

**TRC**  
***Certificate of Compliance***

*Training Research Co., Ltd.*

hereby certifies that

EMC TEST Class A

24-Port 10/100Mbps+2-Port Gigabit+2-Port mini-GBIC WEB Smart Switch  
Model No.: TEG-2224WS

Made by

**TRENDWare International Inc.**

**3135 Kashiwa Street Torrance, CA 90505, U.S.A.**

is fulfilled

EMI: EN 55022:1998, EN61000-3-2: 2000, EN61000-3-3: 1995+A1: 2001

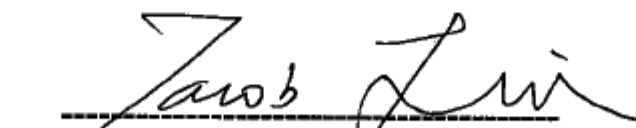
EMS: EN 61000-6-1/2001 → EN 61000-4-2/1995, EN 61000-4-3/1996, EN 61000-4-4/1995

EN 61000-4-5/1995, EN 61000-4-6/1996, EN 61000-4-8/1993, EN 61000-4-11/1994

Test Date: July 2, 2003

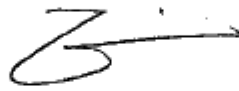
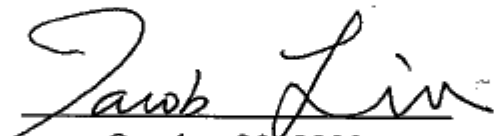
Verification Registration No.: C51CE268

*October 30, 2003*

  
V. General Manager, Jacob Lin

**CE CE CE CE CE**

Training Research Co., Ltd. (NVLAP LAB CODE: 200174-0)

Report No.	C51CE268	
Directives Standard	89/336/EEC EMC, Class A EN 61000-6-3/EN 55024 (CE), ICES-003 (Canada)	
Applicant Applicant address	TRENDWare International Inc. 3135 Kashiwa Street Torrance, CA 90505, U.S.A.	
Items tested	24-Port 10/100Mbps+2-Port Gigabit+2-Port mini-GBIC WEB Smart Switch	
Model No.	TEG-2224WS (Sample # C51576)	
Results	<b>Compliance</b> (As detailed within this report)	
Date	05/22/2003 (month / day / year)(Sample received) 07/02/2003 (month / day / year)(Tested)	
Prepared by		Project Engineer
Authorized by		V. General Manager (Jacob Lin)
Issue date	October 30, 2003	(month / day / year)
<b>Modifications</b>	<b>None</b>	
Tested by	Training Research Co., Ltd. ( <b>Accredited by NVLAP</b> )	
Office at	1F, No. 255, Nan Yang Street, Hsichih, Taipei Hsien 221, Taiwan	
Open site at	No. 15, Lane 530, Pa-Lian RD., Sec. 1, Hsichih City, Taipei Hsien, Taiwan, R.O.C.	

**Conditions of issue :**

- *This test report shall not be reproduced except in full, without written approval of TRC. And the test result contained within this report only relate to the sample submitted for testing.*
- *The test data in this test report are following the procedures in accordance with the terms of accreditation.*
- *This test report and measurements made by TRC are traceable to the NIST only Conducted and Radiated Method (TRC is accredited by NVLAP, code No.: 200174-0).*
- *The device has been tested is fully complied with the requirements the Directive 89/336/EEC (CE), AS/NZS CISPR 22: 2002 (C-Tick) and ICES-003 (Canada).*

## Contents

<b>Chapter 0 Emission and Susceptibility Standards .....</b>	<b>3</b>
<b>Chapter 1 Introduction</b>	
Description of EUT .....	4
Configuration of Test Setup .....	5
List of Support Equipment .....	8
<b>Chapter 2 Conducted Emission Test</b>	
Test Condition and Setup .....	10
Conducted Test Placement .....	11
<b>Chapter 3 Radiated Emission Test</b>	
Test Condition and Setup .....	13
Radiated Test Placement .....	14
<b>Chapter 4 Radio Frequency Immunity Test (RS test) .....</b>	<b>15</b>
EN 61000-4-3 Photo of Test Set-Up .....	16
<b>Chapter 5 Electrical Fast Transient/Burst Test (EFT test) .....</b>	<b>17</b>
EN 61000-4-4 Photo of Test Set-Up .....	18
<b>Chapter 6 Electrostatic Discharges Immunity Test .....</b>	<b>19</b>
EN 61000-4-2 Photo of Test Set-Up .....	20
<b>Chapter 7 Surge Immunity Test .....</b>	<b>21</b>
EN 61000-4-5 Photo of Test Set-Up .....	22
<b>Chapter 8 Continuous Wave Voltage Immunity Test .....</b>	<b>23</b>
EN 61000-4-6 Photo of Test Set-Up .....	24
<b>Chapter 9 Power Frequency Magnetic Field Immunity Test .....</b>	<b>26</b>
EN 61000-4-8 Photo of Test Set-Up .....	27
<b>Chapter 10 Voltage DIP / Interruption Immunity Test .....</b>	<b>28</b>
EN 61000-4-11 Photo of Test Set-Up .....	29
<b>Chapter 11 Harmonics Test .....</b>	<b>30</b>
<b>Chapter 12 Voltage Fluctuation and Flicker Test .....</b>	<b>31</b>
<b>Appendix A :</b>	
Conducted test result .....	32
<b>Appendix B :</b>	
Radiated test result .....	34
<b>Appendix C :</b>	
Photographs of EUT .....	35

## Chapter 0 Emission and Susceptibility Standards

### *Emission Standards*

Emission Standard	European Standard	International Standard
( X )	EN 61000-6-3/2001	IEC 61000-6-1/1996
( )	EN 61000-6-4/2001	IEC 61000-6-1/1997
( )	EN 50081-1/1992	
( )	EN 50081-1/8.93	
( )	EN 55014/4.93	CISPR 14: 1993
( )	EN 55015/12.93	CISPR 15: 1992
( )	EN 55013/2001	CISPR 13: 2001
( X )	EN 55022/98	CISPR 22: 1997
( X )	EN 61000-3-2/2000	IEC 61000-3-2: 2000 + A1: 2001
( X )	EN 61000-3-3/1995+A1: 2001	IEC 61000-3-3: 1994 + A1: 2001

### *Susceptibility Standards*

Susceptibility Standard	European Standard	International Standard
( X )	EN 61000-6-1/2001	IEC 61000-6-1/1997
( )	EN 61000-6-2/2001	IEC 61000-6-1/1999
( )	EN 50082-1/1997	
( )	EN 50082-2/1994	
( X )	EN 55024/1998	CISPR 24/1997
( )	EN 55020/2002	CISPR 20/2002
( X )	EN 61000-4-2:1995	IEC 61000-4-2:1995
( X )	EN 61000-4-3:1996	IEC 61000-4-3:1995
( X )	EN 61000-4-4:1995	IEC 61000-4-4:1995
( X )	EN 61000-4-5:1995	IEC 61000-4-5:1995
( X )	EN 61000-4-6:1996	IEC 61000-4-6:1996
( X )	EN 61000-4-8:1993	IEC 61000-4-8:1993
( X )	EN 61000-4-11:1994	IEC 61000-4-11:1994

## *Chapter 1 Introduction*

### *Description of EUT:*

This EUT is a data transmission / receiving facility. It was connected to LAN card installed in the PC or compatible computer and makes your data equipment available to transmit / receive data via the EUT.

### *Test method:*

Pretest was found that the emission of operating mode is worse than standby mode. So, The final test is made at the operating mode.

This EUT has two kinds of power module for option, features as below:

Trade Name	Model No.	Input	Output
UMEC	UP0301S-05	100-240 Vac	5.0Vdc
LEADER	SA25-050100-01	100-240 Vac	5.0Vdc

During testing, there are eight modes were tested:

- 10 x 10 Mbps UMEC Power 230Vac/50Hz
- 100 x 100 Mbps UMEC Power 230Vac/50Hz
- 1000 x 100 Mbps UMEC Power 230Vac/50Hz
- 1000 x 1000 Mbps UMEC Power 230Vac/50Hz
- 10 x 10 Mbps LEADER Power 230Vac/50Hz
- 100 x 100 Mbps LEADER Power 230Vac/50Hz
- 1000 x 100 Mbps LEADER Power 230Vac/50Hz
- 1000 x 1000 Mbps LEADER Power 230Vac/50Hz

The Conduction test was found out the test mode “**10 x 10 Mbps UMEC Power 230Vac/50Hz**” was the worst case. Telecommunication ports test was found out the test mode “**Leader Power 10 x 10 Mbps 230Vac/50Hz**” was the worst case. And we only recorded the worst data in this report.

The radiation test was found out the testing mode: “**1000 x 100 Mbps LEADER Power 230Vac/50Hz**” was the worst case and we only recorded the worst case in this report.

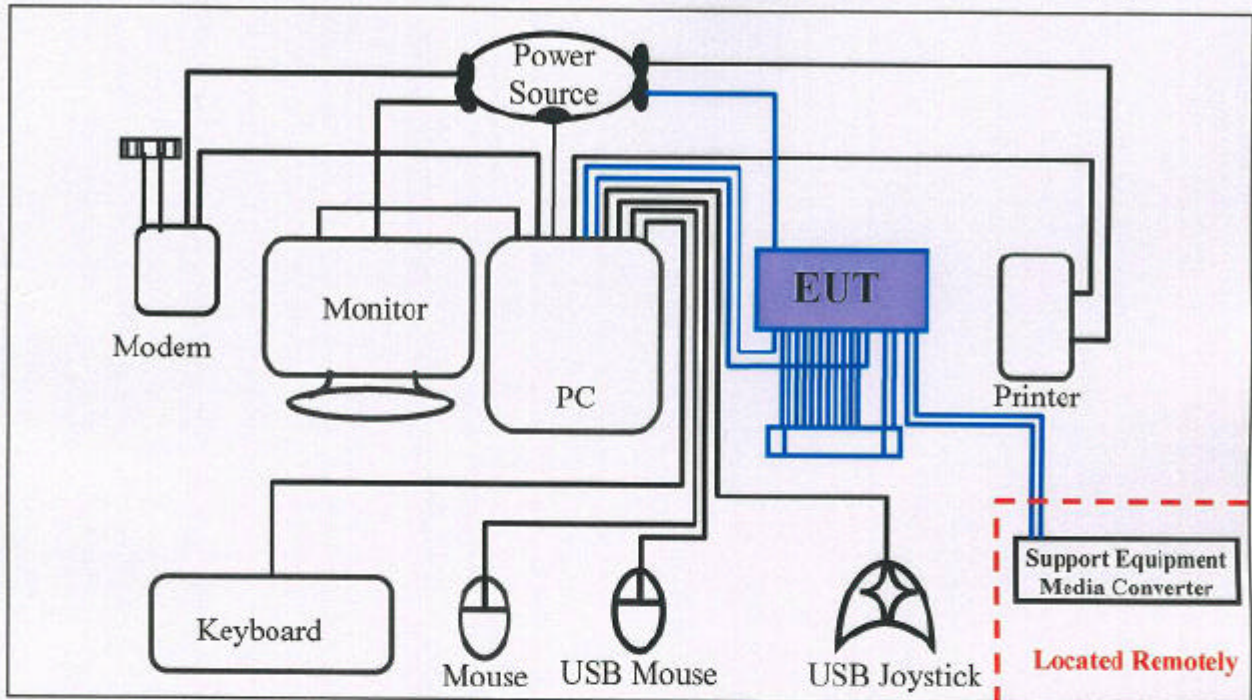
During testing, the EUT was operated at “transmitting” and “receiving” mode simultaneously.

The test placement as the photographs showed is the worst emission placed. (If the emission is close to the ambient, the resolution BW and view resolution will be reduced and the data will be recorded by detection of maximum hold peak mode.)

***The testing configuration of test setup is showing in the next page.***



### Configuration of test setup (Test Mode: 10 x 10 Mbps & 100 x 100 Mbps)



#### Connections:

##### PC:

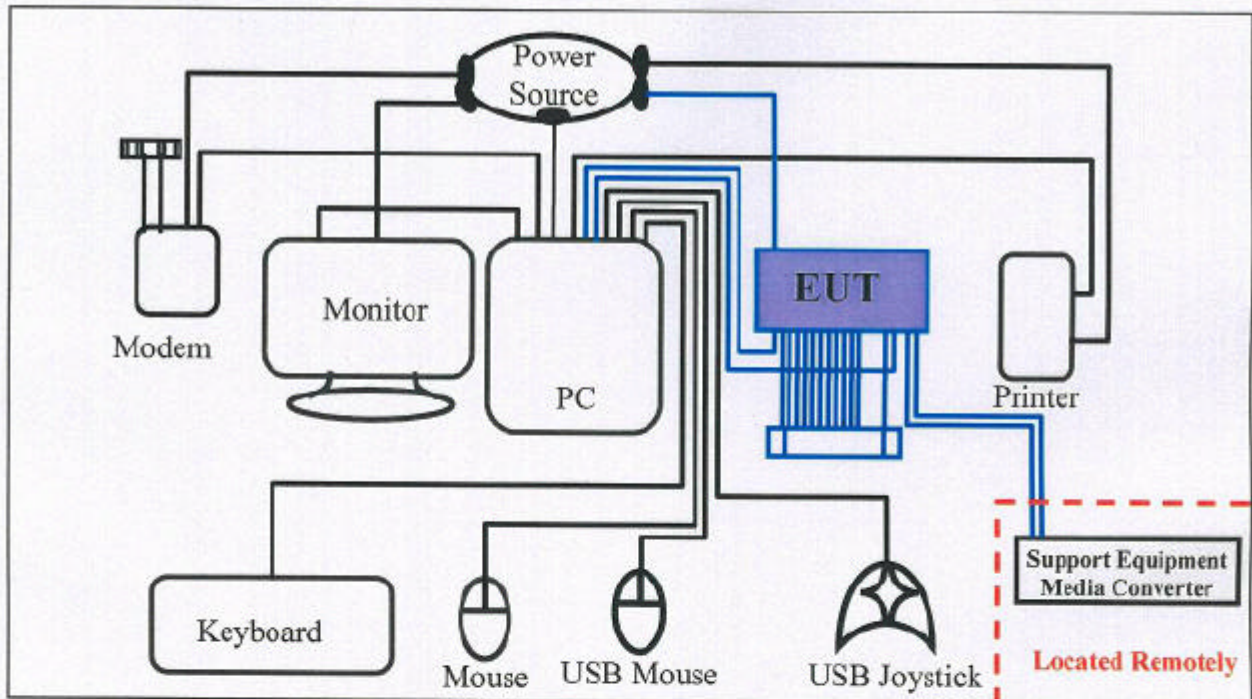
- \*Serial Port --- via a 110cm shielded RS-232 cable to modem.
- \*Monitor Port --- a monitor with 1.5m length data cable.
- \*Keyboard port --- a keyboard with 1.50m length data cable.
- \*Mouse port --- a mouse with 1.50m length data cable.
- \*USB port A --- a USB joystick with 1.5m long, shielded, no ferrite bead data cable.
- \*USB port B --- a USB mouse with 1.8m long, shielded, no ferrite bead data cable.
- \*Printer port --- a printer with 1.80m length data cable.

##### EUT:

- \*UTP port 1 --- via a 1m length RJ-45 cable to the RJ-45 jack of the LAN card that installed in nearby PC.
- \*UTP port 2~23 --- connect with a 2m length RJ-45 cable that terminated with 200ohm.
- \*UTP port 24 --- via a 10m long, non-shielded, no ferrite bead, RJ-45 cable to the RJ-45 jack of the LAN card that installed in nearby PC.
- \*Gigabit UTP port 1, 2 --- connect with a 2m length RJ-45 cable that terminated with 200ohm.
- \*Fiber port 1, 2 --- with a Gigabit module and via a 5m length fiber cable to the support equipment media converter..
- \*Power port --- via a 1.80m length power cable with a power adaptor to the power source.
- \*Power module --- Trade: LEI; Model: SA-25-050100-01; I/P: 100-240Vac 50/60Hz 0.6A;  
O/P: 5Vdc 5A
- \*Power module --- Trade: UMEC; Model: UP0301S-05; I/P: 100-240Vac 47/63Hz 0.7A Max;  
O/P: 5Vdc 5A



### Configuration of test setup (Test Mode: 1000 x 100 Mbps)



#### Connections:

##### PC:

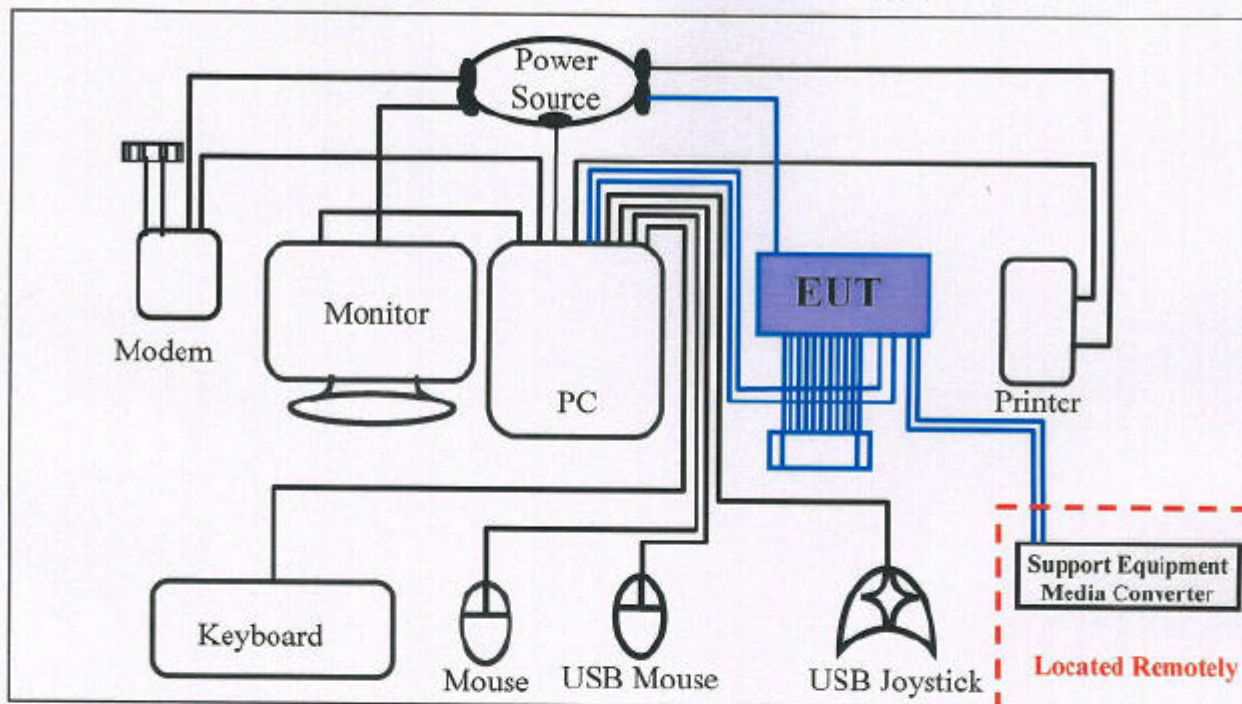
- \*Serial Port --- via a 110cm shielded RS-232 cable to modem.
- \*Monitor Port --- a monitor with 1.5m length data cable.
- \*Keyboard port --- a keyboard with 1.50m length data cable.
- \*Mouse port --- a mouse with 1.50m length data cable.
- \*USB port A --- a USB joystick with 1.5m long, shielded, no ferrite bead data cable.
- \*USB port B --- a USB mouse with 1.8m long, shielded, no ferrite bead data cable.
- \*Printer port --- a printer with 1.80m length data cable.

##### EUT:

- \*UTP port 1 --- via a 1m length RJ-45 cable to the RJ-45 jack of the LAN card that installed in nearby PC.
- \*UTP port 2~24 --- connect with a 2m length RJ-45 cable that terminated with 200ohm.
- \*Gigabit UTP port 1 --- connect with a 2m length RJ-45 cable that terminated with 200ohm.
- \*Gigabit UTP port 2 --- via a 10m long, non-shielded, no ferrite bead, RJ-45 cable to the RJ-45 jack of the LAN card that installed in nearby PC.
- \*Fiber port 1, 2 --- with a Gigabit module and via a 5m length fiber cable to the support equipment media converter..
- \*Power port --- via a 1.80m length power cable with a power adaptor to the power source.
- \*Power module --- Trade: LEI; Model: SA-25-050100-01; I/P: 100-240Vac 50/60Hz 0.6A;  
O/P: 5Vdc 5A
- \*Power module --- Trade: UMEC; Model: UP0301S-05; I/P: 100-240Vac 47/63Hz 0.7A Max;  
O/P: 5Vdc 5A



### Configuration of test setup (Test Mode: 1000 x 1000 Mbps)



#### Connections:

##### PC:

- \*Serial Port --- via a 110cm shielded RS-232 cable to modem.
- \*Monitor Port --- a monitor with 1.5m length data cable.
- \*Keyboard port --- a keyboard with 1.50m length data cable.
- \*Mouse port --- a mouse with 1.50m length data cable.
- \*USB port A --- a USB joystick with 1.5m long, shielded, no ferrite bead data cable.
- \*USB port B --- a USB mouse with 1.8m long, shielded, no ferrite bead data cable.
- \*Printer port --- a printer with 1.80m length data cable.

##### EUT:

- \*UTP port 1~24 --- connect with a 2m length RJ-45 cable that terminated with 200ohm.
- \*Gigabit UTP port 1, 2 --- via a 10m long, non-shielded, no ferrite bead, RJ-45 cable to the RJ-45 jack of the LAN card that installed in nearby PC.
- \*Fiber port 1, 2 --- with a Gigabit module and via a 5m length fiber cable to the support equipment media converter..
- \*Power port --- via a 1.80m length power cable with a power adaptor to the power source.
- \*Power module --- Trade: LEI; Model: SA-25-050100-01; I/P: 100-240Vac 50/60Hz 0.6A;  
O/P: 5Vdc 5A
- \*Power module --- Trade: UMEC; Model: UP0301S-05; I/P: 100-240Vac 47/63Hz 0.7A Max;  
O/P: 5Vdc 5A



**List of support equipment****Conducted (Radiated) test:**

**PC** : **HP Brio 85xx 6/350**  
Model No. : D6928A  
Serial No. : SG91801432; SG91801552  
FCC ID : Doc Approved  
Power type : 100 ~ 230VAC / 50 ~ 60Hz, 5A, Switching  
Power cord : Non-shielded, 2.33m long, Plastic, No ferrite core

**Monitor** : **HP 15" Color Monitor**  
Model No. : D2827A  
Serial No. : KR91161719  
FCC ID : C5F7NFCMC1518X  
Power type : 110 ~ 240 VAC / 50 ~ 60 Hz, Switching  
Power cord : Shielded, 1.83m long, No ferrite core  
Data cable : Shielded, 1.46m long, with two ferrite cores

**Keyboard** : **HP**  
Model No. : SK-2501K  
Serial No. : MR80700789  
FCC ID : GYUR38SK  
Power type : By PC  
Data cable : Shielded, 1.73m long, with ferrite core

**Mouse** : **HP**  
Model No. : M-S34  
Serial No. : LZB90714106  
FCC ID : DZL211029  
Power type : By PC  
Power cord : Non-shielded, 1.88m long, No ferrite core

**USB Mouse** : **Logitech Wheel Mouse**  
Model No. : M-BJ-58  
Serial No. : LN20901985  
FCC ID : Doc Approved  
Power type : By PC  
Power cord : Non-shielded, 1.88m long, No ferrite core

**Modem** : **ACEEX**  
Model No. : XDM-9624  
FCC ID : IFAXDM-9624  
Power type : 220VAC, 50Hz / 9VAC, 1A  
Power cord : Non-shielded, 1.9m long, No ferrite cord  
Data cable : RS232, Shielded, 1.2m long, No ferrite core  
RJ11C x 2, 7' long non-shielded, No ferrite core

**Printer** : **HP**  
Model No. : C2642A  
Serial No. : SG69A196GV  
FCC ID : B94C2642X  
Power type : 220 VAC, 50Hz  
Power cord : Non-shielded, 2m long, no ferrite core  
Data cable : Shielded, 1.84m (1.7m) long, no ferrite core

**USB Joystick** : **Rockfire**  
Model No. : QF-337uv  
Serial No. : 10600545  
FCC ID : CE Approval  
Power type : Powered by PC  
Power cable : Shielded, 1.8m long, No ferrite bead data cable

**PC** : **HP Vectra VE**  
Model No. : D6970A  
Serial No. : SG53000707  
FCC ID : Doc Approved  
Power type : 100 ~ 230VAC / 50 ~ 60Hz, 5A, Switching  
Power cord : Non-shielded, 2.30m long, Plastic, No ferrite core

## Chapter 2 Conducted Emission Test

### Test condition and setup:

#### (1) Mains:

All the equipment is placed and setup according to the EN 55022.

The EUT is assembled on a wooden table that is 80 cm high, is placed 40 cm from the back-wall that is a vertical conducting plane. One LISN is for EUT, the other LISN is for support equipment. They are all placed on the conductive ground. The EUT's LISN connect a line switch box for selecting L1 or L2, then connect to a preamplifier and spectrum for pretest.

The spectrum measured from 150KHz to 30MHz. Conducted emission levels are detected at max. peak mode. But if the max. peak mode failed or over average limit, it will be measured by QP and average detection mode using the Receiver.

While testing, there is the worst-emission plot printed at peak detection mode, and there are more than 6 highest emissions relative to limit recorded. The plot is kept as the original data, not included in test report.

#### (2) Telecommunication ports:

The EUT is placed as mains disturbance test. The communication line connected to the ISN and then the measuring receiver connected to the ISN to measured the level of voltage disturbance.

### List of test Instrument :

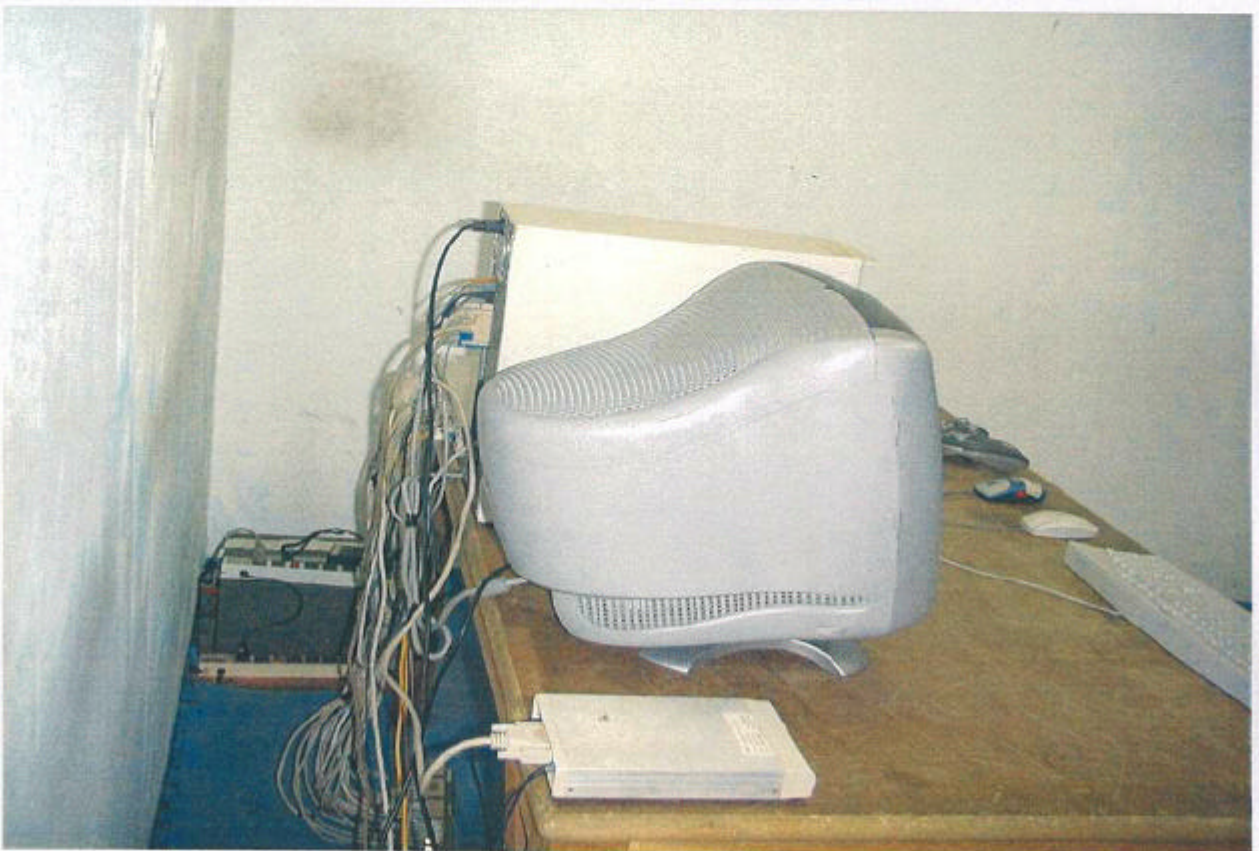
Instrument Name	Model No.	Brand	Serial No.	Calibration Date	
				Last time	Next time
Receiver	SCR3102	SCHAFFNER	012	04/22/03	04/21/04
LISN (EUT)	3825/2	EMCO	9411-2284	07/21/03	07/20/04
LISN (Support E.)	3825/2	EMCO	9210-2007	09/03/03	09/02/04
Preamplifier	CB-001	TRC	98-02	05/29/03	05/28/04
Line switch box	CB-01	TRC	98-04	05/29/03	05/28/04
1dB Attenuator	CAT-1	mini-circuits	-----	05/29/03	05/28/04
FTB-1-6 Attenuator	15542	mini-circuits	9620 03	05/29/03	05/28/04
20dB Attenuator	CAT-20	mini-circuits	9620 13	05/29/03	05/28/04
3dB Attenuator	CAT-3	mini-circuits	9620 14	05/29/03	05/28/04
Coixal Cable	BNC3200B-0058	Jyebao	CL-05	05/29/03	05/28/04
Coixal Cable	BNC31VB-0316	Jyebao	IF-01ca0069-036	05/29/03	05/28/04
50ohm terminator	370BNM	NARDA	PWR5W	07/21/03	07/20/04
50ohm terminator	370BNM	NARDA	PWR5W	07/21/03	07/20/04
50ohm terminator	370BNM	NARDA	PWR5W	09/03/03	09/02/04
50ohm terminator	370BNM	NARDA	PWR5W	09/03/03	09/02/04
ISN	ISN T400	SCHAFFNER	16596	04/16/03	04/16/04

The level of confidence of 95% , the uncertainty of measurement of conducted emission is +3.1/-4.84 dB .

### Test Result : Pass (Appendix A)

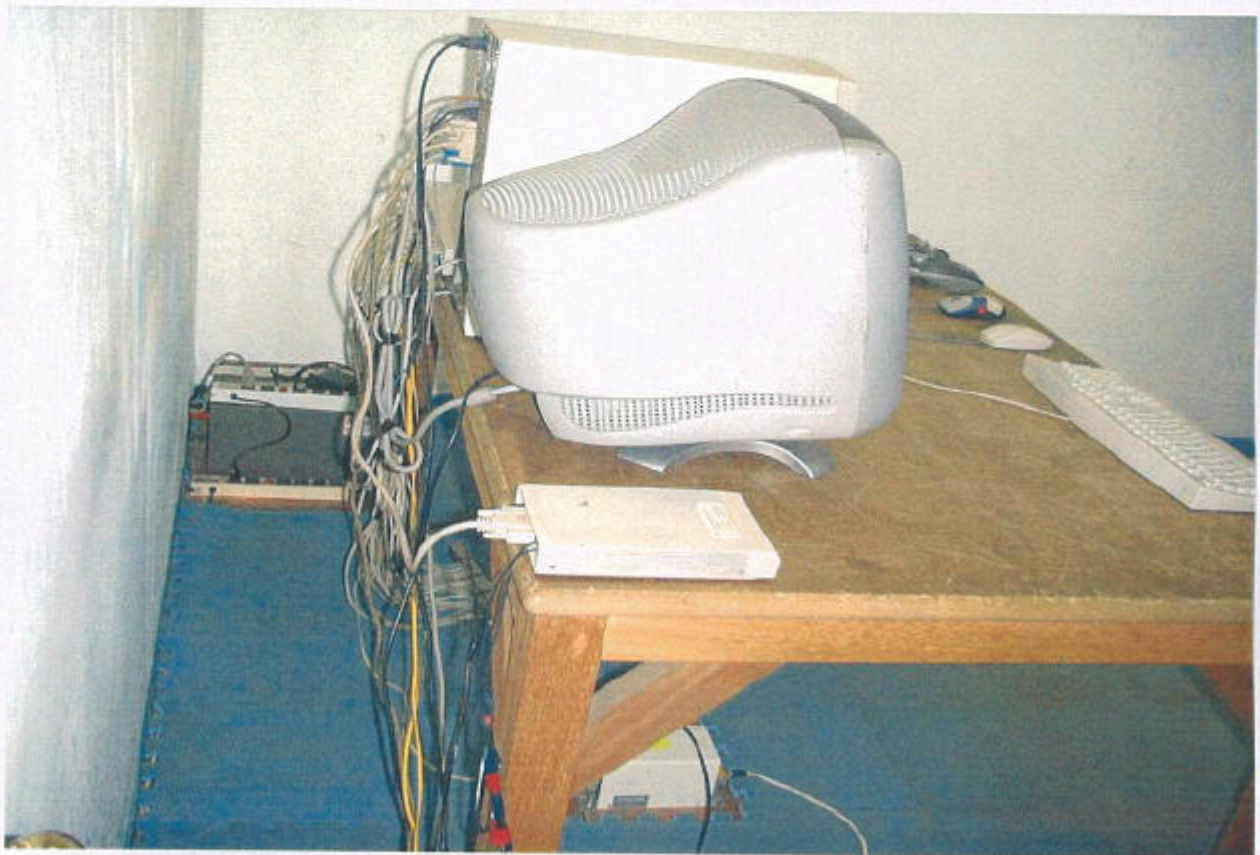


**Conducted Test Placement: (Photographs) (Power Line)**





**Conducted Test Placement: (Photographs) (Data Line)**



### Chapter 3 Radiated emission test

**Test condition and setup :**

**Pretest:** Prior to the final test (OATS test), the EUT is placed in a shielded enclosure, and scan from 30MHz to 1GHz. This is done to ensure the radiation is exactly emitted from the EUT.

**Final test :** Final radiation measurements is made on a **10 – meter**, open-field test site. The EUT is placed on a nonconductive table, which is 0.8m height, the top surface is 1.0 x 1.5 meter. The placement is according to EN 55022.

The M. E. whole range Antenna is used to measure frequency from 30 MHz to 1GHz. The final test is used the Receiver.

Measure more than six top marked frequencies generated form pretest by computer step by step at each frequency. The EUT is rotated 360 degrees, and antenna is raised and lowered from 1 to 4 meters to find the maximum emission levels. The antenna is used with both horizontal and vertical polarization.

Appropriated preamplifier that is made by TRC is used for improving sensitivity and precaution is taken to avoid overloading. The spectrum analyzer’s 6dB bandwidth is set to 120 K Hz, and the EUT is measured at quasi-peak mode.

If the emission is close to the frequency band of ambient, the tester will recheck the data and the corrected data will be written in the test data sheet. If the emission is just within the ambient, the data from shielded room will be taken as the final data.

**List of test Instrument :**

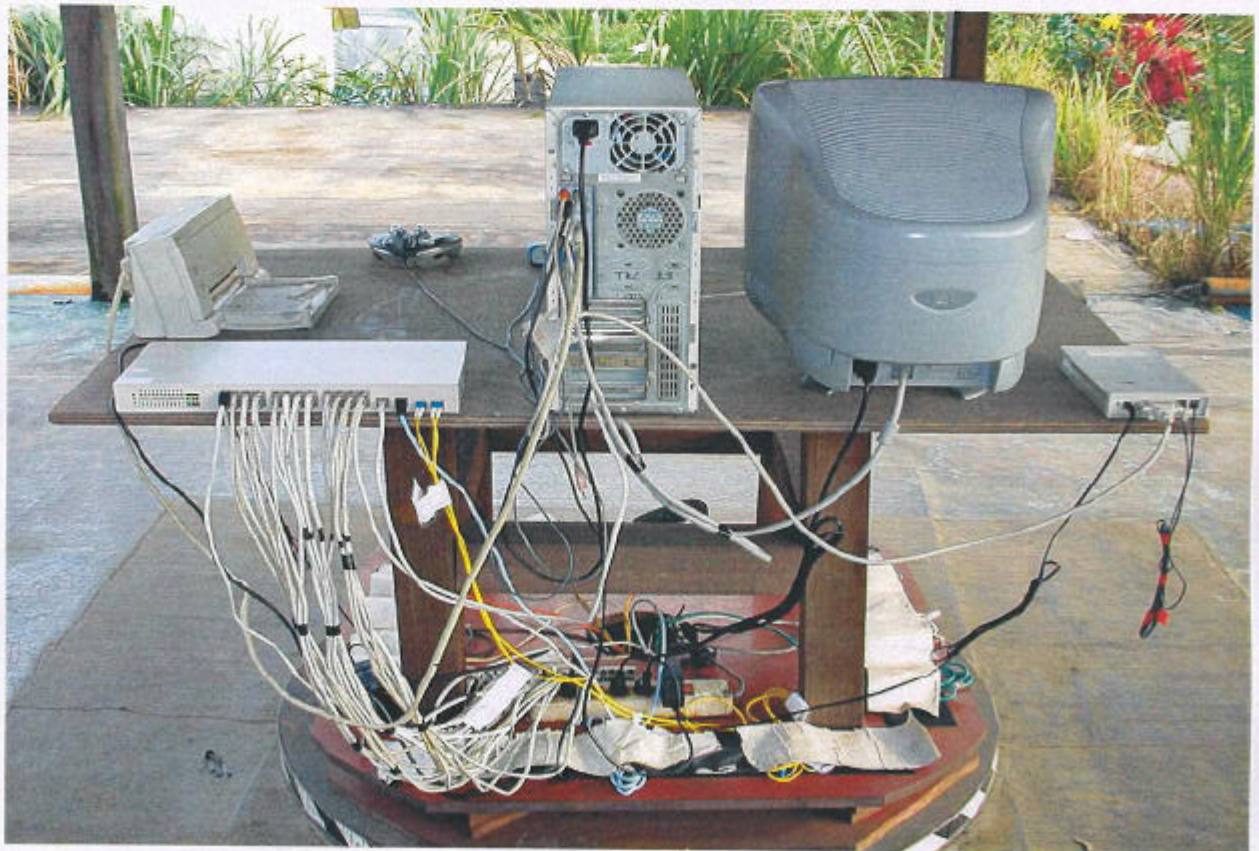
Instrument Name	Model No.	Brand	Serial No.	Calibration Date	
				Last time	Next time
Receiver	SCR3102	SCHAFFNER	012	04/22/03	04/21/04
Control Box	TWR95-4	TRC	C9001-2	N/A	N/A
Antenna	CBL6141A	SCHAFFNER	4206	05/27/03	05/26/04
Open test side (Antenna, Amplify, cable calibrated together)				05/29/03	05/28/04
Pre-amplifier	TRC-CB-2	TRC	CB-002	05/29/03	05/28/04
Coixal Cable(20meter)	RG-214/U	Jyebao	CL-002	05/29/03	05/28/04
Coixal Cable(50cm)	BNC31VB-0316	Jyebao	CL-002	05/29/03	05/28/04
Coixal Cable(20cm)	BNC31VB-0318	Jyebao	CL-007	05/29/03	05/28/04
Coixal Cable(55cm)	BNC31VB-0316	Jyebao	CL-006	05/29/03	05/28/04
Coixal Cable(55cm)	BNC31VB-0316	Jyebao	CL-005	05/29/03	05/28/04

The level of confidence of 95%, the uncertainty of measurement of radiated emission is +2.85/-2.77 dB.

**Test Result : Pass (Appendix B)**



**Radiated Test Placement: (Photographs)**



## Chapter 4 Radio Frequency Immunity Test (RS)

**Test information:**

Test setup: Anechoic Chamber

Test Frequency:     80 ~ 1000 MHz  
                            27 ~ 500 MHz Without Modulation

Modulation:         FM %  
                            80% AM Modulation with 1KHz  
                            900 KHz ± 5 KHz with PM 200 Hz and 100% depth

Step size:             ≤ 1% step size

Sweep time:         2.5 Second

Field strength:     1V/m             3V/m             10V/m

Test mode: Ref. Test method of Chapter 1

Test instruments:

Name	Model Number	Serial Number	Selected
Shielding Room	AC5-001	N / A	X
DC Power Supply	GPR-3520H	7090069	X
Signal Generator	900	287104	X
Amplifier	AC5-002	N / A	X
Power Meter	1219-D-007	157	X
Spectrum Analyzer	8594EM	3710A00198	X
Preamplifier	AC3-002	N / A	X

Comment:

Performance Criteria     A     B     C

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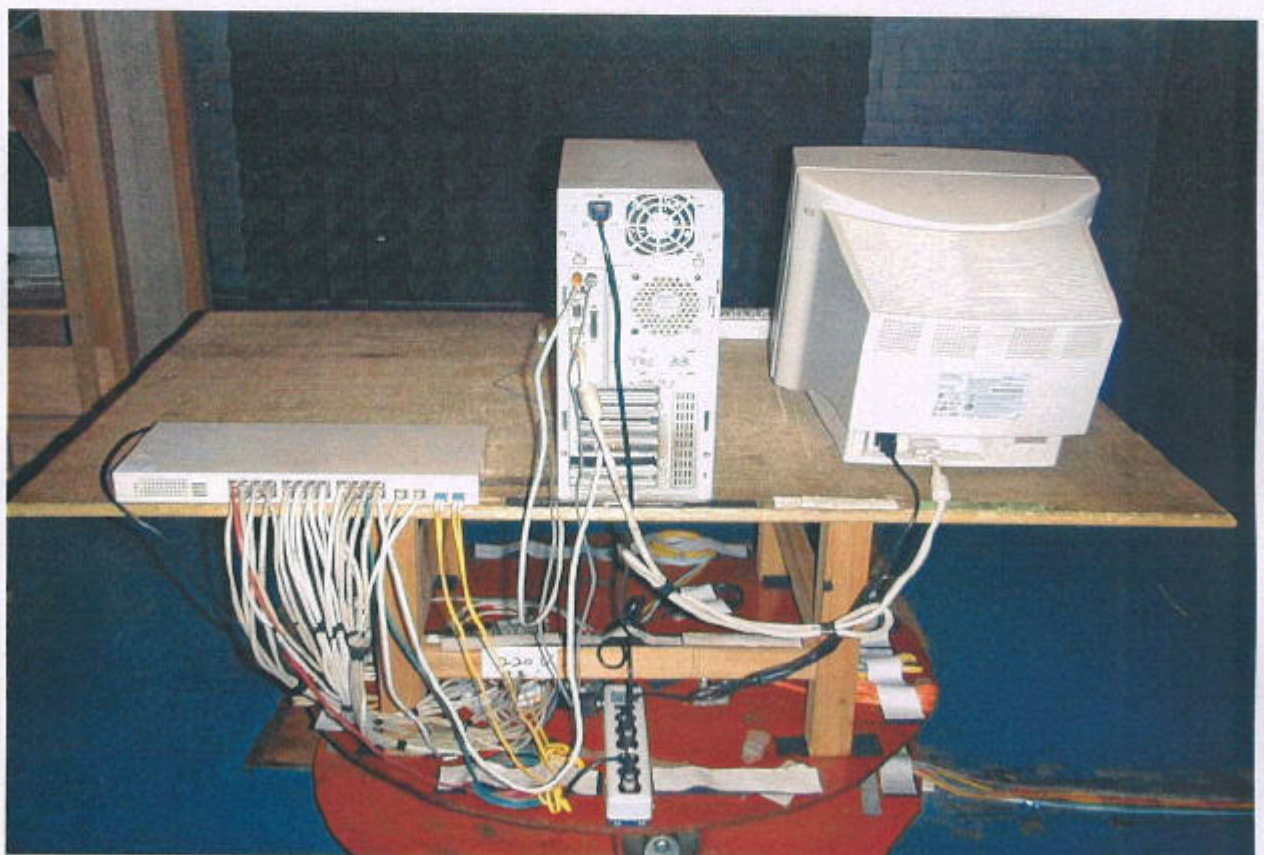
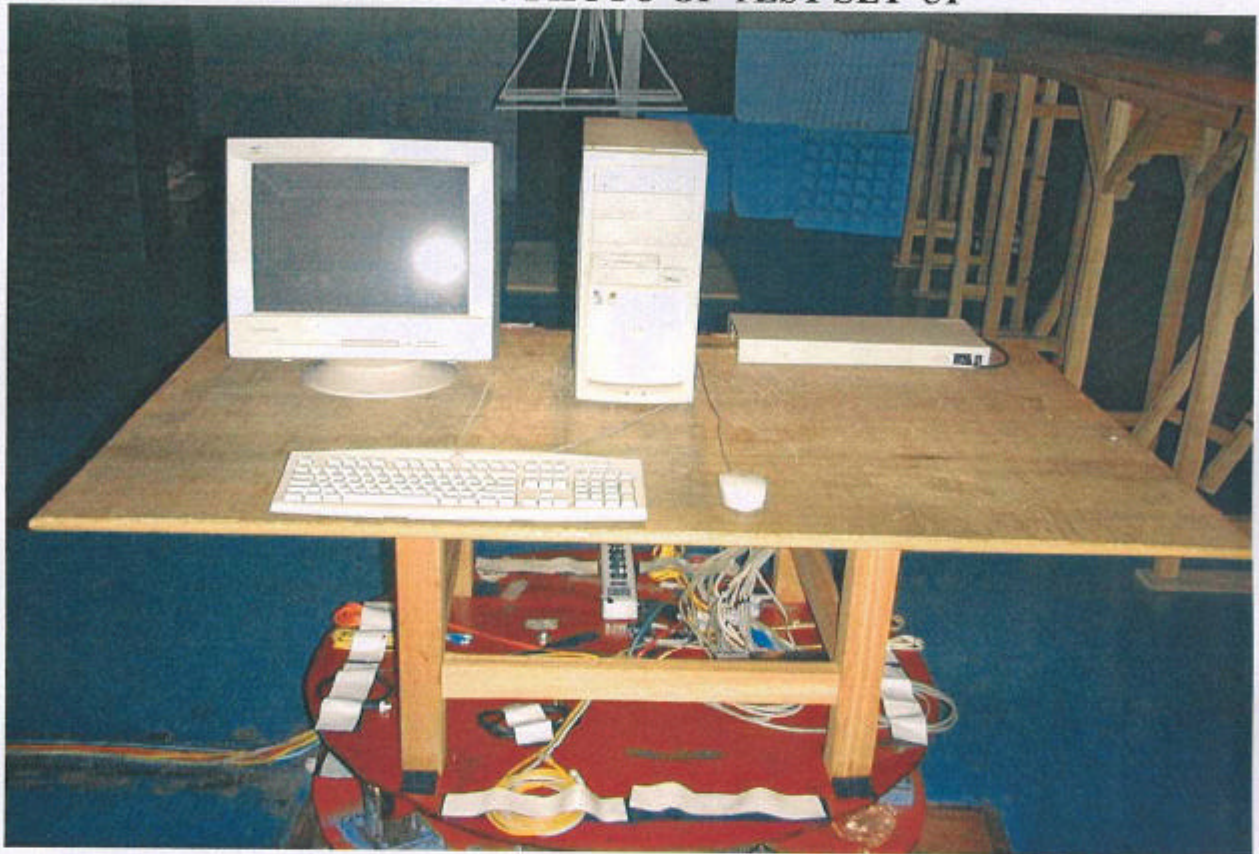


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**Test Result : Pass**



**EN 61000-4-3 PHOTO OF TEST SET-UP**





## Chapter 5 Electric Fast Transient/Burst Requirements Test

**Test information:**

Test setup: According to EN 61000-4-4

Test Voltage: DC Power line       ( ) 0.5 KV, 5 KH  
                   AC Power line       (X) 1 KV, 5 KHz  
                   Signal & Control line (X) 0.5 KV, 5 KHz  
   ( ) 1 KV, 5 KHz

Polarity:           (X) Positive       (X) Negative

Test Duration:   ( ) 1 minute     (X) 3 minutes

Connected lines: ( ) Power line shielded  
                           (X) Power line non-shielded  
                           (X) Signal & Control line non-shielded  
                           ( ) Signal & Control line shielded

Test mode: Ref. Test method of Chapter 1.

Test instruments:

Name	Model Number	Serial Number	Selected
BEST EMC Test Instrument	BEST EMC V2.3 (-8, -9)	199918-006SC	X
Induction Coil	INA 701 BEST	199922-001SC	X

Comment:

Performance Criteria ( ) A (X) B ( ) C

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**Test Result : Pass**

**EN 61000-4-4 PHOTO OF TEST SET-UP**



## *Chapter 6 Electrostatic Discharges Immunity Test*

**Test information:**

Test setup: Shielded Room

Test Voltage:         4KV contact discharge

8KV air discharge

Indirect Discharges:  HCP

VCP

Polarity:             positive    negative

Test mode: Ref. Test method of Chapter 1

Test points: Each Port of EUT

Test instruments:

Name	Model Number	Serial Number	Selected
NoiseKen Electrostatic Discharge Simulator	ESS-100L(A)	2100C03605	X
NoiseKen Electrostatic Discharge Gun	TC-815P	2100C03566	X

Comment:

Performance Criteria    A    B    C

**Test Result : Pass**



EN 61000-4-2 PHOTO OF TEST SET-UP



## Chapter 7 Surge Immunity Test

**Test information:**

Test setup: According to EN 61000-4-5

Test Voltage: DC Power line ( ) 0.5 KV  
 AC Power line ( X ) 2 KV  
 Control line ( ) 0.5 KV  
 Signal ( ) 2 KV

Time : ( X ) 1.2/50µs (8/20µs)

Polarity: ( X ) Positive ( X ) Negative

Connected lines: ( ) Power line shielded ( X ) Power line non-shielded  
 ( ) Signal & Control line non-shielded ( ) Signal & Control line shielded

Test mode: Ref. Test method of Chapter 1.

Test instrument:

Name	Model Number	Serial Number	Selected
BEST EMC Test Instrument	BEST EMC V2.3 (-8, -9)	199918-006SC	X
Induction Coil	INA 701 BEST	199922-001SC	X
KeyTek Pulsed-EMI Test System	E103, E501B, E502B, E503, E505A, E4552A	0008260 ~0008264, 0008254	

Comment:

Performance Criteria: ( ) A ( X ) B ( ) C

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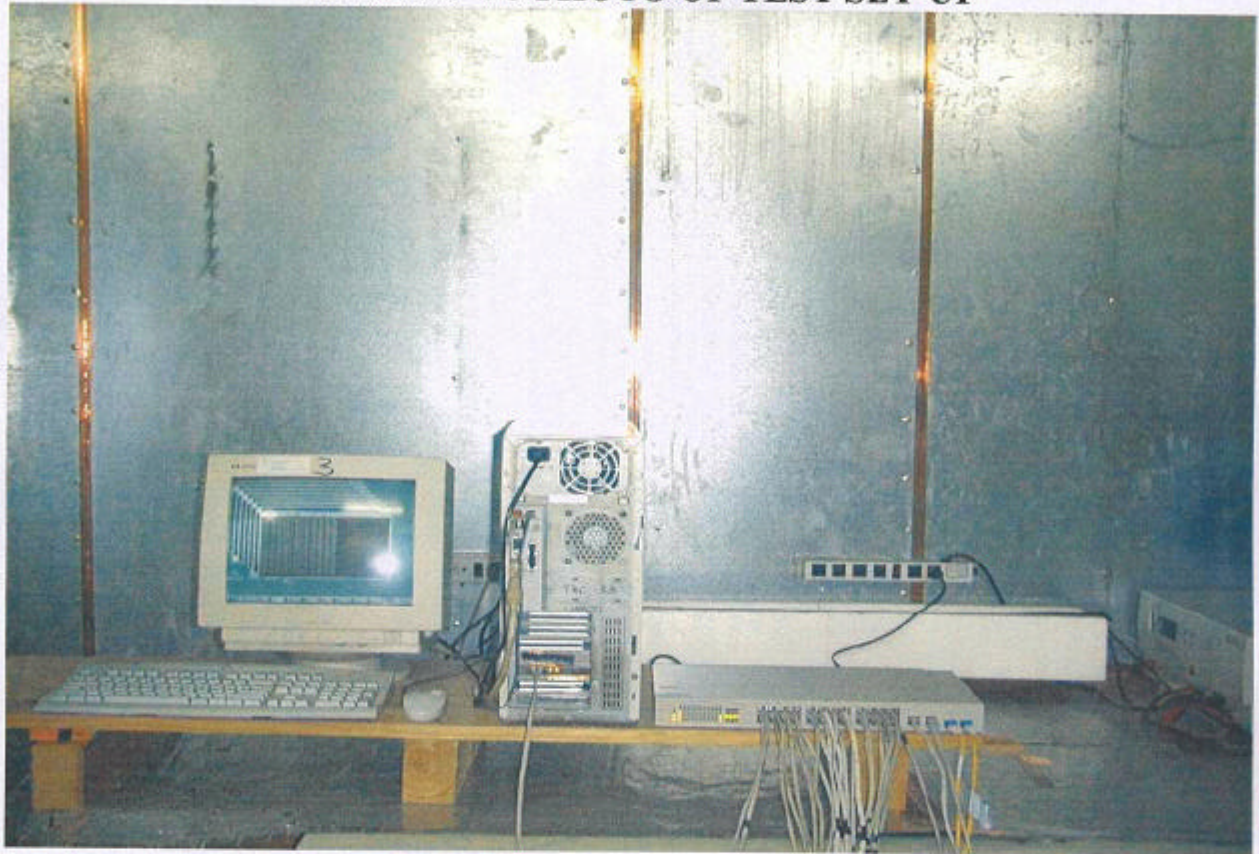


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**Test Result : Pass**



**EN 61000-4-5 PHOTO OF TEST SET-UP**



## Chapter 8 Continuous Wave Voltage Immunity Test

**Test information:**

Test setup: According to EN 61000-4-6

Test Frequency:     0.15 ~ 80MHz

Modulation:         FM %  
                           80% AM Modulation with 1KHz  
                           900 MHz ± 5 MHz with PM 200 Hz and 50% duty cycle

Step size:             ≤ 1% step size

Field strength:     1V         3V         10V

Test mode: Ref. Test method of Chapter 1

Test instruments:

Name	Model Number	Serial Number	Selected
SCHAFFNER RF-SYNTHESIZER/AMPLIFIER	NSG 2070-1	1020	X
SCHAFFNER CDN	M325	13773	X
SCHAFFNER CDN	M216	15604	
SCHAFFNER CDN	T004	15230	X
SCHAFFNER CDN	S501	15167	
SCHAFFNER FM-Koppelzange	KEMZ 801	14301	

Comment:

Performance Criteria:  A     B     C

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**Test Result : Pass**



EN 61000-4-6 PHOTO OF TEST SET-UP





**EN 61000-4-6 PHOTO OF TEST SET-UP**





## Chapter 9 Power Frequency Magnetic Field Immunity Test

**Test information:**

Test setup: According to EN 61000-4-8

Test method :  Continuous  Short duration

Magnetic Field Strength:  1A/m

Frequency: 50Hz

polarization:  X polarization  Y polarization  Z polarization

Test mode: Ref. Test method of Chapter 1

Test Duration:  30 seconds  1~3 seconds

Connected lines:  Power line shielded  Power line non-shielded  
 Signal & Control line non-shielded  Signal & Control line shielded

**\*\* Power Frequency Magnetic Field in the horizontal and vertical polarity.\*\***

Test instruments:

Name	Model Number	Serial Number	Selected
BEST EMC Test Instrument	BEST EMC V2.3 (-8, -9)	199918-006SC	X
Induction Coil	INA 701 BEST	199922-001SC	X

Comment:

Performance Criteria:  A  B  C

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**Test Result : Pass**

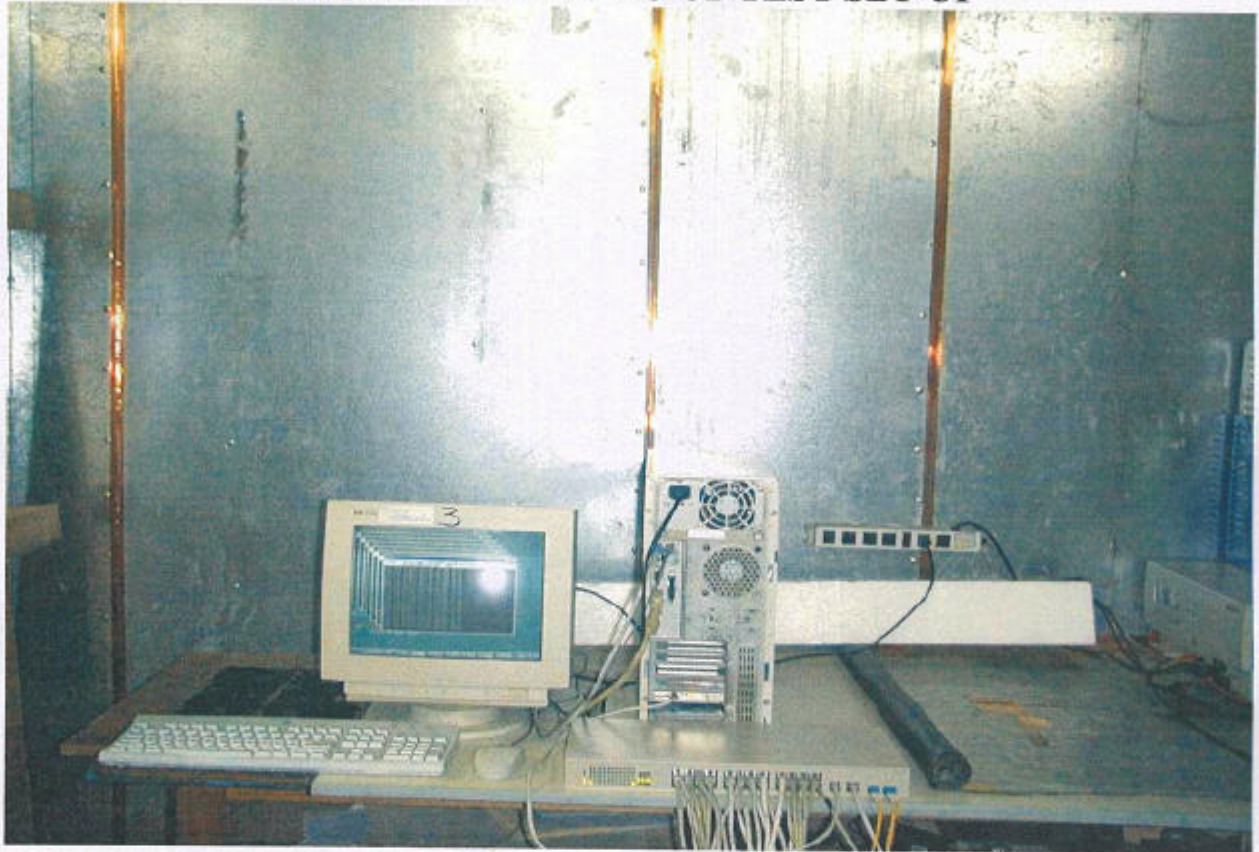
**EN 61000-4-8 PHOTO OF TEST SET-UP**







**EN 61000-4-11 PHOTO OF TEST SET-UP**





## Chapter 11 Harmonics Test

**Test information:**

Test setup: According to EN 61000-3-2

Test Item: Quasi – stationary & Fluctuating Current Harmonics Test

Test mode: Ref. Test method of Chapter 1

Test instrument:

Name	Model Number	Serial Number	Selected
Harmonic/Flicker Test System	HP 6842A	3531A-00102	X

Test Equipment Settings:	Quasi-stationary Current Harmonics Test	Fluctuating Current Harmonics Test
Line Voltage	230VAC	230VAC
Line Frequency	50Hz	50Hz
Device Class	D	D
Test Limit Overrides	None	None
Total Number of Failures:	None	None
Total Number of Errors:	None	None

**Test Result: PASS**

## Chapter 12 Voltage Fluctuation and Flicker Test

**Test information:**

Test setup: According to EN 61000-3-3

Test mode: Ref. Test method of Chapter 1

Test instrument:

Name	Model Number	Serial Number	Selected
Harmonic/Flicker Test System	HP 6842A	3531A-00102	X

Test Equipment Settings:	
Line Voltage	230VAC
Line Frequency	50Hz
Test Limit Overrides	None
Total Number of Failures:	Pst: (0), Plt: (0)
	Dc: (0), Dmax (0), Dt (0)
Total Number of Errors:	None

**Test Result: PASS**



## Appendix A

### Conducted Emission Test Result:

**Test Mode: 10 x 10 Mbps UMEC Power 230Vac/50Hz**

Testing room :      Temperature : 23 ° C      Humidity : 56 % RH

#### Line 1

Frequency (KHz)	READING AMPLITUDE			LIMIT		Margin (dB)
	Peak (dBμV)	Quasi-Peak (dBμV)	Average (dBμV)	Quasi-Peak (dBμV)	Average (dBμV)	
156.00	42.20	***. **	***. **	79.00	66.00	-23.80
164.00	40.14	***. **	***. **	79.00	66.00	-25.86
168.00	44.27	***. **	***. **	79.00	66.00	-21.73
177.00	54.19	***. **	***. **	79.00	66.00	-11.81
185.00	41.60	***. **	***. **	79.00	66.00	-24.40
189.00	41.73	***. **	***. **	79.00	66.00	-24.27
238.00	44.61	***. **	***. **	79.00	66.00	-21.39
291.00	42.40	***. **	***. **	79.00	66.00	-23.60
17820.00	35.15	***. **	***. **	73.00	60.00	-24.85
19240.00	34.34	***. **	***. **	73.00	60.00	-25.66

#### Line 2

Frequency (KHz)	READING AMPLITUDE			LIMIT		Margin (dB)
	Peak (dBμV)	Quasi-Peak (dBμV)	Average (dBμV)	Quasi-Peak (dBμV)	Average (dBμV)	
153.00	46.84	***. **	***. **	79.00	66.00	-19.16
159.00	49.17	***. **	***. **	79.00	66.00	-16.83
170.00	55.06	***. **	***. **	79.00	66.00	-10.94
177.00	60.02	***. **	***. **	79.00	66.00	-5.98
186.00	49.12	***. **	***. **	79.00	66.00	-16.88
194.00	46.26	***. **	***. **	79.00	66.00	-19.74
236.00	52.78	***. **	***. **	79.00	66.00	-13.22
293.00	45.60	***. **	***. **	79.00	66.00	-20.40
16690.00	38.23	***. **	***. **	73.00	60.00	-21.77
17820.00	38.30	***. **	***. **	73.00	60.00	-21.70

\*The reading amplitudes are all under limit.

**Conducted Emission Test Result:**

**Telecommunication ports Test: Leader Power 10 x 10 Mbps 230Vac/50Hz**

Testing room :      Temperature : 26 ° C      Humidity : 65 % RH

**Line 1**

Frequency (KHz)	READING AMPLITUDE			LIMIT		Margin (dB)
	Peak (dBµV)	Quasi-Peak (dBµV)	Average (dBµV)	Quasi-Peak (dBµV)	Average (dBµV)	
3750.00	60.57	***.**	***.**	87.00	74.00	-13.43
4980.00	62.99	***.**	***.**	87.00	74.00	-11.01
5320.00	50.87	***.**	***.**	87.00	74.00	-23.13
7990.00	54.40	***.**	***.**	87.00	74.00	-19.60
8690.00	60.86	***.**	***.**	87.00	74.00	-13.14
9070.00	53.41	***.**	***.**	87.00	74.00	-20.59
9640.00	59.90	***.**	***.**	87.00	74.00	-14.10
10020.00	61.96	***.**	***.**	87.00	74.00	-12.04
10210.00	59.21	***.**	***.**	87.00	74.00	-14.79
10510.00	51.27	***.**	***.**	87.00	74.00	-22.73

**Line 2**

Frequency (KHz)	READING AMPLITUDE			LIMIT		Margin (dB)
	Peak (dBµV)	Quasi-Peak (dBµV)	Average (dBµV)	Quasi-Peak (dBµV)	Average (dBµV)	
3810.00	52.61	***.**	***.**	87.00	74.00	-21.39
4580.00	51.70	***.**	***.**	87.00	74.00	-22.30
4950.00	59.92	***.**	***.**	87.00	74.00	-14.08
5080.00	58.58	***.**	***.**	87.00	74.00	-15.42
5650.00	50.45	***.**	***.**	87.00	74.00	-23.55
6220.00	55.18	***.**	***.**	87.00	74.00	-18.82
8690.00	60.95	***.**	***.**	87.00	74.00	-13.05
9070.00	50.96	***.**	***.**	87.00	74.00	-23.04
9830.00	51.43	***.**	***.**	87.00	74.00	-22.57
10290.00	51.15	***.**	***.**	87.00	74.00	-22.85

\*The reading amplitudes are all under limit.



## Appendix B

**Radiated Emission Test Result:**

**Test Mode: 1000 x 100 Mbps LEADER Power 230Vac/50Hz**

Test Conditions:

Testing site :      Temperature : 28° C      Humidity : 60 % RH

Frequency	Reading Amplitude	Ant. Height	Table	Correction Factors	Corrected Amplitude	Class A Limit	Margin
MHz	dBμV/m	m	degree	dB	dBμV/m	dBμV/m	dB

**(Horizontal)**

250.0038	35.44	3.97	255	-1.80	33.64	47.00	-13.36
500.0063	37.83	2.51	89	6.80	44.63	47.00	-2.37
750.0100	28.89	1.00	302	14.30	43.19	47.00	-3.81
785.7238	23.36	1.00	254	14.16	37.52	47.00	-9.48
928.5825	23.99	3.97	287	16.87	40.86	47.00	-6.14
***							

**(Vertical)**

49.1513	34.17	3.97	211	-4.33	29.84	40.00	-10.16
66.8280	37.67	3.97	77	-9.77	27.90	40.00	-12.10
199.9988	34.14	1.00	254	-3.90	30.24	40.00	-9.76
500.0238	31.79	1.00	87	6.80	38.59	47.00	-8.41
750.0088	29.11	2.51	310	14.30	43.41	47.00	-3.59
***							

Note:

1. Margin = Amplitude - limit, *if margin is minus means under limit.*
2. Corrected Amplitude = Reading Amplitude + Correction Factors
3. Correction factor = Antenna factor + ( Cable Loss - Amplitude gain )  
 (For example : 30MHz correction factor = 15.5 + (-15.26) = 0.24 dB/m)

*Appendix C*  
*Photographs of EUT*



