

FCC TEST REPORT

for

PART 15, SUBPART B CLASS B

EQUIPMENT : CARDEXPERT Rage II C

MODEL NO. : 9806-05

F C C I D : ICUVGA-GW806

FILING TYPE : ORIGINAL CERTIFICATION

APPLICANT : **Gainward CO., LTD.**

12F, No. 96, Hsin Tai Wu Rd., Sec. 1, Hsi-Chih,
Taipei Hsien, Taiwan, R.O.C.

- The test result refers exclusively to the test presented test model / sample.
- Without the written authorization of the test lab., the Test Report may not be copied.

SPORTON INTERNATIONAL INC.

6F, No. 106, Hsin Tai Wu Rd., Sec. 1, Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

TABLE OF CONTENT

SECTION TITLE	PAGE
CERTIFICATE OF COMPLIANCE.....	3
1. GENERAL DESCRIPTION OF EQUIPMENT UNDER TEST	4
1.1. APPLICANT.....	4
1.2. MANUFACTURER.....	4
1.3. BASIC DESCRIPTION OF EQUIPMENT UNDER TEST	4
1.4. FEATURE OF EQUIPMENT UNDER TEST	4
2. TEST CONFIGURATION OF EQUIPMENT UNDER TEST.....	5
2.1. TEST MANNER	5
2.2. DESCRIPTION OF TEST SYSTEM.....	5
2.3. CONNECTION DIAGRAM OF TEST SYSTEM.....	7
3. TEST SOFTWARE	8
4. GENERAL INFORMATION OF TEST.....	9
4.1. TEST FACILITY	9
4.2. STANDARD FOR METHODS OF MEASUREMENT	9
4.3. TEST IN COMPLIANCE WITH	9
4.4. FREQUENCY RANGE INVESTIGATED.....	9
4.5. TEST DISTANCE	9
5. TEST OF CONDUCTED POWERLINE.....	10
5.1. MAJOR MEASURING INSTRUMENTS	10
5.2. TEST PROCEDURES	11
5.3. TYPICAL TEST SETUP LAYOUT OF CONDUCTED POWERLINE.....	12
5.4. TEST RESULT OF AC POWERLINE CONDUCTED EMISSION.....	13
5.4.1. TEST RESULT OF AC POWERLINE CONDUCTED EMISSION.....	14
5.5. PHOTOGRAPHS OF CONDUCTED POWERLINE TEST CONFIGURATION.....	15
6. TEST OF RADIATED EMISSION	17
6.1. MAJOR MEASURING INSTRUMENTS	17
6.2. TEST PROCEDURES	18
6.3. TYPICAL TEST SETUP LAYOUT OF RADIATED EMISSION	19
6.4. TEST RESULT OF RADIATED EMISSION	20
6.4.1. TEST RESULT OF RADIATED EMISSION	21
6.5. PHOTOGRAPHS OF RADIATED EMISSION TEST CONFIGURATION	22
7. ANTENNA FACTOR AND CABLE LOSS	23
8. LIST OF MEASURING EQUIPMENT USED.....	24

1. GENERAL DESCRIPTION OF EQUIPMENT UNDER TEST

1.1. APPLICANT

Gainward CO., LTD.

12F, No. 96, Hsin Tai Wu Rd., Sec. 1, Hsi-Chih,
Taipei Hsien, Taiwan, R.O.C.

1.2. MANUFACTURER

Same as 1.1.

1.3. BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

EQUIPMENT : CARDEXPERT Rage II C

MODEL NO. : 9806-05

TRADE NAME : CARDEXPERT

DATA CABLE : Shielded

POWER SUPPLY TYPE : N/A

POWER CORD : N/A

1.4. FEATURE OF EQUIPMENT UNDER TEST

- Using the ATI Rage II C 2D/3D Graphics Accelerator.
- Display Memory 2/4MB SGRAM/EDORAM
- Provides baseline AGP support.
- 3D Setup Engine support Texture Mapping, Gouraud Shading, Alpha blending, fog and Z-buffering.
- Full support for Direct3D
- Maximum Resolution 1600×1200
- Maximum Refresh Rate 200Hz on 640×480 and 800×600 resolution
- Support VESA DOC and DPMS

2. TEST CONFIGURATION OF EQUIPMENT UNDER TEST

2.1. TEST MANNER

- a. The EUT has been associated with personal computer and peripherals pursuant to ANSI C63.4-1992 and configuration operated in a manner which tended to maximize its emission characteristics in a typical application.
- b. The DELL keyboard, HP PS/2 mouse, HP printer, ACEEX modem and HITACH monitor were connected to the F.I.C. P.C..
- c. The following display resolution were investigated during the compliance test :
 - 1. Horizontal frequency (640×480 to 1600×1200, 31.5KHz to 91KHz)
 - 2. Vertical frequency (60Hz to 85Hz)
- d. According to the above tests, we listed the flowing display modes as the worst cases :
 - 1. 1280×1024 (non-interlanced 91KHz), refresh rate 60Hz.
 - 2. 1600×1200 (non-interlanced 75KHz), refresh rate 85Hz.
- e. Frequency range investigated: Conduction 450 KHz to 30 MHz, Radiation 30 MHz to 2000 MHz.

2.2. DESCRIPTION OF TEST SYSTEM

Support Device 1. --- P.C. (FIC)

FCC ID : N/A
Model No. : P2L97
Serial No. : SP1005
Data Cable : Shielded
Power Cord : Non-shielded
Power Supply Type : Switching

(Remark : This support device was tested to comply with FCC standards and
authorized under a declaration of conformity.)

FCC TEST REPORT**REPORT NO. : F871405**

Support Device 2. --- KEYBOARD (DELL)

FCC ID : GYUM92SK
Model No. : AT101 (DE8M)
Serial No. : SP1021
Data Cable : Shielded, 360 degree via metal backshells, 1.9m

Support Device 3. -- PS/2 MOUSE (HP)

FCC ID : DZL210582
Model No. : 210582
Serial No. : SP1024
Data Cable : Non-shielded, 1.8m

Support Device 4. --- PRINTER (HP)

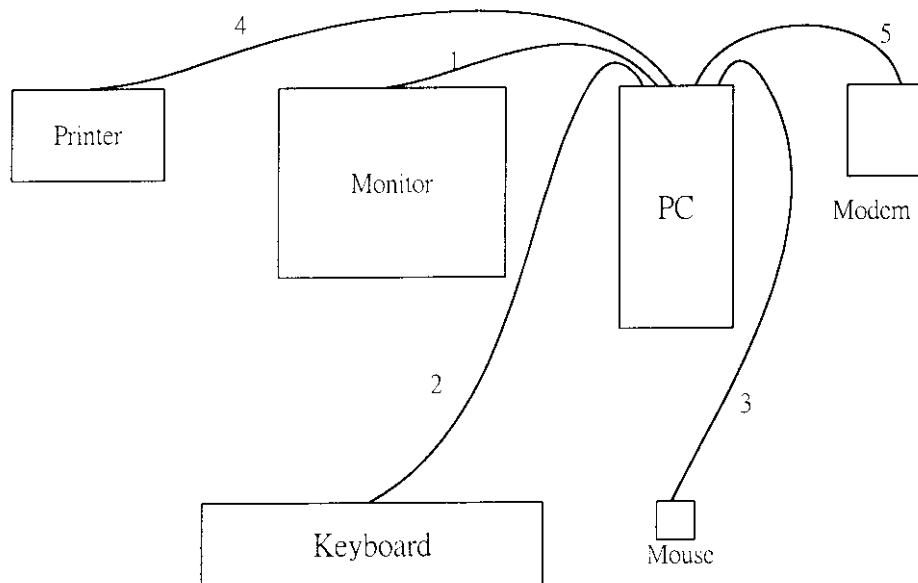
FCC ID : B94C2642X
Model No. : DESK JET 400
Serial No. : SP1040
Data Cable : Shielded, 360 degree via metal backshells, 1.35m
Power Supply Type : Linear, Adapter

Support Device 5. -- MODEM (ACEEX)

FCC ID : IFAXDM1414
Model No. : DM1414
Power Supply Type : Linear, AC Adapter
Power Cord : Non-shielded
Serial No. : SP1045
Data Cable : Shielded, 360 degree via metal backshells, 1.15m

Support Device 6. --- MONITOR (HITACHI)

FCC ID : M9U9705C97BMD
Model No. : CM-803ET
Serial No. : SP1012
Data Cable : Shielded, 360 degree via metal backshells, 1.7m
Power Supply Type : Switching
Power Cord : Non-shielded

2.3. CONNECTION DIAGRAM OF TEST SYSTEM

1. The I/O cable is connected from the EUT to the support device 6.
2. The I/O cable is connected to the support device 2.
3. The I/O cable is connected to the support device 3.
4. The I/O cable is connected to the support device 4.
5. The I/O cable is connected to the support device 5.

3. TEST SOFTWARE

An executive program, EMITEST.EXE, WINFCC.EXE under WIN98, which generate a complete line of continuously repeating " H " pattern were used as the test software.

The programs was executed as follows :

- a. Turn on the power of all equipment.
- b. The PC reads the test program from the floppy disk drive and runs it.
- c. The PC sends " H " messages to the monitor, and the monitor displays " H " patterns on the screen.
- d. The PC sends " H " messages to the printer, then the printer prints them on the paper.
- e. The PC sends " H " messages to the modem.
- f. The PC sends " H " messages to the internal Hard Disk, and the Hard Disk reads and writes the message.
- g. Repeat the steps from b to f.

4. GENERAL INFORMATION OF TEST

4.1. TEST FACILITY

This test was carried out by SPORTON INTERNATIONAL INC.

Test Site Location : No. 30-1, Lin 6, Diing-Fwu Tsuen, Lin-Kou-Hsiang,
Taipei Hsien, Taiwan, R.O.C.

TEL : 886-2-2601-1640

FAX : 886-2-2601-1695

4.2. STANDARD FOR METHODS OF MEASUREMENT

ANSI C63.4-1992

4.3 .TEST IN COMPLIANCE WITH

FCC PART 15, SUBPART B CLASS B

4.4. FREQUENCY RANGE INVESTIGATED

- a. Conduction : from 450 KHz to 30 MHz
- b. Radiation : from 30 MHz to 2000 MHz.

4.5. TEST DISTANCE

The test distance of radiated emission from antenna to EUT is 3M.

5. TEST OF CONDUCTED POWERLINE

Conducted Emissions were measured from 450 KHz to 30 MHz with a bandwidth of 9 KHz on the 115 VAC power and return leads of the EUT according to the methods defined in ANSI C63.4-1992 Section 3.1. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in Figure 5-3. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

5.1. MAJOR MEASURING INSTRUMENTS

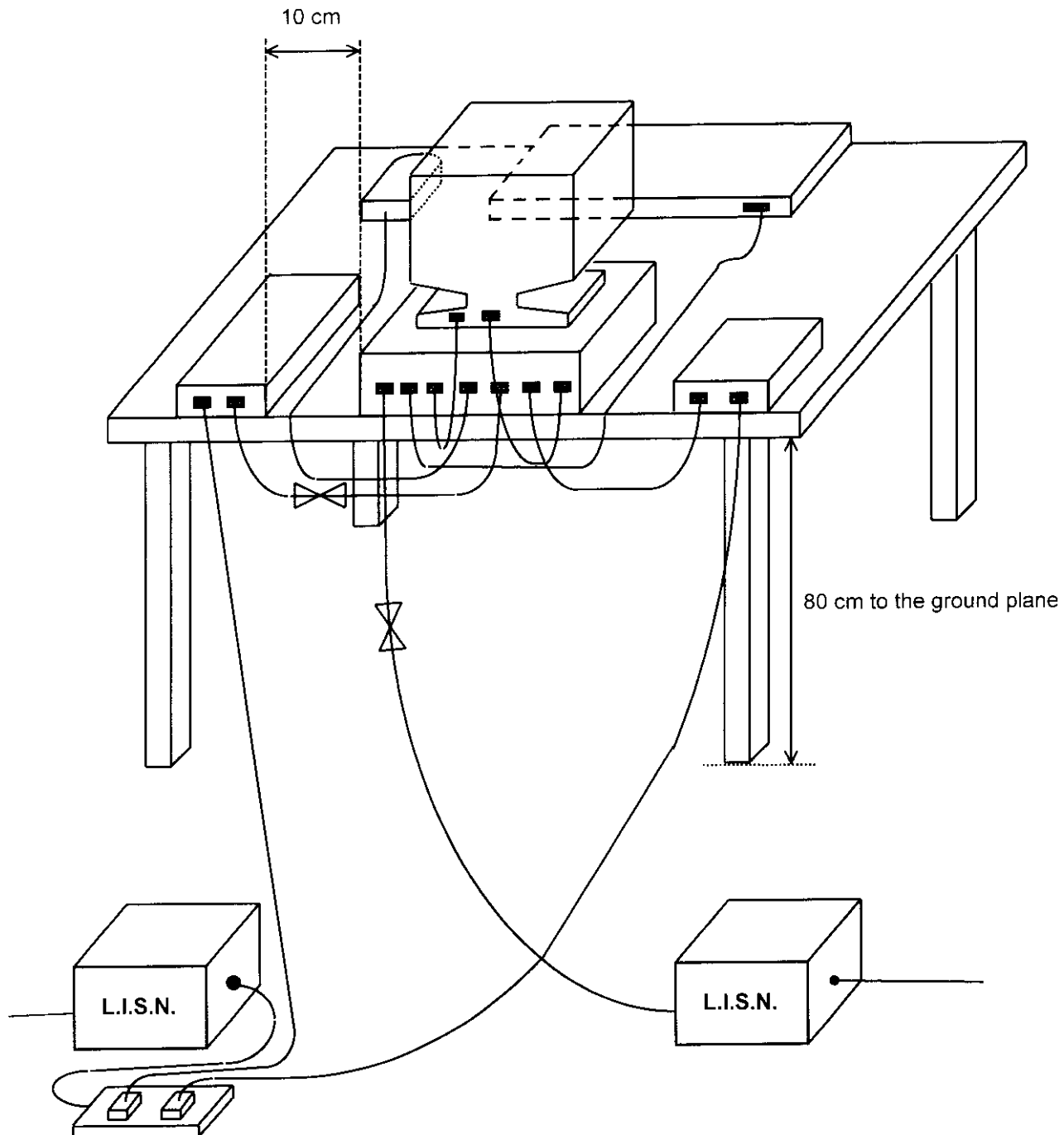
- Test Receiver

Attenuation	0 dB
Start Frequency	0.45 MHz
Stop Frequency	30 MHz
Step MHz	0.007 MHz
IF Bandwidth	9 KHz

5.2. TEST PROCEDURES

- a. The EUT was placed 0.4 meter from the conducting wall of the shielding room and was kept at least 80 centimeters from any other grounded conducting surface.
- b. Connect EUT to the power mains through a line impedance stabilization network (LISN).
- c. All the support units are connect to the other LISN.
- d. The LISN provides 50 ohm coupling impedance for the measuring instrument.
- e. The FCC states that a 50 ohm , 50 microhenry LISN should be used.
- f. Both sides of AC line were checked for maximum conducted interference.
- g. The frequency range from 450 KHz to 30 MHz was searched.
- h. Set the test-receiver system (HP 8591EM) to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- i. If the emission level of the EUT in peak mode was 6 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported otherwise the emissions which do not have 6 dB margin will be retested on by one using the quasi-peak method and reported.

5.3. TYPICAL TEST SETUP LAYOUT OF CONDUCTED POWERLINE



5.4. TEST RESULT OF AC POWERLINE CONDUCTED EMISSION

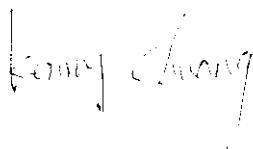
- Frequency Range of Test : from 0.45 MHz to 30 MHz
- All emissions not reported here are more than 10 dB below the prescribed limit.
- Temperature : 29°C
- Relative Humidity : 61 % RH
- Test Mode : 1280×1024 85Hz / 91K
- Test Date : July 24, 1998

The Conducted Emission test was passed at Neutral 0.96 MHz/ 37.50 dBuV.

Frequency (MHz)	Line / Neutral	Meter Reading		Limits		Margin
		(dBuV)	(uV)	(dBuV)	(uV)	(dB)
0.96	L	37.40	74.13	48.00	251.19	-10.60
2.40	L	34.00	50.12	48.00	251.19	-14.00
0.96	N	37.50	74.99	48.00	251.19	-10.50
2.40	N	35.80	61.66	48.00	251.19	-12.20
3.16	N	36.30	65.31	48.00	251.19	-11.70
5.94	N	34.10	50.70	48.00	251.19	-13.90

Test Engineer :

Kenny Chuang



5.4.1. TEST RESULT OF AC POWERLINE CONDUCTED EMISSION

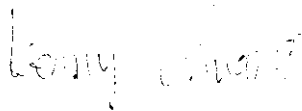
- Frequency Range of Test : from 0.45 MHz to 30 MHz
- All emissions not reported here are more than 10 dB below the prescribed limit.
- Temperature : 29 C
- Relative Humidity : 61 % RH
- Test Mode : 1600×1200 60Hz / 75K
- Test Date : July 24, 1998

The Conducted Emission test was passed at Line 0.86 MHz/ 38.20 dBuV.

Frequency (MHz)	Line / Neutral	Meter Reading		Limits		Margin
		(dBuV)	(uV)	(dBuV)	(uV)	(dB)
0.86	L	38.20	81.28	48.00	251.19	-9.80
1.34	L	37.70	76.74	48.00	251.19	-10.30
0.96	N	37.80	77.62	48.00	251.19	-10.20
1.34	N	36.60	67.61	48.00	251.19	-11.40
2.11	N	36.10	63.83	48.00	251.19	-11.90
4.03	N	36.40	66.07	48.00	251.19	-11.60

Test Engineer :

Kenny Chuang



6. TEST OF RADIATED EMISSION

Radiated emissions from 30 MHz to 2000 MHz were measured with a bandwidth of 120 KHz according to the methods defines in ANSI C63.4-1992. The EUT was placed on a nonmetallic stand in the open-field site, 0.8 meter above the ground plane, as shown in Figure 6-3. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions.

6.1. MAJOR MEASURING INSTRUMENTS

- RF Preselector

Attenuation	0 dB
RF Gain	20 dB
Signal Input	Input 2 (for 20 MHz to 2 GHz)

- Spectrum Analyzer

Attenuation	0 dB
Start Frequency	30 MHz
Stop Frequency	2000 MHz
Resolution Bandwidth	1 MHz
Video Bandwidth	1 MHz
Signal Input	Input 1 (for 30 MHz to 2.9 GHz)

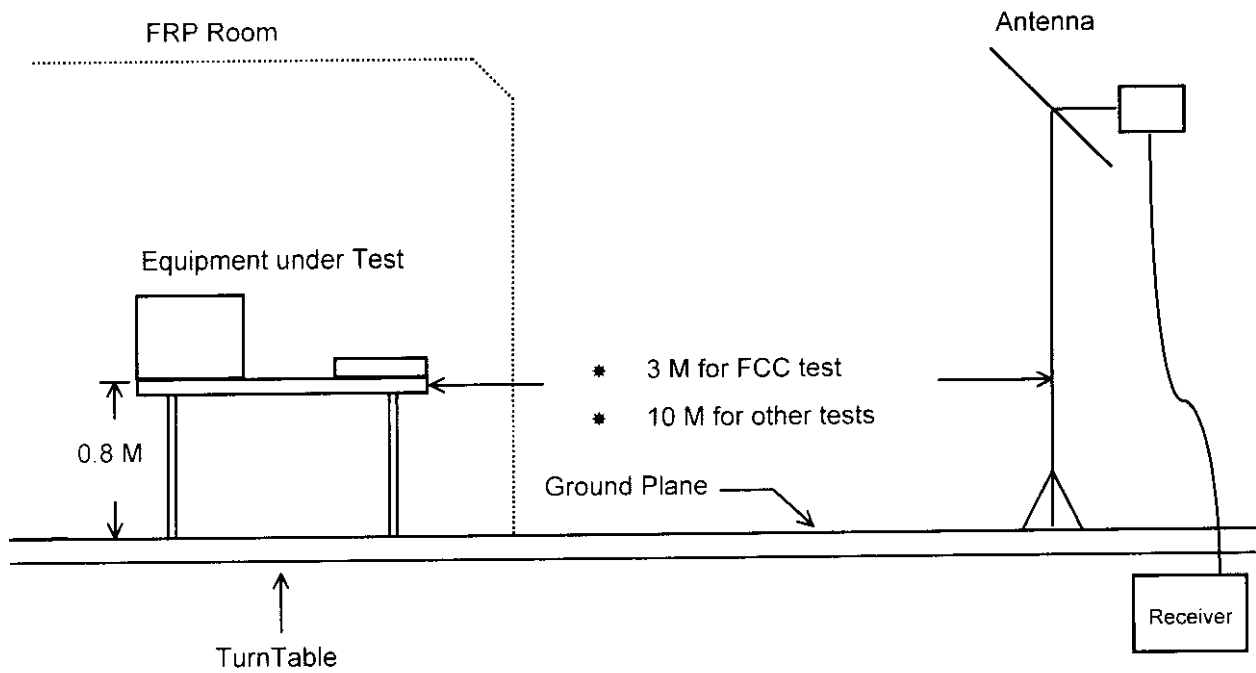
- Quasi-Peak Adapter

Resolution Bandwidth	120 KHz
Frequency Band	30 MHz to 1 GHz
Quasi-Peak Detector	ON for Quasi-Peak Mode OFF for Peak Mode

6.2. TEST PROCEDURES

- a. The EUT was placed on a rotatable table top 0.8 meter above ground.
- b. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. The antenna is a half wave dipole and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- f. Set the test-receiver system (HP 8560E) to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 6 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported otherwise the emissions which do not have 6 dB margin will be repeated one by one using the quasi-peak method and reported.

6.3. TYPICAL TEST SETUP LAYOUT OF RADIATED EMISSION



6.4. TEST RESULT OF RADIATED EMISSION

- Equipment meets the technical specifications of 15.109
- Frequency Range of Test : from 30 MHz to 2000 MHz
- Test Distance : 3 M
- Temperature : 28 °C
- Relative Humidity : 55 % RH
- Test Mode : 1280×1024 85Hz / 91K
- Test Date : July 22, 1998
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Sample Calculation at 118.06 MHz
Corrected Reading = 10.35 + 1.68 + 22.93 = 34.96 (dBuV/m)

The Radiated Emission test was passed at

Horizontal 504.08 MHz / 43.96 dBuV

Antenna Height 1.7 Meter , Turntable Degree 165 °.

Frequency	Antenna	Cable	Reading	Limits	Emission	Level	Margin
Polarity	Factor	Loss					
(MHz)	(dB)	(dB)	(dBuV)	(dBuV)	(uV)	(dBuV)	(uV) (dB)
118.06	V	10.35	1.68	22.93	43.50	150	34.96 55.98 -8.54
504.08	H	22.41	4.12	17.43	46.00	200	✓43.96 157.76 -2.04
519.41	H	22.78	4.22	15.16	46.00	200	✓42.16 128.23 -3.84
34.67	H	-0.80	0.82	34.54	40.00	100	34.56 53.46 -5.44
118.06	H	10.35	1.68	22.81	43.50	150	34.84 55.21 -8.66
173.42	H	12.49	2.24	19.39	43.50	150	34.12 50.82 -9.38

Test Engineer :
Jack Deng

Jack Deng

26.53
17.43
✓3.96
22.78
5.22
15.16
✓2.16

6.4.1. TEST RESULT OF RADIATED EMISSION

- Equipment meets the technical specifications of 15.109
- Frequency Range of Test : from 30 MHz to 2000 MHz
- Test Distance : 3 M
- Temperature : 28 °C
- Relative Humidity : 55 % RH
- Test Mode : 1600×1200 60Hz / 75K
- Test Date : July 22, 1998
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Sample Calculation at 224.52 MHz
Corrected Reading = 14.49 + 2.42 + 16.38 = 33.29 (dBuV/m)

The Radiated Emission test was passed at

Horizontal 504.12 MHz / 43.95 dBuV

Antenna Height 2.0 Meter , Turntable Degree 168 °.

Frequency	Antenna	Cable	Reading	Limits	Emission	Level	Margin
Polarity	Factor	Loss					
(MHz)	(dB)	(dB)	(dBuV)	(dBuV)	(uV)	(dBuV)	(uV) (dB)
224.52	V	14.49	2.42	16.38	46.00	200	33.29 46.18 -12.71
434.13	V	22.37	3.74	17.14	46.00	200	43.24 145.21 -2.76
505.86	V	22.45	4.14	15.11	46.00	200	41.70 121.62 -4.30
161.65	V	12.25	2.04	18.81	43.50	150	33.10 45.19 -10.40
504.12	H	22.41	4.12	17.42	46.00	200	43.95 157.58 -2.05
520.21	H	22.80	4.22	15.52	46.00	200	42.54 133.97 -3.46

Test Engineer :

Jack Deng

7. ANTENNA FACTOR AND CABLE LOSS

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)
30	-1.91	0.90
35	-0.50	0.92
40	0.61	1.04
45	1.40	1.28
50	2.39	1.10
55	3.54	1.11
60	4.40	1.30
65	4.84	1.40
70	5.59	1.37
75	6.21	1.24
80	7.60	1.51
85	7.73	1.60
90	8.22	1.60
95	8.90	1.70
100	9.36	1.70
110	10.01	1.70
120	10.41	1.90
130	10.84	1.90
140	11.42	1.91
150	11.91	2.01
160	12.25	2.11
170	12.72	2.21
180	13.02	2.30
190	13.50	2.30
200	14.05	2.40
220	15.11	2.50
240	16.81	2.60
260	17.51	2.71
280	17.70	2.90
300	17.89	2.91
320	18.00	3.10
340	18.33	3.20
360	19.44	3.30
380	20.31	3.40
400	21.19	3.50
450	21.10	3.70
500	22.21	4.10
550	23.42	4.30
600	24.01	4.50
650	25.11	4.70
700	26.00	4.90
750	26.41	5.11
800	27.10	5.50
850	27.51	5.60
900	27.90	5.80
950	28.01	5.90

8. LIST OF MEASURING EQUIPMENT USED

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver (site 2)	HP	8591EM	3710A01187	9 KHz - 18 GHz	Sep. 29, 1997	Conduction
LISN (EUT) (site 2)	Telemeter	NNB-2/16Z	98009	50 ohm / 50 uH	Jan. 29, 1998	Conduction
LISN (Support Unit) (site 2)	EMCO	3810/2NM	9703-1839	50 ohm / 50 uH	Jul. 06, 1998	Conduction
Spectrum Analyzer (Site 4)	HP	8560E	3728A03186	30MHz - 2.9GHz	Sep. 24, 1997	Radiation
Amplifier (Site 4)	HP	8447D	2944A09072	0.1MHz - 1.3GHz	Sep. 17, 1997	Radiation
Test Receiver (Site 4)	R&S	ESVP	893610/003	20MHz - 1.3GHz	Apr. 13, 1998	Radiation
Bilog Antenna (Site 4)	CHASE	CBL6112A	2288	30MHz -2GHz	Jul. 14, 1998	Radiation
Half-wave dipole antenna (Site 4)	EMCO	3121C	9705-1285	28 M - 1GHz	May 19, 1998	Radiation
Turn Table (site 4)	EMCO	2080	9711-1090	0 ~ 360 degree	N/A	Radiation
Antenna Mast (site 4)	EMCO	2075	9711-2114	1 m- 4 m	N/A	Radiation

※ The column of Remark indicates that the instruments used for conduction ("C") or radiation ("R") test.



D7O0701

SPORTON LAB.

Certificate No:

CERTIFICATE OF COMPLIANCE

Authorized under Declaration of Conformity
according to

47 CFR, Part 2 and Part 15 of the FCC Rules

Equipment Under Test : **PERSONAL COMPUTER**

Model No. : **P2L97**

Applicant : **FIRST INTERNATIONAL COMPUTER INC.**

6F, Formosa Plastics Rear Building 201,

Tung Hwa N. Rd., Taipei, Taiwan, R.O.C.



HEREBY CERTIFY THAT:

THE MEASUREMENTS SHOWN IN THIS TEST REPORT WERE MADE IN
ACCORDANCE WITH THE PROCEDURES GIVEN IN **ANSI C63.4 - 1992**
AND THE ENERGY EMITTED BY THIS EQUIPMENT WAS **PASSED** BOTH
RADIATED AND CONDUCTED EMISSIONS CLASS B LIMITS. THE TESTING
WAS COMPLETED ON **SEP. 02, 1997** AT **SPORTON INTERNATIONAL**
INC. LAB. IN **NEI HWU**.

W. L. Huang OCT 08, 97

W. L. Huang

GENERAL MANAGER