CE

# DECLARATION OF CONFORMITY

We herewith confirm the following designated product

**CPU board**
**MODEL NO.: PCM-6892**

( Product Identification )

has been tested and found to comply with the requirements set up in the council directive on the approximation of the law of member states relating to the EMC Directive 89/336/EEC, amended by 92/31/EEC & 93/68/EEC. For the evaluation regarding to the electromagnetic compatibility, the following standards were applied:

* **EN 55011:1998 Group 1 Class A**
* **EN 61000-3-2:1995+A1:1998+A2:1998**
* **EN 61000-3-3:1995+A1:1998**
* **EN 50082-1:1997**
  **IEC 61000-4-2:1995+A1:1998**
  **IEC 61000-4-3:1995+A1:1998**
  **ENV 50204:1995**
  **IEC 61000-4-4:1995**
  **IEC 61000-4-5:1995**
  **IEC 61000-4-6:1996**
  **IEC 61000-4-8:1993**
  **IEC 61000-4-11:1994**

( Identification of regulations / standards )

This declaration is the responsibility of the manufacturer / importer

**AAEON TECHNOLOGY INC.**
**5F, NO. 135, LANE 235, PAO CHIAO RD.,**
**HSN-TIEN CITY, TAIPEI,**
**TAIWAN, R.O.C.**

( Name / Address )

**MANUFACTURER / IMPORTER**

**TEST LABORATORY**

This declaration is based on the test report (Ref. No. A03040208) issued by SRT Lab., Inc. on Apr. 17, 2003. The Declaration of Conformity has not yet included the test standard, EN 60950 which is applied to the product and required by Low Voltage Directive 73/23/EEC.

(Name)

(Johnson Ho, Director)

(Date )

Apr. 17, 2003
(Date)

**SPECTRUM RESEARCH & TESTING LABORATORY, INC.**

NO. 101-10, LING 8, SHAN-TONG LI, CHUNG-LI CITY, TAOYUAN, TAIWAN, R.O.C. TEL: (03)498-7684 FAX: (03)498-6528

| | |
|---|---|
| Product Name: | CPU board |
| Model No.: | PCM-6892 |
| Applicant: | AAEON TECHNOLOGY INC.<br>5F, NO. 135, LANE 235, PAO CHIAO RD., HSIN-TIEN CITY, TAIPEI, TAIWAN, R.O.C. |
| Date of Receipt: | Apr. 02, 2003 |
| Finished date of Test: | Apr. 10, 2003 |

Applicable Standards:

**Emission**

EN 55011:1998 Group 1 Class A
EN 61000-3-2:1995+A1:1998 +A2:1998
EN 61000-3-3:1995+A1:1998

**Immunity**

EN 50082-1:1997
- IEC 61000-4-2:1995+A1:1998
- IEC 61000-4-3:1995+A1:1998
- ENV 50204:1995
- IEC 61000-4-4:1995
- IEC 61000-4-5:1995
- IEC 61000-4-6:1996
- IEC 61000-4-8:1993
- IEC 61000-4-11:1994

We, **Spectrum Research & Testing Laboratory Inc.**, hereby certify that one sample of the above was tested in our laboratory with positive results according to the above-mentioned standards. The records in the report are an accurate account of the results. Details of the results are given in the subsequent pages of this report.

Checked By : Sunyou Chen , Date: 4/17/2003
(Sunyou Chen )

Approved By : , Date: 4/17/2003
( Johnson Ho, Director )

NVLAP®
Lab Code: 200099-0

# Table of Contents

# 1. DOCUMENT POLICY AND TEST STATEMENT

## 1.1 DOCUMENT POLICY

- The report shall not be reproduced except in full, without the written approval of SRT Lab, Inc.
- The report must not be used by the applicant to claim that the product is endorsed by NVLAP.
- The NVLAP logo applies only to the applicable standards specified in this report.

## 1.2 TEST STATEMENT

- The test results in the report apply only to the unit tested by SRT Lab.
- There was no deviation from the requirements of test standards during the test.
- AC power source, 230 VAC/50 Hz, was used during the test.

## 2. DESCRIPTION OF EUT AND TEST MODE

### 2.1 GENERAL DESCRIPTION OF EUT

| | |
|---|---|
| **PRODUCT** | CPU board |
| **MODEL NO.** | PCM-6892 |
| **POWER SUPPLY** | 230V/50Hz |
| **CABLE** | N/A |

**NOTE :**

For more detailed information, please refer to the EUT's specification or user's manual provided by manufacturer.

### 2.2 DESCRIPTION OF EUT INTERNAL DEVICE

| DEVICE | BRAND / MAKER | MODEL # | FCC ID/DOC | REMARK |
|---|---|---|---|---|
| HDD | IBM | DJSA-210 | N/A | |
| | | | | |
| | | | | |

**NOTE :** The EUT was installed into a PC enclosure which contained the following devices and the CPU installed on EUT is Intel VIA Cyrix 667MHz, clock chip is 133MHz.

The memory installed on EUT is 256MB.

### 2.3 DESCRIPTION OF TEST MODE

The EUT was pre-tested under the following video resolution:
640x480, 800x600 and 1600x1200
The worst emission was found under 1600x1200 and therefore the test data of only this mode is recorded.

## 3. DESCRIPTION OF APPLIED STANDARDS

The EUT could be used in industrial environment information provided by the applicant, it must comply with the requirements of the following standards:

| | |
|---|---|
| **EN 55011:1998 Group 1 Class A** | **EN 50082-1:1999** |
| **EN 61000-3-2:1995+ A1:1998+A2:1998** | - IEC 61000-4-2:1995+A1:1998 |
| **EN 61000-3-3:1995+A1:1998** | - IEC 61000-4-3:1995+A1:1998 |
| | - ENV 50204:1995 |
| | - IEC 61000-4-4:1995 |
| | - IEC 61000-4-5:1995 |
| | - IEC 61000-4-6:1996 |
| | - IEC 61000-4-8:1993 |
| | - IEC 61000-4-11:1994 |

All tests have been performed and recorded as the above standards.

# 4. EMISSION TEST

## 4.1 CONDUCTED EMISSION TEST FOR POWER PORT

### 4.1.1 CONDUCTED EMISSION LIMIT

| FREQUENCY (MHz) | Class A (dBμV) | | Class B (dBμV) | |
|---|---|---|---|---|
| | Quasi-peak | Average | Quasi-peak | Average |
| 0.15 - 0.5 | 79 | 66 | 66 - 56 | 56 - 46 |
| 0.5 - 5.0 | 73 | 60 | 56 | 46 |
| 5.0 - 30.0 | 73 | 60 | 60 | 50 |

**NOTE:**

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

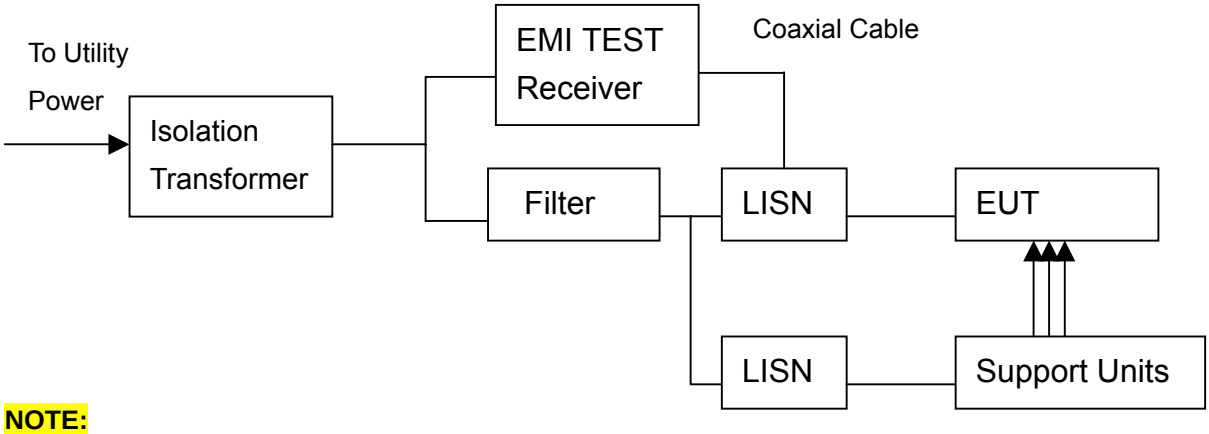
### 4.1.2 TEST EQUIPMENT

The following test equipment was used for the test :

| EQUIPMENT/ FACILITIES | SPECIFICATIONS | MANUFACTURER | MODEL#/ SERIAL# | DUE DATE OF CAL. & CAL. CENTER |
|---|---|---|---|---|
| EMI TEST RECEIVER | 9 kHz TO 30 MHz | ROHDE & SCHWARZ | ESHS30/ 826003/008 | JUL. 2003 R&S |
| LISN | 50 μH, 50 ohm | SOLAR ELECTRONICS | 8012-50-R-24-BNC / 924839 | JUN. 2003 ETC |
| LISN | 50μH, 50 ohm | SOLAR ELECTRONICS | 9252-50-R-24-BNC / 951318 | JUN. 2003 ETC |

**NOTE:** The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

### 4.1.3 TEST SETUP




**NOTE:**

1. The EUT was put on a wooden table with 0.8m height above ground plane, and 0.4m away from reference ground plane (> 2mx2m).
2. For the actual test configuration, please refer to the photos of testing.

### 4.1.4 TEST PROCEDURE

The EUT was tested according to the requirement of EN 55011:1998 Group 1 Class A. The frequency spectrum from 0.15 MHz to 30 MHz was investigated. The LISN used was 50 ohm/50uH as specified. All readings were quasi-peak and average values with 10 kHz resolution bandwidth of the test receiver.The EUT system was operated in all typical methods by users. Both lines of the power mains of EUT were measured and the cables connected to EUT and support units were moved to find the maximum emission levels for each frequency.

### 4.1.5 DESCRIPTION OF SUPPORT UNIT

The EUT was configured by the requirement of EN 55011. All interface ports were connected to the appropriate support units via specific cables. The support units and cables are listed below.

| NO | DEVICE | BRAND | MODEL # | CABLE |
|---|---|---|---|---|
| 1 | MONITOR | SAMSUNG | PG17IS | 1.5m unshielded power cord<br>1.2m shielded data cable |
| 2 | PRINTER | EPSON | STYLUS C20SX | 1.5m unshielded power cord<br>1.2m shielded data cable |
| 3 | MODEM | ACEEX | DM-1414 | 1.5m unshielded DC power cable<br>1.2m shielded data cable |
| 4 | MODEM | ACEEX | DM-1414 | 1.5m unshielded DC power cable<br>1.2m shielded data cable |
| 5 | KEYBOARD | ACER | 6311-TA | 1.5m unshielded data cable |
| 6 | MOUSE | LOGITECH | M-S34 | 1.5m unshielded data cable |
| 7 | COM MOUSE | LOGITECH | M-M35 | 1.2m unshielded data cable |
| 8 | COM MOUSE | LOGITECH | M-M35 | 1.2m unshielded data cable |
| 9 | USB MOUSE | HP | M-S48A | 1.2m unshielded data cable |
| 10 | USB MOUSE | HP | M-S48A | 1.2m unshielded data cable |
| 11 | USB MOUSE | HP | M-S48A | 1.2m unshielded data cable |
| 12 | USB MOUSE | HP | M-S48A | 1.2m unshielded data cable |
| 13 | MICROPHONE | LABTEC | AXIS-301 | 2.4m unshielded data cable |
| 14 | MP3 PLAYER | CURSOR | GSR-A01C | 1.5m unshielded data cable |

**NOTE :** For the actual test configuration, please refer to the photos of testing.

### 4.1.6 EUT OPERATING CONDITION

1. Under Windows 98 ran “EMI TEST”, “WIN FCC” and “Media Player” programs.
2. PC sent "H" pattern or accessed the following peripherals directly or via EUT:
   - Color Monitor
   - RS232
   - Keyboard
   - Mouse
   - Printer
   - FDD
   - HDD
3. Accessed data from internet.

### 4.1.7 TEST RESULT

| | | | |
|---|---|---|---|
| Temperature: | 24 °C | Humidity: | 59 %RH |
| Ferquency Range: | 0.15 – 30 MHz | Test Mode: | N/A |
| Receiver Detector: | Q.P. and AV. | Tested By: | Alen Chou |

Power Line Measured : Line

| Freq. (MHz) | Correct. Factor (dB) | Reading Value (dBμV) | | Emission Level (dBμV) | | Limit (dBμV) | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|
| | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 0.541 | 0.20 | 39.1 | - | 39.3 | - | 56.0 | 46.0 | -16.7 | N/A |
| 0.853 | 0.20 | 35.9 | - | 36.1 | - | 56.0 | 46.0 | -19.9 | N/A |
| 1.162 | 0.20 | 33.0 | - | 33.2 | - | 56.0 | 46.0 | -22.8 | N/A |
| 7.923 | 0.36 | 46.4 | - | 46.8 | - | 60.0 | 50.0 | -13.2 | N/A |
| 9.111 | 0.38 | 47.5 | - | 47.9 | - | 60.0 | 50.0 | -12.1 | N/A |
| 17.037 | 0.54 | 44.0 | - | 44.5 | - | 60.0 | 50.0 | -15.5 | N/A |

Power Line Measured : Neutral

| Freq. (MHz) | Correct. Factor (dB) | Reading Value (dBμV) | | Emission Level (dBμV) | | Limit (dBμV) | | Margin (dB) | |
|---|---|---|---|---|---|---|---|---|---|
| | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 0.310 | 0.20 | 40.7 | - | 40.9 | - | 60.0 | 50.0 | -19.1 | N/A |
| 0.705 | 0.20 | 39.8 | - | 40.0 | - | 56.0 | 46.0 | -16.0 | N/A |
| 1.334 | 0.20 | 36.6 | - | 36.8 | - | 56.0 | 46.0 | -19.2 | N/A |
| 7.923 | 0.36 | 46.6 | - | 47.0 | - | 60.0 | 50.0 | -13.0 | N/A |
| 8.517 | 0.37 | 45.2 | 42.8 | 45.6 | 43.2 | 60.0 | 50.0 | -14.4 | -6.8 |
| 17.431 | 0.55 | 43.7 | - | 44.2 | - | 60.0 | 50.0 | -15.8 | N/A |

**NOTE :**

1. Measurement uncertainty is 2dB
2. Emission level = Reading valus + Correction factor
3. Correction Factor = Cable loss + Insertion loss of LISN
4. Margin value = Emission level - Limit
5. The emission of other frequencies were very low against the limit.
6. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.

## 4.2 RADIATED EMISSION TEST

### 4.2.1 RADIATED EMISSION LIMIT

EN 55011:1998 Group 1 limits of radiated emission measurement for frequency below 1000 MHz

| FREQUENCY (MHz) | Class A (at 10m) | Class B (at 10m) |
|---|---|---|
| | dBμV/m | dBμV/m |
| 30 – 230 | 40 | 30 |
| 230 - 1000 | 47 | 37 |

**NOTE:**

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBμV/m) = 20 log Emission level (μV/m).

### 4.2.2 TEST EQUIPMENT

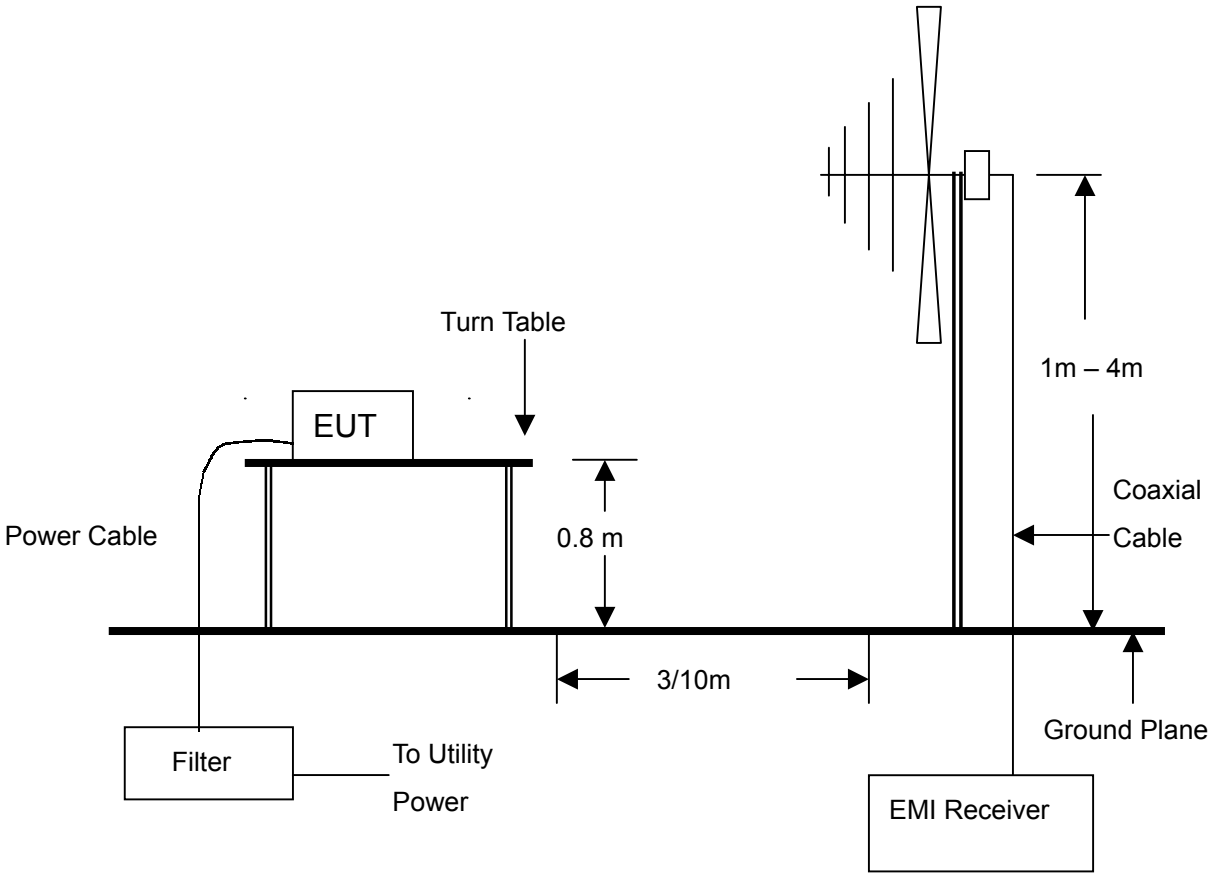
The following test equipment was used during the radiated emission test :

| EQUIPMENT/ FACILITIES | SPECIFICATIONS | MANUFACTURER | MODEL#/ SERIAL# | DUE DATE OF CAL. & CAL. CENTER |
|---|---|---|---|---|
| EMI TEST RECEIVER | 9 kHz TO 2750 MHz | ROHDE & SCHWARZ | ESCS30/ 830245/012 | AUG. 2003 R&S |
| BI-LOG ANTENNA | 25 MHz TO 2 GHz | EMCO | 3142/ 9701-1124 | APR. 2003 ETC |
| OATS | 3 – 10 M MEASUREMENT | SRT | SRT-1 | MAY 2003 SRT |

**NOTE:**

1. The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.
2. The Open Area Test Site (SRT-1) is registered by FCC with No. 90957 and VCCI with No. R-1081.
3. The Open Area Test Site (SRT-2) is registered by FCC with No. 98458 and VCCI with No. R-1168.

### 4.2.3 TEST SET-UP




**NOTE:**

1. The EUT system was put on a wooden table with 0.8m heights above a ground plane.
2. For the actual test configuration, please refer to the photos of testing.

### 4.2.4 TEST PROCEDURE

The EUT was tested according to the requirement of EN 55011:1998 Group 1 Class A. The measurements were made at an open area test site with 10 meter measurement distance. The frequency spectrum measured from 30 MHz to 1 GHz. All readings were quasi-peak values with 120 kHz resolution bandwidth of the test receiver. The EUT system was operated in all typical methods by users. The cables connected to EUT and support units were moved to find the maximum emission levels for each frequency.

### 4.2.5 DESCRIPTION OF SUPPORT UNIT

Same as section 4.1.5 of this report.

### 4.2.6 EUT OPERATING CONDITION

Same as section 4.1.6 of this report.

### 4.2.7 TEST RESULT

| | | | |
|---|---|---|---|
| Temperature: | 24 °C | Humidity: | 62 %RH |
| Ferquency Range: | 30 – 1000 MHz | Measured Distance: | 10m |
| Receiver Detector: | Q.P. | Tested mode: | N/A |
| Tested by: | Alen Chou | | |

Antenna Polarization:Horizontal

| Frequency (MHz) | Cable Loss (dB) | Antenna Factor (dB/m) | Reading Data (dBμV) | Emission Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | AZ(°) | EL(m) |
|---|---|---|---|---|---|---|---|---|
| 121.4784 | 1.34 | 7.47 | 22.4 | 31.2 | 40.0 | -8.8 | 128.3 | 4.00 |
| 133.1114 | 1.38 | 7.44 | 27.0 | 35.8 | 40.0 | -4.2 | 360 | 4.00 |
| 202.4638 | 1.64 | 9.94 | 25.9 | 37.5 | 40.0 | -2.5 | 328.4 | 4.00 |
| 665.5612 | 2.57 | 21.34 | 19.6 | 43.5 | 47.0 | -3.5 | 20.9 | 1.32 |
| 798.6704 | 2.95 | 22.99 | 17.6 | 43.5 | 47.0 | -3.5 | 90.4 | 1.36 |
| 931.7810 | 3.28 | 24.38 | 8.4 | 36.1 | 47.0 | -10.9 | 133.7 | 1.20 |

Antenna Polarization:Vertical

| Frequency (MHz) | Cable Loss (dB) | Antenna Factor (dB/m) | Reading Data (dBμV) | Emission Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | AZ(°) | EL(m) |
|---|---|---|---|---|---|---|---|---|
| 121.4786 | 1.34 | 7.47 | 22.1 | 30.9 | 40.0 | -9.1 | 346.9 | 1.00 |
| 133.1107 | 1.38 | 7.44 | 21.7 | 30.5 | 40.0 | -9.5 | 349.4 | 1.00 |
| 399.3364 | 2.67 | 16.19 | 23.2 | 42.1 | 47.0 | -4.9 | 157 | 1.00 |
| 665.5618 | 2.57 | 21.34 | 15.9 | 39.8 | 47.0 | -7.2 | 190.1 | 1.00 |
| 798.6726 | 2.95 | 22.99 | 14.8 | 40.7 | 47.0 | -6.3 | 191.6 | 1.15 |
| 931.7844 | 3.28 | 24.38 | 8.5 | 36.2 | 47.0 | -10.8 | 29.2 | 3.31 |

**NOTE :**

1. Measurement uncertainty is 4dB.
2. "*": Measurement does not apply for this frequency.
3. Emissiom Level = Reading Value + Ant. Factor + Cable Loss.
4. The field strength of other emission frequencies were very low against the limit.

## 4.3 CURRENT HARMONICS TEST

### 4.3.1 LIMIT

For Class A Equipment

| EVEN HARMONICS | | ODD HARMONICS | |
|---|---|---|---|
| HARMONICS ORDER | LIMIT (Amp.) | HARMONICS ORDER | LIMIT (Amp.) |
| 2 | 1.08 | 3 | 2.30 |
| 4 | 0.43 | 5 | 1.14 |
| 6 | 0.30 | 7 | 0.77 |
| 8 < n < 40 | 0.23 x 8 / n | 9 | 0.40 |
| | | 11 | 0.33 |
| | | 13 | 0.21 |
| | | 15 < n < 39 | 0.15 x 8 / n |

For Class D Equipment

| Harmonics Order n | Max. permissible harmonics current per watt (mA/W) | Max. permissible harmonics current (A) |
|---|---|---|
| Odd Harmonics only | | |
| 3 | 3.4 | 2.30 |
| 5 | 1.9 | 1.14 |
| 7 | 1.0 | 0.77 |
| 9 | 0.5 | 0.40 |
| 11 | 0.35 | 0.33 |
| 13 | 0.30 | 0.21 |
| 15 ≤ n ≤ 39 | 3.85 / n | 0.15 x 15 / n |

**NOTE:**

1. Class A and Class D are judged by test equipment automatically as per Section 5 of EN 61000-3-2:1995

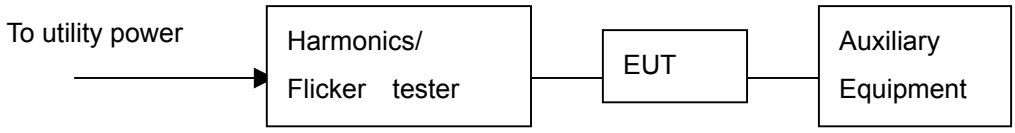
2. The above limits for Class D equipment are for all applications having an active input power > 75 W. No limits apply for equipment with an active input power up to and including 75 W.

### 4.3.2 TEST EQUIPMENT

| EQUIPMENT / FACILITIES | MANUFACTURER | MODEL # / SERIAL # | DUE DATE OF CAL. & CAL. CENTER |
|---|---|---|---|
| MAIN UNIT | HP | 6842A/ 3734A00212 | MAR. 2003 AGILENT |

**NOTE:** The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

### 4.3.3 TEST SETUP




**NOTE** :

1. The EUT system was put on a wooden table with 0.8m high.
2. For the actual test configuration, please refer to the photos of testing.

### 4.3.4 TEST PROCEDURE

According to EN61000-3-2

### 4.3.5 DESCRIPTION OF SUPPORT UNIT

Same as section 4.1.5 of this report.

### 4.3.6 EUT OPERATING CONDITION

Same as section 4.1.6 of this report.

### 4.3.7 TEST RESULT

| | | | |
|---|---|---|---|
| Temperature: | 20 °C | Humidity: | 55% RH |
| Fundamental Current: | 0.135A | Max. Power | |
| Voltage: | 225.5Vrms | Consumption: | 28.3W |
| Power Factor: | 0.406 | Tested mode: | N/A |
| Tested by: | Alen Chou | Test Result: | Pass |

Because the power of EUT was below 75W, so the EUT didn’t need be tested.

## 4.4 VOLTAGE FLUCTUATIONS

### 4.4.1 LIMIT

Short-team flicker ($P_{st}$) : 1.0

Long-term flicker ($P_{lt}$) : 0.65

Relative steady-state voltage change ($D_c$) : ≤ 3%

Relative voltage change characteristic (D (t) ) > 3% ; ($T_{D(t)}$) : ≤ 200 ms

Maximum relative voltage change ($D_{max}$) : ≤ 4%

| TEST ITEM | LIMIT | NOTE |
|---|---|---|
| $P_{st}$ | 1.0 | $P_{st}$ means short-term flicker indicator. |
| $P_{lt}$ | 0.65 | $P_{lt}$ means long-term flicker indicator. |
| $T_{D(t)}$ (ms) | 200 | $T_{D(t)}$ means maximum time that D (t) exceeds 3 %. |
| $D_{max}$ (%) | 4% | $D_{max}$ means maximum relative voltage change. |
| $D_c$ (%) | 3% | $D_c$ means relative steady-state voltage change |

### 4.4.2 TEST EQUIPMENT

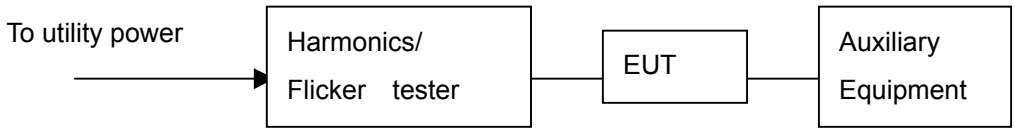
| EQUIPMENT / FACILITIES | MANUFACTURER | MODEL # / SERIAL # | DUE DATE OF CAL. & CAL. CENTER |
|---|---|---|---|
| MAIN UNIT | HP | 6842A/<br>3734A00212 | MAR. 2003<br>AGILENT |

**NOTE:** The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

### 4.4.3 TEST PROCEDURE

According to EN 61000-3-3

### 4.4.4 TEST SETUP




**NOTE** : 1. The EUT system was put on a wooden table with 0.8m high.

2. For the actual test configuration, please refer to the photos of testing.

### 4.4.5 DESCRIPTION OF SUPPORT UNIT

Same as section 4.1.5 of this report.

### 4.4.6 EUT OPERATING CONDITION

Same as section 4.1.6 of this report.

### 4.4.7 TEST RESULT

| | | | |
|---|---|---|---|
| Temperature: | 20 °C | Humidity: | 55% RH |
| Input Voltage: | 225.5Vrms | Observation | |
| Ampere: | 0.3Arms | Period: | 1Hr |
| Power Factor: | 0.401 | Tested mode: | N/A |
| Tested by: | Alen Chou | Test Result: | Pass |

Test Result:

| TEST PARAMETER | MEASUREMENT VALUE | LIMIT | TEST RESULT |
|---|---|---|---|
| $P_{st}$ | 0.09 | 1.0 | PASS |
| $P_{lt}$ | 0.00 | 0.65 | PASS |
| $T_{D(t)}$ (ms) | 0.01 | 200 | PASS |
| $D_{max}$ (%) | 0% | 4% | PASS |
| $D_c$ (%) | 0% | 3% | PASS |

**NOTE:**

1. $P_{st}$ means short-term flicker indicator.
2. $P_{lt}$ means long-term flicker indicator.
3. $T_{D(t)}$ means maximum time that D(t) exceeds 3 %.
4. $D_{max}$ means maximum relative voltage change.
5. $D_c$ means relative steady-state voltage change.
6. N/A: Not applicable.

# 5. ELECTROSTATIC DISCHARGE IMMUNITY TEST

## 5.1 TEST EQUIPMENT

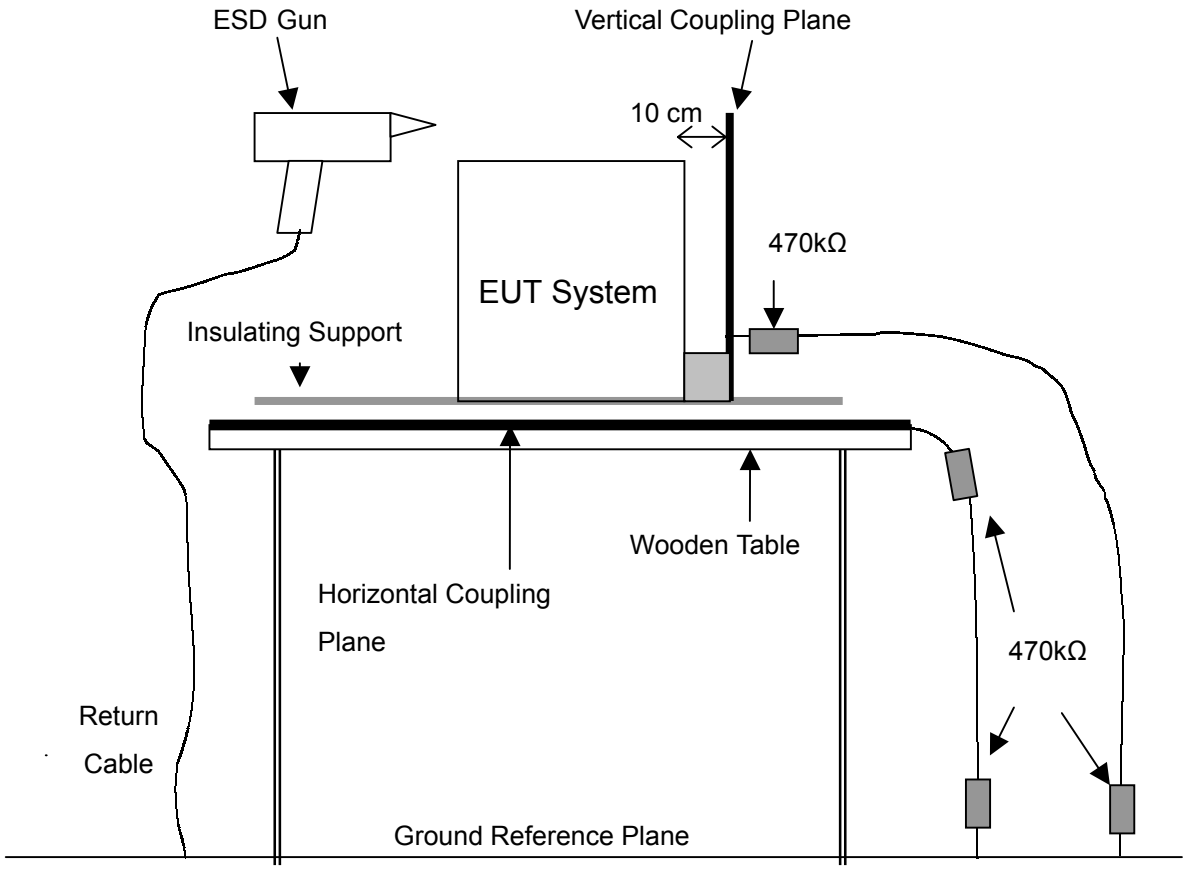
| EQUIPMENT / FACILITIES | MANUFACTURER | MODEL # / SERIAL # | DUE DATE OF CAL. & CAL. CENTER |
|---|---|---|---|
| ESD SIMULATOR | NOISEKEN | ESS-100L(A)/TC-815P/ 8099C02238/7099C02 | NOV. 2003 ETC |

**NOTE:** The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

## 5.2 TEST PROCEDURE

According to IEC/EN 61000-4-2

## 5.3 TEST SET-UP




**NOTE :**

1. The wooden table should be 0.8m high for table top EUT and 0.1m for floor-standing EUT.
2. For the actual test configuration, please refer to the photos of testing.
3. A distance of 1m minimum was provided between EUT and walls / other metallic structure.

## 5.4 DESCRIPTION OF SUPPORT UNIT

Same as section 4.1.5 of this report.

## 5.5 EUT OPERATING CONDITION

Same as section 4.1.6 of this report.

## 5.6 TEST CONDITION AND PERFORMANCE CRITERION

1. Test condition

| | |
|---|---|
| (1) R-C Network | : 330 Ω, 150 pF |
| (2) Test level: Air Discharge | : ±2kV, ±4kV, ±8kV |
| Contact discharge | : ±2kV, ±4kV |
| HCP discharge : | ±2kV, ±4kV |
| VCP discharge : | ±2kV, ±4kV |
| (3) Discharge mode | : Single discharge |
| (4) Discharge period | : at least 1 s |
| (5) Discharge polarity | : Positive and Negative |
| (6) Number of discharge | : Minimum 50 times at each test point of contact discharge and at least 200 times of discharge to EUT in total. Minium 10 times at each test area of air discharge selected. |

2. Standard requirement : Criterion B

3. Performance criterion

| | |
|---|---|
| (1) Criterion A | : Normal performance during test |
| (2) Criterion B | : Temporary degradation or loss of function or performance which is self-recoverable |
| (3) Criterion C | : Temporary degradation or loss of function or performance which requires operator intervention system reset |

## 5.7 SUMMARY OF TEST RESULT

| | | | |
|---|---|---|---|
| Temperature: | 21°C | Humidity: | 42% RH |
| Test Result: | Criterion A pass | Tested by: | Alen Chou |

| SEVERITY LEVEL | COUPLING MODE & TEST OBSERVATION | | | |
|---|---|---|---|---|
| | AIR DISCHARGE | CONTACT DISCHARGE | HCP | VCP |
| ±2kV | A | A | A | A |
| ±4kV | A | A | A | A |
| ±8kV | A | NR | NR | NR |

**NOTE:**

Description of test observation:

A: There was no change compared with initial operation during the test.

NR: No requirement

**Description of test points:**

1. Metal connectors on rear side of EUT.
2. Metal connectors on front side of EUT.
3. Metal enclosure of EUT.
4. Screws of EUT enclosure.
5. Power switch on front side of EUT.
6. Power switch on rear side of EUT.
7. LED on front side of EUT.
8. Screws around the fans on rear side of EUT.

# 6. RADIATED IMMUNITY TEST

## 6.1 TEST EQUIPMENT

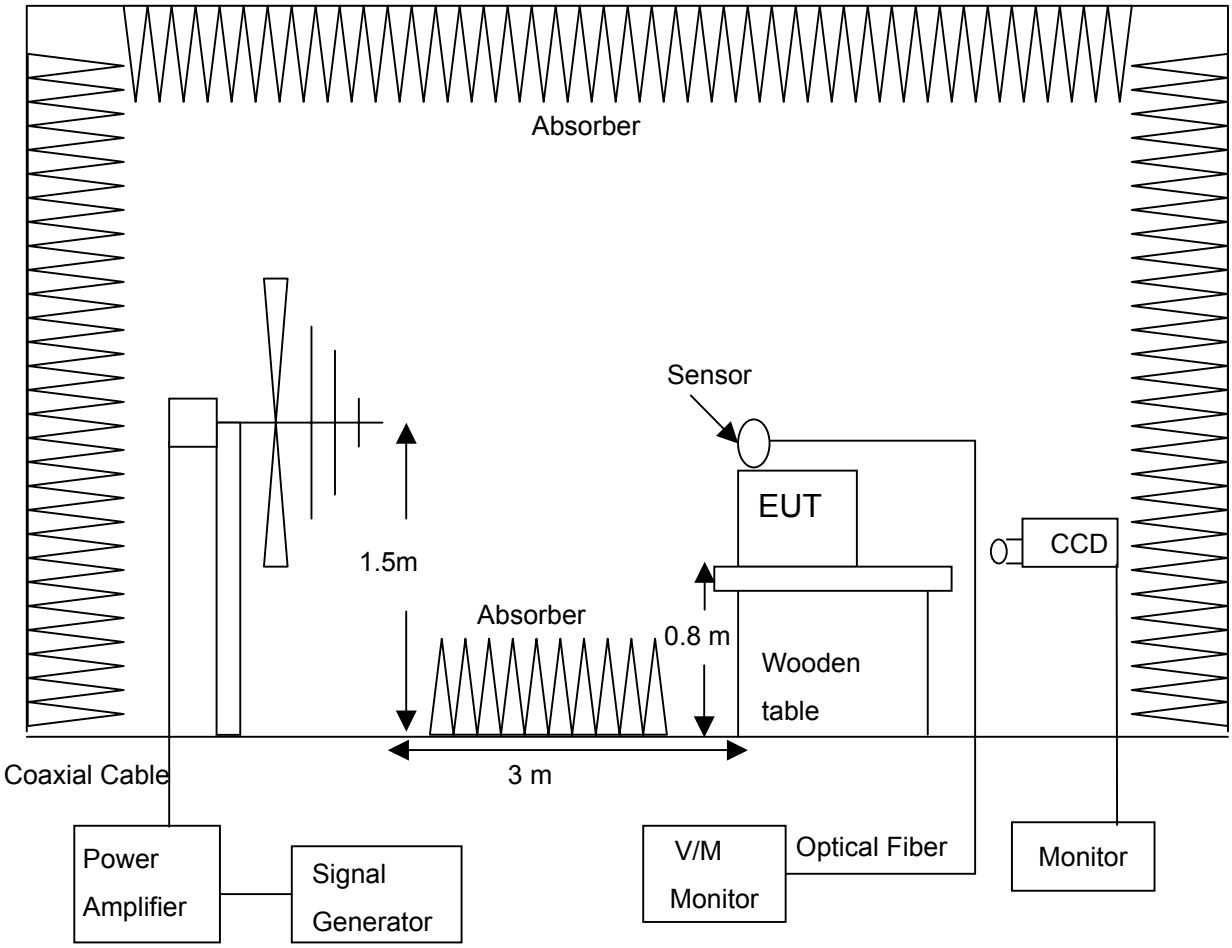
| EQUIPMENT / FACILITIES | MANUFACTURER | MODEL # / SERIAL # | DUE DATE OF CAL. & CAL. CENTER |
|---|---|---|---|
| SIGNAL GENERATOR | HP | 8648A/ 3636A022776 | JUN. 2003 ETC |
| ANTENNA | SCHAFFNER CHASE | CBL6111/ 1188 | JUL. 2003 SRT |
| FIELD SENSOR | AMPLIFIER RESEARCH | FP2000/ 28499 | DEC. 2003 ETC |
| POWER AMPLIFIER | AMPLIFIER RESEARCH | 100W1000M1/ 19509 | JUN. 2003 ETC |
| ANECHOIC CHAMBER | SRT | A05/ SRT005 | SEP. 2003 SRT |

**NOTE:** The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

## 6.2 TEST PROCEDURE

According to IEC/EN 61000-4-3

## 6.3 TEST SETUP




**NOTE :**

1. The wooden table should be 0.8m high for table top EUT and 0.1m for floor-standing EUT.
2. For the actual test configuration, please refer to the photos of testing.

## 6.4 DESCRIPTION OF SUPPORT UNIT

Same as section 4.1.5 of this report.

## 6.5 EUT OPERATING CONDITION

Same as section 4.1.6 of this report.

## 6.6 TEST CONDITION / PERFORMANCE CRITERIA

1. Test condition
   (1) Source voltage and frequency : 230V/50Hz, single phase
   (2) Sweeping frequency : 80MHz – 1 GHz
   (3) Test level : 10V/m, the frequncy step is 1%
   (4) The four sides of EUT are tested : front, rear, left, right
   (5) Modulation : 80%AM, 1kHz Dwell time for each frequency at least 3sec..
   (6) Standard requirement : Criterion A

2. Performance criterion
   (1) Criterion A : Normal performance during test
   (2) Criterion B : Temporary degradation or loss of function or performance which is self-recoverable.
   (3) Criterion C : Temporary degradation or loss of function or performance which requires operator intervention system reset.

## 6.7 TEST RESULT

| | | | |
|---|---|---|---|
| Temperature: | 26°C | Humidity: | 59% RH |
| Test Result: | Criterion A pass | Tested by: | Alen Chou |

| FREQUENCY | LEVEL | MODULATION | DIRECTION | TEST RESULT (CRITERION) |
|---|---|---|---|---|
| 80MHz - 1GHz | 3V/m | 80%AM, 1kHz | FRONT | A |
| 80MHz - 1GHz | 3V/m | 80%AM, 1kHz | REAR | A |
| 80MHz - 1GHz | 3V/m | 80%AM, 1kHz | LEFT | A |
| 80MHz - 1GHz | 3V/m | 80%AM, 1kHz | RIGHT | A |

**NOTE:**

Description of test observation:

A: There was no change compared with initial operation during the test.

# 7. RADIATED IMMUNITY TEST

## 7.1 TEST EQUIPMENT

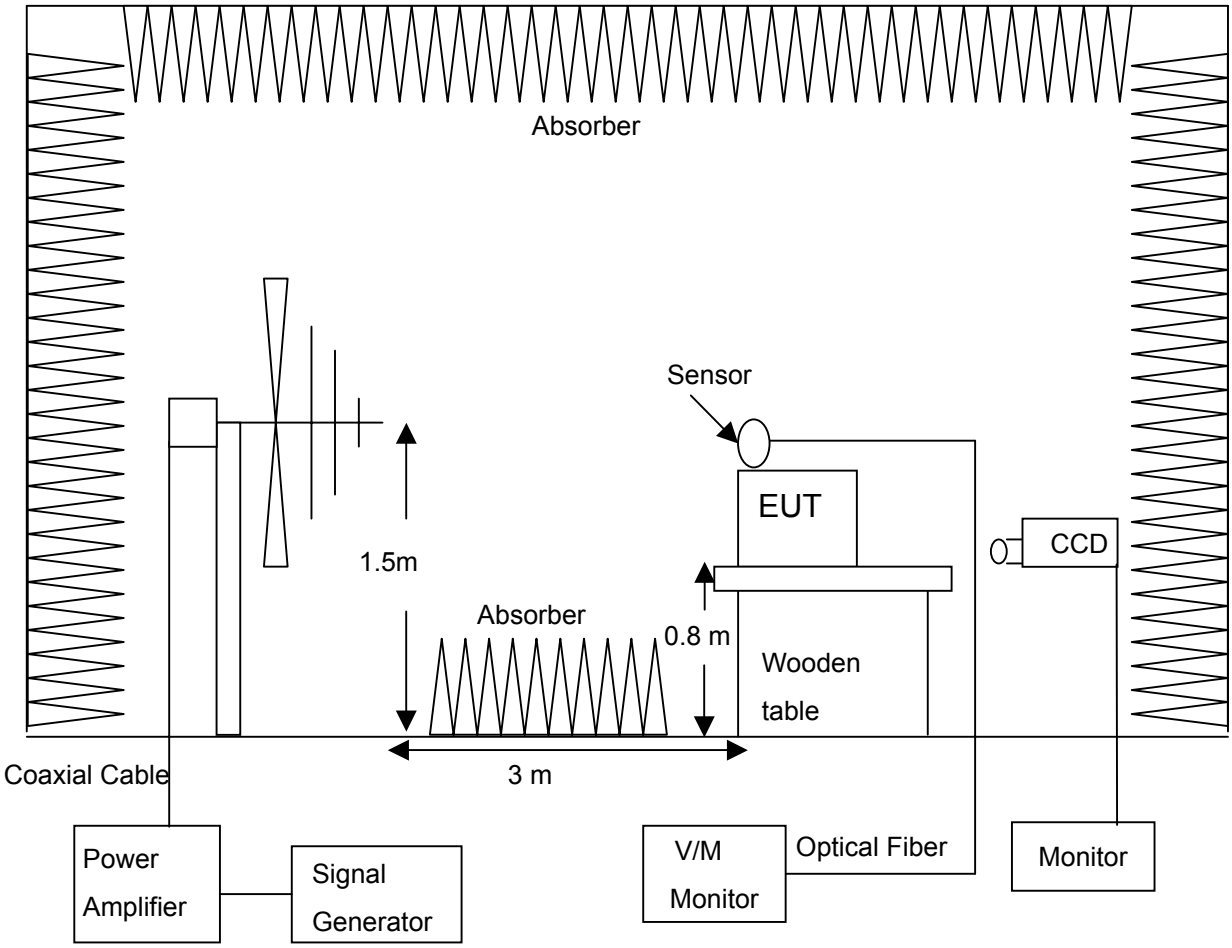
| EQUIPMENT / FACILITIES | MANUFACTURER | MODEL # / SERIAL # | DUE DATE OF CAL. & CAL. CENTER |
|---|---|---|---|
| SIGNAL GENERATOR | HP | 8648A/ 3636A022776 | JUN. 2003 ETC |
| ANTENNA | SCHAFFNER CHASE | CBL6111/ 1188 | JUL. 2003 SRT |
| FIELD SENSOR | AMPLIFIER RESEARCH | FP2000/ 28499 | DEC. 2003 ETC |
| POWER AMPLIFIER | AMPLIFIER RESEARCH | 100W1000M1/ 19509 | JUN. 2003 ETC |
| ANECHOIC CHAMBER | SRT | A05/ SRT005 | SEP. 2003 SRT |

**NOTE:** The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

## 7.2 TEST PROCEDURE

According to ENV 50204

## 7.3 TEST SETUP




**NOTE :**

1. The wooden table should be 0.8m high for table top EUT and 0.1m for floor-standing EUT.
2. For the actual test configuration, please refer to the photos of testing.

## 7.4 DESCRIPTION OF SUPPORT UNIT

Same as section 4.1.5 of this report.

## 7.5 EUT OPERATING CONDITION

Same as section 4.1.6 of this report.

## 7.6 TEST CONDITION / PERFORMANCE CRITERIA

1. Test condition

| | |
|---|---|
| (1) Source voltage and frequency | : 230V/50Hz, single phase |
| (2) Sweeping frequency | : 900 MHz +/-5 MHz |
| (3) Test level | : 3V/m, the frequncy step is 1% |
| (4) The four sides of EUT are tested | : front, rear, left, right |
| (5) Modulation | : 50% duty cycle(1Hz), 200Hz pluse Dwell time for each frequency at least 1sec.. |
| (6) Standard requirement | : Criterion A |

2. Performance criterion

| | |
|---|---|
| (1) Criterion A | : Normal performance during test |
| (2) Criterion B | : Temporary degradation or loss of function or performance which is self-recoverable. |
| (3) Criterion C | : Temporary degradation or loss of function or performance which requires operator intervention system reset. |

## 7.7 TEST RESULT

| | | | |
|---|---|---|---|
| Temperature: | 26°C | Humidity: | 59% RH |
| Test Mode: | N/A | Tested by: | Alen Chou |

Test Result : Criterion A pass

| FREQUENCY | LEVEL | MODULATION | DIRECTION | TEST RESULT (CRITERION) |
|---|---|---|---|---|
| 900MHz +/-5MHz | 3V/m | 50%pulse, 1Hz | FRONT | A |
| 900MHz +/-5MHz | 3V/m | 50%pulse, 1Hz | REAR | A |
| 900MHz +/-5MHz | 3V/m | 50%pulse, 1Hz | LEFT | A |
| 900MHz +/-5MHz | 3V/m | 50%pulse, 1Hz | RIGHT | A |

**NOTE:**

Description of test observation:

A: There was no change compared with initial operation during the test.

# 8. ELECTRICAL FAST TRANSIENT / BURST IMMUNITY TEST

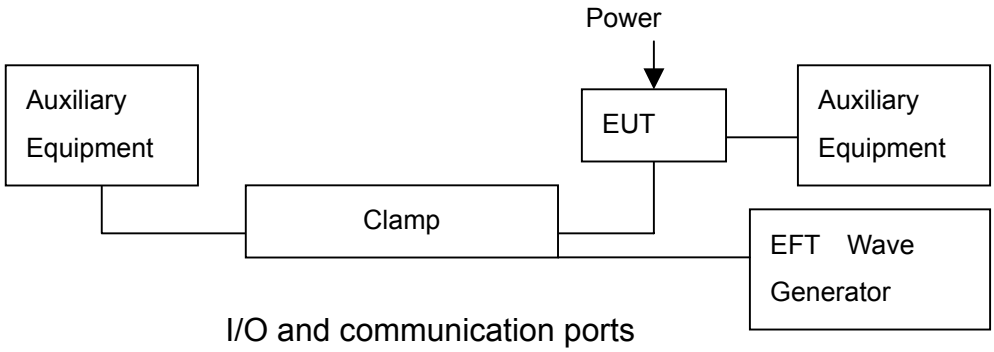
## 8.1 TEST EQUIPMENT

| EQUIPMENT / FACILITIES | MANUFACTURER | MODEL # / SERIAL # | DUE DATE OF CAL & CAL CENTER |
|---|---|---|---|
| EFT GENERATOR | HAEFELY | PEFT-JUNIOR / 583-333-122 | NOV. 2003 ETC |

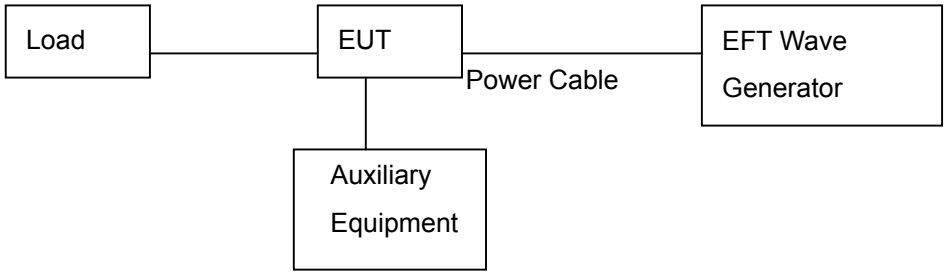
## 8.2 TEST PROCEDURE

According to IEC/EN 61000-4-4

## 8.3 TEST SET-UP




I/O and communication ports




Power supply ports

**NOTE :**

1. The EUT system was put on a wooden table with 0.8m height for table top EUT and 0.1m for floor-standing EUT above ground reference plane.
2. For the actual test configuration, please refer to the photos of testing.
3. The minimum distance between the EUT and all other conductive structure was more than 0.5m.
4. The minimum distance between the coupling plates of the coupling clamps (if used) and all over conductive structures, except the ground plane beneath the coupling clamp and beneath the EUT was more than 0.5m.
5. The power cable connecting EUT was controlled under 1m.

## 8.4 DESCRIPTION OF SUPPORT UNIT

Same as section 4.1.5 of this report.

## 8.5 EUT OPERATING CONDITION

Same as section 4.1.6 of this report.

## 8.6 TEST CONDITION / PERFORMANCE CRITERIA

1. Test condition

(1) Source voltage and frequency : 230V/50Hz, single phase
(2) Pulse risetime and duration : 5ns / 50ns
(3) Pulse repetition : 5kHz
(4) Polarity : Positive Polarization and Negative Polarization
(5) Burst duration and period : 15ms / 300ms
(6) Test duration : ≥ 61sec each line
(7) Time between test : 10Sec
(8) Severity levels : Power Line ±1kV
Signal/Control Line ±0.5kV
(9) Standard requirement : Criterion B

2. Performance criterion

(1) Criterion A : Normal performance during test
(2) Criterion B : Temporary degradation or loss of function or performance which is self-recoverable.
(3) Criterion C : Temporary degradation or loss of function or performance which requires operator intervention system reset.

## 8.7 SUMMARY OF TEST RESULT

| | | | |
|---|---|---|---|
| Temperature: | 25°C | Humidity: | 55% RH |
| Test Mode: | N/A | Tested by: | Alen Chou |

Test Result : Criterion A pass

| Voltage | | 0.5kV | | 1kV | |
|---|---|---|---|---|---|
| Polarity | | + | - | + | - |
| Test Line | L1 | A | A | A | A |
| | L2 | A | A | A | A |
| | GND | A | A | A | A |
| | Signal/ Control Line | A | A | N/A | N/A |

**NOTE:**

Description of test observation:

A: There was no change compared with initial operation during the test.

N/A: Not applicable, as the signal/control line used in typical is less than 3 m.

## 9. SURGE TEST (POWER LINE)

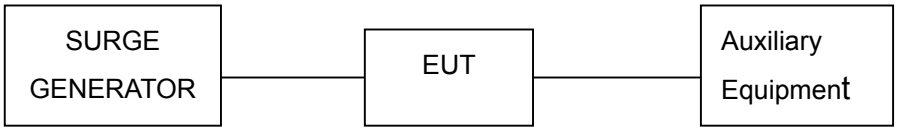
### 9.1 TEST EQUIPMENT

| EQUIPMENT / FACILITIES | MANUFACTURER | MODEL # / SERIAL # | DUE DATE OF CAL. & CAL. CENTER |
|---|---|---|---|
| SURGE TEST (System Mainframe) | SCHAFFNER | NSG 2050 / 199904-057SC | OCT. 2003 ETC |
| SURGE TEST (Impulse Network) | SCHAFFNER | PNW 2050 / 256 | OCT. 2003 ETC |
| SURGE TEST (Pulse Coupling Network) | SCHAFFNER | CDN 131/133 / 520 | OCT. 2003 ETC |

### 9.2 TEST PROCEDURE

According to IEC/EN 61000-4-5

### 9.3 TEST SET-UP




**NOTE :**

1. The EUT system was put on a wooden table with 0.8m height above ground reference plane.
2. For the actual test configuration, please refer to the photos of testing.

### 9.4 DESCRIPTION OF SUPPORT UNIT

Same as section 4.1.5 of this report.

### 9.5 EUT OPERATING CONDITION

Same as section 4.1.6 of this report.

## 9.6 TEST CONDITION / PERFORMANCE CRITERIA

1. Test condition

| | |
|---|---|
| (1) Test level | : Common mode : ±0.5kV, ±1kV, ±2kV<br>Differential mode : ±0.25kV, ±0.5kV, ±1kV |
| (2) Pulse | : 5 |
| (3) Phase | : 0°, 90°, 180°, 270°, 359° |
| (4) Polarity | : Positive and Negative polarization |
| (5) Repetition | : 60 s |
| (6) Waveform | : 1.2/50 μs (open circuit) |
| (7) Standard requirement | : Criterion B |

2. Performance criterion

| | |
|---|---|
| (1) Criterion A | : Normal performance during test |
| (2) Criterion B | : Temporary degradation or loss of function or performance which is self-recoverable |
| (3) Criterion C | : Temporary degradation or loss of function or performance which requires operator intervention system reset |

## 9.7 SUMMARY OF TEST RESULT

| | | | |
|---|---|---|---|
| Temperature: | 25°C | Humidity: | 58% RH |
| Test Mode: | N/A | Tested by: | Alen Chou |

Test Result : Criterion A pass

| Mode | Coupling | Voltage | Phase | | | | |
|---|---|---|---|---|---|---|---|
| | | | 0° | 90° | 180° | 270° | 359° |
| Common | L + PE<br>N + PE<br>L、N + PE | +/-0.5kV | A | A | A | A | A |
| | | +/-1kV | A | A | A | A | A |
| | | +/-2kV | A | A | A | A | A |
| Differential | L + N | +/-0.25kV | A | A | A | A | A |
| | | +/-0.5kV | A | A | A | A | A |
| | | +/-1kV | A | A | A | A | A |

**NOTE:**

Description of test observation:

A: There was no change compared with initial operation during the test.

## 10. INDUCED RF FIELDS (CONDUCTED SUSCEPTIBILITY) TEST

### 10.1 TEST EQUIPMENT

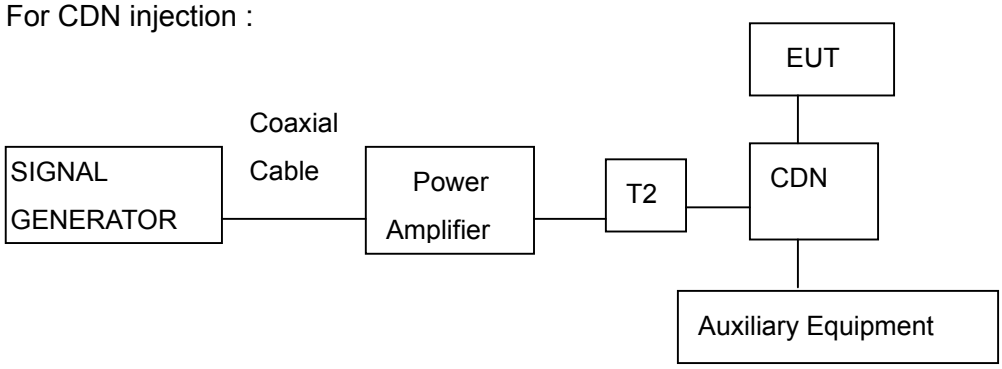
| EQUIPMENT / FACILITIES | MANUFACTURER | MODEL # / SERIAL # | DUE DATE OF CAL. & CAL. CENTER |
|---|---|---|---|
| EM INJECTION CLAMP | FCC | F-203I-23mm/ 110 | MAY 2003 ETC |
| POWER LINE CDN | FCC | FCC-801-M4-32A/ 9808 | MAY 2003 ETC |
| POWER LINE CDN | FCC | FCC-801-M5-32A/ 9812 | MAY 2003 ETC |
| POWER LINE CDN | FCC | FCC-801-M1-32A/ 9820 | MAY 2003 ETC |
| SIGNAL LINE CDN | FCC | FCC-801-T2/ 9830 | MAY 2003 ETC |
| SIGNAL LINE CDN | FCC | FCC-801-T4/ 9831 | MAY 2003 ETC |
| SIGNAL LINE CDN | FCC | FCC-801-T6/ 9832 | MAY 2003 ETC |
| SIGNAL LINE CDN | FCC | FCC-801-S9/ 9843 | MAY 2003 ETC |
| POWER LINE CDN | FCC | FCC-801-M2-32A/ 9840 | NOV. 2003 ETC |
| SIGNAL GENERATOR | HP | 8648A/ 3636A02776 | JUN. 2003 ETC |
| POWER AMPLIFIER | A.R. | 150A100A/ 19553 | MAY 2003 ETC |
| DUAL DIRECTION COULPER | A.R. | DC2600/ 25893 | JUN. 2003 ETC |
| POWER METER | BOONTON | 4232A/ 29001 | MAY 2003 ETC |
| SIGNAL LINE CDN | FCC | FCC-801-S25/ 9845 | MAY 2003 ETC |
| POWER LINE CDN | FCC | FCC-801-M3-32A/ 9874 | MAY 2003 ETC |

### 10.2 TEST PROCEDURE

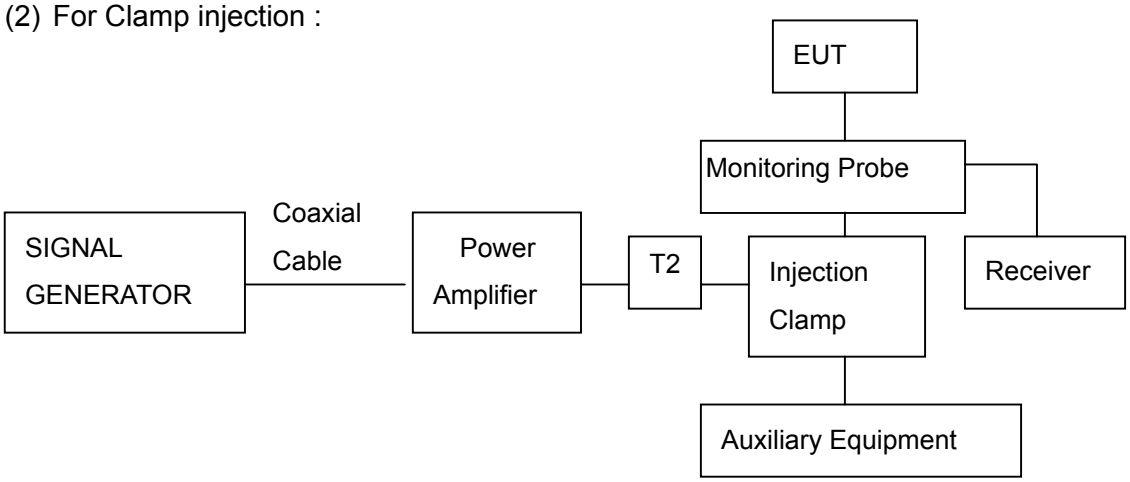
According to IEC/EN 61000-4-6

## 10.3 TEST SET-UP

(1) For CDN injection :




(2) For Clamp injection :




**NOTE :**

1. The EUT system was put on a wooden table with 0.1m height above ground.
2. For the actual test configuration, please refer to the photos of testing.
3. The distance between CDN(Clamp) and EUT was controlled between 0.1m and 0.3m.

## 10.4 DESCRIPTION OF SUPPORT UNIT

Same as section 4.1.5 of this report.

## 10.5 EUT OPERATING CONDITION

Same as section 4.1.6 of this report.

## 10.6 TEST CONDITION / PERFORMANCE CRITERIA

1. Test condition

| | |
|---|---|
| (1) Source voltage and frequency | : 230 V/ 50 Hz, single phase |
| (2) Sweeping frequency | : 150 kHz – 80 MHz |
| (3) Test level | : 3 V, the frequency step is 1% |
| (4) Polarity | : Positive and Negative polarization |
| (5) Modulation | : AM 80%, 1 kHz |
| (6) Dwell time for each frequency | : at least 3 s |
| (7) Standard requirement | : Criterion A |

2. Performance criterion

| | |
|---|---|
| (1) Criterion A | : Normal performance during test |
| (2) Criterion B | : Temporary degradation or loss of function or performance which is self-recoverable |
| (3) Criterion C | : Temporary degradation or loss of function or performance which requires operator intervention system reset |

## 10.7 SUMMARY OF TEST RESULT

| | | | |
|---|---|---|---|
| Temperature: | 23°C | Humidity: | 59% RH |
| Test Mode: | N/A | Tested by: | Alen Chou |

Test Result : Criterion A pass

| FREQUENCY | LEVEL | MODULATION | INJECTION METHOD | TEST RESULT (CRITERION) |
|---|---|---|---|---|
| 150kHz - 80MHz | 3V | 80% AM, 1 kHz | M3 | A |
| 150kHz - 80MHz | 3V | 80% AM, 1 kHz | T4 | A |

**NOTE:**

Description of test observation:

A: There was no change compared with initial operation during the test.

# 11. POWER FREQUENCY MAGNETIC-FIELD TEST

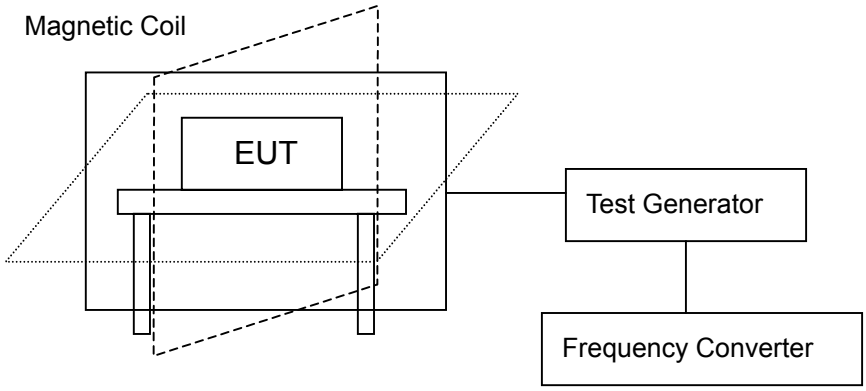
## 11.1 TEST EQUIPMENT

| EQUIPMENT / FACILITIES | MANUFACTURER | MODEL # / SERIAL # | DUE DATE OF CAL. & CAL. CENTER |
|---|---|---|---|
| MAGNETIC FIELD TESTER | HAEFELY | MAG 100.1/ 080.015-04 | JAN. 2004 SRT |
| MAGNETIC FIELD METER | F.W.BELL | 4080/ 19990416 | MAR. 2004 ITRI |

## 11.2 TEST PROCEDURE

According to IEC/EN 61000-4-8

## 11.3 TEST SET-UP




**NOTE :**

1. The EUT system was put on a wooden table with 0.8m height above ground.
2. For the actual test configuration, please refer to the photos of testing

## 11.4 DESCRIPTION OF SUPPORT UNIT

Same as section 4.1.5 of this report.

## 11.5 EUT OPERATING CONDITION

Same as section 4.1.6 of this report.

## 11.6 TEST CONDITION / PERFORMANCE CRITERIA

1. Test condition
   (1) Test axis : X, Y and Z axes
   (2) Test time : 5 min / each axis
   (3) Field strength : 3 A/m
   (4) Standard requirement : Criterion A

2. Performance criterion
   (1) Criterion A : Normal performance during test
   (2) Criterion B : Temporary degradation or loss of function or performance which is self-recoverable
   (3) Criterion C : Temporary degradation or loss of function or performance which requires operator intervention system reset

## 11.7 SUMMARY OF TEST RESULT

| | | | |
|---|---|---|---|
| Temperature: | 25°C | Humidity: | 58% RH |
| Test Mode: | N/A | Tested by: | Alen Chou |

Test Result : Criterion A pass

| ORIENTATION | FIELD STRENGTH | TEST RESULT (CRITERION) |
|---|---|---|
| X | 3 A/m | A |
| Y | 3 A/m | A |
| Z | 3 A/m | A |

**NOTE:**

Description of test observation:

A: There was no change compared with initial operation during the test.

# 12. VOLTAGE DIPS, INTERRUPTS, VARIATIONS TEST

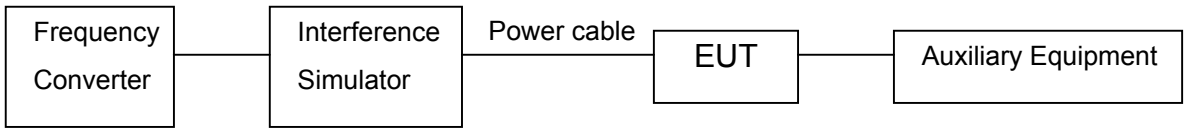
## 12.1 TEST EQUIPMENT

| EQUIPMENT / FACILITIES | MANUFACTURER | MODEL # / SERIAL # | DUE DATE OF CAL. & CAL. CENTER |
|---|---|---|---|
| INTERFERENCE SIMULATOR | HAEFELY | PLINE 1610/ 083-732-05 | JUN. 2003 ETC |

## 12.2 TEST PROCEDURE

According to IEC/EN 61000-4-11

## 12.3 TEST SET-UP




**NOTE :**

1. The EUT system was put on a wooden table with 0.8m height above ground.
2. For the actual test configuration, please refer to the photos of testing.

## 12.4 DESCRIPTION OF SUPPORT UNIT

Same as section 4.1.5 of this report.

## 12.5 EUT OPERATING CONDITION

Same as section 4.1.6 of this report.

## 12.6 TEST CONDITION / PERFORMANCE CRITERIA

1. Test condition

(1) Source voltage and frequency : 230V/50Hz, single phase
(2) Test level : Dip depth 30%, 0.5 period;
Dip depth 60%, 5, 50 period;
interrupt 95%, 250 period.
(3) Phase : 0°, 180°
(4) Test duration : 2min each phase
(5) Time between test : 10 sec
(7) Standard requirement : Dip 30% : Criterion B pass;
Dip 60% : Criterion C pass;
Interrupt > 95% : Criterion C pass

2. Performance criterion

(1) Criterion A : Normal performance during test
(2) Criterion B : Temporary degradation or loss of function or performance which is self-recoverable.
(3) Criterion C : Temporary degradation or loss of function or performance which requires operator intervention system reset.

## 12.7 SUMMARY OF TEST RESULT

| | | | |
|---|---|---|---|
| Temperature: | 25°C | Humidity: | 58% RH |
| Test Result: | Pass | Tested by: | Alen Chou |

| AC POWER | DIP DEPTH | INTERVAL | DIP TIME | TEST TIME | PHASE | TEST RESULT (Criterion) |
|---|---|---|---|---|---|---|
| 230V/50Hz | 30% | 10 sec | 0.5 period | 2 min | 0° | A |
| | | | | | 180° | A |
| | 60% | 10 sec | 5, 50 period | 2 min | 0° | A |
| | | | | | 180° | A |
| | >95% (interrupt) | 10 sec | 250 period | 2 min | 0° | C |
| | | | | | 180° | C |

**NOTE:**

Description of test observation:

A: There was no change compared with initial operation during the test.

C: The Eut requires operator intervention system reset.

## 13. PHOTOS OF TESTING

- Conducted test

- Radiated test

- Harmonics test

- Voltage fluctuations test

- Electrostatic discharge immunity test

- Electrical fast transient / burst immunity test

- Radiated immunity test

-Surge test (power line)

- Inducted RF fields (conducted susceptibility) test

- Power frequency magnetic-field test

- Voltage dips, interrupts, variations test

## 14. TERMS OF ABRIVATION

| | |
|---|---|
| AV. | Average detection |
| AZ(°) | Turn table azimuth |
| Correct. | Correction |
| EL(m) | Antenna height (meter) |
| EUT | Equipment Under Test |
| Horiz. | Horizontal direction |
| LISN | Line Impedance Stabilization Network |
| NSA | Normalized Site Attenuation |
| Q.P. | Quasi-peak detection |
| SRT Lab | Spectrum Research & Testing Laboratory, Inc. |
| Vert. | Vertical direction |