**FCC TEST REPORT****REPORT NO. : F890704**

# FCC TEST REPORT

for

## PART 15, SUBPART B CLASS B

**EQUIPMENT** : CARDEXpert GX3**MODEL NO.** : 9809-11a**FCC ID** : ICUVGA-GW809D**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.

## TABLE OF CONTENT

SECTION TITLE	PAGE
<b>CERTIFICATE OF COMPLIANCE .....</b>	3
<b>1. GENERAL DESCRIPTION OF EQUIPMENT UNDER TEST .....</b>	4
1.1. APPLICANT .....	4
1.2. MANUFACTURER : Same as 1.1 .....	4
1.3. BASIC DESCRIPTION OF EQUIPMENT UNDER TEST .....	4
1.4. FEATURE OF EQUIPMENT UNDER TEST .....	4
<b>2. TEST CONFIGURATION OF EQUIPMENT UNDER TEST .....</b>	5
2.1. TEST MANNER .....	5
2.2. DESCRIPTION OF TEST SYSTEM .....	5
2.3. CONNECTION DIAGRAM OF TEST SYSTEM .....	7
<b>3. TEST SOFTWARE .....</b>	8
<b>4. GENERAL INFORMATION OF TEST .....</b>	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
<b>5. TEST OF CONDUCTED POWERLINE .....</b>	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 CONDUCTED POWERLINE TEST CONFIGURATION .....	15
<b>6. TEST OF RADIATED EMISSION .....</b>	19
6.1. MAJOR MEASURING INSTRUMENTS .....	19
6.2. TEST PROCEDURES .....	20
6.3. TYPICAL TEST SETUP LAYOUT OF RADIATED EMISSION .....	21
6.4. TEST RESULT OF RADIATED EMISSION .....	22
6.5. PHOTOGRAPHS OF RADIATED EMISSION TEST CONFIGURATION .....	24
<b>7. ANTENNA FACTOR AND CABLE LOSS .....</b>	26
<b>8. LIST OF MEASURING EQUIPMENT USED .....</b>	27



## CERTIFICATE OF COMPLIANCE

for

### FCC PART 15, SUBPART B CLASS B

**EQUIPMENT** : CARDEXpert GX3

**MODEL NO.** : 9809-11a

**FCC ID** : ICUVGA-GW809D

**FILING TYPE** : Original Grant

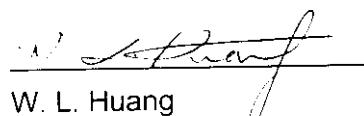
**APPLICANT** : **GAINWARD CO., LTD.**

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

### 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 **Sep. 11, 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., 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 GX3

FCC ID: ICUVGA-GW809D

MODEL NO. : 9809-11a

TRADE NAME : CARDEXpert

DATA CABLE : Shielded

POWER SUPPLY TYPE : N/A

POWER CORD : N/A

**1.4. FEATURE OF EQUIPMENT UNDER TEST**

- ↳ New Single Cycle 3D Architecture
- ↳ 128-bit Dual Rendering Pipeline
- ↳ Single Cycle Trilinear Filtering
- ↳ Highly Optimized 128 bit Graphics Engine
- ↳ 64-bit Synchronous Memory Bus
- ↳ Flash ROM and 12 C Serial Communications Bus
- ↳ 250MHz RAMDAC with Gamma Correction
- ↳ PCI Power Management
- ↳ DDC Monitor Communications

## **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, PANASONIC video monitor, ACEEX LOGITECH mouse, GENIUS mouse and EUT were connected to the F.I.C P.C. for EMI test.
- c. The V-video and S-video were tested in order to find the maximum emission. Since The V-video generates the worst case, the mode was used as the final data.
- d. The following display resolution were investigated during the compliance test:
  1. Horizontal frequency ( 640 x 480 to 1600 x 1200, 31KHz to 106KHz )
  2. Vertical frequency ( 60Hz to 85Hz )
- e. According to the above tests, we listed the following display modes as the worst cases:
  1. 1600 x 1200 (Non-interlanced 106KHz), refresh rate 85Hz.
  2. 640 x 480 (31KHz), refresh rate 60Hz. (TV MODE)
- f. Frequency range investigated: Conduction 450 KHz to 30 MHz, Radiation 30 MHz to 2000MHz.

### **2.2. DESCRIPTION OF TEST SYSTEM**

#### Support Device 1. --- MONITOR (HITACHI)

FCC ID : M9U9705C97BMD  
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 2. --- KEYBOARD (DELL)

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

**Support Device 3. -- MOUSE (LOGITECH)**

FCC ID : DZL211029  
Model No. : M-S34  
Serial No. : SP1014  
Data Cable : Non-shielded, 1.9m

**Support Device 4. --- PRINTER (HP)**

FCC ID : DSI6XU2225  
Model No. : 2225C  
Serial No. : SP0036  
Data Cable : Shielded, 360 degree via metal backshells, 1.35m  
Power Supply Type : Linear, AC Adapter  
Power Card : Non-shielded

**Support Device 5. -- MODEM (ACEEX)**

FCC ID : IFAXDM1414  
Model No. : DM1414  
Power Supply Type : Linear, AC Adapter  
Power Cord : Non-shielded  
Serial No. : SP1019  
Data Cable : Shielded, 360 degree via metal backshells, 1.15m

**Support Device 6. --- P.C. (F.I.C)**

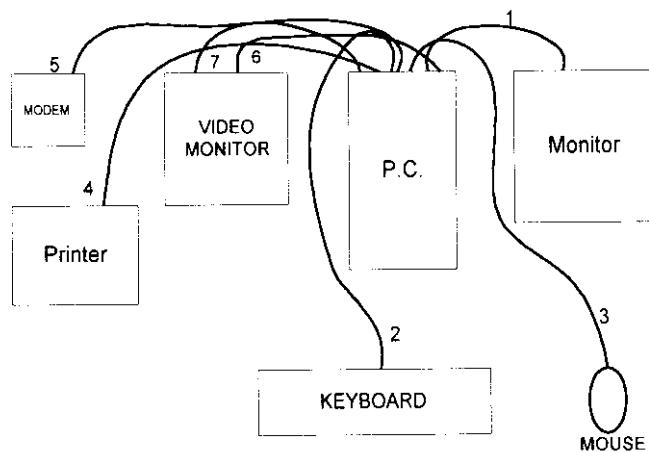
FCC ID : N/A  
Model No. : P2L97  
Serial No. : SP1003  
Data Cable : Shielded  
Power Cord : Non-shielded  
Power Supply Type : Switching

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

**Support Device 7. --- VIDEO MONITOR (PANASONIC)**

FCC ID : N/A  
Model No. : WV-CM1450  
Serial No. : SP1005  
Data Cable : Shielded  
Power Cord : Non-shielded  
Power Supply Type : Switching

## 2.3. CONNECTION DIAGRAM OF TEST SYSTEM



1. The I/O cable is connected from the EUT to the support device 1.
2. The I/O cable is connected from PC to the support device 2.
3. The I/O cable is connected from PC to the support device 3.
4. The I/O cable is connected from PC to the support device 4.
5. The I/O cable is connected from PC to the support device 5.
6. The S-video cable is connected from ~~PC~~ to the support device 6.
7. The V-video cable is connected from ~~PC~~ to the support device 6.

### **3. TEST SOFTWARE**

An executive program, WINFCC.EXE under WIN 95, 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 monitor and TV, and the monitor and TV displays "H" patterns on the screen.
- e. The PC sends "H" messages to the printer, then the printer prints them on the paper.
- f. The PC sends "H" messages to the modem.
- g. The PC sends "H" messages to the internal Hard Disk, and the Hard Disk reads and writes the message.
- h. 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.

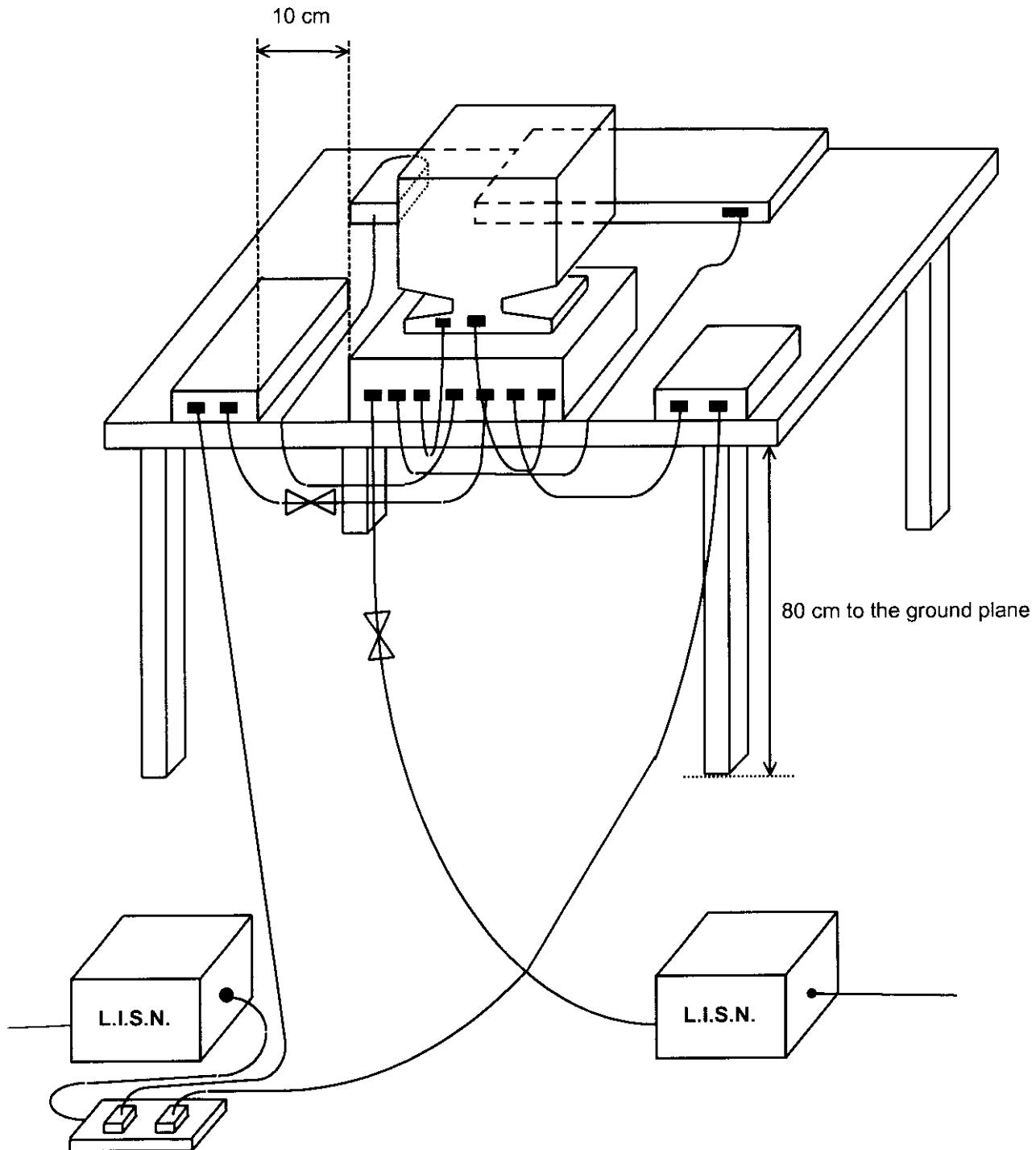
### **5.1. MAJOR MEASURING INSTRUMENTS**

- Test Receiver ( HP 8591EM )
  - 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 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 : 25 °C
- Relative Humidity : 38 % RH
- Test Mode : 1600 × 1200, 106K, 85Hz
- Test Date : Sep. 11, 1998

The Conducted Emission test was passed at minimum margin

Neutral 14.00 MHz / 35.80 dBuV.

Frequency ( MHz )	Line / Neutral	Meter Reading ( dBuV )	Meter Reading ( uV )	Limits ( dBuV )	Limits ( uV )	Margin ( dB )
0.50	L	28.60	26.92	48.00	251.19	-19.40
4.77	L	26.70	21.63	48.00	251.19	-21.30
25.73	L	34.60	53.70	48.00	251.19	-13.40
0.49	N	28.30	26.00	48.00	251.19	-19.70
14.00	N	35.80	61.66	48.00	251.19	-12.20
25.72	N	35.00	56.23	48.00	251.19	-13.00

Test Engineer :

KENNY CHUANG

*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 : 25 °C
- Relative Humidity : 38 % RH
- Test Mode : 640 x 480 , 31K/60Hz (TV MODE)
- Test Date : Sep. 11, 1998

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

**Neutral 21.33 MHz / 45.70 dBuV.**

Frequency ( MHz )	Line / Neutral	Meter Reading ( dBuV )	Meter Reading ( uV )	Limits ( dBuV )	Limits ( uV )	Margin ( dB )
3.56	L	33.80	48.98	48.00	251.19	-14.20
10.67	L	42.50	133.35	48.00	251.19	-5.50
21.34	L	44.10	160.32	48.00	251.19	-3.90
3.56	N	33.70	48.42	48.00	251.19	-14.30
10.67	N	41.80	123.03	48.00	251.19	-6.20
21.33	N	45.70	192.75	48.00	251.19	-2.30

Test Engineer : *Kenny Chuang*  
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.

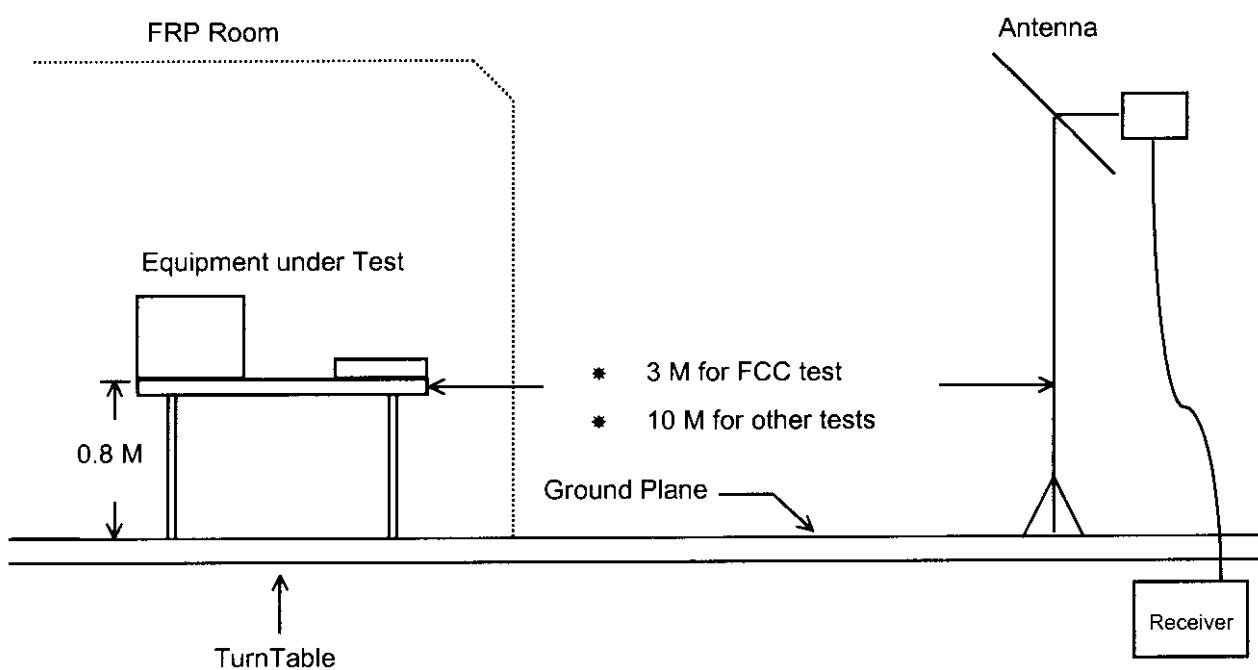
### **6.1. MAJOR MEASURING INSTRUMENTS**

- Amplifier ( HP 87405A )
  - Attenuation 0 dB
  - RF Gain 20 dB
  - Signal Input 0.1 MHz to 1.3 GHz
- Spectrum Analyzer ( ADVANTEST R3261C )
  - Attenuation 0 dB
  - Start Frequency 30 MHz
  - Stop Frequency 2000 MHz
  - Resolution Bandwidth 1 MHz
  - Video Bandwidth 1 MHz
  - Signal Input 9 KHz to 2.6 GHz
- Quasi-Peak Adapter ( ADVANTEST R3261C )
  - 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 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 : 58 % RH
- Test Mode : 1600 × 1200, 106K, 85Hz
- Test Date : Sep. 10, 1998
- Emission level ( dBuV/m ) = 20 log Emission level ( uV/m )
- Sample Calculation at 209.38 MHz

Corrected Reading = 14.17 + 2.40 + 16.24 = 32.81 (dBuV/m )

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

**Vertical 299.44 MHz / 38.76 dBuV**

**Antenna Height 1.0 Meter , Turntable Degree 84° .**

Frequency ( MHz )	Antenna Polarity	Cable Factor	Reading ( dBuV )	Limits ( dBuV )	Emission ( dBuV )	Level ( uV )	Margin ( dB )		
199.71	H	14.03	2.40	13.68	43.50	150	30.11	32.03	-13.39
301.83	H	18.00	3.11	18.08	46.00	200	39.19	91.10	-6.81
742.57	V	26.43	5.48	10.60	46.00	200	42.51	133.51	-3.49
402.57	V	22.30	3.61	12.09	46.00	200	38.00	79.43	-8.00
465.21	V	22.37	3.89	14.92	46.00	200	41.18	114.55	-4.82
744.54	V	26.45	5.49	11.92	46.00	200	43.86	155.96	-2.14

Test Engineer : *Peter Wang*  
PETER WANG

## 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 : 58% RH
- Test Mode : 640 x480 , 31K/60Hz (TV MODE)
- Test Date : Sep. 10, 1998
- Emission level ( dBuV/m ) = 20 log Emission level ( uV/m )
- Sample Calculation at 199.71 MHz

Corrected Reading =  $14.03 + 2.40 + 13.68 = 30.11$  (dBuV/m )

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

**Vertical 742.57 MHz / 42.51 dBuV**

**Antenna Height 1.0 Meter , Turntable Degree 120° .**

Frequency ( MHz )	Antenna Polarity	Cable Factor	Reading ( dBuV )	Limits		Emission ( dBuV )	Level ( uV )	Margin ( dB )			
				Loss							
				( dBuV )	( uV )						
209.38	H	14.17	2.40	16.24	43.50	150	32.81	43.70	-10.69		
226.11	H	14.55	2.43	17.07	46.00	200	34.06	50.47	-11.94		
210.97	V	14.19	2.40	16.56	43.50	150	33.15	45.45	-10.35		
226.91	V	14.59	2.43	13.60	46.00	200	30.62	33.96	-15.38		
299.44	V	17.98	3.10	17.69	46.00	200	38.76	86.70	-7.24		
465.21	V	22.37	3.89	11.52	46.00	200	37.78	77.45	-8.22		

Test Engineer :

PETER WANG

## 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
1000	28.50	5.80
2000	29.00	6.10