

FCC TEST REPORT

for

PART 15, SUBPART B CLASS B

Equipment : NOTEBOOK PC

MODEL NO. : 1100LT

F C C I D : L4PK1100LTS12

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, Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

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CERTIFICATE OF COMPLIANCE

for

FCC PART 15, SUBPART B CLASS B

Equipment : NOTEBOOK PC

MODEL NO.: 1100LT

F C C I D : L4PK1100LTS12

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 Aug. 05, 1998 at **SPORTON International Inc.** in NEI HWU.

A handwritten signature in black ink, appearing to read 'W. L. Huang'.

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

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 PC

MODEL NO. : 1100LT

FCC ID : L4PK1100LTS12

TRADE NAME : KAPOK

DATA CABLE : Shielded

Microphone, Speaker, USB mouse DATA CABLE : Non-shielded

Power adaptor DATA CABLE : Shielded

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

POWER SUPPLY TYPE : Linear

POWER CORD : Non-shielded

1.4. FEATURE OF EQUIPMENT UNDER TEST

- **CPU** : Cyrix 200MHz.
- **Memory** : Expandable memory up to 64 MB, depend on 8/16/32/64 MB SODIMM Module
- **System BIOS** : 256KB flash ROM.
- **Display** :
 - Support TFT panel resolution up to 800x600x64K.
 - CRT resolution up to 1280x1024x256K non-interlaced.
 - Capable of simultaneous display on LCD and CRT (640x480 and 800x600).
- **Mass Storage** : FDD 、 CD-ROM 、 HDD
- **Audio** :
 - Compatible Sound-Blaster PRO version 3.01
 - Built in microphone
 - Built in speakerx2
- **PC Card Sockets** : Two PCMCIA 3.3V/5V socket, type II x2
- **Interface**
 - One USB port
 - One serial port
 - One parallel port
 - External CRT monitor port
 - External keyboard/Mouse (PS/2 type) port
 - One speaker jack
 - One microphone jack
 - DC-in jack

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, SONY monitor, HP printer, GENIUS USB mouse, KOKA microphone, J-S speaker, ASCII memory card and ACEEX modem were connected to the KAPOK notebook PC for EMI test.
- c. The KAPOK notebook PC, was tested in accordance with CYRIX 200MHz (PC running at 66Mhz).
- d. The following display resolution were investigated during the compliance test:
 - 1. LCD display only (from 640 x 480 to 800 x 600 resolution).
 - 2. LCD and CRT display (from 640 x 480 to 800 x 600 resolution).
 - 3. CRT display only (from 640 x 480 to 1280 x 1024 , 64KHz).
- 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 (CYRIX 200MHz) running at 200MHz while the LCD and CRT display at same time (800 x 600).
 - 2. The EUT is installed with TFT color LCD panel, CPU (CYRIX 200MHz) running at 200MHz while the CRT display only (1280 x 1024).
- 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. --- MONITOR (SONY)

FCC ID : AK8GDM17SE2T
Model No. : GDM-17SE2T
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. -- USB MOUSE (GENIUS)

FCC ID : FSUGMZFG
Model No. : NICHE MOUSE
Serial No. : SP1019
Data Cable : Shielded, 1.8m

Support Device 4. --- PRINTER (HP)

FCC ID : DSI6XU2225
Model No. : 2225C
Serial No. : SP1015
Data Cable : Shielded, 360 degree via metal backshells, 1.35m
Power Supply Type : Linear, Adapter
Power Cord : 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. : SP1025
Data Cable : Shielded, 360 degree via metal backshells, 1.15m

Support Device 6. -- MICROPHONE (KOKA)

FCC ID : N/A
Model No. : DM510
Serial No. : SP1023
Data Cable : Non-shielded, 2.8m

Support Device 7. -- SPEAKER (J-S)

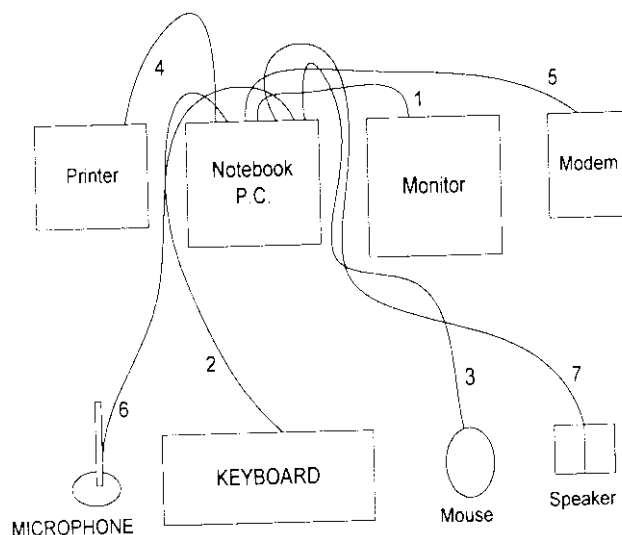
FCC ID : N/A
Model No. : J-008
Serial No. : SP1041
Data Cable : Non-shielded, 1.2m

Support Device 8. --- MEMORY CARD (ASCII)

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

Remark: This memory card is inserted in PCMCIA port.

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 the EUT to the support device 2.
3. The I/O cable is connected from the EUT to the support device 3.
4. The I/O cable is connected from the EUT to the support device 4.
5. The I/O cable is connected from the EUT to the support device 5.
6. The I/O cable is connected from the EUT to the support device 6.
7. The I/O cable is connected from the EUT to the support device 7.

3. TEST SOFTWARE

An executive program, EMITEST.EXE & WINFCC.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 LCD, and the monitor and LCD displays " H " patterns on the screen. (from 640 x 480 to 800 x 600, 38KHz)
- d. The PC sends " H " messages to the monitor , and the monitor and displays " H " patterns on the screen. (from 640 x 480 to 1280 x 1024, 64KHz)
- 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, then the hard disk reads and writes the message.
- h. Repeat the steps from c to g.

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.

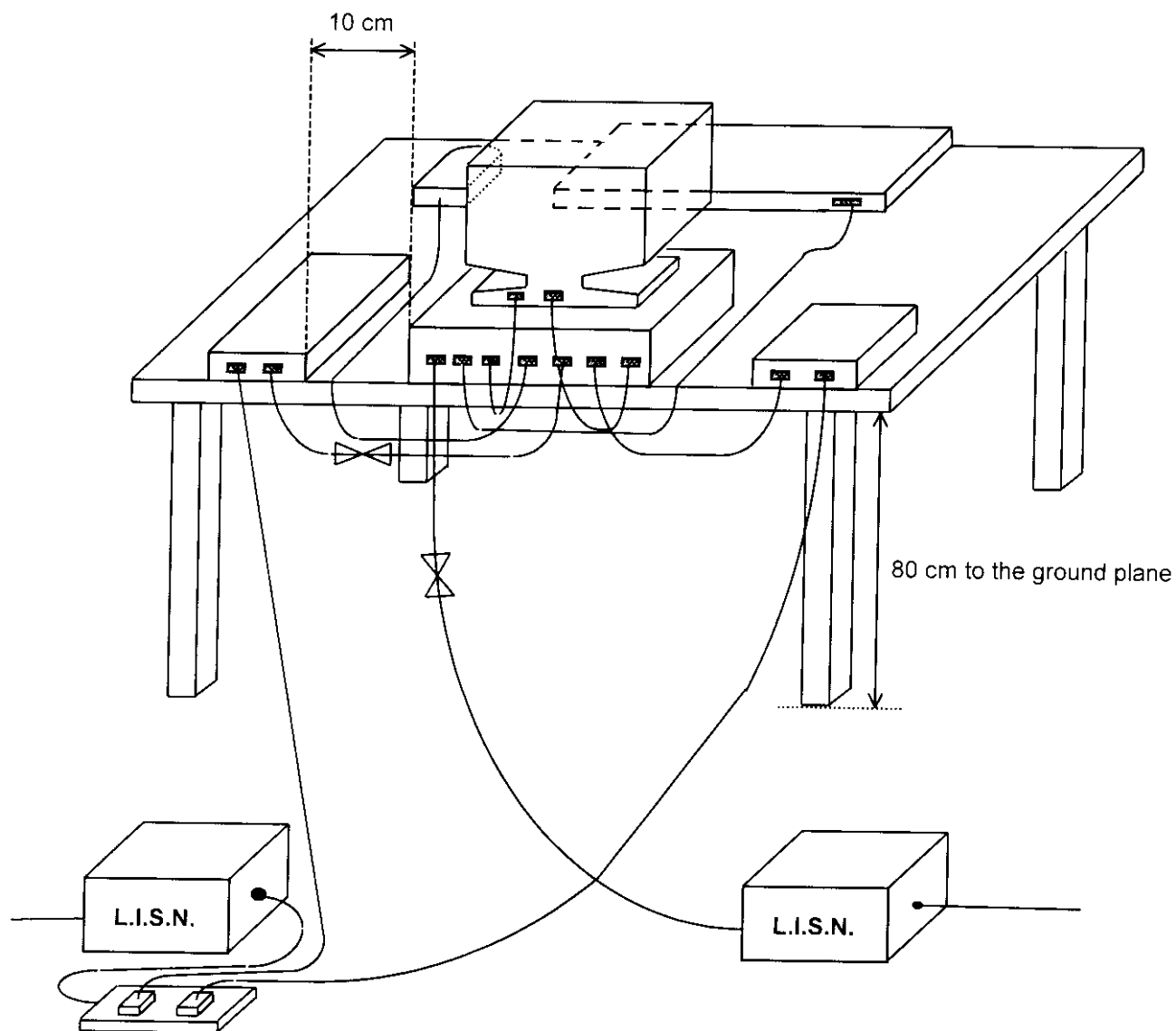
5.1. MAJOR MEASURING INSTRUMENTS

- 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
- Temperature : 29 °C
- Relative Humidity : 49 % RH
- All emissions not reported here are more than 10 dB below the prescribed limit.
- Test measuring mode : LCD and CRT display (800 × 600, 38KHz, 60Hz)
- Test Date : Aug. 05, 1998

The Conducted Emission test was passed at minimum margin

Line 7.25 MHz / 36.40 dBuV.

Frequency (MHz)	Line / Neutral	Meter Reading			Limits		Margin
		(dBuV)	(uV)	(dBuV)	(uV)	(dB)	
1.86	N	33.80	48.98	48.00	251.19	-14.20	
6.39	N	34.20	51.29	48.00	251.19	-13.80	
2.29	L	33.90	49.55	48.00	251.19	-14.10	
5.17	L	36.30	65.31	48.00	251.19	-11.70	
7.25	L	36.40	66.07	48.00	251.19	-11.60	
21.58	L	34.80	54.95	48.00	251.19	-13.20	

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
- Temperature : 29 °C
- Relative Humidity : 49 % RH
- All emissions not reported here are more than 10 dB below the prescribed limit.
- Test measuring mode : CRT only (1280 × 1024, 64KHz, 60Hz)
- Test Date : Aug.05, 1998

The Conducted Emission test was passed at minimum margin

Line 7.73 MHz / 38.30 dBuV.

Frequency (MHz)	Line / Neutral	Meter Reading			Limits (uV)	Margin (dB)
		(dBuV)	(uV)	(dBuV)		
0.48	L	36.60	67.61	48.00	251.19	-11.40
4.26	L	37.00	70.79	48.00	251.19	-11.00
5.44	L	37.30	73.28	48.00	251.19	-10.70
7.73	L	38.30	82.22	48.00	251.19	-9.70
21.69	L	36.50	66.83	48.00	251.19	-11.50
6.72	N	36.60	67.61	48.00	251.19	-11.40

Test Engineer : Kenny Chuang

Kenny Chuang

FCC TEST REPORT

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

- Amplifier (HP 87405A)
 - Attenuation 0 dB
 - RF Gain 20 dB
 - Signal Input 10 MHz to 3 GHz

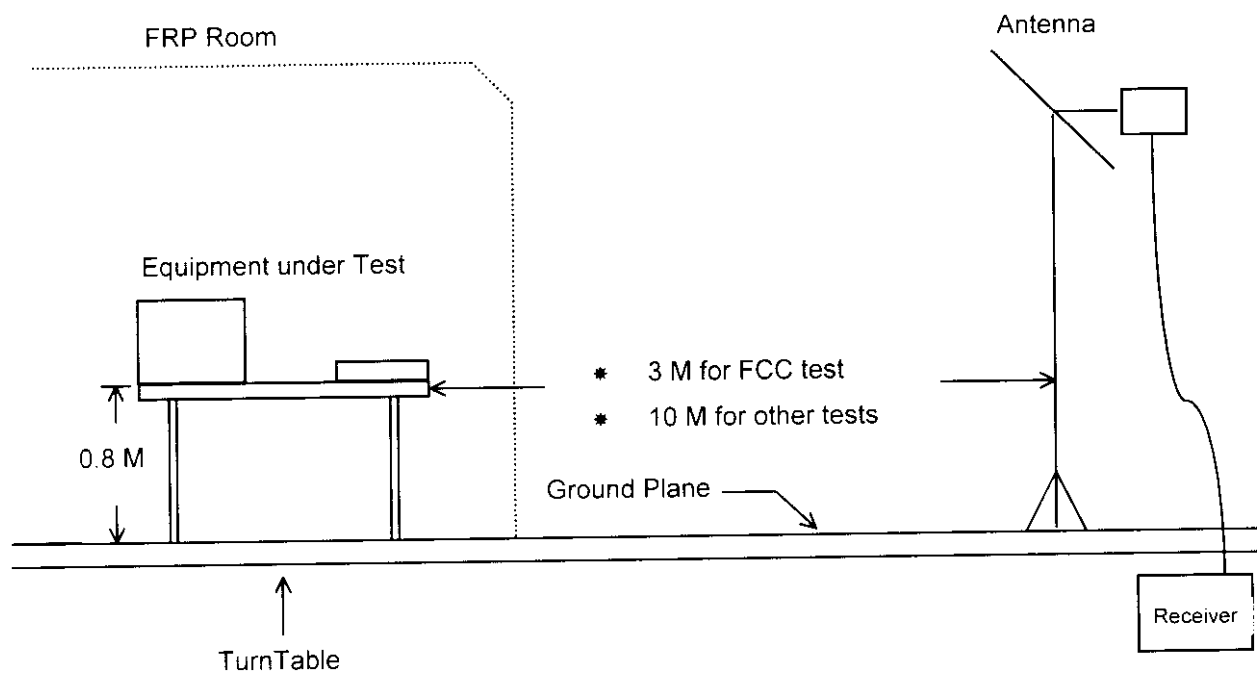
- Spectrum Analyzer (HP 8594A/8568B)
 - Attenuation 0 dB
 - Start Frequency 30 MHz
 - Stop Frequency 1000 MHz
 - Resolution Bandwidth 1 MHz
 - Video Bandwidth 1 MHz
 - Signal Input 9 KHz to 2.9 GHz

- Quasi-Peak Adapter (HP 8594A /85650A)
 - 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 : 29°C
- Relative Humidity : 67 % RH
- Test measuring mode : LCD and CRT display (800 × 600, 38KHz, 60Hz)
- Test Date : Aug. 05, 1998
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Sample Calculation at 636.57 MHz
Corrected Reading = 24.81 + 4.89 + 12.80 = 42.51(dBuV/m)

The Radiated Emission test was passed at minimum margin

Vertical 636.57 MHz / 42.51 dBuV

Antenna Height 1.0 Meter , Turntable Degree 134°.

Frequency	Antenna	Cable	Reading	Limits	Emission	Level	Margin
	Polarity	Factor	Loss				
(MHz)		(dB)	(dB)	(dBuV)	(dBuV)	(uV)	(dB)
73.74	V	5.98	1.27	28.96	40.00	100	36.21 64.64 -3.79
79.65	V	7.03	1.39	27.88	40.00	100	36.30 65.31 -3.70
336.90	V	18.97	3.18	20.30	46.00	200	42.45 132.59 -3.55
403.05	V	22.30	3.61	6.69	46.00	200	32.60 42.66 -13.40
636.57	V	24.81	4.89	12.80	46.00	200	42.51 133.51 -3.49
311.39	H	18.05	3.10	21.08	46.00	200	42.24 129.42 -3.76

Test Engineer : Terry Chang

Terry 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 : 67 % RH
- Test measuring mode : CRT only (1280 × 1024, 64KHz, 60Hz)
- Test Date : Aug. 05, 1998
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Sample Calculation at 327.33MHz
Corrected Reading = 18.48+ 3.14+ 20.96= 42.57(dBuV/m)

The Radiated Emission test was passed at minimum margin

Horizontal 327.33 MHz / 42.57 dBuV

Antenna Height 1.5 Meter , Turntable Degree 206°

Frequency	Antenna	Cable	Reading	Limits	Emission	Level	Margin
Polarity	Factor	Loss					
(MHz)	(dB)	(dB)	(dBuV)	(dBuV)	(uV)	(dBuV)	(uV) (dB)
370.37	V	21.01	3.35	18.12	46.00	200	42.48 133.05 -3.52
467.60	V	22.37	3.91	16.10	46.00	200	42.37 131.37 -3.63
731.80	V	26.32	5.43	10.73	46.00	200	42.49 133.20 -3.51
273.14	H	17.37	2.67	22.38	46.00	200	42.42 132.13 -3.58
327.33	H	18.48	3.14	20.96	46.00	200	42.57 134.43 -3.43
544.12	H	23.38	4.36	14.62	46.00	200	42.36 131.22 -3.64

Test Engineer : _____

Terry 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
1000	29.00	6.20
2000	30.00	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.	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	Jul. 06, 1998	Conduction
Spectrum Analyzer (Site 5)	HP	8594A	3051A00172	9KHz - 2.9GHz	Apr. 17, 1998	Radiation
Quasi-peak Adapter (site 5)	HP	85650A	2521A00821	9KHz - 1 GHz	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	2287	30MHz - 2GHz	Jan. 27, 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