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TEST REPORT

REPORT NUMBER : MKM98F-005

APPLICANT : Matsushita-Kotobuki
Electronics Industries, Ltd.

MODEL NUMBER : DVD5320E

FCC ID : IUO9TB071CRB

Regulation : FCC Part15B Class B

Conducted Emission Test
Radiated Emission Test

Matsushita-Kotobuki Electronics Ind., Ltd.
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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.
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Telephone number : +81 89 966 2111
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Contact person : Kenji Matsugi

DESCRIPTION OF TEST ITEM

Kind of equipment : DVD-ROM Drive
Trademark : Matsushita-Kotobuki
FCC ID : IUO9TB071CRB
Model number : DVD5320E
Serial number : SA8612000006

TEST PERFORMED

FCC File No.	:	31040/SIT
Test started	:	August 25, 1998
Test completed	:	August 25, 1998
Purpose of test	:	FCC Docket 87-389
Regulation	:	FCC Part 15B Class B Unintentional Radiators
Test setup	:	ANSI C63.4 -1992

Report file number : MKM98F-005

Report issue date : August 28, 1998

Test engineer : Shinji Yamauchi *S. Yamauchi*

Report approved by : Shigeru Suzuki *S. Suzuki*
[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 (E.U.T.) 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	DVD5320E	SA8612000006	IUO9TB071CRB	Matsushita-Kotobuki Electronics Ind., Ltd.

Power ratings of E.U.T. : +5V DC, 1.0A / +12V DC, 1.8A

2.1 Port(s) / Connector(s) :

IDE Bus Connector(40pin), Head Phone Jack(Stereo Mini Plug),
Audio Out Connector(4pin), Digital Audio Out Connector(2pin), DC IN Connector(4pin)

2.2 Oscillator(s) / Crystal(s) :

Oscillator	Operating Frequency	Board name	Remarks
16.93 MHz	33.86 MHz	Main PCB	ODC
16.93 MHz	16.93 MHz	Main PCB	CPU
8 MHz	8 MHz	Main PCB	IR Control
460.0 MHz/typ.		Pick Up	High Frequency Module (Highest Frequency)

SECTION 3. SUPPORT EQUIPMENT USED

The E.U.T. 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)	Interface Card	LMEP0345A	None	IUO9TB035CRI	Matsushita-Kotobuki
C)	Host Computer	4865	4115HAM60075	CNT75M8403F1	COMPAQ
D)	Head Phone	RP-HT28	None	N.A.	Panasonic
E)	Stereo Radio Cassette Recorder	RX-F5	None	ACJ9TBRX-F5	Panasonic
F)	Keyboard	Enhanced II Keyboard	9101421CB515	CNT47K109232	COMPAQ
G)	Color Display	CM1483MU	Y0J005103	ABL9679001CD	HITACHI
H)	Printer	3630A	3219A17397	BSD8533630A	HEWLETT PACKARD
I)	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)	40Pin Flat cable	0.4 m	None	DVD-ROM Drive Plastic connector	Host Computer
2)	Audio cable	0.4 m	None	DVD-ROM Drive Plastic connector	Interface Card
3)	Digital Audio cable	0.4 m	None	DVD-ROM Drive Plastic connector	Interface Card
4)	DC Power cable	0.4 m	None	DVD-ROM Drive	Host Computer
5)	Head Phone cable	1.5 m	None	DVD-ROM Drive Plastic connector	Head Phone
6)	Audio cable	1.0 m	None	Interface Card	Stereo Radio Cassette Recorder
7)	Audio cable	1.0 m	None	Interface Card	Stereo Radio Cassette Recorder
8)	Keyboard I/F cable	1.4 m	Yes	Host Computer Metal connector	Keyboard
9)	Video Signal I/F cable	1.9 m	Yes	Host Computer Metal connector	Color Display

None :

All cables are not attached ferrite core.

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
10)	Parallel I/F cable	1.5 m	Yes	Host Computer Metal connector	Printer
11)	RS-232C I/F cable	1.1 m	Yes	Host Computer Metal connector	Modem
12)	Power cord for Host Computer	2.0 m	Yes	Host Computer	Power Source
13)	Power cord for Stereo Radio Cassette Recorder	1.9 m	None	Stereo Radio Cassette Recorder	Power Source
14)	Power cord for Color Display	2.0 m	None	Color Display	Power Source
15)	Power cord for Printer	2.0 m	None	Printer	AC Adapter
16)	Power cord for Printer	2.0 m	None	AC Adapter	Power Source
17)	Power cord for Modem	1.9 m	None	Modem	Power Source

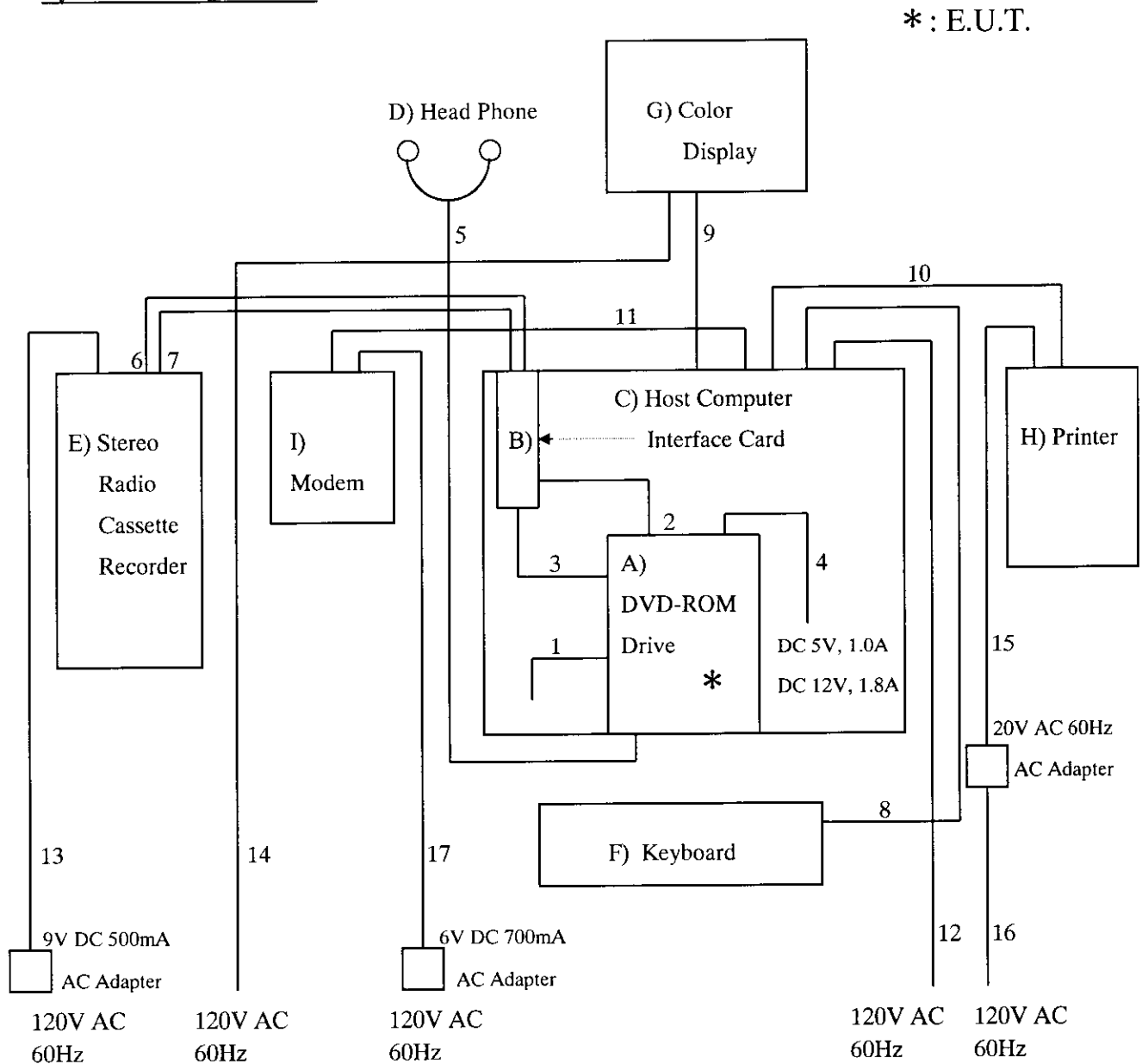
None :

All cables are not attached ferrite core.

SECTION 5. CONSTRUCTION OF EQUIPMENT

The construction of E.U.T. during testing is as follows.

System configuration



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 E.U.T. 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 E.U.T. operates the normal speed.
2. The E.U.T. play-backs the audio data.
3. The E.U.T. 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 E.U.T. changes the disc rotating speed to the 32 times.
8. The E.U.T. 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 E.U.T. operates the 5 times speed.
2. The E.U.T. 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

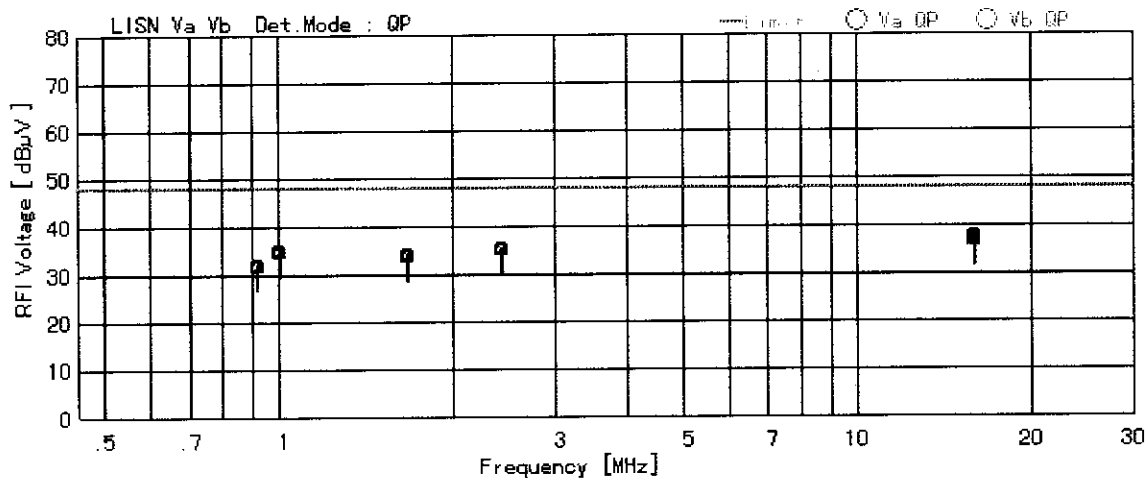
SECTION 8. EVALUATION OF TEST RESULTS

8.1 Conducted Emission Test

8.1.1 CD-ROM read mode

Model Name	DVD-ROM Drive
Model No.	DVD5320E
Serial No.	SA8612000006
Power Supply	120V / 60Hz
Test Mode	CD-ROM read mode
Temp/Humi/Pres	24°C / 68% / 1009 hPa
Operator	S.Yamauchi

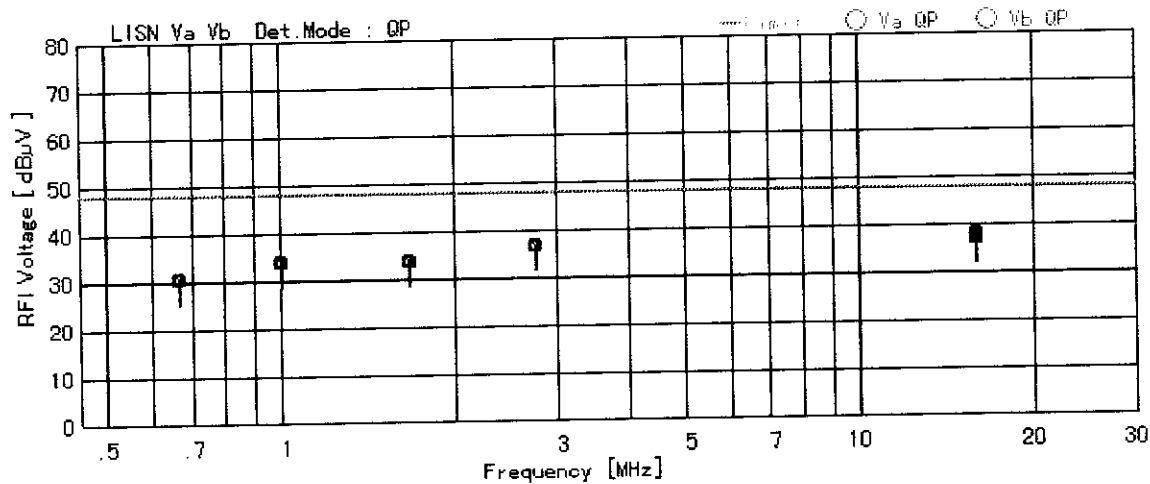
No	Freq. [MHz]	Reading Level [dBuV]		Factor [dB]	Emission Level [dBuV]		Limit [dBuV]	Margin [dB]
		Va	Vb		Va	Vb		
1	0.924	----	31.4	0.1	----	31.5	48.0	16.5
2	1.008	34.4	----	0.1	34.5	----	48.0	13.5
3	1.680	33.4	----	0.2	33.6	----	48.0	14.4
4	2.437	----	34.7	0.2	----	34.9	48.0	13.1
5	15.999	----	36.5	0.8	----	37.3	48.0	10.7
6	15.998	36.0	----	0.8	36.8	----	48.0	11.2



8.1.2 DVD-ROM read mode

Model Name	DVD-ROM Drive
Model No.	DVD5320E
Serial No.	SAB612000006
Power Supply	120V / 60Hz
Test Mode	DVD-ROM read mode
Temp/Humi/Pres	24°C / 68% / 1009hPa
Operator	S.Yamauchi

No	Freq. [MHz]	Reading Level		Factor [dB]	Emission Level		Limit [dBuV]	Margin [dB]
		Va [dBuV]	Vb		Va [dBuV]	Vb		
1	0.671	----	30.3	0.1	----	30.4	48.0	17.6
2	1.007	33.5	----	0.1	33.6	----	48.0	14.4
3	1.679	33.5	----	0.2	33.7	----	48.0	14.3
4	2.772	----	36.5	0.2	----	36.7	48.0	11.3
5	15.998	----	37.2	0.8	----	38.0	48.0	10.0
6	15.999	36.3	----	0.8	37.1	----	48.0	10.9



8.2 Radiated Emission Test

8.2.1 CD-ROM read mode

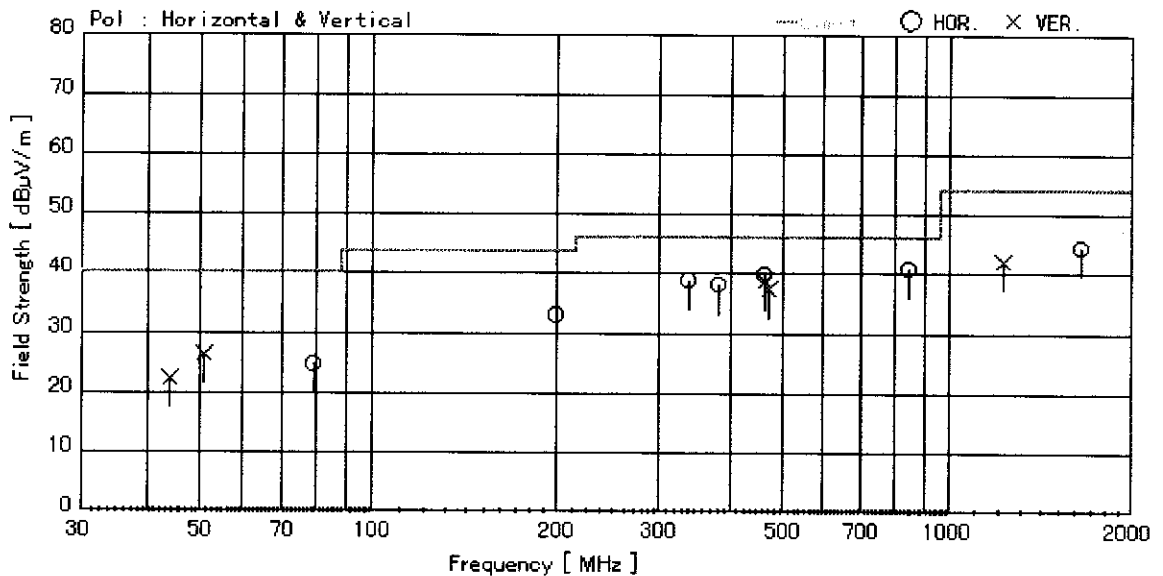
Model Name	DVD-ROM Drive
Model No.	DVD5320E
Serial No.	SA8612000006
Power Supply	120V / 60Hz
Test Mode	CD-ROM read mode
Temp/Humi/Pres	24°C / 68% / 1009hPa
Operator	S.Yamauchi

[Quasi Peak Mode]

No.	FREQ [MHz]	READING LEVEL		FACTOR [dB]	EMISSION LEVEL		LIMIT [dBuV/m]	MARGIN [dB]
		HOR. [dBuV]	VER. [dBuV]		HOR. [dBuV/m]	VER. [dBuV/m]		
1	44.188	----	6.9	15.3	----	22.2	40.0	17.8
2	50.717	----	13.2	13.2	----	26.4	40.0	13.6
3	79.983	16.3	----	8.3	24.6	----	40.0	15.4
4	199.991	14.5	----	18.7	33.2	----	43.5	10.3
5	338.214	19.5	----	19.0	38.5	----	46.0	7.5
6	383.321	18.3	----	19.8	38.1	----	46.0	7.9
7	466.662	18.4	----	21.2	39.6	----	46.0	6.4
8	466.668	----	17.3	21.2	----	38.5	46.0	7.5
9	473.504	----	16.0	21.2	----	37.2	46.0	8.8
10	849.998	12.8	----	28.0	40.8	----	46.0	5.2

[Peak Mode]

No.	FREQ [MHz]	READING LEVEL		FACTOR [dB]	EMISSION LEVEL		LIMIT [dBuV/m]	MARGIN [dB]
		HOR. [dBuV]	VER. [dBuV]		HOR. [dBuV/m]	VER. [dBuV/m]		
1	1223	----	12.4	29.5	----	41.9	54.0	12.1
2	1615	12.6	----	31.5	44.1	----	54.0	9.9



8.2.2 DVD-ROM read mode

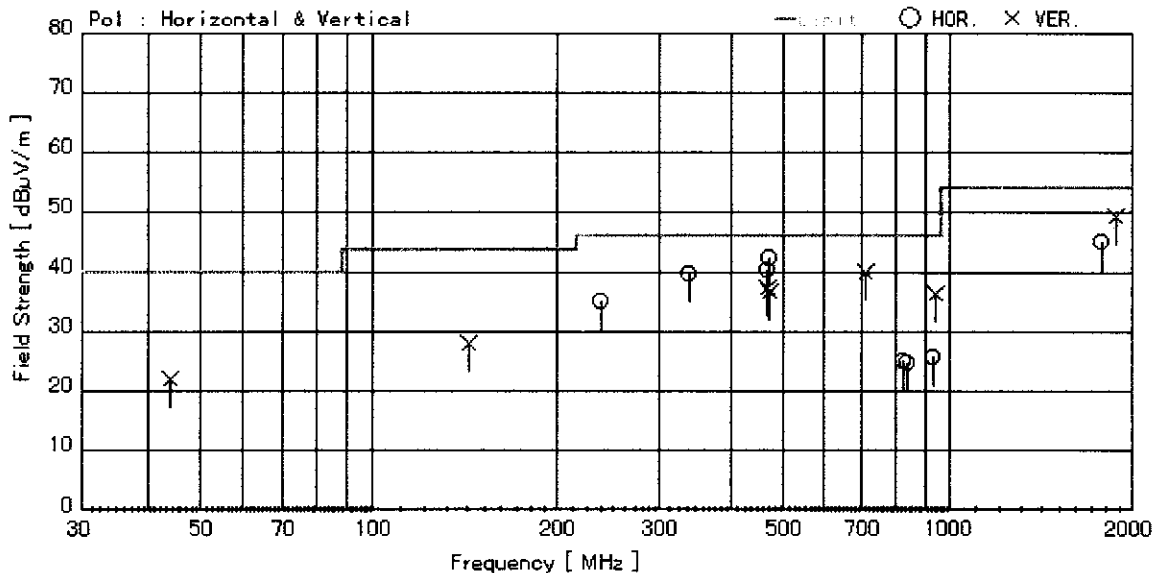
Model Name	DVD-ROM Drive
Model No.	DVD5320E
Serial No.	SA8612000006
Power Supply	120V / 60Hz
Test Mode	DVD-ROM read mode
Temp/Humi/Pres	24°C / 68% / 1009hPa
Operator	S.Yamauchi

[Quasi Peak Mode]

No.	FREQ [MHz]	READING LEVEL		FACTOR [dB]	EMISSION LEVEL		LIMIT [dBuV/m]	MARGIN [dB]
		HOR. [dBuV]	VER. [dBuV]		HOR. [dBuV/m]	VER. [dBuV/m]		
1	44.142	----	6.8	15.3	----	22.1	40.0	17.9
2	141.623	----	11.6	16.6	----	28.2	43.5	15.3
3	233.339	15.9	----	19.0	34.9	----	46.0	11.1
4	338.219	20.8	----	19.0	39.8	----	46.0	6.2
5	466.662	19.0	----	21.2	40.2	----	46.0	5.8
6	466.668	----	16.0	21.2	----	37.2	46.0	8.8
7	470.435	21.1	----	21.2	42.3	----	46.0	3.7
8	470.449	----	15.6	21.2	----	36.8	46.0	9.2
9	710.260	----	12.4	27.7	----	40.1	46.0	5.9
10	823.230	-3.4	----	28.3	24.9	----	46.0	21.1
11	834.772	-3.5	----	28.2	24.7	----	46.0	21.3
12	938.260	-3.4	----	29.0	25.6	----	46.0	20.4
13	940.893	----	7.3	29.1	----	36.4	46.0	9.6

[Peak Mode]

No.	FREQ [MHz]	READING LEVEL		FACTOR [dB]	EMISSION LEVEL		LIMIT [dBuV/m]	MARGIN [dB]
		HOR. [dBuV]	VER. [dBuV]		HOR. [dBuV/m]	VER. [dBuV/m]		
1	1780	12.8	----	32.4	45.2	----	54.0	8.8
2	1883	----	16.0	33.1	----	49.1	54.0	4.9



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	10.0 dB	at	15.998 MHz
Radiation measurement	3.7 dB	at	470.435 MHz

8.4 Sample Calculations

8.4.1 Conducted Emission

Example @ 15.998 MHz

$$\begin{array}{rcl}
 \text{Emission Level} & = & \text{Meter Reading} & 37.2 \text{ dBuV} \\
 & & + \text{ A.M.N. Factor} & + \underline{0.8 \text{ dB}} \\
 & & & = 38.0 \text{ dBuV}
 \end{array}$$

$$\begin{array}{rcl}
 \text{Margin} & = & \text{Limit} & 48.0 \text{ dBuV} \\
 & & - \text{ Emission Level} & - \underline{38.0 \text{ dBuV}} \\
 & & & = 10.0 \text{ dB}
 \end{array}$$

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

8.4.2 Radiated Emission

Example @ 470.435 MHz

$$\begin{array}{rcl}
 \text{Emission Level} & = & \text{Meter Reading} & 21.1 \text{ dBuV} \\
 & & + \text{ Factor} & + 21.2 \text{ dB} \\
 \text{(Factor = Antenna Factor + Cable Loss)} & & & \underline{\hspace{2cm}} \\
 & & & = 42.3 \text{ dBuV/m}
 \end{array}$$

$$\begin{array}{rcl}
 \text{Margin} & = & \text{Limit} & 46.0 \text{ dBuV/m} \\
 & & - \text{ Emission Level} & - \underline{42.3 \text{ dBuV/m}} \\
 & & & = 3.7 \text{ dB}
 \end{array}$$

SECTION 10. INSTRUMENTS USED FOR TEST

Instrument	Model No.	Serial No.	Manufacturer	Last cal.	Period
EMI Test Receiver	85462A	3520A00241	Hewlett Packard	8/97	1 Year
RF Filter Section	85460A	3448A00210	Hewlett Packard	8/97	1 Year
Biconical Antenna	BBA9106	None	Schwarzbeck	10/97	1 Year
Logperiodic Antenna	UHALP9107	1622	Schwarzbeck	10/97	1 Year
Double Ridged Antenna	3115	9702-5139	EMCO	7/98	1 Year
Artificial Mains Network(AMN) = Line Impedance Stabilization Network(LISN)	ESH3-Z5	840062/024	Schwarzbeck	6/98	1 Year
Artificial Mains Network(AMN) = Line Impedance Stabilization Network(LISN)	ESH3-Z5	840062/028	Schwarzbeck	7/98	1 Year

SECTION 11. PRECISION

Tolerance 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.