

**MATSUSHITA-KOTOBUKI
ELECTRONICS INDUSTRIES LTD.**

MATSUYAMA DIVISION

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TEST REPORT

REPORT NUMBER : MKM99F-001

APPLICANT : Matsushita-Kotobuki
Electronics Industries, Ltd.

MODEL NUMBER : LKM-RMB33

FCC ID : IUO9TB078LSS

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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Fax number : +81 89 966 5733
Contact person : Kenji Matsugi

DESCRIPTION OF TEST ITEM

Kind of equipment : Super Disk Drive
Trademark : Matsushita-Kotobuki
FCC ID : IUO9TB078LSS
Model number : LKM-RMB33
Serial number : BA950600M00001

TEST PERFORMED

FCC File No.	: 31040/SIT
Test started	: May 6, 1999
Test completed	: May 6, 1999
Purpose of test	: FCC Docket 87-389
Regulation	: FCC Part 15B Class B Unintentional Radiators
Test setup	: ANSI C63.4 -1992

Report file number : MKM99F-001

Report issue date : May 17, 1999

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 (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)	Super Disk Drive	LKM-RMB33	BA950600M00001	IUO9TB078LSS	Matsushita-Kotobuki Electronics Ind., Ltd.

Power ratings of EUT : +5V DC, 1.2A

2.1 Port(s) / Connector(s) :

USB Connector(4pin), DC IN Connector(2pin)

2.2 Oscillator(s) / Crystal(s) :

Oscillator	Operating Frequency	Board name	Remarks
24.0 MHz	24.0 MHz	I/F PCB	CPU, M37640
6.4 MHz	32.0 MHz	Main PCB	ASIC, UPD90F49

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	Think Pad 600 Type 2645	97-9244V	Declaration of Conformity	IBM
C)	Printer	3630A	3040A00351	BSD8533630A	HEWLETT PACKARD

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)	USB Interface cable	1.1 m	Yes	Super Disk Drive Plastic connector	Host Computer
2)	DC Power cable	2.0 m	None	Super Disk Drive Plastic connector	AC Adapter
3)	Parallel I/F cable	1.5 m	Yes	Host Computer Metal connector	Printer
4)	Power cord for Printer	2.0 m	None	Printer	AC Adapter
5)	Power cord for Printer	2.0 m	None	AC Adapter	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

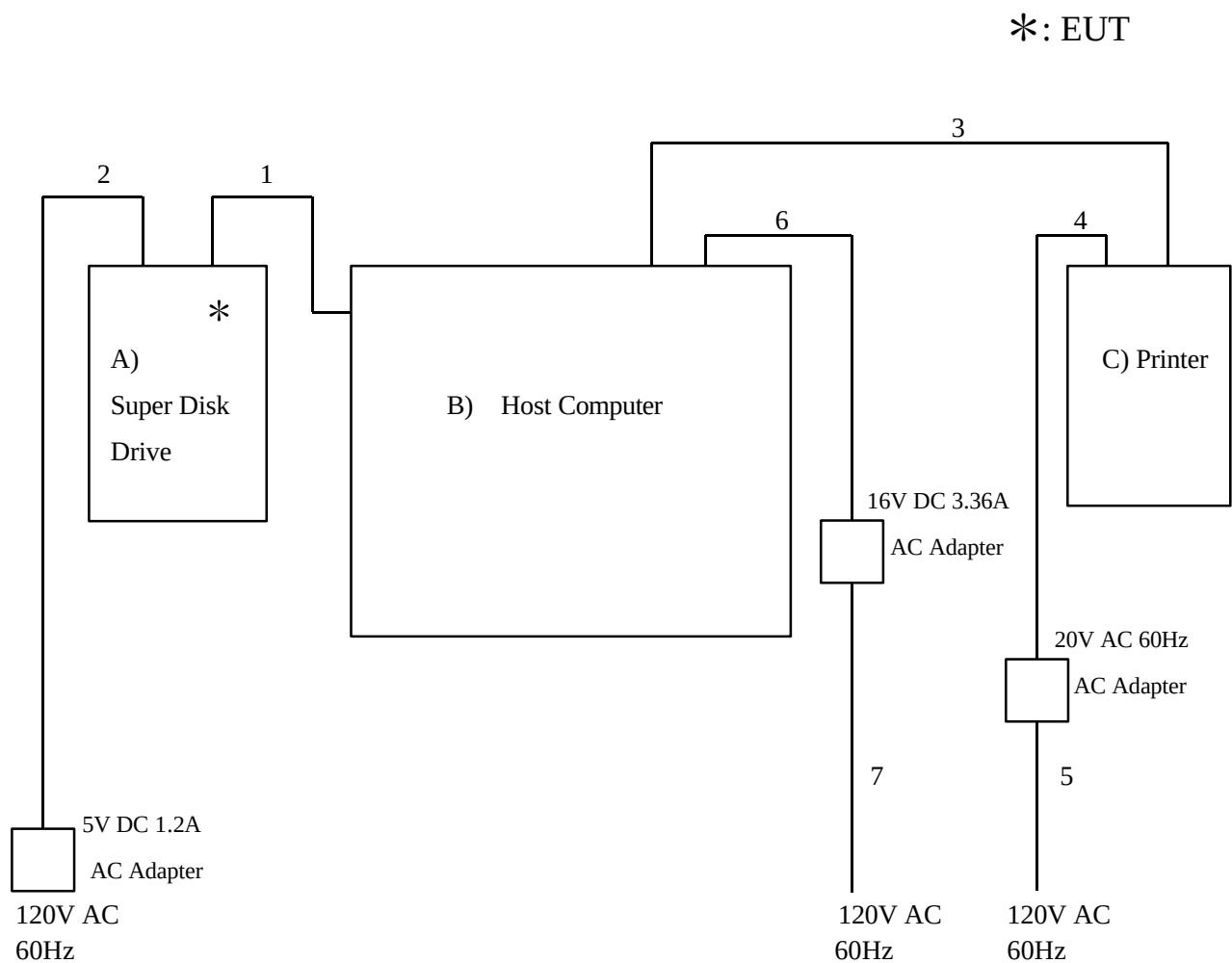
None :

All cables are not attached ferrite core.

SECTION 5. CONSTRUCTION OF EQUIPMENT

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

6.1 Operating condition

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

6.2 Operation flow [Write/Read mode]

Performed following operations continuously.

1. The Computer sends write command to EUT.
2. The Computer sends 'H' characters data to EUT.
3. The EUT writes 'H' characters' data.
4. The EUT sends the status and message to Computer.
5. The Display displays 'H' characters' data.
6. The Printer prints 'H' characters' data.
7. The Computer sends read command to EUT.
8. The EUT reads the data and sends it to Computer.
9. The EUT sends the status and message to Computer.
10. The Display displays 'H' characters' data.
11. The Printer prints '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).

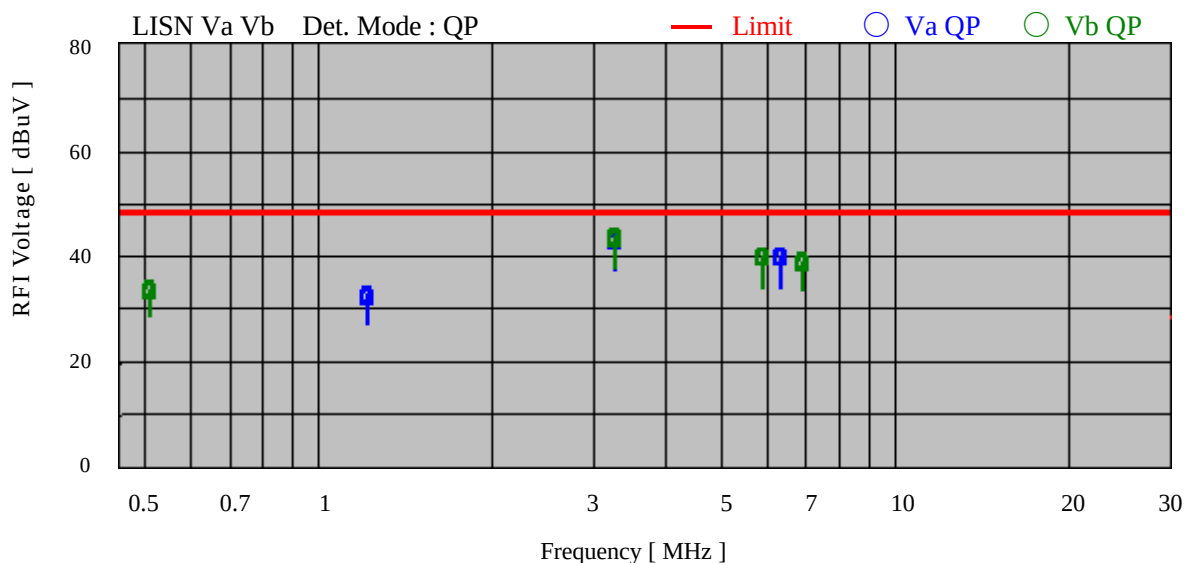
Test item	Test procedure used	Scanned Frequency Range
Conducted Emission	ANSI C63.4-1992	0.45 - 30 MHz
Radiated Emission	ANSI C63.4-1992	30 - 1000 MHz

SECTION 8. EVALUATION OF TEST RESULTS

8.1 Conducted Emission Test

Product Name	: Super Disk Drive
Model No.	: LKM-RMB33
Serial No.	: BA950600M00001
Power Supply	: 120V / 60Hz
Test Mode	: Read & Write
Temp / Humi / Pres	: 19°C / 42% / 998hPa
Operator	: S. Yamauchi

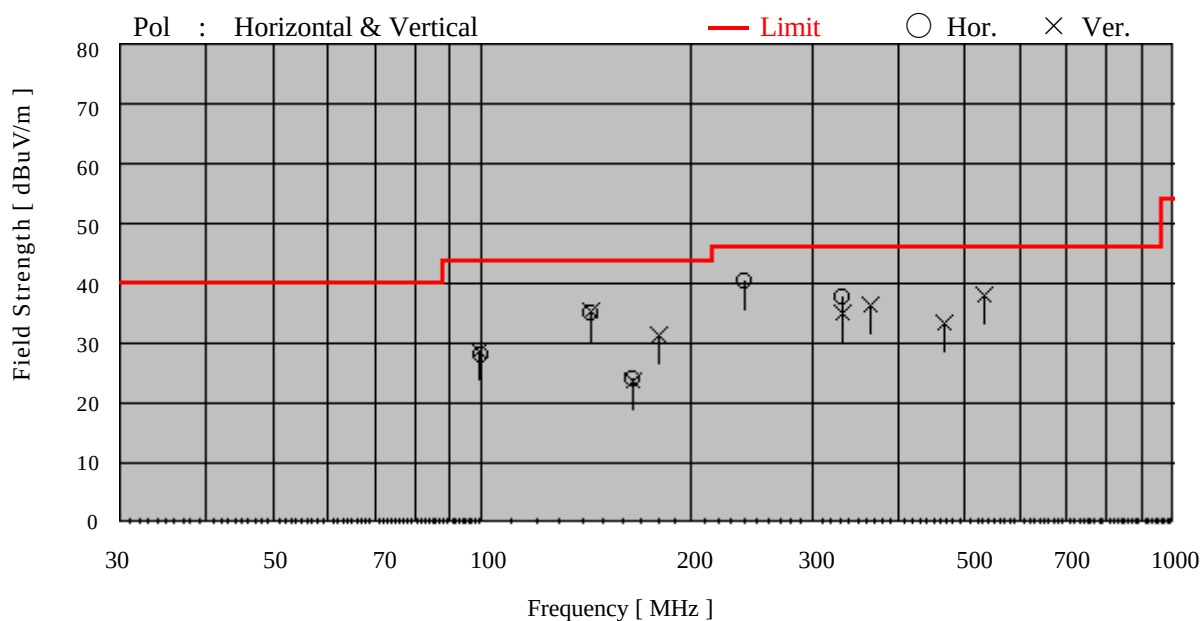
No	Freq. [MHz]	Reading Level		Factor [dB]	Emission Level		Limit [dBuV]	Margin [dB]
		Va [dBuV]	Vb		Va [MHz]	Vb		
1	0.510	----	33.3	0.1	----	33.4	48.0	14.6
2	1.226	32.0	----	0.2	32.2	---	48.0	15.8
3	3.267	42.4	----	0.2	42.6	----	48.0	5.4
4	3.270	----	43.0	0.2	----	43.2	48.0	4.8
5	5.930	----	39.1	0.3	----	39.4	48.0	8.6
6	6.335	39.1	----	0.3	39.4	----	48.0	8.6
7	6.953	----	38.3	0.4	----	38.7	48.0	9.3



8.2 Radiated Emission Test

Product Name : Super Disk Drive
 Model No. : LKM-RMB33
 Serial No. : BA950600M00001
 Power Supply : 120V / 60Hz
 Test Mode : Read & Write
 Temp / Humi / Pres : 19°C / 42% / 998hPa
 Operator : S. Yamauchi

No	Freq. [MHz]	Reading Level		Factor [dB]	Emission Level		Limit [dBuV/m]	Margin [dB]
		Hor.	Ver.		Hor.	Ver.		
		[dBuV]			[dBuV/m]			
1	99.258	----	16.6	12.1	----	28.7	43.5	14.8
2	99.648	15.9	----	12.2	28.1	----	43.5	15.4
3	144.001	----	18.7	16.7	----	35.4	43.5	8.1
4	144.011	18.4	----	16.7	35.1	----	43.5	8.4
5	165.290	6.2	----	17.7	23.9	----	43.5	19.6
6	165.409	----	5.8	17.7	----	23.5	43.5	20.0
7	180.007	----	13.1	18.4	----	31.5	43.5	12.0
8	240.007	21.1	----	19.4	40.5	----	46.0	5.5
9	332.281	18.3	----	19.6	37.9	----	46.0	8.1
10	332.393	----	15.4	19.6	----	35.0	46.0	11.0
11	365.446	----	16.9	19.4	----	36.3	46.0	9.7
12	465.439	----	12.0	21.2	----	33.2	46.0	12.8
13	531.297	----	15.5	22.6	----	38.1	46.0	7.9



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	4.8 dB	at	3.270 MHz
-Radiation measurement	5.5 dB	at	240.007 MHz

8.4 Sample Calculations

8.4.1 Conducted Emission

Example @ 3.270 MHz

$$\begin{array}{rcl}
 \text{Emission Level} & = & \text{Meter Reading} \quad 43.0 \text{ dBuV} \\
 & + & \text{A.M.N. Factor} \quad + \quad 0.2 \text{ dB} \\
 & & \hline
 & = & 43.2 \text{ dBuV}
 \end{array}$$

$$\begin{array}{rcl}
 \text{Margin} & = & \text{Limit} \quad 48.0 \text{ dBuV} \\
 & - & \text{Emission Level} \quad - \quad 43.2 \text{ dBuV} \\
 & & \hline
 & = & 4.8 \text{ dB}
 \end{array}$$

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

8.4.2 Radiated Emission

Example @ 240.007 MHz

$$\begin{array}{rcl}
 \text{Emission Level} & = & \text{Meter Reading} \quad 21.1 \text{ dBuV} \\
 & + & \text{Factor} \quad + \quad 19.4 \text{ dB} \\
 \text{(Factor = Antenna Factor + Cable Loss)} & & \hline
 & = & 40.5 \text{ dBuV/m}
 \end{array}$$

$$\begin{array}{rcl}
 \text{Margin} & = & \text{Limit} \quad 46.0 \text{ dBuV/m} \\
 & - & \text{Emission Level} \quad - \quad 40.5 \text{ dBuV/m} \\
 & & \hline
 & = & 5.5 \text{ dB}
 \end{array}$$

SECTION 9. PHOTOGRAPHS OF TEST SET-UP

Test setup in accordance with ANSI C63.4-1992

9.1 Conducted Emission Test



Front View



Side View

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

Test setup in accordance with ANSI C63.4-1992

9.2 Radiated Emission Test



Front View



Side 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	11/98	1 Year
RF Filter Section	85460A	3448A00210	Hewlett Packard	11/98	1 Year
Biconical Antenna	BBA9106	None	Schwarzbeck	11/98	1 Year
Logperiodic Antenna	UHALP9107	1622	Schwarzbeck	11/98	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) | 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.