

**MATSUSHITA-KOTOBUKI
ELECTRONICS INDUSTRIES LTD.**

MATSUYAMA DIVISION

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Page 1 of 19 pages

TEST REPORT

REPORT NUMBER : MKM00F-004

APPLICANT : Matsushita-Kotobuki
Electronics Industries, Ltd.

MODEL NUMBER : SW-9501-S

FCC ID : IUO9TB085CRS

Regulation : FCC Part15B Class B

Conducted Emission Test
Radiated Emission Test

Matsushita-Kotobuki Electronics Ind., Ltd.
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TABLE OF CONTENTS

	Page
SECTION 1. <u>TEST CERTIFICATION</u>	3
SECTION 2. <u>EQUIPMENT UNDER TEST</u>	5
SECTION 3. <u>SUPPORT EQUIPMENT USED</u>	6
SECTION 4. <u>CABLE(S) USED</u>	7
SECTION 5. <u>CONSTRUCTION OF EQUIPMENT</u>	8
SECTION 6. <u>OPERATING CONDITIONS</u>	9
SECTION 7. <u>TEST PROCEDURE(S)</u>	10
SECTION 8. <u>EVALUATION OF TEST RESULTS</u>	11
SECTION 9. <u>PHOTOGRAPHS OF TEST SET-UP</u>	17
SECTION 10. <u>INSTRUMENTS USED FOR TEST</u>	18
SECTION 11. <u>PRECISION</u>	19
SECTION 12. <u>VALIDITY OF TEST REPORT</u>	19

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.
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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-R Drive
Trademark : Matsushita-Kotobuki
FCC ID : IUO9TB085CRS
Model number : SW-9501-S
Serial number : SX0313000008

TEST PERFORMED

FCC Registration No.	: 90793
Test started	: March 30, 2000
Test completed	: March 30, 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-004

Report issue date : March 31, 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-R Drive	SW-9501-S	SX0313000008	IUO9TB085CRS	Matsushita-Kotobuki Electronics Ind., Ltd.

Power ratings of EUT : AC 100-240V, 50/60Hz, 0.34-0.17A

2.1 Port(s) / Connector(s) :

Port name	Connector type	Connector pin	Remarks
SCSI	Half pitch	50 pin	
SCSI	Half pitch	50 pin	

2.2 Oscillator(s) / Crystal(s) :

Oscillator	Operating Frequency	Board name	Remarks
16.00 MHz	16.00 MHz	Main PCB	CPU2
26.16 MHz	26.16 MHz	Main PCB	ODC
16.93 MHz	16.93 MHz	Main PCB	ODC
400 MHz / typ.	400 MHz / typ.	Optical 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	OptiPlex GXa DCS	SPHWX	Declaration of Conformity	DELL
C)	CD-ROM Drive	3509-707	23-ADGN1	IUO9TB029CRS	IBM
D)	Color Display	XC-1429C	009133290	BGB9J5XC-1429C	MITSUBISHI
E)	Modem	C202A	010489	BKM552C202A	EPSON
F)	Printer	3630A	3219A17397	BSD8533630A	HEWLETT PACKARD
G)	Keyboard	SK-1000REW	M970911905	GYUR36SK	DELL
H)	AC Adapter	H00CAA	019592	N.A.	EPSON
I)	AC Adapter	3301D	91KZ41	N.A.	AT&T

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	Connector
1)	SCSI cable	1.0 m	Yes	Metal
2)	SCSI cable	0.9 m	Yes	Metal
3)	RS-232C cable	1.2 m	Yes	Metal
4)	Centronics cable	1.5 m	Yes	Metal
5)	Video cable	1.4 m	Yes	Metal
6)	Keyboard cable	1.9 m	Yes	Metal
7)	Power cord for EUT	1.8 m	None	
8)	Power cord for Computer	1.8 m	None	
9)	Power cord for CD-ROM Drive	1.8 m	None	
10)	Power cord for Color Display	1.5 m	None	
11)	Power cord for Modem	1.9 m	None	
12)	Power cord for Printer	2.0 m	None	
13)	Power cord for Printer	2.0 m	None	

None :

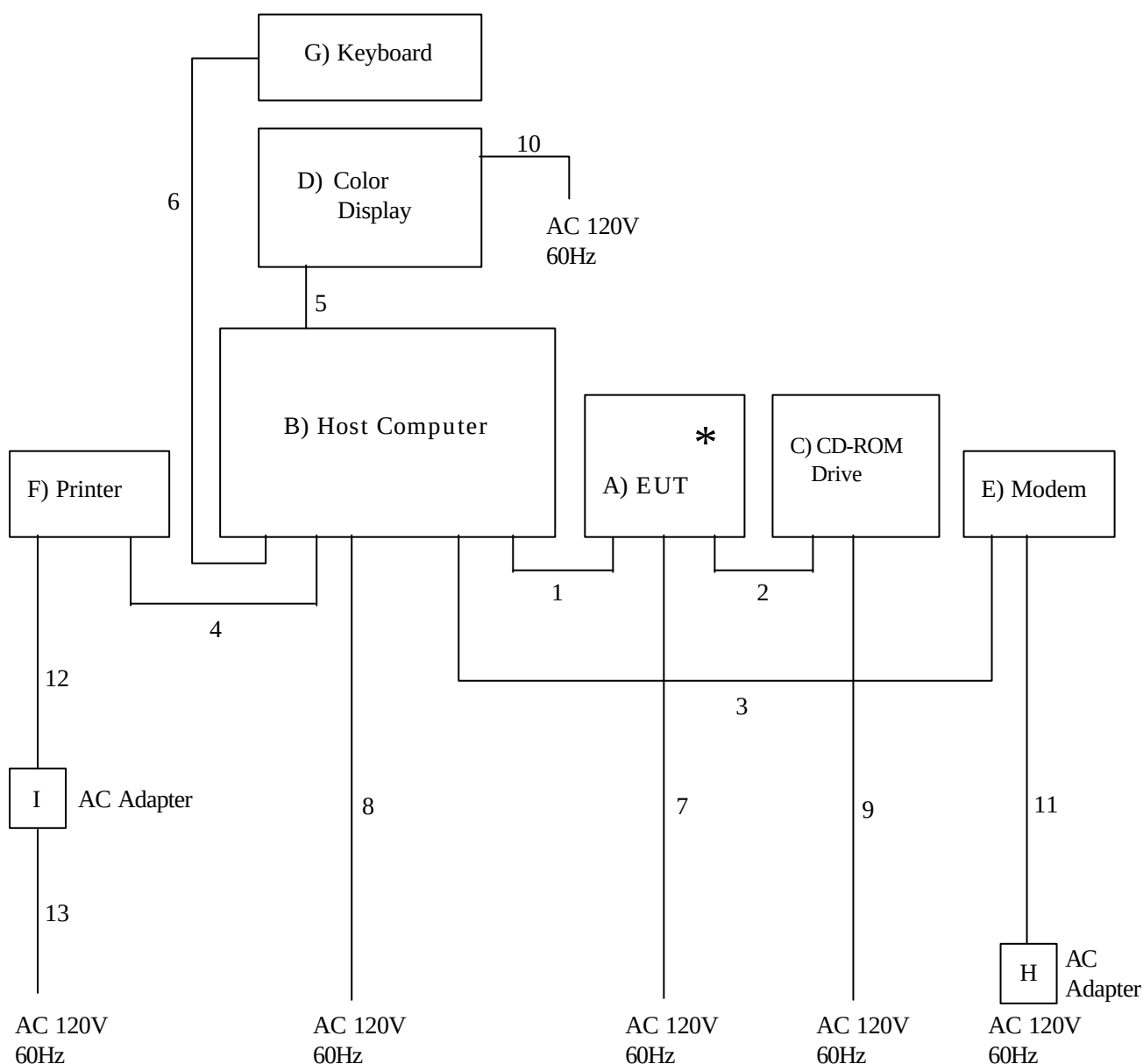
All cables are not attached ferrite core.

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

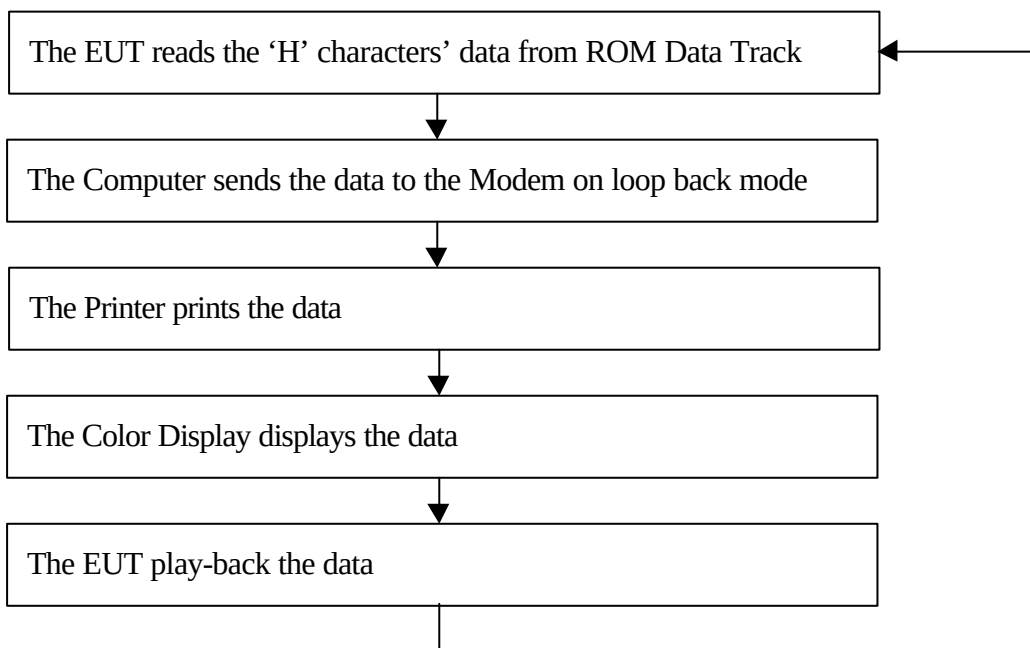
The tests have been carried out under Read mode and Write mode.

EUT was examined in the operating conditions that had maximum emissions.

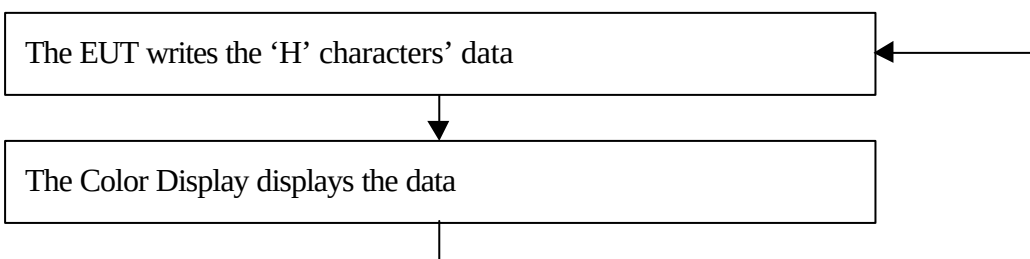
6.2 Operation flow

Following operations were performed continuously.

6.2.1 Read mode



6.2.2 Write mode



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

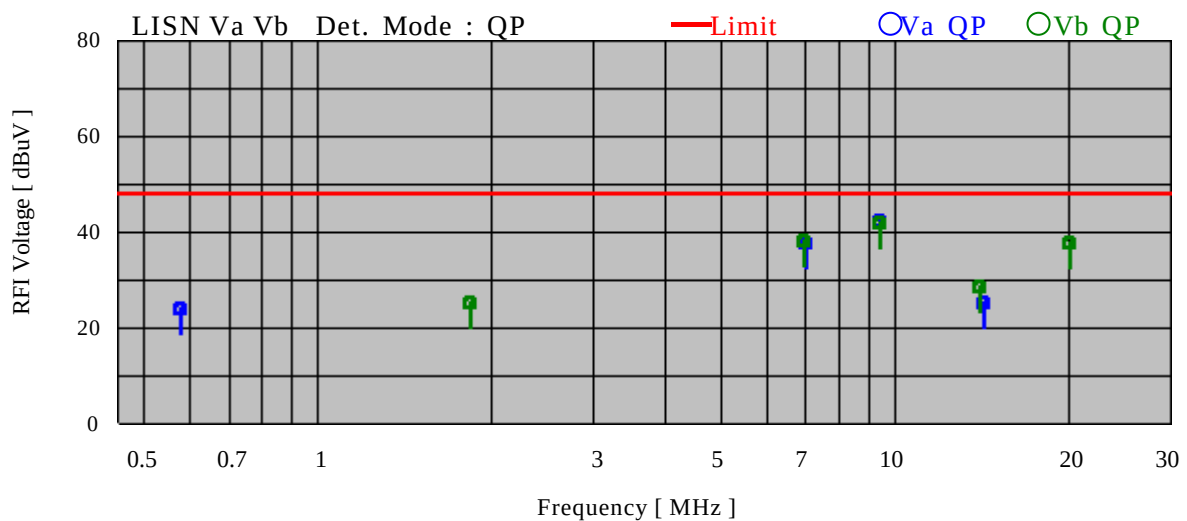
SECTION 8. EVALUATION OF TEST RESULTS

8.1 Conducted Emission Test

8.1.1 Read mode

Product Name	:	DVD-R Drive
Model No.	:	SW-9501-S
Serial No.	:	SX0313000008
Power Supply	:	120V / 60Hz
Test Mode	:	Read mode
Temp / Humi / Pres	:	18 °C / 46% / 1002hPa
Operator	:	S. Yamauchi

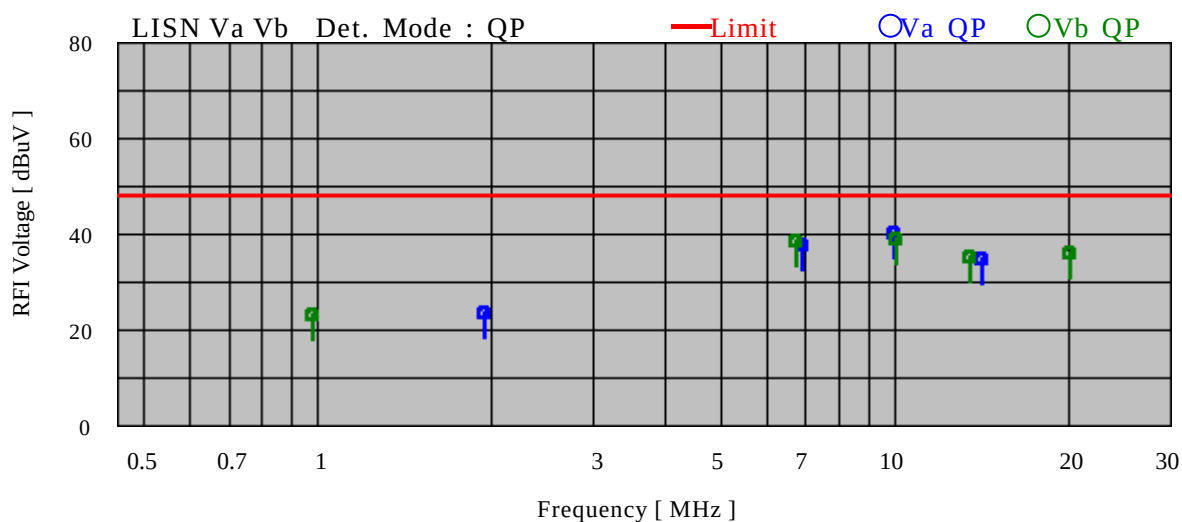
No	Freq. [MHz]	Reading Level		Factor [dB]	Emission Level		Limit [dBuV]	Margin [dB]
		Va [dBuV]	Vb [dBuV]		Va [MHz]	Vb [MHz]		
1	0.582	23.5	---	0.1	23.6	---	48.0	24.4
2	1.847	---	24.8	0.2	---	25.0	48.0	23.0
3	7.010	---	37.6	0.4	---	38.0	48.0	10.0
4	7.072	37.3	---	0.4	37.7	---	48.0	10.3
5	9.430	---	41.4	0.4	---	41.8	48.0	6.2
6	9.430	41.6	---	0.4	42.0	---	48.0	6.0
7	14.126	---	27.5	0.7	---	28.2	48.0	19.8
8	14.353	24.1	---	0.7	24.8	---	48.0	23.2
9	20.205	---	36.3	1.0	---	37.3	48.0	10.7



8.1.2 Write mode

Product Name	:	DVD-R Drive
Model No.	:	SW-9501-S
Serial No.	:	SX0313000008
Power Supply	:	120V / 60Hz
Test Mode	:	Write mode
Temp / Humi / Pres	:	18 °C / 46% / 1002hPa
Operator	:	S. Yamauchi

No	Freq. [MHz]	ReadingLevel		Factor [dB]	Emission Level		Limit [dBuV]	Margin [dB]
		Va [dBuV]	Vb [dBuV]		Va [MHz]	Vb [MHz]		
1	0.980	---	22.7	0.1	---	22.8	48.0	25.2
2	1.955	23.3	---	0.2	23.5	---	48.0	24.5
3	6.753	---	38.0	0.4	---	38.4	48.0	9.6
4	6.941	36.9	---	0.4	37.3	---	48.0	10.7
5	10.000	39.3	---	0.5	39.8	---	48.0	8.2
6	10.103	---	38.3	0.5	---	38.8	48.0	9.2
7	13.510	---	34.2	0.7	---	34.9	48.0	13.1
8	14.180	33.7	---	0.7	34.4	---	48.0	13.6
9	20.205	---	34.9	1.0	---	35.9	48.0	12.1



8.2 Radiated Emission Test

8.2.1 Read mode

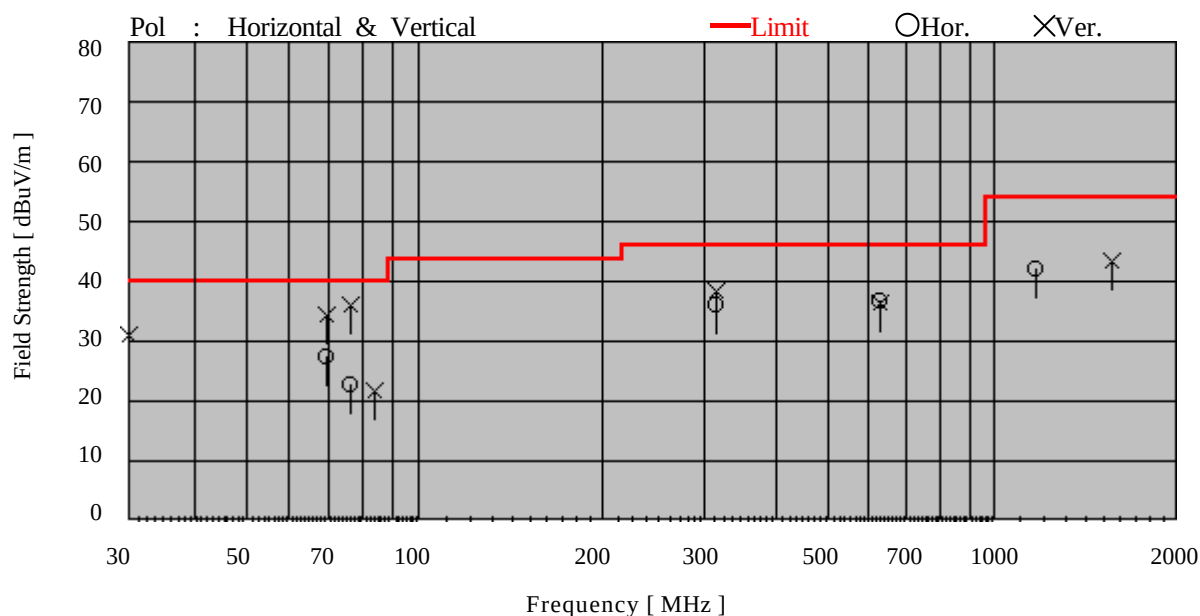
Product Name	: DVD-R Drive
Model No.	: SW-9501-S
Serial No.	: SX0313000008
Power Supply	: 120V / 60Hz
Test Mode	: Read mode
Temp / Humi / Pres	: 18 °C / 46% / 1002hPa
Operator	: S. Yamauchi

[Quasi Peak mode]

No	Freq. [MHz]	Reading Level		Factor [dB]	Emission Level		Limit [dBuV/m]	Margin [dB]
		Hor.	Ver.		Hor.	Ver.		
		[dBuV]			[dBuV/m]			
1	30.059	----	10.7	20.3	----	31.0	40.0	9.0
2	69.408	18.7	----	8.6	27.3	----	40.0	12.7
3	69.441	----	25.8	8.6	----	34.4	40.0	5.6
4	76.423	----	27.7	8.5	----	36.2	40.0	3.8
5	76.436	14.2	----	8.5	22.7	----	40.0	17.3
6	83.839	----	12.8	9.1	----	21.9	40.0	18.1
7	314.902	----	18.5	20.0	----	38.5	46.0	7.5
8	314.947	16.0	----	20.0	36.0	----	46.0	10.0
9	629.672	11.4	----	25.1	36.5	----	46.0	9.5
10	629.838	----	11.3	25.1	----	36.4	46.0	9.6

[Peak mode]

No	Freq. [MHz]	Reading Level		Factor [dB]	Emission Level		Limit [dBuV/m]	Margin [dB]
		Hor.	Ver.		Hor.	Ver.		
		[dBuV]			[dBuV/m]			
1	1170	12.9	----	29.2	42.1	----	54.0	11.9
2	1558	----	12.6	31.1	----	43.7	54.0	10.3



8.2.2 Write mode

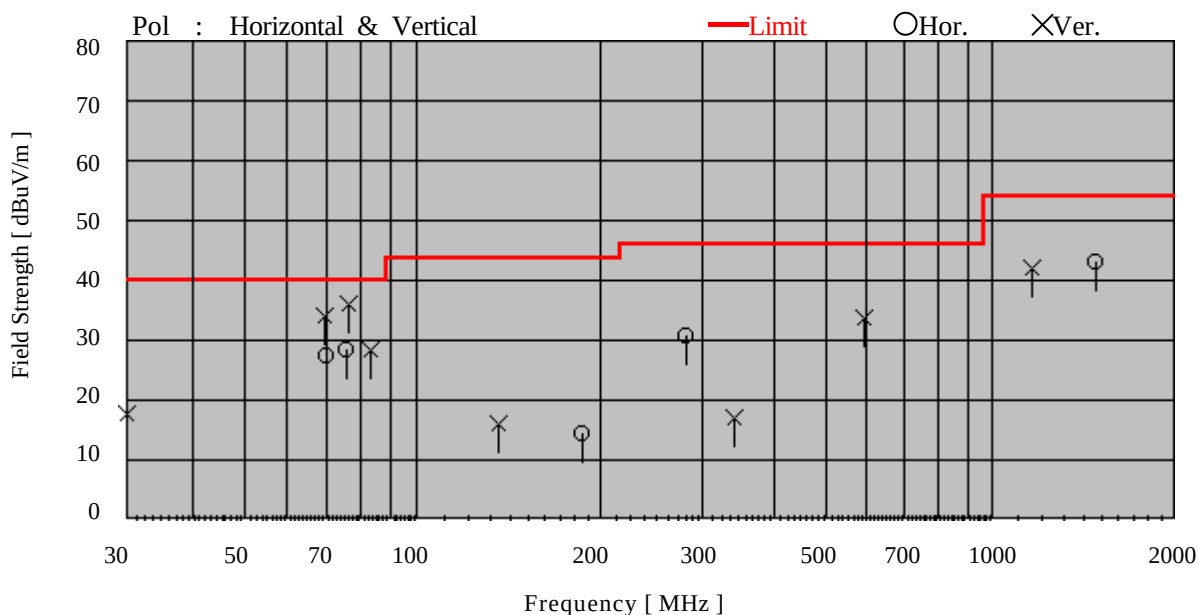
Product Name	: DVD-R Drive
Model No.	: SW-9501-S
Serial No.	: SX0313000008
Power Supply	: 120V / 60Hz
Test Mode	: Write mode
Temp / Humi / Pres	: 18 °C / 46% / 1002hPa
Operator	: S. Yamauchi

[Quasi Peak mode]

No	Freq. [MHz]	Reading Level		Factor [dB]	Emission Level		Limit [dBuV/m]	Margin [dB]
		Hor.	Ver.		Hor.	Ver.		
		[dBuV]			[dBuV/m]			
1	30.059	----	-2.5	20.3	----	17.8	40.0	22.2
2	69.462	----	25.3	8.6	----	33.9	40.0	6.1
3	69.514	18.7	----	8.6	27.3	----	40.0	12.7
4	76.381	19.9	----	8.5	28.4	----	40.0	11.6
5	76.531	----	27.5	8.5	----	36.0	40.0	4.0
6	83.624	----	19.3	9.0	----	28.3	40.0	11.7
7	133.102	----	-0.1	16.1	----	16.0	43.5	27.5
8	187.021	-4.1	----	18.5	14.4	----	43.5	29.1
9	277.540	9.4	----	21.3	30.7	----	46.0	15.3
10	336.541	----	-2.4	19.5	----	17.1	46.0	28.9
11	592.681	----	9.2	24.5	----	33.7	46.0	12.3

[Peak mode]

No	Freq. [MHz]	Reading Level		Factor [dB]	Emission Level		Limit [dBuV/m]	Margin [dB]
		Hor.	Ver.		Hor.	Ver.		
		[dBuV]			[dBuV/m]			
1	1178	----	12.4	29.2	----	41.6	54.0	12.4
2	1478	12.5	----	30.6	43.1	----	54.0	10.9



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	6.0 dB	at	9.430 MHz
Radiation measurement	3.8 dB	at	76.423 MHz

8.4 Sample Calculations

8.4.1 Conducted Emission

Example @ 9.430 MHz

$$\begin{array}{rcl}
 \text{Emission Level} & = & \text{Meter Reading} \\
 & + & \text{A.M.N. Factor} \\
 & & \begin{array}{r} 41.6 \text{ dBuV} \\ + 0.4 \text{ dB} \\ \hline = 42.0 \text{ dBuV} \end{array}
 \end{array}$$

$$\begin{array}{rcl}
 \text{Margin} & = & \text{Limit} \\
 & - & \text{Emission Level} \\
 & & \begin{array}{r} 48.0 \text{ dBuV} \\ - 42.0 \text{ dBuV} \\ \hline = 6.0 \text{ dB} \end{array}
 \end{array}$$

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

8.4.2 Radiated Emission

Example @ 76.423 MHz

$$\begin{array}{rcl}
 \text{Emission Level} & = & \text{Meter Reading} \\
 & + & \text{Factor} \\
 (\text{Factor} = \text{Antenna Factor} + \text{Cable Loss}) & & \begin{array}{r} 27.7 \text{ dBuV} \\ + 8.5 \text{ dB} \\ \hline = 36.2 \text{ dBuV/m} \end{array}
 \end{array}$$

$$\begin{array}{rcl}
 \text{Margin} & = & \text{Limit} \\
 & - & \text{Emission Level} \\
 & & \begin{array}{r} 40.0 \text{ dBuV/m} \\ - 36.2 \text{ dBuV/m} \\ \hline = 3.8 \text{ dB} \end{array}
 \end{array}$$

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) | impedance $\pm 20\%$
= Line Impedance Stabilization Network(LISN) |
| 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.