



# EMC

## TEST REPORT

REPORT NO. : F87060403  
MODEL NO. : NW56  
DATE OF TEST : June 9, 1998

PREPARED FOR : NETRONICS INC.

ADDRESS : 6F NO. 1 SEC. 4, NANKING E. ROAD,  
TAIPEI, TAIWAN, R.O.C.

PREPARED BY: ADVANCE DATA TECHNOLOGY CORPORATION



Accredited Laboratory

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**1. CERTIFICATION**

Issue Date: July 21, 1998

Product : MODEM  
Trade Name : NTi  
Model No. : NW56  
Applicant : NETRONICS INC.  
Standard : FCC Part 15, Subpart B, Class B  
ANSI C63.4-1992  
CISPR 22:1993+A1+A2

We hereby certify that one sample of the designation has been tested in our facility on June 9, 1998. The test record, data evaluation and Equipment Under Test (EUT) configurations represent herein are true and accurate representation of the measurements of the sample's EMC characteristics under the conditions herein specified.

The test results show that the EUT as described in this report is in compliance with the Class B limits of conducted and radiated emission of applicable standards.

TESTED BY: \_\_\_\_\_, DATE: \_\_\_\_\_  
( Chris Yang )

CHECKED BY: Sharon Hsiung, DATE: 7/21/98  
( Sharon Hsiung )

APPROVED BY: \_\_\_\_\_, DATE: \_\_\_\_\_  
( Mike Su )

**ADVANCE DATA TECHNOLOGY CORPORATION****NVLAP<sup>®</sup>**

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## **2. GENERAL INFORMATION**

### **2.1 GENERAL DESCRIPTION OF EUT**

Product	:	MODEM
Model No.	:	NW56
Power Supply Type	:	Linear (from power adapter)
Power Cord	:	Nonshielded (1.8m)
Data Cable	:	Shielded (1.5m)

Note: The EUT is a modem with baud rate of 56 Kbps.

It was tested with a power adapter, model: MW48-0901000 which is a 2 pin direct-plug-in type. Its rating: Input: AC 110V, 60 Hz ; Output: 9 Vac, 1A

There is a ferrite core on the interface cable of EUT which will be sold together with the EUT.

For more detailed features description, please refer to ATTACHMENT 1 - TECHNICAL DESCRIPTION OF EUT and User's Manual.



## 2.2 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories are used to form representative test configuration during the tests.

No	Product	Brand	Model No.	FCC ID	I/O Cable
1.	PERSONAL COMPUTER	HP	VL Series 4 5/100	B94VECTRA500T	Nonshielded Power (1.8m)
2.	COLOR MONITOR	OPTIQUEST	4500DC	KZQ4500DC	Shielded Signal (1.5m) Nonshielded Power (1.8m)
3.	PRINTER	HP	2225C+	DSI6XU2225	Shielded Signal (1.2m) Nonshielded Power (1.8m)
4.	KEYBOARD	FORWARD	FDA-104GA	F4ZDA-104G	Shielded Signal (1.4m)
5.	TELEPHONE	VICTORLA	T/PM-L	N/A	Nonshielded Signal (2m)
6.	MOUSE	COMPAQ	M-S28	DZL210472	Shielded Signal (1.5m)
7.	SPEAKER	J-S	J-009	N/A	Nonshielded Signal (1.1m)
8.	MICROPHONE	CAROL	MUD-329	N/A	Nonshielded Signal (3.0m)
9.	PERSONAL COMPUTER	HP	D4579A	DOC Approved	Nonshielded Power (1.8m)
10.	MONITOR	ACER	7134T	JVP7134T	Shielded Signal (1.2m) Nonshielded Power (1.8m)
11.	KEYBOARD	FORWARD	FDA-104GA	F4ZDA-104G	Shielded Signal (1.4m)
12.	MOUSE	DEXIN	A2P800A	NIYA2P800A	Shielded Signal (1.5m)
13.	MODEM	ADI	SVD-56KRE/SEC	BR8SVD-56KER	Shielded Signal (1.2m) Nonshielded Power (1.8m)

Note: Support units 1-8 were set up as the SERVER PC system and communicated with units 9-13 which acted as HOST PC and communication partner.

## 2.3 TEST METHODOLOGY AND CONFIGURATION

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4:1992. Radiated testing was performed at an antenna to EUT distance of 10 m on an open area test site. Please refer to the photos of test configuration in Item 5.



### 3. TEST INSTRUMENTS

#### 3.1 TEST INSTRUMENTS (EMISSION)

##### RADIATED EMISSION MEASUREMENT

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
HP Spectrum Analyzer	8594A	3144A00308	Sept. 1, 1998
HP Preamplifier	8447D	2944A08119	Aug. 2, 1998
ROHDE & SCHWARZ TEST RECEIVER	ESVP	893496/030	July 17, 1998
SCHWARZBECK Tunable Dipole Antenna	VHA 9103 UHA 9105	E101051 E101055	Nov. 28, 1998
CHASE Bilog Antenna	CBL6112	2086	Dec. 26, 1998
EMCO Turn Table	1060	1195	N/A
EMCO Tower	1051	1163	N/A
Open Field Test Site	Site 2	ADT-R02	Sept. 26, 1998

Note: 1. The measurement uncertainty is less than +/- 3dB, which is calculated as per NAMA's document NIS81.

2. The calibration interval of the above test instruments is 12 months.  
And the calibrations are traceable to NML/ROC and NIST/USA.

##### CONDUCTED EMISSION MEASUREMENT

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ROHDE & SCHWARZ Test Receiver	ESH3	893495/006	July 23, 1998
ROHDE & SCHWARZ Spectrum Monitor	EZM	893787/013	July 24, 1998
ROHDE & SCHWARZ Artificial Mains Network	ESH3-Z5	839135/006	Aug. 1, 1998
EMCO-L.I.S.N.	3825/2	9204-1964	July 22, 1998
Shielded Room	Site 2	ADT-C02	N/A

Note: 1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per NAMA's document NIS81.

2. The calibration interval of the above test instruments is 12 months.  
And the calibrations are traceable to NML/ROC and NIST/USA.



## 3.2 LIMITS OF CONDUCTED AND RADIATED EMISSION

### LIMIT OF RADIATED EMISSION OF CISPR 22

FREQUENCY (MHz)	Class A (at 10m)	Class B (at 10m)
	dBuV/m	dBuV/m
30 - 230	40	30
230 - 1000	47	37

### LIMIT OF RADIATED EMISSION OF FCC PART 15, SUBPART B FOR FREQUENCY ABOVE 1000 MHz

FREQUENCY (MHz)	Class A (at 10m)		Class B (at 3m)	
	uV/m	dBuV/m	uV/m	dBuV/m
Above 1000	300	49.5	500	54.0

- Note: (1) The lower limit shall apply at the transition frequencies.  
 (2) Emission level (dBuV/m) = 20 log Emission level (uV/m).  
 (3) All emanation from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

### LIMIT OF CONDUCTED EMISSION OF CISPR 22

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

- Note: (1) The lower limit shall apply at the transition frequencies.  
 (2) The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50 MHz  
 (3) All emanation from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.



## 4. TEST RESULTS (EMISSION)

### 4.1 RADIO DISTURBANCE

Frequency Range : 0.15 - 30 MHz (Conducted Emission)  
30 - 2000 MHz (Radiated Emission)  
Input Voltage : 120 Vac, 60 Hz  
Temperature : 26 °C  
Humidity : 60 %  
Atmospheric Pressure : 997 mbar

TEST RESULT	Remarks
<b>PASS</b>	Minimum passing margin of conducted emission: -14.7 dB at 0.150 MHz Minimum passing margin of radiated emission: -2.4 dB at 169.33 MHz

Note: The highest emission levels were found at highest transceiving speed.

#### 4.1.1 EUT OPERATION CONDITION

1. Turn on the power of all equipments.
2. Server PC and Host PC run a test program to enable all functions.
3. Server PC transmitted messages to and received messages from the Host PC via the telephone cables connected to EUT.
4. Server PC sent "H" messages to monitor and monitor displayed "H" patterns on screen.
5. Server PC sent "H" messages to printer, then printer printed them on paper.
6. Server PC sent "H" messages to EUT.
7. Repeat steps 3-7.





## 4.2 TEST DATA OF CONDUCTED EMISSION

EUT: **MODEM**MODEL: **NW56**

6 dB Bandwidth: 10 kHz

TEST PERSONNEL:

Freq.	L Level		N Level		Limit		Margin [dB (μV)]			
[MHz]	[dB (μV)]		[dB (μV)]		[dB (μV)]		L		N	
	QP	AV	QP	AV	QP	AV	QP	AV	QP	AV
0.150	49.60	-	51.30	-	66.00	56.00	-16.4	-	-14.7	-
0.185	41.50	-	43.20	-	64.26	54.26	-22.8	-	-21.1	-
0.222	36.80	-	40.00	-	62.74	52.74	-25.9	-	-22.7	-
0.296	28.60	-	32.90	-	60.35	50.35	-31.8	-	-27.5	-
3.936	37.70	-	37.50	-	60.00	50.00	-22.3	-	-22.5	-
14.288	38.00	-	38.50	-	60.00	50.00	-22.0	-	-21.5	-

- Remarks:
1. "\*": Undetectable
  2. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  3. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  4. The emission level of other frequencies were very low against the limit.
  5. Margin value = Emission level - Limit value

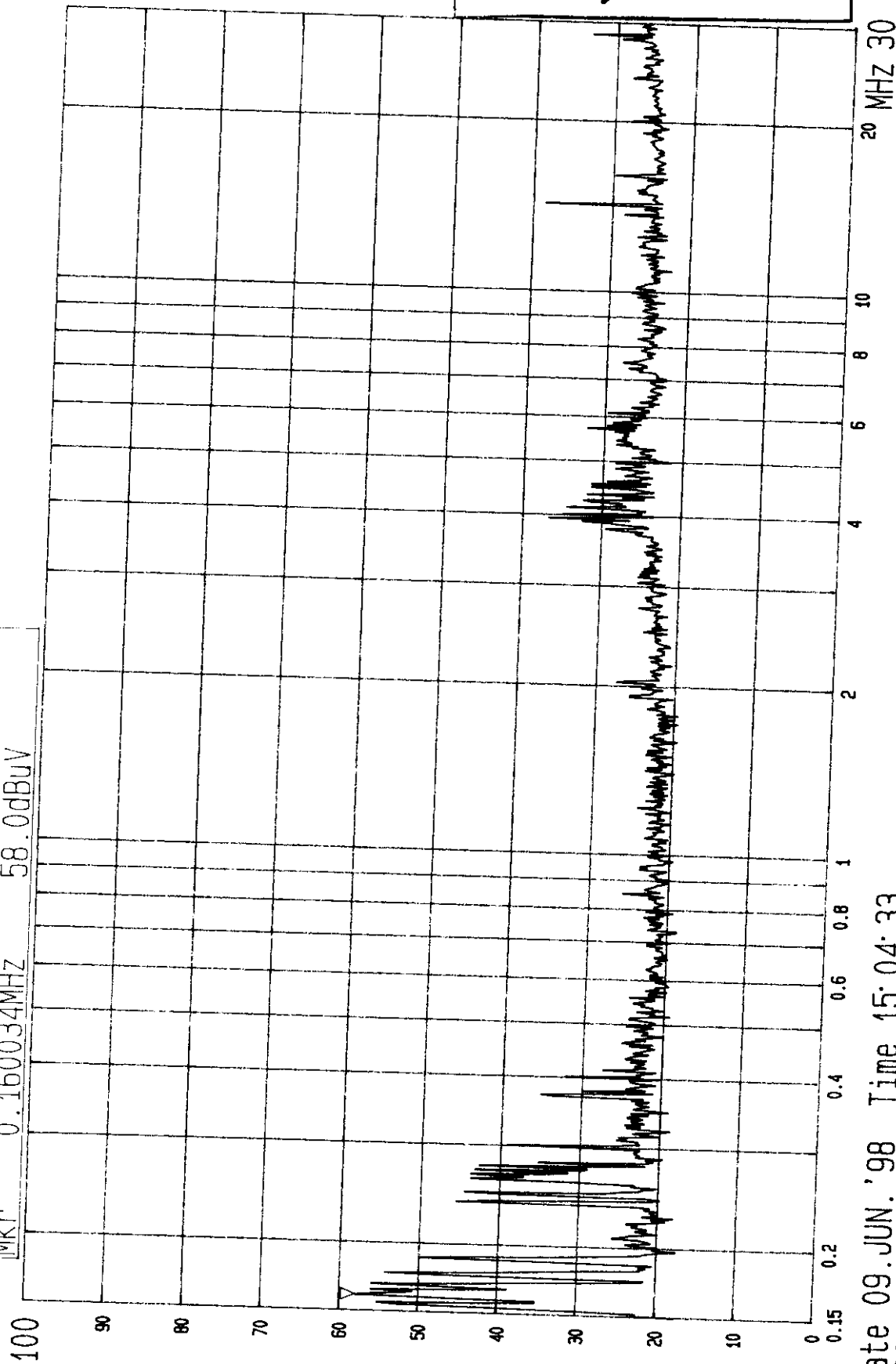
Report No. F87060407

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Tested by

dBuV

Mkr 0.160034MHz 58.0dBuV



(PEAK VALUE)

ADT CORP.  
LISN : L

--- Date 09.JUN.'98 Time 15:04:33  
CISPR 22 CLASS B  
MODEL : NW56

dBuV

Mkr 0.160034MHz 58.2dBuV

100

90

80

70

60

50

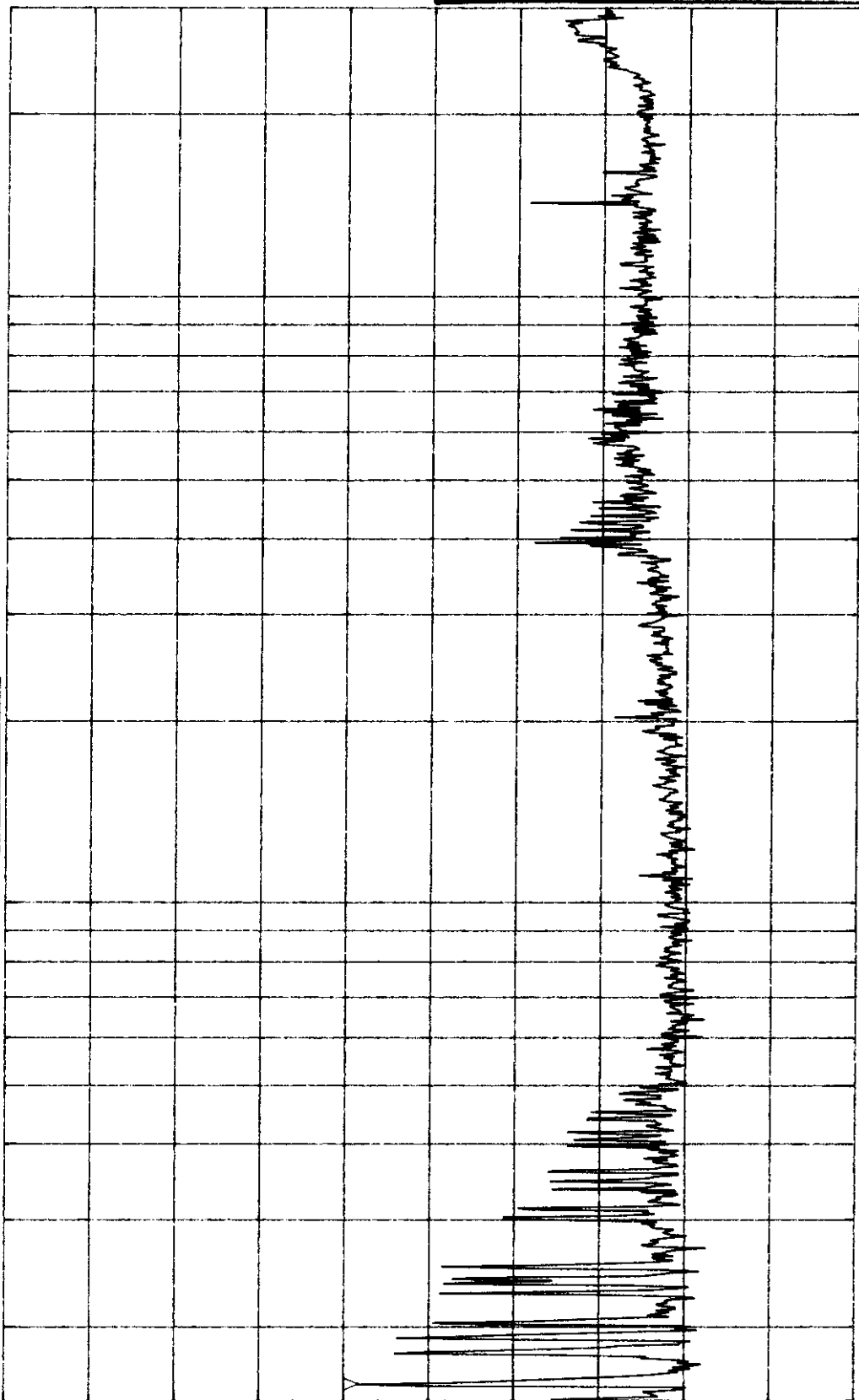
40

30

20

10

0



20 MHz 30

--- Date 09.JUN.'98 Time 15:06:13

CISPR 22 CLASS B

MODEL : NW56

(PEAK VALUE)

ADT CORP.  
LISN : N

Report No. F89060407

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Tested by



#### 4.2.1 TEST DATA OF RADIATED EMISSION

EUT: **MODEM**MODEL: **NW56**

ANTENNA: CHASE BILOG CBL6112

POLARITY: Horizontal

DETECTOR FUNCTION: Quasi-peak

6 dB BANDWIDTH: 120 kHz

FREQUENCY RANGE: 30-1000 MHz

MEASURED DISTANCE: 10 M

TEST PERSONNEL:

Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
84.66	9.3	9.6	18.9	30.0	-11.1
112.88	5.0	14.4	19.4	30.0	-10.6
141.11	12.6	14.0	26.6	30.0	-3.4
169.33	15.3	12.3	27.6	30.0	-2.4
197.56	7.5	13.1	20.6	30.0	-9.4
225.78	9.1	14.5	23.6	30.0	-6.4
254.00	15.5	16.3	31.8	37.0	-5.2

- REMARKS :
1. Emission level (dBuV/m) = Correction Factor(dB/m) + Meter Reading (dBuV).
  2. Correction Factor(dB/m) = Ant. Factor(dB/m)+Cable loss(dB)
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level - Limit value



## TEST DATA OF RADIATED EMISSION

EUT: **MODEM**MODEL: **NW56**

ANTENNA: CHASE BILOG CBL6112

POLARITY: Vertical

DETECTOR FUNCTION: Quasi-peak

6 dB BANDWIDTH: 120 kHz

FREQUENCY RANGE: 30-1000 MHz

MEASURED DISTANCE: 10 M

### TEST PERSONNEL:

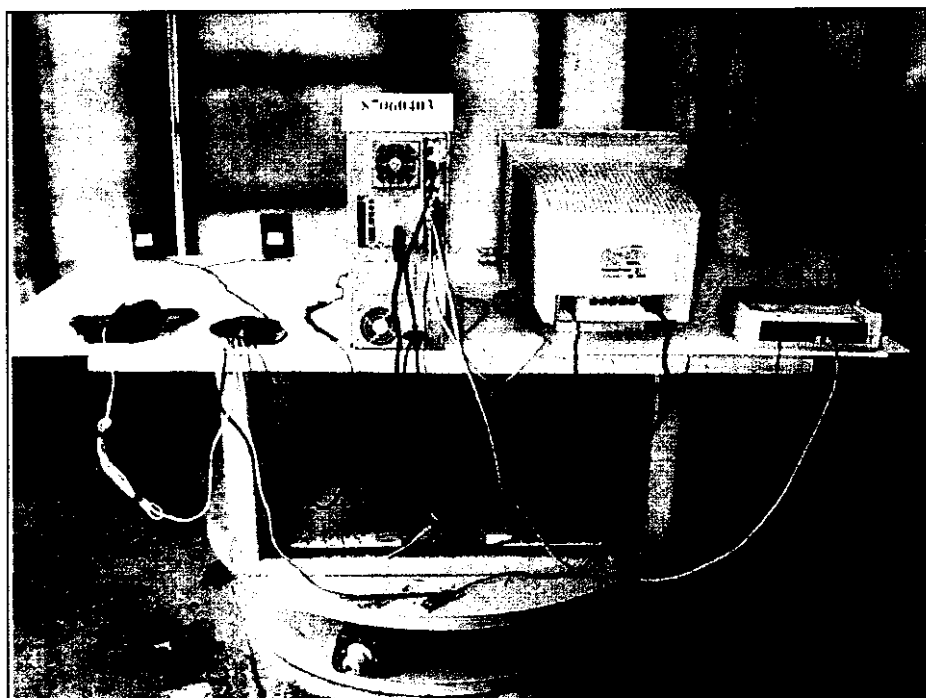
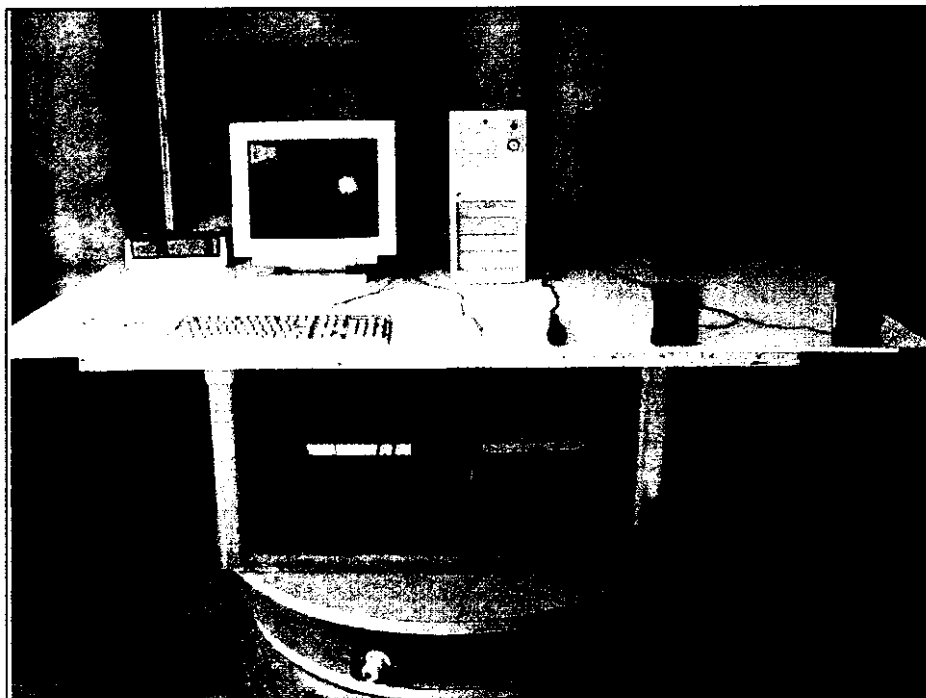
Frequency (MHz)	Correction Factor (dB/m)	Reading Data (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
84.66	9.9	9.6	19.5	30.0	-10.5
112.89	9.3	13.9	23.2	30.0	-6.8
141.10	12.1	15.0	27.1	30.0	-2.9
169.36	14.7	12.3	27.0	30.0	-3.0
197.56	8.0	13.5	21.5	30.0	-8.5
531.81	6.4	24.5	30.9	37.0	-6.1

- REMARKS :
1. Emission level (dBuV/m) = Correction Factor(dB/m) + Meter Reading (dBuV).
  2. Correction Factor(dB/m) = Ant. Factor(dB/m)+Cable loss(dB)
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level - Limit value



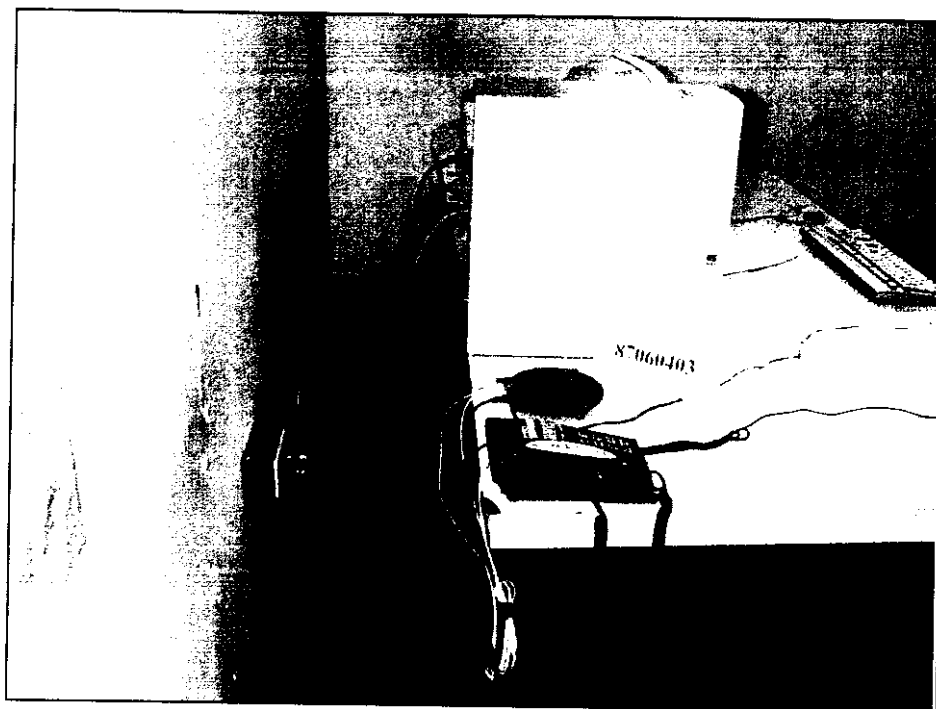
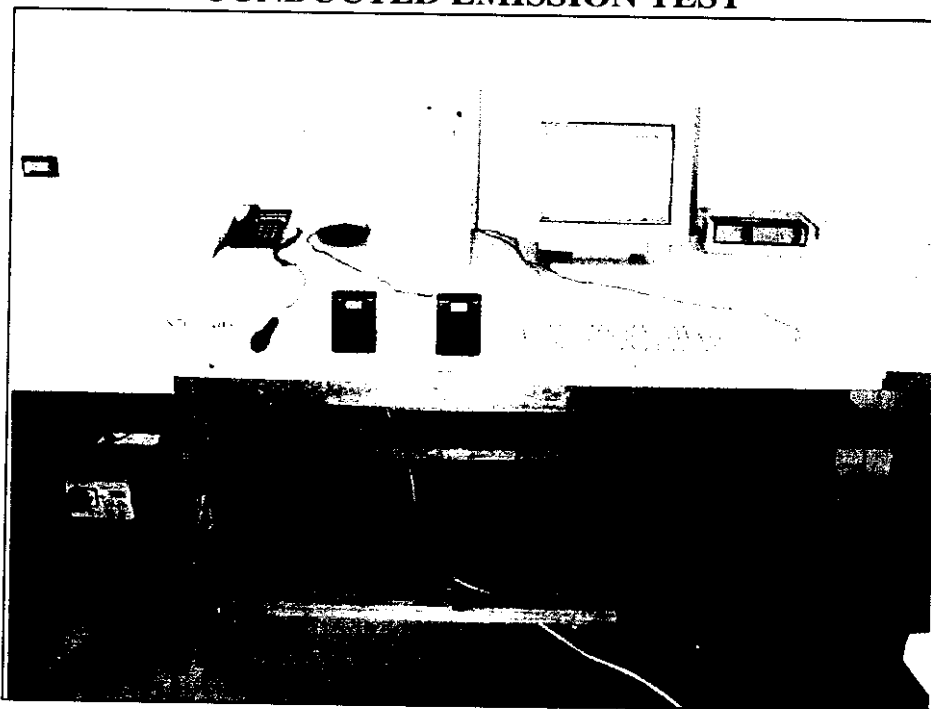
## 5. PHOTOGRAPHS OF THE TEST CONFIGURATION WITH MINIMUM MARGIN

### RADIATED EMISSION TEST





## CONDUCTED EMISSION TEST





## 6. ATTACHMENT I-TECHNICAL DESCRIPTION OF EUT

### SPECIFICATIONS:

- Data modem
  - ITU-T V.90 and K56flex
  - V.34 (33.6 kbps) , V.32 bis, V.32, V.22 bis, V22, V.23, and V.21; Bell 212A and 103
  - V.42 LAPM, MNP 2-4, and MNP 10 error correction
  - V.42 bis and MNP 5 data compression
  - MNP 10EC enhanced cellular performance
- Fax modem send and receive rates up to 14400 bps
  - V.17, V.29, V.27 ter, and V.21 channel 2
  - V.80 synchronuous access mode supports host-based communication protocols
- Voice/TAM mode
- AudioSpan (simultaneous audio/voice and data)
  - ITU-T V.61 modulation (4.8 kbps data plus audio)
  - Handset, headset, or half-duplex speakerphone
- Full-duplex speakerphone (FDSP) mode
  - Acoustic and line echo cancellation
  - Microphone gain and muting
  - Speaker volume control and muting
- Communication software compatible AT command sets
  - Data, fax class 1, fax class 2, voice / TAM
  - Speakerphone
- NVRAM directory and stored profiles
- Flash memory support
- Serial ITU-T V.24 (EIA/TIA-232-E)
- Supports Serial PnP interface per Plug and Play External COM Device Specification, Rev 1.00
- Caller ID support
- On line timer (4-digit 7-segment display)
  - Reset to 00:00 when off-hook
  - Start to count when carrier detected
  - Stop count when on-hook