



EMC

TEST REPORT

REPORT NO. : F87040103
MODEL NO. : T-336CX
DATE OF TEST : April 2, 1998

PREPARED FOR: TAINET COMMUNICATION SYSTEM CORP.

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Accredited Laboratory

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**1. CERTIFICATION**

Issue Date: April 17, 1998

Product : MODEM
Trade Name : TAINET
Model No. : T-336CX
Applicant : TAINET COMMUNICATION SYSTEM CORP.
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 April 10, 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 the applicable standards.

PREPARED BY: Jackey Cheng, DATE: 4/17/98
(Jackey Cheng)

TESTED BY: Sharon Hsiung, DATE: 4/17/98
(Sharon Hsiung)

APPROVED BY: Mike Su, DATE: 4/17/98
(Mike Su)

ADVANCE DATA TECHNOLOGY CORPORATION



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2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product	:	MODEM
Model No.	:	T-336CX
Power Supply Type	:	Linear (from power adapter)
Power Cord	:	Nonshielded
Data Cable	:	Shielded

Note: The EUT is a high performance synchronous and asynchronous, full duplex multi-standard modem designed for use on 2-wire dial circuits and 2/4 wire leased lines.

For more detailed features, please refer to ATTACHMENT 1 - TECHNICAL DESCRIPTION OF EUT or 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.	MONITOR	OPTIQUEST	4500DC	KZQ4500DC	Shielded Signal (1.2m) Nonshielded Power (1.8m)
3.	PRINTER	HP	2225C+	DSI6XU2225	Shielded Signal (1.2m) Nonshielded Power (1.9m)
4.	KEYBOARD	ACER	6311	CQ86311-K	Shielded Signal (1.5m)
5.	MOUSE	LOGITECH	M-M30	LTR5350780	Shielded Signal (2.8m)
6.	TELEPHONE	DAISHO	DS-05	N/A	Nonshielded signal (3.0m)
7.	MODEM	TAINET	T-336CX	N/A	Shielded Signal (7.5m) Nonshielded Power (1.8m)

Note: Support unit 7 was kept in the control room and was set in the loop back mode.

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 - 1000 MHz (Radiated Emission)
Input Voltage : 120 Vac, 60 Hz
Temperature : 18 °C
Humidity : 61 %
Atmospheric Pressure : 1060 mbar

TEST RESULT	Remarks
PASS	Minimum passing margin of conducted emission: -12.0 dB at 2.830 MHz Minimum passing margin of radiated emission: -2.0 dB at 471.85 MHz

4.1.1 EUT OPERATION CONDITION

1. Turn on the power of all equipments.
2. PC runs a test program to enable all functions of EUT.
3. PC sends messages to EUT and EUT sends messages to the modem in the control room. The modem in the control room is set in the loop back mode and thus it sends the messages back to PC.
4. PC sent "H" messages to monitor and monitor displayed "H" patterns on screen.
5. PC sent "H" messages to printer, then printer printed them on paper.
6. Repeat steps 3-6.



4.1.2 TEST DATA OF CONDUCTED EMISSION

EUT: MODEM

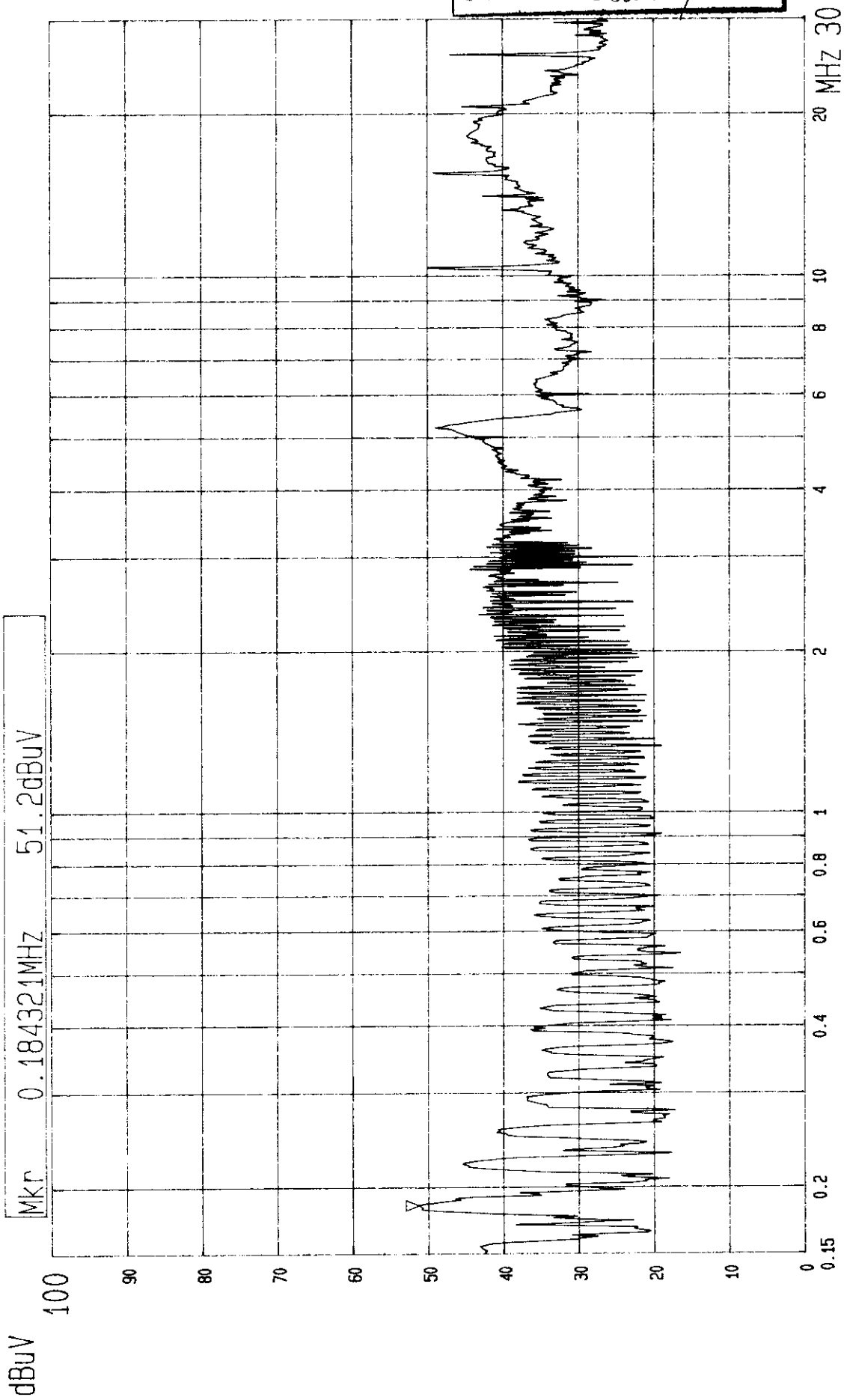
MODEL: T-336CX

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
0.174	38.50	-	41.50	-	64.79	54.79	-26.3	-	-23.3	-
0.391	36.50	-	39.00	-	58.03	48.03	-21.5	-	-19.0	-
2.830	44.00	-	43.00	-	56.00	46.00	-12.0	-	-13.0	-
5.201	33.30	-	33.50	-	60.00	50.00	-26.7	-	-26.5	-
10.345	35.40	-	36.00	-	60.00	50.00	-24.6	-	-24.0	-
15.518	36.20	-	35.50	-	60.00	50.00	-23.8	-	-24.5	-

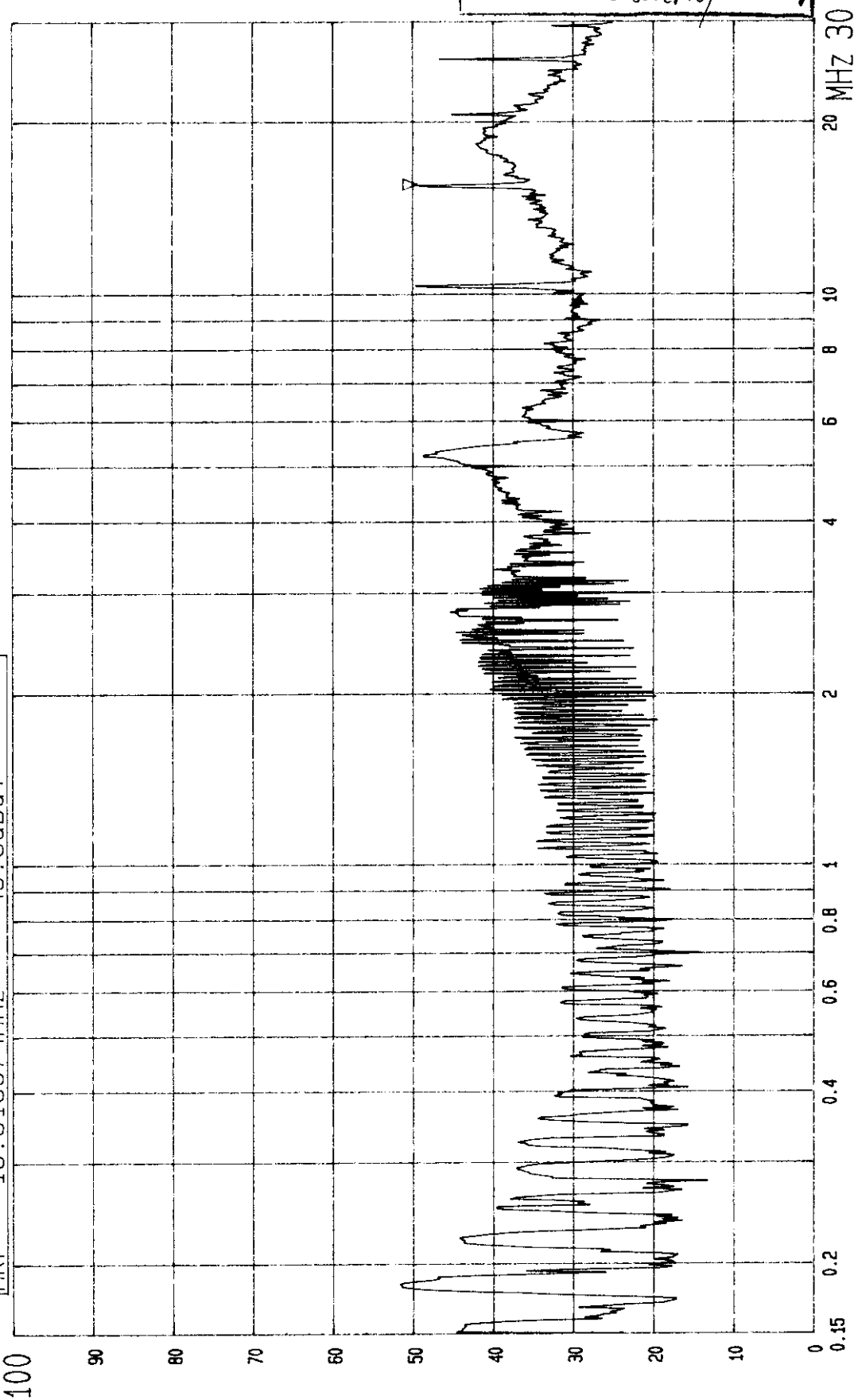
- Remarks:
1. "*": Undetectable
 2. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 3. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
 4. The emission level of other frequencies were very low against the limit.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



--- Date 02.APR.'98 Time 13:08:28
CISPR 22 CLASS B CONDUCTION TEST (PEAK VALUE) ADT CORP.
MODEM: T-336CX LISN: L

dBuV

Mkr 15.515674MHZ 49.5dBuV



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Tested by *Jackey Chang*

----- Date 02.APR.'98 Time 13:11:27
CISPR 22 CLASS B CONDUCTION TEST
MODEM: T-336CX

(PEAK VALUE)
ADT CORP.
LISN: N



4.1.3 TEST DATA OF RADIATED EMISSION

EUT: **MODEM**MODEL: **T-336CX**

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)
117.92	14.9	10.1	25.0	30.0	-5.0
176.92	12.2	13.3	25.5	30.0	-4.5
187.47	12.6	11.7	24.3	30.0	-5.7
191.49	12.8	12.3	25.1	30.0	-4.9
207.62	13.6	9.3	22.9	30.0	-7.1
219.71	14.2	11.9	26.1	30.0	-3.9
353.88	19.4	12.3	31.7	37.0	-5.3
442.31	22.2	11.8	34.0	37.0	-3.0
471.85	22.7	12.3	35.0	37.0	-2.0

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: **T-336CX**

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:

Jaikey Chang

Frequency (MHz)	Correction Factor (dB/m)	Reading Data dBuV	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
66.52	7.4	14.2	21.6	30.0	-8.4
117.96	15.0	12.0	27.0	30.0	-3.0
147.44	14.0	11.0	25.0	30.0	-5.0
176.95	12.5	14.0	26.5	30.0	-3.5
182.57	12.7	11.5	24.2	30.0	-5.8
191.50	13.2	12.3	25.5	30.0	-4.5
212.04	14.1	11.5	25.6	30.0	-4.4

- 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



6. ATTACHMENT 1 - TECHNICAL DESCRIPTION OF EUT

* Specifications.

The T-336Cx fully comply with ITU-T recommendations V.34, V.32bis, V.32, V.22bis, V.22, V.21, V.23, V.24, V.25, V.25bis, V.52, V.54, V.42, V.42bis, V.8, and BELL 212A/103 operation standards.

* Clock Tolerance

- (1) Synchronous : $\pm 0.01\%$
- (2) Asynchronous : Basic range + 1% to -2.5%
Extended overspeed range + 2.3% to -2.5%

* DET Speed

- (1) Synchronous : 33600 / 31200 / 28800 / 26400 / 24000 / 21600 / 19200 /
16800 / 14400 / 12000 / 9600 / 7200 / 4800 / 2400 / 1200 bps
- (2) Asynchronous : 115200 / 76800 / 57600 / 38400 / 33600 / 32000 / 31200 /
28800 / 26400 / 24000 / 21600 / 19200 / 16800 / 14400 /
12000 / 9600 / 7200 / 4800 / 3600 / 2400 / 1200 / 600 / 300
bps
with speed conversion.
- Total bit length : 8, 9, 10, 11 bits
- Parity bit : odd, even, none
- Stop bit : 1, 1.5, 2 bit

* Error Correction : MNP 4/ITU-T V.42

* Data Compression : MNP 5/ITU-T V.42bis

* Flow Control : Hardware CTS/RTS, CTS only
Software X-NO/X-OFF

* Dial Command : Extended AT and ITU-T V.25bis command set.

* G3 Fax Modulation and speed (option)

V.17	--14400, 12000, 9600, 7200 bps
V.29	--9600, 7200 bps
V.27 ter	--4800, 2400, bps
V.21 channel 2	--300bps