



CE EMC

TEST REPORT

For

IPC

**Model: IPC-610MB-30ZF; IPC-610MB-30ZFB; IPC-610MB-30ZEA;
IPC-610MB-30EB; IPC-610MB-25ZF; IPC-610MB-25ZEA;
IPC-610BP-30ZEA; IPC-610BP-30ZEB; IPC-610BP-30ZF;
IPC-610BP-30ZFB; IPC-610MB-25ZL; IPC-610MB-25Z;
IPC-610MB-30ZL; IPC-610MB-30Z; IPC-610BP-30ZL;
IPC-610BP-30Z; IPC-610BP-30ZH; ACP-4000BP-30Z; IPC-610MB-30ZH;
ACP-4000MB-30Z; ACP-4000MB-30R; IPC-510MB-25Z; IPC-510MB-30Z**

Trade Name: ADVANTECH

Issued for

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

Issued by

**Compliance Certification Services Inc.
No. 81-1, Lane 210, Bade Rd., 2, Luchu Hsiang,
Taoyuan Hsien, (338) Taiwan, R.O.C.
TEL: 886-3-324-0332
FAX: 886-3-324-5235**



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1 TEST RESULT CERTIFICATION

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.

Equipment Under Test: IPC

Trade Name: ADVANTECH

Model: IPC-610MB-30ZF; IPC-610MB-30ZFB; IPC-610MB-30ZEA;
IPC-610MB-30EB; IPC-610MB-25ZF; IPC-610MB-25ZEA;
IPC-610BP-30ZEA; IPC-610BP-30ZEB; IPC-610BP-30ZF;
IPC-610BP-30ZFB; IPC-610MB-25ZL; IPC-610MB-25Z;
IPC-610MB-30ZL; IPC-610MB-30Z; IPC-610BP-30ZL;
IPC-610BP-30Z; IPC-610BP-30ZH; ACP-4000BP-30Z; IPC-610MB-30ZH;
ACP-4000MB-30Z; ACP-4000MB-30R; IPC-510MB-25Z; IPC-510MB-30Z

Detailed EUT Description: See Item 2 of this report

Date of Test: February 10 ~ 12, 2004

Applicable Standard	Class/Limit/Criterion	Test Result
EN 55022: 1998	Class A	No non-compliance noted
EN 61000-3-2: 2000	Class D	Please refer page 28
EN 61000-3-3: 1995 + A1: 2001	Limit	No non-compliance noted
EN 55024: 1998, including		
IEC 61000-4-2: 1995 + A2: 2000	Criterion B	No non-compliance noted
IEC 61000-4-3: 1995 + A2: 2000	Criterion A	No non-compliance noted
IEC 61000-4-4: 1995 + A1: 2000	Criterion B	No non-compliance noted
IEC 61000-4-5: 1995 + A1: 2000	Criterion B	No non-compliance noted
IEC 61000-4-6: 1996 + A1: 2000	Criterion A	No non-compliance noted
IEC 61000-4-8: 1993 + A1: 2000	Criterion A	No non-compliance noted
IEC 61000-4-11: 1994 + A1: 2000	Criterion B/C/C	No non-compliance noted
Deviation from Applicable Standard		
1. According to applicant's declaration, this EUT is a class A product and to be market in industrial environment only.		
2. The conducted emission test item for telecom ports disturbance voltage (according to section 9.5 of EN 55022:1998) is not tested in this report as per client's request.		

The above equipment was tested by Compliance Certification Services Inc. for compliance with the requirements set forth in the EMC Directive 89/336/EEC and the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Approved by:

Kurt Chen
Director of Linkou Laboratory
Compliance Certification Services Inc.

Reviewed by:

Jessie Wang
Section Manager of Linkou Laboratory
Compliance Certification Services Inc.



2 EUT DESCRIPTION

Product	IPC		
Trade Name	ADVANTECH		
Model	IPC-610MB-30ZF; IPC-610MB-30ZFB; IPC-610MB-30ZEA; IPC-610MB-30EB; IPC-610MB-25ZF; IPC-610MB-25ZEA; IPC-610BP-30ZEA; IPC-610BP-30ZEB; IPC-610BP-30ZF; IPC-610BP-30ZFB; IPC-610MB-25ZL; IPC-610MB-25Z; IPC-610MB-30ZL; IPC-610MB-30Z; IPC-610BP-30ZL; IPC-610BP-30Z; IPC-610BP-30ZH; ACP-4000BP-30Z; IPC-610MB-30ZH; ACP-4000MB-30Z; ACP-4000MB-30R; IPC-510MB-25Z; IPC-510MB-30Z		
Housing Type	Metal Case		
EUT Power Rating	DCV from Power Supply		
Power Supply Manufacturer	FSP	Model	FSP300-60PLN
			FSP250-60ATV
Power Supply Power Rating	I/P: 100-240VAC, 50-60Hz, 10A O/P: +3.3V, 28A; +5VSB, 2.0A; +5V, 30A; +12V, 15A; -5V, 0.3A; -12V, 0.8A		
AC Power Cord Type	Unshielded, 1.8m (Detachable)		
CPU Manufacture	Intel	Model	P4 2.0 GHz
OSC/Clock Frequencies	133 MHz		
Memory Capacity	256 MB		
Main Board Manufacturer	ADVANTECH	Model	AIMB-740
			PCA-6186
HDD Manufacturer	Quantum (For Main Board Series Only)	Model	Fireball
FDD Manufacturer	TEAC	Model	FD-235HF
CD-ROM Manufacturer	AOpen	Model	CD-950E/TKV
VGA Card Manufacturer	On Board		
LAN Card Manufacturer	On Board		

I/O Port of EUT (for Main Board AIMB-740)

I/O Port Type	Q'TY	TESTED WITH
1) Parallel Port	1	1
2) Serial Port	1	1
3) PS/2 Keyboard Port	1	1
4) PS/2 Mouse	1	1
5) Video Port (VGA)	1	1
5) Microphone Port	1	1
6) Earphone Port	2	2
7) LAN Port	2	2
8) USB Port	4	4

**I/O Port of EUT (for Main Board PCA-6186)**

I/O Port Type	Q'TY	TESTED WITH
1) Serial Port	1	1
3) PS/2 Keyboard Port	1	1
4) PS/2 Mouse	1	1
5) Video Port (VGA)	1	1
6) Earphone Port	1	1
7) LAN Port	1	1
8) USB Port	2	2

Note: 1. The Different between twenty-three model numbers are list as below:

<i>Model</i>	<i>Main Board</i>	<i>Watt</i>	<i>Case (Please refer to photograph)</i>
<i>IPC-610MB-30ZF</i>	<i>AIMB-740</i>	<i>300W</i>	<i>IPC-610F Series</i>
<i>IPC-610MB-30ZFB</i>	<i>AIMB-740</i>	<i>300W</i>	
<i>IPC-610MB-30ZEA</i>	<i>AIMB-740</i>	<i>300W</i>	
<i>IPC-610MB-30EB</i>	<i>AIMB-740</i>	<i>300W</i>	
<i>IPC-610MB-25ZF</i>	<i>AIMB-740</i>	<i>250W</i>	
<i>IPC-610MB-25ZEA</i>	<i>AIMB-740</i>	<i>250W</i>	
<i>IPC-610BP-30ZEA</i>	<i>PCA-6186</i>	<i>300W</i>	
<i>IPC-610BP-30ZEB</i>	<i>PCA-6186</i>	<i>300W</i>	
<i>IPC-610BP-30ZF</i>	<i>PCA-6186</i>	<i>300W</i>	
<i>IPC-610BP-30ZFB</i>	<i>PCA-6186</i>	<i>300W</i>	
<i>IPC-610MB-25ZL</i>	<i>AIMB-740</i>	<i>250W</i>	<i>IPC-610MB-30ZL</i>
<i>IPC-610MB-25Z</i>	<i>AIMB-740</i>	<i>250W</i>	
<i>IPC-610MB-30ZL</i>	<i>AIMB-740</i>	<i>300W</i>	
<i>IPC-610MB-30Z</i>	<i>AIMB-740</i>	<i>300W</i>	
<i>IPC-610BP-30ZL</i>	<i>PCA-6186</i>	<i>300W</i>	
<i>IPC-610BP-30Z</i>	<i>PCA-6186</i>	<i>300W</i>	
<i>IPC-610BP-30ZH</i>	<i>PCA-6186</i>	<i>300W</i>	<i>IPC-610BP-30ZH</i>
<i>ACP-4000BP-30Z</i>	<i>PCA-6186</i>	<i>300W</i>	
<i>IPC-610MB-30ZH</i>	<i>AIMB-740</i>	<i>300W</i>	
<i>ACP-4000MB-30Z</i>	<i>AIMB-740</i>	<i>300W</i>	
<i>ACP-4000MB-30R</i>	<i>AIMB-740</i>	<i>300W</i>	<i>IPC-510MB Series</i>
<i>IPC-510MB-25Z</i>	<i>AIMB-740</i>	<i>250W</i>	
<i>IPC-510MB-30Z</i>	<i>AIMB-740</i>	<i>300W</i>	

2. Client consigns ten samples to test (Model Number: *IPC-610MB-30ZF*, *IPC-610MB-25ZF*, *IPC-610BP-30ZEA*, *IPC-610MB-25ZL*, *IPC-610MB-30ZL*, *IPC-610BP-30ZL*, *IPC-610BP-30ZH*, *IPC-610MB-30ZH*, *IPC-510MB-25Z*, *IPC-510MB-30Z*). Therefore, the testing Lab. just guarantees the unit, which has been tested.



3 TEST METHODOLOGY

3.1 EUT SYSTEM OPERATION

1. EMI test software was loaded and executed under “Windows 2000” environment.
2. A communicated software was loaded and executed to communicate between EUT and remote side.
3. EUT sends and receives data from Notebook PC on remote side via LAN Cable.
4. Data was sent to monitor filling the screen with upper case of “H” patterns.
5. Test program sequentially exercised all related I/O’s of EUT and sent “H” patterns to all applicable output ports of EUT.
6. Repeat step 2 to 5

Note: Test program is self-repeating throughout the test.

3.2 DECISION OF FINAL TEST MODE

1. The following test mode(s) were scanned during the preliminary test:

Customer defined:

Mode	Model Number	Main Board	Power (W)
1.	IPC-610MB-30ZF	AIMB-740	300
2.	IPC-610MB-25ZF	AIMB-740	250
3.	IPC-610BP-30ZEA	PCA-6186	300
4.	IPC-610MB-25ZL	AIMB-740	250
5.	IPC-610MB-30ZL	AIMB-740	300
6.	IPC-610BP-30ZL	PCA-6186	300
7.	IPC-610BP-30ZH	PCA-6186	300
8.	IPC-610MB-30ZH	AIMB-740	300
9.	IPC-510MB-25Z	AIMB-740	250
10.	IPC-510MB-30Z	AIMB-740	300

2. After the preliminary scan, the following test mode was found to produce the highest emission level.

Mode 4, 5, 7

Then, the EUT configuration and cable configuration of the above highest emission mode was chosen for all final test items.



4 SETUP OF EQUIPMENT UNDER TEST

Setup Diagram

See test photographs attached in Appendix 1 for the actual connections between EUT and support equipment.

Support Equipment

(For Mode 4, 5)

No.	Equipment	Model No.	Serial No.	FCC ID	Trade Name	Data Cable	Power Cord
1.	Monitor	959NF	AQ19H2RT706137Y	FCC DoC	SAMSUNG	Shielded, 1.8m with two cores	Unshielded, 1.8m
2.	Modem	DM-1414	0304012269	IFAXDM1414	ACEEX	Shielded, 1.4m	Unshielded, 1.8m
3.	Printer	STYLUS C60	DR3K041995	FCC DoC	EPSON	Shielded, 1.8m	Unshielded, 1.8m
4.	PS/2 Keyboard	KB-0133	N/A	FCC DoC	Compaq	Shielded, 1.8m	N/A
5.	PS/2 Mouse	M-S69	N/A	FCC DoC	Compaq	Shielded, 1.8m	N/A
6.	USB Mouse	MO19UCA	020440986	FCC DoC	HP	Shielded, 1.8m	N/A
7.	USB Mouse	MO19UCA	020509272	FCC DoC	HP	Shielded, 1.8m	N/A
8.	USB Mouse	MO19UCA	020509254	FCC DoC	HP	Shielded, 1.8m	N/A
9.	USB Mouse	MO19UCA	020509265	FCC DoC	HP	Shielded, 1.8m	N/A
10.	Multimedia Headset	Axis-301	N/A	FCC DoC	Labtec	Unshielded, 1.8m	N/A
11.	Multimedia Headset	Axis-301	N/A	FCC DoC	Labtec	Unshielded, 1.8m	N/A
12.	Notebook PC (Remote)	M285	NU2503544	FCC DoC	LEO	LAN Cable: Unshielded, 10m	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core
13.	Notebook PC (Remote)	Valiant 6380i9TD	N/A	FCC DoC	KDS	LAN Cable: Unshielded, 10m	AC I/P: Unshielded, 1.8m DC O/P: Unshielded, 1.8m with a core

**(For Mode 7)**

No.	Equipment	Model No.	Serial No.	FCC ID	Trade Name	Data Cable	Power Cord
1.	Monitor	959NF	AQ19H2RT706137Y	FCC DoC	SAMSUNG	Shielded, 1.8m with two cores	Unshielded, 1.8m
2.	Modem	DM-1414	0304012264	IFAXDM1414	ACEEX	Shielded, 1.4m	Unshielded, 1.8m
3.	PS/2 Keyboard	Y-SP29	SYU30272826	FCC DoC	Logitech	Shielded, 1.8m	N/A
4.	PS/2 Mouse	M-S69	N/A	FCC DoC	Compaq	Shielded, 1.8m	N/A
5.	USB Mouse	MO19UCA	020440986	FCC DoC	HP	Shielded, 1.8m	N/A
6.	USB Mouse	MO19UCA	020509272	FCC DoC	HP	Shielded, 1.8m	N/A
7.	Multimedia Headset	Axis-301	N/A	FCC DoC	Labtec	Unshielded, 1.8m	N/A
8.	Notebook PC (Remote)	M285	NU2503544	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.

5 FACILITIES AND ACCREDITATIONS








5.1 FACILITIES

All measurement facilities used to collect the measurement data are located at CCS Taiwan Linkou Lab at No. 81-1, Lane 210, Bade Rd., 2, Luchu Hsiang, Taoyuan Hsien, Taiwan.

The measurement facilities are constructed in conformance with the requirements of CISPR 16-1, ANSI C63.4 and other equivalent standards.

5.2 LABORATORY ACCREDITATIONS AND LISTINGS

The test facilities used to perform Electromagnetic compatibility tests are registered or accredited by the organizations listed in the following table which includes the recognized scope specifically.

Country	Agency	Scope of Accreditation	Logo
USA	NVLAP	EN 55011, EN 55014-1, AS/NZS 1044, CNS 13783-1, EN 55022, CNS 13438, EN 61000-3-2, EN 61000-3-3, ANSI C63.4, FCC OST/MP-5, AS/NZS CISPR 22, IEC 61000-4-2, IEC 61000-4-3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11	 Lab. Code: 200600-0
USA	FCC	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	 93105, 90471
Japan	VCCI	3/10 meter Open Area Test Sites and conducted test sites to perform radiated/conducted measurements	 R-393/1066/725/879 C-402/747/912
Norway	NEMKO	EN 50081-1/2, EN 50082-1/2, IEC 61000-6-1/2, EN 50091-2, EN 50130-4, EN 55011, EN 55013, EN 55014-1/2, EN 55015, EN 55022, EN 55024, EN 61000-3-2/3, EN 61326-1, IEC 61000-4-2/3/4/5/6/8/11, EN 60601-1-2, EN 300 328-2, EN 300 422-2, EN 301 419-1, EN 301 489-01/03/07/08/09/17, EN 301 419-2/3, EN 300 454-2, EN 301 357-2	 ELA 124a ELA 124b ELA 124c
Taiwan	CNLA	EN 300 328-1, EN 300 328-2, EN 300 220-1, EN 300 220-2, EN 300 220-3, 47 CFR FCC Part 15 Subpart C, EN 61000-3-2, EN 61000-3-3, CNS 13439, CNS 13783-1, CNS 14115, CNS 13438, AS/NZS CISPR 22, CNS 13022-1, IEC 61000-4-2/3/4/5/6/8/11, CNS 13022-2/3	 0363 ILAC MRA
Taiwan	BSMI	CNS 13438, CNS 13783-1, CNS 13439, CNS 14115	 SL2-IS-E-0014 / IN-E-0014 /A1-E-0014 /R1-E-0014 /R2-E-0014 /L1-E-0014
Canada	Industry Canada	RSS212, Issue 1	 IC 3991-3 IC 3991-4

Note: No part of this report may be used to claim or imply product endorsement by CNLA, NVLAP or other government agency.



6 INSTRUMENT AND CALIBRATION

6.1 MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

6.2 TEST AND MEASUREMENT EQUIPMENT

The following list contains measurement equipment used for testing. The equipment conforms to the requirement of CISPR 16-1, ANSI C63.2 and other required standards.

Calibration of all test and measurement, including any accessories that may effect such calibration, is checked frequently to ensure the accuracy. Adjustments are made and correction factors are applied in accordance with the instructions contained in the respective manual.

Equipment Used for Emission Measurement

Conducted Emission Test Site # 3				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMI Test Receiver	R&S	ESCS30	845552/030	03/14/2005
LISN	R&S	ESH2-Z5	843285/010	01/08/2005
LISN	EMCO	3825/2	9003-1628	07/27/2004

Note: The measurement uncertainty is less than +/- 2.83dB, which is evaluated as per the NAMAS NIS 81 and CISPR/A/291/CDV.

Open Area Test Site # 4				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	ADVANTEST	R3132	91700456	N.C.R
EMI Test Receiver	R&S	ESVS10	846285/016	04/10/2004
Bilog Antenna	Sunol Sciences	JB1	A111203	01/09/2005
Turn Table	Chance most	N/A	N/A	N.C.R
Antenna Tower	Chance most	N/A	N/A	N.C.R
Controller	Chance most	N/A	N/A	N.C.R
RF Switch	ANRITSU	MP59B	M51067	N.C.R
Site NSA	C&C Lab.	N/A	N/A	08/08/2004

Note: The measurement uncertainty is less than +/- 3.36dB, which is evaluated as per the NAMAS NIS 81 and CISPR/A/291/CDV.



Power Harmonic & Voltage Fluctuation/Flicker Measurement (EN 61000-3-2&-3-3)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
EMC-PARTNER	EMC Emission Tester	HARMONICS-1000	019	04/02/2004

Equipment Used for Immunity Measurement

ESD Test Site (IEC/EN 61000-4-2)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
ESD Generator	EM TEST	P30C	0603-01	02/26/2005

Radiated Electromagnetic Field Immunity Test Site (IEC/EN 61000-4-3)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
S.G.	R&S	SMY02	100094	08/05/2004
Power Meter	R&S	NRVD	837794/029	N.C.R.
Power Amplifier	ar	150W1000	300300	N.C.R
Power Antenna	EMCO	93141	9712-1083	N.C.R

Fast Transients/Burst Test Site (IEC/EN 61000-4-4)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Fast Transients/Burst Generator	HAEFELY TRENCH	PEFT- JUNIOR	583 333-117	08/19/2004
Clamp	HAEFELY TRENCH	093 506.1	080 421.13	N.C.R

Surge Immunity Test Site (IEC/EN 61000-4-5)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Surge Tester	HAEFELY TRENCH	PSUGER 4010	583 334-71	08/19/2004



CS Test Site (IEC/EN 61000-4-6)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
S.G.	R&S	SMY02	100094	08/05/2004
Power Meter	R&S	NRVD	837794/029	N.C.R.
Power Amplifier	ar	500A100A	300299	N.C.R
CDN	Lüthi	801-M3	1879	02/25/2005
CDN	FRANKONIA	CDN-M2	A3002010	04/27/2004
CDN	SCHAFFNER	T400	16906	12/28/2004

Power Frequency Magnetic Field Immunity Test Site (IEC/EN 61000-4-8)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
TRIAX ELF Magnetic Field Meter	F.W.BELL	4090	9711	11/13/2004
Clamp Meter	National	300K	11-5980 K	12/04/2004
Magnetic Field Tester	HAEFELY TRENCH	MAG 100.1	080 938-01	N.C.R

Voltage Dips/Short Interruption and Voltage Variation Immunity Test Site (IEC/EN 61000-4-11)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Dips/Interruption and Variations Simulator	HAEFELY TRENCH	PLINE 1610	080 344-05	03/27/2004

7 LINE CONDUCTED & RADIATED EMISSION TEST

7.1 LIMIT

Maximum permissible level of Line Conducted Emission

Frequency (MHZ)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

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

Maximum permissible level of Common Mode Conducted Emission (Telecommunication Ports)

CLASS A

Frequency (MHZ)	Voltage Limit (dBuV)		Current Limit (dBuA)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	97 – 87	84 - 74	53 – 43	40 – 30
0.5 - 30.0	87	74	43	30

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

CLASS B

Frequency (MHZ)	Voltage Limit (dBuV)		Current Limit (dBuA)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	84 - 74	74 - 64	40 – 30	30 – 20
0.5 - 30.0	74	64	30	20

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

Maximum permissible level of Radiated Emission measured at 10 meter

Frequency (MHZ)	Class A (dBuV/m)	Class B (dBuV/m)
	Quasi-peak	Quasi-peak
30 – 230	40	30
230 - 1000	47	37

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



7.2 TEST PROCEDURE OF LINE CONDUCTED EMISSION

Procedure of Preliminary Test

- The EUT was set up as per the test configuration to simulate typical 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.
- Support equipment, if needed, was placed as per EN 55022.
- All I/O cables were positioned to simulate typical actual usage as per EN 55022.
- The test equipment EUT installed received AC power, 230VAC/50Hz, through a Line Impedance Stabilization Network (LISN), which supplied power source and was grounded to the ground plane.
- All support equipment received power from a second LISN.
- The EUT test program was started. Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.
- The Receiver scanned from 150kHz to 30MHz for emissions in each of the test modes.
- During the above scans, the emissions were maximized by cable manipulation.
- The test mode(s) described in Item 3.2 were scanned during the preliminary test.
- After the preliminary scan, we found the test mode described in Item 3.2 producing the highest emission level.
- The EUT configuration and cable configuration of the above highest emission level were recorded for reference of the final test.

Procedure of Final Test

- EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.
- 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 Average limit in Q.P. mode, then the emission signal was re-checked using an Average detector.
- The test data of the worst-case condition(s) was recorded.

**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	---	73.00	60.00	-29.05	---	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 Formula

Margin (dB) = RAW (dBuV) – Limit (dBuV)

7.3 TEST PROCEDURE OF COMMON MODE CONDUCTED EMISSION FOR TELECOMMUNICATION PORT

- Selecting ISN for unscreened cable or a current probe for screened cable to take measurement.
- The port of the EUT was connected to the remote side support equipment through the ISN/Current Probe and communication in normal condition.
- 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.
- 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.
- In case of measuring on the screened cable, the current limit shall be applied, otherwise the voltage limit should be applied.
- The following test mode(s) were scanned during the preliminary test:

No applicable, the conducted emission test item for telecom ports disturbance voltage is not tested in this report as per client's request.

**Data Sample:**

Freq. (MHz)	Q.P. Raw (dBuV)	AV. Raw (dBuV)	Q.P. Limit (dBuV)	AV. Limit (dBuV)	Q.P. Margin (dB)	AV. Margin (dB)	Note
x.xx	43.95	---	87.00	74.00	-43.05	---	---

Freq.: Emission frequency

Raw: Uncorrected Analyzer / Receiver reading

Limit: Limit stated in standard

Margin: 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.

7.4 TEST PROCEDURE OF RADIATED EMISSION

Procedure of Preliminary Test

- The equipment was set up as per the test configuration to simulate typical 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. 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.
- Support equipment, if needed, was placed as per EN 55022.
- All I/O cables were positioned to simulate typical usage as per EN 55022.
- The EUT received AC power source, 230VAC/50Hz, from the outlet socket under the turntable. All support equipment received power from another socket under the turntable.
- The antenna was placed at 10 meter away from the EUT as stated in EN 55022. The antenna connected to the Spectrum Analyzer via a cable and at times a pre-amplifier would be used.
- 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.
- The test mode(s) described in Item 3.2 were scanned during the preliminary test:
- After the preliminary scan, we found the test mode described in Item 3.2 producing the highest emission level.
- The EUT and cable configuration, antenna position, polarization and turntable position of the above highest emission level were recorded for the final test.

**Procedure of Final Test**

- EUT and support equipment were set up on the turntable as per the configuration with highest emission level in the preliminary test.
- 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.
- 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.
- The test data of the worst-case condition(s) was recorded.

Data Sample:

Freq. (MHz)	Raw Data (dBuV)	Corr. Factor (dB/m)	Emiss. Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
xx.xx	14.00	12.20	26.20	40.00	-13.80

Freq.	= Emission frequency in MHz
Raw Data (dBuV)	= Uncorrected Analyzer / Receiver reading
Corr. Factor (dB/m)	= 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 Formula

Margin (dB) = Emiss. Level (dBuV/m) – Limits (dBuV/m)

Emission Level (dBuV/m) = Raw Data (dBuV) + Corr. Factor (dB/m)



7.5 TEST RESULTS

Line Conducted Emission

Model: IPC-610MB-25ZL**Test Mode:** Mode 4**Temperature:** 23°C**Humidity:** 65% RH**Tested by:** George Kuo**Test Results:** Pass

(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
0.155	39.90	---	79.00	66.00	-39.10	---	L1
11.552	27.40	---	73.00	60.00	-45.60	---	L1
12.178	28.00	---	73.00	60.00	-45.00	---	L1
13.941	27.60	---	73.00	60.00	-45.40	---	L1
18.079	28.20	---	73.00	60.00	-44.80	---	L1
19.280	28.00	---	73.00	60.00	-45.00	---	L1
0.205	39.80	---	79.00	66.00	-39.20	---	L2
11.281	27.40	---	73.00	60.00	-45.60	---	L2
12.753	28.30	---	73.00	60.00	-44.70	---	L2
13.649	27.70	---	73.00	60.00	-45.30	---	L2
18.103	27.90	---	73.00	60.00	-45.10	---	L2
19.308	27.60	---	73.00	60.00	-45.40	---	L2

L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)

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

**Line Conducted Emission****Model:** IPC-610MB-30ZL**Test Mode:** Mode 5**Temperature:** 23°C**Humidity:** 65% RH**Tested by:** George Kuo**Test Results:** Pass

(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
0.155	36.40	---	79.00	66.00	-42.60	---	L1
1.041	26.20	---	73.00	60.00	-46.80	---	L1
3.039	24.70	---	73.00	60.00	-48.30	---	L1
5.187	22.10	---	73.00	60.00	-50.90	---	L1
7.993	23.40	---	73.00	60.00	-49.60	---	L1
12.011	26.60	---	73.00	60.00	-46.40	---	L1
0.155	36.50	---	79.00	66.00	-42.50	---	L2
1.042	26.40	---	73.00	60.00	-46.60	---	L2
3.318	25.90	---	73.00	60.00	-47.10	---	L2
4.293	26.10	---	73.00	60.00	-46.90	---	L2
6.091	26.80	---	73.00	60.00	-46.20	---	L2
12.011	26.40	---	73.00	60.00	-46.60	---	L2

L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)

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

**Line Conducted Emission****Model:** IPC-610BP-30ZH**Test Mode:** Mode 7**Temperature:** 23°C**Humidity:** 65% RH**Tested by:** George Kuo**Test Results:** Pass

(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
0.155	36.90	---	79.00	66.00	-42.10	---	L1
1.291	27.40	---	73.00	60.00	-45.60	---	L1
2.923	25.20	---	73.00	60.00	-47.80	---	L1
8.028	26.60	---	73.00	60.00	-46.40	---	L1
8.612	27.10	---	73.00	60.00	-45.90	---	L1
13.507	28.40	---	73.00	60.00	-44.60	---	L1
0.270	36.30	---	79.00	66.00	-42.70	---	L2
1.021	27.30	---	73.00	60.00	-45.70	---	L2
3.189	26.80	---	73.00	60.00	-46.20	---	L2
4.068	24.50	---	73.00	60.00	-48.50	---	L2
7.992	24.70	---	73.00	60.00	-48.30	---	L2
12.012	26.40	---	73.00	60.00	-46.60	---	L2

L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)

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

**Radiated Emission (A)****Model:** IPC-610MB-25ZL**Test Mode:** Mode 4**Temperature:** 18°C**Humidity:** 62% RH**Detector Function:** Quasi-peak.**Antenna:** Vertical at 10m**Tested by:** George Kuo**Test Results:** Pass

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

Freq. (MHz)	Raw Data (dBuV)	Corr. Factor (dB/m)	Emiss. Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
52.06	25.0	8.9	33.9	40.0	-6.1
65.75	18.5	9.1	27.6	40.0	-12.4
165.54	13.9	14.7	28.6	40.0	-11.4
198.11	14.7	15.8	30.5	40.0	-9.5
233.50	19.6	14.6	34.2	47.0	-12.8
297.89	14.3	18.7	33.0	47.0	-14.0
433.65	8.4	21.9	30.3	47.0	-16.7
500.00	7.6	23.9	31.5	47.0	-15.5

**Radiated Emission (B)****Model:** IPC-610MB-25ZL**Test Mode:** Mode 4**Temperature:** 18°C**Humidity:** 62% RH**Detector Function:** Quasi-peak.**Antenna:** Horizontal at 10m**Tested by:** George Kuo**Test Results:** Pass

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

Freq. (MHz)	Raw Data (dBuV)	Corr. Factor (dB/m)	Emiss. Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
74.02	17.8	9.8	27.6	40.0	-12.4
166.74	15.9	14.6	30.5	40.0	-9.5
200.20	12.9	16.0	28.9	40.0	-11.1
231.75	21.6	14.5	36.1	47.0	-10.9
297.88	14.6	18.7	33.3	47.0	-13.7
430.25	9.7	21.8	31.5	47.0	-15.5
496.40	11.1	23.8	34.9	47.0	-12.1
600.52	8.6	24.8	33.4	47.0	-13.6

**Radiated Emission (A)****Model:** IPC-610MB-30ZL**Test Mode:** Mode 5**Temperature:** 18°C**Humidity:** 62% RH**Detector Function:** Quasi-peak.**Antenna:** Vertical at 10m**Tested by:** George Kuo**Test Results:** Pass

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

Freq. (MHz)	Raw Data (dBuV)	Corr. Factor (dB/m)	Emiss. Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
66.42	16.8	9.3	26.1	40.0	-13.9
165.55	13.6	14.7	28.3	40.0	-11.7
200.65	16.2	16.0	32.2	40.0	-7.8
233.49	20.1	14.6	34.7	47.0	-12.3
297.90	13.1	18.7	31.8	47.0	-15.2
433.66	8.4	21.9	30.3	47.0	-16.7
496.38	5.5	23.8	29.3	47.0	-17.7
728.42	5.7	27.3	33.0	47.0	-14.0

**Radiated Emission (B)****Model:** IPC-610MB-30ZL**Test Mode:** Mode 5**Temperature:** 18°C**Humidity:** 62% RH**Detector Function:** Quasi-peak.**Antenna:** Horizontal at 10m**Tested by:** George Kuo**Test Results:** Pass

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

Freq. (MHz)	Raw Data (dBuV)	Corr. Factor (dB/m)	Emiss. Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
74.24	17.3	9.8	27.1	40.0	-12.9
166.75	17.2	14.6	31.8	40.0	-8.2
233.47	21.1	14.6	35.7	47.0	-11.3
297.88	13.1	18.7	31.8	47.0	-15.2
372.04	9.3	20.0	29.3	47.0	-17.7
432.08	8.1	21.9	30.0	47.0	-17.0
500.36	10.2	23.9	34.1	47.0	-12.9
796.90	5.4	27.9	33.3	47.0	-13.7

**Radiated Emission (A)****Model:** IPC-610BP-30ZH**Test Mode:** Mode 7**Temperature:** 18°C**Humidity:** 62% RH**Detector Function:** Quasi-peak.**Antenna:** Vertical at 10m**Tested by:** George Kuo**Test Results:** Pass

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

Freq. (MHz)	Raw Data (dBuV)	Corr. Factor (dB/m)	Emiss. Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
66.45	17.8	9.3	27.1	40.0	-12.9
127.97	12.7	15.8	28.5	40.0	-11.5
170.01	14.4	14.5	28.9	40.0	-11.1
180.01	21.6	14.1	35.7	40.0	-4.3
228.06	17.3	14.3	31.6	40.0	-8.4
230.00	20.3	14.4	34.7	40.0	-5.3
300.00	22.3	18.7	41.0	47.0	-6.0
400.04	10.0	20.9	30.9	47.0	-16.1
499.99	13.2	23.9	37.1	47.0	-9.9
564.86	10.0	24.8	34.8	47.0	-12.2

**Radiated Emission (B)****Model:** IPC-610BP-30ZH**Test Mode:** Mode 7**Temperature:** 18°C**Humidity:** 62% RH**Detector Function:** Quasi-peak.**Antenna:** Horizontal at 10m**Tested by:** George Kuo**Test Results:** Pass

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

Freq. (MHz)	Raw Data (dBuV)	Corr. Factor (dB/m)	Emiss. Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)
74.23	18.2	9.8	28.0	40.0	-12.0
172.04	11.3	14.4	25.7	40.0	-14.3
190.04	14.7	15.1	29.8	40.0	-10.2
232.06	19.1	14.5	33.6	47.0	-13.4
250.01	16.2	15.7	31.9	47.0	-15.1
300.00	22.7	18.7	41.4	47.0	-5.6
350.01	15.4	19.2	34.6	47.0	-12.4
441.59	16.1	22.2	38.3	47.0	-8.7
464.20	7.3	22.9	30.2	47.0	-16.8
564.89	9.8	24.8	34.6	47.0	-12.4

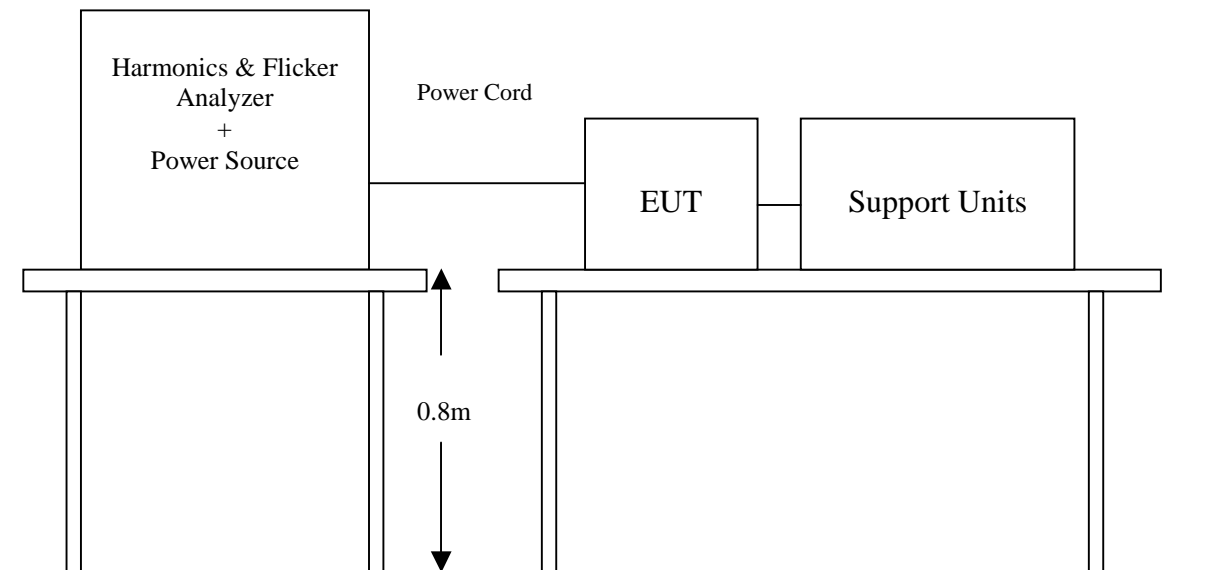


8 POWER HARMONICS TEST

Port : AC mains
Basic Standard : EN 61000-3-2 (2000)
Limits : ☐ CLASS A ; ☐ CLASS B ; ☐ CLASS C ; ☒ CLASS D
Tested by : George Kuo
Temperature : 26 °C
Humidity : 51 % RH
Test Mode : 4, 5, 7

Limit:

Limits for Class A equipment		Limits for Class D equipment		
Harmonics Order n	Max. permissible harmonics current A	Harmonics Order n	Max. permissible harmonics current per watt mA/W	Max. permissible harmonics current A
Odd harmonics		Odd Harmonics only		
3	2.30	3	3.4	2.30
5	1.14	5	1.9	1.14
7	0.77	7	1.0	0.77
9	0.40	9	0.5	0.40
11	0.33	11	0.35	0.33
13	0.21	13	0.30	0.21
15<=n<=39	0.15x15/n	15<=n<=39	3.85/n	0.15x15/n
Even harmonics				
2	1.08			
4	0.43			
6	0.30			
8<=n<=40	0.23x8/n			

Block Diagram of Test Setup:**Test Procedure:**

- The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the maximum harmonic components under normal operating conditions for each successive harmonic component in turn.
- The correspondent test program of test instrument to measure the current harmonics emanated from EUT is chosen. The measure time shall be not less than the time necessary for the EUT to be exercised.

Test Result : (See Appendix II for details)**For Test Mode 4**

Note: According to clause 7 of EN 61000-3-2: 2000, equipment with a rated power of 75W or less, no limits apply. The test result is only for reference.

For Test Mode 5, 7

<input checked="checked" type="checkbox"/> PASS <input type="checkbox"/> FAIL

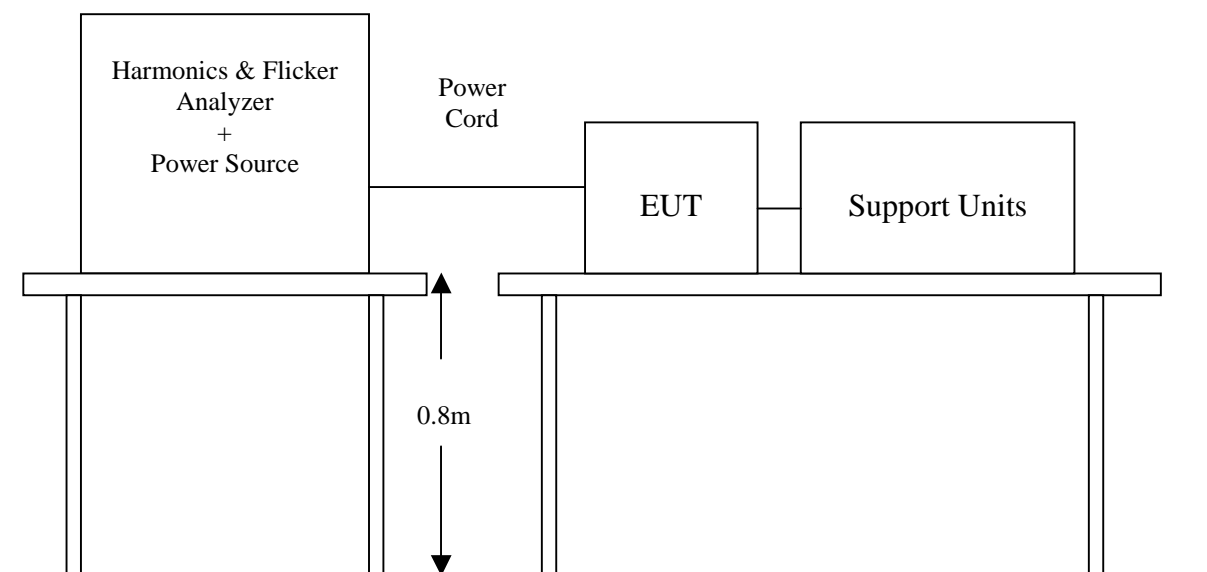
9 POWER VOLTAGE FLUCTUATION / FLICKER TEST

Port : AC mains
Basic Standard : EN 61000-3-3 (1995 + A1: 2001)
Limits : §5 of EN 61000-3-3
Tested by : George Kuo
Temperature : 26 °C
Humidity : 51 % RH
Test Mode : 4, 5, 7

Limit:

TEST ITEM	LIMIT	REMARK
P_{st}	1.0	P_{st} means short-term flicker indicator.
P_{lt}	0.65	P_{lt} means long-term flicker indicator.
T_{dt} (ms)	500	T_{dt} means maximum time that dt exceeds 3 %.
d_{max} (%)	4%	d_{max} means maximum relative voltage change.
dc (%)	3.3%	dc means relative steady-state voltage change

Block Diagram of Test Setup:



Test Procedure:

- a. The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the most unfavorable sequence of voltage changes under normal operating conditions.
- b. During the flick measurement, the measure time shall include that part of whole operation cycle in which the EUT produce the most unfavorable sequence of voltage changes. The observation period for short-term flicker indicator is 10 minutes and the observation period for long-term flicker indicator is 2 hours.

Test Result: (See Appendix II for details)**Mode 4**

** Continue

Test Parameter	Measurement Value	Limit	Result
P _{st}	0.072	1.0	Pass
P _{lt}	0.072	0.65	Pass
T _{dt} (ms)	0	500	Pass
d _{max} (%)	0%	4%	Pass
dc (%)	0%	3.3%	Pass

** Manual Switch

Test Parameter	Measurement Value	Limit	Result
P _{st}	0.072	1.0	Pass
P _{lt}	0.072	0.65	Pass
T _{dt} (ms)	0	500	Pass
d _{max} (%)	0%	4%	Pass
dc (%)	0%	3.3%	Pass

**Mode 5**

** Continue

Test Parameter	Measurement Value	Limit	Result
P _{st}	0.072	1.0	Pass
P _{lt}	0.072	0.65	Pass
T _{dt} (ms)	0	500	Pass
d _{max} (%)	0%	4%	Pass
dc (%)	0%	3.3%	Pass

** Manual Switch

Test Parameter	Measurement Value	Limit	Result
P _{st}	0.072	1.0	Pass
P _{lt}	0.072	0.65	Pass
T _{dt} (ms)	0	500	Pass
d _{max} (%)	0%	4%	Pass
dc (%)	0.01%	3.3%	Pass

Mode 7

** Continue

Test Parameter	Measurement Value	Limit	Result
P _{st}	0.107	1.0	Pass
P _{lt}	0.107	0.65	Pass
T _{dt} (ms)	0	500	Pass
d _{max} (%)	0%	4%	Pass
dc (%)	0.1%	3.3%	Pass

** Manual Switch

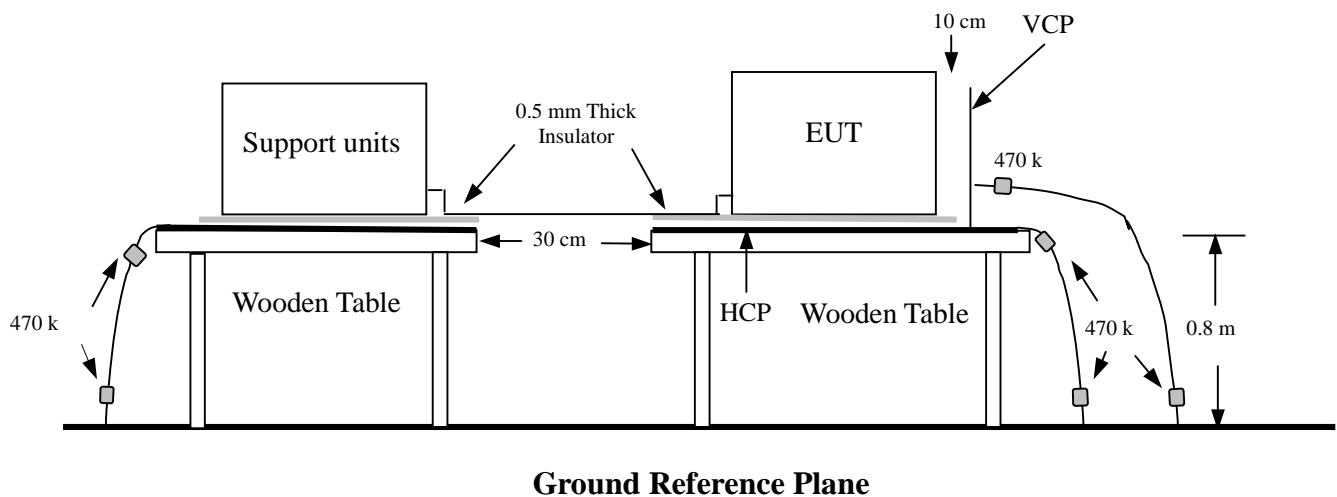
Test Parameter	Measurement Value	Limit	Result
P _{st}	0.107	1.0	Pass
P _{lt}	0.107	0.65	Pass
T _{dt} (ms)	0	500	Pass
d _{max} (%)	0%	4%	Pass
dc (%)	0.1%	3.3%	Pass

10 ELECTROSTATIC DISCHARGE (ESD) IMMUNITY TEST

Port	: Enclosure
Basic Standard	: IEC/EN 61000-4-2
Test Level	: ± 8 kV (Air Discharge) ± 4 kV (Contact Discharge) ± 4 kV (Indirect Discharge)
Performance Criterion	: B (Standard Required)
Tested by	: George Kuo
Temperature	: 26°C
Humidity	: 51% RH
Pressure	: 1014mbar
Test Mode	: 4, 5, 7

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 indirect support units were located 1 m minimum away from the EUT, but direct support unit was/were located at same location as EUT on the HCP and keep at a distance of 10 cm with EUT.
3. A scroll 'H' test program was loaded and executed in Windows 2000 mode.
4. The EUT sent above message to monitor 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; 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. The EUT direct connection units also need to be applied ESD at the port of EUT cable connected.
10. Putting a mark on EUT to show tested points. The following test condition was followed during the tests.

Note: As per IEC/EN 61000-4-2, 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 discharge	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	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

****For 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** ☐ **FAIL**

Observation: The USB ports were breakdown, but can be auto recovered as the events disappear.

The Tested Points of EUT

MB Series

Photo 1 of 4



Photo 2 of 4





Photo 3 of 4



Photo 4 of 4



BP Series

Photo 1 of 4



Photo 2 of 4





Photo 3 of 4



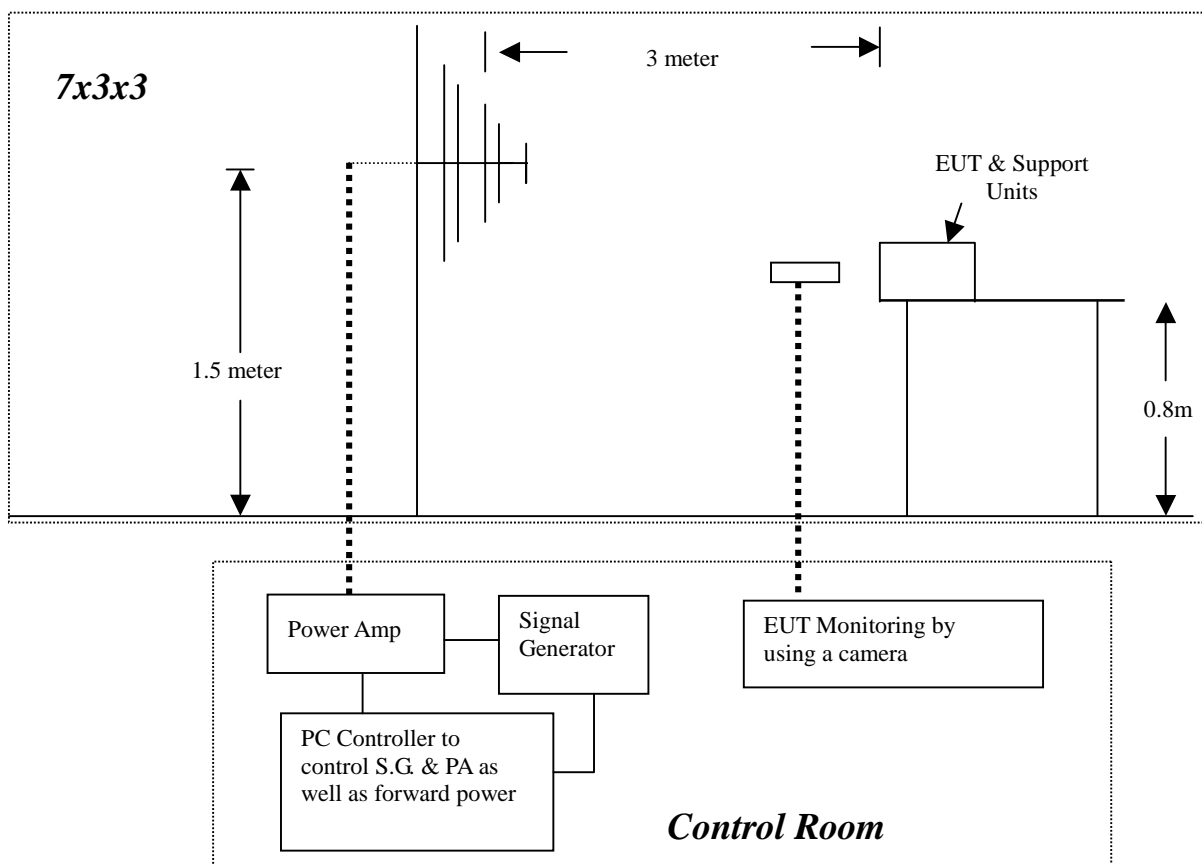
Photo 4 of 4



11 RADIATED ELECTROMAGNETIC FIELD IMMUNITY TEST

Port	: Enclosure
Basic Standard	: IEC/EN 61000-4-3
Requirements	: 3 V/m / with 80% AM. 1kHz Modulation.
Performance Criterion	: A (Standard Required)
Tested by	: George Kuo
Temperature	: 26°C
Humidity	: 51% RH
Pressure	: 1014mbar
Test Mode	: 4, 5, 7

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/EN 61000-4-3.
2. Setting the testing parameters of RS test software per IEC/EN 61000-4-3.
3. Performing the pre-test at each side of with double specified level (6V/m) at 4% steps.
4. 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.
5. Recording the test result in following table.
6. It is not necessary to perform test as per annex A of EN 55024 if the EUT doesn't belong to ITE product.

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/m	Yes	H	Front	Pass
80-1000	6V/m	Yes	V	Front	Pass
80-1000	6V/m	Yes	H	Right	Pass
80-1000	6V/m	Yes	V	Right	Pass
80-1000	6V/m	Yes	H	Back	Pass
80-1000	6V/m	Yes	V	Back	Pass
80-1000	6V/m	Yes	H	Left	Pass
80-1000	6V/m	Yes	V	Left	Pass

Final test conditions:

Test level : 6V/m
Steps : 1 % of fundamental
Dwell Time : 3 sec

Range (MHz)	Field	Modulation	Polarity	Position	Result (Pass/Fail)
80-1000	6V/m	Yes	H	Back	Pass
80-1000	6V/m	Yes	V	Back	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** ☐ **FAIL**

Observation: No function degraded during the tests.

12 FAST TRANSIENTS/BURST IMMUNITY TEST

Port : On Power Supply Lines and LAN Cable

Basic Standard : IEC/EN 61000-4-4

Requirements : ± 1 kV for Power Supply Line
 ± 0.5 kV for LAN Cable

Performance Criteria : B (Standard Required)

Tested by : George Kuo

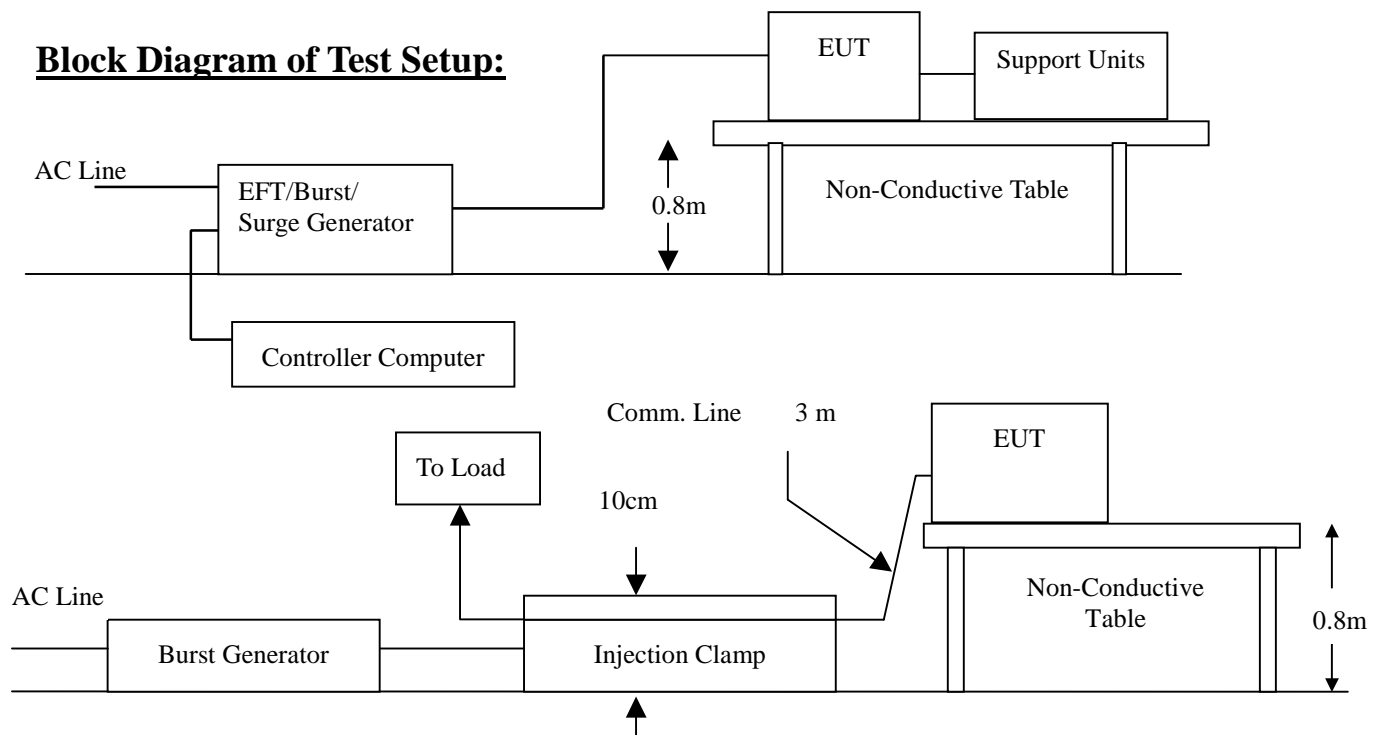
Temperature : 26°C

Humidity : 51% RH

Pressure : 1014mbar

Test Mode : 4, 5, 7

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. Injected test voltage to the EUT ports from minimum to standard request or client request.
5. 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)
L	± 1	Direct	Pass
N	± 1	Direct	Pass
PE	± 1	Direct	Pass
L + N	± 1	Direct	Pass
L + PE	± 1	Direct	Pass
N + PE	± 1	Direct	Pass
L + N + PE	± 1	Direct	Pass
RJ 45 Port (LAN Cable)	± 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** ☐ **FAIL**

Observation: No function degraded during the tests.

13 SURGE IMMUNITY TEST

Port : Power Cord

Basic Standard : IEC/EN 61000-4-5

Requirements : ± 1 kV (Line to Line)
 ± 2 kV (Line to Ground)

Performance Criteria : B (Standard Required)

Tested by : George Kuo

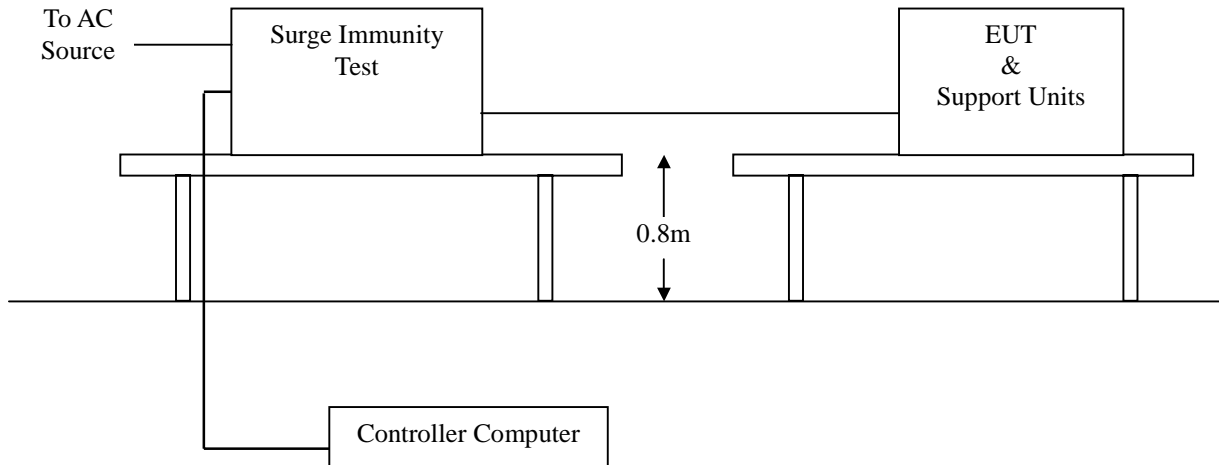
Temperature : 26°C

Humidity : 51% RH

Pressure : 1014mbar

Test Mode : 4, 5, 7

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. Injected test voltage to the EUT ports from minimum to standard request or client request.
3. Recording the test result as shown in following table.

**Test conditions:**

Voltage Waveform : 1.2/50 μ s
Current Waveform : 8/20 μ 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** ☐ **FAIL**

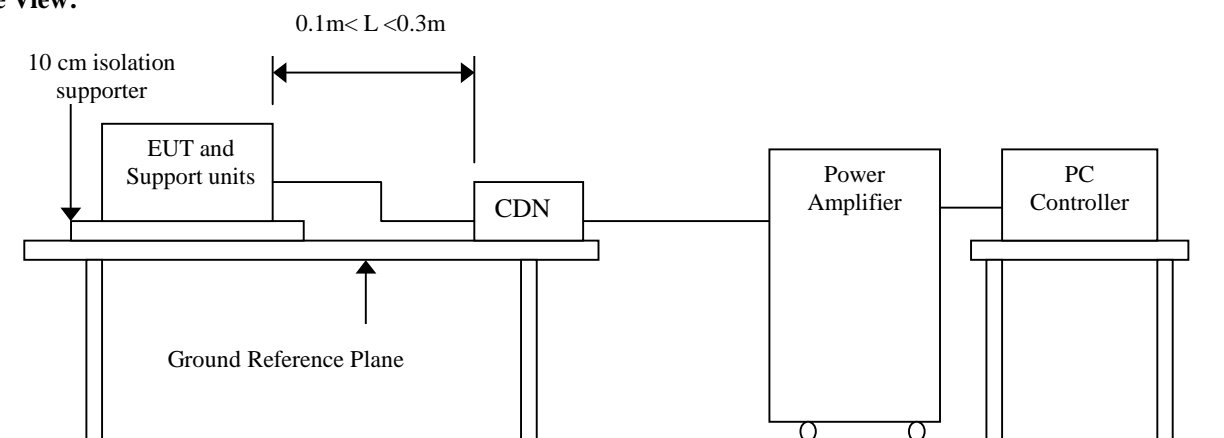
Observation: No function degraded during the tests.

14 CONDUCTED DISTURBANCE/INDUCED RADIO-FREQUENCY FIELD IMMUNITY TEST

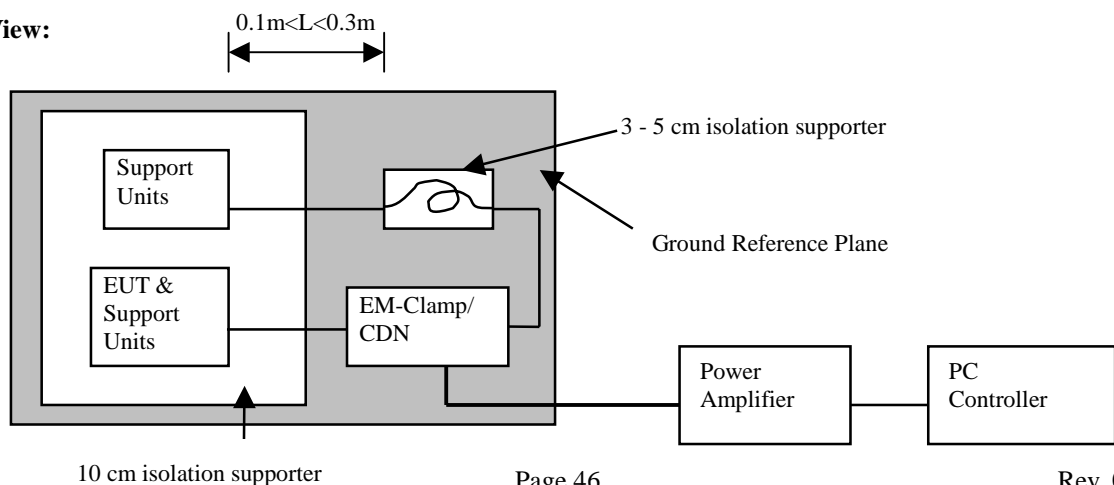
Port	: AC Port and LAN Cable
Basic Standard	: IEC/EN 61000-4-6
Requirements	: 3 V with 80% AM. 1kHz Modulation.
Injection Method	: CDN-M3 for Power Cord CDN-T4 for LAN Cable
Performance Criterion	: A (Standard Required)
Tested by	: George Kuo
Temperature	: 26°C
Humidity	: 51% RH
Pressure	: 1014mbar
Test Mode	: 4, 5, 7

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. Setting the testing parameters of CS test software as per IEC/EN 61000-4-6.
3. 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:

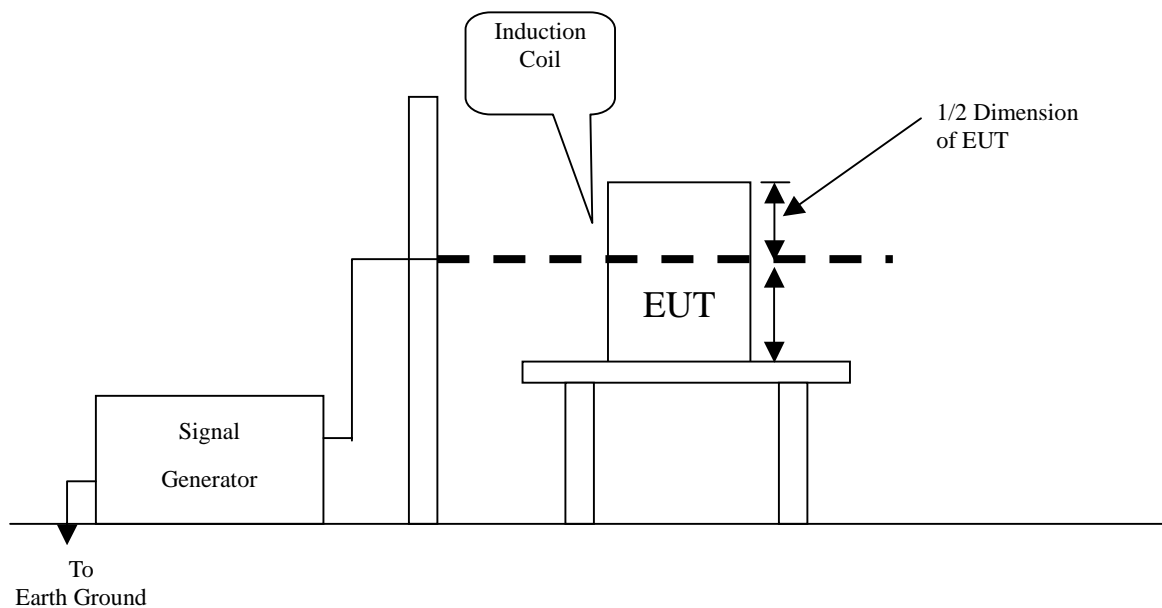
- ☒ **Criteria A:** The apparatus continues to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the apparatus is used as intended. In some cases the performance level may be replaced by a permissible loss of 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.

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

15 POWER FREQUENCY MAGNETIC FIELD IMMUNITY TEST

Port	: Enclosure
Basic Standard	: IEC/EN 61000-4-8
Requirements	: 1 A/m
Performance Criterion	: A (Standard Required)
Tested by	: George Kuo
Temperature	: 26°C
Humidity	: 51% RH
Pressure	: 1014mbar
Test Mode	: 4, 5, 7

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. Rotating the induction coil by 90° (Y direction)
4. Rotating the induction coil by 90° again (Z direction)
5. Recording the test result as shown in following table.

**Test conditions:**

Field Strength: 1A/m
Power Freq.: 50Hz
Orientation: X, Y, Z

Orientation	Field	Result (Pass/Fail)	Remark
X	1A/m	Pass	
Y	1A/m	Pass	
Z	1A/m	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** ☐ **FAIL**

Observation: No function degraded during the tests.

16 VOLTAGE DIPS / SHORT INTERRUPTIONS

Port : AC mains

Basic Standard : IEC/EN 61000-4-11

Requirement : PHASE ANGLE 0, 45, 90, 135, 180, 225, 270, 315 degrees

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

Voltage Interceptions	Test Level % U_T	Reduction (%)	Duration (periods)	Performance Criteria
	<5	>95	250	C

Test Interval : Min. 10 sec.

Tested by : George Kuo

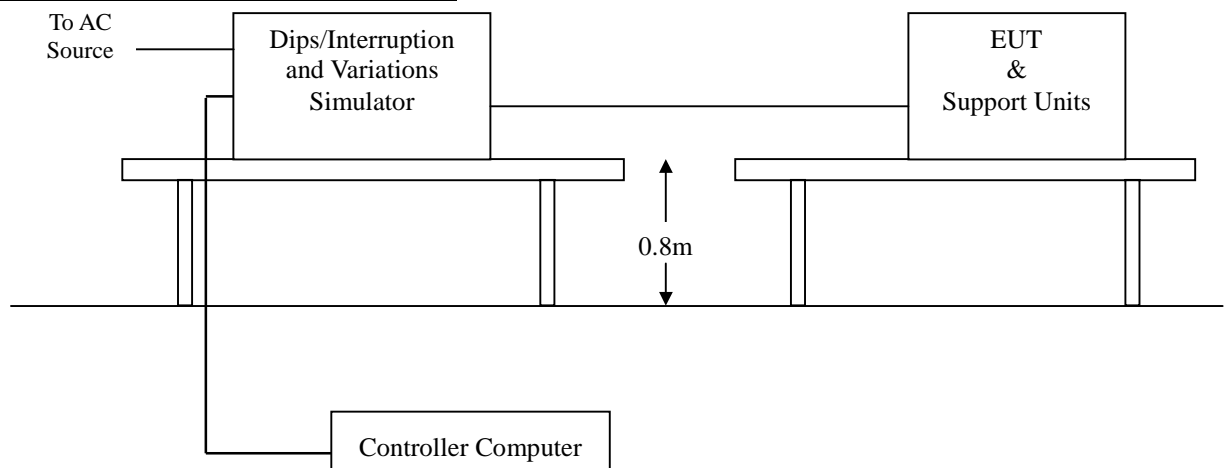
Temperature : 26°C

Humidity : 51% RH

Pressure : 1014mbar

Test Mode : 4, 5, 7

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. Setting the parameter of tests and then Perform the test software of test simulator.
3. Conditions changes to occur at 0 degree crossover point of the voltage waveform.
4. 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 recovered by manual, as the events disappear.	C

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.

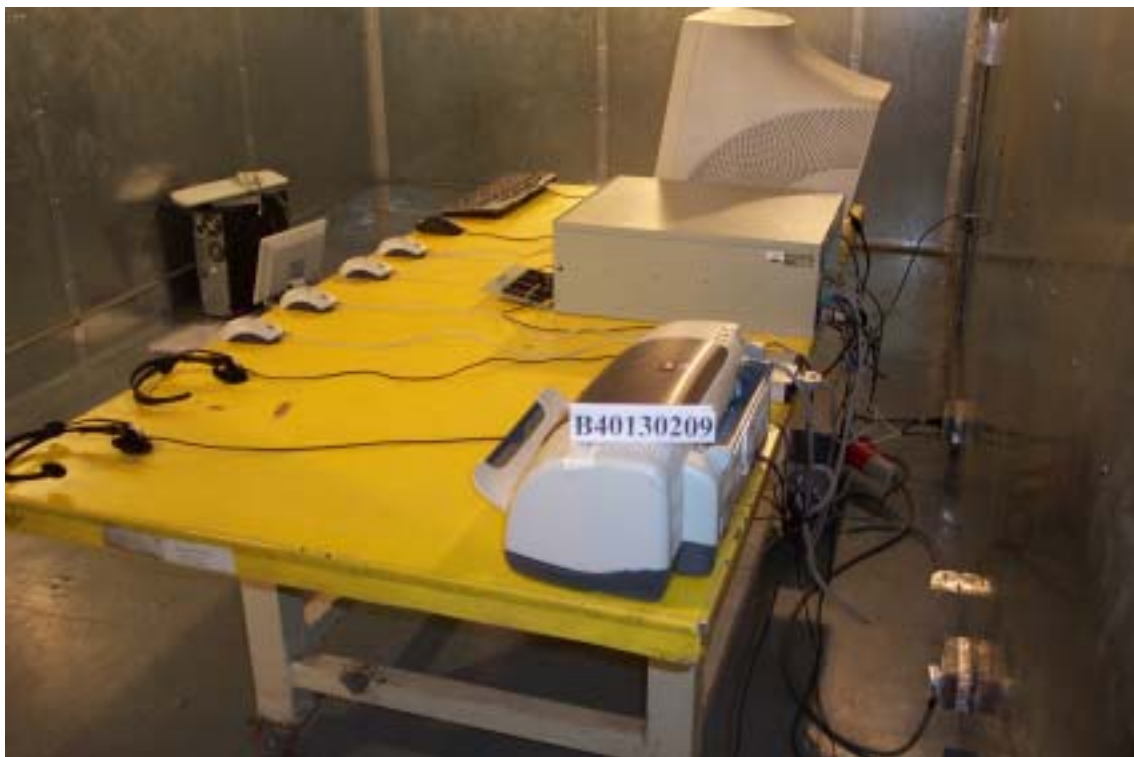
**PASS****FAIL**



APPENDIX I - PHOTOGRAPHS OF TEST SETUP

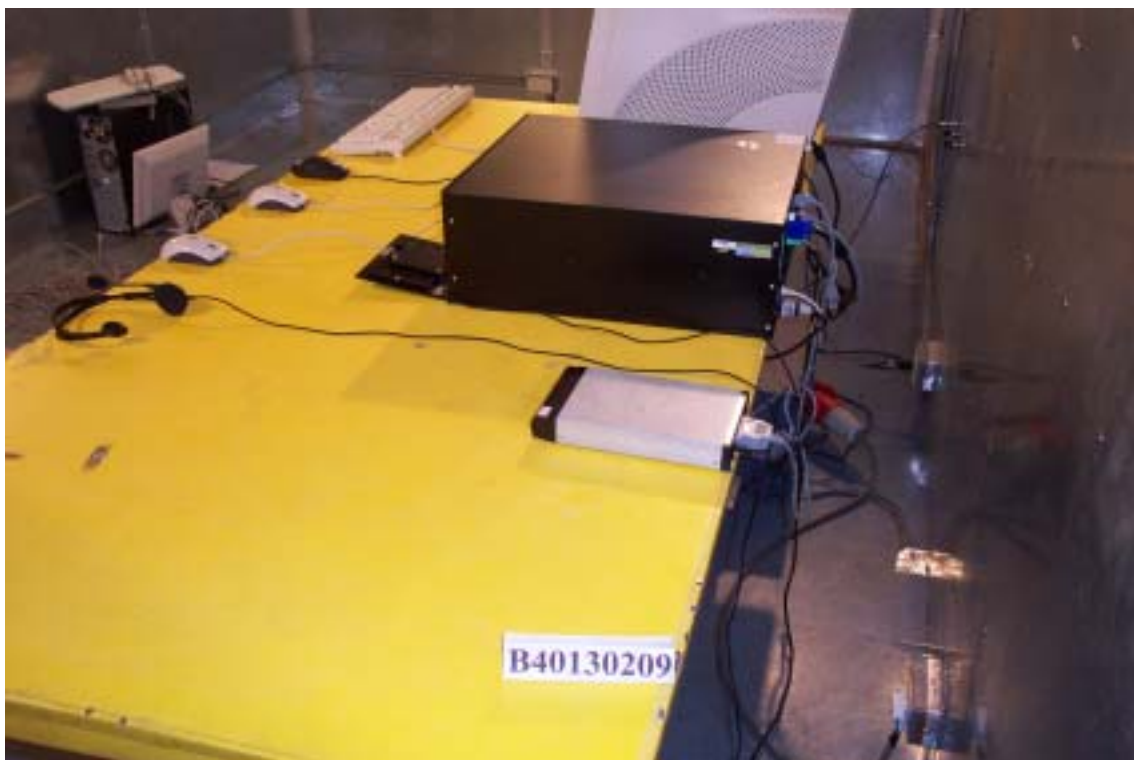
LINE CONDUCTED EMISSION TEST (EN 55022)

MB Series





BP Series



RADIATED EMISSION TEST (EN 55022)

MB Series





BP Series



POWER HARMONIC & VOLTAGE FLUCTUATION / FLICKER TEST

MB Series



BP Series



ELECTROSTATIC DISCHARGE TEST

MB Series



BP Series



RADIATED ELECTROMAGNETIC FIELD TEST

MB Series



BP Series

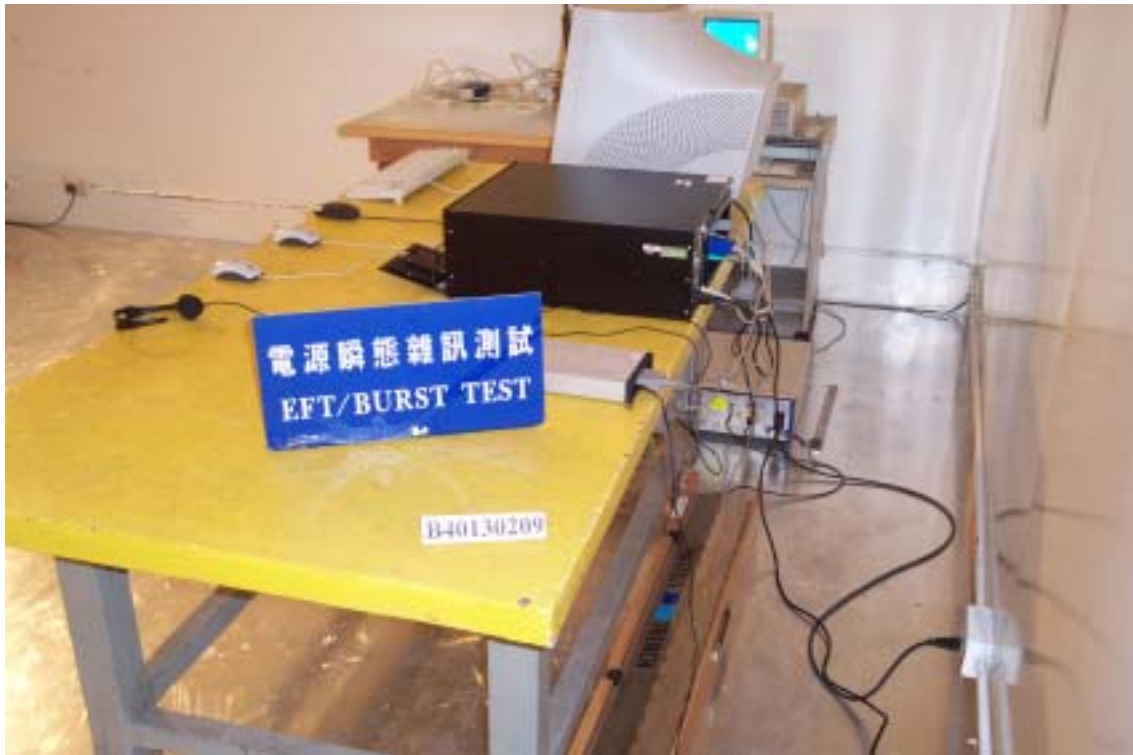


FAST TRANSIENTS/BURST TEST

MB Series



BP Series



SURGE IMMUNITY TEST

MB Series



BP Series



CONDUCTED DISTURBANCE, INDUCED BY RADIO-FREQUENCY FIELDS TEST

MB Series



BP Series



POWER FREQUENCY MAGNETIC FIELD IMMUNITY TEST

MB Series



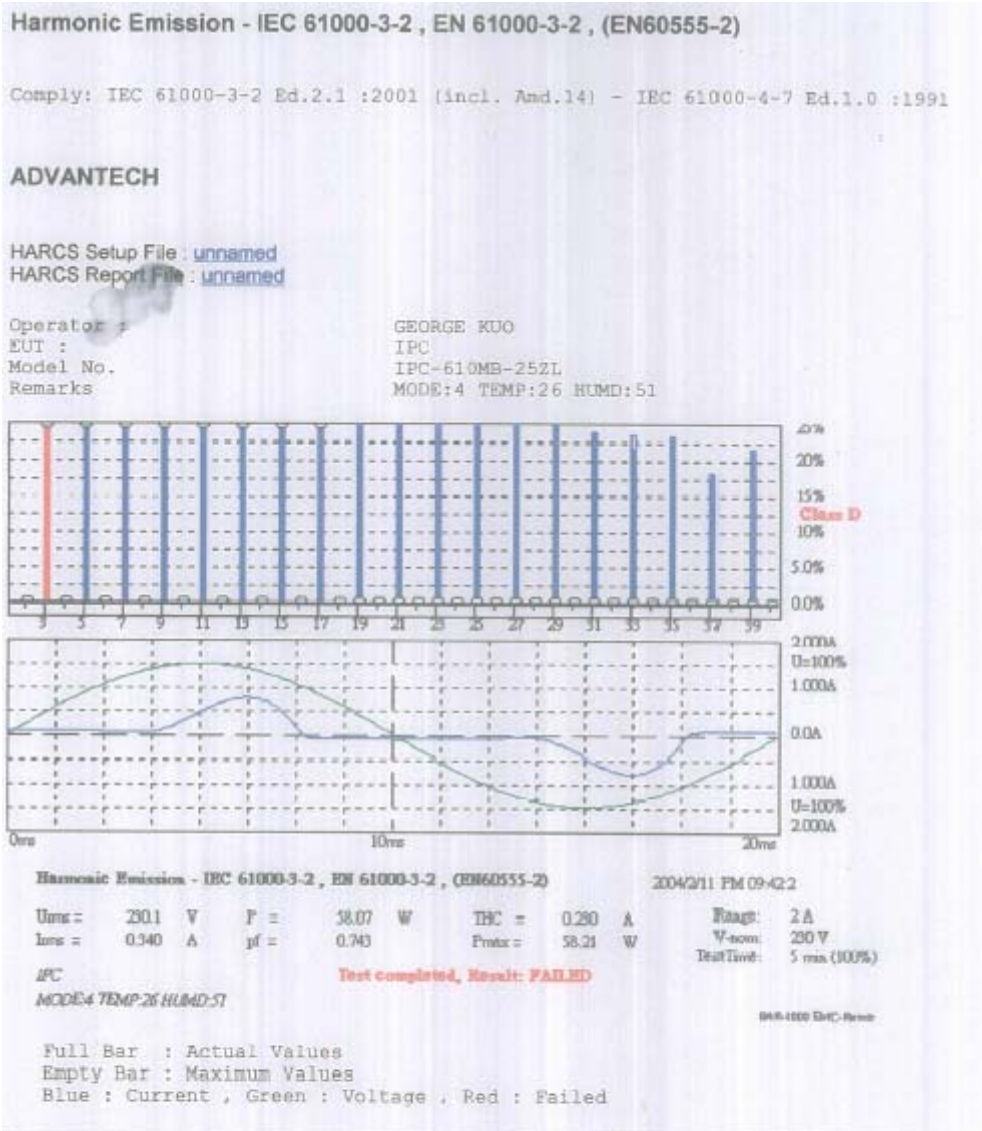
BP Series



VOLTAGE DIPS / INTERRUPTION TEST**MB Series****BP Series**



APPENDIX II – TEST RESULT OF EN 61000-3-2/-3 Mode 4



Measurement

ADVANTECH

Date : 2004/2/11 PM 09:42:2 V3.15

File :

Operator :

GEORGE KUO

EUT :

IPC

Model No. :

IPC-610MB-252L

Remarks :

MODE:4 TEMP:26 HUMD:51



Urms = 230.1V Freq = 49.987 Range: 2 A
Irms = 0.340A Ipk = 0.808A cf = 2.376
P = 58.07W Pap = 78.20VA pf = 0.743
THDi = 67.3 % THDu = 0.10 % Class D

Test - Time : 5min (100 %)

Limit Reference: Pmax = 58.212W

Test completed, Result: FAILED

Order	Freq. [Hz]	Imax [A]	Imax% [%]	Imax%L [%]	Limit [A]	Status
1	50	0.2535	74.605			
2	100	0.0011	0.3233			
3	150	0.1987	58.477	100.41	0.1979	Fail
4	200	0.0005	0.1437			
5	250	0.1062	31.250	96.021	0.1106	
6	300	0.0002	0.0718			
7	350	0.0360	10.596	61.862	0.0582	
8	400	0.0002	0.0718			
9	450	0.0216	6.3578	74.234	0.0291	
10	500	0.0001	0.0359			
11	550	0.0160	4.7055	78.488	0.0204	
12	600	0.0001	0.0359			
13	650	0.0085	2.5144	49.566	0.0172	
14	700	0.0001	0.0359			
15	750	0.0082	2.4066	54.740	0.0149	
16	800	0.0001	0.0359			
17	850	0.0054	1.5805	40.742	0.0132	
18	900	0.0001	0.0359			
19	950	0.0049	1.4368	41.396	0.0118	
20	1000	0.0000	0.0000			
21	1050	0.0040	1.1853	37.746	0.0107	
22	1100	0.0000	0.0000			
23	1150	0.0032	0.9339	32.572	0.0097	
24	1200	0.0000	0.0000			
25	1250	0.0031	0.8980	34.042	0.0090	
26	1300	0.0000	0.0000			
27	1350	0.0022	0.6466	26.471	0.0083	
28	1400	0.0000	0.0000			
29	1450	0.0021	0.6106	26.853	0.0077	
30	1500	0.0000	0.0000			
31	1550	0.0017	0.5029	23.639	0.0072	
32	1600	0.0000	0.0000			
33	1650	0.0016	0.4670	23.367	0.0068	
34	1700	0.0000	0.0000			
35	1750	0.0015	0.4310	22.876	0.0064	
36	1800	0.0000	0.0000			
37	1850	0.0011	0.3233	18.138	0.0061	
38	1900	0.0000	0.0000			
39	1950	0.0012	0.3592	21.242	0.0057	
40	2000	0.0000	0.0000			

Important:

Pmax is below 75W. This seems not to be a class D equipment.



ADVANTECH

Date : 2004/2/11 PM 09:59:0 U3.15

File :

Operator : GEORGE KUO
EUT : IPC
Model No. IPC-610MB-252L
Remarks MODE:4 TEMP:26 HUMD:51

Urms = 230.1V Freq = 49.987 Range: 2 A
Irms = 0.340A Ipk = 0.800A cf = 2.376
P = 57.97W Pap = 70.20VA pF = 0.741

Test - Time : 1 x 10min = 10min (100 %)

LIN (Line Impedance Network) : SLIN 0.24ohm +j0.15ohm N:0.16ohm +j0.10ohm

Limits : Plt : 0.65 Pst : 1.00
dmax : 4.00 % dc : 3.30 %
dtLim: 3.30 % dt>Lim: 500ns

Test completed, Result: PASSED

Plt = 0.072

	Pst	dmax	dc	dt>Lim	Fail
		[%]	[%]	[ns]	
1	0.072	0.000	0.000	0.000	



ADVANTECH

Date : 2004/2/11 PM 10:23:4 U3.15

File :

Operator :

GEORGE KUO

EUT :

IPC

Model No.

IPC-610HB-252L

Remarks

MODE:4 TEMP:26 HUMID:51

Urms = 230.1V Freq = 49.987 Range: 2 A
Irms = 0.339A Ipk = 0.807A cf = 2.380
P = 57.92W Pap = 77.98VA pf = 0.743

Test - Time : 1 x 10min = 10min (100 %)

LIN (Line Impedance Network) : SLIN 0.24ohm +j0.15ohm N:0.16ohm +j0.10ohm

Limits : Plt : 0.65 Pst : 1.00
dmax : 4.00 % dc : 3.30 %
dtlim: 3.30 % dt>Lim: 500ns

Test completed, Result: PASSED

Plt = 0.072

	Pst	dmax	dc	dt>Lim	Fail
		[%]	[%]	[ns]	
1	0.072	0.000	0.000	0.000	

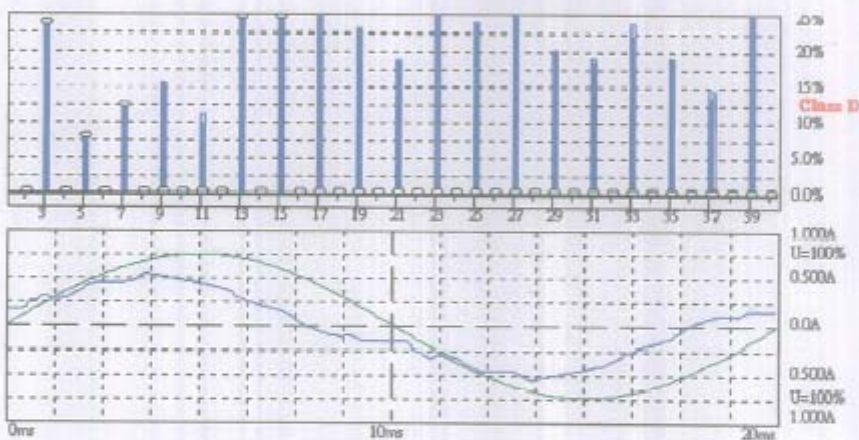


Mode 5

Harmonic Emission - IEC 61000-3-2, EN 61000-3-2, (EN60555-2)

Comply: IEC 61000-3-2 Ed.2.1 :2001 (incl. Amd.14) - IEC 61000-4-7 Ed.1.0 :1991

ADVANTECH

HARCS Setup File: unnamed
HARCS Report File: unnamedOperator : GEORGE KUO
EUT : IPC
Model No. IPC-610MB-302L
Remarks MODE:5 TEMP:26 HUMD:51

Harmonic Emission - IEC 61000-3-2, EN 61000-3-2, (EN60555-2)

2004/2/11 PM 10:48:1

Ume = 230.1 V	P = 61.82 W	THC = 0.054 A	Range: 1 A
Ims = 0.319 A	pf = 0.841	Pmax = 62.36 W	Vacm: 230 V
IPC			Test Time: 5 min (100%)

MODE:5 TEMP:26 HUMD:51

HAR-1000 EMC-4000

Full Bar : Actual Values
Empty Bar : Maximum Values
Blue : Current , Green : Voltage , Red : Failed

Measurement

ADVANTECH

Date : 2004/2/11 PM 10:48:1 V3.15

File :

Operator : GEORGE KUO
EUT : IPC
Model No. IPC-610MB-302L
Remarks MODE:5 TEMP:26 HUMD:51



Urms = 230.1V Freq = 49.987 Range: 1 A
Irms = 0.319A Ipk = 0.552A cf = 1.728
P = 61.82W Pap = 73.48VA pf = 0.841
THDi = 17.0 % THDu = 0.10 % Class D

Test - Time : 5min (100 %)

Limit Reference: Pmax = 62.355W

Test completed, Result: PASSED

Order	Freq. [Hz]	I _{max} [A]	I _{max} % [%]	I _{max} L [%]	Limit [A]	Status
1	50	0.3168	99.197			
2	100	0.0008	0.2485			
3	150	0.0497	15.577	23.463	0.2120	
4	200	0.0001	0.0191			
5	250	0.0092	2.8861	7.7791	0.1185	
6	300	0.0001	0.0191			
7	350	0.0076	2.3891	12.235	0.0624	
8	400	0.0001	0.0382			
9	450	0.0048	1.4908	15.270	0.0312	
10	500	0.0002	0.0573			
11	550	0.0024	0.7454	10.907	0.0218	
12	600	0.0002	0.0765			
13	650	0.0143	4.4916	77.671	0.0185	
14	700	0.0002	0.0573			
15	750	0.0079	2.4656	49.196	0.0160	
16	800	0.0002	0.0573			
17	850	0.0048	1.5099	34.145	0.0141	
18	900	0.0001	0.0382			
19	950	0.0029	0.8983	22.704	0.0126	
20	1000	0.0001	0.0382			
21	1050	0.0021	0.6690	18.687	0.0114	
22	1100	0.0001	0.0382			
23	1150	0.0035	1.1086	33.916	0.0104	
24	1200	0.0001	0.0382			
25	1250	0.0023	0.7072	23.517	0.0096	
26	1300	0.0001	0.0382			
27	1350	0.0026	0.8028	28.831	0.0089	
28	1400	0.0001	0.0382			
29	1450	0.0016	0.5161	19.907	0.0083	
30	1500	0.0001	0.0191			
31	1550	0.0015	0.4587	18.916	0.0077	
32	1600	0.0001	0.0191			
33	1650	0.0017	0.5352	23.492	0.0073	
34	1700	0.0001	0.0191			
35	1750	0.0013	0.4014	18.687	0.0069	
36	1800	0.0001	0.0191			
37	1850	0.0009	0.2867	14.110	0.0065	
38	1900	0.0001	0.0382			
39	1950	0.0021	0.6690	34.704	0.0062	
40	2000	0.0002	0.0573			

Important:

Pmax is below 75W. This seems not to be a class D equipment.



ADVANTECH

Date : 2004/2/11 PM 11:00:1 U3.15

File :

Operator :

GEORGE KUO

EUT :

IPC

Model No.

IPC-610MB-302L

Remarks

MODE:5 TEMP:26 HUMD:51

Urms = 230.1V Freq = 49.987 Range: 1 A
Irms = 0.319A Ipk = 0.549A cf = 1.721
P = 61.67W Pap = 73.37VA pf = 0.841

Test - Time : 1 x 10min = 10min (100 %)

LIN (Line Impedance Network) : SLIN 0.24ohm +j0.15ohm N:0.16ohm +j0.10ohm

Limits : Plt : 0.65 Pst : 1.00
dmax : 4.00 % dc : 3.30 %
dtLin: 3.30 % dt>Lim: 500ns

Test completed, Result: PASSED

Plt = 0.072

	Pst	dmax	dc	dt>Lim	Fail
		[%]	[%]	[ms]	
1	0.072	0.000	0.000	0.000	



ADVANTECH

Date : 2004/2/11 PM 11:11:4 U3.15

File :

Operator :

GEORGE KUO

EUT :

IPC

Model No.

IPC-610MB-302L

Remarks

MODE:5 TEMP:26 HUMID:51

Urms = 230.1V Freq = 49.987 Range: 1 A
Irms = 0.319A Ipk = 0.552A cf = 1.730
P = 61.70W Pap = 73.370A pf = 0.841

Test - Time : 1 x 10min = 10min (100 %)

LIN (Line Impedance Network) : SLIN 0.24ohm +j0.15ohm N:0.16ohm +j0.10ohm

Limits : Plt : 0.65 Pst : 1.00
dmax : 4.00 % dc : 3.30 %
dtLim: 3.30 % dt>Lim: 500ns

Test completed, Result: PASSED

Plt = 0.072

	Pst	dmax	dc	dt>Lim	Fail
		[%]	[%]	[ms]	
1	0.072	0.000	0.010	0.000	



Mode 7

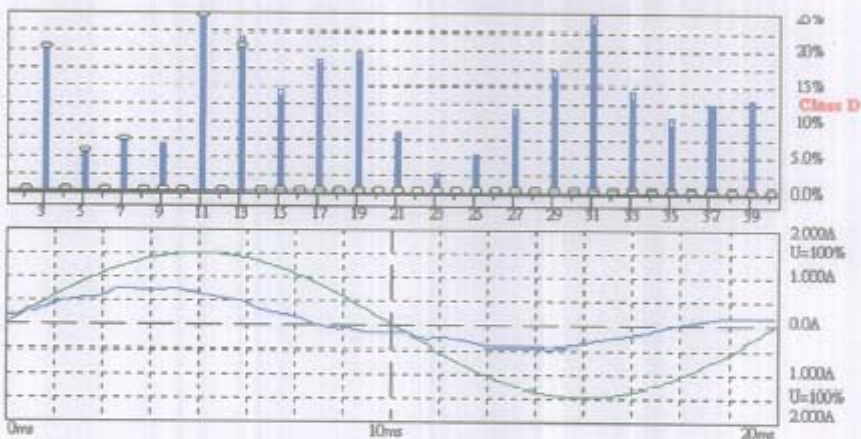
Harmonic Emission - IEC 61000-3-2, EN 61000-3-2, (EN60555-2)

Comply: IEC 61000-3-2 Ed.2.1 :2001 (incl. Amd.14) - IEC 61000-4-7 Ed.1.0 :1991

ADVANTECH

HARCS Setup File : unnamed
HARCS Report File : unnamed

Operator : GEORGE KUO
EUT : IPC
Model No. IPC-610BP-30ZH
Remarks MODE:7 TEMP:26 HUMD:51



Harmonic Emission - IEC 61000-3-2, EN 61000-3-2, (EN60555-2)

2004/2/11 PM 09:21:4

Ums = 230.1 V P = 96.21 W TFC = 0.069 A Range: 2A
Ims = 0.473 A pf = 0.885 Pmax = 97.08 W Vnom: 230 V
TestTime: 5 min (100%)

IPC

Test completed, Result: PASSED

MODE:7 TEMP:26 HUMD:51

B40130209-E

Full Bar : Actual Values
Empty Bar : Maximum Values
Blue : Current , Green : Voltage , Red : Failed

Measurement

ADVANTECH

Date : 2004/2/11 PM 09:21:4 V3.15

File :

Operator : GEORGE KUO
EUT : IPC
Model No. IPC-610BP-30ZH
Remarks MODE:7 TEMP:26 HUMD:51



Urms = 230.1V Freq = 49.987 Range: 2 A
Irms = 0.473A Ipk = 1.023A cf = 2.165
P = 96.21W Pap = 108.8VA pf = 0.885
THDi = 15.2 % THDu = 0.10 % Class D

Test - Time : 5min (100 %)

Limit Reference: Pmax = 97.084W

Test completed, Result: PASSED

Order	Freq. [Hz]	I _{max} [A]	I _{max} % [%]	I _{max} %L [%]	Limit [A]	Status
1	50	0.4500	95.196			
2	100	0.0032	0.6715			
3	150	0.0663	14.024	20.081	0.3301	
4	200	0.0005	0.1033			
5	250	0.0103	2.1694	5.5589	0.1845	
6	300	0.0005	0.1033			
7	350	0.0071	1.4979	7.2927	0.0971	
8	400	0.0013	0.2841			
9	450	0.0032	0.6715	6.5383	0.0485	
10	500	0.0016	0.3357			
11	550	0.0098	2.0661	28.740	0.0340	
12	600	0.0018	0.3874			
13	650	0.0062	1.3171	21.653	0.0288	
14	700	0.0021	0.4390			
15	750	0.0035	0.7490	14.207	0.0249	
16	800	0.0016	0.3357			
17	850	0.0040	0.8523	18.322	0.0220	
18	900	0.0015	0.3099			
19	950	0.0038	0.8006	19.236	0.0197	
20	1000	0.0012	0.2583			
21	1050	0.0015	0.3099	8.2300	0.0178	
22	1100	0.0010	0.2066			
23	1150	0.0004	0.0775	2.2535	0.0163	
24	1200	0.0005	0.1033			
25	1250	0.0007	0.1550	4.8988	0.0150	
26	1300	0.0005	0.1033			
27	1350	0.0016	0.3357	11.463	0.0138	
28	1400	0.0007	0.1550			
29	1450	0.0022	0.4649	17.048	0.0129	
30	1500	0.0007	0.1550			
31	1550	0.0029	0.6198	24.298	0.0121	
32	1600	0.0006	0.1291			
33	1650	0.0016	0.3357	14.011	0.0113	
34	1700	0.0005	0.1033			
35	1750	0.0011	0.2324	10.288	0.0107	
36	1800	0.0006	0.1291			
37	1850	0.0012	0.2583	12.084	0.0101	
38	1900	0.0005	0.1033			
39	1950	0.0012	0.2583	12.737	0.0096	
40	2000	0.0005	0.1033			



ADVANTECH

Date : 2004/2/11 PM 08:57:10 V3.15

File :

Operator :

GEORGE KUO

EUT :

IPC

Model No.

IPC-610BP-302H

Remarks

MODE:7 TEMP:26 HUMID:55

Urms = 230.1V Freq = 49.987 Range: 2 A
Irms = 0.477A Ipk = 1.027A cF = 2.156
P = 92.92W Pap = 109.7VA pF = 0.847

Test - Time : 1 x 10min = 10min (100 %)

LIN (Line Impedance Network) : SLIN 0.24ohm +j0.15ohm N:0.16ohm +j0.10ohm

Limits : Plt : 0.65 Pst : 1.00
dmax : 4.00 % dc : 3.30 %
dtLin: 3.30 % dt>Lim: 500ms

Test completed, Result: PASSED

Plt = 0.107

	Pst	dmax	dc	dt>Lim	Fail
		[%]	[%]	[ms]	
1	0.107	0.000	0.100	0.000	



ADVANTECH

Date : 2004/2/11 PM 09:10:1 U3.15

File :

Operator :

GEORGE KUO

EUT :

IPC

Model No.

IPC-6100P-302H

Remarks

MODE:7 TEMP:26 HUMID:55

Urms = 230.1V Freq = 49.987 Range: 2 A
Irms = 0.475A Ipk = 1.022A cf = 2.154
P = 96.70W Pap = 109.20A pf = 0.885

Test - Time : 1 x 10min = 10min (100 %)

LIN (Line Impedance Network) : SLIN 0.24ohm +j0.15ohm N:0.16ohm +j0.10ohm

Limits : Plt : 0.05 Pst : 1.00
dmax : 4.00 % dc : 0.30 %
dtLin: 0.30 % dt>Lin: 500ms

Test completed, Result: PASSED

Plt = 0.107

	Pst	dmax	dc	dt>Lin	Fail
		[%]	[%]	[ms]	
1	0.107	0.000	0.100	0.000	