

# FCC TEST REPORT

for

CISPR PUB. 22 Class B

Equipment : CARDEXpert 6326 (PCI)  
Model No. : VZB-12  
FCC ID : ICUVGA-GWVZBA  
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.
- **Certificate or Test Report must not be used by the applicant to claim the product in this test report endorsement by NVLAP or any agency of U.S. government.**

***SPORTON International Inc.***

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

Table of Contents

**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 ..... 7**

**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

    5.5. Photographs of Counducted 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

    6.5. Photographs of Radiated Emission Test Configuration ..... 22

**7. Antenna Factor & Cable Loss ..... 23**

**8. List of Measuring Equipment Used ..... 23**

**Appendix A. Photographs of EUT ..... A1 ~ A2**

# **CERTIFICATE OF COMPLIANCE**

**for**

## **CISPR PUB. 22 Class B**

Equipment : CARDEXpert 6326 (PCI)  
Model No. : VZB-12  
FCC ID : ICUVGA-GWVZBA  
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 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 CISPR PUB. 22** both radiated and conducted emission class B limits. Testing was carried out on Mar. 21, 2000 at **SPORTON International Inc.** LAB. in Lin Kou.

---

Lenore Chang  
President

***SPORTON International Inc.***

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

## **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 6326 (PCI)  
Model No. : VZB-12  
FCC ID : ICUVGA-GWVZBA  
Trade Name : CARDEXpert  
Data cable : Shielded, 1.15m  
Power Supply Type : From PC  
Power Cord : N/A

### **1.4. Feature of Equipment under Test**

- Using SiS 6326 Graphic Accelerator
- AGP 133MHz support
- Built-in Direct Draw Accelerator
- Per-pixel texture perspective correction support
- Resolution support up to 1600x1200, 94KHz, 75Hz

## **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 HITACHI Monitor, DELL PS/2 Keyboard, PRIMAX PS/2 Mouse, HP Printer, ACEEX Modem and EUT were connected to the FIC PC for EMI test.
- c. The Following display resolution were investigated during the compliance test:
  - 1. Horizontal frequency (640x480 to 1,600x1,200, 31.5 KHz to 94 KHz)
  - 2. Vertical frequency (60 Hz to 85 Hz)
- d. According to the above tests, we listed the following display modes as the worst cases:
  - 1. 1,600x1,200 (non-interlaced 94 KHz), refresh rate 75 Hz.
  - 2. 1,280x1,024 (non-interlaced 91 KHz), refresh rate 85 Hz.
- e. Frequency range investigated: conduction 150 KHz to 30 MHz, radiation 30 MHz to 2,000 MHz.

### **2.2. Description of Test System**

#### Support Unit 1. -- Personal Computer (FIC)

FCC ID	: N/A
Model No.	: P2L97
Power Supply Type	: Switching
Power Cord	: Non-Shielded
Serial No.	: SP0037
Data Cable	: Shielded, 360 degree via metal backshells
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

#### Support Unit 2. -- Monitor (HITACHI)

FCC ID	: N/A
Model No.	: CM753ET
Power Supply Type	: Switching
Power Cord	: Non-Shielded
Serial No.	: SP0176
Data Cable	: Shielded, 360 degree via metal backshells, 1.15m
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

## Support Unit 3. -- PS/2 Keyboard (DELL)

FCC ID : GYUM92SK  
Model No. : AT101(DE8M)  
Serial No. : SP0054  
Data Cable : Shielded, 360 degree via metal backshells, 1.9m

## Support Unit 4. -- PS/2 Mouse (PRIMAX)

FCC ID : EMJMUSJQ  
Model No. : MUS9J  
Serial No. : SP0045  
Data Cable : Shielded, 360 degree via metal backshells, 1.7m

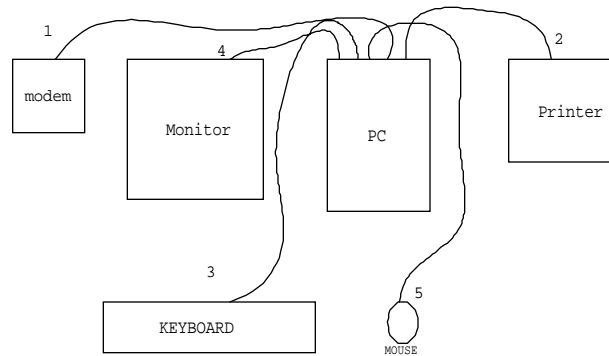
## Support Unit 5. -- Printer (HP)

FCC ID : DSI6XU2225  
Model No. : 2225C  
Power Supply Type : Linear  
Power Cord : Non-Shielded  
Serial No. : SP0014  
Data Cable : Shielded, 360 degree via metal backshells, 1.35m

## Support Unit 6. -- Modem (ACEEX)

FCC ID : IFAXDM1414  
Model No. : DM1414  
Power Supply Type : Linear  
Power Cord : Non-Shielded  
Serial No. : SP0015  
Data Cable : Shielded, 360 degree via metal backshells, 1.15m

**2.3. Connection Diagram of Test System**



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

### **3. Test Software**

An executive program, EMCTEST.EXE under WIN 98, which generates 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. 30-2, 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**

CISPR PUB. 22 Class B

### **4.4. Frequency Range Investigated**

- a. Conduction: from 150 kHz to 30 MHz
- b. Radiation : from 30 MHz to 2,000 MHz

### **4.5. Test Distance**

The test distance of radiated emission from antenna to EUT is 10 M.

## 5. Test of Conducted Powerline

Conducted Emissions were measured from 150 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 section 5.3. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

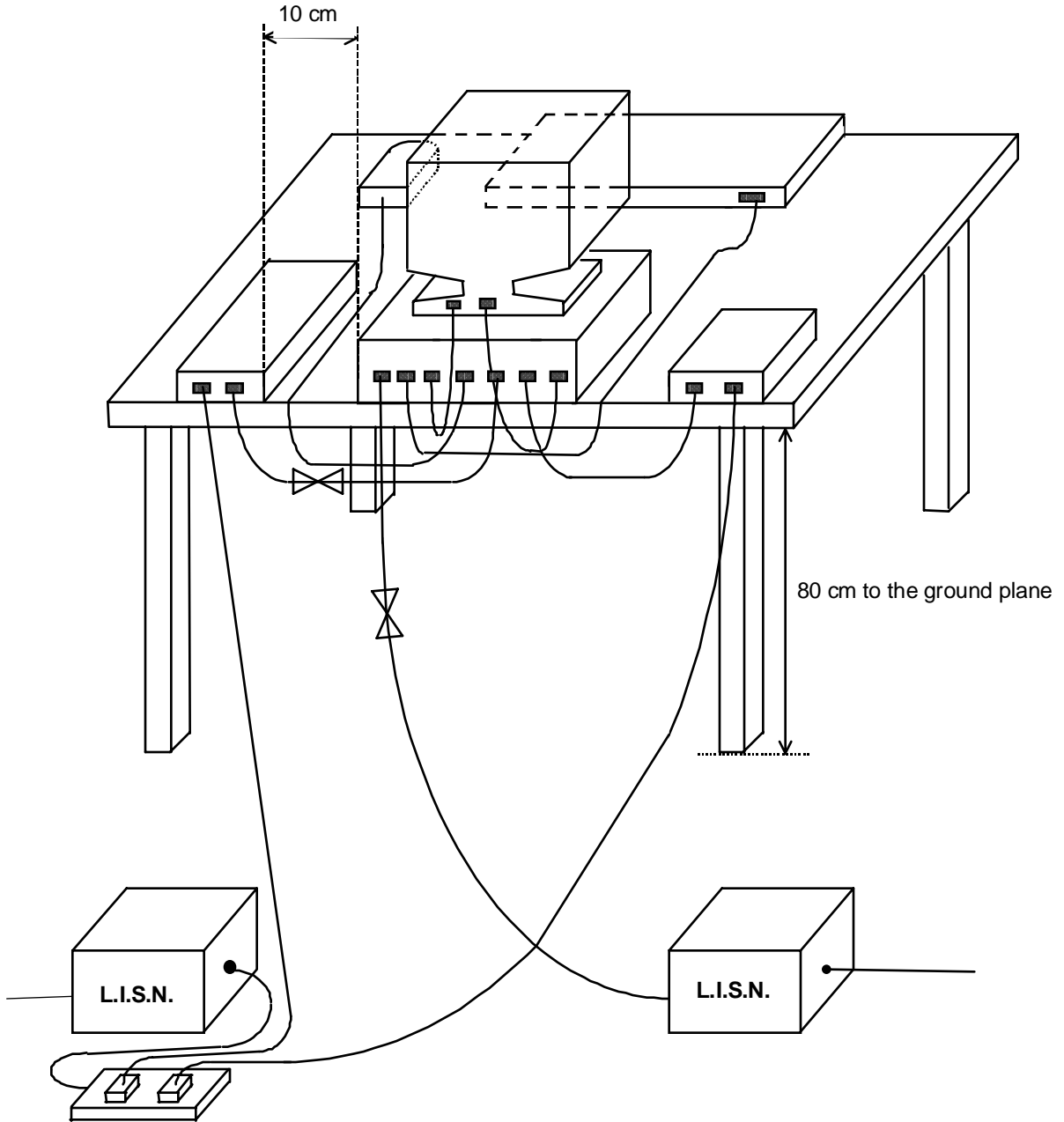
### 5.1. Major Measuring Instruments

Test Receiver	HP 8591EM
Attenuation	0 dB
Start Frequency	0.15 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 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 150 kHz to 30 MHz was searched.
- h. Set the test-receiver system 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 one 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**

5.4.1. Test mode : 1600x1200 75Hz/94K

- Temperature : 26°C
- Relative Humidity : 60 %
- Test Date : Mar. 21, 2000

**The Conducted Emission test was passed at minimum margin**

**NEUTRAL 0.252 MHz / 45.50 dBuV.**

Freq. (MHz)	Line or Neutral	Meter Reading				Limits				Margin	
		Q.P. (dBuV)	A.V. (dBuV)	Q.P. (uV)	A.V. (uV)	Q.P. (dBuV)	A.V. (dBuV)	Q.P. (uV)	A.V. (uV)	Q.P. (dB)	A.V. (dB)
0.252	L	44.90	44.40	175.79	165.96	61.69	51.69	1214.97	384.21	-16.8	-7.3
0.458	L	32.30	31.40	41.21	37.15	56.73	46.73	686.47	217.08	-24.4	-15.3
22.570	L	28.30	26.30	26.00	20.65	60.00	50.00	1000.00	316.23	-31.7	-23.7
0.252	N	45.80	45.50	194.98	188.36	61.69	51.69	1214.97	384.21	-15.9	-6.2
0.458	N	32.60	31.70	42.66	38.46	56.73	46.73	686.47	217.08	-24.1	-15.0
22.570	N	28.20	26.10	25.70	20.18	60.00	50.00	1000.00	316.23	-31.8	-23.9

Test Engineer : \_\_\_\_\_  
Aldrich Hong

5.4.2. Test mode : 1280x1024 85Hz/91K

- Temperature : 26°C
- Relative Humidity : 60 %
- Test Date : Mar. 21, 2000

**The Conducted Emission test was passed at minimum margin**

**NEUTRAL 0.253 MHz / 45.60 dBuV.**

Freq. (MHz)	Line or Neutral	Meter Reading				Limits				Margin	
		Q.P. (dBuV)	A.V. (dBuV)	Q.P. (uV)	A.V. (uV)	Q.P. (dBuV)	A.V. (dBuV)	Q.P. (uV)	A.V. (uV)	Q.P. (dB)	A.V. (dB)
0.214	L	45.60	45.30	190.55	184.08	63.06	53.06	1421.73	449.59	-17.5	-7.8
0.823	L	19.30	13.80	9.23	4.90	56.00	46.00	630.96	199.53	-36.7	-32.2
22.569	L	28.00	25.80	25.12	19.50	60.00	50.00	1000.00	316.23	-32.0	-24.2
0.253	N	45.90	45.60	197.24	190.55	61.67	51.67	1212.35	383.38	-15.8	-6.1
0.823	N	19.60	14.00	9.55	5.01	56.00	46.00	630.96	199.53	-36.4	-32.0
22.569	N	27.50	25.50	23.71	18.84	60.00	50.00	1000.00	316.23	-32.5	-24.5

Test Engineer : \_\_\_\_\_  
Aldrich Hong

**5.5. Photographs of Counducted Powerline Test Configuration**

- The photographs show the configuration that generates the maximum emission.

FRONT VIEW



REAR VIEW



SIDE VIEW





## 6. Test of Radiated Emission

Radiated emissions from 30 MHz to 2,000 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 section 6.3. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions.

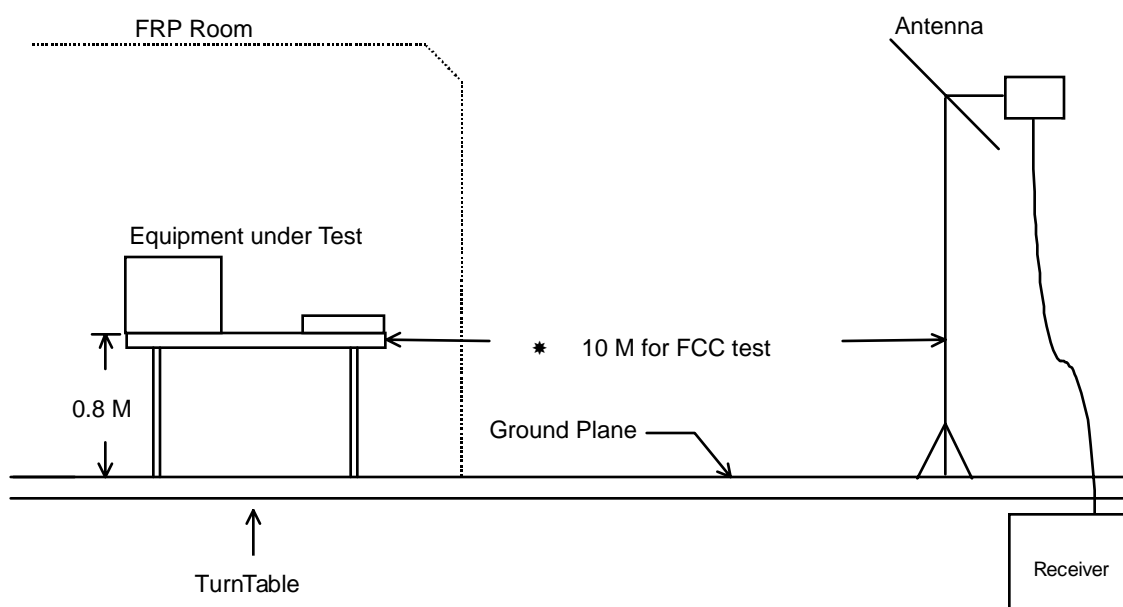
### 6.1. Major Measuring Instruments

Amplifier	(HP 87405A)
Attenuation	0 dB
RF Gain	25 dB
Signal Input	10 MHz to 3.0 GHz
Spectrum Analyzer	(HP 8594A)
Attenuation	0 dB
Start Frequency	30 MHz
Stop Frequency	2,000 MHz
Resolution Bandwidth	1 MHz
Video Bandwidth	1 MHz
Signal Input	9 KHz to 2.9 GHz

**6.2. Test Procedures**

- a. The EUT was placed on a rotatable table top 0.8 meter above ground.
- b. The EUT was set 10 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 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**

6.4.1. Test mode : 1600x1200 75Hz/94K

- Test Distance : 10 M
- Temperature : 30°C
- Relative Humidity : 46 %
- Test Date : Mar. 21, 2000
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading : Antenna Factor + Cable Loss + Reading = Emission

**The Radiated Emission test was passed at minimum margin**

**465.600 MHz / 28.09 dBuV (VERTICAL) Antenna Height 0 Meter, Turntable Degree 0 °.**

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits		Emission (dBuV/m)	Level (uV/m)	Margin (dB)
					(dBuV/m)	(uV/m)			
40.602	H	14.13	0.82	3.90	30.00	31.62	18.85	8.76	-11.15
202.400	H	9.94	2.13	7.02	30.00	31.62	19.09	9.01	-10.91
40.602	V	14.13	0.82	4.60	30.00	31.62	19.55	9.50	-10.45
60.780	V	6.45	1.00	11.32	30.00	31.62	18.77	8.68	-11.23
202.400	V	9.94	2.13	8.42	30.00	31.62	20.49	10.58	-9.51
465.600	V	17.79	4.08	6.22	37.00	70.79	28.09	25.38	-8.91

Test Engineer : \_\_\_\_\_

KENNY CHUANG

6.4.2. Test mode : 1280x1024 85Hz/91K

- Test Distance : 10 M
- Temperature : 30°C
- Relative Humidity : 46 %
- Test Date : Mar. 21, 2000
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading : Antenna Factor + Cable Loss + Reading = Emission

**The Radiated Emission test was passed at minimum margin**

**141.321 MHz / 19.17 dBuV (VERTICAL) Antenna Height 1 Meter, Turntable Degree 359 °.**

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits		Emission (dBuV/m)	Level (uV/m)	Margin (dB)
					(dBuV/m)	(uV/m)			
141.321	H	12.59	1.52	4.66	30.00	31.62	18.77	8.68	-11.23
204.800	H	10.09	2.16	6.81	30.00	31.62	19.06	8.97	-10.94
410.400	H	16.12	3.51	5.63	37.00	70.79	25.26	18.32	-11.74
42.141	V	13.09	0.86	4.30	30.00	31.62	18.25	8.18	-11.75
59.412	V	6.80	1.02	10.72	30.00	31.62	18.54	8.45	-11.46
141.321	V	12.59	1.52	5.06	30.00	31.62	19.17	9.09	-10.83

Test Engineer : \_\_\_\_\_  
KENNY CHUANG

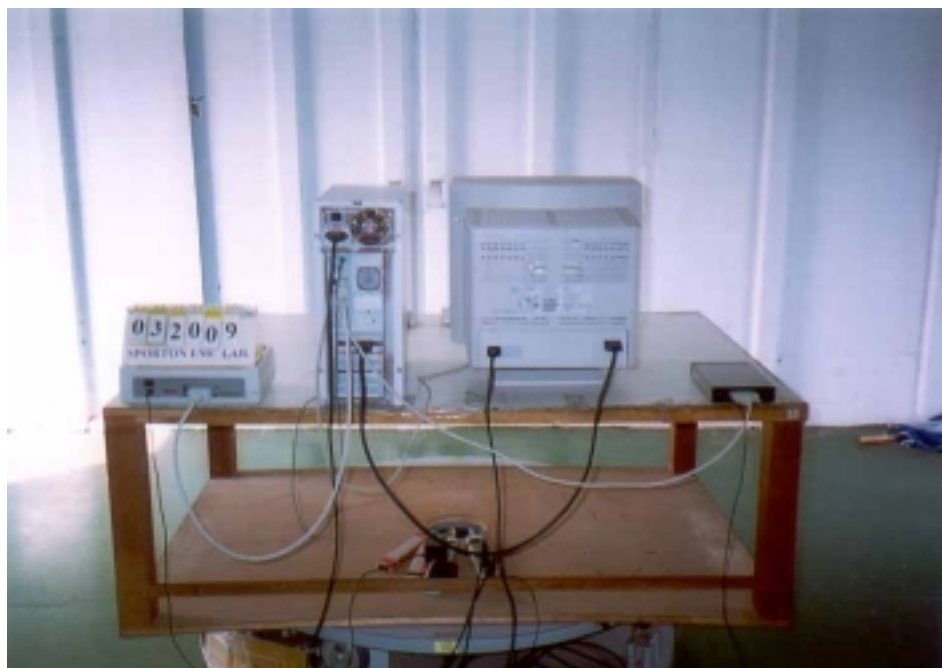
**6.5. Photographs of Radiated Emission Test Configuration**

- The photographs show the configuration that generates the maximum emission.

FRONT VIEW



REAR VIEW



7. Antenna Factor & Cable Loss

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)
30	16.6	0.8
35	15.6	0.8
40	14.6	0.8
45	11.6	0.9
50	9.5	0.9
55	8.0	1.1
60	6.5	1.0
65	6.2	1.0
70	6.0	1.1
75	6.4	1.2
80	7.0	1.1
85	7.5	1.2
90	8.0	1.2
95	9.3	1.3
100	10.6	1.3
110	11.3	1.4
120	12.0	1.4
130	12.5	1.6
140	12.9	1.5
150	11.2	1.6
160	10.5	1.7
170	10.0	1.8
180	9.9	2.0
190	9.8	2.0
200	9.7	2.1
220	11.2	2.3
240	12.7	2.5
260	13.5	2.5
280	13.6	2.7
300	13.7	2.9
320	14.1	3.0
340	14.5	3.1
360	15.0	3.3
380	15.4	3.5
400	15.8	3.4
450	17.3	3.9
500	18.8	4.5
550	19.0	4.6
600	19.0	4.6
650	19.1	5.1
700	19.1	5.4
750	20.1	5.8
800	21.1	6.0
850	21.7	5.9
900	22.2	6.4
950	21.1	6.8
1000	20.0	7.2
2000	31.57	8.2

LKOP5

**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 – 1.8 GHz	Sep. 06. 1999	Conduction
LISN (Support Unit) (site 2)	Telemeter	NNB-2/16Z	98009	50 ohm / 50 uH	Dec. 06. 1999	Conduction
LISN (EUT) (site 2)	Telemeter	NNB-2/16Z	98087	50 ohm / 50 uH	Dec. 06. 1999	Conduction
Amplifier (Site 5)	HP	87405A	3207A01437	10MHz –3.0GHz	Jun. 25, 1999	Radiation
Spectrum Analyzer (Site 5)	HP	8594A	3051A00172	9KHz –2.9GHz	Apr. 16, 1999	Radiation
Bilog Antenna (Site 5)	CHASE	CBL6112A	2287	30MHz -2GHz	Jan. 07, 2000	Radiation
Half-wave dipole antenna (Site 5)	EMCO	3121C	9705-1285	28 M - 1GHz	May 18. 1999	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