

# CE EMC TEST REPORT

**REPORT NO.:** CE930930L06-2

**MODEL NO.:** RIO-3309S

**RECEIVED:** Sep. 30, 2004

**TESTED:** Oct. 27 ~ Nov. 23, 2004

**APPLICANT:** ADVANTECH CO., LTD

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

**ISSUED BY:** Advance Data Technology Corporation

**LAB ADDRESS:** No. 47, 14th Ling, Chia Pau Tsuen, Lin Kou  
Hsiang 244, Taipei Hsien, Taiwan, R.O.C.

**TEST LOCATION:** No. 19, Hwa Ya 2nd Rd., Wen Hwa Tsuen, Kwei  
Shan Hsiang, Taoyuan Hsien 333, Taiwan,  
R.O.C.

This test report consists of 71 pages in total. It may be duplicated completely for legal use with the approval of the applicant. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product endorsement by CNLA, A2LA or any government agency. The test results in the report only apply to the tested sample.



## 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 .....	8
3.3	DESCRIPTION OF SUPPORT UNITS.....	9
3.4	CONFIGURATION OF SYSTEM UNDER TEST .....	12
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.....	17
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.....	25
4.3	HARMONICS CURRENT MEASUREMENT .....	26
4.3.1	LIMITS OF HARMONICS CURRENT MEASUREMENT .....	26
4.3.2	TEST INSTRUMENTS .....	26
4.3.3	TEST PROCEDURE .....	27
4.3.4	DEVIATION FROM TEST STANDARD .....	27
4.3.5	TEST SETUP .....	27
4.3.6	EUT OPERATING CONDITIONS.....	28
4.3.7	TEST RESULTS.....	29
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 .....	36
5.3	EUT OPERATING CONDITION .....	36

5.4	ELECTROSTATIC DISCHARGE IMMUNITY TEST (ESD) .....	37
5.4.1	TEST SPECIFICATION.....	37
5.4.2	TEST INSTRUMENTS .....	37
5.4.3	TEST PROCEDURE .....	38
5.4.4	DEVIATION FROM TEST STANDARD .....	39
5.4.5	TEST SETUP .....	39
5.4.6	TEST RESULTS .....	40
5.5	RADIATED, RADIO-FREQUENCY, ELECTROMAGNETIC FIELD IMMUNITY TEST (RS).....	43
5.5.1	TEST SPECIFICATION .....	43
5.5.2	TEST INSTRUMENTS .....	43
5.5.3	TEST PROCEDURE .....	44
5.5.4	DEVIATION FROM TEST STANDARD .....	44
5.5.5	TEST SETUP .....	45
5.5.6	TEST RESULTS .....	46
5.6	ELECTRICAL FAST TRANSIENT/BURST IMMUNITY TEST (EFT) .....	47
5.6.1	TEST SPECIFICATION.....	47
5.6.2	TEST INSTRUMENTS .....	47
5.6.3	TEST PROCEDURE .....	47
5.6.4	DEVIATION FROM TEST STANDARD .....	47
5.6.5	TEST SETUP .....	48
5.6.6	TEST RESULTS .....	49
5.7	SURGE IMMUNITY TEST .....	50
5.7.1	TEST SPECIFICATION.....	50
5.7.2	TEST INSTRUMENTS .....	50
5.7.3	TEST PROCEDURE .....	51
5.7.4	DEVIATION FROM TEST STANDARD .....	51
5.7.5	TEST SETUP .....	51
5.7.6	TEST RESULTS .....	52
5.8	IMMUNITY TO CONDUCTED DISTURBANCES INDUCED BY RF FIELDS (CS)...	53
5.8.1	TEST SPECIFICATION.....	53
5.8.2	TEST INSTRUMENTS .....	53
5.8.3	TEST PROCEDURE .....	54
5.8.4	DEVIATION FROM TEST STANDARD .....	54
5.8.5	TEST SETUP .....	55
5.8.6	TEST RESULTS .....	56
5.9	POWER FREQUENCY MAGNETIC FIELD IMMUNITY TEST .....	57
5.9.1	TEST SPECIFICATION.....	57
5.9.2	TEST INSTRUMENTS .....	57
5.9.3	TEST PROCEDURE .....	57
5.9.4	DEVIATION FROM TEST STANDARD .....	58
5.9.5	TEST SETUP .....	58
5.9.6	TEST RESULTS .....	59
5.10	VOLTAGE DIP/SHORT INTERRUPTIONS/VOLTAGE VARIATIONS (DIP) IMMUNITY TEST .....	60
5.10.1	TEST SPECIFICATION .....	60



5.10.2	TEST INSTRUMENTS .....	60
5.10.3	TEST PROCEDURE .....	60
5.10.4	DEVIATION FROM TEST STANDARD .....	60
5.10.5	TEST SETUP .....	61
5.10.6	TEST RESULTS .....	62
6	PHOTOGRAPHS OF THE TEST CONFIGURATION .....	64
7	APPENDIX - INFORMATION ON THE TESTING LABORATORIES .....	71



## 1 CERTIFICATION

**PRODUCT:** Chassis(with PSA300M)  
**BRAND NAME:** Advantech  
**MODEL NO:** RIO-3309S  
**APPLICANT:** ADVANTECH CO., LTD  
**TESTED:** Oct. 27 ~ Nov. 23, 2004  
**TEST SAMPLE:** ENGINEERING SAMPLE  
**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  
EN 55024: 1998+A1: 2001+A2: 2003  
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 61000-4-6:2003  
IEC 61000-4-8:2001  
IEC 61000-4-11:2001

The above equipment 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 :** Windy Chou , **DATE:** Dec. 01, 2004  
( Windy Chou )

**TECHNICAL**  
**ACCEPTANCE :** Mart Su , **DATE:** Dec. 01, 2004  
Responsible for EMI ( Mart Su )

**TECHNICAL**  
**ACCEPTANCE :** Clark Lin , **DATE:** Dec. 01, 2004  
Responsible for EMS ( Clark Lin )

**APPROVED BY :** Ken Lu , **DATE:** Dec. 01, 2004  
( Ken Lu / Manager )

## 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 -24.77dB at 0.166MHz.
	Radiated Test	PASS	Meets Limit Minimum passing margin is -2.15dB at 73.73 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; EN 55024)			
Standard	Test Type	Result	Remarks
IEC 61000-4-2:2001	Electrostatic discharge immunity test	PASS	Meets the requirements of Performance Criterion B
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 B
IEC 61000-4-5:2001	Surge immunity test	PASS	Meets the requirements of Performance Criterion A
IEC 61000-4-6:2003	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	<b>Voltage Dips:</b> i) 30% reduction -0.5 period, Performance Criterion A ii) 60% reduction – 5 period, Performance Criterion A iii) 60% reduction – 50 period, Performance Criterion C <b>Voltage Interruptions:</b> iv) >95% reduction – 250 period, Performance Criterion C
IEC 61000-4-11:2001 (for EN 55024)	Voltage dips, short interruptions and voltage variations immunity tests	PASS	Meets the requirements of <b>Voltage Dips:</b> 1. >95% reduction - Performance Criterion A 2. 30% reduction – Performance Criterion A <b>Voltage Interruptions:</b> 1. >95% reduction – Performance Criterion C

### 3 GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	Chassis(with PSA300M)
<b>MODEL NO.</b>	RIO-3309S
<b>POWER SUPPLY</b>	230 Vac, 50Hz

**NOTE:**

1. There were the components provided to this EUT for testing, please refer to the table as below:

Item	Support Unit	Brand	Model	Remark
1	Case	Advantech	MIC-3081A/8-10R	
2	Slot Board	Advantech	MIC-3806 A1 01-1	
3	Alarm B/D	Advantech	MIC-3924L B1 02-1	
4	Power	PRT	PSA300M	
5	CPU Board	Advantech	RIO-3309S Rev:B1 02-1	SCSI*1, USB*1, PS/2*1 VGA*1, COM2*1
6	SCSI Backplane	Advantech	SMB 1205 Rev.A1 03-1	1.1m SCSI cable
7	HDD	Seagate	ST336607LC	The first external SCSI HDD
8	HDD	Seagate	ST336607LC	The second external SCSI HDD

2. This EUT has two AC Input Port. The test data would be recorded in this report.

3. 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**

**EN 55024: 1998+A1: 2001+A2: 2003**

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 61000-4-6:2003

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 COMPUTER	DELL	D600	G8HBC1S	E2K24CLNS
2	NOTEBOOK COMPUTER	DELL	PP05L	27368374672	E2K24CLNS
3	LCD MONITOR	EPSON	LQ-300+	DCGY046020	FCC DoC Approved
4	PRINTER	ADI	CM100	240058T00100080	FCC DoC Approved
5	FireWire Hard Drive	Terasys	F12-UF	A0100215-3A80012	FCC DoC Approved
6	FireWire Hard Drive	Terasys	F12-UF	A0100215-3A80016	FCC DoC Approved
7	FireWire Hard Drive	Terasys	F12-UF	A0100215-42H004	FCC DoC Approved
8	MOUSE	LOGITECH	M-CAA43	HCA23303518	FCC DoC Approved
9	MOUSE	LOGITECH	M-CAA43	HCA30102457	FCC DoC Approved
10	MOUSE	LOGITECH	M-CAA43	HCA35000200	FCC DoC Approved
11	KEYBOARD	HP	SK-1688	C0306115118	GYUR84SK
12	MOUSE	HP	M-S69	M4-010567	INZ211443
13	MINE CASSETTE RECORDER	PANASONIC	RQ-L11	C1-010050	NA
14	MICROPHONE	Labtec	LVA7313	M5-010077	NA
15	EARPHONE	PHILIPS	SBC HL125	H2-010065	NA
16	SCSI HDD	Seagate	ST336607LC	NA	NA
17	SCSI HDD	Seagate	ST336607LC	NA	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	NA
3	1.8 m braid shielded wire, terminated with VGA connector via metallic frame
4	1.2 m shielded cable
5	1.5 m shielded cable, terminated with USB connector, w/o core.
6	1.5 m shielded cable, terminated with USB connector, w/o core.
7	1.5 m shielded cable, terminated with USB connector, w/o core.
8	1.8 m shielded cable, w/o core.
9	1.8 m shielded cable, w/o core.
10	1.8 m shielded cable, w/o core.
11	1.3 m shielded cable, w/o core.
12	1.8 m shielded cable, w/o core.
13	NA
14	1.0 m shielded cable, w/o core.
15	1.2 m shielded cable, w/o core.
16	NA
17	NA

**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.  
 3. Item 16 ~ 17 were provided by client.

## For Harmonics / Flicker / Immunity Test

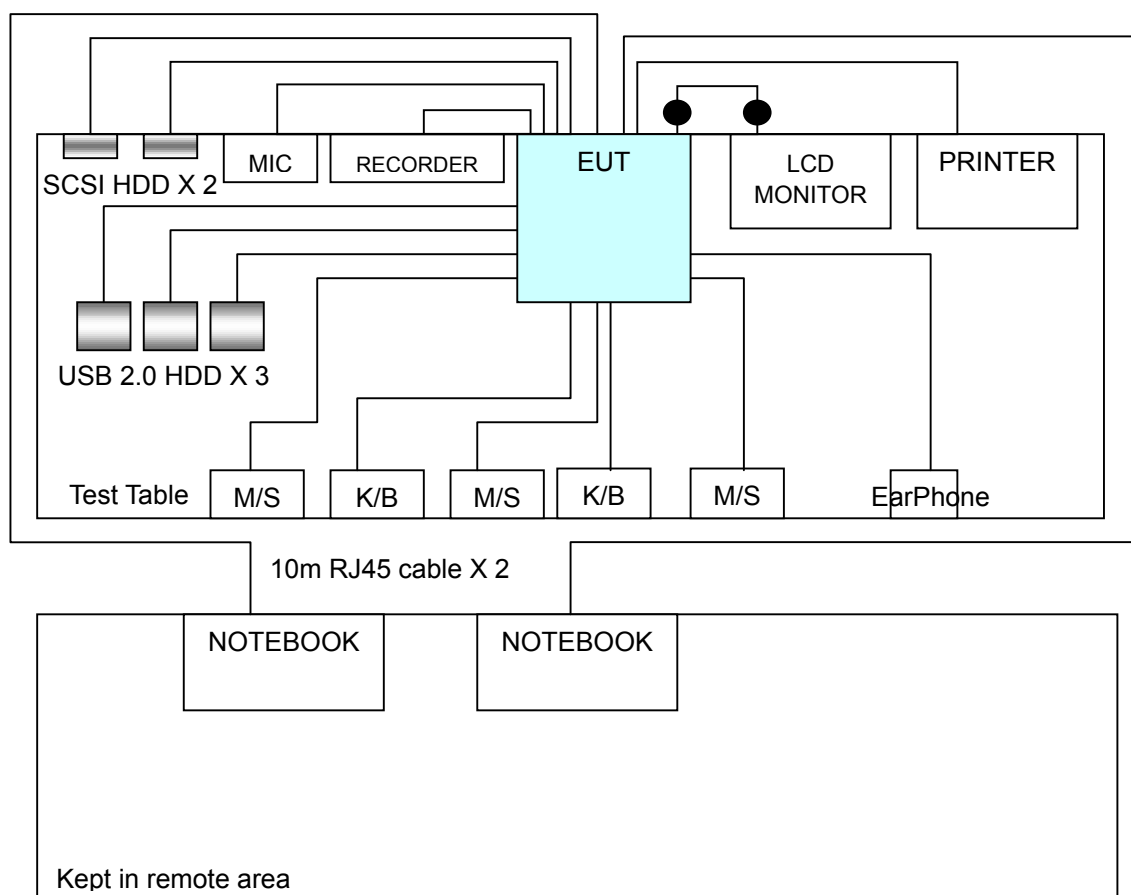
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP05L	3616274224	E2K24CLNS
2	NOTEBOOK COMPUTER	DELL	PP05L	42737890096	E2K24CLNS
3	LCD MONITOR	ACER	AL1721	ET.L0408.0104040 01FAPK00	FCC DoC Approved
4	PRINTER	EPSON	LQ-300+	DCGY054103	FCC DoC Approved
5	FireWire Hard Drive	Terasys	F12-UF	A0100215- 41H0013	FCC DoC Approved
6	FireWire Hard Drive	Terasys	F12-UF	A0100215- 3A80008	FCC DoC Approved
7	FireWire Hard Drive	Terasys	F12-UF	A0100215- 3A80013	FCC DoC Approved
8	MOUSE	LOGITECH	M-CAA43	HCA35000200	FCC DoC Approved
9	MOUSE	LOGITECH	M-CAA43	HCA23303518	FCC DoC Approved
10	MOUSE	LOGITECH	M-CAA43	HCA35000267	FCC DoC Approved
11	MOUSE	LOGITECH	M-CAA43	HCA35000024	FCC DoC Approved
12	PS/2 KEYBOARD	BTC	5200T	F24800265	E5XKB5122WTH 0110
13	MINE CASSETTE RECORDER	PANASONIC	RQ-L11	C1-010054	N/A
14	MICROPHONE	Labtec	LVA7313	M5-010085	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	10m shielded cable, terminated with RJ45 connector, w/o core.
2	10m shielded cable, terminated with RJ45 connector, w/o core.
3	1.8 m shielded cable
4	1.2 m shielded cable
5	1.5 m shielded cable, terminated with USB connector, w/o core.
6	1.5 m shielded cable, terminated with USB connector, w/o core.
7	1.5 m shielded cable, terminated with USB connector, w/o core.
8	1.8 m shielded cable, w/o core.
9	1.8 m shielded cable, w/o core.
10	1.8 m shielded cable, w/o core.
11	1.8 m shielded cable, w/o core.
12	1.6 m shielded cable, w/o core.
13	NA
14	1.0 m shielded cable, w/o core.

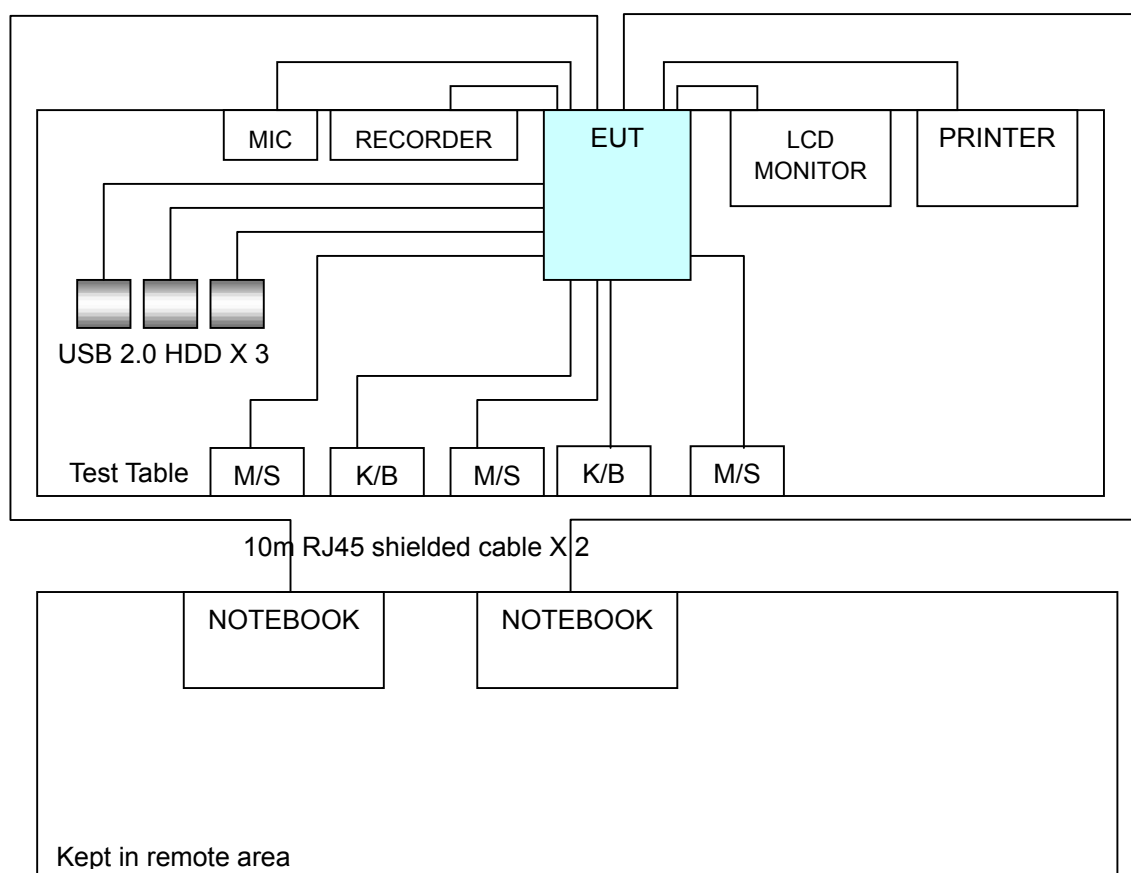
**NOTE:** 1. All power cords of the above support units are non-shielded (1.8m).  
2. Item 1 ~ 2 acted as communication partners to transfer data.

### 3.4 CONFIGURATION OF SYSTEM UNDER TEST

#### For Emission Test



## For Harmonics / Flicker / Immunity Test



## 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	100291	Dec. 12, 2004
RF signal cable Woken	5D-FB	Cable-HYC01-01	Mar. 02, 2005
LISN ROHDE & SCHWARZ	ESH3-Z5	100312	Mar. 03, 2005
LISN ROHDE & SCHWARZ	ESH2-Z5	100104	Mar. 02, 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 1.
  3. The VCCI Site Registration No. is C-2040.

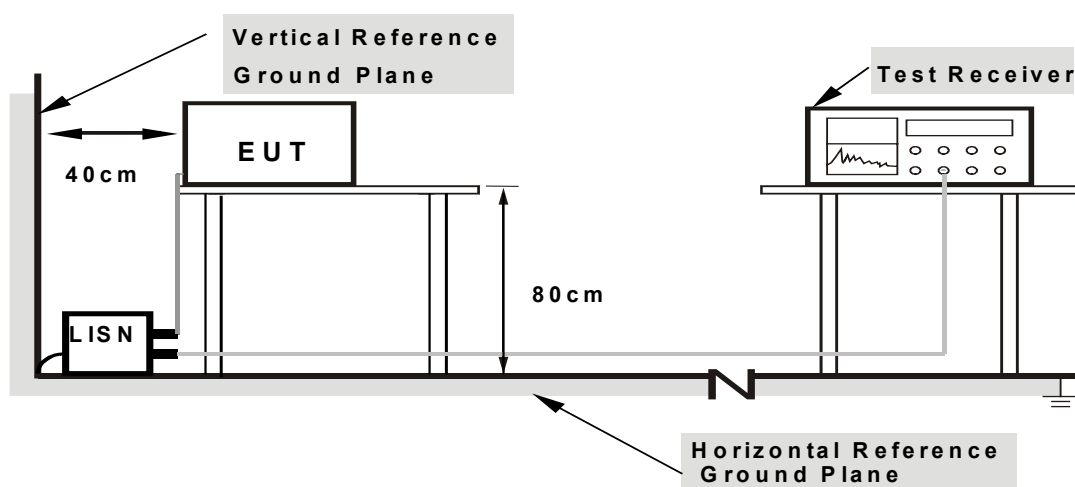
### 4.1.3 TEST PROCEDURE

- 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.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- 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:**
- Support units were connected to second LISN.
  - 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.

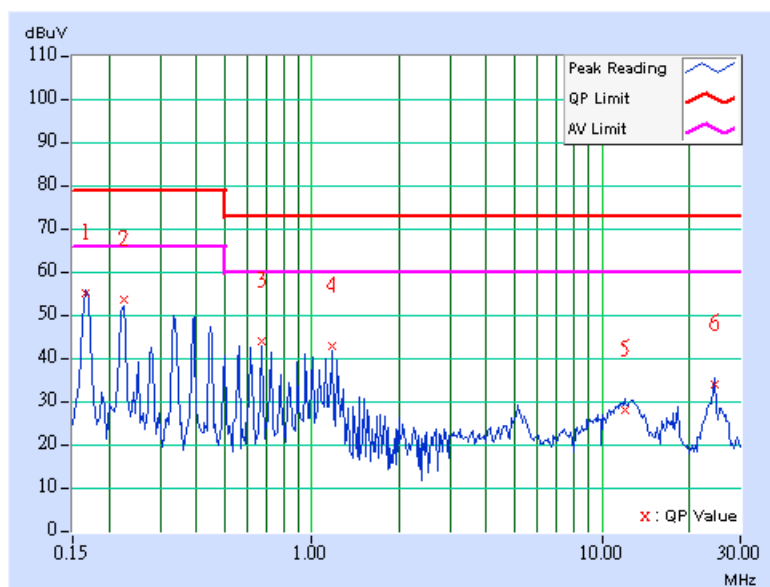


## 4.1.7 TEST RESULTS

EUT	Chassis(with PSA300M)	MODEL NO.	RIO-3309S
INPUT POWER	230 Vac, 50 Hz (AC INPUT 1)	6dB BANDWIDTH	9 kHz
ENVIRONMENTAL CONDITIONS	20 deg. C, 65% RH, 991 hPa	PHASE	Line (L)
TESTED BY	Kent 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	0.166	0.11	54.12	-	54.23	-	79.00	66.00	-24.77	-
2	0.224	0.12	52.39	-	52.51	-	79.00	66.00	-26.49	-
3	0.670	0.13	42.87	-	43.00	-	73.00	60.00	-30.00	-
4	1.172	0.15	41.69	-	41.84	-	73.00	60.00	-31.16	-
5	12.000	0.49	27.01	-	27.50	-	73.00	60.00	-45.50	-
6	24.582	1.15	33.03	-	34.18	-	73.00	60.00	-38.82	-

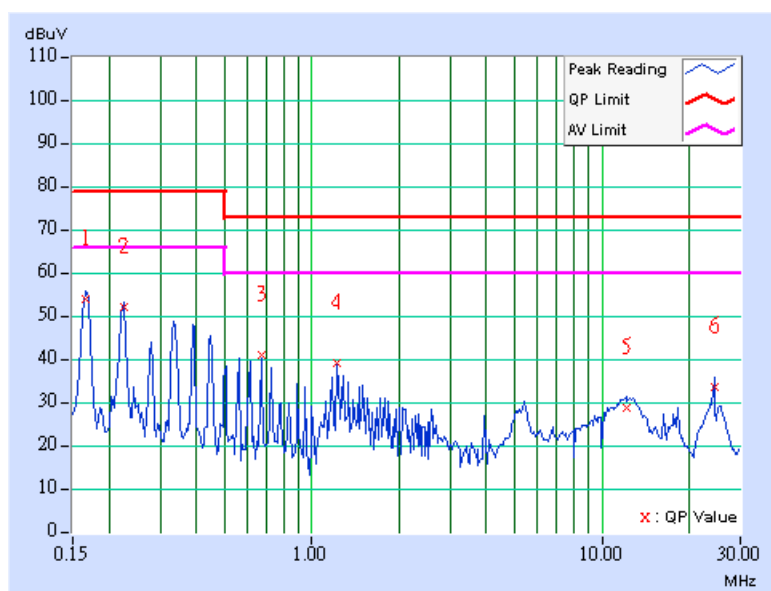
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



<b>EUT</b>	Chassis(with PSA300M)	<b>MODEL NO.</b>	RIO-3309S
<b>INPUT POWER</b>	230 Vac, 50 Hz (AC INPUT 1)	<b>6dB BANDWIDTH</b>	9 kHz
<b>ENVIRONMENTAL CONDITIONS</b>	20 deg. C, 65% RH, 991 hPa	<b>PHASE</b>	Neutral (N)
<b>TESTED BY</b>	Kent Chan		

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	0.166	0.10	53.57	-	53.67	-	79.00	66.00	-25.33	-
2	0.224	0.11	51.60	-	51.71	-	79.00	66.00	-27.29	-
3	0.670	0.12	40.39	-	40.51	-	73.00	60.00	-32.49	-
4	1.227	0.15	38.76	-	38.91	-	73.00	60.00	-34.09	-
5	12.121	0.43	28.26	-	28.69	-	73.00	60.00	-44.31	-
6	24.582	0.67	32.85	-	33.52	-	73.00	60.00	-39.48	-

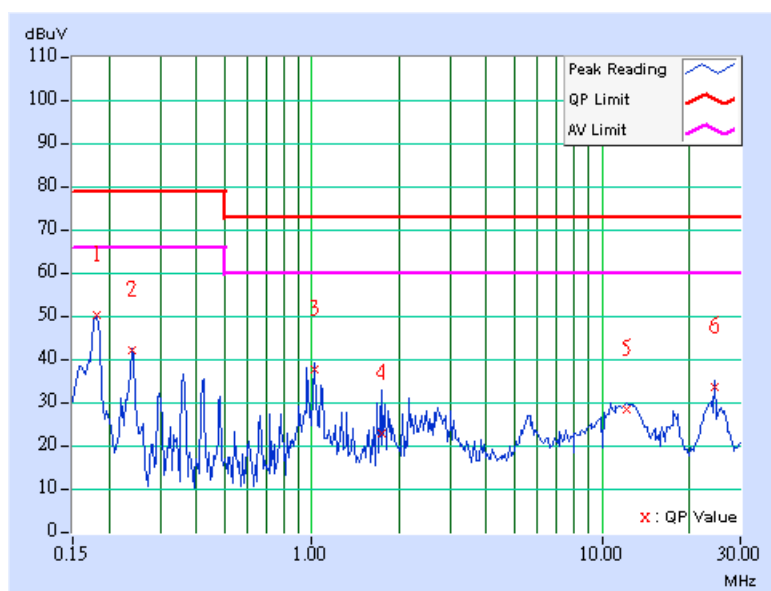
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



<b>EUT</b>	Chassis(with PSA300M)	<b>MODEL NO.</b>	RIO-3309S
<b>INPUT POWER</b>	230 Vac, 50 Hz (AC INPUT 2)	<b>6dB BANDWIDTH</b>	9 kHz
<b>ENVIRONMENTAL CONDITIONS</b>	20 deg. C, 65% RH, 991 hPa	<b>PHASE</b>	Line (L)
<b>TESTED BY</b>	Kent 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	0.181	0.11	49.08	-	49.19	-	79.00	66.00	-29.81	-
2	0.240	0.12	41.10	-	41.22	-	79.00	66.00	-37.78	-
3	1.023	0.15	36.65	-	36.80	-	73.00	60.00	-36.20	-
4	1.738	0.16	21.85	-	22.01	-	73.00	60.00	-50.99	-
5	12.121	0.50	27.25	-	27.75	-	73.00	60.00	-45.25	-
6	24.583	1.15	32.61	-	33.76	-	73.00	60.00	-39.24	-

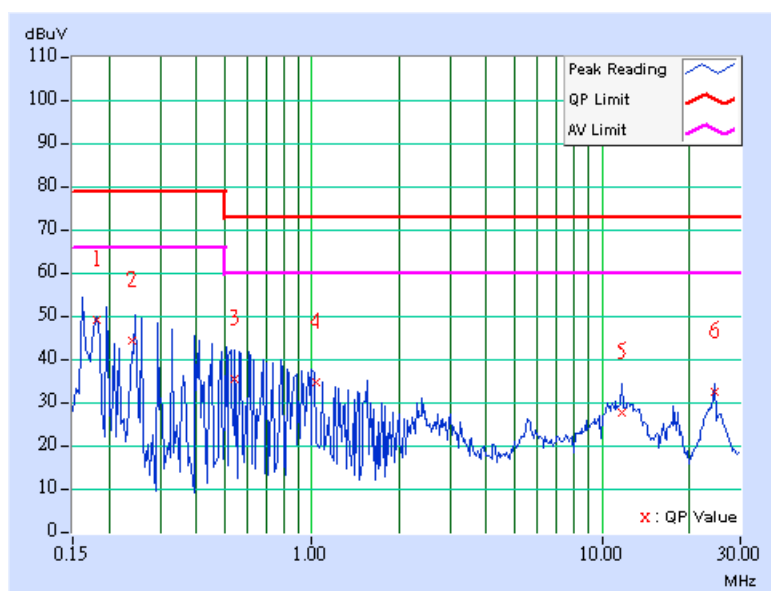
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



<b>EUT</b>	Chassis(with PSA300M)	<b>MODEL NO.</b>	RIO-3309S
<b>INPUT POWER</b>	230 Vac, 50 Hz (AC INPUT 2)	<b>6dB BANDWIDTH</b>	9 kHz
<b>ENVIRONMENTAL CONDITIONS</b>	20 deg. C, 65% RH, 991 hPa	<b>PHASE</b>	Neutral (N)
<b>TESTED BY</b>	Kent Chan		

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	0.182	0.11	48.58	-	48.69	-	79.00	66.00	-30.31	-
2	0.241	0.11	43.86	-	43.97	-	79.00	66.00	-35.03	-
3	0.545	0.12	34.83	-	34.95	-	73.00	60.00	-38.05	-
4	1.029	0.15	34.04	-	34.19	-	73.00	60.00	-38.81	-
5	11.754	0.41	26.99	-	27.40	-	73.00	60.00	-45.60	-
6	24.582	0.67	31.93	-	32.60	-	73.00	60.00	-40.40	-

- 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	910047	NA
Ferrite clamp	FC18	910035	NA
Ferrite clamp	FC18	910046	NA
Ferrite clamp	FC18	910039	NA
Ferrite clamp	FC18	910080	NA
Ferrite clamp	FC18	910070	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.

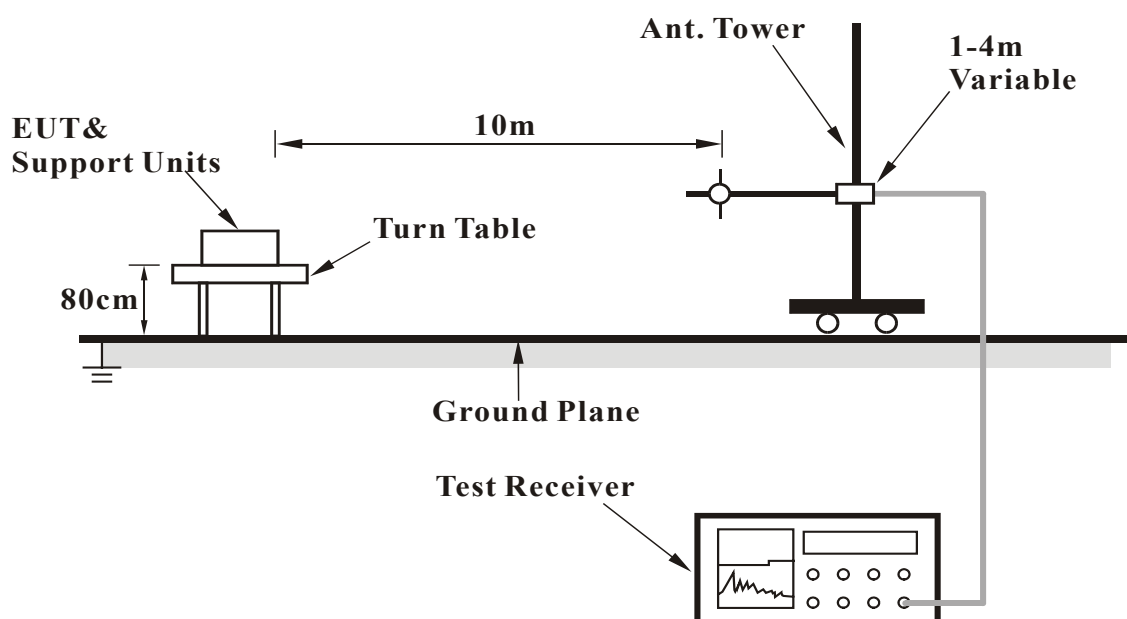
**NOTE:**

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

<b>EUT</b>	Chassis(with PSA300M)	<b>MODEL NO.</b>	RIO-3309S
<b>FREQUENCY RANGE</b>	30 ~ 1000 MHz	<b>INPUT POWER</b>	230 Vac, 50 Hz
<b>ENVIRONMENTAL CONDITIONS</b>	23 deg. C, 68% RH, 991 hPa	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>TESTED BY</b>	Derry Tsai		

### 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	84.39	30.71 QP	40.00	-9.29	3.50 H	358	21.67	9.04
2	135.20	35.49 QP	40.00	-4.51	3.50 H	102	22.60	12.88
3	430.79	37.69 QP	47.00	-9.31	2.00 H	202	19.64	18.05
4	454.15	38.05 QP	47.00	-8.95	2.50 H	160	19.46	18.59
5	749.95	38.57 QP	47.00	-8.43	1.00 H	86	13.84	24.73
6	775.25	39.95 QP	47.00	-7.05	1.00 H	59	15.12	24.83
7	798.61	40.91 QP	47.00	-6.09	1.00 H	104	15.99	24.92
8	909.53	39.40 QP	47.00	-7.60	1.00 H	32	12.92	26.49

### 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	47.41	34.29 QP	40.00	-5.71	1.00 V	265	20.37	13.92
2	73.73	37.85 QP	40.00	-2.15	2.00 V	2	27.32	10.53
3	109.69	32.72 QP	40.00	-7.28	1.00 V	46	21.90	10.82
4	134.99	31.62 QP	40.00	-8.38	1.00 V	2	18.96	12.66
5	479.45	34.79 QP	47.00	-12.21	2.50 V	146	15.98	18.81
6	724.65	37.95 QP	47.00	-9.05	2.00 V	312	14.38	23.58
7	798.61	37.73 QP	47.00	-9.27	1.50 V	326	13.21	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.

## 4.3 HARMONICS CURRENT MEASUREMENT

### 4.3.1 LIMITS OF HARMONICS CURRENT MEASUREMENT

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			

**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.

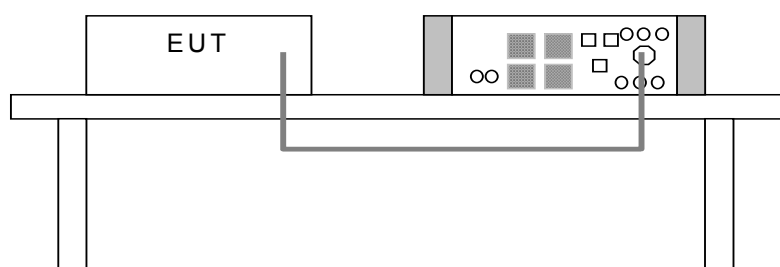
Class D: Equipment having a specified power less than or equal to 600 W of the following types: Personal computers and personal computer monitors and television receivers.

- 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



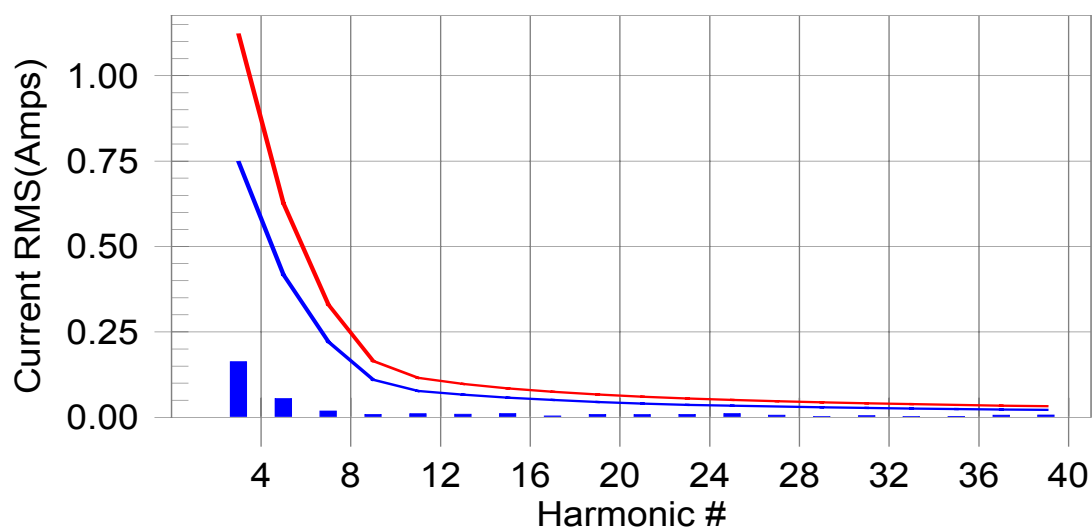
For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

#### **4.3.6 EUT OPERATING CONDITIONS**

- a. The EUT read and wrote messages from/to and HDD.
- b. Prepared other Notebook 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

<b>EUT</b>	Chassis(with PSA300M)	<b>MODEL</b>	RIO-3309S
<b>FUNDAMENTAL VOLTAGE/AMPERE</b>	230.14 Vrms 1.124Arms	<b>POWER FREQUENCY</b>	50.00 Hz
<b>RATED POWER CONSUMPTION</b>	221W	<b>POWER FACTOR</b>	0.892
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 58% RH, 991 hPa	<b>TESTED BY</b>	Kalvin Hsieh



Harm #	Harms (avg) (A)	100% Limit (A)	Harms (max) (A)	150% Limit (A)	Test Result
3	0.153	0.747	0.163	14.56	Pass
5	0.052	0.418	0.055	8.83	Pass
7	0.017	0.221	0.019	5.65	Pass
9	0.008	0.110	0.009	5.31	Pass
11	0.010	0.077	0.011	9.19	Pass
13	0.009	0.066	0.009	9.51	Pass
15	0.010	0.057	0.011	13.20	Pass
17	0.003	0.051	0.004	5.42	Pass
19	0.008	0.045	0.009	12.85	Pass
21	0.007	0.040	0.008	13.77	Pass
23	0.008	0.037	0.009	15.49	Pass
25	0.010	0.034	0.011	22.08	Pass
27	0.006	0.031	0.006	13.57	Pass
29	0.002	0.029	0.002	5.39	Pass
31	0.004	0.027	0.005	11.98	Pass
33	0.002	0.026	0.003	7.74	Pass
35	0.002	0.024	0.003	7.16	Pass
37	0.005	0.023	0.006	18.45	Pass
39	0.006	0.022	0.007	21.78	Pass

**NOTE:** Dynamic limits were applied for this test. The highest harmonics values in the above table may not occur at the same window as the maximum harmonics/limit ratio.

## 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.

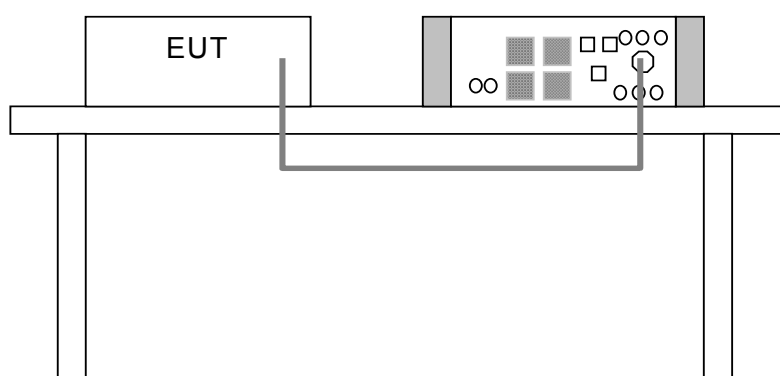
### 4.4.2 TEST PROCEDURE

- 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.
- 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

<b>EUT</b>	Chassis(with PSA300M)	<b>MODEL</b>	RIO-3309S
<b>FUNDAMENTAL VOLTAGE/AMPERE</b>	229.82 Vrms 1.124Arms	<b>POWER FREQUENCY</b>	50.00 Hz
<b>OBSERVATION PERIOD (Tp)</b>	10 min	<b>POWER FACTOR</b>	0.892
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 58% RH, 991 hPa	<b>TESTED BY</b>	Kalvin Hsieh

TEST PARAMETER	MEASUREMENT VALUE	LIMIT	REMARKS
$P_{st}$	0.023	1.0	Pass
$P_{lt}$	0.010	0.65	Pass
$d(t) (\%)$	-0.18	3.3%	Pass
$d_{max} (\%)$	-0.10	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	
<b>Basic Standard, specification requirement, and Performance Criteria:</b>	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	<b>Voltage Dips:</b> 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 <b>Voltage Interruptions:</b> iv) >95% reduction – 250 period, Performance Criterion C

<b>Product Standard:</b>	<b>EN55024:1998+A1:2001+A2:2003</b>	
<b>Basic Standard, specification requirement, and Performance Criteria:</b>	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, 3V/m, 80% AM (1kHz), Performance Criterion A
	IEC 61000-4-4	Electrical Fast Transient/Burst - EFT, Power line: 1kV, Signal line: 0.5kV, 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, 3Vrms, 80% AM, 1kHz, Performance Criterion A
	IEC 61000-4-8	Power Frequency Magnetic Field Test, 50 Hz, 1A/m, Performance Criterion A
	IEC 61000-4-11	Voltage Dips: i) >95% reduction – 0.5 period, Performance Criterion B ii) 30% reduction – 25 period, Performance Criterion C Voltage Interruptions: iii) >95% reduction – 250 period, Performance Criterion C

## 5.2 GENERAL PERFORMANCE CRITERIA DESCRIPTION

<b>CRITERION A</b>	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.
<b>CRITERION B</b>	<p>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.</p> <p>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.</p>
<b>CRITERION C</b>	<p>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.</p> <p>Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.</p>

## 5.3 EUT OPERATING CONDITION

Same as item 4.3.6.

## 5.4 ELECTROSTATIC DISCHARGE IMMUNITY TEST (ESD)

### 5.4.1 TEST SPECIFICATION

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

### 5.4.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Thermo ESD Simulator	MZ-15/EC	0310225	Oct. 06, 2005

**NOTE:** 1. The test was performed in Hwa Ya ESD Room No. 2.  
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.

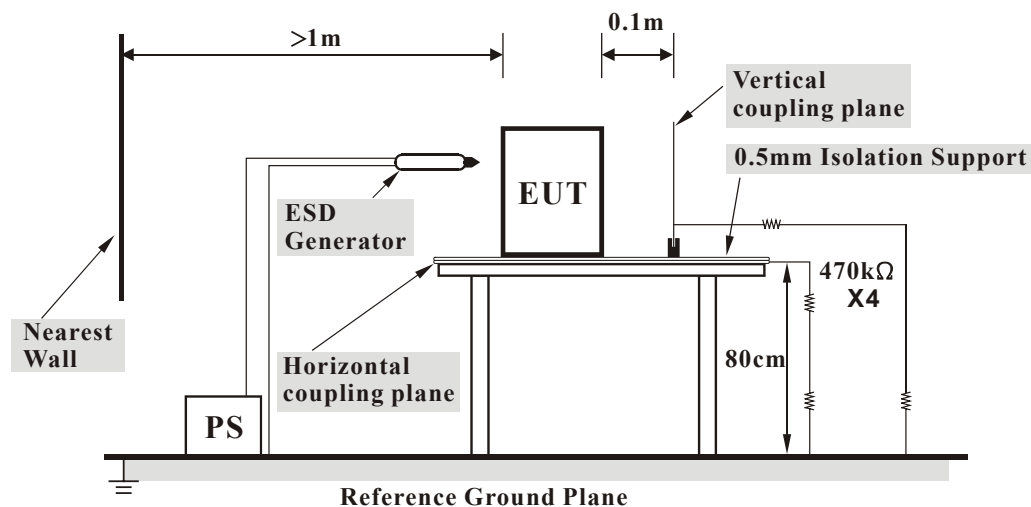
The basic test procedure was in accordance with IEC 61000-4-2:

- 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

<b>EUT</b>	Chassis(with PSA300M)	<b>MODEL</b>	RIO-3309S
<b>ENVIRONMENTAL CONDITIONS</b>	24 deg. C, 51% RH, 986 hPa	<b>INPUT POWER</b>	230 Vac, 50 Hz
<b>TESTED BY</b>	Kalvin Hsieh		

TEST RESULTS OF DIRECT APPLICATION					
Discharge Level (kV)	Polarity (+/-)	Test Point	Contact Discharge	Air Discharge	Test Result
2; 4; 8	+/-	1, 2	NA	NOTE 1	PASS
2; 4	+/-	3~11	NOTE 2	NA	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 1	NOTE 1	PASS

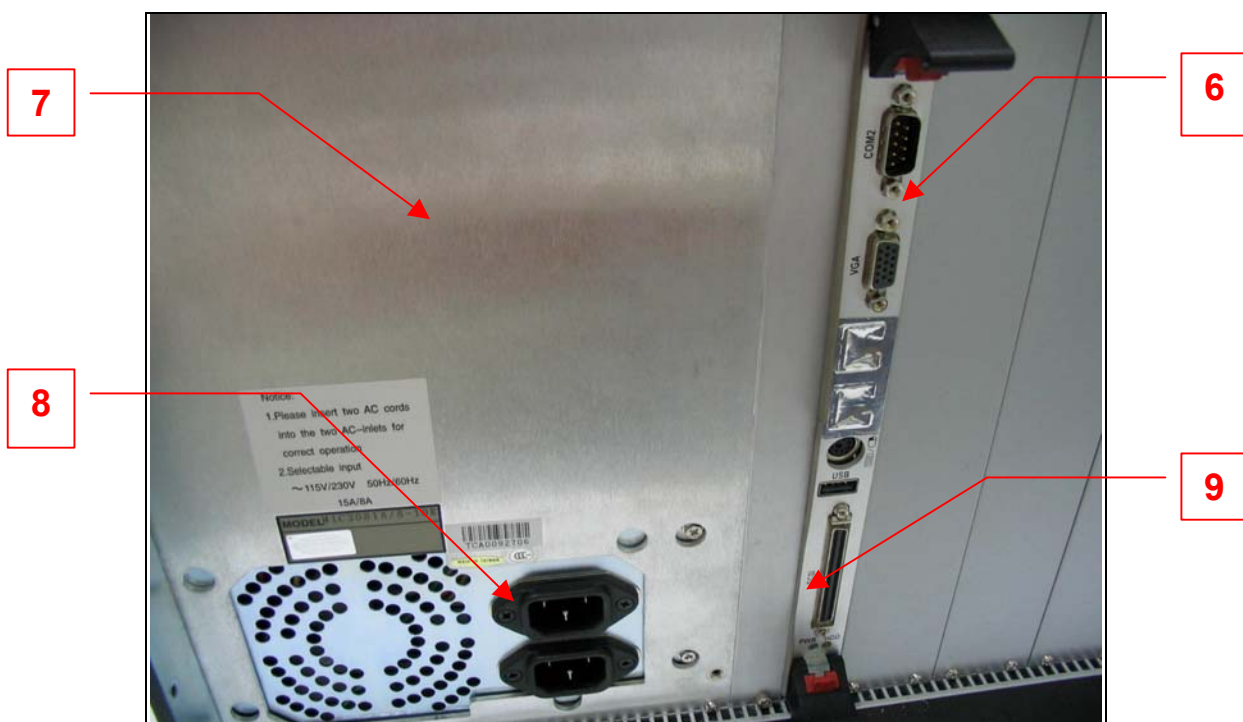
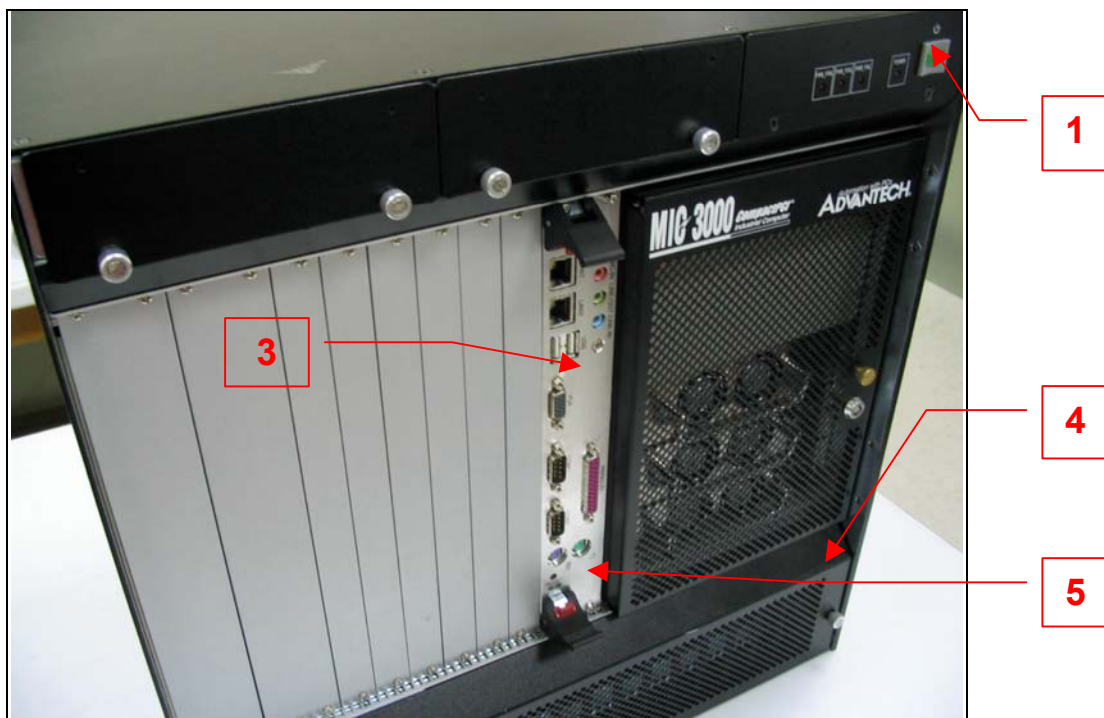
**Description of test point:**

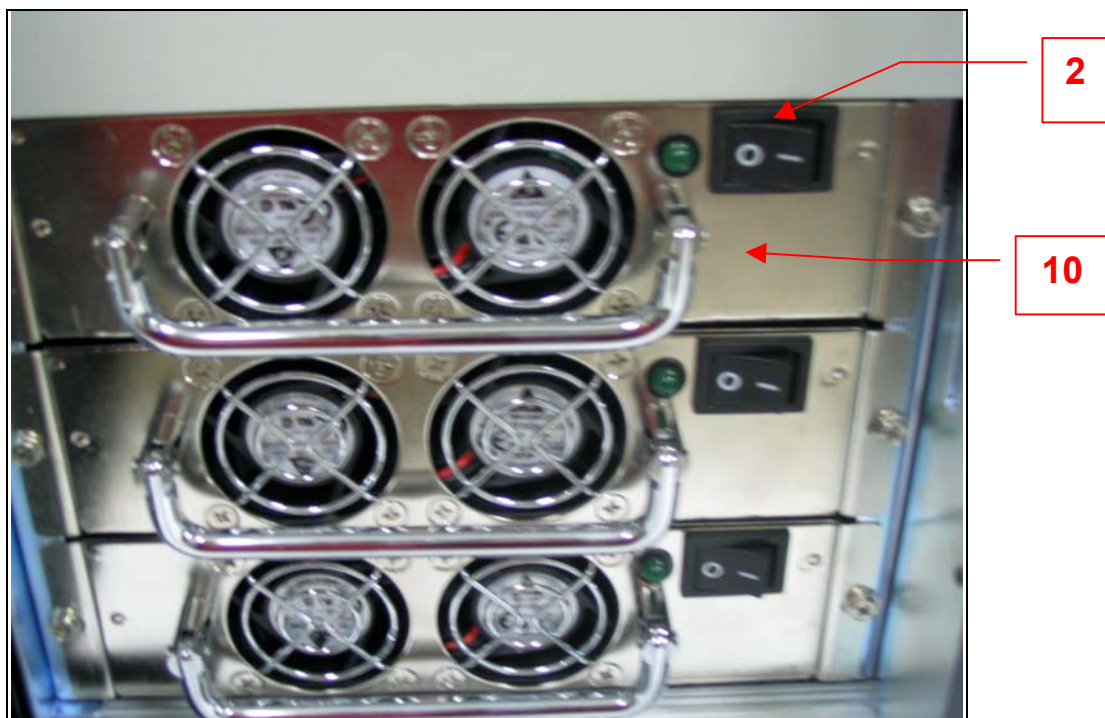
1. Left side    2. Right side    3. Front side    4. Rear side

**NOTE 1:** There was no change compared with initial operation during and after the test.

**NOTE 2:** The EUT stop function during the test, but self-recoverable after the test.







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

### 5.5.1 TEST SPECIFICATION

<b>Basic Standard:</b>	IEC 61000-4-3
<b>Frequency Range:</b>	80 MHz - 1000 MHz
<b>Field Strength:</b>	10 V/m
<b>Modulation:</b>	1 kHz Sine Wave, 80%, AM Modulation
<b>Frequency Step:</b>	1 % of preceding frequency value
<b>Polarity of Antenna:</b>	Horizontal and Vertical
<b>Test Distance:</b>	3 m
<b>Antenna Height:</b>	1.5m
<b>Dwell Time:</b>	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. 24, 2005
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**

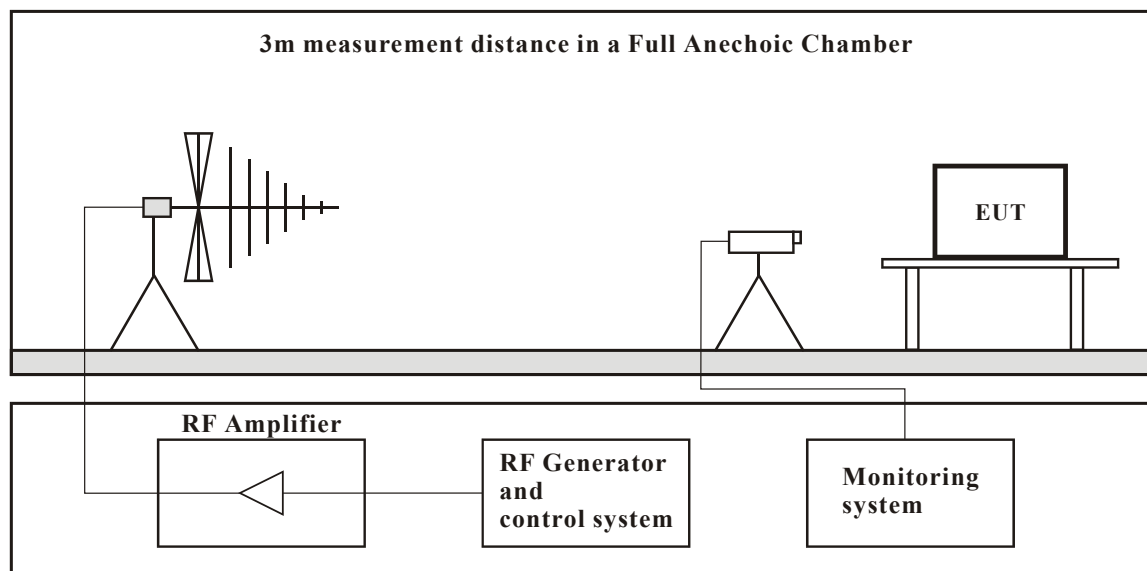
The test procedure was in accordance with IEC 61000-4-3

- 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  $1.5 \times 10^{-3}$  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

<b>EUT</b>	Chassis(with PSA300M)	<b>MODEL</b>	RIO-3309S
<b>ENVIRONMENTAL CONDITIONS</b>	24 deg. C, 60% RH, 986 hPa	<b>INPUT POWER</b>	230 Vac, 50 Hz
<b>TESTED BY</b>	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

<b>Basic Standard:</b>	IEC 61000-4-4
<b>Test Voltage:</b>	Power Line: 2 kV Signal/Control Line: 1 kV
<b>Polarity:</b>	Positive/Negative
<b>Impulse Frequency:</b>	5 kHz
<b>Impulse Waveshape :</b>	5/50 ns
<b>Burst Duration:</b>	15 ms
<b>Burst Period:</b>	300 ms
<b>Test Duration:</b>	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. 14, 2005
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.

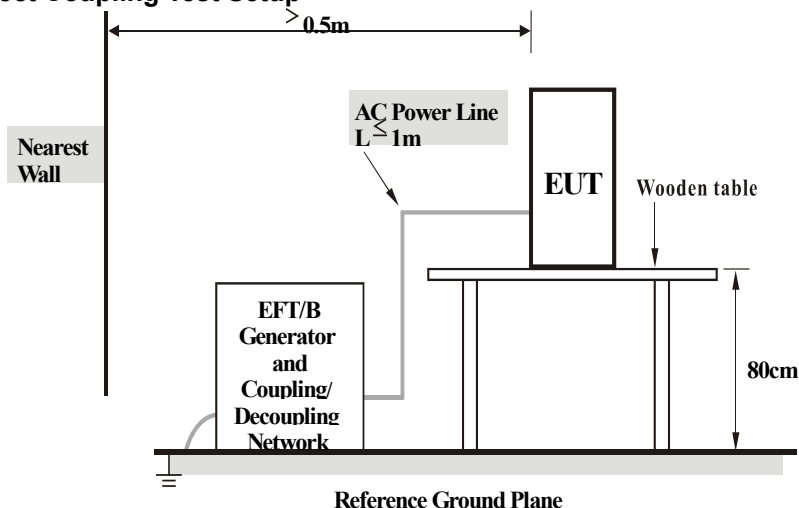
### 5.6.4 DEVIATION FROM TEST STANDARD

No deviation.

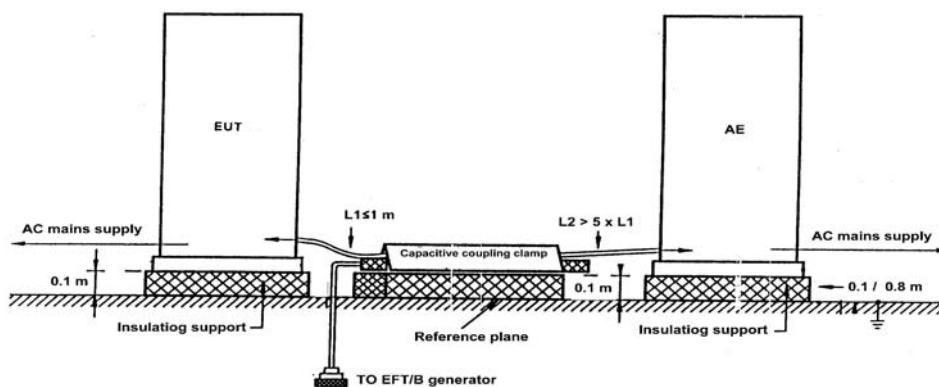


## 5.6.5 TEST SETUP

### 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

<b>EUT</b>	Chassis(with PSA300M)	<b>MODEL</b>	RIO-3309S
<b>ENVIRONMENTAL CONDITIONS</b>	24 deg. C, 60% RH, 986 hPa	<b>INPUT POWER</b>	230 Vac, 50 Hz
<b>TESTED BY</b>	Kalvin Hsieh		

Test Point	Polarity	Test Voltage (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
Cat. 5 Line	+/-	1	NOTE	PASS

**NOTE:** The loss of function of the EUT during the test and it was recovered by itself operation after the test.

## 5.7 SURGE IMMUNITY TEST

### 5.7.1 TEST SPECIFICATION

<b>Basic Standard:</b>	IEC 61000-4-5
<b>Wave-Shape:</b>	Combination Wave 1.2/50 us Open Circuit Voltage 8 /20 us Short Circuit Current
<b>Test Voltage:</b>	Power Line ~ line to line: 0.5 kV; 1 kV; line to ground: 0.5 kV; 1.0 kV; 2kV
<b>Surge Input/Output:</b>	Power Line: L1-L2 / L1-PE / L2-PE
<b>Generator Source</b>	2 ohm between networks
<b>Impedance:</b>	12 ohm between network and ground
<b>Polarity:</b>	Positive/Negative
<b>Phase Angle:</b>	NA
<b>Pulse Repetition Rate:</b>	1 time / min. (maximum)
<b>Number of Tests:</b>	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).

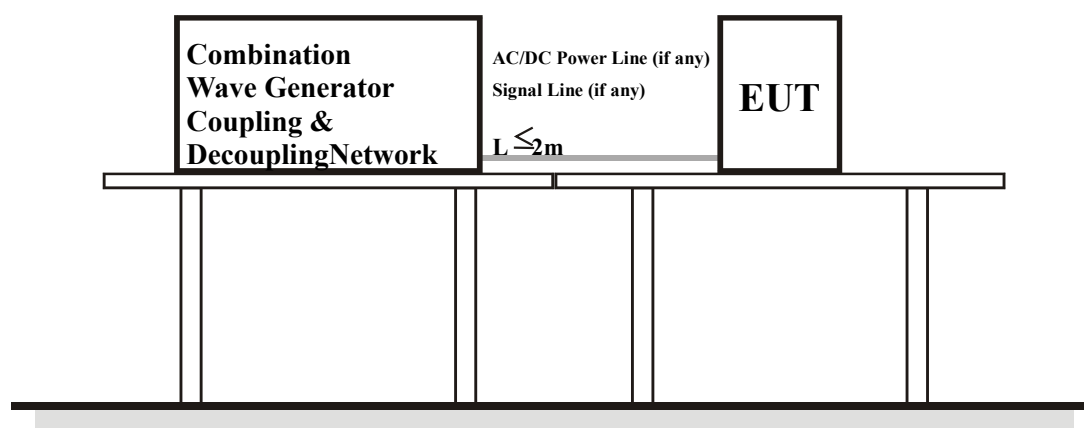
c. For test applied to unshielded symmetrically operated interconnection / telecommunication lines of EUT:

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

<b>EUT</b>	Chassis(with PSA300M)	<b>MODEL</b>	RIO-3309S
<b>ENVIRONMENTAL CONDITIONS</b>	24 deg. C, 60% RH, 986 hPa	<b>INPUT POWER</b>	230 Vac, 50 Hz
<b>TESTED BY</b>	Kalvin Hsieh		

VOLTAGE (kV)	TEST POINT	POLARITY (+/-)	Phase Angle				Test Result
			0°	90°	180°	270°	
0.5; 1	L1-L2	+/-	NOTE	NOTE	NOTE	NOTE	PASS
0.5; 1; 2	L1-PE	+/-	NOTE	NOTE	NOTE	NOTE	PASS
0.5; 1; 2	L2-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

<b>Basic Standard:</b>	IEC 61000-4-6
<b>Frequency Range:</b>	0.15 MHz ~ 80 MHz
<b>Field Strength:</b>	10 V <sub>r.m.s.</sub>
<b>Modulation:</b>	1 kHz Sine Wave, 80%, AM Modulation
<b>Frequency Step:</b>	1 % of preceding frequency value
<b>Coupled Cable:</b>	Power Mains, Shielded
<b>Coupling Device:</b>	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	Nov. 07, 2005
FCC POWER LINE COUPLING DECOUPLING NETWORK	M/N:FCC-801-M2-25A	03049	Nov. 07, 2005
FCC POWER LINE COUPLING DECOUPLING NETWORK	M/N:FCC-801-M2-25A	03050	Nov. 07, 2005
FCC POWER LINE COUPLING DECOUPLING NETWORK	M/N:FCC-801-M3-25A	03056	Nov. 07, 2005
FCC POWER LINE COUPLING DECOUPLING NETWORK	M/N:FCC-801-M3-25A	03057	Nov. 07, 2005
FCC SIGNAL LINE POWER LINE COUPLING DECOUPLING NETWORK	P/N:FCC-801-T2	03030	Nov. 07, 2005
FCC SIGNAL LINE POWER LINE COUPLING DECOUPLING NETWORK	P/N:FCC-801-T4	03031	Nov. 07, 2005
FCC SIGNAL LINE POWER LINE COUPLING DECOUPLING NETWORK	P/N:FCC-801-T8	03032	Nov. 07, 2005
EMI Injection Clamp	P/N:F-203I-23MM	434	Nov. 07, 2005
BOONTON 4232ARF POWER METER	4232A-01-02	104302	Nov. 07, 2005
AR Amplifier	75A250AM2	307804	Nov. 05, 2005
R&S Signal generator	SML 01	102148	Nov. 05, 2005
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  $1.5 \times 10^{-3}$  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.



## 5.8.6 TEST RESULTS

<b>EUT</b>	Chassis(with PSA300M)	<b>MODEL</b>	RIO-3309S
<b>ENVIRONMENTAL CONDITIONS</b>	24 deg. C, 60 % RH, 986 hPa	<b>INPUT POWER</b>	230 Vac, 50 Hz
<b>TESTED BY</b>	Kalvin Hsieh		

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

**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

<b>Basic Standard:</b>	IEC 61000-4-8
<b>Frequency Range:</b>	50Hz
<b>Field Strength:</b>	30 A/m
<b>Observation Time:</b>	1 minute
<b>Inductance Coil:</b>	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	NA
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.

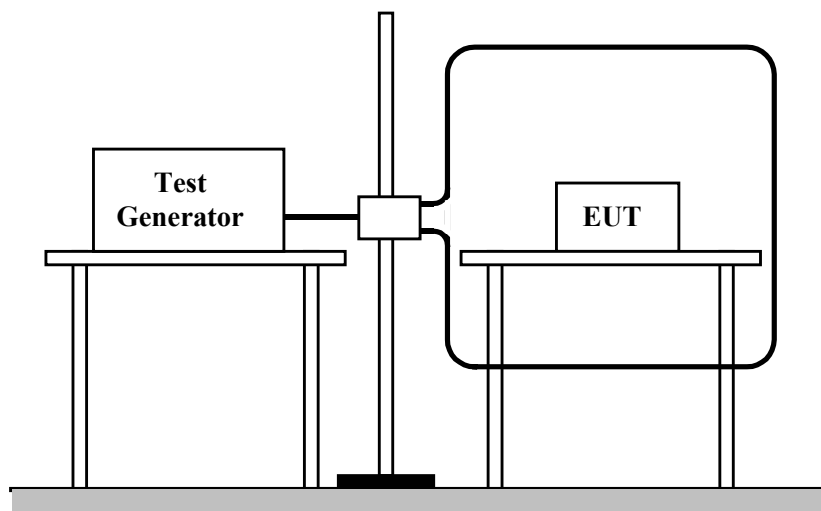
### 5.9.3 TEST PROCEDURE

- 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

<b>EUT</b>	Chassis(with PSA300M)	<b>MODEL</b>	RIO-3309S
<b>ENVIRONMENTAL CONDITIONS</b>	24 deg. C, 60% RH, 986 hPa	<b>INPUT POWER</b>	230 Vac, 50 Hz
<b>TESTED BY</b>	Kalvin Hsieh		

<b>DIRECTION</b>	<b>OBSERVATION</b>	<b>RESULTS</b>
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

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

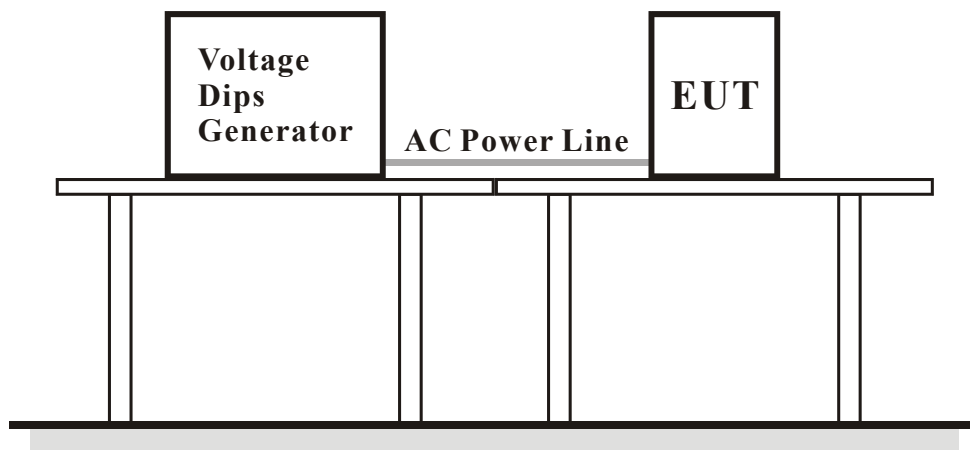
### 5.10.3 TEST PROCEDURE

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

(For EN 61000-6-2)

<b>EUT</b>	Chassis(with PSA300M)	<b>MODEL</b>	RIO-3309S
<b>ENVIRONMENTAL CONDITIONS</b>	26 deg. C, 60% RH, 986 hPa	<b>INPUT POWER</b>	240 Vac, 50 Hz 230 Vac, 50 Hz 100 Vac, 50 Hz
<b>TESTED BY</b>	Kalvin Hsieh		

Ut: 230Vac, 50Hz

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

Ut: 240Vac, 50Hz

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

Ut: 100Vac, 50Hz

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

**NOTE:**

1. There was no change compared with initial operation during the test.
2. The system shut down during the test and it was recovered manually to the initial operation after the test.

**(For EN 55024)**

<b>EUT</b>	Chassis(with PSA300M)	<b>MODEL</b>	RIO-3309S
<b>ENVIRONMENTAL CONDITIONS</b>	24 deg. C, 60% RH, 986 hPa	<b>INPUT POWER</b>	240 Vac, 50 Hz 230 Vac, 50 Hz 100 Vac, 50 Hz
<b>TESTED BY</b>	Kalvin Hsieh		

Ut: 230 Vac, 50 Hz

<b>Voltage % Reduction</b>	<b>Duration (Period)</b>	<b>Observation</b>	<b>Test Result</b>
>95	25	NOTE 1	PASS
30	0.5	NOTE 1	PASS
>95	250	NOTE 2	PASS

Ut: 240 Vac, 50 Hz

<b>Voltage % Reduction</b>	<b>Duration (Period)</b>	<b>Observation</b>	<b>Test Result</b>
>95	25	NOTE 1	PASS
30	0.5	NOTE 1	PASS
>95	250	NOTE 2	PASS

Ut: 100 Vac, 50 Hz

<b>Voltage % Reduction</b>	<b>Duration (Period)</b>	<b>Observation</b>	<b>Test Result</b>
>95	25	NOTE 1	PASS
30	0.5	NOTE 1	PASS
>95	250	NOTE 2	PASS

- NOTE:**
1. There was no change compared with initial operation during the test.
  2. The system shut down during the test and it was recovered manually to the initial operation after the test.

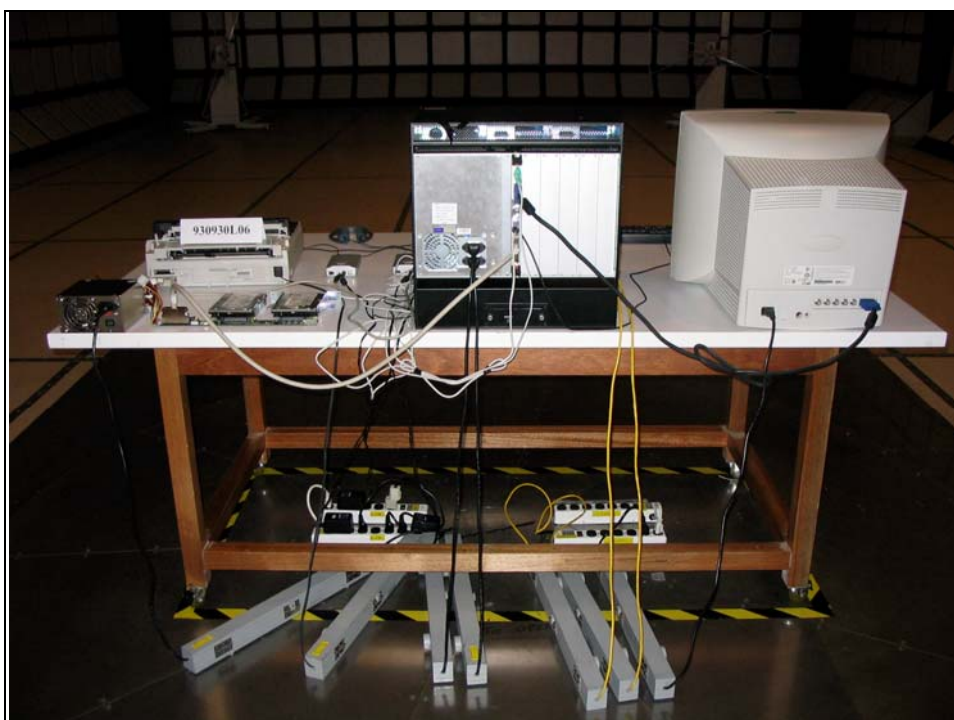
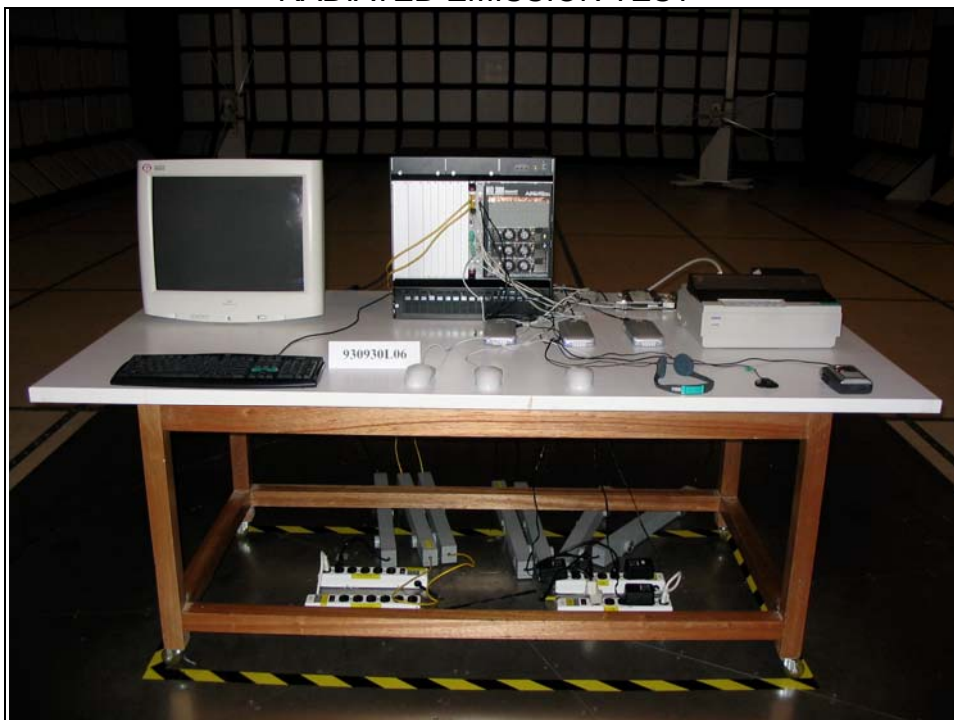
## 6 PHOTOGRAPHS OF THE TEST CONFIGURATION

### CONDUCTED EMISSION TEST

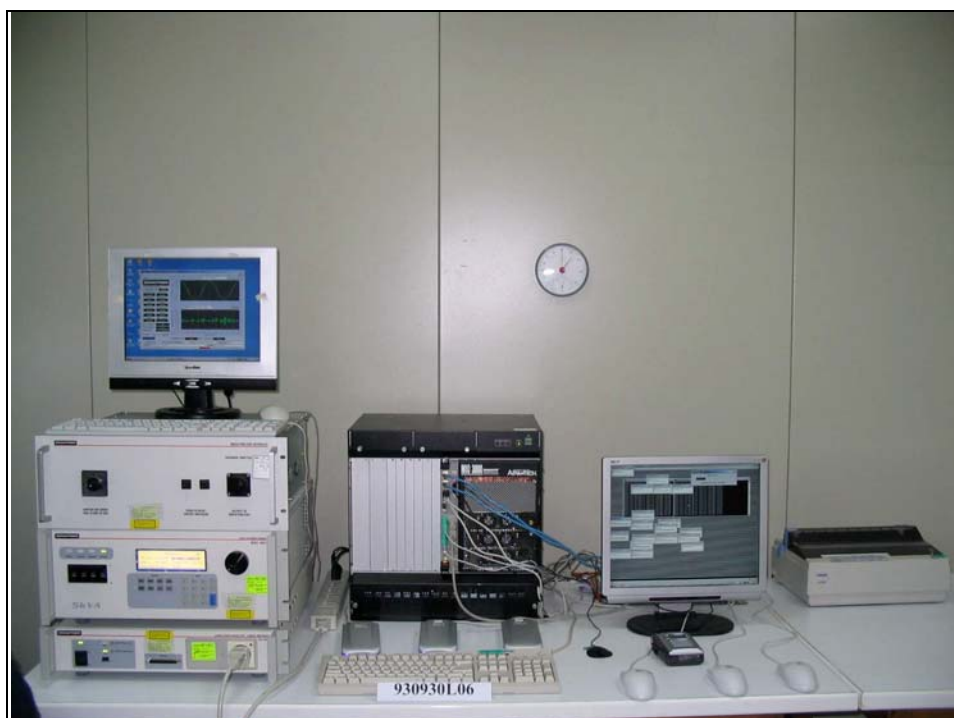




## RADIATED EMISSION TEST



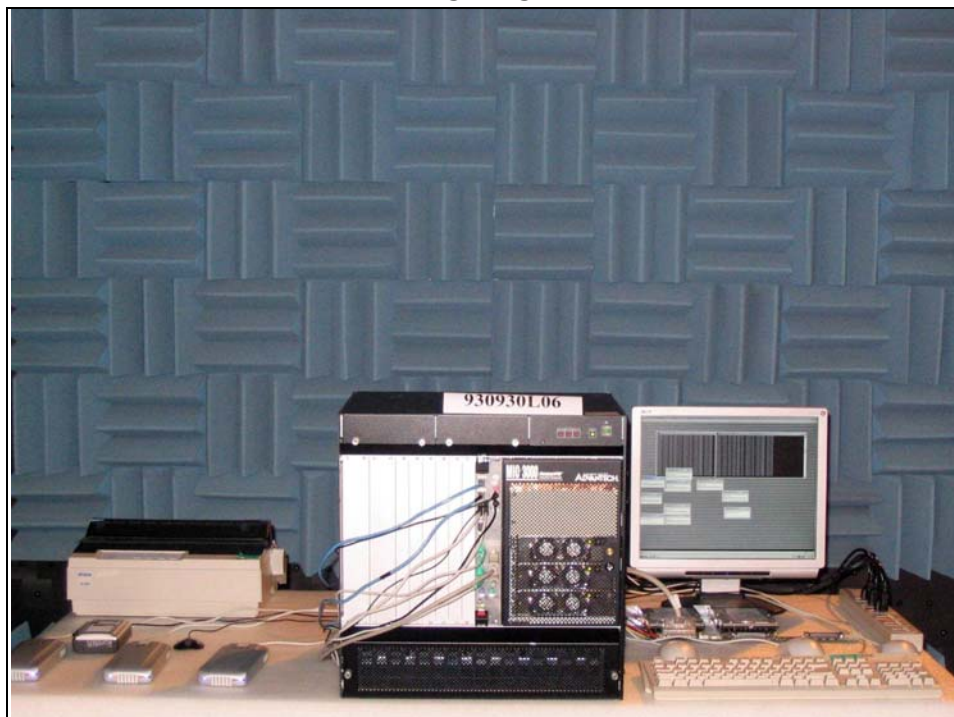
## HARMONICS EMISSION TEST & VOLTAGE FLUCTUATIONS AND FLICKER TEST



## ESD TEST



## RS TEST



## EFT TEST

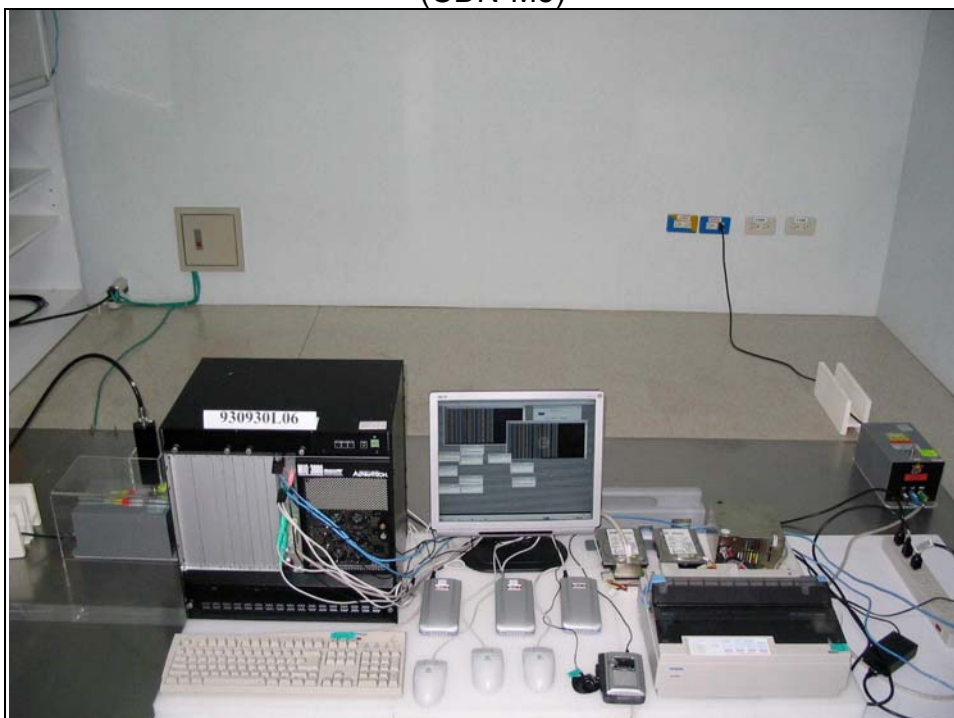


## SURGE TEST

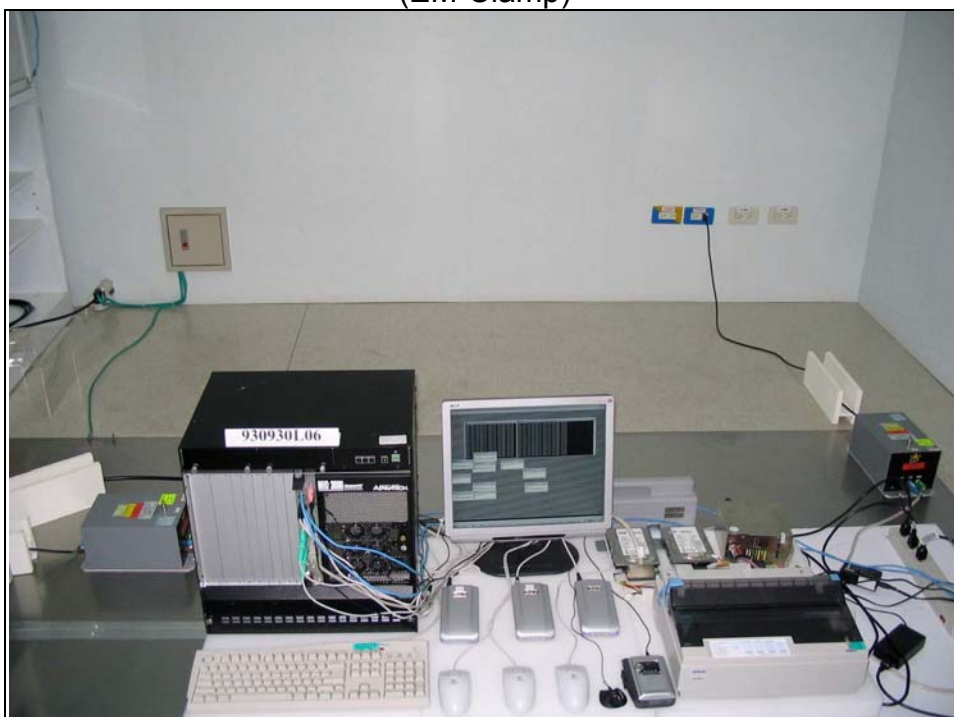




### CONDUCTED SUSCEPTIBILITY TEST (CDN-M3)



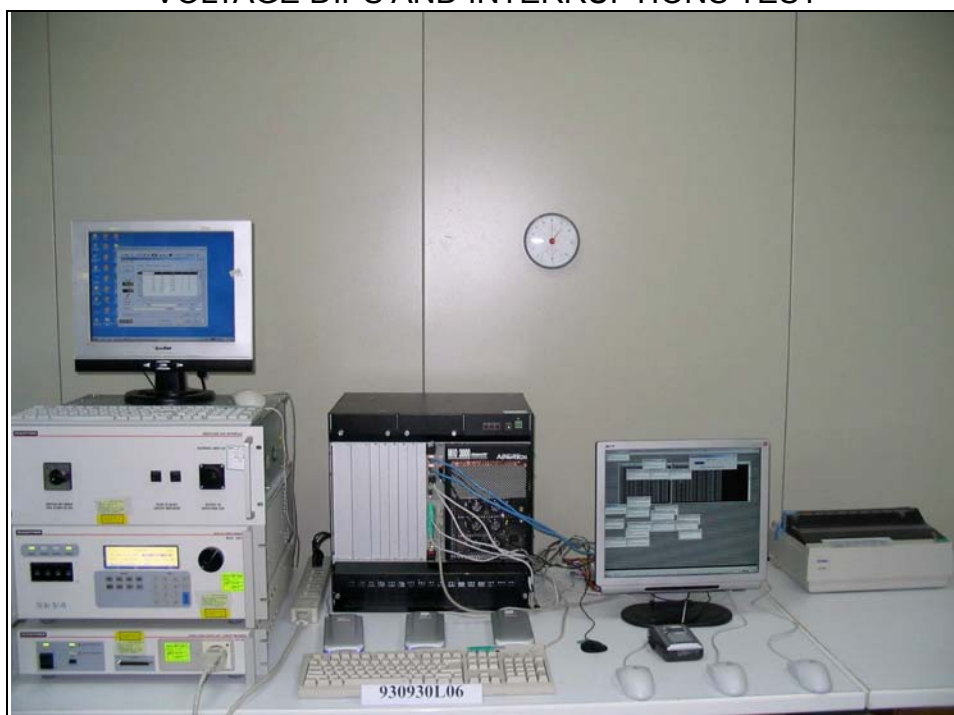
### CONDUCTED SUSCEPTIBILITY TEST (EM-Clamp)



## 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:

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

Fax: 886-3-3270892

**Email:** [service@mail.adt.com.tw](mailto:service@mail.adt.com.tw)

**Web Site:** [www.adt.com.tw](http://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