Spectrum Research & Testing Lab., Inc. No. 101-10, Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan, Taiwan, R.O.C.	**TEST REPORT**	Reference No.:A03040206 Report No.:EMCA03040206 Page:1 of 51 Date:Apr. 17, 2003

Product Name:	CPU board
Model No.:	PCM-6894
Applicant:	AAEON TECHNOLOGY INC. 5F, NO. 135, LANE 235, PAO CHIAO RD., HSIN-TIEN CITY, TAIPEI, TAIWAN, R.O.C.
Date of Receipt:	Apr. 02, 2003
Finished date of Test:	Apr. 09, 2003

Applicable Standards:

Emission	**Immunity**
EN 55011:1998 Group 1 Class A	EN 50082-1:1997
EN 61000-3-2:1995+A1:1998 +A2:1998	- IEC 61000-4-2:1995+A1:1998
EN 61000-3-3:1995+A1:1998	- IEC 61000-4-3:1995+A1:1998
	- ENV 50204:1995
	- IEC 61000-4-4:1995
	- IEC 61000-4-5:1995
	- IEC 61000-4-6:1996
	- IEC 61000-4-8:1993
	- IEC 61000-4-11:1994

We, **Spectrum Research & Testing Laboratory Inc.**, hereby certify that one sample of the above was tested in our laboratory with positive results according to the above-mentioned standards. The records in the report are an accurate account of the results. Details of the results are given in the subsequent pages of this report.

Checked By : Sunyou Chen , Date: 4/17/2003
(Sunyou Chen)

Approved By : , Date: 4/17/2003
(Johnson Ho, Director)

NVLAP®
Lab Code: 200099-0

Table of Contents

1. DOCUMENT POLICY AND TEST STATEMENT 5
1.1 DOCUMENT POLICY 5
1.2 TEST STATEMENT 5
2. DESCRIPTION OF EUT AND TEST MODE 6
2.1 GENERAL DESCRIPTION OF EUT 6
2.2 DESCRIPTION OF EUT INTERNAL DEVICE 6
2.3 DESCRIPTION OF TEST MODE 6
3. DESCRIPTION OF APPLIED STANDARDS 7
4. EMISSION TEST 8
4.1 CONDUCTED EMISSION TEST FOR POWER PORT 8
4.1.1 CONDUCTED EMISSION LIMIT 8
4.1.2 TEST EQUIPMENT 8
4.1.3 TEST SETUP 9
4.1.4 TEST PROCEDURE 9
4.1.5 DESCRIPTION OF SUPPORT UNIT 10
4.1.6 EUT OPERATING CONDITION 10
4.1.7 TEST RESULT 11
4.2 RADIATED EMISSION TEST 12
4.2.1 RADIATED EMISSION LIMIT 12
4.2.2 TEST EQUIPMENT 12
4.2.3 TEST SET-UP 13
4.2.4 TEST PROCEDURE 13
4.2.5 DESCRIPTION OF SUPPORT UNIT 14
4.2.6 EUT OPERATING CONDITION 14
4.2.7 TEST RESULT 15
4.3 CURRENT HARMONICS TEST 16
4.3.2 TEST EQUIPMENT 17
4.3.3 TEST SETUP 17
4.3.4 TEST PROCEDURE 17
4.3.5 DESCRIPTION OF SUPPORT UNIT 17
4.3.6 EUT OPERATING CONDITION 17
4.3.7 TEST RESULT 18
4.4 VOLTAGE FLUCTUATIONS 19
4.4.1 LIMIT 19
4.4.2 TEST EQUIPMENT 19
4.4.3 TEST PROCEDURE 19
4.4.4 TEST SETUP 20
4.4.5 DESCRIPTION OF SUPPORT UNIT 20
4.4.6 EUT OPERATING CONDITION 20
4.4.7 TEST RESULT 21
5. ELECTROSTATIC DISCHARGE IMMUNITY TEST 22
5.1 TEST EQUIPMENT 22

5.2 TEST PROCEDURE 22
5.3 TEST SET-UP 23
5.4 DESCRIPTION OF SUPPORT UNIT 24
5.5 EUT OPERATING CONDITION 24
5.6 TEST CONDITION AND PERFORMANCE CRITERION 24
5.7 SUMMARY OF TEST RESULT 25
6. RADIATED IMMUNITY TEST 26
6.1 TEST EQUIPMENT 26
6.2 TEST PROCEDURE 26
6.3 TEST SETUP 27
6.4 DESCRIPTION OF SUPPORT UNIT 27
6.5 EUT OPERATING CONDITION 27
6.6 TEST CONDITION / PERFORMANCE CRITERIA 28
6.7 TEST RESULT 28
7. RADIATED IMMUNITY TEST 29
7.1 TEST EQUIPMENT 29
7.2 TEST PROCEDURE 29
7.3 TEST SETUP 30
7.4 DESCRIPTION OF SUPPORT UNIT 30
7.5 EUT OPERATING CONDITION 30
7.6 TEST CONDITION / PERFORMANCE CRITERIA 31
7.7 TEST RESULT 31
8. ELECTRICAL FAST TRANSIENT / BURST IMMUNITY TEST 32
8.1 TEST EQUIPMENT 32
8.2 TEST PROCEDURE 32
8.3 TEST SET-UP 33
8.4 DESCRIPTION OF SUPPORT UNIT 33
8.5 EUT OPERATING CONDITION 33
8.6 TEST CONDITION / PERFORMANCE CRITERIA 34
8.7 SUMMARY OF TEST RESULT 34
9. SURGE TEST (POWER LINE) 35
9.1 TEST EQUIPMENT 35
9.2 TEST PROCEDURE 35
9.3 TEST SET-UP 35
9.4 DESCRIPTION OF SUPPORT UNIT 35
9.5 EUT OPERATING CONDITION 35
9.6 TEST CONDITION / PERFORMANCE CRITERIA 36
9.7 SUMMARY OF TEST RESULT 36
10. INDUCED RF FIELDS (CONDUCTED SUSCEPTIBILITY) TEST 37
10.1 TEST EQUIPMENT 37
10.2 TEST PROCEDURE 37
10.3 TEST SET-UP 38
10.4 DESCRIPTION OF SUPPORT UNIT 38
10.5 EUT OPERATING CONDITION 38

10.6 TEST CONDITION / PERFORMANCE CRITERIA 39
10.7 SUMMARY OF TEST RESULT 39
11. POWER FREQUENCY MAGNETIC-FIELD TEST 40
11.1 TEST EQUIPMENT 40
11.2 TEST PROCEDURE 40
11.3 TEST SET-UP 40
11.4 DESCRIPTION OF SUPPORT UNIT 40
11.5 EUT OPERATING CONDITION 41
11.6 TEST CONDITION / PERFORMANCE CRITERIA.....41
11.7 SUMMARY OF TEST RESULT 41
12. VOLTAGE DIPS, INTERRUPTS, VARIATIONS TEST 42
12.1 TEST EQUIPMENT.....42
12.2 TEST PROCEDURE 42
12.3 TEST SET-UP.....42
12.4 DESCRIPTION OF SUPPORT UNIT 42
12.5 EUT OPERATING CONDITION.....42
12.6 TEST CONDITION / PERFORMANCE CRITERIA 43
12.7 SUMMARY OF TEST RESULT.....43
13. PHOTOS OF TESTING..... 44
14. TERMS OF ABRIVATION 51

1. DOCUMENT POLICY AND TEST STATEMENT

1.1 DOCUMENT POLICY

- The report shall not be reproduced except in full, without the written approval of SRT Lab, Inc.
- The report must not be used by the applicant to claim that the product is endorsed by NVLAP.
- The NVLAP logo applies only to the applicable standards specified in this report.

1.2 TEST STATEMENT

- The test results in the report apply only to the unit tested by SRT Lab.
- There was no deviation from the requirements of test standards during the test.
- AC power source, 230 VAC/50 Hz, was used during the test.

2. DESCRIPTION OF EUT AND TEST MODE

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	CPU board
MODEL NO.	PCM-6894
POWER SUPPLY	230V/50Hz
CABLE	N/A

NOTE :

For more detailed information, please refer to the EUT's specification or user's manual provided by manufacturer.

2.2 DESCRIPTION OF EUT INTERNAL DEVICE

DEVICE	BRAND / MAKER	MODEL #	REMARK
POWER SUPPLY	ENHANCE	ENP-1815	
CD-ROM	NEC	CD-2800D	
FDD	MITSUMI	D353F3	
HDD	MAXTOR	40040HZ	

NOTE : The EUT was installed into a PC enclosure which contained the following devices and the CPU installed on EUT is Intel Celeron 800MHz, clock chip is 100MHz.

The memory installed on EUT is 64MB.

2.3 DESCRIPTION OF TEST MODE

The EUT was pre-tested under the following video resolution:
640x480, 800x600 and 1280x1024
The worst emission was found under 1280x1024 and therefore the test data of only this mode is recorded.

3. DESCRIPTION OF APPLIED STANDARDS

The EUT could be used in industrial environment information provided by the applicant, it must comply with the requirements of the following standards:

EN 55011:1998 Group 1 Class A	**EN 50082-1:1999**
EN 61000-3-2:1995+ A1:1998+A2:1998	- IEC 61000-4-2:1995+A1:1998
EN 61000-3-3:1995+A1:1998	- IEC 61000-4-3:1995+A1:1998
	- ENV 50204:1995
	- IEC 61000-4-4:1995
	- IEC 61000-4-5:1995
	- IEC 61000-4-6:1996
	- IEC 61000-4-8:1993
	- IEC 61000-4-11:1994

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

4. EMISSION TEST

4.1 CONDUCTED EMISSION TEST FOR POWER PORT

4.1.1 CONDUCTED EMISSION LIMIT

FREQUENCY (MHz)	Class A (dBμV)		Class B (dBμV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.5 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

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.

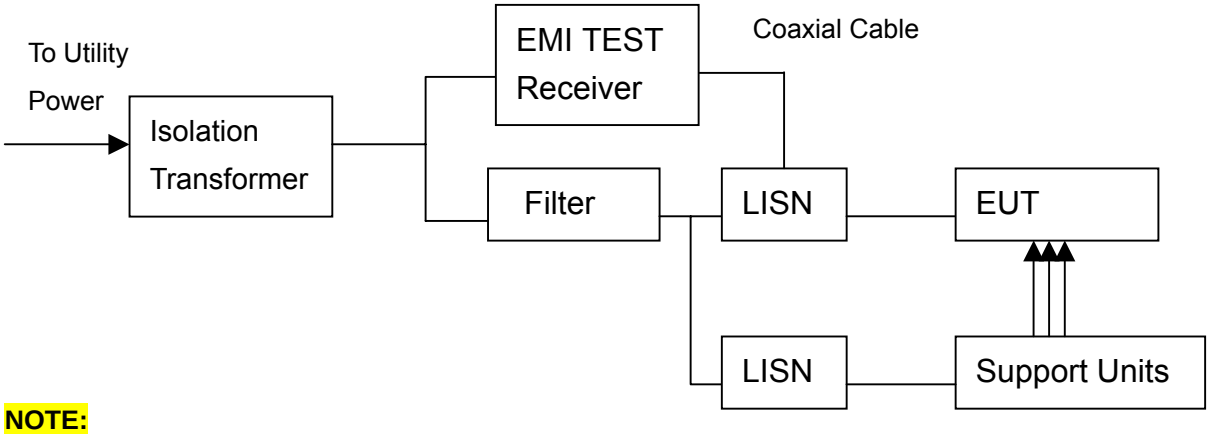
4.1.2 TEST EQUIPMENT

The following test equipment was used for the test :

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
EMI TEST RECEIVER	9 kHz TO 30 MHz	ROHDE & SCHWARZ	ESHS30/ 826003/008	JUL. 2003 R&S
LISN	50 μH, 50 ohm	SOLAR ELECTRONICS	8012-50-R-24-BNC / 924839	JUN. 2003 ETC
LISN	50μH, 50 ohm	SOLAR ELECTRONICS	9252-50-R-24-BNC / 951318	JUN. 2003 ETC

NOTE: The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

4.1.3 TEST SETUP



NOTE:

1. The EUT was put on a wooden table with 0.8m height above ground plane, and 0.4m away from reference ground plane (> 2mx2m).
2. For the actual test configuration, please refer to the photos of testing.

4.1.4 TEST PROCEDURE

The EUT was tested according to the requirement of EN 55011:1998 Group 1 Class A. The frequency spectrum from 0.15 MHz to 30 MHz was investigated. The LISN used was 50 ohm/50uH as specified. All readings were quasi-peak and average values with 10 kHz resolution bandwidth of the test receiver.The EUT system was operated in all typical methods by users. Both lines of the power mains of EUT were measured and the cables connected to EUT and support units were moved to find the maximum emission levels for each frequency.

4.1.5 DESCRIPTION OF SUPPORT UNIT

The EUT was configured by the requirement of EN 55011. All interface ports were connected to the appropriate support units via specific cables. The support units and cables are listed below.

NO	DEVICE	BRAND	MODEL #	CABLE
1	MONITOR	SAMSUNG	PG17IS	1.5m unshielded power cord 1.2m shielded data cable
2	PRINTER	EPSON	STYLUS C20SX	1.5m unshielded power cord 1.2m shielded data cable
3	MODEM	ACEEX	DM-1414	1.5m unshielded DC power cable 1.2m shielded data cable
4	MODEM	ACEEX	DM-1414	1.5m unshielded DC power cable 1.2m shielded data cable
5	KEYBOARD	ACER	6311-TA	1.5m unshielded data cable
6	MOUSE	LOGITECH	M-S34	1.5m unshielded data cable
7	COM MOUSE	LOGITECH	M-M35	1.5m unshielded data cable
8	COM MOUSE	LOGITECH	M-M35	1.5m unshielded data cable
9	USB MOUSE	HP	MO195CA	1.5m unshielded data cable
10	USB MOUSE	HP	MO195CA	1.5m unshielded data cable
11	SPEAKER	JS	J-205A	1.5m unshielded power cord 1.2m unshielded data cable
12	WALKMAN	AIWA	HS-J470	1.2m unshielded data cable
13	MICROPHONE	TAKY	UDM-606	1.8m unshielded data cable

NOTE : For the actual test configuration, please refer to the photos of testing.

4.1.6 EUT OPERATING CONDITION

1. Under Windows 98 ran “EMI TEST”, “WIN FCC” and “FLASH” programs.
2. PC sent "H" pattern or accessed the following peripherals directly or via EUT:
   - Color Monitor
   - RS232
   - Keyboard
   - Mouse
   - Printer
   - FDD
   - HDD
3. Accessed data from internet.

4.1.7 TEST RESULT

Temperature:	25 °C	Humidity:	60 %RH
Ferquency Range:	0.15 – 30 MHz	Test Mode:	N/A
Receiver Detector:	Q.P. and AV.	Tested By:	Eric Yao

Power Line Measured : Line

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBμV)		Emission Level (dBμV)		Limit (dBμV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.209	0.20	29.8	-	30.0	-	79.0	66.0	-49.0	N/A
0.502	0.20	35.1	-	35.3	-	73.0	60.0	-37.7	N/A
0.658	0.20	36.5	-	36.7	-	73.0	60.0	-36.3	N/A
1.123	0.20	32.4	-	32.6	-	73.0	60.0	-40.4	N/A
14.373	0.49	32.4	-	32.9	-	73.0	60.0	-40.1	N/A
22.068	0.64	36.3	-	36.9	-	73.0	60.0	-36.1	N/A

Power Line Measured : Neutral

Freq. (MHz)	Correct. Factor (dB)	Reading Value (dBμV)		Emission Level (dBμV)		Limit (dBμV)		Margin (dB)	
		Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.271	0.20	41.6	-	41.8	-	79.0	66.0	-37.2	N/A
0.502	0.20	35.1	-	35.3	-	73.0	60.0	-37.7	N/A
0.810	0.20	36.3	-	36.5	-	73.0	60.0	-36.5	N/A
1.509	0.20	31.9	-	32.1	-	73.0	60.0	-40.9	N/A
2.205	0.20	28.2	-	28.4	-	73.0	60.0	-44.6	N/A
21.474	0.63	36.6	-	37.2	-	73.0	60.0	-35.8	N/A

NOTE :

1. Measurement uncertainty is 2dB
2. Emission level = Reading valus + Correction factor
3. Correction Factor = Cable loss + Insertion loss of LISN
4. Margin value = Emission level - Limit
5. The emission of other frequencies were very low against the limit.
6. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.

4.2 RADIATED EMISSION TEST

4.2.1 RADIATED EMISSION LIMIT

EN 55011:1998 Group 1 limits of radiated emission measurement for frequency below 1000 MHz

FREQUENCY (MHz)	Class A (at 10m)	Class B (at 10m)
	dBμV/m	dBμV/m
30 – 230	40	30
230 - 1000	47	37

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBμV/m) = 20 log Emission level (μV/m).

4.2.2 TEST EQUIPMENT

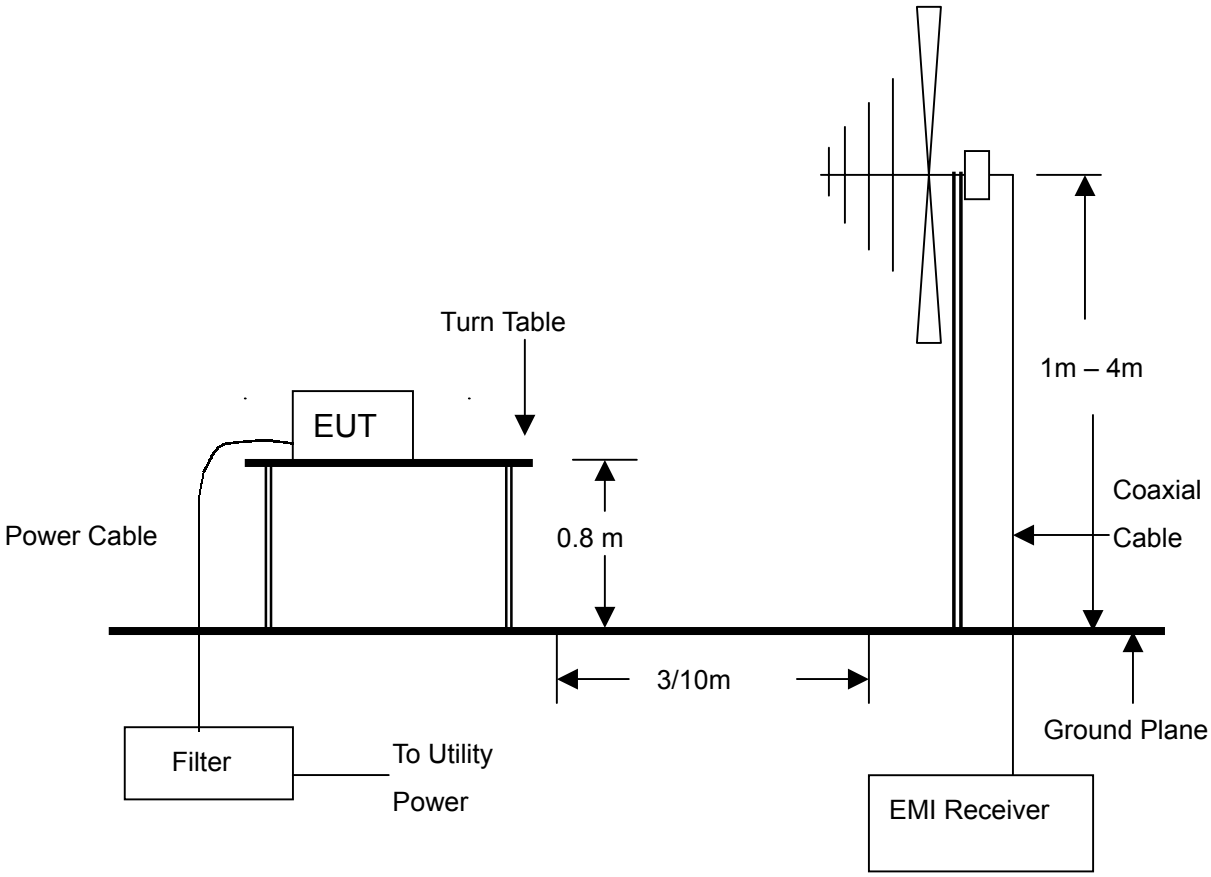
The following test equipment was used during the radiated emission test :

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
EMI TEST RECEIVER	9 kHz TO 2750 MHz	ROHDE & SCHWARZ	ESCS30/ 830245/012	AUG. 2003 R&S
BI-LOG ANTENNA	25 MHz TO 2 GHz	EMCO	3142/ 9701-1124	APR. 2003 ETC
OATS	3 – 10 M MEASUREMENT	SRT	SRT-1	MAY 2003 SRT

NOTE:

1. The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.
2. The Open Area Test Site (SRT-1) is registered by FCC with No. 90957 and VCCI with No. R-1081.
3. The Open Area Test Site (SRT-2) is registered by FCC with No. 98458 and VCCI with No. R-1168.

4.2.3 TEST SET-UP



NOTE:

1. The EUT system was put on a wooden table with 0.8m heights above a ground plane.
2. For the actual test configuration, please refer to the photos of testing.

4.2.4 TEST PROCEDURE

The EUT was tested according to the requirement of EN 55011:1998 Group 1 Class A. The measurements were made at an open area test site with 10 meter measurement distance. The frequency spectrum measured from 30 MHz to 1 GHz. All readings were quasi-peak values with 120 kHz resolution bandwidth of the test receiver. The EUT system was operated in all typical methods by users. The cables connected to EUT and support units were moved to find the maximum emission levels for each frequency.

4.2.5 DESCRIPTION OF SUPPORT UNIT

Same as section 4.1.5 of this report.

4.2.6 EUT OPERATING CONDITION

Same as section 4.1.6 of this report.

4.2.7 TEST RESULT

Temperature:	20 °C	Humidity:	56 %RH
Ferquency Range:	30 – 1000 MHz	Measured Distance:	10m
Receiver Detector:	Q.P.	Tested mode:	N/A
Tested by:	Eric Yao		

Antenna Polarization:Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
166.3870	1.58	8.96	26.2	36.7	40.0	-3.3	213.0	4.0
188.6470	1.59	10.42	24.2	36.2	40.0	-3.8	301.0	4.0
216.0355	1.72	10.34	22.1	34.2	40.0	-5.8	49.0	3.5
232.9320	1.89	10.82	31.8	44.5	47.0	-2.5	316.0	4.0
299.4790	2.06	14.42	28.5	44.9	47.0	-2.1	31.0	4.0
323.2570	2.02	14.91	21.8	38.7	47.0	-8.3	297.0	4.0

Antenna Polarization:Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
120.3470	1.34	7.50	18.7	27.5	40.0	-12.5	187.0	1.0
216.0348	1.72	10.34	19.2	31.3	40.0	-8.7	51.0	1.0
232.9370	1.89	10.82	24.5	37.2	47.0	-9.8	324.0	1.0
299.4810	2.06	14.42	24.4	40.9	47.0	-6.1	31.0	1.0
323.2490	2.02	14.91	19.2	36.1	47.0	-10.9	299.0	1.0
499.9420	2.94	18.57	11.9	33.4	47.0	-13.6	175.0	1.0

NOTE :

1. Measurement uncertainty is 4dB.
2. "*": Measurement does not apply for this frequency.
3. Emissiom Level = Reading Value + Ant. Factor + Cable Loss.
4. The field strength of other emission frequencies were very low against the limit.

4.3 CURRENT HARMONICS TEST

4.3.1 LIMIT

For Class A Equipment

EVEN HARMONICS		ODD HARMONICS	
HARMONICS ORDER	LIMIT (Amp.)	HARMONICS ORDER	LIMIT (Amp.)
2	1.08	3	2.30
4	0.43	5	1.14
6	0.30	7	0.77
8 < n < 40	0.23 x 8 / n	9	0.40
		11	0.33
		13	0.21
		15 < n < 39	0.15 x 8 / n

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	0.15 x 15 / n

NOTE:

1. Class A and Class D are judged by test equipment automatically as per Section 5 of EN 61000-3-2:1995

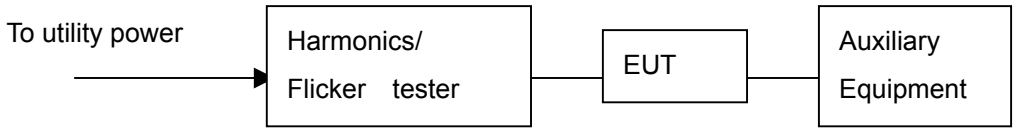
2. The above limits for Class D equipment are for all applications having an active input power > 75 W. No limits apply for equipment with an active input power up to and including 75 W.

4.3.2 TEST EQUIPMENT

EQUIPMENT / FACILITIES	MANUFACTURER	MODEL # / SERIAL #	DUE DATE OF CAL. & CAL. CENTER
MAIN UNIT	HP	6842A/ 3734A00212	MAR. 2003 AGILENT

NOTE: The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

4.3.3 TEST SETUP



NOTE :

1. The EUT system was put on a wooden table with 0.8m high.
2. For the actual test configuration, please refer to the photos of testing.

4.3.4 TEST PROCEDURE

According to EN61000-3-2

4.3.5 DESCRIPTION OF SUPPORT UNIT

Same as section 4.1.5 of this report.

4.3.6 EUT OPERATING CONDITION

Same as section 4.1.6 of this report.

4.3.7 TEST RESULT

Temperature:	20 °C	Humidity:	55% RH
Fundamental Current:	0.219A	Max. Power	
Voltage:	225.5Vrms	Consumption:	47.5W
Power Factor:	0.451	Tested mode:	N/A
Tested by:	Eric Yao	Test Result:	Pass

Because the power of EUT was below 75W, so the EUT didn't need be tested.

4.4 VOLTAGE FLUCTUATIONS

4.4.1 LIMIT

Short-team flicker (P_{st}) : 1.0

Long-term flicker (P_{lt}) : 0.65

Relative steady-state voltage change (D_c) : ≤ 3%

Relative voltage change characteristic (D (t)) > 3% ; ($T_{D(t)}$) : ≤ 200 ms

Maximum relative voltage change (D_{max}) : ≤ 4%

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.
$T_{D(t)}$ (ms)	200	$T_{D(t)}$ means maximum time that D (t) exceeds 3 %.
D_{max} (%)	4%	D_{max} means maximum relative voltage change.
D_c (%)	3%	D_c means relative steady-state voltage change

4.4.2 TEST EQUIPMENT

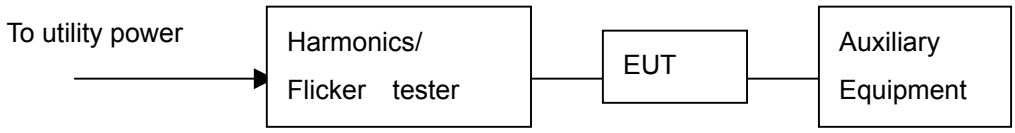
EQUIPMENT / FACILITIES	MANUFACTURER	MODEL # / SERIAL #	DUE DATE OF CAL. & CAL. CENTER
MAIN UNIT	HP	6842A/ 3734A00212	MAR. 2003 AGILENT

NOTE: The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

4.4.3 TEST PROCEDURE

According to EN 61000-3-3

4.4.4 TEST SETUP



NOTE : 1. The EUT system was put on a wooden table with 0.8m high.

2. For the actual test configuration, please refer to the photos of testing.

4.4.5 DESCRIPTION OF SUPPORT UNIT

Same as section 4.1.5 of this report.

4.4.6 EUT OPERATING CONDITION

Same as section 4.1.6 of this report.

4.4.7 TEST RESULT

Temperature:	20 °C	Humidity:	55% RH
Input Voltage:	225.5Vrms	Observation	
Ampere:	0.5Arms	Period:	1Hr
Power Factor:	0.456	Tested mode:	N/A
Tested by:	Eric Yao	Test Result:	Pass

Test Result:

TEST PARAMETER	MEASUREMENT VALUE	LIMIT	TEST RESULT
P_{st}	0.09	1.0	PASS
P_{lt}	0.00	0.65	PASS
$T_{D(t)}$ (ms)	0.01	200	PASS
D_{max} (%)	0%	4%	PASS
D_c (%)	0%	3%	PASS

NOTE:

1. P_{st} means short-term flicker indicator.
2. P_{lt} means long-term flicker indicator.
3. $T_{D(t)}$ means maximum time that D(t) exceeds 3 %.
4. D_{max} means maximum relative voltage change.
5. D_c means relative steady-state voltage change.
6. N/A: Not applicable.

5. ELECTROSTATIC DISCHARGE IMMUNITY TEST

5.1 TEST EQUIPMENT

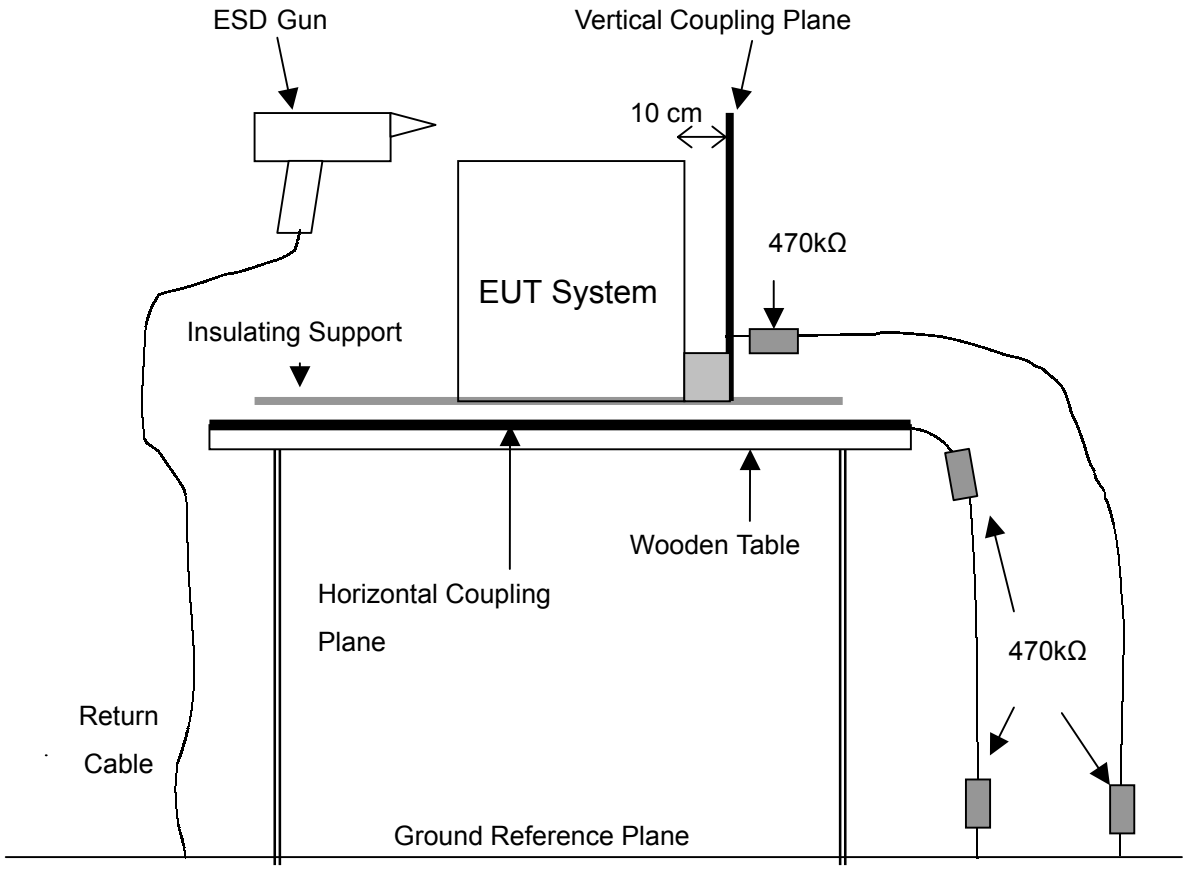
EQUIPMENT / FACILITIES	MANUFACTURER	MODEL # / SERIAL #	DUE DATE OF CAL. & CAL. CENTER
ESD SIMULATOR	NOISEKEN	ESS-100L(A)/TC-815P/ 8099C02238/7099C02	NOV. 2003 ETC

NOTE: The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

5.2 TEST PROCEDURE

According to IEC/EN 61000-4-2

5.3 TEST SET-UP



NOTE :

1. The wooden table should be 0.8m high for table top EUT and 0.1m for floor-standing EUT.
2. For the actual test configuration, please refer to the photos of testing.
3. A distance of 1m minimum was provided between EUT and walls / other metallic structure.

5.4 DESCRIPTION OF SUPPORT UNIT

Same as section 4.1.5 of this report.

5.5 EUT OPERATING CONDITION

Same as section 4.1.6 of this report.

5.6 TEST CONDITION AND PERFORMANCE CRITERION

1. Test condition

(1) R-C Network	: 330 Ω, 150 pF
(2) Test level: Air Discharge	: ±2kV, ±4kV, ±8kV
Contact discharge	: ±2kV, ±4kV
HCP discharge :	±2kV, ±4kV
VCP discharge :	±2kV, ±4kV
(3) Discharge mode	: Single discharge
(4) Discharge period	: at least 1 s
(5) Discharge polarity	: Positive and Negative
(6) Number of discharge	: Minimum 50 times at each test point of contact discharge and at least 200 times of discharge to EUT in total. Minium 10 times at each test area of air discharge selected.

2. Standard requirement : Criterion B

3. Performance criterion

(1) Criterion A	: Normal performance during test
(2) Criterion B	: Temporary degradation or loss of function or performance which is self-recoverable
(3) Criterion C	: Temporary degradation or loss of function or performance which requires operator intervention system reset

5.7 SUMMARY OF TEST RESULT

Temperature:	21°C	Humidity:	53% RH
Test Result:	Criterion A pass	Tested by:	Eric Yao

SEVERITY LEVEL	COUPLING MODE & TEST OBSERVATION			
	AIR DISCHARGE	CONTACT DISCHARGE	HCP	VCP
±2kV	A	A	A	A
±4kV	A	A	A	A
±8kV	A	NR	NR	NR

NOTE:

Description of test observation:

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

NR: No requirement

Description of test points:

1. Metal connectors on rear side of EUT.
2. Metal connectors on front side of EUT.
3. Metal enclosure of EUT.
4. Screws of EUT enclosure.
5. Power switch on front side of EUT.
6. Power switch on rear side of EUT.
7. LED on front side of EUT.
8. Screws around the fans on rear side of EUT.

6. RADIATED IMMUNITY TEST

6.1 TEST EQUIPMENT

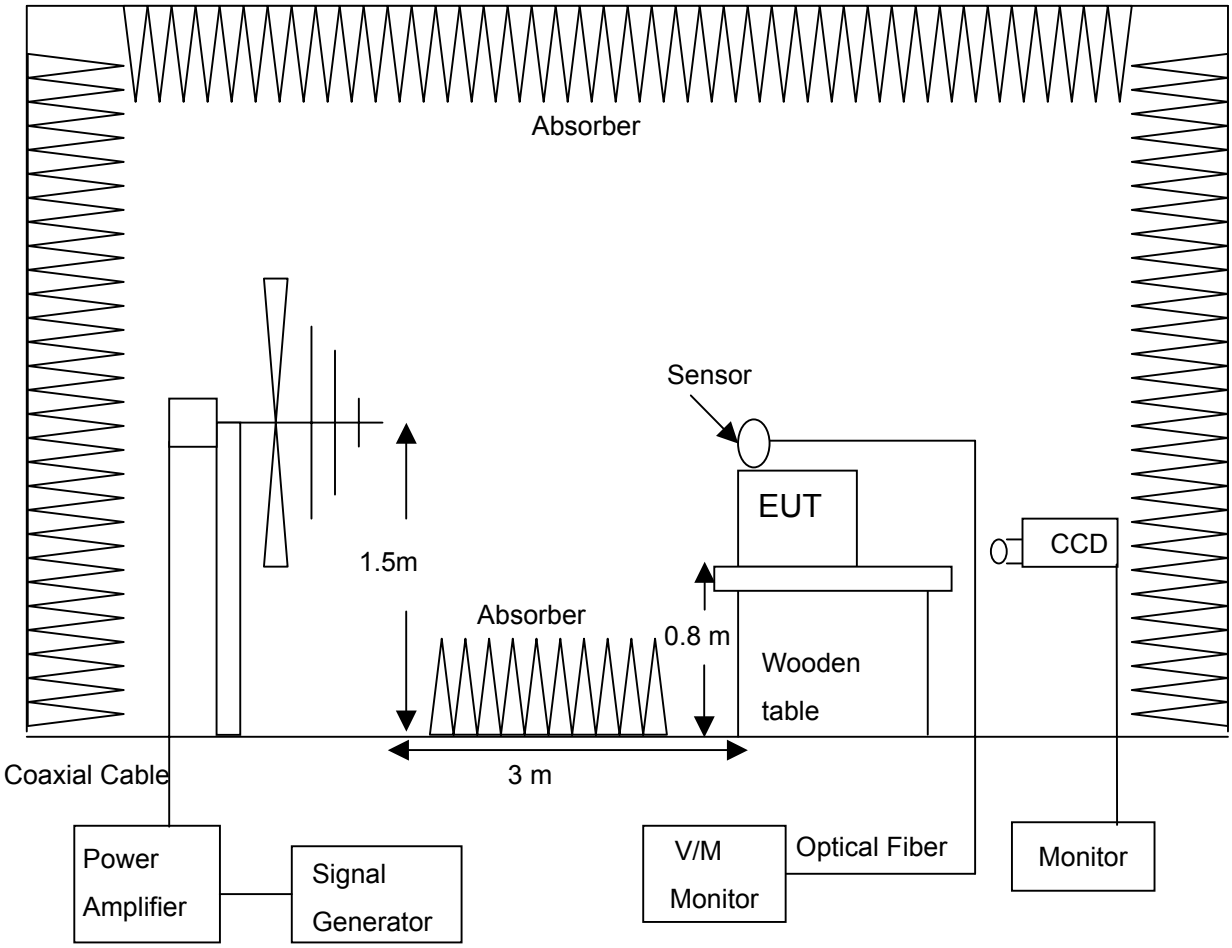
EQUIPMENT / FACILITIES	MANUFACTURER	MODEL # / SERIAL #	DUE DATE OF CAL. & CAL. CENTER
SIGNAL GENERATOR	HP	8648A/ 3636A022776	JUN. 2003 ETC
ANTENNA	SCHAFFNER CHASE	CBL6111/ 1188	JUL. 2003 SRT
FIELD SENSOR	AMPLIFIER RESEARCH	FP2000/ 28499	DEC. 2003 ETC
POWER AMPLIFIER	AMPLIFIER RESEARCH	100W1000M1/ 19509	JUN. 2003 ETC
ANECHOIC CHAMBER	SRT	A05/ SRT005	SEP. 2003 SRT

NOTE: The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

6.2 TEST PROCEDURE

According to IEC/EN 61000-4-3

6.3 TEST SETUP



NOTE :

1. The wooden table should be 0.8m high for table top EUT and 0.1m for floor-standing EUT.
2. For the actual test configuration, please refer to the photos of testing.

6.4 DESCRIPTION OF SUPPORT UNIT

Same as section 4.1.5 of this report.

6.5 EUT OPERATING CONDITION

Same as section 4.1.6 of this report.

6.6 TEST CONDITION / PERFORMANCE CRITERIA

1. Test condition
   (1) Source voltage and frequency : 230V/50Hz, single phase
   (2) Sweeping frequency : 80MHz – 1 GHz
   (3) Test level : 10V/m, the frequncy step is 1%
   (4) The four sides of EUT are tested : front, rear, left, right
   (5) Modulation : 80%AM, 1kHz Dwell time for each frequency at least 3sec..
   (6) Standard requirement : Criterion A

2. Performance criterion
   (1) Criterion A : Normal performance during test
   (2) Criterion B : Temporary degradation or loss of function or performance which is self-recoverable.
   (3) Criterion C : Temporary degradation or loss of function or performance which requires operator intervention system reset.

6.7 TEST RESULT

Temperature:	25°C	Humidity:	57% RH
Test Result:	Criterion A pass	Tested by:	Eric Yao

FREQUENCY	LEVEL	MODULATION	DIRECTION	TEST RESULT (CRITERION)
80MHz - 1GHz	3V/m	80%AM, 1kHz	FRONT	A
80MHz - 1GHz	3V/m	80%AM, 1kHz	REAR	A
80MHz - 1GHz	3V/m	80%AM, 1kHz	LEFT	A
80MHz - 1GHz	3V/m	80%AM, 1kHz	RIGHT	A

NOTE:

Description of test observation:

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

7. RADIATED IMMUNITY TEST

7.1 TEST EQUIPMENT

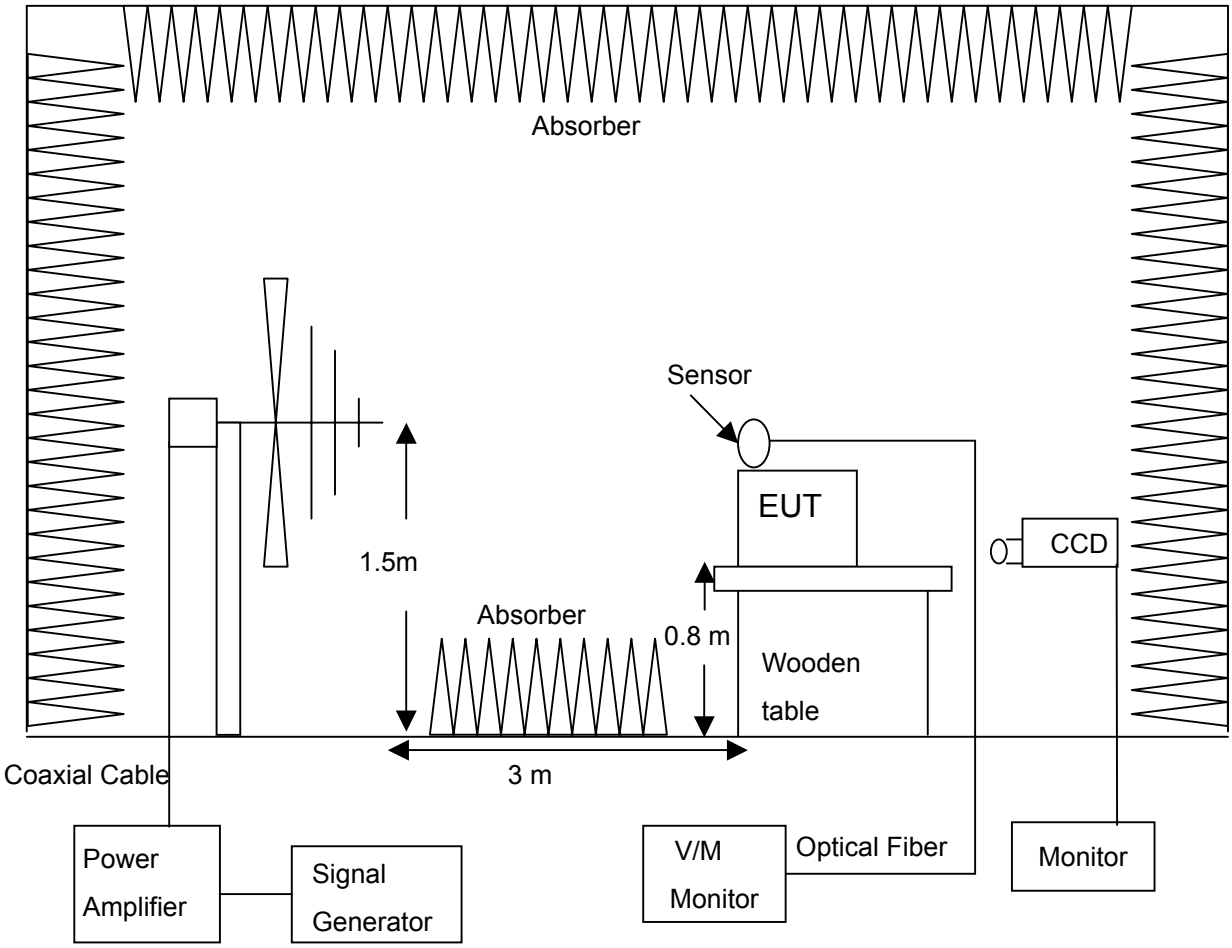
EQUIPMENT / FACILITIES	MANUFACTURER	MODEL # / SERIAL #	DUE DATE OF CAL. & CAL. CENTER
SIGNAL GENERATOR	HP	8648A/ 3636A022776	JUN. 2003 ETC
ANTENNA	SCHAFFNER CHASE	CBL6111/ 1188	JUL. 2003 SRT
FIELD SENSOR	AMPLIFIER RESEARCH	FP2000/ 28499	DEC. 2003 ETC
POWER AMPLIFIER	AMPLIFIER RESEARCH	100W1000M1/ 19509	JUN. 2003 ETC
ANECHOIC CHAMBER	SRT	A05/ SRT005	SEP. 2003 SRT

NOTE: The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

7.2 TEST PROCEDURE

According to ENV 50204

7.3 TEST SETUP



NOTE :

1. The wooden table should be 0.8m high for table top EUT and 0.1m for floor-standing EUT.
2. For the actual test configuration, please refer to the photos of testing.

7.4 DESCRIPTION OF SUPPORT UNIT

Same as section 4.1.5 of this report.

7.5 EUT OPERATING CONDITION

Same as section 4.1.6 of this report.

7.6 TEST CONDITION / PERFORMANCE CRITERIA

1. Test condition
   (1) Source voltage and frequency : 230V/50Hz, single phase
   (2) Sweeping frequency : 900 MHz +/-5 MHz
   (3) Test level : 3V/m, the frequncy step is 1%
   (4) The four sides of EUT are tested : front, rear, left, right
   (5) Modulation : 50% duty cycle(1Hz), 200Hz pluse Dwell time for each frequency at least 1sec..
   (6) Standard requirement : Criterion A

2. Performance criterion
   (1) Criterion A : Normal performance during test
   (2) Criterion B : Temporary degradation or loss of function or performance which is self-recoverable.
   (3) Criterion C : Temporary degradation or loss of function or performance which requires operator intervention system reset.

7.7 TEST RESULT

Temperature:	25°C	Humidity:	57% RH
Test Mode:	N/A	Tested by:	Eric Yao

Test Result : Criterion A pass

FREQUENCY	LEVEL	MODULATION	DIRECTION	TEST RESULT (CRITERION)
900MHz +/-5MHz	3V/m	50%pulse, 1Hz	FRONT	A
900MHz +/-5MHz	3V/m	50%pulse, 1Hz	REAR	A
900MHz +/-5MHz	3V/m	50%pulse, 1Hz	LEFT	A
900MHz +/-5MHz	3V/m	50%pulse, 1Hz	RIGHT	A

NOTE:

Description of test observation:

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

8. ELECTRICAL FAST TRANSIENT / BURST IMMUNITY TEST

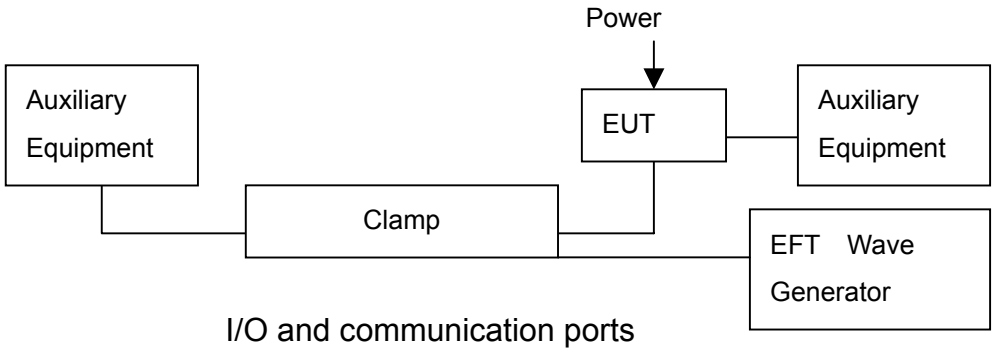
8.1 TEST EQUIPMENT

EQUIPMENT / FACILITIES	MANUFACTURER	MODEL # / SERIAL #	DUE DATE OF CAL & CAL CENTER
EFT GENERATOR	HAEFELY	PEFT-JUNIOR / 583-333-122	NOV. 2003 ETC

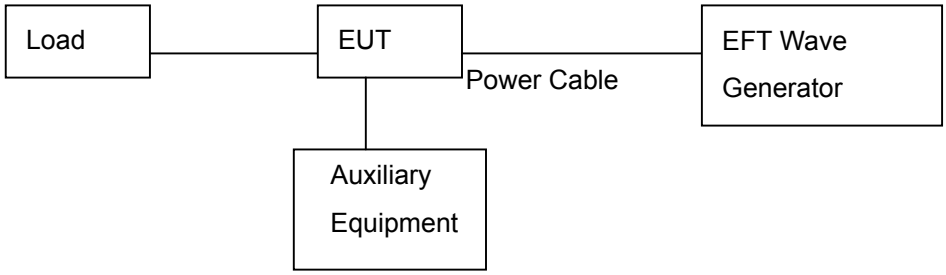
8.2 TEST PROCEDURE

According to IEC/EN 61000-4-4

8.3 TEST SET-UP



I/O and communication ports



Power supply ports

NOTE :

1. The EUT system was put on a wooden table with 0.8m height for table top EUT and 0.1m for floor-standing EUT above ground reference plane.
2. For the actual test configuration, please refer to the photos of testing.
3. The minimum distance between the EUT and all other conductive structure was more than 0.5m.
4. The minimum distance between the coupling plates of the coupling clamps (if used) and all over conductive structures, except the ground plane beneath the coupling clamp and beneath the EUT was more than 0.5m.
5. The power cable connecting EUT was controlled under 1m.

8.4 DESCRIPTION OF SUPPORT UNIT

Same as section 4.1.5 of this report.

8.5 EUT OPERATING CONDITION

Same as section 4.1.6 of this report.

8.6 TEST CONDITION / PERFORMANCE CRITERIA

1. Test condition

(1) Source voltage and frequency : 230V/50Hz, single phase
(2) Pulse risetime and duration : 5ns / 50ns
(3) Pulse repetition : 5kHz
(4) Polarity : Positive Polarization and Negative Polarization
(5) Burst duration and period : 15ms / 300ms
(6) Test duration : ≥ 61sec each line
(7) Time between test : 10Sec
(8) Severity levels : Power Line ±1kV
Signal/Control Line ±0.5kV
(9) Standard requirement : Criterion B

2. Performance criterion

(1) Criterion A : Normal performance during test
(2) Criterion B : Temporary degradation or loss of function or performance which is self-recoverable.
(3) Criterion C : Temporary degradation or loss of function or performance which requires operator intervention system reset.

8.7 SUMMARY OF TEST RESULT

Temperature:	25°C	Humidity:	55% RH
Test Mode:	N/A	Tested by:	Eric Yao

Test Result : Criterion A pass

Voltage		0.5kV		1kV	
Polarity		+	-	+	-
Test Line	L1	A	A	A	A
	L2	A	A	A	A
	GND	A	A	A	A
	Signal/ Control Line	A	A	N/A	N/A

NOTE:

Description of test observation:

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

N/A: Not applicable, as the signal/control line used in typical is less than 3 m.

9. SURGE TEST (POWER LINE)

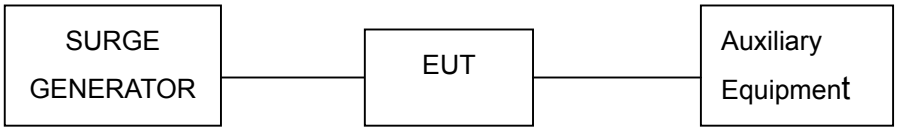
9.1 TEST EQUIPMENT

EQUIPMENT / FACILITIES	MANUFACTURER	MODEL # / SERIAL #	DUE DATE OF CAL. & CAL. CENTER
SURGE TEST (System Mainframe)	SCHAFFNER	NSG 2050 / 199904-057SC	OCT. 2003 ETC
SURGE TEST (Impulse Network)	SCHAFFNER	PNW 2050 / 256	OCT. 2003 ETC
SURGE TEST (Pulse Coupling Network)	SCHAFFNER	CDN 131/133 / 520	OCT. 2003 ETC

9.2 TEST PROCEDURE

According to IEC/EN 61000-4-5

9.3 TEST SET-UP



NOTE :

1. The EUT system was put on a wooden table with 0.8m height above ground reference plane.
2. For the actual test configuration, please refer to the photos of testing.

9.4 DESCRIPTION OF SUPPORT UNIT

Same as section 4.1.5 of this report.

9.5 EUT OPERATING CONDITION

Same as section 4.1.6 of this report.

9.6 TEST CONDITION / PERFORMANCE CRITERIA

1. Test condition

(1) Test level : Common mode : ±0.5kV, ±1kV, ±2kV
Differential mode : ±0.25kV, ±0.5kV, ±1kV

(2) Pulse : 5

(3) Phase : 0°, 90°, 180°, 270°, 359°

(4) Polarity : Positive and Negative polarization

(5) Repetition : 60 s

(6) Waveform : 1.2/50 μs (open circuit)

(7) Standard requirement : Criterion B

2. Performance criterion

(1) Criterion A : Normal performance during test

(2) Criterion B : Temporary degradation or loss of function or performance which is self-recoverable

(3) Criterion C : Temporary degradation or loss of function or performance which requires operator intervention system reset

9.7 SUMMARY OF TEST RESULT

Temperature:	24°C	Humidity:	59% RH
Test Mode:	N/A	Tested by:	Eric Yao

Test Result : Criterion A pass

Mode	Coupling	Voltage	Phase				
			0°	90°	180°	270°	359°
Common	L + PE N + PE L、N + PE	+/-0.5kV	A	A	A	A	A
		+/-1kV	A	A	A	A	A
		+/-2kV	A	A	A	A	A
Differential	L + N	+/-0.25kV	A	A	A	A	A
		+/-0.5kV	A	A	A	A	A
		+/-1kV	A	A	A	A	A

NOTE:

Description of test observation:

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

10. INDUCED RF FIELDS (CONDUCTED SUSCEPTIBILITY) TEST

10.1 TEST EQUIPMENT

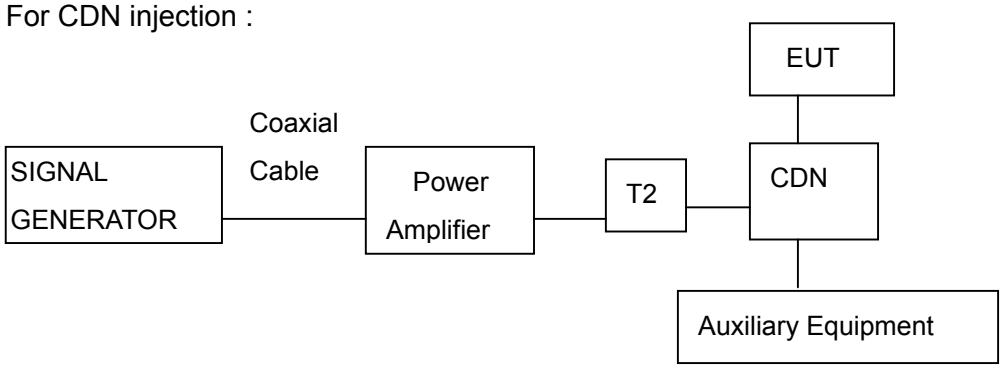
EQUIPMENT / FACILITIES	MANUFACTURER	MODEL # / SERIAL #	DUE DATE OF CAL. & CAL. CENTER
EM INJECTION CLAMP	FCC	F-203I-23mm/ 110	MAY 2003 ETC
POWER LINE CDN	FCC	FCC-801-M4-32A/ 9808	MAY 2003 ETC
POWER LINE CDN	FCC	FCC-801-M5-32A/ 9812	MAY 2003 ETC
POWER LINE CDN	FCC	FCC-801-M1-32A/ 9820	MAY 2003 ETC
SIGNAL LINE CDN	FCC	FCC-801-T2/ 9830	MAY 2003 ETC
SIGNAL LINE CDN	FCC	FCC-801-T4/ 9831	MAY 2003 ETC
SIGNAL LINE CDN	FCC	FCC-801-T6/ 9832	MAY 2003 ETC
SIGNAL LINE CDN	FCC	FCC-801-S9/ 9843	MAY 2003 ETC
POWER LINE CDN	FCC	FCC-801-M2-32A/ 9840	NOV. 2003 ETC
SIGNAL GENERATOR	HP	8648A/ 3636A02776	JUN. 2003 ETC
POWER AMPLIFIER	A.R.	150A100A/ 19553	MAY 2003 ETC
DUAL DIRECTION COULPER	A.R.	DC2600/ 25893	JUN. 2003 ETC
POWER METER	BOONTON	4232A/ 29001	MAY 2003 ETC
SIGNAL LINE CDN	FCC	FCC-801-S25/ 9845	MAY 2003 ETC
POWER LINE CDN	FCC	FCC-801-M3-32A/ 9874	MAY 2003 ETC

10.2 TEST PROCEDURE

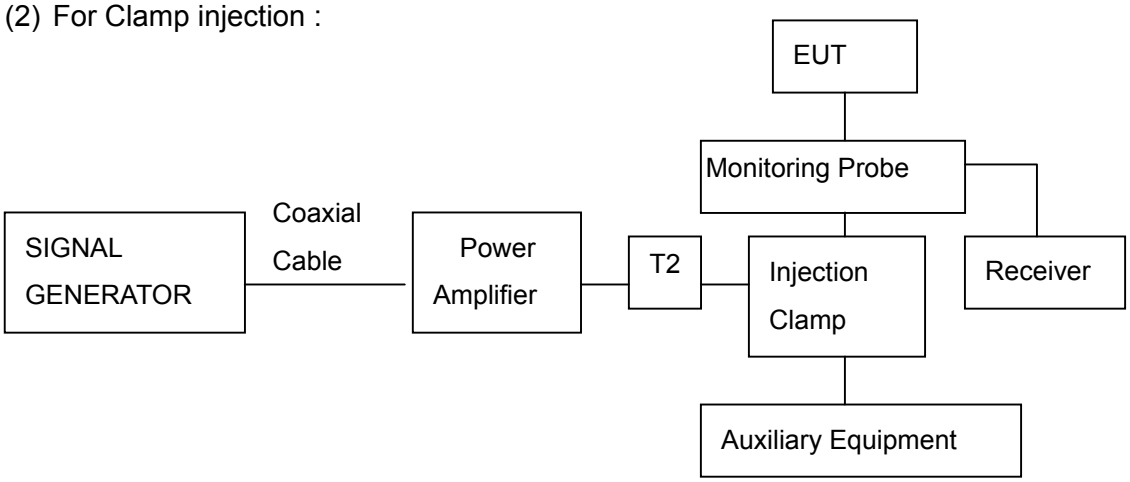
According to IEC/EN 61000-4-6

10.3 TEST SET-UP

(1) For CDN injection :



(2) For Clamp injection :



NOTE :

1. The EUT system was put on a wooden table with 0.1m height above ground.
2. For the actual test configuration, please refer to the photos of testing.
3. The distance between CDN(Clamp) and EUT was controlled between 0.1m and 0.3m.

10.4 DESCRIPTION OF SUPPORT UNIT

Same as section 4.1.5 of this report.

10.5 EUT OPERATING CONDITION

Same as section 4.1.6 of this report.

10.6 TEST CONDITION / PERFORMANCE CRITERIA

1. Test condition
   (1) Source voltage and frequency : 230 V/ 50 Hz, single phase
   (2) Sweeping frequency : 150 kHz – 80 MHz
   (3) Test level : 3 V, the frequency step is 1%
   (4) Polarity : Positive and Negative polarization
   (5) Modulation : AM 80%, 1 kHz
   (6) Dwell time for each frequency : at least 3 s
   (7) Standard requirement : Criterion A

2. Performance criterion
   (1) Criterion A : Normal performance during test
   (2) Criterion B : Temporary degradation or loss of function or performance which is self-recoverable
   (3) Criterion C : Temporary degradation or loss of function or performance which requires operator intervention system reset

10.7 SUMMARY OF TEST RESULT

Temperature:	24°C	Humidity:	56% RH
Test Mode:	N/A	Tested by:	Eric Yao

Test Result : Criterion A pass

FREQUENCY	LEVEL	MODULATION	INJECTION METHOD	TEST RESULT (CRITERION)
150kHz - 80MHz	3V	80% AM, 1 kHz	M3	A
150kHz - 80MHz	3V	80% AM, 1 kHz	T4	A

NOTE:
Description of test observation:
A: There was no change compared with initial operation during the test.

11. POWER FREQUENCY MAGNETIC-FIELD TEST

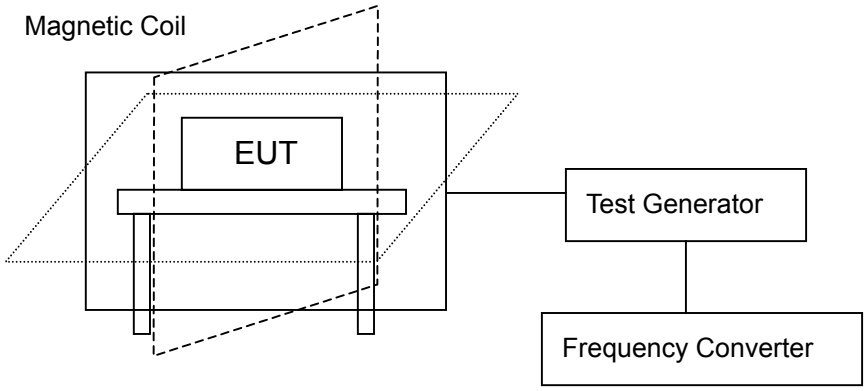
11.1 TEST EQUIPMENT

EQUIPMENT / FACILITIES	MANUFACTURER	MODEL # / SERIAL #	DUE DATE OF CAL. & CAL. CENTER
MAGNETIC FIELD TESTER	HAEFELY	MAG 100.1/ 080.015-04	JAN. 2004 SRT
MAGNETIC FIELD METER	F.W.BELL	4080/ 19990416	MAR. 2004 ITRI

11.2 TEST PROCEDURE

According to IEC/EN 61000-4-8

11.3 TEST SET-UP



NOTE :

1. The EUT system was put on a wooden table with 0.8m height above ground.
2. For the actual test configuration, please refer to the photos of testing

11.4 DESCRIPTION OF SUPPORT UNIT

Same as section 4.1.5 of this report.

11.5 EUT OPERATING CONDITION

Same as section 4.1.6 of this report.

11.6 TEST CONDITION / PERFORMANCE CRITERIA

1. Test condition
   (1) Test axis : X, Y and Z axes
   (2) Test time : 5 min / each axis
   (3) Field strength : 3 A/m
   (4) Standard requirement : Criterion A

2. Performance criterion
   (1) Criterion A : Normal performance during test
   (2) Criterion B : Temporary degradation or loss of function or performance which is self-recoverable
   (3) Criterion C : Temporary degradation or loss of function or performance which requires operator intervention system reset

11.7 SUMMARY OF TEST RESULT

Temperature:	26°C	Humidity:	50% RH
Test Mode:	N/A	Tested by:	Eric Yao

Test Result : Criterion A pass

ORIENTATION	FIELD STRENGTH	TEST RESULT (CRITERION)
X	3 A/m	A
Y	3 A/m	A
Z	3 A/m	A

NOTE:

Description of test observation:

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

12. VOLTAGE DIPS, INTERRUPTS, VARIATIONS TEST

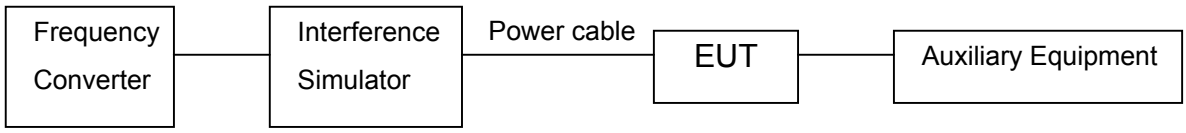
12.1 TEST EQUIPMENT

EQUIPMENT / FACILITIES	MANUFACTURER	MODEL # / SERIAL #	DUE DATE OF CAL. & CAL. CENTER
INTERFERENCE SIMULATOR	HAEFELY	PLINE 1610/ 083-732-05	JUN. 2003 ETC

12.2 TEST PROCEDURE

According to IEC/EN 61000-4-11

12.3 TEST SET-UP



NOTE :

1. The EUT system was put on a wooden table with 0.8m height above ground.
2. For the actual test configuration, please refer to the photos of testing.

12.4 DESCRIPTION OF SUPPORT UNIT

Same as section 4.1.5 of this report.

12.5 EUT OPERATING CONDITION

Same as section 4.1.6 of this report.

12.6 TEST CONDITION / PERFORMANCE CRITERIA

1. Test condition

(1) Source voltage and frequency : 230V/50Hz, single phase
(2) Test level : Dip depth 30%, 0.5 period;
Dip depth 60%, 5, 50 period;
interrupt 95%, 250 period.
(3) Phase : 0°, 180°
(4) Test duration : 2min each phase
(5) Time between test : 10 sec
(7) Standard requirement : Dip 30% : Criterion B pass;
Dip 60% : Criterion C pass;
Interrupt > 95% : Criterion C pass

2. Performance criterion

(1) Criterion A : Normal performance during test
(2) Criterion B : Temporary degradation or loss of function or performance which is self-recoverable.
(3) Criterion C : Temporary degradation or loss of function or performance which requires operator intervention system reset.

12.7 SUMMARY OF TEST RESULT

Temperature:	24°C	Humidity:	59% RH
Test Result:	Pass	Tested by:	Eric Yao

AC POWER	DIP DEPTH	INTERVAL	DIP TIME	TEST TIME	PHASE	TEST RESULT (Criterion)
230V/50Hz	30%	10 sec	0.5 period	2 min	0°	A
					180°	A
	60%	10 sec	5, 50 period	2 min	0°	A
					180°	A
	>95% (interrupt)	10 sec	250 period	2 min	0°	C
					180°	C

NOTE:

Description of test observation:

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

C: The Eut requires operator intervention system reset.

13. PHOTOS OF TESTING

- Conducted test

- Radiated test

- Harmonics test

- Voltage fluctuations test

- Electrostatic discharge immunity test

- Electrical fast transient / burst immunity test

- Radiated immunity test

-Surge test (power line)

- Inducted RF fields (conducted susceptibility) test

- Power frequency magnetic-field test

- Voltage dips, interrupts, variations test

14. TERMS OF ABRIVATION

AV.	Average detection
AZ(°)	Turn table azimuth
Correct.	Correction
EL(m)	Antenna height (meter)
EUT	Equipment Under Test
Horiz.	Horizontal direction
LISN	Line Impedance Stabilization Network
NSA	Normalized Site Attenuation
Q.P.	Quasi-peak detection
SRT Lab	Spectrum Research & Testing Laboratory, Inc.
Vert.	Vertical direction