EMC UPDATE TEST REPORT

For

Advantech Co., Ltd.

Panel PC with Touch Screen

Model: POC-153T

Trade ADVANTECH

Date of Test: January 2, ~ June 14, 2004

Revision: 02

Description of Rev. 02:

1. Applicant adds one LCD Panel to re-test.
   (Please refer to have ** mark items on this report)
2. Other information, please refer to the B30804209-E1, B40421207-E1 and this test report.

Approved by:

Kurt Chen
Director of Linkou Laboratory
Compliance Certification Services Inc.

Reviewed by:

Jessie Wang
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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:	Panel PC with Touch Screen
Trade Name:	ADVANTECH
Model:	POC-153T
Detailed EUT Description:	See Item 2 of this report
Date of Test:	January 2 ~ June 14, 2004

Applicable Standard	Class/Limit/Criterion	Test Result
EN 60601-1-2: 2001, including		
EN 55011: 1998 + A1: 1999	Class B	No non-compliance noted
IEC 61000-4-2: 1995 + A2: 2000	See Item 9 of this report	No non-compliance noted
IEC 61000-4-3: 1995 + A2: 2000	See Item 10 of this report	No non-compliance noted
IEC 61000-4-4: 1995 + A1: 2000	See Item 11 of this report	No non-compliance noted
IEC 61000-4-5: 1995 + A1: 2000	See Item 12 of this report	No non-compliance noted
IEC 61000-4-6: 1996 + A1: 2000	See Item 13 of this report	No non-compliance noted
IEC 61000-4-8: 1993 + A1: 2000	See Item 14 of this report	N/A
IEC 61000-4-11: 1994 + A1: 2000	See Item 15 of this report	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
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 93/42/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	Panel PC with Touch Screen		
Trade Name	ADVANTECH		
Model	POC-153T		
Housing Type	Plastic		
Power Supply Manufacturer	SKYNET	**Model**	SNP-8086
Power Supply Power Rating	100-240VAC, 50-60Hz		
AC Power Cord Type	Unshielded, 1.8m (Detachable)		
CPU Manufacturer	Intel	**Model**	PIII 1.26GHz
CPU Board Manufacturer	Adventech	**Model**	PCM-9673
OSC/Clock Frequencies	133MHz		
Memory Capacity		**Installed**	256MB SDRAM
LCD Panel Manufacturer	CHUNG HWA	**Model**	13012751W
	AU	**Model**	G150XG01
		**	M150XN07
	CPT	**Model**	CLAA150XP03
HDD Manufacturer	Fujitsu	**Model**	MHN2200AT
FDD Manufacturer	NEC	**Model**	FD1238T
CD-ROM Manufacturer	QSI	**Model**	SCR-242

I/O Port of EUT

I/O PORT TYPES	*Q'TY*	*TESTED WITH*
1). Parallel Port	*1*	*1*
2). Serial Port	*4*	*4*
3). Video Out Port (VGA)	*1*	*1*
4). PS/2 Keyboard/ Mouse Port	*1*	*1*
5). Line In Port	*1*	*1*
6). Line Out Port	*1*	*1*
7). Microphone Port	*1*	*1*
8). Game Port	*1*	*1*
9). LAN Port	*1*	*1*
10).USB Port	*2*	*2*

3 TEST METHODOLOGY

3.1 DECISION OF FINAL TEST MODE

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

   Mode 1
   1024 X 768 Resolution / 100Mbps with AU / M150XN07 LCD Panel

   Mode 2
   1024 X 768 Resolution / 10Mbps with AU / M150XN07 LCD Panel

   Mode 3
   800 X 600 Resolution / 100Mbps with AU / M150XN07 LCD Panel

   Mode 4
   640 X 480 Resolution / 100Mbps with AU / M150XN07 LCD Panel

2. After preliminary scan, 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.	Monitor	959NF	AQ19H2RT706132L	FCC DoC	FCC DoC	Shielded, 1.8m with two cores	Unshielded, 1.8m
2.	Modem	DM-1414	0304012269	IFAXDM1414	ACEEX	Shielded, 1.5m	Unshielded, 1.8m
3.	Modem	DM-1414	0304012264	IFAXDM1414	ACEEX	Shielded, 1.5m	Unshielded, 1.8m
4.	Printer	STYLUS C60	STYLUS C60	DR3K039425	EPSON	Shielded, 1.5m	Unshielded, 1.8m
5.	PS/2 Keyboard (One to two adapter)	KB-0133	N/A	FCC DoC	Compaq	Shielded, 1.8m	N/A
6.	PS/2 Mouse (One to two adapter)	M-S69	N/A	FCC DoC	Compaq	Shielded, 1.8m	N/A
7.	Mouse	M-MM43	LZE93352988	FCC DoC	Logitech	Shielded, 1.8m	N/A
8.	Mouse	M-MM43	LZE94052791	FCC DoC	Logitech	Shielded, 1.8m	N/A
9.	USB 2.0 External HDD	F12-U	A0100214-31d0014	FCC DoC	TeraSyS	Shielded, 1.8m	N/A
10.	USB 2.0 External HDD	F12-U	A0100214-31d0028	FCC DoC	TeraSyS	Shielded, 1.8m	N/A
11.	Joystick	G-ZA-PHI	PHB01600992	FCC DoC	Logitech	Shielded, 1.8m	N/A
12.	Multimedia Earphone	Axis-301	N/A	FCC DoC	Labtec	Unshielded, 1.8m	N/A
13.	Walkman	RQ-L10	HB004471	FCC DoC	Panasonic	Unshielded, 1.8m	N/A
14.	Notebook PC (Remote)	M285	NU2503589	FCC DoC	LEO	LAN Cable: Unshielded, 10m	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core

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 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.

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 # 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	01/08/2005
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 # 4				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Spectrum Analyzer	ADVANTEST	R3132	91700456	N.C.R
EMI Test Receiver	R&S	ESVS10	846285/016	04/25/2005
Bilog Antenna	Sunol Sciences	JB1	A111203	01/09/2005
Turn Table	Chance most	N/A	N/A	N.C.R
Antenna Tower	Chance most	N/A	N/A	N.C.R
Controller	Chance most	N/A	N/A	N.C.R
RF Switch	ANRITSU	MP59B	M51067	N.C.R
Site NSA	C&C Lab.	N/A	N/A	08/08/2004

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**
HARMONICS SYSTEM	EMC-PARTNER	HARMONICS-1 000	094	10/26/2004

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	02/26/2005

Radiated Electromagnetic Field Immunity Test Site (IEC/EN 61000-4-3) (80-1000MHz)				
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

Radiated Electromagnetic Field Immunity Test Site (IEC/EN 61000-4-3) (1400-2500MHz)				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
S.G.	Agilnet	8648C	4108A05772	07/29/2004
Power Meter	BOONTON	4232A	98501	07/08/2004
Power Amplifier	ar	150W1000M3	306730	N.C.R
Power Amplifier	ar	30S1G3M1	306722	N.C.R
RF Test Sys Ctrlr	ar	SC1000M3	306666	N.C.R
Bilog Antenna	ar	AT1080	306709	N.C.R
Horn Antenna	ar	AT4002	306750	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
Clamp	HAEFELY TRENCH	093 506.1	080 421.13	N.C.R

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	08/19/2004

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 Meter	R&S	NRVD	837794/029	N.C.R.
Power Amplifier	ar	500A100A	300299	N.C.R
CDN	MEB	M2	A3002010	04/27/2005
CDN	SCHAFFNER	T400	16906	12/28/2004

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	04/06/2005

6 TEST RESULTS

Line Conducted Emission

Model: POC-153T **Test Mode:** Mode 1

Temperature: 17°C **Humidity:** 67% RH

Tested by: Ethan Huang **Test Results:** Pass

(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
0.195	45.30	---	63.82	53.82	-18.52	---	L1
1.927	40.00	---	56.00	46.00	-16.00	---	L1
2.369	39.30	---	56.00	46.00	-16.70	---	L1
4.000	35.60	---	56.00	46.00	-20.40	---	L1
14.728	31.60	---	60.00	50.00	-28.40	---	L1
16.229	35.90	---	60.00	50.00	-24.10	---	L1
0.195	45.40	---	63.82	53.82	-18.42	---	L2
2.318	38.70	---	56.00	46.00	-17.30	---	L2
3.294	37.00	---	56.00	46.00	-19.00	---	L2
4.057	35.10	---	56.00	46.00	-20.90	---	L2
14.701	49.40	46.10	60.00	50.00	-10.60	-3.90	L2
16.227	49.70	46.50	60.00	50.00	-10.30	-3.50	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.*

Radiated Emission (A)

Model: POC-153T **Test Mode:** Mode 1

Temperature: 24°C **Humidity:** 60% RH

Detector Function: Quasi-peak. **Antenna:** Vertical at 10m

Tested by: Max Yan **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)
110.55	13.9	14.1	28.0	30.0	-2.0
133.37	11.2	14.2	25.4	30.0	-4.6
177.98	14.8	12.3	27.1	30.0	-2.9
181.82	10.2	12.2	22.4	30.0	-7.6
204.18	10.8	12.7	23.5	30.0	-6.5
211.20	12.0	12.8	24.8	30.0	-5.2
227.30	10.2	13.2	23.4	30.0	-6.6
259.76	14.8	17.1	31.9	37.0	-5.1
400.22	14.2	20.8	35.0	37.0	-2.0
667.10	10.0	25.0	35.0	37.0	-2.0
934.00	6.6	27.8	34.4	37.0	-2.6

Radiated Emission (B)

Model: POC-153T **Test Mode:** Mode 1

Temperature: 24°C **Humidity:** 60% RH

Detector Function: Quasi-peak. **Antenna:** Horizontal at 10m

Tested by: Max Yan **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)
135.10	12.6	14.2	26.8	30.0	-3.2
176.71	7.7	12.4	20.1	30.0	-9.9
181.82	8.9	12.2	21.1	30.0	-8.9
204.81	10.9	12.7	23.6	30.0	-6.4
227.31	9.6	13.2	22.8	30.0	-7.2
259.77	12.9	17.1	30.0	37.0	-7.0
400.23	14.2	20.8	35.0	37.0	-2.0
667.11	5.6	25.0	30.6	37.0	-6.4
933.85	5.9	27.8	33.7	37.0	-3.3

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 : 65.687W

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 : Max Yan

Temperature : 22°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%	4%	Pass
dc (%)	0.01%	3.3%	Pass

** Manual Switch

Test Parameter	Measurement Value	Limit	Result
P_{st}	0.076	1.0	Pass
P_{lt}	0.076	0.65	Pass
T_{dt} (ms)	0	500	Pass
d_{max} (%)	1.66%	4%	Pass
dc (%)	0.46%	3.3%	Pass

9 ELECTROSTATIC DISCHARGE (ESD) IMMUNITY TEST

Port	:	Enclosure
Basic Standard	:	IEC/EN 61000-4-2
Test Level	:	± 2, 4, 8 kV (Air Discharge)
		± 2, 4, 6 kV (Contact Discharge)
		± 2, 4, 6 kV (Indirect Discharge)
Performance Criterion	:	The Equipment or System shall be able to provide the essential performance and remain safe.
Tested by	:	George Kuo
Temperature	:	24°C
Humidity	:	52% RH
Pressure	:	1019mbar

Block Diagram of Test Setup:

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

Ground Reference Plane

Test Procedure:

The electrostatic discharges were applied as follows:

Amount of Discharges	Voltage	Coupling	Result (Pass/Fail)
≧10 / Point	± 2, 4, 8 kV	Air Discharge	Pass
≧10 / Point	± 2, 4, 6 kV	Contact Discharge	Pass
≧10 / Point	± 2, 4, 6 kV	Indirect Discharge HCP	Pass
≧10 / Point	± 2, 4, 6 kV	Indirect Discharge VCP (Left)	Pass
≧10 / Point	± 2, 4, 6 kV	Indirect Discharge VCP (Back)	**N/A
≧10 / Point	± 2, 4, 6 kV	Indirect Discharge VCP (Right)	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)

Observation: No any function degraded during the tests.

Compliance Criteria:

Under the test conditions specified in 36.202, the EQUIPMENT or SYSTEM shall be able to provide the ESSENTIAL PERFORMANCE and remain safe. The following DEGRADATIONS associated with ESSENTIAL PERFORMANCE and safety shall not be allowed:

- Component failures
- Changes in programmable parameters
- Reset to factory defaults (manufacturer's presets)
- Chang of operating mode
- False alarms
- Cessation or interruption of any intended operation, even if accompanied by an alarm
- Initiation of any unintended operation, including unintended or uncontrolled motion, even if accompanied by an alarm
- Error of a displayed numerical value sufficiently large to affect diagnosis or treatment
- Noise on a waveform in which the noise is indistinguishable from physiologically-produced signals or the noise interferes with interpretation of physiologically-produced signals
- Artefact or distortion in an image in which the artefact is indistinguishable from physiologically-produced signals or the distortion interferes with interpretation of physiologically-produced signals
- Failure of automatic diagnosis or treatment EQUIPMENT and SYSTEMS to diagnose or treat, even if accompanied by an alarm.

For EQUIPMENT and SYSTEMS with multiple FUNCTIONS, the criteria apply to each FUNCTION, parameter and channel.
The EQUIPMENT or SYSTEM may exhibit DEGRADATION of performance (e.g. deviation from manufacturer's specifications) that does not affect ESSENTIAL PERFORMANCE or safety.

The Tested Points of EUT

Photo 1 of 3

Photo 2 of 3

Photo 3 of 3

10 RADIATED ELECTROMAGNETIC FIELD IMMUNITY TEST

Port	:	Enclosure
Basic Standard	:	IEC/EN 61000-4-3
Requirements	:	10 V/m / with 80% AM. 1kHz Modulation.
Performance Criterion	:	The Equipment or System shall be able to provide the essential performance and remain safe.
Tested by	:	George Kuo
Temperature	:	25°C
Humidity	:	51% RH
Pressure	:	1019mbar

Block Diagram of Test Setup:

Test Procedure:

Frequency Range 80MHz ~ 2500MHz
Steps : 1 % of fundamental
Dwell Time : 3 sec

Range (MHz)	Field	Modulation	Polarity	Position	Result (Pass/Fail)
80-2500	10V/m	Yes	H	0	Pass
80-2500	10V/m	Yes	V	0	Pass
80-2500	10V/m	Yes	H	90	Pass
80-2500	10V/m	Yes	V	90	Pass
80-2500	10V/m	Yes	H	180	Pass
80-2500	10V/m	Yes	V	180	Pass
80-2500	10V/m	Yes	H	270	Pass
80-2500	10V/m	Yes	V	270	Pass

Observation: No any function degraded during the tests.

Compliance Criteria:

Under the test conditions specified in 36.202, the EQUIPMENT or SYSTEM shall be able to provide the ESSENTIAL PERFORMANCE and remain safe. The following DEGRADATIONS associated with ESSENTIAL PERFORMANCE and safety shall not be allowed:

- Component failures
- Changes in programmable parameters
- Reset to factory defaults (manufacturer's presets)
- Chang of operating mode
- False alarms
- Cessation or interruption of any intended operation, even if accompanied by an alarm
- Initiation of any unintended operation, including unintended or uncontrolled motion, even if accompanied by an alarm
- Error of a displayed numerical value sufficiently large to affect diagnosis or treatment
- Noise on a waveform in which the noise is indistinguishable from physiologically-produced signals or the noise interferes with interpretation of physiologically-produced signals
- Artefact or distortion in an image in which the artefact is indistinguishable from physiologically-produced signals or the distortion interferes with interpretation of physiologically-produced signals
- Failure of automatic diagnosis or treatment EQUIPMENT and SYSTEMS to diagnose or treat, even if accompanied by an alarm.

For EQUIPMENT and SYSTEMS with multiple FUNCTIONS, the criteria apply to each FUNCTION, parameter and channel.
The EQUIPMENT or SYSTEM may exhibit DEGRADATION of performance (e.g. deviation from manufacturer's specifications) that does not affect ESSENTIAL PERFORMANCE or safety.

11 FAST TRANSIENTS/BURST IMMUNITY TEST

Port	:	On Power Supply Line and LAN Cable
Basic Standard	:	IEC/EN 61000-4-4
Requirements	:	± 2 kV for Power Supply Line ± 1kV for LAN Cable
Performance Criterion	:	The Equipment or System shall be able to provide the essential performance and remain safe.
Tested by	:	George Kuo
Temperature	:	25°C
Humidity	:	52% RH
Pressure	:	1019mbar

Block Diagram of Test Setup:

Test Procedure:

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

Inject Line	Voltage kV	Inject Method	Result (Pass/Fail)
L	± 2	Direct	Pass
N	± 2	Direct	Pass
PE	± 2	Direct	Pass
L + N	± 2	Direct	Pass
L + PE	± 2	Direct	Pass
N + PE	± 2	Direct	Pass
L + N + PE	± 2	Direct	Pass
RJ 45 Port (LAN Cable)	± 1	Clamp	Pass

Observation: No any function degraded during the tests.

Compliance Criteria:

Under the test conditions specified in 36.202, the EQUIPMENT or SYSTEM shall be able to provide the ESSENTIAL PERFORMANCE and remain safe. The following DEGRADATIONS associated with ESSENTIAL PERFORMANCE and safety shall not be allowed:

- Component failures
- Changes in programmable parameters
- Reset to factory defaults (manufacturer's presets)
- Chang of operating mode
- False alarms
- Cessation or interruption of any intended operation, even if accompanied by an alarm
- Initiation of any unintended operation, including unintended or uncontrolled motion, even if accompanied by an alarm
- Error of a displayed numerical value sufficiently large to affect diagnosis or treatment
- Noise on a waveform in which the noise is indistinguishable from physiologically-produced signals or the noise interferes with interpretation of physiologically-produced signals
- Artefact or distortion in an image in which the artefact is indistinguishable from physiologically-produced signals or the distortion interferes with interpretation of physiologically-produced signals
- Failure of automatic diagnosis or treatment EQUIPMENT and SYSTEMS to diagnose or treat, even if accompanied by an alarm.

For EQUIPMENT and SYSTEMS with multiple FUNCTIONS, the criteria apply to each FUNCTION, parameter and channel.
The EQUIPMENT or SYSTEM may exhibit DEGRADATION of performance (e.g. deviation from manufacturer's specifications) that does not affect ESSENTIAL PERFORMANCE or safety.

12 SURGE IMMUNITY TEST

Port	:	Power Cord
Basic Standard	:	IEC/EN 61000-4-5
Requirements	:	± 0.5, 1 kV (Line to Line)
		± 0.5, 1, 2 kV (Line to Ground)
Performance Criteria	:	The Equipment or System shall be able to provide the essential performance and remain safe.
Tested by	:	George Kuo
Temperature	:	25°C
Humidity	:	50% RH
Pressure	:	1019mbar

Block Diagram of Test Setup:

Test Procedure:

Voltage Waveform : 1.2/50 *u*s
Current Waveform : 8/20 *u*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	0.5, 1	Positive	Capacitive	Pass
L1-PE	0.5, 1, 2	Positive	Capacitive	Pass
L2-PE	0.5, 1, 2	Positive	Capacitive	Pass
L1-L2	0.5, 1	Negative	Capacitive	Pass
L1-PE	0.5, 1, 2	Negative	Capacitive	Pass
L2-PE	0.5, 1, 2	Negative	Capacitive	Pass

Observation: No any function degraded during the tests.

Compliance Criteria:

Under the test conditions specified in 36.202, the EQUIPMENT or SYSTEM shall be able to provide the ESSENTIAL PERFORMANCE and remain safe. The following DEGRADATIONS associated with ESSENTIAL PERFORMANCE and safety shall not be allowed:

- Component failures
- Changes in programmable parameters
- Reset to factory defaults (manufacturer's presets)
- Chang of operating mode
- False alarms
- Cessation or interruption of any intended operation, even if accompanied by an alarm
- Initiation of any unintended operation, including unintended or uncontrolled motion, even if accompanied by an alarm
- Error of a displayed numerical value sufficiently large to affect diagnosis or treatment
- Noise on a waveform in which the noise is indistinguishable from physiologically-produced signals or the noise interferes with interpretation of physiologically-produced signals
- Artefact or distortion in an image in which the artefact is indistinguishable from physiologically-produced signals or the distortion interferes with interpretation of physiologically-produced signals
- Failure of automatic diagnosis or treatment EQUIPMENT and SYSTEMS to diagnose or treat, even if accompanied by an alarm.

For EQUIPMENT and SYSTEMS with multiple FUNCTIONS, the criteria apply to each FUNCTION, parameter and channel.

The EQUIPMENT or SYSTEM may exhibit DEGRADATION of performance (e.g. deviation from manufacturer's specifications) that does not affect ESSENTIAL PERFORMANCE or safety.

13 CONDUCTED DISTRBANCE/INDUCED RADIO-FREQUENCY FIELD IMMUNITY TEST

Port	:	AC Port and LAN Cable
Basic Standard	:	IEC/EN 61000-4-6
Requirements	:	10 V with 80% AM. 1kHz Modulation.
Injection Method	:	CDN-M3 for Power Cord CDN-T4 for LAN Cable
Performance Criterion	:	The Equipment or System shall be able to provide the essential performance and remain safe.
Tested by	:	George Kuo
Temperature	:	25°C
Humidity	:	52% RH
Pressure	:	1019mbar

Block Diagram of Test Setup:

Side View:

Top View:

Test Procedure:

Frequency Range : 0.15MHz-80MHz
Frequency Step : 1% of fundamental
Dwell Time : 3 sec

Range (MHz)	Field	Modulation	Result (Pass/Fail)
0.15-80	10V	Yes	Pass

Observation: No any function degraded during the tests.

Compliance Criteria:

Under the test conditions specified in 36.202, the EQUIPMENT or SYSTEM shall be able to provide the ESSENTIAL PERFORMANCE and remain safe. The following DEGRADATIONS associated with ESSENTIAL PERFORMANCE and safety shall not be allowed:

- Component failures
- Changes in programmable parameters
- Reset to factory defaults (manufacturer's presets)
- Chang of operating mode
- False alarms
- Cessation or interruption of any intended operation, even if accompanied by an alarm
- Initiation of any unintended operation, including unintended or uncontrolled motion, even if accompanied by an alarm
- Error of a displayed numerical value sufficiently large to affect diagnosis or treatment
- Noise on a waveform in which the noise is indistinguishable from physiologically-produced signals or the noise interferes with interpretation of physiologically-produced signals
- Artefact or distortion in an image in which the artefact is indistinguishable from physiologically-produced signals or the distortion interferes with interpretation of physiologically-produced signals
- Failure of automatic diagnosis or treatment EQUIPMENT and SYSTEMS to diagnose or treat, even if accompanied by an alarm.

For EQUIPMENT and SYSTEMS with multiple FUNCTIONS, the criteria apply to each FUNCTION, parameter and channel.
The EQUIPMENT or SYSTEM may exhibit DEGRADATION of performance (e.g. deviation from manufacturer's specifications) that does not affect ESSENTIAL PERFORMANCE or safety.

14 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

	Test Level % U_T	Reduction (%)	Duration (periods)
Voltage Dips	<5	>95	0.5
	40	60	5
	70	30	25

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

Test Interval : Min. 10 sec.

Performance Criteria : The Equipment or System shall be able to provide the essential performance and remain safe.

Tested by : George Kuo

Temperature : 25°C

Humidity : 50% RH

Pressure : 1019mbar

Block Diagram of Test Setup:

Test Procedure:

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	Result
0	100	0.5	Normal	PASS
40	60	5	Normal	PASS
70	30	25	Normal	PASS

Voltage Interruptions:

Test Level % U_T	Reduction (%)	Duration (periods)	Observation	Result
0	100	250	EUT shut down but can be recovered by manual, as the events disappear.	PASS

Note:

1. Normal - No any functions degrade during and after the test.
2. For Voltage Interruption, EQUIPMENT and SYSTEMS are allowed a deviation from the requirements of 36.202.1 j) at the IMMUNITY TEST LEVEL specified in Table 211, provided the EQUIPMENT or SYSTEM remains safe, experiences no component failures and is restorable to the pre-test state with OPERATOR intervention. Determination of compliance is based upon performance of the EQUIPMENT or SYSTEM during and after application of the test sequence.

Observation: No any function degraded during the tests.

Compliance Criteria:

Under the test conditions specified in 36.202, the EQUIPMENT or SYSTEM shall be able to provide the ESSENTIAL PERFORMANCE and remain safe. The following DEGRADATIONS associated with ESSENTIAL PERFORMANCE and safety shall not be allowed:

- Component failures
- Changes in programmable parameters
- Reset to factory defaults (manufacturer's presets)
- Chang of operating mode
- False alarms
- Cessation or interruption of any intended operation, even if accompanied by an alarm
- Initiation of any unintended operation, including unintended or uncontrolled motion, even if accompanied by an alarm
- Error of a displayed numerical value sufficiently large to affect diagnosis or treatment
- Noise on a waveform in which the noise is indistinguishable from physiologically-produced signals or the noise interferes with interpretation of physiologically-produced signals
- Artefact or distortion in an image in which the artefact is indistinguishable from physiologically-produced signals or the distortion interferes with interpretation of physiologically-produced signals
- Failure of automatic diagnosis or treatment EQUIPMENT and SYSTEMS to diagnose or treat, even if accompanied by an alarm.

For EQUIPMENT and SYSTEMS with multiple FUNCTIONS, the criteria apply to each FUNCTION, parameter and channel.

The EQUIPMENT or SYSTEM may exhibit DEGRADATION of performance (e.g. deviation from manufacturer's specifications) that does not affect ESSENTIAL PERFORMANCE or safety.

APPENDIX I - PHOTOGRAPHS OF TEST SETUP

LINE CONDUCTED EMISSION TEST (EN 55011)

RADIATED EMISSION TEST (EN 55011)

POWER 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

VOLTAGE DIPS / INTERRUPTION TEST

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

ADVANTECH Date : 2004/1/2 PM 03:22:19 V3.15

File :

Operator : MAX YAN
EUT : PANEL PC
Model No. POC-153T
Remarks 1024*768 TEMP:22 HUMD:55(CONTINUE)

Urms =	230.1V	Freq =	49.987	Range:	5 A		
Irms =	0.593A	Ipk =	2.390A	cf	=	4.029	
P =	62.34W	Pap =	136.5VA	pf	=	0.457	

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 [ms]	Fail
1	0.072	0.000	0.010	0.000	

ADVANTECH Date : 2004/1/2 PM 03:35:13 V3.15

File :

Operator : MAX YAN
EUT : PANEL PC
Model No. POC-153T
Remarks 1024*768 TEMP:22 HUMD:55

Urms =	230.1V	Freq =	49.974	Range:	5 A		
Irms =	0.564A	Ipk =	2.288A	cf =	4.056		
P =	58.78W	Pap =	129.8VA	pf =	0.453		

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 = 0.076

	Pst	dmax [%]	dc [%]	dt>Lim [ms]	Fail
1	0.076	1.660	0.460	0.000	