# FCC CLASS B COMPLIANCE REPORT (DoC)

for

Electromagnetic Emissions

of

**Mother Board**

| | |
|---|---|
| **Trade Name** | **:** N/A |
| **Model Number** | **:** 886LCD-ATX |
| **Serial Number** | **:** N/A |
| **Report Number** | **:** 020656-D |
| **Date** | **:** June 12, 2002 |

Prepared for **:**

**Firstech Technology Co., Ltd.**
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Prepared by **:**

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OET CLARIFIES RULES FOR MARKETING OF CPU BOARDS

The Commission's Office of Engineering and Technology (OET) hereby clarifies certain procedure: allow manufacturers to market Central Processing Unit (CPU) boards as separate components. Th procedures for CPU boards sold as separate components were adopted on May 9, 1996, by Report a Order in ET Docket 95-19, and became effective on August 19, 1996. See 47 CFR 15.32.

CPU boards that are marketed separately are required to meet FCC standards that limit potentia frequency interference. Determination of compliance with the emissions limits is necessary pr marketing of the CPU boards. Section 15.32 allows two ways for manufacturers to show complian the FCC's emissions limits for CPU boards. Under Section 15.32(a)(1), the CPU board may be te the cover off. If that test does not demonstrate compliance with the emission limit but these exceeded by more than 6 dB, it may be retested with the cover on. Alternatively, manufacturer cover-on test, under Section 15.32(a)(2), which requires the CPU board to be marketed together "specific enclosure" used for the test.

We wish to clarify how the "specific enclosure" referenced in Section 15.32(a)(2) may be ident CPU manufacturer. Manufacturers may comply with Section 15.32(a)(2) by either marketing the C board together with the same model of the enclosure used for testing, or by marketing the CPU separate component and supplying the following information with the installation instructions board.

The names and model numbers of sample enclosures that can be used to comply with emission limits that are readily available on the market.

A detailed description of required characteristics, such as the type of case mate aperture size of any openings, grounding requirements, etc., of other enclosures that may b used to ensure compliance with the emission limit.

The address of a web site maintained by the CPU board manufacturer listing the ab information and any updates.

CPU board manufacturers will continue to be responsible for compliance where assemblers or use followed the appropriate instructions but the complete computer does not meet the FCC emission digital devices.

- FCC -

http://www.fcc.gov/Bureaus/Engineering_Technology/Public_Notices/1999/da990890.txt 1999/7/2

# VERIFICATION OF COMPLIANCE

| | |
|---|---|
| **Equipment Under Test:** | Mother Board |
| **Trade Name:** | N/A |
| **Model Number:** | 886LCD-ATX |
| **Serial Number:** | N/A |
| **Applicant:** | **Firstech Technology Co., Ltd.**<br>7F, No. 50, Chou-Tze Street, Nei-Hu District,<br>Taipei, Taiwan, R.O.C. |
| **Manufacturer:** | **Firstech Technology Co., Ltd.**<br>7F, No. 50, Chou-Tze Street, Nei-Hu District,<br>Taipei, Taiwan, R.O.C. |
| **Type of Test:** | FCC Class B (DoC) |
| **Measurement Procedure:** | ANSI C63.4: 1992 |
| **File Number:** | 020656-D |
| **Date of test:** | June 7 ~ 10, 2002 |
| **Deviation:** | None |
| **Condition of Test Sample:** | Normal |

The above equipment was tested by C&C Laboratory, Co., Ltd. for compliance with the requirements set forth in the FCC Rules and Regulations Part 15, Subpart B and the measurement procedure according to ANSI C63.4. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment are within the compliance requirements.

The test results of this report relate only to the tested sample identified in this report.

**Responsible Party**

Lucky Chen

**Lucky Chen / EMC Director**

**Officer of the Responsible Party**

# SYSTEM DESCRIPTION

## EUT Test Program:

1. EUT was installed at internal of PC.
2. EMI test program (file name: EMCTEST. EXE) was loaded and executed in “Window” mode.
3. The EMI test program sequentially exercised all I/O’s of EUT.
4. Communicated software was loaded and executed to communicate between EUT and remote side via LAN cable.
5. The EUT sends and receives message from remote side, and filling the screen of monitor with upper case of “H” patterns.
6. Repeat 3 to 5. Test program is self-repeating throughout the test.

# PRODUCT INFORMATION

| | | | |
|---|---|---|---|
| **Housing Type:** | N/A | | |
| **EUT Power Rating:** | DCV from Power Supply | | |
| **AC Power during test** | 120VAC, 60Hz to Power Supply | | |
| **AC Power Cord Type:** | Unshielded, 1.8m (Detachable) to Power Supply | | |
| **Power Supply Manufacturer:** | DELTA | | |
| **Power Supply Model Number:** | DPS-250KB-3 | | |
| **CPU Manufacturer:** | Intel | **Type:** | P4 2.4GHz |
| **OSC/Clock Frequencies:** | 100MHz/133MHz | | |
| **Memory Capacity:** | | **Installed:** | 256MB |
| **Floppy Drive Manufacturer:** | CHINON | **Model:** | FD1231H |
| **Hard Drive Manufacturer:** | Maxtor | **Model:** | 33073H3 |
| **CD-ROM Manufacturer:** | LITE-ON | **Model:** | LTN-486S |
| **LAN Card Manufacturer:** | On Board | | |
| **VGA Card Manufacturer:** | On Board | | |

**Note:** The manufacture must list all items and the manipulation for compliance FCC requirement n the user's manual.

**I/O Port of EUT**

| I/O PORT TYPES | Q'TY | TESTED WITH |
|---|---|---|
| 1). Parallel Port | 1 | 1 |
| 2). Serial Port | 1 | 1 |
| 3). PS/2 Keyboard | 1 | 1 |
| 4). PS/2 Mouse Port | 1 | 1 |
| 5). Microphone Port | 1 | 1 |
| 6). Line-in Port | 1 | 1 |
| 7). Line-out Port | 1 | 1 |
| 8). LAN Port | 1 | 1 |
| 9). USB Port | 4 | 4 |
| 10). Video Port | 1 | 1 |

# SUPPORT EQUIPMENT

| No. | Equipment | Model # | Serial # | FCC ID | Trade Name | Data Cable | Power Cord |
|---|---|---|---|---|---|---|---|
| 1. | Monitor | CPD-G200 | 2715884 | FCC DoC | SONY | Shielded, 1.8m with a core | Unshielded, 1.8m |
| 2. | Modem | 231AA | A08431083982 | BFJ9D93108US | Hayes | Shielded, 1.8m | Unshielded, 1.8m |
| 3. | Printer | EPSON STYLUS C20SX | DW4E126664 | FCC DoC | EPSON | Shielded, 1.8m | Unshielded, 1.8m |
| 4. | PS/2 Keyboard | SK-2800C | B1C790BCPJ73JQ | GYUR79SK | Compaq | Shielded, 1.8m | N/A |
| 5. | PS/2 Mouse | M-CAA43 | LZA11752129 | FCC DoC | Logitech | Shielded, 1.8m | N/A |
| 6. | USB 2.0 External HDD | FSP024-1ADA21 | N/A | FCC DoC | TSE | Shielded, 1.8m | N/A |
| 7. | USB 2.0 External HDD | FSP024-1ADA21 | N/A | FCC DoC | TSE | Shielded, 1.8m | N/A |
| 8. | USB 2.0 External HDD | FSP024-1ADA21 | N/A | FCC DoC | TSE | Shielded, 1.8m | N/A |
| 9. | USB 2.0 External HDD | FSP024-1ADA21 | N/A | FCC DoC | TSE | Shielded, 1.8m | N/A |
| 10. | Earphone | GT-2004V | N/A | N/A | GITON | Unshielded, 1.8m | N/A |
| 11. | Walkman | RQ-L10 | HB004469 | FCC DoC | Panasonic | Unshielded, 1.8m | N/A |
| 12. | Microphone | DM-510 | I3-0 | N/A | KOKA | Unshielded, 1.8m | N/A |
| 13. | HUB | J2600A | SG43801953 | N/A | HP | LAN Cable: Unshielded, 20m | Unshielded, 1.8m |
| 14. | Notebook PC (Remote) | Valiant 6380i9TD | N/A | FCC DoC | KDS | LAN Cable: Unshielded, 1.5m | AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core |

**Note:** All the above equipment/cables were placed in worse case positions to maximize emission signals during emission test.

**Grounding:** Grounding was in accordance with the manufacturer's requirements and conditions for the intended use.

# MEASUREMENT PROCEDURE
## (PRELIMINARY LINE CONDUCTED EMISSION TEST)

1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.

2) Support equipment, if needed, was placed as per ANSI C63.4.

3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.

4) The EUT received AC power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.

5) All support equipment-received power from a second LISN supplying power of 110VAC/60Hz, if any.

6) The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.

7) Analyzer / Receiver scanned from 150kHz to 30MHz for emissions in each of the test modes.

8) During the above scans, the emissions were maximized by cable manipulation.

9) The following test mode(s) ware scanned during the preliminary test:

**Mode(s):**

**1. 2048 x 1536 Resolution + Intel P4 2.4GHz CPU + 100MHz External Clock (100Mbps)**
**2. 2048 x 1536 Resolution + Intel P4 2.4GHz CPU + 100MHz External Clock (10Mbps)**
**3. 1920 x 1440 Resolution + Intel P4 2.4GHz CPU + 100MHz External Clock (100Mbps)**
**4. 1600 x 1200 Resolution + Intel P4 2.4GHz CPU + 100MHz External Clock (100Mbps)**
**5. 1280 x 1024 Resolution + Intel P4 2.4GHz CPU + 100MHz External Clock (100Mbps)**
**6. 2048 x 1536 Resolution + Intel P4 2.4GHz CPU + 133MHz External Clock (100Mbps)**

10) After the preliminary scan, we found the following test mode producing the highest emission level.

**Mode: 1.**

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

# MEASUREMENT PROCEDURE
## (FINAL LINE CONDUCTED EMISSION TEST)

1) EUT and support equipment was set up on the test bench as per step 10 of the preliminary test.

2) A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less –2dB to the A.V. limit in Q.P. mode, then the emission signal was re-checked using an Average detector.

3) The test data of the worst case condition(s) was reported on the Summary Data page.

**Data Sample:**

| Freq. MHz | Q.P. Raw dBuV | Average Raw dBuV | Q.P. Limit dBuV | Average Limit dBuV | Q.P. Margin dB | Average Margin dB | Note |
|---|---|---|---|---|---|---|---|
| x.xx | 43.95 | --- | 56 | 46 | -12.05 | -2.05 | L 1 |

| | |
|---|---|
| Freq. | = Emission frequency in MHz |
| Raw dBuV | = Uncorrected Analyzer/Receiver reading |
| Limit dBuV | = Limit stated in standard |
| Margin dB | = Reading in reference to limit |
| Note | = Current carrying line of reading |
| "---" | = The emission level complied with the Average limits, with at least 2 dB margin, so no further recheck. |

# LINE CONDUCTED EMISSION LIMIT

| Frequency | Maximum RF Line Voltage | |
|---|---|---|
| | Q.P. | AVERAGE |
| 150kHz-500kHz | 66-56dBuV | 56-46dBuV |
| 500kHz-5MHz | 56dBuV | 46dBuV |
| 5MHz-30MHz | 60dBuV | 50dBuV |

**Note:** The lower limit shall apply at the transition frequency.

# MEASUREMENT PROCEDURE
## (PRELIMINARY RADIATED EMISSION TEST)

1) The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
2) Support equipment, if needed, was placed as per ANSI C63.4.
3) All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
4) The EUT received AC power source from the outlet socket under the turntable. All support equipment received 110VAC/60Hz power from another socket under the turntable, if any.
5) The antenna was placed at 10 meter away from the EUT as stated in ANSI C63.4: 1992. The antenna connected to the Analyzer via a cable and at times a pre-amplifier would be used.
6) The Analyzer / Receiver quickly scanned from 30MHz to 12GHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
7) The following test mode(s) ware scanned during the preliminary test:

**Mode(s):**

**1. 2048 x 1536 Resolution + Intel P4 2.4GHz CPU + 100MHz External Clock (100Mbps)**
**2. 2048 x 1536 Resolution + Intel P4 2.4GHz CPU + 100MHz External Clock (10Mbps)**
**3. 1920 x 1440 Resolution + Intel P4 2.4GHz CPU + 100MHz External Clock (100Mbps)**
**4. 1600 x 1200 Resolution + Intel P4 2.4GHz CPU + 100MHz External Clock (100Mbps)**
**5. 1280 x 1024 Resolution + Intel P4 2.4GHz CPU + 100MHz External Clock (100Mbps)**
**6. 2048 x 1536 Resolution + Intel P4 2.4GHz CPU + 133MHz External Clock (100Mbps)**

8) After the preliminary scan, we found the following test mode producing the highest emission level.

**Mode: 1. (Close Case / Open Case)**

Then, the EUT and cable configuration, antenna position, polarization and turntable position of the above highest emission level were recorded for reference of final testing.

# MEASUREMENT PROCEDURE
## (FINAL RADIATED EMISSION TEST)

1) EUT and support equipment were set up on the turntable as per step 8 of the preliminary test.

2) The Analyzer / Receiver scanned from 30MHz to 12GHz. Emissions were scanned and measured rotating the EUT to 360 degrees, varying cable placement and positioning the antenna 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.

3) Recorded at least the six highest emissions. Emission frequency, amplitude, were recorded into a computer ( The antenna position, polarization and turntable position were kept in raw data file ) in which correction factors were used to calculate the emission level and compare reading to the applicable limit.

4) The test data of the worst case condition(s) was reported on the Summary Data page.

**Data Sample:**

| Freq. (MHz) | Raw Data (dBuV/m) | Corr. Factor (dB) | Emiss. Level ( dBuV/m ) | Limits | Margin (dB) |
|---|---|---|---|---|---|
| xx.xx | 14.0 | 11.2 | 26.2 | 30 | -3.8 |

Freq. = Emission frequency in MHz
Raw Data (dBuV/m) = Uncorrected Analyzer / Receiver reading
Corr. Factor (dB) = Correction factors of antenna factor and cable loss
Emiss. Level = Raw reading converted to dBuV/m and CF added
Limit dBuV/m = Limit stated in standard
Margin dB = Reading in reference to limit

# RADIATED EMISSION LIMIT

| Frequency (MHz) | Distance (m) | Maximum Field Strength Limit (dBu V/m/ Q.P.) |
|---|---|---|
| 30-230 | 10 | 30 |
| 230-1000 | 10 | 37 |

**Note:** The lower limit shall apply at the transition frequency.

# SUMMARY DATA

# (LINE CONDUCTED TEST)

**Model Number:** 886LCD-ATX **Location:** Site # 3

**Tested by:** Michael Chen

**Test Mode:** Mode 1

**Detector Function:** Quasi-Peak **Test Results:** Passed

**Temperature:** 28 **Humidity:** 64%RH

(The chart below shows the highest readings taken from the final data)

| FREQ MHz | Q.P. Raw dBuV | AVG Raw dBuV | Q.P. Limit dBuV | AVG Limit dBuV | Q.P. Margin dB | AVG Margin dB | NOTE |
|---|---|---|---|---|---|---|---|
| 0.195 | 45.30 | --- | 63.80 | 53.80 | -18.50 | --- | L1 |
| 3.800 | 25.20 | --- | 56.00 | 46.00 | -30.80 | --- | L1 |
| 4.900 | 27.70 | --- | 56.00 | 46.00 | -28.30 | --- | L1 |
| 10.000 | 31.10 | --- | 60.00 | 50.00 | -28.90 | --- | L1 |
| 16.230 | 34.30 | --- | 60.00 | 50.00 | -25.70 | --- | L1 |
| 23.400 | 33.00 | --- | 60.00 | 50.00 | -27.00 | --- | L1 |
| 0.190 | 45.00 | --- | 64.00 | 54.00 | -19.00 | --- | L2 |
| 2.200 | 24.10 | --- | 56.00 | 46.00 | -31.90 | --- | L2 |
| 3.800 | 26.20 | --- | 56.00 | 46.00 | -29.80 | --- | L2 |
| 8.720 | 30.40 | --- | 60.00 | 50.00 | -29.60 | --- | L2 |
| 16.230 | 34.50 | --- | 60.00 | 50.00 | -25.50 | --- | L2 |
| 23.390 | 31.00 | --- | 60.00 | 50.00 | -29.00 | --- | L2 |

L1 = Line One (Hot side) / L2 = Line Two (Neutral side)

****NOTE: "---" denotes the emission level was or more than 2dB below the Average limit, so no re-check anymore.**

# SUMMARY DATA

# (RADIATED EMISSION TEST)

**Model Number:** 886LCD-ATX **Location:** Site # 4

**Tested by:** Michael Chen **Polar:** Vertical--10m

**Test Mode:** Mode 1 (Close Case) **Test Results:** Passed

**Detector Function:** Quasi-Peak

**Temperature:** 28°C **Humidity:** 66%RH

(The chart below shows the highest readings taken from the final data)

| Freq. (MHz) | Raw Data ( dBuV/m ) | Corr. Factor (dB) | Emiss. Level ( dBuV/m ) | Limits ( dBuV/m ) | Margin (dB) |
|---|---|---|---|---|---|
| 47.84 | 15.6 | 11.1 | 26.7 | 30.0 | -3.3 |
| 133.08 | 12.7 | 14.2 | 26.9 | 30.0 | -3.1 |
| 160.01 | 13.3 | 13.5 | 26.8 | 30.0 | -3.2 |
| 165.58 | 11.2 | 13.1 | 24.3 | 30.0 | -5.7 |
| 186.97 | 12.6 | 12.3 | 24.9 | 30.0 | -5.1 |
| 200.27 | 12.6 | 12.7 | 25.3 | 30.0 | -4.7 |

| | | | | | |
|---|---|---|---|---|---|
| 213.07 | 14.4 | 12.8 | 27.2 | 30.0 | -2.8 |
| 852.63 | 1.6 | 26.9 | 28.5 | 37.0 | -8.5 |
| 880.06 | 3.6 | 27.4 | 31.0 | 37.0 | -6.0 |
| 900.06 | 2.7 | 27.8 | 30.5 | 37.0 | -6.5 |

# SUMMARY DATA

# (RADIATED EMISSION TEST)

**Model Number:** 886LCD-ATX **Location:** Site # 4

**Tested by:** Michael Chen **Polar:** Horizontal--10m

**Test Mode:** Mode 1 (Close Case) **Test Results:** Passed

**Detector Function:** Quasi-Peak

**Temperature:** 28°C **Humidity:** 66%RH

(The chart below shows the highest readings taken from the final data)

| Freq. (MHz) | Raw Data ( dBuV/m ) | Corr. Factor (dB) | Emiss. Level ( dBuV/m ) | Limits ( dBuV/m ) | Margin (dB) |
|---|---|---|---|---|---|
| 76.94 | 14.3 | 9.0 | 23.3 | 30.0 | -6.7 |
| 111.18 | 12.5 | 14.1 | 26.6 | 30.0 | -3.4 |
| 123.61 | 7.8 | 14.5 | 22.3 | 30.0 | -7.7 |
| 145.48 | 11.9 | 13.9 | 25.8 | 30.0 | -4.2 |
| 191.24 | 12.5 | 12.5 | 25.0 | 30.0 | -5.0 |
| 200.30 | 13.1 | 12.7 | 25.8 | 30.0 | -4.2 |
| 213.17 | 12.4 | 12.8 | 25.2 | 30.0 | -4.8 |
| 573.91 | 6.5 | 24.7 | 31.2 | 37.0 | |

| | | | | |
|---|---|---|---|---|
| -5.8 | | | | |
| 698.49 | 5.2 | 25.2 | 30.4 | 37.0 |
| -6.6 | | | | |
| 880.91 | 2.0 | 27.4 | 29.4 | 37.0 |
| -7.6 | | | | |

# SUMMARY DATA

# (RADIATED EMISSION TEST)

**Model Number:** F886LCD-ATX **Location:** Site # 4

**Tested by:** Jason Lin **Polar:** Vertical--10m

**Test Mode:** Mode 1 (Open Case) **Test Results:** Passed

**Detector Function:** Quasi-Peak

**Temperature:** 28 **Humidity:** 66%RH

(The chart below shows the highest readings taken from the final data)

| Freq. (MHz) | Raw Data ( dBuV/m ) | Corr. Factor (dB) | Emiss. Level ( dBuV/m ) | Limits ( dBuV/m ) | Margin (dB) |
|---|---|---|---|---|---|
| 75.02 | 22.1 | 8.9 | 31.0 | 30.0 | 1.0 |
| 166.98 | 17.2 | 13.0 | 30.2 | 30.0 | .2 |
| 200.57 | 15.8 | 12.7 | 28.5 | 30.0 | -1.5 |
| 213.62 | 17.8 | 12.8 | 30.6 | 30.0 | .6 |
| 480.00 | 17.0 | 22.4 | 39.4 | 37.0 | 2.4 |
| 696.00 | 14.9 | 25.1 | 40.0 | 37.0 | 3.0 |
| 881.00 | 12.5 | 27.4 | 39.9 | 37.0 | 2.9 |

# SUMMARY DATA

# (RADIATED EMISSION TEST)

**Model Number:** 886LCD-ATX **Location:** Site # 4

**Tested by:** Jason Lin **Polar:** Horizontal--10m

**Test Mode:** Mode 1 (Open Case) **Test Results:** Passed

**Detector Function:** Quasi-Peak

**Temperature:** 26 **Humidity:** 66%RH

(The chart below shows the highest readings taken from the final data)

| Freq. (MHz) | Raw Data ( dBuV/m ) | Corr. Factor (dB) | Emiss. Level ( dBuV/m ) | Limits ( dBuV/m ) | Margin (dB) |
|---|---|---|---|---|---|
| 74.97 | 20.9 | 8.8 | 29.7 | 30.0 | -.3 |
| 143.37 | 16.5 | 14.0 | 30.5 | 30.0 | .5 |
| 168.02 | 18.6 | 12.9 | 31.5 | 30.0 | 1.5 |
| 240.01 | 21.6 | 15.1 | 36.7 | 37.0 | -.3 |
| 370.01 | 20.3 | 19.1 | 39.4 | 37.0 | 2.4 |
| 696.51 | 15.3 | 25.1 | 40.4 | 37.0 | 3.4 |
| 881.00 | 12.7 | 27.4 | 40.1 | 37.0 | 3.1 |

# SUMMARY DATA

# (RADIATED EMISSION TEST)

**Model Number:** 886LCD-ATX **Location:** 3 meter chamber

**Tested by:** Michael Chen **Polar:** Vertical ---3 m

**Test Mode:** Mode 1 (Close Case)

**Detector Function:** Pk / A.V. **Test Results:** Passed

**Temperature:** 30 **Humidity:** 60%RH

(The chart below shows the highest readings taken from the final data)

| Freq. (MHz) | Raw Data ( dBuV/m ) | Corr. Factor (dB) | Emiss. Level (Pk) ( dBuV/m ) | Limits (Pk) | Margin (dB) |
|---|---|---|---|---|---|
| 1016.00 | 16.0 | 26.4 | 42.4 | 73.9 | -31.5 |
| 1126.00 | 19.4 | 26.8 | 46.2 | 73.9 | -27.7 |
| 1204.00 | 17.9 | 27.0 | 44.9 | 73.9 | -29.0 |
| 1330.00 | 16.4 | 27.4 | 43.8 | 73.9 | -30.1 |

****Note:** In case of peak reading complied with the limit at least 22dB margin, no further measurement with A.V. detector required.

# SUMMARY DATA

# (RADIATED EMISSION TEST)

**Model Number:** 886LCD-ATX **Location:** 3 meter chamber

**Tested by:** Michael Chen **Polar:** Horizontal ---3 m

**Test Mode:** Mode 1 (Close Case)

**Detector Function:** Pk / A.V. **Test Results:** Passed

**Temperature:** 30 **Humidity:** 60%RH

(The chart below shows the highest readings taken from the final data)

| Freq. (MHz) | Raw Data ( dBuV/m ) | Corr. Factor (dB) | Emiss. Level (Pk) ( dBuV/m ) | Limits (Pk) | Margin (dB) |
|---|---|---|---|---|---|
| 1173.00 | 17.9 | 26.9 | 44.8 | 73.9 | -29.1 |
| 1330.00 | 18.4 | 27.4 | 45.8 | 73.9 | -28.1 |
| 1424.00 | 16.1 | 27.7 | 43.8 | 73.9 | -30.1 |
| 2414.00 | 15.8 | 31.3 | 47.1 | 73.9 | -26.8 |
| 3514.00 | 12.4 | 35.1 | 47.5 | 73.9 | -26.4 |

****Note:** In case of peak reading complied with the limit at least 22dB margin, no further measurement with A.V. detector required.

# SUMMARY DATA

# (RADIATED EMISSION TEST)

**Model Number:** 886LCD-ATX **Location:** 3 meter chamber

**Tested by:** Michael Chen **Polar:** Vertical ---3 m

**Test Mode:** Mode 1 (Open Case)

**Detector Function:** Pk / A.V. **Test Results:** Passed

**Temperature:** 30 **Humidity:** 60%RH

(The chart below shows the highest readings taken from the final data)

| Freq. (MHz) | Raw Data ( dBuV/m ) | Corr. Factor (dB) | Emiss. Level (Pk) ( dBuV/m ) | Limits (Pk) | Margin (dB) |
|---|---|---|---|---|---|
| 1079.00 | 19.6 | 26.6 | 46.2 | 73.9 | -27.7 |
| 1126.00 | 20.6 | 26.8 | 47.4 | 73.9 | -26.5 |
| 1204.00 | 24.6 | 27.0 | 51.6 | 73.9 | -22.3 |
| 1330.00 | 20.5 | 27.4 | 47.9 | 73.9 | -26.0 |
| 1440.00 | 21.1 | 27.8 | 48.9 | 73.9 | -25.0 |
| 1503.00 | 20.7 | 28.0 | 48.7 | 73.9 | -25.2 |
| 2414.00 | 13.2 | 31.3 | 44.5 | 73.9 | -29.4 |
| 4316.00 | 10.0 | 37.0 | 47.0 | 73.9 | -26.9 |

****Note:** In case of peak reading complied with the limit at least 22dB margin, no further measurement with A.V. detector required.

# SUMMARY DATA

# (RADIATED EMISSION TEST)

**Model Number:** 886LCD-ATX **Location:** 3 meter chamber

**Tested by:** Michael Chen **Polar:** Horizontal ---3 m

**Test Mode:** Mode 1 (Open Case)

**Detector Function:** Pk / A.V. **Test Results:** Passed

**Temperature:** 30 **Humidity:** 60%RH

(The chart below shows the highest readings taken from the final data)

| Freq. (MHz) | Raw Data ( dBuV/m ) | Corr. Factor (dB) | Emiss. Level (Pk) ( dBuV/m ) | Limits (Pk) | Margin (dB) |
|---|---|---|---|---|---|
| 1016.00 | 21.1 | 26.4 | 47.5 | 73.9 | -26.4 |
| 1063.00 | 30.1 | 26.6 | 56.7 | 73.9 | -17.2 |
| 1065.14 | 12.4 | 26.6 | 39.0 (A.V.) | 53.9 | (A.V.)-14.9 |
| 1126.00 | 25.1 | 26.8 | 51.9 | 73.9 | -22.0 |
| 1199.05 | 14.4 | 27.0 | 41.4 (A.V.) | 53.9 | (A.V.)-12.5 |
| 1204.00 | 28.2 | 27.0 | 55.2 | 73.9 | -18.7 |
| 1330.00 | 24.2 | 27.4 | 51.6 | 73.9 | -22.3 |
| 1440.00 | 29.5 | 27.8 | 57.3 | 73.9 | -16.6 |
| 1440.29 | 9.7 | 27.8 | 37.5 (A.V.) | 53.9 | (A.V.)-16.4 |

| | | | | |
|---|---|---|---|---|
| 1487.00 | 22.9 | 27.9 | 50.8 | 73.9 -23.1 |
| 1550.00 | 22.4 | 28.1 | 50.5 | 73.9 -23.4 |
| 1597.00 | 24.7 | 28.3 | 53.0 | 73.9 -20.9 |
| 1598.57 | 5.4 | 28.3 | 33.7 (A.V.) | 53.9 (A.V.)-20.2 |
| 1990.00 | 16.4 | 29.5 | 45.9 | 73.9 -28.0 |
| 2414.00 | 18.7 | 31.3 | 50.0 | 73.9 -23.9 |
| 3513.16 | -2.4 | 35.1 | 32.7 (A.V.) | 53.9 (A.V.)-21.2 |
| 3514.00 | 18.5 | 35.1 | 53.6 | 73.9 -20.3 |

****Note:** In case of peak reading complied with the limit at least 22dB margin, no further measurement with A.V. detector required.

# APPENDIX 1

# TEST FACILITY

# TEST FACILITY

**Location:** No. 81-1, 210 Lane, Pa-de 2nd Road, Lu-Chu Hsiang, Taoyuan, Taiwan, R.O.C.

**Description:** There are four 3/10m open area test sites and three line conducted labs for final test. The Open Area Test Sites and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 1992 and CISPR 16 requirements.

**Site Filing:** A site description is on file with the Federal Communications Commission, 7435 Oakland Mills Road, Columbia, MD 21046.

Registration also was made with Voluntary Control Council for Interference (VCCI).

**Site Accreditation:** Accredited by NEMKO (Authorization #: ELA 124) for EMC & A2LA (Certificate #: 824.01) for Emission

Also accredited by BSMI for the product category of Information Technology Equipment.

**Instrument Tolerance:** All measuring equipment is in accord with ANSI C63.4 and CISPR 22 requirements that meet industry regulatory agency and accreditation agency requirement.

**Ground Plane:** Two conductive reference ground planes were used during the Line Conducted Emission, one in vertical and the other in horizontal. The dimensions of these ground planes are as below. The vertical ground plane was placed distancing 40 cm to the rear of the wooden test table on where the EUT and the support equipment were placed during test. The horizontal ground plane projected 50 cm beyond the footprint of the EUT system and distanced 80 cm to the wooden test table. For Radiated Emission Test, one horizontal conductive ground plane extended at least 1m beyond the periphery of the EUT and the largest measuring antenna, and covered the entire area between the EUT and the antenna. It has no holes or gaps having longitudinal dimensions larger than one-tenth of a wavelength at the highest frequency of measurement up to 1GHz.

**Site # 3 & # 4 Line Conducted Test Site:** At Shielding Room

0363

THE AMERICAN
ASSOCIATION
FOR LABORATORY
ACCREDITATION

## ACCREDITED LABORATORY

A2LA has accredited

**C & C LABORATORY CO., LTD**
**Hsi Chin, Taipei Hsien, Taiwan, R.O.C**

for technical competence in the field of

**Electrical Testing**

The accreditation covers the specific tests and types of tests listed on the agreed scope of accreditation. This laboratory meets the requirements of ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration Laboratories" and any additional program requirements in the identified field of testing. Testing and calibration laboratories that comply with this International Standard also operate in accordance with ISO 9001 or ISO 9002 (1994).

Presented this 30th day of January, 2002.

SEAL

President
For the Accreditation Council
Certificate Number 0824.01
Valid to January 31, 2004

For tests or types of tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation

## American Association for Laboratory Accreditation

SCOPE OF ACCREDITATION TO ISO/IEC 17025:1999

C & C LABORATORY CO., LTD[1]
No. 81-1, Lane 210, Pa-De 2nd Rd.,
Lu Chu Hsiang, Taoyuan, TAIWAN, R.O.C.
Kurt Chen Phone: 002 886 3 324 0332
Fax: 002 886 3 324 5235

ELECTRICAL (EMC)

Valid to: January 31, 2004 Certificate Number: 0824.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following electromagnetic compatibility tests:

| Test Technology | Test Method(s) |
|---|---|
| *Emissions* | |
| Radiated & Conducted | CFR 47, FCC Part 15/18 using ANSI 63.4/1992&2000; AS/NZS 3548; VCCI V3 (2001); CNS 13438; CNS 13439; CNS 13783; CNS 13803; CNS 14115 CISPR 11; EN 55011; CISPR 14-1; EN 55014-1; CISPR 15; EN 55015; CISPR 22; EN 55022; EN 50081-1/ EN 61000-6-3: 2001; EN 50082-1/ EN 61000-6-4: 2001 |
| *Immunity* | |
| Electrostatic Discharge (ESD) | IEC/EN 61000-4-2; IEC 801-2 |
| Radiated Immunity | IEC/EN 61000-4-3; IEC 801-3 |
| Electrical Fast Transient/Burst | IEC/EN 61000-4-4; IEC 801-4 |
| Surge Immunity | IEC/EN 61000-4-5 |
| Conducted Immunity | IEC/EN 61000-4-6 |
| Power Frequency Magnetic Field Immunity | IEC/EN 61000-4-8 |
| Voltage Dips, Short Interruptions, and Line Voltage Variations | IEC/EN 61000-4-11 |
| Harmonics/Flicker | IEC/EN 61000-3-2; IEC/EN 61000-3-3 |

[1] Note: This accreditation covers testing performed at the main laboratory listed above, and the satellite laboratory located at No.198, Chung Sheng Road, Hsin Tien City, Taipei, TAIWAN, R.O.C.

(A2LA Cert. No. 0824.01) 01/30/02 Page 1 of 2

5301 Buckeystown Pike, Suite 350 • Frederick, MD 21704-8373 • Phone: 301-644 3248 • Fax: 301-662 2974

| *Product Immunity / Generic Immunity* | |
|---|---|
| ITE Product | CISPR 24; EN 55024 |
| Home Appliance | CISPR 14-2; EN 55014-2 |
| Residential, commercial and light Industry | EN 50081-2/ EN 61000-6-1: 2001 |
| Industry | EN 50082-2/ EN 61000-6-2: 2001 |

On the following products/equipment:
Computer Components and Peripherals; Networking Components; Wireless Communications Components; Electronic Components; Televisions; Home Appliances

01/23/02

(A2LA Cert. No. 0824.01) 01/30/02 Page 2 of 2

FEDERAL COMMUNICATIONS COMMISSION
Laboratory Division
7435 Oakland Mills Road
Columbia, MD. 21046

March 06, 2002

Registration Number: 93105

C & C Laboratory Co., Ltd.
No. 81-1, 210 Lane,
Pa-de 2nd Road, Lu-Chu Hsiang
Taoyuan
Taiwan
Attention: Kurt Chen

Re: Measurement facility located at Taoyuan
Site No. 4 (3 & 10 meters)
Date of Listing: March 06, 2002

Gentlemen:

Your submission of the description of the subject measurement facility has been reviewed and found to be in compliance with the requirements of Section 2.948 of the FCC Rules. The description has, therefore, been placed on file and the name of your organization added to the Commission's list of facilities whose measurement data will be accepted in conjunction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Please note that this filing must be updated for any changes made to the facility, and at least every three years from the date of listing the data on file must be certified as current.

If requested, the above mentioned facility has been added to our list of those who perform these measurement services for the public on a fee basis. An up-to-date list of such public test facilities is available on the Internet on the FCC Website at WWW.FCC.GOV, E-Filing, OET Equipment Authorization Electronic Filing.

Sincerely,

Thomas W Phillips
Electronics Engineer

FEDERAL COMMUNICATIONS COMMISSION
Laboratory Division
7435 Oakland Mills Road
Columbia, MD. 21046

February 27, 2001

Registration Number: 90471

C & C Laboratory Co., Ltd.
#B1, 1st Fl., No. 183, Sec. 1
Tatung Rd., Hsi Chih
Taipei
Taiwan, R.O.C.
Attention: Kurt Chen

Re: Measurement facility located at Taoyuan
Sites No. 1 & 3 (3 & 10 meters)
Date of Listing: February 27, 2001

Gentlemen:

Your submission of the description of the subject measurement facility has been reviewed and found to be in compliance with the requirements of Section 2.948 of the FCC Rules. The description has, therefore, been placed on file and the name of your organization added to the Commission's list of facilities whose measurement data will be accepted in conjunction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Please note that this filing must be updated for any changes made to the facility, and at least every three years from the date of listing the data on file must be certified as current.

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Sincerely,

Thomas W Phillips
Electronics Engineer

COMMERCE
MINISTRY OF COMMERCE
Te Manatu Tauhokohoko

ENG 3/9
AJD

22 January 1998

C & C Laboratory Co Ltd
1st Fl
No. 344
Fu Ching Street
Taipei
TAIWAN ROC

Attention: Mr Tony Houng

Dear Sir

**LABORATORY APPROVAL**

Thank you for your submission of 21 January regarding the approval of your testing laboratory to the Ministry of Commerce's laboratory approval criteria. Thank you for your interest in this matter.

I am pleased to advise that your submission has been successful and your laboratory has been added to the list of Ministry-approved laboratories. Your approved status is valid until 31 December 1998. At this time, the Approved Laboratory scheme will cease operation with the implementation of the new radiocommunications regulations. Test reports from your laboratory will be accepted under the new framework. Please find enclosed a copy of the Ministry's discussion paper, DP10, outlining the proposed compliance process from 1 January 1999.

If you have any further questions on this matter please do not hesitate to contact me.

Yours faithfully

Andrew Dyke
Senior Technical Officer(Regulatory)

***Operations and Risk Management Branch***, Ministry of Commerce Building, 33 Bowen Street, Wellington, New Zealand
P.O. Box 2847. Telephone (04) 472 0030, Fax (04) 473 3489

COMMERCE
MINISTRY OF COMMERCE
Te Manatu Tauhokohoko

ENG 3/9
AJD

22 January 1998

C & C Laboratory Co Ltd
1st Fl
No. 344
Fu Ching Street
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Andrew Dyke
Senior Technical Officer(Regulatory)

***Operations and Risk Management Branch***, Ministry of Commerce Building, 33 Bowen Street, Wellington, New Zealand
P.O. Box 2847. Telephone (04) 472 0030, Fax (04) 473 3489

Nemko World-wide Testing and Certification

ELA 4RTTE

## EMC Laboratory Authorisation

**Aut. No. : ELA 192**

**Testing of**

**Radio & Telecommunications Terminal Equipment**

**EMC Laboratory:** **C & C Laboratory Co., Ltd.**
**No. 15, 14 Lin, Chin Twu Chi, Lu Chu Hsiang,**
**Taoyuan 338, Taiwan R.O.C.**

**Scope of Authorisation:** **All CENELEC and ETSI standards [ENs and ETSs that are listed on the accompanying page, and, all of the corresponding CISPR, IEC, and ISO EMC standards]. This authorisation covers all of the EMC-related testing and documentation within the scope of the *Radio and Telecommunications Terminal Equipment [R&TTE] Directive [i.e. 1999/5/EC].***

**NOTE: This authorisation also covers EMC-related testing and documentation that is within the scope of Article 10.5 of the *EMC Directive [i.e. 89/336/EEC as amended by 92/31/EEC]***

This Authorisation Document confirms that the above mentioned EMC Laboratory has been validated against EN 45001 and found to be compliant. The laboratory also fulfils the conditions described in Nemko Document ELA 10. During Nemko's visit to the laboratory, an assessment was made of the relevant parts of your organisation - i.e. facilities, personnel qualifications, test equipment, and testing practices. It was found that the EMC Laboratory is capable of performing tests within the Scope of Authorisation given on the accompanying page. Accordingly, Nemko will accept your test reports as a basis for attesting conformity to these EMC Standards for the products in question under the European Union's Directives specified above

For Type Examination Certification(s) to be issued by Nemko, your EMC Laboratory's test report(s) will be accepted by Nemko if they are enclosed with the Application Form submitted by the manufacturer.

In order to maintain the Authorisation, the information given in the enclosed ELA-INFOs (if any) must be carefully followed. Nemko is to be promptly notified about any changes in the situation at your EMC Laboratory which may affect the basis for this Authorisation. The Authorisation may at any time be withdrawn if the conditions are no longer considered to be fulfilled.

The Authorisation is valid through **31. December 2003**.

**Oslo 26 April 2001**

For Nemko AS:

Kjell Bergh, Nemko Group EMC Co-ordinator

*Postal address:* P.O.Box 73 Blindern N-0314 OSLO, NORWAY
*Telephone:* +47 22 96 03 30
*Fax:* +47 22 96 05 50

Nemko World-wide Testing and Certification

ELA 4RTTE

## EMC Laboratory Authorisation

**Aut. No. : ELA 192**

**(Page 2 of 2)**

### SCOPE OF AUTHORISATION

**Generic and product-family standards, R&TTE**

| | | |
|---|---|---|
| ETS 300 328:1996 + A1:97<br>EN 300 328-2:2000 | ETS 300 342-1 :1997<br>EN 301 489-07 :2000 | EN 301 489-08 :2000 |
| EN 300 422-2 :2000 | ETS 300 445 :1996 + A1 :97<br>EN 301 489-09 :2000 | EN 300 454-2 :2000 |
| ETS 300 683 :1997<br>EN 301 489-03 :2000 | ETS 300 826 :1997<br>EN 301 489-17 :2000 | EN 301 357-2:2000 |
| EN 301 419-1:1999 | EN 301 419-2:1999 | EN 301 419 3:1999 |
| EN 301 489-01 2000 | | |

**Basic standards**

| | | |
|---|---|---|
| EN 61000-4-2:1995 + A1:98<br>IEC 61000-4-2:1995 + A1:98<br><br>(EN 60801-1:1993<br>IEC 801 2:1991<br>IEC 801 2:1984) | EN 61000-4-3:1996 + A1:98<br>IEC 61000 4 3:1995 + A1:98<br><br>(IEC 801.3:1984<br>ENV 50140:1993 +<br>ENV 50204:1995) | EN 61000-4-4:1995<br>IEC 61000-4-4:1995<br><br>(IEC 801.4:1990) |
| EN 61000 4 5:1995<br>IEC 61000-4-5:1995<br><br>(HNV 50142:1994) | EN 61000-4 6:1996<br>IEC 61000-4-6:1996<br><br>(HNV 50141:1993) | EN 61000-4-8:1993<br>IEC 61000-4-8:1993 |
| EN 61000-4-11:1994<br>IEC 61000-4-11:1994 | | |

**Oslo 26 April 2001** Kjell Bergh, Nemko Group EMC Co-ordinator

*Postal address:* P.O.Box 73 Blindern N-0314 OSLO, NORWAY
*Telephone:* +47 22 96 03 30
*Fax:* +47 22 96 05 50

Nemko World-wide Testing and Certification

ELA 4

## EMC Laboratory Authorisation

**Aut. No. : ELA 124**

**EMC Laboratory:** **C & C Laboratory Co., Ltd.**
**No. 15, 14 Lin, Chin Twu Chi, Lu Chu Hsiang,**
**Taoyuan 338, Taiwan R.O.C.**

**Scope of Authorization:** **All CENELEC standards [ENs] for EMC that are listed on the accompanying page, and, all of the corresponding CISPR, IEC, and ISO EMC standards that are listed on the accompanying page.**

This Authorisation Document confirms that the above-mentioned EMC Laboratory has been validated against EN 45001 and found to be compliant. The laboratory also fulfils the conditions described in Nemko Document ELA 10. During Nemko's visit to the laboratory an assessment was made of the relevant parts of your organisation - i.e. facilities, personnel qualifications, test equipment, and testing practices. It was found that the EMC Laboratory is capable of performing tests within the Scope of Authorisation given on the accompanying page. Accordingly, Nemko will accept your test reports as a basis for attesting conformity to these EMC Standards for the products in question under the European Union EMC Directive [89/336/EEC as amended by 92/31/EEC and 98/13/EC].

In case of applications for Product Certification(s) to be issued by Nemko, your EMC Laboratory's test report(s) will be accepted by Nemko if they are enclosed with the Application Form submitted by the manufacturer.

In order to maintain this Authorization, the information given in the enclosed ELA-INFOs (if any) must be carefully followed. Nemko is to be promptly notified about any changes in the situation at your EMC Laboratory, which may affect the basis for this Authorization. The Authorization may at any time be withdrawn if the conditions are no longer considered to be fulfilled.

The Authorisation is valid through **31 December 2003**.

**Oslo 26 April 2001**

For Nemko AS:

Kjell Bergh, Nemko Group EMC Co-ordinator

*Postal address:* P.O.Box 73 Blindern N-0314 OSLO, NORWAY
*Telephone:* +47 22 96 03 30
*Fax:* +47 22 96 05 50

Nemko World-wide Testing and Certification

ELA 4

## EMC Laboratory Authorisation

**Aut. No. : ELA 160**

EMC Laboratory: **C & C Laboratory Co., Ltd.**
**No. 15, 14 Lin, Chin Twu Chi, Lu Chu Hsiang,**
**Taoyuan 338, Taiwan R.O.C.**

Scope of Authorization: **EN 60601-1-2 and IEC 60601-1-2, the Collateral Standards for electromedical products, with particular application to EMC requirements only.**

This Authorisation Document confirms that the above mentioned EMC Laboratory has been validated against EN 45001 and found to be compliant. The laboratory also fulfils the conditions described in Nemko Document ELA 10. During Nemko's visit to the laboratory an assessment was made of the relevant parts of your organisation - i.e. facilities, personnel qualifications, test equipment, and testing practices. It was found that the EMC Laboratory is capable of performing tests within the Scope of Authorisation listed above. Accordingly, Nemko will accept your test reports as a basis for attesting conformity to these EMC Standards for the products in question under either the European Union Medical Device Directive [MDD], 93/42/EEC, or the European Union Active Implantable Medical Device Directive [AIMD], 90/385/EEC, (as applicable).

In case of applications for Product Certification(s) to be issued by Nemko, your EMC Laboratory's test report(s) will be accepted by Nemko if they are enclosed with the Application Form submitted by the manufacturer.

In order to maintain the Authorisation, the information given in the enclosed ELA-INFOs (if any) must be carefully followed. Nemko is to be promptly notified about any changes in the situation at your EMC Laboratory which may affect the basis for this Authorisation. The Authorisation may at any time be withdrawn if the conditions are no longer considered to be fulfilled.

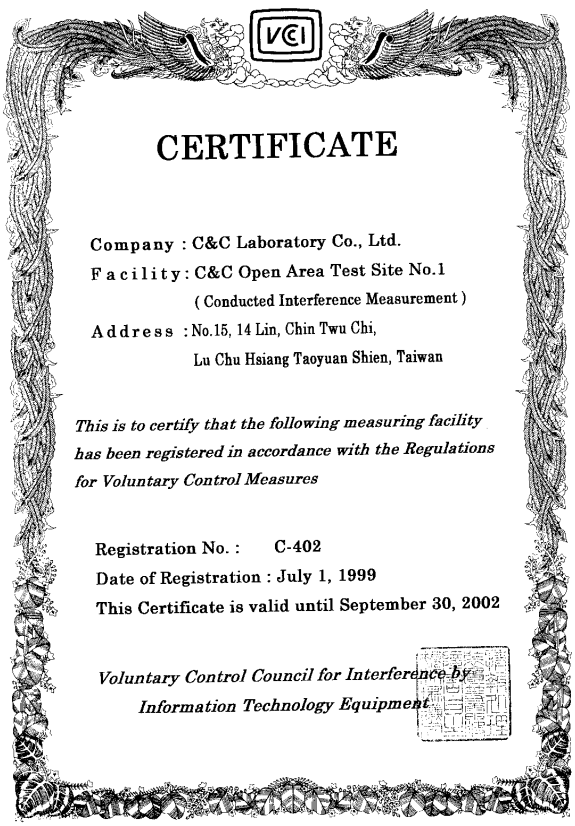
The Authorisation is valid through **31. December 2003**.

**Oslo 26 April 2001**

For Nemko AS:

Kjell Bergh, Nemko Group EMC Co-ordinator

*Postal address:* P.O.Box 73 Blindern N-0314 OSLO, NORWAY
*Telephone:* +47 22 96 03 30
*Fax:* +47 22 96 05 50



# CERTIFICATE

Company : C&C Laboratory Co., Ltd.
Facility: C&C Open Area Test Site No.1
( Conducted Interference Measurement )
Address : No.15, 14 Lin, Chin Twu Chi,
Lu Chu Hsiang Taoyuan Shien, Taiwan

*This is to certify that the following measuring facility has been registered in accordance with the Regulations for Voluntary Control Measures*

Registration No. : C-402
Date of Registration : July 1, 1999
This Certificate is valid until September 30, 2002

*Voluntary Control Council for Interference by Information Technology Equipment*

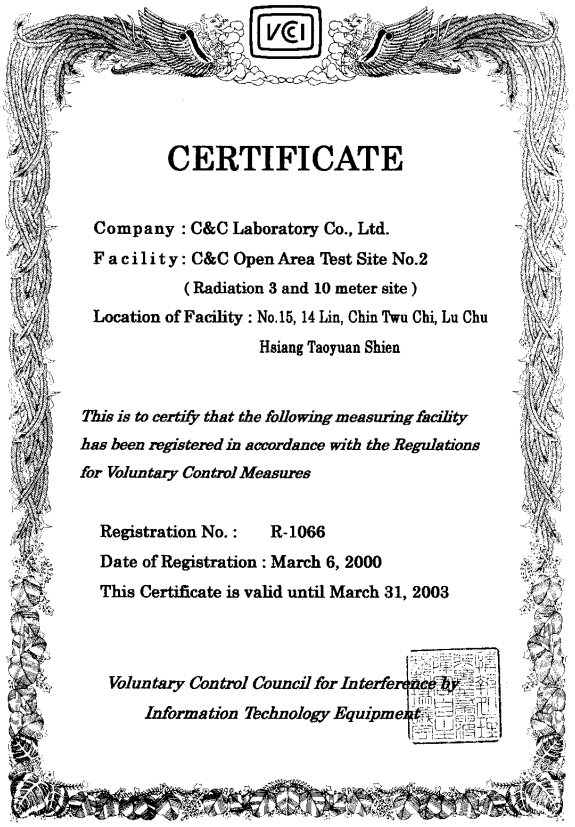
# CERTIFICATE

Company : C&C Laboratory Co., Ltd.
Facility: C&C Open Area Test Site No.1
( Radiation 3 and 10 meter site )
Address : No.15, 14 Lin, Chin Twu Chi,
Lu Chu Hsiang Taoyuan Shien, Taiwan

*This is to certify that the following measuring facility has been registered in accordance with the Regulations for Voluntary Control Measures*

Registration No. : R-393
Date of Registration : July 1, 1999
This Certificate is valid until September 30, 2002

*Voluntary Control Council for Interference by Information Technology Equipment*



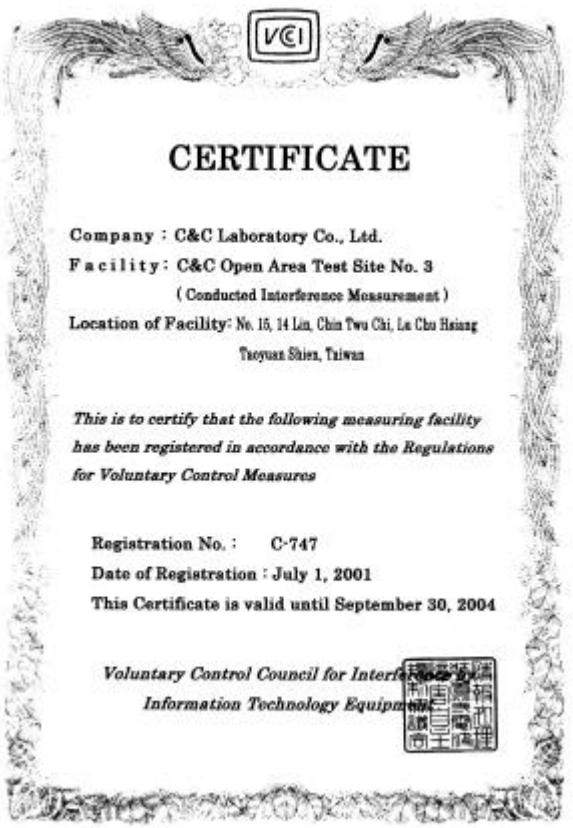
# CERTIFICATE

Company : C&C Laboratory Co., Ltd.
Facility: C&C Open Area Test Site No.2
( Radiation 3 and 10 meter site )
Location of Facility : No.15, 14 Lin, Chin Twu Chi, Lu Chu Hsiang Taoyuan Shien

*This is to certify that the following measuring facility has been registered in accordance with the Regulations for Voluntary Control Measures*

Registration No. : R-1066
Date of Registration : March 6, 2000
This Certificate is valid until March 31, 2003

*Voluntary Control Council for Interference by Information Technology Equipment*



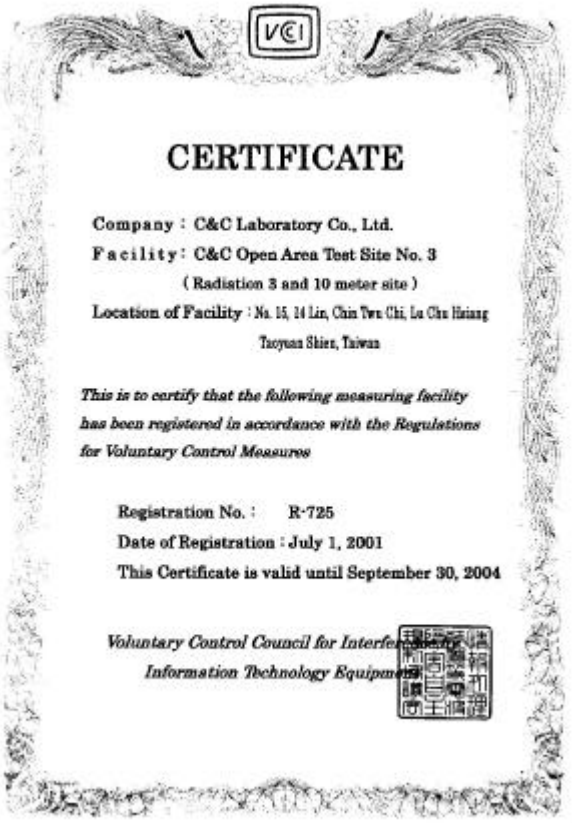
# CERTIFICATE

Company : C&C Laboratory Co., Ltd.
Facility: C&C Open Area Test Site No. 3
( Conducted Interference Measurement )
Location of Facility: No. 15, 14 Lin, Chin Twu Chi, Lu Chu Hsiang Taoyuan Shien, Taiwan

*This is to certify that the following measuring facility has been registered in accordance with the Regulations for Voluntary Control Measures*

Registration No. : C-747
Date of Registration : July 1, 2001
This Certificate is valid until September 30, 2004

*Voluntary Control Council for Interference by Information Technology Equipment*



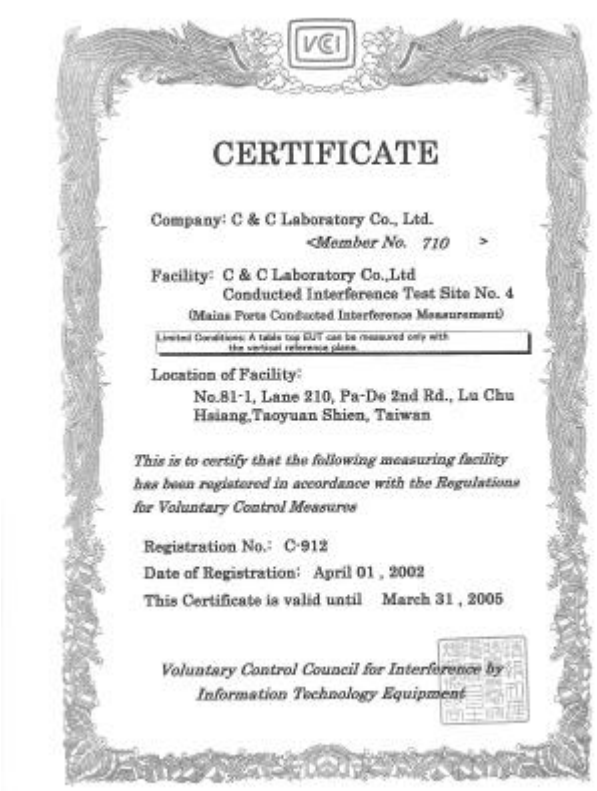
# CERTIFICATE

**Company : C&C Laboratory Co., Ltd.**
**Facility: C&C Open Area Test Site No. 3**
**( Radiation 3 and 10 meter site )**
**Location of Facility : No. 15, 14 Lin, Chin Twu Chi, Lu Chu Hsiang**
**Taoyuan Shien, Taiwan**

***This is to certify that the following measuring facility has been registered in accordance with the Regulations for Voluntary Control Measures***

**Registration No. : R-725**
**Date of Registration : July 1, 2001**
**This Certificate is valid until September 30, 2004**

*Voluntary Control Council for Interference by Information Technology Equipment*



# CERTIFICATE

Company: C & C Laboratory Co., Ltd.
*<Member No. 710 >*

Facility: C & C Laboratory Co.,Ltd
Conducted Interference Test Site No. 4
(Mains Ports Conducted Interference Measurement)

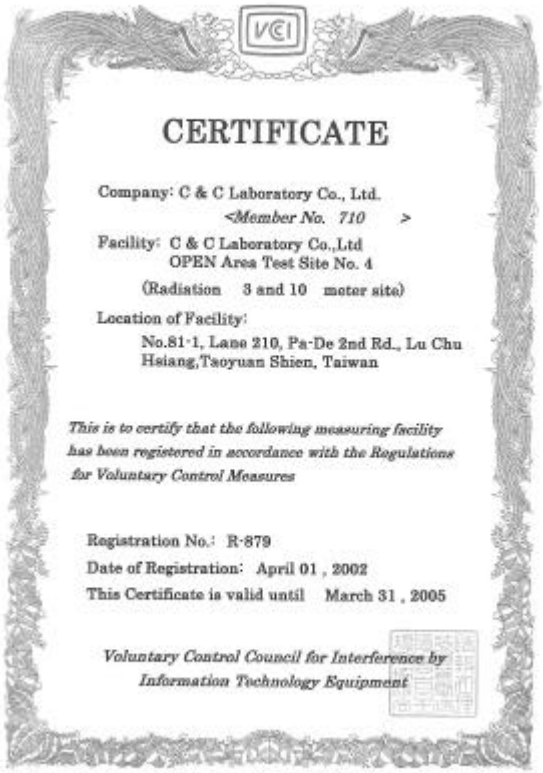
Limited Conditions: A table top EUT can be measured only with the vertical reference plane.

Location of Facility:
No.81-1, Lane 210, Pa-De 2nd Rd., Lu Chu Hsiang,Taoyuan Shien, Taiwan

*This is to certify that the following measuring facility has been registered in accordance with the Regulations for Voluntary Control Measures*

Registration No.: C-912
Date of Registration: April 01 , 2002
This Certificate is valid until March 31 , 2005

*Voluntary Control Council for Interference by Information Technology Equipment*



# CERTIFICATE

Company: C & C Laboratory Co., Ltd.
*<Member No. 710 >*

Facility: C & C Laboratory Co.,Ltd
OPEN Area Test Site No. 4
(Radiation 3 and 10 meter site)

Location of Facility:
No.81-1, Lane 210, Pa-De 2nd Rd., Lu Chu Hsiang,Taoyuan Shien, Taiwan

*This is to certify that the following measuring facility has been registered in accordance with the Regulations for Voluntary Control Measures*

Registration No.: R-879
Date of Registration: April 01 , 2002
This Certificate is valid until March 31 , 2005

*Voluntary Control Council for Interference by Information Technology Equipment*

Technischer Überwachungs-Verein Rheinland

TÜV Rheinland

# Certificate

of

# Appointment

No. 19964142-9906

The applicant:

**C & C Laboratory Co., Ltd.**

**No. 15, 14 Lin, Chin twu Chi, Lu Chu Hsiang, Taoyuan, Taiwan, R.O.C.**

has been authorized to carry out EMC tests by order and under supervision of TÜV Rheinland according to

**EN 55 011:1991, EN 55 014-1:1993/A1, EN 55 022:1994/A1, EN 55 014-2:1997, EN 60 555-2:1987, EN 61 000-3-2:1995, EN 61 000-3-3:1995 EN 50 081-1:1992, EN 50 082-1:1992, EN 50 082-1:1997, EN 50 081-2:1993 EN 50 082-2:1995, IEC 801-2:1984, IEC 801-2:1991, IEC 801-3:1984 IEC 801-4:1988, IEC 801-5:1990, EN 61 000-4-2:1995, ENV 50 140:1993, ENV 50 141:1993 ENV 50 204:1995, EN 61 000-4-3:1996, EN 61 000-4-4:1995, EN 61 000-4-5:1995 EN 61 000-4-6:1995, EN 61 000-4-8:1993, EN 61 000-4-11:1994**

An inspection of the facility was conducted according to the Document "Approval of Test Site" with reference to EN 45 001 by a TÜV Rheinland inspector.

Audit Report No. P 9964142E01, Rev.-

This certificate is valid until the next scheduled inspection or up to 15 month, at the discretion of TÜV Rheinland.

TÜV Rheinland Taiwan Ltd.
Taipei, 24. June 1999

Dipl.-Ing. A. Klinker

Dipl.-Ing. R. Charton
Auditor

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中華民國經濟部標準檢驗局
臺北市濟南路一段四號
BUREAU OF STANDARDS, METROLOGY AND INSPECTION
MINISTRY OF ECONOMIC AFFAIRS, REPUBLIC OF CHINA
4, SEC. 1, CHINAN ROAD, TAIPEI, TAIWAN, R. O. C.
Tel: 886-2-23431700 FAX: 886-2-23932324

To: C&C Laboratory Co., Ltd

IN REPLY REFER TO
90-3-3000015

#B1, 1st Fl., Universal Center, No. 183, Sec. 1, Tatung Rd., His Chih, Taipei Hsien, Taiwan, R.O.C.

This Designation Document confirms that your subject measurement facility has been validated according to the **ISO/IEC Guide 25-1990** and found to be in compliance with the requirements of " BSMI's Operation Guidelines of the Approval and Management of Designated Laboratories."

The description of your facility has, therefore, been placed on file and the name of your organization added to the Bureau's list of facilities whose measurement data and test reports will be accepted as a basis for attesting conformity to CNS13803-1997, CNS13438-1997, CNS13783-1-1998, CNS13439-1997, CNS14115-1998 for Industrial, Scientific and Medical Instrument、Information Technology Equipment、household appliances/tools、broadcast receivers and related equipments and fluorescent lights/luminaries.

It is located at: **http://www.bsmi.gov.tw**

Please reference the file numbers below in the body of all test reports containing measurements made on the corresponding facility.

For your **EMI Testing Lab**, use reference "**SL2-IS-E-0014, SL2-IN-E-0014, SL2-A1-E-0014, SL2-R1-E-0014, SL2-R2-E-0014, SL2-L1-E-0014**"

Note that this filing must be updated for any changes made to the documentation and / or facility and whenever major modifications to your documentation or major construction or repairs to your facility are completed, re-submission of the related information or the site attenuation characteristics will be required within 2 weeks.

The Designation is valid through January 16, 2004.

Taipei, January 5, 2000
For BSMI, MOEA

Neng-Jong Lin

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## Chinese National Laboratory Accreditation Certificate ROC

This is to certify that C & C EMC Laboratory, C & C Laboratory Co., Ltd.(Registration No.:0363) has been recognized by the Council of Chinese National Laboratory Accreditation as an accredited laboratory. The laboratory has been registered for fourteen items within the field of Electrical Testing and confirmed to meet the requirements of ISO/IEC 17025. The details of the scope of accreditation are described in the following pages and this certificate is valid until November 14, 2004.

Neng-Jong Lin
Chairman of Chinese National Laboratory Accreditation Council

on May 15, 2002
(This document is invalid unless accompanied by all 5 pages)

CNLA 0363



Organization : C & C Laboratory Co., Ltd.
Laboratory : C & C EMC Laboratory
Registration No. : 0363
Laboratory Head : WANG, Charles
Testing Field : Electrical Testing
Date of Registration: 1998.11.15
Date of Extension : 2001.11.15

| Registration items | Test items | Test Methods | Ranges | Best Test capability recognized | Remarks |
|---|---|---|---|---|---|
| EH0280 Low power R.F. equipment | Low power radiators/receivers | DOT Low Power Radio Device Technical Specification (2000.10) | 9 kHz~50 GHz | | |
| | Low power R. F. Equipment | ETSI EN 300 328-1 V1.3.1 (2001-08)<br>ETSI EN 300 328-2 V1.2.1 (2001-08)<br>ETSI EN 300 220-1 V1.3.1 (2000-09)<br>TEST EN 300 220-2 V1.2.1 (2000-09)<br>TEST EN 300 220-3 V1.1.1 (2000-09)<br>47 CFR Part 15 Subpart C (2000-10) | | | |
| EJ0102 Harmonic current emissions | ITE and peripheral products | IEC 61000-3-2(1995) A1(2001)<br>EN 61000-3-2(1995) A1(1998), A2(1998), A14(2000) | EUT Voltage: 0-270VAC<br>(Single Phase)50/60 Hz<br>EUT current:0-16 A<br>Harmonic number:<br>1~40 order | | |
| EJ0103 Voltage fluctuations and flicker | ITE and peripheral Products | IEC 1000-3-3 (1994)<br>EN 61000-3-3 (1995) | EUT Voltage:0-270 VAC<br>(Single Phase)50/60 Hz<br>EUT Current:0-16 A<br>Standard impedance:Ra = 0.4 Ω | | |



| Registration items | Test items | Test Methods | Ranges | Best Test capability recognized | Remarks |
|---|---|---|---|---|---|
| EJ0113 Audio and television broadcast receivers and associated equipment | Broadcast receivers and associated equipment | EN 55013:1990+A12:1994+A13:1996<br>CISPR 13:1975+A1:1983<br>CNS 13439 (1997.5) | EUT Voltage:100~270 VAC<br>(Single Phase)50/60 Hz<br>EUT Current:0~30 A<br>9 kHz~1.75 GHz<br>Conduction Emission:<br>9 kHz~30 MHz<br>Antenna Terminal:<br>30 MHz~1.75 GHz<br>Radiation Emission:<br>30 MHz~1000 GHz<br>Disturbance Power:<br>30~300 MHz | | |
| EJ0114 Electrical appliances and systems | Household appliances/Electric tools and similar apparatus | EN 55014-1 : 1993+A1 : 1997+A2 : 1999<br>CISPR 14 : 1993+A1 : 1996+A2 : 1998<br>CNS 13783-1 (1998.6) | EUT Voltage:0-270 VAC<br>(Single/3 Phase)50/60 Hz<br>EUT Current:0~200 A<br>Conduction Emission:<br>9 kHz~30 MHz<br>Disturbance Power:<br>30~300 MHz | | |
| EJ0115 Fluorescent lamps and luminosities | Fluorescent Lamps and Luminosities | CISPR 15 (1992)<br>EN 55015 (1999)<br>CNS 14115 (1998) | EUT Voltage:0-270 VAC<br>(Single/3 Phase)<br>Conduction emission frequency range:9 kHz~30 MHz<br>Magnetic interference frequency range:9 kHz~30 MHz<br>(Magnetic loop antenna)<br>Insertion loss frequency range:150~8605 kHz<br>Lamp EM interference frequency | | |

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| Registration items | Test items | Test Methods | Ranges | Best Test capability recognized | Remarks |
|---|---|---|---|---|---|
| | | | range:<br>30 MHz~26.5 GHz | | |
| EJ0122<br>Systems and apparatus of the telecommunication and information technology | ITE and peripheral products | CISPR 22 (1997)<br>EN 55022 (1998)<br>CNS 13438 (1997)<br>AS/NZS 3548 (1998)<br>FCC (2001)<br>47 CFR Part 15 Subpart B (2000.10) | EUT Voltage:0~270 VAC<br>(Single/3 Phase)50/60 Hz<br>EUT Current:0~200 A<br>Conduction interference:<br>150 KHz~30 MHz<br>Radiation interference:<br>30 MHz~26.5 GHz | | |
| EJ0202<br>Electrostatic discharge tests | ITE and peripheral products | IEC 61000-4-2 (2001)<br>EN 61000-4-2 (1995)<br>CNS 13022-1 (1992) | EUT Voltage:100~270 VAC<br>(Single Phase)50/60 Hz<br>EUT Current:0~16 A<br>Air discharge:<br>0.2~25 KV(+/-)<br>Contact discharge:<br>0.2~15 KV(+/-) | | |
| EJ0203<br>Radiated susceptibility tests | ITE and peripheral products | IEC 801-3 (1984)<br>IEC 1000-4-3 (1995)<br>EN 61000-4-3 (1996)<br>ENV 50204 (1995) | EUT Voltage:0~270 VAC<br>(Single Phase)50/60 Hz<br>EUT Current:0~30 A<br>Frequency range:<br>26MHz~1.0 GHz<br>(Field intensity:10 V/m, AM Modulation) | | |
| EJ0204<br>Electrical fast transient/burst tests | ITE and peripheral products | IEC 801-4 (1988)<br>IEC 1000-4-4 (1995)<br>EN 61000-4-4 (1995)<br>CNS 13022-2 (1992) | EUT Voltage:0~270 VAC<br>(Single/3 phase)50/60 Hz<br>EUT Current:0~200 A<br>Equipment range:0.2~4.5 kV | | |

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| Registration items | Test items | Test Methods | Ranges | Best Test capability recognized | Remarks |
|---|---|---|---|---|---|
| EJ0205<br>Surge/lightening tests | ITE and peripheral products | IEC 1000-4-5 (1995)<br>ENV 50142 (1994)<br>CNS 13022-3 (1992)<br>EN 61000-4-5 (1995) | EUT Volt.:0~270 VAC<br>(Single phase)50/60 Hz<br>DC 100V<br>EUT Current:0~16 A (AC/DC)<br>Equipment range :0.2~4.2 kV<br>Test Ports:Power line, Signal line | | |
| EJ0206<br>Conducted susceptibility tests | ITE and peripheral products | IEC 1000-4-6 (1993)<br>EN 61000-4-6 (1996)<br>ENV 50141 (1993) | EUT Voltage:0~270 VAC<br>(Single Phase)50/60 Hz<br>EUT Current:0~16 A<br>Frequency range:<br>150 kHz~230 MHz<br>(Amplitude:10 V, AM Modulation) | | |
| EJ0208<br>Power frequency magnetic field immunity test | ITE and peripheral products | IEC 1000-4-8 (1993)<br>EN 61000-4-8 (1993) | EUT Voltage:0~270 VAC<br>(Single/3 Phase)50/60 Hz<br>EUT Current:0~16 A<br>Continuous magnetic field:<br>1~100 A/m | | |
| EJ0211<br>Voltage dips,short interruptions and voltage variations immunity tests<br><br>( Null Below ) | ITE and peripheral products | IEC 1000-4-11 (1994)<br>ENV 61000-4-11 (1994) | EUT Voltage:100~270 VAC<br>(Single Phase)50/60 Hz<br>EUT Current:0~16 A<br>Voltage interruption:<br>100 %<br>Voltage Dips:0~100 %<br>Voltage variation:<br>Standard variation wave shape | | |

# APPENDIX 2

# TEST EQUIPMENT

# TEST EQUIPMENT LIST

**Instrumentation:** The following list contains equipment used at C & C Laboratory, Co., Ltd. for testing. The equipment conforms to the CISPR 16-1 / ANSI C63.2-1988 Specifications for Electromagnetic Interference and Field Strength Instrumentation from 10kHz to 1.0GHz or above.

**Equipment used during the tests:**

**Open Area Test Site:** # 4

| Open Area Test Site # 4 | | | | | |
|---|---|---|---|---|---|
| **EQUIPMENT TYPE** | **MFR** | **MODEL NUMBER** | **SERIAL NUMBER** | **LAST CAL.** | **CAL. DUE** |
| Spectrum Analyzer | ADVANTEST | R3132 | 91700456 | 02/22/2002 | 02/21/2003 |
| EMI Test Receiver | R&S | ESVS10 | 846285/016 | 04/18/2002 | 04/17/2003 |
| Bilog Antenna | CHASE | CBL 6112B | 2462 | 01/12/2002 | 01/11/2003 |
| Turn Table | Chance most | N/A | N/A | N.C.R | N.C.R |
| Antenna Tower | Chance most | N/A | N/A | N.C.R | N.C.R |
| Controller | Chance most | N/A | N/A | N.C.R | N.C.R |
| RF Switch | ANRITSU | MP59B | M51067 | N.C.R | N.C.R |
| Site NSA | C&C Lab. | N/A | N/A | 11/24/2001 | 11/23/2002 |

| 3 meter chamber | | | | | |
|---|---|---|---|---|---|
| **EQUIPMENT TYPE** | **MFR** | **MODEL NUMBER** | **SERIAL NUMBER** | **LAST CAL.** | **CAL. DUE** |
| Spectrum Analyzer | ADVANTEST | R3271A | 85060321 | 10/15/2001 | 10/14/2002 |
| Pre-Amplifier | HP | 8449B | 3008A00965 | 10/11/2001 | 10/10/2002 |
| Horn Antenna | EMCO | 3115 | 9602-4659 | 04/16/2002 | 04/15/2003 |
| Coaxial Cable | ANOREW | LDF-2-50 | 79027 | 09/22/2001 | 09/21/2002 |
| Turn Table | HD | HD320 | N/A | N.C.R | N.C.R |
| Antenna Tower | HD | MA 240 | N/A | N.C.R | N.C.R |
| Controller | HD | HD 100 | N/A | N.C.R | N.C.R |

**Conducted Emission Test Site:** # 3

| Conducted Emission Test Site # 3 | | | | | |
|---|---|---|---|---|---|
| **EQUIPMENT TYPE** | **MFR** | **MODEL NUMBER** | **SERIAL NUMBER** | **LAST CAL.** | **CAL. DUE** |
| EMI Test Receiver | R&S | ESCS30 | 847793/012 | 12/19/2001 | 12/18/2002 |
| LISN | R&S | ESH2-Z5 | 843285/010 | 12/10/2001 | 12/09/2002 |
| LISN | EMCO | 3825/2 | 9003-1628 | 07/16/2001 | 07/15/2002 |

The calibrations of the measuring instruments, including any accessories that may effect such calibration, are checked frequently to assure their accuracy. Adjustments are made and correction factors applied in accordance with instructions contained in the manual for the measuring instrument.

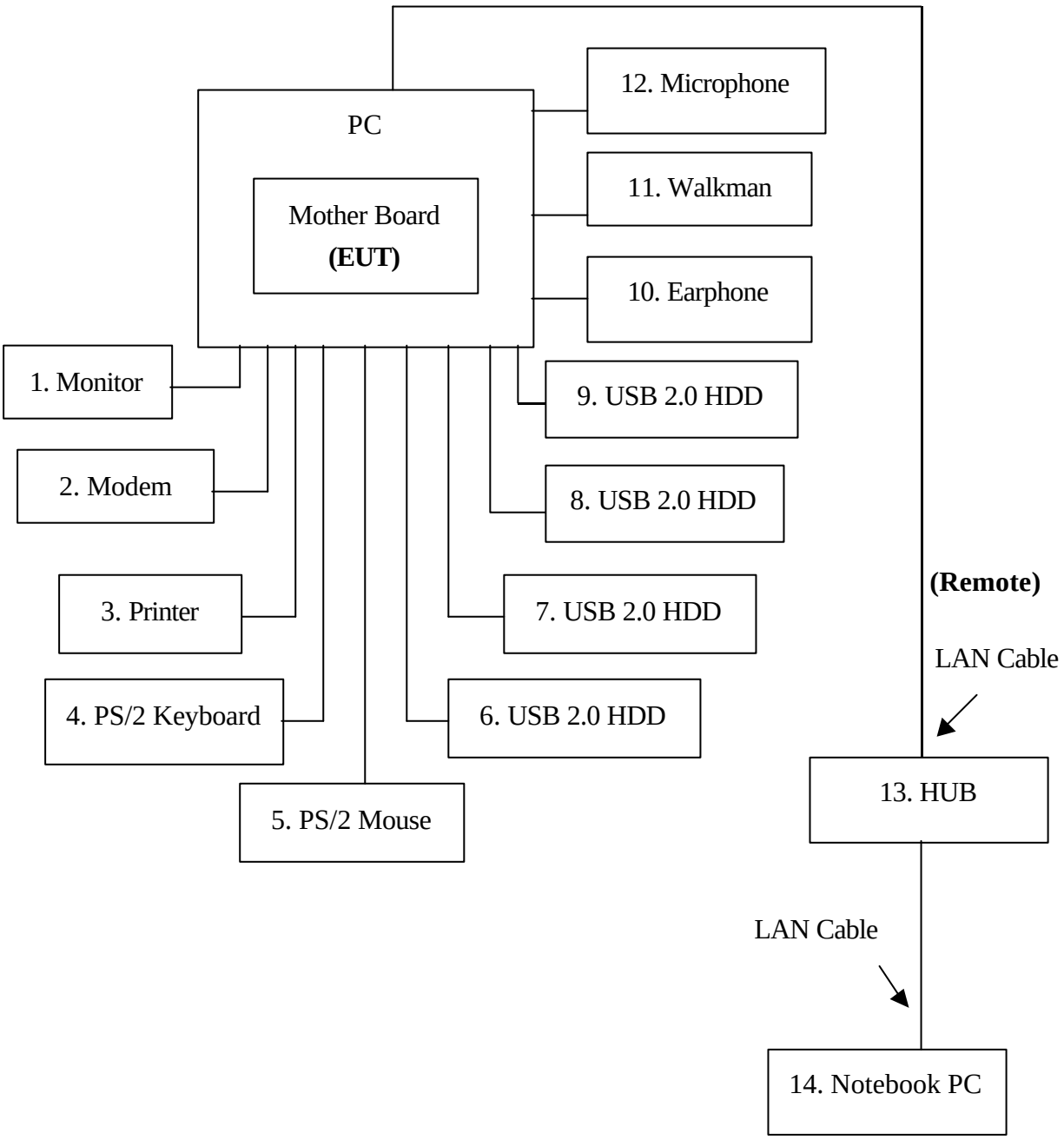
# APPENDIX 3

# BLOCK DIAGRAM OF TEST SETUP

# BLOCK DIAGRAM OF TEST SETUP

**System Diagram of Connections between EUT and Simulators**

**EUT:** Mother Board
**Trade Name:** N/A
**Model Number:** 886LCD-ATX
**AC Power Cord:** Unshielded, 1.8m to Power Supply



# APPENDIX 4

# PHOTOGRAPHS OF TEST SETUP
# (TEST SETUP OF LINE CONDUCTED EMISSION)

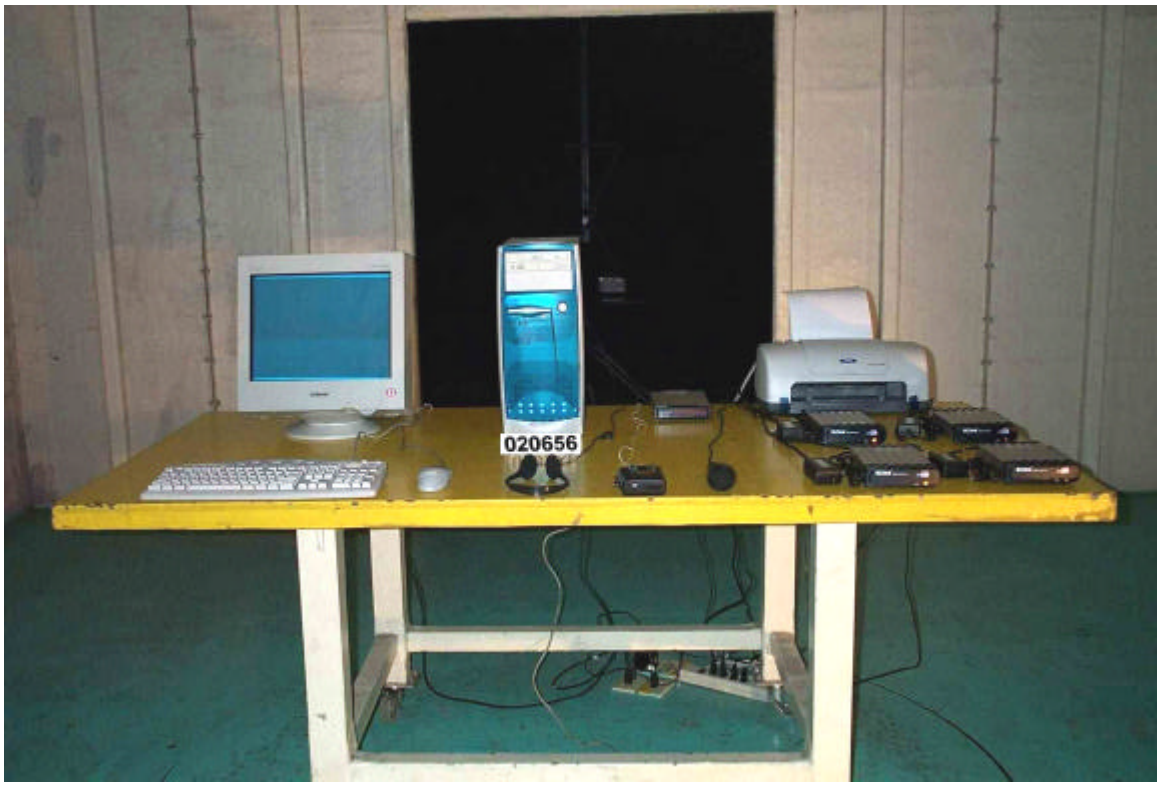
# LINE CONDUCTED EMISSION TEST

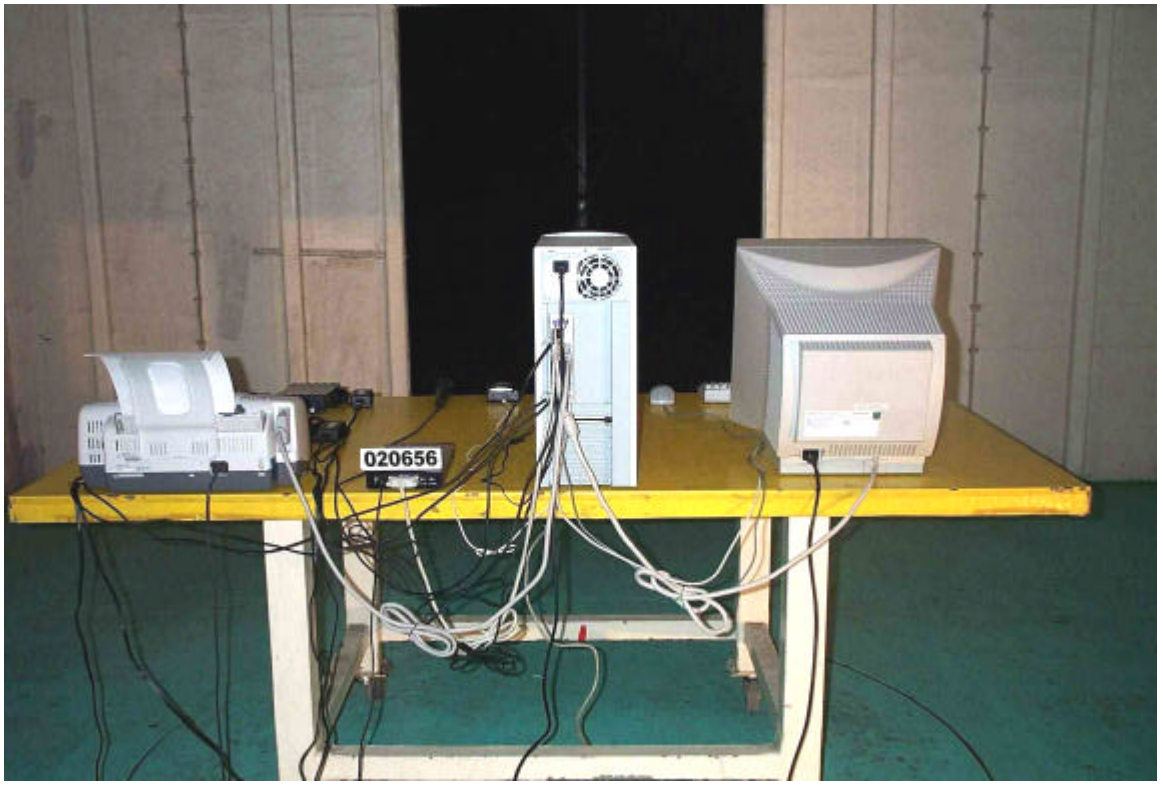

# APPENDIX 5

# PHOTOGRAPHS OF TEST SETUP
# (TEST SETUP OF RADIATED EMISSION)

# RADIATED EMISSION TEST

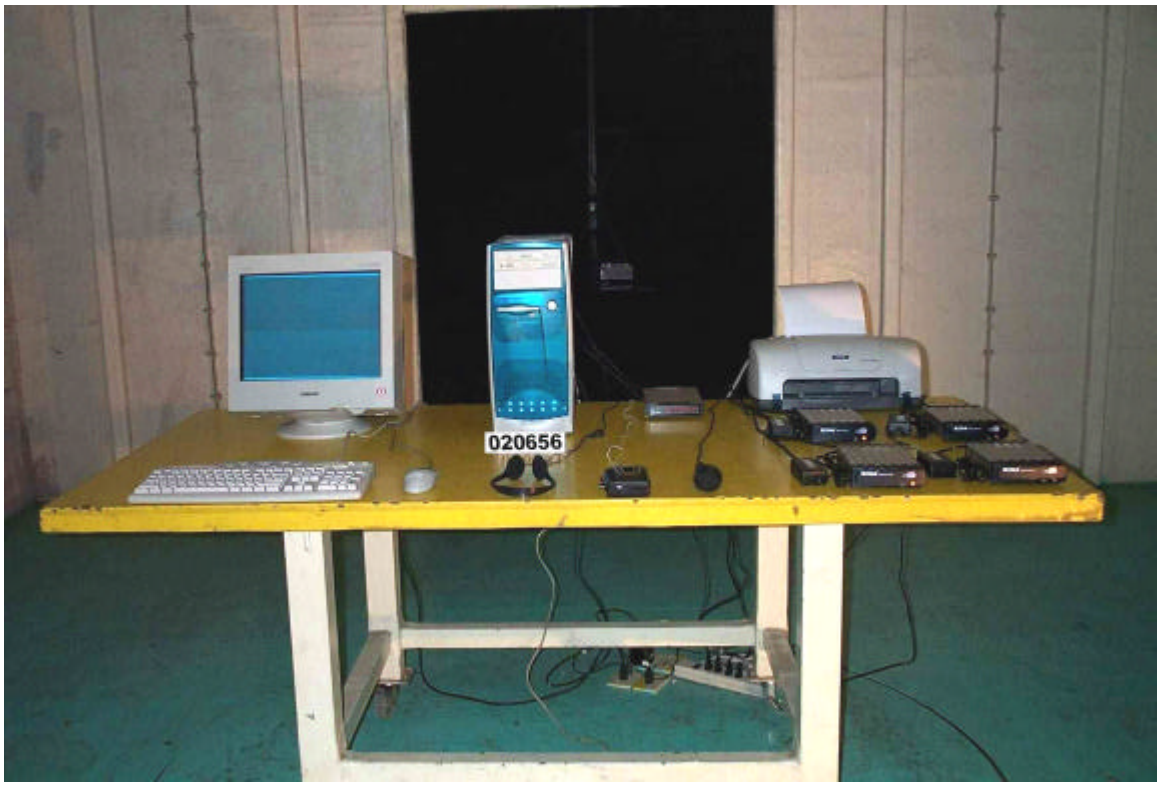
## (Close Case)

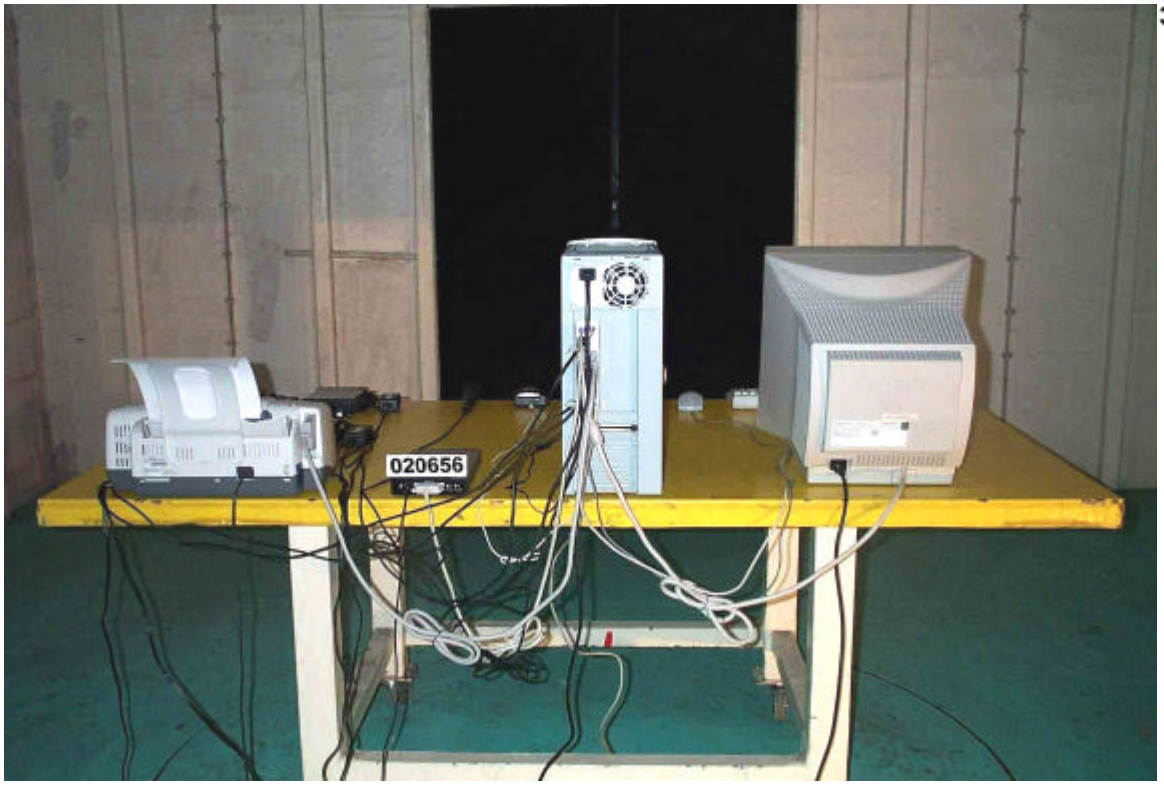


# RADIATED EMISSION TEST

## (Open Case)




020656

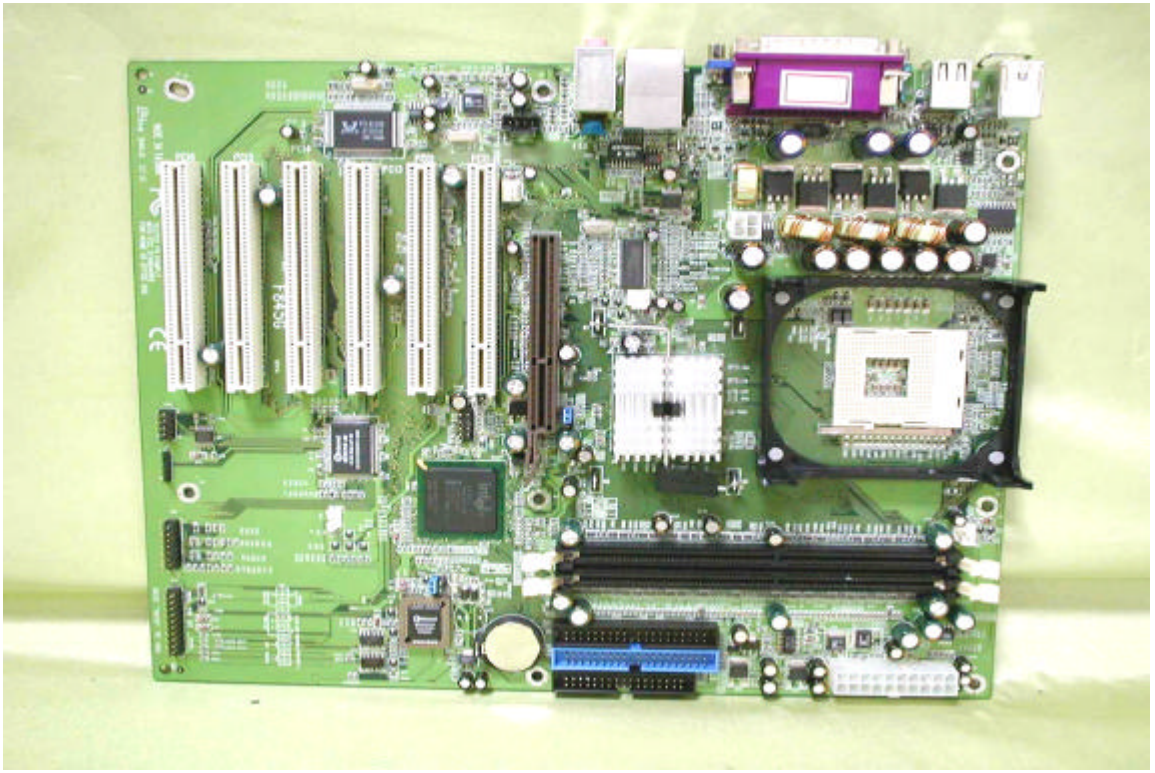
# APPENDIX 6

# PHOTOGRAPHS OF EUT

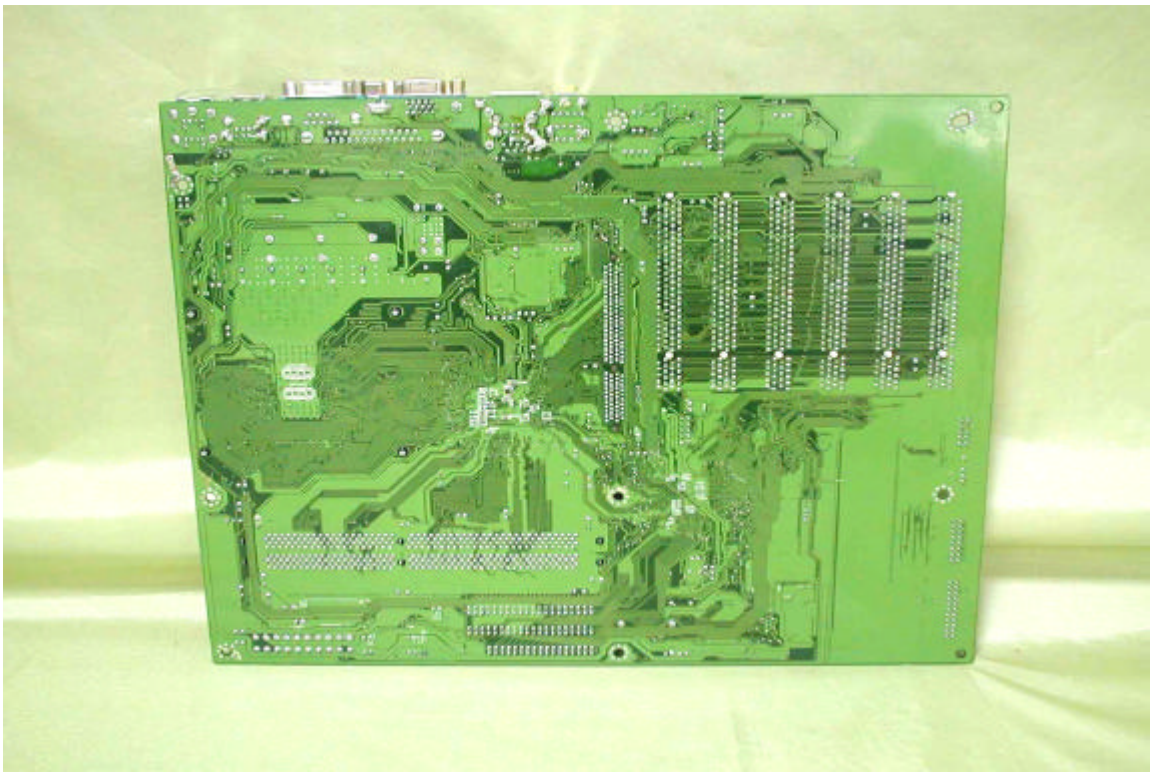
# Front View of PC

# Back View of PC

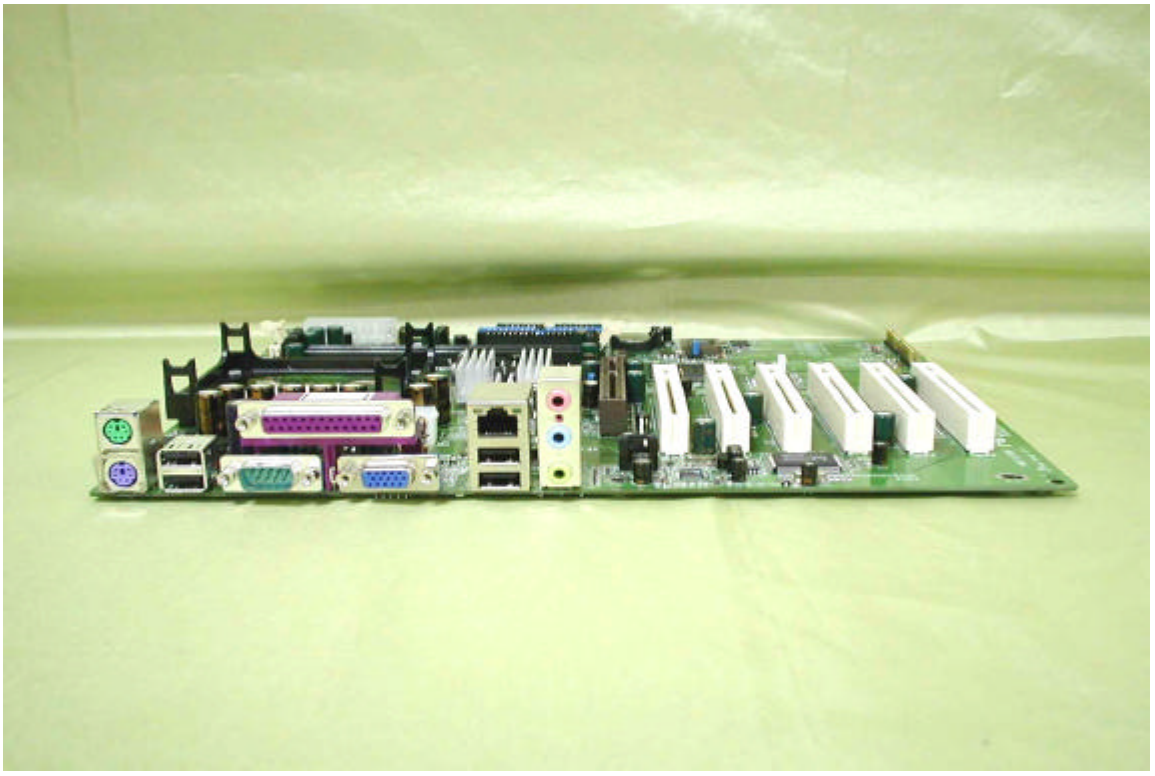
# Front View of EUT



# Back View of EUT



# I/O Port of EUT



# Internal View of PC