

APPLICATION FOR CERTIFICATION
On Behalf of
Velleman Components N. V.
PC Scope

Model : PCS64i

FCC ID : NLO-PCS64I

Prepared for : Velleman Components N. V.
Legen Heirweg 33, 9890 Gavere,
Belgium

Prepared By : Taiwan Tokin EMC Eng. Corp.
No. 53-11, Tin-Fu Tsun, Lin-Kou,
Taipei Hsien, Taiwan, R.O.C.

Tel : (02) 2609-9301~2, 2609-2133~5

File Number : ATM-G98233
Report Number : TTEMC-F98072
Date of Test : Apr. 24/28 , 1998
Date of Report : May. 07, 1998

TABLE OF CONTENTS

Description	Page
Test Report Certification	
1. GENERAL INFORMATION	1.-1
1.1. Description of Device (EUT)	1.-1
1.2. Details of Support Equipments	1.-2
1.3. Description of Test Facility	1.-3
2. POWERLINE CONDUCTED TEST	2.-1
2.1. Test Equipment	2.-1
2.2. Block Diagram of Test Setup	2.-1
2.3. Conducted Powerline Emission Limit (CLASS B)	2.-1
2.4. EUT Configuration on Measurement	2.-2
2.5. Operating Condition of EUT	2.-2
2.6. Test Procedure	2.-3
2.7. Line Conducted RF Voltage Measurement Results	2.-4
3. RADIATED EMISSION TEST	3.-1
3.1. Test Equipment	3.-1
3.2. Block Diagram of Test Setup	3.-1
3.3. Radiation Limit (CLASS B)	3.-2
3.4. EUT Configuration on Measurement	3.-2
3.5. Operating Condition of EUT	3.-2
3.6. Test Procedure	3.-2
3.7. Radiated Emission Noise Measurement Results	3.-3
4. DEVIATION TO TEST SPECIFICATIONS	4.-1
5. PHOTOGRAPHS	5.-1
5.1. Photos of Powerline Conducted Measurement	5.-1
5.2. Photos of Radiated Measurement at Open Field Test Site	5.-2

TEST REPORT CERTIFICATION

Applicant : Velleman Components N. V.
Manufacturer : Velleman Components N. V. Taiwan Branch
FCC ID : NLO-PCS64I
EUT Description : PC Scope
(A) MODEL NO. : PCS64i
(B) SERIAL NO. : N/A
(C) POWER SUPPLY : AC120V,60Hz

Measurement Procedure Used:

FCC RULES AND REGULATIONS PART 15 SUBPART B CLASS B OCTOBER 1996
AND FCC / ANSI C63.4-1992

The device described above was tested by TAIWAN TOKIN EMC ENG. CORP. to determine the maximum emission levels emanating from the device. The maximum emission levels were compared to the FCC Part 15B Class B limits both radiated and conducted emissions.

The measurement results are contained in this test report and TAIWAN TOKIN EMC ENG. CORP. is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliant with the FCC official limits. TAIWAN TOKIN EMC ENG. CORP. recommends that this data can be submitted for FCC certification purposes if a 6dB margin below FCC limits is obtained. This report applies to above tested sample only. This report shall not be reproduced in part without written approval of Taiwan Tokin EMC Eng. corp.

Date of Test : Apr. 24/28, 1998

Prepared by : Monica Chang
(MONICA CHANG)

Test Engineer : Allen Wang
(ALLEN WANG)

Approve & Authorized Signer : Jackie Deng 5/9/98
(JACKIE DENG)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

Description	:	PC Scope
Model Number	:	PCS64i
FCC ID	:	NLO-PCS64I
Applicant	:	Velleman Components N. V. Legen Heirweg 33, 9890 Gavere, Belgium
Manufacturer	:	Velleman Components N. V. Taiwan Branch 1F. No.256 Sec.1 Wen Hwa 2nd Road, Lin Ko Hsiang, Taipei, Taiwan, R.O.C.
Sampling Frequency	:	32MHz
Data Cable	:	Shielded, Detachable, 1.8m
Oscilloscope Probe Kit *2 (Optional)	:	M/N PROBE60S Cable : Shielded, Detachable, 1.2m
Power Adapter	:	Sincho Ele. Co. M/N 48-90850 Input : 120Vac, 60Hz Output : 9Vdc, 850mA Cable : Nonshielded, Undetachable, 1.8m Bonded a ferrite core
Date of Test	:	Apr. 24/28, 1998

1.2. Details of Support Equipments

1.2.1. PERSONAL COMPUTER

Model Number	:	810WW
Serial Number	:	TA434D0560
FCC ID	:	AO9-81XWW
Manufacturer	:	Digital
Switching Power Supply	:	Astec, M/N SA201-3450
Floppy Driver 3.5"	:	Mitsubishi, M/N MF355F-258MG,
Floppy Driver 5.25"	:	Teach, M/N FD-55GFR
Hard Disk Driver	:	Maxtor, M/N 7850AV
VGA Card	:	Dataexpert Corp. M/N DSV3365E, S/N E601604162 FCC ID LUT-DSV3365
Disk Ctrl Card	:	Within Mother Board
Serial/Parallel Card	:	Within Mother Board
Power Cord	:	Nonshielded, Detachable, 1.8m

1.2.2. MONITOR

Model Number	:	PM36A
Serial Number	:	W70205200A
FCC ID	:	LLW9ZB1564
Manufacturer	:	Funai Electric Company of Taiwan
Data Cable	:	Shielded, Undetachable, 1.2m
Power Cord	:	Nonshielded, Detachable, 1.5m

1.2.3. KEYBOARD

Model Number	:	RT101
Serial Number	:	A2541630
FCC ID	:	AQ6-MTN4XZ15
Manufacturer	:	DIGITAL
Data Cable	:	Shielded, Undetachable, 1.9m

1.2.4. MODEM #1

Model Number	:	1414
Serial Number	:	950110299
FCC ID	:	IFAXDM1414
Manufacturer	:	Aceex
Data Cable	:	Shielded, Detachable, 1.2m
Power Adapter	:	Amigo, Model AM-91000A Nonshielded, Undetachable, 1.8m

1.2.5. MODEM #2

Model Number	:	1414
Serial Number	:	950110300
FCC ID	:	IFAXDM1414
Manufacturer	:	Aceex
Data Cable	:	Shielded, Detachable, 1.2m
Power Adapter	:	Amigo, Model AM-91000A Nonshielded, Undetachable, 1.8m

1.2.6. MOUSE

Model Number	:	M-S34
Serial Number	:	LZA65201997
FCC ID	:	DZL210472
Manufacturer	:	Logitech
Data Cable	:	Nonshielded, Undetachable, 1.9m

1.2.7. POWER ADAPTER

Model Number	:	AM-91000A
Serial Number	:	N/A
Manufacturer	:	Amigo
Data Cable	:	Nonshielded, Undetachable, 1.8m

1.3. Description of Test Facility

Site Description (No. 2 Open Site)	:	Jul. 15, 1996 Re-file on Federal Communication Commission FCC Engineering Laboratory 7435 Oakland Mills Road Columbia, MD 21046, U.S.A.
Name of Firm	:	Taiwan Tokin EMC Eng. Corp.
Site Location	:	No. 53-11, Tin-Fu Tsun, Lin-Kou, Taipei Hsien, Taiwan, R.O.C.
NVLAP Lab Code	:	200077-0

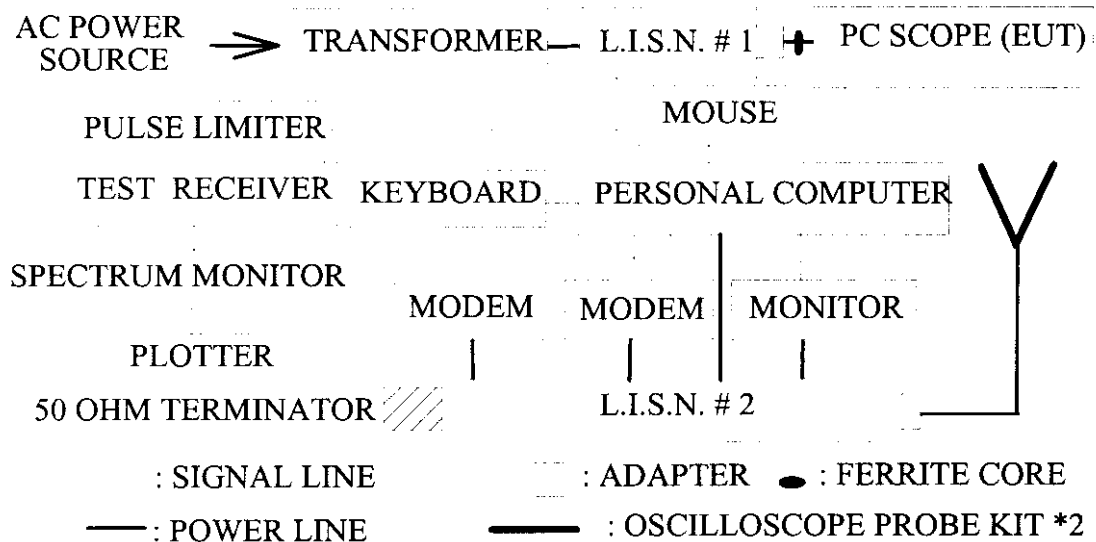
2. POWERLINE CONDUCTED TEST

2.1. Test Equipment

The following test equipments are used during the power line conducted tests :

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESH3	893044/015	Aug.01, 97'	1 Year
2.	L.I.S.N. # 1	Kyoritsu	KNW-407	8-855-9	Apr.14, 98'	1 Year
3.	L.I.S.N. # 2	Kyoritsu	KNW-407	8-881-13	Apr.14, 98'	1 Year

2.2. Block Diagram of Test Setup



2.3. Conducted Powerline Emission Limit (CLASS B)

Frequency	Maximum RF Line Voltage	
	uV	dBuV
0.45MHz ~ 30MHz	250	48

REMARKS : RF LINE VOLTAGE (dBuV) = 20 log RF LINE VOLTAGE (uV)

2.4. EUT Configuration on Measurement

The following equipments were installed on RF LINE VOLTAGE measurement to meet the Commission requirement and operating in a manner which tended to maximize its emission characteristics in a normal application.

2.4.1. PC Scope (EUT)

Model Number	:	PCS64i
Serial Number	:	N/A
FCC ID	:	NLO-PCS64I
Manufacturer	:	Velleman Components N. V. Taiwan Branch
Sampling Frequency	:	32MHz
Data Cable	:	Shielded, Detachable, 1.8m
Oscilloscope Probe Kit*2	:	Valleman, M/N PROBE60S
(Optional)	:	Cable : Shielded, Detachable, 1.2m
Power Adapter	:	Sincho Ele. CO., M/N 48-90850
		Input : 120Vac, 60Hz
		Output : 9Vdc, 850mA
		Cable : Nonshielded, Undetachable, 1.8m
		Bonded a ferrite core

2.4.2. Support Simulators : As in section 1.2

2.5. Operating Condition of EUT

2.5.1. Setup the EUT and simulator as shown on 2.2.

2.5.2. Turned on the power of all equipments.

2.5.3. The EUT measured the voltage of the adapter (Output : AC 9V) through the CH1 and CH2 of the EUT.

2.5.4. The monitor displayed reading and software.

2.5.5. The other peripheral devices were stand by during all testing.

2.6. Test Procedure

The EUT w/ a adapter was connected to the power mains through a line impedance stabilization network (L.I.S.N. #1) and the other peripheral devices power cord were connected to the power mains through a line impedance stabilization network (L.I.S.N. #2) This provided a 50 ohm coupling impedance for the measuring equipment.

(Please refer to the block diagram of the test setup and photographs.)

Both sides of A.C. line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions simulators of the interface cables should be manipulated according to FCC ANSI C63.4-1992 during conducted measurement.

The bandwidth of the field strength meter (R & S Test Receiver ESH3) was set at 10KHz.

The frequency range from 450KHz to 30MHz was checked.

All the test results are listed in section 2.7.

2.7. Line Conducted RF Voltage Measurement Results

The frequency range from 450KHz to 30 MHz was investigated.

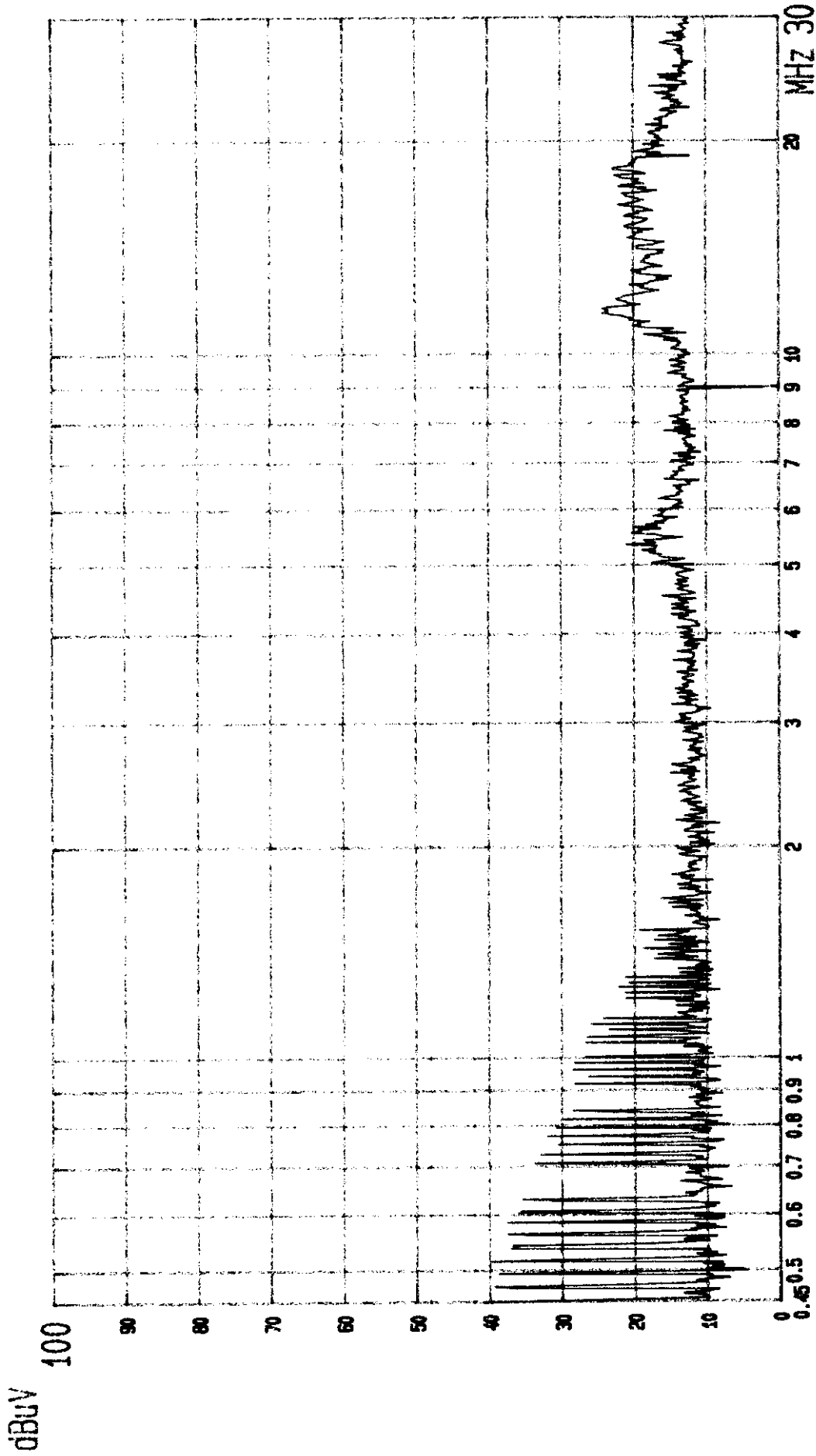
All emissions not report below are too low against the prescribed limits.

Date of Test : Apr. 28, 1998 Temperature : 25 °C

EUT : PC Scope Humidity : 78 %

Frequency (MHz)	Factor dB	Measurement (dBuV)		Reading (dBuV)		Limits (dBuV)	Margin (dBuV)	
		VA	VB	VA	VB		VA	VB
0.4592	0.2	*	28.2	*	28.4	48.0	*	19.6
0.4739	0.2	31.1	*	31.3	*	48.0	16.7	*
0.4873	0.2	*	27.4	*	27.6	48.0	*	20.4
0.6157	0.2	29.8	*	30	*	48.0	18	*
0.9852	0.2	20.2	*	20.4	*	48.0	27.6	*
1.1549	0.2	*	9.7	*	9.9	48.0	*	38.1
5.3577	0.3	15.3	*	15.6	*	48.0	32.4	*
5.6172	0.3	*	16.7	*	17	48.0	*	31
11.4189	0.6	8.7	*	9.3	*	48.0	38.7	*
11.4943	0.6	*	18.6	*	19.2	48.0	*	28.8
15.4642	0.8	*	5.7	*	6.5	48.0	*	41.5
18.2907	0.8	14.7	*	15.5	*	48.0	32.5	*

- Remark :
1. All readings are Quasi-Peak values.
 2. Factor = Insertion Loss + Cable Loss
 3. The worst emission was detected at 0.4739MHz with corrected signal level of 31.5dBuV (limit is 48dBuV) when the VA side of the EUT was connected to L.I.S.N.



--- Date 28.APR.'98 Time 21:05:13

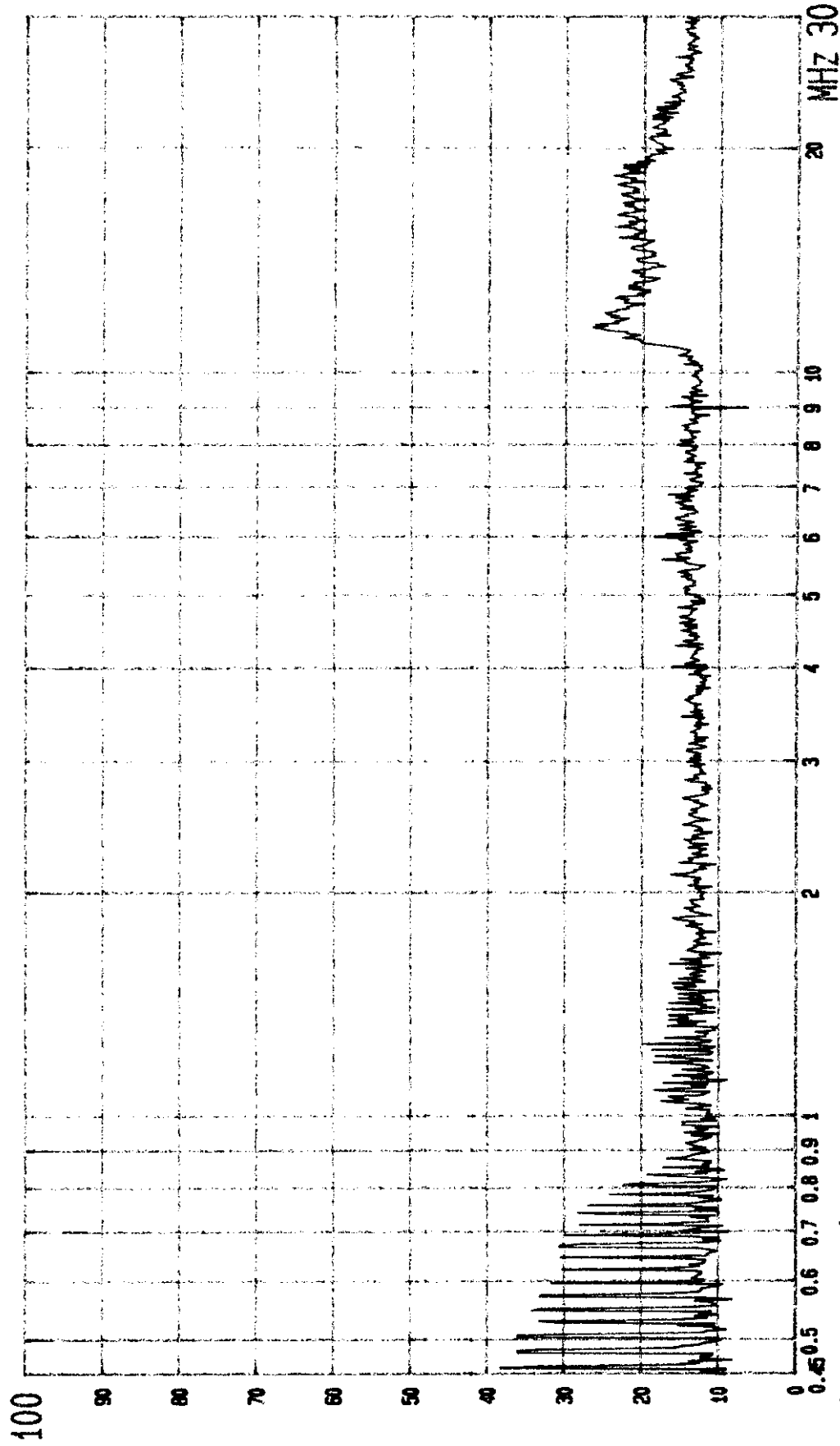
VELLEMAN EUT: PC SCOPE

LINE: VA

M/N: PCS 64I
(PEAK VALUE) TAIWAN TOKIN EMC.ENG.CORP.

PAGE: 002.

dBuV



--- Date 28.APR.'98 Time 20:03:20

VELLEMAN EUT: PC SCOPE

LINE: VB

M/N: PCS 64I
(PEAK VALUE) TAIWAN TOKIN EMC.ENG.CORP.

PAGE: 001.

3. RADIATED EMISSION TEST

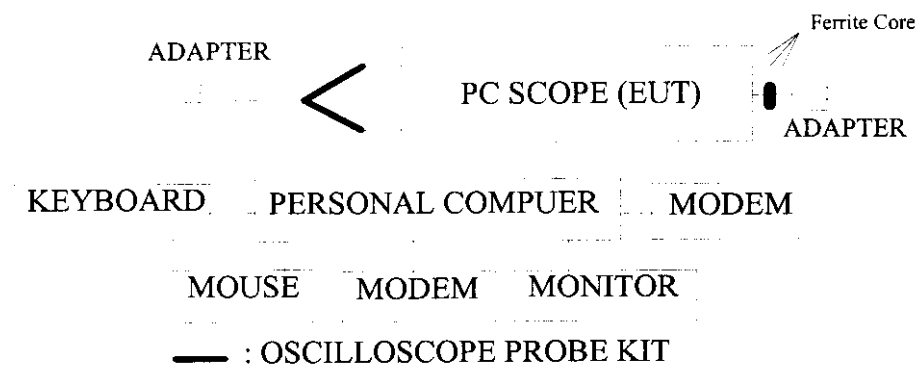
3.1. Test Equipment

The following test equipments are used during the radiated emission tests :

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde&Schwarz	ESVP	893202/001	Aug.04, 97'	1 Year
2.	Broadband Antenna	Chase	VBA6106A	1240	Jan. 14, 98'	1 Year
3.	Broadband Antenna	Schwarzbeck	UHALP 9108-A	0139	Jan. 14, 98'	1 Year

3.2. Block Diagram of Test Setup

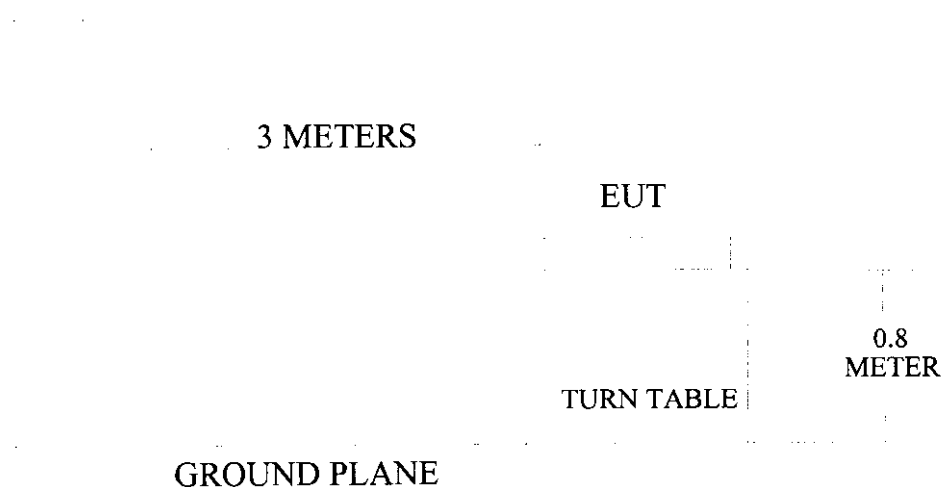
3.2.1. Block Diagram of connection between EUT and simulators



3.2.2. Open Field Test Site Setup Diagram

ANTENNA TOWER

ANTENNA ELEVATION VARIES FROM 1METER TO 4 METER



3.3. Radiation Limit (CLASS B)

FREQUENCY	DISTANCE	FIELD STRENGTHS LIMITS	
MHz	Meters	uV/M	dBuV/M
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0

Remark : (1) Emission level (dBuV/M) = 20 log Emission level (uV/M)
 (2) The tighter limit applies at the edge between two frequency bands.
 (3) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

3.4. EUT Configuration on Measurement

The configuration of EUT and its simulators are same as those used in conducted measurement. Please refer to 2.4.

3.5. Operating Condition of EUT

Same as conducted measurement which is listed in 2.5.

3.6. Test Procedure

The EUT and its simulators were placed on a turn table which was 0.8 meter above ground. The turn table rotated 360 degrees to determine the position of the maximum emission level. EUT was set 3 meters away from the receiving antenna which was mounted on a antenna tower. The antenna moved up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated biconical and log periodical antenna) and dipole antenna were used as receiving antenna. Both horizontal and vertical polarization of the antenna were set on measurement. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4-1992 on radiated measurement.

The bandwidth setting on the field strength meter (R&S TEST RECEIVER ESVP) was 120KHz.

The frequency range from 30MHz to 1000MHz was checked.

All the test results are listed in section 3.7.

3.7. Radiated Emission Noise Measurement Results

The frequency spectrum from 30 MHz to 1000 MHz was investigated. All the emissions not report below are too low against the FCC CLASS B limit..

Date of Test : Apr. 24, 1998 Temperature : 27 °C
 EUT : PC Scope Humidity : 65 %

Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading		Emission Level	
			Horizontal dBuV	Horizontal dBuV/m	Limits dBuV/m	Margin dBuV/m
96.016	17.02	2.67	13.80	33.49	43.50	10.01
104.002	17.91	2.78	11.50	32.19	43.50	11.31
128.001	19.91	3.16	9.30	32.37	43.50	11.13
144.001	20.78	3.44	7.70	31.92	43.50	11.58
160.001	21.25	3.64	5.40	30.29	43.50	13.21
176.001	21.69	3.78	7.40	32.87	43.50	10.63
192.002	21.97	3.95	4.20	30.12	43.50	13.38
208.001	22.20	4.11	5.70	32.01	43.50	11.49
224.001	22.38	4.28	6.90	33.56	46.00	12.44
240.007	22.56	4.49	3.10	30.15	46.00	15.85
288.002	25.50	4.95	8.50	38.95	46.00	7.05
320.002	13.63	5.36	19.00	37.99	46.00	8.01
336.002	14.12	5.55	14.30	33.97	46.00	12.03
352.002	14.79	5.67	16.90	37.36	46.00	8.64
368.002	15.54	5.83	12.60	33.97	46.00	12.03
* 384.002	16.92	5.94	19.30	42.16	46.00	3.84
400.002	17.02	6.08	15.40	38.50	46.00	7.50
432.002	16.81	6.43	14.40	37.64	46.00	8.36
539.999	18.78	7.70	4.80	31.28	46.00	14.72

- Remark :
1. All readings are Quasi-Peak values.
 2. The worst emission was detected at 384.002MHz with corrected signal level of 42.16dBuV/m (limit is 46.0dBuV/m) when the antenna was at horizontal polarization and was at 1.8m high and the turn table was at 195 ° .
 3. 0 ° was the table front facing the antenna. Degree is calculated from 0 ° clockwise facing the antenna.

Date of Test : Apr. 24, 1998 Temperature : 27 °CEUT : PC Scope Humidity : 65 %

Frequency MHz	Antenna	Cable	Meter Reading		Emission Level	
	Factor dB/m	Loss dB	Vertical dBuV	Vertical dBuV/m	Limits dBuV/m	Margin dBuV/m
96.022	17.89	2.67	10.40	30.96	43.50	12.54
112.001	17.55	2.94	8.20	28.69	43.50	14.81
128.001	18.99	3.16	7.10	29.25	43.50	14.25
144.001	19.26	3.44	8.80	31.50	43.50	12.00
160.001	21.46	3.64	3.30	28.40	43.50	15.10
176.001	22.16	3.78	4.00	29.94	43.50	13.56
208.001	22.41	4.11	2.30	28.82	43.50	14.68
224.001	22.69	4.28	6.70	33.67	46.00	12.33
240.001	23.44	4.49	7.50	35.43	46.00	10.57
256.001	24.13	4.64	5.10	33.87	46.00	12.13
288.002	24.96	4.95	7.40	37.31	46.00	8.69
320.002	14.33	5.36	15.80	35.49	46.00	10.51
352.002	14.92	5.67	13.90	34.49	46.00	11.51
384.002	15.68	5.94	16.30	37.92	46.00	8.08
416.002	16.02	6.20	13.30	35.52	46.00	10.48
448.003	16.60	6.65	10.90	34.15	46.00	11.85
464.003	16.66	6.91	11.20	34.77	46.00	11.23
* 480.000	17.23	6.95	14.50	38.68	46.00	7.32
496.003	18.07	7.08	11.10	36.25	46.00	9.75
512.003	19.04	7.21	11.09	37.34	46.00	8.66
528.003	19.30	7.42	10.50	37.22	46.00	8.78
560.003	19.06	7.69	3.91	30.66	46.00	15.34

- Remark :
1. All readings are Quasi-Peak values.
 2. The worst emission was detected at 480.000MHz with corrected signal level of 38.68dBuV/m (limit is 46dBuV/m) when the antenna was at vertical polarization and was at 1.3m high and the turn table was at 186 ° .
 3. 0 ° was the table front facing the antenna. Degree is calculated from 0 ° clockwise facing the antenna.

4. DEVIATION TO TEST SPECIFICATIONS

【 NONE 】