

FCC TEST REPORT

for

47 CFR, Part 2, Part 15 and CISPR PUB. 22

EQUIPMENT : MOUSE

MODEL NO. : LYNX 99 3D

F C C I D : F2Q4NE993D

FILING TYPE : Original Grant

APPLICANT : **QTRONIX CORPORATION**
9F, #75, Sec. 1, Hsin Tai Wu Rd., Hsichih,
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
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.....	8
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 CONDUCTED POWERLINE TEST CONFIGURATION.....	15
5.5.1. PHOTOGRAPHS OF CONDUCTED POWERLINE TEST CONFIGURATION.....	17
6. TEST OF RADIATED EMISSION	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
7. ANTENNA FACTOR AND CABLE LOSS	26
8. LIST OF MEASURING EQUIPMENT USED.....	27

CERTIFICATE OF COMPLIANCE

for

47 CFR, Part 2, Part 15 and CISPR PUB. 22

EQUIPMENT : MOUSE

MODEL NO. : LYNX 99 3D

F C C I D : F2Q4NE993D

APPLICANT : **QTRONIX CORPORATION**

9F, #75, Sec. 1, Hsin Tai Wu Rd., Hsichih,
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 and FCC Part 15** in both radiated and conducted emission ***Class B*** limits.

Testing was carried out on **Dec. 24, 1998** at **SPORTON International Inc.** LAB.

Lenore Chang
President

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

QTRONIX CORPORATION

9F, #75, Sec. 1, Hsin Tai Wu Rd., Hsichih,
Taipei Hsien, Taiwan, R.O.C.

1.2. MANUFACTURER

Same as 1.1

1.3. BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

EQUIPMENT : Mouse

MODEL NO. : LYNX 99 3D

TRADE NAME : LYNIX

FCC ID. : F2Q4NE993D

DATA CABLE : Non-shielded, 1.5m

POWER SUPPLY TYPE : N/A

POWER CORD : N/A

1.4. FEATURE OF EQUIPMENT UNDER TEST

- The LYNX 99 3D PM Net model have three buttons, and 3D has one wheel which emulate the two buttons of a microsoft mouse or PS/2 mouse, and the side button is the toggle switch for normal mouse middle button under some application wheel is for the scrolling function.
- Compatible with IBM PC XT, AT PS/2.
- Hardware Resolution : 400dpi.
- Tracking Speed : 500mm/sec.
- Encoder : Opto-Mechanical.
- Switch : 1 Million Cycle Life.
- Total Current : Less than 8mA.
- Boud Rate : 1200bps.

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 SONY monitor, DELL keyboard, HP printer, ACEEX modem and EUT were connected to the FIC P.C.
- c. Frequency range investigated: Conduction 150 KHz to 30 MHz, Radiation 30 MHz to 1000 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. --- PRINTER (HP)

FCC ID : DSI6XU2225
Model No. : 2225C
Serial No. : SP0021
Data Cable : Shielded, 360 degree via metal backshells, 1.35m
Power Supply Type : Linear
Power Cord : Non-shielded

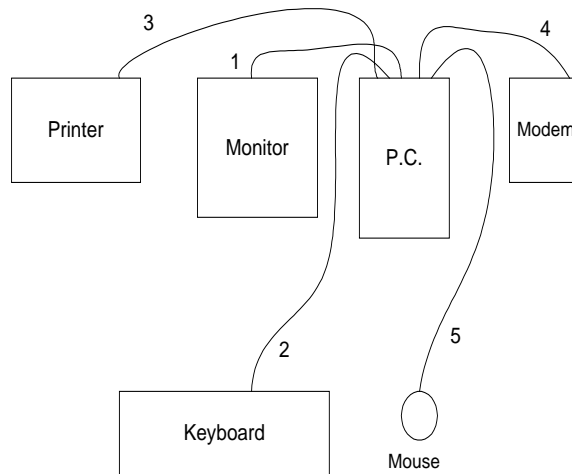
Support Device 4. -- MODEM (ACEEX)

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 5. --- P.C. (FIC)

FCC ID : N/A
Model No. : P2L97
Serial No. : SP1005
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.)

2.3. CONNECTION DIAGRAM OF TEST SYSTEM

1. The I/O cable was connected from PC to the support device 1.
2. The I/O cable was connected from PC to the support device 2.
3. The I/O cable was connected from PC to the support device 3.
4. The I/O cable was connected from PC to the support device 4.
5. The I/O cable was connected from PC to the EUT.

3. TEST SOFTWARE

An executive program, EMITEST.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. 30-1, 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

CISPR PUB. 22 and FCC Part 15

4.4. FREQUENCY RANGE INVESTIGATED

- a. Conduction : from 150 KHz to 30 MHz
- b. Radiation : from 30 MHz to 1000 MHz.

4.5. TEST DISTANCE

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

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 Figure 5-3. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

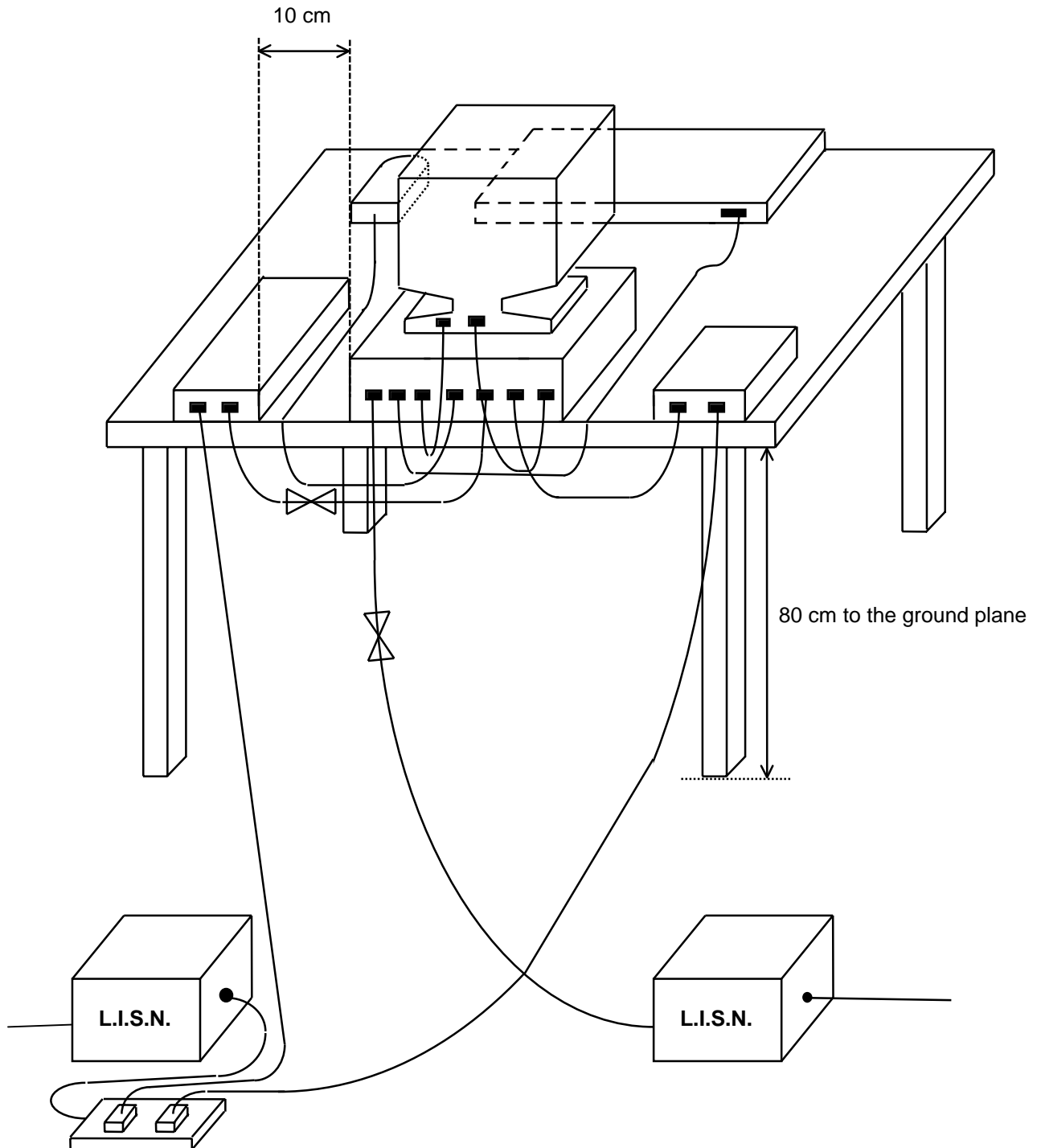
5.1. MAJOR MEASURING INSTRUMENTS

• Test Receiver	(HP 8591EM)
Attenuation	0 dB
Start Frequency	0.15 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 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 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 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 0.15 MHz to 30 MHz
- All emissions not reported here are more than 10 dB below the prescribed limit.
- Temperature : 20
- Relative Humidity : 70 % RH
- Test Mode : PS/2
- Test Date : Dec. 24, 1998

The Conducted Emission test was passed at Line 0.28 MHz / 52.40 dBuV.

Frequency (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)
0.28	Line	52.40	47.20	416.87	229.09	62.29	52.29	1301.03	411.42	-9.89	-5.09
7.22	Line	38.00	31.70	79.43	38.46	60.00	50.00	1000.00	316.23	-22.00	-18.30
10.87	Line	35.00	29.20	56.23	28.84	60.00	50.00	1000.00	316.23	-25.00	-20.80
0.28	Neutral	52.20	47.00	407.38	223.87	62.29	52.29	1301.03	411.42	-10.09	-5.29
7.22	Neutral	37.90	31.60	78.52	38.02	60.00	50.00	1000.00	316.23	-22.10	-18.40
10.87	Neutral	34.50	28.70	53.09	27.23	60.00	50.00	1000.00	316.23	-25.50	-21.30

Test Engineer :

Kenny Chuang

5.4.1. TEST RESULT OF AC POWERLINE CONDUCTED EMISSION

- Frequency Range of Test : from 0.15 MHz to 30 MHz
- All emissions not reported here are more than 10 dB below the prescribed limit.
- Temperature : 20
- Relative Humidity : 70 % RH
- Test Mode : Serial
- Test Date : Dec. 24, 1998

The Conducted Emission test was passed at Line 0.28 MHz / 52.70 dBuV.

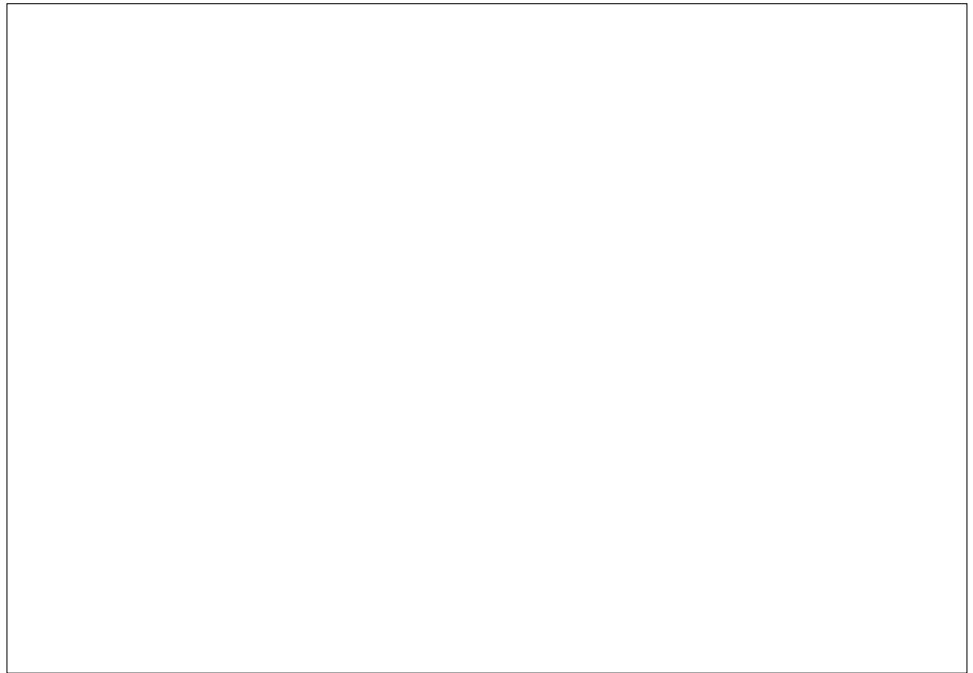
Frequency (MHz)	Line or Neutral	Meter Reading				Limits				Margin	
		Q.P. (dBuV)	A.V. (dBuV)	Q.P. (uV)	A.V. (uV)	Q.P. (dBuV)	A.V. (dBuV)	Q.P. (uV)	A.V. (uV)	Q.P. (dB)	A.V. (dB)
0.28	Line	52.70	47.50	431.52	237.14	62.29	52.29	1301.03	411.42	-9.59	-4.79
7.26	Line	36.40	30.20	66.07	32.36	60.00	50.00	1000.00	316.23	-23.60	-19.80
10.87	Line	35.30	29.50	58.21	29.85	60.00	50.00	1000.00	316.23	-24.70	-20.50
0.28	Neutral	52.30	47.10	412.10	226.46	62.29	52.29	1301.03	411.42	-9.99	-5.19
7.22	Neutral	37.50	31.20	74.99	36.31	60.00	50.00	1000.00	316.23	-22.50	-18.80
10.87	Neutral	34.70	28.90	54.33	27.86	60.00	50.00	1000.00	316.23	-25.30	-21.10

Test Engineer :

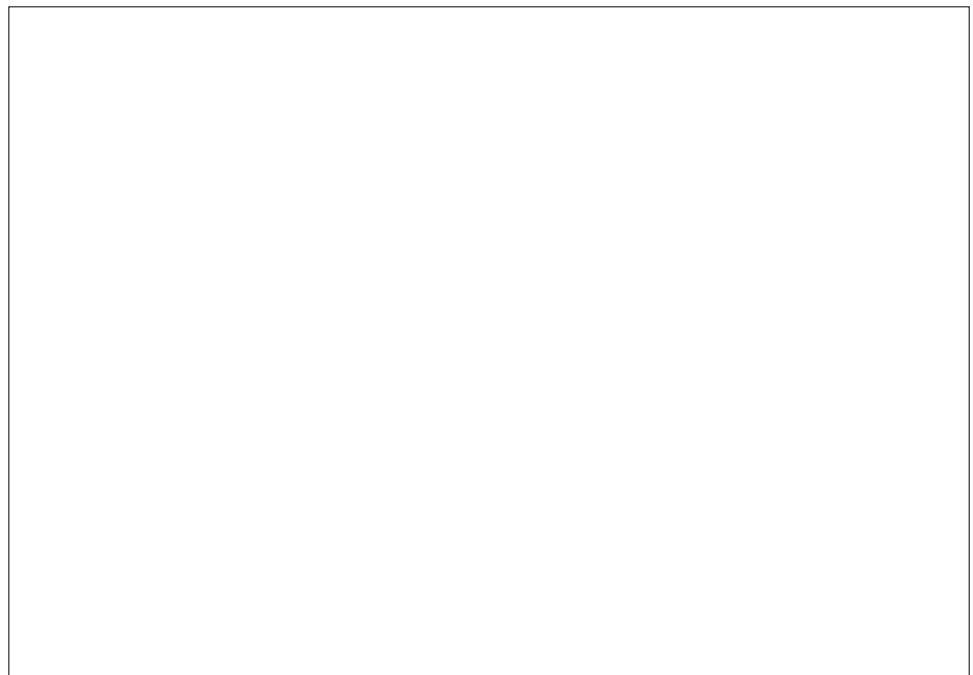
Kenny Chuang

5.5. PHOTOGRAPHS OF CONDUCTED POWERLINE TEST CONFIGURATION

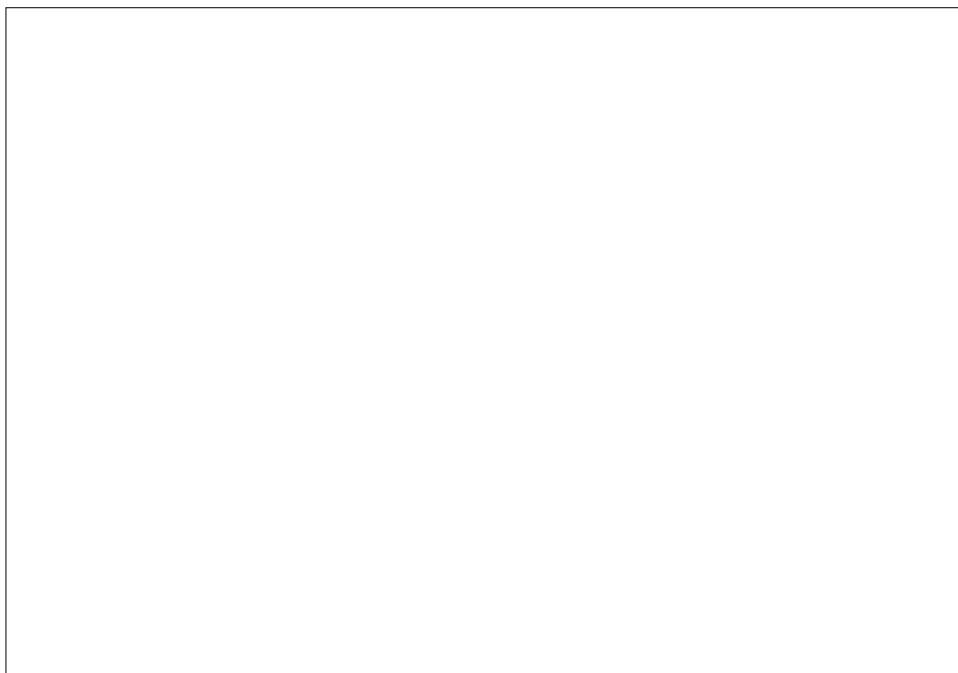
FRONT VIEW
(PS/2)



REAR VIEW
(PS/2)



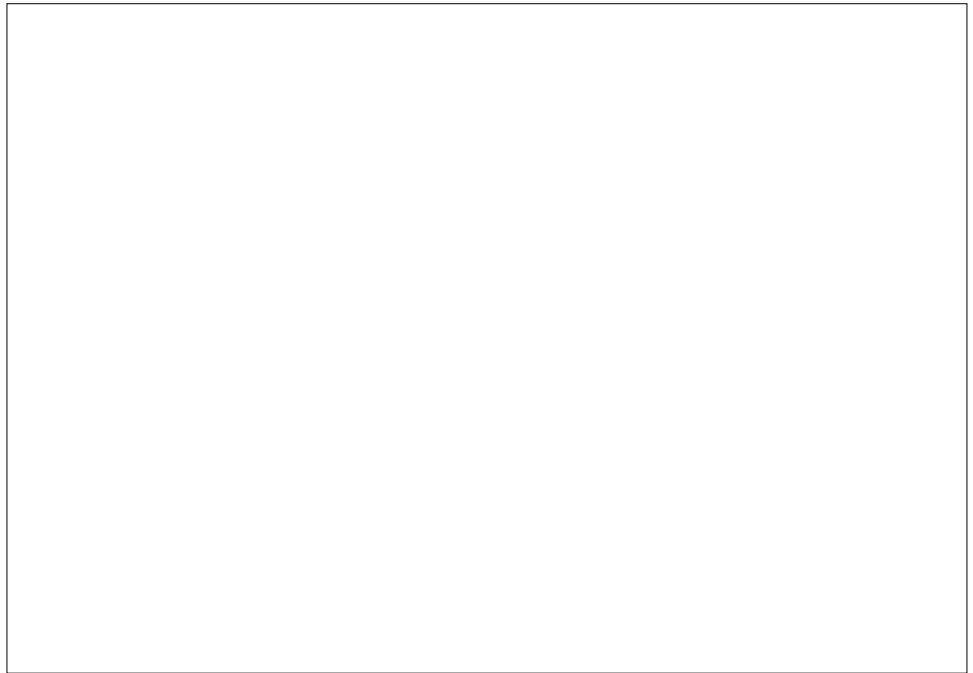
SIDE VIEW
(PS/2)



5.5.1. PHOTOGRAPHS OF CONDUCTED POWERLINE TEST CONFIGURATION

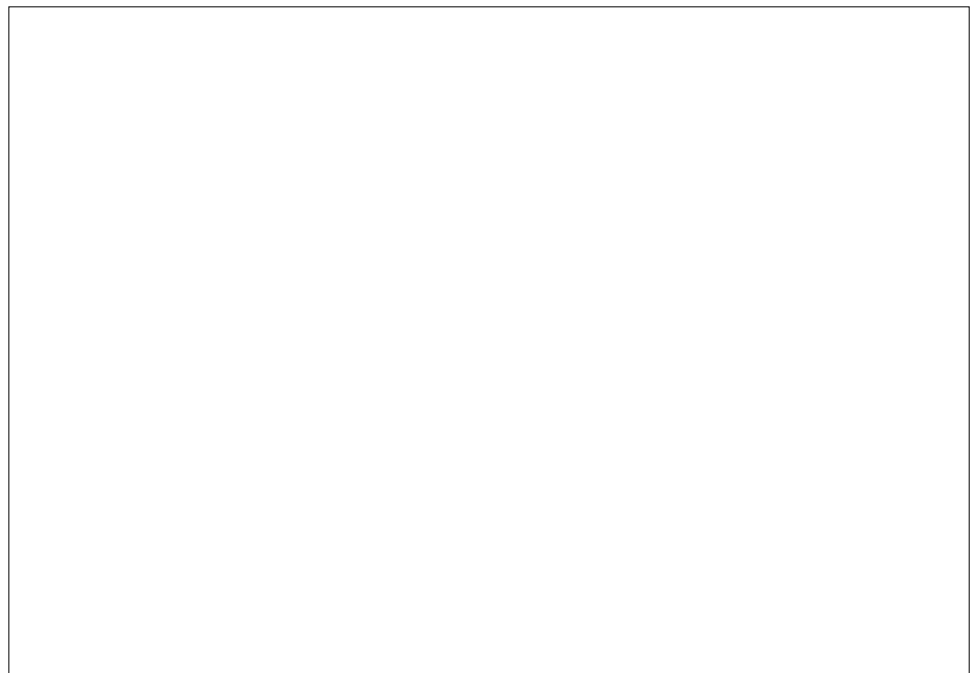
FRONT VIEW

(Serial)

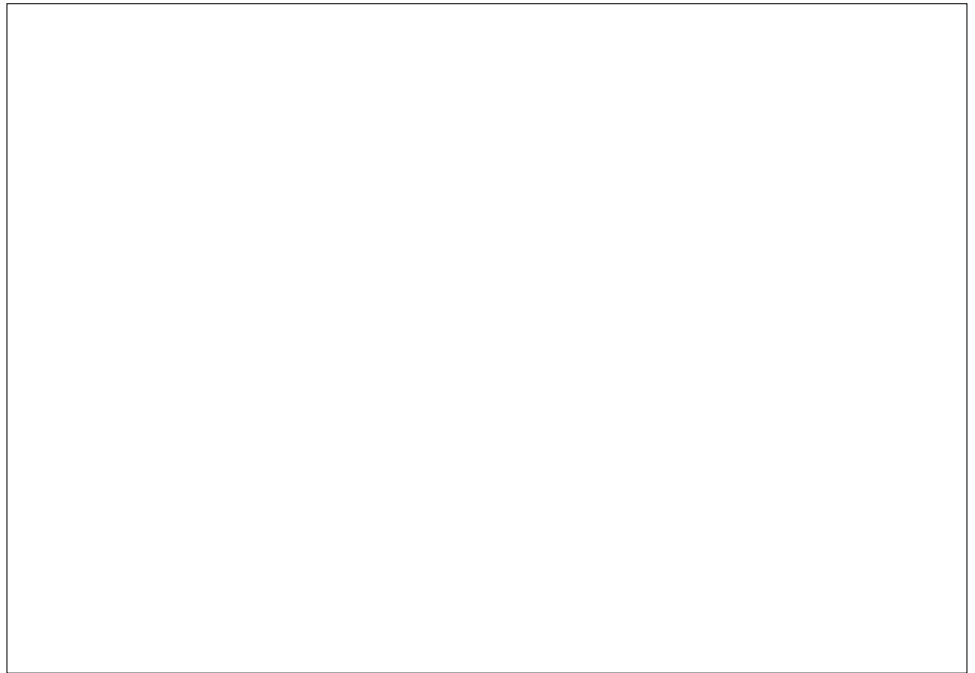


REAR VIEW

(Serial)



SIDE VIEW
(Serial)



6. TEST OF RADIATED EMISSION

Radiated emissions from 30 MHz to 1000 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 8447D)
 - Attenuation 0 dB
 - RF Gain 25 dB
 - Signal Input 0.1 MHz to 1.3 GHz

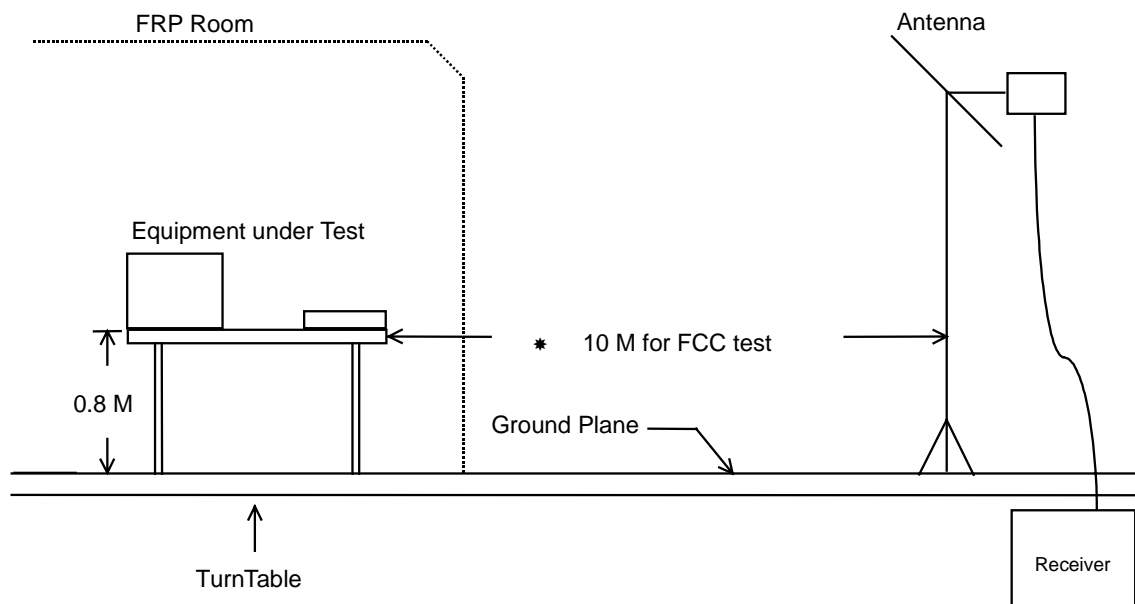
- Spectrum Analyzer (HP 8568B)
 - Attenuation 0 dB
 - Start Frequency 30 MHz
 - Stop Frequency 1000 MHz
 - Resolution Bandwidth 1 MHz
 - Video Bandwidth 1 MHz
 - Signal Input 100 Hz to 1.5 GHz

- Quasi-Peak Adapter (HP 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 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

- Equipment meets the technical specifications of CISPR PUB. 22 and FCC Rule 15.109
- Frequency Range of Test : from 30 MHz to 1000 MHz
- Test Distance : 10 M
- Temperature : 19
- Relative Humidity : 81 % RH
- Test Mode : PS/2
- Test Date : Dec. 22, 1998
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Sample Calculation at 84.89 MHz
Corrected Reading = 7.49 + 1.60 + 14.90 = 23.99 (dBuV/m)

The Radiated Emission test was passed at

Vertical 154.66 MHz / 25.56 dBuV ,

Antenna Height 1.0 Meter , Turntable Degree 49°.

Frequency	Polarity	Antenna	Cable	Reading	Limits	Emission	Level	Margin	
		Factor	Loss						
(MHz)		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)
84.89	H	7.49	1.60	14.90	30.00	32	23.99	15.83	-6.01
112.76	H	10.79	1.87	11.33	30.00	32	23.99	15.83	-6.01
84.89	V	7.49	1.60	16.00	30.00	32	25.09	17.97	-4.91
109.34	V	10.38	1.89	12.04	30.00	32	24.31	16.42	-5.69
114.65	V	11.05	1.85	12.35	30.00	32	25.25	18.30	-4.75
154.66	V	11.25	2.15	12.16	30.00	32	25.56	32.58	-4.44

Test Engineer :

Terry Chang

6.4.1. TEST RESULT OF RADIATED EMISSION

- Equipment meets the technical specifications of CISPR PUB. 22 and FCC Rule 15.109
- Frequency Range of Test : from 30 MHz to 1000 MHz
- Test Distance : 10 M
- Temperature : 19
- Relative Humidity : 81 % RH
- Test Mode : Serial
- Test Date : Dec. 22, 1998

- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Sample Calculation at 42.14 MHz
Corrected Reading = 11.76 + 1.09 + 12.22 = 25.06 (dBuV/m)

The Radiated Emission test was passed at

Vertical 154.66 MHz / 26.26 dBuV ,

Antenna Height 1.0 Meter , Turntable Degree 93°.

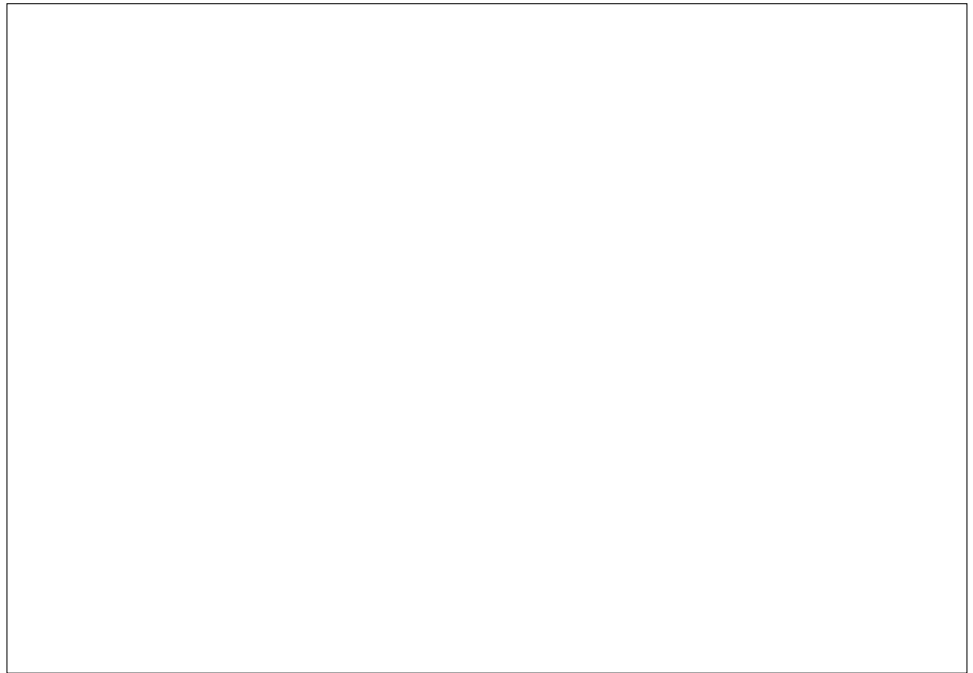
Frequency	Polarity	Antenna	Cable	Reading	Limits	Emission	Level	Margin	
		Factor	Loss						
(MHz)		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)
42.14	H	11.76	1.09	12.22	30.00	32	25.06	17.91	-4.94
120.29	H	11.78	1.81	11.40	30.00	32	25.00	17.78	-5.00
42.01	V	11.83	1.08	13.05	30.00	32	25.96	19.86	-4.04
48.13	V	8.79	1.20	13.36	30.00	32	23.35	14.71	-6.65
114.65	V	11.05	1.85	12.35	30.00	32	25.25	18.30	-4.75
154.66	V	11.25	2.15	12.86	30.00	32	26.26	32.58	-3.74

Test Engineer :

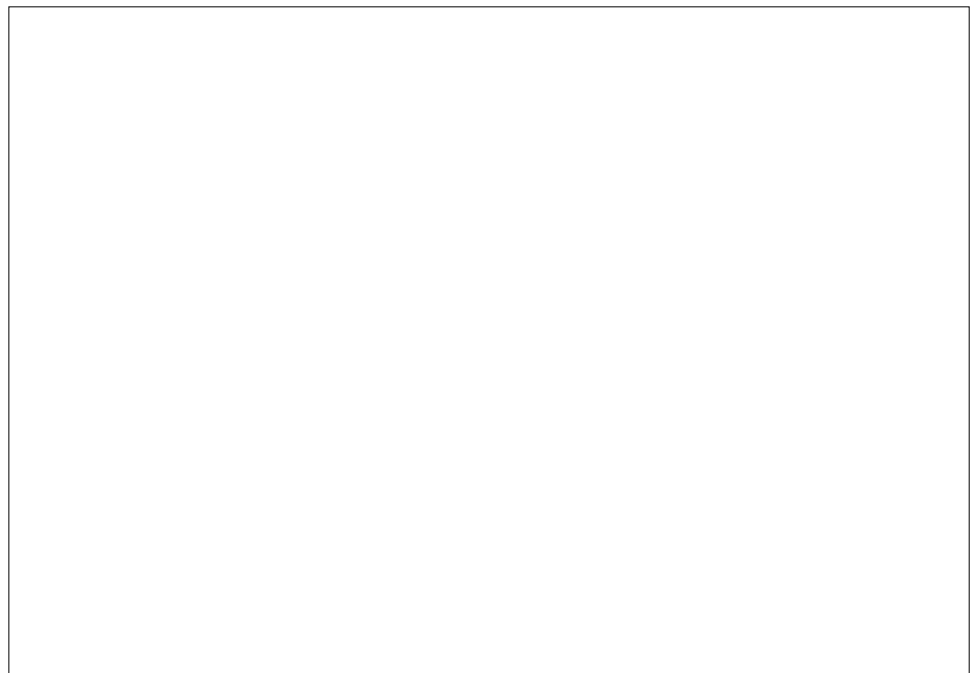
Terry Chang

6.5. PHOTOGRAPHS OF RADIATED EMISSION TEST CONFIGURATION

FRONT VIEW
(PS/2)



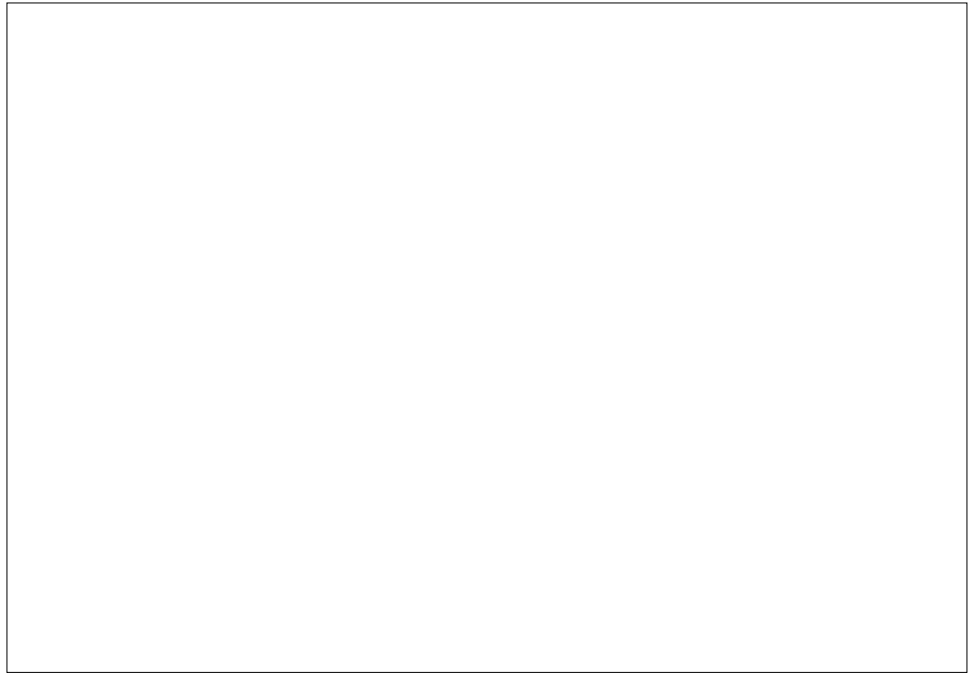
REAR VIEW
(PS/2)



6.5.1. PHOTOGRAPHS OF RADIATED EMISSION TEST CONFIGURATION

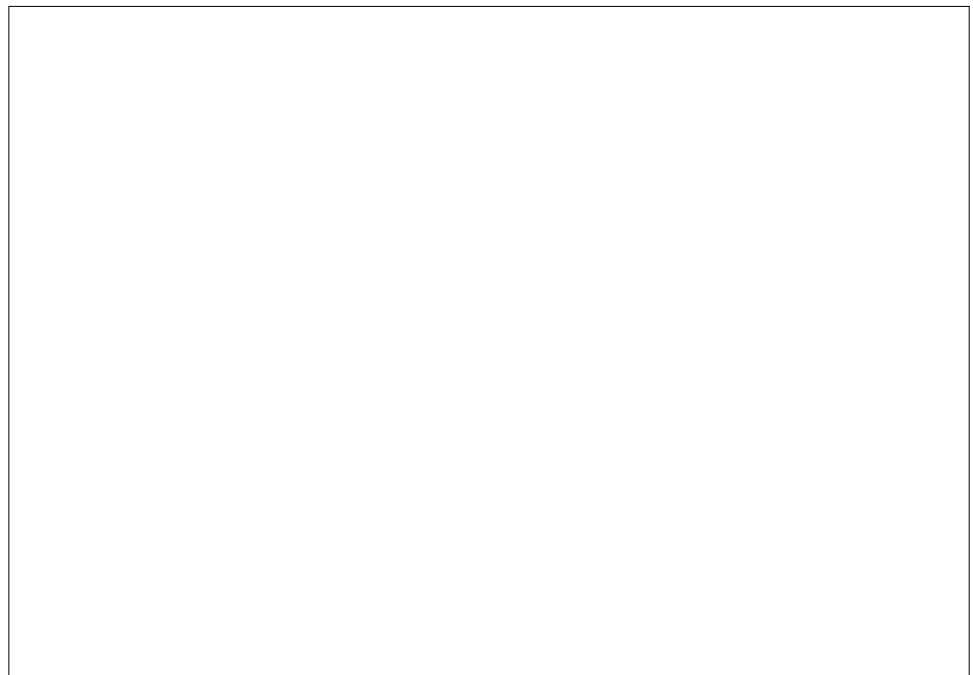
FRONT VIEW

(Serial)



REAR VIEW

(Serial)



7. ANTENNA FACTOR AND CABLE LOSS

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)
30	16.7	1.0
35	15.5	1.2
40	14.2	1.2
45	11.3	1.3
50	8.4	1.2
55	6.8	1.3
60	5.1	1.5
65	5.6	1.3
70	6.1	1.5
75	6.6	1.5
80	7.2	1.7
85	8.2	1.5
90	9.2	1.7
95	10.0	1.7
100	10.8	1.7
110	11.7	2.0
120	12.4	2.0
130	11.8	2.0
140	10.8	2.2
150	10.8	2.2
160	10.5	2.3
170	10.1	2.2
180	9.7	2.3
190	9.4	2.5
200	9.0	2.5
220	10.0	2.6
240	11.0	2.7
260	11.8	2.7
280	12.3	2.9
300	12.9	3.2
320	13.8	3.3
340	14.8	3.3
360	15.6	3.3
380	16.1	3.4
400	16.6	3.5
450	16.7	3.8
500	17.7	4.2
550	19.0	4.3
600	19.0	4.5
650	18.7	4.7
700	18.7	4.8
750	19.9	5.2
800	21.3	5.3
850	21.4	5.7
900	21.2	5.7
950	22.4	6.0
1000	23.0	6.2

8. LIST OF MEASURING EQUIPMENT USED

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration	Remark
EMC Receiver (site 2)	HP	8591EM	3710A01187	9 KHz - 18 GHz	Sep. 15, 1998	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
Quasi-peak Adapter (site 5)	HP	85650A	2521A00821	9KHz -1 GHz	Nov 12, 1998	Radiation
Spectrum Analyzer (Site 5)	HP	8568B	2634A03000	100Hz - 1.5GHz	Nov. 12, 1998	Radiation
Amplifier (Site 5)	HP	8447D	2944A09073	0.1MHz -1.3GHz	Dec. 20, 1998	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