



EMC COMPLIANCE TEST REPORT

for

PANEL PC

Trade Name : ADVANTECH
Model Number : TPC-1260X (X= A~ Z or Blank)
Serial Number : N/A
Report Number : 010483-1-E
Date : August 22, 2001
Regulations : See below

| Standards | Results (Pass/Fail) |
|--|---------------------|
| EN 55022: 1998(Class A) | PASS |
| EN 55011:1998(Group 1, Class A) | PASS |
| EN 61000-3-2: 1995 + A1: 1998 + A2: 1998 + A14: 2000 | PASS |
| EN 61000-3-3: 1995 | PASS |
| EN 55024: 1998(following EN 61000-6-2:1999 test level) | PASS |
| - IEC 61000-4-2: 1995 + A2: 2000 (EN61000-4-2:1995) | PASS |
| - IEC 61000-4-3: 1995(EN 61000-4-3:1995) | PASS |
| - IEC 61000-4-4: 1995(EN 61000-4-4:1995) | PASS |
| - IEC 61000-4-5: 1995(EN 61000-4-5:1995) | PASS |
| - IEC 61000-4-6: 1996(EN 61000-4-6:1996) | PASS |
| - IEC 61000-4-8: 1993(EN 61000-4-8:1993) | PASS |
| - IEC 61000-4-11: 1994(EN 61000-4-11:1994) | PASS |

Prepared for:

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Prepared by:

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VERIFICATION OF COMPLIANCE

Equipment Under Test: PANEL PC

Trade Name: ADVANTECH

Model Number: TPC-1260X (X= A~ Z or Blank)

Serial Number: N/A

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

Manufacturer: **Advantech Co., Ltd.**
4th 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: 1998 (Class A) ; EN55011:1998(Group1, Class A)
EN 61000-3-2: 1995 + A1: 1998 + A2: 1998 + A14: 2000
EN 61000-3-3: 1995
EN55024: 1998 (following EN61000-6-2:1999 test level)
IEC 61000-4-2: 1995 + A2: 2000 (EN 61000-4-2:1995);
IEC 61000-4-3: 1995(EN 61000-4-3:1995);
IEC 61000-4-4: 1995(EN 61000-4-4:1995);
IEC 61000-4-5: 1995(EN 61000-4-5:1995);
IEC 61000-4-6: 1996(EN 61000-4-6:1996);
IEC 61000-4-8: 1993(EN 61000-4-8:1993);
IEC 61000-4-11:1994(EN 61000-4-11:1994)

File Number: 010483-1-E

Date of test: June 7 ~ August 15, 2001

Deviation: According to applicant's declaration this EUT is a class A product, and to be market in industrial environment only.

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

Contact Person: John Chou

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

File Number: 010483-1-E

Date of Test: June 7 ~ August 15, 2001

Equipment Under Test: PANEL PC

Model Number: TPC-1260X (X= A~ Z or Blank)

Serial Number: N/A

Type of Test: EMC Directive 89/336/EEC for CE Marking

Technical Standards: EN 55022: 1998 (Class A) ; EN55011:1998(Group1, Class A)
EN 61000-3-2: 1995 + A1: 1998 + A2: 1998 + A14: 2000
EN 61000-3-3: 1995
EN55024: 1998 (following EN61000-6-2:1999 test level)
IEC 61000-4-2: 1995 + A2: 2000 (EN 61000-4-2:1995);
IEC 61000-4-3: 1995(EN 61000-4-3:1995);
IEC 61000-4-4: 1995(EN 61000-4-4:1995);
IEC 61000-4-5: 1995(EN 61000-4-5:1995);
IEC 61000-4-6: 1996(EN 61000-4-6:1996);
IEC 61000-4-8: 1993(EN 61000-4-8:1993);
IEC 61000-4-11:1994(EN 61000-4-11:1994)

**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. 81-1, 210 Lane, Pa-de 2nd Road, Lu-Chu Hsiang
Taoyuan, Taiwan, R. O. C.



SYSTEM DESCRIPTION

EUT Test Program:

1. An EMI test software was loaded and executed under in Dos mode.
2. The EMI test program sequentially exercised all I/O's of EUT.
3. A communicated software was loaded and executed to communicate between EUT and remote side.
4. The EUT sends to and receives message from remote side, and filling the screen of monitor with upper case of "H" patterns.
5. Repeat step 2 to 4 throughout the test.



PRODUCT INFORMATION

| | | | |
|--|-----------------------------------|-----------------|------------------------------------|
| Housing Type: | Plastic with metal plate | | |
| EUT Power Rating: | 115/230VAC, 50/60Hz, 1.5/0.8A | | |
| AC Power during Test | 230VAC/50Hz | | |
| Power Supply Manufacturer: | Skynet | | |
| Power Supply Model Number: | SNP-PA59 | | |
| AC Power Cord Type: | Unshielded, 1.8m (Detachable) | | |
| DC Power Cable Type: | Unshielded, 1.5m (Non-detachable) | | |
| CPU Manufacture: | Intel | Type: | Transmeta Crusoe™ TM5400 533MHz |
| OSC/Clock Frequencies: | 66MHz | | |
| Memory Capacity: | | Install: | 128MB |
| 12.0" TFT LCD Panel Manufacturer: | Toshiba | Model: | LTM12C289 |
| Flash Card Manufacturer: | COMPACTFTASH | Model: | Sun Disk 32 |
| VGA Card Manufacturer: | On board | | |

I/O Port of EUT

| I/O PORT TYPES | Q'TY | TESTED WITH |
|------------------------------|------|-------------|
| 1) Parallel Port | 1 | 1 |
| 2) Serial Port | 3 | 3 |
| 3) PS/2 Keyboard/ Mouse Port | 2 | 2 |
| 4) LAN Port | 1 | 1 |
| 5) USB Port | 1 | 1 |
| 6) RS485 Port | 1 | 1 |

Note: Client consigns only one Model sample to test. (Model Number: TPC-1260T). Therefore, the testing Lab. just guarantees the units, which have been tested.



SUPPORT EQUIPMENT

| No. | Equipment | Model # | Serial # | FCC ID | Trade Name | Data Cable | Power Cord |
|-----|------------------------------------|------------|--------------|--------------|------------|-------------------------------|------------------|
| 1) | Printer | 2225C | 2804S03094 | DSI6XU2225 | HP | Shielded, 1.8m | Unshielded, 1.8m |
| 2) | Modem | 231AA | A08631083483 | BF9D93108US | Hayes | Shielded, 1.8m | Unshielded, 1.8m |
| 3) | PS/2 Keyboard | SK-2502C | M99043551 | FCC DoC | HP | Shielded, 1.8m | N/A |
| 4) | PS/2 Mouse | S-48a | LZE02451546 | JZ201213 | Logitech | Shielded, 1.8m | N/A |
| 5) | USB Mouse | M-BB48 | LZE1450904 | FCC DoC | Logitech | Shielded, 1.8m | N/A |
| 6) | Serial Mouse | M-MM43 | LZE93352988 | DoC | Logitech | Shielded, 1.9m | N/A |
| 7) | Serial Mouse | M-MM43 | LZE94052771 | DoC | Logitech | Shielded, 1.9m | N/A |
| 8) | Serial Mouse | M-MM43 | LZE94052791 | DoC | Logitech | Shielded, 1.9m | N/A |
| 9) | Monitor (Remote) | GDM-17SE2T | 7138048 | AK8GDM17SE2T | SONY | Shielded, 1.5m with two cores | Unshielded, 1.8m |
| 10) | PS/2 Keyboard (Remote) | 6511-TW4C | KP2 | N/A | ACER | Shielded, 1.8m | N/A |
| 11) | PC (Remote) | ipc-6806 | N/A | N/A | adventech | LAN Cable: Shielded, 10m | Unshielded, 1.8m |
| | RS485 to RS232 Adapter (for Modem) | ADAM-4522 | N/A | N/A | ADAM | Unshielded, 0.6m | N/A |

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.



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 22/EN 55022 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



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 9kHz to 1.0 / 2.0 GHz.

Equipment used during the tests:

Open Area Test Site: # 1

| Open Area Test Site # 1 | | | | | |
|-------------------------|------------|--------------|---------------|------------|------------|
| EQUIPMENT TYPE | MFR | MODEL NUMBER | SERIAL NUMBER | LAST CAL. | CAL DUE. |
| Pre-Amplifier | HP | 8447F | 2944A03748 | 11/10/2000 | 11/09/2001 |
| EMI Test Receiver | R&S | ESCS30 | 847793/012 | 11/10/2000 | 11/09/2001 |
| Precision Dipole | SCHWAZBECK | VHAP | 998/999 | 05/17/2001 | 05/16/2002 |
| Precision Dipole | SCHWAZBECK | UHAP | 981/982 | 05/17/2001 | 05/16/2002 |
| Bilog Antenna | CHASE | CBL6112A | 2309 | 02/11/2001 | 02/10/2002 |
| Turn Table | EMCO | 2081-1.21 | N/A | N.C.R | N.C.R |
| Antenna Tower | EMCO | 2075-2 | 9707-2604 | N.C.R | N.C.R |
| Controller | EMCO | 2090 | N/A | N.C.R | N.C.R |
| RF Switch | ANRITSU | MP59B | M54367 | N.C.R | N.C.R |
| Site NSA | C&C | N/A | N/A | 11/05/2000 | 11/04/2001 |
| Spectrum Analyzer | ADVANTEST | R3261C | 71720533 | 10/26/2000 | 10/25/2001 |

Conducted Emission Test Site: # 4

| Conducted Emission Test Site # 4 | | | | | |
|----------------------------------|-----------|--------------|---------------|------------|------------|
| EQUIPMENT TYPE | MFR | MODEL NUMBER | SERIAL NUMBER | LAST CAL. | CAL DUE. |
| EMI Test Receiver | R&S | ESHS10 | 843743/015 | 12/15/2000 | 12/14/2001 |
| LISN | R&S | ENV 4200 | 8303261016 | 11/18/2000 | 11/17/2001 |
| LISN | EMCO | 3825/2 | 9003/1382 | 02/08/2001 | 02/07/2002 |
| Spectrum Analyzer | ADVANTEST | R3261A | 91720031 | 05/05/2001 | 05/04/2002 |
| 2X2 WIRE ISN | R&S | ENY22 | 830661/027 | 04/06/2001 | 04/05/2002 |
| FOUR WIRE ISN | R&S | ENY41 | 830663/024 | 04/04/2001 | 04/03/2002 |

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.



TEST EQUIPMENT LIST

For Power Harmonic & Voltage Fluctuation/Flicker Measurement:

| Manufacturer/Type | Model No. | Serial No. | Last Cal. | Cal. Due |
|---|-----------|------------|---------------|---------------|
| HAEFELY TRENCH Harmonic & Flicker Tester | PHF 555 | 080 419-25 | Oct. 16, 2000 | Oct. 15, 2001 |

For ESD test:

| Manufacturer/Type | Model No. | Serial No. | Last Cal. | Cal. Due |
|---------------------------------|-----------|------------|---------------|---------------|
| HAEFELY/TRENCH ESD Generator | PESD 1600 | H710203 | Sep. 02, 2000 | Sep. 01, 2001 |

For Radiated Electromagnetic Field immunity Measurement:

| Manufacturer/Type | Model No. | Serial No. | Last Cal. | Cal. Due |
|--|---------------------|------------|---------------|---------------|
| Maconi /Signal Generator | 2022D | 119246/003 | Aug. 21, 2000 | Aug. 20, 2001 |
| M2S / Power Amplifier | A00181/1000 | 9801-112 | N/A | N/A |
| M2S / Power Amplifier | AC8113/800-250 A | 9801-179 | N/A | N/A |
| Wandel & Goltormann/ EM-Radiation Meter | EMR-30 | L-0013 | Mar. 16, 2001 | Mar. 15, 2002 |
| EMCO Power Antenna | 93141 | 9712-1083 | N/A | N/A |

For Fast Transients/Burst test:

| Manufacturer/Type | Model No. | Serial No. | Last Cal. | Cal. Due |
|---|-------------|-------------|---------------|---------------|
| HAEFELY TRENCH/ Fast Transients/Burst Generator | PEFT-JUNIOR | 583 333-117 | Aug. 21, 2000 | Aug. 20, 2001 |
| HAEFELY TRENCH/ Clamp | 093 506.1 | 080 421.13 | N/A | N/A |

For CS test:

| Manufacturer/Type | Model No. | Serial No. | Last Cal. | Cal. Due |
|--------------------------|-------------|------------|---------------|---------------|
| Maconi /Signal Generator | 2022D | 119246/003 | Aug. 21, 2000 | Aug. 20, 2001 |
| MEB / CDN M3 | M3 | 3683 | Sep. 11, 2000 | Sep. 10, 2001 |
| C.D.N / CDN M2 | CDN-M2 | A3002010 | Apr. 17, 2001 | Apr. 16, 2002 |
| M2S / Power Amplifier | A00181/1000 | 9801-112 | N/A | N/A |
| MEB / Clamp | KEMZ-801 | 13 602 | N/A | N/A |

For Surge Immunity test:

| Manufacturer/Type | Model No. | Serial No. | Last Cal. | Cal. Due |
|---------------------------------|-------------|------------|---------------|---------------|
| HAEFELY TRENCH/ Surge Tester | PSURGE 4010 | 583 334-71 | Sep. 01, 2000 | Aug. 31, 2001 |
| HAEFELY TRENCH/ CDN | IP6.2 | 148342 | Mar. 22, 2001 | Mar. 21, 2002 |
| HAEFELY TRENCH/ CDN | DEC1A | 148050 | Apr. 06, 2001 | Apr. 05, 2002 |

For Power Frequency Magnetic Field Immunity test:

| Manufacturer/Type | Model No. | Serial No. | Last Cal. | Cal. Due |
|---|-----------|------------|--------------|--------------|
| F.W.BELL/ TRIAX ELF Magnetic Field Meter | 4090 | 9711 | Oct. 20,2000 | Oct.19, 2001 |
| HAEFELY TRENCH/ Magnetic Field Tester | MAG 100.1 | 080 938-01 | N/A | N/A |

For Voltage Dips/Short Interruption and Voltage Variation Immunity test:

| Manufacturer/Type | Model No. | Serial No. | Last Cal. | Cal. Due |
|--|------------|------------|---------------|---------------|
| HAEFELY TRENCH/ Dips/Interruption and Variations Simulator | PLINE 1610 | 080 344-05 | Feb. 08, 2001 | Feb. 07, 2002 |



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 (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.
- 3) All I/O cables were positioned to simulate typical actual usage as per EN 55022.
- 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 were scanned during the preliminary test:

Mode:

1. 640 x 480 Resolution

- 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 A.V. 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 | --- | L1 |

| | |
|------------|---|
| 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 2dB margin limits, so no further recheck. |

LINE CONDUCTED EMISSION LIMIT

| Frequency | Maximum RF Line Voltage | |
|---------------|-------------------------|---------|
| | Q.P. | AVERAGE |
| 150kHz-500kHz | 79dBuV | 66dBuV |
| 500kHz-5MHz | 73dBuV | 60dBuV |
| 5MHz-30MHz | 73dBuV | 60dBuV |

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



MEASUREMENT PROCEDURE (COMMON MODE CONDUCTED EMISSION MEASUREMENT)

- 1) Selecting ISN for unscreened cable or a current probe for screened cable to take measurement.
- 2) The port of the EUT was connected to the remote side support equipment through the ISN/Current Probe and communication in normal condition.
- 3) Making a overall range scan by using the test receiver controlled by controller and record at least six highest emissions for showing in the test report.
- 4) 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.
- 5) In case of measuring on the screened cable, the current limit shall be applied, otherwise the voltage limit should be applied.
- 6) 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 | --- | 74 | 64 | -30.05 | --- | |

| | |
|------------|---|
| 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. |

COMMON MODE CONDUCTED EMISSION LIMIT AT TELECOMMUNICATION PORTS

| <input checked="" type="checkbox"/> CE-Mark (EN 55022:1998) | | | | | |
|---|-------------------|----------------------|-------|----------------------|-------|
| CLASS | Measuring Band | Voltage limit dB(uV) | | Current limit dB(uA) | |
| | | Q.P. | AV | Q.P. | AV |
| A | 150kHz-500kHz | 97-87 | 84-74 | 53-43 | 40-30 |
| | 500kHz-30MHz | 87 | 74 | 43 | 30 |

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 (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.
- 3) All I/O cables were positioned to simulate typical actual usage as per EN 55022.
- 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 EN 55022. 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 1000MHz. 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 were scanned during the preliminary test:

Mode:

1. 640 x 480 Resolution

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

Mode: 1.

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 / Receiver 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. (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 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 (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

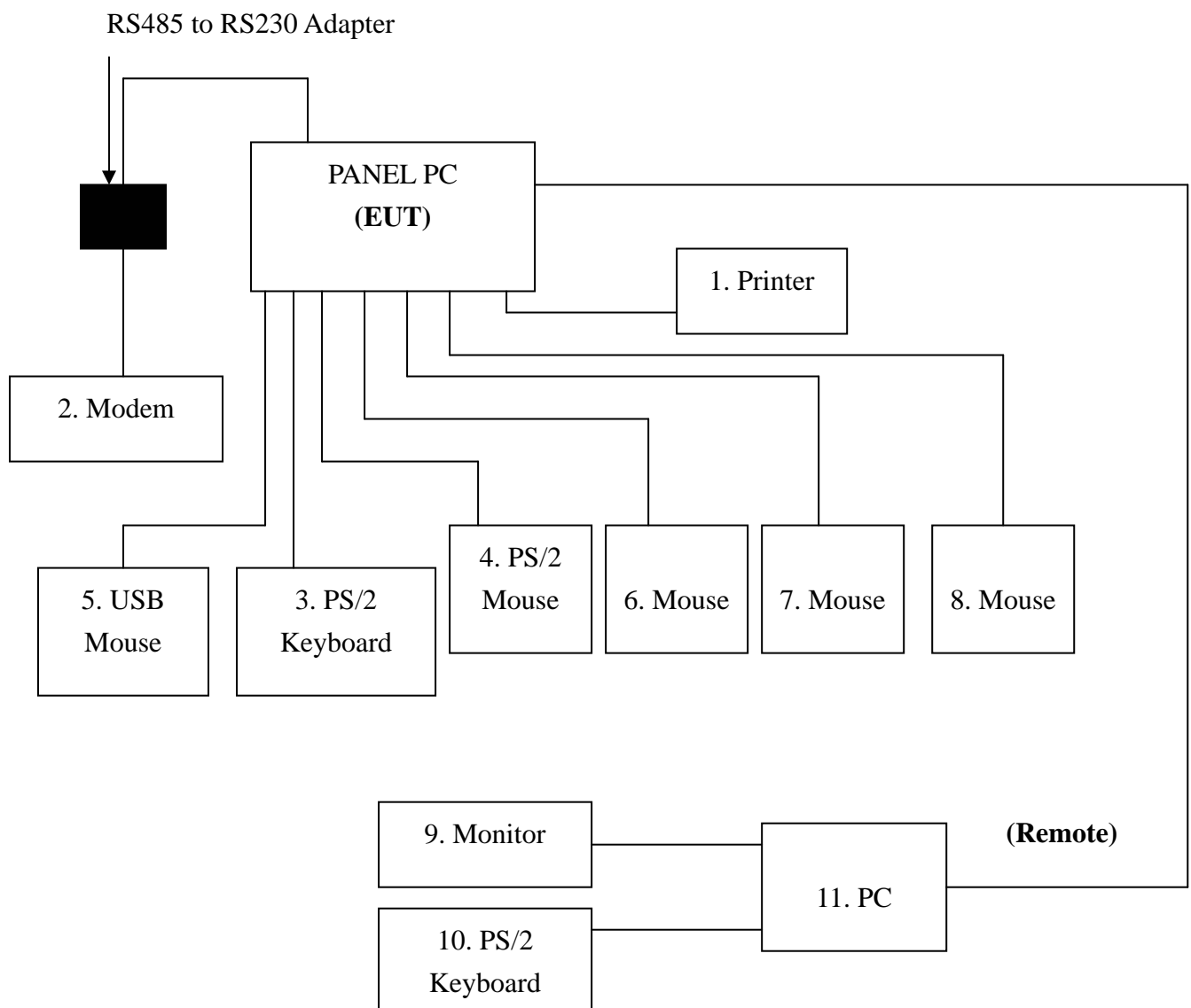
System Diagram of Connections between EUT and Simulators

EUT: PANEL PC

Trade Name: ADVANTECH

Model Number: X (X= A~ Z or Blank)

Power Cord: Unshielded, 1.8m





SUMMARY DATA

(LINE CONDUCTED TEST)

Model Number: TPC-1260T

Location: Site # 4

Tested by: Summer Lee

Test Mode: Mode 1

Test Results: Passed

Temperature: 28°C

Humidity: 60%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 |
|-------------|---------------------|--------------------|-----------------------|----------------------|----------------------|---------------------|------|
| 0.150 | 53.2 | --- | 79.0 | 66.0 | -25.8 | --- | L1 |
| 9.656 | 46.1 | --- | 73.0 | 60.0 | -26.9 | --- | L1 |
| 10.153 | 37.1 | --- | 73.0 | 60.0 | -35.9 | --- | L1 |
| 17.168 | 40.3 | --- | 73.0 | 60.0 | -32.7 | --- | L1 |
| 21.451 | 37.3 | --- | 73.0 | 60.0 | -35.7 | --- | L1 |
| 25.753 | 46.5 | --- | 73.0 | 60.0 | -26.5 | --- | L1 |
| 0.150 | 51.7 | --- | 79.0 | 66.0 | -27.3 | --- | L2 |
| 1.009 | 32.5 | --- | 73.0 | 60.0 | -40.5 | --- | L2 |
| 10.361 | 37.3 | --- | 73.0 | 60.0 | -35.7 | --- | L2 |
| 17.163 | 40.1 | --- | 73.0 | 60.0 | -32.9 | --- | L2 |
| 21.461 | 35.2 | --- | 73.0 | 60.0 | -37.8 | --- | L2 |
| 25.765 | 47.4 | --- | 73.0 | 60.0 | -25.6 | --- | 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

(COMMON MODE CONDUCTED EMISSION MEASUREMENT)

(LAN)

Model Number: TPC-1260T

Location: Site # 4

Tested by: Summer Lee

Test Mode: Mode 1

Test Results: Passed

Temperature: 29°C

Humidity: 60% 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 |
|-------------|---------------------|--------------------|-----------------------|----------------------|----------------------|---------------------|------|
| 0.405 | 68.3 | --- | 88.8 | 75.8 | -20.5 | --- | |
| 0.925 | 52.1 | --- | 87.0 | 74.0 | -34.9 | --- | |
| 2.576 | 53.7 | --- | 87.0 | 74.0 | -33.3 | --- | |
| 7.563 | 52.2 | --- | 87.0 | 74.0 | -34.8 | --- | |
| 16.752 | 51.2 | --- | 87.0 | 74.0 | -35.8 | --- | |
| 25.137 | 58.1 | --- | 87.0 | 74.0 | -28.9 | --- | |

****NOTE:** “---” denotes the emission level was less –2 dB to the Average limit, so no re-check anymore.



SUMMARY DATA

(RADIATED EMISSION TEST)

Model Number: TPC-1260T

Location: Site # 1

Tested by: Summer Lee

Polar: Vertical--10m

Test Mode: Mode 1

Test Results: Passed

Detector Function: Quasi-Peak

Temperature: 28°C

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 (dBuV/m) | Limits | Margin (dB) |
|----------------|---------------------------|-------------------------|-------------------------------|--------|----------------|
| 34.54 | 11.6 | 18.3 | 29.9 | 40.0 | -10.1 |
| 86.57 | 19.5 | 8.9 | 28.4 | 40.0 | -11.6 |
| 165.90 | 26.2 | 11.3 | 37.5 | 40.0 | -2.5 |
| 531.23 | 22.4 | 22.1 | 44.5 | 47.0 | -2.5 |
| 797.09 | 12.2 | 25.6 | 37.8 | 47.0 | -9.2 |
| 927.87 | 14.1 | 27.1 | 41.2 | 47.0 | -5.8 |



SUMMARY DATA (RADIATED EMISSION TEST)

Model Number: TPC-1260T

Location: Site # 1

Tested by: Summer Lee

Polar: Horizontal--10m

Test Mode: Mode 1

Test Results: Passed

Detector Function: Quasi-Peak

Temperature: 28°C

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 (dBuV/m) | Limits | Margin (dB) |
|----------------|---------------------------|-------------------------|-------------------------------|--------|----------------|
| 125.10 | 18.1 | 13.1 | 31.2 | 40.0 | -8.8 |
| 166.07 | 23.8 | 11.3 | 35.1 | 40.0 | -4.9 |
| 178.18 | 21.6 | 11.0 | 32.6 | 40.0 | -7.4 |
| 397.86 | 19.8 | 19.3 | 39.1 | 47.0 | -7.9 |
| 530.30 | 17.2 | 22.1 | 39.3 | 47.0 | -7.7 |
| 795.34 | 17.8 | 25.6 | 43.4 | 47.0 | -3.6 |
| 927.70 | 16.7 | 27.1 | 43.8 | 47.0 | -3.2 |

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

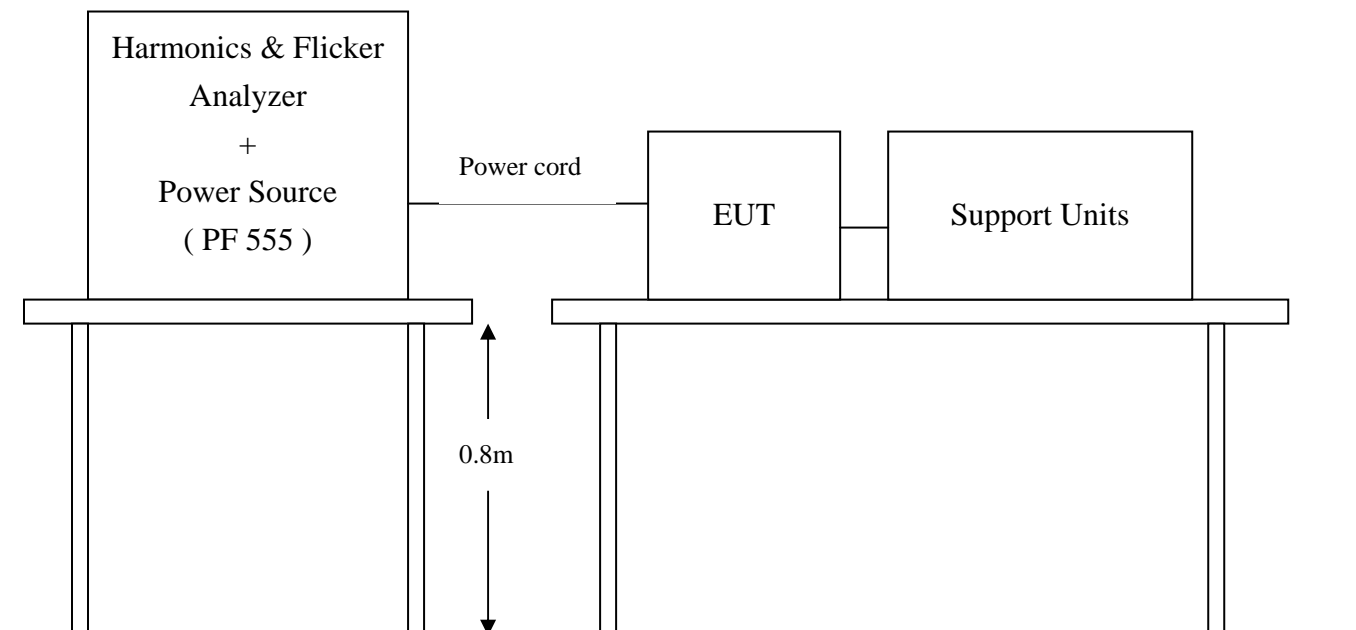
POWER HARMONICS MEASUREMENT

Port : AC mains
Basic Standard : EN 61000-3-2 (1995 + A1: 1998 + A2: 1998 + A14: 2000)
Limits : ☒ CLASS A ; ☐ CLASS D
Tester : Summer Lee
Temperature : 27°C
Humidity : 53%

VOLTAGE FLUCTUATION/FLICKER MEASUREMENT

Port : AC mains
Basic Standard : EN 61000-3-3 (1995)
Limits : §5 of EN 61000-3-3
Tester : Summer Lee
Temperature : 27°C
Humidity : 53%

Block Diagram of Test Setup:



Result:

Please see the attached test data.



EN 61000-3-2 TEST REPORT 2001/6/12 11:27 PM

Unit: PANEL PC

Model No.: TPC-1260T

Remarks: TEMP:27°C HUM:53%

Operator: SUMMER LEE

=====

TEST SETUP

| | | | |
|------------------|-----------|---------------|--------------|
| Test Freq.: | 50.00 Hz. | Test Voltage: | 230.0 vac |
| Waveform : | SINE | Test Time: | 2.5 min. |
| Classification : | CLASS A | Test Type: | STEADY-STATE |

| | | | |
|-------------------|-----|-----------|-------|
| Prog. Zo Enabled: | YES | Prog. Zo: | 0.000 |
|-------------------|-----|-----------|-------|

| | |
|--|--------|
| Motor Driven with Phase Angle Control: | NO |
| Impedance selected: | DIRECT |

| | |
|------------------------|------------------------|
| Synthetic R+L Enabled: | NO |
| Resistance: 0.380 Ohms | Inductance: 460.000 uH |

MAX WATTS:24.5W



TEST DATA

Result: PASS

Harmonic Current Results

| Hn | AMPS | LO Limit | HI Limit | Result |
|----|-------|----------|----------|--------|
| 0 | 0.000 | 0.000 | 0.000 | PASS |
| 1 | 0.141 | NaN | NaN | PASS |
| 2 | 0.001 | 1.080 | 1.080 | PASS |
| 3 | 0.104 | 2.300 | 2.300 | PASS |
| 4 | 0.001 | 0.430 | 0.430 | PASS |
| 5 | 0.096 | 1.140 | 1.140 | PASS |
| 6 | 0.001 | 0.300 | 0.300 | PASS |
| 7 | 0.089 | 0.770 | 0.770 | PASS |
| 8 | 0.001 | 0.230 | 0.230 | PASS |
| 9 | 0.080 | 0.400 | 0.400 | PASS |
| 10 | 0.001 | 0.184 | 0.184 | PASS |
| 11 | 0.071 | 0.330 | 0.330 | PASS |
| 12 | 0.001 | 0.153 | 0.153 | PASS |
| 13 | 0.060 | 0.210 | 0.210 | PASS |
| 14 | 0.001 | 0.131 | 0.131 | PASS |
| 15 | 0.050 | 0.150 | 0.150 | PASS |
| 16 | 0.001 | 0.115 | 0.115 | PASS |
| 17 | 0.040 | 0.132 | 0.132 | PASS |
| 18 | 0.001 | 0.102 | 0.102 | PASS |
| 19 | 0.030 | 0.118 | 0.118 | PASS |
| 20 | 0.000 | 0.092 | 0.092 | PASS |
| 21 | 0.021 | 0.107 | 0.107 | PASS |
| 22 | 0.000 | 0.084 | 0.084 | PASS |
| 23 | 0.014 | 0.098 | 0.098 | PASS |



| | | | | |
|----|-------|-------|-------|------|
| 24 | 0.000 | 0.077 | 0.077 | PASS |
| 25 | 0.008 | 0.090 | 0.090 | PASS |
| 26 | 0.000 | 0.071 | 0.071 | PASS |
| 27 | 0.004 | 0.083 | 0.083 | PASS |
| 28 | 0.000 | 0.066 | 0.066 | PASS |
| 29 | 0.002 | 0.078 | 0.078 | PASS |
| 30 | 0.000 | 0.061 | 0.061 | PASS |
| 31 | 0.003 | 0.073 | 0.073 | PASS |
| 32 | 0.000 | 0.058 | 0.058 | PASS |
| 33 | 0.004 | 0.068 | 0.068 | PASS |
| 34 | 0.000 | 0.054 | 0.054 | PASS |
| 35 | 0.004 | 0.064 | 0.064 | PASS |
| 36 | 0.000 | 0.051 | 0.051 | PASS |
| 37 | 0.003 | 0.061 | 0.061 | PASS |
| 38 | 0.000 | 0.048 | 0.048 | PASS |
| 39 | 0.002 | 0.058 | 0.058 | PASS |
| 40 | 0.000 | 0.046 | 0.046 | PASS |

END OF REPORT



EN 61000-3-3 TEST REPORT 2001/6/12 11:48 PM

Unit: PANEL PC

Model No.: TPC-1260T (Continue)

Remarks: TEMP:27°C HUM:53%

Operator: SUMMER LEE

=====

TEST SETUP

Test Freq.: 50.00 Hz. Test Voltage: 230.0 vac
Waveform : SINE
Test Time: 10.0 min. Tshort: 10.0 min.

Prog. Zo Enabled: YES Prog. Zo: 0.000

Voltage Change less than once per Hour: NO
Impedance selected: DIRECT

Synthetic R+L Enabled: NO
Resistance: 0.380 Ohms Inductance: 460.000 uH



TEST DATA

Result: PASS

| | EUT Data | Limit | Result | Test Enabled |
|-------------------|----------|-------|--------|--------------|
| Pst max | 0.008 | 1.00 | PASS | true |
| Plt max | 0.008 | 0.65 | PASS | true |
| dc % | 0.00 | 3.00 | PASS | true |
| dmax % | 0.00 | 4.00 | PASS | true |
| d(t) sec. | 0.00 | 0.20 | PASS | true |
| Power Source Data | | | | |
| Source Pst max | 0.025 | 0.400 | PASS | true |
| % THD | 0.03 | 3.00 | PASS | true |

END OF REPORT



EN 61000-3-3 TEST REPORT 2001/6/13 12:02 PM

Unit: PANEL PC

Model No.: TPC-1260T

Remarks: TEMP:27°C HUM:53%

Operator: SUMMER LEE

=====

TEST SETUP

Test Freq.: 50.00 Hz. Test Voltage: 230.0 vac
Waveform : SINE
Test Time: 10.0 min. Tshort: 10.0 min.

Prog. Zo Enabled: YES Prog. Zo: 0.000

Voltage Change less than once per Hour: NO
Impedance selected: DIRECT

Synthetic R+L Enabled: NO
Resistance: 0.380 Ohms Inductance: 460.000 uH



TEST DATA

Result: PASS

| | EUT Data | Limit | Result | Test Enabled |
|-------------------|----------|-------|--------|--------------|
| Pst max | 0.008 | 1.00 | PASS | true |
| Plt max | 0.008 | 0.65 | PASS | true |
| dc % | 0.00 | 3.00 | PASS | true |
| dmax % | 0.00 | 4.00 | PASS | true |
| d(t) sec. | 0.00 | 0.20 | PASS | true |
| Power Source Data | | | | |
| Source Pst max | 0.025 | 0.400 | PASS | true |
| % THD | 0.03 | 3.00 | PASS | true |

END OF REPORT

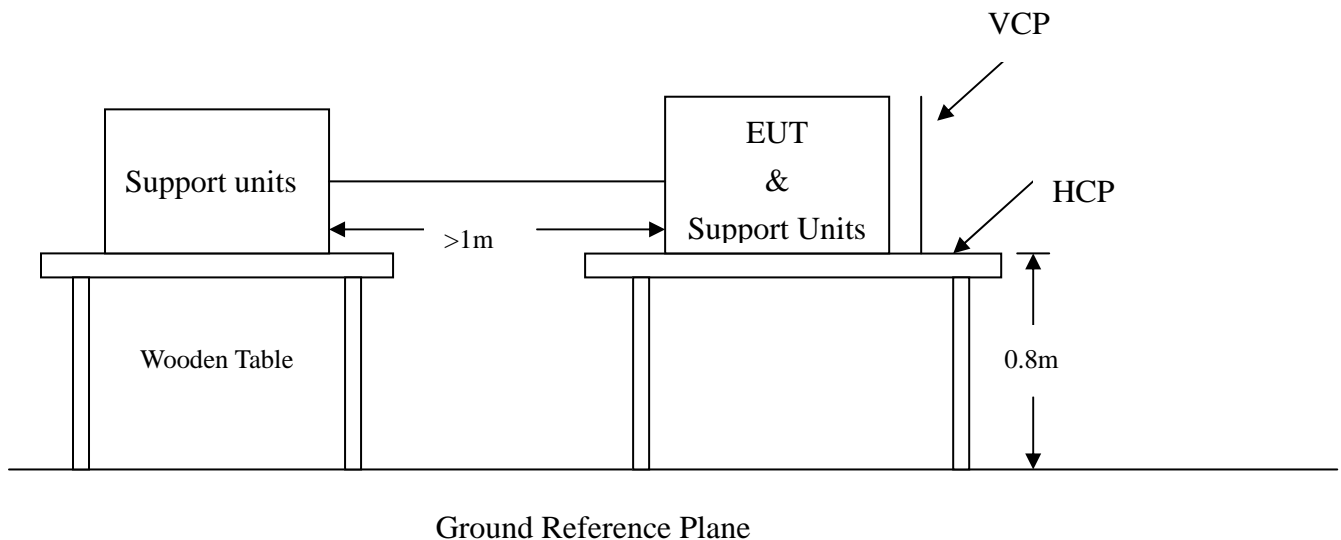
SECTION 3 IEC 61000-4-2 (ELECTROSTATIC DISCHARGE)

ELECTROSTATIC DISCHARGE (ESD) IMMUNITY TEST

Port : Enclosure
Basic Standard : IEC 61000-4-2
Test Level : ± 8 kV (Air Discharge)
 ± 4 kV (Contact Discharge)
 ± 4 kV (Indirect Discharge)
Performance Criteria : B (Standard require)
Tester : Summer Lee
Temperature/Humidity: 27°C/51%

Block Diagram of Test Setup:

(The 470 k ohm resistors are installed per standard requirement)



Test Procedure:

1. The EUT was located 0.1 m minimum from all side of the HCP.
2. The support units were located 1 m minimum away from the EUT.
3. A scroll 'H' test program was loaded and executed in Windows mode.
4. The EUT sent above message to EUT and related peripherals through the test.
5. Active the communication function if the EUT with such port(s).
6. As per the requirement of EN 55024:1998; applying direct contact discharge at the sides other than front of EUT at minimum 50 discharges (25 positive and 25 negative) if applicable, can't be applied direct contact discharge side of EUT then the indirect discharge shall be applied. One of the test points shall be subjected to at least 50 indirect discharge (contact) to the front edge of horizontal coupling plane.
7. Other parts of EUT where it is not possible to perform contact discharge then selecting appropriate points of EUT for air discharge, a minimum of 10 single air discharges shall be applied.
8. The application of ESD to the contact of open connectors is not required.
9. Putting a mark on EUT to show tested points. The following test condition was followed during the tests.

Note: As per A2 to IEC 61000-4-2, a bleed resistor cable is connected between the EUT and HCP during the test.

The electrostatic discharges were applied as follows:

| Amount of Discharges | Voltage | Coupling | Result (Pass/Fail) |
|----------------------|---------|--------------------------------|--------------------|
| Mini 25 /Point | ±4kV | Contact Discharge | Pass |
| Mini 25 /Point | ±4kV | Indirect Discharge HCP (Front) | Pass |
| Mini 25 /Point | ±4kV | Indirect Discharge VCP (Left) | Pass |
| Mini 25 /Point | ±4kV | Indirect Discharge VCP (Back) | N/A |
| Mini 25 /Point | ±4kV | Indirect Discharge VCP (Right) | Pass |
| Mini 10 /Point | ±8kV | Air Discharge | Pass |

*** The tested points to EUT please refer to attach pages.

(Blue arrow mark for contact discharge, red arrow mark for air discharge.)



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.

☒ **PASS**

☐ **FAILED**

Observation: No any function degraded during the tests.

The Tested Points of EUT

(Photo 1 of 3)



(Photo 2 of 3)



(Photo 3 of 3)

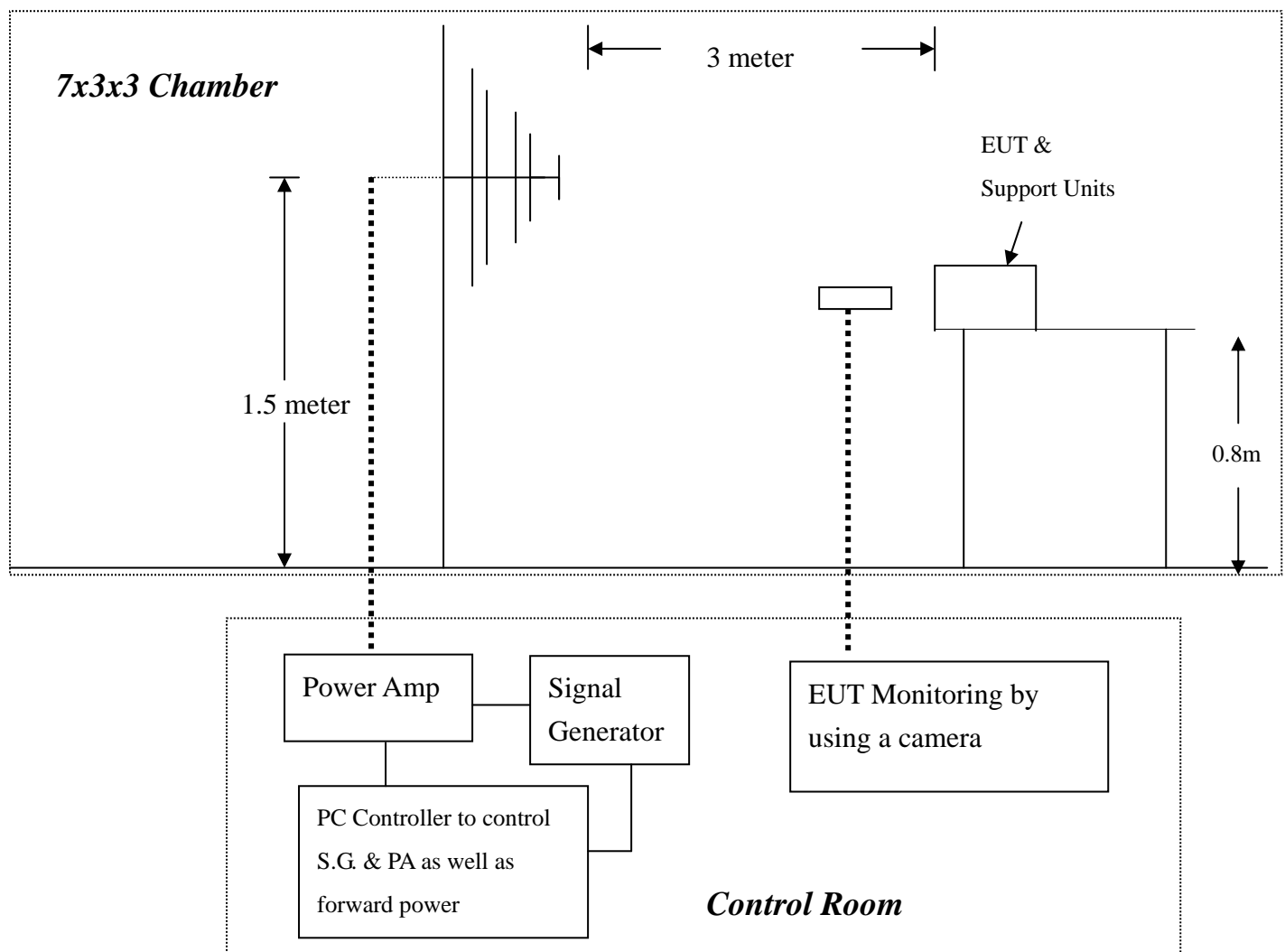


SECTION 4 IEC 61000-4-3 (RADIATED ELECTROMAGNETIC FIELD)

RADIATED ELECTROMAGNETIC FIELD IMMUNITY TEST

| | |
|----------------------|--|
| Port | : Enclosure |
| Basic Standard | : IEC 61000-4-3 |
| Requirements | : 10 V/m / with 80% AM. 1kHz Modulation. |
| Performance Criteria | : A (Standard require) |
| Tester | : Summer Lee |
| Temperature | : 30°C |
| Humidity | : 51% |

Block Diagram of Test Setup:



Test Procedure:

1. The EUT was located at the edge of supporting table keep 3 meter away from transmitting antenna, it just the calibrated square area of field uniformity. The support units were located outside of the uniformity area, but the cable(s) connected with EUT were exposed to the calibrated field as per IEC 61000-4-3.
2. A scroll 'H' messages were displayed on part of screen of EUT and an enlarged 'H' characters were displayed on the other part of screen of EUT.
3. Adjusting the monitoring camera to monitor the 'H' message as clear as possible.
4. Setting the testing parameters of RS test software per IEC 61000-4-3.
5. Performing the test at each side of with specified level from 80MHz to 1000MHz at 1% steps.
6. Recording the test result in following table.
7. It is not necessary to perform test as per annex A of EN 55024:1998 if the EUT doesn't belong to TTE product.

IEC 61000-4-3 test conditions:

Test level : 10V/m

Steps : 1 % of fundamental;

Dwell Time : 3 sec

| Range (MHz) | Field | Modulation | Polarity | Position (°) | Result (Pass/Fail) |
|-------------|-------|------------|----------|--------------|--------------------|
| 80-1000 | 10V | Yes | H | Front | Pass |
| 80-1000 | 10V | Yes | V | Front | Pass |
| 80-1000 | 10V | Yes | H | Right | Pass |
| 80-1000 | 10V | Yes | V | Right | Pass |
| 80-1000 | 10V | Yes | H | Back | Pass |
| 80-1000 | 10V | Yes | V | Back | Pass |
| 80-1000 | 10V | Yes | H | Left | Pass |
| 80-1000 | 10V | Yes | V | Left | 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.

☒ **PASS** ☐ **FAILED**

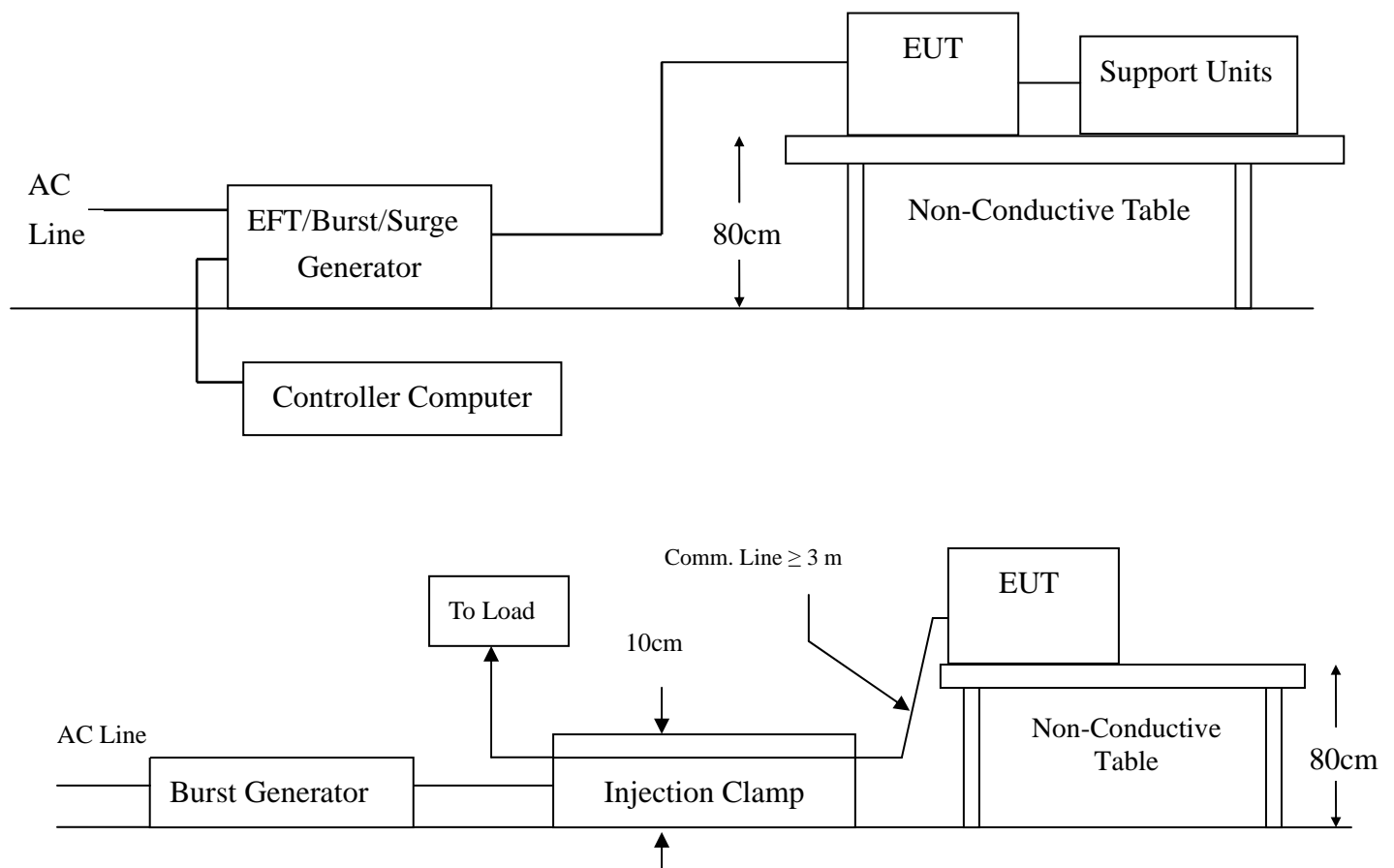
Observation: No any function degraded during the tests.

SECTION 5 IEC 61000-4-4 (FAST TRANSIENTS/BURST)

FAST TRANSIENTS/BURST IMMUNITY TEST

| | |
|-----------------------------|--|
| Port | : On Power Supply Lines and Data Cable |
| Basic Standard | : IEC 61000-4-4 |
| Requirements | : +/- 2kV for Power Supply Lines +/- 1kV for Data Cable |
| Performance Criteria | : B (Standard require) |
| Tester | : Summer Lee |
| Temperature | : 27°C |
| Humidity | : 51% |

Block Diagram of Test Setup:





Test Procedure:

1. The EUT and support units were located on a wooden table 0.8 m away from ground reference plane.
2. A 1.0 meter long power cord was attached to EUT during the test.
3. The length of communication cable between communication port and clamp was keeping within 1 meter.
4. A test program was loaded and executed in Windows mode.
5. The data was sent to EUT filling the screens with upper case of "H" patterns.
6. The test program exercised related support units sequentially.
7. Repeating step 3 to 6 through the test.
8. Recording the test result as shown in following table.

Test conditions:

Impulse Frequency: 5kHz

Tr/Th: 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.

☒ **PASS** ☐ **FAILED**

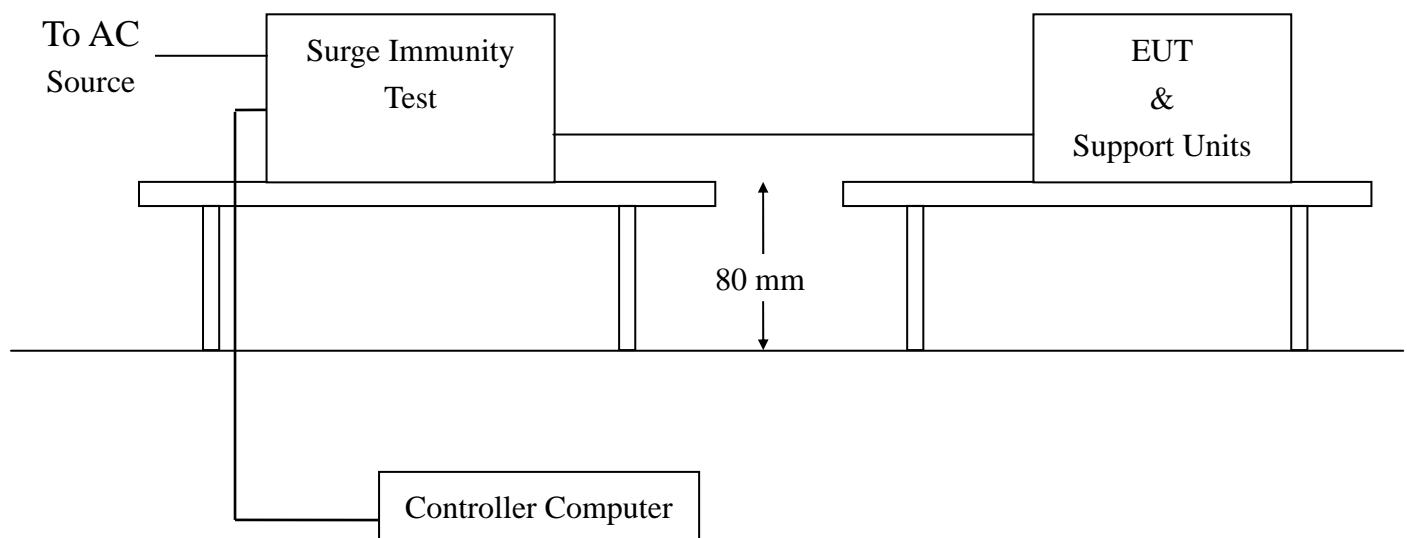
Observation: No any function degraded during the tests.

SECTION 6 IEC 61000-4-5 (SURGE IMMUNITY)

SURGE IMMUNITY TEST

Port : Power Cord
Basic Standard : IEC 61000-4-5
Requirements : +/- 1kV (Line to Line)
: +/- 2kV (Line to Ground)
Performance Criteria : B (Standard require)
Tester : Summer Lee
Temperature : 27°C
Humidity : 51%

Block Diagram of Test Setup:





Test Procedure:

1. The EUT and support units were located on a wooden table 0.8 m away from ground floor.
2. A test program was loaded and executed in Windows mode.
3. The data was sent to EUT filling the screens with upper case of "H" patterns.
4. The test program exercised related support units sequentially.
5. Repeating step 3 to 4 through the test.
6. Recording the test result as shown in following table.

Test conditions:

Voltage Waveform : 1.2/50 *us*
Current Waveform : 8/20 *us*
Polarity : Positive/Negative
Phase angle : 0°, 90°, 270°
Number of Test : 5

| Coupling Line | Voltage (kV) | Polarity | Coupling Method | Result (Pass/Fail) |
|---------------|--------------|----------|-----------------|--------------------|
| L1-L2 | 1 | Positive | Capacitive | Pass |
| L1-PE | 2 | Positive | Capacitive | Pass |
| L2-PE | 2 | Positive | Capacitive | Pass |
| L1-L2 | 1 | Negative | Capacitive | Pass |
| L1-PE | 2 | Negative | Capacitive | Pass |
| L2-PE | 2 | Negative | Capacitive | 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.

☒ **PASS**

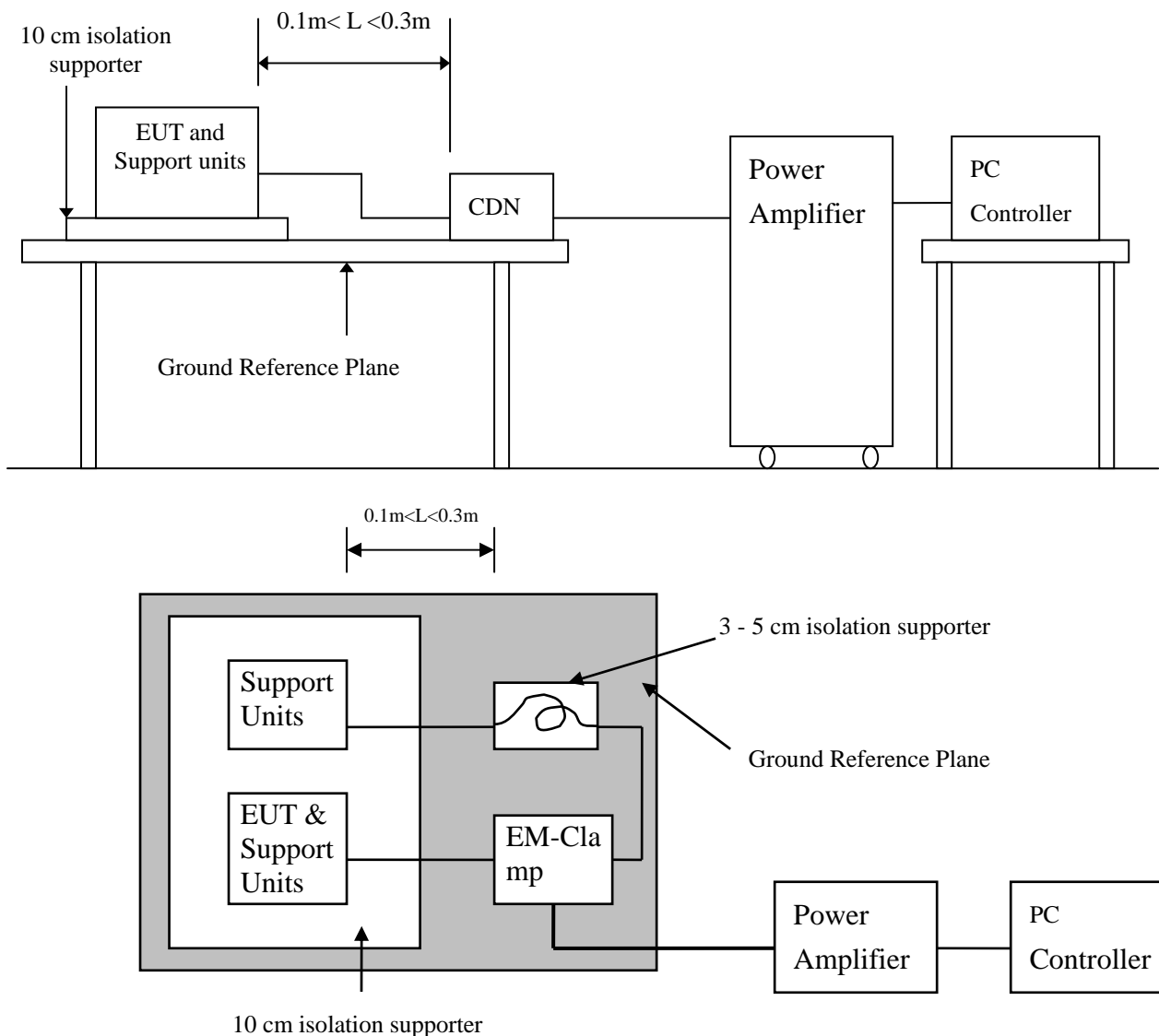
☐ **FAILED**

Observation: No any function degraded during the tests.

SECTION 7 IEC 61000-4-6 (CONDUCTED DISTURBANCE/INDUCED BY RADIO-FREQUENCY FIELD)

Port : AC Port and Data Cable
Basic Standard : IEC 61000-4-6
Requirements : 10V with modulated
Injection Method : CDN-M3 for Power Cord
 EM-Clamp for LAN Cable
Performance Criteria : A (Standard require)
Tester : Summer Lee
Temperature : 27°C
Humidity : 51%

Block Diagram of Test Setup:



Test Procedure:

1. The EUT and support units were located at a ground reference plane with the interposition of a 0.1 m thickness insulating support and the CDN was located on GRP directly.
2. A 'H' messages were displayed on screen of EUT.
3. Adjusting the monitoring camera to monitor the 'H' message as clear as possible.
4. Setting the testing parameters of CS test software per EN 61000-4-6.
5. Recording the test result in following table.

Test conditions:

Frequency Range : 0.15MHz-80MHz
Frequency Step : 1% of fundamental
Dwell Time : 3 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.

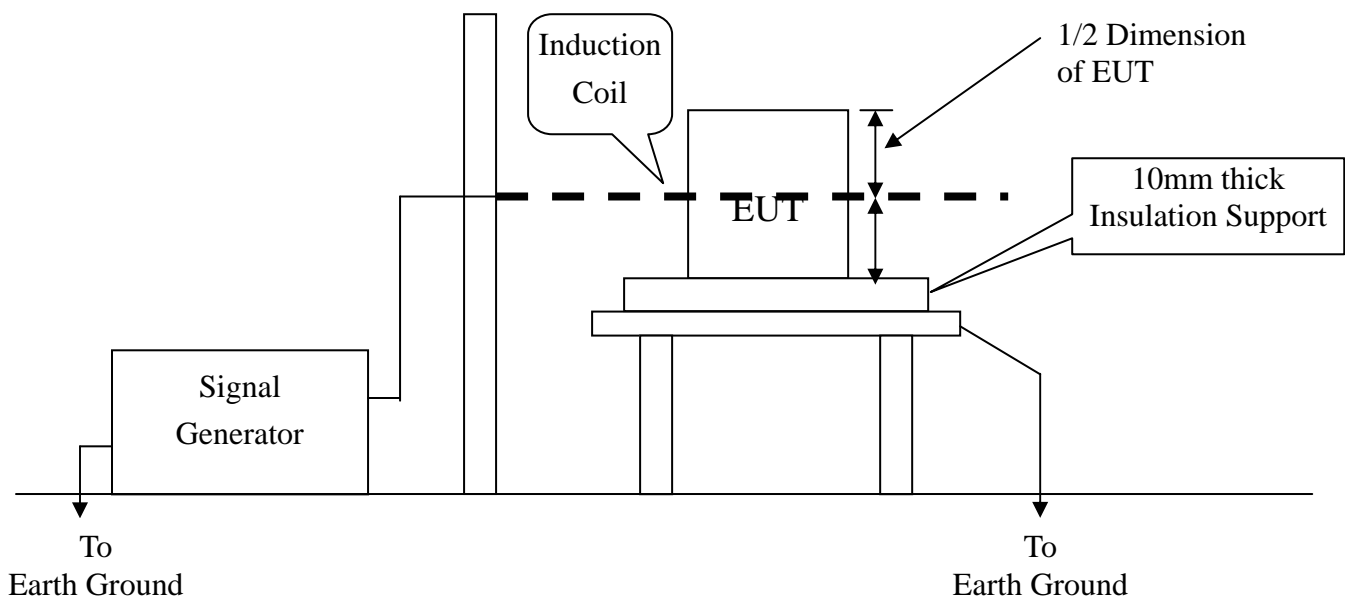
☒ **PASS** ☐ **FAILED**

Observation: No any function degraded during the tests.

SECTION 8 IEC 61000-4-8 (POWER FREQUENCY MAGNETIC FIELD IMMUNITY TEST)

Port : Enclosure
Basic Standard : IEC 61000-4-8
Requirements : 30 A/m
Performance Criteria : A (Standard Required)
Tester : Summer Lee
Temperature / Humidity : 27°C / 51%

Block Diagram of Test Setup:



Test Procedure:

1. The EUT and support units were located on Ground Reference Plane with the interposition of a 0.1 m thickness insulation support.
2. Putting the induction coil on horizontal direction.(X direction)
3. A test program was loaded and executed in Windows mode.
4. The data was sent to the screen of EUT and filling the screen with upper case of “H” patterns.
5. The test program exercised related support units sequentially.
6. Repeating step 3 to 5 through the test.
7. Recording the test result as shown in following table.
8. Rotating the induction coil by 90° (Y direction) then repeat step 3 to 7.
9. Rotating the induction coil by 90° again (Z direction) then repeat step 3 to 7.

*, Test conditions:

Field Strength: 30A/m
Power Freq.: 50Hz
Orientation: X, Y, Z

| Orientation | Field | Result (Pass/Fail) | Remark |
|-------------|-------|--------------------|--------|
| X | 30A | Pass | |
| Y | 30A | Pass | |
| Z | 30A | 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.

☒ **PASS**

☐ **FAILED**

Observation: No any function degraded during the tests.

SECTION 9 IEC 61000-4-11 (VOLTAGE DIPS, SHORT INTERRUPTIONS AND VOLTAGE VARIATIONS)

VOLTAGE DIPS / SHORT INTERRUPTIONS

Port : AC mains
Basic Standard : IEC 61000-4-11 (1994)
Requirement : PHASE ANGLE 0, 45, 90, 135, 180, 225, 270, 315 degrees

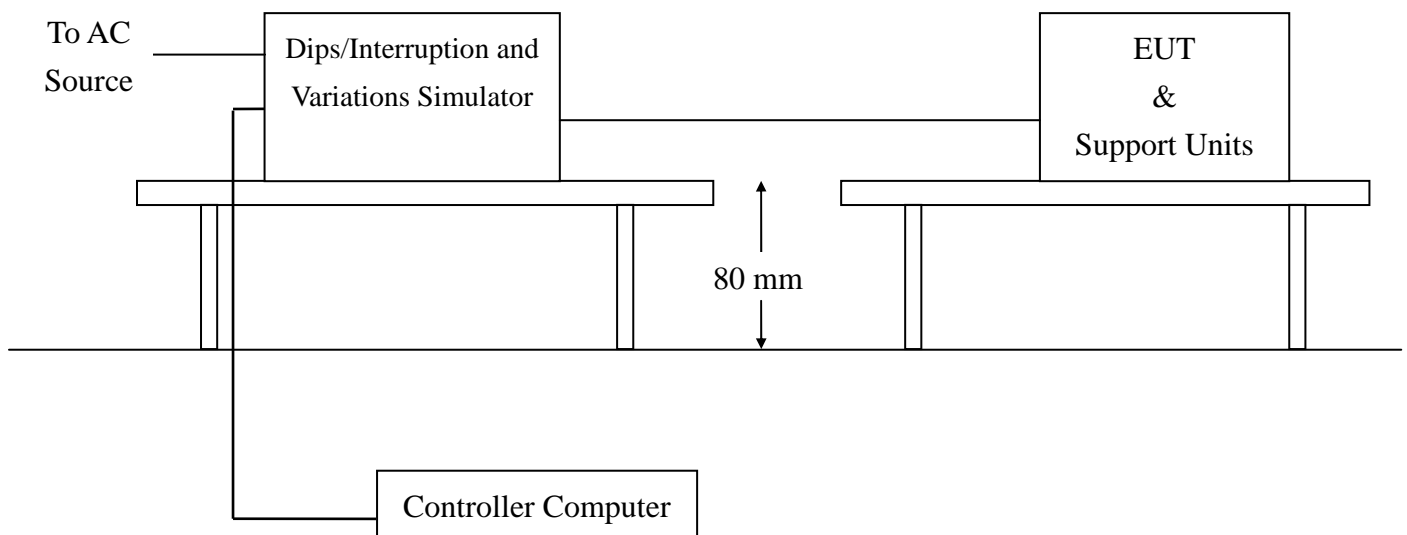
| Voltage Dips (EN55024) | Test Level % U_T | Reduction (%) | Duration | Performance Criteria |
|---------------------------|-----------------------|------------------|----------------|-------------------------|
| | <5 | >95 | 0.5(periods) | B |
| | 70 | 30 | 25(periods) | C |

| Voltage Dips (EN61000-6-2) | Test Level % U_T | Reduction (%) | Duration | Performance Criteria |
|--------------------------------|-----------------------|------------------|----------------|-------------------------|
| | 70 | 30 | 10ms | B |
| | 40 | 60 | 100 and 1000ms | C |

| Voltage Interruptions (EN55024) (EN61000-6-2) | Test Level % U_T | Reduction (%) | Duration | Performance Criteria |
|--|-----------------------|------------------|----------------|-------------------------|
| | <5 | >95 | 250(periods) | C |

Test Interval : Min. 10 sec.
Tester : Summer Lee
Temperature : 27°C
Humidity : 51%

Block Diagram of Test Setup:





Test Procedure:

1. The EUT and support units were located on a wooden table, 0.8 m away from ground floor.
2. A test program was loaded and executed in Windows mode.
3. The data was sent to EUT filling the screens with upper case of "H" patterns.
4. The test program exercised related support units sequentially.
5. Setting the parameter of tests and then Perform the test software of test simulator.
6. Conditions changes to occur at 0 degree crossover point of the voltage waveform.
7. Repeating step 3 to 4 through the test.
8. Recording the test result in test record form.

Test conditions:

The duration with a sequence of three dips/interruptions with interval of 10 s minimum
(Between each test event)

Voltage Dips:

| Test Level % U _T | Reduction (%) | Duration (periods) | Observation | Meet Performance Criteria |
|--------------------------------|------------------|------------------------|-------------|------------------------------|
| 0 | 100 | 0.5 | Normal | A |
| 70 | 30 | 25 | Normal | A |
| 70 | 30 | 0.5(10ms) | Normal | A |
| 40 | 60 | 5(100ms) | Normal | A |
| 40 | 60 | 50(1000ms) | Normal | A |

Voltage Interruptions:

| Test Level % U _T | Reduction (%) | Duration (periods) | Observation | Meet Performance Criteria |
|--------------------------------|------------------|------------------------|---|------------------------------|
| 0 | 100 | 250 (5000ms) | EUT shut down, but can be recovered by manual as the evens disappear. | C |

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.

☒ **PASS** ☐ **FAILED**



APPENDIX 1

PHOTOGRAPHS OF TEST SETUP

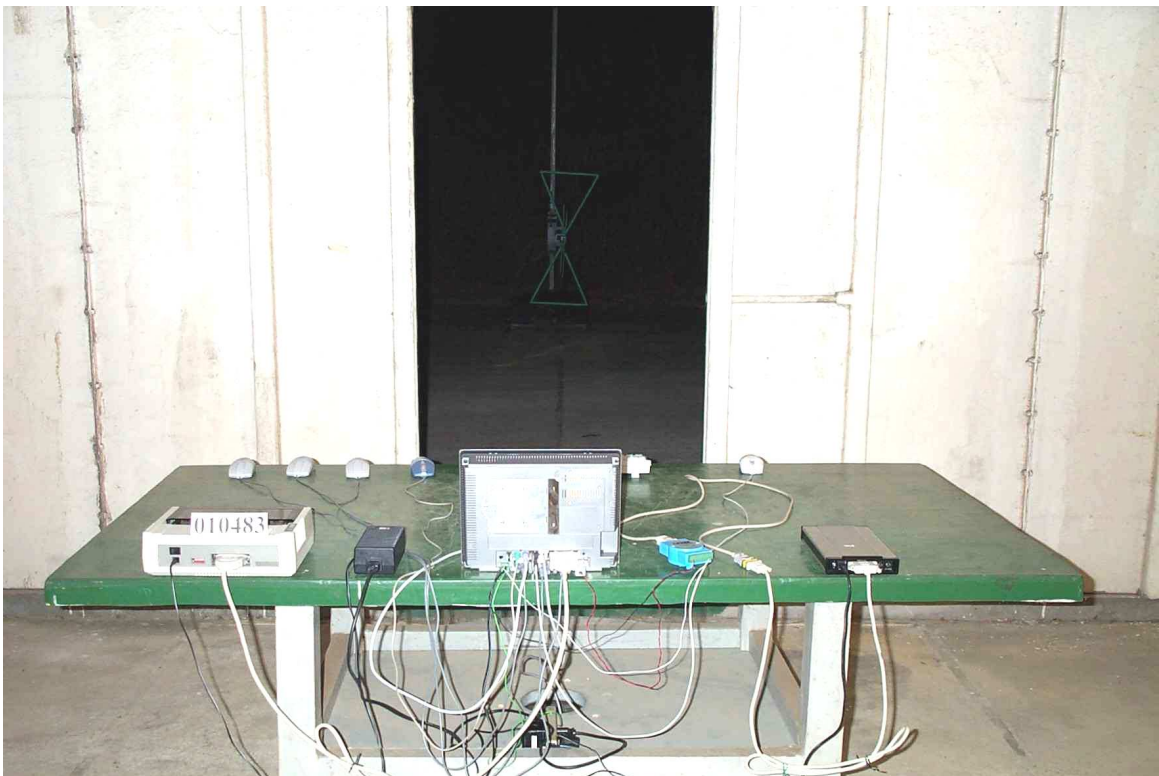
LINE CONDUCTED EMISSION TEST (EN 55022)



COMMON MODE CONDUCTED EMISSION TEST



RADIATED EMISSION TEST (EN 55022)



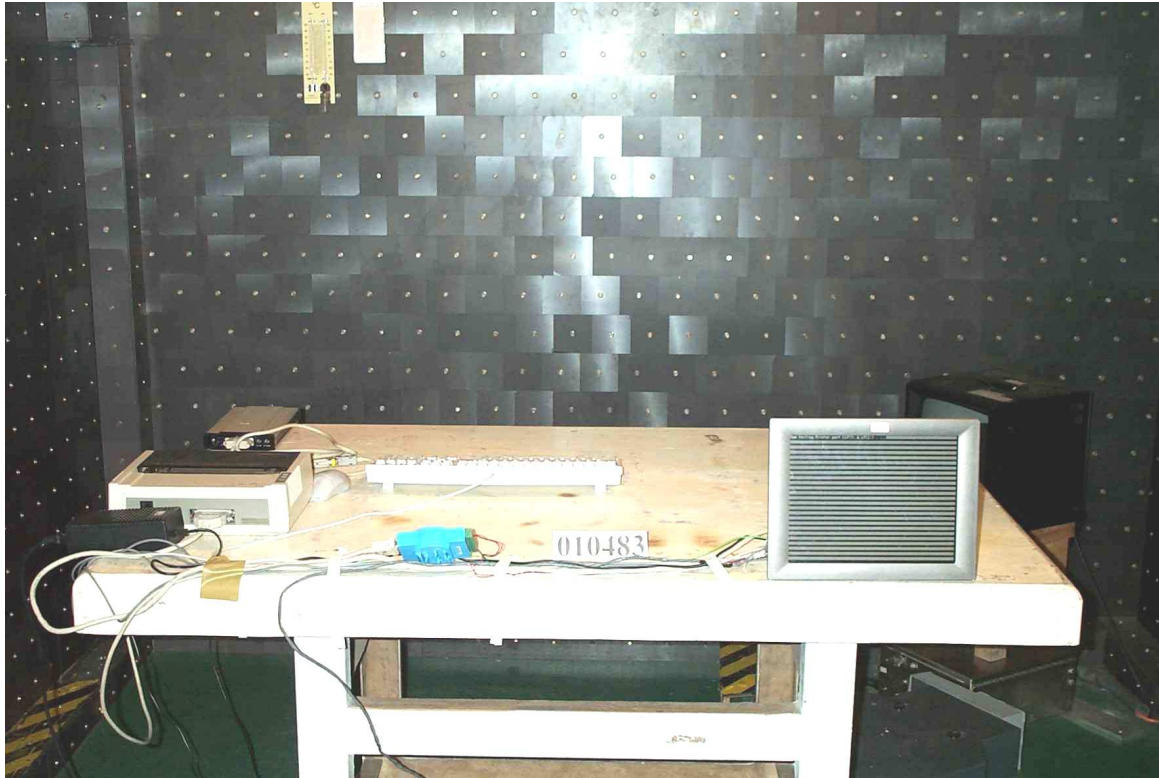
POWER HARMONIC & VOLTAGE FLUCTUATION / FLICKER TEST (EN 61000-3-2, EN 61000-3-3)



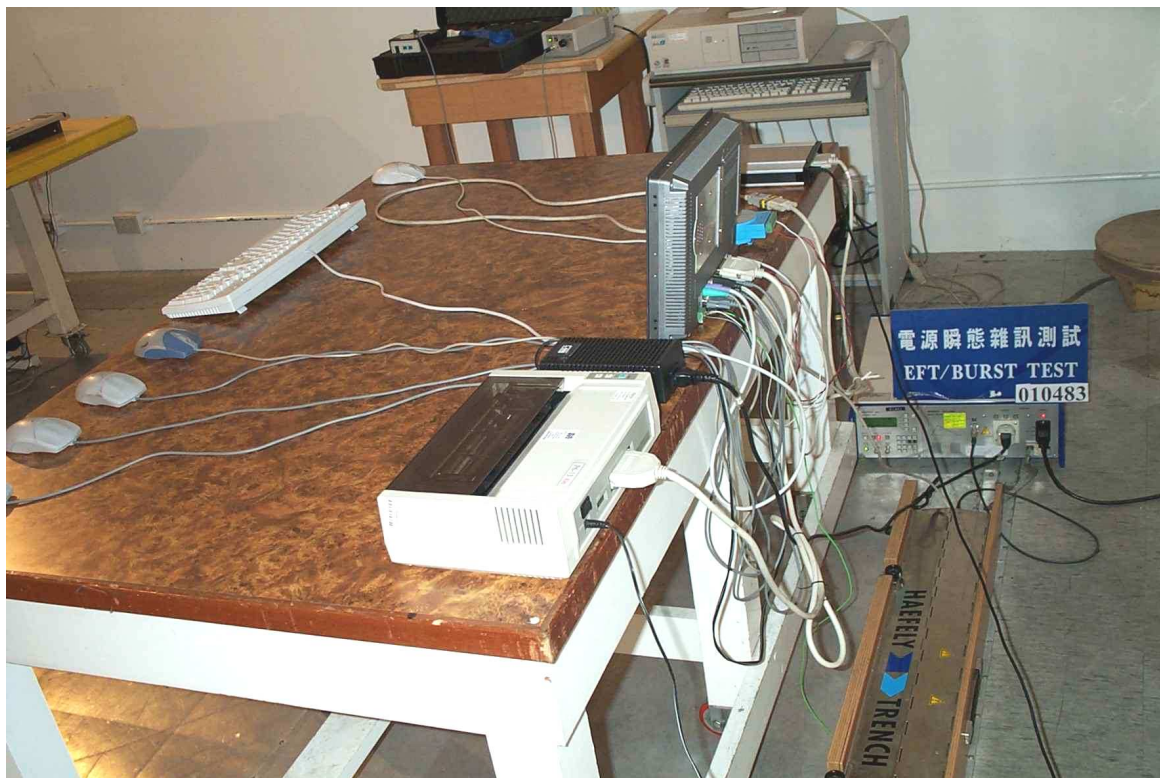
ELECTROSTATIC DISCHARGE TEST (IEC 61000-4-2)



RADIATED ELECTROMAGNETIC FIELD (IEC 61000-4-3)



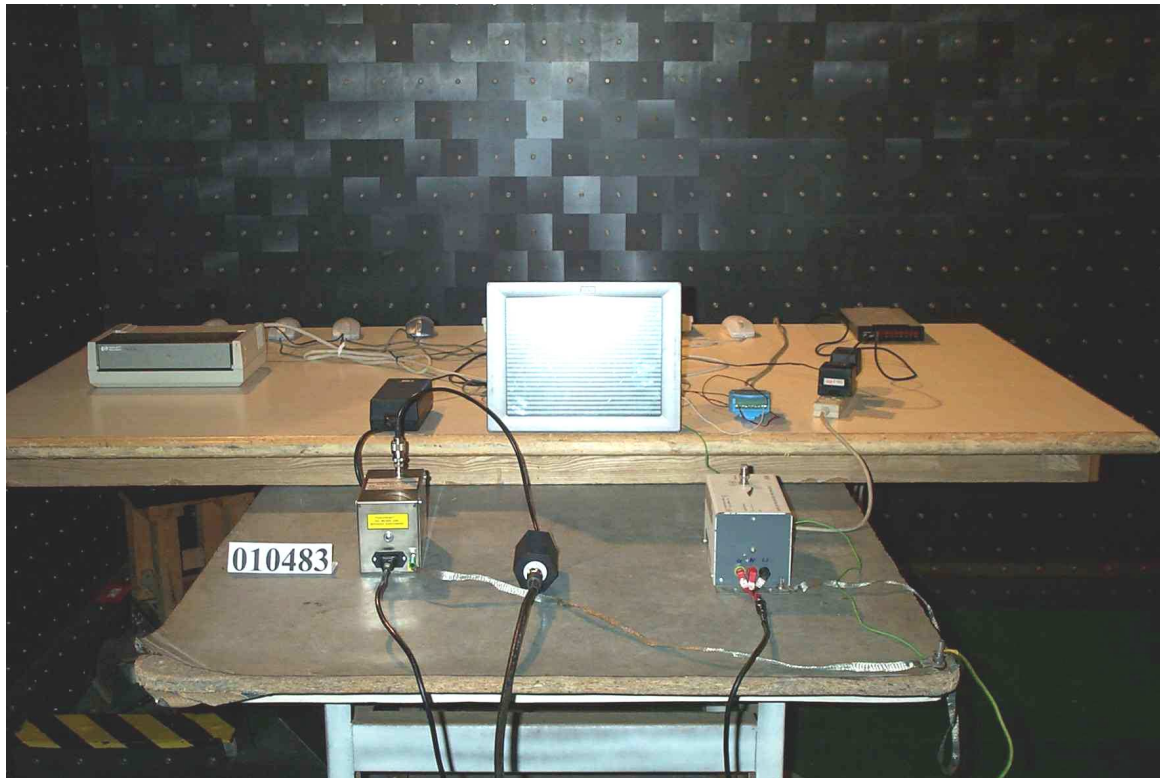
FAST TRANSIENTS/BURST TEST (IEC 61000-4-4)



SURGE IMMUNITY TEST (IEC 61000-4-5)



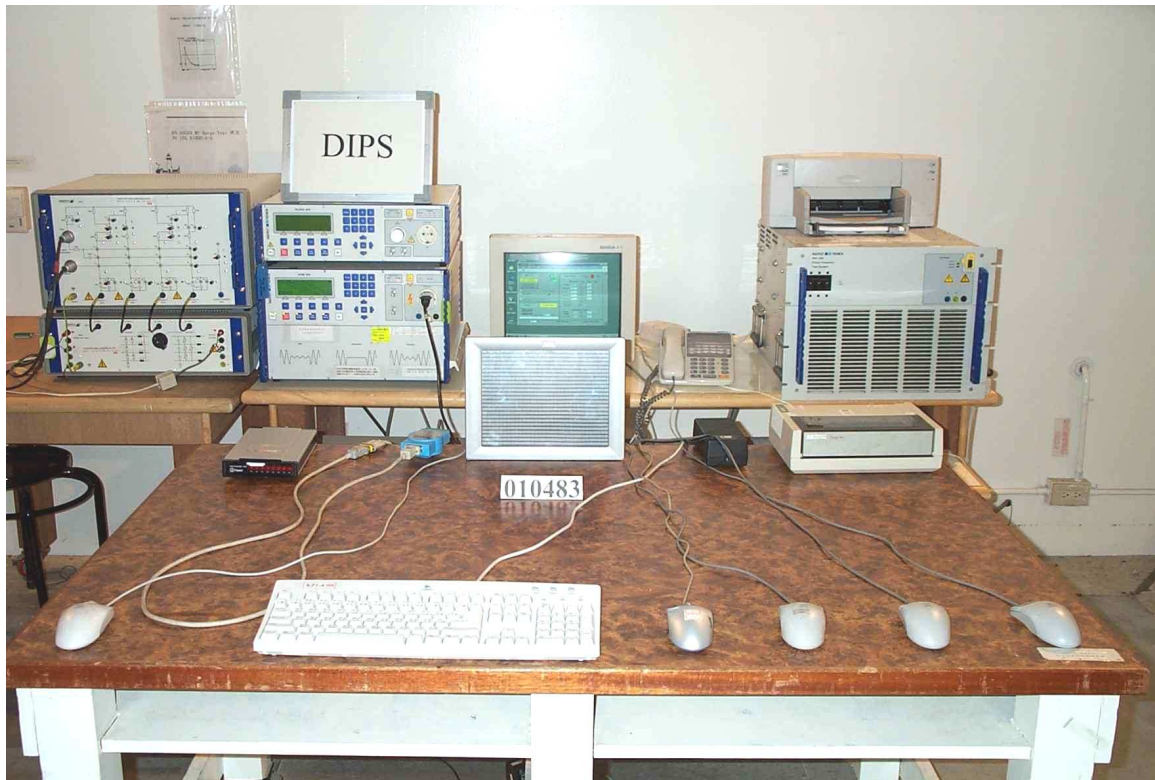
CONDUCTED DISTURBANCE, INDUCED BY RADIO-FREQUENCY FIELDS TEST (IEC 61000-4-6)



POWER FREQUENCY MAGNETIC FIELD IMMUNITY TEST (IEC 61000-4-8)



VOLTAGE DIPS / INTERRUPTION TEST (IEC 61000-4-11)





APPENDIX 2

PHOTOGRAPHS OF EUT

Front view of EUT



Back view of EUT



Left view of EUT



Right View of EUT

