

# **FCC TEST REPORT**

for

## **PART 15, SUBPART B CLASS B**

Equipment : SOHOware™ PCMCIA

MODEL NO. : ND5100-E, ND5120-E

**F C C I D** : IOUND5100ES01

**APPLICANT : National Datacomm Corporation.**

2F, No. 28, Industry East 9th Rd.,  
Science Park, Hsin-Chu, 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 OF COMPLIANCE

for

### FCC PART 15, SUBPART B CLASS B

Equipment : SOHOware™ PCMCIA

MODEL NO. : ND5100-E, ND5120-E

F C C I D : IOUND5100ES01


APPLICANT : **National Datacomm Corporation.**

2F, No. 28, Industry East 9th Rd.,

Science Park, Hsin-Chu, 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 FEB. 18, 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**

**National Datacomm Corporation.**

2F, No. 28, Industry East 9th Rd.,

Science Park, Hsin-Chu, Taiwan, R.O.C.

### **1.2. MANUFACTURER**

Same as 1.1

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

EQUIPMENT : SOHOware™ PCMCIA

MODEL NO. : ND5100-E, ND5120-E

FCC ID: IOUND5100ES01

TRADE NAME : NDC

TP DATA CABLE : Non-shielded

BNC DATA CABLE: Shielded

POWER CORD : N/A

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

- Conforms to IEEE 802.3, PCMCIA Release 2.1, and JEIDA 4.1
- Provide an auto-setup and installation program for NetWare and Windows for Workgroups
- Hassle free PCMCCOA installation with IRQ, I/O and Memory Address conflict resolution
- Smart configuration program automatically detects the presence of card service & socket service and configures adapter accordingly
- Automatic media selection:
  - BNC for coaxial cable networks
  - RJ-45 for UTP cable networks
- User diagnostics
- Ultra low power consumption
- Two LEDs for Link and Traffic Status

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## **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 monitor, HP printer, PRIMAX mouse and ACEEX modem were connected to the ACER NOTEBOOK PC.
- c. Using the twisted Pair cable or BNC cable to connect the EUT and workstation which is installed with the other ethernet lan card. ✓
- d. Frequency range investigated: Conduction 450 KHz to 30 MHz, Radiation 30 MHz to 1000 MHz.

### **2.2. DESCRIPTION OF TEST SYSTEM**

#### **Support Device 1. --- NOTEBOOK PERSONAL COMPUTER (ACER)**

FCC ID	:GQB350
Model No.	:350C
Serial No.	:SP1040
Data Cable	:Shielded, 360 degree via metal backshells
Power Cord	:Non-shielded
Power Supply Type	:Switching

#### **Support Device 2. --- MODEM ( ACEEX)**

FCC ID	:IFAXDM1414
Model No.	:1414
Serial No.	:SP0020
Data Cable	:Shielded, 360 degree via metal backshells.
Power Supply Type	:Linear

**Support Device 3. --- PRINTER (HP)**

FCC ID :B94C2642X  
Model No. :Desk Jet 400  
Serial No. :SP0004  
Data Cable :Shielded, 360 degree via metal backshells  
Power Supply Type :Linear

**Support Device 4. --- MONITOR (HP)**

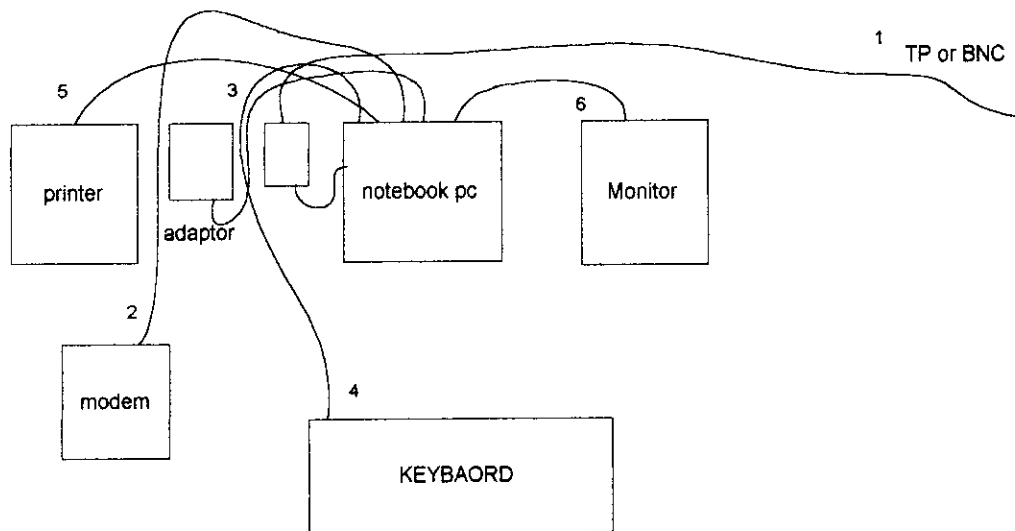
FCC ID :ACJ93312116  
Model No. :D2807A  
Serial No. :SP1045  
Data Cable :Shielded  
Power Supply Type :Switching  
Power Cord :Non-shielded

**Support Device 5. --- KEYBOARD (DELL)**

FCC ID :GYUM92SK  
Model No. :AT101  
Serial No. :SP1013  
Data Cable :Shielded, 360 degree via metal backshells.

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### 2.3. CONNECTION DIAGRAM OF TEST SYSTEM



1. The Twisted Pair cable or BNC cable is connected to the support device 6.
2. The I/O cable is connected to the support device 2.
3. The power cable is connected to the adaptor.
4. The I/O cable is connected to the support device 5.
5. The I/O cable is connected to the support device 3.
6. The I/O cable is connected to the support device 4.

### **3. TEST SOFTWARE**

3.0 Using the following batch files to connect the EUT and workstation with Twisted Pair cable.

- a. For EUT: In DOS mode, running the "EMITEST.EXE"
  - b. For workstation: In DOS mode, running the batch file "EMITEST.EXE"
- 
- a. Turn on the power of all equipment.
  - b. The EUT transmits the "H" character to the other EUT.
  - c. The monitor then displaying the "H" characters on the screen continuously and repeatly.
  - 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**

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.

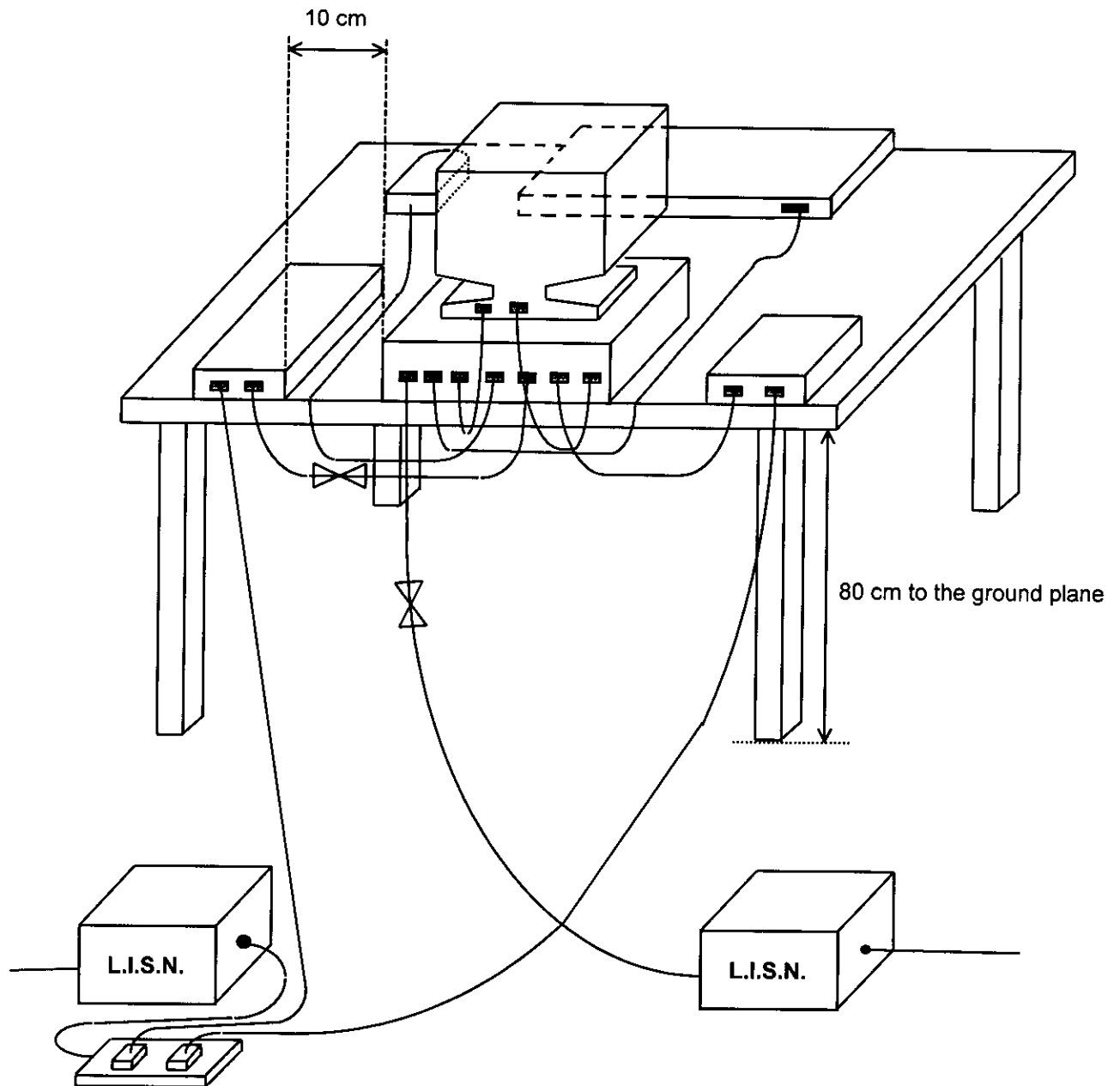
### **5.1. MAJOR MEASURING INSTRUMENTS**

• Test Receiver	HP85462A
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 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
- Temperature : 26°C
- Relative Humidity :53% RH
- Test Mode: TP MODE
- All emissions not reported here are more than 10 dB below the prescribed limit.
- Test Date : Jun. 24, 1998

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

**LINE 3.65 MHz / 37.70dBuV.**

Frequency ( MHz )	Line / Neutral	Meter Reading		Limits		Margin
		( dBuV )	( uV )	( dBuV )	( uV )	( dB )
0.92	L	33.20	45.71	48.00	251.19	-14.80
1.71	L	34.00	50.12	48.00	251.19	-14.00
3.65	L	37.70	76.74	48.00	251.19	-10.30
0.88	N	33.00	44.67	48.00	251.19	-15.00
1.16	N	33.80	48.98	48.00	251.19	-14.20
3.52	N	37.30	73.28	48.00	251.19	-10.70

Test Engineer :  
ALEX WU



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

- Frequency Range of Test : from 0.45 MHz to 30 MHz
- Temperature : 26°C
- Relative Humidity : 53% RH
- Test Mode: BNC MODE
- All emissions not reported here are more than 10 dB below the prescribed limit.
- Test Date : Jun. 24, 1998

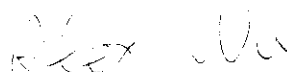
**The Conducted Emission test was passed at minimum margin**

**NEUTRAL 10.00 MHz / 43.10dBuV.**

Frequency ( MHz )	Line / Neutral	Meter Reading		Limits		Margin ( dB )
		( dBuV )	( uV )	( dBuV )	( uV )	
1.39	L	32.70	43.15	48.00	251.19	-15.30
3.46	L	38.70	86.10	48.00	251.19	-9.30
1.53	N	33.70	48.42	48.00	251.19	-14.30
3.46	N	38.60	85.11	48.00	251.19	-9.40
10.00	N	43.10	142.89	48.00	251.19	-4.90
16.28	N	37.30	73.28	48.00	251.19	-10.70

Test Engineer :

ALEX WU



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## 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

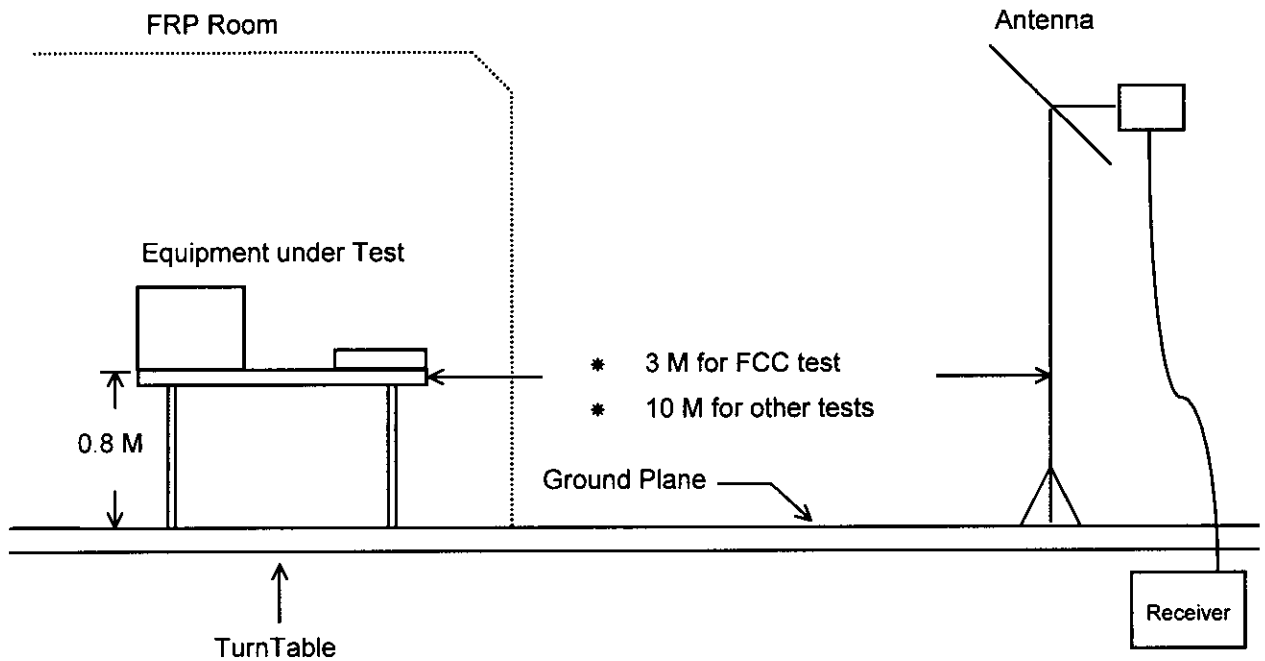
Resolution Bandwidth	120 KHz
Frequency Band	30 MHz to 1 GHz
Quasi-Peak Detector	ON for Quasi-Peak Mode
	OFF for Peak Mode

**6.2. TEST PROCEDURES**

- a. The EUT was placed on a rotatable table top 0.8 meter above ground.
- b. The EUT was set 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 : 20°C
- Relative Humidity : 71% RH
- Test Date : Jun. 19, 1998
- Test Mode: TP MODE
- Emission level ( dBuV/m ) = 20 log Emission level ( uV/m )
- Sample Calculation at 300.00 MHz  
Corrected Reading = 17.99+ 3.11+ 22.87= 43.97(dBuV/m )

The Radiated Emission test was passed at minimum margin

**Vertical 300.00 MHz / 43.97 dBuV**

**Antenna Height 2 Meter , Turntable Degree 286°.**

Frequency	Antenna	Cable	Reading	Limits	Emission	Level	Margin
Polarity	Factor	Loss					
( MHz )	( dB )	( dB )	( dBuV )	( dBuV )	( uV )	( dBuV )	( uV ) ( dB )
300.00	V	17.99	3.11	22.87	46.00	200	43.97 157.94 -2.03
401.60	V	22.29	3.61	17.94	46.00	200	43.84 155.60 -2.16
300.80	H	17.99	3.11	22.61	46.00	200	43.71 153.29 -2.29
50.10	V	2.40	1.00	33.19	40.00	100	36.60 67.61 -3.40
130.30	V	10.76	1.80	22.84	43.50	150	35.40 58.88 -8.10
139.90	H	11.41	1.91	21.45	43.50	150	34.77 54.76 -8.73

Test Engineer : *William Lee*

WILLIAM LEE

## 6.4. 1TEST 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 : 20°C
- Relative Humidity : 71% RH
- Test Date : Jun. 20, 1998
- Test Mode: BNC MODE
- Emission level ( dBuV/m ) = 20 log Emission level ( uV/m )
- Sample Calculation at 50.30 MHz  
Corrected Reading = 2.43+ 1.01+33.52= 36.96 (dBuV/m )

The Radiated Emission test was passed at minimum margin

Vertical 300.00 MHz / 43.37 dBuV

Antenna Height 1.5 Meter , Turntable Degree 131°.

Frequency	Antenna	Cable	Reading	Limits	Emission	Level	Margin
Polarity	Factor	Loss					
( MHz )	( dB )	( dB )	( dBuV )	( dBuV )	( uV )	( dBuV )	( uV ) ( dB )
50.30	V	2.43	1.01	33.52	40.00	100	36.96 70.47 -3.04
110.30	H	10.12	1.60	25.05	43.50	150	36.77 68.94 -6.73
239.20	H	15.08	2.50	26.19	46.00	200	43.76 154.17 -2.24
150.10	V	11.91	2.01	22.60	43.50	150	36.52 66.99 -6.98
300.00	V	17.99	3.11	22.27	46.00	200	43.37 147.40 -2.63
220.00	H	14.31	2.40	19.63	46.00	200	36.34 65.61 -9.66

Test Engineer : *William Lee*

WILLIAM LEE

## 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.	Characteristics	Calibration Date	Remark
Receiver RF section (site 1)	HP	85462A	3325A00108	9 KHz - 6.5 GHz	Oct. 22, 1997	Conduction
RF Filter section (site 1)	HP	85460A	3308A00104	9 KHz - 6.5 GHz	Oct. 22, 1997	Conduction
LISN (EUT) (site 1)	EMCO	3850/2	1035	50 ohm / 50 uH	Oct. 27, 1997	Conduction
LISN (Support Unit) (site 1)	KYORITSU	KNW-407	8-693-10	50 ohm / 50 uH	Oct. 04, 1997	Conduction
EMI Filter (site 1)	CORCOM	MRI-2030	N/A	480 VAC / 30 A	N/A	Conduction
Amplifier (Site 1)	HP	8447D	2944A08291	0.1MHz -1.3GHz	Nov. 12, 1997	Radiation
Quasi-Peak Adapter (site 1)	HP	85650A	2811A01116	9KHz - 1000KHz	Jun 17, 1998	Radiation
Spectrum Analyzer (site 1)	HP	8568B	2732A04100	100Hz - 1500KHz	Jun 17, 1998	Radiation
Bilog Antenna (Site 1)	CHASE	CBL6111	1378	30MHz -1 GHz	Aug. 11, 1997	Radiation
Half-wave dipole antenna (site 1)	EMCO	3121C	9705-1285	28 M - 1GHz	May 19, 1998	Radiation
Turn Table (site 1)	EMCO	1060-1.211	9507-1805	0 ~ 360 degree	N/A	Radiation
Antenna Mast (site 1)	EMCO	1051-1.2	9502-1868	1 m - 4 m	N/A	Radiation

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