



FCC TEST REPORT

for

PART 15, SUBPART B CLASS B

EQUIPMENT : CARDEXPERT ST3D

MODEL NO. : 9802-30

F C C I D : ICUVGA-GW802C

FILING TYPE : Original Grant

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.

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CERTIFICATE OF COMPLIANCE

for

FCC PART 15, SUBPART B CLASS B

EQUIPMENT : CARDEXPERT ST3D

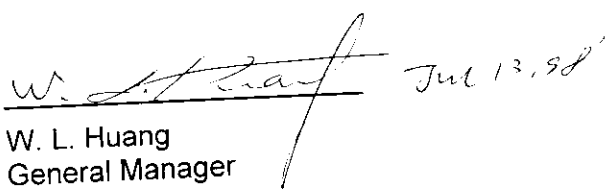
MODEL NO. : 9802-30

F C C I D : ICUVGA-GW802C

APPLICANT : **GAINWARD CO., LTD.**
12F., No. 96, Hsin Tai Wu Rd., Sec. 1, Hsi-Chih,
Taipei Hsien, Taiwan, R.O.C.

I HEREBY CERTIFY THAT :

The measurement shown in this 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.
Testing was carried out on **June 24, 1998** at **SPORTON International Inc.**


W. L. Huang
General Manager

SPORTON INTERNATIONAL INC.

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

1. GENERAL DESCRIPTION OF EQUIPMENT UNDER TEST

1.1. APPLICANT

GAINWARD CO., LTD.
12F., 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 ST3D
MODEL NO. : 9802-30
TRADE NAME : CARDEXPERT
FCC ID : ICUVGA-GW802C
DATA CABLE : SHIELDED
POWER SUPPLY TYPE : N/A
POWER CORD : N/A

1.4. FEATURE OF EQUIPMENT UNDER TEST

- Enhanced 128-bit graphics engine.
- Integrated 230MHz RAMDAC.
- Enhanced Streams Processor™ technology for hardware-assisted high-quality video playback of two video streams against a graphics background.
- Supports simultaneous display of graphics and video of different color depths.
- 110MHz Streams Processor operation permits video resolution support of up to 1280x1024x256 @60Hz refresh.
- 66MHz Baseline AGP bus (Trio3D AGP), 33MHz PCI bus (Trio3D PCI).
- Bus Mastering.
- Resolution support of up to 1152x864x16M, 1600x1200x64K.
- 100MHz Memory Clock support functionality for high performance, support SGRAM block write.
- BIOS support for VESA Display Power Management Signaling (DPMS) monitor power savings modes, DDC monitor communications support.

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, HITACHI monitor, HP printer, ACEEX modem, PRIMAX PS/2 mouse and EUT were connected to the FIC P.C. for EMI test.
- c. The following display resolution were investigated during the compliance test:
 1. Horizontal frequency (640 x 480 to 1600 x 1200, 31.5KHz to 106KHz)
 2. Vertical frequency (60Hz to 85Hz)
- d. According to the above tests, we listed the following display modes as the worst cases:
 1. 1280 x 1024 (Non-interlanced 91.0KHz), refresh rate 85Hz.
 2. 1600 x 1200 (106KHz), refresh rate 85Hz.
- e. Frequency range investigated: Conduction 450 KHz to 30 MHz, Radiation 30 MHz to 2000MHz.
- f. During the test, the monitor AC power cord was plugged into the PC computer-mounted AC outlet and a floor-mounted AC outlet to search the maximum emission.

2.2. DESCRIPTION OF TEST SYSTEM

Support Device 1. --- KEYBOARD (DELL)

FCC ID : GYUM92SK
Model No. : AT101 (DE8M)
Serial No. : SP1009
Data Cable : Shielded, 360 degree via metal backshells, 1.9m

Support Device 2. -- PS/2 MOUSE (PRIMAX)

FCC ID : EMJMUSJQ
Model No. : MUS9J
Serial No. : SP1012
Data Cable : Shielded, 1.7m

Support Device 3. --- PRINTER (HP)

FCC ID : B94C2642X
Model No. : DESKJET 400
Serial No. : SP0037
Data Cable : Shielded, 360 degree via metal backshells, 1.35m
Power Supply Type : Linear

Support Device 4. -- MODEM (ACEEX)

FCC ID : IFAXDM1414
Model No. : DM1414
Power Supply Type : Linear, AC Adapter
Power Cord : Non-shielded
Serial No. : SP1019
Data Cable : Shielded, 1.15m

Support Device 5. --- MONITOR (HITACHI)

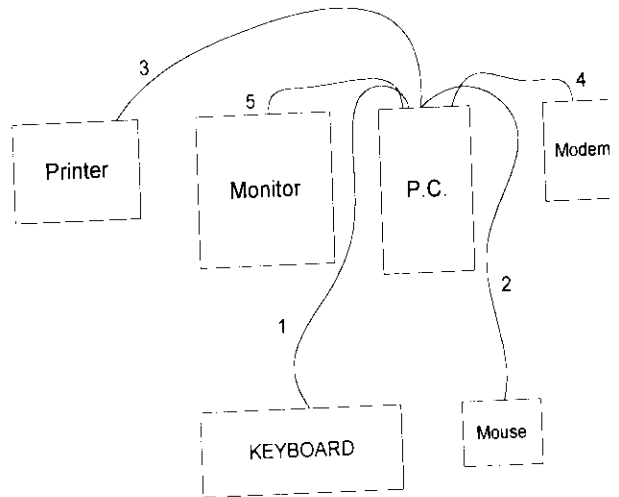
FCC ID : M9U9705C978BMD
Model No. : CM803ET
Serial No. : SP1006
Data Cable : Shielded, 360 degree via metal backshells, 1.7m
Power Supply Type : Switching
Power Cord : Non-shielded

Support Device 6. --- P.C. (FIC)

FCC ID : N/A
Model No. : P2L97
Serial No. : SP1003
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.)

2.3. CONNECTION DIAGRAM OF TEST SYSTEM



1. The I/O cable is connected to the support device 1.
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, WINFCC.EXE under WIN 98, which generate a complete line of continuously repeating " H " pattern was used as the test software.

The program 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.

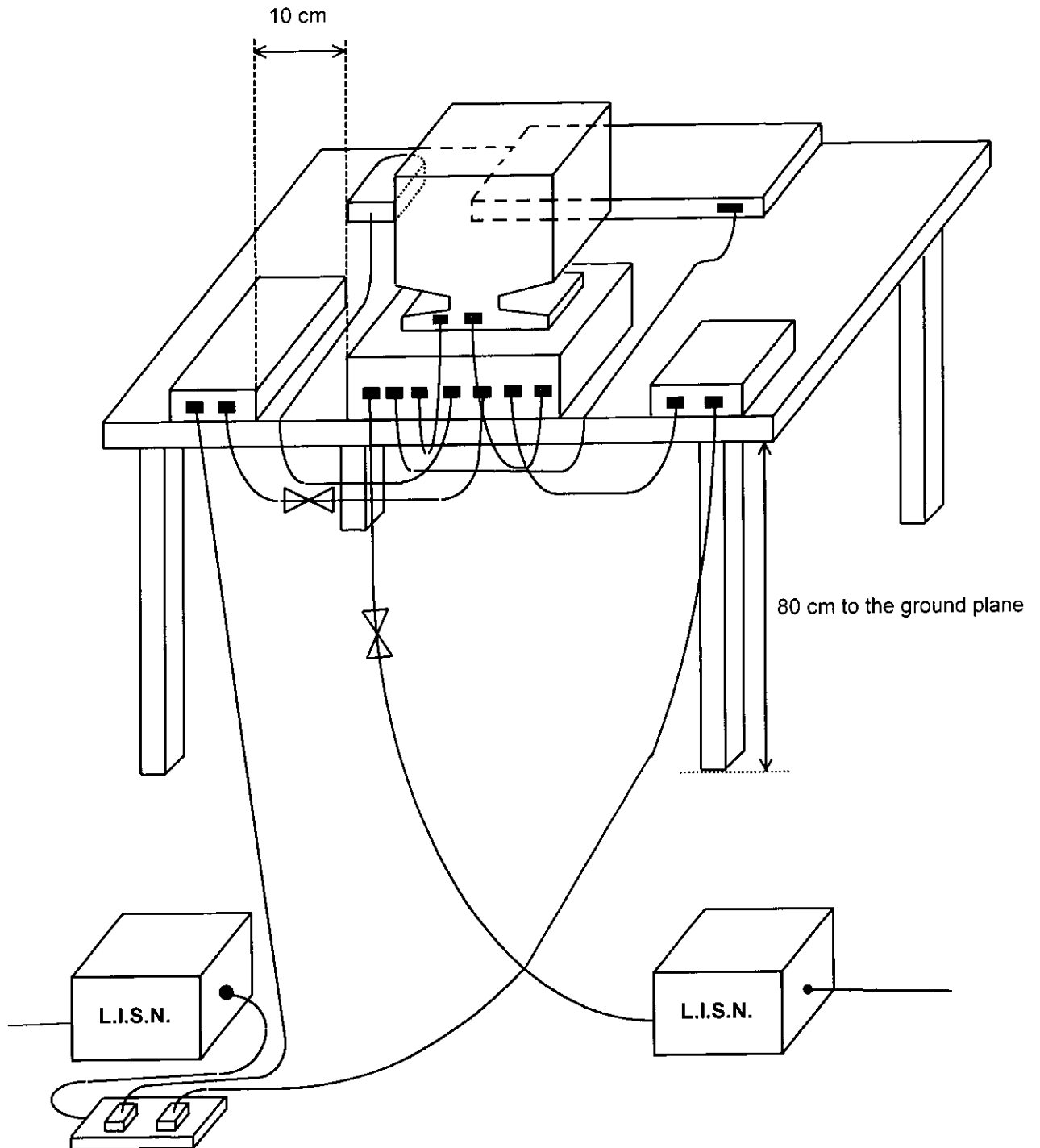
5.1. MAJOR MEASURING INSTRUMENTS

- Test Receiver (HP 85462A)
 - 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 receiver 8546A) 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 : 20°C
- Relative Humidity : 68 % RH
- Test Mode : **1600 × 1200, 106k, 85Hz**
- Test Date : June 24, 1998

The Conducted Emission test was passed at Line 7.82 MHz / 41.30 dBuV.

Frequency (MHz)	Line / Neutral	Meter Reading		Limits		Margin (dB)
		(dBuV)	(uV)	(dBuV)	(uV)	
0.77	L	38.80	87.10	48.00	251.19	-9.20
1.11	L	35.90	62.37	48.00	251.19	-12.10
7.82	L	41.30	116.14	48.00	251.19	-6.70
0.77	N	39.30	92.26	48.00	251.19	-8.70
0.85	N	36.10	63.83	48.00	251.19	-11.90
1.11	N	36.70	68.39	48.00	251.19	-11.30

Test Engineer : *Bruce Huang*

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 : 20°C
- Relative Humidity : 68 % RH
- Test Mode : **1280 × 1024, 91k, 85Hz**
- Test Date : June 24, 1998

The Conducted Emission test was passed at Line 7.82 MHz / 41.70 dBuV.

Frequency (MHz)	Line / Neutral	Meter Reading		Limits		Margin (dB)
		(dBuV)	(uV)	(dBuV)	(uV)	
0.77	L	39.30	92.26	48.00	251.19	-8.70
1.11	L	37.10	71.61	48.00	251.19	-10.90
7.82	L	41.70	121.62	48.00	251.19	-6.30
0.77	N	39.30	92.26	48.00	251.19	-8.70
1.11	N	37.00	70.79	48.00	251.19	-11.00
7.82	N	39.70	96.61	48.00	251.19	-8.30

Test Engineer : *Bruce Huang*

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)

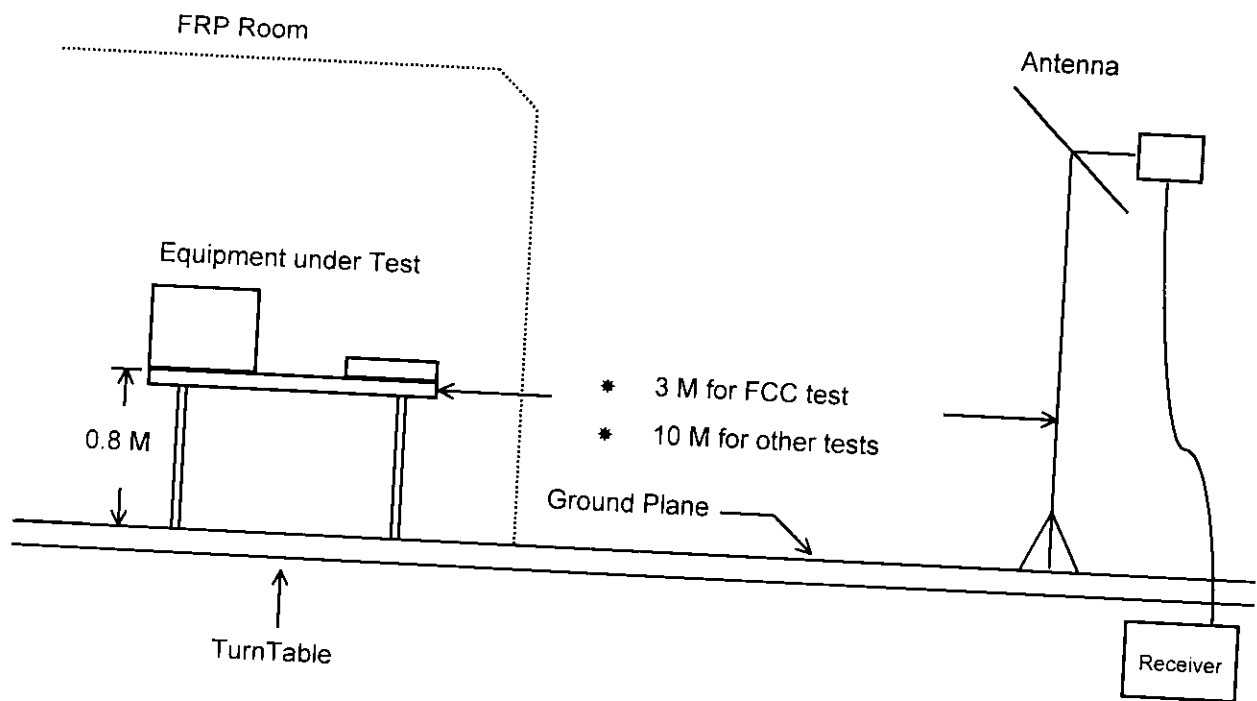
- Spectrum Analyzer 8568B/8594a
 - Attenuation 0 dB
 - Start Frequency 30 MHz
 - Stop Frequency 2000 MHz
 - Resolution Bandwidth 1 MHz
 - Video Bandwidth 1 MHz
 - Signal Input Input 1 (for 9KHz to 2.9GHz)

- 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 8568B) 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 : 29°C
- Relative Humidity : 71% RH
- Test Mode : **1600 × 1200, 106k, 85Hz**
- Test Date : June 17, 1998

- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Sample Calculation at 54.11 MHz
Corrected Reading = 3.01 + 1.09 + 29.93 = 34.03 (dBuV/m)

The Radiated Emission test was passed at

248.00 MHz / 41.40 dBuV (Vertical)

Antenna Height 1.5 Meter , Turntable Degree 313°

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m) (uV/m)	Emission (dBuV/m)	Level (uV/m)	Margin (dB)
54.11	V	3.01	1.09	29.93	40.00 100	34.03	50.29	-5.97
85.58	V	7.61	1.40	25.84	40.00 100	34.85	55.27	-5.15
209.60	V	14.17	2.40	17.04	43.50 150	33.61	47.92	-9.89
248.00	V	15.91	2.54	22.69	46.00 200	41.14	114.02	-4.86
85.23	H	7.56	1.40	24.99	40.00 100	33.95	49.83	-6.05
189.71	H	13.49	2.30	18.14	43.50 150	33.93	49.72	-9.57

Test Engineer : *Jerry Chang*

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 : 29°C
- Relative Humidity : 71% RH
- Test Mode : **1280 × 1024, 91k, 85Hz**
- Test Date : June 17, 1998

- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Sample Calculation at 39.23 MHz
 Corrected Reading = 0.32 + 0.92 + 33.82 = 35.07 (dBuV/m)

The Radiated Emission test was passed at

39.23 MHz / 35.07 dBuV (Vertical)

Antenna Height 1.2 Meter , Turntable Degree 73°

Frequency (MHz)	Antenna Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m) (uV/m)	Emission (dBuV/m) (uV/m)	Level (uV/m)	Margin (dB)
39.23	V	0.32	0.92	33.82	40.00 100	35.07 56.69	56.69	-4.93
372.80	V	21.21	3.36	15.39	46.00 200	39.96 99.54	99.54	-6.04
57.19	H	3.69	1.15	27.55	40.00 100	32.39 41.64	41.64	-7.61
80.45	H	7.14	1.40	25.29	40.00 100	33.83 49.15	49.15	-6.17
234.40	H	14.89	2.47	20.99	46.00 200	38.35 82.70	82.70	-7.65
371.20	H	21.08	3.36	15.10	46.00 200	39.53 94.73	94.73	-6.47

Test Engineer : *Jerry Chang*

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	March 06, 1998	Conduction
Quasi-Peak Adapter (site 5)	HP	85650A	2521A00821	9KHz - 1000KHz	Nov. 12, 1997	Radiation
Spectrum Analyzer (Site 5)	HP	8568B	2634A03000	100Hz - 1.5GHz	Nov. 12, 1997	Radiation
Amplifier (Site 5)	HP	8447D	2944A09073	0.1MHz -1.3GHz	Sep. 17, 1997	Radiation
Bilog Antenna (Site 5)	CHASE	CBL6112A	2322	30MHz -2GHz	Jan. 22, 1998	Radiation
Half-wave dipole antenna (Site 5)	EMCO	3121C	9705-1285	28 M - 1GHz	May 19, 1998	Radiation
Turn Table (site 5)	EMCO	2080	9711-2021	0 ~ 360 degree	N/A	Radiation
Antenna Mast (site 5)	EMCO	2075	9711-2115	1 m- 4 m	N/A	Radiation

Remark : Except the calibration interval of LISN (EMCO/3810/2NM) is one and half years, the Calibration interval of all instruments are one year.