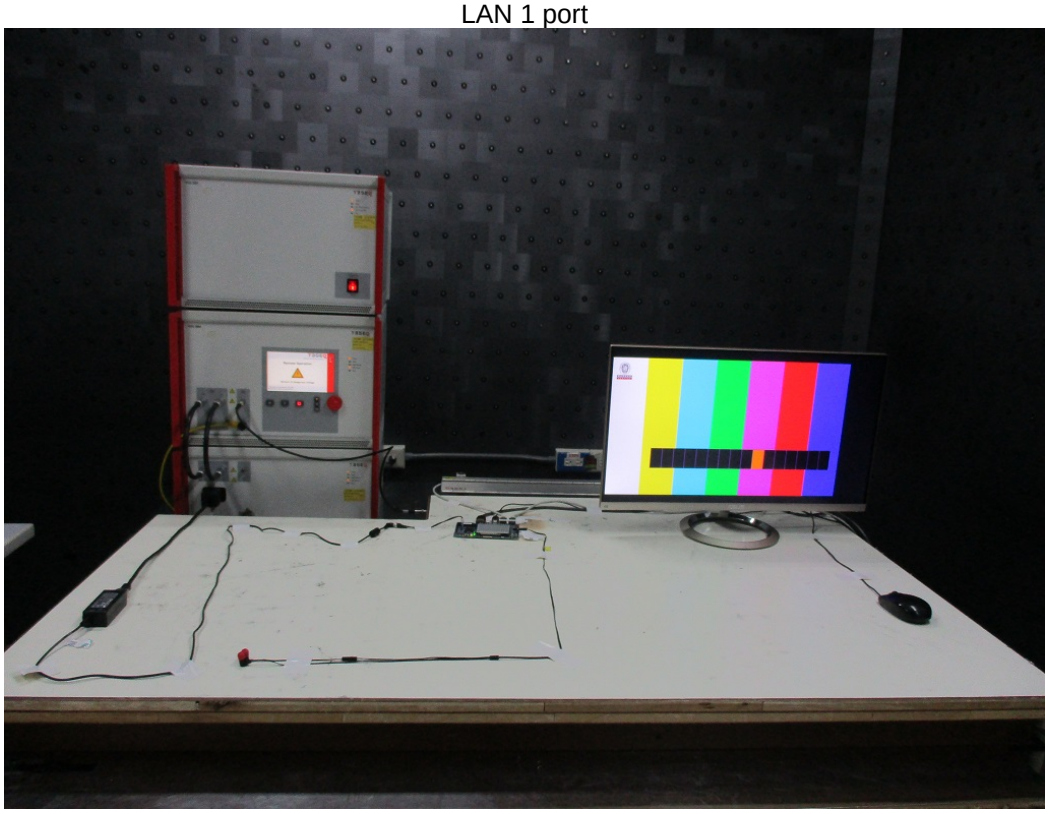
19.7 Radio-frequency, Electromagnetic Field Immunity Test (RS)

19.8 Electrical Fast Transient/Burst Immunity Test (EFT)

Power port

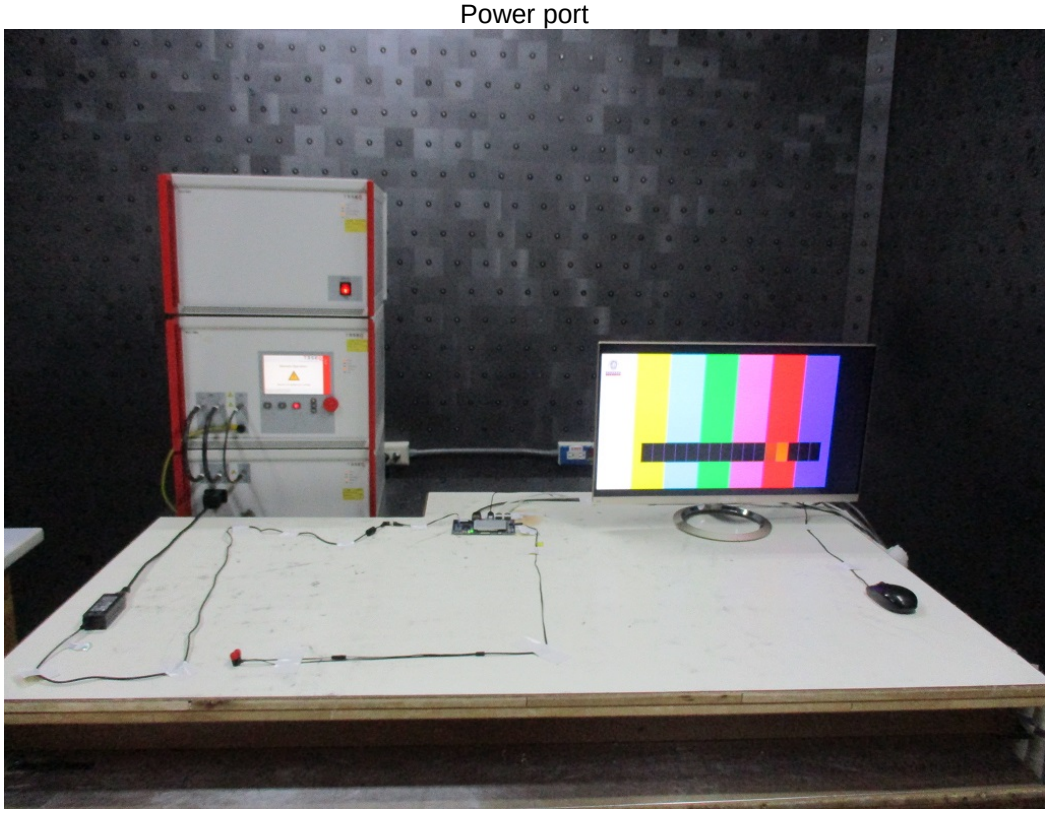


LAN 1 port

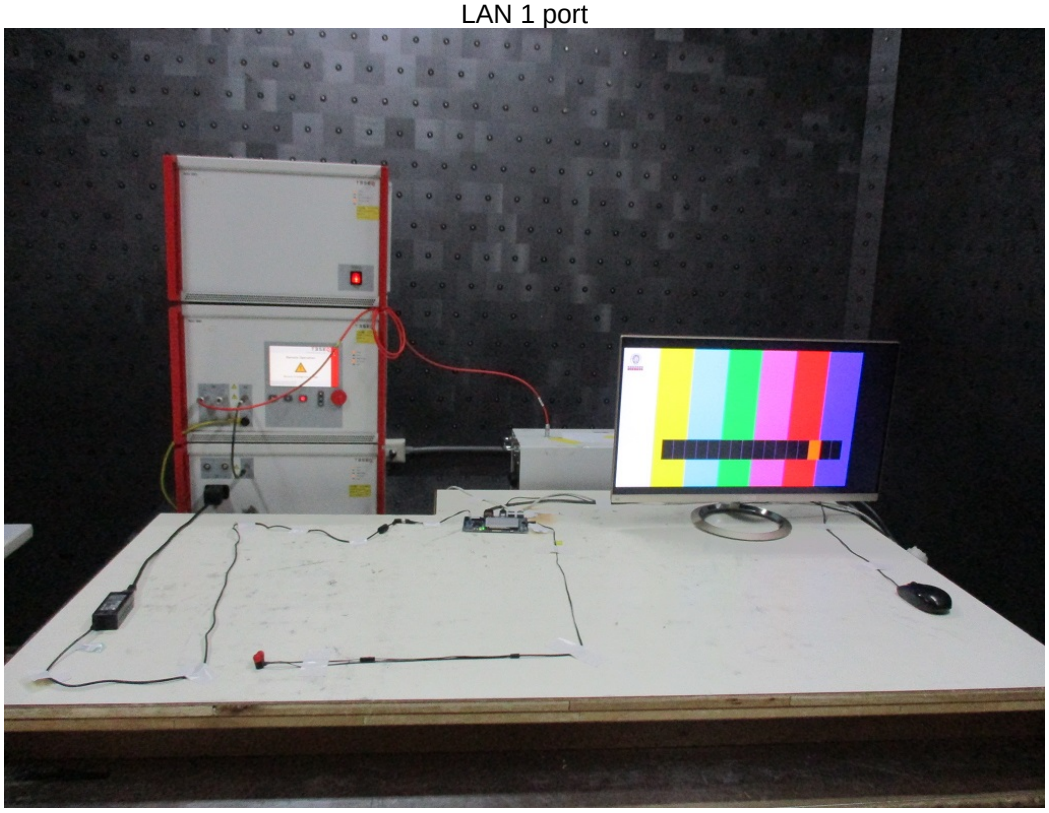


19.9 Surge Immunity Test

Power port

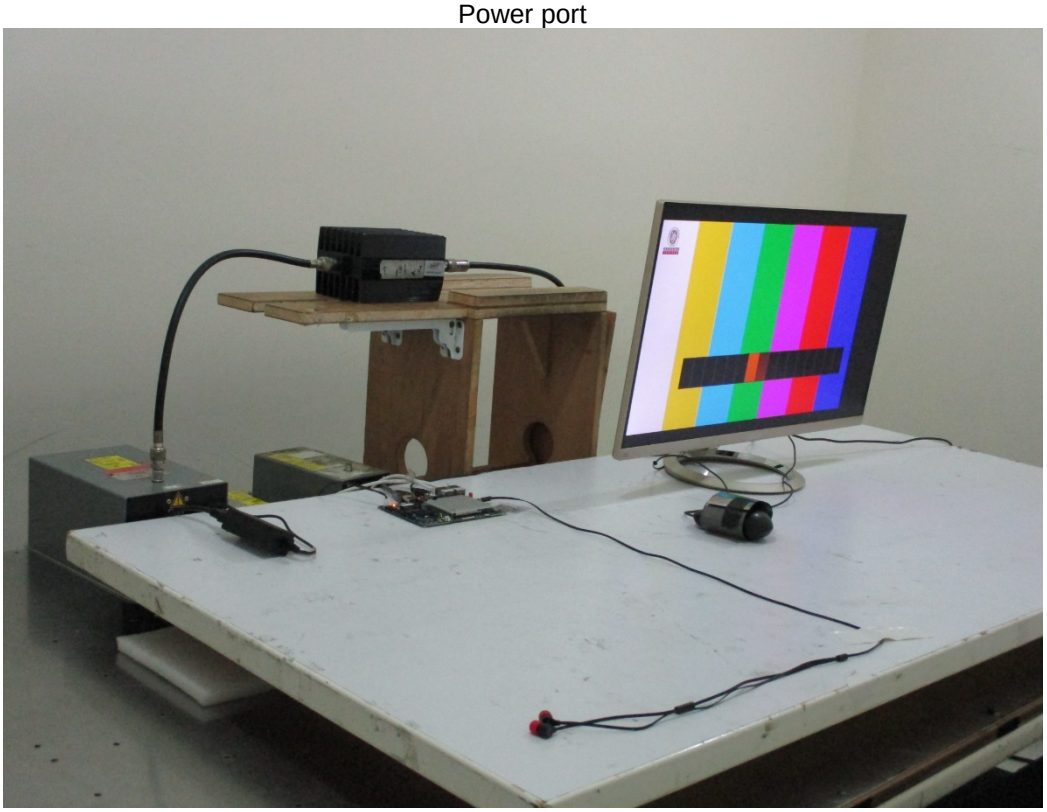


LAN 1 port

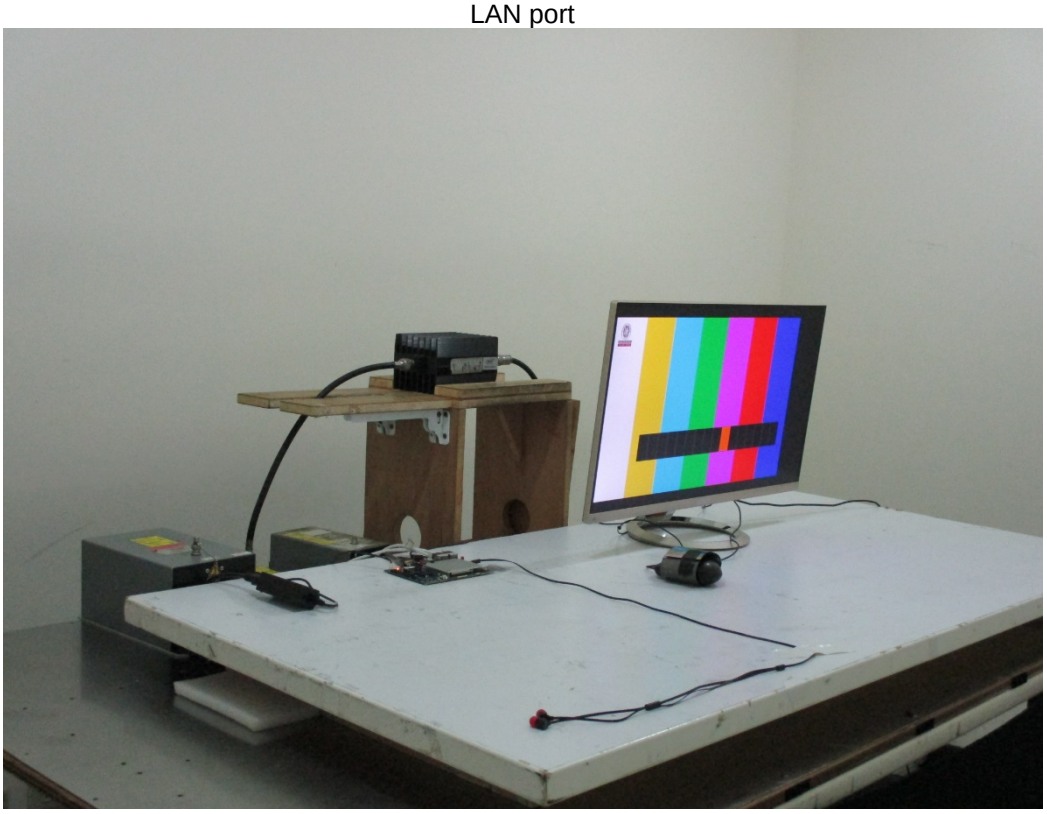


19.10 Conducted Disturbances Induced by RF Fields (CS)

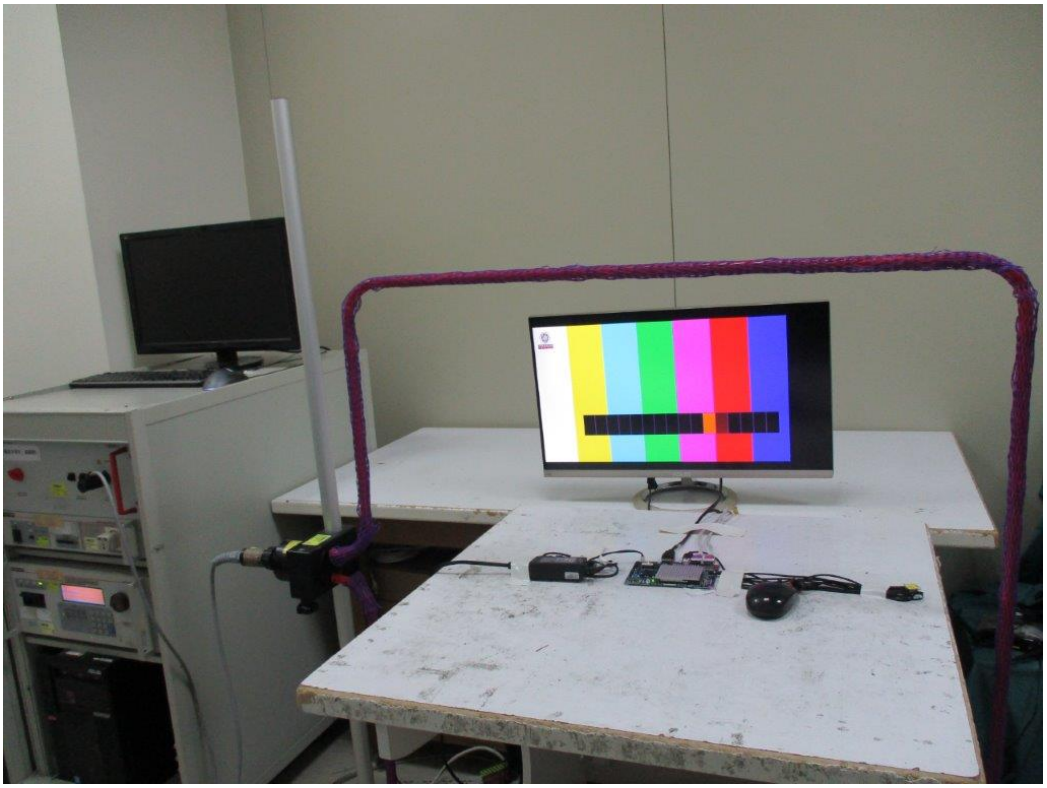
Power port



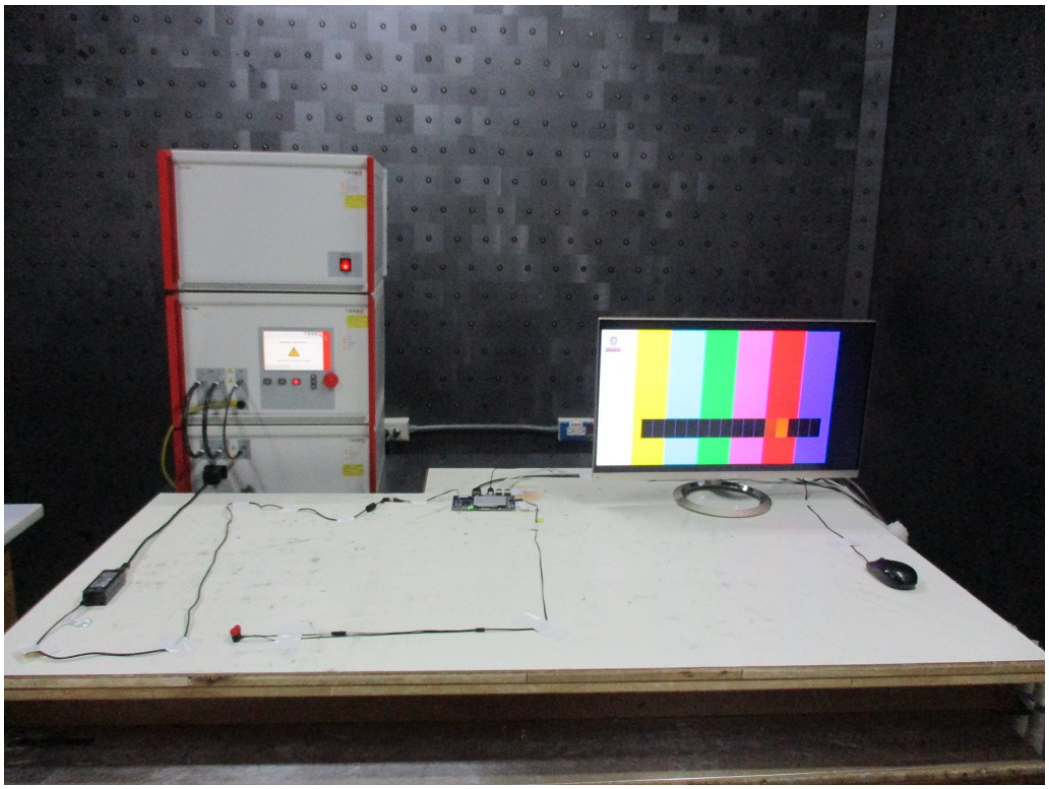
LAN port



19.11 Power Frequency Magnetic Field Immunity Test (PFMF)



19.12 Voltage Dips and Interruptions



Appendix – 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 and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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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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