



CE EMC TEST REPORT

REPORT NO.: CE930902L09

MODEL NO.: UNO-3062

SERIES MODEL NO.: UNO-3TUV-WXYZ, UNO-3TUVmn-WXYZ
(Refer to page 8 for more details.)

RECEIVED: Sep. 02, 2004

TESTED: Sep. 06 ~ Sep. 08, 2004

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Table of Contents

1	CERTIFICATION	5
2	SUMMARY OF TEST RESULTS	6
3	GENERAL INFORMATION	8
3.1	GENERAL DESCRIPTION OF EUT	8
3.2	GENERAL DESCRIPTION OF APPLIED STANDARDS	10
3.3	DESCRIPTION OF SUPPORT UNITS	11
3.4	CONFIGURATION OF SYSTEM UNDER TEST	13
4	EMISSION TEST	14
4.1	CONDUCTED EMISSION MEASUREMENT	14
4.1.1	LIMITS OF CONDUCTED EMISSION MEASUREMENT	14
4.1.2	TEST INSTRUMENTS	14
4.1.3	TEST PROCEDURE	15
4.1.4	DEVIATION FROM TEST STANDARD	15
4.1.5	TEST SETUP	15
4.1.6	EUT OPERATING CONDITIONS	16
4.1.7	TEST RESULTS (A)	17
4.1.8	TEST RESULTS (B)	19
4.2	RADIATED EMISSION MEASUREMENT	21
4.2.1	LIMITS OF RADIATED EMISSION MEASUREMENT	21
4.2.2	TEST INSTRUMENTS	22
4.2.3	TEST PROCEDURE	23
4.2.4	DEVIATION FROM TEST STANDARD	23
4.2.5	TEST SETUP	24
4.2.6	EUT OPERATING CONDITIONS	24
4.2.7	TEST RESULTS (A)	25
4.2.8	TEST RESULTS (B)	26
4.3	HARMONICS CURRENT MEASUREMENT	27
4.3.1	LIMITS OF HARMONICS CURRENT MEASUREMENT	27
4.3.2	TEST INSTRUMENTS	27
4.3.3	TEST PROCEDURE	28
4.3.4	DEVIATION FROM TEST STANDARD	28
4.3.5	TEST SETUP	28
4.3.6	EUT OPERATING CONDITIONS	29



4.3.7	TEST RESULTS	30
4.4	LIMITS OF VOLTAGE FLUCTUATION AND FLICKS MEASUREMENT.....	31
4.4.1	TEST INSTRUMENTS	31
4.4.2	TEST PROCEDURE	31
4.4.3	DEVIATION FROM TEST STANDARD	32
4.4.4	TEST SETUP	32
4.4.5	EUT OPERATING CONDITIONS.....	32
4.4.6	TEST RESULTS	33
5	IMMUNITY TEST.....	34
5.1	GENERAL DESCRIPTION.....	34
5.2	GENERAL PERFORMANCE CRITERIA DESCRIPTION	35
5.3	EUT OPERATING CONDITION	35
5.4	ELECTROSTATIC DISCHARGE IMMUNITY TEST (ESD)	36
5.4.1	TEST SPECIFICATION.....	36
5.4.2	TEST INSTRUMENTS	36
5.4.3	TEST PROCEDURE	37
5.4.4	DEVIATION FROM TEST STANDARD	38
5.4.5	TEST SETUP	38
5.4.6	TEST RESULTS	39
5.5	RADIATED, RADIO-FREQUENCY, ELECTROMAGNETIC FIELD IMMUNITY TEST (RS).....	41
5.5.1	TEST SPECIFICATION.....	41
5.5.2	TEST INSTRUMENTS	41
5.5.3	TEST PROCEDURE	42
5.5.4	DEVIATION FROM TEST STANDARD	42
5.5.5	TEST SETUP	43
5.5.6	TEST RESULTS	44
5.6	ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST (EFT).....	45
5.6.1	TEST SPECIFICATION.....	45
5.6.2	TEST INSTRUMENTS	45
5.6.3	TEST PROCEDURE	45
5.6.4	DEVIATION FROM TEST STANDARD	45
5.6.5	TEST SETUP	46
5.6.6	TEST RESULTS	47
5.7	SURGE IMMUNITY TEST.....	48



5.7.1	TEST SPECIFICATION.....	48
5.7.2	TEST INSTRUMENTS	48
5.7.3	TEST PROCEDURE	49
5.7.4	DEVIATION FROM TEST STANDARD	49
5.7.5	TEST SETUP	49
5.7.6	TEST RESULTS	50
5.8	IMMUNITY TO CONDUCTED DISTURBANCES INDUCED BY RF FIELDS (CS)...	51
5.8.1	TEST SPECIFICATION.....	51
5.8.2	TEST INSTRUMENTS	51
5.8.3	TEST PROCEDURE	52
5.8.4	DEVIATION FROM TEST STANDARD	52
5.8.5	TEST SETUP	53
5.8.6	TEST RESULTS	54
5.9	POWER FREQUENCY MAGNETIC FIELD IMMUNITY TEST	55
5.9.1	TEST SPECIFICATION.....	55
5.9.2	TEST INSTRUMENTS	55
5.9.3	TEST PROCEDURE	55
5.9.4	DEVIATION FROM TEST STANDARD	56
5.9.5	TEST SETUP	56
5.9.6	TEST RESULTS	57
5.10	VOLTAGE DIP/SHORT INTERRUPTIONS/VOLTAGE VARIATIONS (DIP) IMMUNITY TEST	58
5.10.1	TEST SPECIFICATION.....	58
5.10.2	TEST INSTRUMENTS	58
5.10.3	TEST PROCEDURE	58
5.10.4	DEVIATION FROM TEST STANDARD	58
5.10.5	TEST SETUP	59
5.10.6	TEST RESULTS	60
6	PHOTOGRAPHS OF THE TEST CONFIGURATION	61
7	APPENDIX - INFORMATION ON THE TESTING LABORATORIES	68



1 CERTIFICATION

PRODUCT: IPC with Certified Power
BRAND NAME: Advantech
MODEL NO: UNO-3062
SERIES MODEL: UNO-3TUV-WXYZ, UNO-3TUVmn-WXYZ

(Refer to page 8 for more details.)

APPLICANT: ADVANTECH CO., LTD
TESTED: Sep. 06 ~ Sep. 08, 2004
TEST ITEM: ENGINEERING SAMPLE

STANDARDS: EN 61000-6-4:2001	EN 61000-6-2:2001
CISPR 11:1999	IEC 61000-4-2:2001
EN 61000-3-2:2000, Class D	IEC 61000-4-3:2002+A1:2002
EN 61000-3-3:1995+A1:2001	IEC 61000-4-4:1995+A1:2000 +A2:2001
	IEC 61000-4-5:2001
	IEC 61000-4-6:2001
	IEC 61000-4-8:2001
	IEC 61000-4-11:2001

The above equipment (model: UNO-3062) have been tested by **Advance Data Technology Corporation**, and found compliance with the requirement of the above standards. The test record, data evaluation and Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions herein specified.

PREPARED BY : Suntee Liu , **DATE:** Sep. 13, 2004
(Suntee Liu)

TECHNICAL ACCEPTANCE : Mart Su , **DATE:** Sep. 13, 2004
Responsible for EMI (Mart Su)

TECHNICAL ACCEPTANCE : Clark Lin , **DATE:** Sep. 13, 2004
Responsible for EMS (Clark Lin)

APPROVED BY : Ken Lu , **DATE:** Sep. 13, 2004
(Ken Lu / Manager)

Note: The power consumption of EUT is 31 W, which is less than 75W and no limits apply. Therefore it is deemed to comply with EN 61000-3-2 without any testing.

2 SUMMARY OF TEST RESULTS

After estimating all the combination of every test mode, the result shown as below is the worst case.

The EUT has been tested according to the following specifications:

EMISSION			
Standard	Test Type	Result	Remarks
EN 61000-6-4:2001 CISPR 11:1999	Conducted Test	PASS	Meets Limit Minimum passing margin is -23.10 dB at 1.648 MHz
	Radiated Test	PASS	Meets Limit Minimum passing margin is -2.13 dB at 467.77 MHz
EN 61000-3-2:2000, Class D	Harmonic current emissions	PASS	Meets Class D Limit.
EN 61000-3-3:1995 +A1:2001	Voltage fluctuations & flicker	PASS	Meets the requirements.

IMMUNITY (EN 61000-6-2:2001)			
Standard	Test Type	Result	Remarks
IEC 61000-4-2:2001	Electrostatic discharge immunity test	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-3:2002 +A1:2002	Radiated, radio-frequency, electromagnetic field immunity test	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-4:1995 +A1:2000+A2:2001	Electrical fast transient / burst immunity test.	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-5:2001	Surge immunity test	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-6:2001	Immunity to conducted disturbances, induced by radio-frequency fields	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-8: 2001	Power frequency magnetic field immunity test.	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-11:2001 (for EN 61000-6-2)	Voltage dips, short interruptions and voltage variations immunity tests	PASS	<p>Voltage Dips:</p> <ul style="list-style-type: none"> i) 30% reduction -0.5 period, Performance Criterion A ii) 60% reduction – 5 period, Performance Criterion A iii) 60% reduction – 50 period, Performance Criterion A <p>Voltage Interruptions:</p> <ul style="list-style-type: none"> iv) >95% reduction – 250 period, Performance Criterion B
IEC 61000-4-11:2001 (for EN 55024)	Voltage dips, short interruptions and voltage variations immunity tests	PASS	<p>Meets the requirements of</p> <p>Voltage Dips:</p> <ul style="list-style-type: none"> 1. >95% reduction - Performance Criterion A 2. 30% reduction – Performance Criterion A <p>Voltage Interruptions:</p> <ul style="list-style-type: none"> 1. >95% reduction – Performance Criterion C



3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	IPC with Certified Power
MODEL NO.	UNO-3062
SERIES MODEL NO.	UNO-3TUV-WXYZ, UNO-3TUVmn-WXYZ
POWER SUPPLY	230 Vac

NOTE:

- The series models are identical to main model. The letters of series models are defined as below.

Model	Definition	
UNO-3TUV-WXYZ	T: Housing form factor	0 = 4U
	U: CPU grade	1 = RISC CPU 4 = 486 CPU 5 = Pentium CPU 6 = Pentium III CPU
	V: Highlighted function	2 = 2 PCI slots 4 = 4 PCI slots
	W: Hardware specification	J = Celeron-400 CPU + 256MB RAM K = Celeron-400 CPU + 512MB RAM L = Celeron-650 CPU + 256MB RAM M = Celeron-650 CPU + 512MB RAM
	X: CompactFlash card size	D = 32MB or N/A for pure hardware version E = 64MB F = 128MB G = 256MB
	Y: hardware type	G = 256MB B = Standard hardware w/o case
	Z: product revision no.	0 = 1st version hardware 1 = 2nd version hardware

UNO-3TUVmn-WXYZ	T: Housing form factor	0 = 4U
	U: CPU grade	1 = RISC CPU 4 = 486 CPU 5 = Pentium CPU 6 = Pentium III CPU
	V: Highlighted function	2 = 2 PCI slots 4 = 4 PCI slots
	mn: OS type	CE = Windows CE .NET XP = XP Embedded LX = Linux
	W: Hardware specification	J = Celeron-400 CPU+256MB SDRAM K = Celeron-400 CPU+512MB SDRAM L = Celeron-650 CPU+256MB SDRAM M = Celeron-650 CPU+512MB SDRAM
	X: CompactFlash card size	D = 32MB E = 64MB F = 128MB G = 256MB
	Y: OS language type	A = Standard English version T = Traditional Chinese version C = Simplified Chinese version J = Japanese version G = German version
Z: product revision no.		

2. There are 2 CPUs which are 400 and 650. The test data are presented in the report as below.

Conducted & Radiated Emission Measurement	
Test Results	CPU
A	400
B	650

3. For immunity measurement, the worst case has been found at CPU 400 after pre-testing. Therefore only the test data are presented in the report.
4. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.



3.2 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is according to the specifications of the manufacturers, must comply with the requirements of the following standards:

EN 61000-6-4:2001

CISPR 11:1999

EN 61000-3-2: 2000, Class D

EN 61000-3-3: 1995+A1: 2001

EN 61000-6-2:2001

IEC 61000-4-2:2001

IEC 61000-4-3:2002+A1:2002

IEC 61000-4-4:1995+A1:2000+A2: 2001

IEC 61000-4-5:2001

IEC 61000-4-6:2001

IEC 61000-4-8:2001

IEC 61000-4-11:2001

All tests have been performed and recorded as per the above standards.



3.3 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

For Emission Test

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK	DELL	PP05L	DPBCB1S	E2K24CLNS
2	NOTEBOOK	Dell	PP01L	TW-09c748-12800-165-3171	FCC DoC Approved
3	LCD MONITOR	ACER	AL1721	ET.L0408.0104040 0202PK00	FCC DoC Approved
4	FIREWIRE HARD DRIVE	Terasys	F12-UF	A0100215-42H010	FCC DoC Approved
5	FIREWIRE HARD DRIVE	Terasys	F12-UF	A0100215-3A80014	FCC DoC Approved
6	FIREWIRE HARD DRIVE	Terasys	F12-UF	A0100215-42H004	FCC DoC Approved
7	FIREWIRE HARD DRIVE	Terasys	F12-UF	A0100215-3A80012	FCC DoC Approved
8	MODEM	ACEEX	1414V/3	0401008276	IFAXDM1414
9	MODEM	ACEEX	1414V/3	0401008270	IFAXDM1414
10	MODEM	ACEEX	1414V/3	0401008273	IFAXDM1414
11	KEYBOARD	HP	SK-1688	C0306114690	GYUR84SK
12	MOUSE	HP	M-S69	N/A	INZ211443

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	NA
3	1.8 m shielded cable
4	NA
5	NA
6	NA
7	NA
8	1.2 m shielded cable
9	1.2 m shielded cable
10	1.2 m shielded cable
11	1.3 m shielded cable
12	1.8 m shielded cable

NOTE: 1. All power cords of the above support units are non-shielded (1.8m).
 2. Item 1~2 acted as communication partners to transfer data.



For Harmonics / Flicker / Immunity Test

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	LCD MONITOR	CTX	S700	051-32600054	FCC DoC Approved
2	FIREWIRE HARD DRIVE	Terasys	F12-UF	A0100215-34P0025	FCC DoC Approved
3	FIREWIRE HARD DRIVE	Terasys	F12-UF	A0100215-3A80008	FCC DoC Approved
4	FIREWIRE HARD DRIVE	Terasys	F12-UF	A0100215-3A80013	FCC DoC Approved
5	FIREWIRE HARD DRIVE	Terasys	F12-UF	A0100215-42H012	FCC DoC Approved
6	MODEM	ACEEX	1414V/3	0401008249	IFAXDM1414
7	MODEM	ACEEX	1414V/3	0401008253	IFAXDM1414
8	MODEM	ACEEX	1414V/3	0401008257	IFAXDM1414
9	PS/2 MOUSE	BTC	M851	G00347024168	E5XMSM860
10	PS/2 KEYBOARD	BTC	5200T	F24800410	E5XKB5122WTH0110
11	NOTEBOOK COMPUTER	DELL	PP05L	3616274224	E2K24CLNS
12	NOTEBOOK COMPUTER	DELL	PP05L	42737890096	E2K24CLNS

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	1.5 m shielded cable
2	NA
3	NA
4	NA
5	NA
6	1.2 m shielded cable
7	1.2 m shielded cable
8	1.2 m shielded cable
9	1.8 m shielded cable
10	1.3 m shielded cable
11	NA
12	NA

NOTE: 1. All power cords of the above support units are non-shielded (1.8m).
 2. Item 11~12 acted as communication partners to transfer data.



4 EMISSION TEST

4.1 CONDUCTED EMISSION MEASUREMENT

4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY (MHz)	Quasi-peak (dBuV)	Average (dBuV)
0.15 - 0.5	79	66
0.50 - 5.0	73	60
5.0 - 30.0	73	60

- NOTE:** (1) The lower limit shall apply at the transition frequencies.
(2) The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESCS30	100288	Dec. 11, 2004
RF signal cable Woken	5D-FB	Cable-HyC02-01	Mar. 07, 2005
LISN ROHDE & SCHWARZ	ESH2-Z5	100100	Mar. 10, 2005
LISN ROHDE & SCHWARZ	ESH3-Z5	100311	Mar. 04, 2005
Software ADT	ADT_Cond_V3	NA	NA

- NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Shielded Room 2.
3. The VCCI Site Registration No. is C-2047.

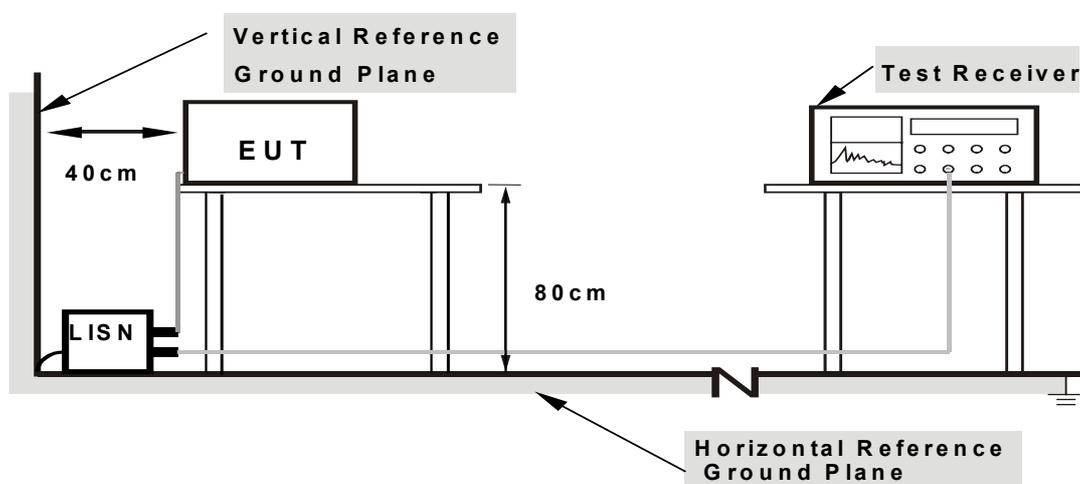
4.1.3 TEST PROCEDURE

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit – 20dB) were not recorded.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation.

4.1.5 TEST SETUP



- Note:**
1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.



4.1.6 EUT OPERATING CONDITIONS

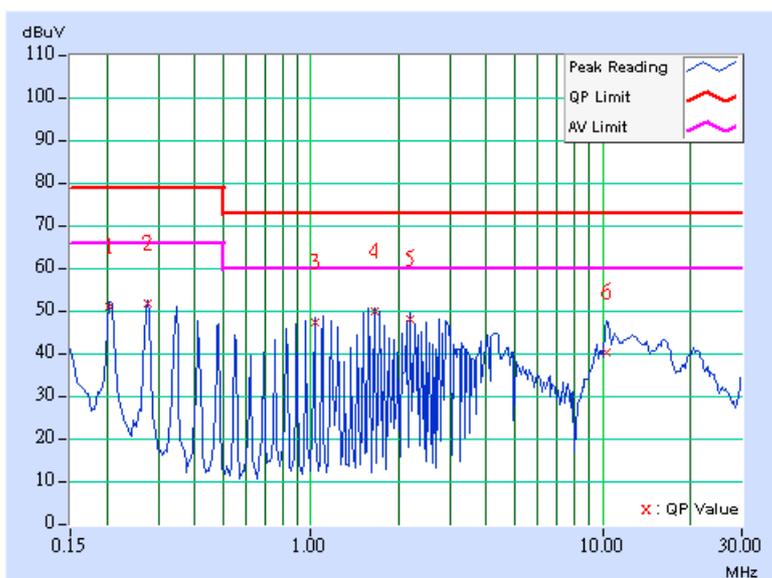
- a. The EUT read and wrote messages from/to and HDD.
- b. Prepared other notebook systems to act as communication partners and placed them outside of testing area.
- c. The communication partner ran a test program (provided by manufacturer) to transmit and receive data from EUT.

4.1.7 TEST RESULTS (A)

EUT	IPC with Certified Power	MODEL NO.	UNO-3062
INPUT POWER	230 Vac, 50 Hz	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	25 deg. C, 72% RH, 991 hPa	PHASE	Line (L)
TESTED BY	Kevin Chen		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.205	0.10	50.62	-	50.72	-	79.00	66.00	-28.28	-
2	0.275	0.11	51.17	-	51.28	-	79.00	66.00	-27.72	-
3	1.031	0.25	46.85	-	47.10	-	73.00	60.00	-25.90	-
4	1.648	0.26	49.50	-	49.76	-	73.00	60.00	-23.24	-
5	2.195	0.27	47.68	-	47.95	-	73.00	60.00	-25.05	-
6	10.302	0.54	39.85	-	40.39	-	73.00	60.00	-32.61	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.

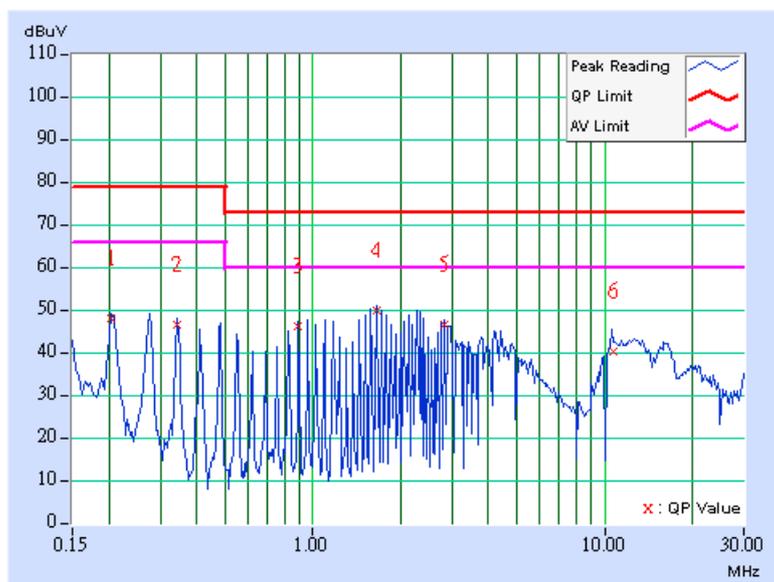




EUT	IPC with Certified Power	MODEL NO.	UNO-3062
INPUT POWER	230 Vac, 50 Hz	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	25 deg. C, 72% RH, 991 hPa	PHASE	Neutral (N)
TESTED BY	Kevin Chen		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.205	0.10	47.60	-	47.70	-	79.00	66.00	-31.30	-
2	0.341	0.11	46.21	-	46.32	-	79.00	66.00	-32.68	-
3	0.892	0.21	45.63	-	45.84	-	73.00	60.00	-27.16	-
4	1.648	0.25	49.65	-	49.90	-	73.00	60.00	-23.10	-
5	2.816	0.27	46.22	-	46.49	-	73.00	60.00	-26.51	-
6	10.667	0.50	39.89	-	40.39	-	73.00	60.00	-32.61	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.

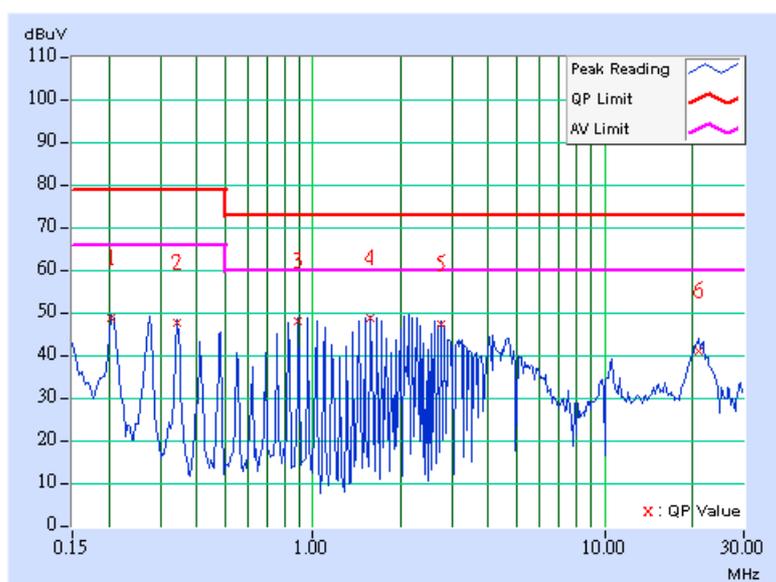


4.1.8 TEST RESULTS (B)

EUT	IPC with Certified Power	MODEL NO.	UNO-3062
INPUT POWER	230 Vac, 50 Hz	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	25 deg. C, 72% RH, 991 hPa	PHASE	Line (L)
TESTED BY	Kevin Chen		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.205	0.10	48.09	-	48.19	-	79.00	66.00	-30.81	-
2	0.341	0.11	46.67	-	46.78	-	79.00	66.00	-32.22	-
3	0.892	0.22	47.12	-	47.34	-	73.00	60.00	-25.66	-
4	1.578	0.26	47.97	-	48.23	-	73.00	60.00	-24.77	-
5	2.746	0.28	46.53	-	46.81	-	73.00	60.00	-26.19	-
6	21.037	0.97	40.14	-	41.11	-	73.00	60.00	-31.89	-

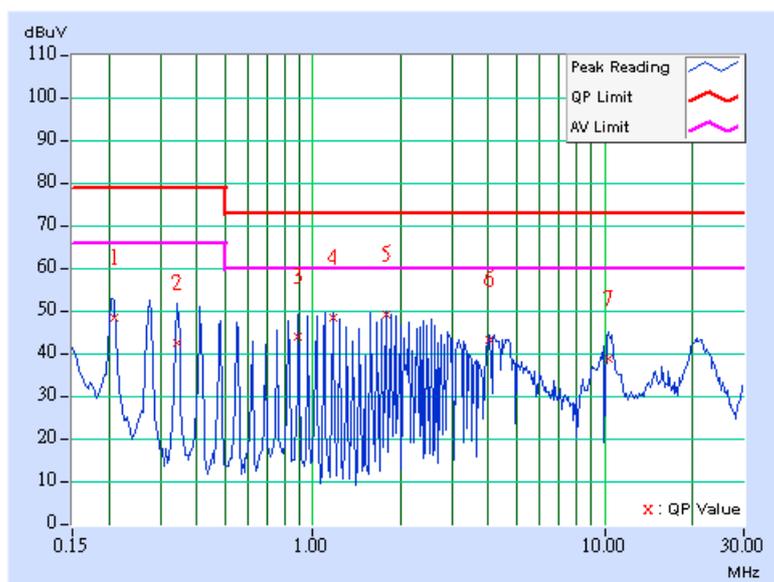
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.



EUT	IPC with Certified Power	MODEL NO.	UNO-3062
INPUT POWER	230 Vac, 50 Hz	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	25 deg. C, 72% RH, 991 hPa	PHASE	Neutral (N)
TESTED BY	Kevin Chen		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.209	0.10	48.05	-	48.15	-	79.00	66.00	-30.85	-
2	0.341	0.11	41.99	-	42.10	-	79.00	66.00	-36.90	-
3	0.892	0.21	43.60	-	43.81	-	73.00	60.00	-29.19	-
4	1.168	0.24	48.19	-	48.43	-	73.00	60.00	-24.57	-
5	1.785	0.25	48.60	-	48.85	-	73.00	60.00	-24.15	-
6	4.051	0.31	43.01	-	43.32	-	73.00	60.00	-29.68	-
7	10.297	0.49	38.43	-	38.92	-	73.00	60.00	-34.08	-

- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 3. The emission levels of other frequencies were very low against the limit.
 4. Margin value = Emission level - Limit value
 5. Correction factor = Insertion loss + Cable loss
 6. Emission Level = Correction Factor + Reading Value.





4.2 RADIATED EMISSION MEASUREMENT

4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

FREQUENCY (MHz)	dBuV/m (At 10m)
30 – 230	40
230 – 1000	47

- NOTE:** (1) The lower limit shall apply at the transition frequencies.
(2) Emission level (dBuV/m) = 20 log Emission level (uV/m).



4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESIB7	100186	Jan. 09, 2005
Test Receiver ROHDE & SCHWARZ	ESIB7	100187	Jan. 09, 2005
BILOG Antenna SCHWARZBECK	VULB9168	9168-148	Feb. 03, 2005
BILOG Antenna SCHWARZBECK	VULB9168	9168-149	Feb. 03, 2005
Preamplifier Agilent	8447D	2944A10636	Jan. 15, 2005
Preamplifier Agilent	8447D	2944A10637	Jan. 15, 2005
RF signal cable Woken	8D-FB	Cable-Hych1-01	Feb. 16, 2005
RF signal cable Woken	8D-FB	Cable-Hych1-02	Feb. 16, 2005
Software ADT	ADT_Radiated_V7	NA	NA
Antenna Tower HD Deisel GmbH	MA240	11030	NA
Antenna Tower HD Deisel GmbH	MA240	12030	NA
Turn Table HD Deisel GmbH	DS430	50303	NA
Controller HD Deisel GmbH	HD2000	18303	NA
Ferrite clamp	FC18	910068	NA
Ferrite clamp	FC18	910053	NA
Ferrite clamp	FC18	910035	NA
Ferrite clamp	FC18	910051	NA

NOTE: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Chamber 1.

3. The VCCI Site Registration No. is R-1893.

4. The IC Site Registration No. is IC4924-1.

4.2.3 TEST PROCEDURE

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. All cables leaving the tabletop, the EUT for a connection outside the test site (e.g. mains cables, telephone lines, connections to auxiliary equipment located outside the test area) has been fitted with ferrite clamp.
(For the Standard: EN 55022:1998+A1:2000 / CISPR 22:1997+A1:2000)

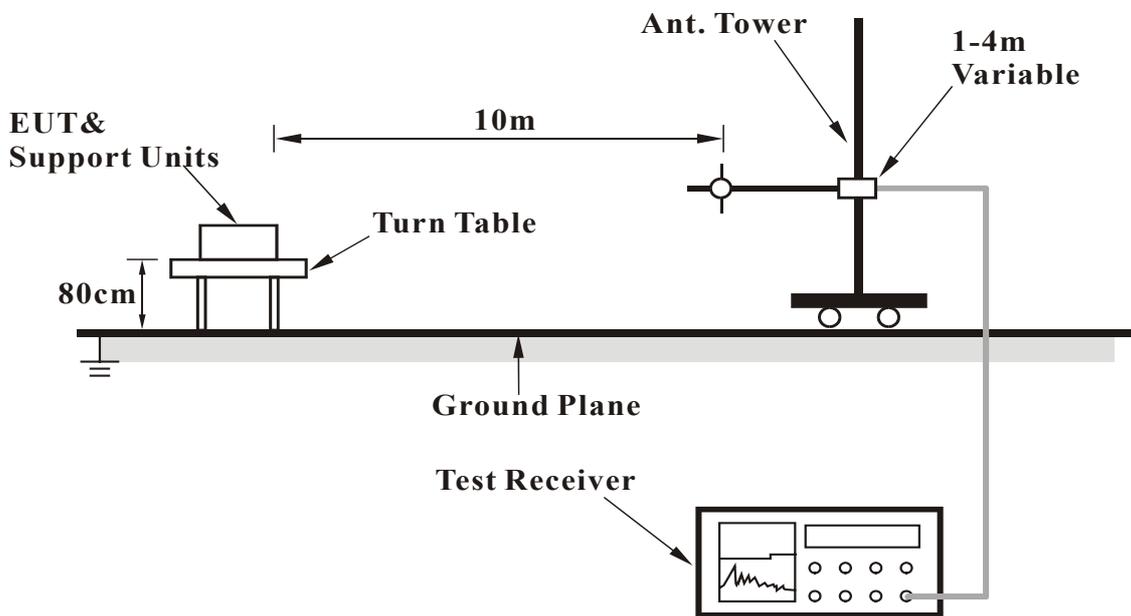
NOTE:

The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.2.6 EUT OPERATING CONDITIONS

Same as item 4.1.6.



4.2.7 TEST RESULTS (A)

EUT	IPC with Certified Power	MODEL NO.	UNO-3062
FREQUENCY RANGE	30 ~ 1000 MHz	INPUT POWER	230 Vac, 50 Hz
ENVIRONMENTAL CONDITIONS	24 deg. C, 70% RH, 991 hPa	DETECTOR FUNCTION	Quasi-Peak
TESTED BY	Simon Chen		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 10 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	166.13	31.92 QP	40.00	-8.08	3.97 H	329	18.53	13.38
2	201.16	37.35 QP	40.00	-2.65	4.00 H	35	26.67	10.68
3	242.02	36.26 QP	47.00	-10.74	2.99 H	14	23.51	12.74
4	354.90	35.49 QP	47.00	-11.51	2.79 H	304	19.44	16.06
5	399.66	33.75 QP	47.00	-13.25	2.65 H	276	16.57	17.18
6	467.77	44.87 QP	47.00	-2.13	2.87 H	359	26.01	18.86
7	498.91	43.36 QP	47.00	-3.64	2.45 H	350	23.93	19.43
8	531.99	37.26 QP	47.00	-9.74	2.13 H	262	17.11	20.15
9	602.05	35.08 QP	47.00	-11.92	2.54 H	153	13.05	22.03
10	699.36	36.77 QP	47.00	-10.23	1.12 H	270	13.30	23.47
11	802.50	35.31 QP	47.00	-11.69	1.03 H	204	10.36	24.95

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 10 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	99.96	33.32 QP	40.00	-6.68	1.02 V	246	23.43	9.89
2	133.04	37.47 QP	40.00	-2.53	1.78 V	303	25.06	12.41
3	166.13	33.14 QP	40.00	-6.86	1.89 V	278	19.90	13.24
4	201.16	34.74 QP	40.00	-5.26	1.47 V	324	24.19	10.54
5	298.46	28.20 QP	47.00	-18.80	1.79 V	142	13.93	14.27
6	399.66	27.92 QP	47.00	-19.08	2.31 V	114	11.01	16.91
7	432.74	34.81 QP	47.00	-12.19	1.64 V	7	16.92	17.90
8	465.82	38.84 QP	47.00	-8.16	1.78 V	311	20.24	18.60
9	500.85	36.89 QP	47.00	-10.11	1.45 V	348	17.77	19.12
10	565.08	37.20 QP	47.00	-9.80	3.56 V	112	16.64	20.57
11	598.16	32.51 QP	47.00	-14.49	2.85 V	104	11.00	21.51
12	699.36	33.84 QP	47.00	-13.16	1.12 V	125	10.91	22.93
13	798.61	35.71 QP	47.00	-11.29	3.21 V	106	11.20	24.51

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.

4.2.8 TEST RESULTS (B)

EUT	IPC with Certified Power	MODEL NO.	UNO-3062
FREQUENCY RANGE	30 ~ 1000 MHz	INPUT POWER	230 Vac, 50 Hz
ENVIRONMENTAL CONDITIONS	24 deg. C, 70% RH, 991 hPa	DETECTOR FUNCTION	Quasi-Peak
TESTED BY	Simon Chen		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 10 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	61.04	37.82 QP	40.00	-2.18	1.98 H	292	25.24	12.58
2	136.94	34.29 QP	40.00	-5.71	2.04 H	290	21.17	13.12
3	214.78	35.82 QP	40.00	-4.18	3.65 H	6	24.62	11.20
4	347.11	39.76 QP	47.00	-7.24	1.42 H	278	23.93	15.83
5	498.91	44.29 QP	47.00	-2.71	2.11 H	348	24.86	19.43
6	631.24	37.39 QP	47.00	-9.61	1.85 H	153	14.96	22.42
7	703.25	36.39 QP	47.00	-10.61	3.96 H	248	12.83	23.56

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 10 M

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	57.15	37.65 QP	40.00	-2.35	4.00 V	333	24.75	12.90
2	80.50	37.26 QP	40.00	-2.74	2.25 V	258	28.35	8.91
3	142.77	36.93 QP	40.00	-3.07	1.94 V	263	23.50	13.43
4	214.78	35.24 QP	40.00	-4.76	2.16 V	197	24.19	11.05
5	234.24	38.35 QP	47.00	-8.65	2.05 V	210	26.19	12.16
6	349.06	43.82 QP	47.00	-3.18	2.24 V	165	28.19	15.63
7	467.77	38.44 QP	47.00	-8.56	1.94 V	210	19.81	18.63
8	502.80	40.99 QP	47.00	-6.01	3.85 V	185	21.83	19.16
9	565.08	35.02 QP	47.00	-11.98	2.67 V	305	14.45	20.57
10	635.13	34.19 QP	47.00	-12.81	3.21 V	326	12.12	22.07
11	769.42	33.39 QP	47.00	-13.61	1.84 V	65	9.05	24.34

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
 2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.

4.3 HARMONICS CURRENT MEASUREMENT

4.3.1 LIMITS OF HARMONICS CURRENT MEASUREMENT

Limits for Class A equipment	
Harmonics Order n	Max. permissible harmonics current A
Odd harmonics	
3	2.30
5	1.14
7	0.77
9	0.40
11	0.33
13	0.21
15<=n<=39	0.15x15/n
Even harmonics	
2	1.08
4	0.43
6	0.30
8<=n<=40	0.23x8/n

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

- NOTE:** 1. Class A and Class D are classified according to item section 5 of EN 61000-3-2: 2000.
2. According to section 7 of EN 61000-3-2: 2000, the above limits for all equipment except for lighting equipment are for all applications having an active input power > 75 W and no limits apply for equipment with an active input power up to and including 75 W.

4.3.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Schaffner AC Power Source	NSG1007	55616	Dec. 21, 2004
Schaffner Signal Conditioning Unit- Lumped Impedance	CCN1000-1-LR1	72224	Dec. 21, 2004
Software	Shchaffner Win 2100V3	NA	NA

- NOTE:** 1. The test was performed in Hwa Ya EMS Room.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.3.3 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 maximum harmonic components under normal operating conditions for each successive harmonic component in turn.
- b. The classification of EUT is according to section 5 of EN 61000-3-2:2000.

The EUT is classified as follows:

Class A: Balanced three-phase equipment, Household appliances excluding equipment as Class D, Tools excluding portable tools, Dimmers for incandescent lamps, audio equipment, equipment not specified in one of the three other classes.

Class B: Portable tools.;Arc welding equipment which is not professional equipment

Class C: Lighting equipment.

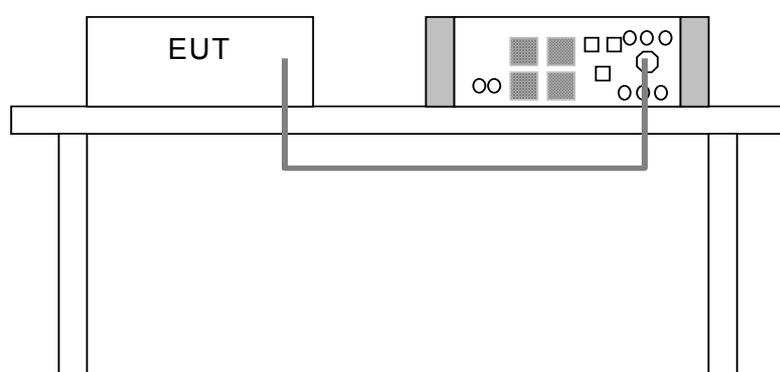
Class D: Equipment having a specified power less than or equal to 600 W of the following types: Personal computers and personal computer monitors and television receivers.

- c. 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.

4.3.4 DEVIATION FROM TEST STANDARD

No deviation.

4.3.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.



4.3.6 EUT OPERATING CONDITIONS

- a. The EUT read and wrote messages from/to and HDD.
- b. Prepared other notebook systems to act as communication partners and placed them outside of testing area.
- c. The communication partner ran a test program (provided by manufacturer) to transmit and receive data from EUT.

4.3.7 TEST RESULTS

EUT	IPC with Certified Power	MODEL	UNO-3062
FUNDAMENTAL VOLTAGE/AMPERE	230.23 Vrms 0.311 Arms	POWER FREQUENCY	50 Hz
RATED POWER CONSUMPTION	31 W	POWER FACTOR	0.440
ENVIRONMENTAL CONDITIONS	27 deg. C, 57% RH, 991 hPa	TESTED BY	Kalvin Chen

- NOTE:** 1. Limits are not specified for equipment with a rated power of 75 W or less (other than lighting equipment).
2. According to EN61000-3-2 the manufacturer shall specify the power of the apparatus. This value shall be used for establishing limits. The specified power shall be within +/-10% of the measured power.

4.4 LIMITS OF VOLTAGE FLUCTUATION AND FLICKS MEASUREMENT

TEST ITEM	LIMIT	NOTE
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 3.3 %.
d_{max} (%)	4%	d_{max} means maximum relative voltage change.
dc (%)	3.3%	dc means relative steady-state voltage change

4.4.1 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Schaffner AC Power Source	NSG1007	55616	Dec. 21, 2004
Schaffner Signal Conditioning Unit- Lumped Impedance	CCN1000-1-LR1	72224	Dec. 21, 2004
Software	Shchaffner Win 2100V3	NA	NA

- NOTE:** 1. The test was performed in Hwa Ya EMS Room.
 2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

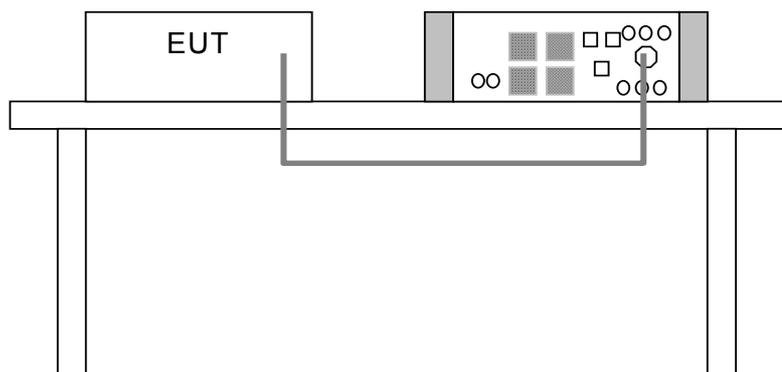
4.4.2 TEST PROCEDURE

- 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 10 minutes.

4.4.3 DEVIATION FROM TEST STANDARD

No deviation.

4.4.4 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.4.5 EUT OPERATING CONDITIONS

Same as item 4.3.6.

4.4.6 TEST RESULTS

EUT	IPC with Certified Power	MODEL	UNO-3062
FUNDAMENTAL VOLTAGE/AMPERE	230.17 Vrms 0.311 Arms	POWER FREQUENCY	50 Hz
OBSERVATION PERIOD (Tp)	10 min	POWER FACTOR	0.440
ENVIRONMENTAL CONDITIONS	27 deg. C, 57% RH, 991 hPa	TESTED BY	Kalvin Chen

TEST PARAMETER	MEASUREMENT VALUE	LIMIT	REMARKS
P_{st}	0.001	1.0	Pass
P_{lt}	0.001	0.65	Pass
$d(t)$ (%)	0	3.3%	Pass
d_{max} (%)	0	4%	Pass
dc (%)	0	3.3%	Pass

- NOTE:**
- (1) P_{st} means short-term flicker indicator.
 - (2) P_{lt} means long-term flicker indicator.
 - (3) $d(t)$ means maximum time that not exceeds 500 ms
 - (4) d_{max} means maximum relative voltage change.
 - (5) dc means relative steady-state voltage change.

5 IMMUNITY TEST

5.1 GENERAL DESCRIPTION

Generic Standard:	EN 61000-6-2:2001	
Basic Standard, specification requirement, and Performance Criteria:	IEC 61000-4-2	Electrostatic Discharge – ESD: 8kV air discharge, 4kV Contact discharge, Performance Criterion B
	IEC 61000-4-3	Radio-Frequency Electromagnetic Field Susceptibility Test – RS: 80-1000 MHz, 10V/m, 80% AM (1kHz), Performance Criterion A
	IEC 61000-4-4	Electrical Fast Transient/Burst - EFT, Power line: 2kV, Signal line: 1kV, Performance Criterion B
	IEC 61000-4-5	Surge Immunity Test: 1.2/50 us Open Circuit Voltage, 8/20 us Short Circuit Current, Power Line - line to line: 1 kV, line to earth: 2kV, Performance Criterion B
	IEC 61000-4-6	Conducted Radio Frequency Disturbances Test – CS: 0.15-80 MHz, 10Vrms, 80% AM, 1kHz, Performance Criterion A
	IEC 61000-4-8	Power Frequency Magnetic Field Test, 50 Hz, 30A/m, 60 Hz, 30 A/m, Performance Criterion A
	IEC 61000-4-11	Voltage Dips: i) 30% reduction -0.5 period, Performance Criterion B ii) 60% reduction – 5 period, Performance Criterion C iii) 60% reduction – 50 period, Performance Criterion C Voltage Interruptions: iv) >95% reduction – 250 period, Performance Criterion C

5.2 GENERAL PERFORMANCE CRITERIA DESCRIPTION

CRITERION A	The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
CRITERION B	After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomenon below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is allowed. However, no change of operating state if stored data is allowed to persist after the test. If the minimum performance level (or the permissible performance loss) is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.
CRITERION C	Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

5.3 EUT OPERATING CONDITION

Same as item 4.3.6.



5.4 ELECTROSTATIC DISCHARGE IMMUNITY TEST (ESD)

5.4.1 TEST SPECIFICATION

Basic Standard:	IEC 61000-4-2
Discharge Impedance:	330 ohm / 150 pF
Discharge Voltage:	Air Discharge: 2, 4, 8 kV (Direct) Contact Discharge: 2, 4 kV (Direct/Indirect)
Polarity:	Positive & Negative
Number of Discharge:	Air Discharge: min. 20 times at each test point Contact Discharge: min. 50 times at each test point
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum

5.4.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
NOISEKEN ELECTRONIC DISCHARGE SIMULATOR	ESS-2000	ESS0382041	Nov. 2, 2005

- NOTE:** 1. The test was performed in Hwa Ya ESD Room No. 1.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

5.4.3 TEST PROCEDURE

The discharges shall be applied in two ways:

- a. Contact discharges to the conductive surfaces and coupling planes:

The EUT shall be exposed to at least 200 discharges, 100 each at negative and positive polarity, at a minimum of four test points. One of the test points shall be subjected to at least 50 indirect discharges to the center of the front edge of the horizontal coupling plane. The remaining three test points shall each receive at least 50 direct contact discharges. If no direct contact test points are available, then at least 200 indirect discharges shall be applied in the indirect mode. Test shall be performed at a maximum repetition rate of one discharge per second.

- b. Air discharges at slots and apertures and insulating surfaces:

On those parts of the EUT where it is not possible to perform contact discharge testing, the equipment should be investigated to identify user accessible points where breakdown may occur. Such points are tested using the air discharge method. This investigation should be restricted to those area normally handled by the user. A minimum of 10 single air discharges shall be applied to the selected test point for each such area.

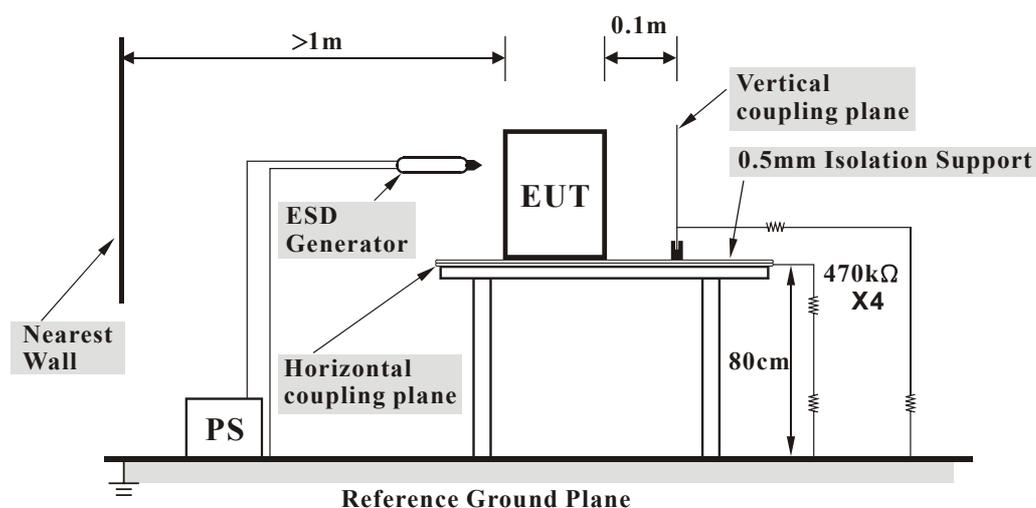
The basic test procedure was in accordance with IEC 61000-4-2:

- a. Electrostatic discharges were applied only to those points and surfaces of the EUT that are accessible to users during normal operation.
- b. The test was performed with at least ten single discharges on the pre-selected points in the most sensitive polarity.
- c. The time interval between two successive single discharges was at least 1 second.
- d. The ESD generator was held perpendicularly to the surface to which the discharge was applied and the return cable was at least 0.2 meters from the EUT.
- e. Contact discharges were applied to the non-insulating coating, with the pointed tip of the generator penetrating the coating and contacting the conducting substrate.
- f. Air discharges were applied with the round discharge tip of the discharge electrode approaching the EUT as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator was removed from the EUT and re-triggered for a new single discharge. The test was repeated until all discharges were complete.
- g. At least ten single discharges (in the most sensitive polarity) were applied to the **Horizontal Coupling Plane** at points on each side of the EUT. The ESD generator was positioned vertically at a distance of 0.1 meters from the EUT with the discharge electrode touching the **HCP**.
- h. At least ten single discharges (in the most sensitive polarity) were applied to the center of one vertical edge of the **Vertical Coupling Plane** in sufficiently different positions that the four faces of the EUT were completely illuminated. The **VCP** (dimensions 0.5m x 0.5m) was placed vertically to and 0.1 meters from the EUT.

5.4.4 DEVIATION FROM TEST STANDARD

No deviation.

5.4.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

NOTE:

TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table 0.8 meters high standing on the **Ground Reference Plane**. The **GRP** consisted of a sheet of aluminum at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system. A **Horizontal Coupling Plane** (1.6m x 0.8m) was placed on the table and attached to the **GRP** by means of a cable with 940kΩ total impedance. The equipment under test, was installed in a representative system as described in section 7 of IEC 61000-4-2, and its cables were placed on the **HCP** and isolated by an insulating support of 0.5mm thickness. A distance of 1-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

FLOOR-STANDING EQUIPMENT

The equipment under test was installed in a representative system as described in section 7 of IEC 61000-4-2, and its cables were isolated from the Ground Reference Plane by an insulating support of 0.1-meter thickness. The GRP consisted of a sheet of aluminum that is at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system and extended at least 0.5 meters from the EUT on all sides.



5.4.6 TEST RESULTS

EUT	IPC with Certified Power	MODEL	UNO-3062
ENVIRONMENTAL CONDITIONS	24 deg. C, 53% RH, 986 hPa	INPUT POWER	230 Vac, 50 Hz
TESTED BY	Kalvin Hsieh		

TEST RESULTS OF DIRECT APPLICATION					
Discharge Level (kV)	Polarity (+/-)	Test Point	Contact Discharge	Air Discharge	Test Result
2; 4	+/-	4~10	NOTE	NA	PASS
2; 4; 8	+/-	1~3	NA	NOTE	PASS

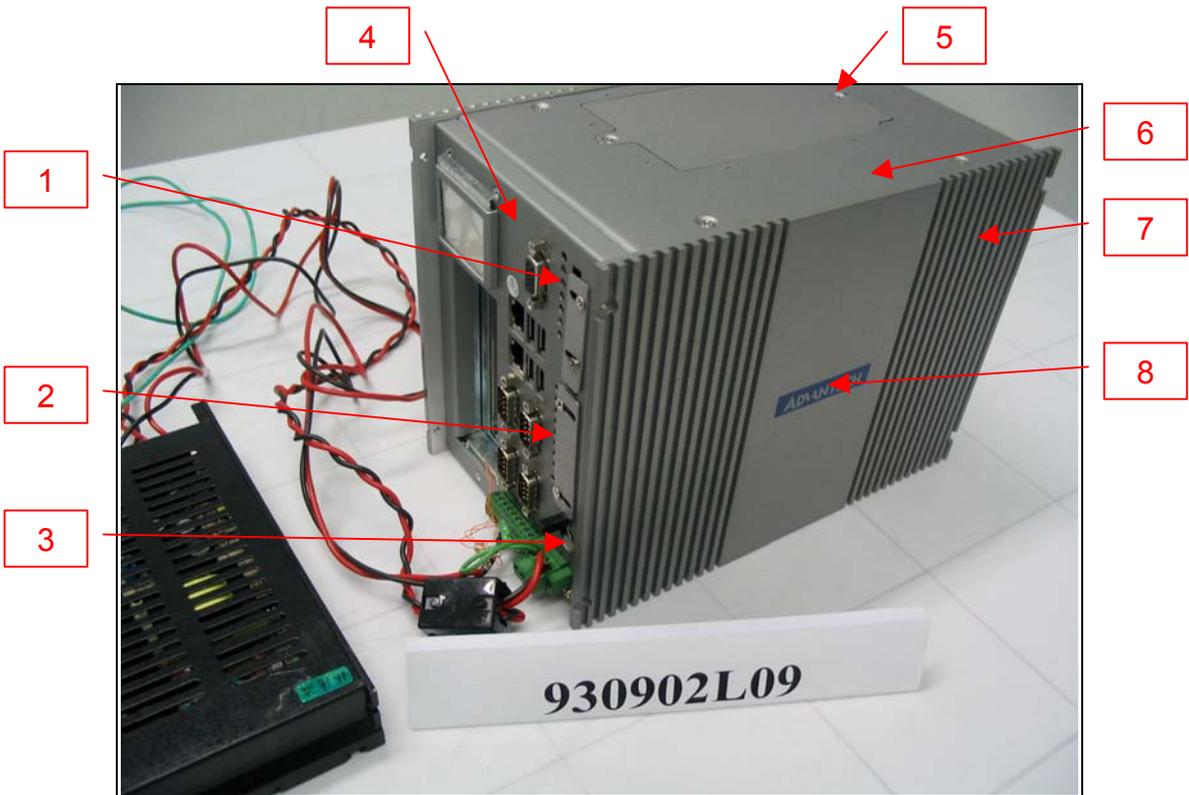
Description of test point: Please refer to following page.

TEST RESULTS OF INDIRECT APPLICATION					
Discharge Level (kV)	Polarity (+/-)	Test Point	Horizontal Coupling Plane	Vertical Coupling Plane	Test Result
2; 4	+/-	4 sides	NOTE	NOTE	PASS

Description of test point:

1. Left side
2. Right side
3. Front side
4. Rear side

NOTE: There was no change compared with initial operation during and after the test.





5.5 RADIATED, RADIO-FREQUENCY, ELECTROMAGNETIC FIELD IMMUNITY TEST (RS)

5.5.1 TEST SPECIFICATION

Basic Standard:	IEC 61000-4-3
Frequency Range:	80 MHz - 1000 MHz
Field Strength:	10 V/m
Modulation:	1 kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of preceding frequency value
Polarity of Antenna:	Horizontal and Vertical
Test Distance:	3 m
Antenna Height:	1.5m
Dwell Time:	at least 3 seconds

5.5.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Boonton RF Power Meter	4232A-01-02	107402	Feb. 10, 2005
R&S Signal Generator	SML03	101499	Nov. 30, 2004
AR Amplifier	60S1G3M1	308049	Jan. 14, 2005
AR Amplifier RF TEST SYS CTRLR	SC1000M1	308057	Jan. 18, 2005
AR Amplifier	150W1000M1	308045	Jan. 14, 2005
AR ELECTRIC FIELD SENSOR	FP 6001	307198	Jan. 18, 2005
Software	ADT_RS_V450	NA	NA

- NOTE:** 1. The test was performed in Hwa Ya RS Room.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

5.5.3 TEST PROCEDURE

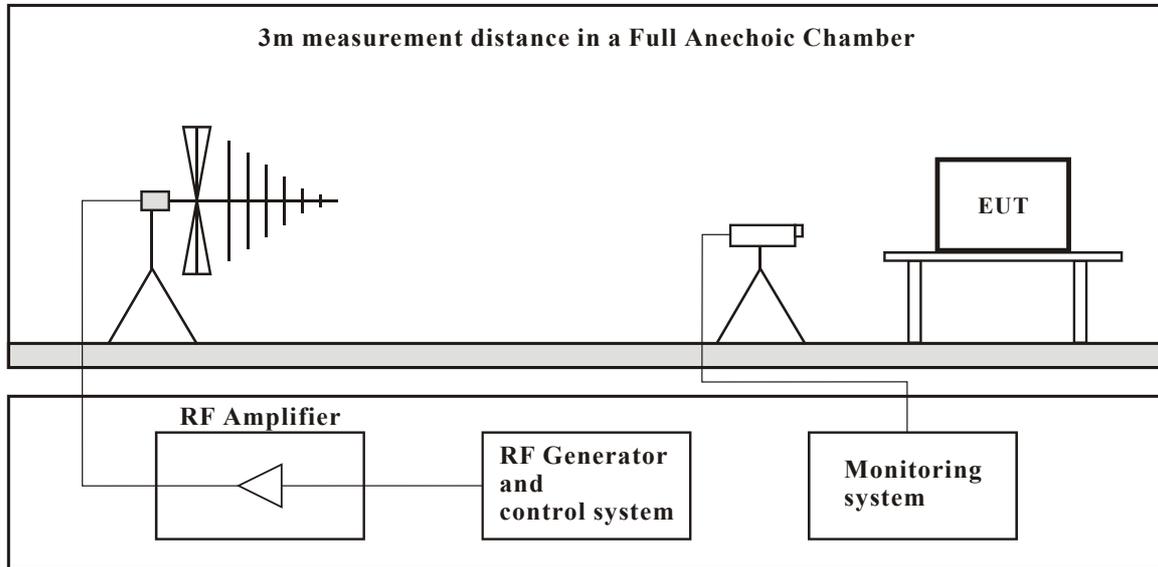
The test procedure was in accordance with IEC 61000-4-3

- a. The testing was performed in a fully-anechoic chamber. The transmit antenna was located at a distance of 3 meters from the EUT.
- b. The frequency range is swept from 80 MHz to 1000 MHz, with the signal 80% amplitude modulated with a 1kHz sinewave. The rate of sweep did not exceed 1.5×10^{-3} decade/s. Where the frequency range is swept incrementally, the step size was 1 % of preceding frequency value.
- c. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
- d. The field strength level was 10V/m.
- e. The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

5.5.4 DEVIATION FROM TEST STANDARD

No deviation.

5.5.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

NOTE:

TABLETOP EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC 61000-4-3 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

FLOOR STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC 61000-4-3 was placed on a non-conductive wood support 0.1 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.



5.5.6 TEST RESULTS

EUT	IPC with Certified Power	MODEL	UNO-3062
ENVIRONMENTAL CONDITIONS	24 deg. C, 57% RH, 986 hPa	INPUT POWER	230 Vac, 50 Hz
TESTED BY	Kalvin Hsieh		

Frequency (MHz)	Polarity	Azimuth	Field Strength (V/m)	Observation	Test Result
80 ~ 1000 MHz	V&H	0	10	NOTE	PASS
80 ~ 1000 MHz	V&H	90	10		
80 ~ 1000 MHz	V&H	180	10		
80 ~ 1000 MHz	V&H	270	10		

NOTE: There was no change compared with initial operation during the test.



5.6 ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST (EFT)

5.6.1 TEST SPECIFICATION

Basic Standard:	IEC 61000-4-4
Test Voltage:	Power Line: 2 kV Signal/Control Line: 1 kV
Polarity:	Positive/Negative
Impulse Frequency:	5 kHz
Impulse Waveshape :	5/50 ns
Burst Duration:	15 ms
Burst Period:	300 ms
Test Duration:	Not less than 1 min.

5.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
EMC-Partner EFT Generator	TRA2000EFT-C1	623	Nov. 24, 2004
EMC-Partner Capacitive Coupling clamp	CN-EFT1000	364	NA
Software	EMC-Partner GENECS	NA	NA

NOTE: 1. The test was performed in Hwa Ya EFT Room.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

5.6.3 TEST PROCEDURE

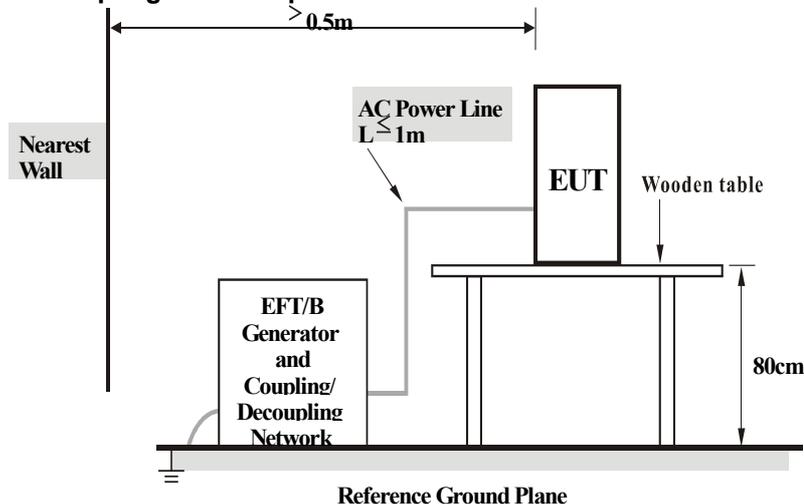
- The EUT was tested with 2 kV discharges to the AC power input leads and 1 kV discharges to the interconnect cables.
- Both positive and negative polarity discharges were applied.
- The length of the "hot wire" from the coaxial output of the EFT generator to the terminals on the EUT should not exceed 1 meter.
- The duration time of each test sequential was 1 minute.
- The transient/burst waveform was in accordance with IEC 61000-4-4, 5/50ns.

5.6.4 DEVIATION FROM TEST STANDARD

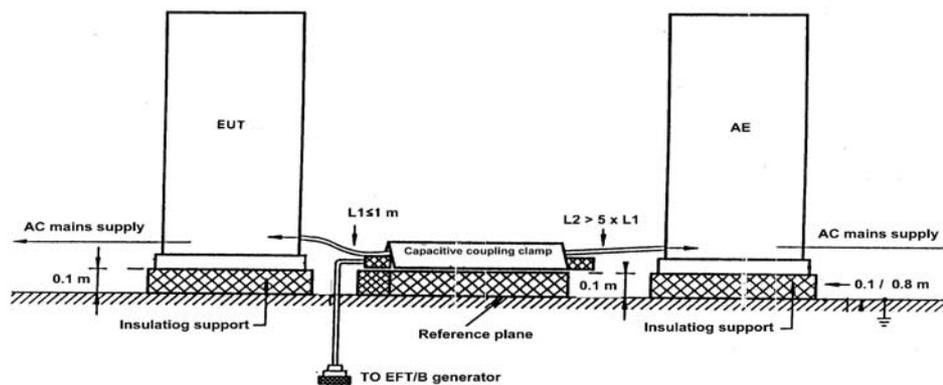
No deviation.

5.6.5 TEST SETUP

a. Direct Coupling Test Setup



b. Capacitive Clamp Test Setup (if any)



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

NOTE:

TABLETOP EQUIPMENT

The configuration consisted of a wooden table (0.8m high) standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system. A minimum distance of 0.5m was provided between the EUT and the walls of the laboratory or any other metallic structure.

FLOOR STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC 61000-4-4 and its cables, were isolated from the Ground Reference Plane by an insulating support that is 0.1-meter thick. The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system.



5.6.6 TEST RESULTS

EUT	IPC with Certified Power	MODEL	UNO-3062
ENVIRONMENTAL CONDITIONS	26 deg. C, 62% RH, 986 hPa	INPUT POWER	230 Vac, 50 Hz
TESTED BY	Dark Su		

Test Point	Polarity	Test Level (kV)	Observation	Test Result
L	+/-	2	NOTE	PASS
N	+/-	2	NOTE	PASS
L – N	+/-	2	NOTE	PASS
PE	+/-	2	NOTE	PASS
L – PE	+/-	2	NOTE	PASS
N – PE	+/-	2	NOTE	PASS
L – N – PE	+/-	2	NOTE	PASS
Signal/Control Line	+/-	1	NOTE	PASS

NOTE: There was no change compared with initial operation during the test.



5.7 SURGE IMMUNITY TEST

5.7.1 TEST SPECIFICATION

Basic Standard:	IEC 61000-4-5
Wave-Shape:	Combination Wave 1.2/50 us Open Circuit Voltage 8 /20 us Short Circuit Current
Test Voltage:	Power Line ~ line to line: 1 kV; line to ground: 2 kV
Surge Input/Output:	L1-L2 / L1-PE / L2-PE
Generator Source	2 ohm between networks
Impedance:	12 ohm between network and ground
Polarity:	Positive/Negative
Phase Angle:	NA
Pulse Repetition Rate:	1 time / min. (maximum)
Number of Tests:	5 positive and 5 negative at selected points

5.7.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATION UNTIL
EMC-Partner Modular Impulse Generator	MIG0603IN3	352	Dec. 18, 2004

- NOTE:** 1. The test was performed in Hwa Ya Surge Room.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

5.7.3 TEST PROCEDURE

a. For EUT power supply:

The surge is to be applied to the EUT power supply terminals via the capacitive coupling network. Decoupling networks are required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines, and to provide sufficient decoupling impedance to the surge wave. The power cord between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

b. For test applied to unshielded unsymmetrically operated interconnection lines of EUT:

The surge is applied to the lines via the capacitive coupling. The coupling / decoupling networks shall not influence the specified functional conditions of the EUT. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

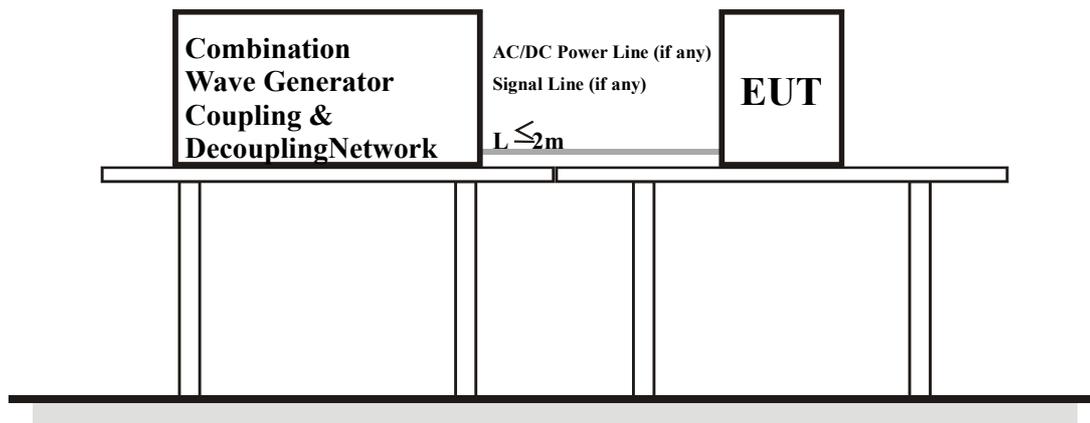
c. For test applied to unshielded symmetrically operated interconnection / telecommunication lines of EUT:

The surge is applied to the lines via gas arrestors coupling. Test levels below the ignition point of the coupling arrestor cannot be specified. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

5.7.4 DEVIATION FROM TEST STANDARD

No deviation

5.7.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.



5.7.6 TEST RESULTS

EUT	IPC with Certified Power	MODEL	UNO-3062
ENVIRONMENTAL CONDITIONS	24 deg. C, 60% RH, 986 hPa	INPUT POWER	230 Vac, 50 Hz
TESTED BY	Kalvin Hsieh		

VOLTAGE (kV)	TEST POINT	POLARITY (+/-)	Phase Angle				Test Result
			0°	90°	180°	270°	
1	L1-L2	+/-	NOTE	NOTE	NOTE	NOTE	PASS
2	L1-PE	+/-	NOTE	NOTE	NOTE	NOTE	PASS
2	L1-PE	+/-	NOTE	NOTE	NOTE	NOTE	PASS

NOTE: There was no change compared with initial operation during the test.

5.8 IMMUNITY TO CONDUCTED DISTURBANCES INDUCED BY RF FIELDS (CS)

5.8.1 TEST SPECIFICATION

Basic Standard:	IEC 61000-4-6
Frequency Range:	0.15 MHz ~ 80 MHz
Field Strength:	10 V _{r.m.s.}
Modulation:	1 kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of preceding frequency value
Coupled Cable:	Power Mains, Unshielded
Coupling Device:	CDN-M3 (3 wires), EM-Clamp

5.8.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
FCC POWER LINE COUPLING DECOUPLING NETWORK	M/N:FCC-801-M1-25A	03030	Dec. 3, 2004
FCC POWER LINE COUPLING DECOUPLING NETWORK	M/N:FCC-801-M2-25A	03049	Dec. 3, 2004
FCC POWER LINE COUPLING DECOUPLING NETWORK	M/N:FCC-801-M2-25A	03050	Dec. 3, 2004
FCC POWER LINE COUPLING DECOUPLING NETWORK	M/N:FCC-801-M3-25A	03056	Dec. 3, 2004
FCC POWER LINE COUPLING DECOUPLING NETWORK	M/N:FCC-801-M3-25A	03057	Dec. 3, 2004
FCC SIGNAL LINE POWER LINE COUPLING DECOUPLING NETWORK	P/N:FCC-801-T2	03030	Dec. 3, 2004
FCC SIGNAL LINE POWER LINE COUPLING DECOUPLING NETWORK	P/N:FCC-801-T4	03031	Dec. 3, 2004
FCC SIGNAL LINE POWER LINE COUPLING DECOUPLING NETWORK	P/N:FCC-801-T8	03032	Dec. 3, 2004
EMI Injection Clamp	P/N:F-203I-23MM	434	Dec. 3, 2004
BOONTON 4232ARF POWER METER	4232A-01-02	104302	Nov. 17, 2004
AR Amplifier	75A250AM2	307804	Dec. 12, 2004
R&S Signal generator	SML 01	102148	Nov. 25, 2004
Software	ADT_CS_V37	NA	NA

- NOTE:**
1. The test was performed in Hwa Ya CS Room.
 2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

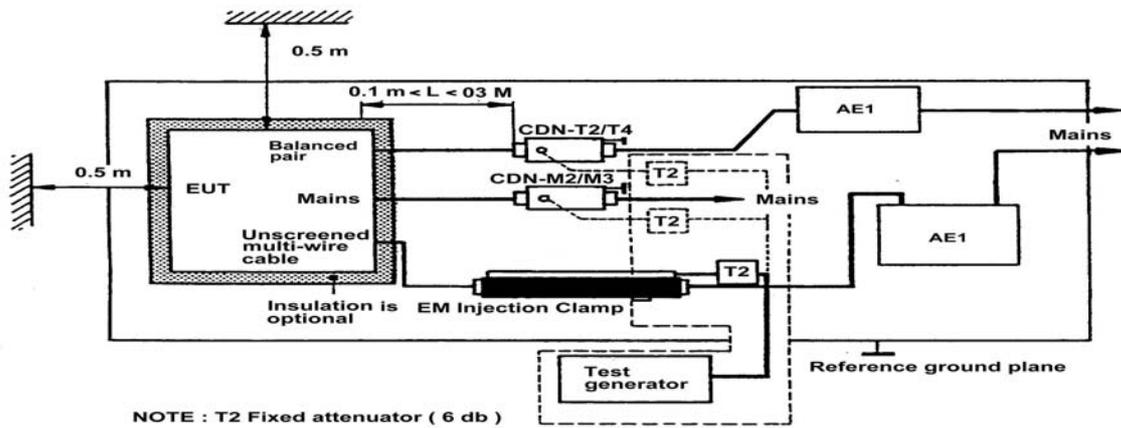
5.8.3 TEST PROCEDURE

- a. The EUT shall be tested within its intended operating and climatic conditions.
- b. The test shall be performed with the test generator connected to each of the coupling and decoupling devices in turn, while the other non-excited RF input ports of the coupling devices are terminated by a 50-ohm load resistor.
- c. The frequency range is swept from 150 kHz to 80 MHz, using the signal level established during the setting process and with a disturbance signal of 80 % amplitude. The signal is modulated with a 1 kHz sine wave, pausing to adjust the RF signal level or the switch coupling devices as necessary. The sweep rate shall not exceed 1.5×10^{-3} decades/s. The step size shall not exceed 1 % of the start and thereafter 1 % of the preceding frequency value where the frequency is swept incrementally.
- d. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies such as clock frequency(ies) and harmonics or frequencies of dominant interest, shall be analyzed separately.
- e. Attempts should be made to fully exercise the EUT during testing, and to fully interrogate all exercise modes selected for susceptibility.

5.8.4 DEVIATION FROM TEST STANDARD

No deviation.

5.8.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

NOTE:

FLOOR-STANDING EQUIPMENT

The equipment to be tested is placed on an insulating support of 0.1 meters height above a ground reference plane. All relevant cables shall be provided with the appropriate coupling and decoupling devices at a distance between 0.1 meters and 0.3 meters from the projected geometry of the EUT on the ground reference plane.



5.8.6 TEST RESULTS

EUT	IPC with Certified Power	MODEL	UNO-3062
ENVIRONMENTAL CONDITIONS	24 deg. C, 60% RH, 986 hPa	INPUT POWER	230 Vac, 50 Hz
TESTED BY	Kalvin Hsieh		

Frequency Band (MHz)	Applied Voltage (Vrms)	Observation	Test Result	Remark
0.15 ~ 80	10	NOTE	PASS	CDN-M3
0.15 ~ 80	10	NOTE	PASS	EM-Clamp

NOTE: There was no change compared with initial operation during the test.

5.9 POWER FREQUENCY MAGNETIC FIELD IMMUNITY TEST

5.9.1 TEST SPECIFICATION

Basic Standard:	IEC 61000-4-8
Frequency Range:	50Hz, 60Hz
Field Strength:	30 A/m
Observation Time:	1 minute
Inductance Coil:	Rectangular type, 1mx1m

5.9.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Schaffner Induction Coil Interface	INA2141	6015	NA
Schaffner AC Power Source	NSG1007	55616	Dec. 21, 2004
Schaffner INA702 Coil	INA702	111	Nov. 13, 2004
Software	Shchaffner Win 2120V3	NA	NA

- NOTE:** 1. The test was performed in Hwa Ya EMS Room.
 2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

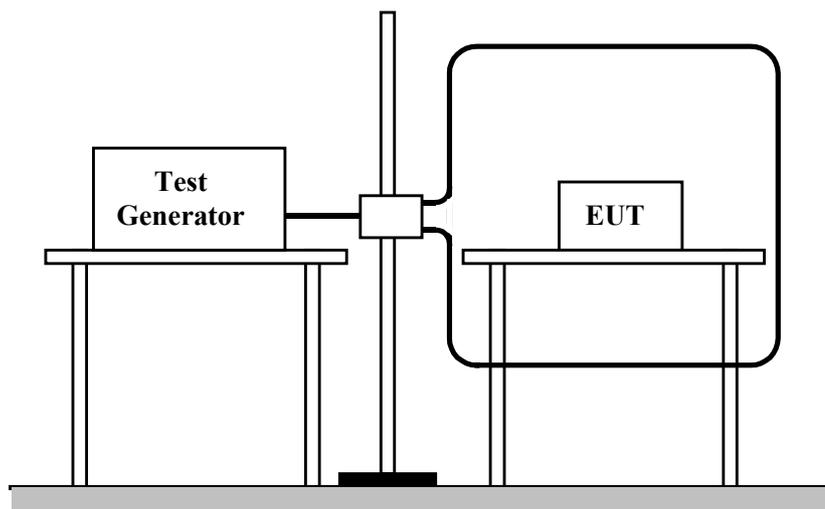
5.9.3 TEST PROCEDURE

- The equipment is configured and connected to satisfy its functional requirements. It shall be placed on the GRP with the interposition of a 0.1m-thick insulating support.
- The equipment cabinets shall be connected to the safety earth directly on the GRP via the earth terminal of the EUT.
- The power supply, input and output circuits shall be connected to the sources of power supply, control and signal.
- The cables supplied or recommended by the equipment manufacturer shall be used. 1 meter of all cables used shall be exposed to the magnetic field.

5.9.4 DEVIATION FROM TEST STANDARD

No deviation.

5.9.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

NOTE:

TABLETOP EQUIPMENT

The equipment shall be subjected to the test magnetic field by using the induction coil of standard dimension (1 m x 1 m). The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.

FLOOR-STANDING EQUIPMENT

The equipment shall be subjected to the test magnetic field by using induction coils of suitable dimensions. The test shall be repeated by moving and shifting the induction coils, in order to test the whole volume of the EUT for each orthogonal direction. The test shall be repeated with the coil shifted to different positions along the side of the EUT, in steps corresponding to 50 % of the shortest side of the coil. The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.



5.9.6 TEST RESULTS

EUT	IPC with Certified Power	MODEL	UNO-3062
ENVIRONMENTAL CONDITIONS	24 deg. C, 57% RH, 986 hPa	INPUT POWER	230 Vac, 50 Hz
TESTED BY	Kalvin Hsieh		

DIRECTION	OBSERVATION	RESULTS
X	NOTE	PASS
Y	NOTE	PASS
Z	NOTE	PASS

NOTE: There is no change compared with the initial operation during the test.



5.10 VOLTAGE DIP/SHORT INTERRUPTIONS/VOLTAGE VARIATIONS (DIP) IMMUNITY TEST

5.10.1 TEST SPECIFICATION

Basic Standard:	IEC 61000-4-11
Test Duration Time:	Minimum three test events in sequence
Interval between Event:	Minimum ten seconds
Phase Angle:	0°/45°/90°/135°/180°/225°/270°/315°/360°
Test Cycle:	3 times

5.10.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Schaffner AC Power Source	NSG1007	55616	Dec. 21, 2004
Schaffner Signal Conditioning Unit- Lumped Impedance	CCN1000-1-LR1	72224	Dec. 21, 2004
Software	Shchaffner Win 2100V3	NA	NA

- NOTE:** 1. The test was performed in Hwa Ya EMS Room.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

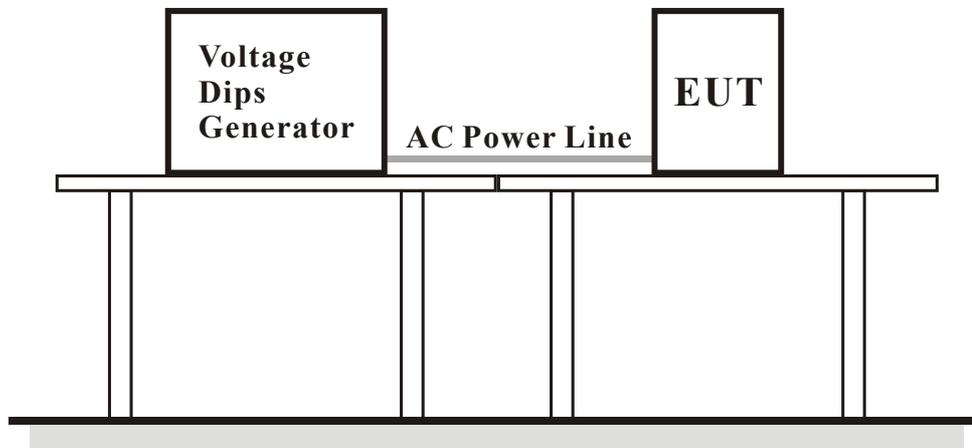
5.10.3 TEST PROCEDURE

The EUT shall be tested for each selected combination of test levels and duration with a sequence of three dips/interruptions with intervals of 10 s minimum (between each test event). Each representative mode of operation shall be tested. Abrupt changes in supply voltage shall occur at zero crossings of the voltage waveform.

5.10.4 DEVIATION FROM TEST STANDARD

No deviation.

5.10.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

5.10.6 TEST RESULTS

EUT	IPC with Certified Power	MODEL	UNO-3062
ENVIRONMENTAL CONDITIONS	24 deg. C, 60% RH, 986 hPa	INPUT POWER	230 Vac, 50 Hz
TESTED BY	Kalvin Hsieh		

Ut: 230Vac, 50Hz

VOLTAGE % REDUCTION	DURATION (PERIOD)	OBSERVATION	TEST RESULT
30%	0.5	NOTE 1	PASS
60%	5	NOTE 1	PASS
60%	50	NOTE 1	PASS
>95%	250	NOTE 2	PASS

Ut: 240Vac, 50Hz

VOLTAGE % REDUCTION	DURATION (PERIOD)	OBSERVATION	TEST RESULT
30%	0.5	NOTE 1	PASS
60%	5	NOTE 1	PASS
60%	50	NOTE 1	PASS
>95%	250	NOTE 2	PASS

Ut: 100Vac, 50Hz

VOLTAGE % REDUCTION	DURATION (PERIOD)	OBSERVATION	TEST RESULT
30%	0.5	NOTE 1	PASS
60%	5	NOTE 1	PASS
60%	50	NOTE 1	PASS
>95%	250	NOTE 2	PASS

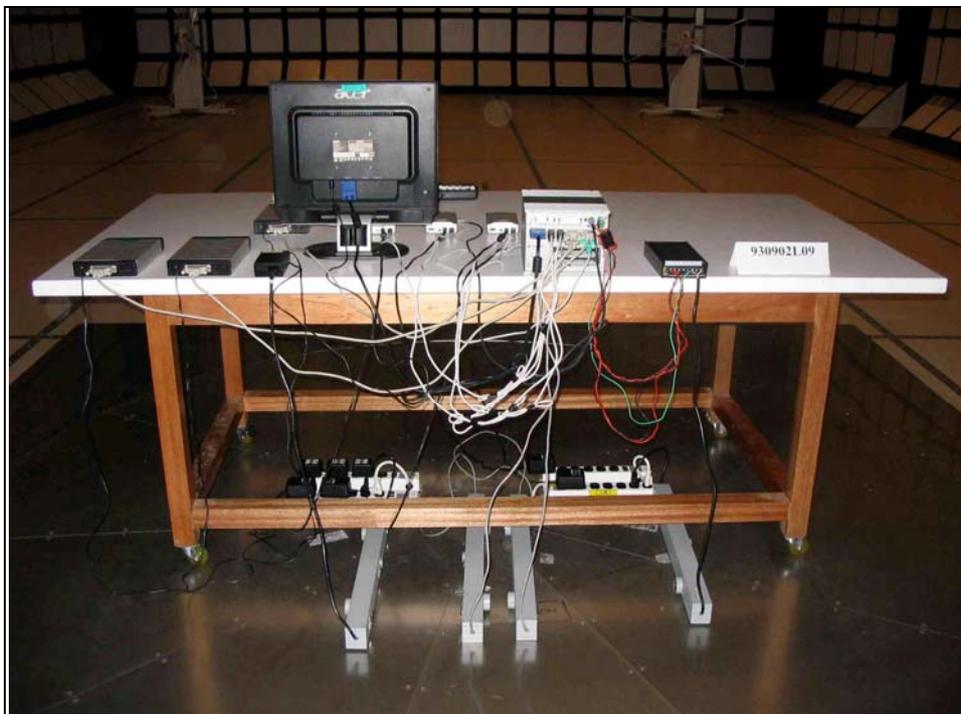
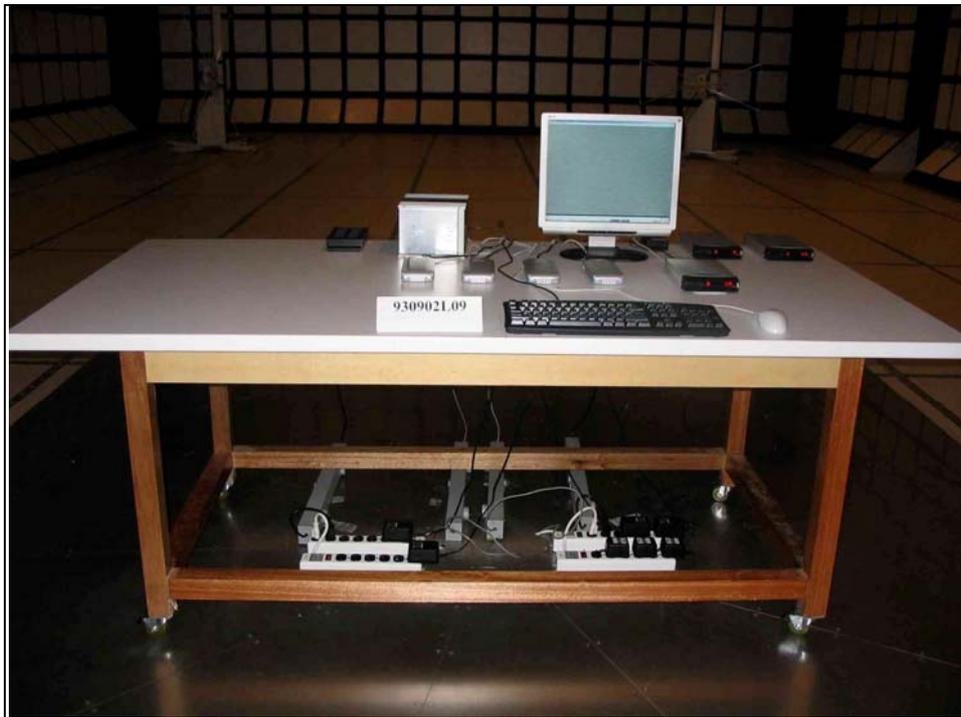
- NOTE:**
1. There was no change compared with initial operation during the test.
 2. The EUT shut down during the test.

6 PHOTOGRAPHS OF THE TEST CONFIGURATION

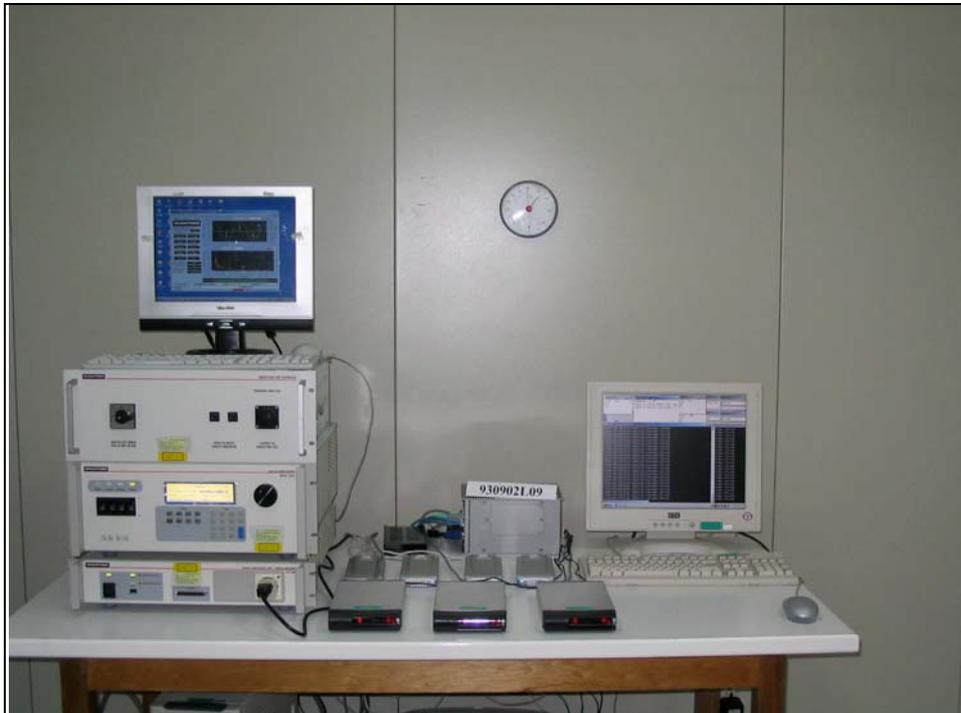
CONDUCTED EMISSION TEST



RADIATED EMISSION TEST



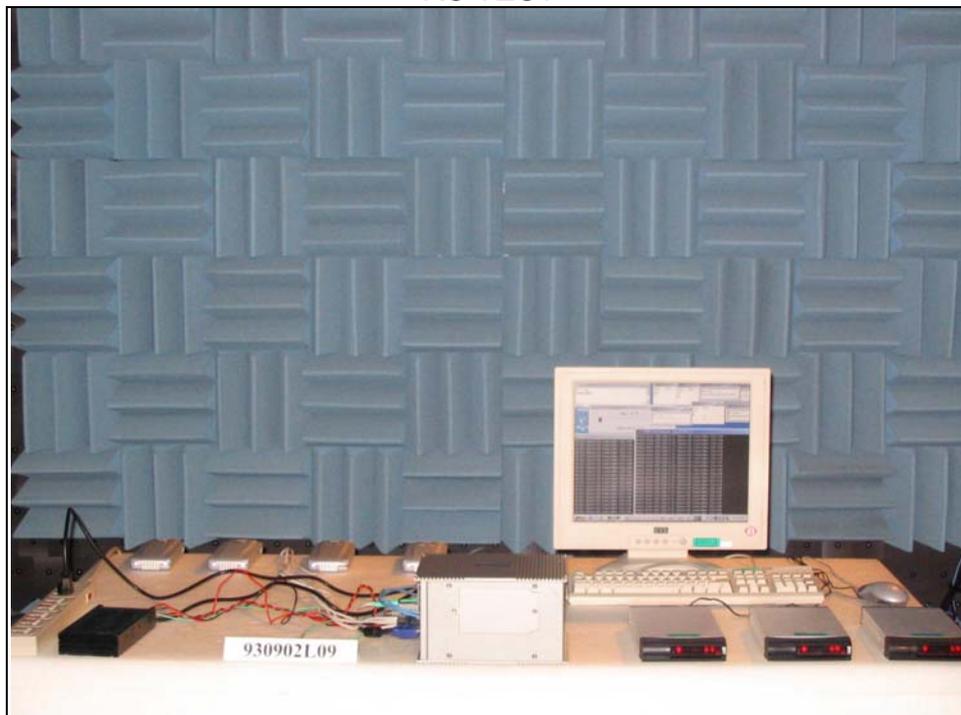
HARMONICS EMISSION TEST & VOLTAGE FLUCTUATIONS AND FLICKER TEST



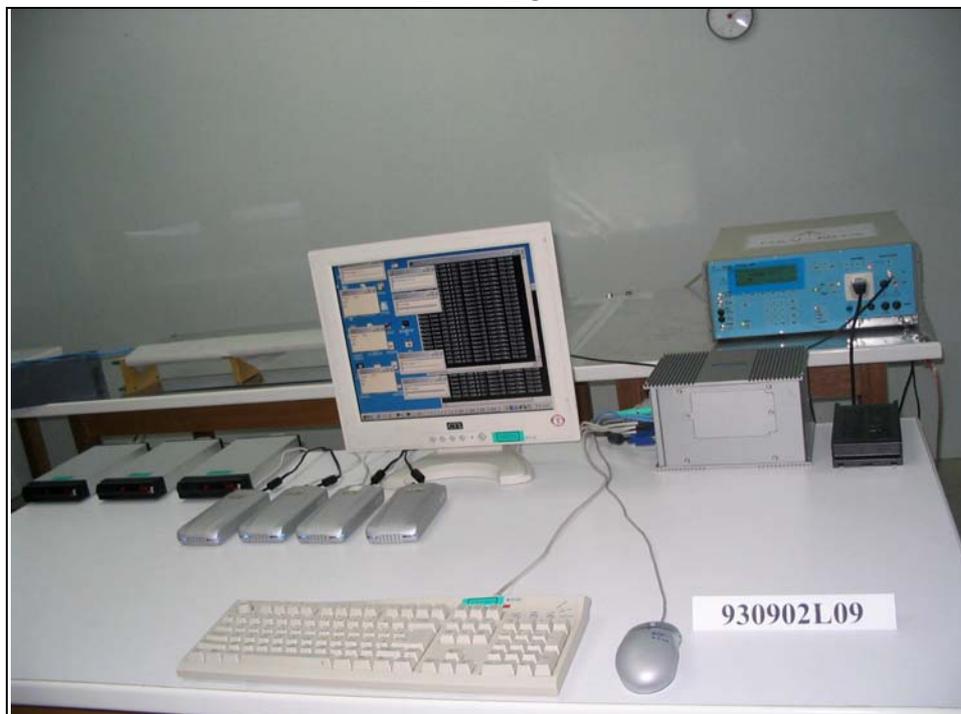
ESD TEST



RS TEST



EFT TEST



SURGE TEST



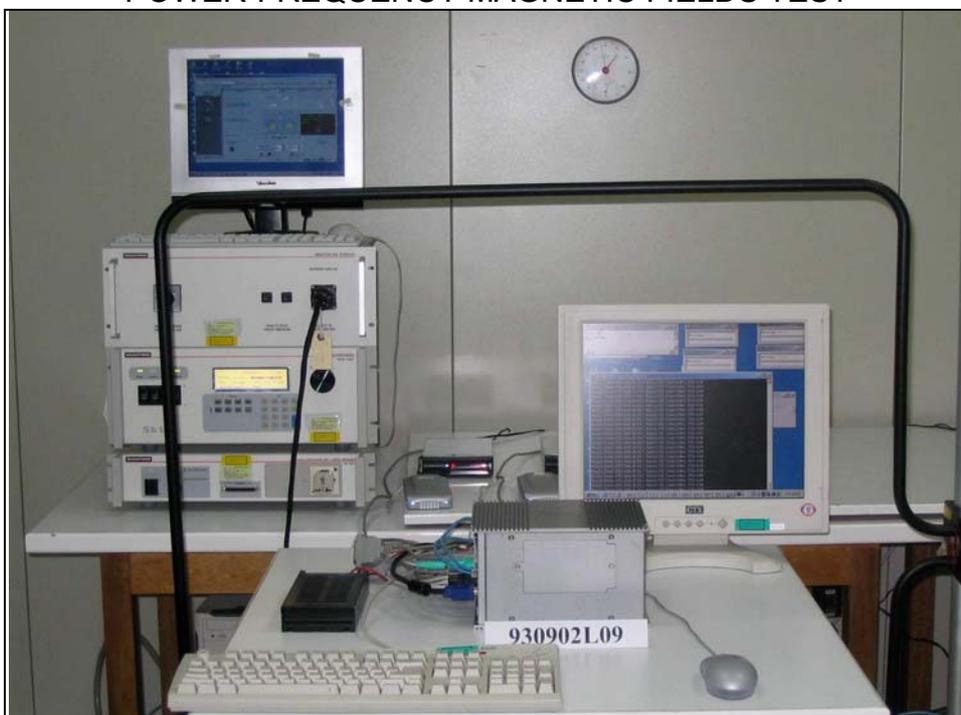
CONDUCTED SUSCEPTIBILITY TEST (CDN-M2)



CONDUCTED SUSCEPTIBILITY TEST (EM-Clamp)



POWER-FREQUENCY MAGNETIC FIELDS TEST



VOLTAGE DIPS AND INTERRUPTIONS TEST





7 APPENDIX - INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025, Guide 25 or EN 45001:

USA	FCC, NVLAP, UL, A2LA
Germany	TUV Rheinland
Japan	VCCI
Norway	NEMKO
Canada	INDUSTRY CANADA , CSA
R.O.C.	CNLA, BSMI, DGT
Netherlands	Telefication
Singapore	PSB , GOST-ASIA(MOU)
Russia	CERTIS(MOU)

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5/phtml.
If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab

Tel: 886-2-26052180
Fax: 886-2-26052943

Hsin Chu EMC/RF Lab

Tel: 886-3-5935343
Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety/Telecom Lab

Tel: 886-3-3183232
Fax: 886-3-3185050

Linko RF Lab.

Tel: 886-3-3270910
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Email: service@mail.adt.com.tw

Web Site: www.adt.com.tw

The address and road map of all our labs can be found in our web site also.

Report Format Version 1.5