

SPORTON International Inc.

TEL : 886-2-2696-2468

FAX : 886-2-2696-2255

FCC TEST REPORT

REPORT NO. : F831902

EXHIBIT B

FCC TEST REPORT

for

CISPR PUB. 22 CLASS B

Equipment : 10M LAN CARD

MODEL NO. : WS-R320CT

F C C I D : L4OWS-R320CT

Filing Type : Original Grant

APPLICANT : CIS TECHNOLOGY INC.

16F, No. 75, Hsin Tai Wu Rd., Sec. 1, Hsi Chih,
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.

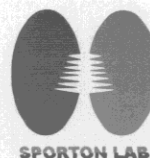
SPORTON INTERNATIONAL INC.

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

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CERTIFICATE NO. : F831902

CERTIFICATE OF COMPLIANCE

for

CISPR PUB. 22 CLASS B

Equipment : 10M LAN CARD

MODEL NO. : WS-R320CT

F C C I D : L4OWS-R320CT

APPLICANT : CIS TECHNOLOGY INC.

16F, No. 75, Hsin Tai Wu Rd., Sec. 1, Hsi Chih,
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 CISPR PUB. 22 CLASS B** in both radiated and conducted emissions limits. Testing was carried out on APR. 14, 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.

1. GENERAL DESCRIPTION OF EQUIPMENT UNDER TEST

1.1. APPLICANT

CIS TECHNOLOGY INC.

16F, No. 75, Hsin Tai Wu Rd., Sec. 1, Hsi Chih,
Taipei Hsien, Taiwan, R.O.C.

1.2. MANUFACTURER

Same as 1.1

1.3. BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

EQUIPMENT : 10M LAN CARD

MODEL NO. : WS-R320CT

FCC ID: L4OWS-R320CT

TRADE NAME : CIS

TP DATA CABLE : Non-shielded

BNC DATA CABLE : Shielded

POWER SUPPLY TYPE : N/A

POWER CORD : N/A

1.4. FEATURE OF EQUIPMENT UNDER TEST

- Compliant with 10BASE-T and 10BASE2 specifications of the IEEE 802.3 standard.
- Full-duplex operation support
- Auto-detecting connector in use
- One status LED mounted on bracket for easy viewing and troubleshooting
- On-board socket for optional BOOT ROM
- Automatic PCI configuration without jumpers

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, PRIMAX mouse and ACEEX modem were connected to the LEO PC.
- c. Using the twisted pair cable to connect the EUT and workstation which is installed with the other ethernet lan card.
- d. Using the BNC cable to connect the EUT and workstation which is installed with the other ethernet lan card.
- e. 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 : B94C2642X
Model No. : DESKJET 400
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. : SP1039
 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. --- MONITOR (SONY)

FCC ID : AK8GDM17SE2T
 Model No. : GDM-17SE2T
 Serial No. : SP1016
 Data Cable : Shielded, 360 degree via metal backshells.
 Power Supply Type : Switching
 Power Cord : Non-shielded

Support Device 6. --- MOUSE (PRIMAX)

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

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Support Device 7. --- ETHERNET LAN CARD (CIS)

FCC ID :L4OD300

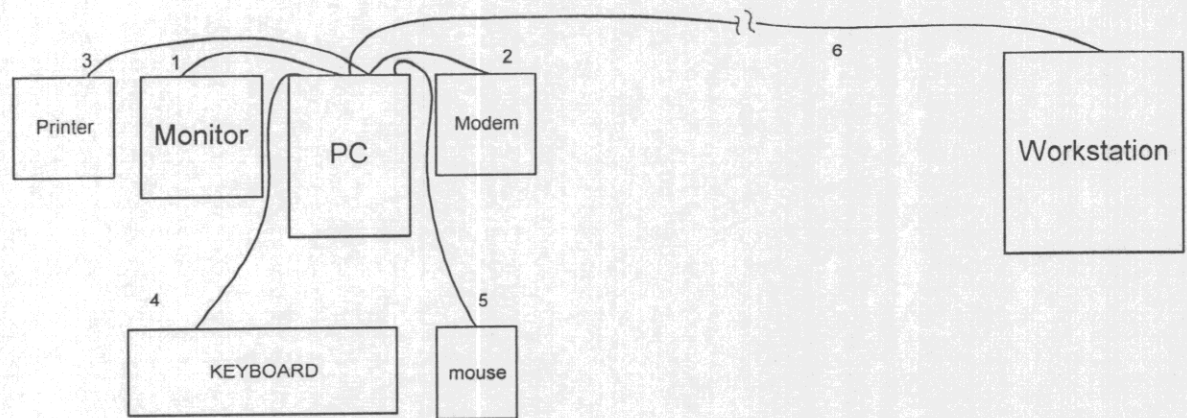
Model No. :D300

Serial No. :SP1039

TP Data Cable :Non-shielded

BNC Data Cable :Shielded

2.3. CONNECTION DIAGRAM OF TEST SYSTEM



1. The I/O cable is connected to the support device 5.
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.
6. The TP or BNC cable is connected to the support device 7.

3. TEST SOFTWARE

3.0 Using the following batch files to connect the EUT and workstation with twisted pair or BNC cable.

- a. For EUT: In DOS mode, running the "TEST200J.EXE"
 - b. For workstation: In DOS mode, running the batch file "TEST200J.EXE"
-
- a. Turn on the power of all equipment.
 - b. The PC transmits the "H" character to the other PC.
 - c. The monitor then displaying the "H" characters on the screen continuously and repeatedly.
 - d. The PC sends " H " messages to the printer, then the printer prints it 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 CLASS B

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.

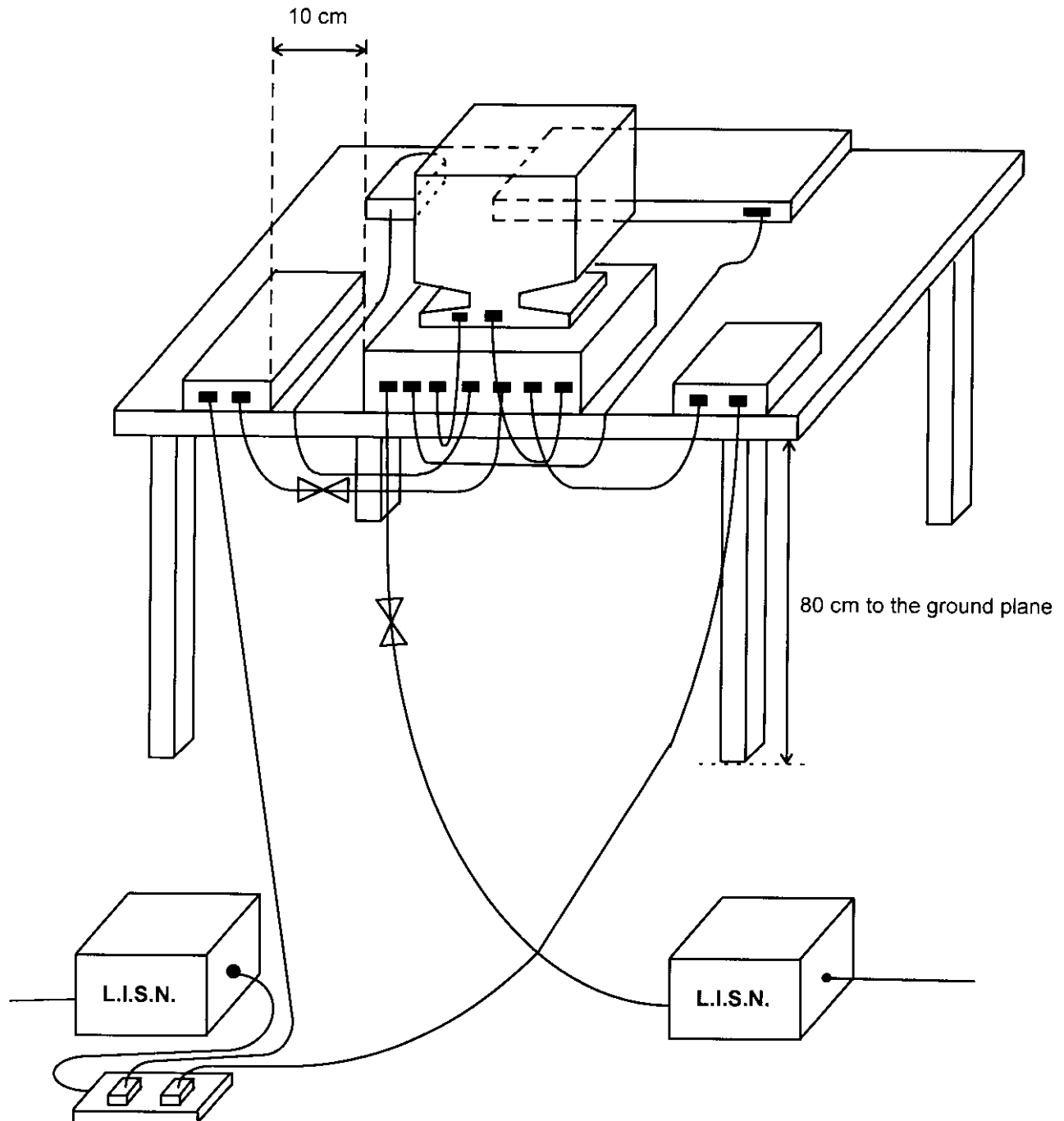
Conducted Emissions were measured from 150 KHz to 30 MHz with a bandwidth of 9 KHz on the 115 VAC power and return leads of the EUT according to the methods defined in ANSI C63.4-1992 Section 3.1. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown 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.

- 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 : 20 °C
- Relative Humidity : 75% RH
- Test mode: TP mode
- Test date: APR. 14, 1998
- All emissions not reported here are more than 10 dB below the prescribed limit.

The Conducted Emission test was passed at minimum margin

NEUTRAL 24.63MHz / 30.30dBuV.

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)
0.20	N	36.90	28.80	69.98	27.54	64.57	54.57	1692.67	535.27	-27.67	-25.77
0.29	N	29.90	26.80	31.26	21.88	62.00	52.00	1258.93	398.11	-32.10	-25.20
24.63	N	33.00	30.30	44.67	32.73	60.00	50.00	1000.00	316.23	-27.00	-19.70
0.29	L	27.00	19.40	22.39	9.33	62.00	52.00	1258.93	398.11	-35.00	-32.60
20.64	L	27.10	20.50	22.65	10.59	60.00	50.00	1000.00	316.23	-32.90	-29.50
24.63	L	32.90	27.90	44.16	24.83	60.00	50.00	1000.00	316.23	-27.10	-22.10

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 : 19 °C
- Relative Humidity : 65% RH
- Test mode: BNC mode
- Test date: APR. 14, 1998
- All emissions not reported here are more than 10 dB below the prescribed limit.

The Conducted Emission test was passed at minimum margin

NEUTRAL 1.42MHz / 31.70dBuV.

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)
0.39	L	34.00	34.00	50.12	50.12	59.14	49.14	906.03	286.51	-25.14	-15.14
0.81	L	32.30	30.00	41.21	31.62	56.00	46.00	630.96	199.53	-23.70	-16.00
1.54	L	31.50	30.00	37.58	31.62	56.00	46.00	630.96	199.53	-24.50	-16.00
0.75	N	32.80	30.80	43.65	34.67	56.00	46.00	630.96	199.53	-23.20	-15.20
1.42	N	33.30	31.70	46.24	38.46	56.00	46.00	630.96	199.53	-22.70	-14.30
3.60	N	32.40	28.80	41.69	27.54	56.00	46.00	630.96	199.53	-23.60	-17.20

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)

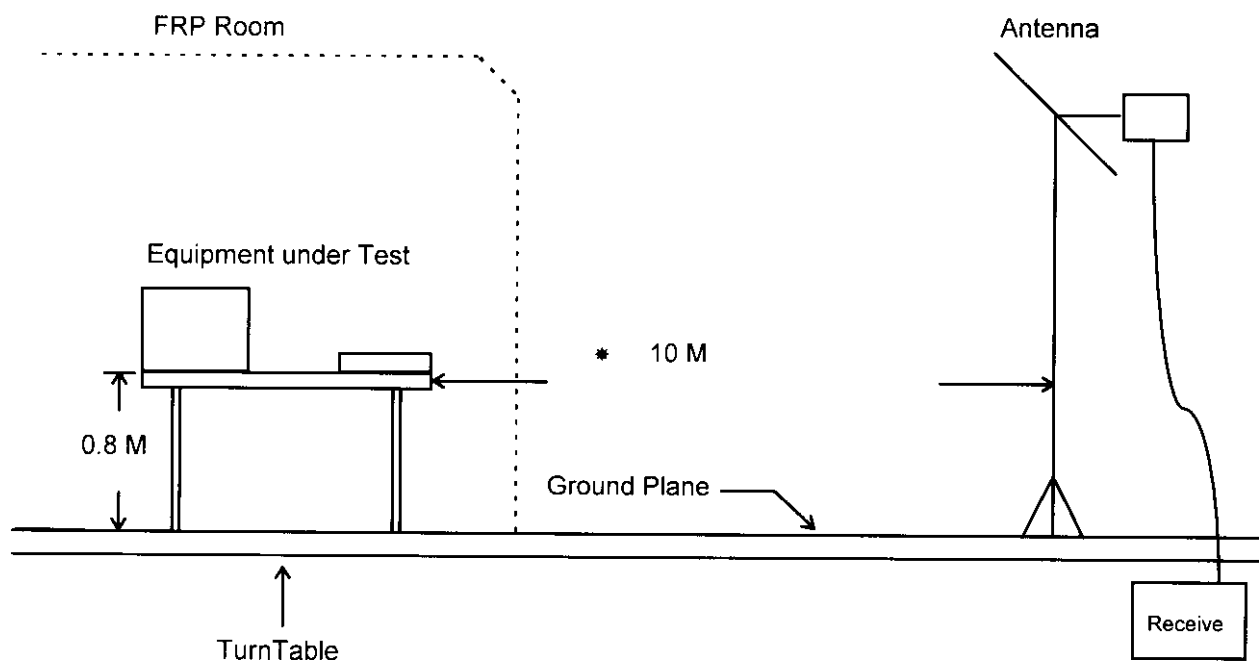
- Spectrum Analyzer 8568B
 - Attenuation 0 dB
 - Start Frequency 30 MHz
 - Stop Frequency 1000MHz
 - Resolution Bandwidth 1 MHz
 - Video Bandwidth 1 MHz
 - Signal Input Input 1 (for 100KHz to 1.5 GHz)

- 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 : 19 °C
- Relative Humidity : 65% RH
- Test mode: TP mode
- Test date: MAR. 18, 1998
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Sample Calculation at 200.04MHz
Corrected Reading = $9.10 + 2.30 + 13.68 = 25.08(\text{dBuV/m})$

The Radiated Emission test was passed at

141.13 MHz / 24.73 dBuV (Vertical)

Antenna Height 1 Meter , Turntable Degree 128 °.

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m)	Emission (uV/m)	Level (dBuV/m)	Margin (uV/m)	(dB)
40.02	V	12.99	1.00	11.86	30.00	32	25.85	19.61	-4.15
160.03	V	10.50	2.10	12.30	30.00	32	24.90	17.58	-5.10
233.88	V	10.32	2.54	20.87	37.00	71	33.72	48.53	-3.28
460.06	V	17.38	3.70	12.05	37.00	71	33.13	45.34	-3.87
233.87	H	10.32	2.54	20.27	37.00	71	33.12	45.29	-3.88
200.04	H	9.10	2.30	13.68	30.00	32	25.08	17.95	-4.92

Test Engineer :

Terry Chang

6.4.1 TEST RESULT OF RADIATED EMISSION

- For frequency 30-1Ghz equipment meets the CISPR PUB. 22 CLASS B limits.
- Test Distance : 10M
- Temperature : 19 °C
- Relative Humidity : 65% RH
- Test mode: BNC mode
- Test date: MAR. 18, 1998
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Sample Calculation at 501.14MHz
Corrected Reading = 17.74+ 3.70+ 11.29= 32.74(dBuV/m)

The Radiated Emission test was passed at

434.31 MHz / 33.80 dBuV (Vertical)

Antenna Height 1 Meter , Turntable Degree 28 °.

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m)	Emission (uV/m)	Level (dBuV/m)	Margin (dB)
40.02	V	12.99	1.00	11.96	30.00	32	25.95	19.84 -4.05
66.82	V	6.08	1.36	18.17	30.00	32	25.62	19.10 -4.38
70.01	V	6.40	1.30	17.96	30.00	32	25.66	19.19 -4.34
267.20	V	12.42	2.70	17.68	37.00	71	32.80	43.65 -4.20
434.31	V	16.99	3.61	13.21	37.00	71	33.80	48.98 -3.20
501.14	V	17.74	3.70	11.29	37.00	71	32.74	43.35 -4.26

Test Engineer :

Terry Chang

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.