



## EMC COMPLIANCE TEST REPORT

for

### SME Security Gateway with 3 LAN

**Trade Name** : Advantech  
**Model Number** : SG-2103-XXXXXX (X=0-9, A-Z, or Blank)  
**Serial Number** : N/A  
**Report Number** : 030132-E  
**Date** : March 5, 2003  
**Regulations** : See below

Standards	Results (Pass/Fail)
EN 55022: 1998 (Class A)	PASS
EN 61000-3-2: 1995 + A1: 1998 + A2: 1998	PASS
EN 61000-3-3: 1995	PASS
EN 55024: 1998	PASS
- IEC 61000-4-2: 2001	PASS
- IEC 61000-4-3: 1995	PASS
- IEC 61000-4-4: 1995	PASS
- IEC 61000-4-5: 1995	PASS
- IEC 61000-4-6: 1996	PASS
- IEC 61000-4-8: 1993	N/A
- IEC 61000-4-11: 1994	PASS

Prepared for:

**Advantech Co., Ltd.**

**No. 1, Alley 20, Lane 26, Rueiguang Road,  
Neihu District, Taipei 114, R.O.C.**

Prepared by:



**C&C LABORATORY, CO., LTD.**  
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## TABLE OF CONTENTS

<b>1</b>	<b>VERIFICATION OF COMPLIANCE</b> .....	<b>3</b>
<b>2</b>	<b>GENERAL INFORMATION</b> .....	<b>4</b>
<b>3</b>	<b>SYSTEM DESCRIPTION</b> .....	<b>5</b>
<b>4</b>	<b>PRODUCT INFORMATION</b> .....	<b>6</b>
<b>5</b>	<b>SUPPORT EQUIPMENT</b> .....	<b>7</b>
<b>6</b>	<b>TEST FACILITY</b> .....	<b>8</b>
<b>7</b>	<b>TEST EQUIPMENT LIST (EMISSION)</b> .....	<b>9</b>
<b>8</b>	<b>TEST EQUIPMENT LIST (IMMUNITY)</b> .....	<b>10</b>
<b>9</b>	<b>SECTION 1 EN 55022 (LINE CONDUCTED &amp; RADIATED EMISSION)</b> .....	<b>11</b>
9.1	MEASUREMENT PROCEDURE (PRELIMINARY LINE CONDUCTED EMISSION TEST).....	11
9.2	MEASUREMENT PROCEDURE (COMMON MODE CONDUCTED EMISSION MEASUREMENT).....	14
9.3	MEASUREMENT PROCEDURE (PRELIMINARY RADIATED EMISSION TEST) .....	16
<b>10</b>	<b>BLOCK DIAGRAM OF TEST SETUP</b> .....	<b>18</b>
<b>11</b>	<b>SUMMARY DATA</b> .....	<b>19</b>
<b>12</b>	<b>SECTION 2 EN 61000-3-2 &amp; EN 61000-3-3 (POWER HARMONICS &amp; VOLTAGE FLUCTUATION / FLICKER)</b> ..	<b>23</b>
<b>13</b>	<b>SECTION 3 IEC 61000-4-2 (ELECTROSTATIC DISCHARGE)</b> .....	<b>31</b>
<b>14</b>	<b>SECTION 4 IEC 61000-4-3 (RADIATED ELECTROMAGNETIC FIELD)</b> .....	<b>35</b>
<b>15</b>	<b>SECTION 5 IEC 61000-4-4 (FAST TRANSIENTS/BURST)</b> .....	<b>38</b>
<b>16</b>	<b>SECTION 6 IEC 61000-4-5 (SURGE IMMUNITY)</b> .....	<b>40</b>
<b>17</b>	<b>SECTION 7 IEC 61000-4-6 (CONDUCTED DISTURBANCE/INDUCED RADIO-FREQUENCY FIELD)</b> .....	<b>42</b>
<b>18</b>	<b>SECTION 8 IEC 61000-4-8 (POWER FREQUENCY MAGNETIC FIELD IMMUNITY TEST)</b> .....	<b>44</b>
<b>19</b>	<b>SECTION 9 IEC 61000-4-11 (VOLTAGE DIPS, SHORT INTERRUPTIONS AND VOLTAGE VARIATIONS )</b> .....	<b>45</b>
<b>20</b>	<b>APPENDIX 1 PHOTOGRAPHS OF TEST SETUP</b> .....	<b>48</b>
20.1	LINE CONDUCTED EMISSION TEST (EN 55022).....	49
20.2	COMMON MODE CONDUCTED EMISSION TEST .....	50
20.3	RADIATED EMISSION TEST (EN 55022).....	51
20.4	POWER HARMONIC & VOLTAGE FLUCTUATION / FLICKER TEST (EN 61000-3-2, EN 61000-3-3) .....	52
20.5	ELECTROSTATIC DISCHARGE TEST (IEC 61000-4-2).....	53
20.6	RADIATED ELECTROMAGNETIC FIELD (IEC 61000-4-3).....	54
20.7	FAST TRANSIENTS/BURST TEST (IEC 61000-4-4) .....	55
20.8	SURGE IMMUNITY TEST (IEC 61000-4-5).....	56
20.9	CONDUCTED DISTURBANCE, INDUCED BY RADIO-FREQUENCY FIELDS TEST (IEC 61000-4-6).....	57
20.10	VOLTAGE DIPS / INTERRUPTION TEST (IEC 61000-4-11).....	58
<b>21</b>	<b>APPENDIX 2 PHOTOGRAPHS OF EUT</b> .....	<b>59</b>

# 1 VERIFICATION OF COMPLIANCE

**Equipment Under Test:** SME Security Gateway with 3 LAN  
**Trade Name:** Advantech  
**Model Number:** SG-2103-XXXXX (X=0-9, A-Z, or Blank)  
**Serial Number:** N/A  
**Applicant:** **Advantech Co., Ltd.**  
 No. 1, Alley 20, Lane 26, Rueiguang Road,  
 Neihu District, Taipei 114, R.O.C.  
**Manufacturer:** **Advantech Co., Ltd.**  
 No. 1, Alley 20, Lane 26, Rueiguang Road,  
 Neihu District, Taipei 114, R.O.C.  
**Type of Test:** EMC Directive 89/336/EEC for CE Marking  
**Technical Standards:** EN 55022: 1998 (Class A)  
 EN 61000-3-2: 1995 + A1: 1998 + A2: 1998  
 EN 61000-3-3: 1995  
 EN 55024: 1998 (IEC 61000-4-2: 2001, IEC 61000-4-3: 1995,  
 IEC 61000-4-4: 1995, IEC 61000-4-5: 1995,  
 IEC 61000-4-6: 1996, IEC 61000-4-11: 1994)  
**File Number:** 030132-E  
**Date of Test:** February 25 ~ March 4, 2003  
**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  
**Final Result:** Pass  
**Worst Data:** See below

Test Item	Freq. (MHz)	Measured Data	Margin (MμC)	Remark
Radiated Emission	79.45	31.5 (dB/m)	-8.5 dB (± 3.3498 dB)	
Conducted Emission	0.170/3.670	41.8/35.8 (dB)	-37.2 dB (± 2.8104 dB)	

- The negative sign in Margin cell means under the specific limit.
- This test result traceable to national or international standards.

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: \_\_\_\_\_

*Susan Su for*

**Jonson Lee / EMC Director**

## 2 GENERAL INFORMATION

**Applicant:** Advantech Co., Ltd.  
No. 1, Alley 20, Lane 26, Rueiguang Road,  
Neihu District, Taipei 114, R.O.C.

**Contact Person:** John Chou

**Manufacturer:** Advantech Co., Ltd.  
No. 1, Alley 20, Lane 26, Rueiguang Road,  
Neihu District, Taipei 114, R.O.C.

**File Number:** 030132-E

**Date of Test:** February 25 ~ March 4, 2003

**Equipment Under Test:** SME Security Gateway with 3 LAN

**Model Number:** SG-2103-XXXXXX (X=0-9, 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)  
EN 61000-3-2: 1995 + A1: 1998 + A2: 1998  
EN 61000-3-3: 1995  
EN 55024: 1998 (IEC 61000-4-2: 2001, IEC 61000-4-3: 1995,  
IEC 61000-4-4: 1995, IEC 61000-4-5: 1995,  
IEC 61000-4-6: 1996, IEC 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 2<sup>nd</sup> Road, Lu-Chu Hsiang,  
Taoyuan, Taiwan, R.O.C.

### **3 SYSTEM DESCRIPTION**

#### **EUT Test Program:**

1. EUT connected with Notebook PC on remote side through HUB via LAN Cable.
2. The LAN communicated software was loaded and executed on Notebook PC at remote side.
3. Date transmit to Notebook PC via EUT.
4. Repeat item 3 during test.

## 4 PRODUCT INFORMATION

<b>Housing Type:</b>	Metal case		
<b>EUT Power Rating:</b>	100-127/ 200-240 VAC, 50/60 Hz, 5/2.5 A		
<b>AC Power during Test:</b>	230VAC / 50Hz		
<b>AC Power Cord Type:</b>	Unshielded, 1.8m (Detachable)		
<b>Power Supply Manufacturer:</b>	Enhance	<b>Model:</b>	ENP-1815
<b>CPU Manufacturer:</b>	V1A	<b>Model:</b>	800MHz
<b>CPU Board Manufacturer:</b>	V1A	<b>Model:</b>	400 MHz
<b>Memory Capacity</b>		<b>Model:</b>	128 MB
<b>OSC/Clock Frequencies:</b>	100 MHz		
<b>HDD Manufacturer:</b>	Quantum	<b>Model:</b>	LB20400AT
<b>Chassis Manufacturer:</b>	Advantech	<b>Model:</b>	SG-2103

### I/O Port of EUT

I/O PORT TYPES	Q'TY	TESTED WITH
1.) Serial Port	1	1
2.) LAN Port	3	3

### Note:

1. The means of suffix "XXXXX" (X=0~9, A-Z or Blank) on model numbers are identical, just for marketing purpose only.
2. Client consigns only two model samples to tested (Model Number: SG-2103-A; SG-2103-B). Therefore, the testing Lab. just guarantees the units, which have been tested.

## 5 SUPPORT EQUIPMENT

No.	Equipment	Model #	Serial #	FCC ID	Trade Name	Data Cable	Power Cord
1.	Modem	231AA	A25531083541	BFJ9D93108US	Hayes	Shielded, 1.8m	Unshielded, 1.8m
2.	HUB	J2600A	SG43801953	N/A	HP	LAN Cable x 3: Unshielded, 1m	Unshielded, 1.8m
3.	Notebook PC (Remote)	M285	NU2503589	FCC DoC	LEO	LAN Cable: Unshielded, 10m	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core

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

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

## 6 TEST FACILITY

- Location:** No. 81-1, 210 Lane, Pa-de 2<sup>nd</sup> Road, Lu-Chu Hsiang, Taoyuan, Taiwan, R. O. C.
- Description:** There are four 3/10m open area test sites and three line conducted labs for final test. The Open Area Test Sites and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 1992 and CISPR 16 requirements.
- Site Filing:** A site description is on file with the Federal Communications Commission, 7435 Oakland Mills Road, Columbia, MD 21046.
- Registration also was made with Voluntary Control Council for Interference (VCCI).
- Site Accreditation:** Accredited by NEMKO (Authorization #: ELA 124) for EMC & A2LA (Certificate #: 824.01) for Emission
- Accredited by NVLAP (Certificate #: 200600-0)
- 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



## 7 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
Spectrum Analyzer	HP	8568B	3001A05004	07/03/2002	07/02/2003
S.P.A Display	HP	85662A	3014A18846	07/03/2002	07/02/2003
Q.P Adaptor	HP	85650A	2811A01399	07/03/2002	07/02/2003
RF Pre-selector	HP	85685A	2947A01064	07/03/2002	07/02/2003
Spectrum Analyzer	Anritsu	MS2601A	MT09950	N/A	N/A
Pre-Amplifier	HP	8447D	2944A08432	N/A	N/A
Bilog Antenna	CHASE	CBL6112A	2309	02/28/2003	02/27/2004
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	08/31/2002	08/30/2003

**Conducted Emission Test Site:** # 3

Conducted Emission Test Site # 3					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL. DUE
EMI Test Receiver	R&S	ESCS30	847793/012	12/21/2002	12/20/2003
LISN	R&S	ESH2-Z5	843285/010	12/16/2002	12/15/2003
LISN	EMCO	3825/2	9003-1628	07/26/2002	07/25/2003
2X2 WIRE ISN	R&S	ENY22	100020	06/20/2002	06/19/2003
FOUR WIRE ISN	R&S	ENY41	100006	06/20/2002	06/19/2003

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.

## 8 TEST EQUIPMENT LIST (IMMUNITY)

Power Harmonic & Voltage Fluctuation/Flicker Measurement (61000-3-2&-3-3)					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Harmonic & Flicker Tester	HAEFELY TRENCH	PHF555	080 419-25	10/14/2002	10/13/2003
ESD test (61000-4-2)					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
ESD Generator	NoiseKen	ESS-2001	ESS0210582	06/18/2002	06/17/2003
Radiated Electromagnetic Field immunity Measurement (61000-4-3)					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
S.G.	R&S	SMY02	100094	08/08/2002	08/07/2003
Power Amplifier	ar	150W1000	300300	N/A	N/A
Power Antenna	EMCO	93141	9712-1083	N/A	N/A
EM PROBE	GW	EMR-30	L-0013	05/23/2002	05/22/2003
Fast Transients/Burst test (61000-4-4)					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Fast Transients/Burst Generator	HAEFELY TRENCH	PEFT- JUNIOR	583 333-117	08/22/2002	08/21/2003
Clamp	HAEFELY TRENCH	093 506.1	080 421.13	N/A	N/A
Surge Immunity test (61000-4-5)					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Surge Tester	HAEFELY TRENCH	PSUGER 4010	583 334-71	09/03/2002	09/02/2003
CS test (61000-4-6)					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
S.G.	R&S	SMY02	100094	08/08/2002	08/07/2003
Power Amplifier	ar	500A100A	300299	N/A	N/A
CDN	Lüthi	801-M3	1879	02/26/2003	02/25/2004
CDN	MEB	M2	A3002010	04/24/2002	04/23/2003
CDN	SCHAFFNER	T200	16892	10/17/2002	10/16/2003
CDN	SCHAFFNER	T400	16906	10/17/2002	10/16/2003
Voltage Dips/Short Interruption and Voltage Variation Immunity test (61000-4-11)					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Dips/Interruption and Variations Simulator	HAEFELY TRENCH	PLINE 1610	080 344-05	04/08/2002	04/07/2003

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

### 9.1 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(s) were scanned during the preliminary test:

**Mode(s):**

- 1. Data transmit/ 100Base (SG-2103A)**
- 2. Data transmit/ 100Base (SG-2103B)**
- 3. Data transmit/ 10Base (SG-2103A)**

- 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	---	79	66	-35.05	---	L1

Freq.	= Emission frequency in MHz
Raw dBuV	= Uncorrected Analyzer/Receiver reading + Insertion loss of LISN, if it > 0.5 dB
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.

### Calculation example:

$$\text{Margin (dB)} = \text{RAW (dBuV)} - \text{Limit (dBuV)}$$

## LINE CONDUCTED EMISSION LIMIT (EN 55022)

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.

## 9.2 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 following test mode(s) were scanned during the preliminary test:

**Mode(s): 1) LAN 1 2) LAN 2 3) LAN 3**

- 7) After the preliminary scan, we found the following test mode(s) producing the highest emission level and test data of the worst case was reported on the summary Data page.

**Mode: 3. (10 / 100Mbps)**

### 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.

Raw dBuV

Limit dBuV

Margin dB

Note

“---“

= Emission frequency in MHz

= Uncorrected Analyzer / Receiver reading

= Limit stated in standard

= Reading in reference to limit

= 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.

### 9.3 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(s) were scanned during the preliminary test:

**Mode(s):**

- 1. Data transmit/ 100Base (SG-2103A)**
- 2. Data transmit/ 100Base (SG-2103B)**
- 3. Data transmit/ 10Base (SG-2103A)**

- 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	40	-13.8

Freq.	= Emission frequency in MHz
Raw Data (dBuV/m)	= Uncorrected Analyzer / Receiver reading
Corr. Factor (dB)	= Antenna factor + Cable loss – Amplifier gain
Emiss. Level (dBuV/m)	= Raw reading converted to dBuV/m and CF added
Limit (dBuV/m)	= Limit stated in standard
Margin (dB)	= Reading in reference to limit
P	= Peak Reading
Q	= Quasi-peak Reading
A	= Average Reading

### Calculation example:

$$\text{Margin (dB)} = \text{Emiss. Level (dBuV/m)} - \text{Limits (dBuV/m)}$$

$$\text{Emission Level (dBuV/m)} = \text{Raw Data (dBuV/m)} + \text{Corr Factor (dB)}$$

## RADIATED EMISSION LIMIT

Frequency (MHz)	Distance (m)	Maximum Field Strength Limit (dBu V/m/ Q.P.)
30-230	10	40
230-1000	10	47

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

## 10 BLOCK DIAGRAM OF TEST SETUP

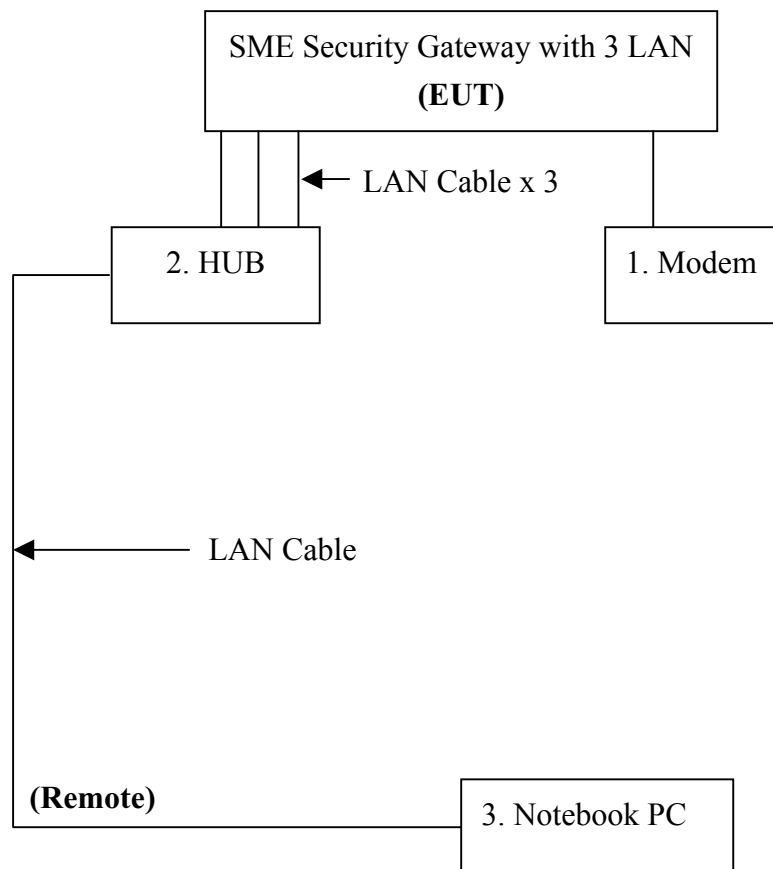
### System Diagram of Connections between EUT and Simulators

**EUT:** SME Security Gateway with 3 LAN

**Trade Name:** Advantech

**Model Number:** SG-2103-A

**Power Cord:** Unshielded, 1.8m



## 11 SUMMARY DATA

### (LINE CONDUCTED TEST)

**Model Number:** SG-2103-A**Location:** Site # 3**Tested by:** Hank Huang**Test Mode:** Mode 1**Test Results:** Passed**Temperature:** 17°C**Humidity:** 70%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
0.170	41.80	---	79.00	66.00	-37.20	---	L1
1.120	33.40	---	73.00	60.00	-39.60	---	L1
3.670	35.80	---	73.00	60.00	-37.20	---	L1
4.070	35.20	---	73.00	60.00	-37.80	---	L1
6.480	35.30	---	73.00	60.00	-37.70	---	L1
6.970	34.60	---	73.00	60.00	-38.40	---	L1
0.170	35.70	---	79.00	66.00	-43.30	---	L2
1.720	33.90	---	73.00	60.00	-39.10	---	L2
2.370	32.10	---	73.00	60.00	-40.90	---	L2
4.580	31.30	---	73.00	60.00	-41.70	---	L2
6.870	35.20	---	73.00	60.00	-37.80	---	L2
7.180	35.00	---	73.00	60.00	-38.00	---	L2

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

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

## SUMMARY DATA

### (COMMON MODE CONDUCTED EMISSION MEASUREMENT)

#### (LAN Port)

**Model Number:** SG-2103-A

**Location:** Site # 3

**Tested by:** Lung Tsai

**Test Mode:** Mode 3

**Test Results:** Passed

**Temperature:** 21°C

**Humidity:** 70%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
5.000	57.30	---	87.00	74.00	-29.70	---	10Base
7.500	58.40	---	87.00	74.00	-28.60	---	10Base
10.000	77.80	58.00	87.00	74.00	-9.20	-16.00	10Base
10.173	62.70	---	87.00	74.00	-24.30	---	10Base
12.514	57.40	---	87.00	74.00	-29.60	---	10Base
20.000	54.30	---	87.00	74.00	-32.70	---	10Base
13.423	65.30	---	87.00	74.00	-21.70	---	100Base
16.233	63.10	---	87.00	74.00	-23.90	---	100Base
23.134	64.70	---	87.00	74.00	-22.30	---	100Base
24.357	63.40	---	87.00	74.00	-23.60	---	100Base
26.604	35.00	---	87.00	74.00	-52.00	---	100Base
27.163	64.00	---	87.00	74.00	-23.00	---	100Base

**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:** SG-2103-A**Location:** Site # 1**Tested by:** Hank Huang**Polar:** Vertical--10m**Test Mode:** Mode 1**Test Results:** Passed**Detector Function:** Quasi-Peak**Temperature:** 17°C**Humidity:** 70%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)
74.55	23.2	6.2	29.4	40.0	-10.6
79.45	24.6	6.9	31.5	40.0	-8.5
83.38	21.5	7.7	29.2	40.0	-10.8
111.61	12.0	11.6	23.6	40.0	-16.4
132.46	14.2	12.1	26.3	40.0	-13.7
149.53	12.3	11.1	23.4	40.0	-16.6
155.63	12.8	10.4	23.2	40.0	-16.8
159.66	12.4	9.9	22.3	40.0	-17.7
166.60	15.5	10.4	25.9	40.0	-14.1
170.26	13.9	10.7	24.6	40.0	-15.4
174.86	15.7	11.1	26.8	40.0	-13.2
180.87	16.2	11.5	27.7	40.0	-12.3
200.47	12.7	10.8	23.5	40.0	-16.5

## SUMMARY DATA

### (RADIATED EMISSION TEST)

**Model Number:** SG-2103-A**Location:** Site # 1**Tested by:** Hank Huang**Polar:** Horizontal--10m**Test Mode:** Mode 1**Test Results:** Passed**Detector Function:** Quasi-Peak**Temperature:** 17°C**Humidity:** 70%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)
79.45	20.5	6.9	27.4	40.0	-12.6
83.89	15.6	7.8	23.4	40.0	-16.6
132.46	6.5	12.1	18.6	40.0	-21.4
155.61	10.4	10.4	20.8	40.0	-19.2
159.62	9.7	9.9	19.6	40.0	-20.4
166.61	12.1	10.4	22.5	40.0	-17.5
170.26	13.1	10.7	23.8	40.0	-16.2
180.31	17.4	11.5	28.9	40.0	-11.1
200.48	12.6	10.8	23.4	40.0	-16.6

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

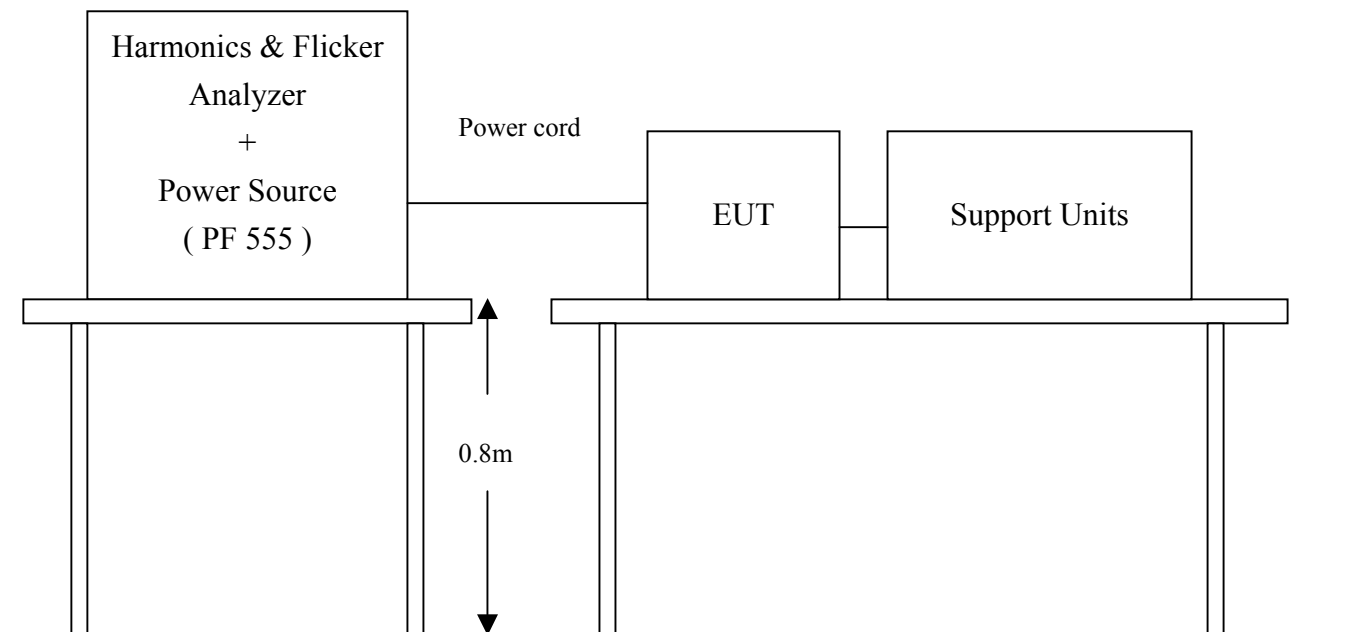
### POWER HARMONICS MEASUREMENT

**Port** : AC mains  
**Basic Standard** : EN 61000-3-2 (1995 + A1: 1998 + A2: 1998)  
**Limits** : ☒ CLASS A ; ☐ CLASS D  
**Tester** : Hank Huang  
**Temperature** : 17°C  
**Humidity** : 70%

### VOLTAGE FLUCTUATION/FLICKER MEASUREMENT

**Port** : AC mains  
**Basic Standard** : EN 61000-3-3 (1995)  
**Limits** : 5 of EN 61000-3-3  
**Tester** : Hank Huang  
**Temperature** : 17°C  
**Humidity** : 70%

### Block Diagram of Test Setup:



### Result:

Please see the attached test data.

-----

EN 61000-3-2 TEST REPORT 2003/3/4 07:42 PM

-----

Unit: SME Security Gateway with 3 LAN

Model No.: SG-2103-A

Remarks: Temp: 17°C Humid: 70%

Operator: Hank Huang

=====

#### 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: 45.5W



TEST DATA  
-----

Result: PASS

Harmonic Current Results  
-----

Hn	AMPS	LO Limit	HI Limit	Result
0	0.000	0.000	0.000	PASS
1	0.205	NaN	NaN	PASS
2	0.005	1.080	1.080	PASS
3	0.179	2.300	2.300	PASS
4	0.006	0.430	0.430	PASS
5	0.167	1.140	1.140	PASS
6	0.005	0.300	0.300	PASS
7	0.152	0.770	0.770	PASS
8	0.004	0.230	0.230	PASS
9	0.131	0.400	0.400	PASS
10	0.003	0.184	0.184	PASS
11	0.109	0.330	0.330	PASS
12	0.003	0.153	0.153	PASS
13	0.086	0.210	0.210	PASS
14	0.002	0.131	0.131	PASS
15	0.064	0.150	0.150	PASS
16	0.001	0.115	0.115	PASS
17	0.044	0.132	0.132	PASS
18	0.001	0.102	0.102	PASS
19	0.031	0.118	0.118	PASS
20	0.001	0.092	0.092	PASS

21	0.019	0.107	0.107	PASS
22	0.001	0.084	0.084	PASS
23	0.010	0.098	0.098	PASS
24	0.001	0.077	0.077	PASS
25	0.013	0.090	0.090	PASS
26	0.001	0.071	0.071	PASS
27	0.016	0.083	0.083	PASS
28	0.001	0.066	0.066	PASS
29	0.016	0.078	0.078	PASS
30	0.001	0.061	0.061	PASS
31	0.014	0.073	0.073	PASS
32	0.001	0.058	0.058	PASS
33	0.011	0.068	0.068	PASS
34	0.001	0.054	0.054	PASS
35	0.009	0.064	0.064	PASS
36	0.001	0.051	0.051	PASS
37	0.007	0.061	0.061	PASS
38	0.001	0.048	0.048	PASS
39	0.005	0.058	0.058	PASS
40	0.001	0.046	0.046	PASS

END OF REPORT

-----  
EN 61000-3-3 TEST REPORT 2003/3/4 08:33 PM  
-----

Unit: SME Security Gateway with 3 LAN

Model No.: SG-2103-A (Continue)

Remarks: Temp: 17°C Humid: 70%

Operator: Hank Huang

=====

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	0.001	1.00	PASS	true
Plt max	0.001	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	0.021	0.400	PASS	true
% THD	0.03	3.00	PASS	true

END OF REPORT

-----  
EN 61000-3-3 TEST REPORT 2003/3/4 09:45 PM  
-----

Unit: SME Security Gateway with 3 LAN

Model No.: SG-2103-A (Manual Switch)

Remarks: Temp: 17°C Humid: 70%

Operator: Hank Huang

=====

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	0.001	1.00	PASS	true
Plt max	0.001	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	0.020	0.400	PASS	true
% THD	0.03	3.00	PASS	true

END OF REPORT

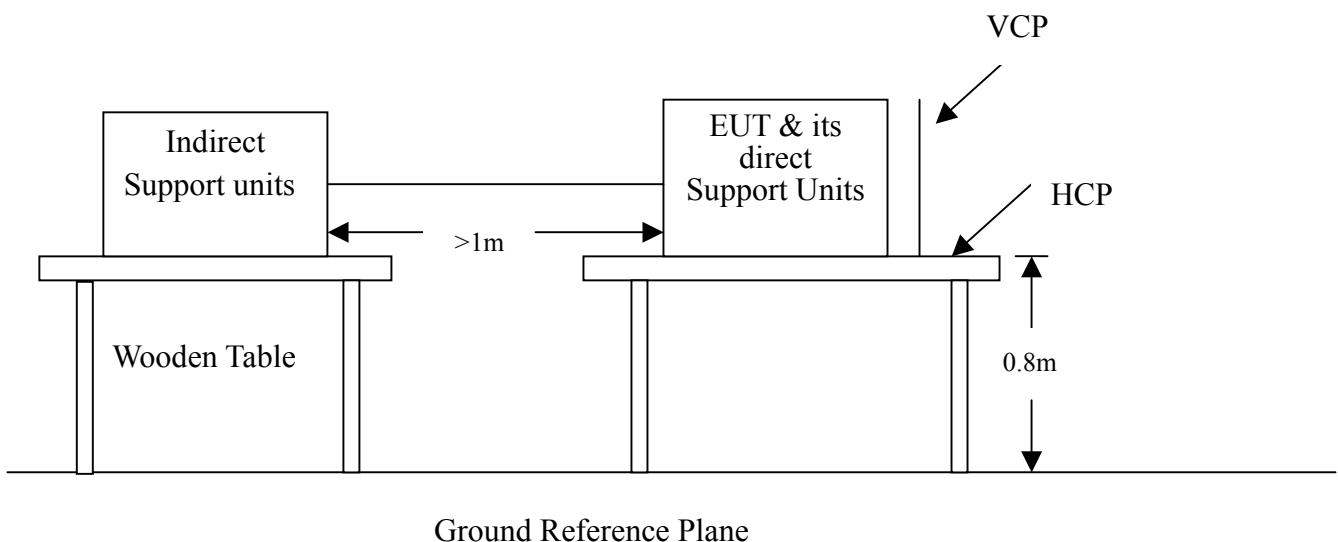
### 13 SECTION 3 IEC 61000-4-2 (ELECTROSTATIC DISCHARGE)

#### ELECTROSTATIC DISCHARGE (ESD) IMMUNITY TEST

<b>Port</b>	: Enclosure
<b>Basic Standard</b>	: IEC 61000-4-2
<b>Test Level</b>	: $\pm 8$ kV (Air Discharge) $\pm 4$ kV (Contact Discharge) $\pm 4$ kV (Indirect Discharge)
<b>Performance Criteria</b>	: B ( Standard require )
<b>Tester</b>	: Lung Tsai
<b>Temperature</b>	: 21°C
<b>Humidity</b>	: 48%
<b>Pressure</b>	: 1020mbar

#### 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 communication test program was loaded and executed in Windows 2000 mode.
4. Notebook PC sent transmit data to EUT via LAN Cable.
5. As per the requirement of EN 55024; 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.
6. 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.
7. The application of ESD to the contact of open connectors is not required.
8. Putting a mark on EUT to show tested points. The following test condition was followed during the tests.

**Note:** As per IEC 61000-4-2:2001, with two 470k bleed resistors cable is connected between the EUT and HCP during the test applicable for power ungrounded or battery operating unit only.

The electrostatic discharges were applied as follows:

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

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

(Blue arrow mark for Contact Discharge and 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 4)*



*(Photo 2 of 4)*



*(Photo 3 of 4)*



*(Photo 4 of 4)*

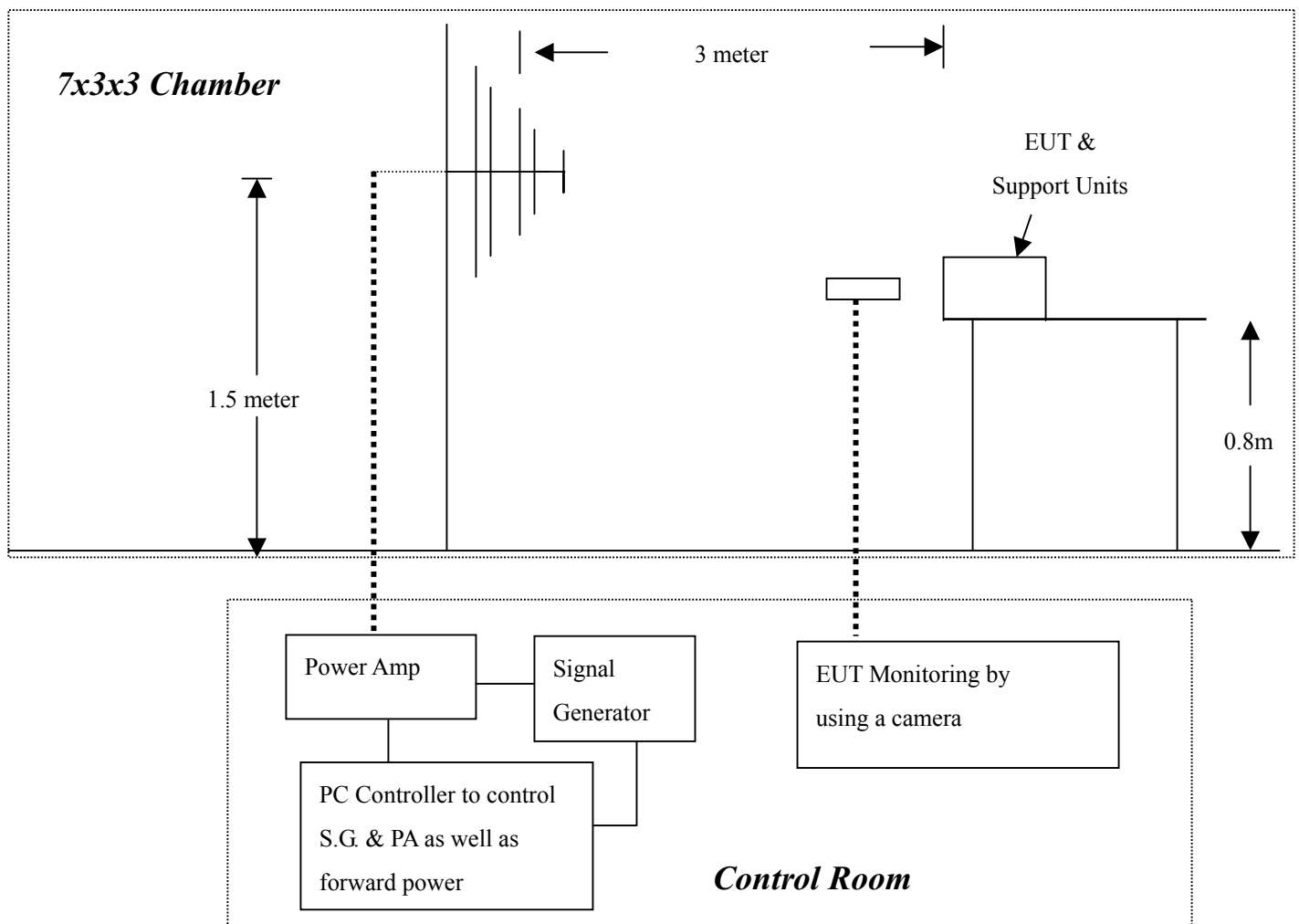


## 14 SECTION 4 IEC 61000-4-3 (RADIATED ELECTROMAGNETIC FIELD)

### RADIATED ELECTROMAGNETIC FIELD IMMUNITY TEST

<b>Port</b>	: Enclosure
<b>Basic Standard</b>	: IEC 61000-4-3
<b>Requirements</b>	: 3 V/m / with 80% AM. 1kHz Modulation.
<b>Performance Criteria</b>	: A ( Standard require )
<b>Tester</b>	: Lung Tsai
<b>Temperature</b>	: 21°C
<b>Humidity</b>	: 48%
<b>Pressure</b>	: 1020mbar

#### 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. Transmit data messages were displayed on part of screen on LCD Panel of Notebook PC and a scroll "H" messages were displayed on the other part of screen of LCD Panel of Notebook PC.
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 pre-test at each side of with double specified level (6V/m) at 4% steps.
6. From the result of pre-test in step 5, choice the worst side of EUT for final test from 80 MHz to 1000 MHz at 1% steps.
7. Recording the test result in following table.
8. It is not necessary to perform test as per annex A of EN 55024:1998 if the EUT doesn't belong to ITE product.

#### **IEC 61000-4-3 Preliminary test conditions:**

Test level : 6V/m  
 Steps : 4 % of fundamental  
 Dwell Time : 3 sec

Range (MHz)	Field	Modulation	Polarity	Position (°)	Result (Pass/Fail)
80-1000	6V	Yes	H	Front	Pass
80-1000	6V	Yes	V	Front	Pass
80-1000	6V	Yes	H	Right	Pass
80-1000	6V	Yes	V	Right	Pass
80-1000	6V	Yes	H	Back	Pass
80-1000	6V	Yes	V	Back	Pass
80-1000	6V	Yes	H	Left	Pass
80-1000	6V	Yes	V	Left	Pass

#### **IEC 61000-4-3 Final test conditions:**

Test level : 3V/m  
 Steps : 1 % of fundamental  
 Dwell Time : 3 sec

Range (MHz)	Field	Modulation	Polarity	Position (°)	Result (Pass/Fail)
80-1000	3V	Yes	H	Front	Pass
80-1000	3V	Yes	V	Front	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.

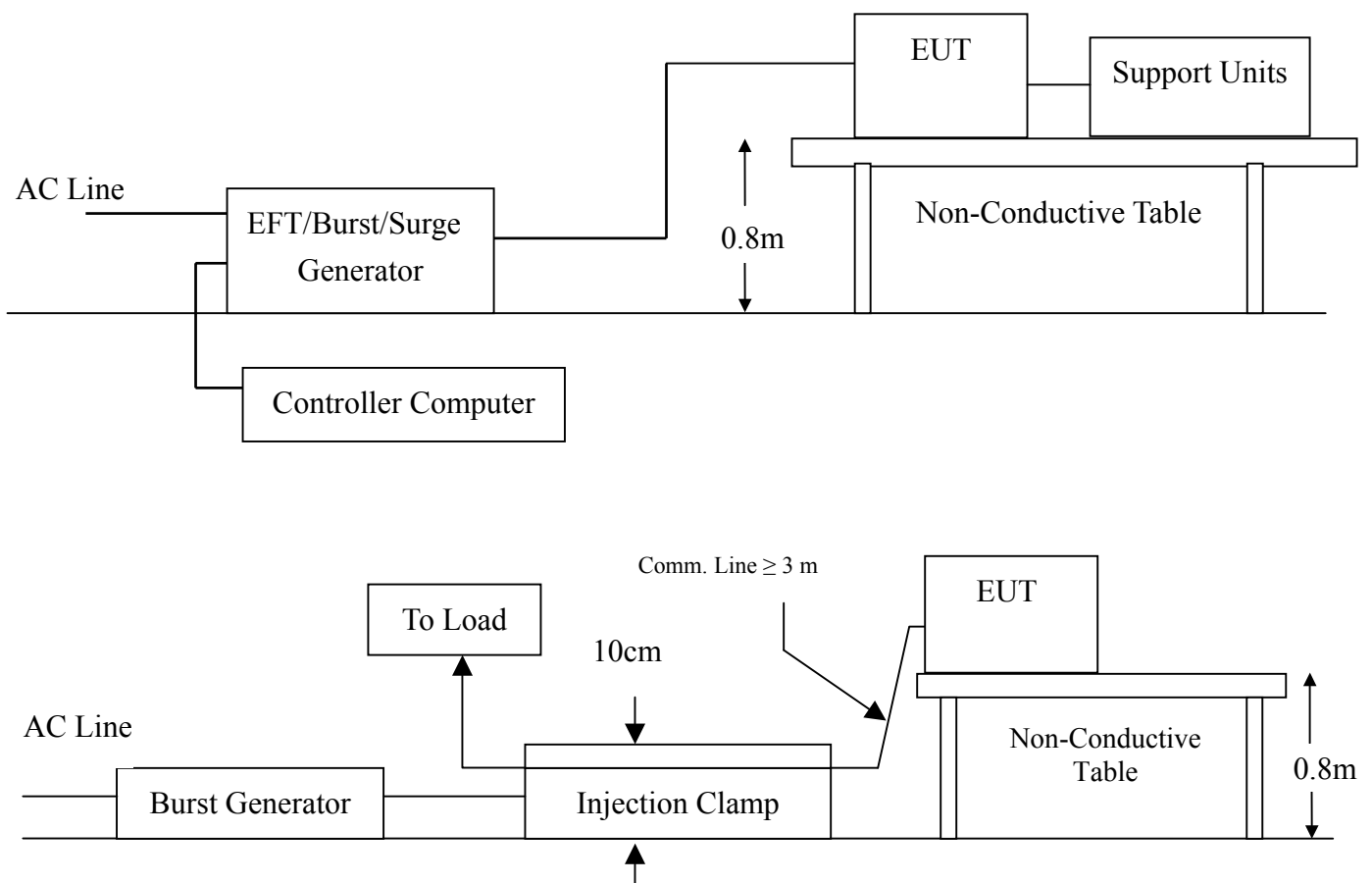
☒ **PASS**☐ **FAILED****Observation: No any function degraded during the tests.**

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

### FAST TRANSIENTS/BURST IMMUNITY TEST

<b>Port</b>	: On Power Supply Lines and Data Lines
<b>Basic Standard</b>	: IEC 61000-4-4
<b>Requirements</b>	: $\pm 1$ kV for Power Supply Line $\pm 0.5$ kV to LAN Cable
<b>Performance Criteria</b>	: B ( Standard require )
<b>Tester</b>	: Lung Tsai
<b>Temperature</b>	: 21°C
<b>Humidity</b>	: 48%
<b>Pressure</b>	: 1020mbar

#### 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 2000 mode.
5. The communication test program was display on the LCD Panel of Notebook PC on remote side.
6. The data were send to printer and print out also.
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	$\pm 1$	Direct	Pass
N	$\pm 1$	Direct	Pass
PE	$\pm 1$	Direct	Pass
L1 + N	$\pm 1$	Direct	Pass
L1 + PE	$\pm 1$	Direct	Pass
N + PE	$\pm 1$	Direct	Pass
L1 + N + PE	$\pm 1$	Direct	Pass
LAN Cable	$\pm 0.5$	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**

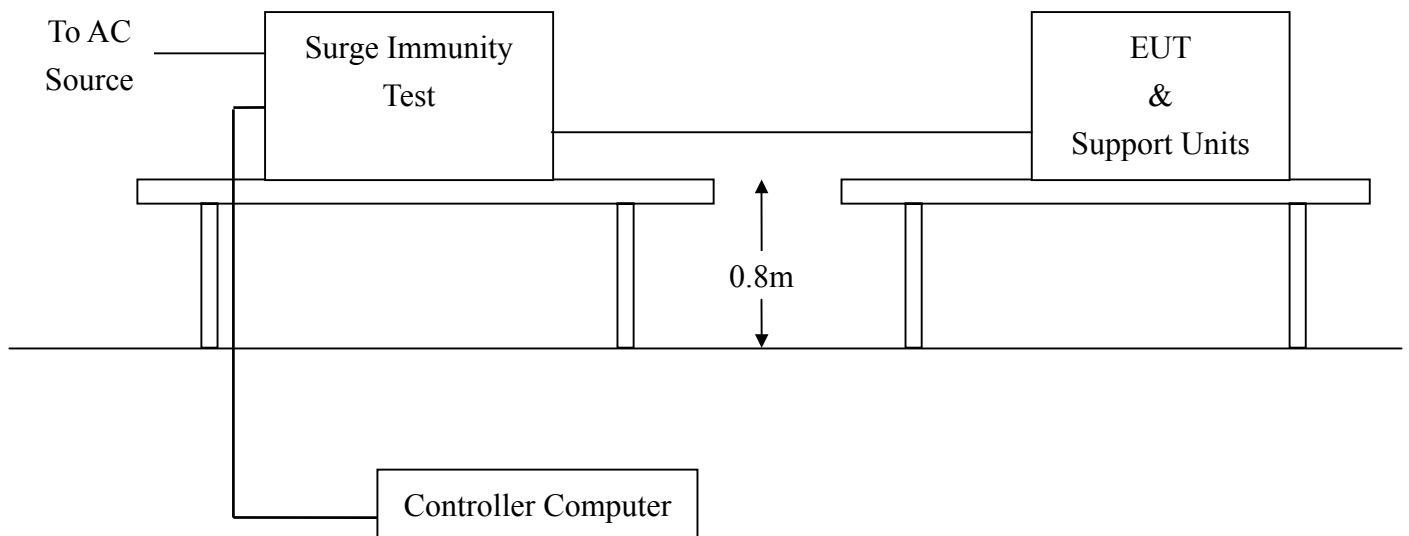
**Observation: No any function degraded during the tests.**

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

### SURGE IMMUNITY TEST

<b>Port</b>	: Power Cord
<b>Basic Standard</b>	: IEC 61000-4-5
<b>Requirements</b>	: $\pm 1$ kV (Line to Line) $\pm 2$ kV (Line to Ground)
<b>Performance Criteria</b>	: B ( Standard require )
<b>Tester</b>	: Lung Tsai
<b>Temperature</b>	: 21°C
<b>Humidity</b>	: 48%
<b>Pressure</b>	: 1020mbar

#### 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 communication test program was loaded and executed in Windows 2000 mode.
3. The communication test program was display on the LCD Panel of Notebook PC on remote side.
4. The data were send to printer and print out also.
5. The test program exercised related support units sequentially.
6. Repeating step 3 to 4 through the test.
7. Recording the test result as shown in following table.

### **Test conditions:**

Voltage Waveform : 1.2/50  $\mu$ s  
 Current Waveform : 8/20  $\mu$ s  
 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.**

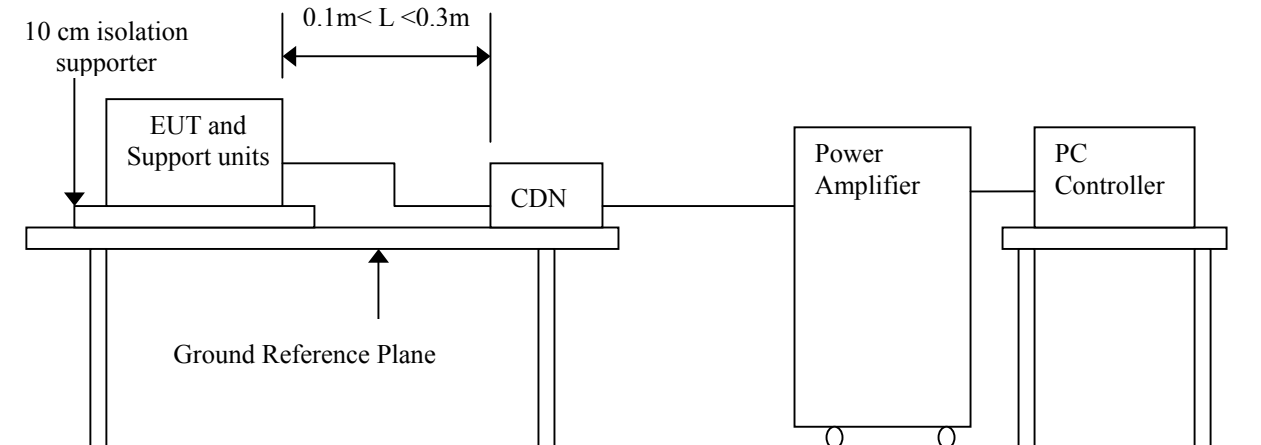
## 17 SECTION 7 IEC 61000-4-6 (CONDUCTED DISTURBANCE/INDUCED RADIO-FREQUENCY FIELD)

### CONDUCTED DISTURBANCE/INDUCED RADIO-FREQUENCY FIELD IMMUNITY TEST

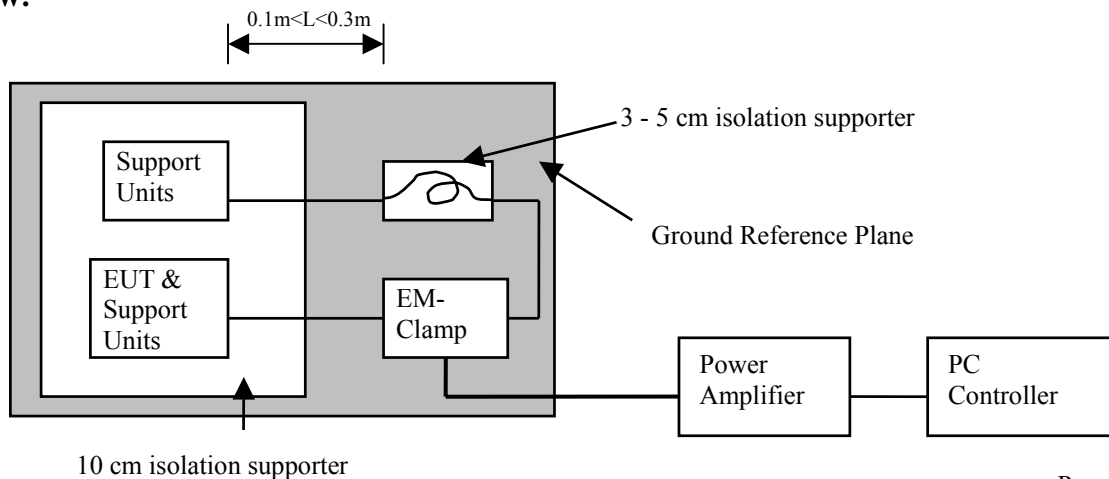
<b>Port</b>	: AC Port and LAN Cable
<b>Basic Standard</b>	: IEC 61000-4-6
<b>Requirements</b>	: 3V with 80% Am, modulated
<b>Injection Method</b>	: CDN-M3 for Power Cord EM-Clamp for LAN Cable
<b>Performance Criteria</b>	: A (Standard require)
<b>Tester</b>	: Lung Tsai
<b>Temperature</b>	: 21°C
<b>Humidity</b>	: 48%
<b>Pressure</b>	: 1020mbar

#### Block Diagram of Test Setup:

##### Side View:



##### Top view:



### **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. The communication test program was display on the LCD Panel of Notebook PC on remote side.
3. The data were send to printer and print out also.
4. Adjusting the monitoring camera to monitor the 'H' message as clear as possible.
5. Setting the testing parameters of CS test software per IEC 61000-4-6.
6. 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	3V	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.

<input checked="" type="checkbox"/> <b>PASS</b>	<input type="checkbox"/> <b>FAILED</b>
<b>Observation: No any function degraded during the tests.</b>	

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

### POWER FREQUENCY MAGNETIC FIELD IMMUNITY TEST

**Port** : Enclosure  
**Basic Standard** : IEC 61000-4-8  
**Requirements** : 1 A/m  
**Performance Criteria** : A (Standard Required)  
**Temperature** : N/A  
**Humidity** : N/A

#### 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.

<input type="checkbox"/> <b>PASS</b> <input type="checkbox"/> <b>FAILED</b>
<b>**Note: Not applicable, because no any component can be influenced by power magnetic fields.</b>

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

### VOLTAGE DIPS / SHORT INTERRUPTIONS

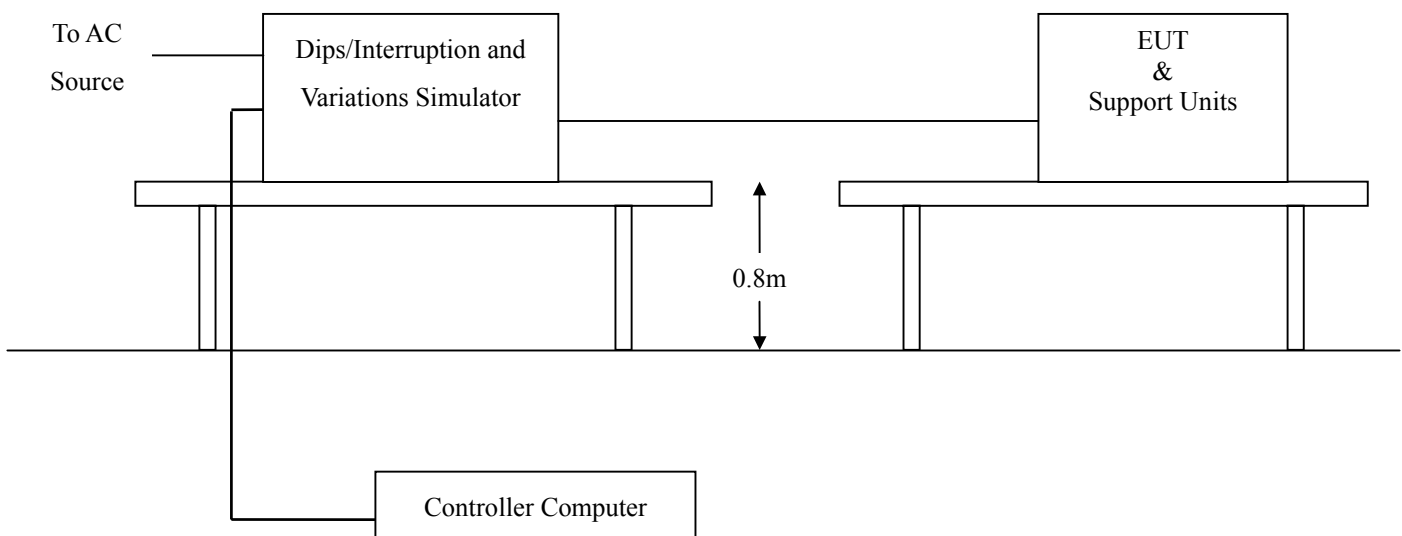
**Port** : AC mains  
**Basic Standard** : IEC 61000-4-11 (1994)  
**Requirement** : PHASE ANGLE 0, 45, 90, 135, 180, 225, 270, 315 degrees

Voltage Dips	Test Level % U <sub>T</sub>	Reduction (%)	Duration ( periods )	Performance Criteria
	<5	>95	0.5	B
	70	30	25	C

Voltage Interceptions	Test Level % U <sub>T</sub>	Reduction (%)	Duration ( periods )	Performance Criteria
	<5	>95	250	C

**Test Interval** : Min. 10 sec.  
**Tester** : Lung Tsai  
**Temperature** : 21°C  
**Humidity** : 48%  
**Pressure** : 1020mbar

### 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 communication test program was loaded and executed in Windows 2000 mode.
3. The communication test program was display on the LCD Panel of Notebook PC on remote side.
4. The data were send to printer and print out also.
5. The test program exercised related support units sequentially.
6. Setting the parameter of tests and then Perform the test software of test simulator.
7. Conditions changes to occur at 0 degree crossover point of the voltage waveform.
8. Repeating step 3 to 4 through the test.
9. 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

### **Voltage Interruptions:**

Test Level % $U_T$	Reduction (%)	Duration ( periods )	Observation	Meet Performance Criteria
0	100	250	EUT shut down, but can be auto recovered as the events disappear.	B

**Normal:** No any functions degrade during and after the test.

### **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**

## **20      APPENDIX 1    PHOTOGRAPHS OF TEST SETUP**



## 20.1 LINE CONDUCTED EMISSION TEST (EN 55022)

*Front View*



*Back View*



## 20.2 COMMON MODE CONDUCTED EMISSION TEST



### 20.3 RADIATED EMISSION TEST (EN 55022)

*Front View*



*Back View*



## 20.4 POWER HARMONIC & VOLTAGE FLUCTUATION / FLICKER TEST

(EN 61000-3-2, EN 61000-3-3)





## 20.5 ELECTROSTATIC DISCHARGE TEST (IEC 61000-4-2)



## 20.6 RADIATED ELECTROMAGNETIC FIELD (IEC 61000-4-3)



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

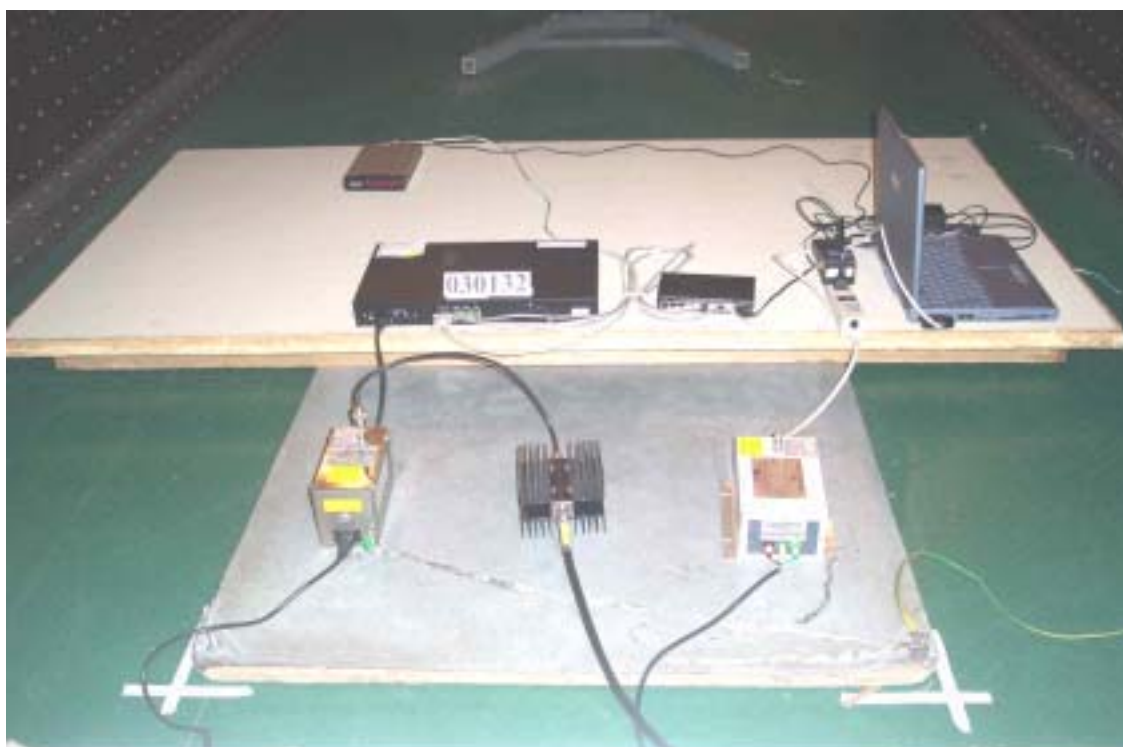
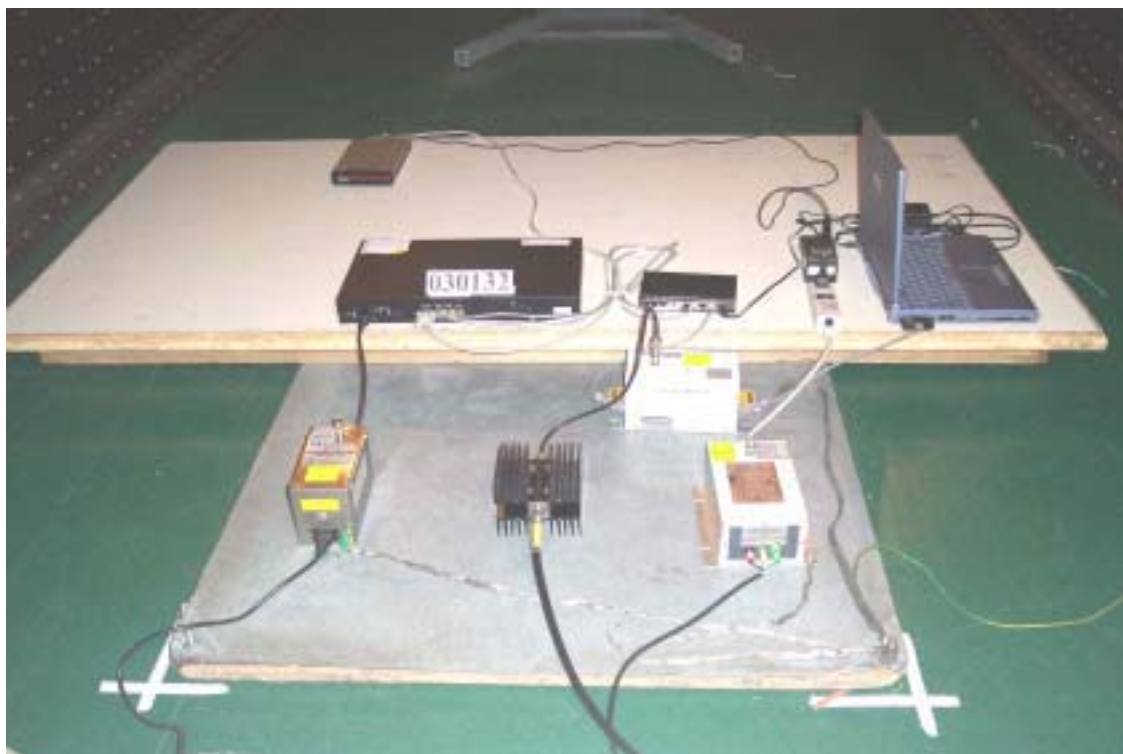


## 20.8 SURGE IMMUNITY TEST (IEC 61000-4-5)





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



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



## **21    APPENDIX 2    PHOTOGRAPHS OF EUT**

*Front view of EUT*



*Back view of EUT*



*Right view of EUT*



*Left view of EUT*



*Bottom view of EUT*

