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FCC TEST REPORT

REPORT NO. : F861102

CERTIFICATE NO. : F861102

CERTIFICATE OF COMPLIANCE

for

FCC PART 15, SUBPART B CLASS B

EQUIPMENT : FAX MODEM

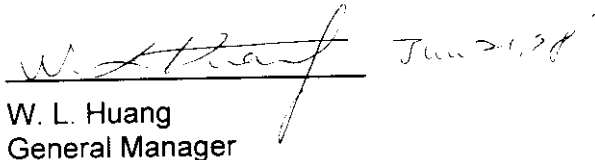
MODEL NO. : PT-3020

F C C I D : H52PT-3020

APPLICANT : **Puretek Industrial Co., LTD.**
4F, No. 12, LANE 235, PAO-CHIAD 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** both radiated and conducted emissions **Class B** limits. Testing was carried out on **June 16, 1998** at **SPORTON International Inc. LAB.**


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**

Puretek Industrial Co., LTD.
4F, No. 12, LANE 235, PAO-CHIAD 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 : FAX MODEM

MODEL NO. : PT-3020

FCC ID : H52PT-3020

TRADE NAME : Puretek

MODEM DATA CABLE : Shielded

(Remark : With ferrite loaded at the EUT end.)

SPEAKER, MICROPHONE, TELEPHONE DATA CABLE : Non-shielded

POWER SUPPLY TYPE : Adapter

POWER CORD : Non-shielded

1.4. FEATURE OF EQUIPMENT UNDER TEST

Data

- ITU-T V.90 (For 56Kbps Modem only)
- Rockwell k56flex (For 56Kbps Modem only)
- ITU-T V.34, V.32bis, V.32, V.22bis, V.22
- Bell 103 & 212A
- V.42bis & MNP 5 (Data compression)
- V.42 & MNP2-4 (Error correction)

Fax

- V.17 (14400bps FAX)
- V.29 (9600bps FAX)
- V.27ter (4800bps FAX)

Voice

- Voice/Audio mode
- Full-Duplex speakerphone
- AudioSpan (Simultaneous Audio/Voice/Data:SAVD)

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, SILITEK keyboard, GENIUS mouse, HP printer, JUSTER speaker, KOKA microphone, two TRANBON telephone, and EUT were connected to the F.I.C. P.C. for EMI test.
- c. The phone jack of the EUT were connected to the TRANBON telephone by telephone line and line jack was connected to the TRANBON telephone by telephone line.
- d. During the test, the monitor AC power cord was plugged into the P.C. computer-mounted AC outlet and a floor-mounted AC outlet to search the maximum emission.
- e. Frequency range investigated: Conduction 450 KHz to 30 MHz, Radiation 30 MHz to 1000 MHz.

2.2. DESCRIPTION OF TEST SYSTEM

Support Device 1. --- P.C. (FIC)

FCC ID : N/A
Model No. : P55T2P4
Serial No. : SP1003
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.)

Support Device 2. --- MONITOR (SONY)

FCC ID : AK8GDM17SE2T
Model No. : GDM-17SE2T
Serial No. : SP1006
Data Cable : Shielded, 360 degree via metal backshells, 1.75m
Power Supply Type : Switching
Power Cord : Non-shielded

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Support Device 3. --- KEYBOARD (SILITEK)

FCC ID : GYUM99SK
Model No. : SK9001AS2U
Serial No. : SP1042
Data Cable : Shielded, 132 cm Length, Metallic connector, 2.5m

Support Device 4. -- PS/2 MOUSE (GENIUS)

FCC ID : FSUGMZFC
Model No. : NETMOUSE
Serial No. : SP1034
Data Cable : Non-shielded, 1.75m

Support Device 5. --- PRINTER (HP)

FCC ID : DSI6XU2225
Model No. : 2225C
Serial No. : SP1015
Data Cable : Shielded, 360 degree via metal backshells, 2.0m
Power Supply Type : Linear

Support Device 6. -- SPEAKER (JUSTER)

FCC ID : N/A
Model No. : SP-1000
Serial No. : SP1041
Data Cable : Non-shielded, 1.0m

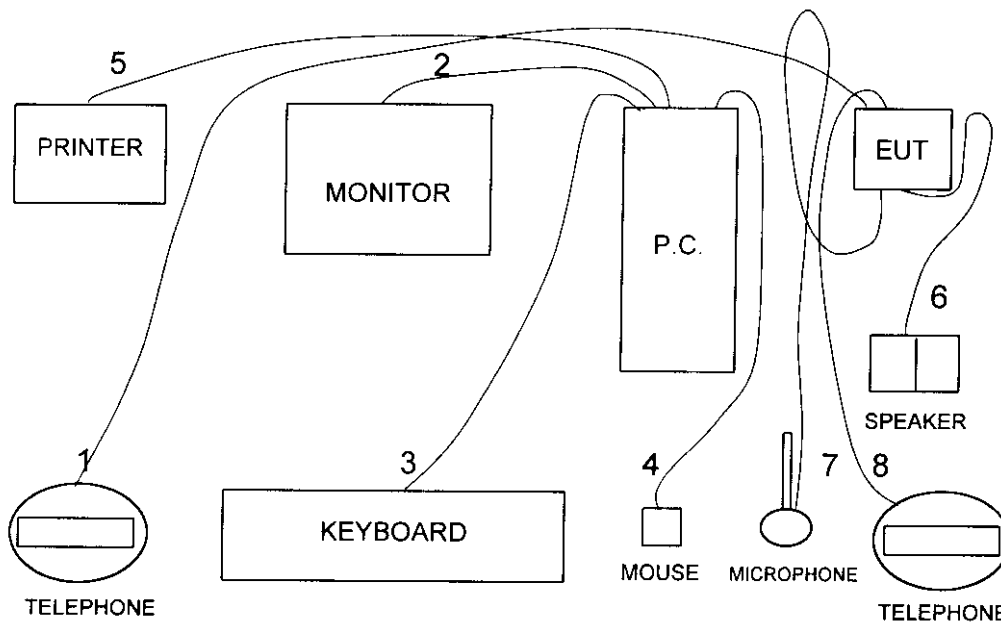
Support Device 7. -- MICROPHONE (KOKA)

FCC ID : N/A
Model No. : SRM02
Serial No. : SP1031
Data Cable : Non-shielded, 2.1m

Support Device 8. --- TELEPHONES (TRANBON)

FCC ID : N/A
Model No. : TE-302(ㄷ)
Serial No. : SP1029
Data Cable : Non-shielded, 2.1m

2.3. CONNECTION DIAGRAM OF TEST SYSTEM



1. The I/O cable is connected from the EUT to the support device 8.
2. The I/O cable is connected to the support device 2.
3. The I/O cable is connected to the support device 3.
4. The I/O cable is connected to the support device 4.
5. The I/O cable is connected 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.
8. The I/O cable is connected from the EUT to the support device 8.

3. TEST SOFTWARE

An executive program, FCC.EXE under DOS, 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 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, and modem return the "H" to P.C..
- f. The PC read and writes the floppy disk drive.
- 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. 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 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

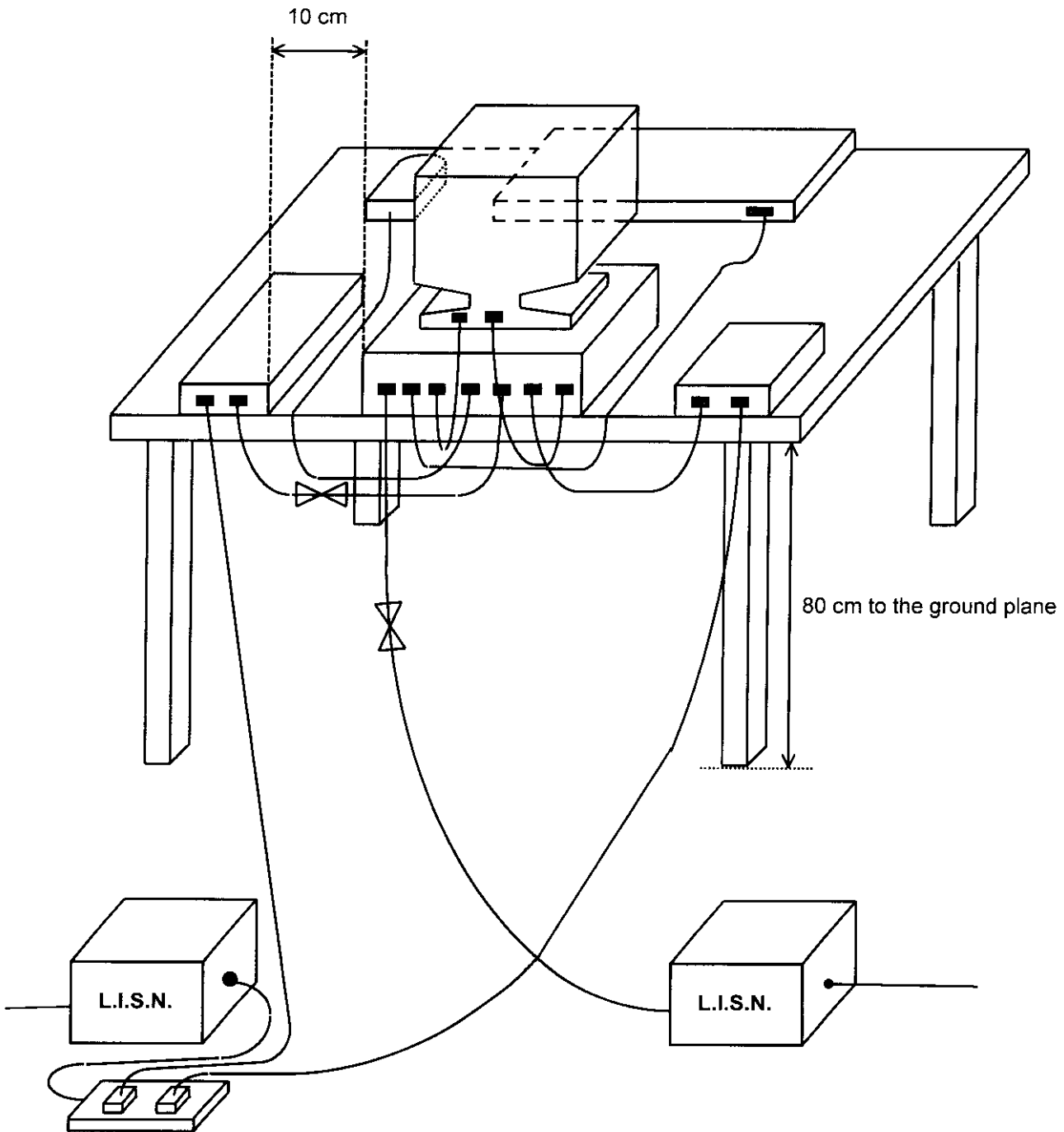
- Test Receiver

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 (HP receiver 85462A) 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 : 23°C
- Relative Humidity : 61 % RH
- Test Mode : 9PIN RS232
- Test Date : June 16, 1998

The Conducted Emission test was passed at Line 0.46 MHz/ 39.80 dBuV.

Frequency (MHz)	Line / Neutral	Meter Reading		Limits		Margin (dB)
		(dBuV)	(uV)	(dBuV)	(uV)	
0.46	L	39.80	97.72	48.00	251.19	-8.20
1.09	L	30.80	34.67	48.00	251.19	-17.20
13.95	L	28.00	25.12	48.00	251.19	-20.00
0.47	N	37.70	76.74	48.00	251.19	-10.30
1.06	N	31.20	36.31	48.00	251.19	-16.80
13.63	N	28.10	25.41	48.00	251.19	-19.90

Test Engineer : *Benson Tsai*
 BENSON TSAI

5.4.1. 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 : 23°C
- Relative Humidity : 61 % RH
- Test Mode : 25PIN RS232
- Test Date : June 16, 1998

The Conducted Emission test was passed at Line 0.46 MHz/ 40.20 dBuV.

Frequency (MHz)	Line / Neutral	Meter Reading		Limits		Margin (dB)
		(dBuV)	(uV)	(dBuV)	(uV)	
0.46	L	40.20	102.33	48.00	251.19	-7.80
2.29	L	26.70	21.63	48.00	251.19	-21.30
14.46	L	28.70	27.23	48.00	251.19	-19.30
0.50	N	37.00	70.79	48.00	251.19	-11.00
2.22	N	27.30	23.17	48.00	251.19	-20.70
15.70	N	27.10	22.65	48.00	251.19	-20.90

Test Engineer : 
BENSON TSAI

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

- 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	1000 MHz
Resolution Bandwidth	1 MHz
Video Bandwidth	1 MHz
Signal Input	Input 1 (for 100 KHz to 1.5 GHz)

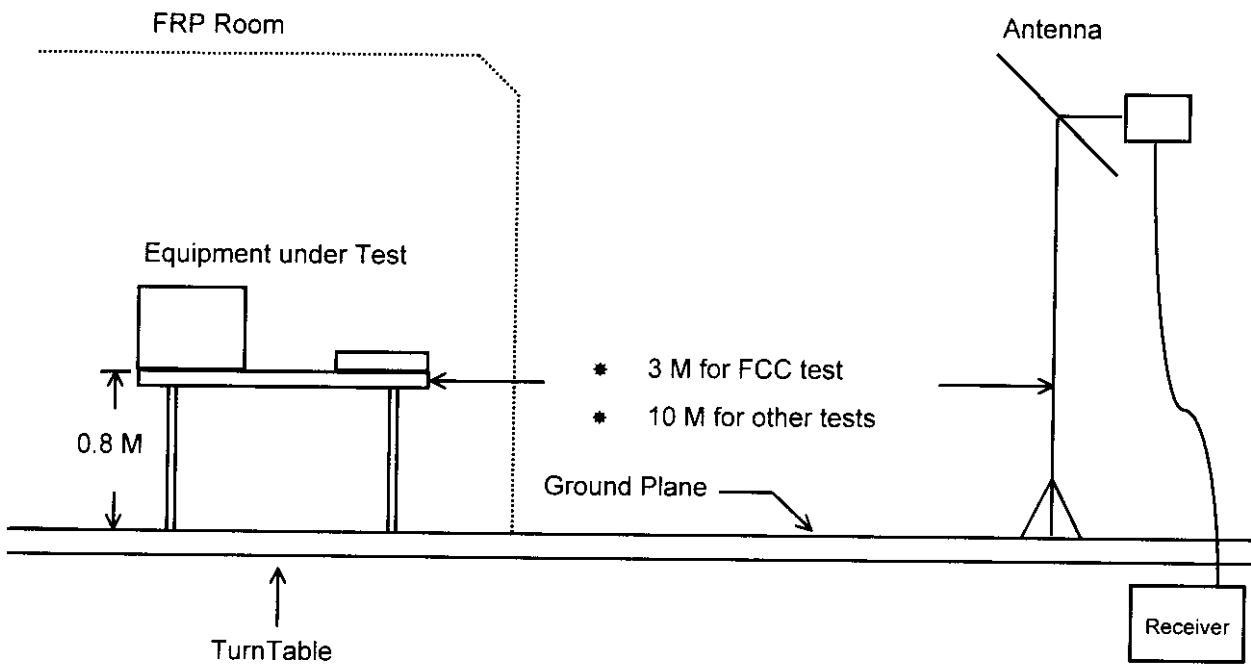
- Quasi-Peak Adapter

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 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) 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 : 28°C
- Relative Humidity : 60 % RH
- Test Mode : 9PIN RS232
- Test Date : June 16, 1998
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Sample Calculation at 55.43 MHz
Corrected Reading = 3.61 + 1.13 + 30.18 = 34.92 (dBuV/m)

The Radiated Emission test was passed at

Horizontal 141.07 MHz / 36.39 dBuV

Antenna Height 1.0 Meter , Turntable Degree 0 °.

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m)	Emission Level (uV/m)	Level (dBuV/m)	Margin (dB)
55.43	H	3.61	1.13	30.18	40.00	100	34.92	55.72 -5.08
141.07	H	11.47	1.92	23.00	43.50	150	36.39	65.99 -7.11
197.64	H	13.92	2.38	16.84	43.50	150	33.14	45.39 -10.36
141.07	V	11.47	1.92	22.70	43.50	150	36.09	63.75 -7.41
169.44	V	12.69	2.20	18.69	43.50	150	33.59	47.81 -9.91
197.64	V	13.92	2.38	19.24	43.50	150	35.54	59.84 -7.96

Test Engineer :

Benson Tsai

BENSON TSAI

6.4.1. 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 : 28°C
- Relative Humidity : 60 % RH
- Test Mode : 25PIN RS232
- Test Date : June 16, 1998
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Sample Calculation at 56.47 MHz
Corrected Reading = 3.79 + 1.17 + 30.16 = 35.12 (dBuV/m)

The Radiated Emission test was passed at

Vertical 141.11 MHz / 36.56 dBuV

Antenna Height 1.0 Meter , Turntable Degree 0°.

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m)	Emission (uV/m)	Level (dBuV/m)	Margin (dB)
56.47	H	3.79	1.17	30.16	40.00	100	35.12	57.02 -4.88
141.24	H	11.48	1.92	22.59	43.50	150	35.99	63.02 -7.51
266.06	H	17.57	2.77	21.64	46.00	200	41.98	125.60 -4.02
141.11	V	11.47	1.92	23.16	43.50	150	36.56	67.30 -6.94
225.11	V	15.54	2.53	18.61	46.00	200	36.68	68.23 -9.32
266.86	V	17.58	2.78	22.32	46.00	200	42.67	135.99 -3.33

Test Engineer : *Benson Tsai*
BENSON TSAI

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

8 LIST OF MEASURING EQUIPMENT USED

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Test Receiver	R&S	ESH3	893495/013	9 KHz - 30MHz	April 13, 1998	Conduction
Test Receiver	R&S	ESVP	893610/003	20MHz - 1.3 GHz	April 13, 1998	Conduction
LISN	EMCO	3825/2	9510-2484	50 ohm / 50 μ H	Nov. 29, 1997	Conduction
LISN	KYORITSU	KNW-407	8-1010-15	50 ohm / 50 μ H	Nov. 10, 1997	Conduction
EMI Filter	CORCOM	MRI-2030	N/A	480VAC / 30A	N/A	Conduction
Spectrum Monitor	R & S	EZM	894987/011	N/A	April 13, 1998	Conduction
RF Preselector (site 1)	HP	85685A	2926A00951	20Hz - 1.5GHz	Jul. 19, 1997	Radiation
Spectrum Analyzer (site 1)	HP	8568B	2928A04713	100Hz - 1.5GHz	Jul. 19, 1997	Radiation
Spectrum Analyzer display (site 1)	HP	N/A	2848A18002	N/A	Jul. 19, 1997	Radiation
Quasi-peak Adapter (site 1)	HP	85650A	2811A01285	9KHz -1 GHz	Jul. 19, 1997	Radiation
Bilog Antenna (1)	CHASE	CBL6112A	2296	30MHz - 2GHz	Jul. 24, 1997	Radiation
Half-wave dipole antenna (1)	EMCO	3121C	8912-496	20MHz - 1GHz	Aug. 12, 1997	Radiation
Turn Table	EMCO	1060-1.211	9507-1805	0 -360 degree	N/A	Radiation
Antenna Mast	EMCO	1051-1.2	9502-1868	1 m - 4 m	N/A	Radiation