



CE EMC
TEST REPORT

For
LCD Monitor

Model: PDC-170

Trade Name: ADVANTECH

Issued for

Advantech Co., Ltd.
No. 1, Alley 20, Lane 26, Rueiguang Road, Neihu District,
Taipei 114, Taiwan, R.O.C.

Issued by

Compliance Certification Services Inc.
No. 81-1, Lane 210, Bade Rd., 2, Luchu Hsiang,
Taoyuan Hsien, (338) Taiwan, R.O.C.
TEL: 886-3-324-0332
FAX: 886-3-324-5235



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1 TEST RESULT CERTIFICATION

Applicant: Advantech Co., Ltd.
No. 1, Alley 20, Lane 26, Rueiguang Road, Neihu District,
Taipei 114, Taiwan, R.O.C.

Manufacturer: Advantech Co., Ltd.
No. 1, Alley 20, Lane 26, Rueiguang Road, Neihu District,
Taipei 114, Taiwan, R.O.C.

Equipment Under Test: LCD Monitor

Trade Name: ADVANTECH

Model: PDC-170

Detailed EUT Description: See Item 2 of this report

Date of Test: November 29 ~ December 25, 2003

Applicable Standard	Class/Limit/Criterion	Test Result
EN 55022: 1998	Class B	No non-compliance noted
EN 61000-3-2: 2000	Class D	Please refer to page 26
EN 61000-3-3: 1995 + A1: 2001	Limit	No non-compliance noted
EN 55024: 1998, including		
IEC 61000-4-2: 1995 + A2: 2000	Criterion B	No non-compliance noted
IEC 61000-4-3: 1995 + A2: 2000	Criterion A	No non-compliance noted
IEC 61000-4-4: 1995 + A1: 2000	Criterion B	No non-compliance noted
IEC 61000-4-5: 1995 + A1: 2000	Criterion B	No non-compliance noted
IEC 61000-4-6: 1996 + A1: 2000	Criterion A	No non-compliance noted
IEC 61000-4-8: 1993 + A1: 2000	Criterion A	No non-compliance noted
IEC 61000-4-11: 1994 + A1: 2000	Criterion B/C/C	No non-compliance noted
Deviation from Applicable Standard		
None		

The above equipment was tested by Compliance Certification Services Inc. for compliance with the requirements set forth in the EMC Directive 89/336/EMC and the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Approved by:

Kurt Chen
Director of Linkou Laboratory
Compliance Certification Services Inc.

Reviewed by:

Jessie Wang
Section Manager of Linkou Laboratory
Compliance Certification Services Inc.



2 EUT DESCRIPTION

Product	LCD Monitor		
Trade Name	ADVANTECH		
Model	PDC-170		
Housing Type	Plastic		
EUT Power Rating	DCV from Power Adapter		
Power Adapter Manufacturer	HiTRON	Model	HES49-12040
	MEDI-POWER ELECTRONICS INC.	Model	AD-1280MB-60
	SINPRO	Model	MPU50-105
Power Adapter Rating	For HES49-12040 I/P: AC 100-240V, 50/60Hz, 1A O/P: DC 12V, 4A For AD-1280MB-60 I/P: AC 100-240V, 60/50Hz, 1~0.5A O/P: DC 12V, 6A For MPU50-105 I/P: AC 100-240V, 47-63Hz, 1.35A O/P: DC 12V, 3.75A		
AC Power Cord Type	Unshielded, 1.8m (Detachable)		
DC Power Cable Type	Unshielded, 1.8m (Non-detachable) with a core for HES49-12040; AD-1280MB-60 Unshielded, 1.8m (Non-detachable) for MPU50-105		

I/O Port of EUT

I/O PORT TYPES	Q'TY	TESTED WITH
1). Serial Port	1	1
2). Video In Port (VGA)	1	1
3). Video In Port (DVI)	1	1
4). Line In Port	1	1
5). Up Stream USB Port	1	1
6). Down Stream USB Port	2	2



3 TEST METHODOLOGY

3.1 EUT SYSTEM OPERATION

1. EMC test program was loaded and executed in Windows mode.
2. Data was sent to EUT filling the screen with upper case of “H” patterns.
3. Test program sequentially exercised printer and modem, then sent “H” patterns to them individually.
4. Repeat 2 to 3.

Note: Test program is self-repeating throughout the test.

3.2 DECISION OF FINAL TEST MODE

1. The following test mode(s) were scanned during the preliminary test:

Mode 1

1280 × 1024 Resolution (DVI) + HES49-12040 Power Adapter

Mode 2

1280 × 1024 Resolution (DVI) + AD-1280MB-60 Power Adapter

Mode 3

1280 × 1024 Resolution (DVI) + MPU50-105 Power Adapter

Mode 4

1280 × 1024 Resolution (D-SUB) + AD-1280MB-60 Power Adapter

Mode 5

1024 × 768 Resolution (DVI) + AD-1280MB-60 Power Adapter

Mode 6

800 × 600 Resolution (DVI) + AD-1280MB-60 Power Adapter

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

Mode 1, 2, 3

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



4 SETUP OF EQUIPMENT UNDER TEST

Setup Diagram

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

Support Equipment

No.	Equipment	Model No.	Serial No.	FCC ID	Trade Name	Data Cable	Power Cord
1	PC	EVO D300	6K1BKF83F18F	FCC DoC	Compaq	VGA Cable: Shielded, 1.8m with two cores DVI Cable: Shielded, 1.8m with two cores Audio Cable: Unshielded, 1.8m Up Stream USB Cable: Unshielded, 1.8m RS232 Cable: Unshielded, 1.8m	Unshielded, 1.8m
2	Printer	STYLUS C60	DR3K041995	FCC DoC	EPSON	Shielded, 1.8m	Unshielded, 1.8m
3	PS/2 Keyboard	KB-0133	N/A	FCC DoC	Compaq	Shielded, 1.8m	N/A
4	PS/2 Mouse	M-S69	N/A	FCC DoC	Compaq	Shielded, 1.8m	N/A
5	USB Mouse	MO19UCA	020440967	FCC DoC	HP	Down Stream USB Cable: Shielded, 1.8m	N/A
6	USB Mouse	MO19UCA	020509282	FCC DoC	HP	Down Stream USB Cable: Shielded, 1.8m	N/A

Note: All the above equipment/cables were placed in worse case positions to maximize emission signals during emission test.

Grounding: Grounding was in accordance with the manufacturer's requirements and conditions for the intended use.

5 FACILITIES AND ACCREDITATIONS








5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at CCS Taiwan Linkou Lab at No. 81-1, Lane 210, Bade Rd., 2, Luchu Hsiang, Taoyuan Hsien, Taiwan.

The measurement facilities are constructed in conformance with the requirements of CISPR 16-1, ANSI C63.4 and other equivalent standards.

5.2 LABORATORY ACCREDITATIONS AND LISTINGS

The test facilities used to perform Electromagnetic compatibility tests are registered or accredited by the organizations listed in the following table which includes the recognized scope specifically.

Country	Agency	Scope of Accreditation	Logo
USA	NVLAP	EN 55011, EN 55014-1, AS/NZS 1044, CNS 13783-1, EN 55022, CNS 13438, EN 61000-3-2, EN 61000-3-3, ANSI C63.4, FCC OST/MP-5, AS/NZS CISPR 22, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11	 Lab. Code: 200600-0
USA	FCC	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	 93105, 90471
Japan	VCCI	3/10 meter Open Area Test Sites and conducted test sites to perform radiated/conducted measurements	 R-393/1066/725/879 C-402/747/912
Norway	NEMKO	EN 50081-1/2, EN 50082-1/2, IEC 61000-6-1/2, EN 50091-2, EN 50130-4, EN 55011, EN 55013, EN 55014-1/2, EN 55015, EN 55022, EN 55024, EN 61000-3-2/3, EN 61326-1, IEC 61000-4-2/3/4/5/6/8/11, EN 60601-1-2, EN 300 328-2, EN 300 422-2, EN 301 419-1, EN 301 489-01/03/07/08/09/17, EN 301 419-2/3, EN 300 454-2, EN 301 357-2	 ELA 124a ELA 124b ELA 124c
Taiwan	CNLA	EN 300 328-1, EN 300 328-2, EN 300 220-1, EN 300 220-2, EN 300 220-3, 47 CFR FCC Part 15 Subpart C, EN 61000-3-2, EN 61000-3-3, CNS 13439, CNS 13783-1, CNS 14115, CNS 13438, AS/NZS CISPR 22, CNS 13022-1, IEC 61000-4-2/3/4/5/6/8/11, CNS 13022-2/3	 0363 ILAC MRA
Taiwan	BSMI	CNS 13438, CNS 13783-1, CNS 13439, CNS 14115	 SL2-IS-E-0014 / IN-E-0014 /A1-E-0014 /R1-E-0014 /R2-E-0014 /L1-E-0014
Canada	Industry Canada	RSS212, Issue 1	 IC 3991-3 IC 3991-4

Note: No part of this report may be used to claim or imply product endorsement by CNLA, NVLAP or other government agency.



6 INSTRUMENT AND CALIBRATION

6.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

6.2 TEST AND MEASUREMENT EQUIPMENT

The following list contains measurement equipment used for testing. The equipment conforms to the requirement of CISPR 16-1, ANSI C63.2 and other required standards.

Calibration of all test and measurement, including any accessories that may effect such calibration, is checked frequently to ensure the accuracy. Adjustments are made and correction factors are applied in accordance with the instructions contained in the respective manual.

Equipment Used for Emission Measurement

Conducted Emission Test Site # 3				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI Test Receiver	R&S	ESHS30	828144/003	08/07/2004
LISN	R&S	ESH2-Z5	843285/010	01/19/2004
LISN	EMCO	3825/2	9003-1628	07/27/2004

Note: The measurement uncertainty is less than +/- 2.83dB, which is evaluated as per the NAMAS NIS 81 and CISPR/A/291/CDV.

Open Area Test Site # 1				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	ADVANTEST	R3261A	91720031	N.C.R
EMI Test Receiver	SCHAFFNER	SCR 3501	412	02/02/2004
Pre-Amplifier	Anritsu	MH648A	M18767	08/31/2004
Bilog Antenna	CHASE	CBL6112A	2309	02/27/2004
Turn Table	EMCO	2081-1.21	N/A	N.C.R
Antenna Tower	EMCO	2075-2	9707-2604	N.C.R
Controller	EMCO	2090	N/A	N.C.R
RF Switch	Anritsu	MP59B	M54367	N.C.R
Site NSA	C&C	N/A	N/A	08/15/2004

Note: The measurement uncertainty is less than +/- 3.36dB, which is evaluated as per the NAMAS NIS 81 and CISPR/A/291/CDV.



Power Harmonic & Voltage Fluctuation/Flicker Measurement (EN 61000-3-2&-3-3)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMC-PARTNER	EMC Emission Tester	HARMONICS-1000	019	04/02/2004

Equipment Used for Immunity Measurement

ESD Test Site (IEC/EN 61000-4-2)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI Test Receiver	EM TEST	P30C	0603-01	02/26/2004

Radiated Electromagnetic Field Immunity Test Site (IEC/EN 61000-4-3)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
S.G.	R&S	SMY02	100094	08/05/2004
Power Meter	R&S	NRVD	837794/029	N.C.R.
Power Amplifier	ar	150W1000	300300	N.C.R.
Power Antenna	EMCO	93141	9712-1083	N.C.R.

Fast Transients/Burst Test Site (IEC/EN 61000-4-4)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Fast Transients/Burst Generator	HAEFELY TRENCH	PEFT- JUNIOR	583 333-117	08/19/2004

Surge Immunity Test Site (IEC/EN EN 61000-4-5)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Surge Tester	HAEFELY TRENCH	PSUGER 4010	583 334-71	08/19/2004

CS Test Site (IEC/EN 61000-4-6)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
S.G.	R&S	SMY02	100094	08/05/2004
Power Amplifier	ar	500A100A	300299	N.C.R.
CDN	Lüthi	801-M3	1879	02/25/2004
CDN	FRANKONIA	CDN-M2	A3002010	04/27/2004



Power Frequency Magnetic Field Immunity Test Site (IEC/EN 61000-4-8)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
TRIAX ELF Magnetic Field Meter	F.W.BELL	4090	9711	10/20/2004
Magnetic Field Tester	HAEFELY TRENCH	MAG 100.1	080 938-01	N.C.R

Voltage Dips/Short Interruption and Voltage Variation Immunity Test Site (IEC/EN 61000-4-11)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Dips/Interruption and Variations Simulator	HAEFELY TRENCH	PLINE 1610	080 344-05	03/27/2004

7 LINE CONDUCTED & RADIATED EMISSION TEST

7.1 LIMIT

Maximum permissible level of Line Conducted Emission

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

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

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

CLASS A

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

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

CLASS B

Frequency (MHZ)	Voltage Limit (dBuV)		Current Limit (dBuA)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	84 - 74	74 - 64	40 – 30	30 – 20
0.5 - 30.0	74	64	30	20

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

Maximum permissible level of Radiated Emission measured at 10 meter

Frequency (MHZ)	Class A (dBuV/m)	Class B (dBuV/m)
	Quasi-peak	Quasi-peak
30 – 230	40	30
230 - 1000	47	37

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



7.2 TEST PROCEDURE OF LINE CONDUCTED EMISSION

Procedure of Preliminary Test

- The EUT was set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per EN 55022 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- Support equipment, if needed, was placed as per EN 55022.
- All I/O cables were positioned to simulate typical actual usage as per EN 55022.
- The test equipment EUT installed received AC power, 230VAC/50Hz, through a Line Impedance Stabilization Network (LISN), which supplied power source and was grounded to the ground plane.
- All support equipment received power from a second LISN.
- The EUT test program was started. Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.
- The Receiver scanned from 150kHz to 30MHz for emissions in each of the test modes.
- During the above scans, the emissions were maximized by cable manipulation.
- The test mode(s) described in Item 3.2 were scanned during the preliminary test.
- After the preliminary scan, we found the test mode described in Item 3.2 producing the highest emission level.
- The EUT configuration and cable configuration of the above highest emission level were recorded for reference of the final test.

Procedure of Final Test

- EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.
- A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less -2dB to the Average limit in Q.P. mode, then the emission signal was re-checked using an Average detector.
- The test data of the worst-case condition(s) was recorded.

**Data Sample:**

Freq. (MHz)	Q.P. Raw (dBuV)	Average Raw (dBuV)	Q.P. Limit (dBuV)	Average Limit (dBuV)	Q.P. Margin (dB)	Average Margin (dB)	Note
x.xx	43.95	---	56.00	46.00	-12.05	---	L1

Freq. = Emission frequency in MHz

Raw dBuV = Uncorrected Analyzer/Receiver reading + Insertion loss of LISN, if it > 0.5 dB

Limit dBuV = Limit stated in standard

Margin dB = Reading in reference to limit

Note = Current carrying line of reading

“---“ = The emission level complied with the Average limits, with at least 2dB margin limits, so no further recheck.

Calculation Formula

Margin (dB) = RAW (dBuV) – Limit (dBuV)

**7.3 TEST PROCEDURE OF COMMON MODE CONDUCTED
EMISSION FOR TELECOMMUNICATION PORT**

- Selecting ISN for unscreened cable or a current probe for screened cable to take measurement.
- The port of the EUT was connected to the remote side support equipment through the ISN/Current Probe and communication in normal condition.
- Making a overall range scan by using the test receiver controlled by controller and record at least six highest emissions for showing in the test report.
- Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.
- In case of measuring on the screened cable, the current limit shall be applied, otherwise the voltage limit should be applied.
- The following test mode(s) were scanned during the preliminary test:

No applicable, because EUT hasn't LAN Port or Modem Port.

**Data Sample:**

Freq. (MHz)	Q.P. Raw (dBuV)	AV. Raw (dBuV)	Q.P. Limit (dBuV)	AV. Limit (dBuV)	Q.P. Margin (dB)	AV. Margin (dB)	Note
x.xx	43.95	---	74.00	64.00	-30.05	---	---

Freq.: Emission frequency

Raw: Uncorrected Analyzer / Receiver reading

Limit: Limit stated in standard

Margin: Reading in reference to limit

Note: Current carrying line of reading

“--”: The emission level complied with the Average limits, with at least 2 dB margin, so no further recheck.

7.4 TEST PROCEDURE OF RADIATED EMISSION

Procedure of Preliminary Test

- The equipment was set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane. When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- Support equipment, if needed, was placed as per EN 55022.
- All I/O cables were positioned to simulate typical usage as per EN 55022.
- The EUT received AC power source, 230VAC/50Hz, from the outlet socket under the turntable. All support equipment received power from another socket under the turntable.
- The antenna was placed at 10 meter away from the EUT as stated in EN 55022. The antenna connected to the Spectrum Analyzer via a cable and at times a pre-amplifier would be used.
- The Analyzer / Receiver quickly scanned from 30MHz to 1000MHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- The test mode(s) described in Item 3.2 were scanned during the preliminary test:
- After the preliminary scan, we found the test mode described in Item 3.2 producing the highest emission level.
- The EUT and cable configuration, antenna position, polarization and turntable position of the above highest emission level were recorded for the final test.

**Procedure of Final Test**

- EUT and support equipment were set up on the turntable as per the configuration with highest emission level in the preliminary test.
- The Analyzer / Receiver scanned from 30MHz to 1000MHz. Emissions were scanned and measured rotating the EUT to 360 degrees, varying cable placement and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- Recorded at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and only Q.P. reading is presented.
- The test data of the worst-case condition(s) was recorded.

Data Sample:

Freq. (MHz)	Raw Data (dBuV)	Corr. Factor (dB/m)	Emiss. Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
xx.xx	14.00	12.20	26.20	30.00	-3.80

Freq.	= Emission frequency in MHz
Raw Data (dBuV)	= Uncorrected Analyzer / Receiver reading
Corr. Factor (dB/m)	= Antenna factor + Cable loss – Amplifier gain
Emiss. Level (dBuV/m)	= Raw reading converted to dBuV/m and CF added
Limit (dBuV/m)	= Limit stated in standard
Margin (dB)	= Reading in reference to limit
P	= Peak Reading
Q	= Quasi-peak Reading
A	= Average Reading

Calculation Formula

Margin (dB) = Emiss. Level (dBuV/m) – Limits (dBuV/m)

Emission Level (dBuV/m) = Raw Data (dBuV) + Corr. Factor (dB/m)



7.5 TEST RESULTS

Line Conducted Emission

Model: PDC-170**Test Mode:** Mode 1**Temperature:** 23°C**Humidity:** 70% RH**Tested by:** George Kuo**Test Results:** Passed

(The chart below shows the highest readings taken from the final data)

Freq. (MHz)	Q.P. Raw (dBuV)	AVG Raw (dBuV)	Q.P. Limit (dBuV)	AVG Limit (dBuV)	Q.P. Margin (dB)	AVG Margin (dB)	NOTE
15.524	41.70	---	60.00	50.00	-18.30	---	L1
16.621	44.30	---	60.00	50.00	-15.70	---	L1
17.817	43.90	---	60.00	50.00	-16.10	---	L1
20.104	44.40	---	60.00	50.00	-15.60	---	L1
21.526	45.10	---	60.00	50.00	-14.90	---	L1
22.473	44.80	---	60.00	50.00	-15.20	---	L1
0.150	51.40	---	66.00	56.00	-14.60	---	L2
17.463	43.70	---	60.00	50.00	-16.30	---	L2
19.074	44.10	---	60.00	50.00	-15.90	---	L2
20.790	46.30	---	60.00	50.00	-13.70	---	L2
21.567	47.40	---	60.00	50.00	-12.60	---	L2
23.071	45.40	---	60.00	50.00	-14.60	---	L2

L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)

Note: “---” denotes the emission level was or more than 2dB below the Average limit, so no re-check anymore.

**Line Conducted Emission****Model:** PDC-170**Test Mode:** Mode 2**Temperature:** 23°C**Humidity:** 70% RH**Tested by:** George Kuo**Test Results:** Passed

(The chart below shows the highest readings taken from the final data)

Freq. (MHz)	Q.P. Raw (dBuV)	AVG Raw (dBuV)	Q.P. Limit (dBuV)	AVG Limit (dBuV)	Q.P. Margin (dB)	AVG Margin (dB)	NOTE
0.225	43.70	---	62.62	52.62	-18.92	---	L1
2.043	38.40	---	56.00	46.00	-17.60	---	L1
3.744	39.70	---	56.00	46.00	-16.30	---	L1
5.337	43.10	---	60.00	50.00	-16.90	---	L1
5.783	43.60	---	60.00	50.00	-16.40	---	L1
12.471	37.40	---	60.00	50.00	-22.60	---	L1
0.155	44.30	---	65.73	55.73	-21.43	---	L2
2.163	35.70	---	56.00	46.00	-20.30	---	L2
3.864	37.90	---	56.00	46.00	-18.10	---	L2
5.347	38.40	---	60.00	50.00	-21.60	---	L2
5.567	40.10	---	60.00	50.00	-19.90	---	L2
12.603	38.40	---	60.00	50.00	-21.60	---	L2

L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)

Note: “---” denotes the emission level was or more than 2dB below the Average limit, so no re-check anymore.

**Line Conducted Emission****Model:** PDC-170**Test Mode:** Mode 3**Temperature:** 23°C**Humidity:** 69% RH**Tested by:** George Kuo**Test Results:** Passed

(The chart below shows the highest readings taken from the final data)

Freq. (MHz)	Q.P. Raw (dBuV)	AVG Raw (dBuV)	Q.P. Limit (dBuV)	AVG Limit (dBuV)	Q.P. Margin (dB)	AVG Margin (dB)	NOTE
0.162	43.10	---	65.35	55.35	-22.25	---	L1
4.883	27.40	---	56.00	46.00	-28.60	---	L1
6.751	33.70	---	60.00	50.00	-26.30	---	L1
6.974	33.60	---	60.00	50.00	-26.40	---	L1
9.783	30.40	---	60.00	50.00	-29.60	---	L1
28.104	31.50	---	60.00	50.00	-28.50	---	L1
0.165	42.90	---	65.21	55.21	-22.31	---	L2
6.547	34.20	---	60.00	50.00	-25.80	---	L2
6.993	33.30	---	60.00	50.00	-26.70	---	L2
9.769	31.70	---	60.00	50.00	-28.30	---	L2
10.161	30.10	---	60.00	50.00	-29.90	---	L2
12.394	30.40	---	60.00	50.00	-29.60	---	L2

L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)

*Note: "---" denotes the emission level was or more than 2dB below the Average limit, so no re-check anymore.***Common Mode Conducted Emission****Not applicable**

**Radiated Emission (A)****Model:** PDC-170**Test Mode:** Mode 1**Temperature:** 22°C**Humidity:** 63% RH**Detector Function:** Quasi-peak.**Antenna:** Vertical at 10m**Tested by:** Bill Cheng**Test Results:** Passed

(The chart below shows the highest readings taken from the final data)

Freq. (MHz)	Raw Data (dBuV)	Corr. Factor (dB/m)	Emiss. Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
153.57	15.7	10.6	26.3	30.0	-3.7
184.24	13.8	11.4	25.2	30.0	-4.8
358.27	12.2	18.1	30.3	37.0	-6.7
410.37	14.0	19.8	33.8	37.0	-3.2
539.96	11.7	22.2	33.9	37.0	-3.1
587.94	6.7	22.2	28.9	37.0	-8.1
647.94	2.9	23.5	26.4	37.0	-10.6
755.94	2.7	26.0	28.7	37.0	-8.3

**Radiated Emission (B)****Model:** PDC-170**Test Mode:** Mode 1**Temperature:** 22°C**Humidity:** 63% RH**Detector Function:** Quasi-peak.**Antenna:** Horizontal at 10m**Tested by:** Bill Cheng**Test Results:** Passed

(The chart below shows the highest readings taken from the final data)

Freq. (MHz)	Raw Data (dBuV)	Corr. Factor (dB/m)	Emiss. Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
184.24	14.1	11.4	25.5	30.0	-4.5
492.01	4.6	20.8	25.4	37.0	-11.6
539.99	8.8	22.2	31.0	37.0	-6.0
589.76	5.0	22.2	27.2	37.0	-9.8
720.11	5.8	24.6	30.4	37.0	-6.6
755.96	6.4	26.0	32.4	37.0	-4.6

**Radiated Emission (A)****Model:** PDC-170**Test Mode:** Mode 2**Temperature:** 23°C**Humidity:** 63% RH**Detector Function:** Quasi-peak.**Antenna:** Vertical at 10m**Tested by:** Bill Cheng**Test Results:** Passed

(The chart below shows the highest readings taken from the final data)

Freq. (MHz)	Raw Data (dBuV)	Corr. Factor (dB/m)	Emiss. Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
43.00	8.3	14.0	22.3	30.0	-7.7
153.55	14.4	10.7	25.1	30.0	-4.9
184.25	14.1	11.4	25.5	30.0	-4.5
204.73	16.7	10.7	27.4	30.0	-2.6
409.45	12.8	19.8	32.6	37.0	-4.4
540.02	9.7	22.2	31.9	37.0	-5.1
647.92	3.9	23.5	27.4	37.0	-9.6
755.97	4.2	26.0	30.2	37.0	-6.8

**Radiated Emission (B)****Model:** PDC-170**Test Mode:** Mode 2**Temperature:** 23°C**Humidity:** 63% RH**Detector Function:** Quasi-peak.**Antenna:** Horizontal at 10m**Tested by:** Bill Cheng**Test Results:** Passed

(The chart below shows the highest readings taken from the final data)

Freq. (MHz)	Raw Data (dBuV)	Corr. Factor (dB/m)	Emiss. Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
37.25	4.3	16.7	21.0	30.0	-9.0
153.53	16.0	10.7	26.7	30.0	-3.3
204.74	16.5	10.7	27.2	30.0	-2.8
409.43	8.8	19.8	28.6	37.0	-8.4
539.97	11.0	22.2	33.2	37.0	-3.8
755.91	7.7	26.0	33.7	37.0	-3.3

**Radiated Emission (A)****Model:** PDC-170**Test Mode:** Mode 3**Temperature:** 23°C**Humidity:** 63% RH**Detector Function:** Quasi-peak.**Antenna:** Vertical at 10m**Tested by:** Bill Cheng**Test Results:** Passed

(The chart below shows the highest readings taken from the final data)

Freq. (MHz)	Raw Data (dBuV)	Corr. Factor (dB/m)	Emiss. Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
40.28	7.0	14.8	21.8	30.0	-8.2
153.24	13.7	10.7	24.4	30.0	-5.6
184.13	13.0	11.4	24.4	30.0	-5.6
204.38	14.7	10.7	25.4	30.0	-4.6
409.10	11.3	19.8	31.1	37.0	-5.9
539.76	9.2	22.2	31.4	37.0	-5.6
755.08	5.6	26.0	31.6	37.0	-5.4

**Radiated Emission (B)****Model:** PDC-170**Test Mode:** Mode 3**Temperature:** 23°C**Humidity:** 63% RH**Detector Function:** Quasi-peak.**Antenna:** Horizontal at 10m**Tested by:** Bill Cheng**Test Results:** Passed

(The chart below shows the highest readings taken from the final data)

Freq. (MHz)	Raw Data (dBuV)	Corr. Factor (dB/m)	Emiss. Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
35.29	3.8	17.9	21.7	30.0	-8.3
153.27	15.1	10.7	25.8	30.0	-4.2
184.58	13.7	11.4	25.1	30.0	-4.9
204.16	15.3	10.7	26.0	30.0	-4.0
409.15	11.3	19.8	31.1	37.0	-5.9
539.89	10.5	22.2	32.7	37.0	-4.3
755.26	6.0	26.0	32.0	37.0	-5.0

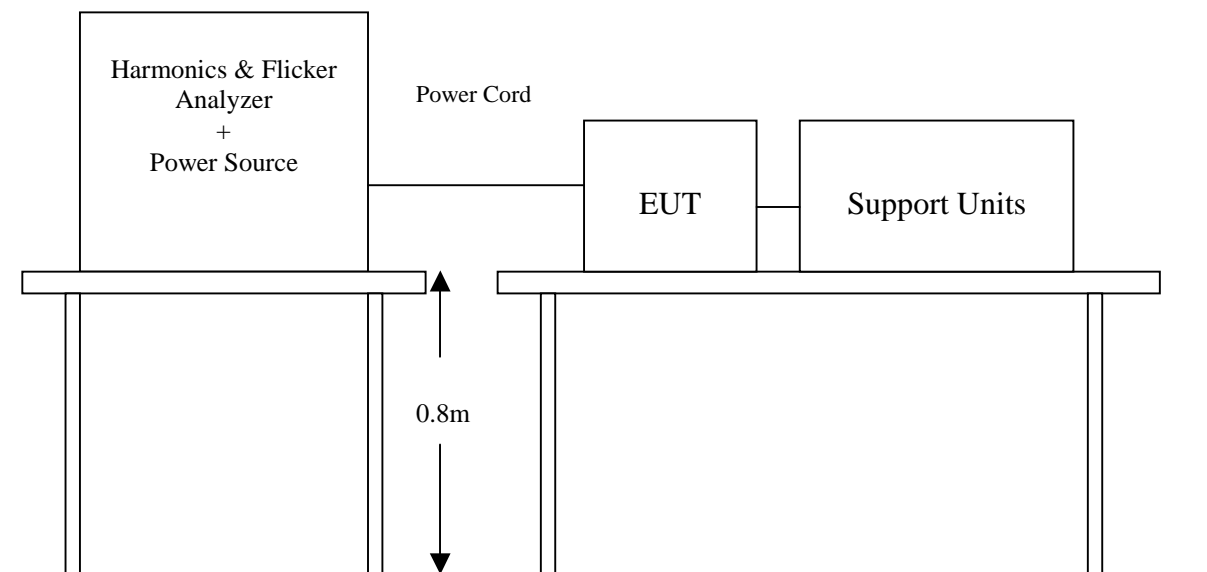


8 POWER HARMONICS TEST

Port : AC mains
Basic Standard : EN 61000-3-2 (2000)
Limits : ☐ CLASS A ; ☐ CLASS B ; ☐ CLASS C ; ☒ CLASS D
Tested by : Arno Hsieh
Temperature : 26°C
Humidity : 55%
Test Mode : 1, 2, 3

Limit:

Limits for Class A equipment		Limits for Class D equipment		
Harmonics Order n	Max. permissible harmonics current A	Harmonics Order n	Max. permissible harmonics current per watt mA/W	Max. permissible harmonics current A
Odd harmonics		Odd Harmonics only		
3	2.30	3	3.4	2.30
5	1.14	5	1.9	1.14
7	0.77	7	1.0	0.77
9	0.40	9	0.5	0.40
11	0.33	11	0.35	0.33
13	0.21	13	0.30	0.21
15<=n<=39	0.15x15/n	15<=n<=39	3.85/n	0.15x15/n
Even harmonics				
2	1.08			
4	0.43			
6	0.30			
8<=n<=40	0.23x8/n			

Block Diagram of Test Setup:**Test Procedure:**

- 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.
- 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.

Test Result : (See Appendix II for details)**Mode 1**

<input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL
--

Mode 2, 3

Note: According to clause 7 of EN 61000-3-2: 2000, equipment with a rated power of 75W or less, no limits apply. The test result is only for reference.

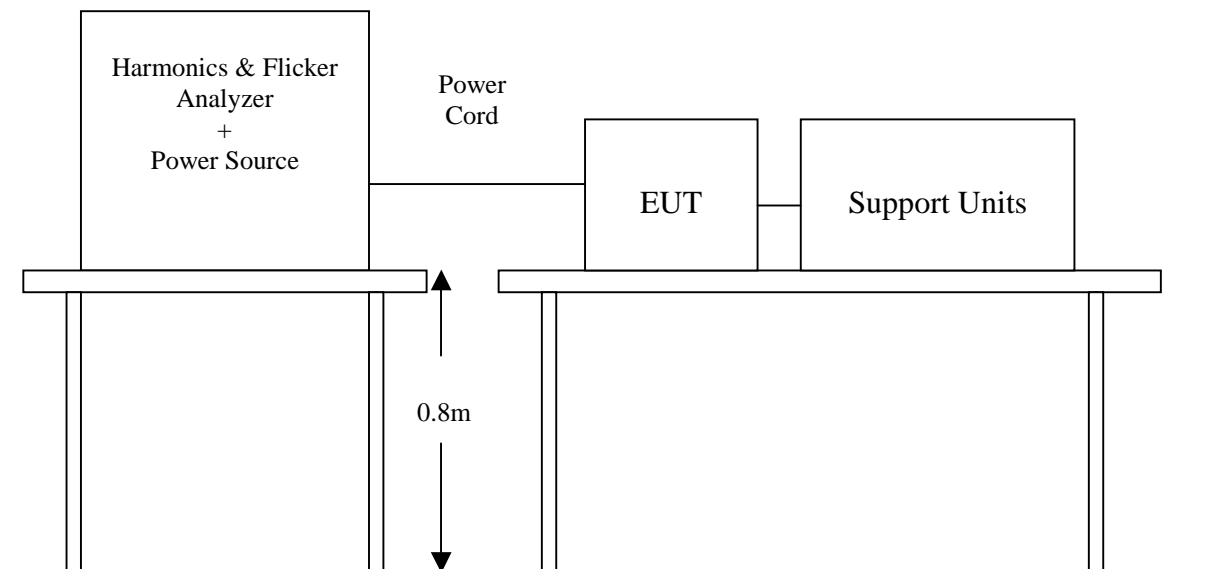
9 POWER VOLTAGE FLUCTUATION / FLICKER TEST

Port : AC mains
Basic Standard : EN 61000-3-3 (1995 + A1: 2001)
Limits : §5 of EN 61000-3-3
Tested by : Arno Hsieh
Temperature : 26°C
Humidity : 55%
Test Mode : 1, 2, 3

Limit:

TEST ITEM	LIMIT	REMARK
P_{st}	1.0	P_{st} means short-term flicker indicator.
P_{lt}	0.65	P_{lt} means long-term flicker indicator.
T_{dt} (ms)	500	T_{dt} means maximum time that dt exceeds 3 %.
d_{max} (%)	4%	d_{max} means maximum relative voltage change.
dc (%)	3.3%	dc means relative steady-state voltage change

Block Diagram of Test Setup:



**Test Procedure:**

- 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.

Test Result: (See Appendix II for details)

Mode 1

** Continue

Test Parameter	Measurement Value	Limit	Result
P _{st}	0.072	1.0	Pass
P _{lt}	0.072	0.65	Pass
T _{dt} (ms)	0	500	Pass
d _{max} (%)	0%	4%	Pass
dc (%)	0.01%	3.3%	Pass

** Manual Switch

Test Parameter	Measurement Value	Limit	Result
P _{st}	0.073	1.0	Pass
P _{lt}	0.073	0.65	Pass
T _{dt} (ms)	0	500	Pass
d _{max} (%)	0%	4%	Pass
dc (%)	0.04%	3.3%	Pass



Mode 2

** Continue

Test Parameter	Measurement Value	Limit	Result
P _{st}	0.072	1.0	Pass
P _{lt}	0.072	0.65	Pass
T _{dt} (ms)	0	500	Pass
d _{max} (%)	0%	4%	Pass
dc (%)	0.02%	3.3%	Pass

** Manual Switch

Test Parameter	Measurement Value	Limit	Result
P _{st}	0.072	1.0	Pass
P _{lt}	0.072	0.65	Pass
T _{dt} (ms)	0	500	Pass
d _{max} (%)	0%	4%	Pass
dc (%)	0.019%	3.3%	Pass

Mode 3

** Continue

Test Parameter	Measurement Value	Limit	Result
P _{st}	0.072	1.0	Pass
P _{lt}	0.072	0.65	Pass
T _{dt} (ms)	0	500	Pass
d _{max} (%)	0%	4%	Pass
dc (%)	0.24%	3.3%	Pass

** Manual Switch

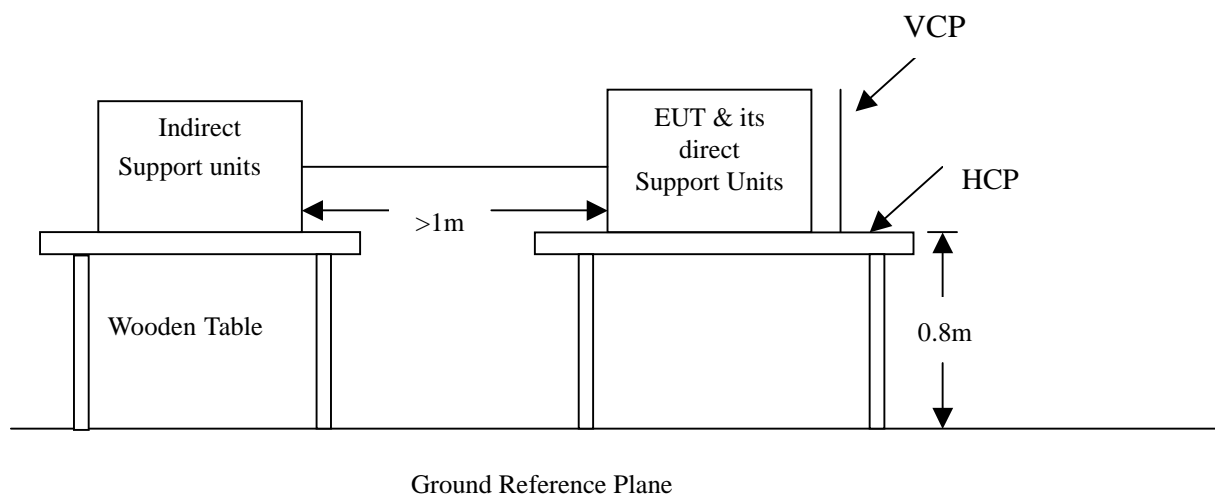
Test Parameter	Measurement Value	Limit	Result
P _{st}	0.073	1.0	Pass
P _{lt}	0.073	0.65	Pass
T _{dt} (ms)	0	500	Pass
d _{max} (%)	0%	4%	Pass
dc (%)	0.02%	3.3%	Pass

10 ELECTROSTATIC DISCHARGE (ESD) IMMUNITY TEST

Port	: Enclosure
Basic Standard	: IEC/EN 61000-4-2
Test Level	: ± 8 kV (Air Discharge) ± 4 kV (Contact Discharge) ± 4 kV (Indirect Discharge)
Performance Criterion	: B (Standard Required)
Tested by	: Arno Hsieh
Temperature	: 24°C
Humidity	: 51% RH
Pressure	: 1017mbar
Test Mode	: 1, 2, 3

Block Diagram of Test Setup:

(The 470 k ohm resistors are installed per standard requirement.)



**Test Procedure:**

1. The EUT was located 0.1 m minimum from all side of the HCP.
2. The indirect support units were located 1 m minimum away from the EUT, but direct support unit was/were located at same location as EUT on the HCP and keep at a distance of 10 cm with EUT.
3. A scroll 'H' test program was loaded and executed in Windows XP mode.
4. The Host PC sent above message to EUT and related peripherals through the test.
5. Active the communication function if the EUT with such port(s).
6. As per the requirement of EN 55024; applying direct contact discharge at the sides other than front of EUT at minimum 50 discharges (25 positive and 25 negative) if applicable, can't be applied direct contact discharge side of EUT then the indirect discharge shall be applied. One of the test points shall be subjected to at least 50 indirect discharge (contact) to the front edge of horizontal coupling plane.
7. Other parts of EUT where it is not possible to perform contact discharge then selecting appropriate points of EUT for air discharge, a minimum of 10 single air discharges shall be applied.
8. The application of ESD to the contact of open connectors is not required.
9. The EUT direct connection units also need to be applied ESD at the port of EUT cable connected.
10. Putting a mark on EUT to show tested points. The following test condition was followed during the tests.

Note: As per IEC/EN 61000-4-2, two 470k bleed resistors cable is connected between the EUT and HCP during the test applicable for power ungrounded or battery operating unit only.

The electrostatic discharges were applied as follows:

Amount of discharge	Voltage	Coupling	Result (Pass/Fail)
Mini 10 /Point	± 8 kV	Air Discharge	Pass
Mini 25 /Point	± 4 kV	Contact Discharge	Pass
Mini 25 /Point	± 4 kV	Indirect Discharge HCP	Pass
Mini 25 /Point	± 4 kV	Indirect Discharge VCP (Front)	Pass
Mini 25 /Point	± 4 kV	Indirect Discharge VCP (Right)	Pass
Mini 25 /Point	± 4 kV	Indirect Discharge VCP (Left)	Pass
Mini 25 /Point	± 4 kV	Indirect Discharge VCP (Back)	N/A

****For the tested points to EUT, please refer to attached page.**

(Blue arrow mark for Contact Discharge and red arrow mark for Air Discharge)



Performance & Result:

- ☒ **Criteria A:** The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.
- ☐ **Criteria B:** The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
- ☐ **Criteria C:** Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

☒ **PASS** ☐ **FAIL**

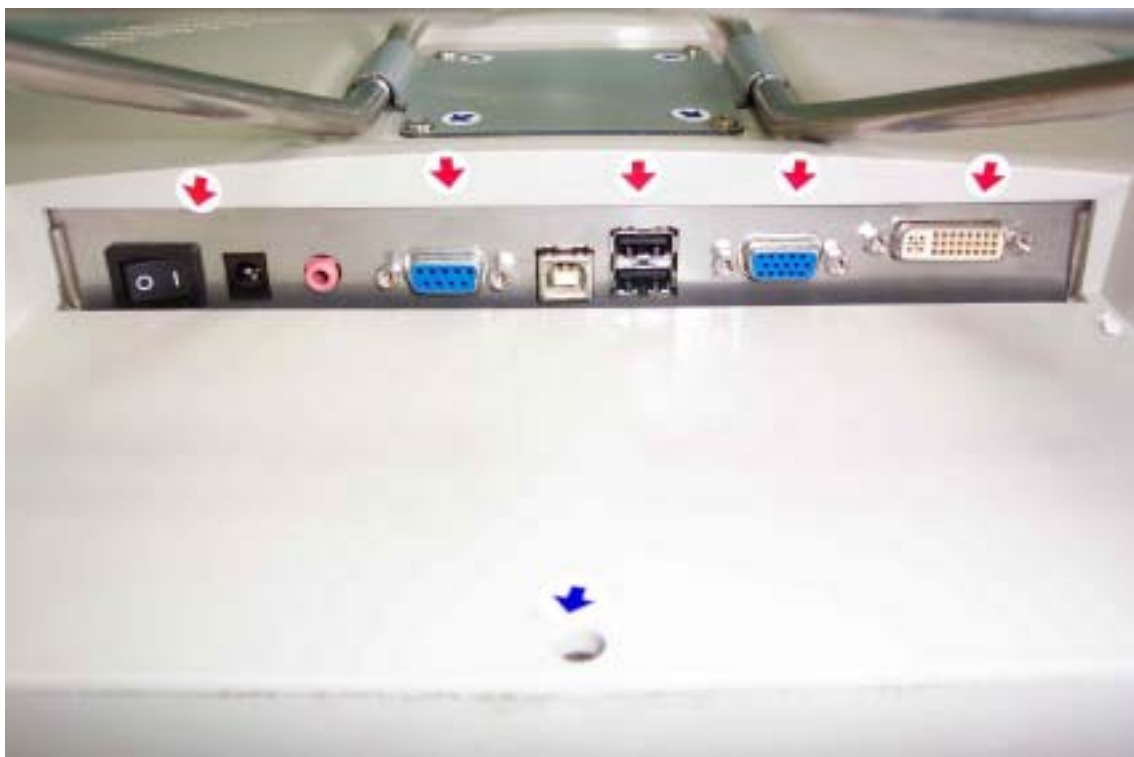
Observation: No function degraded during the tests.

The Tested Points of EUT

Photo 1 of 2



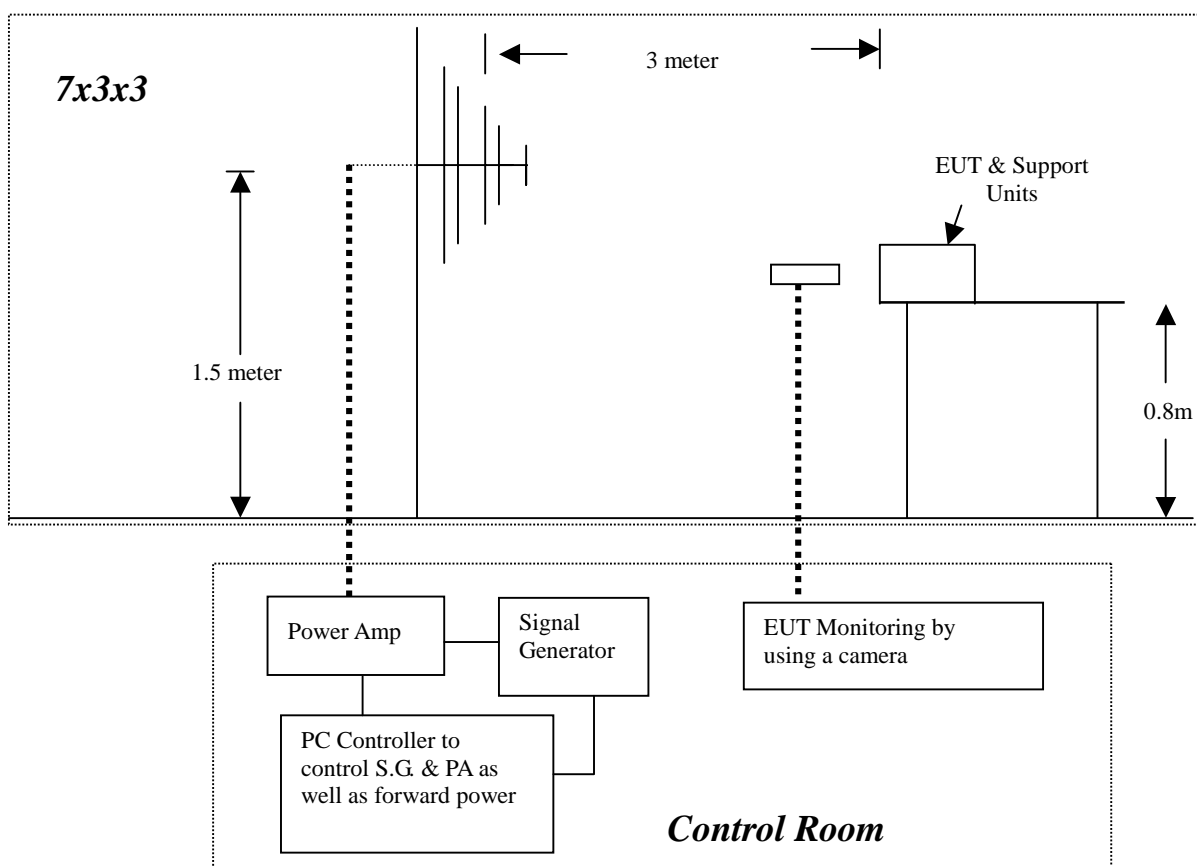
Photo 2 of 2



11 RADIATED ELECTROMAGNETIC FIELD IMMUNITY TEST

Port	: Enclosure
Basic Standard	: IEC/EN 61000-4-3
Requirements	: 3 V/m / with 80% AM. 1kHz Modulation.
Performance Criterion	: A (Standard Required)
Tested by	: Arno Hsieh
Temperature	: 24°C
Humidity	: 51% RH
Pressure	: 1017mbar
Test Mode	: 1, 2, 3

Block Diagram of Test Setup:



**Test Procedure:**

1. The EUT was located at the edge of supporting table keep 3 meter away from transmitting antenna, it just the calibrated square area of field uniformity. The support units were located outside of the uniformity area, but the cable(s) connected with EUT were exposed to the calibrated field as per IEC/EN 61000-4-3.
2. Setting the testing parameters of RS test software per IEC/EN 61000-4-3.
3. Performing the pre-test at each side of with double specified level (6V/m) at 4% steps.
4. From the result of pre-test in step 5, choice the worst side of EUT for final test from 80 MHz to 1000 MHz at 1% steps.
5. Recording the test result in following table.
6. It is not necessary to perform test as per annex A of EN 55024 if the EUT doesn't belong to ITE product.

Preliminary test conditions:

Test level : 6V/m
Steps : 4 % of fundamental
Dwell Time : 3 sec

Range (MHz)	Field	Modulation	Polarity	Position	Result (Pass/Fail)
80-1000	6V/m	Yes	H	Front	Pass
80-1000	6V/m	Yes	V	Front	Pass
80-1000	6V/m	Yes	H	Right	Pass
80-1000	6V/m	Yes	V	Right	Pass
80-1000	6V/m	Yes	H	Back	Pass
80-1000	6V/m	Yes	V	Back	Pass
80-1000	6V/m	Yes	H	Left	Pass
80-1000	6V/m	Yes	V	Left	Pass

Final test conditions:

Test level : 3V/m
Steps : 1 % of fundamental
Dwell Time : 3 sec

Range (MHz)	Field	Modulation	Polarity	Position	Result (Pass/Fail)
80-1000	3V/m	Yes	H	Front	Pass
80-1000	3V/m	Yes	V	Front	Pass



Performance & Result:

- ☒ **Criteria A:** The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.
- ☐ **Criteria B:** The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
- ☐ **Criteria C:** Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

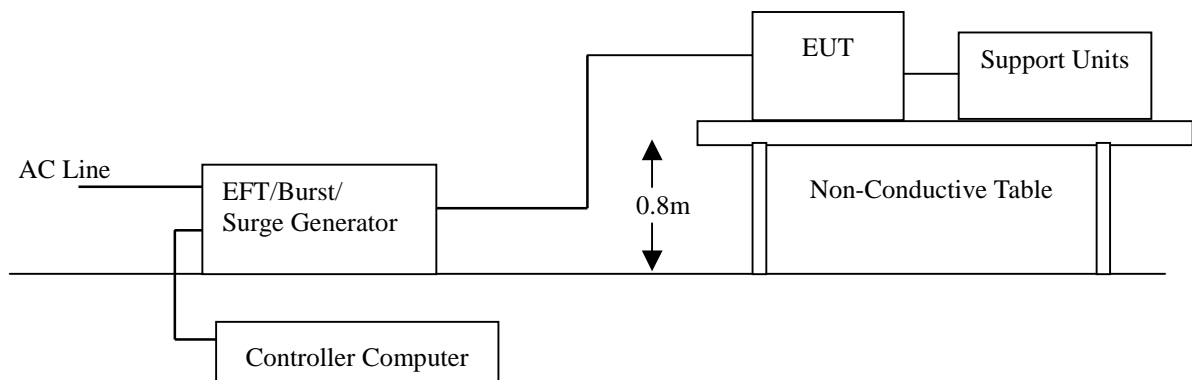
☒ **PASS** ☐ **FAIL**

Observation: No function degraded during the tests.

12 FAST TRANSIENTS/BURST IMMUNITY TEST

Port	: On Power Supply Lines
Basic Standard	: IEC/EN 61000-4-4
Requirements	: ± 1 kV for Power Supply Line
Performance Criteria	: B (Standard Required)
Tested by	: Arno Hsieh
Temperature	: 24°C
Humidity	: 51% RH
Pressure	: 1017mbar
Test Mode	: 1, 2, 3

Block Diagram of Test Setup:



Test Procedure:

1. The EUT and support units were located on a wooden table 0.8 m away from ground reference plane.
2. A 1.0 meter long power cord was attached to EUT during the test.
3. The length of communication cable between communication port and clamp was keeping within 1 meter.
4. Injected test voltage to the EUT ports from minimum to standard request or client request.
5. Recording the test result as shown in following table.

**Test conditions:**

Impulse Frequency : 5kHz
Tr/Th : 5/50ns
Burst Duration : 15ms
Burst Period : 3Hz

Inject Line	Voltage kV	Inject Method	Result (Pass/Fail)
L	± 1	Direct	Pass
N	± 1	Direct	Pass
PE	± 1	Direct	Pass
L + N	± 1	Direct	Pass
L + PE	± 1	Direct	Pass
N + PE	± 1	Direct	Pass
L + N + PE	± 1	Direct	Pass

Performance & Result:

- ☒ **Criteria A:** The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.
- ☐ **Criteria B:** The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
- ☐ **Criteria C:** Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

☒ **PASS** ☐ **FAIL**

Observation: No function degraded during the tests.

13 SURGE IMMUNITY TEST

Port : Power Cord

Basic Standard : IEC/EN 61000-4-5

Requirements : ± 1 kV (Line to Line)
 ± 2 kV (Line to Ground)

Performance Criteria : B (Standard Required)

Tested by : Arno Hsieh

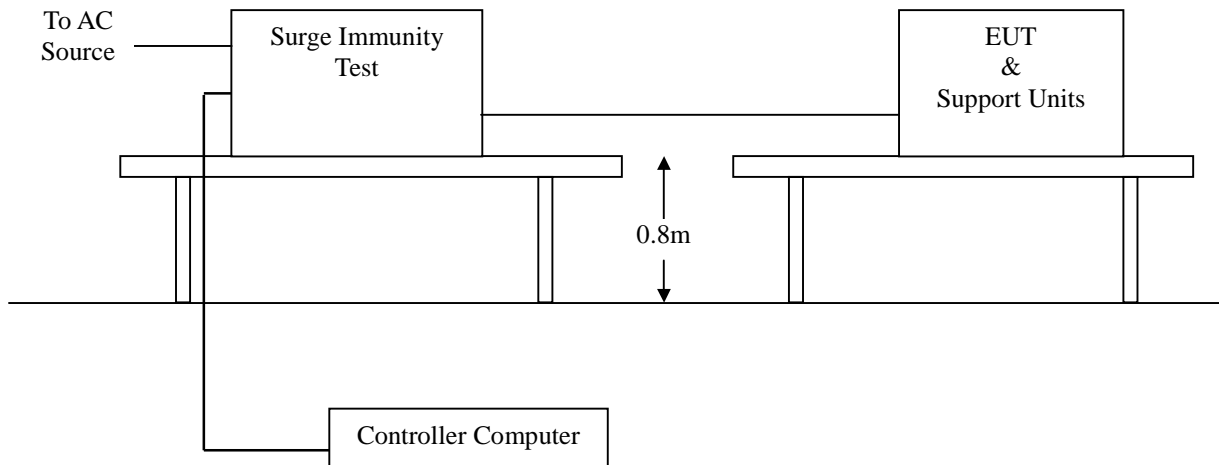
Temperature : 24°C

Humidity : 51% RH

Pressure : 1017mbar

Test Mode : 1, 2, 3

Block Diagram of Test Setup:



Test Procedure:

1. The EUT and support units were located on a wooden table 0.8 m away from ground floor.
2. Injected test voltage to the EUT ports from minimum to standard request or client request.
3. Recording the test result as shown in following table.

**Test conditions:**

Voltage Waveform : 1.2/50 μ s
Current Waveform : 8/20 μ s
Polarity : Positive/Negative
Phase angle : 0°, 90°, 270°
Number of Test : 5

Coupling Line	Voltage (kV)	Polarity	Coupling Method	Result (Pass/Fail)
L1-L2	1	Positive	Capacitive	Pass
L1-PE	2	Positive	Capacitive	Pass
L2-PE	2	Positive	Capacitive	Pass
L1-L2	1	Negative	Capacitive	Pass
L1-PE	2	Negative	Capacitive	Pass
L2-PE	2	Negative	Capacitive	Pass

Performance & Result:

- ☒ **Criteria A:** The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.
- ☐ **Criteria B:** The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
- ☐ **Criteria C:** Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

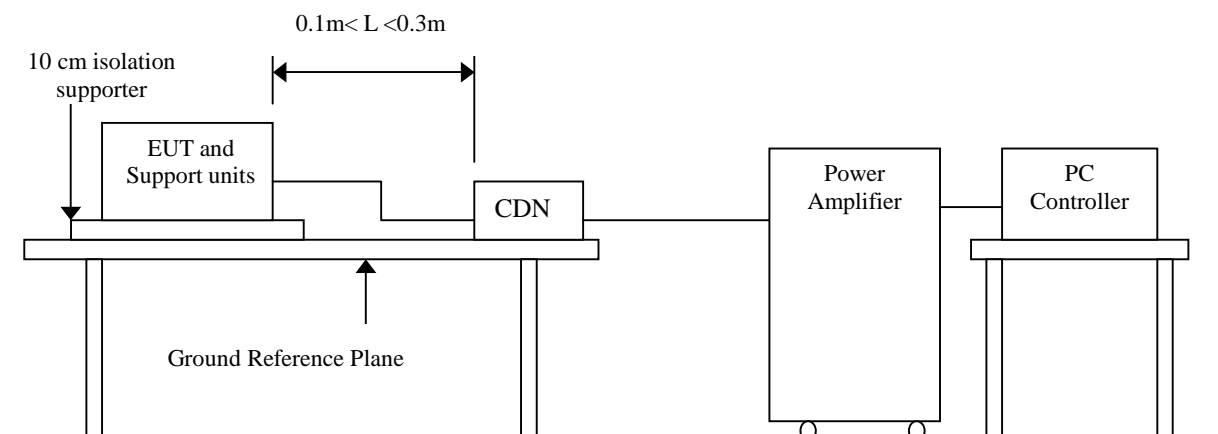
☒ **PASS** ☐ **FAIL**

Observation: No function degraded during the tests.

14 CONDUCTED DISTURBANCE/INDUCED RADIO-FREQUENCY FIELD IMMUNITY TEST

Port	: AC Port
Basic Standard	: IEC/EN 61000-4-6
Requirements	: 3 V with 80% AM. 1kHz Modulation.
Injection Method	: CDN-M3 for Power Cord
Performance Criterion	: A (Standard Required)
Tested by	: Arno Hsieh
Temperature	: 24°C
Humidity	: 51% RH
Pressure	: 1017mbar
Test Mode	: 1, 2, 3

Block Diagram of Test Setup:



Test Procedure:

1. The EUT and support units were located at a ground reference plane with the interposition of a 0.1 m thickness insulating support and the CDN was located on GRP directly.
2. Setting the testing parameters of CS test software as per IEC/EN 61000-4-6.
3. Recording the test result in following table.

**Test conditions:**

Frequency Range : 0.15MHz-80MHz

Frequency Step : 1% of fundamental

Dwell Time : 3 sec

Range (MHz)	Field	Modulation	Result (Pass/Fail)
0.15-80	3V	Yes	Pass

Performance & Result:

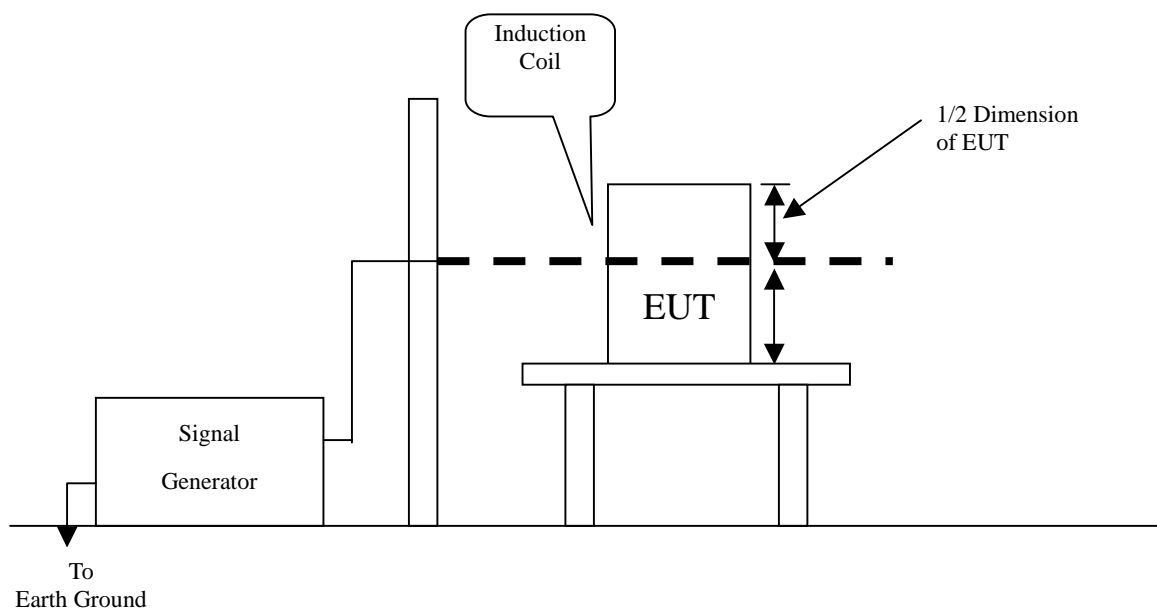
- ☒ **Criteria A:** The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.
- ☐ **Criteria B:** The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
- ☐ **Criteria C:** Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

☒ **PASS** ☐ **FAIL****Observation:** No function degraded during the tests.

15 POWER FREQUENCY MAGNETIC FIELD IMMUNITY TEST

Port	: Enclosure
Basic Standard	: IEC/EN 61000-4-8
Requirements	: 1 A/m
Performance Criterion	: A (Standard Required)
Tested by	: Arno Hsieh
Temperature	: 24°C
Humidity	: 51% RH
Pressure	: 1017mbar
Test Mode	: 1, 2, 3

Block Diagram of Test Setup:



Test Procedure:

1. The EUT and support units were located on Ground Reference Plane with the interposition of a 0.1 m thickness insulation support.
2. Putting the induction coil on horizontal direction. (X direction)
3. Rotating the induction coil by 90° (Y direction)
4. Rotating the induction coil by 90° again (Z direction)
5. Recording the test result as shown in following table.

**Test conditions:**

Field Strength: 1A/m
Power Freq.: 50Hz
Orientation: X, Y, Z

Orientation	Field	Result (Pass/Fail)	Remark
X	1A/m	Pass	
Y	1A/m	Pass	
Z	1A/m	Pass	

Performance & Result:

- ☒ **Criteria A:** The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.
- ☐ **Criteria B:** The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
- ☐ **Criteria C:** Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

☒ **PASS** ☐ **FAIL**

Observation: No function degraded during the tests.

16 VOLTAGE DIPS / SHORT INTERRUPTIONS

Port : AC mains

Basic Standard : IEC/EN 61000-4-11

Requirement : PHASE ANGLE 0, 45, 90, 135, 180, 225, 270, 315 degrees

Voltage Dips	Test Level % U_T	Reduction (%)	Duration (periods)	Performance Criteria
	<5	>95	0.5	B
	70	30	25	C

Voltage Interceptions	Test Level % U_T	Reduction (%)	Duration (periods)	Performance Criteria
	<5	>95	250	C

Test Interval : Min. 10 sec.

Tested by : Arno Hsieh

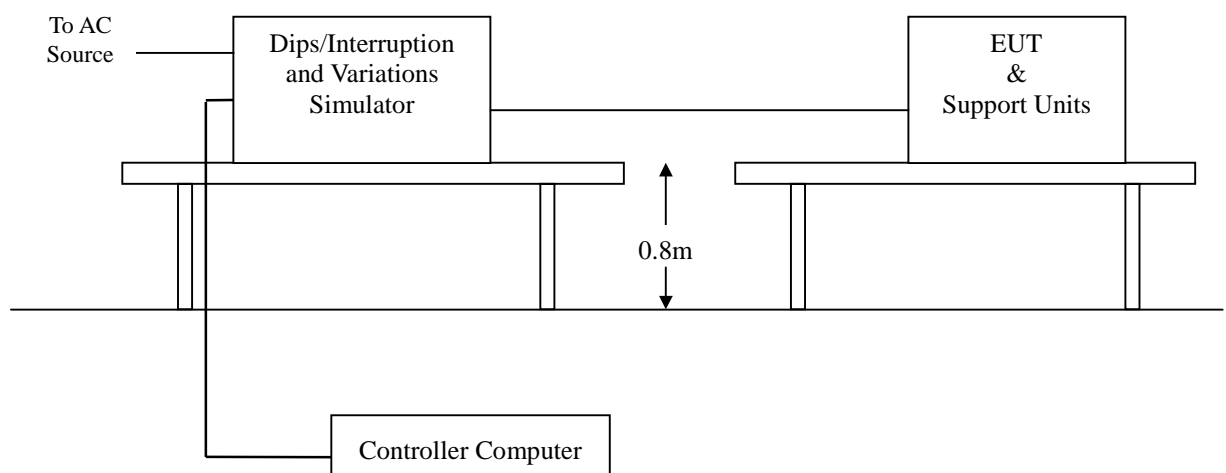
Temperature : 24 °C

Humidity : 51% RH

Pressure : 1017mbar

Test Mode : 1, 2, 3

Block Diagram of Test Setup:



Test Procedure:

1. The EUT and support units were located on a wooden table, 0.8 m away from ground floor.
2. Setting the parameter of tests and then Perform the test software of test simulator.
3. Conditions changes to occur at 0 degree crossover point of the voltage waveform.
4. Recording the test result in test record form.

**Test conditions**

The duration with a sequence of three dips/interruptions with interval of 10 s minimum
(Between each test event)

Voltage Dips:

Test Level % U _T	Reduction (%)	Duration (periods)	Observation	Meet Performance Criteria
0	100	0.5	Normal	A
70	30	25	Normal	A

Voltage Interruptions:

Test Level % U _T	Reduction (%)	Duration (periods)	Observation	Meet Performance Criteria
0	100	250	EUT shut down, but can be auto recovered as the events disappear.	B

Normal: No any functions degrade during and after the test.

Performance & Result:

Criteria A: The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance.

Criteria B: The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.

Criteria C: Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

☒ **PASS** ☐ **FAIL**

APPENDIX I - PHOTOGRAPHS OF TEST SETUP

LINE CONDUCTED EMISSION TEST (EN 55022)



RADIATED EMISSION TEST (EN 55022)





POWER HARMONIC & VOLTAGE FLUCTUATION / FLICKER TEST



ELECTROSTATIC DISCHARGE TEST



RADIATED ELECTROMAGNETIC FIELD TEST



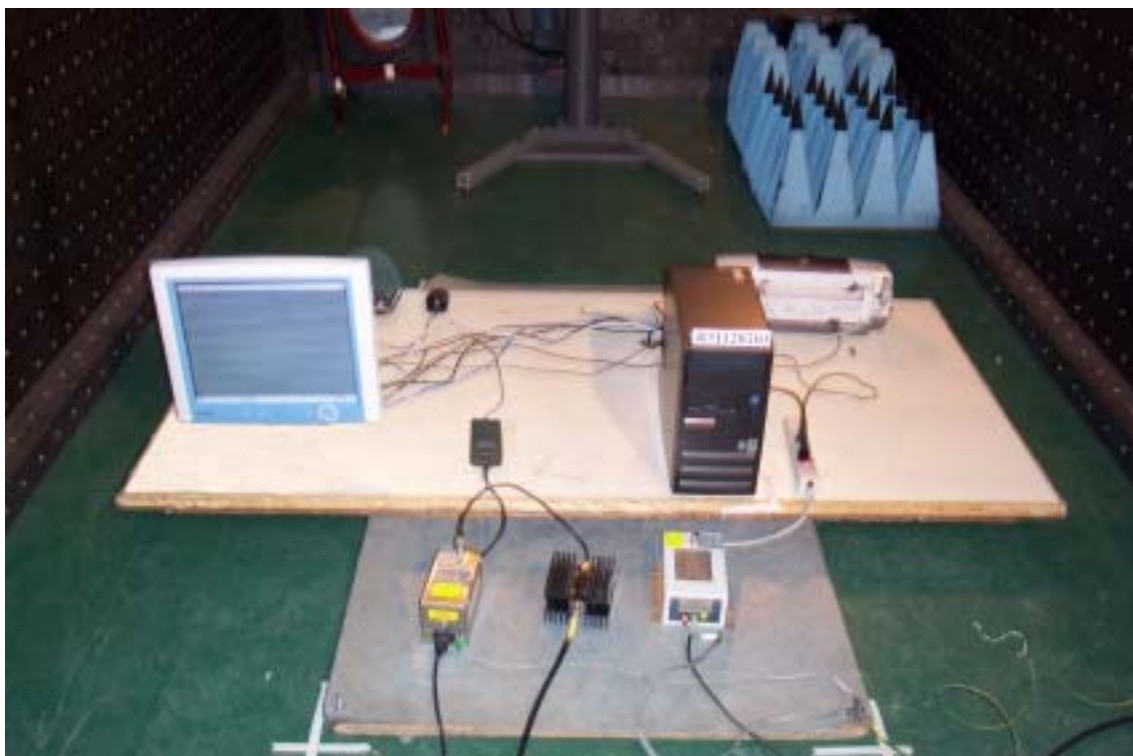
FAST TRANSIENTS/BURST TEST



SURGE IMMUNITY TEST



CONDUCTED DISTURBANCE, INDUCED BY RADIO-FREQUENCY FIELDS TEST



POWER FREQUENCY MAGNETIC FIELD IMMUNITY TEST



VOLTAGE DIPS / INTERRUPTION TEST



**APPENDIX II – TEST RESULT OF EN 61000-3-2/-3**

Mode 1

ADVANTECH
_15
Date : 2003/12/1 PM 07:08:4 US

File :

Operator : ARNO HSIEH
EUT : LCD MONITOR
Model No. PDC-170
Remarks DVI 1280*1024 A/D:1 TEMP:26 HUMD:55

Urms = 230.3V Freq = 50.000 Range: 0.5 A
Irms = 0.178A Ipk = 0.366A cf = 2.055
P = 36.95W Pap = 41.05VA pf = 0.900
THDi = 28.8 % THDu = 0.10 % Class D

Test - Time : 5min (100 %)

Limit Reference: Pmax = 37.212W

Test completed, Result: PASSED

Order	Freq. [Hz]	Imax [A]	Imax% [%]	Imax%L [%]	Limit [A]	Status
1	50	0.1718	96.404			
2	100	0.0012	0.6678			
3	150	0.0332	18.647	26.267	0.1265	
4	200	0.0015	0.8390			
5	250	0.0317	17.808	44.890	0.0707	
6	300	0.0015	0.8219			
7	350	0.0162	9.0753	43.465	0.0372	
8	400	0.0007	0.4110			
9	450	0.0070	3.9212	37.560	0.0186	
10	500	0.0008	0.4281			
11	550	0.0139	7.7740	106.38	0.0130	
12	600	0.0013	0.7534			
13	650	0.0082	4.6233	74.767	0.0110	
14	700	0.0015	0.8562			
15	750	0.0059	3.3219	61.987	0.0096	
16	800	0.0011	0.5993			
17	850	0.0038	2.1233	44.903	0.0084	
18	900	0.0006	0.3425			
19	950	0.0067	3.7329	88.230	0.0075	
20	1000	0.0013	0.7021			
21	1050	0.0020	1.0959	28.629	0.0068	
22	1100	0.0013	0.7363			
23	1150	0.0036	2.0034	57.322	0.0062	
24	1200	0.0013	0.7192			
25	1250	0.0029	1.6267	50.590	0.0057	
26	1300	0.0007	0.4110			
27	1350	0.0034	1.8836	63.265	0.0053	
28	1400	0.0011	0.6336			

第 1 頁



29	1450	0.0011	0.6164	22.238	0.0049
30	1500	0.0012	0.6507		
31	1550	0.0028	1.5925	61.411	0.0046
32	1600	0.0013	0.7192		
33	1650	0.0019	1.0616	43.582	0.0043
34	1700	0.0009	0.5137		
35	1750	0.0025	1.4041	61.135	0.0041
36	1800	0.0009	0.5308		
37	1850	0.0005	0.2568	11.822	0.0039
38	1900	0.0010	0.5479		
39	1950	0.0023	1.2671	61.475	0.0037
40	2000	0.0011	0.5993		

Important:

P_{max} is below 75W. This seems not to be a class D equipment.

ADVANTECH
.15

Date : 2003/12/1 PM 07:22:1 U3

File :

Operator :

ARNO HSIEH

EUT :

LCD MONITOR

Model No.

PDC-170

Remarks

DVI 1280*1024 A/D:1 TEMP:26 HUMD:55

Urms = 230.3V Freq = 50.000 Range: 0.5 A
Irms = 0.174A Ipk = 0.361A cf = 2.077
P = 36.06W Pap = 40.03VA pf = 0.901

Test - Time : 1 x 10min = 10min (100 %)

LIN (Line Impedance Network) : SLIN 0.24ohm +j0.15ohm N:0.16ohm +j0.10ohm

Limits : Plt : 0.65 Pst : 1.00
dmax : 4.00 % dc : 3.30 %
dtLim: 3.30 % dt>Lim: 500ms

Test completed, Result: PASSED

Plt = 0.072

	Pst	dmax	dc	dt>Lim	Fail
		[%]	[%]	[ms]	
1	0.072	0.000	0.010	0.000	

ADVANTECH
.15

Date : 2003/12/1 PM 07:33:5 U3

File :

Operator :

ARNO HSIEH

EUT :

LCD MONITOR

Model No.

PDC-170

Remarks

DVI 1280*1024 A/D:1 TEMP:26 HUMD:55

Urms = 230.3V Freq = 50.000 Range: 0.5 A

Irms = 0.178A Ipk = 0.369A cf = 2.074

P = 36.95W Pap = 40.93VA pf = 0.903

Test - Time : 1 x 10min = 10min (100 %)

LIN (Line Impedance Network) : SLIN 0.24ohm +j0.15ohm N:0.16ohm +j0.10ohm

Limits :

Plt : 0.65

Pst : 1.00

dmax : 4.00 %

dc : 3.30 %

dtLim: 3.30 %

dt>Lim: 500ms

Test completed, Result: PASSED

Plt = 0.073

	Pst	dmax	dc	dt>Lim	Fail
		[%]	[%]	[ms]	
1	0.073	0.000	0.040	0.000	



Mode 2

ADVANTECH
.15
Date : 2003/12/1 PM 08:09:31

File :

Operator :
EUT :
Model No.
Remarks

ARNO HSIEH
LCD MONITOR
PDC-170
DVI 1280*1024 A/D:1 TEMP:26 HUMD:55

Urms = 230.3V Freq = 50.000 Range: 2 A
Irms = 0.328A Ipk = 1.331A cf = 4.057
P = 34.06W Pap = 75.57VA pf = 0.451
THDi = 88.6 % THDu = 0.10 % Class D

Test - Time : 5min (100 %)

Limit Reference: Pmax = 34.162W

Test completed, Result: FAILED

Order	Freq. [Hz]	Imax [A]	Imax% [%]	Imax%L [%]	Limit [A]	Status
1	50	0.1558	47.470			
2	100	0.0006	0.1860			
3	150	0.1437	43.787	123.70	0.1161	Fail
4	200	0.0007	0.2232			
5	250	0.1359	41.406	209.32	0.0649	Fail
6	300	0.0009	0.2604			
7	350	0.1244	37.909	364.12	0.0342	Fail
8	400	0.0009	0.2604			
9	450	0.1101	33.557	644.63	0.0171	Fail
10	500	0.0010	0.2976			
11	550	0.0939	28.609	785.11	0.0120	Fail
12	600	0.0011	0.3348			
13	650	0.0768	23.400	758.94	0.0101	Fail
14	700	0.0011	0.3348			
15	750	0.0596	18.155	679.39	0.0088	Fail
16	800	0.0011	0.3348			
17	850	0.0433	13.207	560.13	0.0077	Fail
18	900	0.0011	0.3348			
19	950	0.0288	8.7798	416.18	0.0069	Fail
20	1000	0.0010	0.2976			
21	1050	0.0170	5.1711	270.92	0.0063	Fail
22	1100	0.0009	0.2604			
23	1150	0.0089	2.7158	155.83	0.0057	Fail
24	1200	0.0007	0.2232			
25	1250	0.0074	2.2693	141.54	0.0053	Fail
26	1300	0.0007	0.2232			
27	1350	0.0099	3.0134	202.98	0.0049	Fail
28	1400	0.0006	0.1860			

第 1 頁



29	1450	0.0114	3.4598	250.32	0.0045	Fail
30	1500	0.0006	0.1860			
31	1550	0.0112	3.4226	264.70	0.0042	Fail
32	1600	0.0006	0.1860			
33	1650	0.0100	3.0506	251.15	0.0040	Fail
34	1700	0.0006	0.1860			
35	1750	0.0078	2.3810	207.90	0.0038	Fail
36	1800	0.0006	0.1860			
37	1850	0.0052	1.5997	147.67	0.0036	Fail
38	1900	0.0005	0.1488			
39	1950	0.0027	0.8185	79.634	0.0034	
40	2000	0.0005	0.1488			

Important:

Pmax is below 75W. This seems not to be a class D equipment.

ADVANTECH
.15

Date : 2003/12/1 PM 07:48:00 US

File :

Operator :

ARNO HSIEH

EUT :

LCD MONITOR

Model No.

PDC-170

Remarks

DUI 1280*1024 A/D:2 TEMP:26 HUMD:55

Urms = 230.3V Freq = 49.987 Range: 2 A
Irms = 0.320A Ipk = 1.282A cF = 4.003
P = 33.57W Pap = 73.77VA pf = 0.455

Test - Time : 1 x 10min = 10min (100 %)

LIN (Line Impedance Network) : SLIN 0.24ohm +j0.15ohm N:0.16ohm +j0.10ohm

Limits : Plt : 0.65 Pst : 1.00
dmax : 4.00 % dc : 3.30 %
dtLim: 3.30 % dt>Lim: 500ms

Test completed, Result: PASSED

Plt = 0.072

	Pst	dmax	dc	dt>Lim	Fail
		[%]	[%]	[ms]	
1	0.072	0.000	0.020	0.000	

ADVANTECH
.15

Date : 2003/12/1 PM 08:01:0 U3

File :

Operator :

ARNO HSIEH

EUT :

LCD MONITOR

Model No.

PDC-170

Remarks

DVI 1280*1024 A/D:2 TEMP:26 HUMD:55

Urms = 230.3V Freq = 50.000 Range: 2 A
Irms = 0.316A Ipk = 1.282A cf = 4.052
P = 32.89W Pap = 72.87VA pf = 0.451

Test - Time : 1 x 10min = 10min (100 %)

LIN (Line Impedance Network) : SLIN 0.24ohm +j0.15ohm N:0.16ohm +j0.10ohm

Limits : Plt : 0.65 Pst : 1.00
dmax : 4.00 % dc : 3.30 %
dtLim: 3.30 % dt>Lim: 500ms

Test completed, Result: PASSED

Plt = 0.072

	Pst	dmax	dc	dt>Lim	Fail
		[%]	[%]	[ms]	
1	0.072	0.000	0.190	0.000	



Mode 3

ADVANTECH

Date : 2003/12/1 PM 08:29:1 V3.15

File :

Operator :

ARNO HSIEH

EUT :

LCD MONITOR

Model No.

PDC-170

Remarks

DVI 1280*1024 A/D:3 TEMP:26 HUMD:55

Urms = 230.1V Freq = 49.987 Range: 2 A

Irms = 0.317A Ipk = 1.355A cf = 4.271

P = 32.00W Pap = 73.03VA pf = 0.438

THDi = 90.0 % THDu = 0.10 % Class D

Test - Time : 5min (100 %)

Limit Reference: Pmax = 32.002W

Test completed, Result: FAILED

Order	Freq. [Hz]	Imax [A]	Imax% [%]	Imax%L [%]	Limit [A]	Status
1	50	0.8600	270.96			
2	100	0.0007	0.2308			
3	150	0.1340	42.231	123.19	0.1088	Fail
4	200	0.0007	0.2308			
5	250	0.1282	40.385	210.80	0.0608	Fail
6	300	0.0009	0.2692			
7	350	0.1194	37.615	373.06	0.0320	Fail
8	400	0.0010	0.3077			
9	450	0.1082	34.077	675.93	0.0160	Fail
10	500	0.0010	0.3077			
11	550	0.0950	29.923	847.90	0.0112	Fail
12	600	0.0011	0.3462			
13	650	0.0808	25.462	852.66	0.0095	Fail
14	700	0.0011	0.3462			
15	750	0.0662	20.846	805.50	0.0082	Fail
16	800	0.0011	0.3462			
17	850	0.0519	16.346	715.83	0.0072	Fail
18	900	0.0011	0.3462			
19	950	0.0385	12.115	592.98	0.0065	Fail
20	1000	0.0011	0.3462			
21	1050	0.0270	8.5000	459.82	0.0059	Fail
22	1100	0.0010	0.3077			
23	1150	0.0175	5.5000	325.87	0.0054	Fail
24	1200	0.0010	0.3077			

第 1 頁



25	1250	0.0098	3.0769	198.15	0.0049	Fail
26	1300	0.0009	0.2692			
27	1350	0.0056	1.7692	123.05	0.0046	Fail
28	1400	0.0006	0.1923			
29	1450	0.0074	2.3462	175.27	0.0042	Fail
30	1500	0.0006	0.1923			
31	1550	0.0094	2.9615	236.50	0.0040	Fail
32	1600	0.0005	0.1538			
33	1650	0.0101	3.1923	271.37	0.0037	Fail
34	1700	0.0005	0.1538			
35	1750	0.0098	3.0769	277.42	0.0035	Fail
36	1800	0.0005	0.1538			
37	1850	0.0085	2.6923	256.61	0.0033	Fail
38	1900	0.0005	0.1538			
39	1950	0.0070	2.1923	220.25	0.0032	Fail
40	2000	0.0005	0.1538			

Important:

Pmax is below 75W. This seems not to be a class D equipment.



ADVANTECH

Date : 2003/12/1 PM 08:59:1 V3.15

File :

Operator :

ARNO HSIEH

EUT :

LCD MONITOR

Model No.

PDC-170

Remarks

DVI 1280*1024 A/D:3 TEMP:26 HUMD:5

5

Urms = 230.1V Freq = 49.987 Range: 2 A

Irms = 0.313A Ipk = 1.366A cf = 4.358

P = 31.22W Pap = 72.13VA pf = 0.433

Test - Time : 1 x 10min = 10min (100 %)

LIN (Line Impedance Network) : SLIN 0.24ohm +j0.15ohm N:0.16ohm
+j0.10ohm

Limits : Plt : 0.65 Pst : 1.00

dmax : 4.00 % dc : 3.30 %

dtLim: 3.30 % dt>Lim: 500ms

Test completed, Result: PASSED

Plt = 0.072

	Pst	dmax	dc	dt>Lim	Fail
		[%]	[%]	[ms]	
1	0.072	0.000	0.240	0.000	



ADVANTECH

Date : 2003/12/1 PM 09:12:1 U3.15

File :

Operator :

ARNO HSIEH

EUT :

LCD MONITOR

Model No.

PDC-170

Remarks

DUI 1280*1024 A/D:3 TEMP:26 HUMD:55

Urms = 230.1V Freq = 49.987 Range: 2 A
Irms = 0.304A Ipk = 1.345A cf = 4.428
P = 29.70W Pap = 69.89VA pf = 0.425

Test - Time : 1 x 10min = 10min (100 %)

LIN (Line Impedance Network) : SLIN 0.24ohm +j0.15ohm N:0.16ohm +j0.10ohm

Limits : Plt : 0.65 Pst : 1.00
dmax : 4.00 % dc : 3.30 %
dtLim: 3.30 % dt>Lim: 500ms

Test completed, Result: PASSED

Plt = 0.072

	Pst	dmax	dc	dt>Lim	Fail
		[%]	[%]	[ms]	
1	0.072	0.000	0.020	0.000	