



## EMC COMPLIANCE TEST REPORT

for

### 586 CPU BOARD BISCUIT FORM FACTOR

**Trade Name** : ADVANTECH  
**Model Number** : PCM-5864 / PCM-5864L  
**Serial Number** : Prototype  
**Report Number** : 990320-E  
**Date**: July 27, 1999  
**Regulations** : See below

| Standards                 | Results (Pass/Fail) |
|---------------------------|---------------------|
| EN 550022: 1994 (Class A) | PASS                |
| EN 60555-2 :1987          | PASS                |
| EN 60555-3 :1987          | PASS                |
| EN 50082-2: 1995          | PASS                |
| EN 61000-4-2: 1995        | PASS                |
| EN 61000-4-4: 1995        | PASS                |
| ENV 50140: 1994           | PASS                |
| ENV 50204: 1996           | PASS                |
| ENV 50141: 1994           | PASS                |

Prepared for :

**Advantech Co., Ltd.**  
**4<sup>th</sup> FL., No. 108-3, Ming-Chuan Road, Hsin-Tien City,**  
**Taipei Hsien, Taiwan, R.O.C.**

Prepared by :

**C & C Laboratory Co., Ltd.**  
**1<sup>st</sup> FL., No. 344, Fu Ching Street**  
**Taipei, Taiwan, R.O.C.**  
TEL: (02)27468584  
FAX: (02)27632154



**This report shall not be reproduced, except in full, without the written approval of**  
**C&C Laboratory Co., Ltd.**



## EC-Declaration of Conformity

For the following equipment:

586 CPU Board Biscuit Form Factor

---

( Product Name )

PCM-5864; PCM-5864L / ADVANTECH

---

( Model Designation / Trade name )

Advantech Co., Ltd.

---

( Manufacturer Name )

4<sup>th</sup> FL., No. 108-3, Ming-Chuan Road, Hsin-Tien City, Taipei Hsien, Taiwan, R.O.C.

---

(Manufacturer Address)

is herewith confirmed to comply with the requirements set out in the Council Directive on the Approximation of the Laws of the Member States relating to Electromagnetic Compatibility Directive (89/336/EEC, Amended by 92/31/EEC & 93/68/EEC). For the evaluation regarding the Electromagnetic Compatibility (89/336/EEC, Amended by 92/31/EEC & 93/68/EEC), the following standards are applied:

- |   |   |  |  |
|---|---|--|--|
| <input type="checkbox"/> EN 50081-2:1993                    | <input checked="" type="checkbox"/> ENV 50140: 1994 | <input checked="" type="checkbox"/> EN 61000-4-2: 1995 | <input type="checkbox"/> IEC 1000-3-2                |
| <input checked="" type="checkbox"/> EN 50082-2:1995         | <input checked="" type="checkbox"/> ENV 50141: 1994 | <input type="checkbox"/> EN 61000-4-3: 1995            | <input type="checkbox"/> IEC 1000-3-3                |
| <input checked="" type="checkbox"/> EN 55022:1994 (Class A) | <input checked="" type="checkbox"/> ENV 50204: 1996 | <input checked="" type="checkbox"/> EN 61000-4-4: 1995 | <input checked="" type="checkbox"/> EN 60555-2: 1987 |
| <input checked="" type="checkbox"/> EN 60555-3:1987         | <input type="checkbox"/> EN 61000-4-5: 1995         | <input type="checkbox"/> EN 61000-4-11: 1994           |  |

The following manufacturer / importer or authorized representative established within the EUT is responsible for this declaration:

---

( Company Name )

---

( Company Address )

Person responsible for making this declaration:

---

( Name, Surname )

---

( Position / Title )

---

( Place )

( Date )

( Legal Signature )

## TABLE OF CONTENTS

| DESCRIPTION  | PAGE |
|--|------|
| VERIFICATION OF COMPLIANCE   | 5    |
| GENERAL INFORMATION  | 6    |
| SYSTEM DESCRIPTION   | 7    |
| PRODUCT INFORMATION  | 8    |
| SUPPORT EQUIPMENT  | 10   |
| TEST FACILITY  | 11   |
| TEST EQUIPMENT   | 12   |
| <b>SECTION 1 EN 55022 (LINE CONDUCTED &amp; RADIATED EMISSION)</b>                                   | 17   |
| MEASUREMENT PROCEDURE & LIMIT (LINE CONDUCTED EMISSION TEST)   | 17   |
| MEASUREMENT PROCEDURE & LIMIT (RADIATED EMISSION TEST)   | 19   |
| BLOCK DIAGRAM OF TEST SETUP  | 22   |
| SUMMARY DATA   | 23   |
| <b>SECTION 2 EN 61000-3-2 &amp; EN 61000-3-3 (POWER HARMONICS &amp; VOLTAGE FLUCTUATION/FLICKER)</b> | 26   |
| BLOCK DIAGRAM OF TEST SETUP  | 27   |
| TEST RESULT  | 27   |
| <b>SECTION 3 EN 61000-4-2 (ELECTROSTATIC DISCHARGE)</b>  | 28   |
| BLOCK DIAGRAM OF TEST SETUP  | 29   |
| TEST PROCEDURE   | 30   |
| PERFORMANCE & RESULT   | 30   |
| ESD TESTED POINT TO EUT  | 31   |
| <b>SECTION 4 ENV 50140 (RADIATED ELECTROMAGNETIC FIELD)</b>  | 32   |
| BLOCK DIAGRAM OF TEST SETUP  | 32   |
| TEST PROCEDURE   | 33   |
| PERFORMANCE & RESULT   | 33   |

| <b>DESCRIPTION</b>  | <b>PAGE</b> |
|---|-------------|
| <b>SECTION 5 ENV 50204 (RADIATED ELECTROMAGNETIC FIELD FROM DIGITAL TELEPHONES )</b>  | 34          |
| BLOCK DIAGRAM OF TEST SETUP   | 34          |
| TEST PROCEDURE  | 35          |
| PERFORMANCE & RESULT  | 35          |
| <b>SECTION 6 EN 61000-4-4 (FAST TRANSIENTS/BURST)</b>   | 36          |
| BLOCK DIAGRAM OF TEST SETUP   | 36          |
| TEST PROCEDURE  | 37          |
| PERFORMANCE & RESULT  | 37          |
| <b>SECTION 7 ENV 50141 (CONDUCTED DISTURBANCE, INDUCED BY RADIO-FREQUENCY FIELDS)</b>   | 38          |
| BLOCK DIAGRAM OF TEST SETUP   | 38          |
| TEST PROCEDURE  | 39          |
| PERFORMANCE & RESULT  | 39          |
| APPENDIX 1 PHOTOGRAPHS OF TEST SETUP<br>EN 55022 TEST<br>EN 61000-3-2 TEST<br>EN 61000-3-3 TEST<br>EN 61000-4-2 TEST<br>ENV 50140 & ENV 50204 TEST<br>EN 61000-4-4 TEST<br>ENV 50141 TEST | 40          |
| APPENDIX 2 PHOTOGRAPHS OF EUT   | 48          |

## VERIFICATION OF COMPLIANCE

**Equipment Under Test:** 586 CPU Board Biscuit Form Factor  
**Trade Name:** ADVANTECH  
**Model Number:** PCM-5864 / PCM-5864L  
**Serial Number:** Prototype  
**EUT Powered during test:** 230VAC/50Hz  
**Applicant:** **Advantech Co., Ltd.**  
4<sup>th</sup> FL., No. 108-3, Ming-Chuan Road, Hsin-Tien City,  
Taipei Hsien, Taiwan, R.O.C.  
**Manufacturer:** **Advantech Co., Ltd.**  
4<sup>th</sup> FL., No. 108-3, Ming-Chuan Road, Hsin-Tien City,  
Taipei, Hsien, Taiwan, R.O.C.  
**Type of Test:** EMC Directive 89/336/EEC for CE Marking  
**Technical Standards:** EN 55022: 1994 / A1:1995 / A2: 1997 ClassA  
EN 60555-2: 1987, EN 60555-3: 1987  
EN 50082-2: 1995 (EN 61000-4-2, EN 61000-4-4, ENV 50140,  
ENV 50141, ENV 50204)  
**File Number:** 990320-E  
**Date of test:** July 20-21, 1999  
**Tested by:** Michael Chen  
**Deviation:** EN 61000-3-2: 1995 was used instead of EN 60555-2: 1987.  
EN 61000-3-3: 1995 was used instead of EN 60555-3: 1987.  
**Condition of Test Sample:** Normal

The above equipment was tested by C&C Laboratory Co., Ltd. for compliance with the requirements set forth in EMC Directive 89/336/EEC and the Technical Standards mentioned above. This said equipment in the configuration described in this report shows the maximum emission levels emanating from equipment and the level of the immunity endurance of the equipment are within the compliance requirements.

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

Approved by Authorized Signatory: Kurt Chen  
**Kurt Chen / Q.A. Manager**

## GENERAL INFORMATION

**Applicant:** **Advantech Co., Ltd.**  
4<sup>th</sup> FL., No. 108-3, Ming-Chuan Road, Hsin-Tien City,  
Taipei Hsien, Taiwan, R.O.C

**Contact Person:** John Chou

**Phone Number:** (02)22184567 ext.293

**Fax Number:** (02)22180045

**Manufacturer:** **Advantech Co., Ltd.**  
4<sup>th</sup> FL., No. 108-3, Ming-Chuan Road, Hsin-Tien City,  
Taipei, Hsien, Taiwan, R.O.C.

**File Number:** 990320-E

**Date of Test:** July 20-21, 1999

**Equipment Under Test:** 586 CPU Board Biscuit Form Factor

**Model Number:** PCM-5864 / PCM-5864L

**Serial Number:** Prototype

**Technical Standards:** EN 55022: 1994 / A1:1995 / A2: 1997 ClassA  
EN 60555-2: 1987, EN 60555-3: 1987  
EN 50082-2: 1995 (EN 61000-4-2, EN 61000-4-4  
ENV 50140, ENV 50141, ENV 50204)

**Frequency Range  
(EN 55022):** 150kHz to 30MHz for Line Conducted Test  
30MHz to 1000MHz for Radiated Emission Test

**Test Site** **C & C LABORATORY CO., LTD.**  
No. 15, 14 Lin, Chi Twu Chi, Lu-Chu Hsiang  
Taoyuan, Taiwan, R. O. C.

## **SYSTEM DESCRIPTION**

### **EUT Test Program:**

1. Turn on all of test equipment.
2. LAN driver was loaded and executed in windows environment to communicate with remote side.
3. EMI test program was loaded and executed in Windows mode.
4. Data was sent to monitor and filling the screens with upper case of “H” patterns.
5. Test program sequentially exercised all related I/O's of EUT and sent “H” patterns to all applicable output ports of EUT.
6. Repeat 3 to 5. Test program is self-repeating throughout the test.

## PRODUCT INFORMATION

|                                   |                               |               |                 |
|-----------------------------------|-------------------------------|---------------|-----------------|
| <b>Housing Type:</b>              | Metal Case                    |               |                 |
| <b>EUT Power Rating:</b>          | 90-264VAC, 47-63Hz, 1/0.6A    |               |                 |
| <b>AC Power during Test</b>       | 230VAC/50Hz                   |               |                 |
| <b>Power Supply Manufacturer:</b> | ADVANTECH                     |               |                 |
| <b>Power Supply Model Number:</b> | PS50A                         |               |                 |
| <b>AC Power Cord Type:</b>        | Unshielded, 1.8m (Detachable) |               |                 |
| <b>DC Power Cable Type:</b>       | Unshielded, 0.3m (Detachable) |               |                 |
| <b>OSC/Clock Frequencies:</b>     | 300MHz                        |               |                 |
| <b>CPU Manufacturer:</b>          | AMD                           | <b>Model:</b> | K6-2-300X1      |
| <b>Chassis Manufacturer:</b>      | ADVANTECH                     | <b>Model:</b> | MBPC-300+PS-50A |
| <b>CPU Board Manufacturer:</b>    | ADVANTECH                     | <b>Model:</b> | PCM-5864L       |
| <b>VGA Card Manufacturer:</b>     | On Board                      |               |                 |
| <b>I/O Board</b>                  | On Board                      |               |                 |

**\*\*Note:**

1. The EUT is an open frame CPU board, only marketed for industrial environment.
2. It was installed a computer simulate box at all testing.
3. The differences between model: PCM-5864 and PCM-5864L are listed as below:

| <b>Model No.</b> | <b>Microphone Port</b> | <b>Line-In Port</b> | <b>Line-Out Port</b> | <b>Speaker-Out Port</b> |
|------------------|------------------------|---------------------|----------------------|-------------------------|
| PCM-5864         | Yes                    | Yes                 | Yes                  | Yes                     |
| PCM-5864L        | No                     | No                  | No                   | No                      |



**I/O Ports of EUT:**

| <b>I/O PORT TYPES</b>  | <b>Q'TY</b> | <b>TESTED WITH</b> |
|------------------------|-------------|--------------------|
| 1). Parallel Port      | 1           | 1                  |
| 2). Serial Port        | 4           | 4                  |
| 3). Video Ports        | 1           | 1                  |
| 4). PS/2 Keyboard Port | 1           | 1                  |
| 5). PS/2 Mouse Port    | 1           | 1                  |
| 6). Microphone Port    | 1           | 1                  |
| 7). Line-In Port       | 1           | 1                  |
| 8). Line-Out Port      | 1           | 1                  |
| 9). Speaker-Out Port   | 1           | 1                  |
| 10). LAN Port          | 1           | 1                  |
| 11). USB Ports         | 2           | 2                  |

**\*\* Remark:** The LAN port only connected with a 5m long cable by floating.

## SUPPORT EQUIPMENT

| Equipment  | Model #       | Serial #      | FCC ID       | Manufacturer         | Data Cable                 | Power Cord   |
|------------|---------------|---------------|--------------|----------------------|----------------------------|--|
| Monitor    | CM753ET       | N/A           | N/A          | HITACH               | Shielded, 1.8m             | Unshielded, 1.8m   |
| Printer    | C2642A        | MY8251CSFK    | B94C2642X    | HP                   | Shielded, 1.8m             | AC I/P:<br>Unshielded, 0.9m<br>DC O/P:<br>Unshielded, 1.9m |
| Modem      | 2400          | 94-364-176270 | DK467GSM24   | Computer Peripherals | Shielded, 1.8m             | Unshielded, 1.8m   |
| Modem      | 2400          | 94-364-176267 | DK467GSM24   | Computer Peripherals | Shielded, 1.8m             | Unshielded, 1.8m   |
| Modem      | 2400          | 94-364-176272 | DK467GSM24   | Computer Peripherals | Shielded, 1.8m             | Unshielded, 1.8m   |
| Modem      | 2400          | 94-364-176268 | DK467GSM24   | Computer Peripherals | Shielded, 1.8m             | Unshielded, 1.8m   |
| USB Mouse  | SL-A 79111    | U7-1          | E6QMOUSE X31 | JOW DAIN             | Shielded, 1.4m             | N/A  |
| USB Mouse  | SL-A 79111    | U7-2          | E6QMOUSE X31 | JOW DAIN             | Shielded, 1.4m             | N/A  |
| Mouse      | M-S34         | LZC84359502   | DZL211029    | LOGITECH             | Shielded, 1.8m             | N/A  |
| Keyboard   | E03633YLTW3-C | 3731          | CIGE03633    | HP                   | Shielded, 1.8m with a core | N/A  |
| Earphone   | A170          | A7            | N/A          | AIWA                 | Unshielded, 1.0m           | N/A  |
| Walkman    | YX-328        | W7            | N/A          | YING-KO              | Unshielded, 1.0m           | N/A  |
| Microphone | AY-125        | I7            | N/A          | Diverse              | Unshielded, 1.8m           | N/A  |
| Speaker    | P-9A          | E7            | N/A          | N/A                  | Unshielded, 1.1m           | N/A  |

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

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

## TEST FACILITY (EN 55022)

|  |  |
|--|--|
| <b>Location:</b>                                       | No. 15, 14 Line, Chin Twu Chi, Lu Chu Hsiang, Taoyuan, Taiwan, R.O.C.  |
| <b>Description:</b>                                    | There are three 3/10m open area tests site and three line conducted labs<br>for final test, and one 3/10m open area test site for engineering lab. 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 22/EN 55022 requirements.   |
| <b>Site Filing:</b>                                    | A site description is on file with the Federal Communications Commission, 7435 Oakland Mills Road, Columbia, MD 21046.<br><br>Registration also was made with Voluntary Control Council for Interference (VCCI).<br><br>Site is also approved by Ministry of Commerce of New Zealand.  |
| <b>Site Accreditation:</b>                             | Accredited by NEMKO (Authorization #: ELA 124) for EMC & A2LA (Certificate #: 824.01) for Emission.<br><br>Also accredited by BCIQ for the product category of Information Technology Equipment.   |
| <b>Instrument Tolerance:</b>                           | All measuring equipment is in accord with ANSI C63.4 and CISPR 22 requirement that meet industry regulatory agency and accreditation agency requirement.   |
| <b>Ground Plane:</b>                                   | 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. |
| <b>Site #1 &amp; Site #3 Line Conducted Test Site:</b> | Vertical ground plane (2.2m x 2.2m)<br>Horizontal ground plane (2.5m x 2.5m)   |
| <b>Site #4 Line Conducted Test Site:</b>               | Shielding room   |

## TEST EQUIPMENT

### MEASURING INSTRUMENT SETTING

| TEST TYPE | DETECTOR    | FREQUENCY RANGE | RESOLUTION BANDWIDTH | VIDEO BANDWIDTH |
|-----------|-------------|-----------------|----------------------|-----------------|
| Conducted | Peak/QP/Avg | 150kHz-30MHz    | 9kHz                 | 9kHz            |
| Radiated  | Peak        | 30MHz-1GHz      | 100kHz               | 100kHz          |
| Radiated  | QP          | 30MHz-1GHz      | 120kHz               | 120kHz          |
| Radiated  | Peak/Avg    | Above 1GHz      | 1MHz                 | 1MHz            |

**Note:** All readings on data pages are taken with the detector in peak mode unless otherwise stated.

### UNITS OF MEASUREMENT

Measurements of radiated interference are reported in terms of dBuV/m, at a specified distance. The indicated readings on the spectrum analyzer are converted to dBuV/m by use of appropriate conversion factors. Measurements of conducted interference are reported in terms of dBuV.

## TEST EQUIPMENT LIST ( EMISSION )

**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 1.0 / 2.0 GHz.

**Equipment used during the tests:**

**Open Area Test Site:** ☐ # 1 ; ☒ # 3 ; ☐ # 4

| Open Area Test Site # 1 |         |              |               |            |            |
|-------------------------|---------|--------------|---------------|------------|------------|
| EQUIPMENT TYPE          | * MFR   | MODEL NUMBER | SERIAL NUMBER | LAST CAL.  | CAL. DUE   |
| Spectrum Analyzer       | HP      | 8568B        | 3001A05004    | 04/16/1999 | 04/15/2000 |
| S.P.A Display           | HP      | 85662A       | 3104A18846    | 04/16/1999 | 04/15/2000 |
| RF Pre-selector         | HP      | 85685A       | 2947A01064    | 04/16/1999 | 04/15/2000 |
| Q.P Adaptor             | HP      | 85650A       | 2811A01399    | 04/16/1999 | 04/15/2000 |
| Precision Dipole        | R&S     | HZ-12        | 846932/0004   | 06/16/1999 | 06/16/2000 |
| Precision Dipole        | R&S     | HZ-13        | 846556/0008   | 06/16/1999 | 06/16/2000 |
| Horn Antenna            | EMCO    | 3115         | 9602-4659     | 04/04/1999 | 04/04/2000 |
| Bilog Antenna           | CHASE   | CBL6112A     | 2309          | 03/14/1999 | 03/14/2000 |
| Turn Table              | EMCO    | 2081-1.21    | N/A           | N/A        | N/A        |
| Antenna Tower           | EMCO    | 2075-2       | 9707-2604     | N/A        | N/A        |
| Controller              | EMCO    | 2090         | N/A           | N/A        | N/A        |
| RF Switch               | ANRITSU | MP59B        | N/A           | N/A        | N/A        |
| Site Information        | C&C     | N/A          | N/A           | 01/23/1999 | 01/23/2000 |

| Open Area Test Site # 3 |           |              |               |            |            |
|-------------------------|-----------|--------------|---------------|------------|------------|
| EQUIPMENT TYPE          | * MFR     | MODEL NUMBER | SERIAL NUMBER | LAST CAL.  | CAL. DUE   |
| Spectrum Analyzer       | ADVANTEST | R3261C       | 71720533      | 10/27/1998 | 10/26/1999 |
| Pre-Amplifier           | HP        | 8447D        | 2944A09173    | 01/28/1999 | 01/27/2000 |
| EMI Test Receiver       | R&S       | ESVS20       | 838804/004    | 12/12/1998 | 12/11/1999 |
| Precision Dipole        | R&S       | HZ-12        | 846932/0004   | 06/06/1999 | 06/06/2000 |
| Precision Dipole        | R&S       | HZ-13        | 846556/0008   | 06/16/1999 | 06/16/2000 |
| Horn Antenna            | EMCO      | 3115         | 9602-4659     | 04/04/1999 | 04/04/2000 |
| Bilog Antenna           | CHASE     | CBL6112A     | 2179          | 11/14/1998 | 11/14/1999 |
| Turn Table              | EMCO      | 2081-1.21    | 9709-1885     | N/A        | N/A        |
| Antenna Tower           | EMCO      | 2075-2       | 9707-2060     | N/A        | N/A        |
| Controller              | EMCO      | 2090         | 9709-1256     | N/A        | N/A        |
| RF Switch               | ANRITSU   | MP59B        | N/A           | N/A        | N/A        |
| Site Information        | C&C       | N/A          | N/A           | 01/31/1999 | 01/31/2000 |

| Open Area Test Site # 4 |             |                 |                  |               |             |
|-------------------------|-------------|-----------------|------------------|---------------|-------------|
| EQUIPMENT<br>TYPE       | * MFR       | MODEL<br>NUMBER | SERIAL<br>NUMBER | LAST<br>CAL.  | CAL.<br>DUE |
| Spectrum Analyzer       | ADVANTEST   | R3261C          | 81720301         | AUG/19/1998   | AUG/18/1999 |
| Pre-Amplifier           | HP          | 8447F           | 2944A03748       | OCT/22/1998   | OCT/21/1999 |
| EMI Test Receiver       | R&S         | ESVS10          | 846285/016       | DEC/19/1998   | DEC/18/1999 |
| Turn Table              | Chance most | N/A             | N/A              | N/A           | N/A         |
| Antenna Tower           | Chance most | N/A             | N/A              | N/A           | N/A         |
| Controller              | Chance most | N/A             | N/A              | N/A           | N/A         |
| Bilog Antenna           | Chase       | CBL 6112B       | 2462             | JAN/01/1999   | JAN/01/2000 |
| Site Nsa                | C&C Lab.    | N/A             | N/A              | DEC/27/19986D | DEC/27/1999 |

Conducted Emission Test Site: ☐ # 1 ; ☐ # 3 ; ☒ #4

| Conducted Emission Test Site # 1 |       |              |               |            |            |
|----------------------------------|-------|--------------|---------------|------------|------------|
| EQUIPMENT TYPE                   | * MFR | MODEL NUMBER | SERIAL NUMBER | LAST CAL.  | CAL. DUE   |
| Spectrum Analyzer                | HP    | 8568B        | 3001A05004    | 04/16/1999 | 04/15/2000 |
| S.P.A Display                    | HP    | 85662A       | 3104A18846    | 04/16/1999 | 04/15/2000 |
| RF Pre-selector                  | HP    | 85685A       | 2947A01064    | 04/16/1999 | 04/15/2000 |
| Q.P Adaptor                      | HP    | 85650A       | 2811A01399    | 04/16/1999 | 04/15/2000 |
| LISN                             | EMCO  | 3825/2       | 9106-1809     | 08/14/1998 | 08/14/1999 |
| LISN                             | EMCO  | 3825/2       | 9106-1810     | 08/14/1998 | 08/14/1999 |

| Conducted Emission Test Site # 3 |           |              |               |            |            |
|----------------------------------|-----------|--------------|---------------|------------|------------|
| EQUIPMENT TYPE                   | * MFR     | MODEL NUMBER | SERIAL NUMBER | LAST CAL.  | CAL. DUE   |
| Spectrum Analyzer                | ADVANTEST | R3261A       | 91720031      | 03/25/1999 | 03/24/2000 |
| EMI Test Receiver                | R&S       | ESHS10       | 843743/015    | 12/09/1998 | 12/08/1999 |
| LISN                             | R&S       | ESH3-Z5      | 848773/014    | 10/22/1998 | 10/21/1999 |
| LISN                             | EMCO      | 3825/2       | 9003-1628     | 04/29/1998 | 04/28/1999 |

| Conducted Emission Test Site # 4 |       |              |               |            |            |
|----------------------------------|-------|--------------|---------------|------------|------------|
| EQUIPMENT TYPE                   | * MFR | MODEL NUMBER | SERIAL NUMBER | LAST CAL.  | CAL. DUE   |
| EMI Test Receiver                | R&S   | ESCS30       | 847793/012    | 12/19/1998 | 12/18/1999 |
| LISN                             | R&S   | ESH2-Z5      | 848773/014    | 12/04/1998 | 12/03/1999 |
| LISN                             | EMCO  | 3825/2       | 9003-1628     | 01/09/1999 | 01/08/2000 |

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.

## TEST EQUIPMENT LIST

### For Power Harmonic & Voltage Fluctuation/Flicker Measurement:

| Manufacturer/Type                           | Model No. | Serial No. | Last Cal.     | Cal. Due      |
|---|-----------|------------|---------------|---------------|
| HAEFELY TRENCH<br>Harmonic & Flicker Tester | PHF 555   | 080 419-25 | Oct. 27, 1997 | Oct. 26, 1999 |

### For ESD test:

| Manufacturer/Type                                       | Model No. | Serial No. | Last Cal.     | Cal. Due      |
|---|-----------|------------|---------------|---------------|
| HAEFELY TRENCH/<br>Electrostatic Discharge<br>Simulator | PESD 1600 | H710203    | Sep. 04, 1998 | Sep. 03, 1999 |

### For Radiated Electromagnetic Field immunity Measurement: (ENV 50140 and ENV 50204)

| Manufacturer/Type                          | Model No.       | Serial No. | Last Cal.     | Cal. Due      |
|--|-----------------|------------|---------------|---------------|
| Maconi /Signal Generator                   | 2022D           | 119246/003 | Aug. 10, 1998 | Aug. 10, 1999 |
| M2S / Power Amplifier                      | A00181/1000     | 9801-112   | N/A           | N/A           |
| M2S / Power Amplifier                      | AC8113/800-250A | 9801-179   | N/A           | N/A           |
| Wandel & Goltormann/<br>EM-Radiation Meter | EMR-30          | L-0013     | Dec. 11, 1998 | Dec. 11, 1999 |
| Wandel & Goltormann/ E-<br>Field Sensor    | TYP-8           | H-0014     | Dec. 11, 1998 | Dec. 11, 1999 |
| EMCO Power Antenna                         | 3141            | 9712-1083  | N/A           | N/A           |

### For Fast Transients/Burst test:

| Manufacturer/Type                                     | Model No.   | Serial No.  | Last Cal.     | Cal. Due      |
|---|-------------|-------------|---------------|---------------|
| HAEFELY TRENCH/<br>Fast Transients/Burst<br>Generator | PEFT-JUNIOR | 583 333-117 | Sep. 03, 1998 | Sep. 02, 1999 |

### For CS test:

| Manufacturer/Type     | Model No.   | Serial No. | Last Cal.     | Cal. Due      |
|-----------------------|-------------|------------|---------------|---------------|
| M2S / Power Amplifier | A00181/1000 | 9801-112   | Jan. 27, 1998 | Jan. 26, 1999 |



## SECTION 1 EN 55022 (LINE CONDUCTED & RADIATED EMISSION)

### 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 EN 55022: 1994 (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 EN 55022: 1994.
- 3) All I/O cables were positioned to simulate typical actual usage as per EN 55022: 1994.
- 4) The EUT received AC power through a Line Impedance Stabilization Network (LISN) which supplied power source of 230VAC/50Hz and was grounded to the ground plane.
- 5) All support equipment received power from a second LISN supplying power of 110VAC/60Hz.
- 6) The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum analyzer 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 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.
- 7) Analyzer scanned from 150kHz to 30MHz for emissions in each of the test modes. Analyzer settings were stated on the Measuring Instrument Settings page.
- 8) During the above scans, the emissions were maximized by cable manipulation.
- 9) The following test mode(s) were scanned during the preliminary test:

**Mode(s):**

1. PCM-5864 (640 x 480)
2. PCM-5864 (1024 x 768)
3. PCM-5864 (1600 x 1200)
4. PCM-5864L (1600 x 1200)

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

**Mode(s): 4**

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 peak mode, then the emission signal was re-checked using a Quasi-Peak and Average detector.
- 3) The test data of the worst case condition(s) was reported on the Summary Data page.

### Data Sample:

| Freq.<br>MHz | Q.P.<br>Raw<br>dBuV | Average<br>Raw<br>dBuV | Q.P.<br>Limit<br>dBuV | Average<br>Limit<br>dBuV | Q.P.<br>Margin<br>dB | Average<br>Margin<br>dB | Note |
|--------------|---------------------|------------------------|-----------------------|--------------------------|----------------------|-------------------------|------|
| x.xx         | 43.95               | ---                    | 56                    | 46                       | -12.05               | -2.05                   | L1   |

|            |   |
|------------|---|
| Freq.      | = Emission frequency in MHz   |
| 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 2dB margin, so no further recheck. |

## LINE CONDUCTED EMISSION LIMIT

| Frequency     | Maximum RF Line Voltage |         |
|---------------|-------------------------|---------|
|               | Q.P.                    | AVERAGE |
| 150kHz-500kHz | 79dBuV                  | 66dBuV  |
| 500KHz-30MHz  | 73dBuV                  | 60dBuV  |

**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 EN 55022: 1994 (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 EN 55022: 1994.
- 3) All I/O cables were positioned to simulate typical actual usage as per EN 55022: 1994.
- 4) The EUT received 230VAC/50Hz power source from the outlet socket under the turntable. All support equipment received 110VAC/60Hz power from another socket under the turntable.
- 5) The antenna was placed at some given distance away from the EUT as stated in EN 55022: 1994. The antenna connected to the analyzer via a cable and at times a pre-amplifier would be used.
- 6) The analyzer quickly scanned from 30MHz to 1000MHz. Analyzer settings were stated on the Measuring Instrument Settings page. 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 modes were scanned during the preliminary test:

**Mode(s):**

- 1. PCM-5864 (640 x 480)**
- 2. PCM-5864 (1024 x 768)**
- 3. PCM-5864 (1600 x 1200)**
- 4. PCM-5864L (1600 x 1200)**

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

**Mode(s):     4**

Then, the EUT and cable configuration, antenna position, polarization and turntable position of the above highest emission level were recorded for 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 scanned from 30MHz to 1000MHz. 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, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and only Q.P. reading is presented.
- 4) The test data of the worst case condition(s) was reported on the Summary Data page.

### Data Sample:

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

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

## **RADIATED EMISSION LIMIT**

| Frequency<br>(MHz) | Distance<br>(m) | Maximum Field Strength Limit<br>(dBuV/m/ Q.P.) |
|--------------------|-----------------|--|
| 30-230             | 10              | 40   |
| 230-1000           | 10              | 47   |

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

## BLOCK DIAGRAM OF TEST SETUP

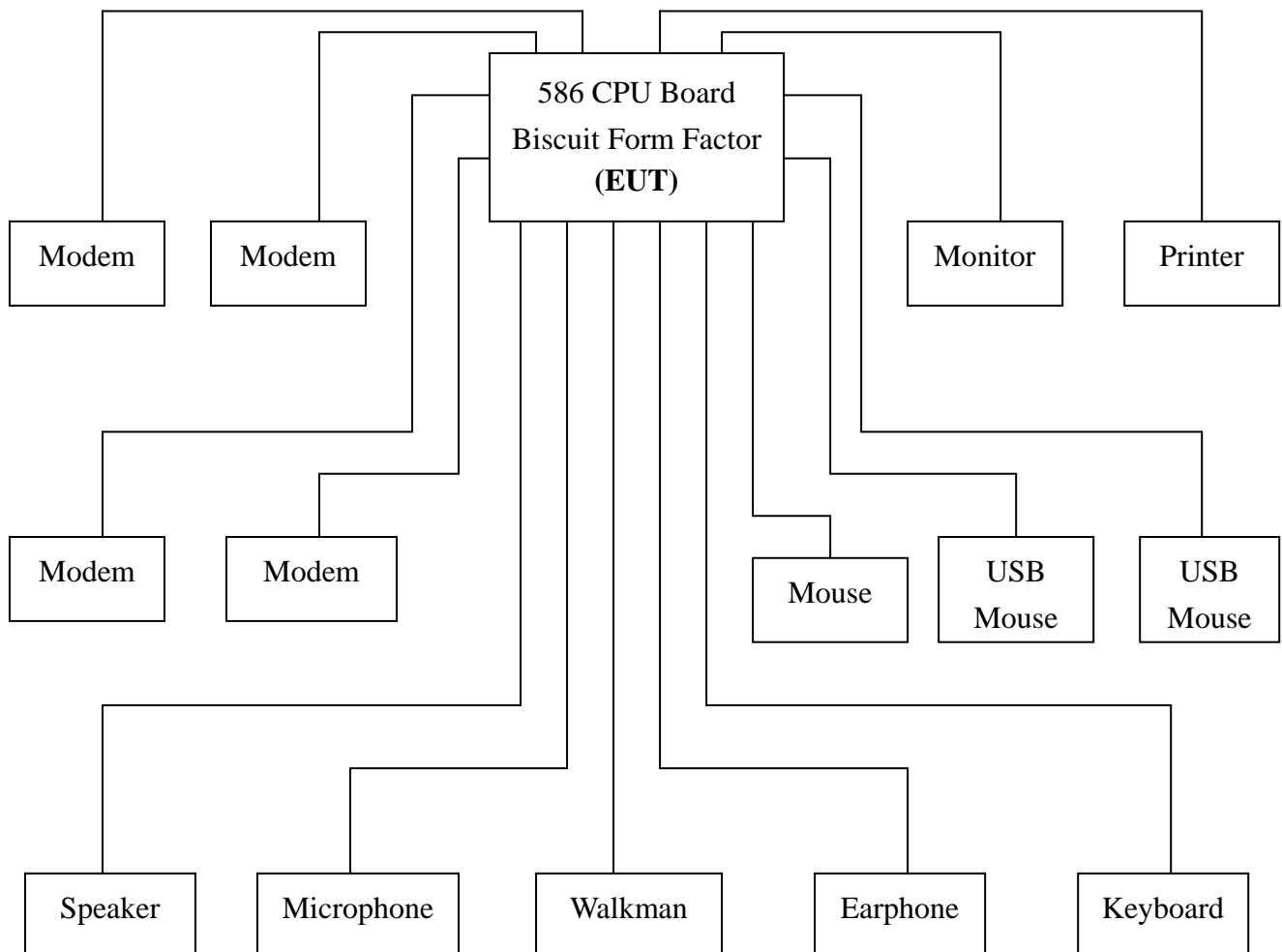
### SYSTEM DIAGRAM OF CONNECTIONS BETWEEN EUT AND SIMULATORS

**EUT:** 586 CPU Board Biscuit Form Factor

**Trade Name:** ADVANTECH

**Model Number:** PCM-5864L

**Power Cord:** Unshielded, 1.8m



## SUMMARY DATA

### (LINE CONDUCTED TEST)

**Model Number:** PCM-5864L

**Location:** Site # 4

**Tested by:** Michael Chen

**Test Mode:** 1600 x 1200

**Test Results:** Passed

**Temperature:** 23°C

**Humidity:** 60%RH

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

| FREQ<br>MHz | Q.P.<br>RAW<br>dBuV | AVG<br>RAW<br>dBuV | Q.P.<br>Limit<br>dBuV | AVG<br>Limit<br>dBuV | Q.P.<br>Margin<br>dB | AVG<br>Margin<br>dB | NOTE |
|-------------|---------------------|--------------------|-----------------------|----------------------|----------------------|---------------------|------|
| 0.175       | 46.5                | ---                | 79.0                  | 66.0                 | -32.5                | ---                 | L1   |
| 0.245       | 48.7                | ---                | 79.0                  | 66.0                 | -30.3                | ---                 | L1   |
| 0.315       | 47.3                | ---                | 79.0                  | 66.0                 | -31.7                | ---                 | L1   |
| 0.560       | 48.7                | ---                | 73.0                  | 60.0                 | -24.3                | ----                | L1   |
| 0.630       | 42.6                | ---                | 73.0                  | 60.0                 | -30.4                | ---                 | L1   |
| 4.085       | 42.4                | ---                | 73.0                  | 60.0                 | -30.6                | ---                 | L1   |
|             |                     |                    |                       |                      |                      |                     |      |
| 0.210       | 45.9                | ---                | 79.0                  | 66.0                 | -33.1                | ---                 | L2   |
| 0.280       | 47.4                | ---                | 79.0                  | 66.0                 | -31.6                | ---                 | L2   |
| 0.455       | 44.5                | ---                | 79.0                  | 66.0                 | -34.5                | ---                 | L2   |
| 0.525       | 48.1                | ---                | 73.0                  | 60.0                 | -14.2                | ---                 | L2   |
| 0.595       | 44.6                | ---                | 73.0                  | 60.0                 | -28.4                | ---                 | L2   |
| 3.965       | 45.2                | ---                | 73.0                  | 60.0                 | -27.8                | ---                 | 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:** PCM-5864L

**Location:** Site # 3

**Tested by:** Michael Chen

**Polar:** Vertical -- 10m

**Test Mode:** 1600 x 1200

**Detector Function:** Quasi-Peak

**Test Results:** Passed

**Temperature:** 23°C

**Humidity:** 60%RH

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

| Freq.<br>(MHz) | Raw<br>Data<br>( dB ) | Corr.<br>Factor<br>(dBuV) | Emiss.<br>Level<br>( dBuV/m ) | Limits | Margin<br>(dB) |
|----------------|-----------------------|---------------------------|-------------------------------|--------|----------------|
| 45.45          | 24.9                  | 11.4                      | 36.3                          | 40.0   | -3.7           |
| 64.16          | 25.1                  | 7.3                       | 32.4                          | 40.0   | -7.6           |
| 200.56         | 23.0                  | 12.3                      | 35.3                          | 40.0   | -4.7           |
| 437.10         | 15.7                  | 22.0                      | 37.7                          | 47.0   | -9.3           |
| 601.33         | 16.6                  | 25.5                      | 42.1                          | 47.0   | -4.9           |
| 901.95         | 12.7                  | 28.9                      | 41.6                          | 47.0   | -5.4           |



## SUMMARY DATA

### (RADIATED EMISSION TEST)

**Model Number:** PCM-5864L

**Location:** Site # 3

**Tested by:** Michael Chen

**Polar:** Horizontal -- 10m

**Test Mode:** 1600 x 1200

**Detector Function:** Quasi-Peak

**Test Results:** Passed

**Temperature:** 23°C

**Humidity:** 60%RH

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

| Freq.<br>(MHz) | Raw<br>Data<br>( dB ) | Corr.<br>Factor<br>(dBuV) | Emiss.<br>Level<br>( dBuV/m ) | Limits | Margin<br>(dB) |
|----------------|-----------------------|---------------------------|-------------------------------|--------|----------------|
| 45.44          | 24.0                  | 12.5                      | 36.5                          | 40.0   | -3.5           |
| 58.86          | 25.0                  | 7.7                       | 32.7                          | 40.0   | -7.3           |
| 176.93         | 20.2                  | 12.9                      | 33.1                          | 40.0   | -6.9           |
| 200.60         | 21.7                  | 11.6                      | 33.3                          | 40.0   | -6.7           |
| 447.14         | 13.1                  | 22.6                      | 35.7                          | 47.0   | -11.3          |
| 601.40         | 14.2                  | 25.5                      | 39.7                          | 47.0   | -7.3           |

## SECTION 2    EN 61000-3-2 & EN 61000-3-3 (POWER HARMONICS & VOLTAGE FLUCTUATION/FLICKER)

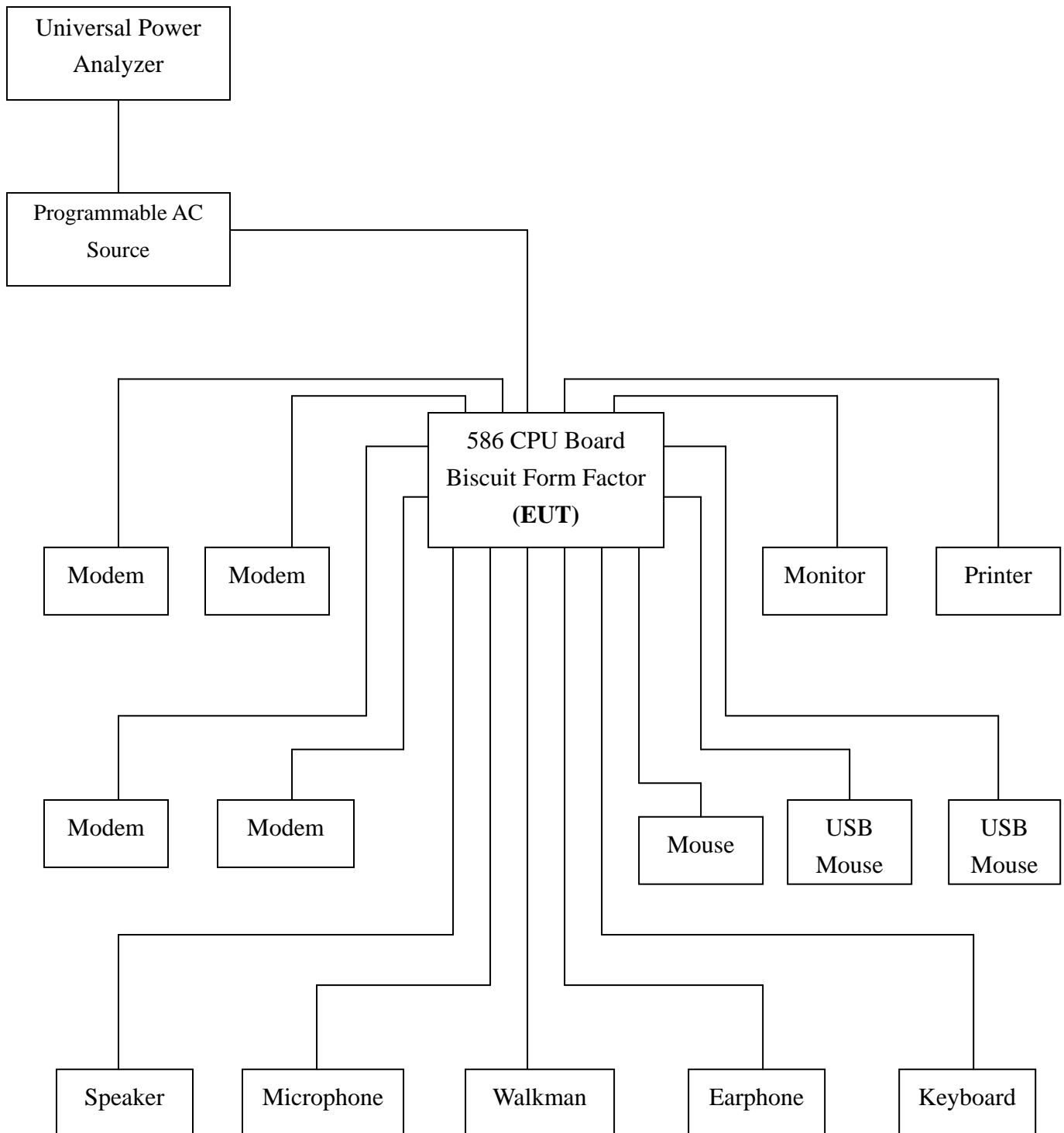
### POWER HARMONICS MEASUREMENT

**Port** : AC mains  
**Basic Standard** : EN 61000-3-2 (1995)  
**Limits** : ☒ CLASS A ; ☐ CLASS D  
**Temperature** : 24°C  
**Humidity** : 60%

### VOLTAGE FLUCTUATION/FLICKER MEASUREMENT

**Port** : AC mains  
**Basic Standard** : EN 61000-3-3 (1995)  
**Limits** : §5 of EN 61000-3-3  
**Temperature** : 23°C  
**Humidity** : 60%

**Block Diagram of Test Setup:**



**Result:**

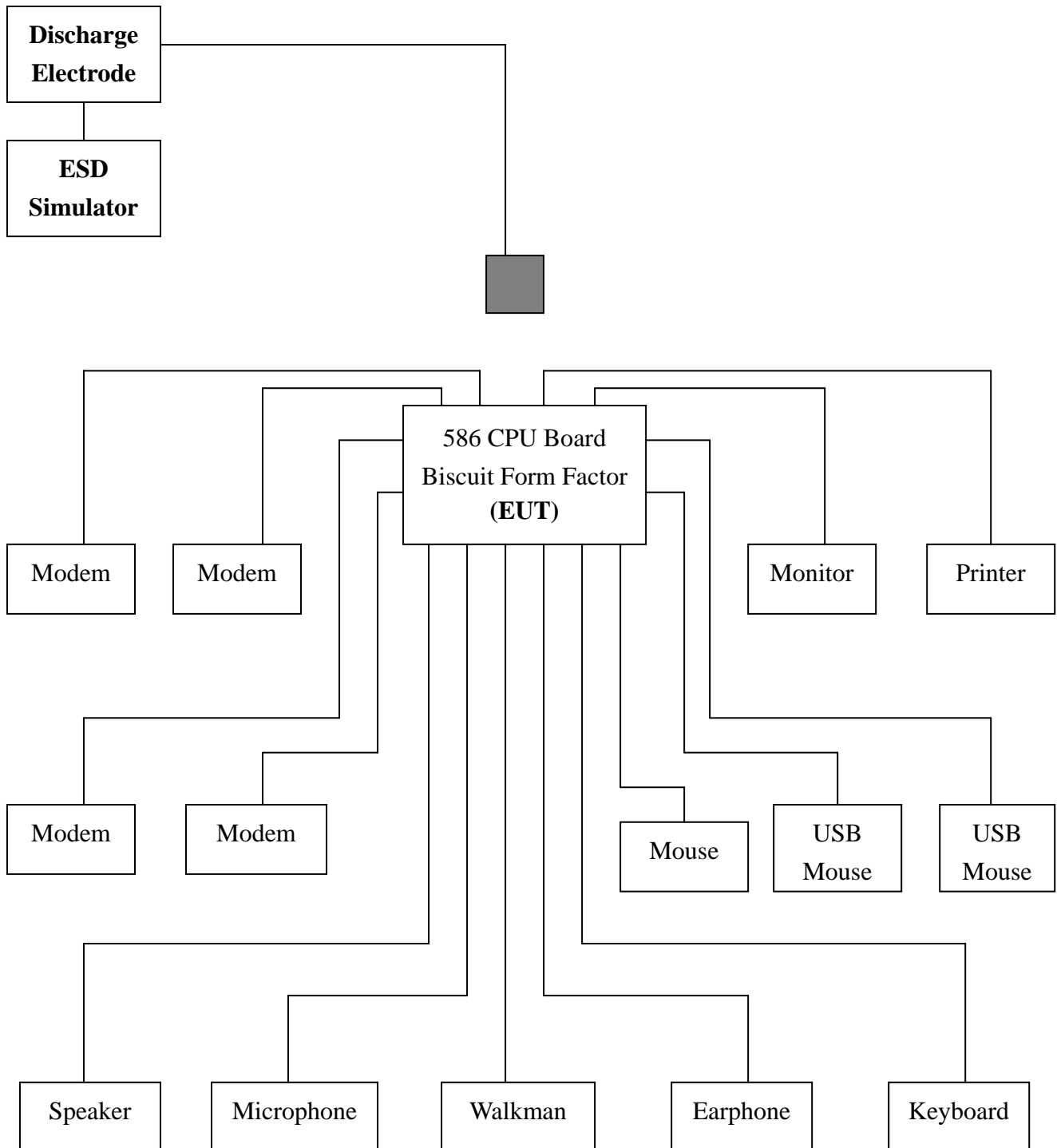
Please see the attached test data.

## **SECTION 3 EN 61000-4-2 (ELECTROSTATIC DISCHARGE)**

### **ELECTROSTATIC DISCHARGE (ESD) IMMUNITY TEST**

**Port** : Enclosure  
**Basic Standard** : EN 61000-4-2  
**Requirements** :  $\pm 8\text{kV}$  (Air Discharge)  
                           $\pm 4\text{kV}$  (Contact Discharge)  
                           $\pm 4\text{kV}$  (Indirect Discharge)  
**Performance Criteria** : B (Standard Required)  
**Temperature/Humidity:**  $25^{\circ}\text{C}$  / 59%

**Block Diagram of Test Setup:**



## **Test Procedure:**

The electrostatic discharges were applied as follows:

| Amount of Discharges | Voltage          | Coupling                          | Result (Pass/Fail) |
|----------------------|------------------|-----------------------------------|--------------------|
| $\geq 10$ /Point     | $\pm 8\text{KV}$ | Air Discharge                     | Pass               |
| $\geq 10$ /Point     | $\pm 4\text{KV}$ | Contact Discharge                 | Pass               |
| $\geq 10$ /Point     | $\pm 4\text{KV}$ | Indirect Discharge<br>HCP         | Pass               |
| $\geq 10$ /Point     | $\pm 4\text{KV}$ | Indirect Discharge<br>VCP (Front) | Pass               |
| $\geq 10$ /Point     | $\pm 4\text{KV}$ | Indirect Discharge<br>VCP (Left)  | Pass               |
| $\geq 10$ /Point     | $\pm 4\text{KV}$ | Indirect Discharge<br>VCP (Back)  | Pass               |
| $\geq 10$ /Point     | $\pm 4\text{KV}$ | Indirect Discharge<br>VCP (Right) | Pass               |

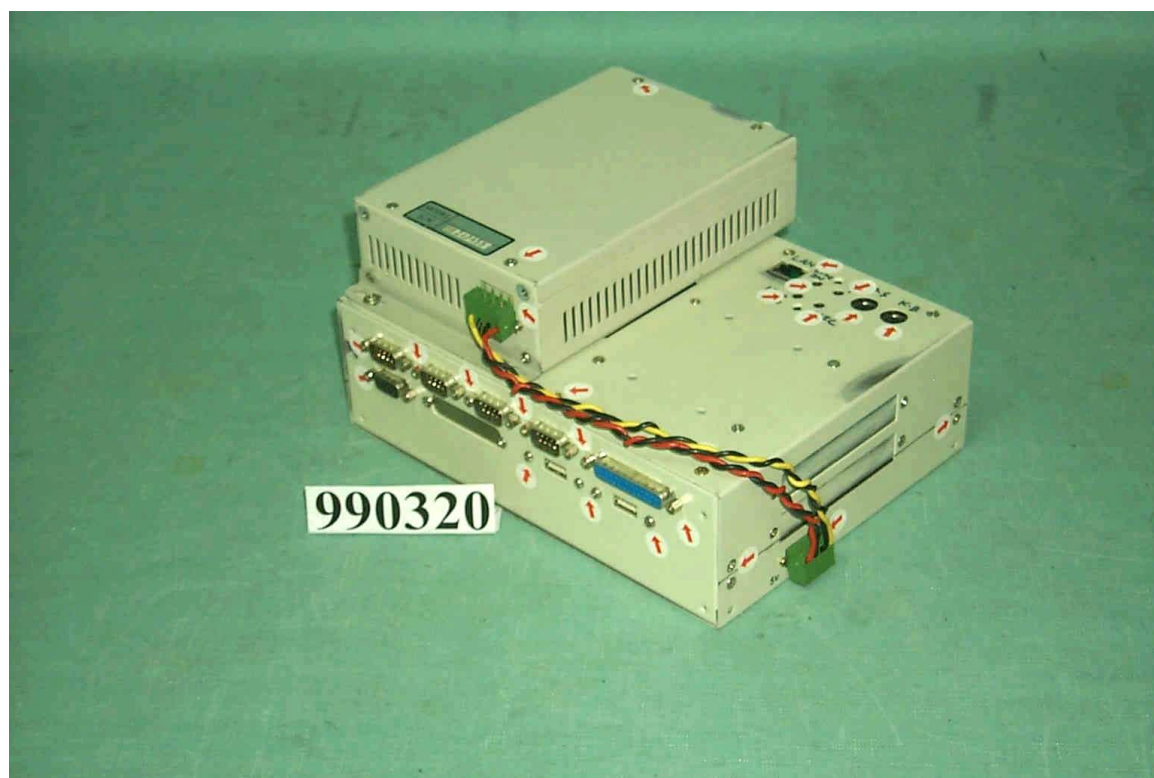
\*\* The tested points to EUT, please refer to attached pages.

## **Performance & Result:**

- ☒ **Criteria A:** The apparatus continues 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. In some cases the performance level may be replaced by a permissible loss of performance.
- ☐ **Criteria B:** The apparatus continues 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. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
- ☐ **Criteria C:** Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

**\*\*Observation:** No any function degraded during the test.

# *The Tested Points of EUT*



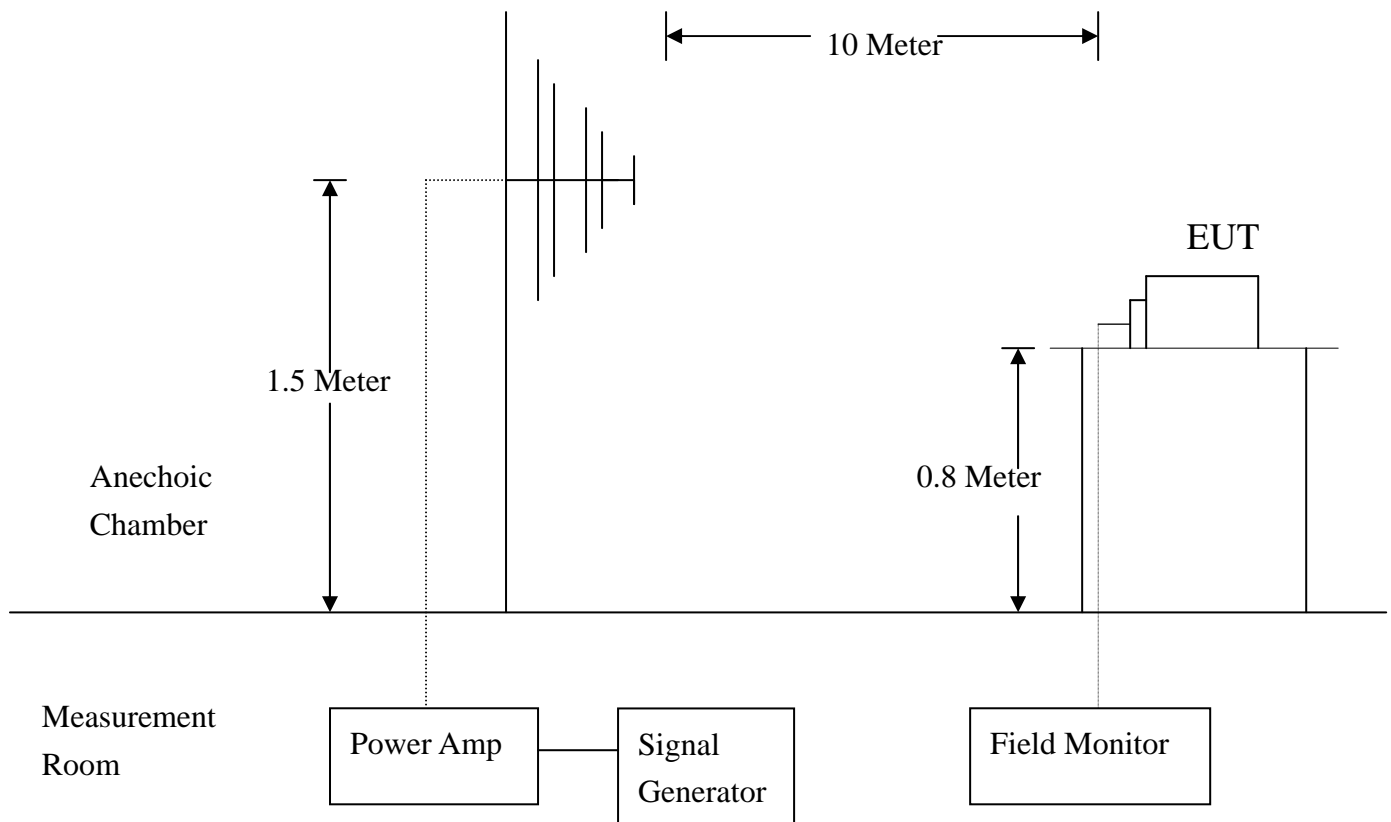
## SECTION 4 ENV 50140 (RADIATED ELECTROMAGNETIC FIELD )

### RADIATED ELECTROMAGNETIC FIELD IMMUNITY TEST

**Port** : Enclosure  
**Basic Standard** : ENV 50140  
**Requirements** : 10 V/m / Modulated  
**Performance Criteria** : A (Standard Required)  
**Temperature** : 25°C  
**Humidity** : 60%

#### Block Diagram of Test Setup:

Same as Section 1 EN 55011 Test Setup:





## **Test Procedure:**

Frequency Range : 80MHz-1000MHz

Frequency Step : 1% of fundamental

Dwell Time : 1 sec

| Range (MHz) | Field | Modulation | Polarity | Position (°) | Result (Pass/Fail) |
|-------------|-------|------------|----------|--------------|--------------------|
| 80-1000     | 10V   | Yes        | H        | 0            | Pass               |
| 80-1000     | 10V   | Yes        | V        | 0            | Pass               |
| 80-1000     | 10V   | Yes        | H        | 90           | Pass               |
| 80-1000     | 10V   | Yes        | V        | 90           | Pass               |
| 80-1000     | 10V   | Yes        | H        | 180          | Pass               |
| 80-1000     | 10V   | Yes        | V        | 180          | Pass               |
| 80-1000     | 10V   | Yes        | H        | 270          | Pass               |
| 80-1000     | 10V   | Yes        | V        | 270          | Pass               |

## **Performance & Result:**

- ☒ **Criteria A:** The apparatus continues 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. In some cases the performance level may be replaced by a permissible loss of performance.
- ☐ **Criteria B:** The apparatus continues 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. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
- ☐ **Criteria C:** Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

**\*\*Observation:** No any function degraded during the test.

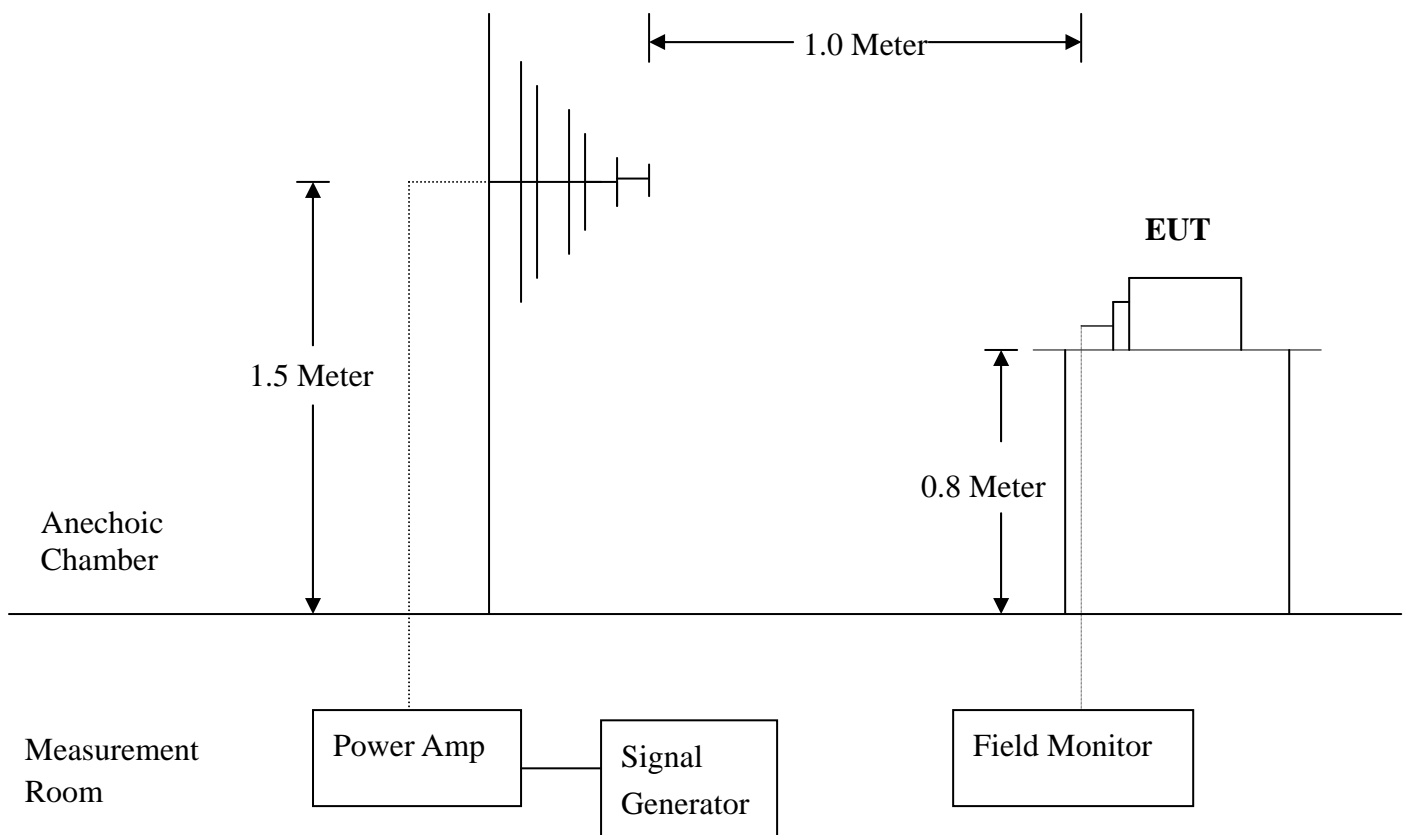
## SECTION 5 ENV 50204 (RADIATED ELECTROMAGNETIC FIELD FROM DIGITAL TELEPHONES )

### Radiated Electromagnetic Field From Digital Telephones Immunity Test

|                             |                          |
|-----------------------------|--------------------------|
| <b>Port</b>                 | : Enclosure              |
| <b>Basic Standard</b>       | : ENV 50204              |
| <b>Requirements</b>         | : 10 V/m, with modulated |
| <b>Performance Criteria</b> | : A (Standard Required)  |
| <b>Temperature</b>          | : 25°C                   |
| <b>Humidity</b>             | : 60%                    |

### Block Diagram of Test Setup:

Same as Section 1 EN 55011 Test Setup:



## **Test Procedure:**

Spot Frequency : 900 MHz  $\pm$  5MHz  
Modulated Frequency : 200 Hz  
Duty cycle : 50%

| Range (MHz) | Field | Modulation | Polarity | Position (°) | Result (Pass/Fail) |
|-------------|-------|------------|----------|--------------|--------------------|
| 900         | 10V   | Yes        | H        | 0            | Pass               |
| 900         | 10V   | Yes        | V        | 0            | Pass               |
| 900         | 10V   | Yes        | H        | 90           | Pass               |
| 900         | 10V   | Yes        | V        | 90           | Pass               |
| 900         | 10V   | Yes        | H        | 180          | Pass               |
| 900         | 10V   | Yes        | V        | 180          | Pass               |
| 900         | 10V   | Yes        | H        | 270          | Pass               |
| 900         | 10V   | Yes        | V        | 270          | Pass               |

## **Performance & Result:**

- ☒ **Criteria A:** The apparatus continues 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. In some cases the performance level may be replaced by a permissible loss of performance.
- ☐ **Criteria B:** The apparatus continues 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. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
- ☐ **Criteria C:** Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

**Observation:** No any function degraded during the tests.

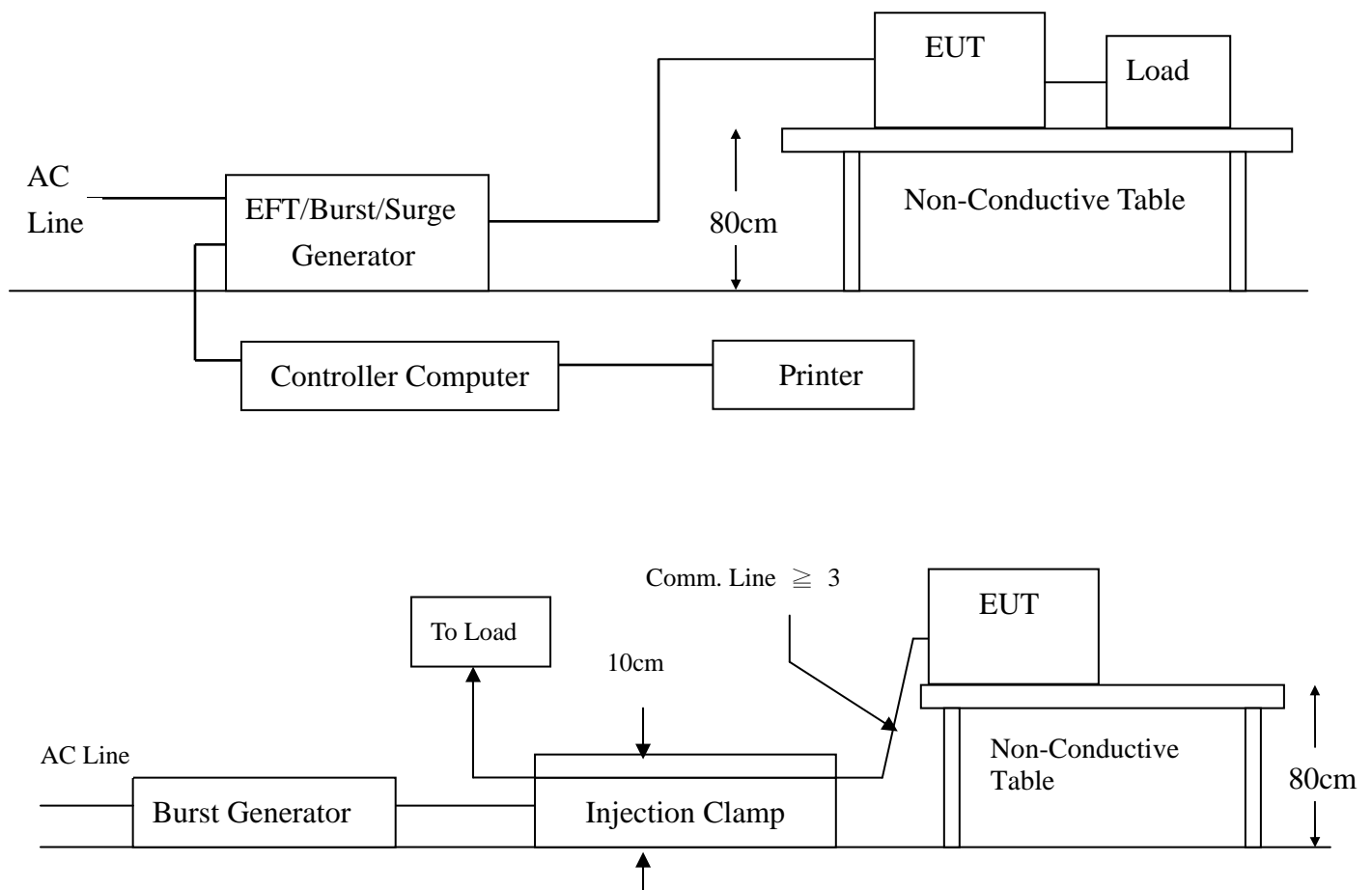
## SECTION 6 EN 61000-4-4 (FAST TRANSIENTS/BURST)

### FAST TRANSIENTS/BURST IMMUNITY TEST

|                             |  |
|-----------------------------|--|
| <b>Port</b>                 | : On Power Port and Data Cable                                     |
| <b>Basic Standard</b>       | : EN 61000-4-4   |
| <b>Requirements</b>         | : $\pm 2\text{kV}$ to Power Port<br>$\pm 1\text{kV}$ to Data Cable |
| <b>Performance Criteria</b> | : B (Standard Required)  |
| <b>Temperature</b>          | : $24^{\circ}\text{C}$   |
| <b>Humidity</b>             | : 59%  |

### Block Diagram of Test Setup:

Same as section1 EN 55022 Test Setup:



## **Test Procedure:**

Impulse Frequency: 5kHz

Tr/Tn: 5/50ns

Burst Duration: 15ms

Burst Period: 3Hz

| Inject Line | Voltage kV | Inject Method | Result (Pass/Fail) |
|-------------|------------|---------------|--------------------|
| L1          | ±2         | Direct        | Pass               |
| N           | ±2         | Direct        | Pass               |
| PE          | ±2         | Direct        | Pass               |
| L1+N        | ±2         | Direct        | Pass               |
| L1+PE       | ±2         | Direct        | Pass               |
| N+PE        | ±2         | Direct        | Pass               |
| L1+N+PE     | ±2         | Direct        | Pass               |
| LAN Cable   | ±1         | Clamp         | Pass               |

## **Performance & Result:**

- ☒ **Criteria A:** The apparatus continues 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. In some cases the performance level may be replaced by a permissible loss of performance.
- ☐ **Criteria B:** The apparatus continues 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. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
- ☐ **Criteria C:** Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

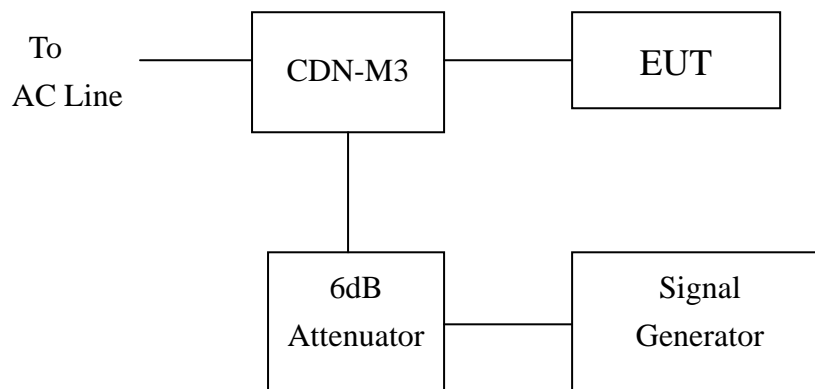
**\*\*Observation:** No any function degraded during the tests.

## SECTION 7 ENV 50141 (CONDUCTED DISTURBANCE/INDUCED BY RADIO-FREQUENCY FIELD)

|                             |                       |
|-----------------------------|-----------------------|
| <b>Port</b>                 | : Power cord          |
| <b>Basic Standard</b>       | : ENV 50141           |
| <b>Requirements</b>         | : 10 V with modulated |
| <b>Injection Method</b>     | : CDN-M3              |
| <b>Performance Criteria</b> | : A                   |
| <b>Temperature</b>          | : 24°C                |
| <b>Humidity</b>             | : 59%                 |

### Block Diagram of Test Setup:

Same as Section 1 EN 55022 Test Setup:



## **Test Procedure:**

Frequency Range : 0.15MHz-80MHz  
Frequency Step : 1% of fundamental  
Dwell Time : 1 sec

| Range (MHz) | Field | Modulation | Result (Pass/Fail) |
|-------------|-------|------------|--------------------|
| 0.15-80     | 10V   | Yes        | Pass               |

## **Performance & Result:**

- ☒ **Criteria A:** The apparatus continues 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. In some cases the performance level may be replaced by a permissible loss of performance.
- ☐ **Criteria B:** The apparatus continues 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. In some cases the performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is however allowed.
- ☐ **Criteria C:** Temporary loss of function is allowed, provided the functions self recoverable or can be restored by the operation of controls.

**\*\*Observation:** No any function degraded during the tests.

## **APPENDIX 1**

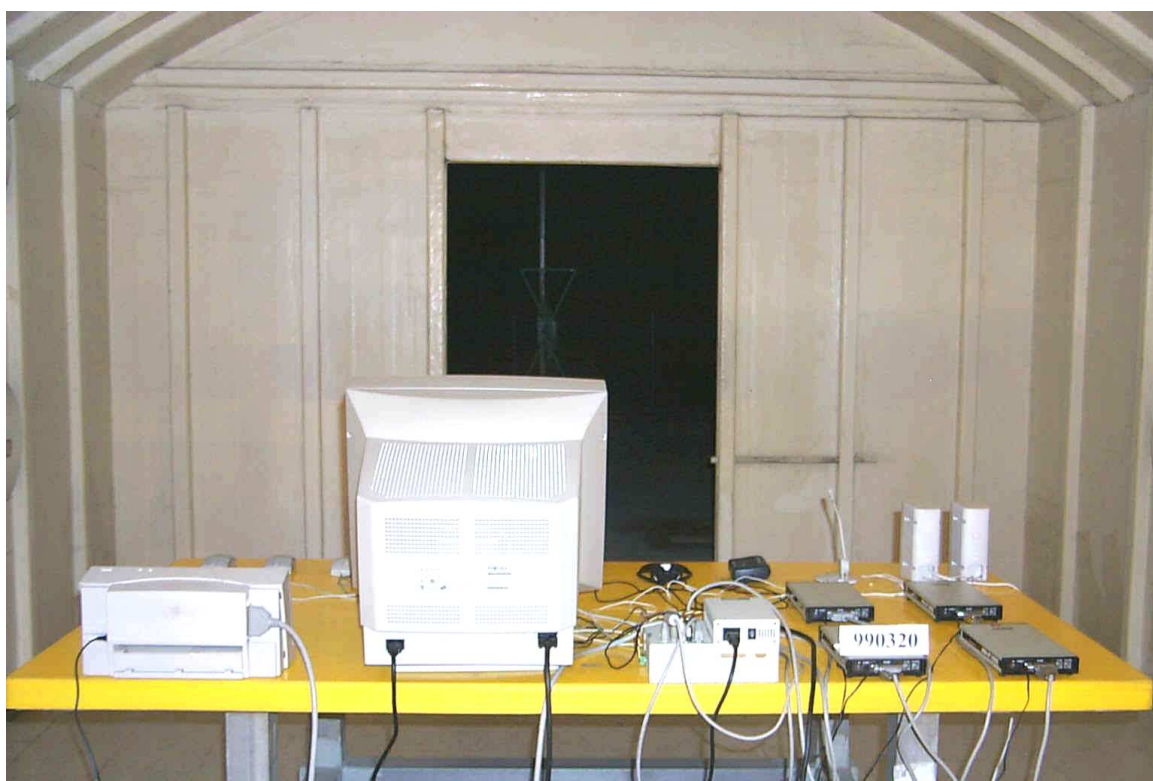
### **PHOTOGRAPHS OF TEST SETUP**



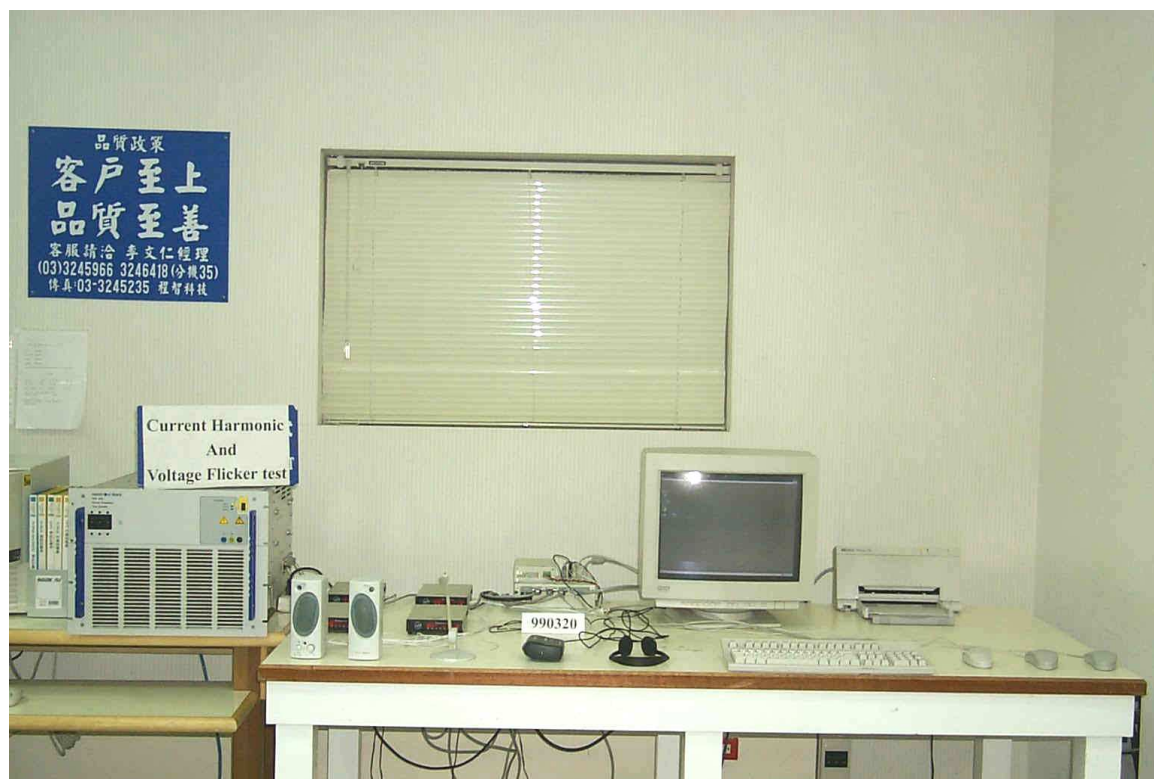
## LINE CONDUCTED EMISSION TEST (EN 55022)



## RADIATED EMISSION TEST (EN 55022)



## POWER HARMONIC & VOLTAGE FLUCTUATION / FLICKER TEST (EN 61000-3-2, EN 61000-3-3)

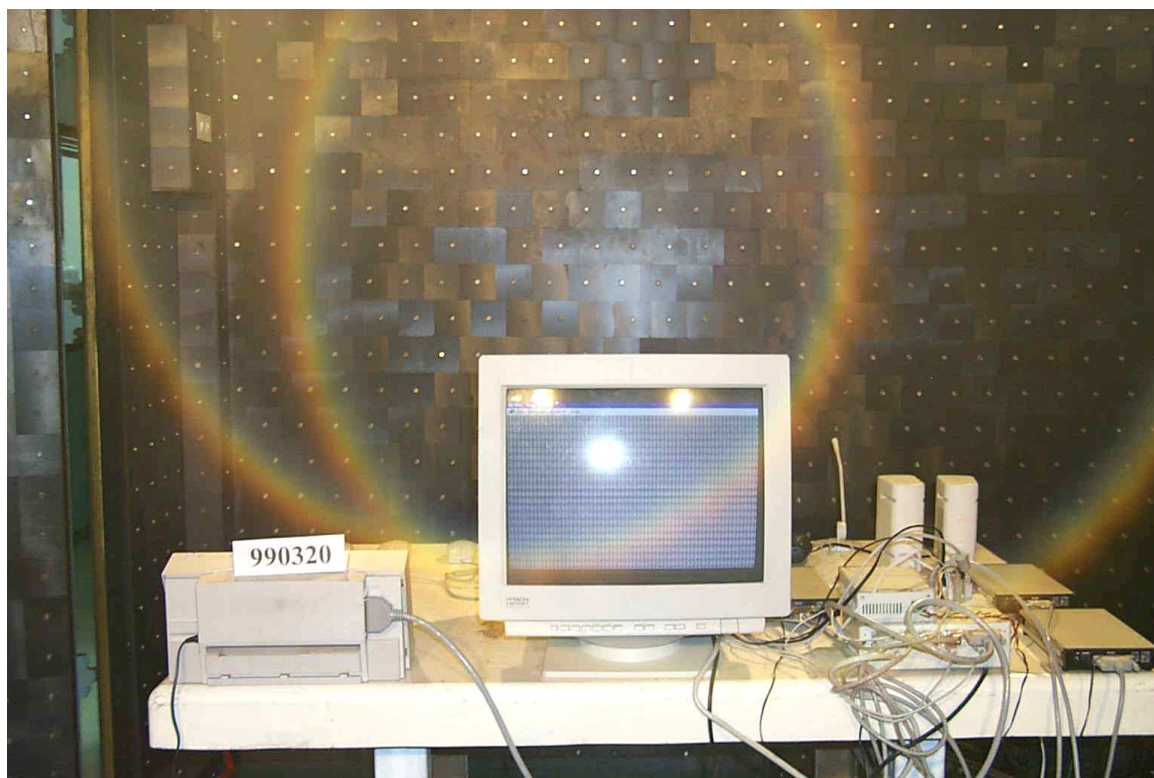




## ELECTROSTATIC DISCHARGE TEST (EN 61000-4-2)

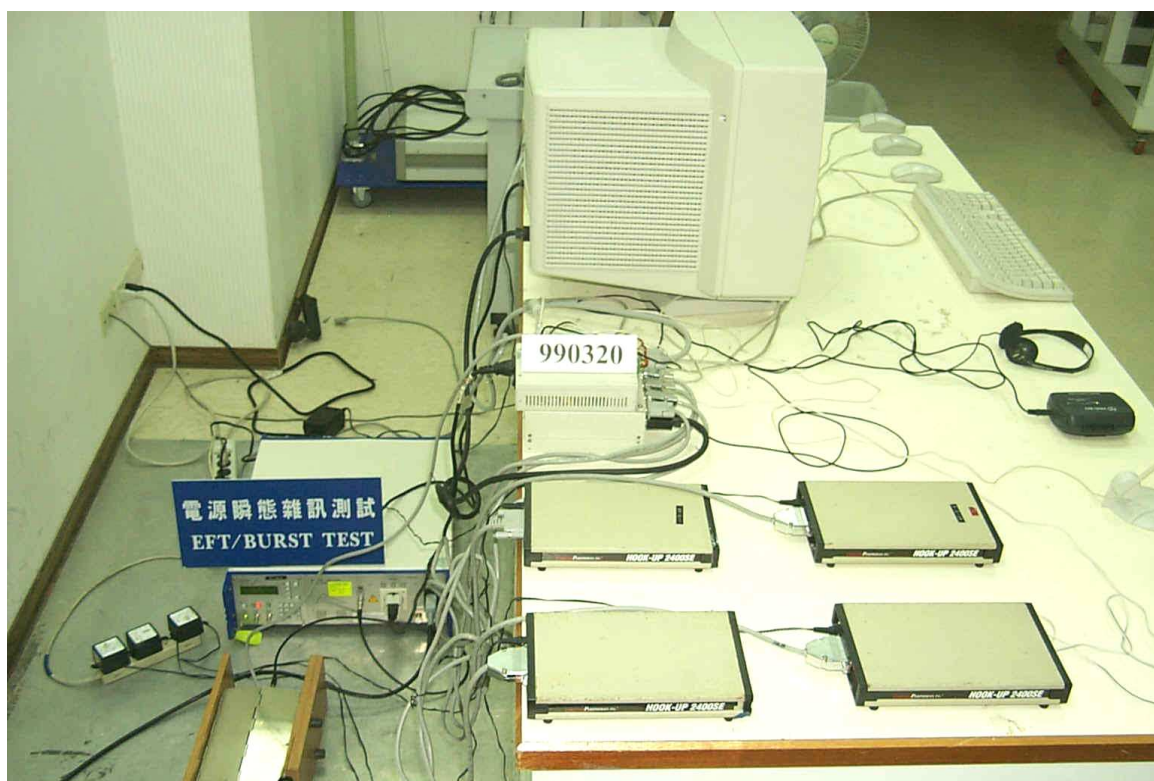


## RADIATED ELECTROMAGNETIC FIELD (ENV 50140 & ENV 50204)

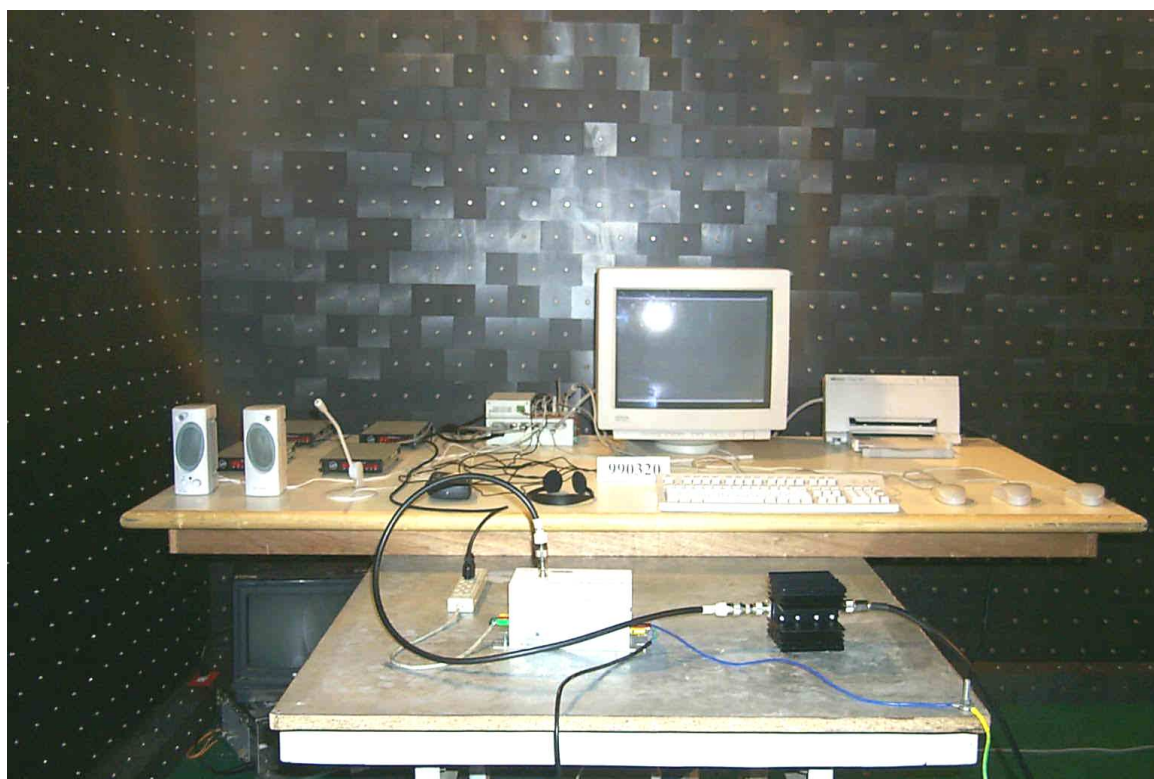




## FAST TRANSIENTS/BURST TEST (EN 61000-4-4)



## **CONDUCTED DISTURBANCE, INDUCED BY RADIO-FREQUENCY FIELDS TEST ( ENV 50141 )**



## **APPENDIX 2**

### **PHOTOGRAPHS OF EUT**





