



CE TEST REPORT

according to

**European Standard EN 55022:1998/A1:2000 Class A
EN 61000-3-2: 2000, EN 61000-3-3:1995/A1:2001 and
EN 55024:1998/A1:2001 (IEC 61000-4-2:1995,
IEC 61000-4-3:1995, IEC 61000-4-4:1995,
IEC 61000-4-5:1995, IEC 61000-4-6:1996, IEC 61000-4-8:1993,
IEC 61000-4-11:1994)**

Equipment : 8 Ports PoE Smart HUB

Model No. : PoE-800y, 8450-0xx, PoE-80 (x=0~9, y=A~Z or Blank)

Applicant : **NETSTAR TECHNOLOGY CORPORATION**
3F, NO. 347, 349, YANG-KUANG ST.,
NEI-HU DIS., 114, TAIPEI, TAIWAN, R.O.C.

- The test result refers exclusively to the test presented test model / sample.
- Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.
- This test report is only applicable to European Community.

SPORTON International Inc.

6F, No. 106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.



Table of Contents

History of this test report..... iii

CERTIFICATE OF COMPLIANCE..... 1

1. General Description of Equipment under Test.....2

 1.1. Applicant..... 2

 1.2. Manufacturer 2

 1.3. Basic Description of Equipment under Test 2

 1.4. Feature of Equipment under Test 3

2. Test Configuration of Equipment under Test4

 2.1. Test Manner 4

 2.2. Description of Test System 4

3. Test Software 8

4. General Information of Test..... 9

 4.1. Test Facility 9

 4.2. Test Voltage 9

 4.3. Standard for Methods of Measurement..... 9

 4.4. Test in Compliance with 9

 4.5. Frequency Range Investigated 9

 4.6. Test Distance 9

5. Test of Conducted Powerline10

 5.1. Description of Major Test Instruments 10

 5.2. Test Procedures 11

 5.3. Typical Test Setup Layout of Conducted Powerline 12

 5.4. Typical Test Setup Layout of disturbances at telecommunication ports 13

 5.5. Test Result of AC Powerline Conducted Emission 14

 5.6. Test Result of disturbances at telecommunication ports..... 16

 5.7. Photographs of Conducted Powerline Test Configuration 20

6. Test of Radiated Emission.....22

 6.1. Description of Major Test Instruments 22

 6.2. Test Procedures..... 23

 6.3. Typical Test Setup Layout of Radiated Emission..... 24

 6.4. Test Result of Radiated Emission 25

 6.5. Photographs of Radiated Emission Test Configuration 29

7. HARMONICS TEST30

 7.1. Standard..... 30

 7.2. Test Procedure..... 30

 7.3. Test Equipment Settings 30

 7.4. Test Setup 30

 7.5. Current Harmonics Test 31

8. VOLTAGE FLUCTUATIONS TEST 32

 8.1. STANDARD..... 32

 8.2. TEST PROCEDURE 32

 8.3. TEST EQUIPMENT SETTINGS : 32

 8.4. TEST SETUP 32

 8.5. TEST RESULT OF VOLTAGE FLUCTUATION AND FLICKER TEST..... 33

 8.6. PHOTOGRAPHS OF HARMONICS TEST, VOLTAGE FLUCTUATION AND FLICKER TEST 34

9. Electrostatic Discharge Immunity Test (ESD)35



9.1. Test setup.....35

9.2. Test Setup for Tests Performed in Laboratory36

9.3. ESD Test Procedure37

9.4. Test Severity Levels38

9.5. Test Points39

9.6. Photographs of Electrostatic Discharge Immunity Test41

10. Radio Frequency Electromagnetic Field Immunity Test (RS).....42

10.1. Test setup.....42

10.2. Test Procedure43

10.3. Test Severity Levels43

10.4. Photographs of Radio Frequency Electromagnetic Field Immunity Test44

11. Electrical Fast Transient/Burst Immunity Test (EFT/BURST)45

11.1. Test setup.....45

11.2. Test on Power Line46

11.3. Test on Communication Lines46

11.4. Test Procedure.....46

11.5. Test Severity Levels.....47

11.6. Photographs of Electrical Fast Transient/BURST Immunity Test.....48

12. SURGE IMMUNITY TEST50

12.1. TEST RECORD.....50

12.2. TEST LEVEL51

12.3. TEST PROCEDURE51

12.4. OPERATING CONDITION52

12.5. Photographs of SURGE IMMUNITY TEST53

13. CONDUCTED DISTURBANCES INDUCED BY RADIO-FREQUENCY FIELD IMMUNITY TEST (CS)...54

13.1. TEST LEVEL54

13.2. OPERATING CONDITION54

13.3. TEST PROCEDURE55

13.4. Photographs of CS tests56

14. Power Frequency Magnetic Field immunity tests57

14.1. TEST RECORD.....57

14.2. TEST SETUP57

14.3. Photographs of Power Frequency Magnetic Field immunity tests58

15. VOLTAGE DIPS AND VOLTAGE INTERRUPTIONS IMMUNITY TESTS59

15.1. TEST RECORD OF VOLTAGE INTERRUPTION.....59

15.2. TEST RECORD OF VOLTAGE DIPS59

15.3. TESTING REQUIREMENT AND PROCEDURE.....60

15.4. TEST CONDITIONS.....60

15.5. OPERATING CONDITION60

15.6. Photographs of VOLTAGE DIPS AND VOLTAGE INTERRUPTIONS IMMUNITY TESTS61

16. List of Measuring Equipment Used62

17. Notice for Class A Product64

18. Declaration of Conformity and the CE Mark65

Appendix A. Photographs of EUT..... A1 ~ A9



CERTIFICATE OF COMPLIANCE

according to

**European Standard EN 55022:1998/A1:2000 Class A
EN 61000-3-2: 2000, EN 61000-3-3:1995/A1:2001 and
EN 55024:1998/A1:2001 (IEC 61000-4-2:1995,
IEC 61000-4-3:1995, IEC 61000-4-4:1995, IEC 61000-4-5:1995,
IEC 61000-4-6:1996, IEC 61000-4-8:1993, IEC 61000-4-11:1994)**

Equipment : 8 Ports PoE Smart HUB

Model No. : PoE-800y, 8450-0xx, PoE-80 (x=0~9, y=A~Z or Blank)

Applicant : **NETSTAR TECHNOLOGY CORPORATION**
3F, NO. 347, 349, YANG-KUANG ST.,
NEI-HU DIS., 114, TAIPEI, TAIWAN, R.O.C.

I HEREBY CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in **EUROPEAN COUNCIL DIRECTIVE 89/336/EEC**. The equipment was *passed* the test performed according to **European Standard EN 55022:1998/A1:2000 Class A, EN61000-3-2:2000, EN 61000-3-3:1995/A1:2001 and EN 55024:1998/A1:2001 (IEC 61000-4-2:1995, IEC 61000-4-3:1995, IEC 61000-4-4:1995, IEC 61000-4-5:1995, IEC 61000-4-6:1996, IEC 61000-4-8:1993, IEC 61000-4-11:1994)**. The test was carried out on Mar. 05, 2004 at **SPORTON International Inc. LAB**.

Alex Chen
Manager

SPORTON International Inc.

6F, No. 106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

1. General Description of Equipment under Test

1.1. Applicant

NETSTAR TECHNOLOGY CORPORATION
3F, NO. 347, 349, YANG-KUANG ST.,
NEI-HU DIS., 114, TAIPEI, TAIWAN, R.O.C.

1.2. Manufacturer

1. NETSTAR TECHNOLOGY CORPORATION
2F, NO. 86, CHUNG-HSIN RD.,
SHI-CHIN, TAIPEI, TAIWAN, R.O.C.
2. Lantech Electronic Co., Ltd.
No. 3, Industrial Area Huang Yong, Dong Guang Guang Dong

1.3. Basic Description of Equipment under Test

Equipment	: 8 Ports PoE Smart HUB
Model No.	: PoE-800y, 8450-0xx, PoE-80 (x=0~9, y=A~Z or Blank)
Trade Name	: NETSTAR
TP Cable x2	: Shielded, 20 m
STP Cable x7	: Shielded, 1.0 m
TP Cable x7	: Non-Shielded, 1.0 m
RS232 Cable	: Shielded, 1.5 m
Power Supply Type	: Switching
AC Power Cord	: Non-Shielded, 2.5 m, 3 pin



1.4. Feature of Equipment under Test

Standard	IEEE802.3af Power over Ethernet
Connector	Data in: 8 x RJ-45, Data pin 1,2,3,6 Data and power out: 8 x RJ-45. Data pin 1,2,3,6 Power pin(V+): 4,5 Power pin(V-) :7,8
Power out put	DC 48V, system POE output maximum 100watts.
Management	Microsoft windows based application for power management
Power management function	Per port power feeding control, power device detection, power device classification control, power sampling control, power device discovery, PD discovery Resistor adjustable, Auto detect port status.
LED	System: power Per port: power good, power fail
Power	AC 100~240V, 50/60 Hz, 130 Watts, IEC power socket with fuse and power switch
Power consumption	100 watts (maximum)
Cooling	2 x DC fan
Operating environment	0 °C~ 40 °C ±90% Humidity (non-condensing)
Dimension	440mm x 224mm x 44mm (L x W x H)

2. Test Configuration of Equipment under Test

2.1. Test Manner

- a. During testing, the interface cables and equipment positions were varied according to European Standard EN 55022.
- b. The complete test system included remote workstation, NETSTAR Test fixture and EUT for EMI test. The remote workstation included COMPAQ PC, GIGA-BYTE PC, VIEWSONIC Monitor, SONY Monitor, MICROSOFT PS/2 Keyboard, BTC PS/2 Keyboard, LOGITECH PS/2 Mouse and LOGITECH USB Mouse.
- c. The following test modes were performed for Disturbances at Telecommunication Ports test:
Mode 1: LAN: 100Mbps (Voltage)
Mode 2: LAN: 10Mbps (Voltage)
Mode 3: LAN: 100Mbps (Current)
Mode 4: LAN: 10Mbps (Current)
- d. The complete test system included remote workstation, DELL PC, VIEWSONIC Monitor, DELL PS/2 Keyboard, DELL PS/2 Mouse, NETSTAR Test fixture and EUT for EMS test. The remote workstation included DELL PC, VIEWSONIC Monitor, DELL PS/2 Keyboard and DELL PS/2 Mouse.
- e. Frequency range investigated: conduction 150 KHz to 30 MHz, radiation 30 MHz to 1000MHz.

2.2. Description of Test System

< EMI >

Support Unit 1. -- Test fixture (NETSTAR) – for local workstation

Support Unit 2. -- Personal Computer (COMPAQ) – for remote workstation

FCC ID	: N/A
Model No.	: Evo D380 mx
Power Supply Type	: Switching
Power Cord	: Non-Shielded
Serial No.	: SP0037
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 3. -- Personal Computer (GIGA-BYTE) – for remote workstation

FCC ID	: N/A
Model No.	: GA-7ZXE
Power Supply Type	: Switching
Power Cord	: Non-Shielded
Serial No.	: SP0037
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.



Support Unit 4. -- Monitor (VIEWSONIC) – for remote workstation

FCC ID : N/A
Model No. : E55
Power Supply Type : Switching
Power Cord : Non-Shielded
Serial No. : SP0050
Data Cable : Shielded, 1.5m
Remark : This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 5. -- Monitor (SONY) – for remote workstation

FCC ID : AK8GDM17SE2T
Model No. : GDM-17SE2T
Power Supply Type : Switching
Power Cord : Non-Shielded
Serial No. : SP0180
Data Cable : Shielded, 360 degree via metal backshells, 1.15m

Support Unit 6. -- PS/2 Keyboard (MICROSOFT) – for remote workstation

FCC ID : N/A
Model No. : 56TWTA
Serial No. : SP0054
Data Cable : Shielded, 1.95m
Remark : This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 7. -- PS/2 Keyboard (BTC) – for remote workstation

FCC ID : N/A
Model No. : 9110
Serial No. : SP0054
Data Cable : Shielded, 360 degree via metal backshells, 1.75m
Remark : This support device was tested to comply with FCC standards and authorized under a declaration of conformity.



Support Unit 8. -- PS/2 Mouse (LOGITECH) – for remote workstation

FCC ID : DZL211029
Model No. : M-S34
Serial No. : SP0041
Data Cable : Non-Shielded, 1.7m

Support Unit 9. -- USB Mouse (LOGITECH) – for remote workstation

FCC ID : N/A
Model No. : M-BE58
Serial No. : SP0042
Data Cable : Shielded, 1.8m
Remark : This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

< EMS >

Support Unit 1. -- Personal Computer (DELL) – for local and remote workstation

FCC ID : N/A
Model No. : OPTIPLEX 160L
Power Supply Type : Switching
Power Cord : Non-Shielded
Serial No. : SP0040
Remark : This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 2. -- Monitor (VIEWSONIC) – for local and remote workstation

FCC ID : N/A
Model No. : VCDTS21553-3P
Power Supply Type : Switching
Power Cord : Non-Shielded
Serial No. : SP0053
Data Cable : Shielded, 1.7m
Remark : This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 3. -- PS/2 Keyboard (DELL) – for local and remote workstation

FCC ID : N/A
Model No. : SK-8100
Serial No. : SP0054
Data Cable : Shielded, 1.7m
Remark : This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 4. -- PS/2 Mouse (DELL) – for local and remote workstation

FCC ID : N/A
Model No. : M-SAW34
Serial No. : SP0001
Data Cable : Shielded, 1.8m
Remark : This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 5. -- Test fixture (NETSTAR) – for local workstation

3. Test Software

< EMI >

During testing, "Ping.exe " under WIN XP was executed to link with the remote workstation to receive and transmit data by TP cable.

< EMS >

During testing, "Ping.exe " under WIN XP was executed to link with the remote workstation to receive and transmit data by TP cable.

4. General Information of Test

4.1. Test Facility

<EMI>

Test Site Location : No. 3, Lane 238, Kang Lo Street, Nei Hwu District,
Taipei 11424, Taiwan, R.O.C.
TEL : 886-2-2631-4739
FAX : 886-2-2631-9740

Test Site No. : CO01-NH, OS01-NH

<EMS>

This test was carried out by SPORTON International Inc.

Test Site Location : No. 52, Hwa Ya 1St Road, Hwa Ya Technology Park,
Kwei-Shan Hsiang, TaoYuan Hsien, Taiwan, R.O.C.
TEL : 886-3-3273456
FAX : 886-3-3180055

4.2. Test Voltage

230V/ 50Hz

4.3. Standard for Methods of Measurement

EMI Test (conduction and radiation) : European Standard EN 55022 Class A
Harmonics Test : European Standard EN 61000-3-2.
Voltage Fluctuations Test : European Standard EN 61000-3-3.
EMS Test : European Standard EN 55024.
(ESD: IEC 61000-4-2, RS: IEC 61000-4-3, EFT: IEC 61000-4-4, SURGE: IEC 61000-4-5,
CS: IEC 61000-4-6, Power Frequency Magnetic Field: IEC 61000-4-8, DIPS: IEC 61000-4-11)

4.4. Test in Compliance with

EMI Test (conduction and radiation) : European Standard EN 55022 Class A
Harmonics Test : European Standard EN 61000-3-2.
Voltage Fluctuations Test : European Standard EN 61000-3-3.
EMS Test : European Standard EN 55024.
(ESD: IEC 61000-4-2, RS: IEC 61000-4-3, EFT: IEC 61000-4-4, SURGE: IEC 61000-4-5,
CS: IEC 61000-4-6, Power Frequency Magnetic Field: IEC 61000-4-8, DIPS: IEC 61000-4-11)

4.5. Frequency Range Investigated

- a. Conducted emission test: from 150 kHz to 30 MHz
- b. Radiated emission test: from 30 MHz to 1,000 MHz
- c. Radio frequency electromagnetic field immunity test : 80-1000 MHz.

4.6. Test Distance

- a. The test distance of radiated emission test from antenna to EUT is 10 M.
- b. The test distance of radio frequency electromagnetic field immunity test from antenna to EUT is 3 M.



5. Test of Conducted Powerline

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 kHz and return leads of the EUT according to the methods defined in European Standard EN 55022 Clause 9. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in section 5.3. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position producing maximum conducted emissions.

5.1. Description of Major Test Instruments

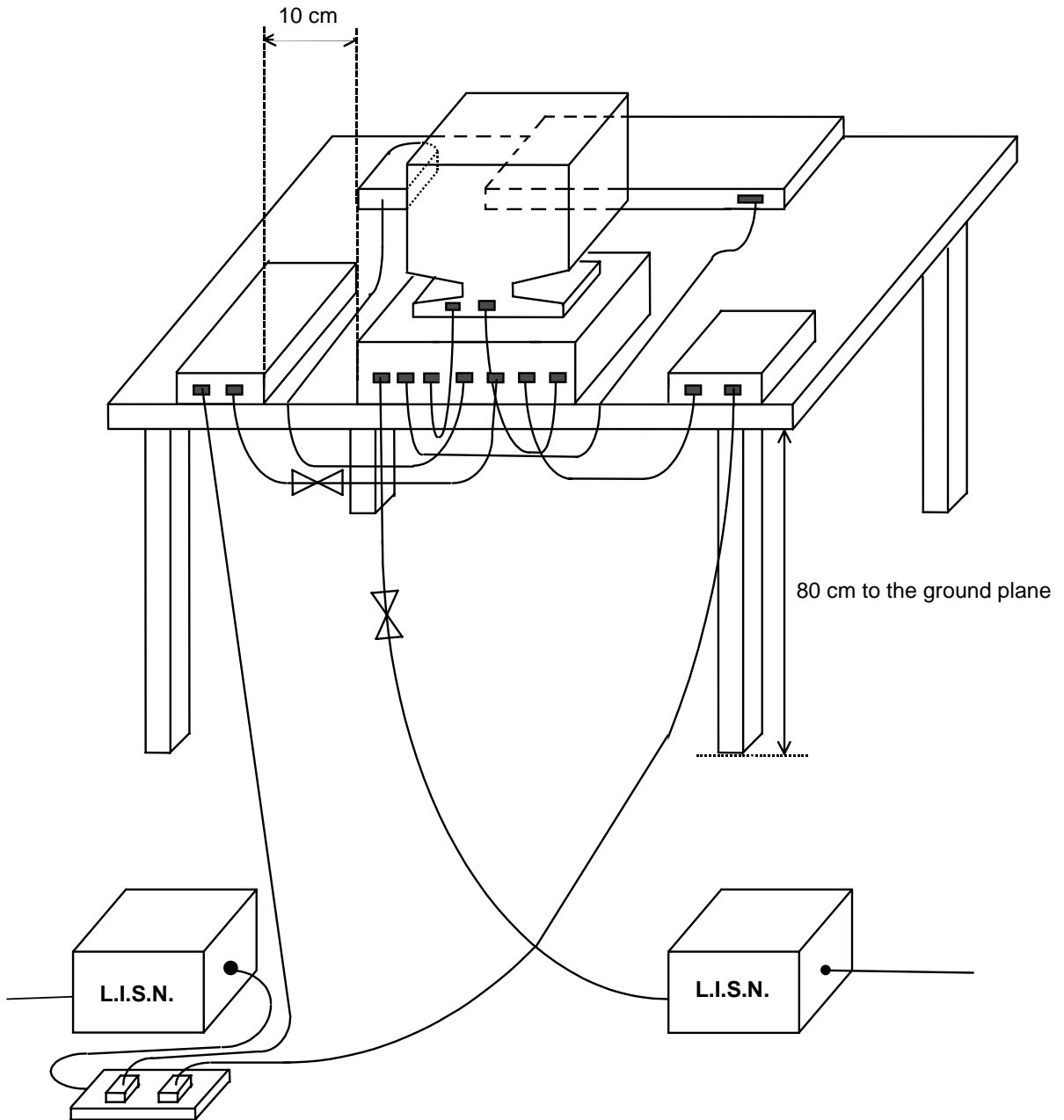
- Test Receiver (R&S ESH3)
 - Attenuation 10 dB
 - Start Frequency 0.15 MHz
 - Stop Frequency 30 MHz
 - IF Bandwidth 9 KHz



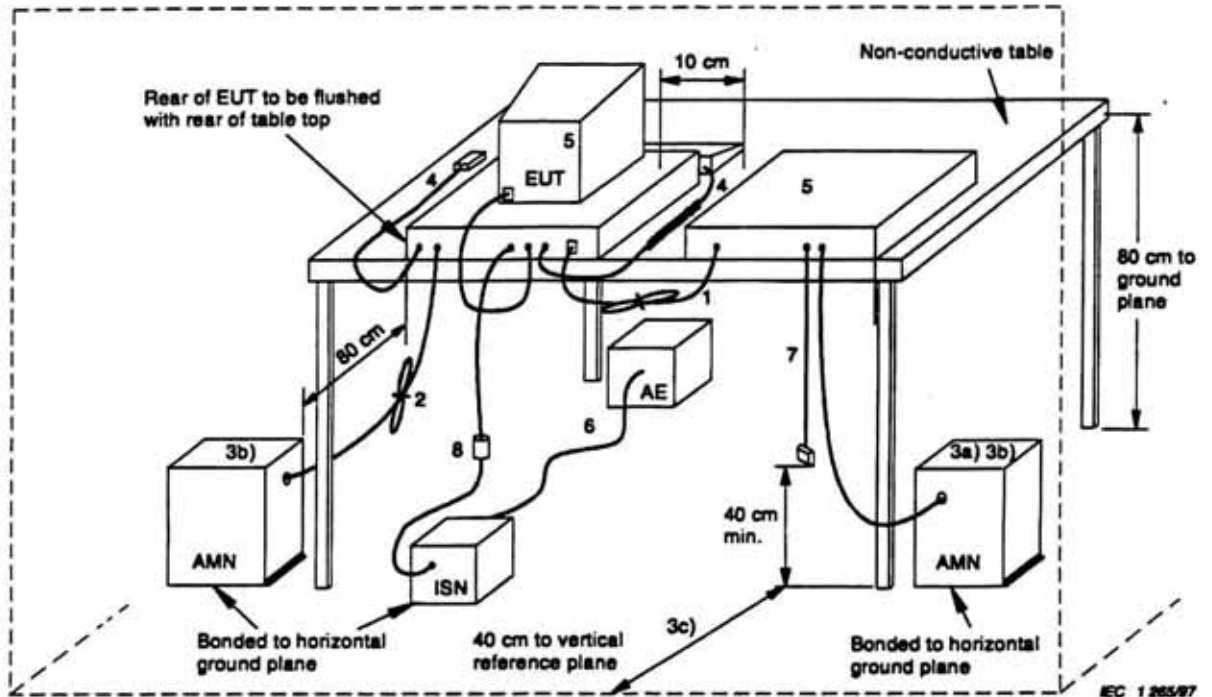
5.2. Test Procedures

- a. The EUT was placed on a desk 0.8 meters height from the metal ground plane and 0.4 meter from the conducting wall of the shielding room and it was kept at least 0.8 meters from any other grounded conducting surface.
- b. Connect EUT to the power mains through a line impedance stabilization network (LISN).
- c. Connect Telecommunication port to ISN (Impedance Stabilization Network).
- d. All the support units are connect to the other LISN.
- e. The LISN provides 50 ohm coupling impedance for the measuring instrument.
- f. The CISPR states that a 50 ohm , 50 microhenry LISN should be used.
- g. Both sides of AC line were checked for maximum conducted interference.
- h. The frequency range from 150 kHz to 30 MHz was searched.
- i. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

5.3. Typical Test Setup Layout of Conducted Powerline



5.4. Typical Test Setup Layout of disturbances at telecommunication ports



AMN = Artificial mains network
 AE = Associated equipment
 EUT = Equipment under test
 ISN = Impedance stabilization network

- 1) If cables, which hang closer than 40 cm to the horizontal metal groundplane, cannot be shortened to appropriate length, the excess shall be folded back and forth forming a bundle 30 cm to 40 cm long.
- 2) Excess mains cord shall be bundled in the centre or shortened to appropriate length.
- 3) EUT is connected to one artificial mains network (AMN). All AMNs and ISNs may alternatively be connected to a vertical reference plane or metal wall (see figures 5 and 6).
 - a) All other units of a system are powered from a second AMN. A multiple outlet strip can be used for multiple mains cords.
 - b) AMN and ISN are 80 cm from the EUT and at least 80 cm from other units and other metal planes.
 - c) Mains cords and signal cables shall be positioned for their entire lengths, as far as possible, at 40 cm from the vertical reference plane.
- 4) Cables of hand operated devices, such as keyboards, mice, etc. shall be placed as for normal usage.
- 5) Peripherals shall be placed at a distance of 10 cm from each other and from the controller, except for the monitor which, if this is an acceptable installation practice, shall be placed directly on the top of the controller.
- 6) I/O signal cable intended for external connection.
- 7) The end of the I/O signal cables which are not connected to an AE may be terminated, if required, using correct terminating impedance.
- 8) If used, the current probe shall be placed at 0,1 m from the ISN.

5.5. Test Result of AC Powerline Conducted Emission

5.5.1. Test Mode: Mode 1

- Temperature : 24 °C
- Relative Humidity : 51 %
- Test Date: Feb. 25, 2004
- All emissions not reported here are more than 10 dB below the prescribed limit.

The test was passed at the minimum margin that marked under gray area in the following table

LINE

Frequency (MHz)	Level (dB μ V)	Over Limit(dB)	Limit Line(dBuV)	Read Level (dB μ V)	Insertion Loss (dB)	Cable Loss (dB)	Detect Mode (QP or AV)
0.401	43.66	-35.34	79.00	43.50	0.10	0.06	QP
0.401	23.06	-42.94	66.00	22.90	0.10	0.06	AV
0.659	37.48	-28.52	66.00	37.30	0.10	0.08	QP
0.659	16.88	-43.12	60.00	16.70	0.10	0.08	AV
1.098	30.21	-35.79	66.00	30.00	0.11	0.11	QP
1.098	20.21	-39.79	60.00	20.00	0.11	0.11	AV
2.323	31.52	-34.48	66.00	31.20	0.16	0.16	QP
2.323	20.52	-39.48	60.00	20.20	0.16	0.16	AV
6.226	31.55	-34.45	66.00	31.10	0.25	0.20	QP
6.226	25.85	-34.15	60.00	25.40	0.25	0.20	AV
21.974	38.58	-27.42	66.00	37.90	0.34	0.34	QP
21.974	34.88	-25.12	60.00	34.20	0.34	0.34	AV



NEUTRAL

Frequency (MHz)	Level (dB μ V)	Over Limit(dB)	Limit Line(dBuV)	Read Level (dB μ V)	Insertion Loss (dB)	Cable Loss (dB)	Detect Mode (QP or AV)
0.244	43.44	-35.56	79.00	43.30	0.10	0.04	QP
0.244	36.84	-29.16	66.00	36.70	0.10	0.04	AV
0.401	43.46	-35.54	79.00	43.30	0.10	0.06	QP
0.401	22.86	-43.14	66.00	22.70	0.10	0.06	AV
0.488	36.57	-42.43	79.00	36.40	0.10	0.07	QP
0.488	30.77	-35.23	66.00	30.60	0.10	0.07	AV
0.658	37.68	-28.32	66.00	37.50	0.10	0.08	QP
0.658	16.78	-43.22	60.00	16.60	0.10	0.08	AV
0.977	35.60	-30.40	66.00	35.40	0.10	0.10	QP
0.977	19.30	-40.70	60.00	19.10	0.10	0.10	AV
1.278	31.22	-34.78	66.00	31.00	0.10	0.12	QP
1.278	13.42	-46.58	60.00	13.20	0.10	0.12	AV

Test Engineer : Castries
Castries Huang

5.6. Test Result of disturbances at telecommunication ports

5.6.1. Test Mode: Mode 1

- Temperature : 24 °C
- Relative Humidity : 51 %
- Test Date: Mar. 05, 2004
- All emissions not reported here are more than 10 dB below the prescribed limit.

The test was passed at the minimum margin that marked under gray area in the following table

Frequency (MHz)	Level (dBvA)	Over Limit(dB)	Limit Line(dBvA)	Read Level (dBvA)	Correction Factor (dB)	Cable Loss (dB)	Detect Mode (QP or AV)
1.219	71.38	-15.62	87.00	61.70	9.57	0.11	QP
1.219	71.28	-2.72	74.00	61.60	9.57	0.11	AV
1.584	71.50	-15.50	87.00	61.80	9.57	0.13	QP
1.584	71.10	-2.90	74.00	61.40	9.57	0.13	AV
1.828	72.01	-14.99	87.00	62.30	9.57	0.14	QP
1.828	71.61	-2.39	74.00	61.90	9.57	0.14	AV
2.560	72.33	-14.67	87.00	62.60	9.56	0.17	QP
2.560	72.03	-1.97	74.00	62.30	9.56	0.17	AV
3.291	68.75	-18.25	87.00	59.00	9.56	0.19	QP
3.291	66.95	-7.05	74.00	57.20	9.56	0.19	AV
4.510	68.26	-18.74	87.00	58.50	9.56	0.20	QP
4.510	63.86	-10.14	74.00	54.10	9.56	0.20	AV

Test Engineer : Castries
Castries Huang

5.6.2. Test Mode: Mode 2

- Temperature : 24 °C
- Relative Humidity : 51 %
- Test Date: Mar. 05, 2004
- All emissions not reported here are more than 10 dB below the prescribed limit.

The test was passed at the minimum margin that marked under gray area in the following table

Frequency (MHz)	Level (dBvA)	Over Limit(dB)	Limit Line(dBvA)	Read Level (dBvA)	Correction Factor (dB)	Cable Loss (dB)	Detect Mode (QP or AV)
1.128	71.78	-15.22	87.00	62.10	9.57	0.11	QP
1.128	71.58	-2.42	74.00	61.90	9.57	0.11	AV
1.584	71.90	-15.10	87.00	62.20	9.57	0.13	QP
1.584	71.50	-2.50	74.00	61.80	9.57	0.13	AV
1.827	72.31	-14.69	87.00	62.60	9.57	0.14	QP
1.827	71.91	-2.09	74.00	62.20	9.57	0.14	AV
2.193	70.92	-16.08	87.00	61.20	9.57	0.16	QP
2.193	70.72	-3.28	74.00	61.00	9.57	0.16	AV
2.559	72.23	-14.77	87.00	62.50	9.56	0.17	QP
2.559	72.13	-1.87	74.00	62.40	9.56	0.17	AV
3.290	69.45	-17.55	87.00	59.70	9.56	0.19	QP
3.290	67.25	-6.75	74.00	57.50	9.56	0.19	AV

Test Engineer : Castries
Castries Huang

5.6.3. Test Mode: Mode 3

- Temperature : 24 °C
- Relative Humidity : 51 %
- Test Date: Feb. 25, 2004
- All emissions not reported here are more than 10 dB below the prescribed limit.

The test was passed at the minimum margin that marked under gray area in the following table

Frequency (MHz)	Level (dBμA)	Over Limit(dB)	Limit Line(dBuA)	Read Level (dBμA)	Correction Factor (dB)	Cable Loss (dB)	Detect Mode (QP or AV)
0.259	20.99	-27.47	48.46	19.60	1.35	0.04	QP
0.259	19.39	-16.07	35.46	18.00	1.35	0.04	AV
0.368	12.56	-32.99	45.55	11.50	1.00	0.06	QP
0.368	8.66	-23.89	32.55	7.60	1.00	0.06	AV
0.548	23.27	-19.73	43.00	22.60	0.60	0.07	QP
0.548	21.77	-8.23	30.00	21.10	0.60	0.07	AV
0.594	23.20	-19.80	43.00	22.60	0.52	0.08	QP
0.594	21.40	-8.60	30.00	20.80	0.52	0.08	AV
0.657	22.50	-20.50	43.00	22.00	0.42	0.08	QP
0.657	18.70	-11.30	30.00	18.20	0.42	0.08	AV
1.026	16.90	-26.10	43.00	16.80	0.00	0.10	QP
1.026	12.70	-17.30	30.00	12.60	0.00	0.10	AV

Test Engineer : Castries
Castries Huang

5.6.4. Test Mode: Mode 4

- Temperature : 24 °C
- Relative Humidity : 51 %
- Test Date: Feb. 25, 2004
- All emissions not reported here are more than 10 dB below the prescribed limit.

The test was passed at the minimum margin that marked under gray area in the following table

Frequency (MHz)	Level (dBμA)	Over Limit(dB)	Limit Line(dBuA)	Read Level (dBμA)	Correction Factor (dB)	Cable Loss (dB)	Detect Mode (QP or AV)
0.259	20.89	-27.57	48.46	19.50	1.35	0.04	QP
0.259	19.19	-16.27	35.46	17.80	1.35	0.04	AV
0.376	16.43	-28.93	45.37	15.40	0.98	0.06	QP
0.376	11.63	-20.73	32.37	10.60	0.98	0.06	AV
0.594	23.50	-19.50	43.00	22.90	0.52	0.08	QP
0.594	21.20	-8.80	30.00	20.60	0.52	0.08	AV
0.657	22.70	-20.30	43.00	22.20	0.42	0.08	QP
0.657	19.10	-10.90	30.00	18.60	0.42	0.08	AV
0.765	20.56	-22.44	43.00	20.20	0.27	0.09	QP
0.765	18.66	-11.34	30.00	18.30	0.27	0.09	AV
1.026	17.20	-25.80	43.00	17.10	0.00	0.10	QP
1.026	12.60	-17.40	30.00	12.50	0.00	0.10	AV

Test Engineer : Castries
Castries Huang

5.7. Photographs of Conducted Powerline Test Configuration

- The photographs show the configuration that generates the maximum emission.

Mode 1 ~ Mode 2

FRONT VIEW



REAR VIEW



- The photographs show the configuration that generates the maximum emission.

Mode 3 ~ Mode 4

FRONT VIEW



REAR VIEW





6. Test of Radiated Emission

Radiated emissions from 30 MHz to 1000 MHz were measured with a bandwidth of 120 kHz according to the methods defines in European Standard EN 55022, Clause 10. The EUT was placed on a nonmetallic stand, 0.8 meter above the ground plane, as shown in section 6.3. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions.

6.1. Description of Major Test Instruments

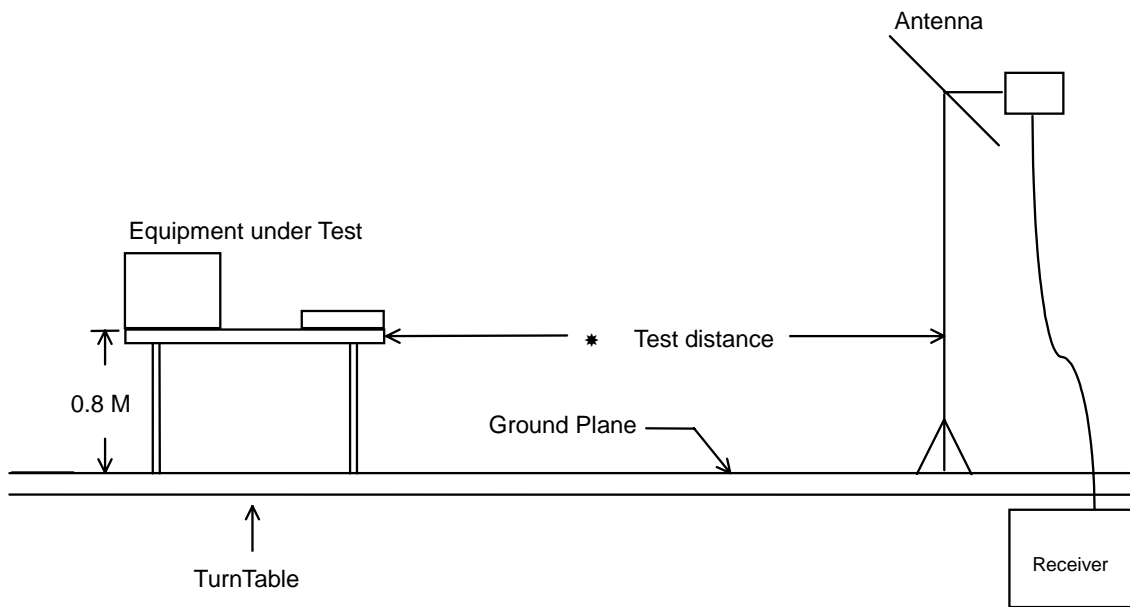
- Amplifier (HP 8447D)
 - RF Gain 25 dB
 - Signal Input 0.1 MHz to 1.3 GHz

- Spectrum Analyzer (R&S FSP7)
 - Attenuation 10 dB
 - Start Frequency 30 MHz
 - Stop Frequency 1000 MHz
 - Resolution Bandwidth 120 KHz
 - Signal Input 9 KHz to 7 GHz

6.2. Test Procedures

- a. The EUT was placed on a rotatable table top 0.8 meter above ground.
- b. The EUT was set 10 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. The antenna is a half wave dipole and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- f. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.

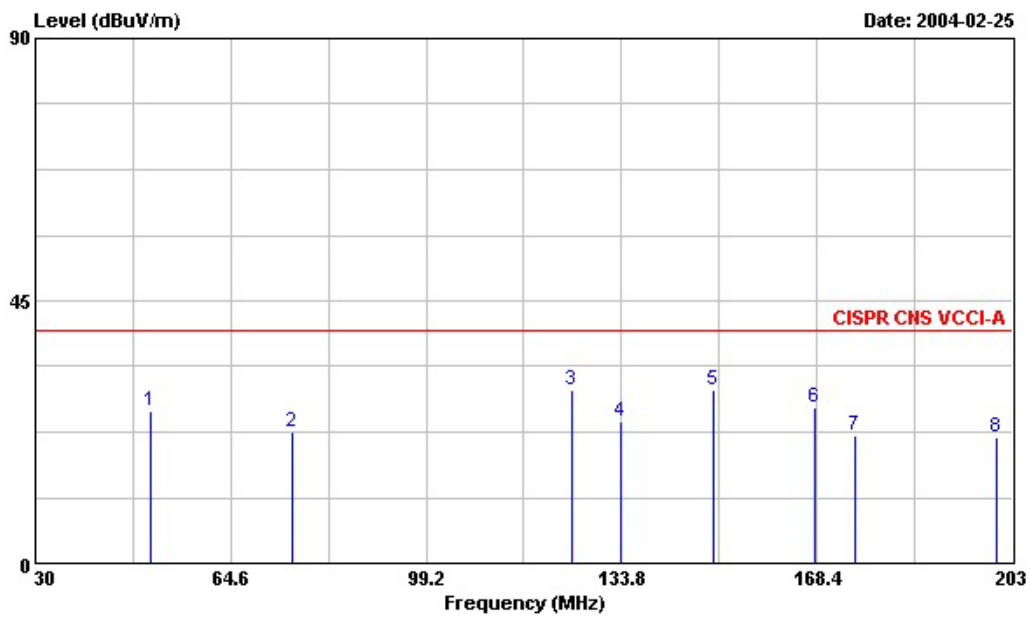
6.3. Typical Test Setup Layout of Radiated Emission



6.4. Test Result of Radiated Emission

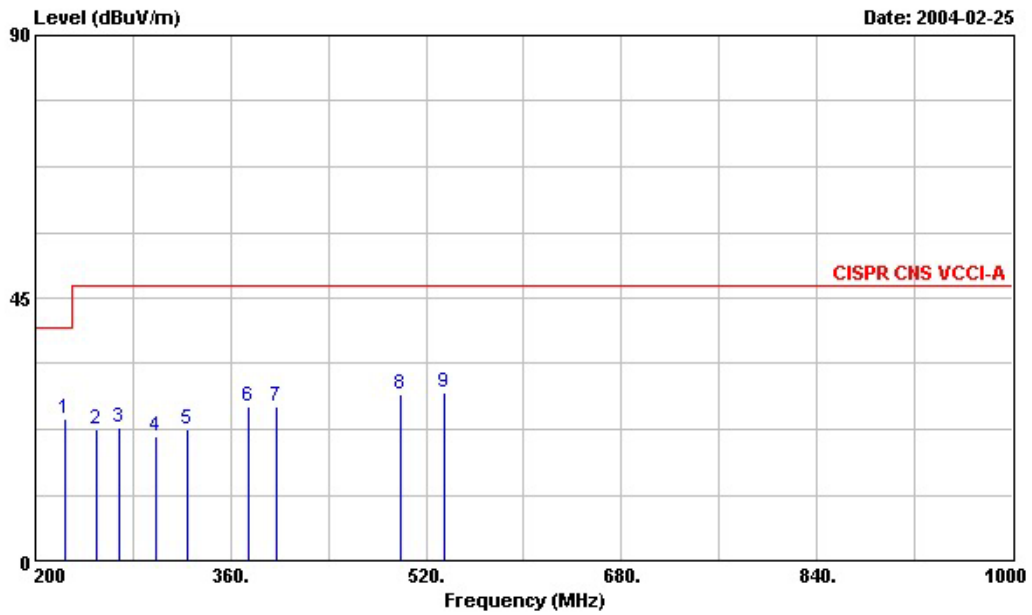
- Temperature : 19 °C
- Relative Humidity : 57 %
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading : Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

The test was passed at the minimum margin that marked by the frame in the following test record



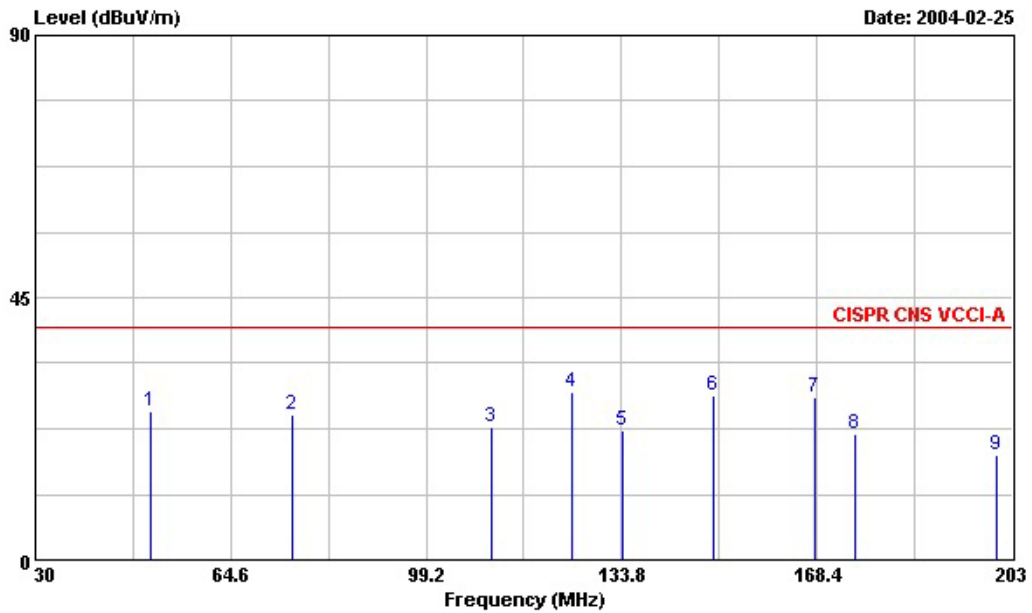
Site : OS01-NH
 Condition : CISPR.CNS VCCI-A 10m OS01-ANT-01-05-2004 VERTICAL
 EUT : 8 Ports PoE Smart HUB
 POWER : 230VAC
 MEMO : 100-100

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB		cm	deg
1	50.410	26.14	-13.86	40.00	44.52	8.07	1.05	27.50	Peak	---	---
2	75.500	22.52	-17.48	40.00	41.85	6.83	1.29	27.45	Peak	---	---
3	125.150	29.73	-10.27	40.00	44.06	11.36	1.59	27.28	Peak	100	220
4	133.630	24.20	-15.80	40.00	38.18	11.61	1.64	27.23	Peak	---	---
5	150.060	29.56	-10.44	40.00	43.80	11.18	1.73	27.15	Peak	---	---
6	168.050	26.80	-13.20	40.00	42.23	9.77	1.86	27.06	Peak	---	---
7	175.150	21.93	-18.07	40.00	38.15	8.90	1.90	27.02	Peak	---	---
8	200.060	21.75	-18.25	40.00	38.24	8.39	2.02	26.90	Peak	---	---



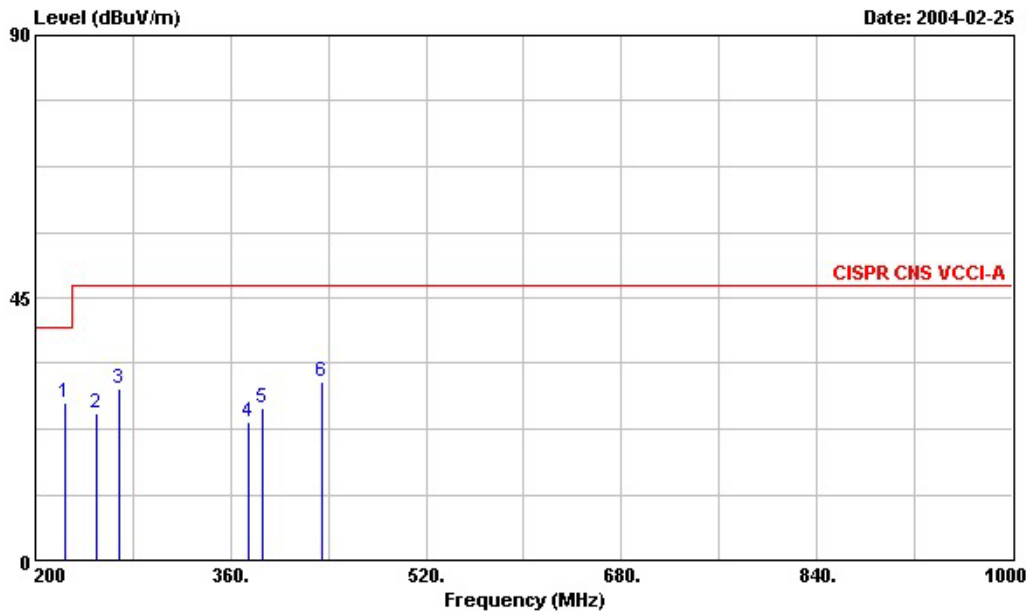
Site : OS01-NH
 Condition : CISPR CNS VCCI-A 10m OS01-ANT-01-05-2004 VERTICAL
 EUT : 8 Ports PoE Smart HUB
 POWER : 230VAC
 MEMO : 100-100

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamplifier	Remark	Ant Pos	Table Pos
	MHz	dBUV/m	dB	dBUV/m	dBuV	dB/m	dB	dB		cm	deg
1	224.800	24.36	-15.64	40.00	38.41	10.61	2.19	26.85	Peak	---	---
2	249.600	22.57	-24.43	47.00	34.31	12.75	2.31	26.80	Peak	---	---
3	268.800	22.84	-24.16	47.00	34.44	12.77	2.39	26.76	Peak	---	---
4	298.400	21.44	-25.56	47.00	32.97	12.65	2.53	26.71	Peak	---	---
5	324.800	22.37	-24.63	47.00	32.79	13.82	2.66	26.90	Peak	---	---
6	374.400	26.29	-20.71	47.00	34.39	16.11	3.08	27.29	Peak	---	---
7	396.800	26.36	-20.64	47.00	33.70	17.15	2.98	27.47	Peak	---	---
8	499.200	28.53	-18.47	47.00	34.85	18.44	3.33	28.09	Peak	---	---
9	534.400	28.81	-18.19	47.00	34.46	19.02	3.46	28.13	Peak	---	---



Site : OS01-NH
 Condition : CISPR.CNS.VCCI-A 10m OS01-ANT-01-05-2004 HORIZONTAL
 EUT : 8 Ports PoE Smart HUB
 POWER : 230VAC
 MEMO : 100-100

Peak No.	Freq MHz	Level dBuV/m	Over Limit dB	Limit Line dBuV/m	ReadAntenna Level dBuV	Antenna Factor dB/m	Cable Loss dB	Preamplifier Factor dB	Remark	Ant Pos cm	Table Pos deg
1	50.410	25.45	-14.55	40.00	43.83	8.07	1.05	27.50	Peak	---	---
2	75.500	25.01	-14.99	40.00	44.34	6.83	1.29	27.45	Peak	---	---
3	110.790	22.93	-17.07	40.00	38.00	10.78	1.50	27.35	Peak	---	---
4	124.980	28.69	-11.31	40.00	43.02	11.36	1.59	27.28	Peak	---	---
5	133.970	22.19	-17.81	40.00	36.17	11.61	1.64	27.23	Peak	---	---
6	150.060	28.25	-11.75	40.00	42.49	11.18	1.73	27.15	Peak	---	---
7	168.050	27.89	-12.11	40.00	43.32	9.77	1.86	27.06	Peak	---	---
8	175.150	21.47	-18.53	40.00	37.69	8.90	1.90	27.02	Peak	---	---
9	200.060	18.13	-21.87	40.00	34.62	8.39	2.02	26.90	Peak	---	---



Site : OS01-NH
 Condition : CISPR CNS VCCI-A 10m OS01-ANT-01-05-2004 HORIZONTAL
 EUT : 8 Ports PoE Smart HUB
 POWER : 230VAC
 MEMO : 100-100

Peak No.	Freq MHz	Level dBUV/m	Over Limit dB	Limit Line dBUV/m	ReadAntenna Level dBuV	Antenna Factor dB/m	Cable Loss dB	Preamp Factor dB	Remark	Ant Pos cm	Table Pos deg
1	224.800	26.97	-13.03	40.00	41.02	10.61	2.19	26.85	Peak	---	---
2	249.600	25.21	-21.79	47.00	36.95	12.75	2.31	26.80	Peak	---	---
3	268.000	29.30	-17.70	47.00	40.90	12.77	2.39	26.76	Peak	---	---
4	374.400	23.70	-23.30	47.00	31.80	16.11	3.08	27.29	Peak	---	---
5	385.600	26.25	-20.75	47.00	33.95	16.65	3.04	27.39	Peak	---	---
6	434.400	30.60	-16.40	47.00	37.49	17.69	3.12	27.70	Peak	---	---

Test Engineer : Castries
 Castries Huang

6.5. Photographs of Radiated Emission Test Configuration

- The photographs show the configuration that generates the maximum emission.

FRONT VIEW



REAR VIEW



7. HARMONICS TEST

7.1. Standard

- Standard : EN 61000-3-2:2000

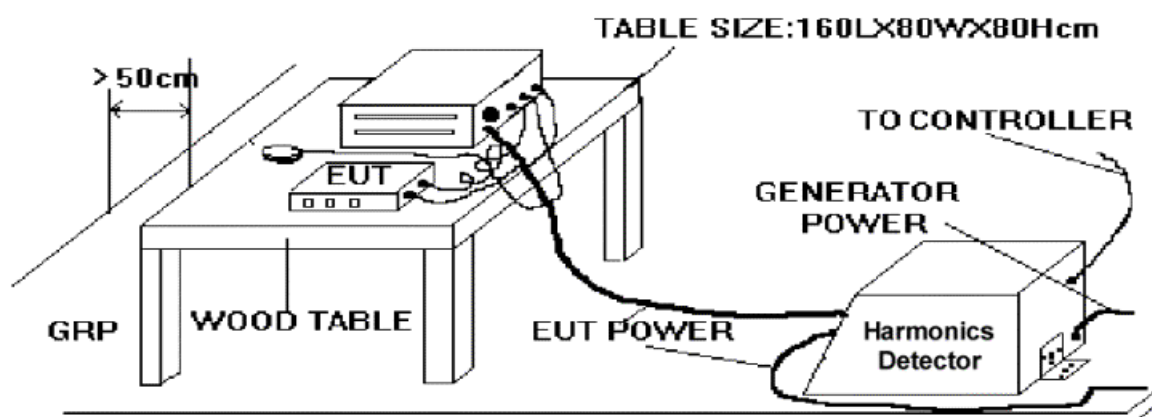
7.2. Test Procedure

The measured values of the harmonics components of the input current, including line current and neutral current, shall be compared with the limits given in Clause 7 of EN 61000-3-2.

7.3. Test Equipment Settings

- Line Voltage : 230 V
- Line Frequency : 50 Hz
- Device Class : D
- Current Measurement Range : High
- Measurement Delay : 10.0 seconds
- Test Duration : 2.00 minutes
- Class determination Pre-test Duration : 10.00 seconds

7.4. Test Setup



7.5. Current Harmonics Test

7.5.1. Test Data Of Current Harmonics

- FINAL TEST RESULT : **PASS**
- Temperature : 23
- Relative Humidity : 47% RH
- Test Date : Mar. 01, 2004

Urms = 230.1V Freq = 49.987 Range: 1 A
 Irms = 0.419A Ipk = 0.726A cf = 1.731
 P = 89.65W Pap = 96.52VA pf = 0.929
 THDi = 24.2 % THDu = 0.10 % Class D
 Test - Time : 2min (100 %)
 Limit Reference: Pmax = 89.801W
 Test completed, Result: PASSED

Order	Freq. [Hz]	Iavg [A]	Iavg%L [%]	Irms [A]	Irms%L [%]	Imax [A]	Imax%L [%]	Limit [A]
1	50	0.4075		0.4072		0.4077		
2	100	0.0000		0.0002		0.0003		
3	150	0.0969	31.725	0.0966	31.645	0.0969	31.745	0.3053
4	200	0.0000		0.0002		0.0002		
5	250	0.0261	15.310	0.0261	15.275	0.0261	15.310	0.1706
6	300	0.0000		0.0000		0.0001		
7	350	0.0123	13.729	0.0124	13.797	0.0124	13.797	0.0898
8	400	0.0000		0.0001		0.0001		
9	450	0.0068	15.089	0.0068	15.089	0.0068	15.089	0.0449
10	500	0.0000		0.0000		0.0000		
11	550	0.0000	0.0000	0.0014	4.4664	0.0014	4.4664	0.0314
12	600	0.0000		0.0001		0.0001		
13	650	0.0000	0.0000	0.0029	11.016	0.0029	11.016	0.0266
14	700	0.0000		0.0001		0.0001		
15	750	0.0000	0.0000	0.0037	16.153	0.0037	16.153	0.0230
16	800	0.0000		0.0001		0.0001		
17	850	0.0000	0.0000	0.0034	16.506	0.0034	16.506	0.0203
18	900	0.0000		0.0001		0.0001		
19	950	0.0000	0.0000	0.0026	14.088	0.0026	14.088	0.0182
20	1000	0.0000		0.0001		0.0001		
21	1050	0.0000	0.0000	0.0015	9.2682	0.0016	9.6390	0.0165
22	1100	0.0000		0.0001		0.0001		
23	1150	0.0000	0.0000	0.0015	10.151	0.0015	10.151	0.0150
24	1200	0.0000		0.0000		0.0001		
25	1250	0.0000	0.0000	0.0019	13.682	0.0020	14.123	0.0138
26	1300	0.0000		0.0000		0.0001		
27	1350	0.0000	0.0000	0.0018	14.300	0.0019	14.776	0.0128
28	1400	0.0000		0.0001		0.0001		
29	1450	0.0000	0.0000	0.0015	12.799	0.0015	12.799	0.0119
30	1500	0.0000		0.0001		0.0001		
31	1550	0.0000	0.0000	0.0012	10.945	0.0012	10.945	0.0112
32	1600	0.0000		0.0001		0.0001		
33	1650	0.0000	0.0000	0.0011	10.486	0.0011	10.486	0.0105
34	1700	0.0000		0.0001		0.0001		
35	1750	0.0000	0.0000	0.0013	12.976	0.0013	12.976	0.0099
36	1800	0.0000		0.0001		0.0001		
37	1850	0.0000	0.0000	0.0013	13.717	0.0013	14.370	0.0093
38	1900	0.0000		0.0000		0.0001		
39	1950	0.0000	0.0000	0.0011	12.393	0.0012	13.081	0.0089
40	2000	0.0000		0.0000		0.0001		

Test Engineer : Jason
 Jason Chang

8. VOLTAGE FLUCTUATIONS TEST

8.1. STANDARD

- Product Standard : EN 61000-3-3:1995/A1:2001

8.2. TEST PROCEDURE

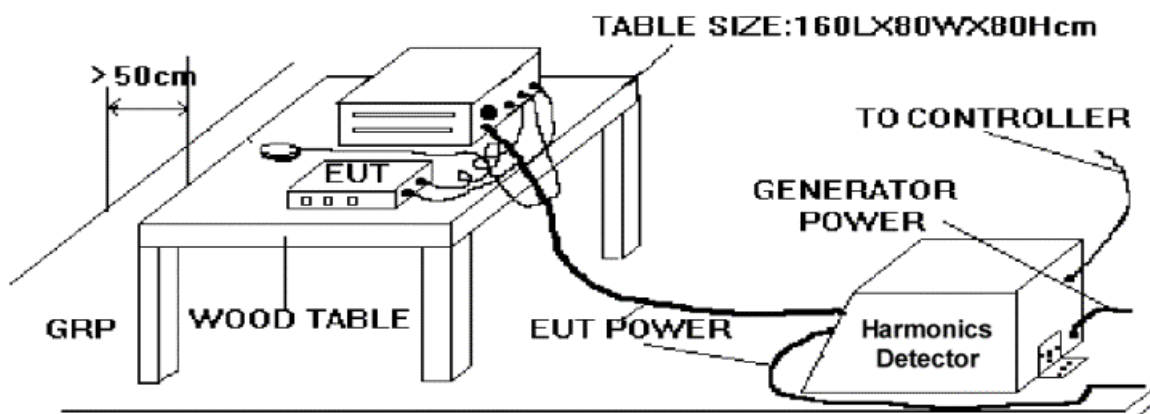
The equipment shall be tested under the conditions of **Clause 5**.

The total impedance of the test circuit, excluding the appliance under test, but including the internal impedance of the supply source, shall be equal to the reference impedance. The stability and tolerance of the reference impedance shall be adequate to ensure that the overall accuracy of $\pm 8\%$ is achieved during the whole assessment procedure.

8.3. TEST EQUIPMENT SETTINGS :

- Line Voltage : 230 V
- Line Frequency : 50 Hz
- Measurement Delay : 10.0 seconds
- Pst Integration Time : 10 minutes
- Pst Integration Periods : 1
- Test Duration : 00:10:00 minutes

8.4. TEST SETUP



8.5. TEST RESULT OF VOLTAGE FLUCTUATION AND FLICKER TEST

8.5.1. TEST DATA OF VOLTAGE FLUCTUATION AND FLICKER

- FINAL TEST RESULT : **PASS**
- Temperature : 23
- Relative Humidity : 47 % RH
- Test Date : Mar. 01, 2004

Urms = 230.1V Freq = 49.987 Range : 1A
Irms = 0.420A Ipk = 0.727A Cf = 1.730
P = 89.75W Pap = 96.63VA pf = 0.929

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

LIN (Line Impedance Network) : Soft LIN 0.24 Ohm +j 0.15 Ohm N: 0.16 Ohm +j 0.10 Ohm

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	P50s	P10s	P3s	P1s	P0.1s	dmax	dc	dt>Lim
						[%]	[%]	[ms]	
1	0.072	0.010	0.010	0.010	0.010	0.010	0.000	0.000	0.000

Test Engineer :

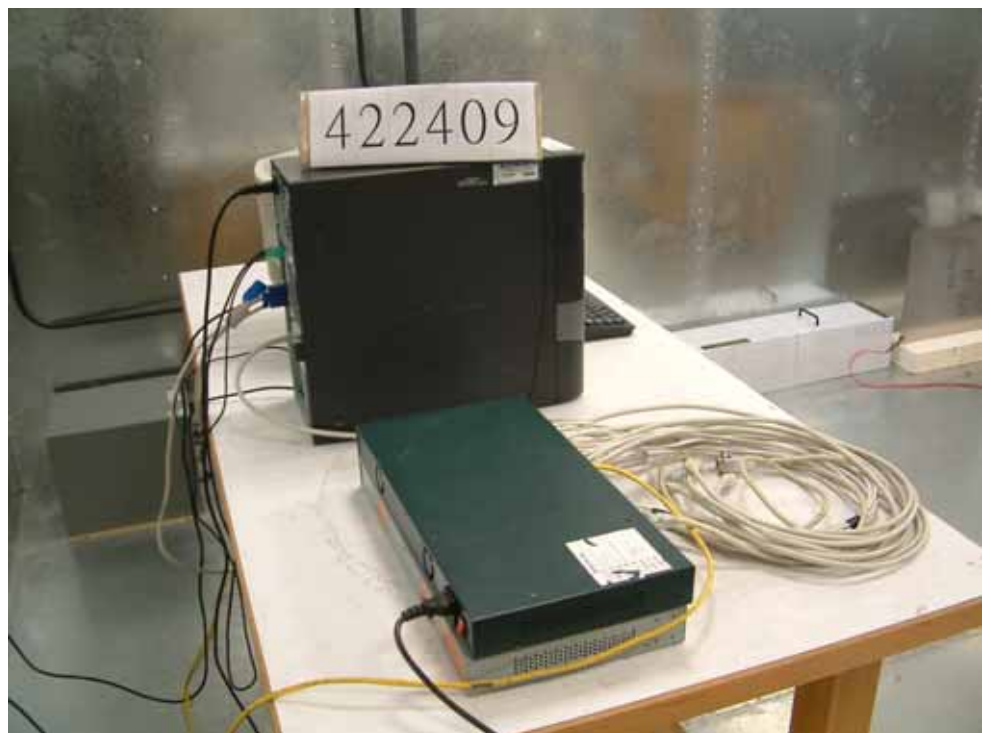
Jason
Jason Chang

8.6. PHOTOGRAPHS OF HARMONICS TEST, VOLTAGE FLUCTUATION AND FLICKER TEST

FRONT VIEW



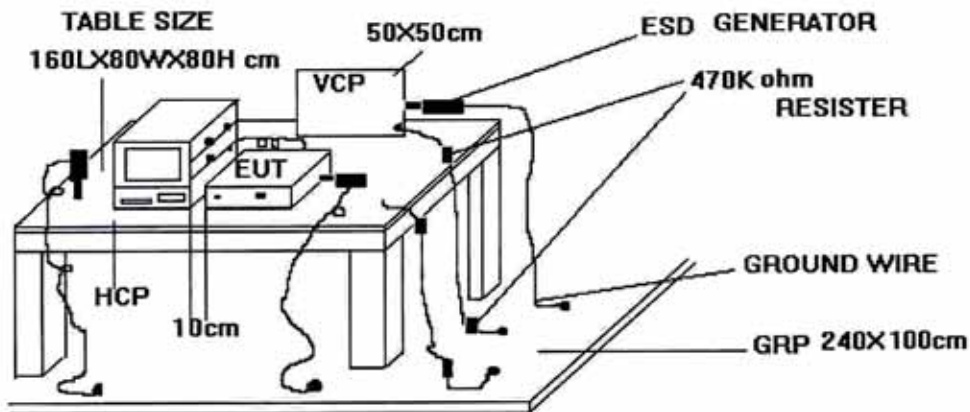
REAR VIEW



9. Electrostatic Discharge Immunity Test (ESD)

- FINAL TEST RESULT : **PASS**
- Pass Performance Criteria : B
- Required performance criteria: B
- Basic Standard : IEC 61000-4-2:1995
- Product Standard : EN 55024:1998/A1:2001
- Level : 3 for air discharge,
: 2 for contact discharge
- Tested voltage : $\pm 2 / \pm 4 / \pm 8$ KV for air discharge,
: $\pm 2 / \pm 4$ KV for contact discharge
- Temperature : 24 °C
- Relative Humidity : 47 %
- Atmospheric pressure : 96kPa
- Test Date : Mar. 01, 2004
- Observation : During the test, network connection was disconnected. After the test, the equipment continued to operate as intended without operator intervention.

9.1. Test setup



The test setup consists of the test generator, EUT and auxiliary instrumentation necessary to perform DIRECT and INDIRECT application of discharges to the EUT as applicable, in the follow manner :

- a. CONTACT DISCHARGE to the conductive surfaces and to coupling plane;
- b. AIR DISCHARGE at insulating surfaces.

The preferred test method is that of type tests performed in laboratories and the only accepted method of demonstrating conformance with this standard. The EUT was arranged as closely as possible to arrangement in final installed conditions.

9.2. Test Setup for Tests Performed in Laboratory

A ground reference plane was provided on the floor of the test site. It was a metallic sheet (copper or aluminum) of 0.25 mm, minimum thickness; other metallic may be used but they shall have at least 0.65 mm thickness. In the SPORTON EMC LAB., we provided 1 mm thickness aluminum ground reference plane or 1 mm thickness stainless steel ground reference plane. The minimum size of the ground reference plane is 1 m x 1 m, the exact size depending on the dimensions of the EUT. It was connected to the protective grounding system.

The EUT was arranged and connected according to its functional requirements. A distance of 1m minimum was provided between the EUT and the wall of the lab. and any other metallic structure. In cases where this length exceeds the length necessary to apply the discharges to the selected points, the excess length shall, where possible, be placed non-inductively off the ground reference plane and shall not come closer than 0.2m to other conductive parts in the test setup.

Where the EUT is installed on a metal table, the table was connected to the reference plane via a cable with a 470k ohm resistor located at each end, to prevent a build-up of charge. The test setup was consist a wooden table, 0.8m high, standing on the ground reference plane. A HCP, 1.6 m x 0.8 m, was placed on the table. The EUT and cables was isolated from the HCP by an insulating support 0.5 mm thick. The VCP size, 0.5 m x 0.5 m.

9.3. ESD Test Procedure

- a. In the case of air discharge testing the climatic conditions shall be within the following ranges:
 - ambient temperature: 15 to 35 ;
 - relative humidity : 30% to 60%;
 - atmospheric pressure : 86 kPa (860 mbar) to 106 kPa (1060 mbar).
- b. Test programs and software shall be chosen so as to exercise all normal modes of operation of the EUT. The use of special exercising software is encouraged, but permitted only where it can be shown that the EUT is being comprehensively exercised.
- c. The test voltage shall be increased from the minimum to the selected test severity level, in order to determine any threshold of failure. The final severity level should not exceed the product specification value in order to avoid damage to the equipment.
- d. The test shall be performed with both air discharge and contact discharge. On preselected points at least 10 single discharges (in the most sensitive polarity) shall be applied on air discharge. On preselected points at least 25 single discharges (in the most sensitive polarity) shall be applied on contact discharge.
- e. For the time interval between successive single discharges an initial value of one second is recommended. Longer intervals may be necessary to determine whether a system failure has occurred.
- f. In the case of contact discharges, the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.
- g. In the case of painted surface covering a conducting substrate, the following procedure shall be adopted :
 - If the coating is not declared to be an insulating coating by the equipment manufacturer, then the pointed tip of the generator shall penetrate the coating so as to make contact with the conducting substrate.
 - Coating declared as insulating by the manufacturer shall only be submitted to the air discharge.
 - The contact discharge test shall not be applied to such surfaces.
- h. In the case of air discharges, the round discharge tip of the discharge electrode shall be approached as fast as possible (without causing mechanical damage) to touch the EUT . After each discharge, the ESD generator (discharge electrode) shall be removed from the EUT. The generator is then retriggered for a new single discharge. This procedure shall be repeated until the discharges are completed. In the case of an air discharge test, the discharge switch, which is used for contact discharge, shall be closed.

9.4. Test Severity Levels

9.4.1. Contact Discharge

Level	Test Voltage (KV) of Contact discharge
1	±2
2	±4
3	±6
4	±8
X	Specified

Remark : "X" is an open level.

9.4.2. Air Discharge

Level	Test Voltage (KV) of Air Discharge
1	±2
2	±4
3	±8
4	±15
X	Specified

Remark : "X" is an open level.



9.5. Test Points

9.5.1. Test Result of Air Discharge

Test Point	Voltage	Tested No.
LED	$\pm 2 / \pm 4 / \pm 8$ KV	BY 10
Power Switch	$\pm 2 / \pm 4 / \pm 8$ KV	BY 10
AC SOCKET	$\pm 2 / \pm 4 / \pm 8$ KV	BY 10



9.5.2. Test Result of Contact Discharge

Polarity	Voltage	Tested No.
Horizontal(At Front)	$\pm 2 / \pm 4$ KV	BY 25
Horizontal (At Left)	$\pm 2 / \pm 4$ KV	BY 25
Horizontal (At Right)	$\pm 2 / \pm 4$ KV	BY 25
Horizontal (At Rear)	$\pm 2 / \pm 4$ KV	BY 25
Vertical (At Front)	$\pm 2 / \pm 4$ KV	BY 25
Vertical (At Left)	$\pm 2 / \pm 4$ KV	BY 25
Vertical (At Right)	$\pm 2 / \pm 4$ KV	BY 25
Vertical (At Rear)	$\pm 2 / \pm 4$ KV	BY 25
CASE	$\pm 2 / \pm 4$ KV	BY 25
SCREW	$\pm 2 / \pm 4$ KV	BY 25
Com Port	$\pm 2 / \pm 4$ KV	BY 25
RJ45 Port	$\pm 2 / \pm 4$ KV	BY 25

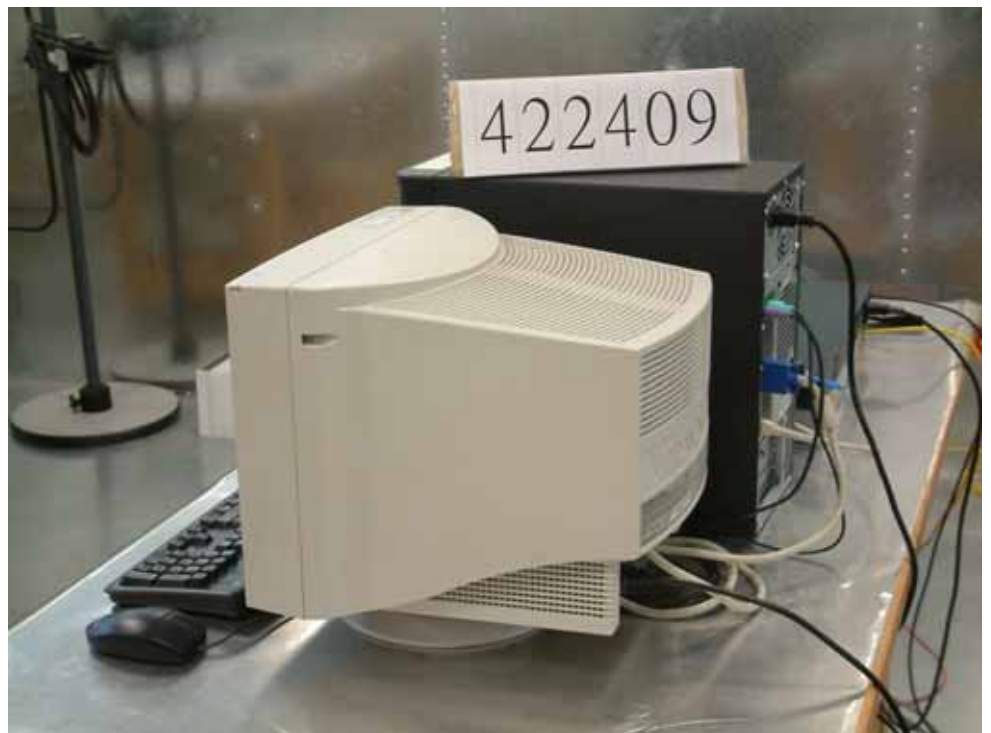
Test Engineer : Jason
Jason Chang

9.6. Photographs of Electrostatic Discharge Immunity Test

FRONT VIEW



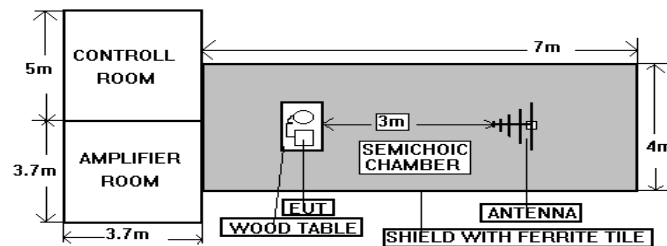
REAR VIEW



10. Radio Frequency Electromagnetic Field Immunity Test (RS)

- FINAL TEST RESULT : **PASS**
- Pass Performance Criteria : A
- Required performance criteria: A
- Basic Standard : IEC 61000-4-3:1995
- Product Standard : EN 55024:1998/A1:2001
- Level : 2
- Frequency Range : 80-1000 MHz
- Field Strength : 3 V/m (Modulated 80% AM)
- Temperature : 26 °C
- Relative Humidity : 47 %
- Atmospheric pressure : 96kPa
- Test Date : Mar. 01, 2004
- Observation : Normal

10.1. Test setup



NOTE : The SPORTON 7m x 4m x 4m semichoice chamber is compliance with the sixteen points uniform field requirement as stated in IEC 1000-4-3 Section 6.2.

The procedure defined in this part requires the generation of electromagnetic fields within which the test sample is placed and its operation observed. To generate fields that are useful for simulation of actual (field) conditions may require significant antenna drive power and the resultant high field strength levels. To comply with local regulations and to prevent biological hazards to the testing personnel, it is recommended that these tests be carried out in a shielded enclosure or semichoice chamber.

10.2. Test Procedure

- a. The equipment to be tested is placed in the center of the enclosure on a wooden table. The equipment is then connected to power and signal leads according to pertinent installation instructions.
- b. The antenna which is enabling the complete frequency range of 80-1000 MHz is placed 3m away from the equipment. The required field strength is determined by placing the field strength meter(s) on top of or directly alongside the equipment under test and monitoring the field strength meter via a remote field strength indicator outside the enclosure while adjusting the continuous-wave to the applicable antennae.
- c. The test is normally performed with the antenna facing the most sensitive side of the EUT. The polarization of the field generated by the biconical antenna necessitates testing each position twice, once with the antenna positioned vertically and again with the antenna positioned horizontally. The circular polarization of the field from the log-spiral antenna makes a change of position of the antenna unnecessary.
- d. At each of the above conditions, the frequency range is swept 80-1000 MHz, pausing to adjust the R.F. signal level or to switch oscillators and antenna. The rate of sweep is in the order of 1.5×10^{-3} decades/s. The sensitive frequencies or frequencies of dominant interest may be discretely analyzed.

10.3. Test Severity Levels

Frequency Band : 80-1000 MHz

Level	Test field strength (V/m)
1	1
2	3
3	10
X	Specified

Remark : "X" is an open class.

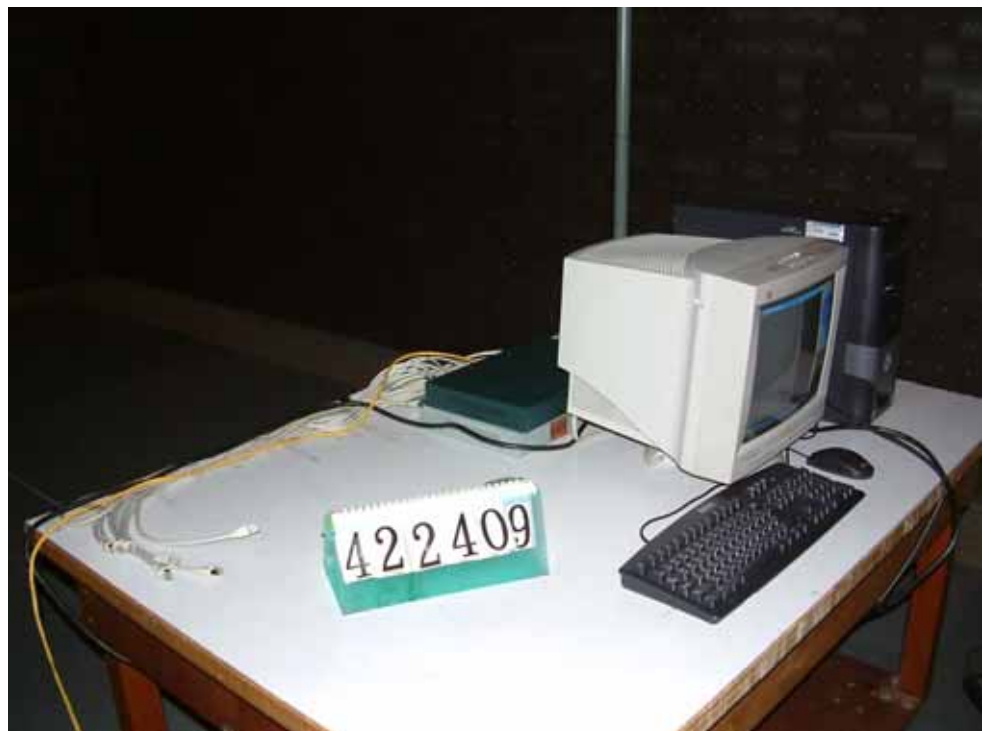
Test Engineer : Jason
Jason Chang

10.4. Photographs of Radio Frequency Electromagnetic Field Immunity Test

FRONT VIEW



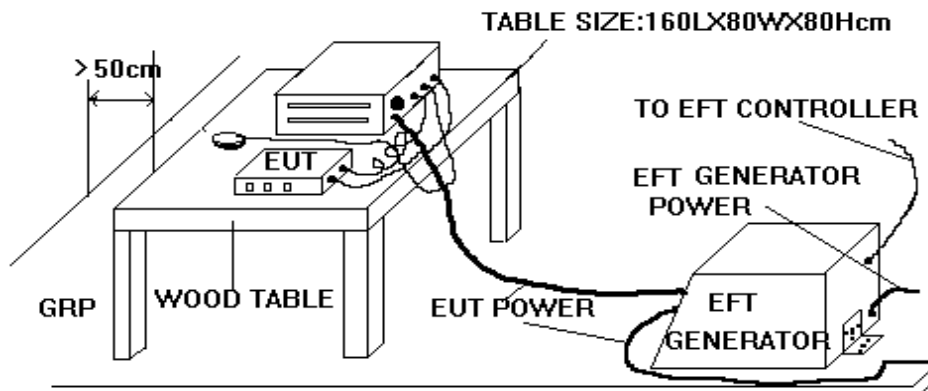
REAR VIEW



11. Electrical Fast Transient/Burst Immunity Test (EFT/BURST)

- FINAL TEST RESULT : **PASS**
- Pass Performance Criteria : B
- Required performance criteria: B
- Basic Standard : IEC 61000-4-4:1995
- Product Standard : EN 55024:1998/A1:2001
- Level : on Power Supply -- 2
: on I/O signal, data and control line -- 2
- Test Voltage : on Power Supply -- $\pm 0.5 / \pm 1.0$ KV
: on I/O signal, data and control line -- $\pm 0.25 / \pm 0.5$ KV
- Temperature : 23°C
- Relative Humidity : 48%
- Atmospheric pressure : 96kPa
- Test Date : Mar. 01, 2004
- Observation : During the test, network connection was disconnected. After the test, the equipment continued to operate as intended without operator intervention.

11.1. Test setup



The EUT was placed on a ground reference plane and was insulated from it by an insulating support about 0.1m thick. If the EUT is table-top equipment, it was located approximately 0.8m above the GRP. The GRP was a metallic sheet (copper or aluminum) of 0.25 mm, minimum thickness; other metallic may be used but they shall have at least 0.65 mm thickness. It shall project beyond the EUT by at least 0.1m on all sides and connected to the protective earth. In the SPORTON EMC LAB. We provided 1 mm thickness aluminum ground reference plane or 1 mm thickness stainless steel ground reference plane. The minimum size of the ground reference plane is 1 m x 1 m, the exact size depending on the dimensions of the EUT. It was connected to the protective grounding system. The EUT was arranged and connected according to its functional requirements. The minimum distance between the EUT and other conductive structures, except the GRP. Beneath the EUT, was more than 0.5 m. Using the coupling clamp, the minimum distance between the coupling plates and all other conductive structures, except the GRP. Beneath the EUT, was more than 0.5 m. The length of the signal and power lines between the coupling device and the EUT was 1m or less.



11.2. Test on Power Line

- a. The EFT/B-generator was located on the GRP.. The length from the EFT/B-generator to the EUT as not exceed 1 m.
- b. The EFT/B-generator provides the ability to apply the test voltage in a non-symmetrical condition to the power supply input terminals of the EUT.

11.3. Test on Communication Lines

- a. The coupling clamp is composed of a clamp unit for housing the cable (length more than 3 m), and was placed on the GRP..
- b. The coupling clamp provides the ability of coupling the fast transient/bursts to the cable under test.

11.4. Test Procedure

- a. In order to minimize the effect of environmental parameters on test results, the climatic conditions when test is carrying out shall comply with the following requirements:
 - ambient temperature: 15 to 35 ;
 - relative humidity : 45% to 75%;
 - atmospheric pressure : 86 kPa (860 mbar) to 106 kPa (1060 mbar).
- b. In order to minimize the effect of environmental parameters on test results, the electromagnetic environment of the laboratory shall not influence the test results.
- c. The variety and diversity of equipment and systems to be tested make it difficult to establish general criteria for the evaluation of the effects of fast transients/bursts on equipment and systems.
- d. The test results may be classified on the basic of the operating conditions and the functional specification of the equipment under test, according to the following performance criteria :
 - Normal performance within the specification limits.
 - Temporary degradation or loss of function or performance which is self-recoverable.
 - Temporary degradation or loss of function or performance which requires operator intervention or system reset.
 - Degradation or loss of function which is not recoverable due to damage of equipment (components).

11.5. Test Severity Levels

The following test severity levels are recommended for the fast transient/burst test :

Open circuit output test voltage $\pm 10\%$		
Level	On Power Supply	On I/O signal, data and control line
1	0.5 KV	0.25 KV
2	1.0 KV	0.50 KV
3	2.0 KV	1.00 KV
4	4.0 KV	2.00 KV
X	Specified	Specified

Remark : " X " is an open level. The level is subject to negotiation between the user and the manufacturer or is specified by the manufacturer.

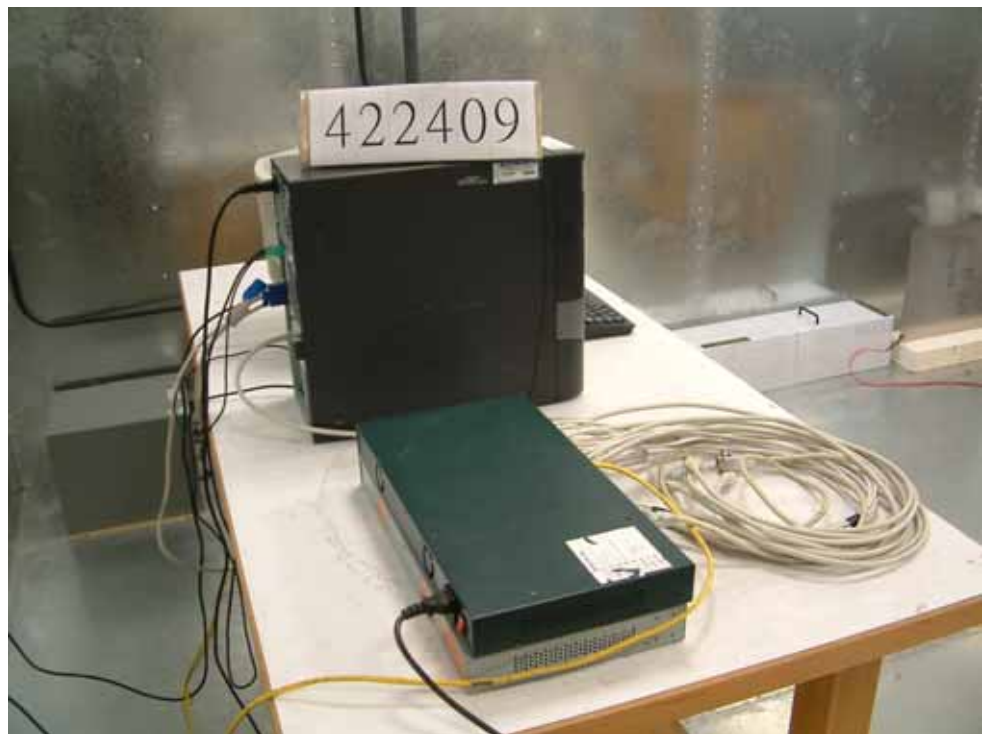
Test Engineer : Jason
Jason Chang

11.6. Photographs of Electrical Fast Transient/BURST Immunity Test

FRONT VIEW



REAR VIEW



CLAMP





12. SURGE IMMUNITY TEST

- FINAL TEST RESULT : **PASS**
- Pass performance Criteria : A
- Required performance criteria: B
- Basic Standard : IEC 61000-4-5 (1995)
- Product Standard : EN 55024:1998/A1:2001
- Surge wave form (Tr/Th) : 1, 2/50 (8/20) μ s
- Level : on RJ45 port – N/A
: on Input AC Power Port – 3
- Test Voltage : on RJ45 port – N/A
: on Input AC Power Port -- $\pm 1.0 / 2.0$ KV
- Temperature : 24 °C
- Relative Humidity : 47 %
- Atmospheric pressure : 96kPa
- Test Date : Mar. 01, 2004
- Observation : Normal.
- Remark : The test on RJ45 ports is not required due to the normal functioning cannot be achieved because of the impact of the CDN on the EUT.

12.1. TEST RECORD

Voltage (KV)	Test Location	Polarity	Phase Angle				Test Result
			0°	90°	180°	270°	
1 KV	L - N	+	A	A	A	A	<u>PASS</u>
		-	A	A	A	A	<u>PASS</u>
2 KV	L - PE	+	A	A	A	A	<u>PASS</u>
		-	A	A	A	A	<u>PASS</u>
	N - PE	+	A	A	A	A	<u>PASS</u>
		-	A	A	A	A	<u>PASS</u>

⊕ Remark : PE = DC output GND

12.2. TEST LEVEL

Level	Open-circuit test voltage, $\pm 10\%$, KV
1	0.5
2	1.0
3	2.0
4	4.0
x	Specified

NOTE - x is an open class.
This level can be specified in the product specification.

12.3. TEST PROCEDURE

- a. Climatic conditions
The climatic conditions shall comply with the following requirements :
 - ambient temperature : 15 to 35
 - relative humidity : 10 % to 75 %
 - atmospheric pressure : 86 kPa to 106 kPa (860 mbar to 1060 mbar)

- b. Electromagnetic conditions
The electromagnetic environment of the laboratory shall not influence the test results.

- c. The test shall be performed according the test plan that shall specify the test set-up with
 - generator and other equipment utilized;
 - test level (voltage/current);
 - generator source impedance;
 - internal or external generator trigger;
 - number of tests : at least five positive and five negative at the selected points;
 - repetition rate : maximum 1/min.
 - inputs and outputs to be tested;
 - representative operating conditions of the EUT;
 - sequence of application of the surge to the circuit;



- phase angle in the case of a.c. power supply;
- actual installation conditions, for example :
 - AC : neutral earthed,
 - DC : (+) or (-) earthed to simulated the actual earthing conditions.

- d. If not otherwise specified the surges have to be applied synchronized to the voltage phase at the zero-crossing and the peak value of the a.c. voltage wave (positive and negative).

- e. The surges have to be applied line to line and line(s) and earth. When testing line to earth, the test voltage has to be applied successively between each of the lines and earth, if there is no other specification.

- f. The test procedure shall also consider the non-linear current-voltage characteristics of the equipment under test. Therefore the test voltage has to be increased by steps up to the test level specified in the product standard or test plan.

- g. All lower levels including the selected test level shall be satisfied. For testing the secondary protection, the output voltage of the generator shall be increased up to the worstcase voltage breakdown level (let-through level) of the primary protection.

- h. If the actual operating signal sources are not available, they may be simulated. Under no circumstances may the test level exceed the product specification. The test shall be carried out according to a test plan.

- i. To find all critical points of the duty cycle of the equipment, a sufficient number of positive and negative test pulses shall be applied. For acceptance test a previously unstressed equipment shall be used to the protection devices shall be replaced.

12.4. OPERATING CONDITION

Full system

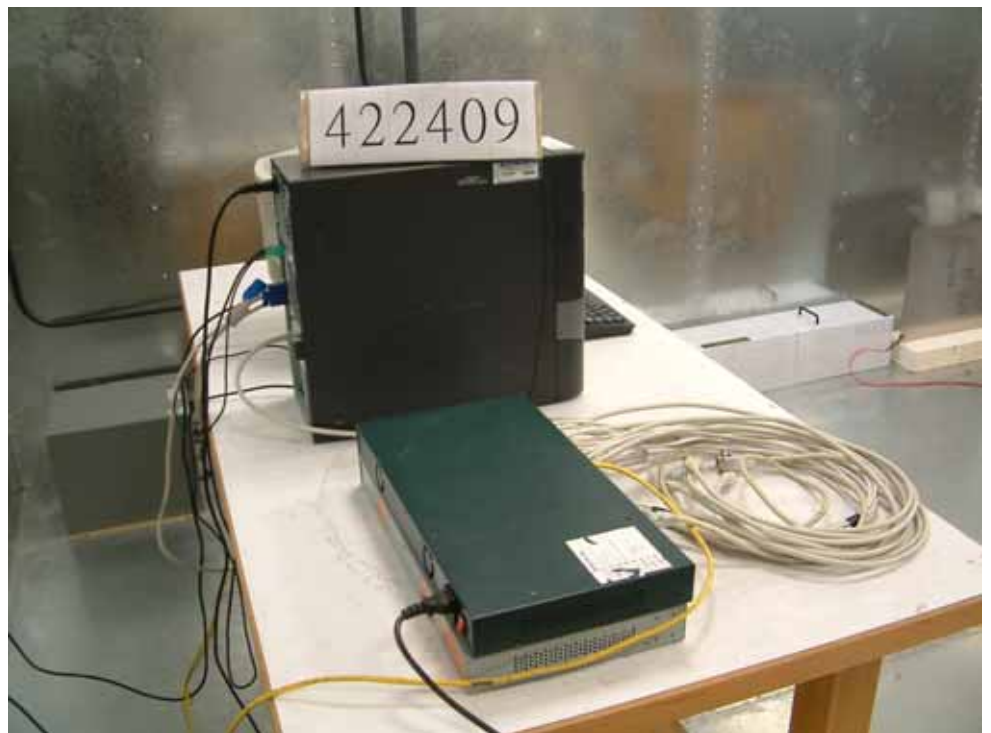
Test Engineer : Jason
Jason Chang

12.5. Photographs of SURGE IMMUNITY TEST

FRONT VIEW



REAR VIEW





13.CONDUCTED DISTURBANCES INDUCED BY RADIO-FREQUENCY FIELD IMMUNITY TEST (CS)

- FINAL TEST RESULT : **PASS**
- Pass performance Criteria : A
- Required performance criteria: A
- Basic Standard : IEC 61000-4-6 (1996)
- Product Standard : EN 55024:1998/A1:2001
- Level : 2
- Test Voltage : 3 V rms (Modulated, 1KHz, 80%, AM)
- Frequency Range : 0.15 MHz to 80 MHz
- Dwell time : 2.9 seconds
- Frequency step size : 1 %
- Coupling mode : CDN-M016M3 for AC power ports, CDN-RJ45/S for Telecom Ports
- Temperature : 25° C
- Relative Humidity : 46 %
- Atmospheric pressure : 96kPa
- Test Date : Mar. 01, 2004
- Observation : Normal

13.1. TEST LEVEL

Level	Voltage Level (EMF),
1	1 V
2	3 V
3	10 V
x	Specified

NOTE - x is an open class.
This level can be specified in the product specification.

13.2. OPERATING CONDITION

Full system



13.3. TEST PROCEDURE

- a. The EUT shall be operated within its intended climatic conditions. The temperature and relative humidity should be recorded.
- b. This test method test can be performed without using a sell shielded enclosure. This is because the disturbance levels applied and the geometry of the setups are not likely to radiated a high amount of energy, especially at the lower frequencies. If under certain circumstances the radiated energy is too high, a shielded enclosure has to be used.
- c. The test shall be performed with the test generator connected to each of the coupling and decoupling devices in turn while the other non-excited RF-input ports of the coupling devices are terminated by a 50 ohm load resistor.
- d. The frequency range is swept from 150 KHz to 80 MHz, using the signal levels established during the setting process, and with the disturbance signal 80% amplitude modulated with a 1KHz sinewave, pausing to adjust the RF-signal level or to switch coupling devices as necessary. The rate of sweep shall no exceed 1.5×10^{-3} decades/s. Where the frequency is swept incrementally, the step size shall no exceed 1% of the start and thereafter 1% of the preceding frequency value.
- e. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies e.g. clock frequency(ies) and harmonics or frequencies of dominant interest shall be analyzed separately.
- f. An alternative test procedure may be adopted, wherein the frequency range is swept incrementally, with a step size not exceeding 4% of the start ad thereafter 4% of the preceding frequency value. The test level should be at least twice the value of the specified test level.
- g. In cases of dispute, the test procedure using a step size not exceeding 1% of the start and thereafter 1% of preceding frequency value shall take precedence.
- h. Attempts should be made to fully exercise the EUT during testing, and to fully interrogate all exercise modes selected for susceptibility.
- i. The use of special exercising programs is recommended.
- j. Testing shall be performed according to a Test Plan, which shall be included in the test report.
- k. It may be necessary to carry out some investigatory testing in order to establish some aspects of the test plan.

Test Engineer :

Jason

Jason Chang

13.4. Photographs of CS tests

FRONT VIEW



REAR VIEW



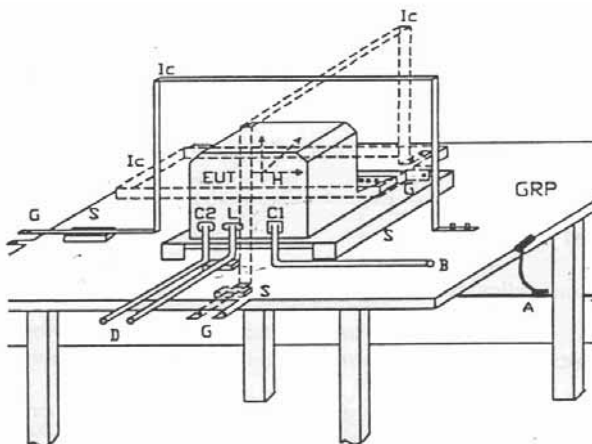
14. Power Frequency Magnetic Field immunity tests

- FINAL TEST RESULT : **PASS**
- Pass performance Criteria : A
- Required performance criteria: A
- Basic Standard : IEC 61000-4-8 (1993)
- Product Standard : EN 55024:1998/A1:2001
- Temperature : 24 °C
- Relative Humidity : 48 %
- Atmospheric pressure : 96kPa
- Test Date : Mar. 01, 2004
- Observation : Normal

14.1. TEST RECORD

Power Frequency Magnetic Field	Testing duration	Coil Orientation	Results
50Hz, 1A/m	1.0 Min	X-axis	Pass
50Hz, 1A/m	1.0 Min	Y-axis	Pass
50Hz, 1A/m	1.0 Min	Z-axis	Pass

14.2. TEST SETUP



- | | |
|---------------------------|--------------------------------|
| GRP: Ground plane | C1: Power supply circuit |
| A: Safety earth | C2: Signal circuit |
| S: Insulating support | L: Communication line |
| EUT: Equipment under test | B: To power supply source |
| Lc: Induction coil | D: To signal source, simulator |
| E: Earth terminal | G: To the test generator |

Test Engineer : Jason
Jason Chang

14.3. Photographs of Power Frequency Magnetic Field immunity tests

FRONT VIEW



REAR VIEW





15. VOLTAGE DIPS AND VOLTAGE INTERRUPTIONS IMMUNITY TESTS

- FINAL TEST RESULT : **PASS**
- Pass performance Criteria : C for voltage interruption, A for voltage dips
- Required performance criteria: C for voltage interruption, B/C for voltage dips
- Basic Standard : IEC 61000-4-11 (1994)
- Product Standard : EN 55024:1998/A1:2001
- Temperature : 24 °C
- Relative Humidity : 47 %
- Atmospheric pressure : 96kPa
- Test Date : Mar. 01, 2004

15.1. TEST RECORD OF VOLTAGE INTERRUPTION

Voltage (V)	Phase Angle		% Reduction	periods (s)	Observation
	0 °	180 °			
230	C	C	>95%	250	After the interruption, the power of EUT reset automatically.

15.2. TEST RECORD OF VOLTAGE DIPS

Voltage (V)	Phase Angle		% Reduction	periods (s)	Observation
	0 °	180 °			
230	A	A	30	25	Normal
230	A	A	>95 %	0.5	Normal



15.3. TESTING REQUIREMENT AND PROCEDURE

The test was based on IEC 61000-4-11 (1994)

15.4. TEST CONDITIONS

1. Source voltage and frequency : 230V / 50Hz, Single phase.
2. Test of interval : 10 sec.
3. Level and duration : Sequency of 3 dips/interrupts.
4. Voltage rise (and fall) time : 1 ~ 5 μ s.
5. Test severity :

Voltage dip and Interrupt reduction (%)	Test Duration (ms)
30	500
60	100
100	10
100	5000

15.5. OPERATING CONDITION

Full system

Test Engineer :

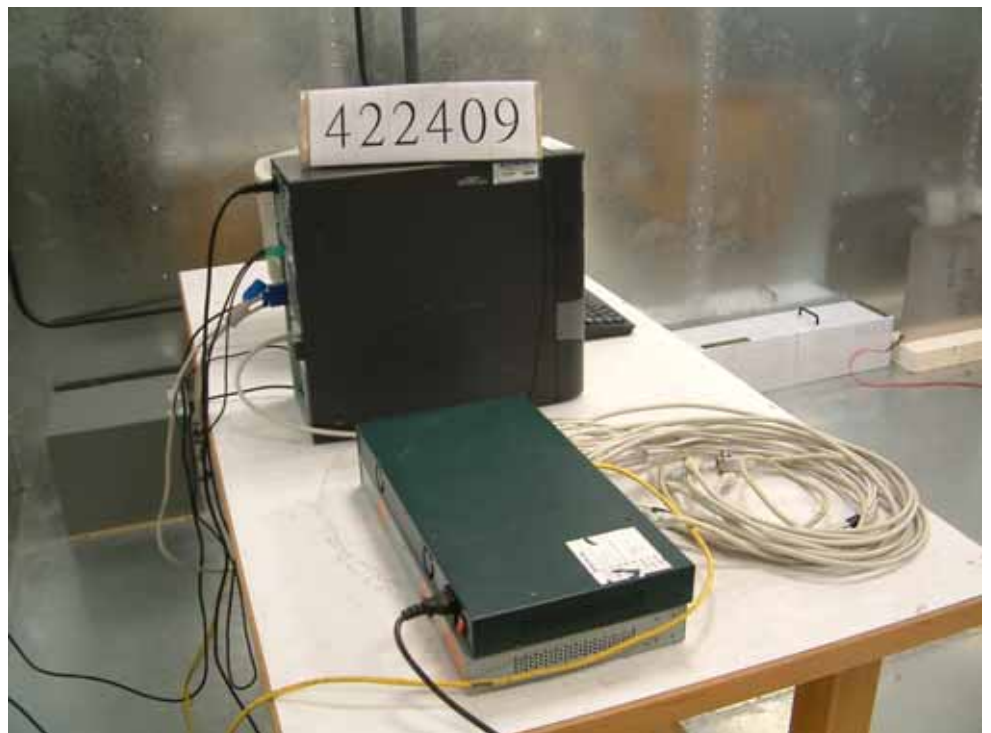
Jason Chang

15.6. Photographs of VOLTAGE DIPS AND VOLTAGE INTERRUPTIONS IMMUNITY TESTS

FRONT VIEW



REAR VIEW



16. List of Measuring Equipment Used

<EMI>

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
LISN	Rolf Heine	NNB-2/16Z	2001/007	50uH / 50 ohm	Jun. 02, 2003	Conduction (CO01-NH)
LISN	KYORITSU	KNW-407	8-1010-15	50uH / 50 ohm	Nov. 28, 2003	Conduction (CO01-NH)
Spectrum Monitor	R&S	EZM	894987/011	9KHz – 1.3GHz	Aug. 06, 2003	Conduction (CO01-NH)
Test Receiver	R&S	ESH3	893495/013	9 KHz - 30 MHz	Sep. 16, 2003	Conduction (CO01-NH)
RF Cable-CON	Suhner Switzerland	RG223/U	CB004	9KHz~30MHz	Dec. 18, 2003	Conduction (CO01-NH)
50 ohm BNC type Terminal	NOBLE	50ohm	TM001	50 ohm	Apr. 09, 2003	Conduction (CO01-NH)
Power Filter	CORCOM	MR12030	N/A	30A*2	N/A	Conduction (CO01-NH)
Impedance Stabilization Network	SCHAFFNER	T400	16851	150KHz – 230MHz	Jul. 05, 2003	Conduction (Telecommunication port)
CURRENT PROBE	SCHAFFNER	SMZ11	18115	9KHz~30MHz	Apr. 10, 2003	Conduction (Telecommunication port)
Open Area Test Site	SPORTON	OATS-10	OS01-NH	30MHz~1GHz 10m	Mar. 22, 2003	Radiation (OS01-NH)
Spectrum Analyzer	R&S	FSP7	838858/038	9KHz – 7GHz	May 19, 2003	Radiation (OS01-NH)
Bilog Antenna	SCHAFFNER	CBL6111C	2738	30MHz - 1GHz	Jan. 03, 2004	Radiation (OS01-NH)
Turn Table	EMCO	1060-1.211	9507-1805	0 ~ 360 degree	N/A	Radiation (OS01-NH)
Antenna Mast	EMCO	1051-1.2	9503-1876	1 m - 4 m	N/A	Radiation (OS01-NH)
RF Cable-R10m	BELDEN	RG8/U	CB001	30MHz~1GHz	Dec. 13, 2003	Radiation (OS01-NH)

Calibration Interval of instruments listed above is one year.

<EMS>

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
ESD Simulator	KEYTEK	MZ-15/EC	9503213	Air: 0 KV - 15 KV Contact: 0 KV -8KV	Jun. 17, 2003	ESD
Antenna	CHASE	CBL6121A	1027	26 MHz - 1 GHz	Dec. 08. 2003	RS
Field Strength Monitoring Antennas (Probe)	AR	FP3000A	16077	0.1 MHz - 1 GHz	Jun. 29. 2003	RS
RS immunity Test system	HP	EMS test System	2062	80 MHz - 1 GHz 3V/m 10v/m	Dec. 08. 2003	RS
Amplifier	AR	100W 1000M3	16060	80 MHz - 1 GHz	Dec. 08. 2003	RS
Power Meter	EMC Automation	438A	3513U04050	100 KHz -4.2 GHz	Dec. 08. 2003	RS
Signal Generator	HP	8648A	3426A00771	100 KHz - 1 GHz	Dec. 04. 2003	RS
Power Sensor	HP	8481D	3318A13140	100 KHz - 1 GHz	Dec. 08. 2003	RS
Power Sensor	HP	8482A	3318A26464	100 KHz - 1 GHz	Dec. 08. 2003	RS
Attenuator	HP	8491A	53603	100 KHz - 1 GHz	Dec. 08. 2003	RS
EFT Generator	KEYTEK	EMCPRO	0303194	0 KV - 4.4 KV	Mar. 17, 2003	EFT
EFT/Clamp	KEYTEK	CCL-4/S	--	0 KV -1 KV	Sep.17, 2003	EFT
Harmonic/Flicker Test System	EMC PARTNER	Harmonics -1000	HAR1000-41	4000VA 16A PEAK	Jun. 23, 2003	Harmonics, Flicker
SURGE Generator	KEYTEK	EMCPRO	0303194	0 KV -6 KV/2 0KV-500V/12	Apr. 17, 2003	SURGE
Conducted Immunity Test System	FRANKONIA	CIT-10/75	1999010443	100KHz ~ 266MHz	Apr. 01, 2003	CS
Coupling and Decoupling Network	SCHAFFNER	CDN M016	16670	150KHz ~ 230MHz	Apr. 23. 2003	CS
Coupling and Decoupling Network	FRANKONIA	CDN RJ45/S	A3018004	150KHz ~ 230MHz	Apr. 07. 2003	CS
Magnetic Generator	EMC -PARTNER	TRANSIENT -2000	TRA2000-376	230VA/50Hz/60Hz	May 05, 2003	Magnetic
Magnetic field Antenna	EMC PARTNER AG Switzerland	MF-1000	MF-1000-51	0.5 up to 150A / m	May 05, 2003	Magnetic
PQF Generator	KEYTEK	EMCPRO	0303194	230VA/50Hz/60Hz 0%Open/5S 0%Short/5S 40%0.10S 70%/0.01S	Apr. 17, 2003	DIP

17. Notice for Class A Product

This Notice is for class A product only. If the Equipment under Test is a class B product, this notice should be disregarded.

Class A ITE is a category of all other ITE which satisfies the class A ITE limits but not the class B ITE limits. Such equipment should not be restricted in its sale but the following warning shall be included in the instructions for use:

Warning

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

18. Declaration of Conformity and the CE Mark

There are three possible procedures pertaining to the declaration of conformity :

18.1. Conformity Testing and Declaration of Conformity by the Manufacturer or His Authorized Representative Established within the Community or by an Importer.

- Article 10 (1) of the EMC Directive,
- § 3 (1) no. 2a of the EMC Act.

18.2. Declaration of Conformity Issued by the Manufacturer or His Authorized Representative Established within the Community or by an Importer Following Testing of the Product and Issued of an EC certificate of conformity by a competent body.

- Article 10 (2) of the EMC Directive,
- § 3 (1) no. 2b of the EMC Act.

18.3. Declaration of Conformity Issued by the Manufacturer or His Authorized Representative Established within the Community or by an Importer Following Testing and Certification of the Product by a Notified Body.

- Article 10 (5) of the EMC Directive,
- § 3 (1) no. 2b of the EMC Act (radio transmitting installations).

18.4. Specimen For The CE Marking Of Electrical / Electronical Equipment

The components of the CE marking shall have substantially the same vertical dimension, which may not be less than 5 mm.

