



# EMC

## TEST REPORT

REPORT NO. : CE88033105

MODEL NO. : IPC-623XX-XXXX

DATE OF TEST : Apr. 3 ~ Apr. 15, 1999

PREPARED FOR : ADVANTECH CO., LTD.

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PREPARED BY: ADVANCE DATA TECHNOLOGY CORPORATION



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1.

## CERTIFICATION

Issue date: Apr. 22, 1999

Product : INDUSTRIAL COMPUTER  
Trade Name : ADVANTECH  
Model No. : IPC-623XX-XXXX  
Applicant : ADVANTECH CO., LTD.  
Standard : EN 55022: 1994+A1: 1995+A2: 1997, **EN 50082-2: 1995**  
Class A EN 61000-4-2: 1995  
EN 61000-3-2: 1995, Class A EN 61000-4-3: 1996  
EN 60555-2: 1987 EN 61000-4-4: 1995  
EN 61000-3-3: 1995 EN 61000-4-6: 1996  
EN 61000-4-8: 1994  
ENV 50204: 1995

We hereby certify that one sample of the designation has been tested in our facility from Apr. 3 to Apr. 15, 1999. The test record, data evaluation and Equipment Under Test (EUT) configurations represent herein are true and accurate representation of the measurements of the sample's EMC characteristics under the conditions herein specified.

TESTED BY : \_\_\_\_\_ , DATE: \_\_\_\_\_  
( Emission ) ( Chris Yang )

TESTED BY : \_\_\_\_\_ , DATE: \_\_\_\_\_  
( Immunity ) (Dennis Chuang )

CHECKED BY : \_\_\_\_\_ , DATE: \_\_\_\_\_  
( Ariel Hsieh )

APPROVED BY : \_\_\_\_\_ , DATE: \_\_\_\_\_  
( Mike Su )

**ADVANCE DATA TECHNOLOGY CORPORATION**



Accredited Laboratory



## 2. GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

Product : INDUSTRIAL COMPUTER  
Model No. : IPC-623XX-XXXX  
Power Supply Type : Switching  
Power Cord : Nonshielded (1.8 m)

Note: The EUT is an INDUSTRIAL COMPUTER with two USB ports.

The X in model: IPC-623XX-XXXX could be defined as A~Z, 0~9 or blank. The former XX stands for different backplanes and the latter XXXX stands for different switching power supplies used.

The EUT was tested under the following test modes and configuration:

|                     | MODE 1                              | MODE 2                                     | MODE 3                                | MODE 4                                                      |
|---------------------|-------------------------------------|--------------------------------------------|---------------------------------------|-------------------------------------------------------------|
| <b>MODEL NO.</b>    | IPC-623MB-300                       | IPC-623MB-300X                             | IPC-623P4-400                         | IPC-623P4-300R                                              |
| <b>CPU</b>          | Intel Pentium II<br>450 MHz         | Intel Pentium II<br>350 MHz                | Intel Pentium II<br>450 MHz           | Intel Pentium II<br>333 MHz                                 |
| <b>BACKPLANE</b>    | ADVANTECH,<br>Model: PCA-6114P4     | -                                          | ADVANTECH<br>Model: PCA-6120P4        | ADVANTECH<br>Model: PCA-6120P4                              |
| <b>MOTHER BOARD</b> | -                                   | ASUS<br>Model: P2B                         | -                                     | -                                                           |
| <b>CPU BOARD</b>    | ADVANTECH<br>Model: PCA-6176        | -                                          | ADVANTECH<br>Model: PCA-6176          | ADVANTECH<br>Model: PCA-6175                                |
| <b>VGA CARD</b>     | ON BOARD<br>(1600x1200)             | CARDEX<br>Model: CD-GX2A44T<br>(1600x1200) | ON BOARD<br>(1600x1200)               | SYNNEX<br>Model: B3D-S32<br>(1280x1024)                     |
| <b>SPS</b>          | SKYNET,<br>Model: ADT-930C,<br>300W | DELTA,<br>Model: DPS-338AB-<br>B, 300W     | SUNPOWER,<br>Model: SPQ-4400,<br>400W | ETASIS,<br>Model: EPR-2309<br>(double power)<br>300W + 300W |
| <b>FDD</b>          | NEC, Model: FD1231H                 |                                            |                                       |                                                             |
| <b>HDD</b>          | NEC, Model: DSE1340A, 1.2G          |                                            |                                       |                                                             |
| <b>CD-ROM</b>       | ACER, Model : ACER 24X              |                                            |                                       |                                                             |

The test data of the above four test modes were recorded individually in this report.

The video resolutions of 1600x1200 (for mode 1, 2 & 3) and 1280x1024 (for mode 4) were used during the test.

For more detailed features description, please refer to manufacturer's specification or User's Manual.



## 2.2 GENERAL DESCRIPTION OF APPLIED STANDARD

According to the manufacturer's request, the EUT was tested with the requirements of the following standards:

EN 55022: 1994+A1: 1995+A2: 1997, Class A

**EN 50082-2: 1995**

EN 61000-3-2: 1995, Class A

EN 61000-4-2: 1995

EN 60555-2: 1987

EN 61000-4-3: 1996

EN 61000-3-3: 1995

EN 61000-4-4: 1995

EN 61000-4-6: 1996

EN 61000-4-8: 1994

ENV 50204: 1995

All tests are performed and recorded as per above standards.

## 2.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories are used to form representative test configuration during the tests.

### FOR EMISSION TEST

| No  | Product                        | Brand     | Model No. | Serial No.  | I/O Cable                                          |
|-----|--------------------------------|-----------|-----------|-------------|----------------------------------------------------|
| 1.  | COLOR MONITOR                  | HP        | D2846     | JP74912250  | Shielded Signal (1.5m)<br>Nonshielded Power (1.8m) |
| 2.  | MODEM                          | ACEEX     | 1414      | 980020507   | Shielded Signal (1.2m)<br>Nonshielded Power (1.2m) |
| 3.  | PRINTER                        | HP        | 2225C+    | 3208S5355   | Shielded Signal (1.2m)<br>Nonshielded Power (1.2m) |
| 4.  | USB KEYBOARD                   | BTC       | 7932      | 174250046   | Shielded Signal (1.7m)                             |
| 5.  | USB MOUSE                      | DEXIN     | A2U800A   | 71001820    | Shielded Signal (1.5m)                             |
| 6.  | PS2 KEYBOARD                   | FORWARD   | FDA-104GA | FDKB8110116 | Shielded Signal (1.4m)                             |
| 7.  | RS232 MOUSE                    | LOGITECH  | M-M30     | LTR53500777 | Shielded Signal (1.9m)                             |
| 8.  | KEYBOARD<br>(for mode 1 only)  | FORWARD   | FDA-104GA | FDKB8110162 | Shielded Signal (1.4m)                             |
| 9.  | MODEM<br>(for mode 2 only)     | OPTIQUEST | 4500DC    | 3651700124  | Shielded Signal (1.2m)<br>Nonshielded Power (1.2m) |
| 10. | PS2 MOUSE<br>(for mode 2 only) | DEXIN     | A2P800A   | 80102047    | Shielded Signal (1.5m)                             |

Note: 1. Support units 4 & 5 were connected to the USB ports of EUT.

2. MODE 4 was tested without USB mouse and USB keyboard (support units 4 & 5).



### FOR IMMUNITY TEST

| No  | Product                        | Brand   | Model No.  | Serial No.    | I/O Cable                                           |
|-----|--------------------------------|---------|------------|---------------|-----------------------------------------------------|
| 1.  | COLOR MONITOR                  | HP      | D2846      | JP74912250    | Shielded Signal (1.5m)<br>Nonshielded Power (1.8m)  |
| 2.  | MODEM                          | GVC     | F-1128V1R6 | 96-191-113003 | Shielded Signal (1.25m)<br>Nonshielded Power (1.5m) |
| 3.  | PRINTER                        | HP      | C2145A     | SG59N16035    | Shielded Signal (2.0m)<br>Nonshielded Power (1.8m)  |
| 4.  | USB KEYBOARD                   | BTC     | 7932       | D7A140018     | Shielded Signal (1.8m)                              |
| 5.  | USB MOUSE                      | DEXIN   | A2U800A    | 71001824      | Shielded Signal (1.5m)                              |
| 6.  | PS2 KEYBOARD                   | HP      | C3758A     | K101088       | Shielded Signal (1.8m)                              |
| 7.  | RS232 MOUSE                    | DEXIN   | A2R800A    | 80110026      | Shielded Signal (1.5m)                              |
| 8.  | KEYBOARD<br>(for mode 1 only)  | FORWARD | FDA-104GA  | FDKB8110162   | Shielded Signal (1.4m)                              |
| 9.  | MODEM<br>(for mode 2 only)     | GVC     | F-1114V/R6 | 853E100       | Shielded Signal (1.25m)<br>Nonshielded Power (1.5m) |
| 10. | PS2 MOUSE<br>(for mode 2 only) | DEXIN   | A2P800A    | 80102123      | Shielded Signal (1.5m)                              |

Note: 1. Support units 4 & 5 were connected to the USB ports of EUT.

2. MODE 4 was tested without USB mouse and USB keyboard (support units 4 & 5).

## 2.4 TEST SETUP

Please refer to the photos of test configuration in Item 6.



### 3. TEST INSTRUMENTS

#### 3.1 TEST INSTRUMENTS (EMISSION)

##### CONDUCTED EMISSION MEASUREMENT

| Description & Manufacturer               | Model No. | Serial No. | Calibrated Until |
|------------------------------------------|-----------|------------|------------------|
| ROHDE & SCHWARZ Test Receiver            | ESHS30    | 828109/007 | July 22, 1999    |
| ROHDE & SCHWARZ Artificial Mains Network | ESH2-Z5   | 892107/003 | July 20, 1999    |
| EMCO L.I.S.N.                            | 3825/2    | 9504-2359  | July 20, 1999    |
| Shielded Room                            | Site 3    | ADT-C03    | NA               |

Note: 1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per NAMAS document NIS81.

2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

##### RADIATED EMISSION MEASUREMENT

| Description & Manufacturer         | Model No.            | Serial No.         | Calibrated Until |
|------------------------------------|----------------------|--------------------|------------------|
| HP Spectrum Analyzer               | 8594E                | 3520A01861         | Feb. 08, 2000    |
| HP Preamplifier                    | 8447D                | 2944A08118         | June 28, 1999    |
| HP Preamplifier                    | 8347A                | 3307A01088         | Sept. 9, 1999    |
| ROHDE & SCHWARZ TEST RECEIVER      | ESVS 10              | 840241/010         | Sept. 10, 1999   |
| SCHWARZBECK Tunable Dipole Antenna | VHA 9103<br>UHA 9105 | E101051<br>E101055 | Nov. 25, 1999    |
| CHASE BILOG Antenna                | CBL6111A             | 1079               | July 17, 1999    |
| EMCO Double Ridged Guide Antenna   | 3115                 | 9312-4192          | April 5, 2000    |
| CHANCE Turn Table                  | U200                 | 9701               | NA               |
| CHANCE Tower                       | AT-100               | CM-A003            | NA               |
| Open Field Test Site               | Site 3               | ADT-R03            | July 16, 1999    |

Note: 1. The measurement uncertainty is less than +/- 3dB, which is calculated as per NAMAS document NIS81.

2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to NML/ROC and NIST/USA.

##### CURRENT HARMONICS, VOLTAGE FLUCTUATION AND FLICKER MEASUREMENT

| Description & Manufacturer           | Model no. | Serial No. | Calibrated Until |
|--------------------------------------|-----------|------------|------------------|
| KeyTek, Power Arb Waveform Generator | EP72HF    | 9508346    | May 28, 1999     |
| KIKUSUI AC SWITCHING POWER SUPPLY    | PCR 4000L | 9508355    | May 28, 1999     |

Note: The calibration interval of the above test instruments is 12 months.

And the calibrations are traceable to NML/ROC and NIST/USA.

## 3.2 TEST INSTRUMENTS (IMMUNITY)

| Description & Manufacturer                             | Model No.     | Serial No. | Calibrated Until |
|--------------------------------------------------------|---------------|------------|------------------|
| KeyTek, ESD Test System                                | 2000          | 9105240/41 | Aug. 9, 1999     |
| KeyTek, ESD Simulator                                  | MZ-15/EC      | 92022232   | April 15, 1999   |
| KeyTek, EFT Generator                                  | CE-40         | 9508257    | Sept. 8, 1999    |
| KeyTek, Capacitive Clamp                               | CE-40-CCL     | 9508259    | Sept. 8, 1999    |
| ROHDE & SCHWARZ<br>Signal Generator                    | SMY01         | 840490/009 | Sept. 30, 1999   |
| KALMUS Power Amplifier                                 | LA1000V       | 091995-1   | NA               |
| KALMUS Power Amplifier                                 | 757LC         | 091995-2   | NA               |
| HOLADAY Field Probe                                    | HI-4422       | 89915      | Oct. 27, 1999    |
| EMCO BiconiLog Antenna                                 | 3141          | 1001       | NA               |
| FCC Coupling Decoupling<br>Network                     | FCC-801-M3-25 | 48         | NA               |
| FCC Coupling Decoupling<br>Network                     | FCC-801-M2-25 | 20         | NA               |
| FISCHER CUSTOM<br>COMMUNICATIONS<br>EM Injection Clamp | FCC-203I      | 50         | NA               |
| FCC Coupling Decoupling<br>Network                     | FCC-801-M1-25 | 17         | NA               |
| BOONTON RF Voltage Meter                               | 9200B         | 331801AE   | Dec. 17, 1999    |
| COMTEST Compact Full<br>Anechoic Chamber (7x3x3 m)     | CFAC          | ADT-S01    | Aug. 4, 1999     |
| HAEFELY Magnetic Field<br>Tester                       | MAG 100.1     | 083794-06  | NA               |
| COMBINOVA Magnetic Field<br>Meter                      | MFM10         | 224        | Aug. 26, 1999    |

Note: 1. The calibration schedule of ESD Simulator is arranged to be finished before Apr. 30, 1999

2. The calibration interval of the above test instruments is 12 months.  
And the calibrations are traceable to NML/ROC and NIST/USA.

### 3.3 LIMITS OF CONDUCTED AND RADIATED EMISSION

#### LIMIT OF RADIATED EMISSION OF EN 55022

| FREQUENCY<br>(MHz) | Class A (at 10m) | Class B (at 10m) |
|--------------------|------------------|------------------|
|                    | dBuV/m           | dBuV/m           |
| 30 - 230           | 40               | 30               |
| 230 - 1000         | 47               | 37               |

- Note: (1) The lower limit shall apply at the transition frequencies.  
 (2) Emission level (dBuV/m) = 20 log Emission level (uV/m).  
 (3) All emanation from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

#### LIMIT OF CONDUCTED EMISSION OF EN 55022

| FREQUENCY<br>(MHz) | Class A (dBuV) |         | Class B (dBuV) |         |
|--------------------|----------------|---------|----------------|---------|
|                    | Quasi-peak     | Average | Quasi-peak     | Average |
| 0.15 - 0.5         | 79             | 66      | 66 - 56        | 56 - 46 |
| 0.50 - 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 linearly with the logarithm of the frequency in the range 0.15 to 0.50 MHz  
 (3) All emanation from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.



## 4. TEST RESULTS (EMISSION)

### 4.1 RADIO DISTURBANCE

Product Family Standard : EN 55022: 1994+A1: 1995+A2: 1997, Class A  
Frequency Range : 0.15 - 30 MHz (Conducted Emission)  
30 - 1000 MHz (Radiated Emission)  
Input Voltage : 230 Vac, 50 Hz  
Temperature : 21 degree C  
Humidity : 73 %  
Atmospheric Pressure : 1000 mbar

| TEST RESULT | Remarks                                                                                                                                  |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------|
| PASS        | Minimum passing margin of conducted emission: -8.6 dB at 0.287 MHz<br>Minimum passing margin of radiated emission: -3.3 dB at 171.85 MHz |

#### 4.1.1 EUT OPERATION CONDITION

1. Turn on the power of all equipment.
2. Industrial PC (EUT) reads a test program to enable all functions.
3. Industrial PC (EUT) reads and writes messages from HDD and FDD.
4. Industrial PC (EUT) sends "H" messages to monitor and monitor displays "H" patterns on screen.
5. Industrial PC (EUT) sends "H" messages to modem.
6. Industrial PC (EUT) sends "H" messages to printer and the printer prints them on paper.
7. Repeat steps 2-7.



#### 4.1.2 TEST DATA OF CONDUCTED EMISSION (A)

EUT: INDUSTRIAL COMPUTER

MODEL: IPC-623MB-300

MODE: 1

6 dB Band Width: 10 kHz

PHASE: LINE (L)

| Freq.  | Meter Reading [dB (uV)] |              |     |       |     | Limit     |      | Margin    |     |
|--------|-------------------------|--------------|-----|-------|-----|-----------|------|-----------|-----|
| [MHz]  | Corr.                   | Reading Data |     | Total |     | [dB (uV)] |      | [dB (uV)] |     |
|        | Factor                  | Q.P.         | AV. | Q.P.  | AV. | Q.P.      | AV.  | Q.P.      | AV. |
| 0.195  | 0.2                     | 43.0         | -   | 43.2  | -   | 79.0      | 66.0 | -35.8     | -   |
| 0.261  | 0.2                     | 32.8         | -   | 33.0  | -   | 79.0      | 66.0 | -46.0     | -   |
| 1.347  | 0.3                     | 38.4         | -   | 38.7  | -   | 73.0      | 60.0 | -34.3     | -   |
| 3.549  | 0.5                     | 44.3         | -   | 44.8  | -   | 73.0      | 60.0 | -28.2     | -   |
| 7.577  | 0.7                     | 51.8         | -   | 52.5  | -   | 73.0      | 60.0 | -20.5     | -   |
| 19.868 | 1.2                     | 38.8         | -   | 40.0  | -   | 73.0      | 60.0 | -33.0     | -   |

Remarks: 1. "\*": Undetectable  
2. Q.P. and AV. are abbreviations of quasi-peak and average individually.  
3. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.  
4. The emission levels of other frequencies were very low against the limit.  
5. Margin value = Emission level - Limit value



## TEST DATA OF CONDUCTED EMISSION (A)

EUT: INDUSTRIAL COMPUTER

MODEL: IPC-623MB-300

MODE: 1

6 dB Band Width: 10 kHz

PHASE: NEUTRAL (N)

| Freq.  | Meter Reading [dB (uV)] |              |     |       |     | Limit     |      | Margin    |     |
|--------|-------------------------|--------------|-----|-------|-----|-----------|------|-----------|-----|
| [MHz]  | Corr.                   | Reading Data |     | Total |     | [dB (uV)] |      | [dB (uV)] |     |
|        | Factor                  | Q.P.         | AV. | Q.P.  | AV. | Q.P.      | AV.  | Q.P.      | AV. |
| 0.195  | 0.2                     | 43.8         | -   | 44.0  | -   | 79.0      | 66.0 | -35.0     | -   |
| 0.261  | 0.2                     | 34.7         | -   | 34.9  | -   | 79.0      | 66.0 | -44.1     | -   |
| 1.347  | 0.3                     | 37.9         | -   | 38.2  | -   | 73.0      | 60.0 | -34.8     | -   |
| 3.549  | 0.4                     | 45.1         | -   | 45.5  | -   | 73.0      | 60.0 | -27.5     | -   |
| 7.577  | 0.5                     | 51.3         | -   | 51.8  | -   | 73.0      | 60.0 | -21.2     | -   |
| 19.868 | 0.8                     | 36.2         | -   | 37.0  | -   | 73.0      | 60.0 | -36.0     | -   |

Remarks:

1. "\*": Undetectable
2. Q.P. and AV. are abbreviations of quasi-peak and average individually.
3. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
4. The emission levels of other frequencies were very low against the limit.
5. Margin value = Emission level - Limit value



### 4.1.3 TEST DATA OF CONDUCTED EMISSION (B)

EUT: INDUSTRIAL COMPUTER

MODEL: IPC-623MB-300X

MODE: 2

6 dB Band Width: 10 kHz

PHASE: LINE (L)

| Freq.  | Meter Reading [dB (uV)] |              |     |       |     | Limit     |      | Margin    |     |
|--------|-------------------------|--------------|-----|-------|-----|-----------|------|-----------|-----|
| [MHz]  | Corr.                   | Reading Data |     | Total |     | [dB (uV)] |      | [dB (uV)] |     |
|        | Factor                  | Q.P.         | AV. | Q.P.  | AV. | Q.P.      | AV.  | Q.P.      | AV. |
| 0.189  | 0.2                     | 41.8         | -   | 42.0  | -   | 79.0      | 66.0 | -37.0     | -   |
| 0.285  | 0.2                     | 31.3         | -   | 31.5  | -   | 79.0      | 66.0 | -47.5     | -   |
| 0.570  | 0.2                     | 27.9         | -   | 28.1  | -   | 73.0      | 60.0 | -44.9     | -   |
| 9.323  | 0.8                     | 44.8         | -   | 45.6  | -   | 73.0      | 60.0 | -27.4     | -   |
| 13.049 | 0.9                     | 40.2         | -   | 41.1  | -   | 73.0      | 60.0 | -31.9     | -   |
| 18.971 | 1.1                     | 36.2         | -   | 37.3  | -   | 73.0      | 60.0 | -35.7     | -   |

Remarks: 1. "\*": Undetectable  
2. Q.P. and AV. are abbreviations of quasi-peak and average individually.  
3. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.  
4. The emission levels of other frequencies were very low against the limit.  
5. Margin value = Emission level - Limit value



## TEST DATA OF CONDUCTED EMISSION (B)

EUT: INDUSTRIAL COMPUTER

MODEL: IPC-623MB-300X

MODE: 2

6 dB Band Width: 10 kHz

PHASE: NEUTRAL (N)

| Freq.  | Meter Reading [dB (uV)] |              |     |       |     | Limit     |      | Margin    |     |
|--------|-------------------------|--------------|-----|-------|-----|-----------|------|-----------|-----|
| [MHz]  | Corr.                   | Reading Data |     | Total |     | [dB (uV)] |      | [dB (uV)] |     |
|        | Factor                  | Q.P.         | AV. | Q.P.  | AV. | Q.P.      | AV.  | Q.P.      | AV. |
| 0.189  | 0.2                     | 40.2         | -   | 40.4  | -   | 79.0      | 66.0 | -38.6     | -   |
| 0.285  | 0.2                     | 31.2         | -   | 31.4  | -   | 79.0      | 66.0 | -47.6     | -   |
| 0.570  | 0.2                     | 26.8         | -   | 27.0  | -   | 73.0      | 60.0 | -46.0     | -   |
| 9.323  | 0.6                     | 45.2         | -   | 45.8  | -   | 73.0      | 60.0 | -27.2     | -   |
| 13.049 | 0.65                    | 39.1         | -   | 39.8  | -   | 73.0      | 60.0 | -33.2     | -   |
| 18.971 | 0.8                     | 34.1         | -   | 34.9  | -   | 73.0      | 60.0 | -38.1     | -   |

Remarks:

1. "\*": Undetectable
2. Q.P. and AV. are abbreviations of quasi-peak and average individually.
3. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
4. The emission levels of other frequencies were very low against the limit.
5. Margin value = Emission level - Limit value



#### 4.1.4 TEST DATA OF CONDUCTED EMISSION (C)

EUT: INDUSTRIAL COMPUTER

MODEL: IPC-623P4-400

MODE: 3

6 dB Band Width: 10 kHz

PHASE: LINE (L)

| Freq.  | Meter Reading [dB (uV)] |              |      |       |      | Limit     |      | Margin    |       |
|--------|-------------------------|--------------|------|-------|------|-----------|------|-----------|-------|
| [MHz]  | Corr.                   | Reading Data |      | Total |      | [dB (uV)] |      | [dB (uV)] |       |
|        | Factor                  | Q.P.         | AV.  | Q.P.  | AV.  | Q.P.      | AV.  | Q.P.      | AV.   |
| 0.160  | 0.15                    | 60.3         | -    | 60.5  | -    | 79.0      | 66.0 | -18.5     | -     |
| 0.287  | 0.2                     | 68.6         | 57.2 | 68.8  | 57.4 | 79.0      | 66.0 | -10.2     | -8.6  |
| 0.432  | 0.2                     | 67.5         | 55.4 | 67.7  | 55.6 | 79.0      | 66.0 | -11.3     | -10.4 |
| 0.479  | 0.2                     | 62.9         | -    | 63.1  | -    | 79.0      | 66.0 | -15.9     | -     |
| 9.323  | 0.8                     | 47.2         | -    | 48.0  | -    | 73.0      | 60.0 | -25.0     | -     |
| 28.616 | 1.5                     | 41.8         | -    | 43.3  | -    | 73.0      | 60.0 | -29.7     | -     |

Remarks: 1. "\*": Undetectable  
2. Q.P. and AV. are abbreviations of quasi-peak and average individually.  
3. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.  
4. The emission levels of other frequencies were very low against the limit.  
5. Margin value = Emission level - Limit value



## TEST DATA OF CONDUCTED EMISSION (C)

EUT: INDUSTRIAL COMPUTER

MODEL: IPC-623P4-400

MODE: 3

6 dB Band Width: 10 kHz

PHASE: NEUTRAL (N)

| Freq.  | Meter Reading [dB (uV)] |              |      |       |      | Limit     |      | Margin    |       |
|--------|-------------------------|--------------|------|-------|------|-----------|------|-----------|-------|
| [MHz]  | Corr.                   | Reading Data |      | Total |      | [dB (uV)] |      | [dB (uV)] |       |
|        | Factor                  | Q.P.         | AV.  | Q.P.  | AV.  | Q.P.      | AV.  | Q.P.      | AV.   |
| 0.160  | 0.15                    | 62.8         | -    | 63.0  | -    | 79.0      | 66.0 | -16.0     | -     |
| 0.287  | 0.2                     | 68.7         | 57.2 | 68.9  | 57.4 | 79.0      | 66.0 | -10.1     | -8.6  |
| 0.432  | 0.2                     | 67.5         | 55.6 | 67.7  | 55.8 | 79.0      | 66.0 | -11.3     | -10.2 |
| 0.479  | 0.25                    | 63.5         | -    | 63.8  | -    | 79.0      | 66.0 | -15.2     | -     |
| 9.323  | 0.6                     | 41.5         | -    | 42.1  | -    | 73.0      | 60.0 | -30.9     | -     |
| 28.616 | 1.1                     | 22.9         | -    | 24.0  | -    | 73.0      | 60.0 | -49.0     | -     |

Remarks:

1. "\*": Undetectable
2. Q.P. and AV. are abbreviations of quasi-peak and average individually.
3. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
4. The emission levels of other frequencies were very low against the limit.
5. Margin value = Emission level - Limit value



#### 4.1.5 TEST DATA OF CONDUCTED EMISSION (D)

EUT: INDUSTRIAL COMPUTER

MODEL: IPC-623P4-300R

MODE: 4

6 dB Band Width: 10 kHz

PHASE: LINE (L)

| Freq.  | Meter Reading [dB (uV)] |              |     |       |     | Limit     |      | Margin    |     |
|--------|-------------------------|--------------|-----|-------|-----|-----------|------|-----------|-----|
| [MHz]  | Corr.                   | Reading Data |     | Total |     | [dB (uV)] |      | [dB (uV)] |     |
|        | Factor                  | Q.P.         | AV. | Q.P.  | AV. | Q.P.      | AV.  | Q.P.      | AV. |
| 0.165  | 0.15                    | 54.8         | -   | 55.0  | -   | 79.0      | 66.0 | -24.0     | -   |
| 0.198  | 0.2                     | 52.1         | -   | 52.3  | -   | 79.0      | 66.0 | -26.7     | -   |
| 0.366  | 0.2                     | 45.3         | -   | 45.5  | -   | 79.0      | 66.0 | -33.5     | -   |
| 0.498  | 0.2                     | 46.2         | -   | 46.4  | -   | 79.0      | 66.0 | -32.6     | -   |
| 9.323  | 0.8                     | 44.9         | -   | 45.7  | -   | 73.0      | 60.0 | -27.3     | -   |
| 13.697 | 0.9                     | 38.2         | -   | 39.1  | -   | 73.0      | 60.0 | -33.9     | -   |

Remarks:

1. "\*": Undetectable
2. Q.P. and AV. are abbreviations of quasi-peak and average individually.
3. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
4. The emission levels of other frequencies were very low against the limit.
5. Margin value = Emission level - Limit value



## TEST DATA OF CONDUCTED EMISSION (D)

EUT: INDUSTRIAL COMPUTER

MODEL: IPC-623P4-300R

MODE: 4

6 dB Band Width: 10 kHz

PHASE: NEUTRAL (N)

| Freq.  | Meter Reading [dB (uV)] |              |     |       |     | Limit     |      | Margin    |     |
|--------|-------------------------|--------------|-----|-------|-----|-----------|------|-----------|-----|
| [MHz]  | Corr.                   | Reading Data |     | Total |     | [dB (uV)] |      | [dB (uV)] |     |
|        | Factor                  | Q.P.         | AV. | Q.P.  | AV. | Q.P.      | AV.  | Q.P.      | AV. |
| 0.165  | 0.15                    | 55.1         | -   | 55.3  | -   | 79.0      | 66.0 | -23.7     | -   |
| 0.198  | 0.2                     | 51.2         | -   | 51.4  | -   | 79.0      | 66.0 | -27.6     | -   |
| 0.366  | 0.2                     | 42.3         | -   | 42.5  | -   | 79.0      | 66.0 | -36.5     | -   |
| 0.498  | 0.2                     | 44.8         | -   | 45.0  | -   | 79.0      | 66.0 | -34.0     | -   |
| 9.323  | 0.3                     | 42.3         | -   | 42.6  | -   | 73.0      | 60.0 | -30.4     | -   |
| 13.697 | 0.65                    | 39.1         | -   | 39.8  | -   | 73.0      | 60.0 | -33.2     | -   |

Remarks:

1. "\*": Undetectable
2. Q.P. and AV. are abbreviations of quasi-peak and average individually.
3. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
4. The emission levels of other frequencies were very low against the limit.
5. Margin value = Emission level - Limit value



#### 4.1.6 TEST DATA OF RADIATED EMISSION (A)

EUT: **INDUSTRIAL COMPUTER**

MODEL: **IPC-623MB-300**

MODE: **1**

ANT. POLARITY: **Horizontal**

DETECTOR FUNCTION: **Quasi-peak**

6 dB BANDWIDTH: **120 kHz**

FREQUENCY RANGE: **30-1000 MHz**

MEASURED DISTANCE: **10 M**

| Frequency<br>(MHz) | Correction<br>Factor<br>(dB) | Reading<br>Data<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) |
|--------------------|------------------------------|---------------------------|-------------------------------|-------------------|----------------|
| 146.10             | 13.1                         | 13.8                      | 26.9                          | 40.0              | -13.1          |
| 171.85             | 11.6                         | 25.1                      | 36.7                          | 40.0              | -3.3           |
| 197.15             | 12.4                         | 13.1                      | 25.5                          | 40.0              | -14.5          |
| 206.38             | 12.8                         | 18.8                      | 31.6                          | 40.0              | -8.4           |
| 223.10             | 13.6                         | 15.5                      | 29.1                          | 40.0              | -10.9          |
| 240.33             | 14.4                         | 17.3                      | 31.7                          | 47.0              | -15.3          |

REMARKS:

1. Emission level (dBuV/m) = Correction Factor (dB/m) + Meter Reading (dBuV).
2. Correction Factor (dB) = Ant. Factor (dB)+Cable loss (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level - Limit value



## TEST DATA OF RADIATED EMISSION (A)

EUT: INDUSTRIAL COMPUTER

MODEL: IPC-623MB-300

MODE: 1

ANT. POLARITY: Vertical

DETECTOR FUNCTION: Quasi-peak

6 dB BANDWIDTH: 120 kHz

FREQUENCY RANGE: 30-1000 MHz

MEASURED DISTANCE: 10 M

| Frequency<br>(MHz) | Correction<br>Factor<br>(dB) | Reading<br>Data<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) |
|--------------------|------------------------------|---------------------------|-------------------------------|-------------------|----------------|
| 146.10             | 12.7                         | 14.8                      | 27.5                          | 40.0              | -12.5          |
| 171.85             | 11.5                         | 24.7                      | 36.2                          | 40.0              | -3.8           |
| 197.25             | 12.1                         | 17.7                      | 29.8                          | 40.0              | -10.2          |
| 200.53             | 12.2                         | 19.0                      | 31.2                          | 40.0              | -8.8           |
| 206.08             | 12.5                         | 19.0                      | 31.5                          | 40.0              | -8.5           |
| 240.33             | 14.4                         | 17.3                      | 31.7                          | 47.0              | -15.3          |

REMARKS:

1. Emission level (dBuV/m) = Correction Factor (dB/m) + Meter Reading (dBuV).
2. Correction Factor (dB) = Ant. Factor (dB)+Cable loss (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level - Limit value



#### 4.1.7 TEST DATA OF RADIATED EMISSION (B)

EUT: **INDUSTRIAL COMPUTER**

MODEL: **IPC-623MB-300X**

MODE: **2**

ANT. POLARITY: **Horizontal**

DETECTOR FUNCTION: **Quasi-peak**

6 dB BANDWIDTH: **120 kHz**

FREQUENCY RANGE: **30-1000 MHz**

MEASURED DISTANCE: **10 M**

| Frequency<br>(MHz) | Correction<br>Factor<br>(dB) | Reading<br>Data<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) |
|--------------------|------------------------------|---------------------------|-------------------------------|-------------------|----------------|
| 48.00              | 11.1                         | 18.0                      | 29.1                          | 40.0              | -10.9          |
| 120.20             | 13.7                         | 12.2                      | 25.9                          | 40.0              | -14.1          |
| 144.10             | 13.3                         | 15.5                      | 28.8                          | 40.0              | -11.2          |
| 192.15             | 12.2                         | 21.1                      | 33.3                          | 40.0              | -6.7           |
| 203.15             | 12.6                         | 16.4                      | 29.0                          | 40.0              | -11.0          |
| 209.00             | 12.9                         | 20.6                      | 33.5                          | 40.0              | -6.5           |
| 220.33             | 13.4                         | 18.3                      | 31.7                          | 40.0              | -8.3           |
| 596.35             | 24.3                         | 13.6                      | 37.9                          | 47.0              | -9.1           |

REMARKS:

1. Emission level (dBuV/m) = Correction Factor (dB/m) + Meter Reading (dBuV).
2. Correction Factor (dB) = Ant. Factor (dB)+Cable loss (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level - Limit value



## TEST DATA OF RADIATED EMISSION (B)

EUT: INDUSTRIAL COMPUTER

MODEL: IPC-623MB-300X

MODE: 2

ANT. POLARITY: Vertical

DETECTOR FUNCTION: Quasi-peak

6 dB BANDWIDTH: 120 kHz

FREQUENCY RANGE: 30-1000 MHz

MEASURED DISTANCE: 10 M

| Frequency<br>(MHz) | Correction<br>Factor<br>(dB) | Reading<br>Data<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) |
|--------------------|------------------------------|---------------------------|-------------------------------|-------------------|----------------|
| 47.99              | 9.9                          | 26.0                      | 35.9                          | 40.0              | -4.1           |
| 120.12             | 13.6                         | 19.6                      | 33.2                          | 40.0              | -6.8           |
| 144.10             | 13.0                         | 18.0                      | 31.0                          | 40.0              | -9.0           |
| 168.10             | 11.4                         | 16.3                      | 27.7                          | 40.0              | -12.3          |
| 192.05             | 12.0                         | 19.3                      | 31.3                          | 40.0              | -8.7           |
| 208.93             | 12.7                         | 16.2                      | 28.9                          | 40.0              | -11.1          |
| 220.18             | 13.3                         | 19.6                      | 32.9                          | 40.0              | -7.1           |
| 596.35             | 23.3                         | 13.1                      | 36.4                          | 47.0              | -10.6          |

REMARKS:

1. Emission level (dBuV/m) = Correction Factor (dB/m) + Meter Reading (dBuV).
2. Correction Factor (dB) = Ant. Factor (dB)+Cable loss (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level - Limit value



#### 4.1.8 TEST DATA OF RADIATED EMISSION (C)

EUT: **INDUSTRIAL COMPUTER**

MODEL: **IPC-623P4-400**

MODE: **3**

ANT. POLARITY: Horizontal

DETECTOR FUNCTION: Quasi-peak

6 dB BANDWIDTH: 120 kHz

FREQUENCY RANGE: 30-1000 MHz

MEASURED DISTANCE: 10 M

| Frequency<br>(MHz) | Correction<br>Factor<br>(dB) | Reading<br>Data<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) |
|--------------------|------------------------------|---------------------------|-------------------------------|-------------------|----------------|
| 87.00              | 8.8                          | 12.6                      | 21.4                          | 40.0              | -18.6          |
| 171.85             | 11.6                         | 14.9                      | 26.5                          | 40.0              | -13.5          |
| 203.08             | 12.6                         | 13.8                      | 26.4                          | 40.0              | -13.6          |
| 206.30             | 12.8                         | 13.4                      | 26.2                          | 40.0              | -13.8          |
| 214.63             | 13.2                         | 13.9                      | 27.1                          | 40.0              | -12.9          |
| 220.40             | 13.5                         | 15.1                      | 28.6                          | 40.0              | -11.4          |
| 386.70             | 19.5                         | 13.6                      | 33.1                          | 47.0              | -13.9          |
| 515.63             | 23.1                         | 10.3                      | 33.4                          | 47.0              | -13.6          |

REMARKS:

1. Emission level (dBuV/m) = Correction Factor (dB/m) + Meter Reading (dBuV).
2. Correction Factor (dB) = Ant. Factor (dB)+Cable loss (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level - Limit value



## TEST DATA OF RADIATED EMISSION (C)

EUT: INDUSTRIAL COMPUTER

MODEL: IPC-623P4-400

MODE: 3

ANT. POLARITY: Vertical

DETECTOR FUNCTION: Quasi-peak

6 dB BANDWIDTH: 120 kHz

FREQUENCY RANGE: 30-1000 MHz

MEASURED DISTANCE: 10 M

| Frequency<br>(MHz) | Correction<br>Factor<br>(dB) | Reading<br>Data<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) |
|--------------------|------------------------------|---------------------------|-------------------------------|-------------------|----------------|
| 60.08              | 6.8                          | 26.3                      | 33.1                          | 40.0              | -6.9           |
| 87.01              | 8.2                          | 17.3                      | 25.5                          | 40.0              | -14.5          |
| 116.01             | 13.0                         | 20.3                      | 33.3                          | 40.0              | -6.7           |
| 171.84             | 11.5                         | 20.7                      | 32.2                          | 40.0              | -7.8           |
| 203.00             | 12.3                         | 17.5                      | 29.8                          | 40.0              | -10.2          |
| 214.55             | 13.0                         | 15.7                      | 28.7                          | 40.0              | -11.3          |
| 229.10             | 13.8                         | 12.8                      | 26.6                          | 40.0              | -13.4          |
| 514.70             | 22.9                         | 11.4                      | 34.3                          | 47.0              | -12.7          |

REMARKS:

1. Emission level (dBuV/m) = Correction Factor (dB/m) + Meter Reading (dBuV).
2. Correction Factor (dB) = Ant. Factor (dB)+Cable loss (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level - Limit value



#### 4.1.9 TEST DATA OF RADIATED EMISSION (D)

EUT: **INDUSTRIAL COMPUTER**

MODEL: **IPC-623P4-300R**

MODE: **4**

ANT. POLARITY: Horizontal

DETECTOR FUNCTION: Quasi-peak

6 dB BANDWIDTH: 120 kHz

FREQUENCY RANGE: 30-1000 MHz

MEASURED DISTANCE: 10 M

| Frequency<br>(MHz) | Correction<br>Factor<br>(dB) | Reading<br>Data<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) |
|--------------------|------------------------------|---------------------------|-------------------------------|-------------------|----------------|
| 167.04             | 11.5                         | 21.0                      | 32.5                          | 40.0              | -7.5           |
| 169.38             | 11.5                         | 18.9                      | 30.4                          | 40.0              | -9.6           |
| 175.03             | 11.6                         | 22.1                      | 33.7                          | 40.0              | -6.3           |
| 200.45             | 12.5                         | 22.7                      | 35.2                          | 40.0              | -4.8           |
| 209.00             | 12.9                         | 16.6                      | 29.5                          | 40.0              | -10.5          |
| 267.27             | 15.0                         | 12.0                      | 27.0                          | 47.0              | -20.0          |
| 534.55             | 23.4                         | 13.2                      | 36.6                          | 47.0              | -10.4          |

REMARKS:

1. Emission level (dBuV/m) = Correction Factor (dB/m)  
+ Meter Reading (dBuV).
2. Correction Factor (dB) = Ant. Factor (dB)+Cable loss (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level - Limit value



## TEST DATA OF RADIATED EMISSION (D)

EUT: **INDUSTRIAL COMPUTER**

MODEL: **IPC-623P4-300R**

MODE: **4**

ANT. POLARITY: Vertical

DETECTOR FUNCTION: Quasi-peak

6 dB BANDWIDTH: 120 kHz

FREQUENCY RANGE: 30-1000 MHz

MEASURED DISTANCE: 10 M

| Frequency<br>(MHz) | Correction<br>Factor<br>(dB) | Reading<br>Data<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) |
|--------------------|------------------------------|---------------------------|-------------------------------|-------------------|----------------|
| 167.04             | 11.3                         | 21.4                      | 32.7                          | 40.0              | -7.3           |
| 169.37             | 11.4                         | 20.4                      | 31.8                          | 40.0              | -8.2           |
| 175.01             | 11.6                         | 19.8                      | 31.4                          | 40.0              | -8.6           |
| 180.65             | 11.7                         | 16.6                      | 28.3                          | 40.0              | -11.7          |
| 200.40             | 12.2                         | 23.8                      | 36.0                          | 40.0              | -4.0           |
| 214.63             | 13.0                         | 12.2                      | 25.2                          | 40.0              | -14.8          |
| 267.28             | 15.5                         | 16.5                      | 32.0                          | 47.0              | -15.0          |
| 701.55             | 25.7                         | 6.1                       | 31.8                          | 47.0              | -15.2          |

REMARKS:

1. Emission level (dBuV/m) = Correction Factor (dB/m)  
+ Meter Reading (dBuV).
2. Correction Factor (dB) = Ant. Factor (dB)+Cable loss (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission level - Limit value



## 4.2 DISTURBANCE IN SUPPLY SYSTEM

Product Family Standard: EN 61000-3-2, Class A (for mode 2 & 3)  
EN 60555-2 (for mode 4)

Input Voltage : 230Vac, 50Hz

Temperature : 21 degree C

Humidity : 53 %

Atmospheric Pressure : 1000 mbar

| TEST RESULT | Remarks |
|-------------|---------|
| PASS        | MODE 2  |
| PASS        | MODE 3  |
| PASS        | MODE 4  |

Note: MODE 2 & 3 meet the requirement of Class A limit. Class A or Class D is classified by test instruments automatically.

### 4.2.1 EUT OPERATION CONDITION

Same as item 4.1.1.



## 4.2.2 MEASUREMENT DATA OF HARMONICS TEST (A)

EUT: **INDUSTRIAL COMPUTER**

MODE: **2**

TEST STANDARD: **EN 61000-3-2, Class A**

MODEL: **IPC-623MB-300X**

Fundamental Voltage : 229.756 Vrms

Amperes : 0.467 Arms

Frequency : 50 Hz

Power Consumption : 54.835 W

| Harm. Order | Reading Data (A) | Limit (A) |
|-------------|------------------|-----------|
| 1           | -                | -         |
| 3           | 0.21             | 2.30      |
| 5           | 0.20             | 1.14      |
| 7           | 0.17             | 0.77      |
| 9           | 0.14             | 0.40      |
| 11          | 0.11             | 0.33      |
| 13          | 0.08             | 0.21      |
| 15          | 0.06             | 0.15      |
| 17          | 0.03             | 0.13      |
| 19          | 0.02             | 0.12      |
| 21          | 0.01             | 0.11      |
| 23          | 0.01             | 0.10      |
| 25          | 0.01             | 0.09      |
| 27          | 0.01             | 0.08      |
| 29          | 0.01             | 0.08      |
| 31          | 0.01             | 0.07      |
| 33          | 0.01             | 0.07      |
| 35          | 0.01             | 0.06      |
| 37          | 0.01             | 0.06      |
| 39          | 0.01             | 0.06      |

| Harm. Order | Reading Data (A) | Limit (A) |
|-------------|------------------|-----------|
| 2           | 0.00             | 1.08      |
| 4           | 0.00             | 0.43      |
| 6           | 0.00             | 0.30      |
| 8           | 0.00             | 0.23      |
| 10          | 0.00             | 0.18      |
| 12          | 0.00             | 0.15      |
| 14          | 0.00             | 0.13      |
| 16          | 0.00             | 0.11      |
| 18          | 0.00             | 0.10      |
| 20          | 0.00             | 0.09      |
| 22          | 0.00             | 0.08      |
| 24          | 0.00             | 0.08      |
| 26          | 0.00             | 0.07      |
| 28          | 0.00             | 0.07      |
| 30          | 0.00             | 0.06      |
| 32          | 0.00             | 0.06      |
| 34          | 0.00             | 0.05      |
| 36          | 0.00             | 0.05      |
| 38          | 0.00             | 0.05      |
| 40          | 0.00             | 0.05      |

Note: Steady state values on AC mains are recorded in the table.



### 4.2.3 MEASUREMENT DATA OF HARMONICS TEST (B)

EUT: **INDUSTRIAL COMPUTER**

MODE: **3**

TEST STANDARD: **EN 61000-3-2, Class A**

MODEL: **IPC-6234P4-400**

Fundamental Voltage : 229.715 Vrms

Amperes : 0.542 Arms

Frequency : 50 Hz

Power Consumption : 61.663 W

| Harm. Order | Reading Data (A) | Limit (A) |
|-------------|------------------|-----------|
| 1           | -                | -         |
| 3           | 0.25             | 2.30      |
| 5           | 0.23             | 1.14      |
| 7           | 0.20             | 0.77      |
| 9           | 0.17             | 0.40      |
| 11          | 0.14             | 0.33      |
| 13          | 0.10             | 0.21      |
| 15          | 0.07             | 0.15      |
| 17          | 0.04             | 0.13      |
| 19          | 0.02             | 0.12      |
| 21          | 0.01             | 0.11      |
| 23          | 0.02             | 0.10      |
| 25          | 0.02             | 0.09      |
| 27          | 0.02             | 0.08      |
| 29          | 0.02             | 0.08      |
| 31          | 0.01             | 0.07      |
| 33          | 0.01             | 0.07      |
| 35          | 0.00             | 0.06      |
| 37          | 0.01             | 0.06      |
| 39          | 0.01             | 0.06      |

| Harm. Order | Reading Data (A) | Limit (A) |
|-------------|------------------|-----------|
| 2           | 0.00             | 1.08      |
| 4           | 0.00             | 0.43      |
| 6           | 0.00             | 0.30      |
| 8           | 0.00             | 0.23      |
| 10          | 0.00             | 0.18      |
| 12          | 0.00             | 0.15      |
| 14          | 0.00             | 0.13      |
| 16          | 0.00             | 0.11      |
| 18          | 0.02             | 0.10      |
| 20          | 0.00             | 0.09      |
| 22          | 0.00             | 0.08      |
| 24          | 0.00             | 0.08      |
| 26          | 0.00             | 0.07      |
| 28          | 0.00             | 0.07      |
| 30          | 0.00             | 0.06      |
| 32          | 0.00             | 0.06      |
| 34          | 0.00             | 0.05      |
| 36          | 0.00             | 0.05      |
| 38          | 0.00             | 0.05      |
| 40          | 0.00             | 0.05      |

Note: Steady state values on AC mains are recorded in the table.



#### 4.2.4 MEASUREMENT DATA OF HARMONICS TEST (C)

EUT: **INDUSTRIAL COMPUTER**

MODE: **4**

TEST STANDARD: **EN 60555-2**

MODEL: **IPC-623P4-300R**

Fundamental Voltage : 229.771 Vrms

Amperes : 0.732 Arms

Frequency : 50 Hz

Power Consumption : 78.024 W

| Harm. Order | Reading Data (A) | Limit (A) |
|-------------|------------------|-----------|
| 1           | -                | -         |
| 3           | 0.32             | 2.30      |
| 5           | 0.30             | 1.14      |
| 7           | 0.27             | 0.77      |
| 9           | 0.24             | 0.40      |
| 11          | 0.20             | 0.33      |
| 13          | 0.16             | 0.21      |
| 15          | 0.13             | 0.15      |
| 17          | 0.09             | 0.13      |
| 19          | 0.06             | 0.12      |
| 21          | 0.04             | 0.11      |
| 23          | 0.02             | 0.10      |
| 25          | 0.01             | 0.09      |
| 27          | 0.01             | 0.08      |
| 29          | 0.01             | 0.08      |
| 31          | 0.01             | 0.07      |
| 33          | 0.01             | 0.07      |
| 35          | 0.02             | 0.06      |
| 37          | 0.01             | 0.06      |
| 39          | 0.01             | 0.06      |

| Harm. Order | Reading Data (A) | Limit (A) |
|-------------|------------------|-----------|
| 2           | 0.00             | 1.08      |
| 4           | 0.00             | 0.43      |
| 6           | 0.01             | 0.30      |
| 8           | 0.00             | 0.23      |
| 10          | 0.00             | 0.18      |
| 12          | 0.00             | 0.15      |
| 14          | 0.00             | 0.13      |
| 16          | 0.00             | 0.11      |
| 18          | 0.00             | 0.10      |
| 20          | 0.00             | 0.09      |
| 22          | 0.00             | 0.08      |
| 24          | 0.00             | 0.08      |
| 26          | 0.00             | 0.07      |
| 28          | 0.00             | 0.07      |
| 30          | 0.00             | 0.06      |
| 32          | 0.01             | 0.06      |
| 34          | 0.02             | 0.05      |
| 36          | 0.00             | 0.05      |
| 38          | 0.00             | 0.05      |
| 40          | 0.00             | 0.05      |

Note: Steady state values on AC mains are recorded in the table.



### 4.3 VOLTAGE FLUCTUATIONS AND FLICKER

Basic Standard : EN 61000-3-3  
Input Voltage : 230Vac, 50Hz  
Temperature : 21 degree C  
Humidity : 53 %  
Atmospheric Pressure : 1000 mbar

| TEST RESULT | Remarks |
|-------------|---------|
| PASS        | MODE 1  |
| PASS        | MODE 2  |
| PASS        | MODE 3  |
| PASS        | MODE 4  |

Note: The measured reading is too low against the limit.

#### 4.3.1 EUT OPERATION CONDITION

Same as item 4.1.1.



#### 4.3.2 TEST DATA OF VOLTAGE FLUCTUATIONS AND FLICKER (A)

EUT: INDUSTRIAL COMPUTER

MODEL: IPC-623MB-300

MODE: 1

Input Voltage : 229.844 Vrms

Input Amperes : 0.642 Arms

Power Factor : 0.376

Power Frequency: 50 Hz

Observation period (Tp): 2 hour

**The measured data are too low against the limit and therefore they are not reported.**



### 4.3.3 TEST DATA OF VOLTAGE FLUCTUATIONS AND FLICKER (B)

EUT: INDUSTRIAL COMPUTER

MODEL: IPC-623MB-300X

MODE: 2

Input Voltage : 229.756 Vrms

Input Amperes : 0.467 Arms

Power Factor : 0.511

Power Frequency: 50 Hz

Observation period (Tp): 2 hour

**The measured data are too low against the limit and therefore they are not reported.**



#### 4.3.4 TEST DATA OF VOLTAGE FLUCTUATIONS AND FLICKER (C)

EUT: INDUSTRIAL COMPUTER

MODEL: IPC-6234P4-400

MODE: 3

Input Voltage : 229.715 Vrms

Input Amperes : 0.542 Arms

Power Factor : 0.495

Power Frequency: 50 Hz

Observation period (Tp): 2 hour

**The measured data are too low against the limit and therefore they are not reported.**



#### 4.3.5 TEST DATA OF VOLTAGE FLUCTUATIONS AND FLICKER (D)

EUT: INDUSTRIAL COMPUTER

MODEL: IPC-623P4-300R

MODE: 4

Input Voltage : 229.771 Vrms

Input Amperes : 0.732 Arms

Power Factor : 0.464

Power Frequency: 50 Hz

Observation period (Tp): 2 hour

**The measured data are too low against the limit and therefore they are not reported.**



## 5. TEST RESULTS (IMMUNITY)

### 5.1 GENERAL DESCRIPTION

|                                        |   |                  |                                                                                                                                               |
|----------------------------------------|---|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Generic Standard                       | : | EN 50082-2: 1995 |                                                                                                                                               |
| Basic Standard                         | : | EN 61000-4-2     | (Electrostatic Discharge, ESD, 8kV air discharge, 4kV Contact discharge, Performance Criterion B)                                             |
| Specification and Performance Criteria | : | EN 61000-4-3     | (Radio-Frequency Electromagnetic Field Susceptibility Test, RS, 80-1000 MHz, 10V/m, 80% AM (1kHz), Performance Criterion A)                   |
|                                        | : | EN 61000-4-4     | (Electrical Fast Transient/Burst, EFT, Power line: 2kV, Signal line: 1kV, Performance Criterion B)                                            |
|                                        | : | EN 61000-4-6     | (Conducted Radio Frequency Disturbances Test, CS, 0.15-80 MHz, 10V/m, 80% AM, 1kHz, Performance Criterion A)                                  |
|                                        | : | EN 61000-4-8     | (Power Frequency Magnetic Field Test, 50 Hz, 30A/m, Performance Criterion A)                                                                  |
|                                        | : | ENV 50204        | (Radio-Frequency Electromagnetic Field, Pulse modulated, 900+/-5 MHz, 10V/m, 50 % duty cycle, Rep. Frequency 200 Hz, Performance Criterion A) |
| Input Voltage                          | : | 230 Vac, 50 Hz   |                                                                                                                                               |
| Temperature                            | : | 21 degree C      |                                                                                                                                               |
| Humidity                               | : | 53 %             |                                                                                                                                               |
| Atmospheric Pressure                   | : | 1000 mbar        |                                                                                                                                               |

### 5.2 PERFORMANCE CRITERIA DESCRIPTION

- Criterion A - The apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended.
- Criterion B - The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended.
- Criterion C - Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

### 5.3 EUT OPERATION CONDITION

Same as item 4.1.1.

## 5.4 TEST RESULT OF ELECTROSTATIC DISCHARGE (ESD)



## 5.5 TEST RESULT OF RADIATED ELECTROMAGNETIC FIELDS (RS)

Basic Standard : EN 61000-4-3  
Frequency range : 80 MHz - 1000 MHz  
Field strength : 10 V/m  
Modulation : 1kHz Sine Wave, 80%, AM Modulation  
Frequency step : 1 % of fundamental  
Polarity of Antenna : Horizontal and Vertical  
Test distance : 3 m

| Test Result |      | Remarks |
|-------------|------|---------|
| Criterion A | PASS | MODE 1  |
| Criterion A | PASS | MODE 2  |
| Criterion A | PASS | MODE 3  |
| Criterion A | PASS | MODE 4  |

Note: Four sides of EUT are verified separately.

### Description of test result:

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



## 5.6 TEST RESULT OF ELECTRICAL FAST TRANSIENT (EFT)

Basic Standard : EN 61000-4-4  
Test Voltage : Power Line - 2 kV  
Signal/Control Line - NA  
Polarity : Positive/Negative  
Impulse Frequency : 5 kHz  
Tr / Tn : 5/50 ns  
Burst Duration : 15 ms  
Burst Period : 300 ms  
Test Duration : Not less than 1 min.

| Test Result |      | Remarks |
|-------------|------|---------|
| Criterion B | PASS | MODE 1  |
| Criterion B | PASS | MODE 2  |
| Criterion B | PASS | MODE 3  |
| Criterion A | PASS | MODE 4  |

### OBSERVATION DESCRIPTION (MODE 1, 2 & 3)

| Test Point | Polarity | Test Level (kV) | Result |
|------------|----------|-----------------|--------|
| L1         | +/-      | 2               | Note 2 |
| L2         | +/-      | 2               | Note 2 |
| GND        | +/-      | 2               | Note 2 |

### OBSERVATION DESCRIPTION (MODE 4)

| Test Point | Polarity | Test Level (kV) | Result |
|------------|----------|-----------------|--------|
| L1         | +/-      | 2               | Note 1 |
| L2         | +/-      | 2               | Note 1 |
| GND        | +/-      | 2               | Note 1 |

#### Description of test result:

Note 1: There was no change compared with initial operation during the test.

Note 2: Mouse and keyboard loose their functions during the test and recoverable only after they are reconnected to PC.



## 5.7 TEST RESULT OF CONDUCTED RADIO FREQUENCY DISTURBANCES (CS)

Basic Standard : EN 61000-4-6  
Frequency range : 0.15 MHz - 80 MHz  
Field strength : 10 V/m  
Modulation : 1kHz Sine Wave, 80%, AM Modulation  
Frequency step : 1 % of fundamental  
Coupled cable : Power Mains, Unshielded  
Coupling device : CDN-M3 (3 wires)

| Test Result |      | Remarks |
|-------------|------|---------|
| Criterion A | PASS | MODE 1  |
| Criterion A | PASS | MODE 2  |
| Criterion A | PASS | MODE 3  |
| Criterion A | PASS | MODE 4  |

### OBSERVATION DESCRIPTION

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



## 5.8 TEST RESULT OF POWER FREQUENCY MAGNETIC FIELD

Basic Standard : EN 61000-4-8  
Frequency range : 50Hz  
Field strength : 30 A/m  
Observation Time : 1 minute  
Inductance coil : Rectangular type, 1mx1m

| Test Result |      | Remarks |
|-------------|------|---------|
| Criterion A | PASS | MODE 1  |
| Criterion A | PASS | MODE 2  |
| Criterion A | PASS | MODE 3  |
| Criterion A | PASS | MODE 4  |

### OBSERVATION DESCRIPTION

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



## 5.9 TEST RESULT OF RADIO-FREQUENCY ELECTROMAGNETIC FIELD, PULSE MODULATED

Basic Standard : ENV 50204  
Frequency range : 900 +/- 5 MHz  
Field strength : 10 V/m  
Modulation : 200Hz, Square Wave, 50% Duty Cycle  
Dwell Time : 30 second  
Polarity of Antenna : Horizontal and Vertical  
Test distance : 3 m

| Test Result |      | Remarks |
|-------------|------|---------|
| Criterion A | PASS | MODE 1  |
| Criterion A | PASS | MODE 2  |
| Criterion A | PASS | MODE 3  |
| Criterion A | PASS | MODE 4  |

Note: Four sides of EUT are verified separately.

### OBSERVATION DESCRIPTION

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

## 6. PHOTOGRAPHS OF THE TEST CONFIGURATION

### CONDUCTED EMISSION TEST (MODE 1)



## CONDUCTED EMISSION TEST (Mode 2)



### CONDUCTED EMISSION TEST (MODE 3)



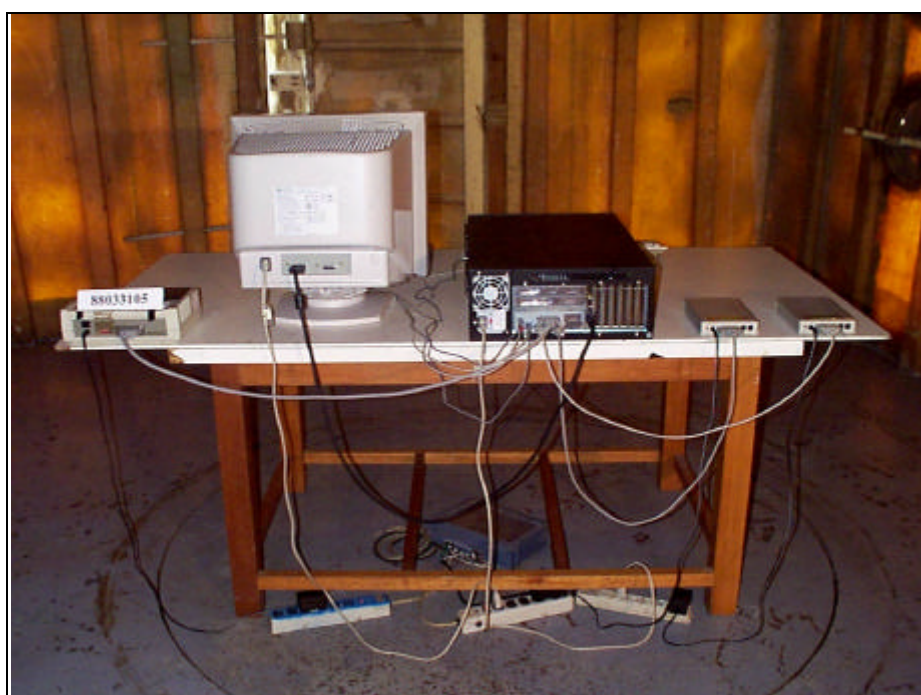
## CONDUCTED EMISSION TEST (MODE 4)



## **RADIATED EMISSION TEST (MODE 1 )**



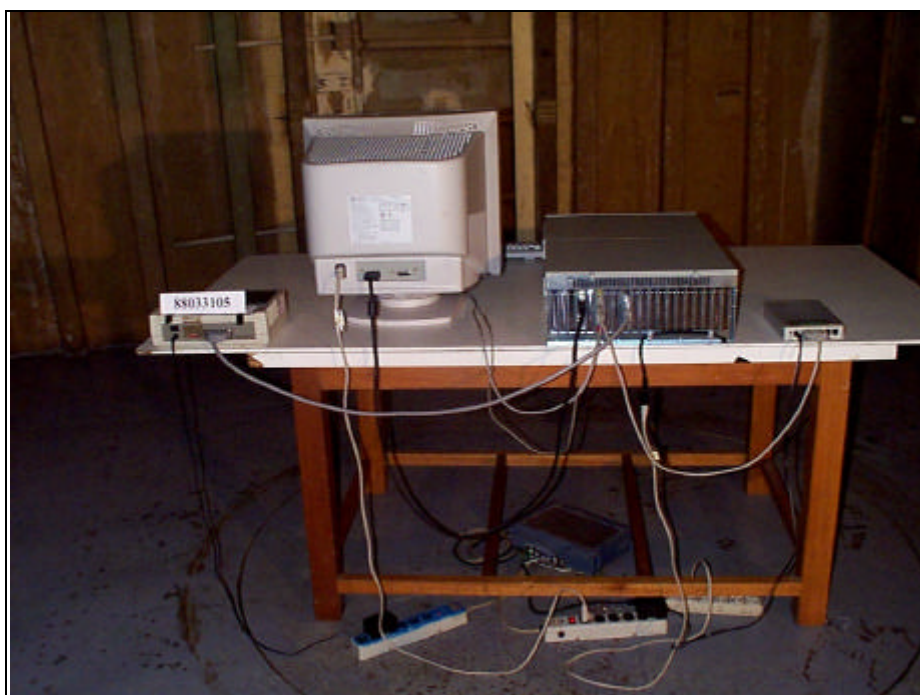
## RADIATED EMISSION TEST (MODE 2)



### **RADIATED EMISSION TEST (MODE 3)**



## **RADIATED EMISSION TEST (MODE 4)**



## **VOLTAGE FLUCTUATIONS AND FLICKER TEST (MODE 1)**



## **HARMONICS EMISSION TEST & VOLTAGE FLUCTUATIONS AND FLICKER TEST (MODE 2)**



**HARMONICS EMISSION TEST &  
VOLTAGE FLUCTUATIONS AND FLICKER TEST  
(MODE 3)**



**HARMONICS EMISSION TEST &  
VOLTAGE FLUCTUATIONS AND FLICKER TEST  
(MODE 4)**



## ESD TEST (MODE 1)



## ESD TEST (MODE 2)



### ESD TEST (MODE 3)



### ESD TEST (MODE 4)



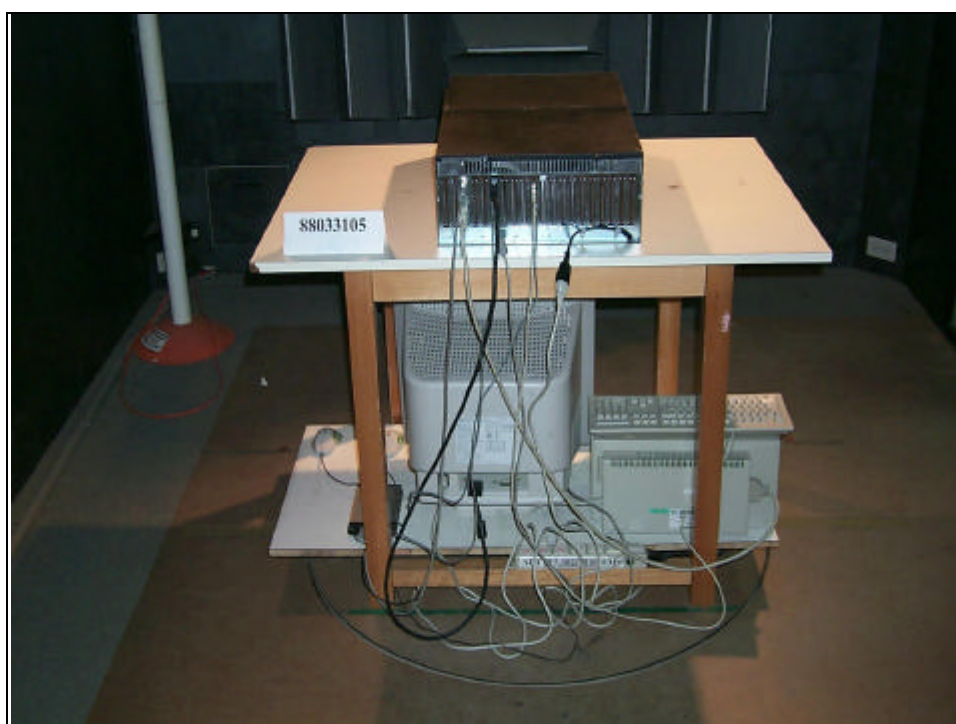
## RS TEST & PULSE MODULATION TEST (MODE 1)



## RS TEST & PULSE MODULATION TEST (MODE 2)



## RS TEST & PULSE MODULATION TEST (MODE 3)



## RS TEST & PULSE MODULATION TEST (MODE 4)



### **EFT TEST (MODE 1)**



### **EFT TEST (MODE 2)**



### EFT TEST (MODE 3)



### EFT TEST (MODE 4)



### **CONDUCTED SUSCEPTIBILITY TEST (MODE 1)**



### **CONDUCTED SUSCEPTIBILITY TEST (MODE 2)**



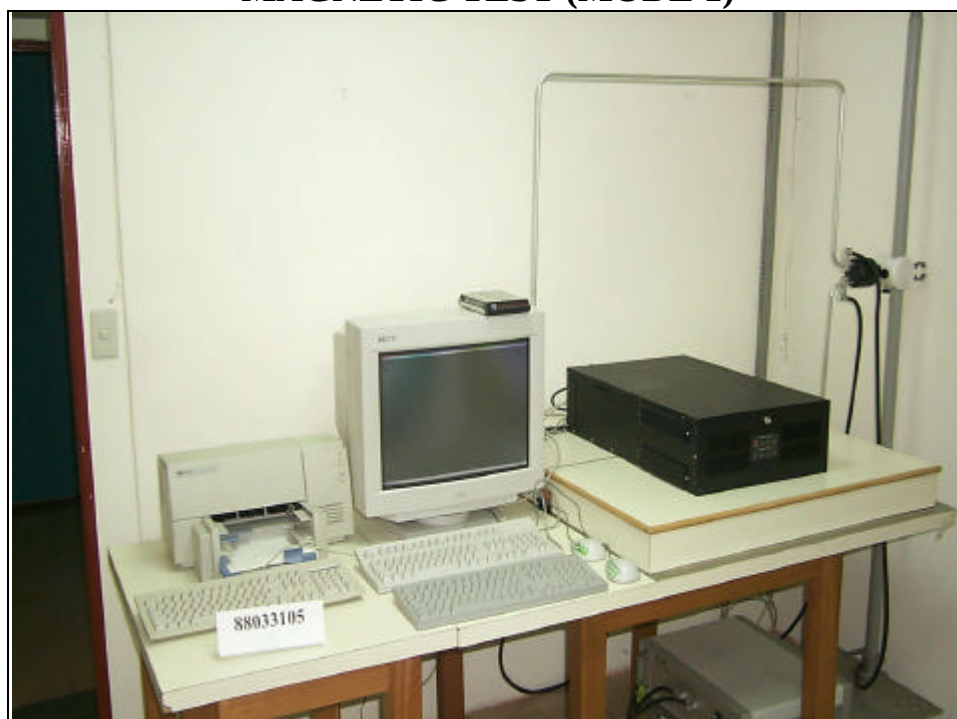
### **CONDUCTED SUSCEPTIBILITY TEST (MODE 3)**



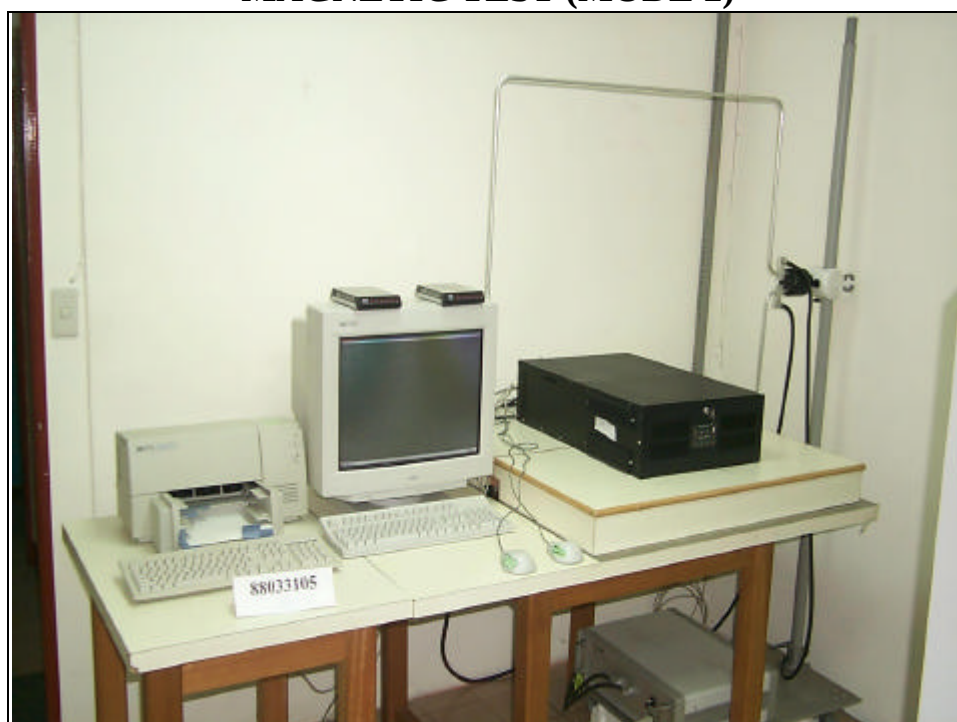
### **CONDUCTED SUSCEPTIBILITY TEST (MODE 4)**



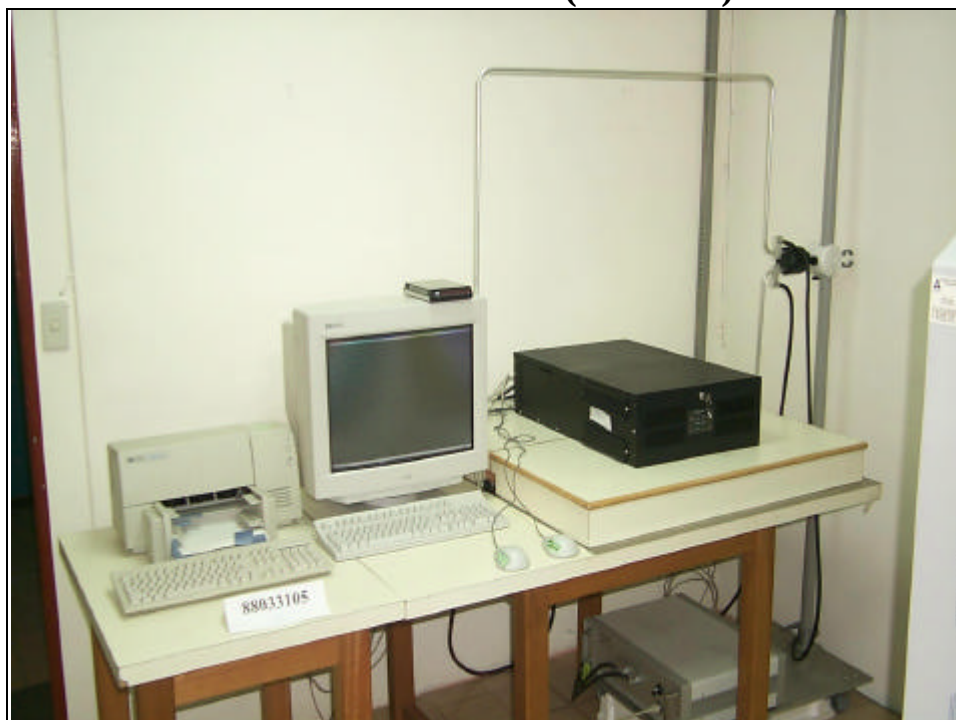
### **MAGNETIC TEST (MODE 1)**



### **MAGNETIC TEST (MODE 2)**



### **MAGNETIC TEST (MODE 3)**



### **MAGNETIC TEST (MODE 4)**





## 7. APPENDIX - INFORMATION OF THE TESTING LABORATORY

### Information of the testing laboratory

We, ADT Corp., are founded in 1988, to provide our best service in EMC and Safety consultation. Our laboratory is accredited by the following approval agencies according to ISO/IEC Guide 25 or EN 45001:

- |               |                                      |
|---------------|--------------------------------------|
| ● USA         | FCC, UL, NVLAP                       |
| ● Germany     | TUV Rheinland<br>TUV Product Service |
| ● Japan       | VCCI                                 |
| ● New Zealand | RFS                                  |
| ● Norway      | NEMKO, DNV                           |
| ● U.K.        | INCHCAPE, SGS                        |
| ● R.O.C.      | BSMI                                 |

Enclosed please find some certificates of our laboratory obtained from approval agencies. If you have any comments, please feel free to contact us with the following:

**Lin Kou EMC Lab.:**

Tel: 886-2-26032180

Fax: 886-2-26022943

**Hsin Chu EMC Lab:**

Tel: 886-35-935343

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