



EMC UPDATE TEST REPORT

For

Advantech Co., Ltd.

Industrial Flat Panel Monitor with 19" LCD in VGA/Video

Model: FPM-3191GX-X (First X=A~Z or Blank; Second X=C, R or Blank)

Trade Name: ADVANTECH

Revision: 01

Description of Rev. 01:

1. Applicant adds one LCD Panel, one Inverter and upgrades standard version for EN 55022 and EN 55024 to re-test
(Please refer to have ** mark items on this report)
2. Other information, please refer to the 41101203 and this test report.

Approved by:

Reviewed by:

Kurt Chen
Director of Linkou Laboratory
Compliance Certification Services Inc.

Susan Su
Section Manager of Linkou Laboratory
Compliance Certification Services Inc.

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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: Industrial Flat Panel Monitor with 19" LCD in VGA/Video

Trade Name: ADVANTECH

Model: FPM-3191GX-X (First X=A~Z or Blank; Second X=C, R or Blank)

Detailed EUT Description: See Item 2 of this report

Date of Test: February 11 ~ 13, 2006

Applicable Standard	Class/Limit/Criterion	Test Result
EN 55022: 1998 + A1: 2000 + A2: 2003	Class B	No non-compliance noted
EN 61000-3-2: 2000	Class A/B/C/D	N/A
EN 61000-3-3: 1995 + A1: 2001	Limit	No non-compliance noted
EN 55024: 1998 + A1: 2001 + A2: 2003, including		
IEC 61000-4-2: 1995 + A1: 1998 + A2: 2000 EN 61000-4-2: 1995 + A1: 1998 + A2: 2001	Criterion B	No non-compliance noted
IEC 61000-4-3: 2002 + A1: 2002 EN 61000-4-3: 2002 + A1: 2002	Criterion A	No non-compliance noted
IEC 61000-4-4: 1995 + A1: 2000 + A2: 2001 EN 61000-4-4: 1995 + A1: 2001 + A2: 2001	Criterion B	No non-compliance noted
IEC 61000-4-5: 1995 + A1: 2000 EN 61000-4-5: 1995 + A1: 2001	Criterion B	No non-compliance noted
IEC 61000-4-6: 1996 + A1: 2000 EN 61000-4-6: 1996 + A1: 2001	Criterion A	No non-compliance noted
IEC 61000-4-8: 1993 + A1: 2000 EN 61000-4-8: 1993 + A1: 2001	Criterion A	No non-compliance noted
IEC 61000-4-11: 1994 + A1: 2000 EN 61000-4-11: 1994 + A1: 2001	Criterion B/C/C	No non-compliance noted
Deviation from Applicable Standard		
The EN-Standards listed under EN 55024 are requested description by the applicant.		

The above equipment was tested by Compliance Certification Services Inc. for compliance with the requirements set forth in the EMC Directive 89/336/EEC, Amended by 92/31/EEC, 93/68/EEC 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.



2 EUT DESCRIPTION

Product	Industrial Flat Panel Monitor with 19" LCD in VGA/Video		
Trade Name	ADVANTECH		
Model	FPM-3191GX-X (First X=A~Z or Blank; Second X=C, R or Blank)		
Housing Type	Metal Case		
EUT Power Rating	DCV from Power Adapter		
Power Adapter Manufacturer	LIEN	Model	LE-9702B
Power Adapter Rating	I/P: AC 100-240V, 50-60Hz, 1.5A O/P: DC 12V, 5.0A		
OSC/Clock Frequencies	20MHz		
LCD Panel Manufacturer	FUJITSU	Model	FLC48SXC8V
	** AUO	Model	M190EG01
Inverter Manufacturer	** TDK	Model	TBD239LR
AC Power Cord Type	Unshielded, 1.8m (Detachable)		
DC Power Cable Type	Unshielded, 1.5m (Non-detachable) with a core		

I/O Port of EUT

I/O PORT TYPES	Q'TY	TESTED WITH
1). Video Out Port (VGA)	1	1
2). Serial Port	1	1

Note:

1. The means of first "X" is Revision Number (X=A~Z or Blank), the second X is means Touchscreen Function (X=C, R or Blank). They are just for marketing purpose only.
2. Client consigns one model sample (Model number: FPM-3191G-C) to test. Therefore, testing Lab. just guarantees the units, which have been tested.
- **3. Client consigns one model sample (Model number: FPM-3191GA-C) to test. Therefore, testing Lab. just guarantees the units, which have been tested.



3 TEST METHODOLOGY

3.1 DECISION OF FINAL TEST MODE

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

Mode 1

1600 × 1200 Resolution

Mode 1

1280 × 1024 Resolution

Mode 2

1024 × 768 Resolution

Mode 3

800 × 600 Resolution

2. After preliminary test, found mode 1 producing the highest emission level, used this mode for all final test.



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	D51C	7251 KN8Z 0014	FCC DoC	Compaq	VGA Cable: Shielded, 1.8m with two cores RS232 Cable: Unshielded, 1.8m	Unshielded, 1.8m
2.	Printer	STYLUS C60	DR3K039632	FCC DoC	EPSON	Shielded, 1.8m	Unshielded, 1.8m
3.	PS/2 Keyboard	Y-SP29	SYU3272818	FCC DoC	Logitech	Unshielded, 1.8m	N/A
4.	PS/2 Mouse	M-S34	HCA25200436	DZL211029	Logitech	Unshielded, 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 INSTRUMENT AND CALIBRATION

5.1 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 under the IEC 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

5.2 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 # 4				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI Test Receiver	R&S	ESCS30	847793/012	12/27/2006
LISN	EMCO	3825/2	9003-1628	07/28/2006
LISN	R&S	ENV 4200	830326/016	03/30/2006

Note: The measurement uncertainty is less than $\pm 2.83\text{dB}$, 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	R3261C	71720533	N.C.R
EMI Test Receiver	SCHAFFNER	SCR 3501	436	11/24/2006
Pre-Amplifier	HP	8447D	2944A09173	03/22/2006
Bilog Antenna	Sunol Sciences	JB1	A111203	03/25/2006
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	CCS	N/A	N/A	08/26/2006
Decoupling Network	FISCHER CUSTOM COMMUNICATION INC.	F-201-DCN-5-6MM	12	03/17/2006

Note: The measurement uncertainty is less than $\pm 3.36\text{dB}$, 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
HARMONICS SYSTEM	EMC-PARTNER	HARMONICS-1000	094	11/22/2006

Equipment Used for Immunity Measurement

ESD Test Site (IEC/EN 61000-4-2)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
ESD Generator	EM TEST	P30C	0603-01	07/10/2006

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	08/09/2006
Power Meter	R&S	NRVD	837794/029	08/09/2006
Power Sensor	R&S	URV5-Z2	835640/015	08/09/2006
Power Sensor	R&S	URV5-Z2	835640/016	08/09/2006
Power Amplifier	ar	150W1000	300300	N.C.R

Fast Transients/Burst Test Site (IEC/EN 61000-4-4)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMC TEST SYSTEM	EMC-PARTNER	TRANSIENT-2000	754	09/07/2006

Surge Immunity Test Site (IEC/EN 61000-4-5)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Surge Tester	HAEFELY TRENCH	PSUGER 4010	583 334-71	08/30/2006



CS Test Site (IEC/EN 61000-4-6)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
S.G.	R&S	SMY02	100094	08/09/2006
Power Meter	R&S	NRVD	837794/029	08/09/2006
Power Sensor	R&S	URV5-Z2	835640/015	08/09/2006
Power Sensor	R&S	URV5-Z2	835640/016	08/09/2006
Power Amplifier	ar	500A100A	300299	N.C.R
CDN	Lüthi	801-M3	1879	03/04/2006
CDN	FRANKONIA	CDN-M2	A3002010	08/02/2006

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	11/27/2006
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	04/10/2006



6 TEST RESULTS

Line Conducted Emission

CCS Conduction Test 4

Job No.: 60210101

Date: 2006/2/13

Time: PM 10:16

Temp.(°C)/Hum.(%):18 °C / 59%

Tested by: Harry Wang

Standard: CISPR 22 / EN 55022 Class B

Power Source: 230 Vac / 50Hz

Measured Line: L1

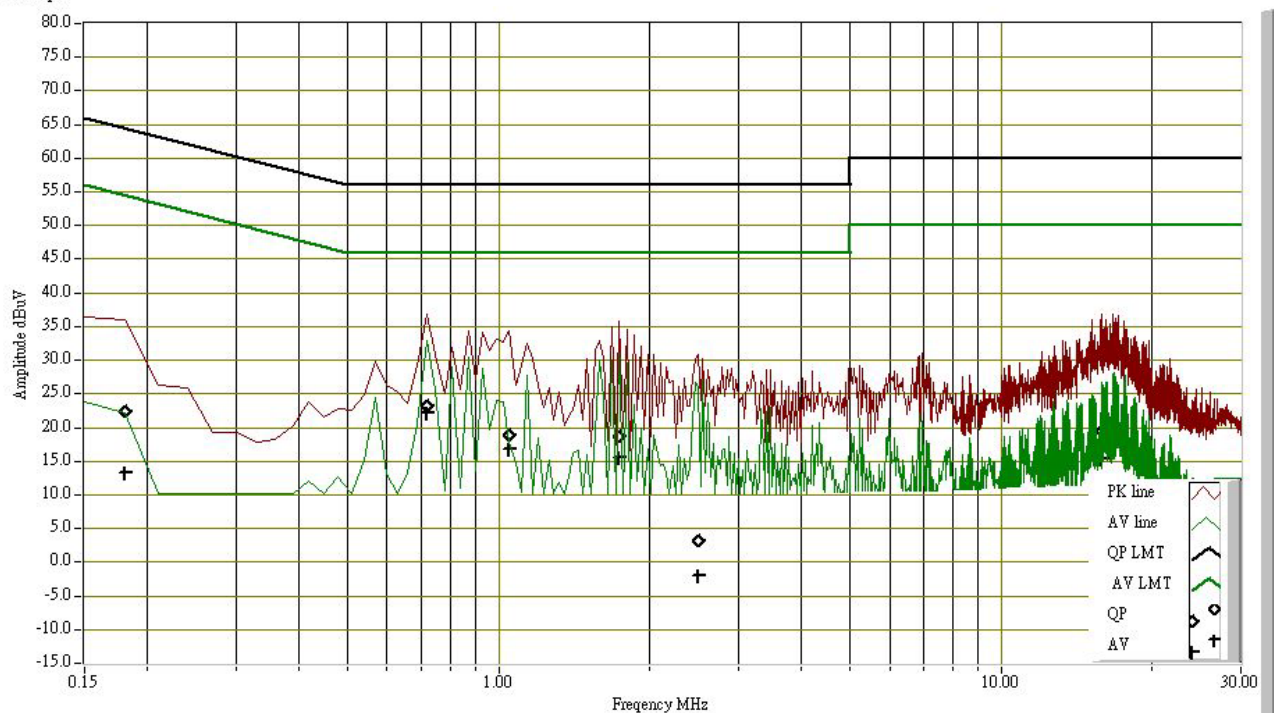
Company: ADVANTECH

Product:

Model: FPM-3191GA-C

Test Mode: 1

final Graph



Freq. (MHz)	QP Reading	AV Reading	Corr. factor	QP Result	AV Result	QP Limit	AV Limit	QP Margin	AV Margin	Remark
0.180	22.370	13.270	10.200	32.570	23.470	64.486	54.486	-31.916	-31.016	PASS
0.720	23.260	22.210	10.256	33.516	32.466	56.000	46.000	-22.484	-13.534	PASS
1.050	18.960	16.850	10.200	29.160	27.050	56.000	46.000	-26.840	-18.950	PASS
1.740	18.740	15.500	10.200	28.940	25.700	56.000	46.000	-27.060	-20.300	PASS
2.490	3.220	-2.060	10.249	13.469	8.189	56.000	46.000	-42.531	-37.811	PASS
15.900	19.530	15.340	11.636	31.166	26.976	60.000	50.000	-28.834	-23.024	PASS

L1 = Line One (Live Line)



CCS Conduction Test 4

Job No.: 60210101

Date: 2006/2/13

Time: PM 10:23

Temp.(°C)/Hum.(%):18 °C / 59%

Tested by: Harry Wang

Standard: CISPR 22 / EN 55022 Class B

Power Source: 230 Vac / 50Hz

Measured Line: L2

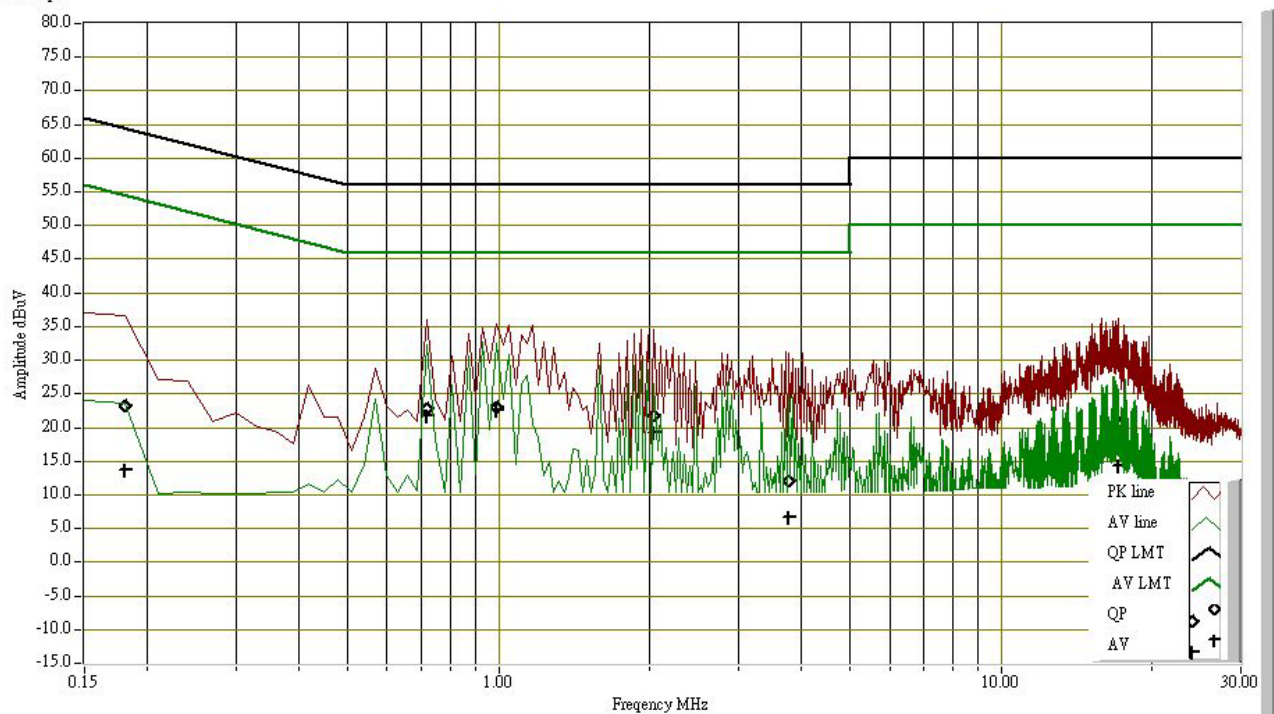
Company: ADVANTECH

Product:

Model: FPM-3191GA-C

Test Mode: 1

final Graph



Freq. (MHz)	QP Reading	AV Reading	Corr. factor	QP Result	AV Result	QP Limit	AV Limit	QP Margin	AV Margin	Remark
0.180	23.300	13.800	10.200	33.500	24.000	64.486	54.486	-30.986	-30.486	PASS
0.720	22.860	21.820	10.344	33.204	32.164	56.000	46.000	-22.796	-13.836	PASS
0.990	22.910	22.560	10.398	33.308	32.958	56.000	46.000	-22.692	-13.042	PASS
2.040	21.790	19.270	10.396	32.186	29.666	56.000	46.000	-23.814	-16.334	PASS
3.780	12.050	6.730	10.456	22.506	17.186	56.000	46.000	-33.494	-28.814	PASS
17.100	20.570	14.330	11.300	31.870	25.630	60.000	50.000	-28.130	-24.370	PASS

L2 = Line Two (Neutral Line)

**Radiated Emission (A)****Model:** FPM-3191GA-C**Test Mode:** Mode 1**Temperature:** 21°C**Humidity:** 55% RH**Detector Function:** Quasi-peak.**Antenna:** Vertical at 10m**Tested by:** Harry Wang**Test Results:** Pass

(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)
111.71	9.59	14.58	24.17	30.00	-5.83
127.69	9.56	16.08	25.65	30.00	-4.35
223.26	9.77	14.40	24.17	30.00	-5.83
402.90	3.98	20.79	24.77	37.00	-12.23
570.60	1.00	25.15	26.15	37.00	-10.85
813.90	0.62	29.25	29.87	37.00	-7.13

**Radiated Emission (B)****Model:** FPM-3191GA-C**Test Mode:** Mode 1**Temperature:** 21°C**Humidity:** 55% RH**Detector Function:** Quasi-peak.**Antenna:** Horizontal at 10m**Tested by:** Harry Wang**Test Results:** Pass

(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)
181.40	8.06	14.40	22.47	30.00	-7.53
193.40	8.66	15.31	23.97	30.00	-6.03
201.46	11.91	15.71	27.62	30.00	-2.38
391.40	4.04	20.46	24.50	37.00	-12.50
588.30	2.54	25.36	27.90	37.00	-9.10
796.00	2.01	28.86	30.87	37.00	-6.13



7 POWER HARMONICS TEST

Port : AC mains

Basic Standard : EN 61000-3-2 (2000)

Limits : ☐ CLASS A ; ☐ CLASS B ; ☐ CLASS C ; ☐ CLASS D

Tested by : N/A

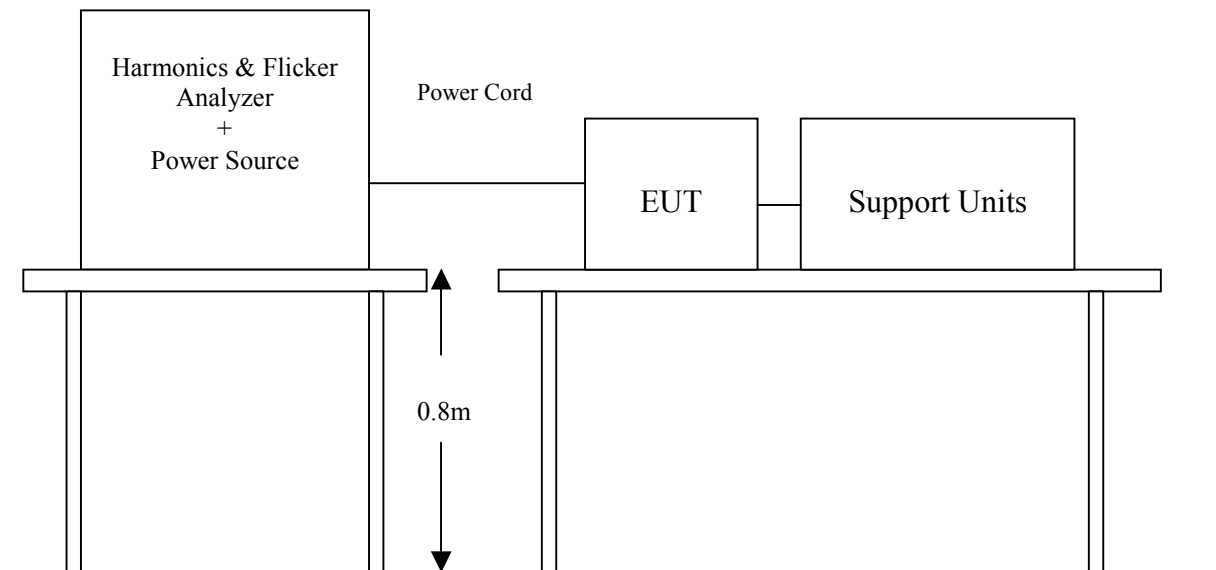
Temperature : N/A

Humidity : N/A

Limit:

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

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

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 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.

Test Result :

EUT max Power : 40.69W

Note: According to clause 7 of EN 61000-3-2: 2000, equipment with a rated power of 75W or less, no limits apply.

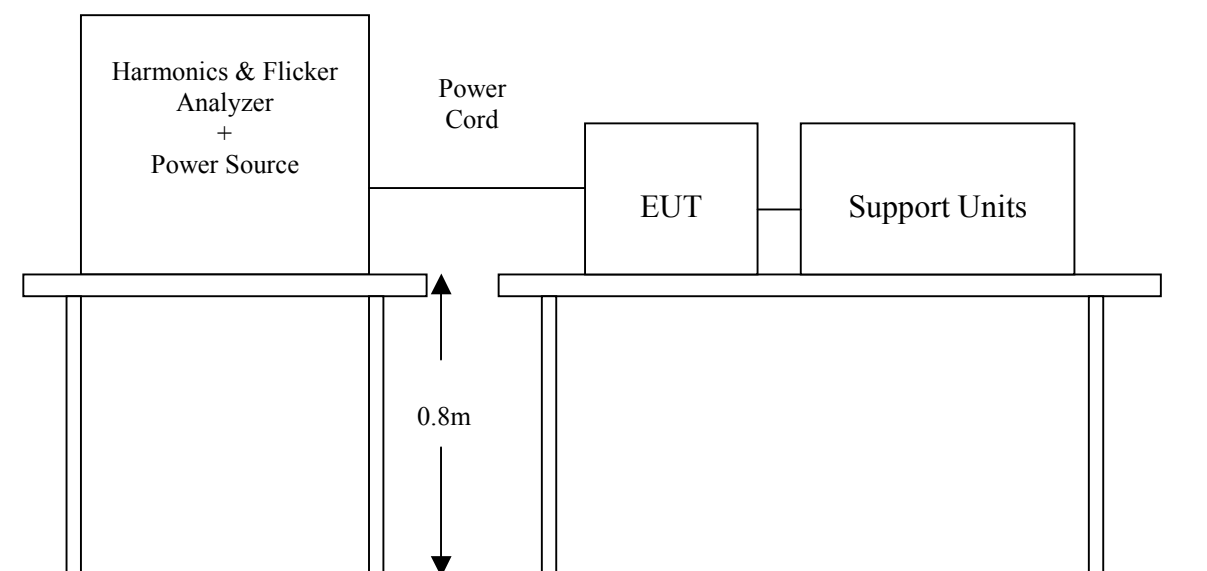
8 POWER VOLTAGE FLUCTUATION / FLICKER TEST

Port : AC mains
Basic Standard : EN 61000-3-3 (1995 + A1: 2001)
Limits : §5 of EN 61000-3-3
Tested by : Harry Wang
Temperature : 21°C
Humidity : 55%RH

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)**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} (%)	0.3%	4%	Pass
dc (%)	0.01%	3.3%	Pass

Manual Switch

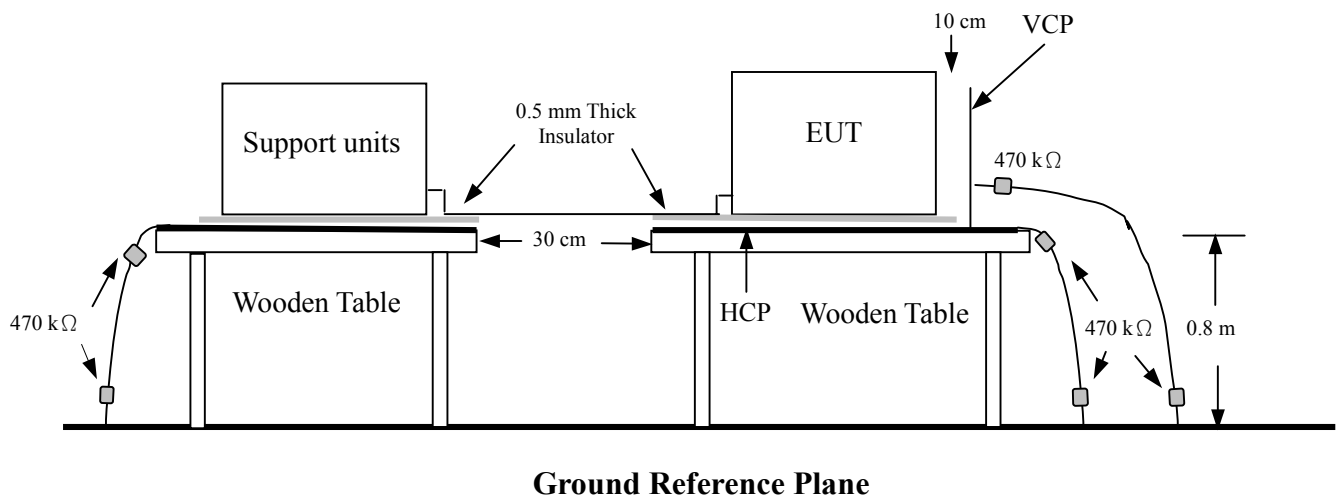
Test Parameter	Measurement Value	Limit	Result
P _{st}	0.072	1.0	Pass
P _{lt}	0.072	0.65	Pass
T _{dt} (ms)	0	500	Pass
d _{max} (%)	0.27%	4%	Pass
dc (%)	0.21%	3.3%	Pass

9 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	: Harry Wang
Temperature	: 23°C
Humidity	: 54% RH
Pressure	: 1010mbar

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 (Right)	Pass
Mini 25 /Point	± 4 kV	Indirect Discharge VCP (Left)	Pass

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 5



Photo 2 of 5

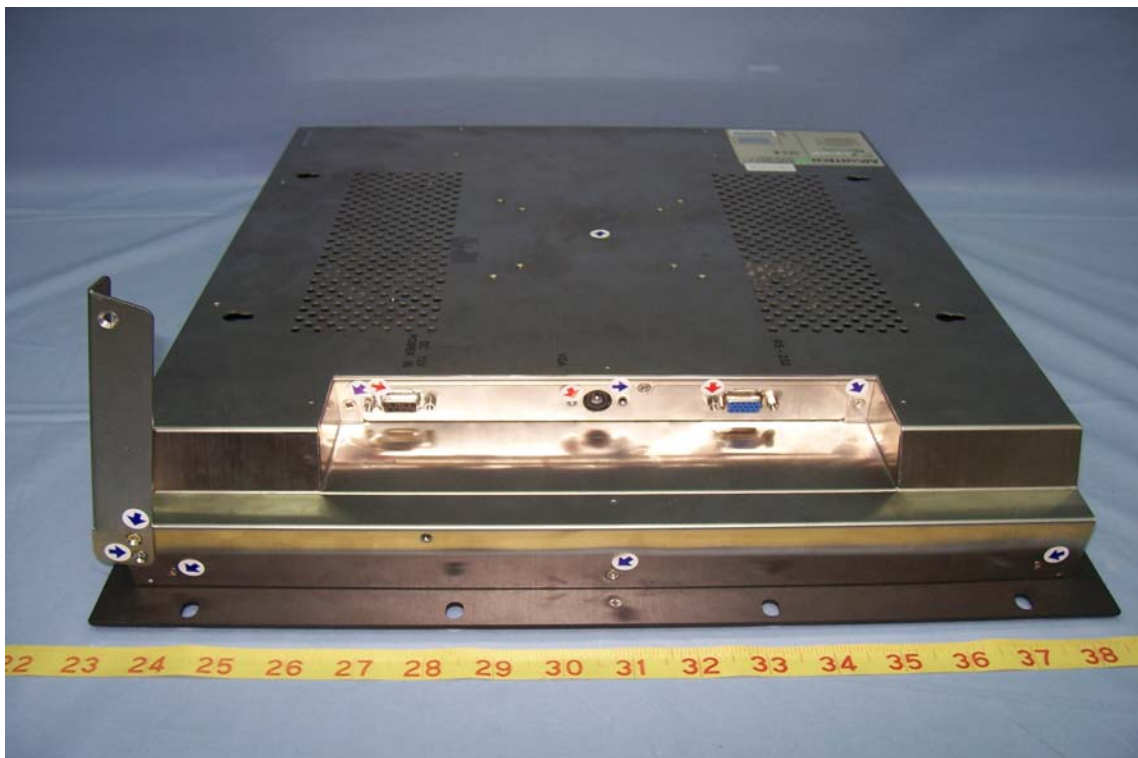




Photo 3 of 5

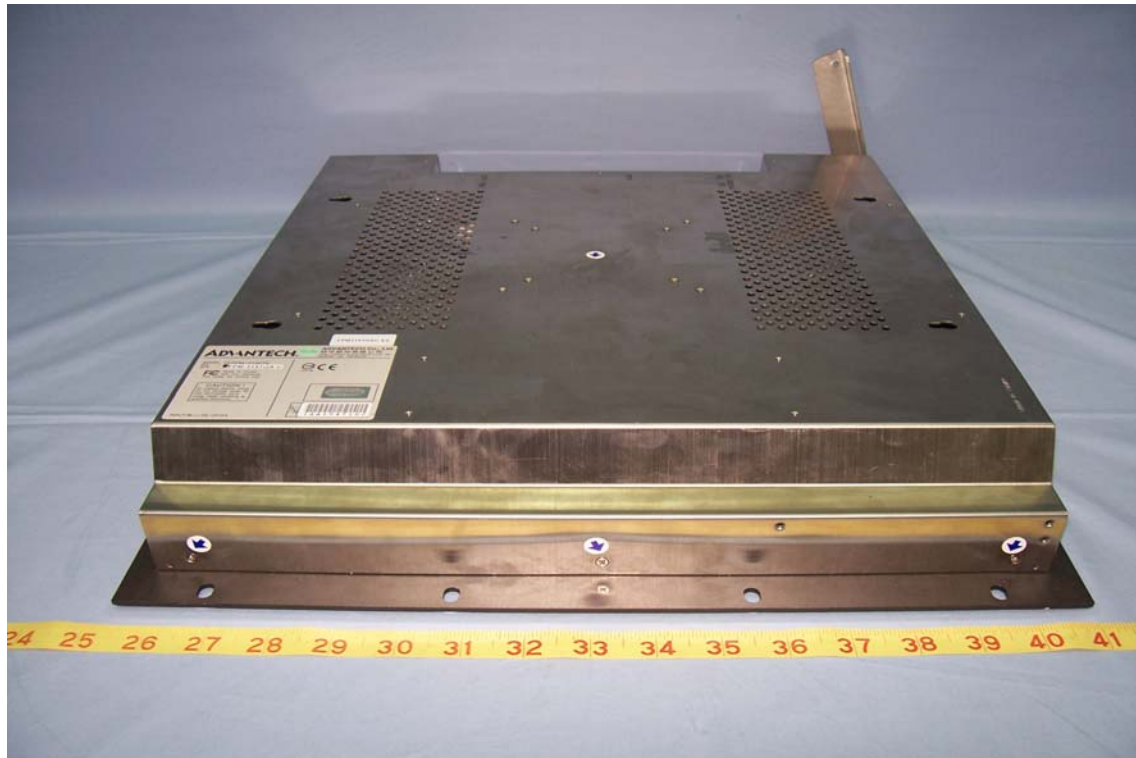
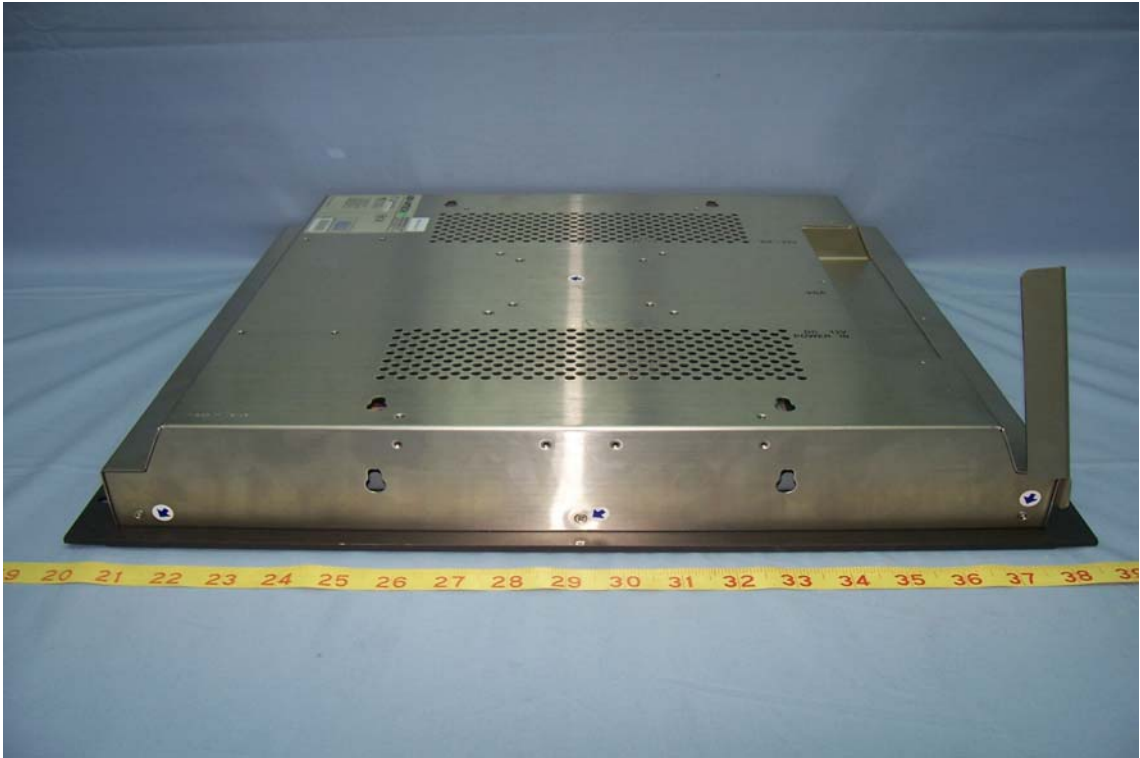


Photo 4 of 5





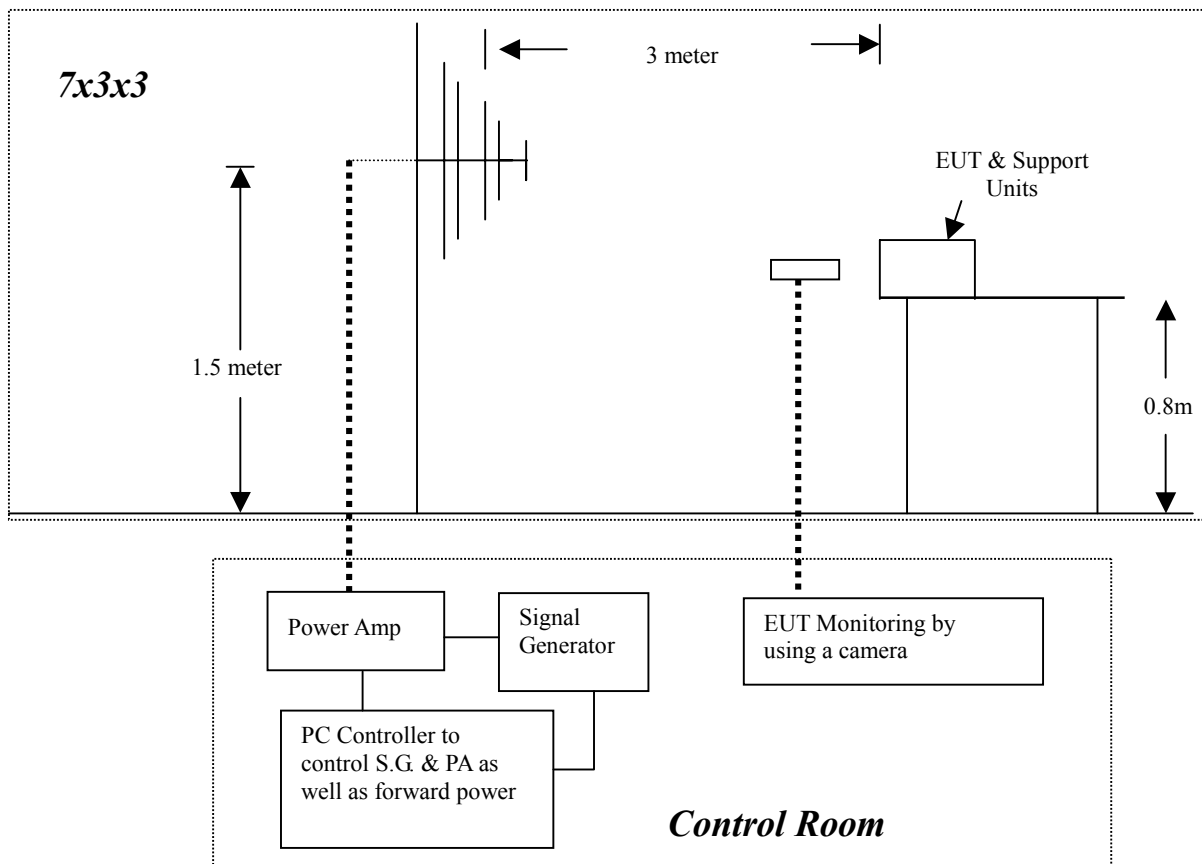
Photo 5 of 5



10 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	: Harry Wang
Temperature	: 21°C
Humidity	: 54% RH
Pressure	: 1011mbar

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 : 10V/m
Steps : 4 % of fundamental
Dwell Time : 3 sec

Range (MHz)	Field	Modulation	Polarity	Position	Result (Pass/Fail)
80-1000	10V/m	Yes	H	Front	Pass
80-1000	10V/m	Yes	V	Front	Pass
80-1000	10V/m	Yes	H	Right	Pass
80-1000	10V/m	Yes	V	Right	Pass
80-1000	10V/m	Yes	H	Back	Pass
80-1000	10V/m	Yes	V	Back	Pass
80-1000	10V/m	Yes	H	Left	Pass
80-1000	10V/m	Yes	V	Left	Pass

Final test conditions:

Test level : 10V/m
Steps : 1 % of fundamental
Dwell Time : 3 sec

Range (MHz)	Field	Modulation	Polarity	Position	Result (Pass/Fail)
80-1000	10V/m	Yes	H	Back	Pass
80-1000	10V/m	Yes	V	Back	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.

11 FAST TRANSIENTS/BURST IMMUNITY TEST

Port : On Power Supply Line

Basic Standard : IEC/EN 61000-4-4

Requirements : ± 1 kV for Power Supply Line

Performance Criteria : B (Standard Required)

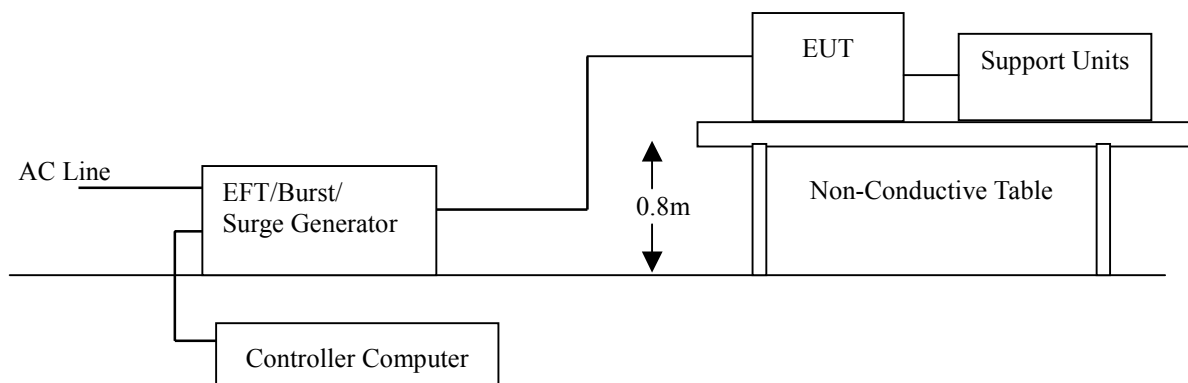
Tested by : Harry Wang

Temperature : 23°C

Humidity : 54% RH

Pressure : 1010mbar

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.

12 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)

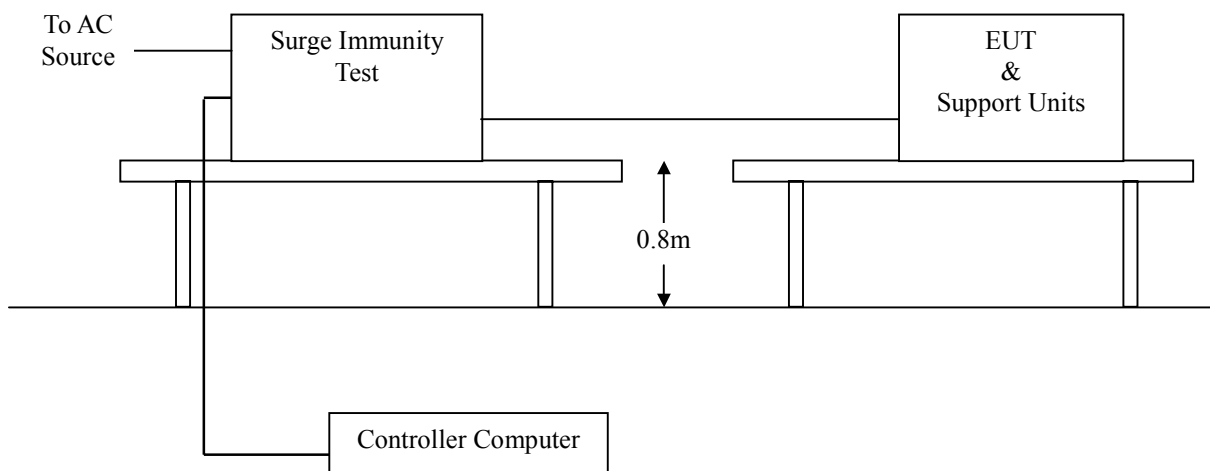
Tested by : Harry Wang

Temperature : 23°C

Humidity : 54% RH

Pressure : 1010mbar

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**

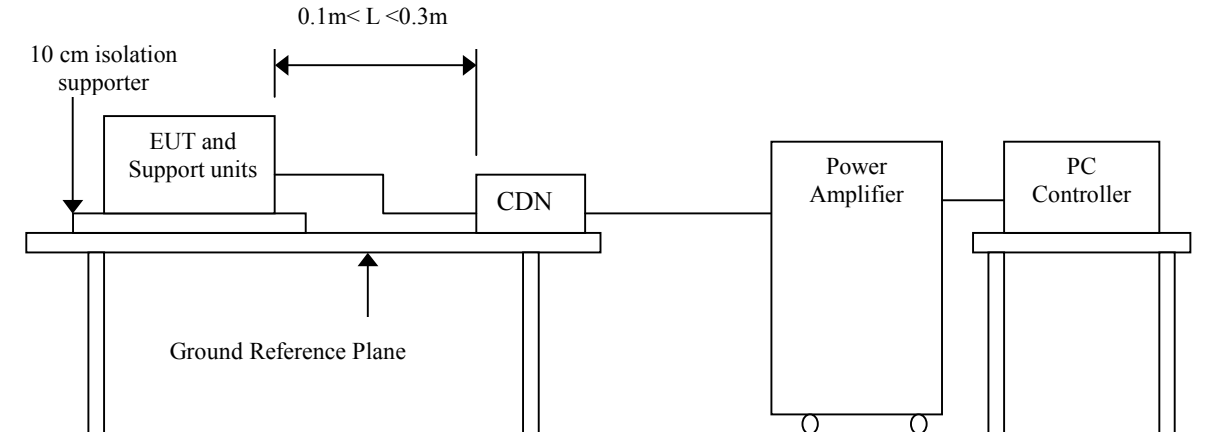
Observation: No function degraded during the tests.

13 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	: Harry Wang
Temperature	: 21°C
Humidity	: 54% RH
Pressure	: 1011mbar

Block Diagram of Test Setup:

Side View:



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:

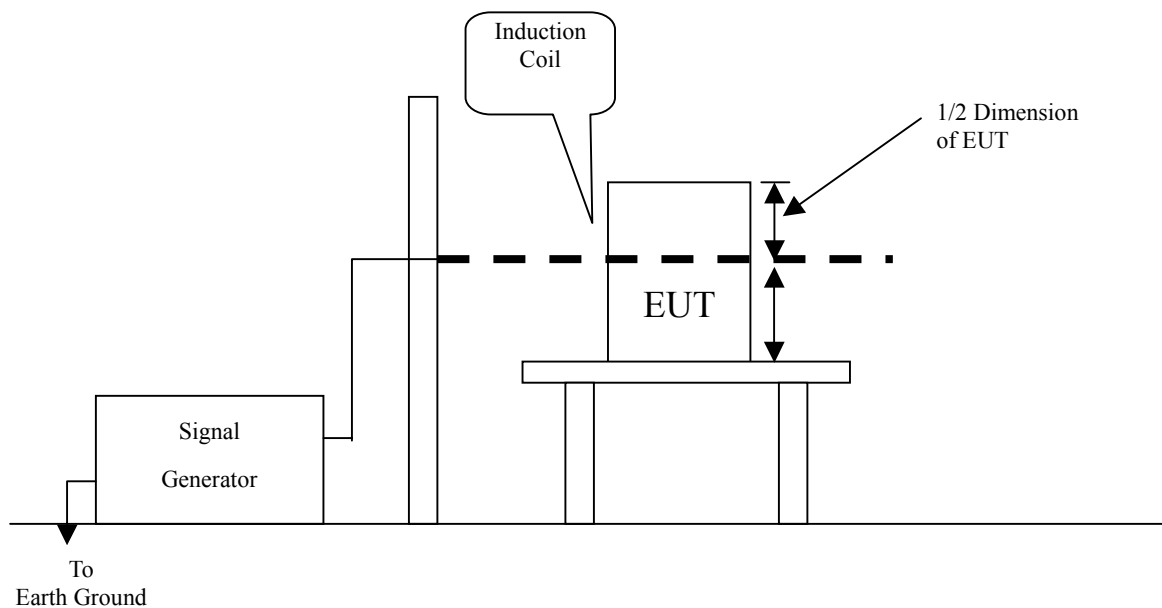
- ☒ **Criteria A:** The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of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

14 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 : Harry Wang
Temperature : 23°C
Humidity : 54% RH
Pressure : 1010mbar

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.

15 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.

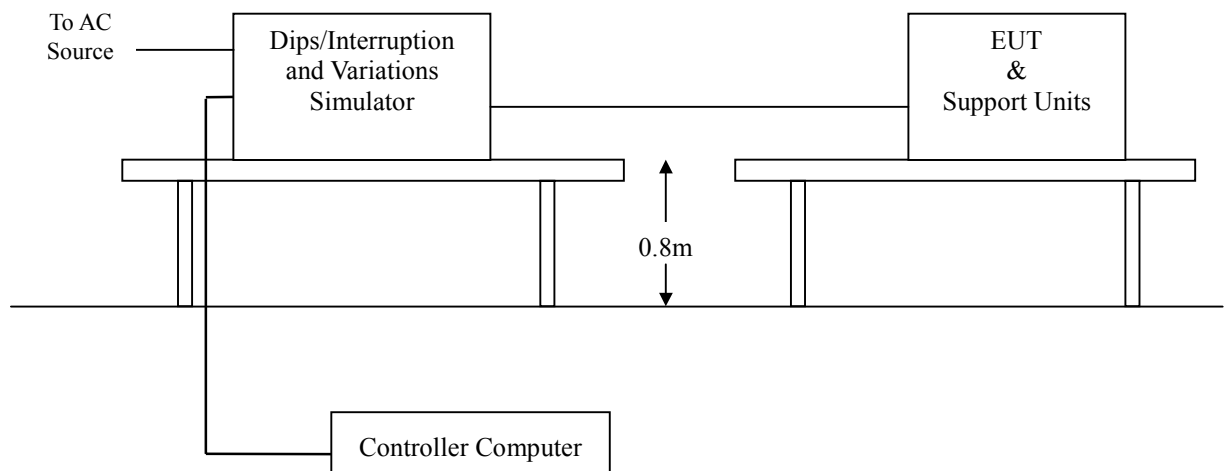
Tested by : Harry Wang

Temperature : 23°C

Humidity : 54% RH

Pressure : 1010mbar

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.
5. Removes the Battery Pack to test if any.

**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 recovered by manual, as the events disappear.	C

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.

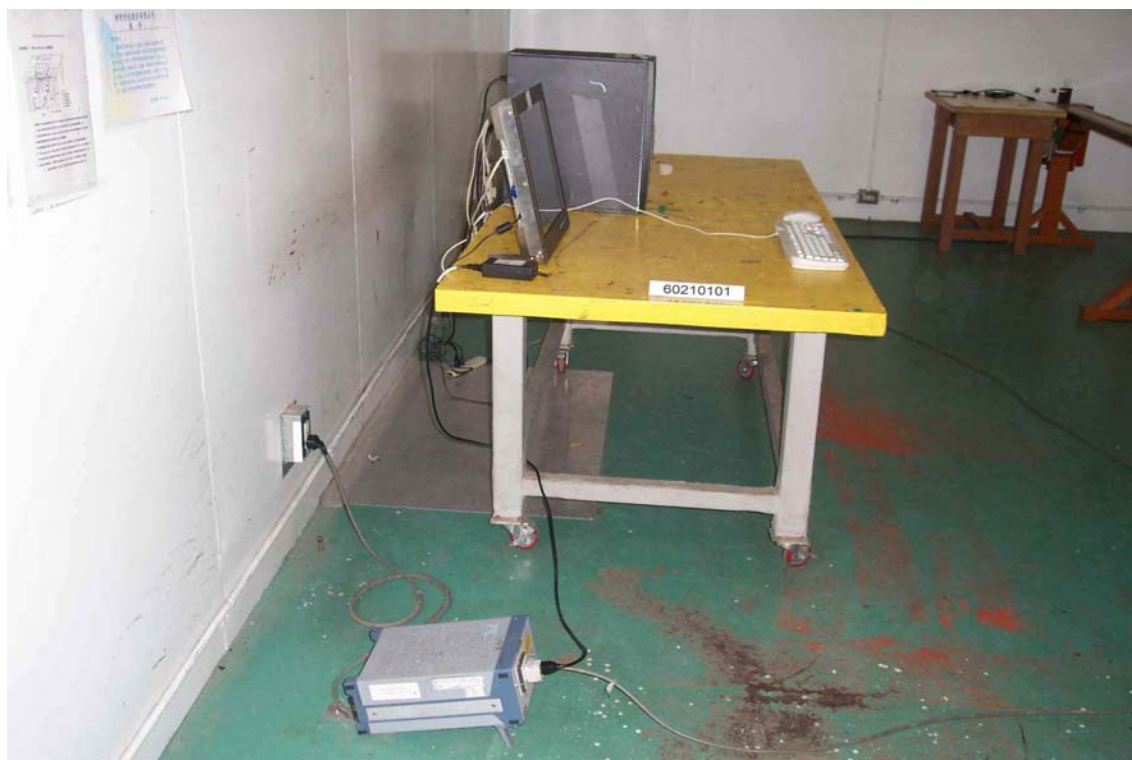
Criteria B: The apparatus continues to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible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



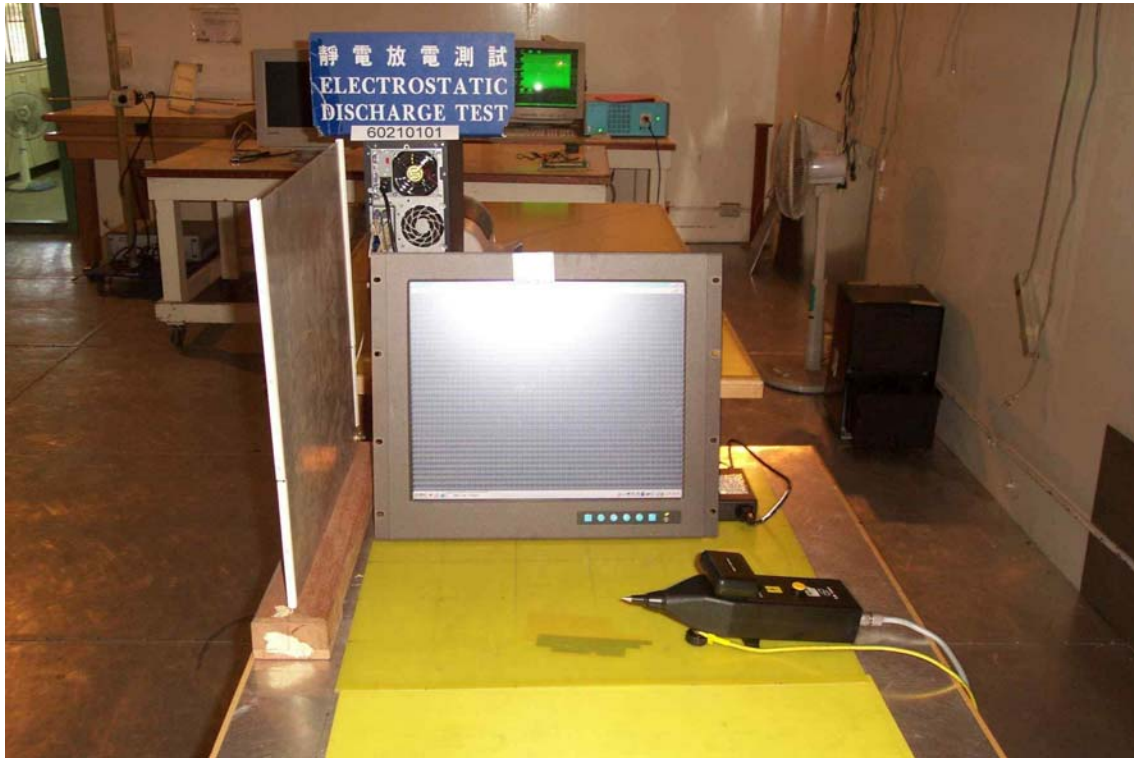
RADIATED EMISSION TEST (EN 55022)



POWER HARMONIC & VOLTAGE FLUCTUATION / FLICKER TEST



ELECTROSTATIC DISCHARGE TEST



RADIATED ELECTROMAGNETIC FIELD TEST



FAST TRANSIENTS/BURST TEST



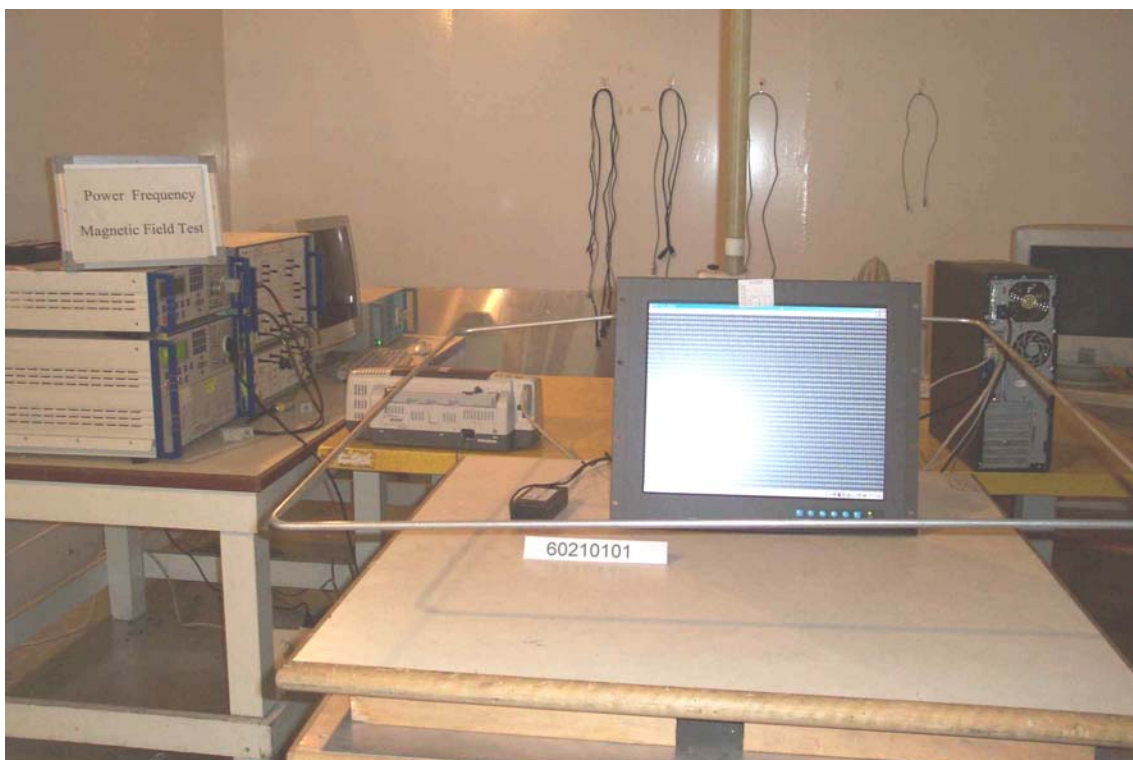
SURGE IMMUNITY TEST



CONDUCTED DISTURBANCE, INDUCED BY RADIO-FREQUENCY FIELDS TEST

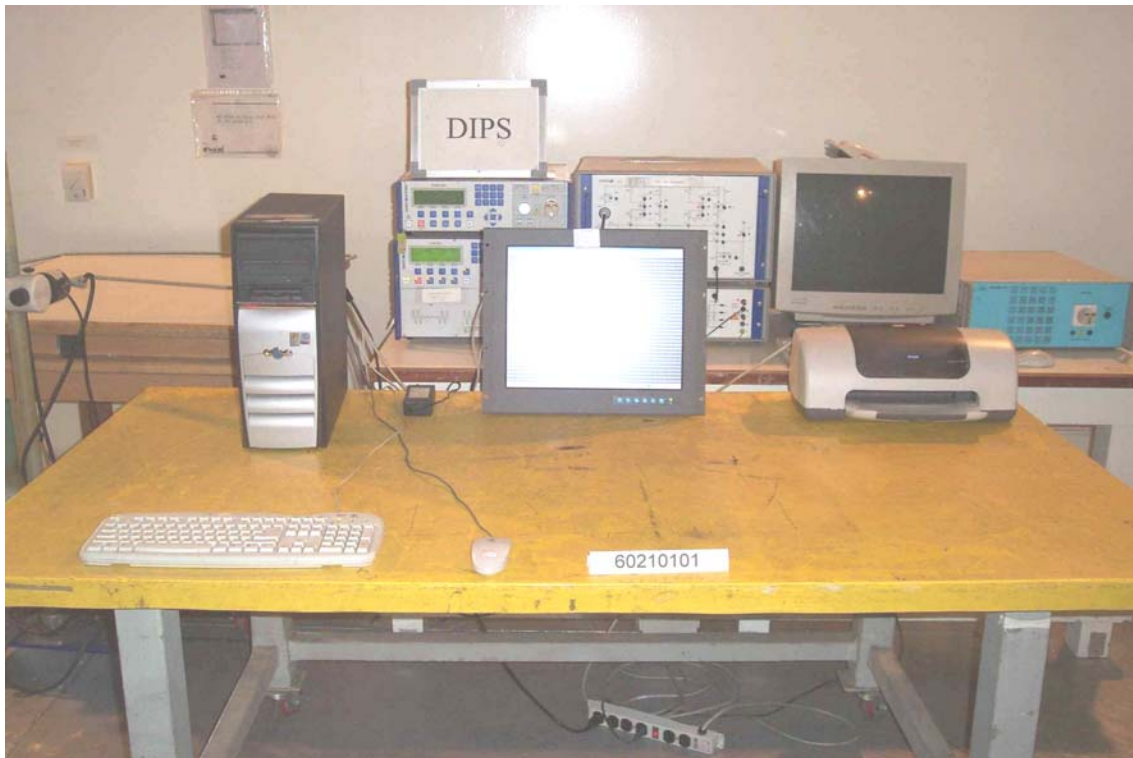


POWER FREQUENCY MAGNETIC FIELD IMMUNITY TEST





VOLTAGE DIPS / INTERRUPTION TEST





APPENDIX II – TEST RESULT OF EN 61000-3-3

ADVANTECH

Date : 2006/2/11 AM 11:05 V4.10

File :

Operator : HARRY WANG
EUT : Industrial Flat Panel Monitor with 19" LCD in VGA/Video
Model No : FPM-3191GA-C
Remarks TEMP:21 HUMD:55 (Continue)

Urms = 230.1V Freq = 49.974 Range: 2 A
Irms = 0.384A Ipik = 1.604A cf = 4.181
P = 39.61W S = 88.31VA pf = 0.449

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

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

Limits :Plt : 0.65Pst : 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	0.300	0.010	0.000	



ADVANTECH

Date : 2006/2/11 AM 11:18 V4.10

File :

Operator : HARRY WANG
EUT : Industrial Flat Panel Monitor with 19" LCD in VGA/Video
Model No : FPM-3191GA-C
Remarks TEMP:21 HUMD:55 (Manual Switch)

Urms = 230.1V Freq = 49.987 Range: 2 A
Irms = 0.385A Ipik = 1.644A cf = 4.272
P = 39.12W S = 88.54VA pf = 0.442

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

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

Limits :Plt : 0.65Pst : 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	0.270	0.210	0.000	