CERTIFICATE NO. : F882605

CERTIFICATE OF COMPLIANCE

for

FCC PART 15, SUBPART B CLASS A

EQUIPMENT : IPC with CPU Board & LCD Panel

MODEL NO. : IPC-610XX, PCM-3540T, PCM-3540R, PCM-3521

F C C I D : N/A

APPLICANT : **ADVANTECH CO., LTD.**
Fl. 4, No. 108-3, Ming-Chuan Road, Shing-Tien City,
Taipei, 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 A** limits. Testing was carried out on **Nov. 05, 1998** at **SPORTON International Inc.**

Lenore Chang
President

Nov. 19, 1998

SPORTON INTERNATIONAL INC.

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

FCC TEST REPORT

for

PART 15, SUBPART B CLASS A

EQUIPMENT : IPC with CPU Board & LCD Panel

MODEL NO. : IPC-610XX, PCM-3540T, PCM-3540R, PCM-3521

F C C I D : N/A

FILING TYPE : VERIFICATION

APPLICANT : **ADVANTECH CO., LTD.**
Fl. 4, No. 108-3, Ming-Chuan Road, Shing-Tien City,
Taipei, 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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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

ADVANTECH CO., LTD.

Fl. 4, No. 108-3, Ming-Chuan Road, Shing-Tien City,

Taipei, Taiwan, R.O.C.

1.1. MANUFACTURER

Same as 1.1.

1.3. BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

EQUIPMENT : IPC with CPU Board & LCD Panel

MODEL NO. : IPC-610XX, PCM-3540T, PCM-3540R, PCM-3521

TRADE NAME : **Advantech**

LCD DATA CABLE : Shielded

POWER SUPPLY TYPE : Switching

POWER CORD : Non-shielded

1.4. FEATURE OF EQUIPMENT UNDER TEST

- CPU : AMD, Am5×86-P75
- CPU Board : PCA-6155
- Base Board : PCA-6114P4
- VGA mode : 640×480, 31.5K

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, HP printer and ACEEX modem×2 were connected to the EUT for EMI test.

c. Frequency range investigated: Conduction 450 KHz to 30 MHz, Radiation 30 MHz to 1000 MHz.

2.2. DESCRIPTION OF TEST SYSTEM

Support Device 1. --- KEYBOARD (DELL)

FCC ID	: GYUM92SK
Model No.	: AT101 (DE8M)
Serial No.	: SP1021
Data Cable	: Shielded, 360 degree via metal backshells, 1.9m

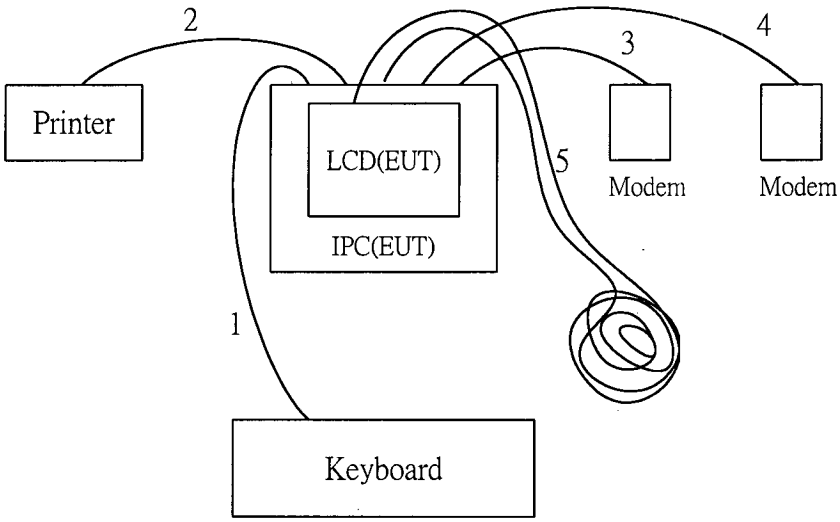
Support Device 2. --- PRINTER (HP)

FCC ID	: B94C2642X
Model No.	: DESK JET 400
Serial No.	: SP1040
Data Cable	: Shielded, 360 degree via metal backshells, 1.35m
Power Supply Type	: Linear, Adapter
Power Cord	: Non-shielded

Support Device 3. -- MODEM (ACEEX)

FCC ID	: IFAXDM1414
Model No.	: DM1414
Power Supply Type	: Linear, AC Adapter
Power Cord	: Non-shielded
Serial No.	: SP1045
Data Cable	: Shielded, 360 degree via metal backshells, 1.15m

2.3. CONNECTION DIAGRAM OF TEST SYSTEM



1. The I/O cable is connected EUT to the support device 1.
2. The I/O cable is connected EUT to the support device 2.
3. The I/O cable is connected EUT to the support device 3.
4. The I/O cable is connected EUT to the support device 4.
5. The I/O cable is connected from LCD PANEL to the IPC.

3. TEST SOFTWARE

An executive program, EMITEST.EXE under DOS, 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. in an openarea test site.

Openarea 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 A

4.4. FREQUENCY RANGE INVESTIGATED

a. Conduction : from 450 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 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.

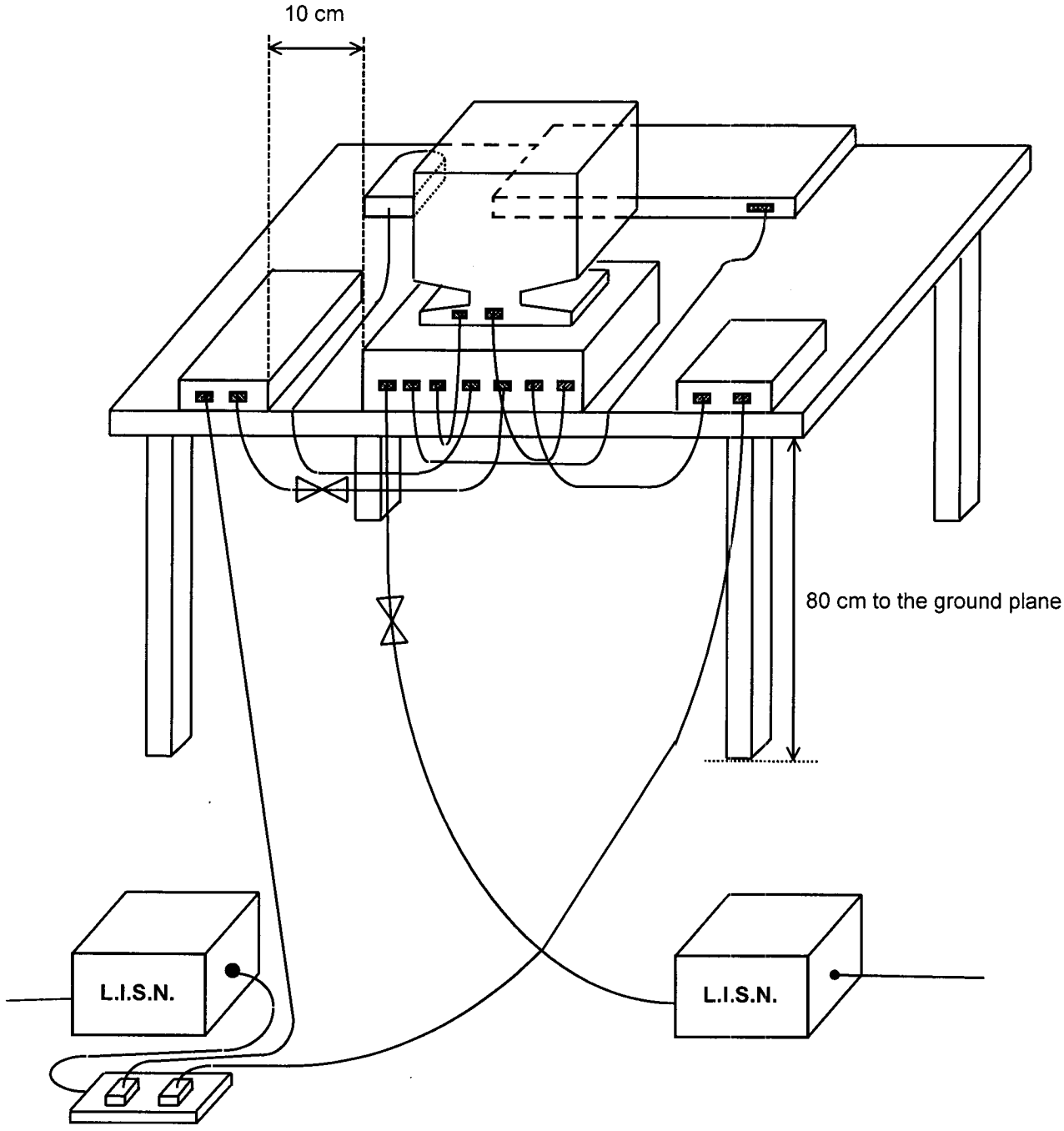
f. Both sides of AC line were checked for maximum conducted interference.

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 : 22℃
- Relative Humidity : 53% RH
- Test Date : Nov. 05, 1998

The Conducted Emission test was passed at Line 6.29 MHz/ 56.80 dBuV.

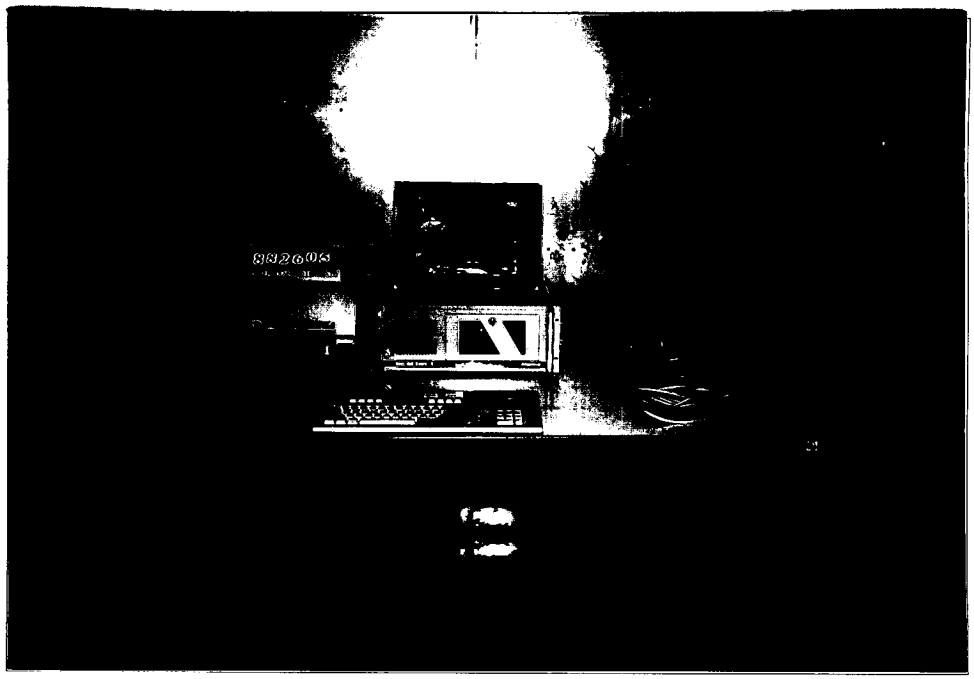
Frequency	Line / Neutral	Meter Reading		Limits		Margin
(MHz)		(dBuV)	(uV)	(dBuV)	(uV)	(dB)
6.29	L	56.80	691.83	69.50	2985.38	-12.60
9.44	L	46.90	221.31	69.50	2985.38	-22.60
25.17	L	54.60	537.03	69.50	2985.38	-14.90
6.29	N	56.80	691.83	69.50	2985.38	-12.70
9.44	N	47.80	245.47	69.50	2985.38	-21.70
25.17	N	50.90	350.75	69.50	2985.38	-18.60

Test Engineer : Kenny Chuang

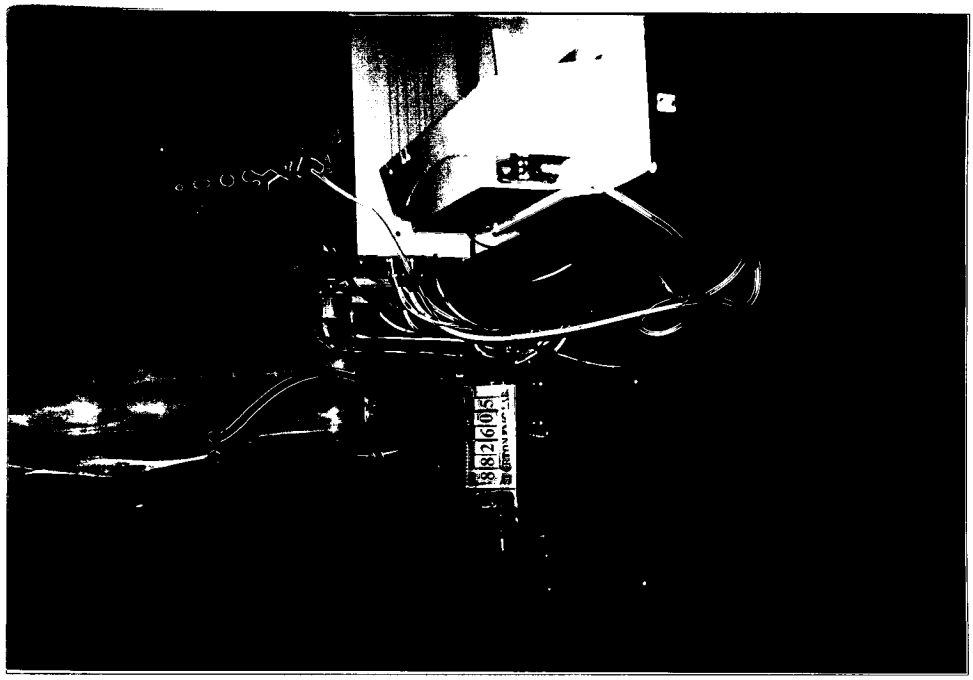
Kenny Chuang

5.5. PHOTOGRAPHS OF CONDUCTED POWERLINE TEST CONFIGURATION

FRONT VIEW



REAR VIEW



SIDE VIEW

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 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.

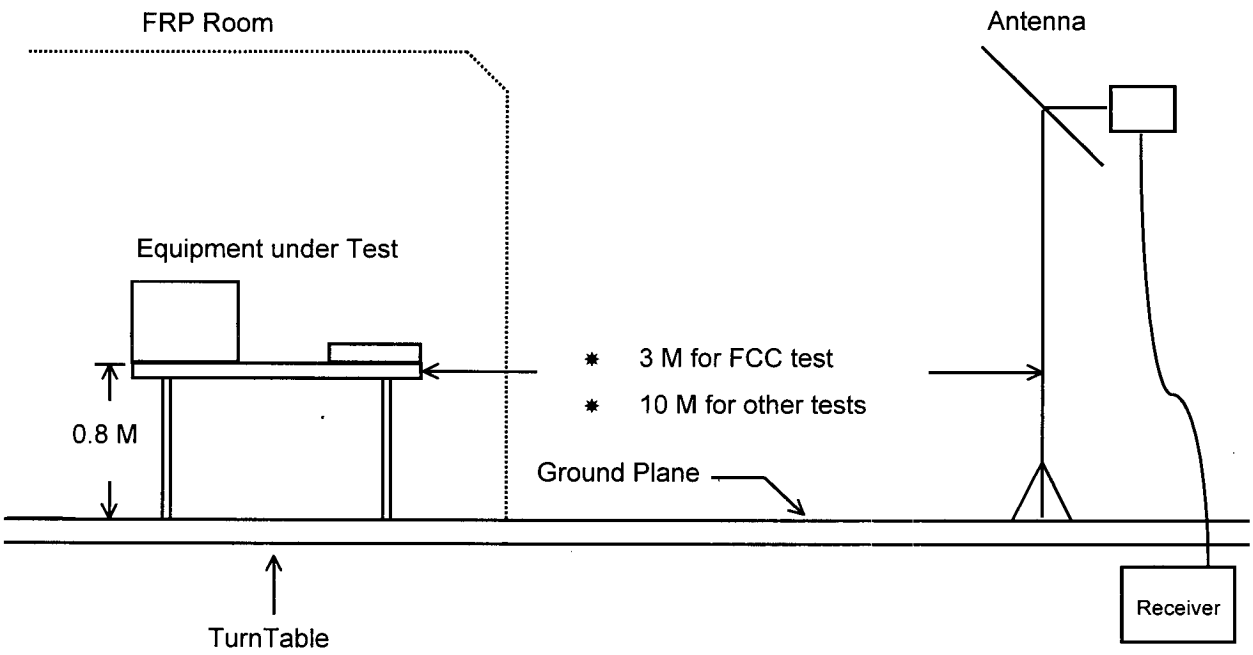
d. The antenna is a half wave dipole and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.

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 1000 MHz
- Test Distance : 3 M
- Temperature : 24℃
- Relative Humidity : 80 % RH
- Test Date : Nov. 05, 1998

- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Sample Calculation at 276.32 MHz

  Corrected Reading = 17.43 + 2.68 + 32.66 = 52.77 (dBuV/m)

The Radiated Emission test was passed at

Vertical 276.32 MHz / 52.77 dBuV

Antenna Height 2.1 Meter , Turntable Degree 17 °.

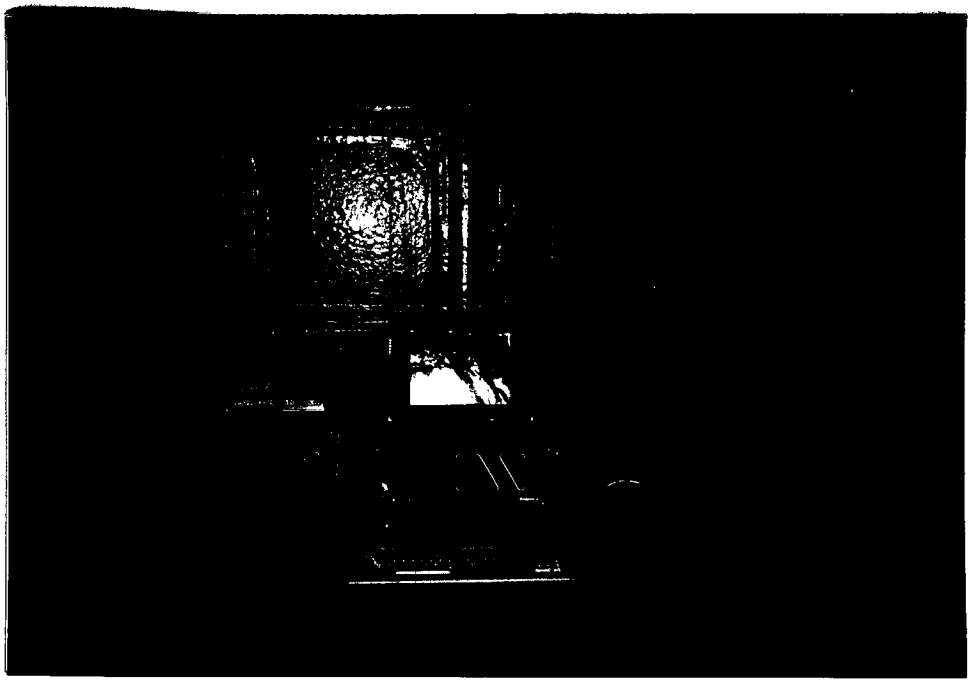
Frequency	Polarity	Antenna Factor	Cable Loss	Reading	Limits		Emission	Level	Margin
(MHz)		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)
276.32	V	17.43	2.68	32.66	56.90	700	52.77	435.01	-4.13
34.93	V	-0.72	0.82	45.01	49.50	299	45.11	180.09	-4.39
31.53	V	-1.74	0.81	45.88	49.50	299	44.95	176.81	-4.55
56.69	V	3.57	1.14	37.90	49.50	299	42.61	135.05	-6.89
273.93	H	17.38	2.67	32.56	56.90	700	52.61	427.07	-4.29
300.23	H	17.99	3.11	29.13	56.90	700	50.23	324.71	-6.67

Test Engineer : Jones Jan

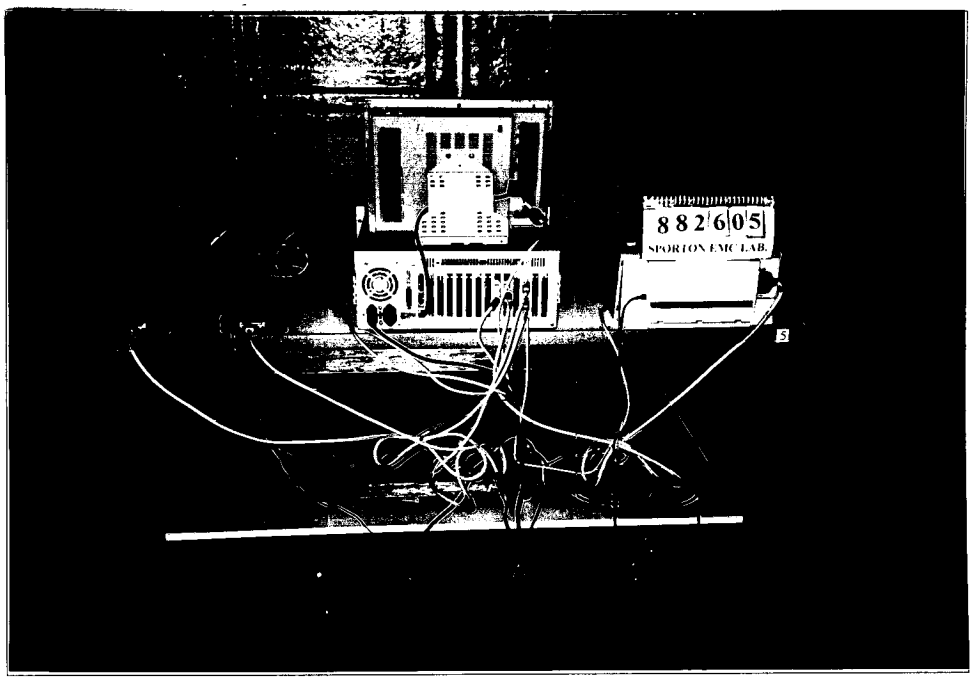
Jones Jan

6.5. PHOTOGRAPHS OF RADIATED EMISSION TEST CONFIGURATION

FRONT VIEW



REAR VIEW



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	28.10	3.00

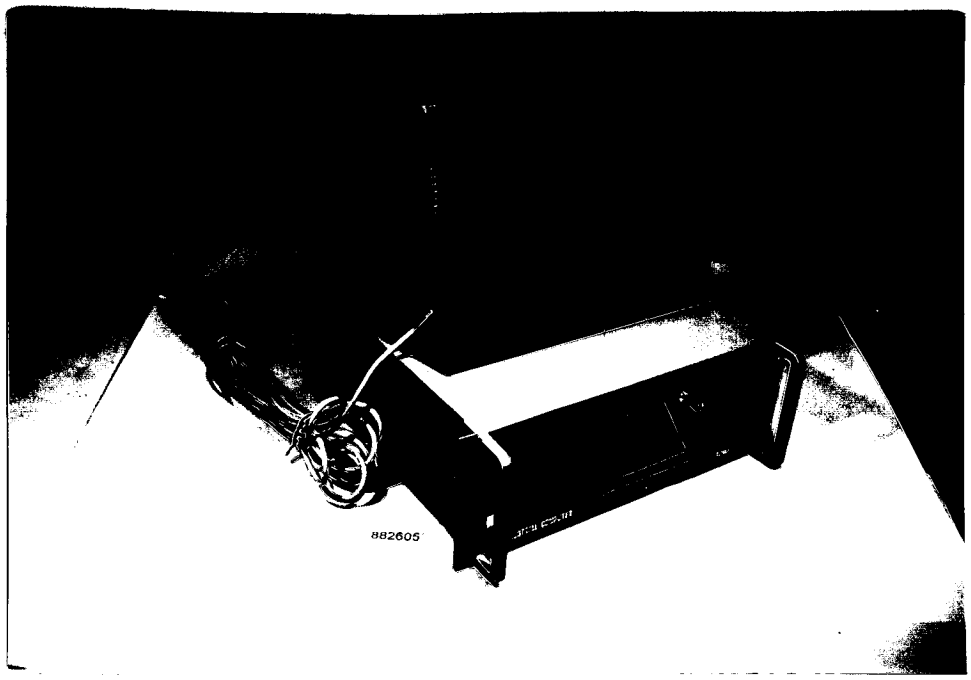
8. LIST OF MEASURING EQUIPMENT USED

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	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, 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	Dec. 20, 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

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

APPENDIX A. Photographs of EUT

FRONT VIEW



REAR VIEW