

**MATSUSHITA-KOTOBUKI
ELECTRONICS INDUSTRIES LTD.**

MATSUYAMA DIVISION

2131-1 Minamikata, Kawauchi-cho, Onsen-gun, Ehime-ken, 791-0395 Japan
PHONE +81 89 966 2111 FAX +81 89 966 2123

Page 1 of 19 pages

TEST REPORT

REPORT NUMBER : MKM00F-001

APPLICANT : Matsushita-Kotobuki
Electronics Industries, Ltd.

MODEL NUMBER : LK-RV624D

FCC ID : IUO9TB083CRS

Regulation : FCC Part15B Class B

Conducted Emission Test
Radiated Emission Test

Matsushita-Kotobuki Electronics Ind., Ltd.
Matsuyama Division

2131-1 Minamikata, Kawauchi-cho, Onsen-gun,
Ehime-ken, 791-0395 Japan
Tel.: +81 89 966 2111 Fax.: +81 89 966 5733

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SECTION 1. TEST CERTIFICATION**APPLICANT INFORMATION**

Company : Matsushita-Kotobuki Electronics Industries, Ltd.
Address : 8-1, Furujin-machi, Takamatsu-city, Kagawa-ken,
760-0025 Japan

GRANTEE INFORMATION

Company : Matsushita-Kotobuki Electronics Industries, Ltd.
Division / Section : Matsuyama Division Legal Affairs Sec.
Address : 2131-1 Minamikata, Kawauchi-cho, Onsen-gun,
Ehime-ken, 791-0395 Japan
Telephone number : +81 89 966 2111
Fax number : +81 89 966 5733
Contact person : Kenji Matsugi

DESCRIPTION OF TEST ITEM

Kind of equipment : DVD-ROM Drive
Trademark : Matsushita-Kotobuki
FCC ID : IUO9TB083CRS
Model number : LK-RV624D
Serial number : SA0111000012

TEST PERFORMED

FCC Registration No.	: 90793
Test started	: January 24, 2000
Test completed	: January 24, 2000
Purpose of test	: FCC Docket 87-389
Regulation	: FCC Part 15B Class B Unintentional Radiators
Test setup	: ANSI C63.4 -1992

Report file number : MKM00F-001

Report issue date : January 28, 2000

Test engineer : Shinji Yamauchi

S. Yamauchi

Report approved by : Hisayuki Honda

H. Honda

[Manager]

This equipment complies with above standard or regulation under the test condition or test configuration shown on this test report.

SECTION 2. EQUIPMENT UNDER TEST

The equipment under test (EUT) consists of the following equipment.
Indication in the following left side column corresponds to section 5.

Symbol	Item	Model No.	Serial No.	FCC ID	Manufacturer
A)	DVD-ROM Drive	LK-RV624D	SA0111000012	IUO9TB083CRS	Matsushita-Kotobuki Electronics Ind., Ltd.

Power ratings of EUT : +5V DC, 1.8A

2.1 Port(s) / Connector(s) :

IDE Bus Connector(50pin), Head Phone Jack(Stereo Mini Plug), DC IN Connector

2.2 Oscillator(s) / Crystal(s) :

Oscillator	Operating Frequency	Board name	Remarks
16.93 MHz	33.86 MHz	Main PCB	ODC, Servo DSP
420 MHz / typ.	420 MHz / typ.	Pick Up	High Frequency Module (Highest Frequency)

SECTION 3. SUPPORT EQUIPMENT USED

The EUT has been supported by the following equipment during these tests. Indication in the following left side column corresponds to section 5.

Symbol	Item	Model No.	Serial No.	FCC ID	Manufacturer
B)	Host Computer	2645	97-9244V	4U6JPN-32476-DT-E	IBM
C)	Head Phone	RP-HT28	None	N.A.	Panasonic
D)	Printer	3630A	3219A17397	BSD8533630A	HEWLETT PACKARD
E)	Modem	C202A	010489	BKM552C202A	EPSON

SECTION 4. CABLE(S) USED

The following cable(s) was used for testing. Indication number in the following left side column corresponds to section 5.

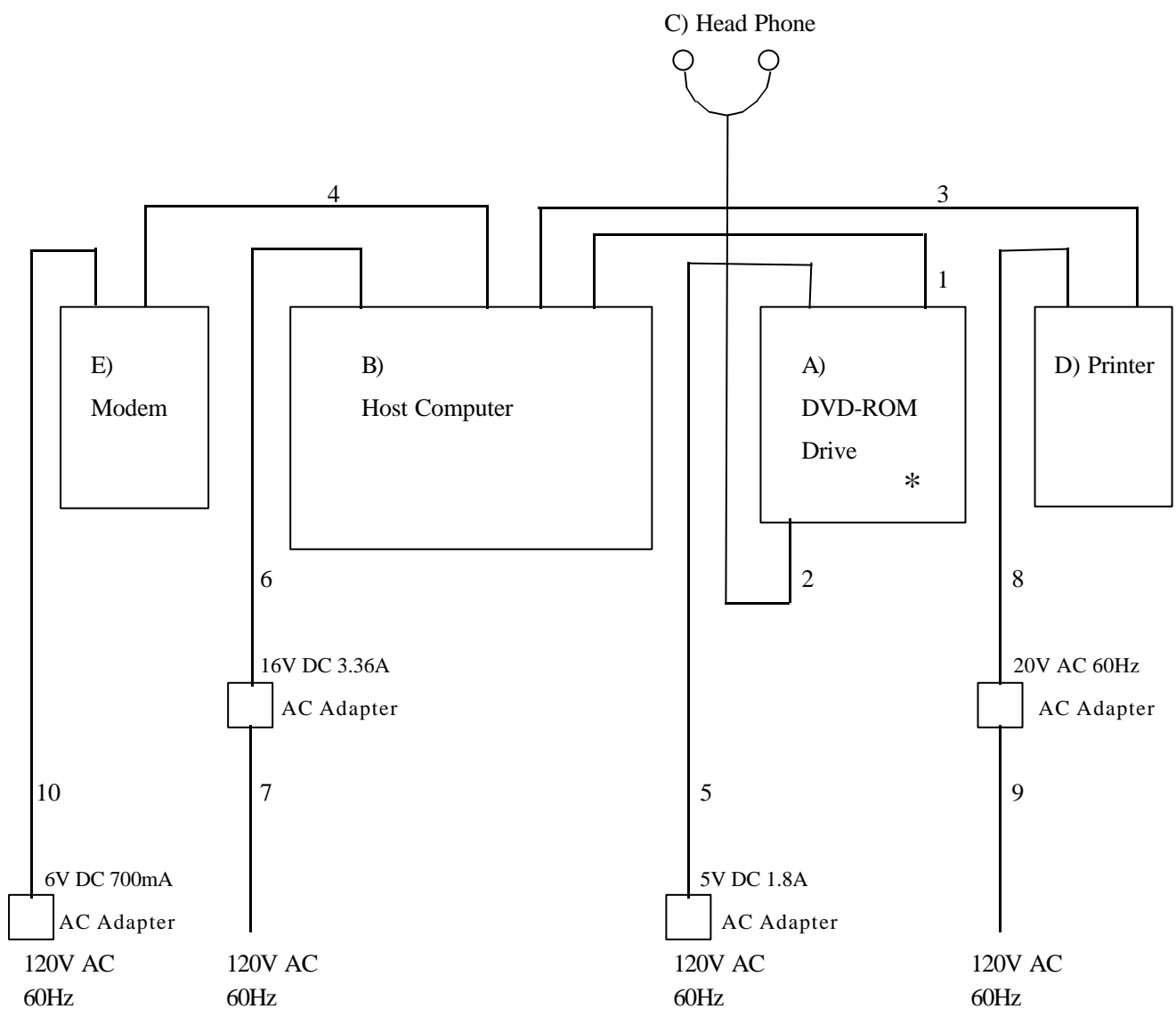
Number	Name	Length	Shield	From	To
1)	50Pin Flat cable	0.3 m	None	DVD-ROM Drive Plastic connector	Host Computer
2)	Head Phone cable	1.5 m	None	DVD-ROM Drive Plastic connector	Head Phone
3)	Parallel I/F cable	1.5 m	Yes	Host Computer Metal connector	Printer
4)	RS-232C I/F cable	1.1 m	Yes	Host Computer Metal connector	Modem
5)	Power cord for DVD-ROM Drive	2.0 m	None	DVD-ROM Drive	Power Source
6)	Power cord for Host Computer	1.8 m	None	Host Computer	AC Adapter
7)	Power cord for Host Computer	1.0 m	None	AC Adapter	Power Source
8)	Power cord for Printer	2.0 m	None	Printer	AC Adapter
9)	Power cord for Printer	2.0 m	None	AC Adapter	Power Source
10)	Power cord for Modem	1.9 m	None	Modem	Power Source

SECTION 5. CONSTRUCTION OF EQUIPMENT

The construction of EUT during testing is as follows.

System configuration

※: EUT



Symbol or numbers assigned to equipment or cables on this diagram are corresponded to the symbols or numbers assigned to equipment or cables on tables in Sections 2 to 4.

SECTION 6. OPERATING CONDITIONS

The EUT has been operated under the following conditions during the tests.

6.1 Operating condition

The tests have been carried out under Read mode.

6.2 Operation flow

Performed following operations continuously.

6.2.1 CD-ROM read mode

1. The EUT operates the normal speed.
2. The EUT play-backs the audio data.
3. The EUT reads the 'H' characters' data.
4. The Color Display displays 'H' characters.
5. The Printer prints 'H' characters' data.
6. The Modem sends 'H' characters' data.
7. The EUT changes the disc rotating speed to the 24 times.
8. The EUT reads 'H' characters' data.
9. The Color Display displays 'H' characters.
10. The Printer prints 'H' characters.
11. The Modem sends 'H' characters' data.

6.2.2 DVD-ROM read mode

1. The EUT operates the 6 times speed.
2. The EUT reads the 'H' characters' data.
3. The Color Display displays 'H' characters.
4. The Printer prints 'H' characters' data.
5. The Modem sends 'H' characters' data.

SECTION 7. TEST PROCEDURE(S)

Tests have been carried out with the test procedure(s) drawn up by our laboratory which is in accordance with the following test procedure(s).

Test item	Test procedure used	Scanned frequency range
Conducted Emission	ANSI C63.4-1992	0.45 - 30 MHz
Radiated Emission	ANSI C63.4-1992	30 - 2000 MHz

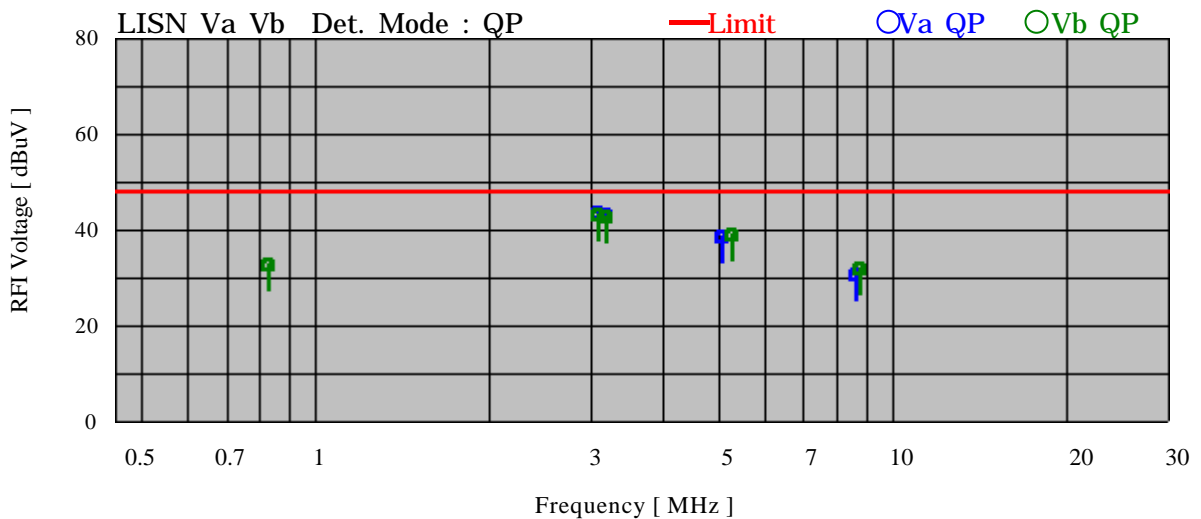
SECTION 8. EVALUATION OF TEST RESULTS

8.1 Conducted Emission Test

8.1.1 CD-ROM read mode

Product Name	:	DVD-ROM Drive
Model No.	:	LK-RV624D
Serial No.	:	SA0111000012
Power Supply	:	120V / 60Hz
Test Mode	:	CD-ROM Read mode
Temp / Humi / Pres	:	17 °C / 44% / 996hPa
Operator	:	S. Yamauchi

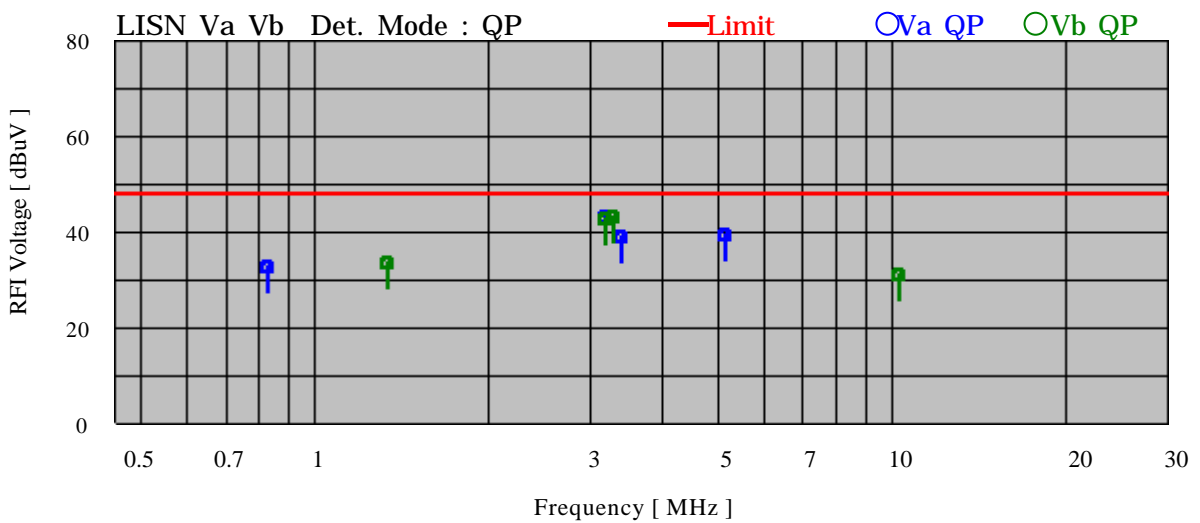
No	Freq. [MHz]	Reading Level		Factor [dB]	Emission Level		Limit [dBuV]	Margin [dB]
		Va [dBuV]	Vb		Va [MHz]	Vb		
1	0.828	---	32.4	0.1	---	32.5	48.0	15.5
2	3.102	43.3	---	0.2	43.5	---	48.0	4.5
3	3.104	---	42.9	0.2	---	43.1	48.0	4.9
4	3.203	42.7	---	0.2	42.9	---	48.0	5.1
5	3.207	---	42.5	0.2	---	42.7	48.0	5.3
6	5.069	38.1	---	0.3	38.4	---	48.0	9.6
7	5.276	---	38.4	0.3	---	38.7	48.0	9.3
8	8.691	30.1	---	0.4	30.5	---	48.0	17.5
9	8.797	---	31.4	0.4	---	31.8	48.0	16.2



8.1.2 DVD-ROM read mode

Product Name	: DVD-ROM Drive
Model No.	: LK-RV624D
Serial No.	: SA0111000012
Power Supply	: 120V / 60Hz
Test Mode	: DVD-ROM Read mode
Temp / Humi / Pres	: 17 °C / 44% / 996hPa
Operator	: S. Yamauchi

No	Freq. [MHz]	ReadingLevel		Factor [dB]	Emission Level		Limit [dBuV]	Margin [dB]
		Va [dBuV]	Vb [dBuV]		Va [MHz]	Vb [MHz]		
1	0.829	32.5	---	0.1	32.6	---	48.0	15.4
2	1.347	---	33.0	0.2	---	33.2	48.0	14.8
3	3.209	---	42.1	0.2	---	42.3	48.0	5.7
4	3.210	42.7	---	0.2	42.9	---	48.0	5.1
5	3.313	---	42.6	0.2	---	42.8	48.0	5.2
6	3.412	38.4	---	0.2	38.6	---	48.0	9.4
7	5.179	38.9	---	0.3	39.2	---	48.0	8.8
8	10.356	---	30.3	0.5	---	30.8	48.0	17.2



8.2 Radiated Emission Test

8.2.1 CD-ROM read mode

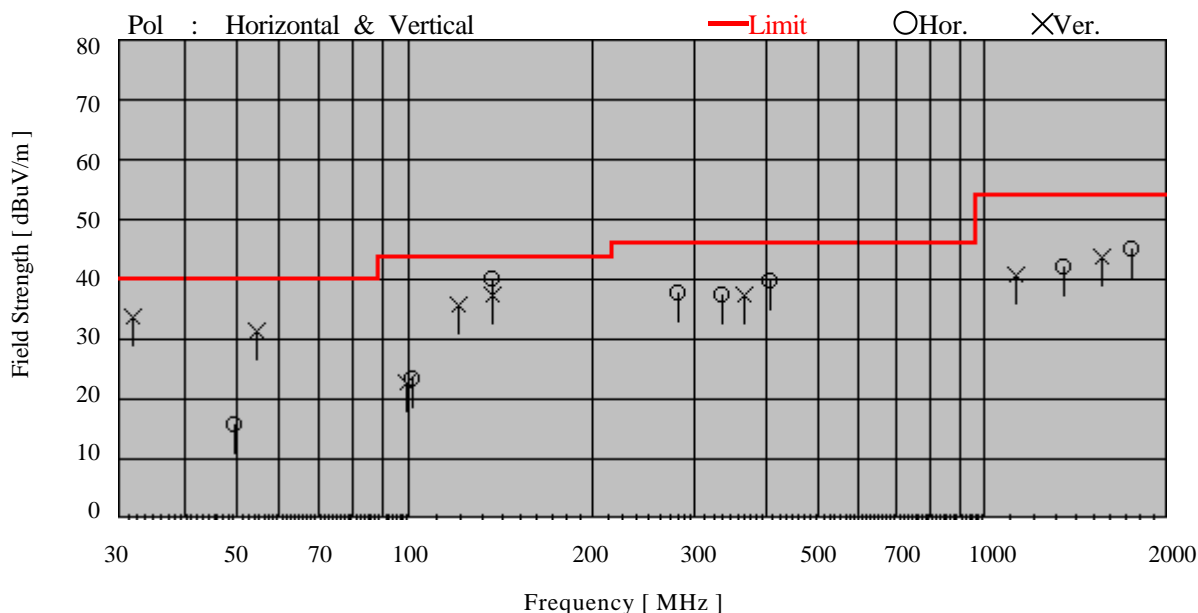
Product Name	: DVD-ROM Drive
Model No.	: LK-RV624D
Serial No.	: SA0111000012
Power Supply	: 120V / 60Hz
Test Mode	: CD-ROM Read mode
Temp / Humi / Pres	: 17 °C / 44% / 996hPa
Operator	: S. Yamauchi

[Quasi Peak mode]

No	Freq. [MHz]	Reading Level [dBuV]		Factor [dB]	Emission Level [dBuV/m]		Limit [dBuV/m]	Margin [dB]
		Hor.	Ver.		Hor.	Ver.		
1	32.198	---	14.0	19.6	---	33.6	40.0	6.4
2	49.609	2.3	---	13.4	15.7	---	40.0	24.3
3	54.775	---	19.7	11.7	---	31.4	40.0	8.6
4	99.252	---	10.3	12.3	---	22.6	43.5	20.9
5	101.606	10.7	---	12.7	23.4	---	43.5	20.1
6	118.711	---	20.7	14.9	---	35.6	43.5	7.9
7	135.670	---	21.4	16.0	---	37.4	43.5	6.1
8	135.674	23.9	---	16.0	39.9	---	43.5	3.6
9	271.356	16.7	---	21.0	37.7	---	46.0	8.3
10	330.984	17.8	---	19.5	37.3	---	46.0	8.7
11	365.358	---	18.0	19.4	---	37.4	46.0	8.6
12	407.023	19.5	---	20.4	39.9	---	46.0	6.1

[Peak mode]

No	Freq. [MHz]	Reading Level [dBuV]		Factor [dB]	Emission Level [dBuV/m]		Limit [dBuV/m]	Margin [dB]
		Hor.	Ver.		Hor.	Ver.		
1	1120	---	11.7	29.0	---	40.7	54.0	13.3
2	1343	11.7	---	30.0	41.7	---	54.0	12.3
3	1560	---	12.6	31.1	---	43.7	54.0	10.3
4	1733	12.5	---	32.2	44.7	---	54.0	9.3



8.2.2 DVD-ROM read mode

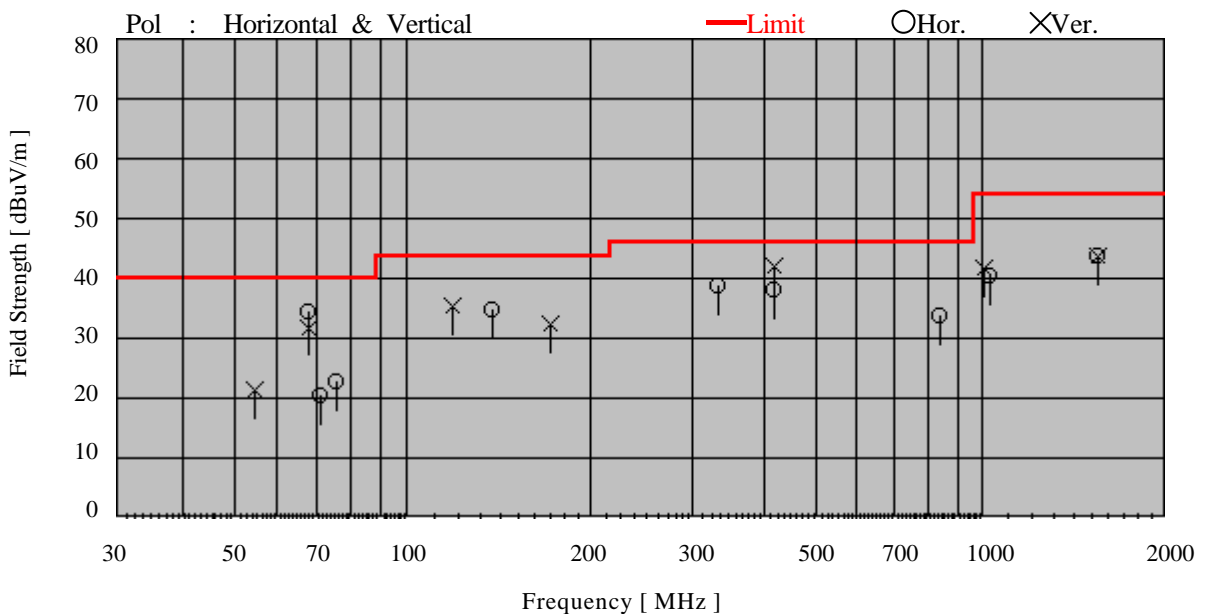
Product Name	: DVD-ROM Drive
Model No.	: LK-RV624D
Serial No.	: SA0111000012
Power Supply	: 120V / 60Hz
Test Mode	: DVD-ROM Read mode
Temp / Humi / Pres	: 17 °C / 44% / 996hPa
Operator	: S. Yamauchi

[Quasi Peak mode]

No	Freq. [MHz]	Reading Level [dBuV]		Factor [dB]	Emission Level [dBuV/m]		Limit [dBuV/m]	Margin [dB]
		Hor.	Ver.		Hor.	Ver.		
1	53.997	----	9.4	12.0	----	21.4	40.0	18.6
2	67.825	25.6	----	8.9	34.5	----	40.0	5.5
3	67.831	----	22.9	8.9	----	31.8	40.0	8.2
4	71.860	11.6	----	8.6	20.2	----	40.0	19.8
5	76.366	14.1	----	8.5	22.6	----	40.0	17.4
6	118.709	----	20.5	14.9	----	35.4	43.5	8.1
7	135.662	18.5	----	16.0	34.5	----	43.5	9.0
8	169.581	----	14.4	17.9	----	32.3	43.5	11.2
9	332.045	19.3	----	19.5	38.8	----	46.0	7.2
10	417.312	17.4	----	20.6	38.0	----	46.0	8.0
11	417.326	----	21.5	20.6	----	42.1	46.0	3.9
12	834.634	6.6	----	27.2	33.8	----	46.0	12.2

[Peak mode]

No	Freq. [MHz]	Reading Level [dBuV]		Factor [dB]	Emission Level [dBuV/m]		Limit [dBuV/m]	Margin [dB]
		Hor.	Ver.		Hor.	Ver.		
1	1025	----	12.3	28.4	----	40.7	54.0	13.3
2	1035	11.7	----	28.5	40.2	----	54.0	13.8
3	1530	12.5	----	30.9	43.4	----	54.0	10.6
4	1575	----	12.4	31.2	----	43.6	54.0	10.4



8.3 Conclusion

This test report clearly shows that the EUT is in compliance with the FCC Part 15B, Class B specification.

The minimum margins to the limits are as follows:

Conduction measurement	4.5 dB	at	3.102 MHz
Radiation measurement	3.6 dB	at	135.674 MHz

8.4 Sample Calculations

8.4.1 Conducted Emission

Example @ 3.102 MHz

$$\begin{array}{rcl}
 \text{Emission Level} & = & \text{Meter Reading} & 43.3 \text{ dBuV} \\
 & & + \text{ A.M.N. Factor} & + 0.2 \text{ dB} \\
 & & & \hline
 & & = & 43.5 \text{ dBuV}
 \end{array}$$

$$\begin{array}{rcl}
 \text{Margin} & = & \text{Limit} & 48.0 \text{ dBuV} \\
 & & - \text{ Emission Level} & - 43.5 \text{ dBuV} \\
 & & & \hline
 & & = & 4.5 \text{ dB}
 \end{array}$$

A.M.N. : Artificial Mains Network = Line Impedance Stabilization Network (LISN)

8.4.2 Radiated Emission

Example @ 135.674 MHz

$$\begin{array}{rcl}
 \text{Emission Level} & = & \text{Meter Reading} & 23.9 \text{ dBuV} \\
 & & + \text{ Factor} & + 16.0 \text{ dB} \\
 \text{(Factor = Antenna Factor + Cable Loss)} & & & \hline
 & & = & 39.9 \text{ dBuV/m}
 \end{array}$$

$$\begin{array}{rcl}
 \text{Margin} & = & \text{Limit} & 43.5 \text{ dBuV/m} \\
 & & - \text{ Emission Level} & - 39.9 \text{ dBuV/m} \\
 & & & \hline
 & & = & 3.6 \text{ dB}
 \end{array}$$

SECTION 9. PHOTOGRAPHS OF TEST SET-UP

Test setup in accordance with ANSI C63.4-1992

9.1 Conducted Emission Test

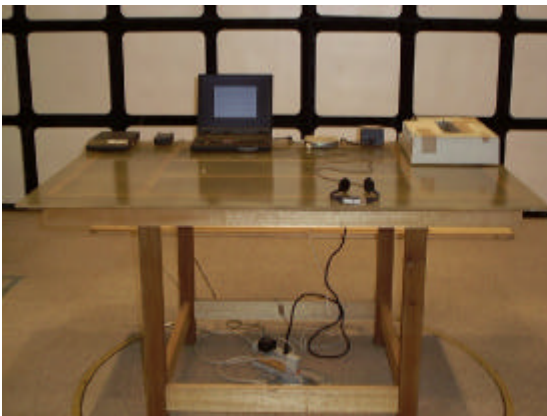


Front View



Rear view

9.2 Radiated Emission Test



Front View



Rear view

Note : Maintaining 10cm spacing between all the equipment cabinets.

SECTION 10. INSTRUMENTS USED FOR TEST

Instrument	Model No.	Serial No.	Manufacturer	Last cal.	Period
EMI Test Receiver	85462A	3520A00241	Hewlett Packard	10/99	1 Year
RF Filter Section	85460A	3448A00210	Hewlett Packard	10/99	1 Year
Biconical Antenna	BBA9106	None	Schwarzbeck	4/99	1 Year
Logperiodic Antenna	UHALP9107	1623	Schwarzbeck	4/99	1 Year
Double Ridged Antenna	3115	9702-5139	EMCO	7/99	1 Year
Artificial Mains Network(AMN) = Line Impedance Stabilization Network(LISN)					
	ESH3-Z5	840062/024	Schwarzbeck	6/99	1 Year
Artificial Mains Network(AMN) = Line Impedance Stabilization Network(LISN)					
	ESH3-Z5	840062/028	Schwarzbeck	7/99	1 Year

SECTION 11. PRECISION

Tolerances of the measuring instruments are shown on below.

- | | |
|--|----------------------|
| 1. Antenna factor | ± 2.0 dB |
| 2. Cable loss | ± 1.0 dB |
| 3. EMI test receiver | ± 2.0 dB |
| 4. Artificial Mains Network(AMN)
= Line Impedance Stabilization Network(LISN) | impedance $\pm 20\%$ |
| 5. Site Attenuation | ± 4.0 dB |

Repeatability and reproducibility about maximum emission setup are not specified herein.

SECTION 12. VALIDITY TEST REPORT

12.1 The test result of this report is effective for equipment under test itself and under the test configuration described on the report.

12.2 This test report does not assure that whether the test result taken in other testing laboratory is compatible or reproducible to the test result on this report or not.

12.3 Copying of this report without permission is prohibited.