

## Measurement Report

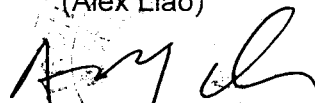
**Issued Date** : Oct. 27, 2003  
**Project No.** : 03E0669  
**Equipment** : 16-Port 10/100/1000Mbps Gigabit Switch  
**Model No.** : TEG-S160TX  
**Applicant** : TRENDWare International Inc.  
3135 Kashiwa Street Torrance, CA 90505, U.S.A.

**Tested by :**  
Neutron Engineering Inc. EMC Laboratory  
**Data of Test :**  
Jun. 07, 2003 ~ Jun. 13, 2003

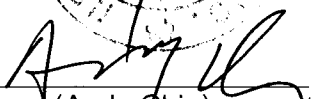
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## Declaration

**Neutron** represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with the standards traceable to National Measurement Laboratory (**NML**) of **R.O.C.**, or National Institute of Standards and Technology (**NIST**) of **U.S.A.**

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## Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

## Assessment Authorities



## Test Standard/Scope/Item Acceptance

FCC Part 15 Subpart B  
IEC/CISPR22  
AS/NZS 3548  
CNS 13438

FCC Part 15 Subpart B  
CISPR 22/EN 55022  
AS/NZS 3548  
VCCI -Technical Requirement  
CNS 13438  
SS IEC/CISPR 22  
IEC/EN 61000-3-2 IEC/EN 61000-4-5  
IEC/EN 61000-3-3 IEC/EN 61000-4-6  
IEC/EN 61000-4-2 IEC/EN 61000-4-8  
IEC/EN 61000-4-3 IEC/EN 61000-4-11  
IEC/EN 61000-4-4

CISPR 22/EN 55022  
IEC/EN 61000-3-2 IEC/EN 61000-4-5  
IEC/EN 61000-3-3 IEC/EN 61000-4-6  
IEC/EN 61000-4-2 IEC/EN 61000-4-8  
IEC/EN 61000-4-3 IEC/EN 61000-4-11  
IEC/EN 61000-4-4

VCCI -Technical Requirement

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## 1. General Information

### 1.1 Applicant

Name TRENDWare International Inc.  
Address 3135 Kashiwa Street Torrance, CA 90505, U.S.A.

### 1.2 Manufacturer

Name N/A  
Address N/A

### 1.3 Equipment Under Tested

Name: 16-Port 10/100/1000Mbps Gigabit Switch  
Trade Name: TRENDWare  
Model No.: TEG-S160TX

### 1.4 OEM Brand/Model (if applicable)

OEM Brand(s)/Model(s) except the basic model in sub-clause 1.3 is(are) the follows:  
OEM Brand: N/A  
Model No.: N/A

### 1.5 Product Descriptions(Application/Features/Specification)

The EUT is a 16-Port 10/100/1000Mbps Gigabit Switch.  
Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual

### 1.6 Connecting I/O Port(s)

16 Ports RJ 45 8P8C

### 1.7 Power Supplied

Power Source: AC Mains.  
Power Cord: Detachable, non-shielded type.  
Power Rating: AC I/P 100-240Vac, 50-60Hz/DC O/P 5Vdc, 8A

## 1.8 Products Covered (if applicable)

The sample tested including the following sub-system/module/accessory :

| Sub-system/ Module/ Accessory | Model/Type No.      | Int. Inst./ Ext. Cont. |
|-------------------------------|---------------------|------------------------|
| Power Supply                  | SA40-050100 (LEI)   | Int. Inst              |
| Power Supply                  | UP0401S-05L1 (UMEC) | Int. Inst              |

## 1.9 Model Difference (Series, Versions, if any)

Except the basic model no. (model designation of the sample tested in this test report), additional model no. covered is(are) :

N/A

## 1.10 EUT Modifications (if applicable)

No any modification required for the EUT to comply with the standards.

Please refer to the Attachment – **A**.

## 1.11 Photos of EUT

Please refer to the Attachment – **C**.

## 2. RFI Emissions Measurement

### 2.1 Test Facility

The test facilities used to collect the test data in this report is OS02 at the location of No.132-1, Lane 329, Sec. 2, Palain Road, Shijr City, Taipei, Taiwan.

### 2.2 Standard Compliance

The test data contained in this report relate only to the item(s) listed below :

Limitation Class A

CISPR 22 :1997/EN 55022 : 1998+A1:2000

### 2.3 Test Methodology

Both conducted and radiated testing were performed during the max. EMI emission evaluation.

Antenna to EUT distance is 10 m.

Test procedures according to the technical standards:

CISPR 22 :1997+A1:2000 / EN 55022 : 1998+A1:2000

### 2.4 Deviations from Standard Test Method

N/A

### 2.5 Sample(s) Tested

The representative sample tested in this reports is(are): TEG-S160TX

Test results in this test report relate only to the sample(s) tested.

The EUT has been tested according to the following environmental condition:

|                   |              |
|-------------------|--------------|
| Input Power       | 230 Vac/50Hz |
| Temperature       | 26           |
| Relative Humidity | 70 %         |

### 2.6 Measurement Instruments

Valid measurement instruments used in this report refer to **Table-1** enclosed.



## 2.7 Measurement Uncertainty

The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately **95 %**.

A. Conducted Measurement :5.05dB

B. Radiated Measurement :

| Test Site | Method | Measurement Frequency Range | Ant.<br>H / V | U , (dB) | NOTE                 |
|-----------|--------|-----------------------------|---------------|----------|----------------------|
| OS-01     | ANSI   | 30MHz ~ 200MHz              | H             | 4.59     |                      |
|           |        | 30MHz ~ 200MHz              | V             | 4.80     |                      |
|           |        | 200MHz ~ 1,000MHz           | H             | 4.47     |                      |
|           |        | 200MHz ~ 1,000MHz           | V             | 5.03     |                      |
| OS-01     | VCCI   | 30MHz ~ 200MHz              | H             | 4.59     | Only for VCCI Report |
|           |        | 30MHz ~ 200MHz              | V             | 4.48     | Only for VCCI Report |
|           |        | 200MHz ~ 1,000MHz           | H             | 4.47     | Only for VCCI Report |
|           |        | 200MHz ~ 1,000MHz           | V             | 4.73     | Only for VCCI Report |
| OS-02     | ANSI   | 30MHz ~ 200MHz              | H             | 4.34     |                      |
|           |        | 30MHz ~ 200MHz              | V             | 5.15     |                      |
|           |        | 200MHz ~ 1,000MHz           | H             | 5.28     |                      |
|           |        | 200MHz ~ 1,000MHz           | V             | 4.53     |                      |
| OS-02     | VCCI   | 30MHz ~ 200MHz              | H             | 4.34     | Only for VCCI Report |
|           |        | 30MHz ~ 200MHz              | V             | 4.77     | Only for VCCI Report |
|           |        | 200MHz ~ 1,000MHz           | H             | 4.91     | Only for VCCI Report |
|           |        | 200MHz ~ 1,000MHz           | V             | 4.53     | Only for VCCI Report |

## 2.8 Tested System Set-Up/Configuration Details

The system was configured for testing in a typical fashion (as a user would normally use) or in-accordance with the operating configuration specified in the user's manual. A Block Diagram(please refer to the Diagram - 1) and Photos(please refer to the attachment - **B**) showing the set-up/configuration of system tested. In addition, **Table-2** and **Table-3** provide a detail of all equipment items and cables information used in the system tested.

**Table -1 Measurement Instruments List**

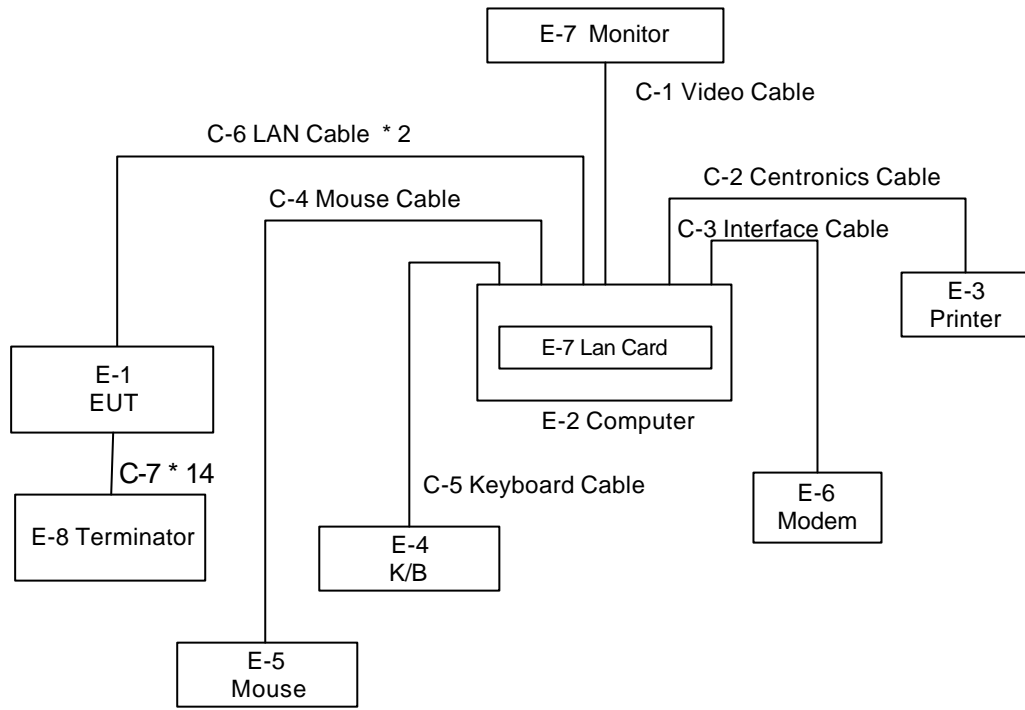
| Item | Instruments        | Mfr/Brand       | Model/Type No. | Serial No.                         | Calibrated Date | Next Cali. Date | Note |
|------|--------------------|-----------------|----------------|------------------------------------|-----------------|-----------------|------|
| 1    | LISN               | EMCO            | 3825/2         | 9605-2539                          | 2003-06-09      | 2004-06-08      |      |
| 2    | LISN               | Rolf Heine      | NNB-2/16Z      | 98083                              | 2002-11-01      | 2003-10-31      | ✓    |
| 3    | LISN               | Rolf Heine      | NNB-2/16Z      | 98053                              | 2002-11-15      | 2003-11-14      | ✓    |
| 4    | Pulse Limiter      | Electro-Metrics | EM-7600        | 112644                             | 2002-12-09      | 2003-12-08      | ✓    |
| 5    | 50 Terminator      | N/A             | N/A            | N/A                                | 2003-05-09      | 2004-05-08      | ✓    |
| 6    | Test Cable         | N/A             | C01            | N/A                                | 2002-12-10      | 2003-12-09      | ✓    |
| 7    | Log-Bicon Antenna  | MESS-ELEKTRONIK | VULB 9160      | 3058                               | 2002-10-23      | 2003-10-22      |      |
| 8    | Log-Bicon Antenna  | MESS-ELEKTRONIK | VULB 9160      | 3060                               | 2002-10-23      | 2003-10-22      | ✓    |
| 9    | Log-Bicon Antenna  | MESS-ELEKTRONIK | VULB 9161      | 4022                               | 2002-07-25      | 2003-07-24      |      |
| 10   | Test Cable         | N/A             | 10M_OS01       | N/A                                | 2002-12-10      | 2003-12-09      |      |
| 11   | Test Cable         | N/A             | OS01-1/-2      | N/A                                | 2002-12-10      | 2003-12-09      |      |
| 12   | Test Cable         | N/A             | 10M_OS02       | N/A                                | 2002-12-10      | 2003-12-09      | ✓    |
| 13   | Test Cable         | N/A             | OS02-1/-2/-3   | N/A                                | 2002-12-10      | 2003-12-09      | ✓    |
| 14   | RF Switch          | Anritsu         | MP59B          | M65982                             | 2001-12-09      | 2003-12-08      |      |
| 15   | Quasi-Peak Adapter | HP              | 85650A         | 2521A00844                         | 2003-04-21      | 2003-10-20      | ✓    |
| 16   | RF Pre-Selector    | HP              | 85685A         | 2648A00417                         | 2003-04-21      | 2003-10-20      | ✓    |
| 17   | Spectrum Analyzer  | HP              | 85680B         | 2634A03025                         | 2003-04-21      | 2003-10-20      | ✓    |
| 18   | Spectrum Monitor   | HP              | 85662B         | 2648A13616                         | 2003-04-21      | 2003-10-20      | ✓    |
| 19   | Pre-Amplifier      | Anritsu         | MH648A         | M09961                             | 2002-12-09      | 2003-12-08      |      |
| 20   | Spectrum Analyzer  | ADVAN TEST      | R3261C         | 81720298                           | 2002-08-14      | 2003-08-13      |      |
| 21   | Test Receiver      | R&S             | ESH3           | 860156/018                         | 2002-10-22      | 2003-10-21      |      |
| 22   | Test Receiver      | R&S             | ESVP           | 860687/009                         | 2002-12-06      | 2003-12-05      |      |
| 23   | Test Receiver      | MEB             | SMV41          | 130                                | 2002-12-06      | 2003-12-05      | ✓    |
| 24   | Test Receiver      | PMM             | PMM 9000       | 4310J01002                         | 2002-10-06      | 2003-10-03      |      |
| 25   | Horn Antenna       | EMCO            | 3115           | 9605-4803                          | 2003-05-23      | 2004-05-22      |      |
| 26   | Test Receiver      | R&S             | ESMI           | 843977/005                         | 2003-01-13      | 2004-01-12      |      |
| 27   | Pre-Amplifier      | R&S             | ESMI-Z7        | 1045.5020.9801<br>(612.278 041 00) | 2003-05-19      | 2004-05-18      | ✓    |
| 28   | Absorbing Clamp    | R&S             | MDS-21         | 841077/011                         | 2002-08-23      | 2003-08-22      |      |
| 29   | Voltage Probe      | R&S             | ESH2-Z3        | 841.800/023                        | 2002-08-28      | 2003-08-27      |      |
| 30   | Signal Generator   | HP              | 8648A          | 3426A01034                         | 2002-10-11      | 2004-10-08      |      |
| 31   | Antenna Mast       | Chance Most     | CMTB-1.5       | N/A                                | N/A             | N/A             | ✓    |
| 32   | Turn Table         | Chance Most     | CMTB-1.5       | N/A                                | N/A             | N/A             | ✓    |

Remark :

(1)" ✓" indicates the instrument used in Test Report.

(2)" N/A" denotes No Model No. / Serial No. and No Calibration specified.

**Diagram - 1**  
**Block diagram showing the configuration of system tested**



**Table - 2 Equipments Used in Tested System**

| Item | Equipment                                    | Mfr/Brand | Model/Type No. | FCC ID      | Series No. | Note |
|------|--|-----------|----------------|-------------|------------|------|
| E-1  | 16-Port<br>10/100/1000Mbps<br>Gigabit Switch | TRENDWare | TEG-S160TX     | N/A(3)      | N/A        | EUT  |
| E-2  | PC   | HP        | Pavilion 8801  | N/A(3)      | SG12460765 |      |
| E-3  | Printer                                      | SII       | DPU-414        | N/A(3)      | 1045105A   |      |
| E-4  | PS/2 K/B                                     | HP        | 5181           | N/A(3)      | N/A        |      |
| E-5  | PS/2 Mouse                                   | HP        | P8131          | N/A(3)      | 5185-1212  |      |
| E-6  | Modem  | ACEEX     | DM-1414V       | N/A(3)      | 8041708    |      |
| E-7  | Lan Card                                     | D-LINK    | DFE-500TX      | KA2APC500X2 | 10M/100M   |      |
| E-7  | Terminator                                   | TRENDWare | N/A            | N/A         | N/A        |      |
|      |  |           |                |             |            |      |
|      |  |           |                |             |            |      |
|      |  |           |                |             |            |      |
|      |  |           |                |             |            |      |

Note:

- (1) Unless otherwise denoted as EUT in 『Remark』 column , device(s) used in tested system is a support equipment.
- (2) Unless otherwise marked as in 『Remark』 column, Neutron consigns the support equipment to the tested system.
- (3) The support equipment was authorized by Declaration of Confirmation.

**Table - 3 Information of Interface Cable**

| Item | Shielded Type | Ferrite Core | Length | Note |
|------|---------------|--------------|--------|------|
| C-1  | YES           | YES          | 1.8M   |      |
| C-2  | YES           | NO           | 1.8M   |      |
| C-3  | YES           | NO           | 1.5M   |      |
| C-4  | YES           | NO           | 1.5M   |      |
| C-5  | YES           | NO           | 1.5M   |      |
| C-6  | NO            | NO           | 2M     |      |
| C-7  | NO            | NO           | 1.2M   |      |
|      |               |              |        |      |
|      |               |              |        |      |
|      |               |              |        |      |
|      |               |              |        |      |
|      |               |              |        |      |

Note:

- (1) Unless otherwise marked as in 『Remark』 column, Neutron consigns the support equipment to the tested system.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

## 2.9 Max.(Worst Case) RF Emission Evaluation

- (a) Both conducted and radiated testing were performed during the max. EMI emission evaluation.
- (b) The system was configured for testing in a typical fashion (as a customer would normally use it). The EUT was connected to support equipment-personal computer. Peripherals of PC, such as monitor, keyboard, modem and printer were contained in this system in order to comply with the CISPR22 (1997) Rules requirement. The PC operated in the default 640 x 480 / 31.5 KHz VGA Graphic mode. This operating condition was tested and used to collect the included data.
- (c) To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Mode 1 10 Mbps (Power Supply: SA40-050100)

Mode 2 100 Mbps (power supply: SA40-05100)

Mode 3 1000 Mbps (power supply: SA40-05100)

Mode 4 10 Mbps (power supply: UP0401S-05L1)

Mode 5 100 Mbps (power supply: UP0401S-05L1)

Mode 6 1000 Mbps (power supply: UP0401S-05L1)

The EUT system operated Mode 2, 3, 5, and 6, mentioned above was found to be the worst case during the pre-scanning test.

These operation modes were used for final testing and collecting test data included in this report.

## 2.10 EUT Operation

The EUT exercise program used during radiated and/or conducted emission measurement was designed to exercise the various system components in a manner similar to a typical use. The program contained on a PC hard disk and is auto-starting on power-up. Once loaded, the program sequentially exercises each system component in turn. The sequence used is:

1. Read (write) from (to) mass storage device (Disk).
2. Send "H" pattern to video port device (Monitor).
3. Send " H " pattern to parallel port device (Printer).
4. Send " H " pattern to serial port device (Modem).
5. EUT send/receive data to/from PC server (EUT - PC).
6. Repeated from 2 to 5 continuously.

As the keyboard and mouse are strictly input devices, no data is transmitted to (from) them during test. They are, however, continuously scanned for data input activity.

### 3. Justification

#### 3.1 Limitations

##### 3.1.1 Power Line Conducted Emission (Frequency Range 150KHz-30MHz)

| Measurement<br>Frequency<br>Range<br>(MHz) | Mains Terminal<br>Class A Limits<br>(dBuV) |         | Mains Terminals<br>Class B Limits<br>(dBuV) |           | Note<br>CISPR<br>FCC<br>Std. |
|--|--|---------|---|-----------|------------------------------|
|  | QP Mode                                    | AV Mode | QP Mode                                     | AV Mode   |                              |
| 0.15 - 0.50                                | 79.00                                      | 66.00   | 66 - 56 *                                   | 56 - 46 * | CISPR                        |
| 0.50 - 5.00                                | 73.00                                      | 60.00   | 56.00                                       | 46.00     | CISPR                        |
| 5.00 - 30.0                                | 73.00                                      | 60.00   | 60.00                                       | 50.00     | CISPR                        |
| 0.45-1.705                                 | 60.00                                      | N/A     | 48.00                                       | N/A       | FCC                          |
| 1.705-30.0                                 | 69.50                                      | N/A     | 48.00                                       | N/A       | FCC                          |

Notes:

- (1). The tighter limit applies at the band edges.
- (2). The limit of " \* " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

##### 3.1.2 Radiated Emission Limits (Frequency Range 30MHz-1000MHz)

| Measurement<br>Frequency<br>Range<br>(MHz) | Quasi-Peak Mode<br>Class A Limits<br>(dBuV/m) |       | Quasi-Peak Mode<br>Class B Limits<br>(dBuV/m) |       | Note<br>CISPR<br>FCC<br>Std. |
|--|---|-------|---|-------|------------------------------|
|  | 10m   | 30m   | 10m   | 3m    |                              |
| 30.00 -230.00                              | 40.00   | 30.00 | 30.00   | 40.00 | CISPR                        |
| 230.0 -1000.0                              | 47.00   | 37.00 | 37.00   | 47.00 | CISPR                        |
| 30.00 - 88.00                              | 39.00   | N/A   | 30.00   | 40.00 | FCC                          |
| 88.00 - 216.0                              | 43.50   | N/A   | 33.50   | 43.50 | FCC                          |
| 216.0 -960.0                               | 46.00   | N/A   | 36.00   | 46.00 | FCC                          |
| above 960.0                                | 49.50   | N/A   | 46.00   | 54.00 | FCC                          |

Notes:

- (1). The tighter limit applies at the band edges.
- (2). Emission level (dBuV/m)=20log Emission level (uV/m).
- (3). A measuring distance Of 10m is a primary used. However, either 3m or 10m (instead of 10m) distance may be allowed. If the distance is 3m, add 10dB to the QP-limit above. If the distance is 10m, subtract 10dB from the QP-limit above.

### 3.2 Measurement Justification

#### 3.2.1 Conducted Emission

The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and these signals are then Quasi Peak detector mode and Average detector mode re-measured.

Data of **Table - 4.** lists the significant emission frequencies, measured levels, limits and safe margins. All readings are Peak Mode measured unless otherwise stated as QP or AV in column of " Remark ".

If the Peak Mode measured value lower than both QP Mode and AV Mode Limit, EUT shall be deemed to compliance with both QP & AV Limits and then no additional QP Mode or AV Mode measurement performed.

If additional QP or AV Mode measurement needed, and if the QP Mode measured value compliance with the QP Mode Limit and lower than AV Mode Limit, the EUT shall be deemed to meet both QP & AV Limits and then only QP Mode was measured, but AV Mode was not performed.

#### 3.2.2 Radiated Emission

The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.

Data of **Table - 5.** lists the significant emission frequencies, measured levels, limits and safe margins. All readings are Peak Mode measured unless otherwise stated as QP in column of " Remark ".

If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.

### 3.3 Measurement Data

Table - 4. Conducted Emission Data

Table - 5. Radiated Emission Data

**Table 4 Conducted Emission Data**

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable)

Mode 2

Judgement : Passed by -18.40 dB at 17.02 MHz    AVG   X   QP    Line   X   Neutral

| Freq.<br>(MHz) | Terminal<br>L/N | Measured(dBuV) |         | Limits(dBuV) |         | Safe Margins |      |
|----------------|-----------------|----------------|---------|--------------|---------|--------------|------|
|                |                 | QP-Mode        | AV-Mode | QP-Mode      | AV-Mode | (dBuV)       | Note |
| 0.21           | Line            | 56.71          | *       | 79.00        | 66.00   | -22.29       | (QP) |
| 0.64           | Line            | 48.51          | *       | 73.00        | 60.00   | -24.49       | (QP) |
| 3.82           | Line            | 43.55          | *       | 73.00        | 60.00   | -29.45       | (QP) |
| 12.32          | Line            | 45.27          | *       | 73.00        | 60.00   | -27.73       | (QP) |
| 16.84          | Line            | 50.89          | *       | 73.00        | 60.00   | -22.11       | (QP) |
| 24.40          | Line            | 44.06          | *       | 73.00        | 60.00   | -28.94       | (QP) |
| 0.21           | Neutral         | 55.81          | *       | 79.00        | 66.00   | -23.19       | (QP) |
| 0.27           | Neutral         | 52.41          | *       | 79.00        | 66.00   | -26.59       | (QP) |
| 0.55           | Neutral         | 48.91          | *       | 73.00        | 60.00   | -24.09       | (QP) |
| 3.28           | Neutral         | 45.92          | *       | 73.00        | 60.00   | -27.08       | (QP) |
| 17.02          | Neutral         | 54.60          | *       | 73.00        | 60.00   | -18.40       | (QP) |
| 24.40          | Neutral         | 46.66          | *       | 73.00        | 60.00   | -26.34       | (QP) |

Remark :

- (1) Reading in which marked as QP means measurements by using are Quasi-Peak Mode with Detector BW=9KHz ; SPA setting in RBW=10KHz,VBW =10KHz, Swp. Time = 0.3 sec./MHz. Reading in which marked as AV means measurements by using are Average Mode with instrument setting in RBW=1MHz,VBW=10Hz, Swp. Time =0.3 sec./MHz.
- (2) All readings are QP Mode value unless otherwise stated AVG in column of 『Note』. If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform. In this case, a " \*" marked in AVG Mode column of Interference Voltage Measured.
- (3) Measuring frequency range from 150KHz to 30MHz.



**Table 4 Conducted Emission Data**

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable)

Mode 3

Judgement : Passed by -19.40 dB at 17.02 MHz      AVG   X   QP      Line   X   Neutral

| Freq.<br>(MHz) | Terminal<br>L/N | Measured(dBuV) |         | Limits(dBuV) |         | Safe Margins |      |
|----------------|-----------------|----------------|---------|--------------|---------|--------------|------|
|                |                 | QP-Mode        | AV-Mode | QP-Mode      | AV-Mode | (dBuV)       | Note |
| 0.21           | Line            | 56.71          | *       | 79.00        | 66.00   | -22.29       | (QP) |
| 0.64           | Line            | 45.51          | *       | 73.00        | 60.00   | -27.49       | (QP) |
| 3.35           | Line            | 37.31          | *       | 73.00        | 60.00   | -35.69       | (QP) |
| 12.32          | Line            | 40.27          | *       | 73.00        | 60.00   | -32.73       | (QP) |
| 16.84          | Line            | 46.89          | *       | 73.00        | 60.00   | -26.11       | (QP) |
| 24.40          | Line            | 40.06          | *       | 73.00        | 60.00   | -32.94       | (QP) |
| 0.21           | Neutral         | 55.81          | *       | 79.00        | 66.00   | -23.19       | (QP) |
| 0.55           | Neutral         | 45.91          | *       | 73.00        | 60.00   | -27.09       | (QP) |
| 3.07           | Neutral         | 36.44          | *       | 73.00        | 60.00   | -36.56       | (QP) |
| 12.32          | Neutral         | 40.67          | *       | 73.00        | 60.00   | -32.33       | (QP) |
| 17.02          | Neutral         | 53.60          | *       | 73.00        | 60.00   | -19.40       | (QP) |
| 24.40          | Neutral         | 40.66          | *       | 73.00        | 60.00   | -32.34       | (QP) |

Remark :

- (1) Reading in which marked as QP means measurements by using are Quasi-Peak Mode with Detector BW=9KHz ; SPA setting in RBW=10KHz,VBW =10KHz, Swp. Time = 0.3 sec./MHz。 Reading in which marked as AV means measurements by using are Average Mode with instrument setting in RBW=1MHz,VBW=10Hz, Swp. Time =0.3 sec./MHz。
- (2) All readings are QP Mode value unless otherwise stated AVG in column of 『Note』 . If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform。 In this case, a “ \* ” marked in AVG Mode column of Interference Voltage Measured。
- (3) Measuring frequency range from 150KHz to 30MHz。

**Table 4 Conducted Emission Data**

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable)

Mode 5

Judgement : Passed by -17.79 dB at 0.54 MHz     AVG   X   QP     Line   X   Neutral

| Freq.<br>(MHz) | Terminal<br>L/N | Measured(dBuV) |         | Limits(dBuV) |         | Safe Margins |      |
|----------------|-----------------|----------------|---------|--------------|---------|--------------|------|
|                |                 | QP-Mode        | AV-Mode | QP-Mode      | AV-Mode | (dBuV)       | Note |
| 0.15           | Line            | 53.36          | *       | 79.00        | 66.00   | -25.64       | (QP) |
| 0.21           | Line            | 52.81          | *       | 79.00        | 66.00   | -26.19       | (QP) |
| 0.56           | Line            | 48.61          | *       | 73.00        | 60.00   | -24.39       | (QP) |
| 4.27           | Line            | 44.89          | *       | 73.00        | 60.00   | -28.11       | (QP) |
| 12.85          | Line            | 48.77          | *       | 73.00        | 60.00   | -24.23       | (QP) |
| 15.64          | Line            | 49.80          | *       | 73.00        | 60.00   | -23.20       | (QP) |
| 0.20           | Neutral         | 58.41          | *       | 79.00        | 66.00   | -20.59       | (QP) |
| 0.25           | Neutral         | 52.01          | *       | 79.00        | 66.00   | -26.99       | (QP) |
| 0.54           | Neutral         | 55.21          | *       | 73.00        | 60.00   | -17.79       | (QP) |
| 2.93           | Neutral         | 41.15          | *       | 73.00        | 60.00   | -31.85       | (QP) |
| 12.12          | Neutral         | 51.27          | *       | 73.00        | 60.00   | -21.73       | (QP) |
| 16.66          | Neutral         | 55.07          | *       | 73.00        | 60.00   | -17.93       | (QP) |

Remark :

- (1) Reading in which marked as QP means measurements by using are Quasi-Peak Mode with Detector BW=9KHz ; SPA setting in RBW=10KHz,VBW =10KHz, Swp. Time = 0.3 sec./MHz。 Reading in which marked as AV means measurements by using are Average Mode with instrument setting in RBW=1MHz,VBW=10Hz, Swp. Time =0.3 sec./MHz。
- (2) All readings are QP Mode value unless otherwise stated AVG in column of 『Note』 . If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform。 In this case, a “ \* ” marked in AVG Mode column of Interference Voltage Measured。
- (3) Measuring frequency range from 150KHz to 30MHz。

**Table 4 Conducted Emission Data**

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable)

Mode 6

Judgement : Passed by -19.79 dB at 12.12 MHz     AVG   X   QP     Line   X   Neutral

| Freq.<br>(MHz) | Terminal<br>L/N | Measured(dBuV) |         | Limits(dBuV) |         | Safe Margins |      |
|----------------|-----------------|----------------|---------|--------------|---------|--------------|------|
|                |                 | QP-Mode        | AV-Mode | QP-Mode      | AV-Mode | (dBuV)       | Note |
| 0.15           | Line            | 53.36          | *       | 79.00        | 66.00   | -25.64       | (QP) |
| 0.21           | Line            | 54.81          | *       | 79.00        | 66.00   | -24.19       | (QP) |
| 0.56           | Line            | 52.61          | *       | 73.00        | 60.00   | -20.39       | (QP) |
| 3.68           | Line            | 41.26          | *       | 73.00        | 60.00   | -31.74       | (QP) |
| 12.85          | Line            | 42.77          | *       | 73.00        | 60.00   | -30.23       | (QP) |
| 24.40          | Line            | 41.46          | *       | 73.00        | 60.00   | -31.54       | (QP) |
| 0.15           | Neutral         | 53.46          | *       | 79.00        | 66.00   | -25.54       | (QP) |
| 0.20           | Neutral         | 54.41          | *       | 79.00        | 66.00   | -24.59       | (QP) |
| 0.54           | Neutral         | 53.21          | *       | 73.00        | 60.00   | -19.79       | (QP) |
| 12.12          | Neutral         | 43.27          | *       | 73.00        | 60.00   | -29.73       | (QP) |
| 16.66          | Neutral         | 53.07          | *       | 73.00        | 60.00   | -19.93       | (QP) |
| 24.40          | Neutral         | 41.36          | *       | 73.00        | 60.00   | -31.64       | (QP) |

Remark :

- (1) Reading in which marked as QP means measurements by using are Quasi-Peak Mode with Detector BW=9KHz ; SPA setting in RBW=10KHz,VBW =10KHz, Swp. Time = 0.3 sec./MHz。 Reading in which marked as AV means measurements by using are Average Mode with instrument setting in RBW=1MHz,VBW=10Hz, Swp. Time =0.3 sec./MHz。
- (2) All readings are QP Mode value unless otherwise stated AVG in column of 『Note』 . If the QP Mode Measured value compliance with the QP Limits and lower than AVG Limits, the EUT shall be deemed to meet both QP & AVG Limits and then only QP Mode was measured, but AVG Mode didn't perform。 In this case, a “ \* ” marked in AVG Mode column of Interference Voltage Measured。
- (3) Measuring frequency range from 150KHz to 30MHz。

Table 5 Radiated Emission Data

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable)

Mode 2

Judgement : Passed by -9.23 dB at 125.02 MHz X Peak      QP      Hor. X Vert.

| Freq.<br>(MHz) | Ant.<br>H/V | Reading(RA)<br>(dBuV) | Corr.Factor(CF)<br>(dB) | Measured(FS)<br>(dBuV/m) | Limits(QP)<br>(dBuV/m) | Safe Margins<br>(dBuV/m) | Note |
|----------------|-------------|-----------------------|-------------------------|--------------------------|------------------------|--------------------------|------|
| 125.02         | V           | 45.20                 | - 14.43                 | 30.77                    | 40.00                  | - 9.23                   |      |
| 125.02         | H           | 44.60                 | - 14.43                 | 30.17                    | 40.00                  | - 9.83                   |      |
| 139.36         | V           | 41.30                 | - 13.19                 | 28.11                    | 40.00                  | - 11.89                  |      |
| 153.07         | V           | 41.30                 | - 12.71                 | 28.59                    | 40.00                  | - 11.41                  |      |
| 153.39         | H           | 39.50                 | - 12.70                 | 26.80                    | 40.00                  | - 13.20                  |      |
| 158.86         | H           | 39.50                 | - 12.68                 | 26.82                    | 40.00                  | - 13.18                  |      |
| 250.00         | V           | 51.25                 | - 13.61                 | 37.64                    | 47.00                  | - 9.36                   |      |
| 375.01         | V           | 41.65                 | - 9.13                  | 32.52                    | 47.00                  | - 14.48                  |      |
| 375.01         | H           | 42.97                 | - 9.13                  | 33.84                    | 47.00                  | - 13.16                  |      |
| 750.01         | H           | 35.17                 | 0.44                    | 35.61                    | 47.00                  | - 11.39                  |      |
| 875.01         | H           | 30.27                 | 3.48                    | 33.75                    | 47.00                  | - 13.25                  |      |
| 875.02         | V           | 29.97                 | 3.48                    | 33.45                    | 47.00                  | - 13.55                  |      |

Remark :

- (1) Reading in which marked as QP or Peak means measurements by using are Quasi-Peak Mode or Peak Mode with Detector BW=120KHz ; SPA setting in RBW=120KHz, VBW =120KHz, Swp. Time = 0.3 sec./MHz.
- (2) All readings are Peak unless otherwise stated QP in column of 『Note』 . Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform.
- (3) Measuring frequency range from 30MHz to 1000MHz.
- (4) If the peak scan value lower limit more than 20dB, then this signal data does not show in table.

Table 5 Radiated Emission Data

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable)

Mode 3

Judgement : Passed by -8.67 dB at 625.0 MHz X Peak     QP X Hor.     Vert.

| Freq.<br>(MHz) | Ant.<br>H/V | Reading(RA)<br>(dBuV) | Corr.Factor(CF)<br>(dB) | Measured(FS)<br>(dBuV/m) | Limits(QP)<br>(dBuV/m) | Safe Margins<br>(dBuV/m) | Note |
|----------------|-------------|-----------------------|-------------------------|--------------------------|------------------------|--------------------------|------|
| 51.91          | V           | 43.22                 | - 15.36                 | 27.86                    | 40.00                  | - 12.14                  |      |
| 63.74          | H           | 40.47                 | - 16.25                 | 24.22                    | 40.00                  | - 15.78                  |      |
| 109.61         | V           | 43.70                 | - 16.16                 | 27.54                    | 40.00                  | - 12.46                  |      |
| 142.04         | H           | 38.42                 | - 13.09                 | 25.33                    | 40.00                  | - 14.67                  |      |
| 148.79         | H           | 38.92                 | - 12.79                 | 26.13                    | 40.00                  | - 13.87                  |      |
| 150.93         | V           | 41.40                 | - 12.72                 | 28.68                    | 40.00                  | - 11.32                  |      |
| 250.00         | V           | 50.92                 | - 13.61                 | 37.31                    | 47.00                  | - 9.69                   |      |
| 250.00         | H           | 47.35                 | - 13.61                 | 33.74                    | 47.00                  | - 13.26                  |      |
| 375.00         | V           | 42.62                 | - 9.13                  | 33.49                    | 47.00                  | - 13.51                  |      |
| 500.00         | V           | 39.67                 | - 5.63                  | 34.04                    | 47.00                  | - 12.96                  |      |
| 625.00         | H           | 40.20                 | - 1.87                  | 38.33                    | 47.00                  | - 8.67                   |      |
| 750.00         | H           | 36.80                 | 0.44                    | 37.24                    | 47.00                  | - 9.76                   |      |

Remark :

- (1) Reading in which marked as QP or Peak means measurements by using are Quasi-Peak Mode or Peak Mode with Detector BW=120KHz ; SPA setting in RBW=120KHz, VBW=120KHz, Swp. Time = 0.3 sec./MHz.
- (2) All readings are Peak unless otherwise stated QP in column of 『Note』 . Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform.
- (3) Measuring frequency range from 30MHz to 1000MHz.
- (4) If the peak scan value lower limit more than 20dB, then this signal data does not show in table.

**Table 5 Radiated Emission Data**

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable)

Mode 5

Judgement : Passed by -7.23 dB at 125.01 MHz X Peak     QP     Hor. X Vert.

| Freq.<br>(MHz) | Ant.<br>H/V | Reading(RA)<br>(dBuV) | Corr.Factor(CF)<br>(dB) | Measured(FS)<br>(dBuV/m) | Limits(QP)<br>(dBuV/m) | Safe Margins<br>(dBuV/m) | Note |
|----------------|-------------|-----------------------|-------------------------|--------------------------|------------------------|--------------------------|------|
| 55.00          | H           | 39.47                 | - 15.43                 | 24.04                    | 40.00                  | - 15.96                  |      |
| 80.50          | H           | 41.80                 | - 18.68                 | 23.12                    | 40.00                  | - 16.88                  |      |
| 125.01         | H           | 39.20                 | - 14.43                 | 24.77                    | 40.00                  | - 15.23                  |      |
| 125.01         | V           | 47.20                 | - 14.43                 | 32.77                    | 40.00                  | - 7.23                   |      |
| 145.98         | V           | 42.22                 | - 12.89                 | 29.33                    | 40.00                  | - 10.67                  |      |
| 159.39         | V           | 42.72                 | - 12.69                 | 30.03                    | 40.00                  | - 9.97                   |      |
| 250.00         | V           | 47.82                 | - 13.61                 | 34.21                    | 47.00                  | - 12.79                  |      |
| 500.00         | H           | 38.65                 | - 5.63                  | 33.02                    | 47.00                  | - 13.98                  |      |
| 625.00         | V           | 33.47                 | - 1.87                  | 31.60                    | 47.00                  | - 15.40                  |      |
| 625.00         | H           | 35.22                 | - 1.87                  | 33.35                    | 47.00                  | - 13.65                  |      |
| 750.00         | H           | 34.90                 | 0.44                    | 35.34                    | 47.00                  | - 11.66                  |      |
| 875.01         | V           | 29.25                 | 3.48                    | 32.73                    | 47.00                  | - 14.27                  |      |

Remark :

- (1) Reading in which marked as QP or Peak means measurements by using are Quasi-Peak Mode or Peak Mode with Detector BW=120KHz ; SPA setting in RBW=120KHz, VBW =120KHz, Swp. Time = 0.3 sec./MHz.
- (2) All readings are Peak unless otherwise stated QP in column of 『Note』 . Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform.
- (3) Measuring frequency range from 30MHz to 1000MHz.
- (4) If the peak scan value lower limit more than 20dB, then this signal data does not show in table.

**Table 5 Radiated Emission Data**

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable)

Mode 6

Judgement : Passed by -10.57 dB at 625.00 MHz X Peak     QP     Hor. X Vert.

| Freq.<br>(MHz) | Ant.<br>H/V | Reading(RA)<br>(dBuV) | Corr.Factor(CF)<br>(dB) | Measured(FS)<br>(dBuV/m) | Limits(QP)<br>(dBuV/m) | Safe Margins<br>(dBuV/m) | Note |
|----------------|-------------|-----------------------|-------------------------|--------------------------|------------------------|--------------------------|------|
| 53.80          | H           | 39.95                 | - 15.40                 | 24.55                    | 40.00                  | - 15.45                  |      |
| 80.30          | H           | 42.25                 | - 18.71                 | 23.54                    | 40.00                  | - 16.46                  |      |
| 117.40         | V           | 38.97                 | - 15.18                 | 23.79                    | 40.00                  | - 16.21                  |      |
| 125.00         | H           | 38.40                 | - 14.43                 | 23.97                    | 40.00                  | - 16.03                  |      |
| 125.00         | V           | 41.40                 | - 14.43                 | 26.97                    | 40.00                  | - 13.03                  |      |
| 147.50         | V           | 36.05                 | - 12.84                 | 23.21                    | 40.00                  | - 16.79                  |      |
| 500.00         | H           | 38.47                 | - 5.63                  | 32.84                    | 47.00                  | - 14.16                  |      |
| 500.00         | V           | 39.40                 | - 5.63                  | 33.77                    | 47.00                  | - 13.23                  |      |
| 625.00         | H           | 36.92                 | - 1.87                  | 35.05                    | 47.00                  | - 11.95                  |      |
| 625.00         | V           | 38.30                 | - 1.87                  | 36.43                    | 47.00                  | - 10.57                  |      |
| 750.00         | H           | 34.32                 | 0.44                    | 34.76                    | 47.00                  | - 12.24                  |      |
| 750.00         | V           | 34.05                 | 0.44                    | 34.49                    | 47.00                  | - 12.51                  |      |

Remark :

- (1) Reading in which marked as QP or Peak means measurements by using are Quasi-Peak Mode or Peak Mode with Detector BW=120KHz ; SPA setting in RBW=120KHz, VBW =120KHz, Swp. Time = 0.3 sec./MHz.
- (2) All readings are Peak unless otherwise stated QP in column of 『Note』 . Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform.
- (3) Measuring frequency range from 30MHz to 1000MHz.
- (4) If the peak scan value lower limit more than 20dB, then this signal data does not show in table.

## 4. Immunity Test

## 4.1 Standard compliance/Servrity Level/Criteria

| Tests<br>Standard No.   | Test Specification<br>Level   | Test Mode<br>Test Ports         | Perform.<br>Criteria | Remark |
|---|---|---------------------------------|----------------------|--------|
| 1. ESD<br>IEC 61000-4-2 (1995)<br>EN 61000-4-2 (1995)                                 | 8KV air discharge<br>4KV contact discharge  | Direct Mode                     | B                    |        |
|   | 4KV HCP discharge<br>4KV VCP discharge  | Indirect Mode                   | B                    |        |
| 2. RS<br>IEC 61000-4-3 (1995)<br>EN 61000-4-3 (1996)                                  | 80 MHz to 1000 MHz<br>3V/m(rms), 1 KHz, 80%,<br>AM modulated                        | Enclosure                       | A                    |        |
| 3. EFT/Burst<br>IEC 61000-4-4 (1995)<br>EN 61000-4-4 (1995)                           | 1.0KV(peak)<br>5/50ns Tr/Th<br>5KHz Repetition Freq.                                | Power Supply<br>Port            | B                    |        |
|   | 0.5 KV(peak)<br>5/50ns Tr/Th<br>5KHz Repetition Freq.                               | CTL/Signal<br>Data Line<br>Port | B                    |        |
| 4. Surges<br>IEC 61000-4-5 (1995)<br>EN 61000-4-5 (1995)                              | 1 KV(5P/5N)<br>1.2/50(8/20) Tr/Th us  | L-N                             | B                    |        |
|   | 2 KV(5P/5N)<br>1.2/50(8/20) Tr/Th us  | L-PE<br>N-PE                    | B                    |        |
| 5 Injected Current<br>IEC 61000-4-6 (1996)<br>EN 61000-4-6 (1996)                     | 0.15 MHz to 80 MHz<br>3V(rms), 1KHz 80 % ,<br>AM Modulated<br>150Ω source impedance | CTL/Signal Port                 | A                    |        |
|   | 0.15 MHz to 80 MHz<br>3V(rms), 1KHz 80 % ,<br>AM Modulated<br>150Ω source impedance | AC Power Port                   | A                    |        |
|   | 0.15 MHz to 80 MHz<br>3V(rms), 1KHz 80 % ,<br>AM Modulated<br>150Ω source impedance | DC Power Port                   | A                    | N/A    |
| 6. Power Frequency<br>Magnetic Field<br>IEC 61000-4-8 (1993)<br>EN 61000-4-8 (1993)   | 50 Hz, 1A/m   | Enclosure                       | C                    |        |
| 7. Volt. Interruptions<br>Volt. Dips<br>IEC 61000-4-11 (1994)<br>EN 61000-4-11 (1994) | Voltage dip > 95%   | < 5%                            | B                    |        |
|   | Voltage dip 30%   | 70%                             | C                    |        |
|   | Interruption > 95%  | < 5%                            | C                    |        |

\* Remark:

N/A : denotes test is not applicable in this Test Report



## 4.2 General Performance Criteria

According to **EN55024:1998+A1:2001** standard, the general performance criteria as following:

|                    |  |
|--------------------|--|
| <b>Criterion A</b> | <p>The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance.</p> <p>If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.</p>  |
| <b>Criterion B</b> | <p>After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomenon below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance.</p> <p>During the test, degradation of performance is allowed. However, no change of operating state if stored data allowed to persist after the test. If the minimum performance level (or the permissible performance loss ) is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.</p> |
| <b>Criterion C</b> | <p>Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer' s instructions.</p> <p>Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.</p>   |

### 4.3 Sample(s) Tested

The representative sample tested in this report is the same as the statements of **2.5** unless otherwise a special model no. is specified in the record (Table of Test Results).

The EUT has been tested according to the following environmental conditions:

Tested items: EN 61000-3-2 / 3 , EN 61000-4-3 / 4 / 5 / 6 / 8 / 11

|                   |              |
|-------------------|--------------|
| Input Power       | 230 Vac/50Hz |
| Temperature       | 26           |
| Relative Humidity | 70 %         |

Tested items: EN 61000-4-2

|                   |              |
|-------------------|--------------|
| Input Power       | 230 Vac/50Hz |
| Temperature       | 22           |
| Relative Humidity | 42 %         |

### 4.4 EUT Operating Condition

The EUT tested system was configured as the statements of **2.10** Unless otherwise a special operating condition is specified in the follows during the testing.

### 4.5 EUT Tested Results

| Tested Items                         | Basic Standards                 | EUT Tested Results                                     | Remark |
|--------------------------------------|---------------------------------|--|--------|
| 1. ESD                               | EN 61000-4-2<br>IEC 61000-4-2   | <b>Table 6</b> ESD Testing                             |        |
| 2. RF Electromagnetic Field Strength | EN 61000-4-3<br>IEC 61000-4-3   | <b>Table 7</b> RS Testing                              |        |
| 3. EFT/Burst                         | EN 61000-4-4<br>IEC 61000-4-4   | <b>Table 8</b> EFT/Burst Testing                       |        |
| 4. Surges                            | EN 61000-4-5<br>IEC 61000-4-5   | <b>Table 9</b> Surges Testing                          |        |
| 5. Injected Current                  | EN 61000-4-6<br>IEC 61000-4-6   | <b>Table 10</b> Injection Current Testing              |        |
| 6. Power-frequency Magnetic-field    | EN 61000-4-8<br>IEC 61000-4-8   | <b>Table 11</b> Power Frequency Magnetic Field Testing |        |
| 7. Volt. Interruptions<br>Volt. Dips | EN 61000-4-11<br>IEC 61000-4-11 | <b>Table 12</b> Volt. Interruptions/<br>Dips Testing   |        |

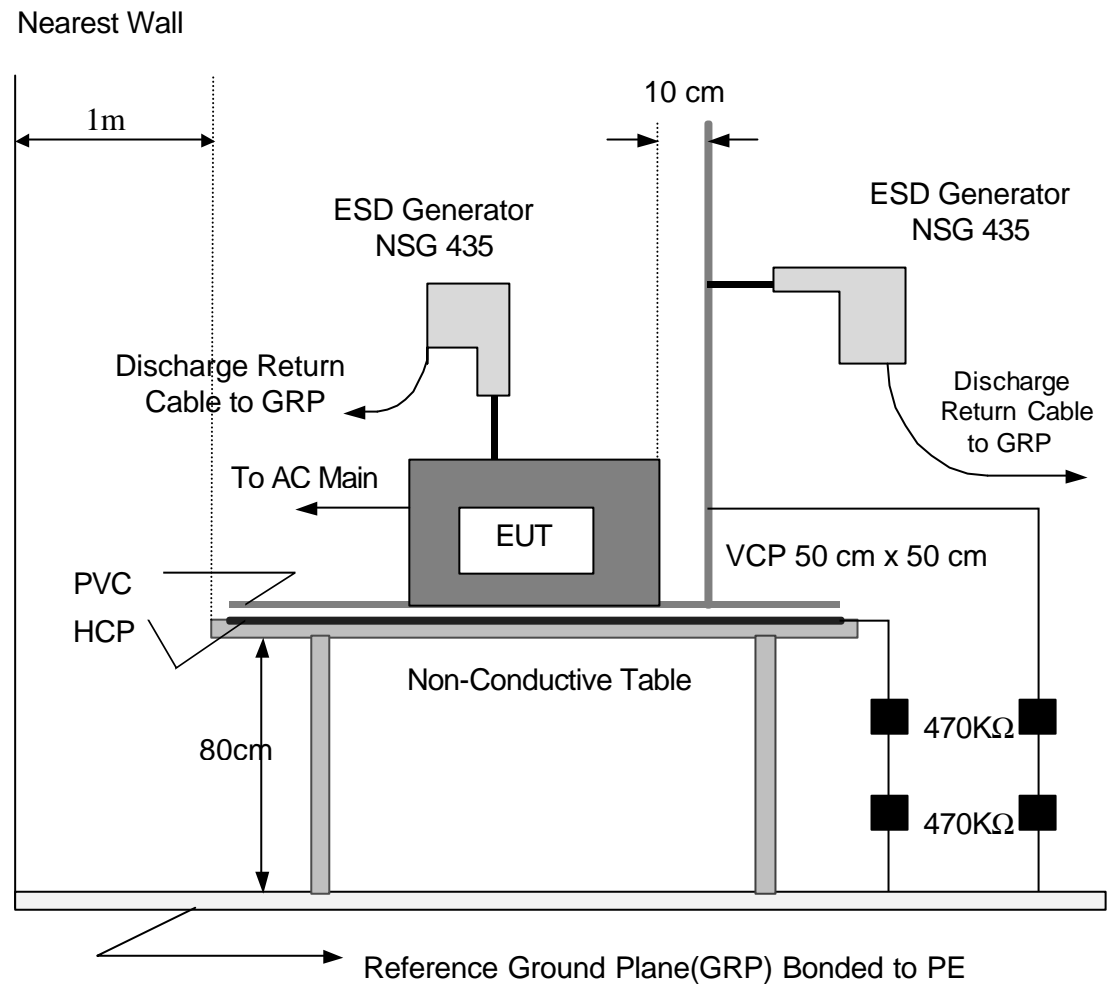
**Remark: \* N/A - denotes test is not applicable in this Test Report**

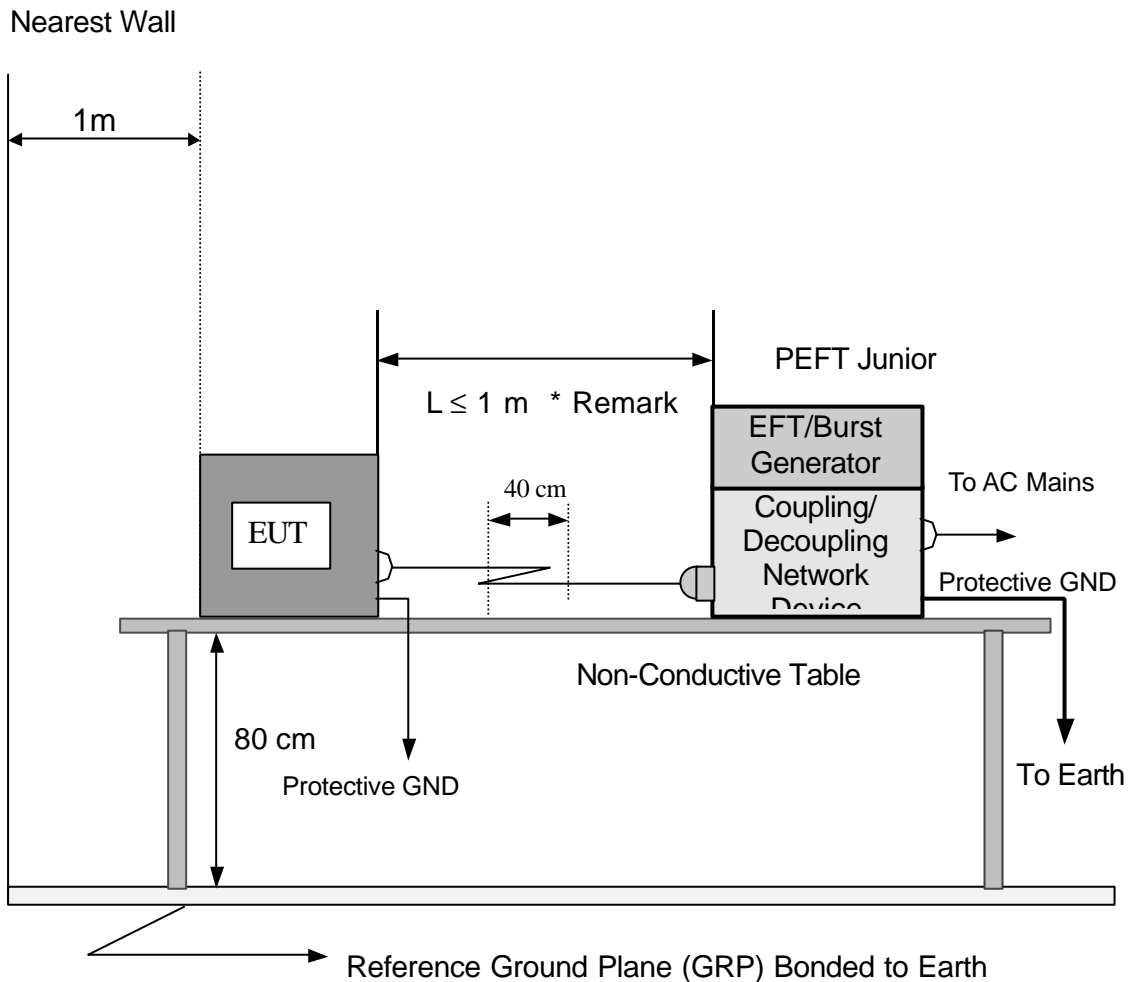
### 4.6 Test Set-Up

The configuration of testing system is described as the block diagram which shown in Fig. 4-6-1,4-6-2,4-6-3,4-6-4,4-6-5,4-6-6,4-6-7,4-6-8 of test set-up configuration.

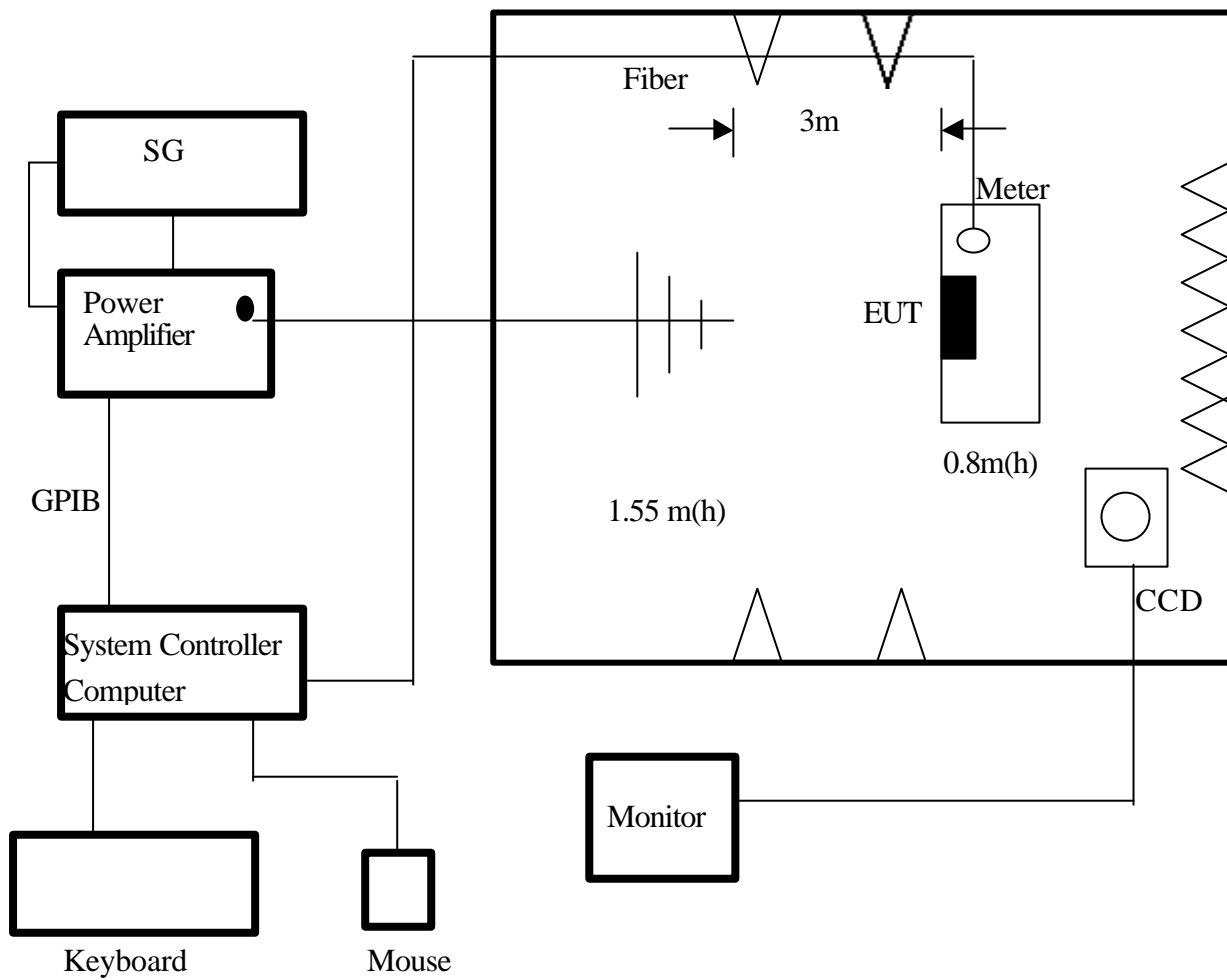
### 4.7 Measurement Instruments

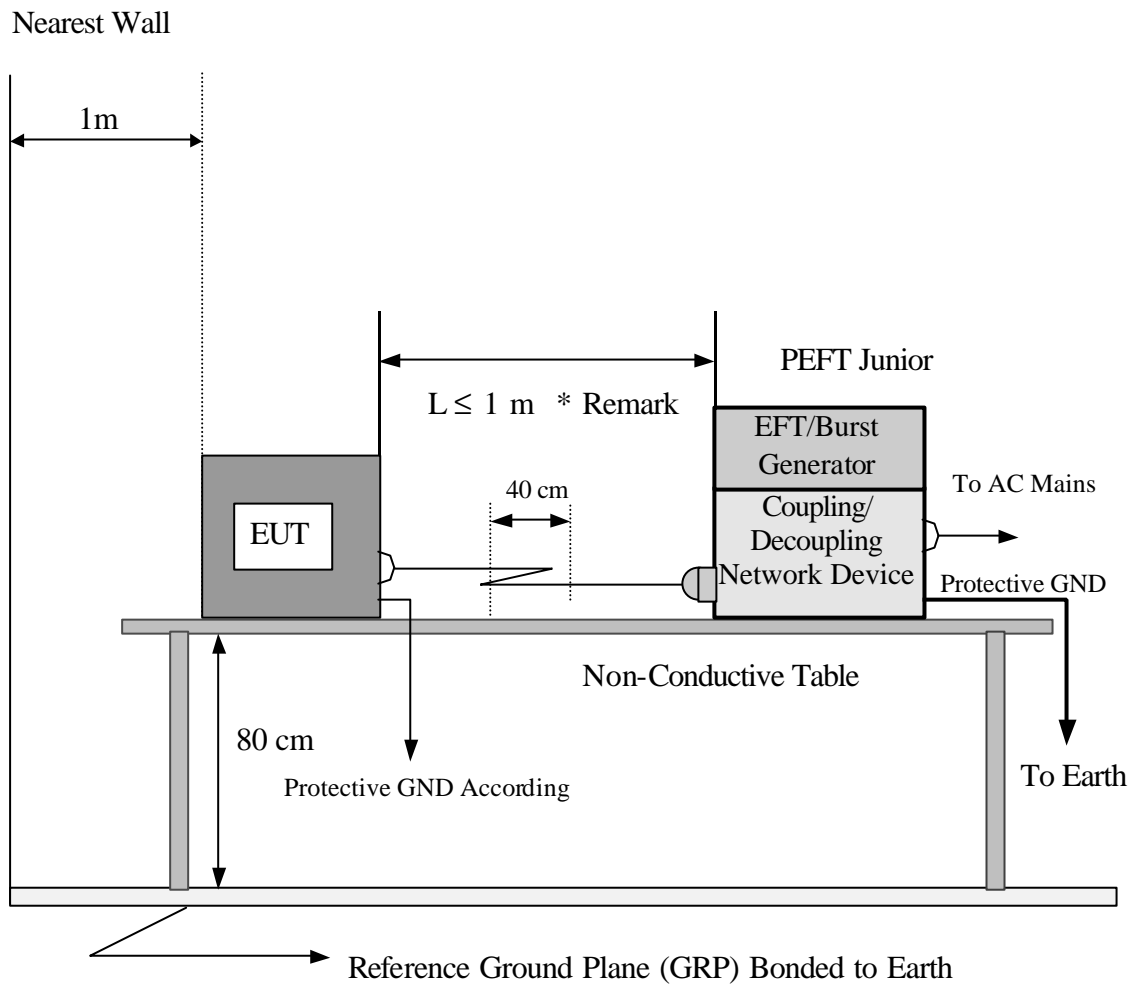
Valid measurement instruments used in this report refer to **Table- 13** enclosed.

**Fig. 4-6-1 ESD Test Set-Up Configuration**

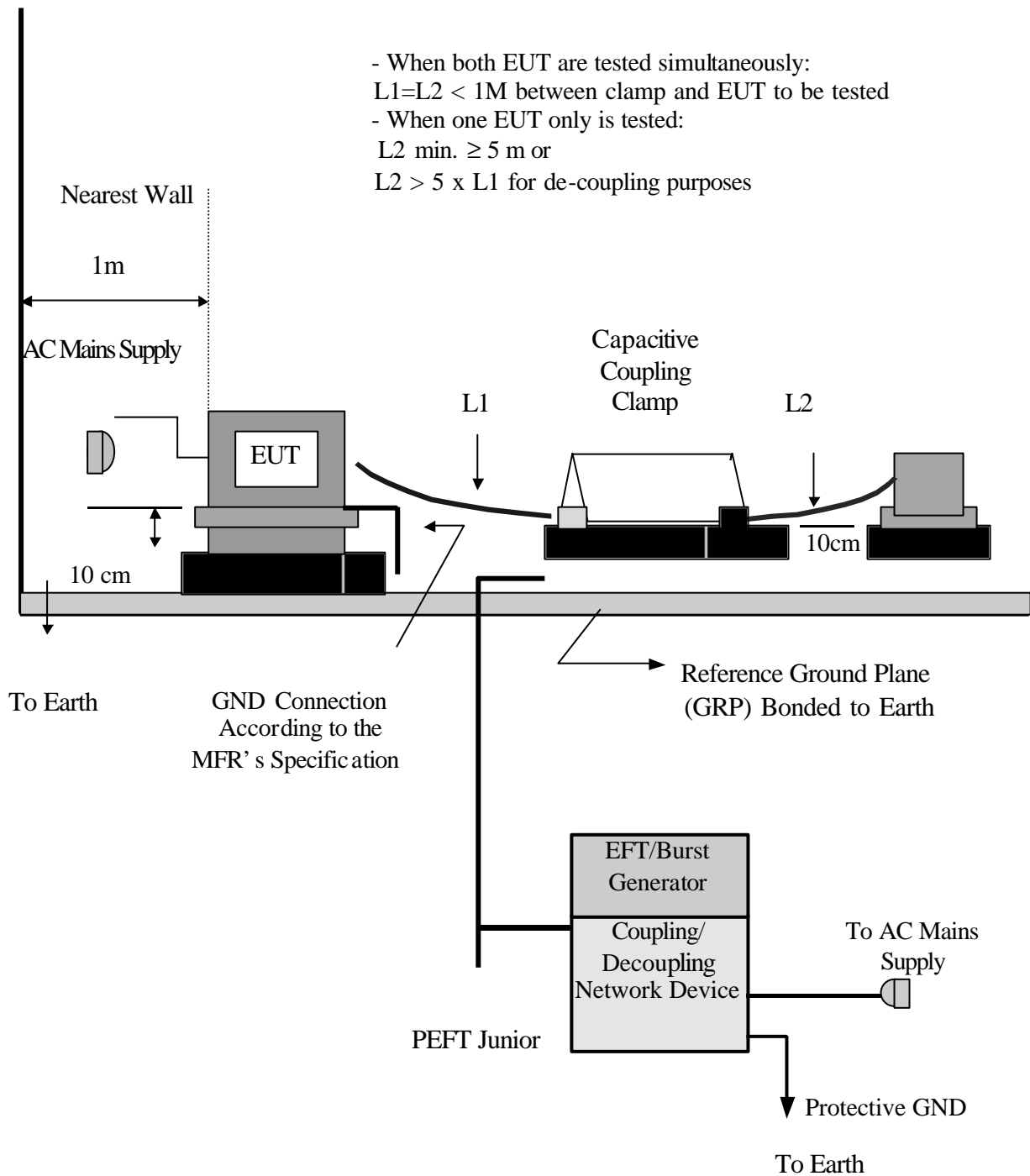
**Fig. 4-6-2 EFT Test Set-Up Configuration for Power Supply Ports****Remark :**

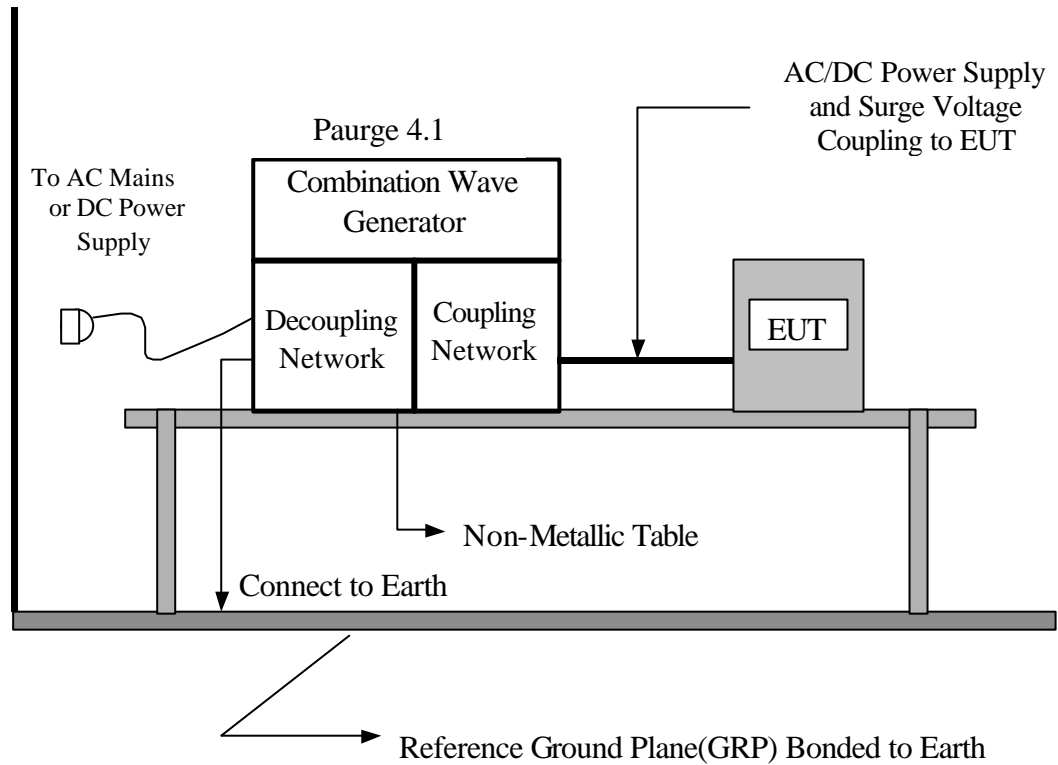
If the manufacturer provides a non-detachable power cord more than 1m long with the EUT, the excess length of this power cord shall be folded back and forth forming a bundle 30-40 cm long and situated at a distance of 10 cm above the reference ground plane (GRP).

**Fig. 4-6-3 RF Electromagnetic Field Strength Test Set-Up configuration**

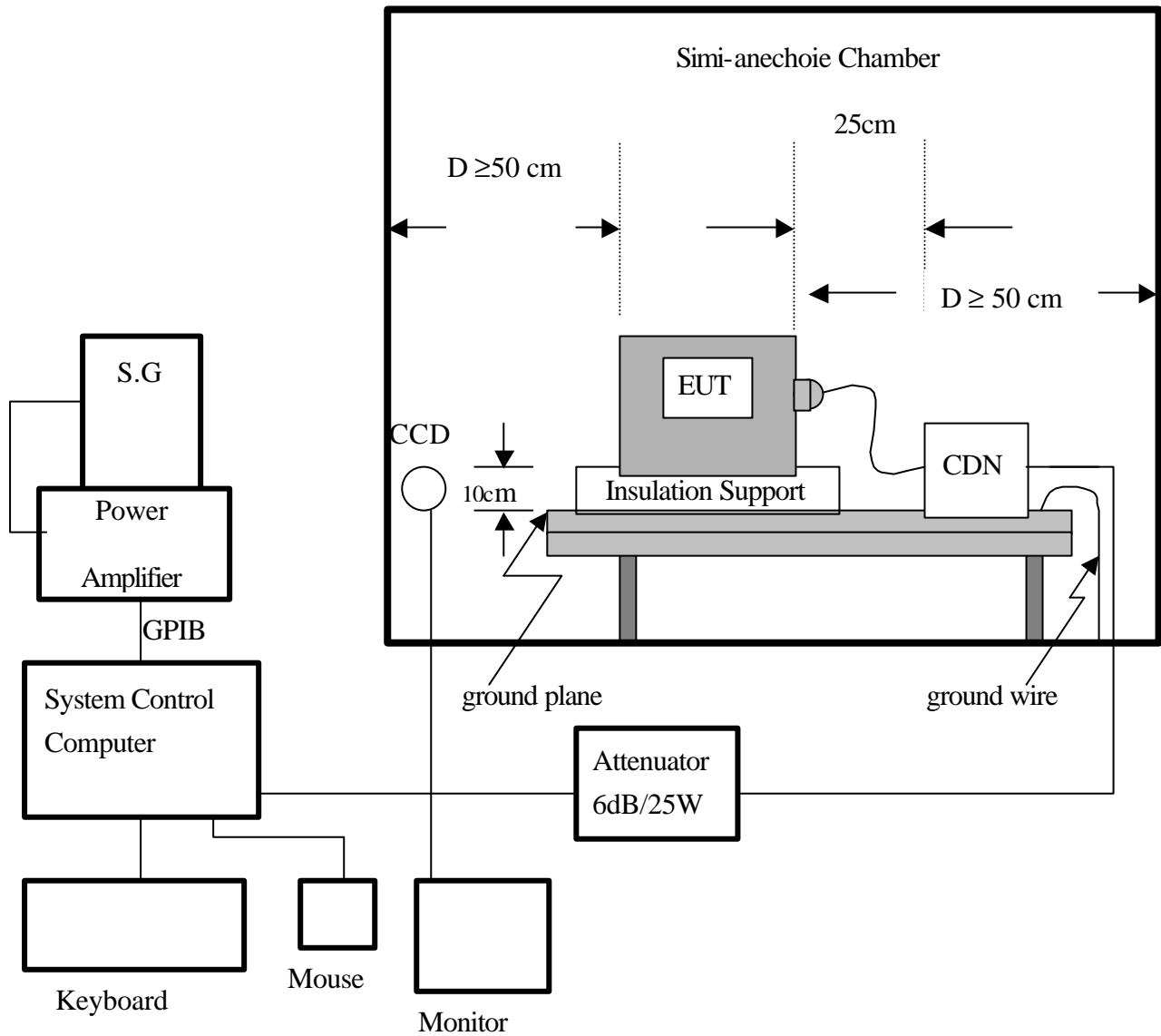
**Fig. 4-6-3(A) EFT Test Set-Up Configuration for Power Supply Ports****Remark :**

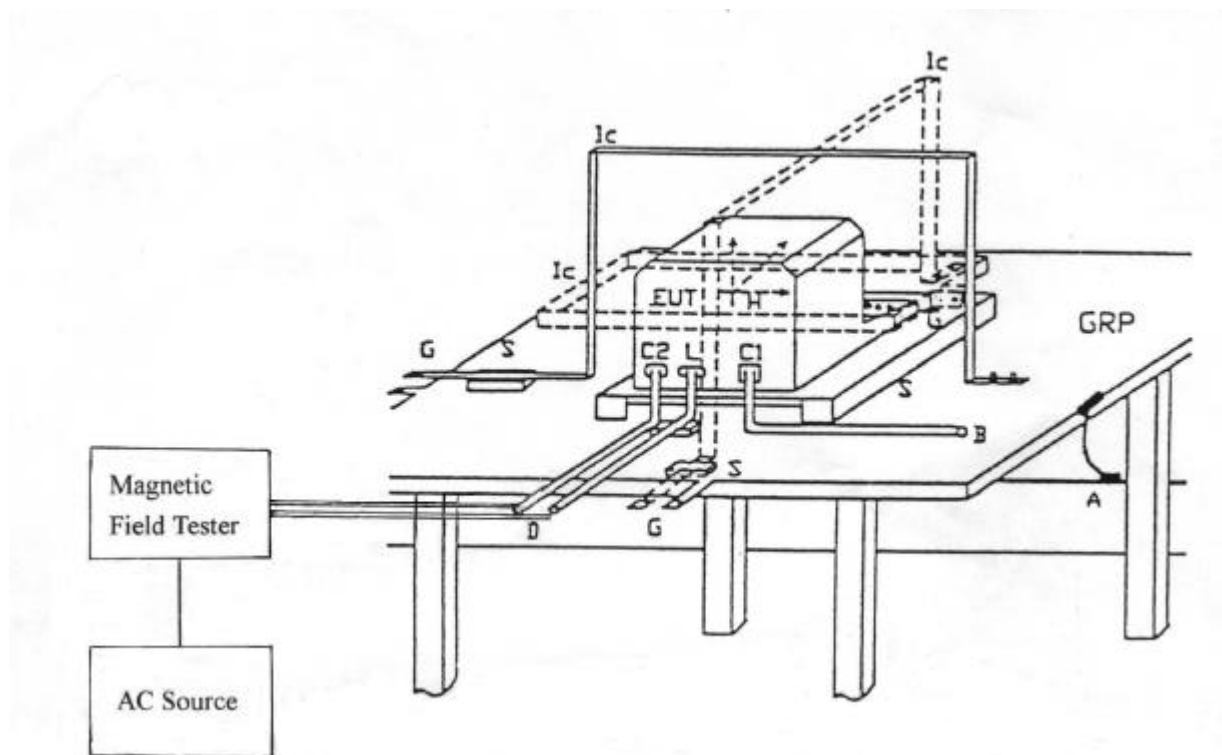
If the manufacturer provides a non-detachable power cord more than 1m long with the EUT, the excess length of this power cord shall be folded back and forth forming a bundle 30-40 cm long and situated at a distance of 10 cm above the reference ground plane (GRP).

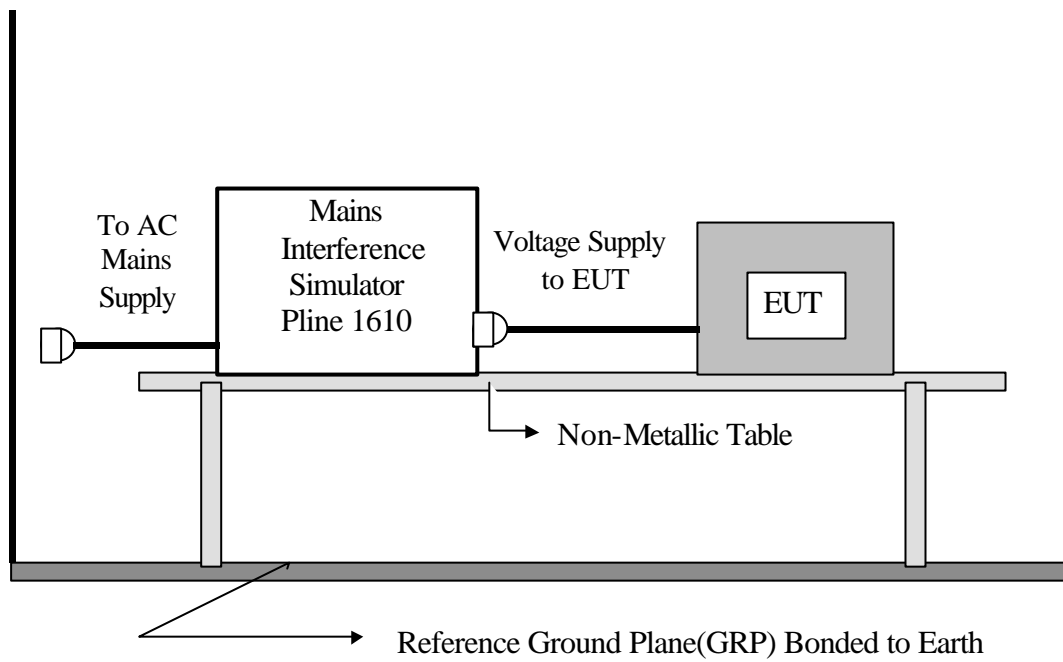
**Fig. 4-6-3(B) EFT Test Set-Up Configuration for CTL/Signal I/O Ports**

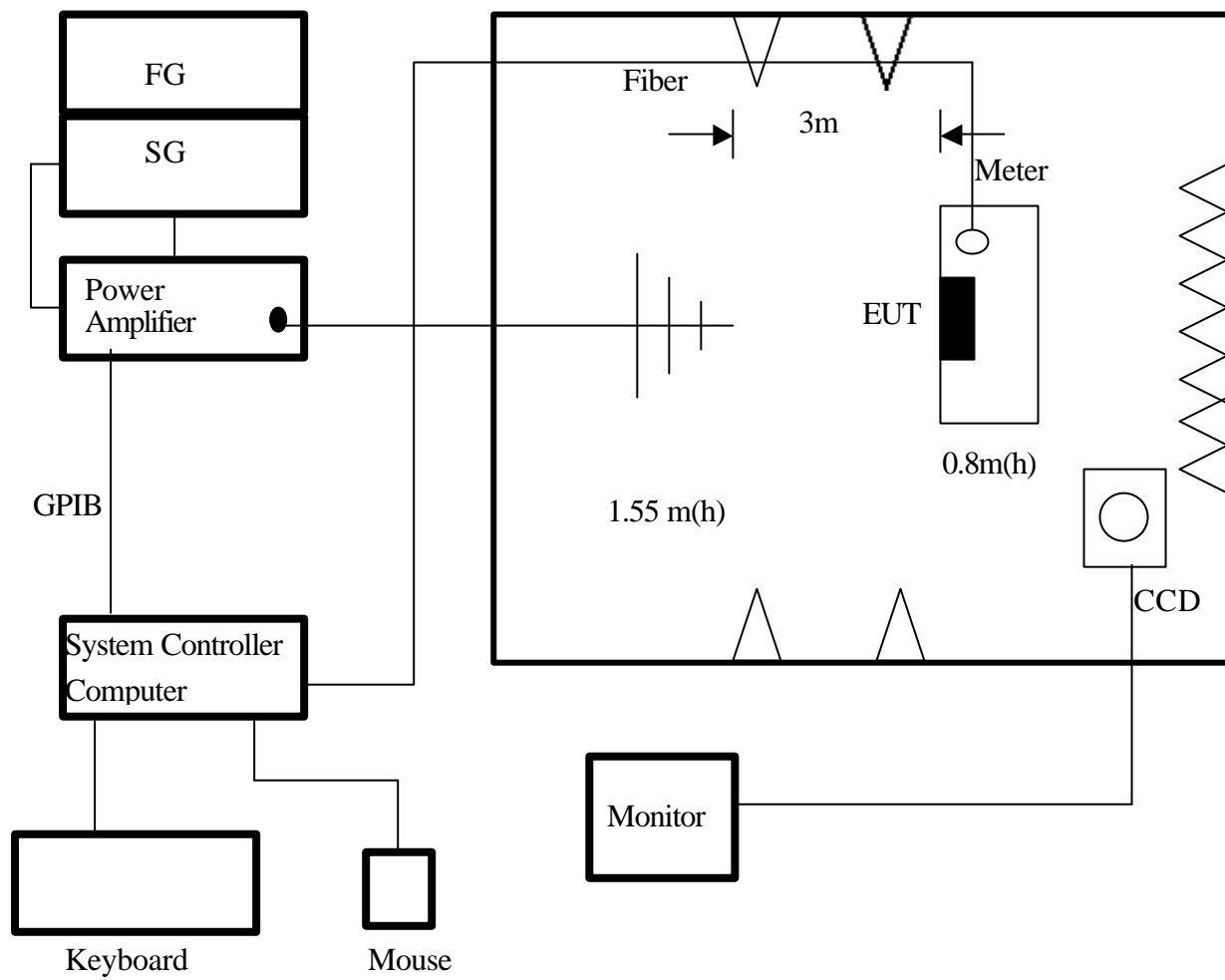
**Fig. 4-6-4 Surge Test Set-Up Configuration**



**Fig. 4-6-5 Injection Current Test Set-Up Configuration**

**Fig. 4-6-6 Power Frequency Magnetic Field Test Set-Up Configuration**

**Fig. 4-6-7 Voltage Interruption/Dips Test Set-Up Configuration**

**Fig. 4-6-8 Radio Frequency Electromagnetic Field Keyed Carrier**

**Table 6 ESD Testing**

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable)

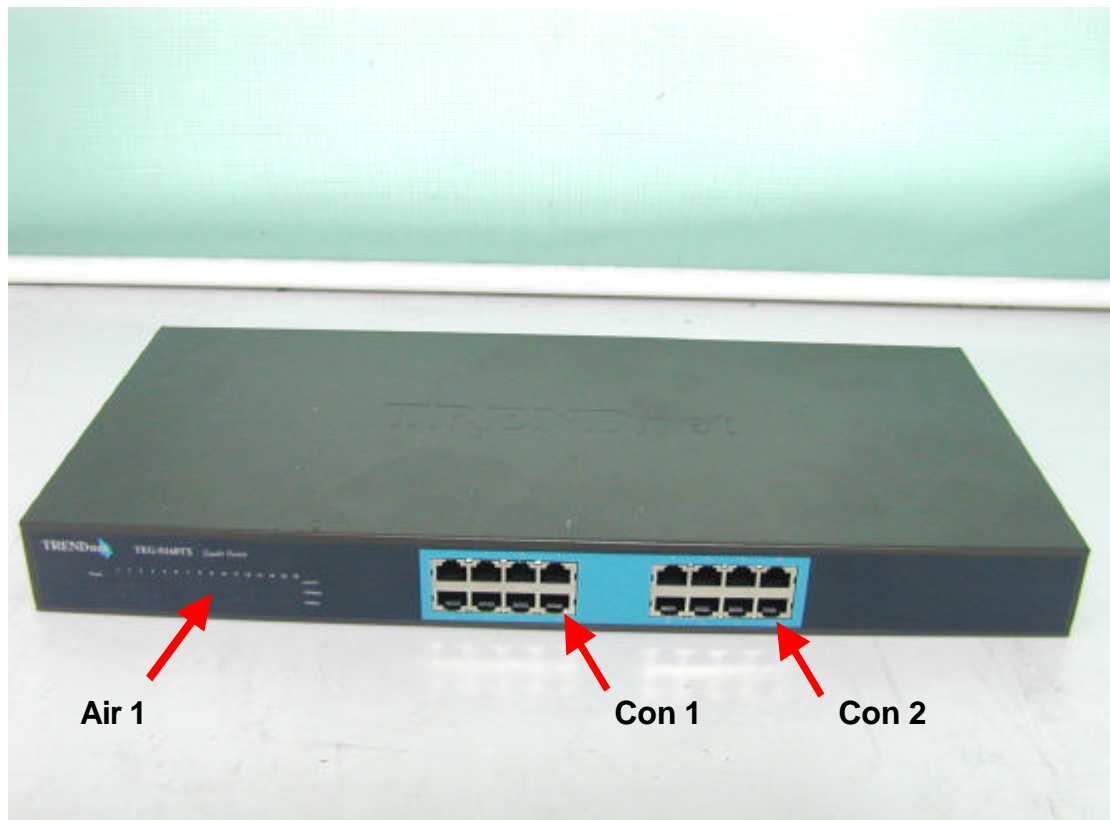
Mode 2/3/5/6

| Mode     | Air Discharge |   |     |   |     |   |      |   | Contact Discharge |   |     |   |     |   |     |   |
|----------|---------------|---|-----|---|-----|---|------|---|-------------------|---|-----|---|-----|---|-----|---|
|          | 2KV           |   | 4KV |   | 8KV |   | 15KV |   | 2KV               |   | 4KV |   | 6KV |   | 8KV |   |
| Location | P             | N | P   | N | P   | N | P    | N | P                 | N | P   | N | P   | N | P   | N |
| 1        | A             | A | A   | A | A   | A |      |   | A                 | A | B   | B |     |   |     |   |
| 2        | A             | A | A   | A | A   | A |      |   | A                 | A | B   | B |     |   |     |   |
| 3        | A             | A | A   | A | A   | A |      |   | A                 | A | B   | B |     |   |     |   |
| 4        | A             | A | A   | A | A   | A |      |   | A                 | A | B   | B |     |   |     |   |
| 5        |               |   |     |   |     |   |      |   | A                 | A | B   | B |     |   |     |   |
| 6        |               |   |     |   |     |   |      |   | A                 | A | B   | B |     |   |     |   |
| 7        |               |   |     |   |     |   |      |   | A                 | A | B   | B |     |   |     |   |
| 8        |               |   |     |   |     |   |      |   | A                 | A | B   | B |     |   |     |   |
| 9        |               |   |     |   |     |   |      |   |                   |   |     |   |     |   |     |   |
| 10       |               |   |     |   |     |   |      |   |                   |   |     |   |     |   |     |   |
| Criteria | <b>B</b>      |   |     |   |     |   |      |   | <b>B</b>          |   |     |   |     |   |     |   |
| Result   | <b>A</b>      |   |     |   |     |   |      |   | <b>B</b>          |   |     |   |     |   |     |   |
| Judgment | <b>PASS</b>   |   |     |   |     |   |      |   | <b>PASS</b>       |   |     |   |     |   |     |   |

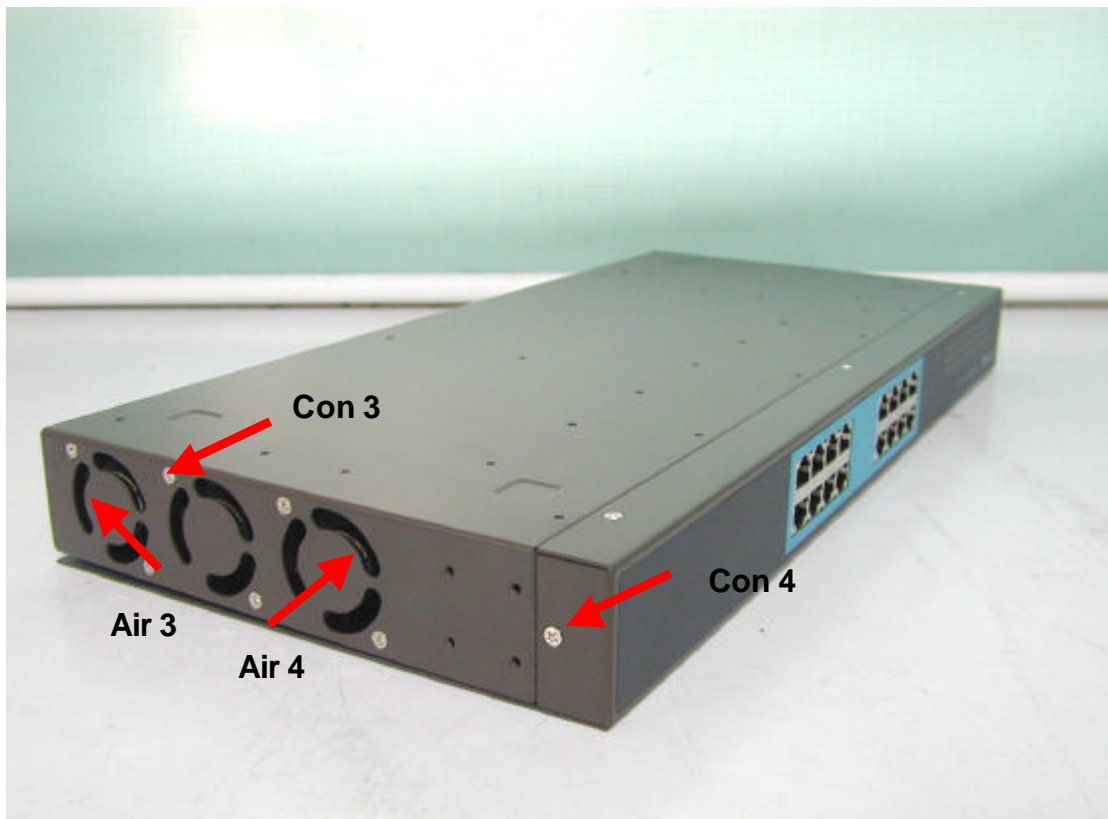
| Mode     | HCP Discharge |   |     |   |     |   |     |   | VCP Discharge |   |     |   |     |   |     |   |
|----------|---------------|---|-----|---|-----|---|-----|---|---------------|---|-----|---|-----|---|-----|---|
|          | 2KV           |   | 4KV |   | 6KV |   | 8KV |   | 2KV           |   | 4KV |   | 6KV |   | 8KV |   |
| Location | P             | N | P   | N | P   | N | P   | N | P             | N | P   | N | P   | N | P   | N |
| 1        | A             | A | A   | A |     |   |     |   | A             | A | A   | A |     |   |     |   |
| 2        | A             | A | A   | A |     |   |     |   | A             | A | A   | A |     |   |     |   |
| 3        | A             | A | A   | A |     |   |     |   | A             | A | A   | A |     |   |     |   |
| 4        | A             | A | A   | A |     |   |     |   | A             | A | A   | A |     |   |     |   |
| Criteria | <b>B</b>      |   |     |   |     |   |     |   | <b>B</b>      |   |     |   |     |   |     |   |
| Result   | <b>A</b>      |   |     |   |     |   |     |   | <b>A</b>      |   |     |   |     |   |     |   |
| Judgment | <b>PASS</b>   |   |     |   |     |   |     |   | <b>PASS</b>   |   |     |   |     |   |     |   |

Note:

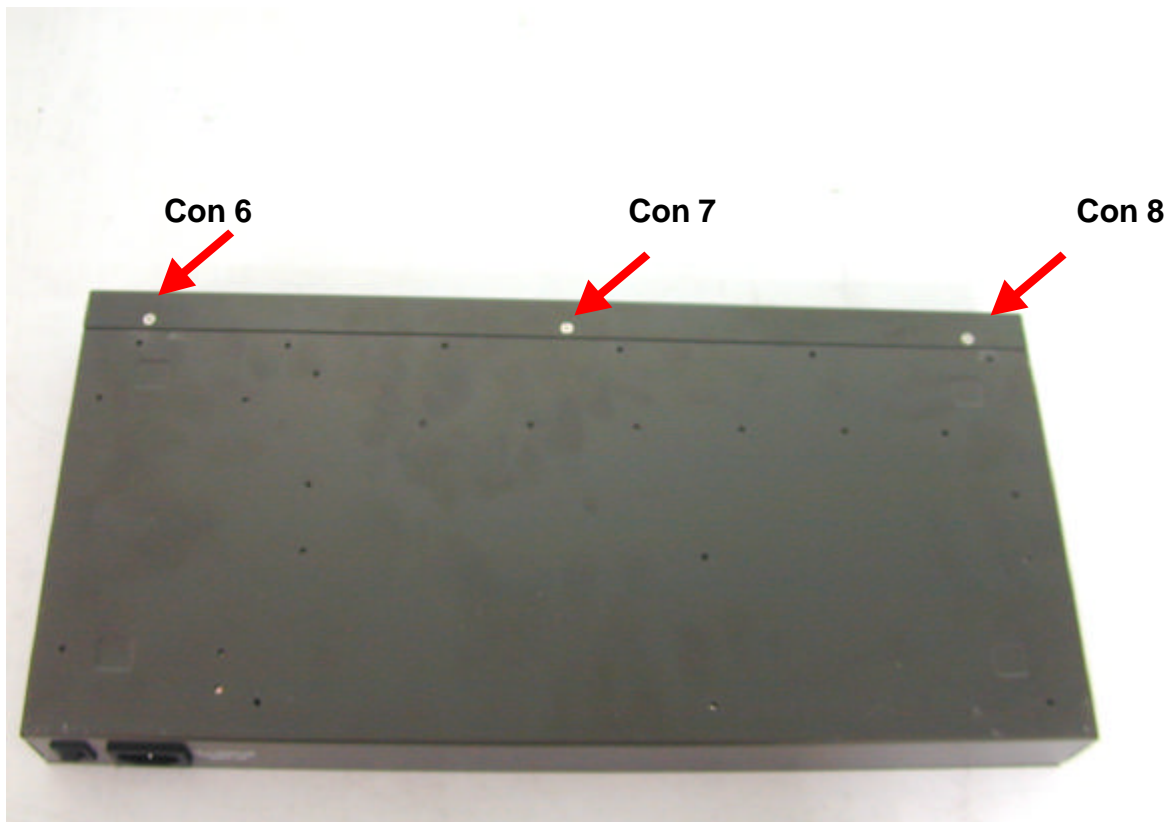
- 1) P/N denotes the Positive/Negative polarity of the output voltage.
- 2) Test condition:  
Direct / Indirect (HCP/VCP) discharges: Minimum 50 times (Positive/Negative) at each point.  
Air discharges: Minimum 10 times (Positive/Negative) at each point.
- 3) Test location(s) in which discharge (Air and contact discharge) to be applied illustrated by photos shown in next page(s)
- 4) The Indirect (HCP/VCP) discharges description of test point as following:  
1.left side 2.right side 3.front side 4.rear side
- 5) N/A - denotes test is not applicable in this test report

**Photo(s) shown the location(s) of ESD evaluated**

Photo(s) shown the location(s) of ESD evaluated



**Photo(s) shown the location(s) of ESD evaluated**





**Table 7 RS Testing**

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable)

Mode 2/3/5/6

| Frequency Range<br>(MHz) | RF Field<br>Position | R.F.<br>Field Strength | Perform.<br>Criteria | Results  | Judgment    |
|--------------------------|----------------------|------------------------|----------------------|----------|-------------|
| 80MHz - 500MHz           | H / V                | 3 V/m(rms)             | <b>A</b>             | <b>A</b> | <b>PASS</b> |
| 500MHz - 1000MHz         |                      | Modulated              |                      |          |             |

Note:

- 1) P/N denotes the Positive/Negative polarity of the output voltage.
- 2) N/A - denotes test is not applicable in this test report.

**Table 8 EFT/Burst Testing**

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable)

Mode 2/3/5/6

| Mode                | ( <b>X</b> ) AC Power Line |         | (   ) DC Power Line |         | ( <b>X</b> ) Signal/Control Line |         |
|---------------------|----------------------------|---------|---------------------|---------|----------------------------------|---------|
| Test Level          | 1KV                        |         | 0.5KV               |         | 0.5KV                            |         |
| Port(s)             | Polarity                   | Results | Polarity            | Results | Polarity                         | Results |
| Line (L)            | P                          | B       | P                   |         | P                                |         |
|                     | N                          | B       | N                   |         | N                                |         |
| Neutral (N)         | P                          | B       | P                   |         | P                                |         |
|                     | N                          | B       | N                   |         | N                                |         |
| Ground (PE)         | P                          | B       | P                   |         | P                                |         |
|                     | N                          | B       | N                   |         | N                                |         |
| Signal/Control Line | P                          |         | P                   |         | P                                | B       |
|                     | N                          |         | N                   |         | N                                | B       |
| Criteria            | <b>B</b>                   |         | <b>B</b>            |         | <b>B</b>                         |         |
| Result              | <b>B</b>                   |         | <b>N/A</b>          |         | <b>B</b>                         |         |
| Judgement           | <b>PASS</b>                |         | <b>N/A</b>          |         | <b>PASS</b>                      |         |

Note:

- 1) P/N denotes the Positive/Negative polarity of the output voltage.
- 2) N/A - denotes test is not applicable in this test report

**Table 9 Surge Test Results**

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable)

Mode 2/3/5/6

| Wave Form<br>EUT Ports Tested | 1.2/50(8/20)Ti/Th us |       |         |          | Results | Judgement |
|-------------------------------|----------------------|-------|---------|----------|---------|-----------|
|                               | Polarity             | Phase | Voltage | Criteria |         |           |
| L - N                         | +/-                  | 0°    | 1kV     | B        | A       | PASS      |
|                               | +/-                  | 90°   |         |          |         |           |
|                               | +/-                  | 180°  |         |          |         |           |
|                               | +/-                  | 270°  |         |          |         |           |
| L - PE                        | +/-                  | 0°    | 2KV     | B        | A       | PASS      |
|                               | +/-                  | 90°   |         |          |         |           |
|                               | +/-                  | 180°  |         |          |         |           |
|                               | +/-                  | 270°  |         |          |         |           |
| N - PE                        | +/-                  | 0°    | 2KV     | B        | A       | PASS      |
|                               | +/-                  | 90°   |         |          |         |           |
|                               | +/-                  | 180°  |         |          |         |           |
|                               | +/-                  | 270°  |         |          |         |           |
| Signal Line<br>(RJ 11)        | +/-                  | 0°    | 1KV     | B        | N/A     | N/A       |
|                               | +/-                  | 90°   |         |          |         |           |
|                               | +/-                  | 180°  |         |          |         |           |
|                               | +/-                  | 270°  |         |          |         |           |

Note:

- 1) P/N denotes the Positive/Negative polarity of the output voltage.
- 2) Polarity and Numbers of Impulses : 5 Pst / Ngt at each tested mode
- 3) N/A - denotes test is not applicable in this Test Report

**Table 10 Injection Current Test Results**

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable)

Mode 2/3/5/6

| Test Ports<br>(Mode)            | Freq. Range<br>MHz) | Field Strength       | Perform.<br>Criteria | Results    | Judgement   |
|---------------------------------|---------------------|----------------------|----------------------|------------|-------------|
| Input/ Output<br>AC. Power Port | 0.15 ---80          | 3V(rms)<br>Modulated | <b>A</b>             | <b>A</b>   | <b>PASS</b> |
| Input/ Output<br>DC. Power Port | 0.15 --- 80         | 3V(rms)<br>Modulated | <b>A</b>             | <b>N/A</b> | <b>N/A</b>  |
| Signal Line<br>(RJ 45 )         | 0.15 --- 80         | 3V(rms)<br>Modulated | <b>A</b>             | <b>A</b>   | <b>PASS</b> |

Note:

- 1) P/N denotes the Positive/Negative polarity of the output voltage.
- 2) N/A - denotes test is not applicable in this Test Report.

**Table 11 Power Frequency Magnetic Field Testing**

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable)

Mode 2/3/5/6

| Test Mode | Test Level | Antenna aspect | Duration (s) | Perform Criteria | Results | Judgement |
|-----------|------------|----------------|--------------|------------------|---------|-----------|
| Enclosure | 1 A/m      | X              | 30 s         | A                | A       | PASS      |
| Enclosure | 1 A/m      | Y              | 30 s         | A                | A       | PASS      |
| Enclosure | 1 A/m      | Z              | 30 s         | A                | A       | PASS      |

Note:

- 1) P/N denotes the Positive/Negative polarity of the output voltage.
- 2) N/A - denotes test is not applicable in this test report

**Table 12 Tests of Voltage Interruption/DIPs**

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable)

Mode 2/3/5/6

| Voltage<br>REDUCTION | Duration<br>(ms) | Perform<br>Criteria | Results   | Judgement   |
|----------------------|------------------|---------------------|-----------|-------------|
| Voltage dip > 95%    | 0.5              | <b>B</b>            | <b>B</b>  | <b>PASS</b> |
| Voltage dip 30%      | 25               | <b>C</b>            | <b>B</b>  | <b>PASS</b> |
| Interruption > 95%   | 250              | <b>C</b>            | <b>C1</b> | <b>PASS</b> |

Note:

- 1) P/N denotes the Positive/Negative polarity of the output voltage.
- 2). N/A - denotes test is not applicable in this test report.

**Table 13 EMS Measurement Instruments List**

| Item | Instruments           | Mfr/Brand       | Model/Type No.  | Serial No.  | Calibrated Date | Next Cali.Date | Note |
|------|-----------------------|-----------------|-----------------|-------------|-----------------|----------------|------|
| 1    | ESD Simulator         | Schaffner       | NSG 435         | ESD-001     | 2002-12-31      | 2003-12-30     | ✓    |
| 2    | Signal Generator      | IFR             | 2023A           | 202301/368  | 2002-03-26      | 2004-03-25     | ✓    |
| 3    | Power Amplifier(RS)   | M2S             | AC8113-800/250A | 9904-113    | 2002-03-27      | 2004-03-26     | ✓    |
| 4    | Antenna(500W)         | MESS-ELEKTRONIK | VULB9161        | 4022        | 2002-07-25      | 2003-07-24     | ✓    |
| 5    | EFT Burst Tester      | Haefely         | PEFT-Junior     | 083 180-24  | 2001-12-05      | 2003-12-04     | ✓    |
| 6    | Surge Tester          | Haefely         | PSURGE 4-1      | 083 665-01  | 2001-12-03      | 2003-12-02     | ✓    |
| 7    | Power Amplifier(CS)   | M2S             | A0122-250       | 9902-111    | 2002-03-27      | 2004-03-26     | ✓    |
| 8    | CDN                   | MEB             | M3              | 13389       | 2003-05-30      | 2005-05-29     | ✓    |
| 9    | CDN                   | MEB             | M2              | 12127       | 2003-05-30      | 2005-05-29     |      |
| 10   | CDN                   | MEB             | S1              | 14393       | 2003-05-30      | 2005-05-29     |      |
| 11   | CDN                   | MEB             | S25             | 12426       | 2003-05-30      | 2005-05-29     |      |
| 12   | EM Clamp              | MEB             | KEMZ 801        | 14291       | 2001-06-20      | 2003-06-19     | ✓    |
| 13   | Magnetic Field Tester | Haefely         | MAG 100.1       | 083858-08   | 2003-06-05      | 2005-06-04     | ✓    |
| 14   | DIP Generator         | Haefely         | PLINE 1610      | 083690-16   | 2001-12-05      | 2003-12-04     | ✓    |
| 15   | Power Analyzer        | Chroma          | 6630            | 66300000120 | 2001-12-03      | 2003-12-02     | ✓    |
| 16   | AC Source             | Chroma          | 6530            | 65300113    | 2001-07-02      | 2003-07-01     | ✓    |

Remark:

(1)" ✓" indicates the instrument used in Test Report.

(2)" N/A" - denotes tests is not applicable in Test Report

## 5. HARMONICS TEST

### 5.1 Limits

#### 5.1.1 Limits of Harmonic Current

| IEC 555-2                          |                  |  |                    |                  |  |
|------------------------------------|------------------|--|--------------------|------------------|--|
| Table - I                          |                  |  | Table - II         |                  |  |
| Equipment Category                 | Harmonic Order n | Max. permissible harmonic current (in Amperes) | Equipment Category | Harmonic Order n | Max. permissible harmonic current (in Amperes) |
| Non Portable Tools or TV Receivers | odd harmonics    |  | TV Receivers       | odd harmonics    |  |
|                                    | 3                | 2.30   |                    | 3                | 0.80   |
|                                    | 5                | 1.14   |                    | 5                | 0.60   |
|                                    | 7                | 0.77   |                    | 7                | 0.45   |
|                                    | 9                | 0.40   |                    | 9                | 0.30   |
|                                    | 11               | 0.33   |                    | 11               | 0.17   |
|                                    | 13               | 0.21   |                    | 13               | 0.12   |
|                                    | 15≤n≤39          | 0.15 . 15/n                                    |                    | 15≤n≤39          | 0.10 . 15/n                                    |
|                                    | even harmonics   |  |                    | even harmonics   |  |
|                                    | 2                | 1.08   |                    | 2                | 0.30   |
|                                    | 4                | 0.43   |                    | 4                | 0.15   |
|                                    | 8                | 0.30   |                    | DC               | 0.05   |
|                                    | 8≤n≤40           | 0.23 . 8/n                                     |                    |                  |  |

Note: For Portable tools, a multiplication factor of 1.5 shall be applied to the limits specified in Table - I.

| EN 61000-3-2/IEC 61000-3-2 |   |                    |                             |   |        |
|----------------------------|---|--------------------|-----------------------------|---|--------|
| Equipment Category         | Max. permissible harmonic current (in Amperes)                                | Equipment Category | Harmonic Order n            | Max. permissible harmonic current (in A) (mA/w) |        |
| Class A                    | Same as Limits Specified in 4-2.1, Table - I, but only odd harmonics required | Class D            | 3                           | 2.30  | 3.4    |
|                            |   |                    | 5                           | 1.14  | 1.9    |
|                            |   |                    | 7                           | 0.77  | 1.0    |
|                            |   |                    | 9                           | 0.40  | 0.5    |
|                            |   |                    | 11                          | 0.33  | 0.35   |
|                            |   |                    | 13≤n≤39                     | see Table I                                     | 3.85/n |
|                            |   |                    | only odd harmonics required |   |        |



### 5.1.2 Limits of Fluctuation and Flicker

| Tests | Limits                   |                          | Descriptions                     |
|-------|--------------------------|--------------------------|----------------------------------|
|       | IEC555-3                 | IEC 61000-3-2            |                                  |
| Pst   | $\leq 1.0$ , Tp= 10 min. | $\leq 1.0$ , Tp= 10 min. | Short Term Flicker Indicator     |
| Plt   | N/A                      | $\leq 0.65$ , Tp=2 hr.   | Long Term Flicker Indicator      |
| dc    | $\leq 3 \%$              | $\leq 3 \%$              | Relative Steady-State V-Chang    |
| dmax  | $\leq 4 \%$              | $\leq 4 \%$              | Maximum Relative V-change        |
| d (t) | N/A                      | $\leq 3\%$ for > 200 ms  | Relative V-change characteristic |

## 5.2 Test Methodology

### 5.2.1 Harmonic Current Test

Tests was performed according to the procedures specified in **Clause 5.0 of IEC555-2** and/or Sub-clause **6.2 of IEC 61000-3-2** depend on which standard adopted for compliance measurement.

### 5.2.2 Fluctuation and Flickers Test

Tests was performed according to the Test Conditions/Assessment of Voltage Fluctu-ations specified in **Clause 5.0/6.0 of IEC555-3** and/or **Clause 6.0/4.0 of IEC 61000-3-3** depend on which standard adopted for compliance measurement.

All types of harmonic current and/or voltage fluctuation in this report are assessed by direct measurement using flicker-meter, which compliance with the specification given in IEC868, connected as the test set-up configuration described in **Section 6**.

## 5.3 Sample(s) Tested

The representative sample tested in this reports is the same as the statements of **2.5** unless otherwise a special model no. is specified in the record (Table of Test Results).

## 5.4 Test Set-Up Configuration

The test set-up configuration, including the auxiliary instruments, is sketched as block diagram of **Fig. 6-4-1** in next page.

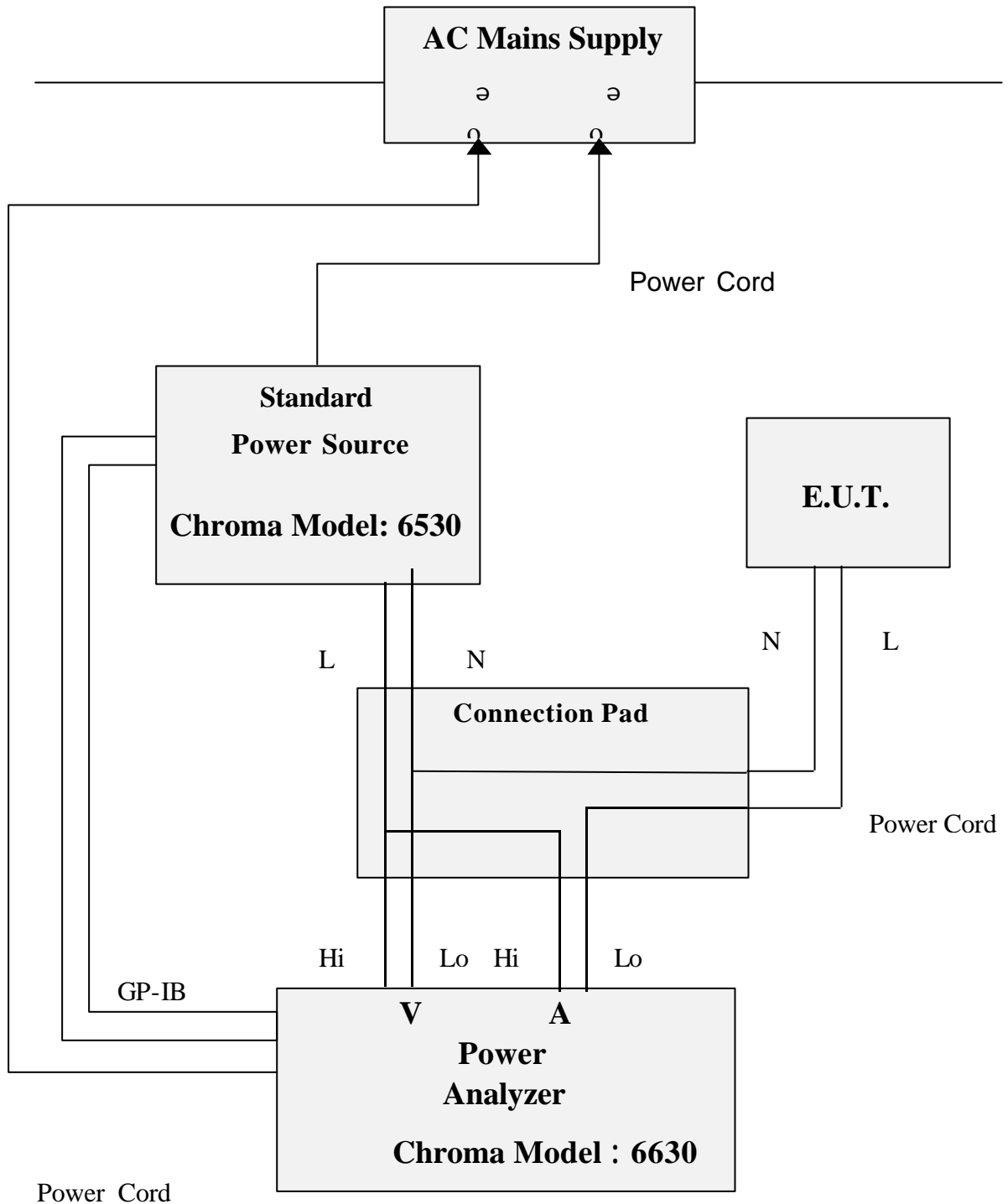
## 5.5 EUT Operating Condition

The EUT tested system was configured as the statements of **2.10** unless otherwise a special operating condition is specified in the follows during the testing.

## 5.6 EUT Tested Results

| Items | Tests                         | EUT Tested Results | Remark |
|-------|-------------------------------|--------------------|--------|
| 1.    | Harmonics Current             | Table 14           |        |
| 2.    | Voltage Fluctuations/Flickers | Table 15           |        |

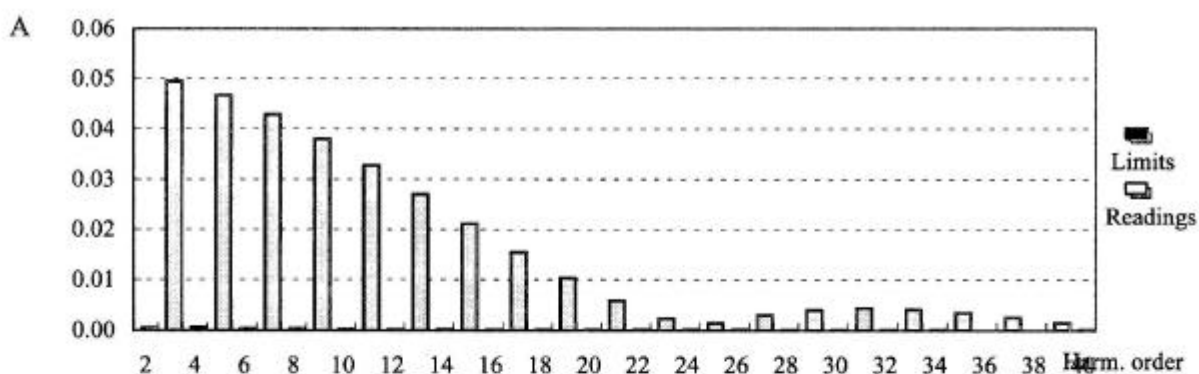
\* Remark: N/A - denotes test is not applicable in this Test Report

**Fig. 5-4-1 Harmonics / Flicker Test Set-Up Configuration**

**Table 14 Harmonics Current Testing**

Test Condition (AC Input) : 230.68 V 0.11712 A 12.2674 W 50.00 Hz P.F. 0.45406  
 Standard No. Apply : ( ) IEC 555-2 ( ) Table I ( ) Table I x 1.5  
( X ) IEC 61000-3-2 ( ) Class A ( X ) Class D  
 Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable)

Mode 2



| H# | Reading  | Limit | Result | H# | Reading  | Limit | Result |
|----|----------|-------|--------|----|----------|-------|--------|
| 1  | 0.055420 |       | PASS   | 21 | 0.005860 |       | PASS   |
| 2  | 0.000460 |       | PASS   | 22 | 0.000090 |       | PASS   |
| 3  | 0.049430 |       | PASS   | 23 | 0.002350 |       | PASS   |
| 4  | 0.000640 |       | PASS   | 24 | 0.000090 |       | PASS   |
| 5  | 0.046740 |       | PASS   | 25 | 0.001390 |       | PASS   |
| 6  | 0.000370 |       | PASS   | 26 | 0.000090 |       | PASS   |
| 7  | 0.042900 |       | PASS   | 27 | 0.002950 |       | PASS   |
| 8  | 0.000400 |       | PASS   | 28 | 0.000080 |       | PASS   |
| 9  | 0.038090 |       | PASS   | 29 | 0.003980 |       | PASS   |
| 10 | 0.000300 |       | PASS   | 30 | 0.000070 |       | PASS   |
| 11 | 0.032740 |       | PASS   | 31 | 0.004340 |       | PASS   |
| 12 | 0.000260 |       | PASS   | 32 | 0.000050 |       | PASS   |
| 13 | 0.026960 |       | PASS   | 33 | 0.004100 |       | PASS   |
| 14 | 0.000190 |       | PASS   | 34 | 0.000030 |       | PASS   |
| 15 | 0.021110 |       | PASS   | 35 | 0.003430 |       | PASS   |
| 16 | 0.000130 |       | PASS   | 36 | 0.000020 |       | PASS   |
| 17 | 0.015450 |       | PASS   | 37 | 0.002510 |       | PASS   |
| 18 | 0.000110 |       | PASS   | 38 | 0.000020 |       | PASS   |
| 19 | 0.010320 |       | PASS   | 39 | 0.001480 |       | PASS   |
| 20 | 0.000090 |       | PASS   | 40 | 0.000030 |       | PASS   |

Test result : **PASS**

Remark :

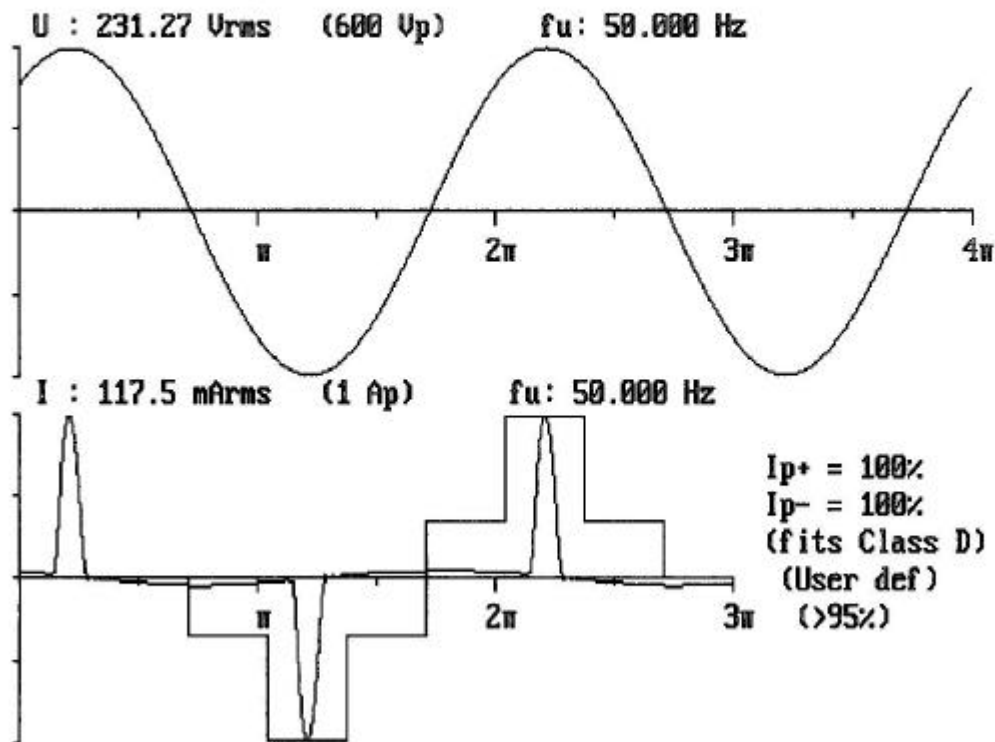
**Table 14 Harmonics Current Testing**

Test Condition (AC Input) : 230.68 V 0.11712 A 12.2674 W 50.00 Hz P.F. 0.45406  
Standard No. Apply : ( ) IEC 555-2 ( ) Table I ( ) Table I x 1.5  
(X) IEC 61000-3-2 ( ) Class A (X) Class D  
Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable)

Mode 2

**Waveform M1**

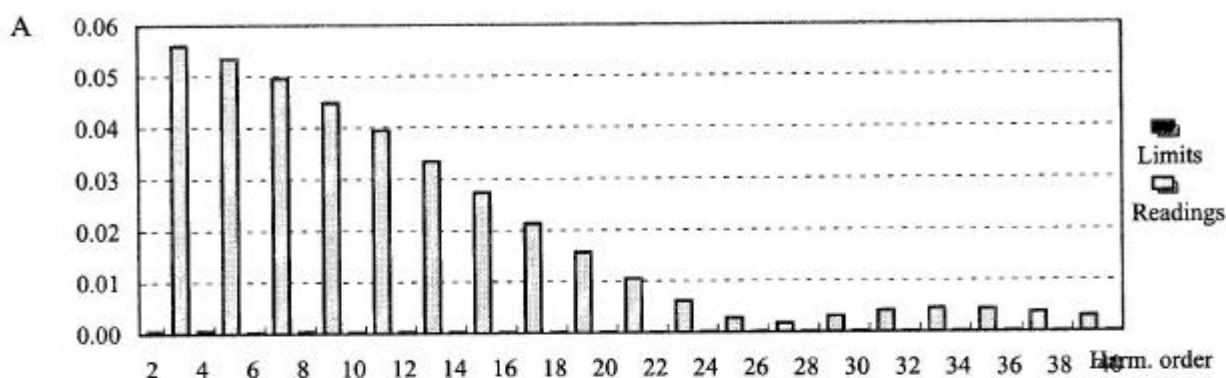
Note:

Next  
measureZoom  
VoltageZoom  
CurrentWrite to  
diskData  
cursor

**Table 14 Harmonics Current Testing**Test Condition (AC Input) : 230.68 V 0.13667 A 13.7855 W 50.00 Hz P.F. 0.43726Standard No. Apply : ( ) IEC 555-2 ( ) Table I ( ) Table I x 1.5(X) IEC 61000-3-2 ( ) Class A (X) Class D

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable)

Mode 3



| H# | Reading  | Limit | Result | H# | Reading  | Limit | Result |
|----|----------|-------|--------|----|----------|-------|--------|
| 1  | 0.061870 |       | PASS   | 21 | 0.010520 |       | PASS   |
| 2  | 0.000540 |       | PASS   | 22 | 0.000070 |       | PASS   |
| 3  | 0.056040 |       | PASS   | 23 | 0.006120 |       | PASS   |
| 4  | 0.000580 |       | PASS   | 24 | 0.000070 |       | PASS   |
| 5  | 0.053410 |       | PASS   | 25 | 0.002720 |       | PASS   |
| 6  | 0.000310 |       | PASS   | 26 | 0.000080 |       | PASS   |
| 7  | 0.049600 |       | PASS   | 27 | 0.001690 |       | PASS   |
| 8  | 0.000350 |       | PASS   | 28 | 0.000080 |       | PASS   |
| 9  | 0.044800 |       | PASS   | 29 | 0.003040 |       | PASS   |
| 10 | 0.000260 |       | PASS   | 30 | 0.000070 |       | PASS   |
| 11 | 0.039420 |       | PASS   | 31 | 0.004070 |       | PASS   |
| 12 | 0.000230 |       | PASS   | 32 | 0.000060 |       | PASS   |
| 13 | 0.033510 |       | PASS   | 33 | 0.004490 |       | PASS   |
| 14 | 0.000160 |       | PASS   | 34 | 0.000040 |       | PASS   |
| 15 | 0.027380 |       | PASS   | 35 | 0.004350 |       | PASS   |
| 16 | 0.000120 |       | PASS   | 36 | 0.000030 |       | PASS   |
| 17 | 0.021320 |       | PASS   | 37 | 0.003790 |       | PASS   |
| 18 | 0.000090 |       | PASS   | 38 | 0.000030 |       | PASS   |
| 19 | 0.015650 |       | PASS   | 39 | 0.002950 |       | PASS   |
| 20 | 0.000070 |       | PASS   | 40 | 0.000030 |       | PASS   |

Test result : **PASS**

Remark :

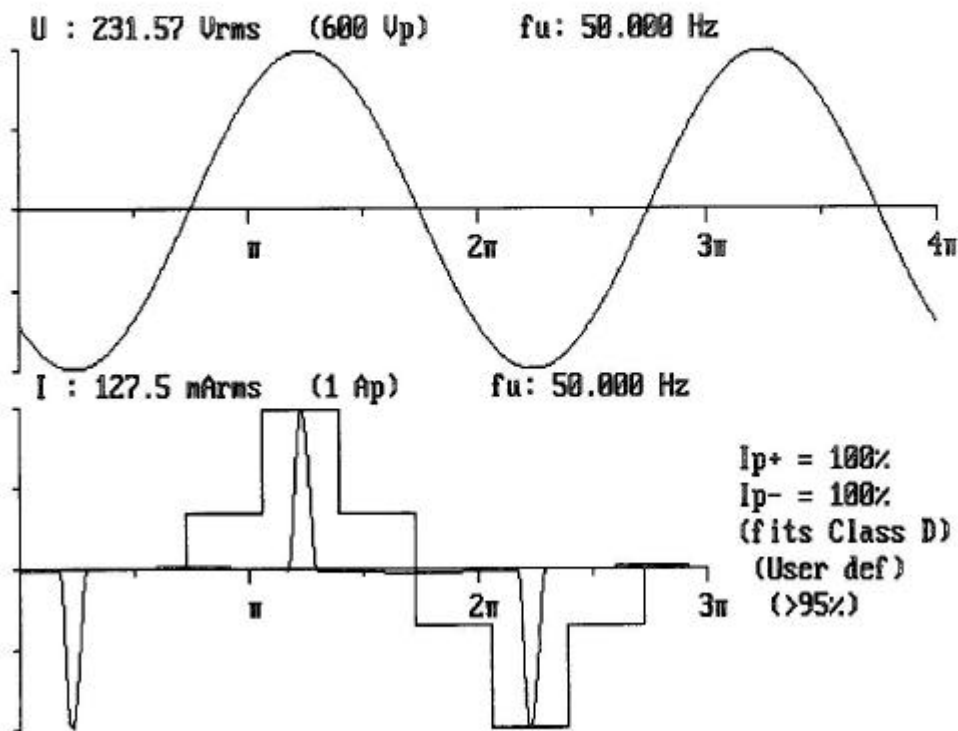
**Table 14 Harmonics Current Testing**

Test Condition (AC Input) : 230.68 V 0.13667 A 13.7855 W 50.00 Hz P.F. 0.43726  
Standard No. Apply : ( ) IEC 555-2 ( ) Table I ( ) Table I x 1.5  
(X) IEC 61000-3-2 ( ) Class A (X) Class D  
Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable)

Mode 3

**Waveform M1**

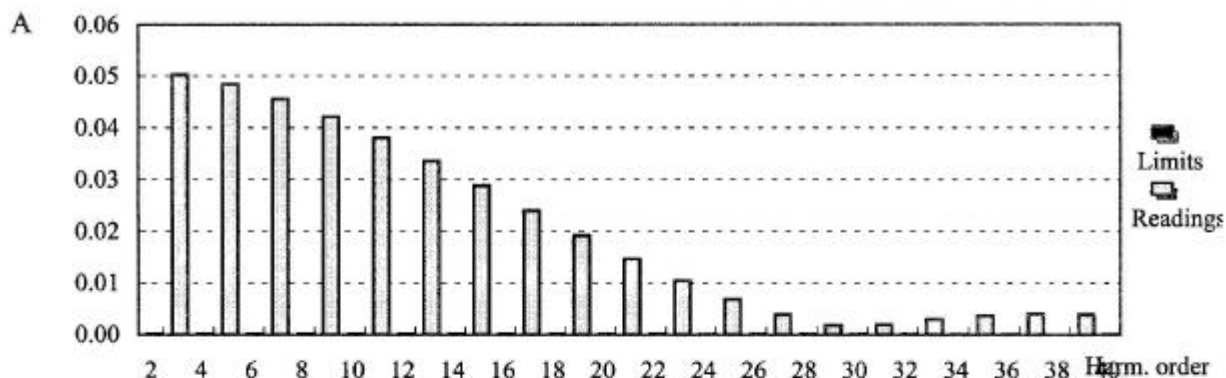
Note:

Next  
measureZoom  
VoltageZoom  
CurrentWrite to  
diskData  
cursor

**Table 14 Harmonics Current Testing**Test Condition (AC Input) : 231.05 V 0.12747 A 11.8536 W 50.00 Hz P.F. 0.40247Standard No. Apply : ( ) IEC 555-2 ( ) Table I ( ) Table I x 1.5(X) IEC 61000-3-2 ( ) Class A (X) Class D

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable)

Mode 5



| H# | Reading  | Limit | Result | H# | Reading  | Limit | Result |
|----|----------|-------|--------|----|----------|-------|--------|
| 1  | 0.051990 |       | PASS   | 21 | 0.014680 |       | PASS   |
| 2  | 0.000140 |       | PASS   | 22 | 0.000080 |       | PASS   |
| 3  | 0.050190 |       | PASS   | 23 | 0.010510 |       | PASS   |
| 4  | 0.000140 |       | PASS   | 24 | 0.000080 |       | PASS   |
| 5  | 0.048370 |       | PASS   | 25 | 0.006830 |       | PASS   |
| 6  | 0.000120 |       | PASS   | 26 | 0.000080 |       | PASS   |
| 7  | 0.045570 |       | PASS   | 27 | 0.003820 |       | PASS   |
| 8  | 0.000100 |       | PASS   | 28 | 0.000070 |       | PASS   |
| 9  | 0.042090 |       | PASS   | 29 | 0.001830 |       | PASS   |
| 10 | 0.000080 |       | PASS   | 30 | 0.000060 |       | PASS   |
| 11 | 0.038080 |       | PASS   | 31 | 0.001950 |       | PASS   |
| 12 | 0.000070 |       | PASS   | 32 | 0.000050 |       | PASS   |
| 13 | 0.033620 |       | PASS   | 33 | 0.002950 |       | PASS   |
| 14 | 0.000050 |       | PASS   | 34 | 0.000030 |       | PASS   |
| 15 | 0.028840 |       | PASS   | 35 | 0.003660 |       | PASS   |
| 16 | 0.000050 |       | PASS   | 36 | 0.000030 |       | PASS   |
| 17 | 0.023960 |       | PASS   | 37 | 0.003960 |       | PASS   |
| 18 | 0.000060 |       | PASS   | 38 | 0.000020 |       | PASS   |
| 19 | 0.019190 |       | PASS   | 39 | 0.003870 |       | PASS   |
| 20 | 0.000070 |       | PASS   | 40 | 0.000030 |       | PASS   |

**Test result : PASS**

Remark :

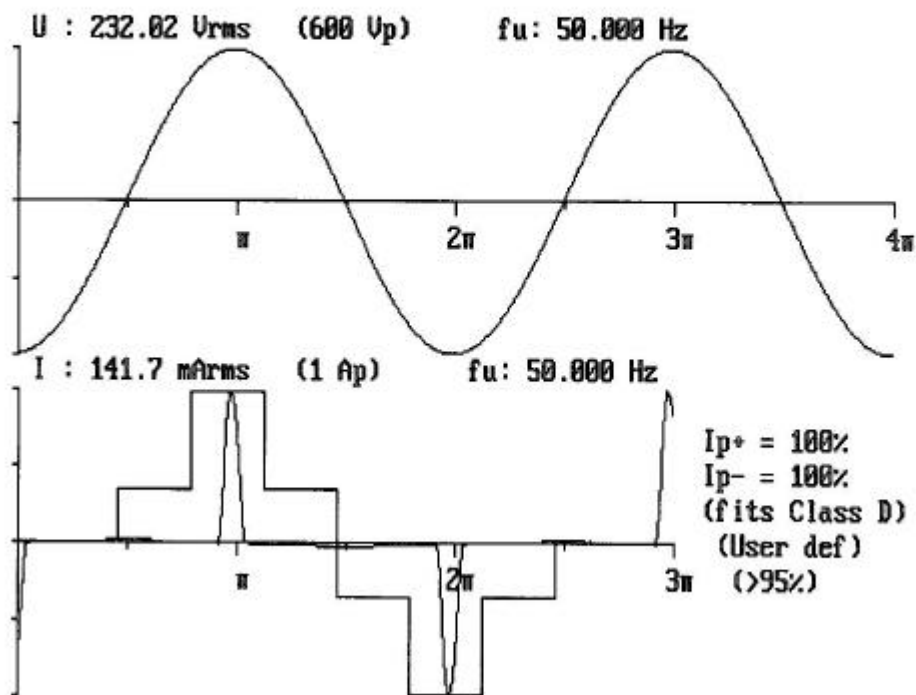
**Table 14 Harmonics Current Testing**

Test Condition (AC Input) : 231.05 V 0.12747 A 11.8536 W 50.00 Hz P.F. 0.40247  
Standard No. Apply : ( ) IEC 555-2 ( ) Table I ( ) Table I x 1.5  
(X) IEC 61000-3-2 ( ) Class A (X) Class D  
Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable)

Mode 5

**Waveform M1**

Note:

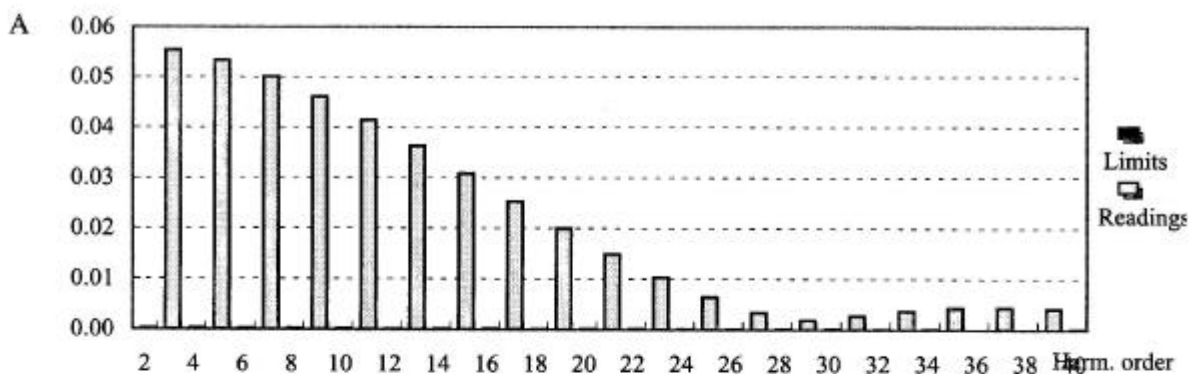
Next  
measureZoom  
VoltageZoom  
CurrentWrite to  
diskData  
cursor



**Table 14 Harmonics Current Testing**Test Condition (AC Input) : 231.05 V 0.13903 A 13.0921 W 50.00 Hz P.F. 0.40756Standard No. Apply : ( ) IEC 555-2 ( ) Table I ( ) Table I x 1.5(X) IEC 61000-3-2 ( ) Class A (X) Class D

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable)

Mode 6



| H# | Reading  | Limit | Result | H# | Reading  | Limit | Result |
|----|----------|-------|--------|----|----------|-------|--------|
| 1  | 0.057350 |       | PASS   | 21 | 0.014900 |       | PASS   |
| 2  | 0.000150 |       | PASS   | 22 | 0.000080 |       | PASS   |
| 3  | 0.055420 |       | PASS   | 23 | 0.010320 |       | PASS   |
| 4  | 0.000150 |       | PASS   | 24 | 0.000080 |       | PASS   |
| 5  | 0.053280 |       | PASS   | 25 | 0.006380 |       | PASS   |
| 6  | 0.000140 |       | PASS   | 26 | 0.000080 |       | PASS   |
| 7  | 0.050050 |       | PASS   | 27 | 0.003310 |       | PASS   |
| 8  | 0.000110 |       | PASS   | 28 | 0.000080 |       | PASS   |
| 9  | 0.046020 |       | PASS   | 29 | 0.001870 |       | PASS   |
| 10 | 0.000080 |       | PASS   | 30 | 0.000060 |       | PASS   |
| 11 | 0.041380 |       | PASS   | 31 | 0.002670 |       | PASS   |
| 12 | 0.000060 |       | PASS   | 32 | 0.000040 |       | PASS   |
| 13 | 0.036270 |       | PASS   | 33 | 0.003690 |       | PASS   |
| 14 | 0.000040 |       | PASS   | 34 | 0.000030 |       | PASS   |
| 15 | 0.030800 |       | PASS   | 35 | 0.004280 |       | PASS   |
| 16 | 0.000050 |       | PASS   | 36 | 0.000020 |       | PASS   |
| 17 | 0.025270 |       | PASS   | 37 | 0.004380 |       | PASS   |
| 18 | 0.000060 |       | PASS   | 38 | 0.000020 |       | PASS   |
| 19 | 0.019920 |       | PASS   | 39 | 0.004090 |       | PASS   |
| 20 | 0.000070 |       | PASS   | 40 | 0.000030 |       | PASS   |

**Test result : PASS**

Remark :

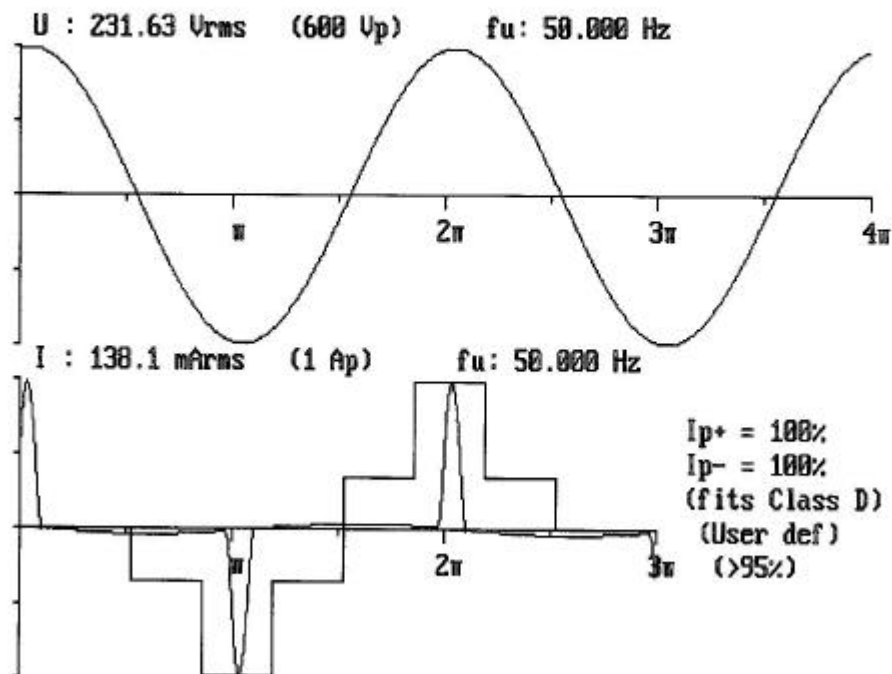
**Table 14 Harmonics Current Testing**Test Condition (AC Input) : 231.05 V 0.13903 A 13.0921 W 50.00 Hz P.F. 0.40756Standard No. Apply : ( ) IEC 555-2 ( ) Table I ( ) Table I x 1.5(X) IEC 61000-3-2 ( ) Class A (X) Class D

Special Notes : (EUT Operation Mode or Test Configuration Mode, if applicable)

Mode 6

**Waveform M1**

Note:

Next  
measureZoom  
VoltageZoom  
CurrentWrite to  
diskData  
cursor

**Table 15 Voltage Fluctuations/Flickers Testing**

|                       |                 |                           |                  |
|-----------------------|-----------------|---------------------------|------------------|
| Kind of Product       | Power Supply    | Model No.:                | SA40-050100/100M |
| Product Category:     | N/A             | Test Condition (AC Input) |                  |
| AC Mains Rating       | 230V, 50Hz, 1 Ø | Voltage(V) :              | 230.7V           |
| Temperature( ):       | 26.0            | Current(mA):              | 116.9mA          |
| Relative Humidity(%): | 70.0 % RH       | Watts(w):                 | 12.2708w         |
| Test Result           | <b>Pass</b>     | Frequency(Hz):            | 49.999Hz         |
| Special Note:         | N/A             | Power Factor:             | 0.455            |

| Datas Measured                                  |            |              |             |
|---|------------|--------------|-------------|
| Test Item                                       | Std Limits | Test Reading | Test Result |
| Relative st-st Voltage Change (dc)              | 3 %        | 0.01 %       | <b>PASS</b> |
| Max. Relative Voltage Change(d <sub>max</sub> ) | 4 %        | 2.29 %       | <b>PASS</b> |
| Duration > 3% dV(d(t) for > 200ms)              | 0.2 Sec.   | 0.05 %       | <b>PASS</b> |
| Short Term Flicker (Pst)                        | 1.00       | 0.69         | <b>PASS</b> |
| Long Term Flicker (Plt)                         | 0.65       | N/A          | N/A         |

**Table 15 Voltage Fluctuations/Flickers Testing**

|                       |                 |                           |                |
|-----------------------|-----------------|---------------------------|----------------|
| Kind of Product       | Power Supply    | Model No.:                | SA40-050100/1G |
| Product Category:     | N/A             | Test Condition (AC Input) |                |
| AC Mains Rating       | 230V, 50Hz, 1 Ø | Voltage(V) :              | 230.7V         |
| Temperature( ):       | 26.0            | Current(mA):              | 116.9mA        |
| Relative Humidity(%): | 70.0 % RH       | Watts(w):                 | 11.89829w      |
| Test Result           | <b>Pass</b>     | Frequency(Hz):            | 49.999Hz       |
| Special Note:         | N/A             | Power Factor:             | 0.455          |

| Datas Measured                                  |            |              |             |
|---|------------|--------------|-------------|
| Test Item                                       | Std Limits | Test Reading | Test Result |
| Relative st-st Voltage Change (dc)              | 3 %        | 0.01 %       | <b>PASS</b> |
| Max. Relative Voltage Change(d <sub>max</sub> ) | 4 %        | 2.29 %       | <b>PASS</b> |
| Duration > 3% dV(d(t) for > 200ms)              | 0.2 Sec.   | 0.05 %       | <b>PASS</b> |
| Short Term Flicker (Pst)                        | 1.00       | 0.69         | <b>PASS</b> |
| Long Term Flicker (Plt)                         | 0.65       | N/A          | N/A         |

**Table 15 Voltage Fluctuations/Flickers Testing**

|                       |                 |                           |                   |
|-----------------------|-----------------|---------------------------|-------------------|
| Kind of Product       | Power Supply    | Model No.:                | UP0401S-05L1/100M |
| Product Category:     | N/A             | Test Condition (AC Input) |                   |
| AC Mains Rating       | 230V, 50Hz, 1 Ø | Voltage(V) :              | 230.7V            |
| Temperature( ):       | 26.0            | Current(mA):              | 116.9mA           |
| Relative Humidity(%): | 70.0 % RH       | Watts(w):                 | 13.07786w         |
| Test Result           | <b>Pass</b>     | Frequency(Hz):            | 49.999Hz          |
| Special Note:         | N/A             | Power Factor:             | 0.455             |

| Datas Measured                                  |            |              |             |
|---|------------|--------------|-------------|
| Test Item                                       | Std Limits | Test Reading | Test Result |
| Relative st-st Voltage Change (dc)              | 3 %        | 0.01 %       | <b>PASS</b> |
| Max. Relative Voltage Change(d <sub>max</sub> ) | 4 %        | 2.29 %       | <b>PASS</b> |
| Duration > 3% dV(d(t) for > 200ms)              | 0.2 Sec.   | 0.05 %       | <b>PASS</b> |
| Short Term Flicker (Pst)                        | 1.00       | 0.69         | <b>PASS</b> |
| Long Term Flicker (Plt)                         | 0.65       | N/A          | N/A         |

**Table 15 Voltage Fluctuations/Flickers Testing**

|                       |                 |                           |                 |
|-----------------------|-----------------|---------------------------|-----------------|
| Kind of Product       | Power Supply    | Model No.:                | UP0401S-05L1/1G |
| Product Category:     | N/A             | Test Condition (AC Input) |                 |
| AC Mains Rating       | 230V, 50Hz, 1 Ø | Voltage(V) :              | 230.7V          |
| Temperature( ):       | 26.0            | Current(mA):              | 116.9mA         |
| Relative Humidity(%): | 70.0 % RH       | Watts(w):                 | 13.86599w       |
| Test Result           | <b>Pass</b>     | Frequency(Hz):            | 49.999Hz        |
| Special Note:         | N/A             | Power Factor:             | 0.455           |

| Datas Measured                                  |            |              |             |
|---|------------|--------------|-------------|
| Test Item                                       | Std Limits | Test Reading | Test Result |
| Relative st-st Voltage Change (dc)              | 3 %        | 0.01 %       | <b>PASS</b> |
| Max. Relative Voltage Change(d <sub>max</sub> ) | 4 %        | 2.29 %       | <b>PASS</b> |
| Duration > 3% dV(d(t) for > 200ms)              | 0.2 Sec.   | 0.05 %       | <b>PASS</b> |
| Short Term Flicker (Pst)                        | 1.00       | 0.69         | <b>PASS</b> |
| Long Term Flicker (Plt)                         | 0.65       | N/A          | N/A         |

## **Attachment**

### **Table Contents**

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- A. EUT Modification Description
- B. EUT Test Photos
- C. EUT Photos

## **Attachment - A.**

### **EUT Modification Description**

No any modification required for the EUT to comply with the standards.



## **Attachment - B.**

### **EUT Test Photos**

- 1. Conducted Measurement Photos**
- 2. Radiated Measurement Photos**

Conducted Measurement Photos





Radiated Measurement Photos



## **Attachment – C**

### **EUT Photos**

- 1. Photo # 1 Front View**
- 2. Photo # 2 Rear View**
- 3. Photo # 3 Side View**
- 4. Photo # 4~8 Unit Partially Disassembled**

Photo # 1

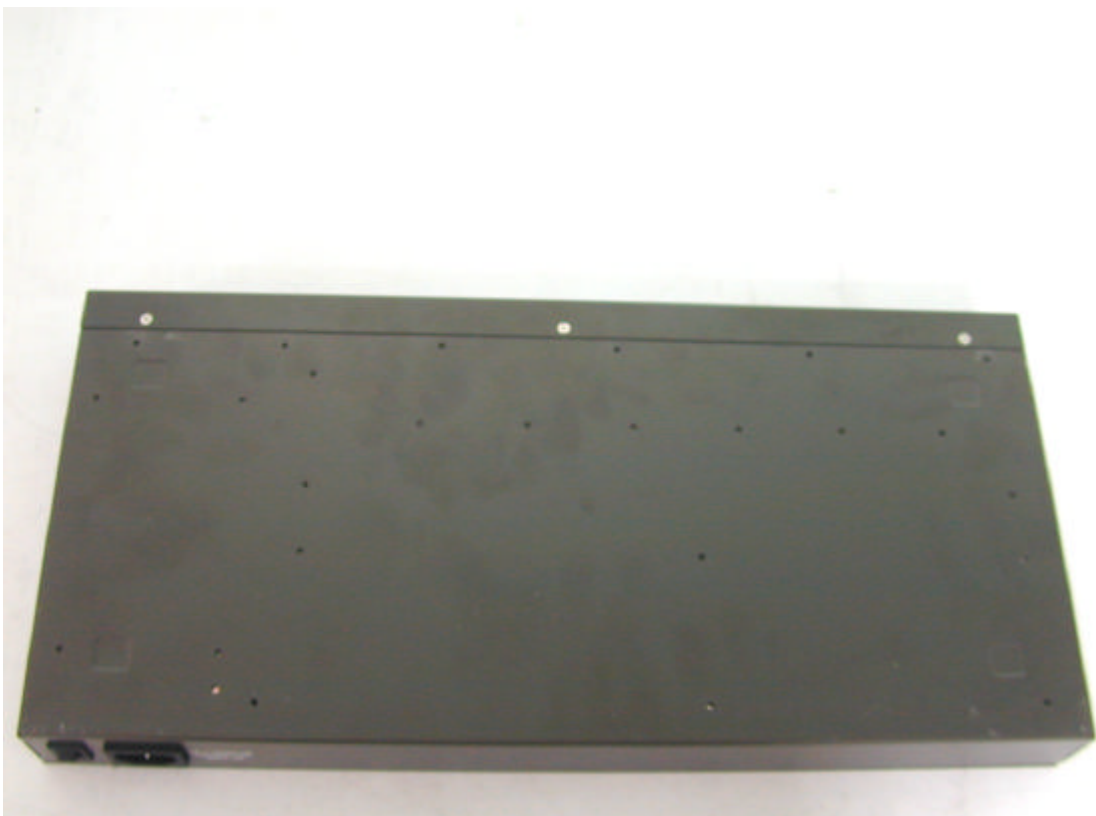




Photo # 2



Photo # 3

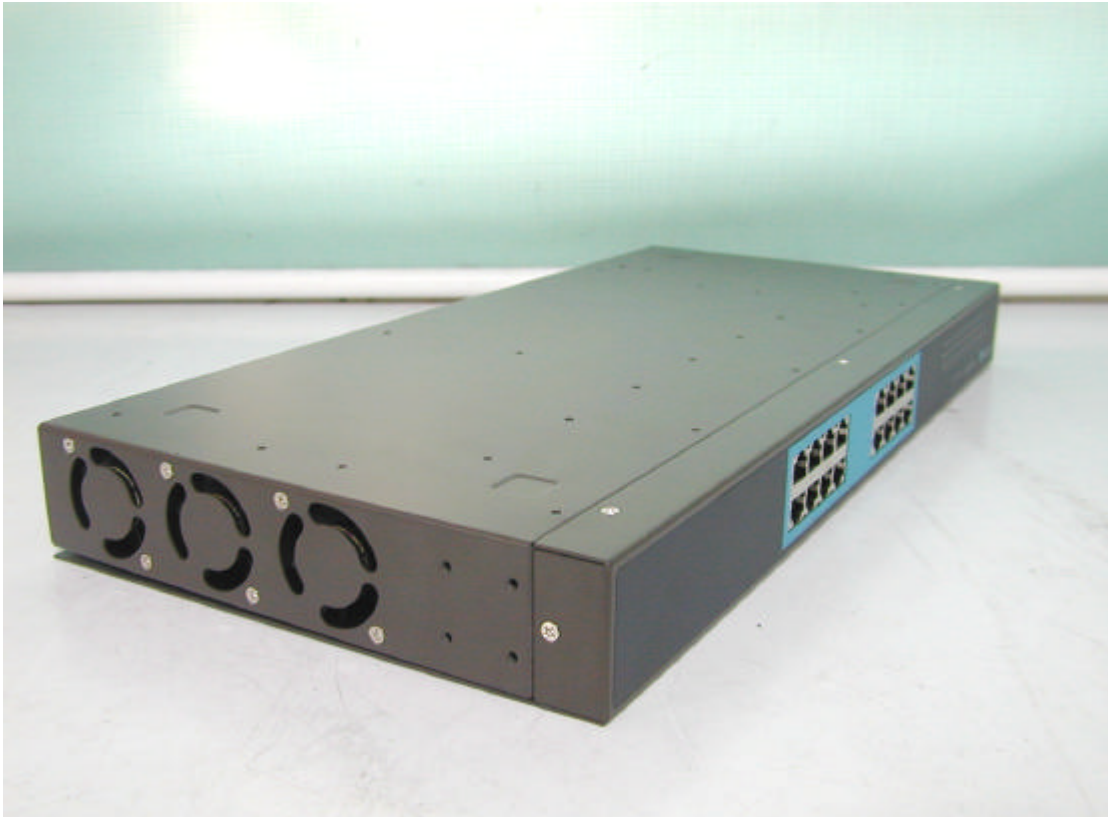


Photo # 4

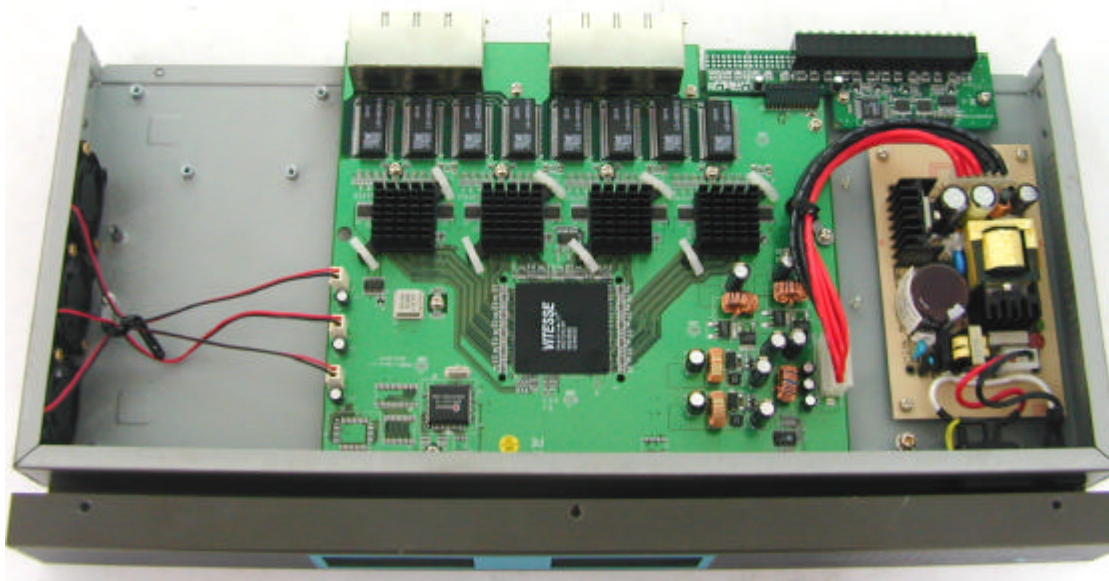
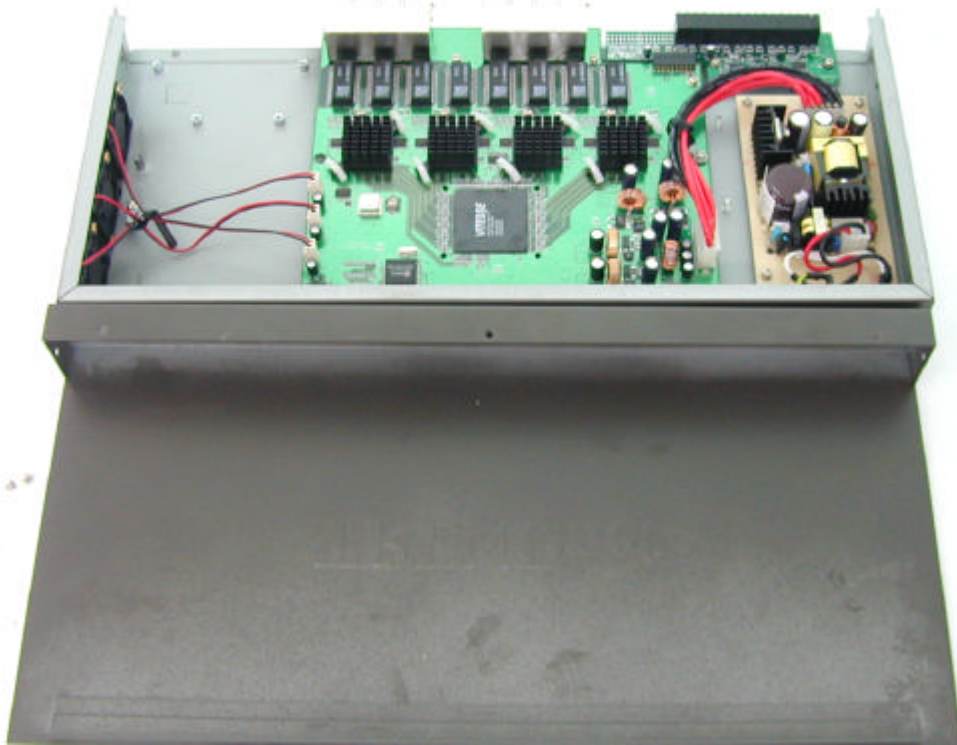




Photo # 5

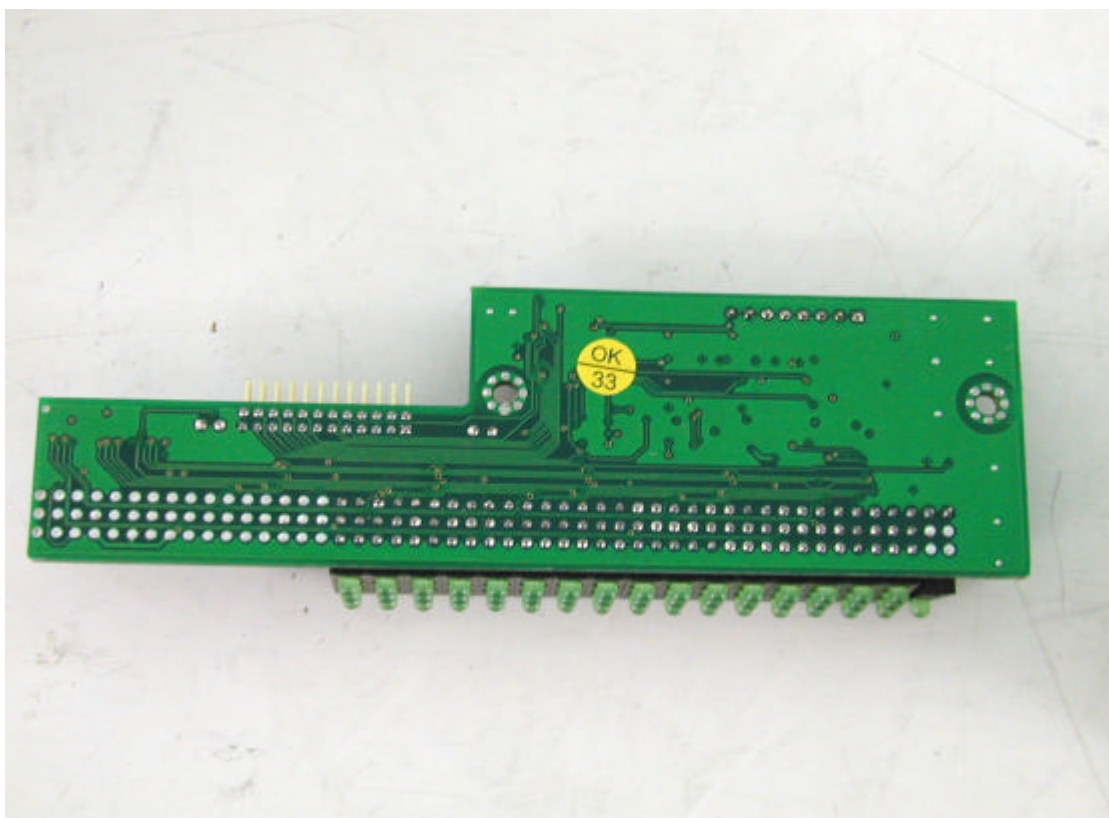
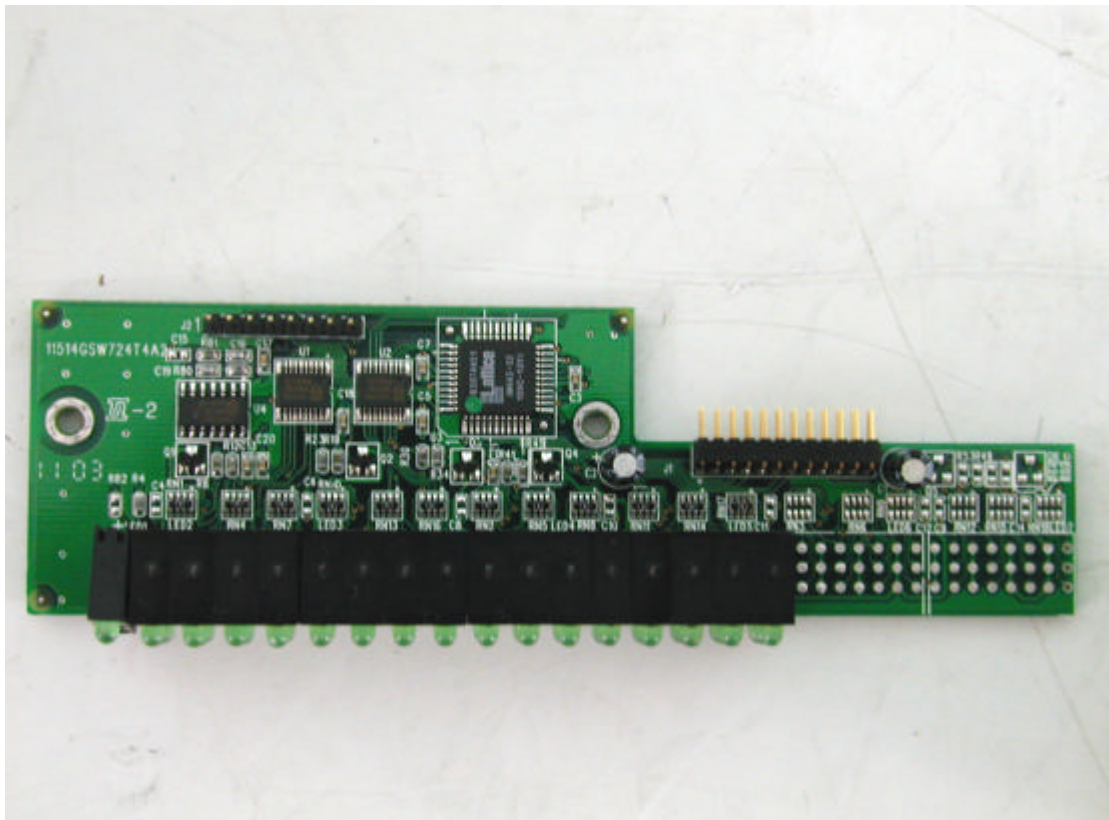


Photo # 6

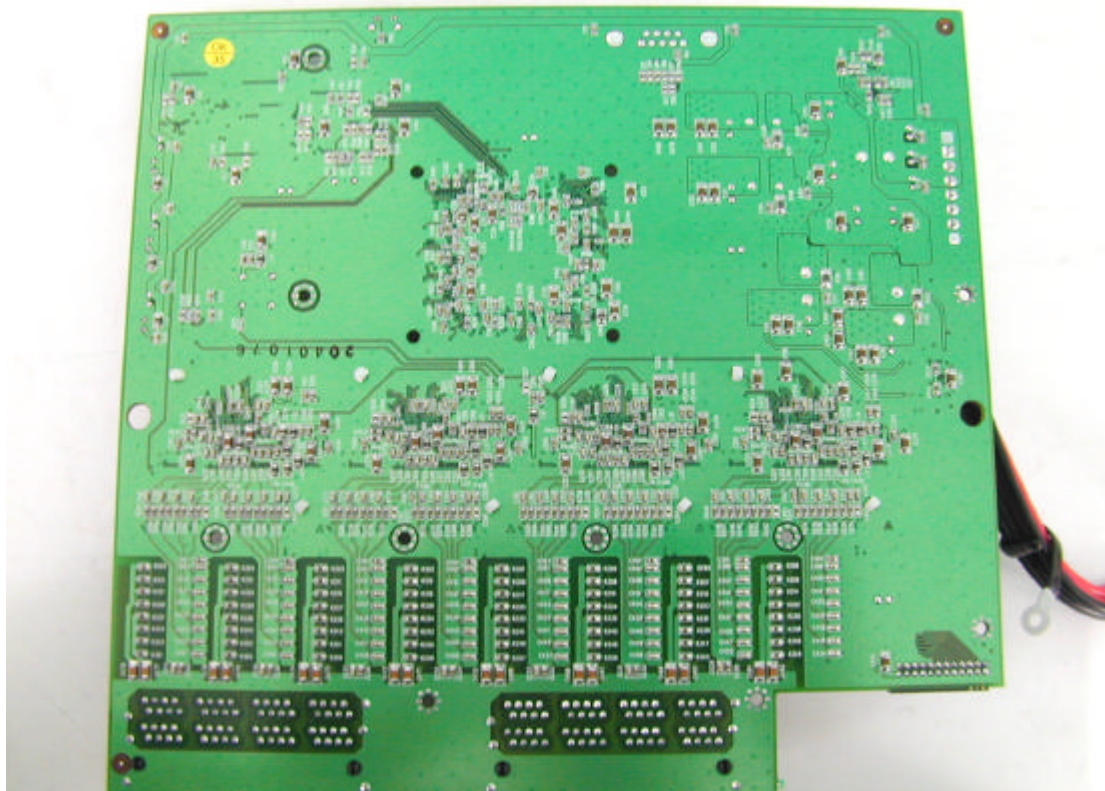
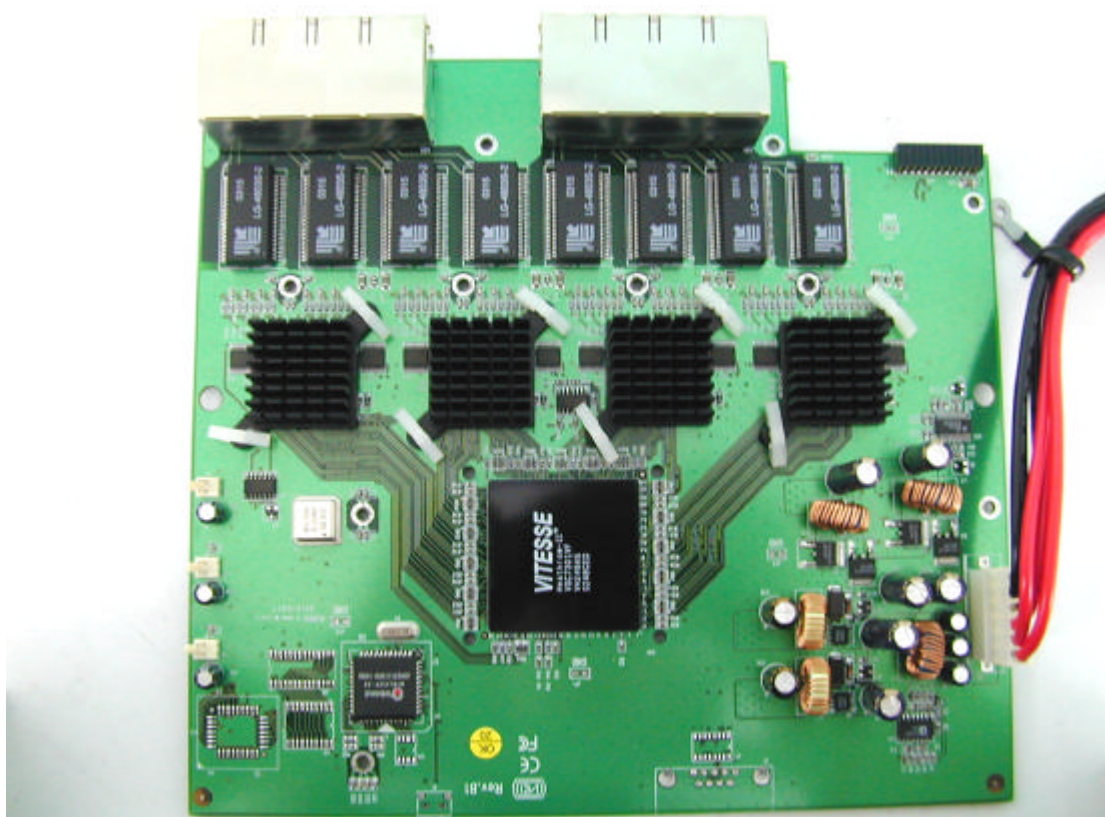




Photo # 7

Model No.:SA40-050100

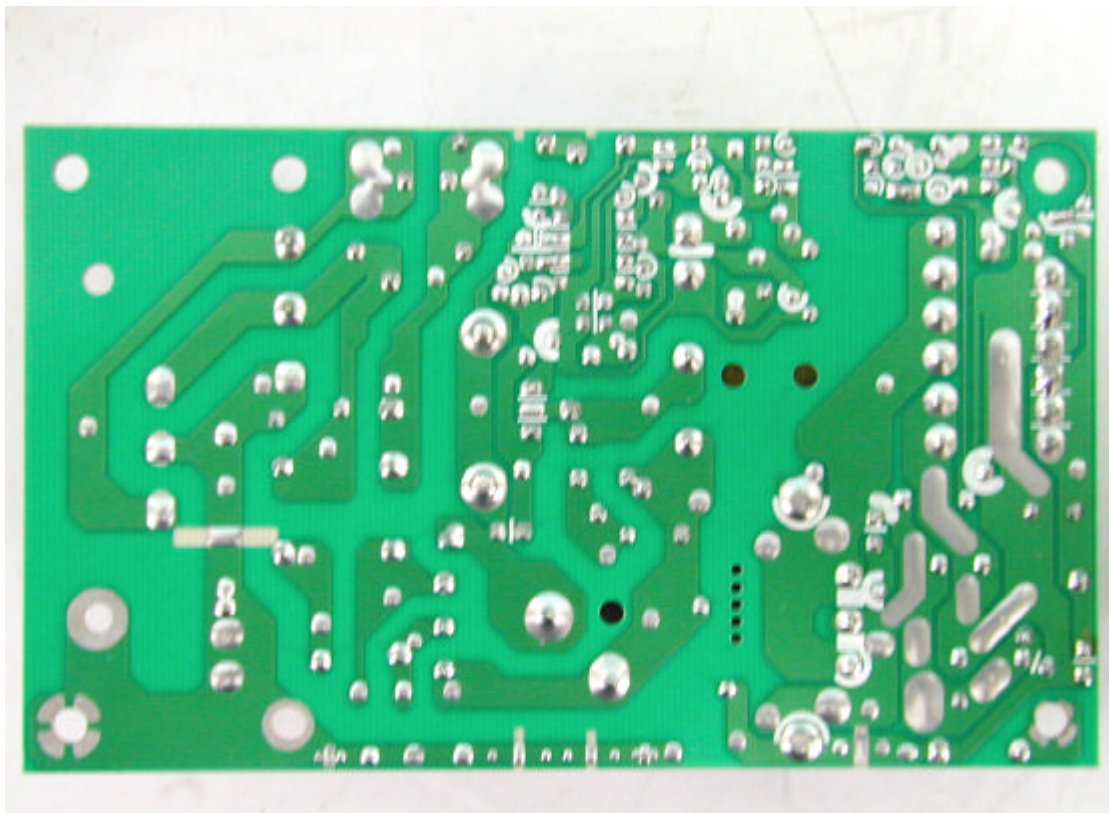
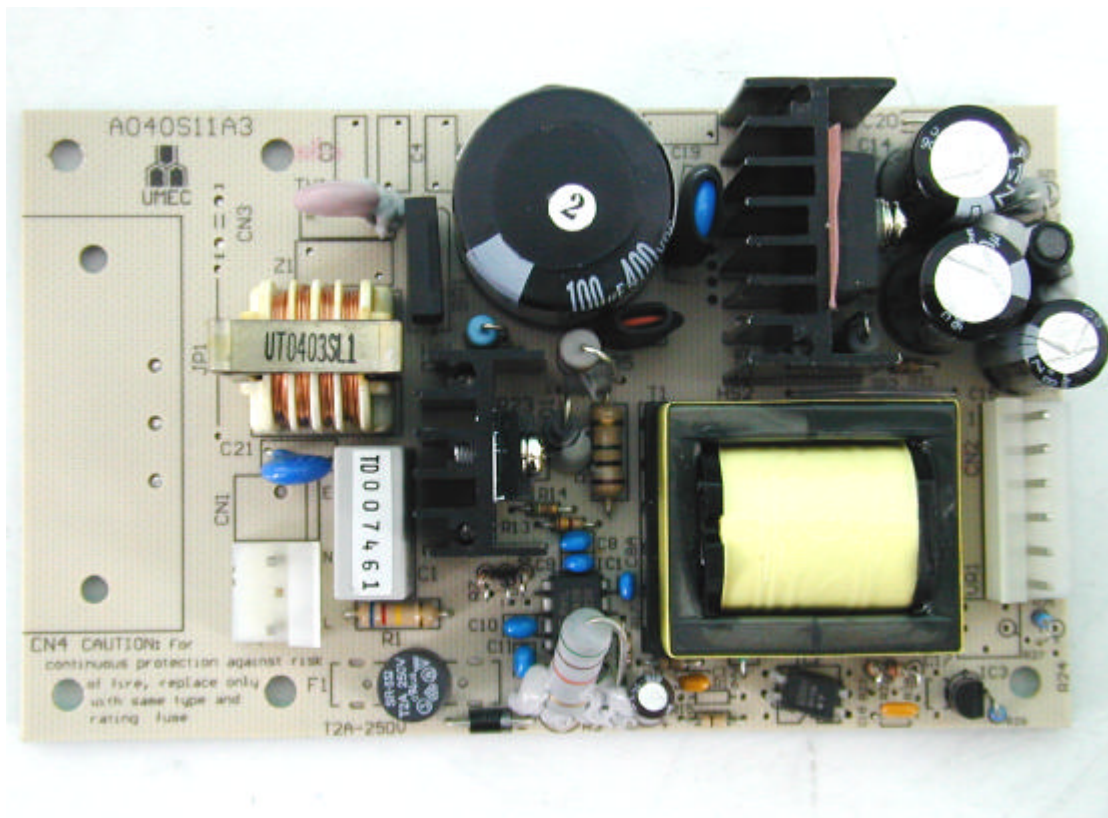


Photo # 8

Model No.:UP0401S-05L1

