

FCC TEST REPORT

for

PART 15, SUBPART B CLASS B

EXI

Equipment : NOTEBOOK PERSONAL COMPUTER

MODEL NO. : 8X00M (X=0-9, A-Z)

F C C I D : L4PK8500MX15

Filing Type : Original Grant

APPLICANT : **KAPOK COMPUTER CO.,**
4F, No. 36, Wu-Chuan 7th Rd., Wu-Ku Industrial
Park, 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, Taipei Hsien, Taiwan, R.O.C.

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CERTIFICATE OF COMPLIANCE

for

FCC PART 15, SUBPART B CLASS B

Equipment : NOTEBOOK PERSONAL COMPUTER

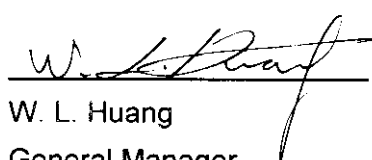
MODEL NO. : 8X00M (X=0-9, A-Z)

F C C I D : L4PK8500MX15

APPLICANT : **KAPOK COMPUTER CO.,**
4F, No. 36, Wu-Chuan 7th Rd., Wu-Ku Industrial
Park, 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 APR. 15, 1997 at **SPORTON International Inc.** in NEI HWU.


W. L. Huang
General Manager

APR 16, 1997

SPORTON International Inc.

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

1. GENERAL DESCRIPTION OF EQUIPMENT UNDER TEST

1.1. APPLICANT

KAPOK COMPUTER CO.,
4F, No. 36, Wu-Chuan 7th Rd., Wu-Ku Industrial
Park, Taipei Hsien, Taiwan, R.O.C.

1.2. MANUFACTURER

Same as 1.1

1.3. BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

EQUIPMENT : NOTEBOOK PERSONAL COMPUTER

MODEL NO. :8X00M (X=0-9, A-Z)

FCC ID:L4PK8500MX15

TRADE NAME : KAPOK

DATA CABLE : Shielded

S-video DATA CABLE: Shielded

Headphone, mouse, Line in, V-video, microphone DATA CABLE : Non-shielded

Power adaptor DATA CABLE: Non-shielded

Remark: A ferrite core is added on the adaptor data cable at EUT end.

POWER SUPPLY TYPE : Switching

POWER CORD : Non-shielded

1.4. FEATURE OF EQUIPMENT UNDER TEST

- CPU: INTEL PENTIUM 233 MMX
- Memory: 8MB expandable up to 128MB
- System BIOS: 256KB flash ROM
- Display: 15.1" TFT, XGA (1024x768 pixels) LCD panel
- Input/output: One CRT port, one serial ports, one mouse port, one PS/2 port, headphone jack, microphone-in jack, line-in jack, one parallel port, built-in trackpad, V-video, S-video.
- PC card sockets: One type III or two type II PC cards.
- Mass storage: 2.5" hard disk drive, 3.5" floppy disk drive, 5.25" CD-ROM.
- Max resolution: internal (1024x768x256), External display (1280x1024)NI

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, JS headphone , KOKA microphone, KOKA stereo cassette player, SONY TV, SURNEY CCD, ASCII memory card and ACEEX modem were connected to the KAPOK PC.
- c. The KAPOK notebook personal computer, FCC ID:L4PK8500MX15, was tested in accordance with Pentium 233 MMX (PC running at 66Mhz).
- d. The following display resolution were investigated during the compliance test:
 1. LCD display only (from 640x480 mode to 1024x768 resolution)
 2. LCD and CRT display (from 640x480 to 1024x768 resolution)
 3. CRT display only (from 640x480 to 1280x1024 80KHz)
 4. TV display only (video motion)
- e. According to the above tests, we listed the following modes as the worst cases:
 1. The EUT is installed with TFT color LCD panel, CPU (Pentium 233) running at 233MHz while the LCD and CRT display at same time (1024x768).
 2. The EUT is installed with TFT color LCD panel, CPU (Pentium 233) running at 233MHz while the CRT display only (1280x1024 non-interlaced 80KHz).
 3. The EUT is installed with TFT color LCD panel, CPU (Pentium 233) running at 233MHz while the TV display only (video motion).
- f. Frequency range investigated: Conduction 450 KHz to 30 MHz, Radiation 30 MHz to 2000 MHz.

2.2. DESCRIPTION OF TEST SYSTEM

Support Device 1. --- MODEM (ACEEX)

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

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Support Device 2. --- 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 3. --- 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 4. --- KEYBOARD (HONEYWELL)

FCC ID :GJK101RX-6
Model No. :PC7XC-AA
Serial No. :SP1011
Data Cable :Shielded, 360 degree via metal backshells

Support Device 5. --- HEADPHONE (JS)

FCC ID :N/A
Model No. :H-201
Serial No. :SP1005
Data Cable : Non-shielded

Support Device 6. --- STEREO CASSETTE PLAYER (KOKA)

FCC ID :N/A
Model No. :KW-247
Serial No. :SP1006
Data Cable : Non-shielded

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Support Device 7. --- MOUSE (KYE)

FCC ID : FSUGMZFC
Model No. : NETMOUSE
Serial No. : SP1009
Data Cable : Non-shielded

Support Device 8. --- MICROPHONE (KOKA)

FCC ID : N/A
Model No. : SR-M02
Serial No. : SP1013
Data Cable : Non-shielded

Support Device 9. --- MEMORY CARD (ASCII)

FCC ID : N/A
Model No. : AF256-S
Serial No. : SP1014

Remark: This memory card is inserted in PCMCIA port.

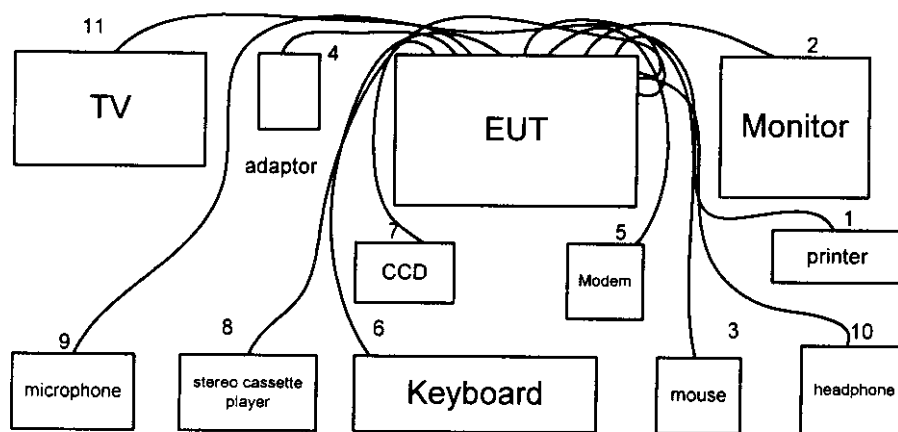
Support Device 10. --- CCD (SURNET)

FCC ID : N/A
Model No. : CCD-06
Serial No. : SP1016
Data Cable : Non-shielded

Support Device 11. --- TV (SONY)

FCC ID : AK896APVM2030
Model No. : PVM-2030
Serial No. : SP1019
Data Cable : Shielded

2.3. CONNECTION DIAGRAM OF TEST SYSTEM



1. The I/O cable is connected to the support device 2.
2. The I/O cable is connected to the support device 3.
3. The I/O cable is connected to the support device 7.
4. The power adaptor cable is connected to the EUT.
5. The I/O cable is connected to the support device 1.
6. The I/O cable is connected to the support device 4.
7. The I/O cable is connected to the support device 10.
8. The I/O cable is connected to the support device 6.
9. The I/O cable is connected to the support device 8.
10. The I/O cable is connected to the support device 5.
11. The I/O cable is connected to the support device 11.

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. Set up the CD-ROM and play music.
- c. The PC reads the test program from the floppy disk drive and runs it.
- d. The PC sends " H " messages to the monitor and LCD, and the monitor and LCD displays " H " patterns on the screen. (from 640x480 to 1024x768)
- e. The PC sends " H " messages to the monitor , and the monitor and displays " H " patterns on the screen. (from 640x480 to 1280x0124 80KHz)
- f. The PC sends " VIDEO MOTION" messages to the TV , and the TV and displays " VIDEO MOTION " patterns on the screen.
- g. The PC sends " H " messages to the printer, then the printer prints them on the paper.
- h. The PC sends " H " messages to the modem.
- i. The PC sends " H " messages to the internal Hard Disk, then the hard disk reads and writes the message.
- j. Repeat the steps from c to h.

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.

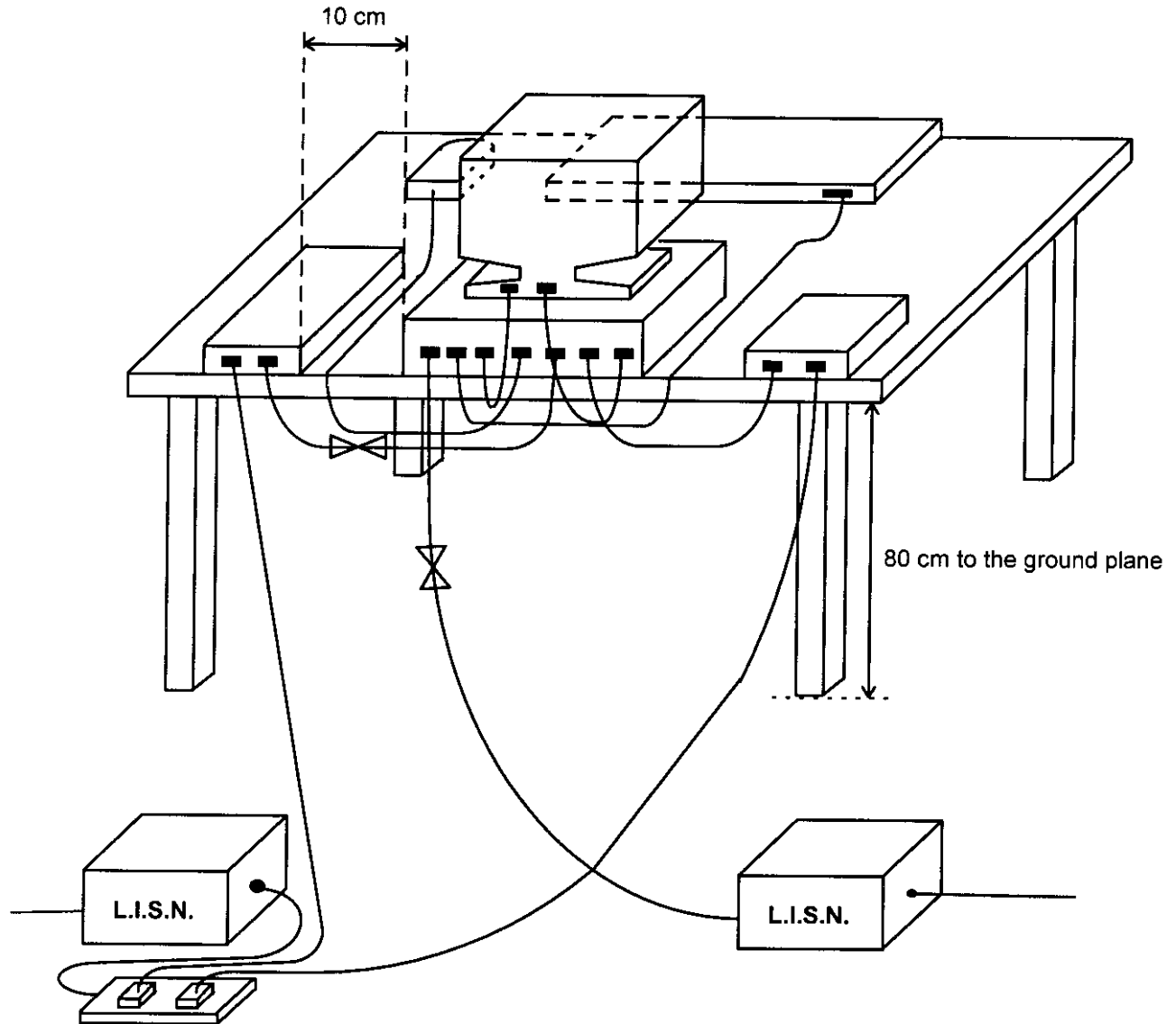
5.1. MAJOR MEASURING INSTRUMENTS

- 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

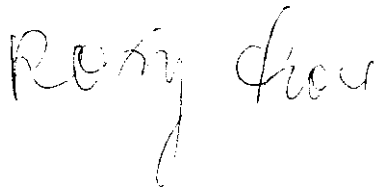
- Frequency Range of Test : from 0.45 MHz to 30 MHz
- Temperature : 25 °C
- Relative Humidity : 64% RH
- All emissions not reported here are more than 10 dB below the prescribed limit.
- Test measuring mode: LCD and CRT display (1024x768 48KHz)
- Test Date : APR. 15, 1998

The Conducted Emission test was passed at minimum margin

LINE 0.95MHz / 41.40dBuV.

Frequency (MHz)	Line / Neutral	Meter Reading		Limits		Margin
		(dBuV)	(uV)	(dBuV)	(uV)	(dB)
0.95	L	41.40	117.49	48.00	251.19	-6.60
1.21	L	43.70	153.11	48.00	251.19	-4.30
4.72	L	43.00	141.25	48.00	251.19	-5.00
0.47	N	38.50	84.14	48.00	251.19	-9.50
1.36	N	37.70	76.74	48.00	251.19	-10.30
7.09	N	36.00	63.10	48.00	251.19	-12.00

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 : 64% RH
- All emissions not reported here are more than 10 dB below the prescribed limit.
- Test measuring mode: CRT display (1280x1024 80KHz)
- Test Date : APR. 15, 1998

The Conducted Emission test was passed at minimum margin

LINE 7.04MHz / 42.50dBuV.

Frequency (MHz)	Line / Neutral	Meter Reading		Limits		Margin
		(dBuV)	(uV)	(dBuV)	(uV)	(dB)
0.78	L	39.20	91.20	48.00	251.19	-8.80
1.87	L	40.20	102.33	48.00	251.19	-7.80
7.04	L	42.50	133.35	48.00	251.19	-5.50
0.48	N	35.00	56.23	48.00	251.19	-13.00
1.76	N	35.20	57.54	48.00	251.19	-12.80
3.58	N	33.70	48.42	48.00	251.19	-14.30

Test Engineer :

Roxy Hou

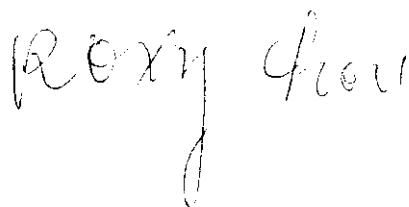
5.4.2 TEST RESULT OF AC POWERLINE CONDUCTED EMISSION

- Frequency Range of Test : from 0.45 MHz to 30 MHz
- Temperature : 25 °C
- Relative Humidity : 64% RH
- All emissions not reported here are more than 10 dB below the prescribed limit.
- Test measuring mode: TV display (VIDEO MOTION)
- Test Date : APR. 15, 1998

**The Conducted Emission test was passed at minimum margin
LINE 0.98MHz / 42.70dBuV.**

Frequency (MHz)	Line / Neutral	Meter Reading		Limits		Margin
		(dBuV)	(uV)	(dBuV)	(uV)	(dB)
0.98	L	42.70	136.46	48.00	251.19	-5.30
1.80	L	42.00	125.89	48.00	251.19	-6.00
4.61	L	40.80	109.65	48.00	251.19	-7.20
1.70	N	37.70	76.74	48.00	251.19	-10.30
7.13	N	35.70	60.95	48.00	251.19	-12.30
10.83	N	33.70	48.42	48.00	251.19	-14.30

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)

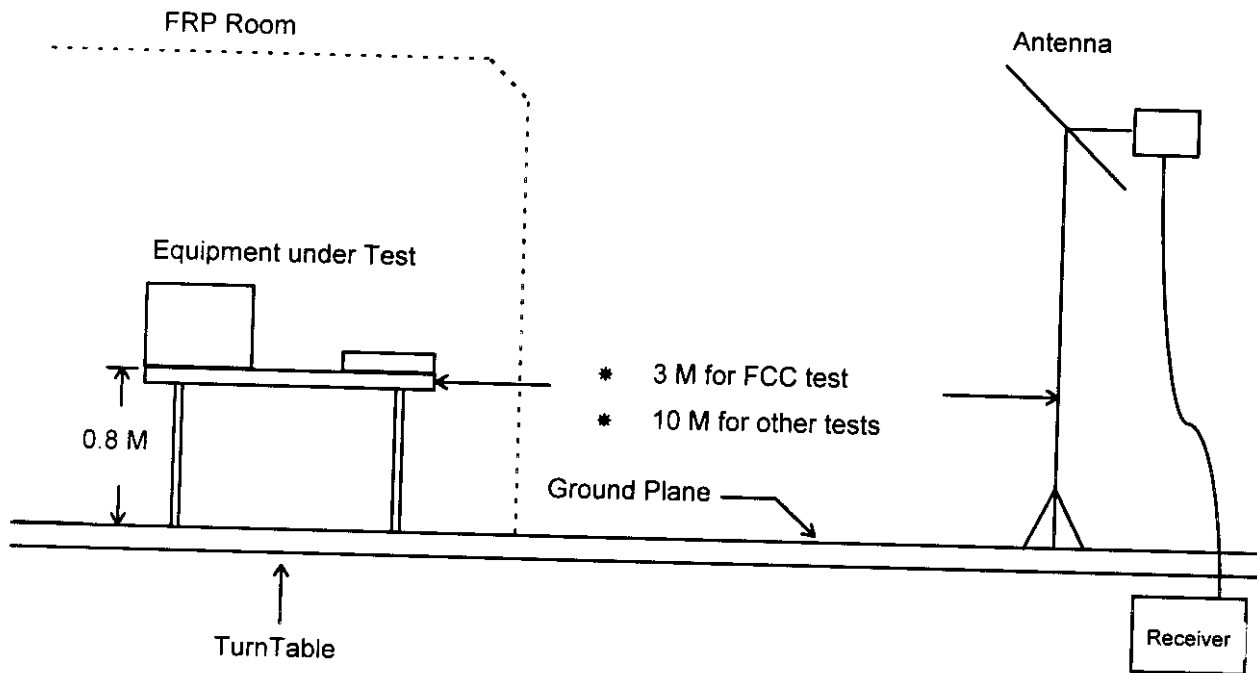
- Spectrum Analyzer 8568B/HP8594A
 - Attenuation 0 dB
 - Start Frequency 30 MHz
 - Stop Frequency 2000MHz
 - Resolution Bandwidth 1 MHz
 - Video Bandwidth 1 MHz
 - Signal Input Input 1 (for 9KHz to 2.9 GHz)

- 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 8568B/8594A) 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 : 23 °C
- Relative Humidity :62% RH
- Test measuring mode: LCD and CRT display (1024x768 48KHz)
- Test Date :MAR. 27, 1998
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Sample Calculation at 172.62MHz

Corrected Reading = 12.80+ 2.23+ 18.13= 33.16(dBuV/m)

The Radiated Emission test was passed at minimum margin

Horizontal 225.73 MHz / 42.40dBuV

Antenna Height 2 Meter , Turntable Degree 172°

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)
200.50	H	14.08	2.40	15.89	43.50	150	32.37	41.54	-11.13
223.76	H	15.43	2.52	18.36	46.00	200	36.31	65.39	-9.69
255.73	H	17.36	2.69	22.35	46.00	200	42.40	131.83	-3.60
255.20	V	17.34	2.68	21.08	46.00	200	41.11	113.63	-4.89
115.06	V	10.21	1.80	20.51	43.50	150	32.52	42.27	-10.98
172.62	V	12.80	2.23	18.13	43.50	150	33.16	45.50	-10.34

Test Engineer :

Mad Chen

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 : 23 °C
- Relative Humidity :62% RH
- Test measuring mode: CRT display (1280x1024 80KHz)
- Test Date :MAR. 27, 1998
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Sample Calculation at 363.20MHz
Corrected Reading = 19.58+ 3.32+ 18.56= 41.46(dBuV/m)

The Radiated Emission test was passed at minimum margin

Horizontal 363.20 MHz / 41.46dBuV

Antenna Height 2 Meter , Turntable Degree 170°.

Frequency (MHz)	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)
215.20	V	14.86	2.48	18.46	43.50 150	35.79	61.59	-7.71
229.28	V	15.90	2.55	17.85	46.00 200	36.30	65.31	-9.70
601.47	V	24.04	4.51	10.81	46.00 200	39.36	92.90	-6.64
200.48	H	14.08	2.40	20.32	43.50 150	36.80	69.18	-6.70
229.23	H	15.89	2.55	15.47	46.00 200	33.91	49.60	-12.09
363.20	H	19.58	3.32	18.56	46.00 200	41.46	118.30	-4.54

Test Engineer :

Mark Chen

6.4.2 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 : 23 °C
- Relative Humidity :62% RH
- Test measuring mode: TV display (VIDEO MOTION)
- Test Date :MAR. 27, 1998
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Sample Calculation at 535.20MHz
Corrected Reading = 23.06+ 4.24+ 13.85= 41.15(dBuV/m)

The Radiated Emission test was passed at minimum margin

Horizontal 367.20 MHz / 41.26dBuV

Antenna Height 1.4 Meter , Turntable Degree 155°.

Frequency (MHz)	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)
367.20	H	19.75	3.34	18.17	46.00 200	41.26	115.61	-4.74
535.20	H	23.06	4.24	13.06	46.00 200	40.36	104.23	-5.64
435.20	H	21.13	3.64	15.41	46.00 200	40.18	102.09	-5.82
367.20	V	19.75	3.34	17.11	46.00 200	40.20	102.33	-5.80
401.60	V	21.19	3.51	15.50	46.00 200	40.19	102.21	-5.81
535.20	V	23.06	4.24	13.85	46.00 200	41.15	114.16	-4.85

Test Engineer :

Mark Chen

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	29.00	6.20

※ 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
Receiver RF Section	HP	85462A	3325A00108	9 KHz - 6.5 GHz	Oct. 22, 1997	C
RF Section	HP	85460A	3308A00104	9 KHz - 6.5 GHz	Oct. 22, 1997	C
LISN	EMCO	3850/2	1035	50 ohm / 50 uH	Oct. 27, 1997	C
LISN	KYORITSU	KNW-407	8-693-10	50 ohm / 50 uH	Oct. 04, 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	2732A04100	100Hz - 1500GHz	Jun 17, 1997	R
Quasi-peak Adapter (site 1)	HP	85650A	2811A01116	9KHz -1 GHz	Jun. 17, 1997	R
Amplifier (Site 1)	HP	8447D	2944A08291	0.1 MHz -1.3 GHz	Nov. 12, 1997	R
Bilog Antenna (Site 1)	CHASE	CBL6111	1378	30 MHz -1000 MHz	Aug. 11, 1997	R
Half-wave dipole antenna	EMCO	3121C	9705-1285	28M-1GHZ	May. 19, 1997	R
Turn Table (site 1)	EMCO	1060-1.211	9508-1805	0 ~ 360 degree	N/A	R
Antenna Mast (site 1)	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.