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# FCC TEST REPORT

for

## PART 15, SUBPART B CLASS B

Equipment : CARDEXPERT 740

EXHI

MODEL NO. : 9804-10

**F C C I D** : ICUVGA-GW804

Filing Type : Original Grant

APPLICANT : **GAINWARD CO., LTD.**

10F-6, No. 79, 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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## 7. ANTENNA FACTOR AND CABLE LOSS

Frequency ( Mhz )	Antenna Factor ( dB )	Cable Loss ( dB )
30	-2.20	0.80
35	-0.70	0.82
40	0.51	0.94
45	1.30	1.00
50	2.39	1.00
55	3.14	1.11
60	4.40	1.20
65	5.14	1.20
70	5.59	1.20
75	6.11	1.30
80	7.10	1.40
85	7.53	1.40
90	8.22	1.40
95	8.80	1.40
100	9.36	1.50
110	10.11	1.60
120	10.41	1.70
130	10.74	1.80
140	11.42	1.91
150	11.91	2.01
160	12.25	2.01
170	12.22	2.21
180	13.02	2.30
190	13.50	2.30
200	14.05	2.40
220	14.31	2.40
240	15.11	2.50
260	17.11	2.61
280	17.50	2.70
300	17.99	3.11
320	18.10	3.10
340	19.13	3.20
360	20.14	3.30
380	21.81	3.40
400	22.29	3.60
450	22.40	3.80
500	22.31	4.10
550	23.42	4.40
600	24.01	4.60
650	25.11	5.00
700	26.00	5.30
750	26.51	5.51
800	27.10	5.70
850	27.51	5.90
900	27.90	6.20
950	30.01	6.30
1000	29.00	6.40

※ Remark: For frequency above 1000 MHz, we used low cable loss BNC cable to test.

## 8. LIST OF MEASURING INSTRUMENTS USED

INSTRUMENT	Manufacturer	Model No.	Serial No.	Characteristic	Calibration date	Remark
Spectrum monitor	R&S	EZM	894987/011	---	Mar. 20, 1997	C
Test Receiver	R&S	ESH3	893495/013	9 KHz - 30MHz	Mar. 21, 1997	C
Test Receiver	R&S	ESVP	893610/003	20Hz - 1.3 GHz	Mar. 20, 1997	C
LISN	EMCO	3825/2	9510-2484	50 ohm / 50 uH	Nov. 29, 1997	C
LISN	KYORITSU	KNW-407	8-1010-15	50 ohm / 50 uH	Nov. 10, 1997	C
EMI Filter	CORCOM	MRI-2030	N/A	480 VAC / 30 A	N/A	C
EMI Filter	CORCOM	MRI-2030	N/A	480 VAC / 30 A	N/A	C
Spectrum Analyzer (site 1)	HP	8568B	2928A04713	100Hz - 1500MHz	Jul. 19, 1997	R
Quasi-peak Adapter (site 1)	HP	85650A	2811A01285	9KHz -1 GHz	Jul. 19, 1997	R
RF Preselector (site 1)	HP	85685A	2926A00951	20Hz-1GHz	Aug. 12, 1997	R
Bilog Antenna (1)	CHASE	CBL6112A	2296	30 MHz -2000 MHz	Jul. 24, 1997	R
Receiver	R&S	ESCS30	70-213-4258	9KHz - 2.75GHz	Dec. 19, 1997	R
Half-wave dipole antenna	EMCO	3121C	8912-496	28M-1GHZ	Aug. 12, 1997	R
Turn Table	EMCO	1060-1.211	9507-1805	0 ~ 360 degree	N/A	R
Antenna Mast	EMCO	1051-1.2	9502-1868	1 m- 4 m	N/A	R

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

## 1. GENERAL DESCRIPTION OF EQUIPMENT UNDER TEST

### 1.1. APPLICANT

**GAINWARD CO., LTD.**

10F-6, No. 79, 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 740

MODEL NO. : 9804-10

FCC ID:ICUVGA-GW804

TRADE NAME :GAINWARD

DATA CABLE : Shielded

POWER SUPPLY TYPE : N/A

POWER CORD : N/A

### 1.4. FEATURE OF EQUIPMENT UNDER TEST

- High-performance intel740 graphics accelerator
- Maximum resolution up to 1280x1024 60Hz
- Maximum refresh rate 85Hz on 1024x768 resolution
- Display memory support 2/4/8 MB SGRAM or 8MB SDRAM

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## 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 HONEYWELL keyboard, SONY monitor, HP printer, KYE mouse and ACEEX modem were connected to the LEO PC.
- c. The following display resolution were investigated during the compliance test:
  1. Horizontal frequency (640x480 to 1280x1024, 31.47Khz to 80KHz)
  2. Vertical frequency (60Hz to 85Hz)
- d. According to the above tests, we listed the following display modes as the worst cases:
  1. 1024x768 (non-interlaced 69Khz), refresh rate 85Hz.
  2. 1280x1024 (non-interlaced 80KHz), refresh rate 75Hz.
- 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. --- PERSONAL COMPUTER (LEO)

FCC ID : N/A  
Model No. : P2L97  
Serial No. : SP1040  
Data Cable : Shielded, 360 degree via metal backshells.  
Power Supply Type : Switching  
Power Cord : Shielded

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

Support Device 2. --- MODEM ( ACEEX)

FCC ID :IFAXDM1414  
Model No. :DM1414  
Serial No. :SP0016  
Data Cable :Shielded, 360 degree via metal backshells  
Power Supply Type :Linear

Support Device 3. --- PRINTER (HP)

FCC ID :DSI6XU2225  
Model No. :2225C  
Serial No. :SP0003  
Data Cable :Shielded, 360 degree via metal backshells  
Power Supply Type :Linear

Support Device 4. --- MONITOR (SONY)

FCC ID :AK8GDM17SE2T  
Model No. :GDM-17SE2T  
Serial No. :SP1041  
Data Cable :Shielded  
Power Supply Type :Switching  
Power Cord :Non-shielded

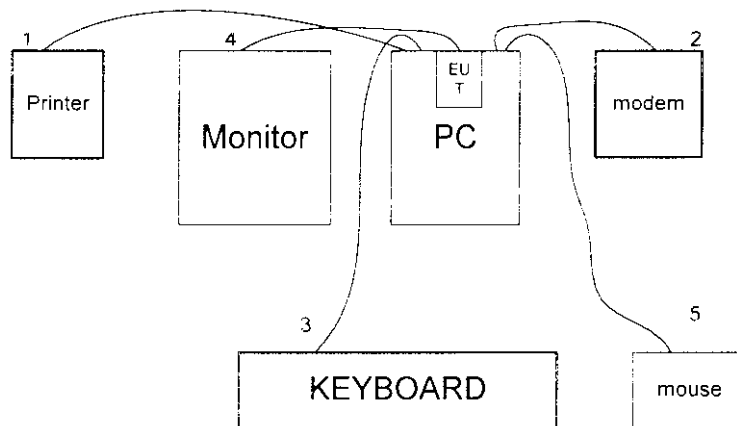
Support Device 5. --- KEYBOARD (HONEYWELL)

FCC ID :GJK101RX-6  
Model No. :PC7XL-AA  
Serial No. :SP1008  
Data Cable :Shielded, 360 degree via metal backshells

Support Device 6. --- MOUSE (KYE)

FCC ID :FSUGMZFC  
Model No. :NETMOUSE  
Serial No. :SP1036  
Data Cable :Non-shielded

2.3. CONNECTION DIAGRAM OF TEST SYSTEM



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



### **3. TEST SOFTWARE**

An executive program, FCC.EXE, which generates a complete line of continuously repeating " H " pattern is 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, then the hard disk reads and writes the message.
- g. Repeat the steps from b to g.

## **4. GENERAL INFORMATION OF TEST**

### **4.1. TEST FACILITY**

This test was carried out by SPORTON INTERNATIONAL INC. in an openarea test site.

Openarea Test Site Location : No. 3, Lane 238, Kang Lo Street, Nei Hwu District,  
Taipei 11424, Taiwan, R.O.C.

TEL : 886-2-2631-4739

FAX : 886-2-2631-9740

### **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.

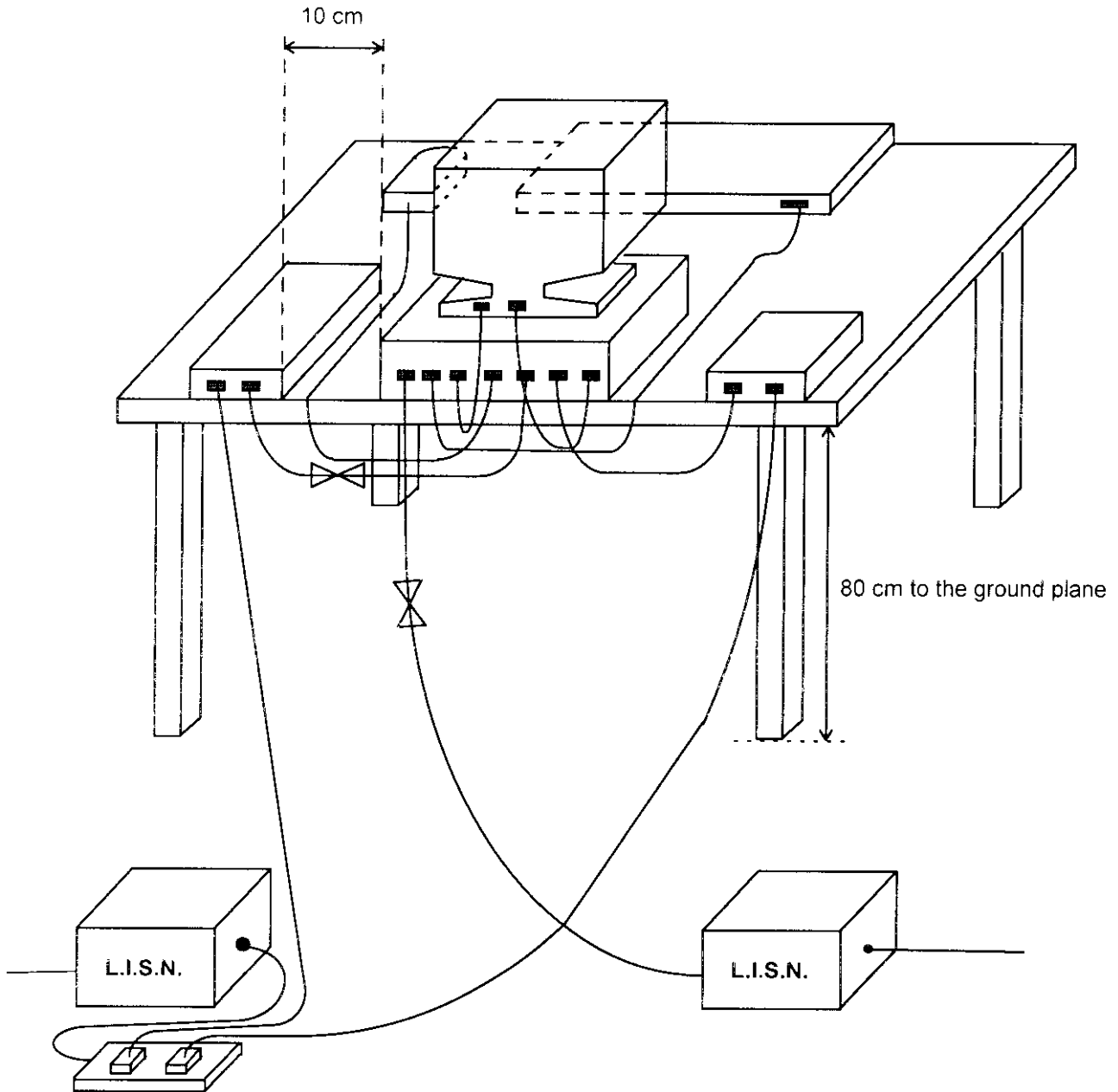
### 5.1. MAJOR MEASURING INSTRUMENTS

- 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 ( R/S receiver ESH3) 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
- Temperature : 25 °C
- Relative Humidity : 60% RH
- Test mode:1024x768 (non-interlaced 69Khz), 85Hz
- All emissions not reported here are more than 10 dB below the prescribed limit.
- Test Date . APR. 02, 1998

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

**NEUTRAL 0.58MHz /42.40dBuV.**

Frequency ( MHz )	Line / Neutral	Meter Reading		Limits		Margin ( dB )
		( dBuV )	( uV )	( dBuV )	( uV )	
0.58	L	42.00	125.89	48.00	251.19	-6.00
0.73	L	41.20	114.82	48.00	251.19	-6.80
1.20	L	38.20	81.28	48.00	251.19	-9.80
0.58	N	42.40	131.83	48.00	251.19	-5.60
0.89	N	40.30	103.51	48.00	251.19	-7.70
1.35	N	38.20	81.28	48.00	251.19	-9.80

Test Engineer :

**5.4.1 TEST RESULT OF AC POWERLINE CONDUCTED EMISSION**

- Frequency Range of Test : from 0.45 MHz to 30 MHz
- Temperature : 25 °C
- Relative Humidity : 60% RH
- Test mode: 1280x1024 (non-interlaced 80KHz), 75Hz
- All emissions not reported here are more than 10 dB below the prescribed limit.
- Test Date : APR. 02, 1998

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

**LINE 0.73MHz /43.50dBuV.**

Frequency ( MHz )	Line / Neutral	Meter Reading		Limits		Margin ( dB )
		( dBuV )	( uV )	( dBuV )	( uV )	
0.73	L	43.50	149.62	48.00	251.19	-4.50
0.89	L	42.00	125.89	48.00	251.19	-6.00
1.04	L	39.50	94.41	48.00	251.19	-8.50
0.74	N	41.50	118.85	48.00	251.19	-6.50
1.19	N	39.50	94.41	48.00	251.19	-8.50
15.15	N	31.70	38.46	48.00	251.19	-16.30

Test Engineer :

## 6. TEST OF RADIATED EMISSION

Radiated emissions from 30 MHz to 2000MHz 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

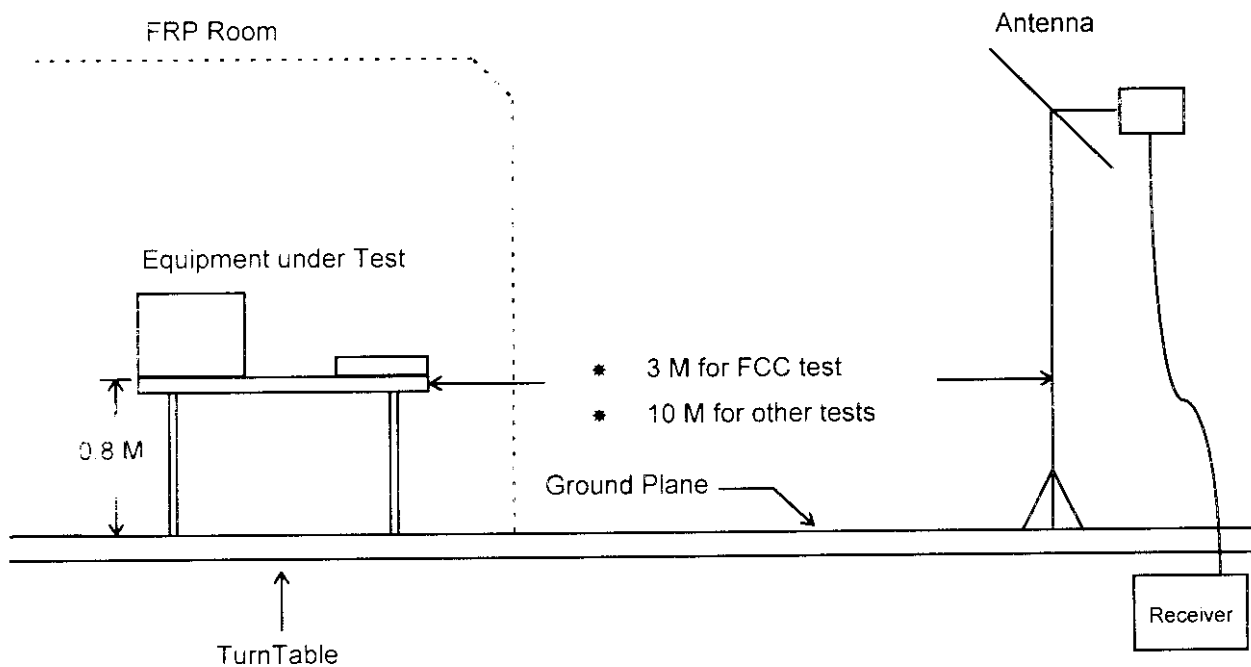
- RF Preselector
  - Attenuation 0 dB
  - RF Gain 20 dB
  - Signal Input Input 2 ( for 20 MHz to 2 GHz )
  
- Spectrum Analyzer 8568B/R/S ESCS30
  - Attenuation 0 dB
  - Start Frequency 30 MHz
  - Stop Frequency 2000MHz
  - Resolution Bandwidth 1 MHz
  - Video Bandwidth 1 MHz
  - Signal Input Input 1 ( for 9KHz to 2.75 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 8568B/ R/S ESCS30 ) 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**

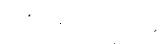
- Equipment meets the technical specifications of 15.109
- Frequency Range of Test : from 30 MHz to 2000 MHz
- Test Distance : 3 M
- Temperature : 27 °C
- Relative Humidity :56% RH
- Test mode :1024x768 (non-interlaced 69Khz), 85Hz
- Test Date :APR. 02, 1998
- Emission level ( dBuV/m ) = 20 log Emission level ( uV/m )
- Sample Calculation at 380.08MHz  
Corrected Reading = 20.31+ 3.40+ 18.92= 42.63(dBuV/m )

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

**Vertical 380.08MHz /42.63dBuV**

**Antenna Height 1 Meter , Turntable Degree 275°**

Frequency ( MHz )	Polarity	Antenna Factor (dB/m)	Cable Loss ( dB )	Reading ( dBuV )	Limits (dBuV/m)	(uV/m)	Emission Level (dBuV/m)	(uV/m)	Margin ( dB )
33.11	H	-1.03	0.91	35.63	40.00	100	35.51	59.63	-4.49
120.65	H	10.44	1.90	23.21	43.50	150	35.55	59.91	-7.95
203.42	H	14.23	2.42	19.12	43.50	150	35.77	61.45	-7.73
33.46	V	-0.93	0.91	35.01	40.00	100	34.99	56.17	-5.01
72.73	V	5.93	1.30	27.74	40.00	100	34.97	56.04	-5.03
380.08	V	20.31	3.40	18.92	46.00	200	42.63	135.36	-3.37

Test Engineer : 

**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 : 27 °C
- Relative Humidity : 56% RH
- Test mode: 1280x1024 (nono-interlaced 80KHz), 75Hz
- Test Date :APR. 02, 1998
- Emission level ( dBuV/m ) = 20 log Emission level ( uV/m )
- Sample Calculation at 226.71MHz  
Corrected Reading = 15.68+ 2.53+ 18.18= 36.39(dBuV/m )

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

**Horizontal 64.25MHz /35.23dBuV**

**Antenna Height 1 Meter , Turntable Degree275°**

Frequency ( MHz )	Polarity	Antenna Factor (dB/m)	Cable Loss ( dB )	Reading ( dBuV )	Limits (dBuV/m)	(uV/m)	Emission Level (dBuV/m)	(uV/m)	Margin ( dB )
48.51	H	2.09	1.15	29.81	40.00	100	33.06	44.98	-6.94
64.25	H	4.77	1.38	29.07	40.00	100	35.23	57.74	-4.77
201.02	H	14.10	2.41	17.58	43.50	150	34.09	50.64	-9.41
66.59	V	5.08	1.39	22.92	40.00	100	29.39	29.48	-10.61
72.11	V	5.85	1.32	24.12	40.00	100	31.29	36.69	-8.71
226.71	V	15.68	2.53	18.18	46.00	200	36.39	65.99	-9.61

Test Engineer :