

**SPORTON International Inc.**

TEL : 886-2-2696-2468

FAX : 886-2-2696-2255

**FCC TEST REPORT**

**REPORT NO. : F831608**

Exh

## FCC TEST REPORT

for

**CISPR PUB. 22 CLASS B**

Equipment : MONITOR

MODEL NO. : 15ca and 15c

**F C C I D : NPU14CX**

Filing Type : CLASS II CHANGE

**APPLICANT : ARIESTEC INC.**

3F, No. 100, Min-Chuan Rd., Hsin 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.

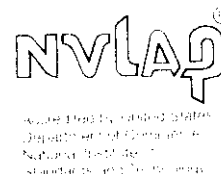
**SPORTON INTERNATIONAL INC.**

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

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# SPORTON INTERNATIONAL INC.



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**FCC TEST REPORT**

**REPORT NO. : F831608**

**CERTIFICATE NO. : F831608**

## CERTIFICATE OF COMPLIANCE

for

**CISPR PUB. 22 CLASS B**

Equipment : MONITOR

MODEL NO. : 15ca and 15c

**F C C I D : NPU14CX**

**APPLICANT : ARIESTEC INC.**

3F, No. 100, Min-Chuan Rd., Hsin 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 CISPR PUB. 22** in both radiated and conducted emissions limits. Testing was carried out on **APR. 08, 1998** at **SPORTON International Inc.** in **LIN KOU**.

  
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.

APPLICANT : ARIESTEC INC.  
EQUIPMENT : MONITOR

**F C C I D : NPU14CX**  
**ISSUED DATE : APR. 08, 1998**  
**PAGE NUMBER : 3 OF 25**

## **1. GENERAL DESCRIPTION OF EQUIPMENT UNDER TEST**

### **1.1. APPLICANT**

**ARISTEC INC.**

3F, No. 100, Min-Chuan Rd., Hsin Tien City,  
Taipei, Taiwan, R.O.C.

### **1.2. MANUFACTURER**

Same as 1.1

### **1.3. BASIC DESCRIPTION OF EQUIPMENT UNDER TEST**

EQUIPMENT : MONITOR

MODEL NO. : 15ca and 15c

FCC ID: NPU14CX

TRADE NAME : ARISTEC

DATA CABLE : Shielded

Remark: A ferrite core is added on the video cable at PC end.

POWER SUPPLY TYPE : Switching

POWER CORD : Non-shielded

### **1.4. FEATURE OF EQUIPMENT UNDER TEST**

- CRT: 15", 0.28mm, detection angle 90 degree
- Resolution: 1024x768 (NI)
- Horizontal Sync.: 31.50 to 54KHz
- Vertical Sync.: 60 to 85Hz
- Signal cable: 15-pin D-type connector
- Power input voltage frequency: 100 to 250VAC, 50/60Hz

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**1.5 FCC CLASS II CHANGE DESCRIPTION**

- a. The applicant would like to add one more equipment using the same FCC ID. The PCB layout, circuit and components of original EUT and of the EUT for this application are exactly the same. The only difference between old model and new model is the CRT size. The CRT size of the EUT which has been granted on Jan. 29, 1998 IS 14" and the CRT size of this equipment is 15". Both of these two models may be marketed in the future.

## **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, ARIESTEC monitor, HP printer, PRIMAX mouse and ACEEX modem were connected to the LEO PC.
- c. The following display resolution were investigated during the compliance test:
  1. Horizontal frequency (640x480 to 1024x768, 31.5Khz to 54KHz)
  2. Vertical frequency (60Hz to 85Hz)
- d. According to the above tests, we listed the following display modes as the worst cases:
  1. 1024x768 (non-interlaced 48Khz), refresh rate 60Hz.
  2. 800x600 (54Khz), refresh rate 85Hz.
- e. During the test, the monitor AC power cord was plugged into the PC computer-mounted AC outlet and a floor-mounted AC outlet to search the maximum emission.
- f. Frequency range investigated: Conduction 150 KHz to 30 MHz, Radiation 30 MHz to 1000 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

#### **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. --- KEYBOARD (DELL)

FCC ID : GYUM92SK  
Model No. : AT101  
Serial No. : SP1011  
Data Cable : Shielded, 360 degree via metal backshells.

## Support Device 4. --- PERSONAL COMPUTER (LEO)

FCC ID : N/A  
Model No. : P55T2P4  
Serial No. : SP1034  
Data Cable : Shielded, 360 degree via metal backshells.  
Power Supply Type : Switching  
Power Cord : Shielded

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

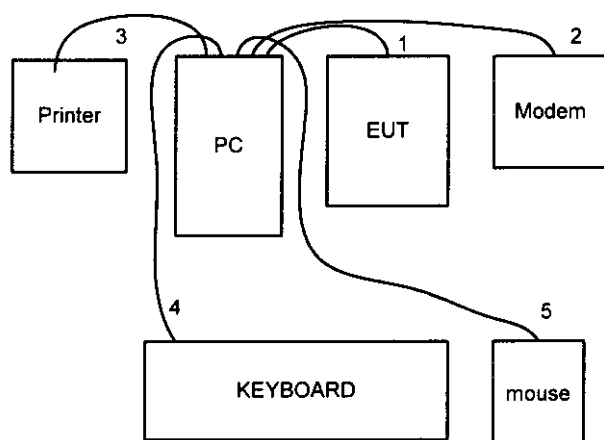
## Support Device 5. --- VGA CARD (BRITEK)

FCC ID : ILLS386XP  
Model No. : BTK-076  
Serial No. : SP1035  
Data Cable : Shielded, 360 degree via metal backshells.

## Support Device 6. --- MOUSE (PRIMAX)

FCC ID : EMJMUSJQ  
Model No. : MUS9J  
Serial No. : SP1036  
Data Cable : Shielded, 360 degree via metal backshells.

## **2.3. CONNECTION DIAGRAM OF TEST SYSTEM**



1. The I/O cable is connected to the EUT.
2. The I/O cable is connected to the support device 1.
3. The I/O cable is connected to the support device 2.
4. The I/O cable is connected to the support device 3.
5. The I/O cable is connected to the support device 6.

### **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. The PC reads the test program from the floppy disk drive and runs it.
- c. The PC sends " H " messages to the EUT, and the EUT 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, then 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**

CISPR PUB. 22

### **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.

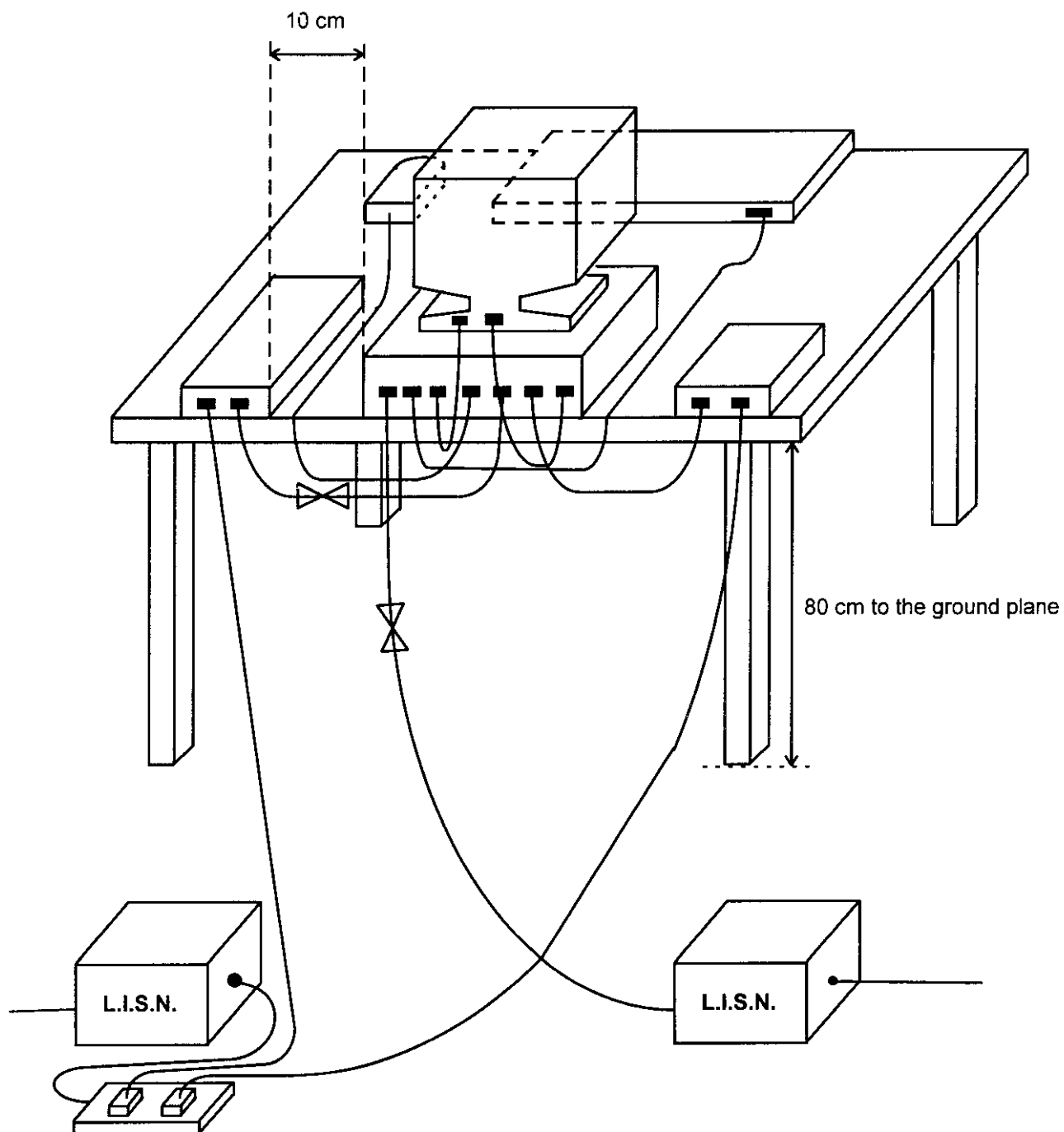
### **5.1. MAJOR MEASURING INSTRUMENTS**

• Test Receiver	HP85462A
Attenuation	0 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
Step MHz	0.007 MHz
IF Bandwidth	10 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 ( receiver HP85462A) 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 or average 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
- Temperature : 22 °C
- Relative Humidity : 69% RH
- Test date: APR. 08, 1998
- Measuring mode: 1024x768 (non-interlaced 48Khz), 60Hz
- All emissions not reported here are more than 10 dB below the prescribed limit.

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

**LINE 0.53MHz / 39.00dBuV.**

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 )
0.19	N	45.70	43.30	192.75	146.22	64.86	54.86	1749.27	553.17	-19.16	-11.56
0.34	N	42.10	41.60	127.35	120.23	60.57	50.57	1068.00	337.73	-18.47	-8.97
0.48	N	35.00	33.80	56.23	48.98	56.57	46.57	673.86	213.09	-21.57	-12.77
0.34	L	41.20	40.80	114.82	109.65	60.57	50.57	1068.00	337.73	-19.37	-9.77
0.48	L	37.90	37.20	78.52	72.44	56.57	46.57	673.86	213.09	-18.67	-9.37
0.53	L	39.40	39.00	93.33	89.13	56.00	46.00	630.96	199.53	-16.60	-7.00

Test Engineer :

Alex

**5.4.1 TEST RESULT OF AC POWERLINE CONDUCTED EMISSION**

- Frequency Range of Test : from 0.15 MHz to 30 MHz
- Temperature : 22 °C
- Relative Humidity : 69% RH
- Test date: APR. 08, 1998
- Measuring mode: 800x600 (54Khz), 85Hz
- All emissions not reported here are more than 10 dB below the prescribed limit.

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

**LINE 0.38MHz / 44.30dBuV.**

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 )
0.16	L	52.30	48.00	412.10	251.19	65.71	55.71	1930.70	610.54	-13.41	-7.71
0.38	L	44.50	44.30	167.88	164.06	59.43	49.43	936.33	296.09	-14.93	-5.13
0.65	L	40.00	39.60	100.00	95.50	56.00	46.00	630.96	199.53	-16.00	-6.40
0.16	N	53.10	49.30	451.86	291.74	65.71	55.71	1930.70	610.54	-12.61	-6.41
0.38	N	42.80	42.40	138.04	131.83	59.43	49.43	936.33	296.09	-16.63	-7.03
0.60	N	38.70	38.30	86.10	82.22	56.00	46.00	630.96	199.53	-17.30	-7.70

Test Engineer :

*Alex*

## 6. TEST OF RADIATED EMISSION

Radiated emissions from 30 MHz to 1000MHz 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.

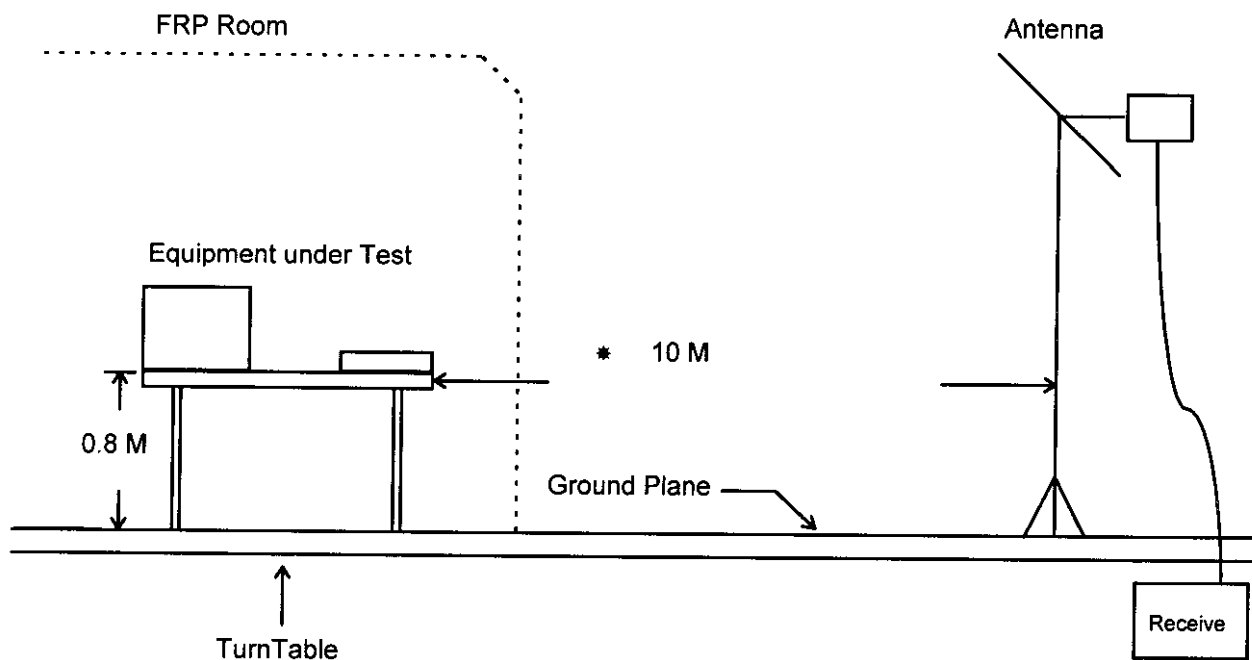
### 6.1. MAJOR MEASURING INSTRUMENTS

- RF Preselector
  - Attenuation 0 dB
  - RF Gain 20 dB
  - Signal Input Input 2 ( for 20 MHz to 2 GHz )
  
- Spectrum Analyzer 8568B
  - Attenuation 0 dB
  - Start Frequency 30 MHz
  - Stop Frequency 1000MHz
  - Resolution Bandwidth 1 MHz
  - Video Bandwidth 1 MHz
  - Signal Input Input 1 ( for 100KHz to 1.5 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 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 ( HP 8568B ) 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**

- For frequency 30-1Ghz equipment meets the CISPR PUB. 22 CLASS B limits.
- Test Distance : 10M
- Temperature : 25 °C
- Relative Humidity : 70% RH
- Test date: MAR. 21, 1998
- Measuring mode: 1024x768 (non-interlaced 48Khz), 60Hz
- Emission level ( dBuV/m ) = 20 log Emission level ( uV/m )
- Sample Calculation at 372.80MHz

Corrected Reading = 15.48+ 3.24+ 12.92= 31.64(dBuV/m )

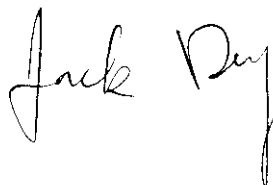
The Radiated Emission test was passed at

48.69 MHz / 26.47 dBuV ( Vertical )

Antenna Height 1 Meter , Turntable Degree 175 °.

Frequency	Polarity	Antenna	Cable	Reading	Limits	Emission	Level	Margin
( MHz )		Factor	Loss	( dBuV )	( dBuV/m )	( uV/m )	( dBuV/m )	( dB )
209.60	V	9.25	2.38	13.14	30.00	32	24.77	17.32
								-5.23
340.86	V	14.58	3.06	14.10	37.00	71	31.74	38.64
								-5.26
372.80	V	15.48	3.24	13.12	37.00	71	31.84	39.08
								-5.16
48.69	V	8.55	1.20	16.72	30.00	32	26.47	21.06
								-3.53
340.80	H	14.58	3.06	14.80	37.00	71	32.44	41.88
								-4.56
372.80	H	15.48	3.24	12.92	37.00	71	31.64	38.19
								-5.36

Test Engineer :



**6.4.1 TEST RESULT OF RADIATED EMISSION**

- For frequency 30-1Ghz equipment meets the CISPR PUB. 22 CLASS B limits.
- Test Distance : 10 M
- Temperature : 25 °C
- Relative Humidity : 70% RH
- Test date: MAR. 21, 1998
- Measuring mode: 800x600 (54Khz). 85Hz
- Emission level ( dBuV/m ) = 20 log Emission level ( uV/m )
- Sample Calculation at 343.69MHz  
Corrected Reading = 14.65+ 3.07+ 13.28= 31.00(dBuV/m)


The Radiated Emission test was passed at

**343.20MHz / 32.66dBuV ( Vertical )**

**Antenna Height 1 Meter , Turntable Degree 40 ° .**

Frequency	Polarity	Antenna	Cable	Reading	Limits	Emission	Level	Margin
( MHz )		Factor	Loss	( dBuV )	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)
		(dB/m)	( dB )	( dBuV )	(dBuV/m)	(uV/m)	(dBuV/m)	( dB )
343.20	V	14.64	3.07	14.95	37.00	71	32.66	42.95
358.02	V	15.04	3.15	13.20	37.00	71	31.39	37.11
42.99	V	11.27	1.12	12.68	30.00	32	25.07	17.93
194.30	H	9.07	2.21	13.97	30.00	32	25.26	18.32
228.00	H	9.78	2.51	11.75	30.00	32	24.04	15.92
343.69	H	14.65	3.07	13.28	37.00	71	31.00	35.48

Test Engineer :



## 7. ANTENNA FACTOR AND CABLE LOSS

Frequency ( Mhz )	Antenna Factor ( dB )	Cable Loss ( dB )
30	-2.20	0.80
35	-0.70	0.82
40	0.51	0.94
45	1.30	1.00
50	2.39	1.00
55	3.14	1.11
60	4.40	1.20
65	5.14	1.20
70	5.59	1.20
75	6.11	1.30
80	7.10	1.40
85	7.53	1.40
90	8.22	1.40
95	8.80	1.40
100	9.36	1.50
110	10.11	1.60
120	10.41	1.70
130	10.74	1.80
140	11.42	1.91
150	11.91	2.01
160	12.25	2.01
170	12.22	2.21
180	13.02	2.30
190	13.50	2.30
200	14.05	2.40
220	14.31	2.40
240	15.11	2.50
260	17.11	2.61
280	17.50	2.70
300	17.99	3.11
320	18.10	3.10
340	19.13	3.20
360	20.14	3.30
380	21.81	3.40
400	22.29	3.60
450	22.40	3.80
500	22.31	4.10
550	23.42	4.40
600	24.01	4.60
650	25.11	5.00
700	26.00	5.30
750	26.51	5.51
800	27.10	5.70
850	27.51	5.90
900	27.90	6.20
950	30.01	6.30
1000	29.00	6.40

※ 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.