

**ORIGINAL**



---

# TEST REPORT

---

**REPORT NUMBER** : AKL-199353

**APPLICANT** : TOSHIBA CORPORATION  
PRODUCT SAFETY GROUP  
TECHNOLOGY & QUALITY  
MANAGEMENT DIVISION  
DIGITAL MEDIA EQUIPMENT &  
SERVICES COMPANY

**MODEL NUMBER** : SD-R1002

**FCC ID** : CJ6AT99-044

**REGULATION** : FCC Part15B Class B  
Canada ICES-003 Class B

**Conducted Emission Test**  
**Radiated Emission Test**



NVLAP accreditation is valid only  
FCC Part15(Digital Devices),  
CISPR22, and AS/NZS 3548  
test reports.

**Akzo Kashima Limited**  
**EMC Division**  
**Kashima Site**

**1, Oaza Sunayama, Hasaki-machi, Kashima-gun**  
**Ibaraki-ken, 314-0255 Japan**  
**Tel.: +81 479 40 1097 Fax.: +81 479 46 1788**

**TABLE OF CONTENTS**

---

	Page
ABBREVIATIONS.....	3
SECTION 1. TEST CERTIFICATION .....	4
SECTION 2. CONCLUSION.....	5
SECTION 3. EQUIPMENT UNDER TEST.....	6
SECTION 4. SUPPORT EQUIPMENT USED.....	7
SECTION 5. CABLE (S) USED .....	8
SECTION 6. CONSTRUCTION OF EQUIPMENT .....	9
SECTION 7. OPERATING CONDITIONS.....	10
SECTION 8. TEST PROCEDURE(S) .....	11
SECTION 9. EVALUATION OF TEST RESULTS .....	16
SECTION 10. PHOTOGRAPHS OF MAXIMUM EMISSION SET-UP .....	21
SECTION 11. INSTRUMENTS USED FOR FINAL TEST.....	22
SECTION 12. UNCERTAINTY OF MEASUREMENT .....	23
SECTION 13. VALIDITY OF TEST REPORT .....	24
SECTION 14. DESCRIPTION OF TEST LABORATORY.....	25

---

**ABBREVIATIONS**

**LISN    = Line Impedance Stabilization Network**

**AMN    = Artificial Mains Network**

**ANT    = Antenna**

**BBA    = Broad-band Antenna**

**DIP    = Dipole Antenna**

**AMP    = Amplifier**

**ATT    = Attenuator**

**EUT    = Equipment Under Test**

**Q-P    = Quasi-peak**

**AVG    = Average**

**SECTION 1. TEST CERTIFICATION****APPLICANT INFORMATION**

Company : TOSHIBA CORPORATION  
PRODUCT SAFETY GROUP  
TECHNOLOGY & QUALITY MANAGEMENT DIVISION  
DIGITAL MEDIA EQUIPMENT & SERVICES COMPANY  
Address : 1-1, Shibaura 1-chome, Minato-ku, Tokyo 105-8001 Japan  
Telephone number : +81 3 3457 2565  
Fax number : +81 3 5444 9405

**DESCRIPTION OF TEST ITEM**

Kind of equipment : CD-RW/DVD-ROM Drive  
Condition of equipment : Pre-Production  
Type : Table-Top (Built-in type)  
Trademark : TOSHIBA  
FCC ID : CJ6AT99-044  
Model number : SD-R1002  
Serial number : 2S3-100

**TEST PERFORMED**

Location : Kashima No. 1 Test Site (FCC File No. : 31040/SIT)  
EUT received : September 22, 1999  
Test started : September 27, 1999  
Test completed : September 28, 1999  
Purpose of test : FCC Docket 87-389  
and Canadian Interference-Causing Equipment Regulations  
Regulation : FCC Part15B Class B and Canada ICES-003 Class B  
Unintentional Radiators  
Test setup : ANSI C63.4-1992

Report file number : AKL-199353

Report issue date : September 29, 1999

Test engineer : Kenichi Takagi

: Koji Setoguchi

Report approved by : Junichi Okada  
[Site Manager]

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

**Responsible Party of Test Item (Product)**

## SECTION 2. CONCLUSION

This test report clearly shows that the EUT is in compliance with the FCC Part 15B Class B specification and the Canada ICES-003 Class B specification.

Traceability to national standards of test result is achieved by means of calibration traceability to national standards.

The minimum margins to the limits are as follows:

**Conduction measurement**

Sequential Write mode at CD-R Disc	11.3 dB	at	3.8062 MHz
---------------------------------------	---------	----	------------

**Radiation measurement**

Random Access Read mode at DVD-ROM Disc	6.8 dB	at	912.23 MHz
--	--------	----	------------

Note : See Section 9 for details.

**SECTION 3. EQUIPMENT UNDER TEST**

The equipment under test (EUT) consisted of the following equipment.  
Indication in the following left side column corresponds to Section 6.

Symbol Item	Model No.	Serial No.	FCC ID / DoC	Manufacturer	Remarks
A) CD-RW/ DVD-ROM Drive	SD-R1002	2S3-100	CJ6AT-044	TOSHIBA	

Power ratings of EUT : DC +5V / 1.6A(max)  
DC +12V / 1.2A(max)

DoC : Device for Declaration of Conformity

**3.1 Port(s)/Connector(s) :**

Port name	Connector type	Connector pin	Remarks
Stereo Headphone	Pin Jack	1 pin	
IDE	ATAPI	40 pin	
AUDIO(ANALOG)	Mini Connector	4 pin	
AUDIO(DIGITAL)	Mini Connector	2 pin	

**3.2 Oscillator(s)/Crystal(s) :**

Oscillator	Operating frequency	Board name	Remarks
22.58 MHz	-	Main Board	
33.86 MHz	-	Main Board	
230 MHz	-	-	Pick-up Module
270 MHz	-	-	Pick-up Module, Highest frequency

**SECTION 4. SUPPORT EQUIPMENT USED**

The EUT was supported by the following equipment during the test.  
Indication in the following left side column corresponds to Section 6.

Symbol Item	Model No.	Serial No.	FCC ID / DoC	Manufacturer	Remarks
B) Computer	MMP	TMNPJ	DoC	DELL Computer	
C) CRT Display	500-069EV	15025E020623	BEJCS592	Gateway2000	
D) Keyboard	SK-1000REW	M970133760	GYUR36SK	DELL Computer	
E) Mouse	X03-65048	7011784-00000	C3KKMP5	Microsoft	
F) Printer	C4608A	SG77G1F1QQ	B94C2164X	HEWLETT PACKARD	
G) Infrared Adapter	ESI-09680-7201	9834	DoC	Extended Systems	
H) Stereo Headphone	MDR-E515	None	N.A.	SONY Corporation	
I) Stereo Cassette Player	WM-EQ7	46800	N.A.	SONY Corporation	
J) MIC	None	None	N.A.	N.A.	
K) Game PAD	PK-GP101	8800147S	N.A.	NEC	
L) AC Adapter	C2178A	None	N.A.	HEWLETT PACKARD	

DoC : Device was tested and authorized under a Declaration of Conformity to the applicable FCC rules.

**SECTION 5. CABLE (S) USED**

The following cable(s) was used for the test.

Indication number in the following left side column corresponds to Section 6.

Number	Name	Length	Shield	Connector
1)	Headphone cable	1.70 m	None	Plastic
2)	Printer cable	2.00 m	Yes	Plastic
3)	Network cable	1.07 m	None	Plastic
4)	Infrared Adadpter cable	1.50 m	Yes	Metal
5)	Keyboard cable	1.95 m	Yes	Plastic
6)	CRT cable	1.86 m	Yes	Plastic
7)	Mouse cable	1.95 m	Yes	Plastic
8)	Stereo cable	1.65 m	None	Plastic
9)	MIC cable	2.18 m	Yes	Plastic
10)	Resistor cable	1.65 m	None	Plastic
11)	PAD cable	2.50 m	Yes	Plastic
12)	Power cord for Computer	2.45 m	None	
13)	Power cord for CRT Display	1.90 m	None	
14)	Power cord for Printer(DC)	1.85 m	None	
15)	Power cord for Printer(AC)	0.95 m	None	

Note :

- a. Two ferrite cores are permanently attached to CRT cable.
- b. One ferrite core is permanently attached to PAD cable.





## SECTION 7. OPERATING CONDITIONS

The EUT was operated under the following conditions during the test.

### 7.1 Operating condition

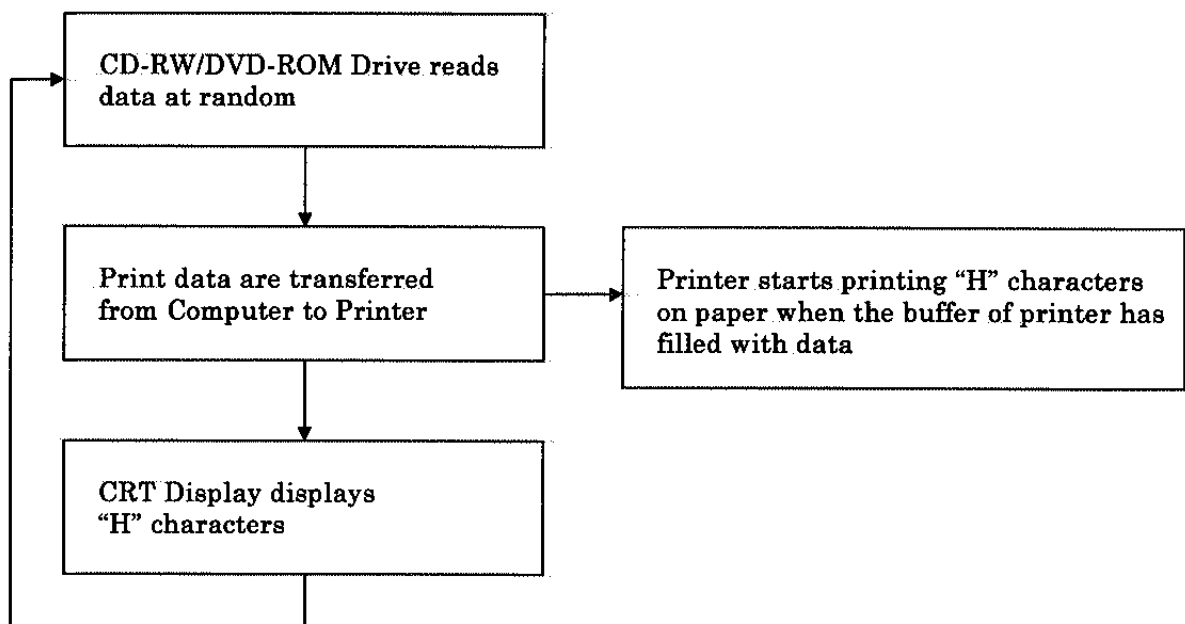
The test was carried out under Random Access Read mode at DVD-ROM Disc and Sequential Write mode at CD-R Disc.

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

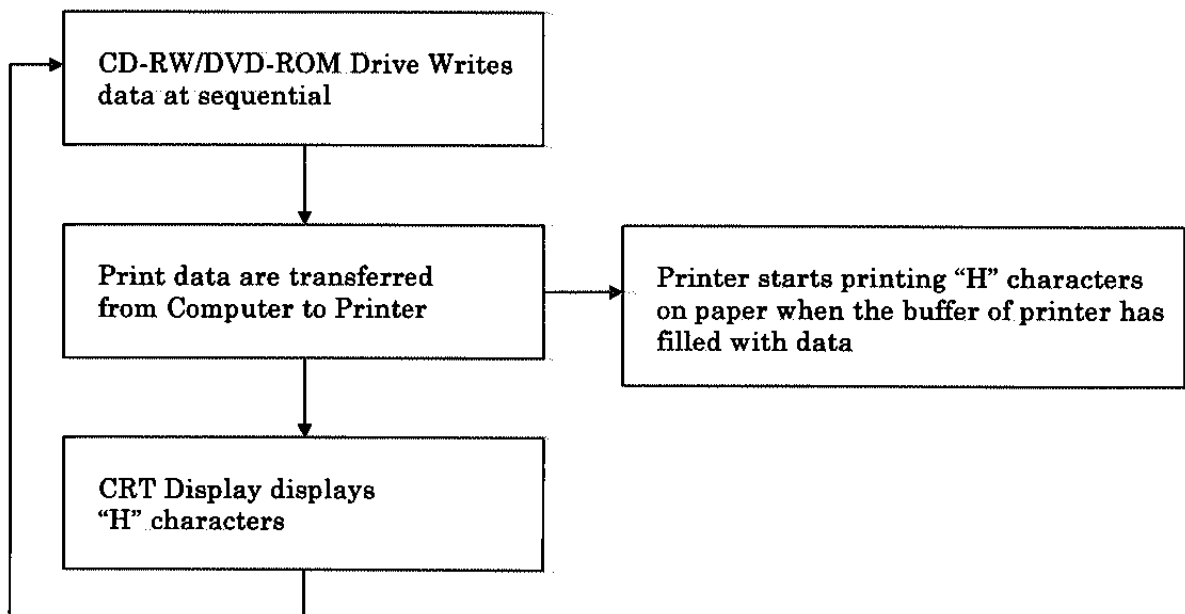
### 7.2 Operating flow

Following operations were performed continuously.

#### 7.2.1 Random Access Read mode at DVD-ROM Disc



#### 7.2.2 Sequential Write mode at CD-R Disc

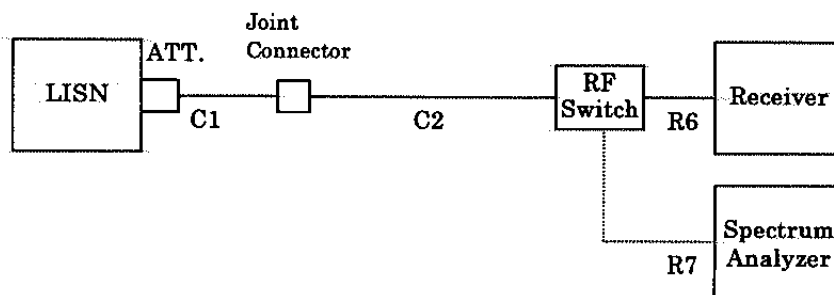
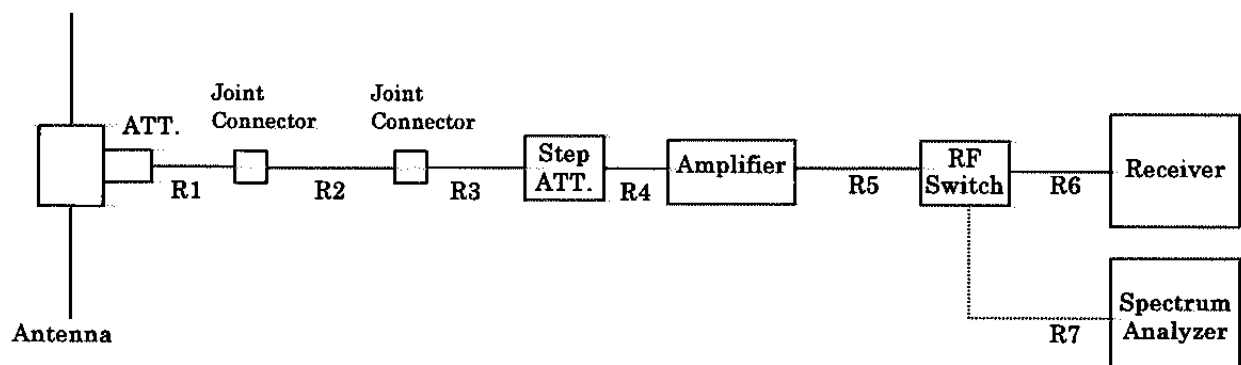


**SECTION 8. TEST PROCEDURE(S)**

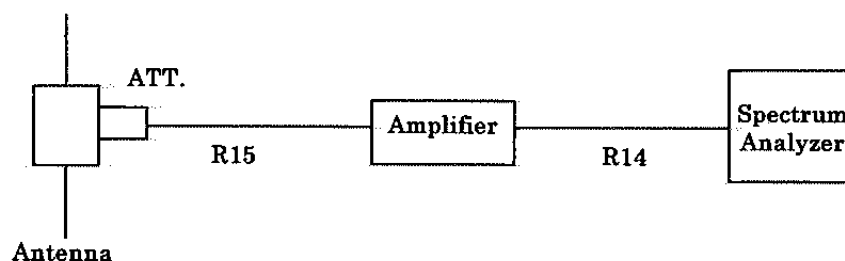
Test was carried out under the following conditions.

Test was carried out with no deviations from standards and test methods.

Subject	Test procedure	Scan frequency
Conducted Emission	Akzo Kashima Document number : 03-10-004	0.45 - 30 MHz
Radiated Emission	Akzo Kashima Document number : 03-10-003	30 - 2000 MHz

**Schema for the conducted measurement****Schema for the radiated measurement**

Above 1GHz



## Summary ;

### 8.1 Conducted Emission Test

#### 8.1.1 Equipment Setup

System configuration and Equipment setup are shown on Section 6 and Section 10.

##### 8.1.1.1 Table-Top Equipment

EUT is placed on the wooden table raised 0.8meter above the metal ground plane.

##### 8.1.1.2 Interconnecting Cables

Excess part of the interconnecting cables longer than 1 meter are bundled in the center. Cables that hang closer than 40 cm to the ground plane is folded back and forth forming bundle 30 to 40 cm long, hanging approx, in the middle between ground plane and table.

##### 8.1.1.3 AC Power Cord

AC power cord for EUT is connected to one LISN which is placed on top of ground plane. The LISN is placed in 80 cm from the nearest part of EUT chassis. The excess power cable is bundled in the center, or shortened to appropriate length. AC cables except from the EUT are connected second LISN.

#### 8.1.2 Measuring Instruments

Measuring instruments list and calibration schedule are shown on Section 11, and brief description are as follows;

##### 8.1.2.1 Spectrum Analyzer

The Spectrum analyzer is used for preliminary measurement.

##### 8.1.2.2 EMI Test Receiver

The Quasi-peak detector(Resolution bandwidth : 10 kHz) and average detector (Resolution bandwidth : 10 kHz) built in test receiver is used for final measurement. The test receiver is complied with the specification of the CISPR publication 16.

##### 8.1.2.3 LISN

The 50 $\mu$ H/50 $\Omega$  LISN is used. The chassis of the LISN is bonded to the ground plane by the copper blade.

The lead to be tested is selectable by switch, and the terminals which are not connected to the EUT are terminated in 50 $\Omega$  resistor termination.

### 8.1.3 Test Procedure

#### 8.1.3.1 Preliminary Measurement

EUT is tested on all operating conditions.

The spectrum analyzer is controlled by the computer program to sweep regulation frequency, then spectrum chart are plotted out to detect the worst conditions in operating mode and/or configuration for the final test.

All leads other than safety ground are tested.

#### 8.1.3.2 Final Measurement

The EUT is operated in the worst condition where maximum emission is detected by the preliminary test. The equipment and cables are arranged or manipulated within the range of the test standard in the above condition.

The each spectrum to be tested are measured in quasi-peak using the test receiver. When the value in the quasi-peak mode is higher than the limit in the standard, the measurement in the average mode is done to compare to the value in the quasi-peak mode. If the value in the quasi-peak mode exceeds the value in the average mode by more than 6 dB, the value reducing 13 dB from the value in the quasi mode is used to compare to the limit.

## 8.2 Radiated Emission Test

### 8.2.1 Equipment Setup

System configuration and Equipment setup are shown on Section 6 and Section 10.

#### 8.2.1.1 Table-Top Equipment

EUT is placed on the wooden table raised 0.8meter above the metal ground plane(turntable).

#### 8.2.1.2 Interconnecting Cables

Excess part of the interconnecting cables longer than 1 meter are bundled in the center. Cables that hang closer than 40 cm to the ground plane is folded back and forth forming bundle 30 to 40 cm long, hanging approx, in the middle between ground plane and table.

### 8.2.2 Measuring Instruments

Measuring instruments list and calibration schedule are shown on Section 11, and brief description are as follows;

#### 8.2.2.1 Antennas

The broadband Bi-cog antenna is used for measurement on the frequency range 30 – 1000 MHz.

The Double ridged guide antenna is used for frequency higher than 1000 MHz. If uncertain result was obtained, the broadband antenna is replaced by the half wave length dipole, then measurement is carried out over again.

#### 8.2.2.2 Pre-amplifier

The broadband pre-amplifier is used for radiated emission measurement. The signal to noise ratio is improved by using pre-amplifier.

#### 8.2.2.3 Spectrum Analyzer

The spectrum analyzer is used for preliminary measurement of frequency range 30 – 1000 MHz, and also used for final measurement of higher than 1000 MHz (Resolution bandwidth : 1 MHz).

#### 8.2.2.4 EMI Test Receiver

The Quasi-peak detector(Resolution bandwidth : 120 kHz) built in test receiver is used for final measurement of the frequency 30 – 1000 MHz.

The test receiver is complied with the specification of the CISPR publication 16.

#### 8.2.2.5 Turntable

The turntable is capable for EUT weight and rotatable 0 to 360 degree horizontally by remote control in the test room.

#### 8.2.2.6 Antenna Mast

The antenna mast is attachable to all antennas described on clause 8.2.2.1 and antenna height is adjustable 1 to 4 meters continuously by remote control at the test room, and antenna polarization is also changed by the remote control.

### 8.2.3 Test Procedure

#### 8.2.3.1 Preliminary Measurement

EUT is tested on all operating conditions.

The spectrum analyzer is set max-hold mode and swept during turntable was rotated 0 to 360 degree. Then spectrum chart are plotted out to detect the worst conditions in configuration, operating mode, or ambient noise notation.

#### 8.2.3.2 Final Measurement

The EUT operated in the condition where maximum emission is detected in the preliminary test.

The turntable azimuth(EUT direction) and antenna height are adjusted the position so that maximum field strength is obtained for each frequency spectrum to be measured. The equipment and cables are arranged or manipulated within the range of the test standard in the above condition.

When the uncertain result was obtained, the measurement is retried by using the half wave dipole antenna instead of the broadband antenna.

## SECTION 9. EVALUATION OF TEST RESULTS

## 9.1 Conducted Emission Test

## 9.1.1 Random Access Read mode at DVD-ROM Disc

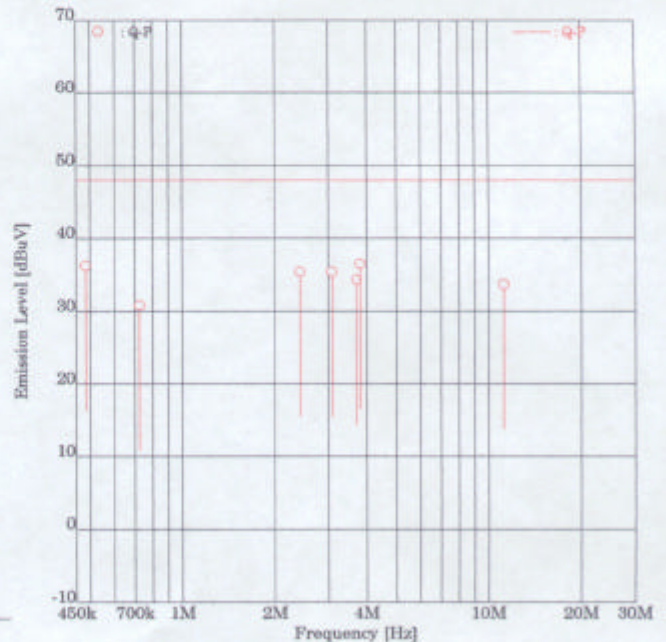
## Akzo Kashima Limited

Kashima No.1 Test Site

## INTERFERENCE CONDUCTION TEST

APPLICANT : TOSHIBA CORPORATION DIGITAL  
MEDIA EQUIPMENT COMPANY  
YANAGICHO OPERATIONS-DIGITAL  
MEDIA EQUIPMENT

EUT NAME : CD-RW/DVD-ROM Drive  
MODEL NO. : SD-R1002  
SERIAL NO. : 2S3-100  
TEST MODE : Random Access Read at DVD-ROM Disc  
POWER SOURCE : DC+5V/1.6A DC+12V/1.2A  
DATE TESTED : Sep 28 1999  
FILE NO. : AKL-199353  
REGULATION : FCC Part15B CLASS B  
TEST METHOD : ANSI C63.4-1992



ENGINEER :

Koji Setoguchi

FREQUENCY No	[MHz]	READING [dBuV]		FACTOR [dB]		EMISSION [dBuV]		LIMIT [dBuV]	MARGIN [dB]	
		Line1	Line2	Line1	Line2	Line1	Line2		Line1	Line2
1	0.4835	<u>29.8</u>	28.8	6.4	6.4	<u>36.2</u>	35.2	48.0	<u>11.8</u>	12.8
2	0.7237	24.5	23.4	6.3	6.3	30.8	29.7	48.0	17.2	18.3
3	2.4211	28.5	<u>28.9</u>	6.5	6.5	35.0	<u>35.4</u>	48.0	13.0	<u>12.6</u>
4	3.0850	28.6	<u>28.8</u>	6.6	6.6	35.2	<u>35.4</u>	48.0	12.8	<u>12.6</u>
5	3.7027	<u>27.7</u>	27.3	6.6	6.6	<u>34.3</u>	33.9	48.0	<u>13.7</u>	14.1
6	3.8062	<u>29.9</u>	29.8	6.6	6.6	<u>36.5</u>	36.4	48.0	<u>11.5</u>	11.6
7	11.1832	<u>27.0</u>	26.7	6.7	6.7	<u>33.7</u>	33.4	48.0	<u>14.3</u>	14.6

Higher six points are underlined.

Other frequencies : Below the FCC Part15B CLASS B limit

Emission Level = Read + Factor(LISN, Pad, Cable)



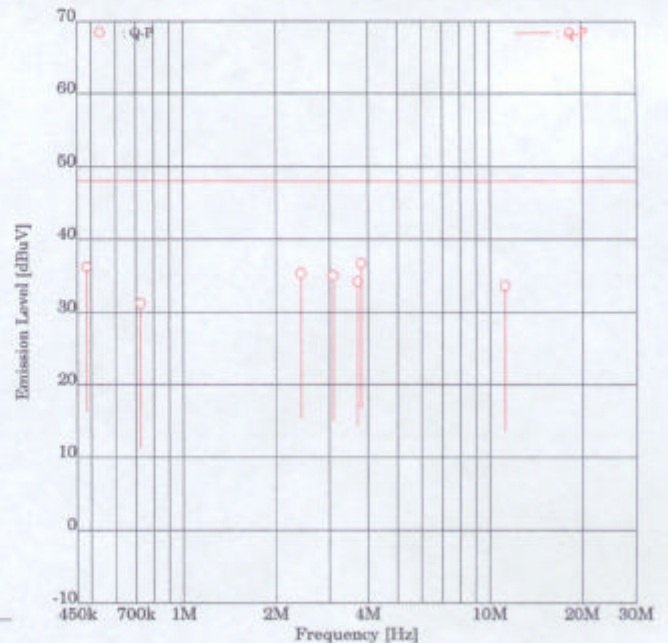
## 9.1.2 Sequential Write mode at CD-R Disc

## Akzo Kashima Limited

Kashima No.1 Test Site

## INTERFERENCE CONDUCTION TEST

APPLICANT : TOSHIBA CORPORATION DIGITAL  
 MEDIA EQUIPMENT COMPANY  
 YANAGICHO OPERATIONS-DIGITAL  
 MEDIA EQUIPMENT  
 EUT NAME : CD-RW/DVD-ROM Drive  
 MODEL NO. : SD-R1002  
 SERIAL NO. : 2S3-100  
 TEST MODE : Write at CD-R Disc  
 POWER SOURCE : DC+5V/1.6A DC+12V/1.2A  
 DATE TESTED : Sep 28 1999  
 FILE NO. : AKL-199353  
 REGULATION : FCC Part15B CLASS B  
 TEST METHOD : ANSI C63.4-1992



ENGINEER :

*Koji Setoguchi*  
Koji Setoguchi

FREQUENCY No	[MHz]	READING [dBuV]		FACTOR [dB]		EMISSION [dBuV]		LIMIT [dBuV]	MARGIN [dB]	
		Line1	Line2	Line1	Line2	Line1	Line2		Line1	Line2
1	0.4835	<u>29.8</u>	28.7	6.4	6.4	<u>36.2</u>	35.1	48.0	<u>11.8</u>	12.9
2	0.7226	24.9	23.2	6.3	6.3	31.2	29.5	48.0	16.8	18.5
3	2.4211	28.2	<u>28.8</u>	6.5	6.5	34.7	<u>35.3</u>	48.0	13.3	<u>12.7</u>
4	3.0850	27.8	<u>28.4</u>	6.6	6.6	34.4	<u>35.0</u>	48.0	13.6	<u>13.0</u>
5	3.7027	<u>27.6</u>	27.0	6.6	6.6	<u>34.2</u>	33.6	48.0	<u>13.8</u>	14.4
6	3.8062	<u>30.1</u>	29.8	6.6	6.6	<u>36.7</u>	36.4	48.0	<u>11.3</u>	11.6
7	11.1832	<u>26.9</u>	26.7	6.7	6.7	<u>33.6</u>	33.4	48.0	<u>14.4</u>	14.6

Higher six points are underlined.  
 Other frequencies : Below the FCC Part15B CLASS B limit  
 Emission Level = Read + Factor(LISN, Pad, Cable)



## 9.2 Radiated Emission Test

## 9.2.1 Random Access Read mode at DVD-ROM Disc

## Akzo Kashima Limited

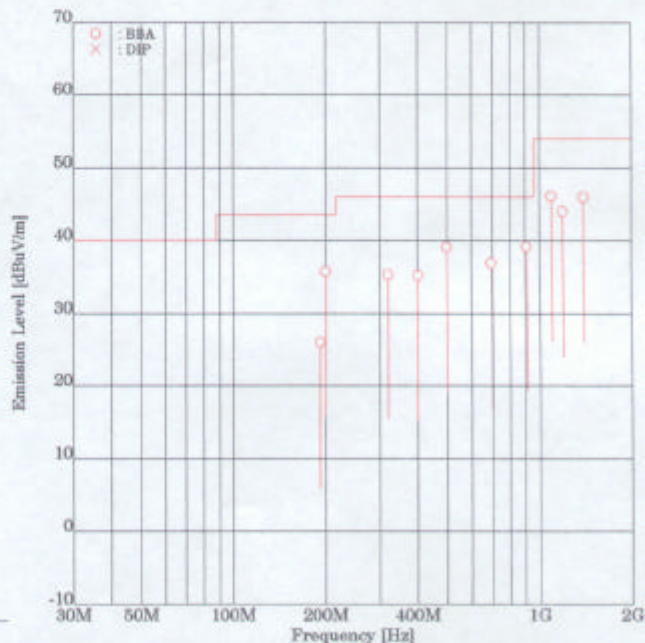
Kashima No.1 Test Site

## INTERFERENCE RADIATION TEST

APPLICANT : TOSHIBA CORPORATION DIGITAL  
 MEDIA EQUIPMENT COMPANY  
 YANAGICHO OPERATIONS-DIGITAL  
 MEDIA EQUIPMENT  
 EUT NAME : CD-RW/DVD-ROM Drive  
 MODEL NO. : SD-R1002  
 SERIAL NO. : 2S3-100  
 TEST MODE : Random Access Read at DVD-ROM Disc  
 POWER SOURCE : DC+5V/1.6A DC+12V/1.2A  
 DATE TESTED : Sep 27 1999  
 FILE NO. : AKL-199353  
 REGULATION : FCC Part15B CLASS B  
 TEST METHOD : ANSI C63.4-1992  
 DISTANCE : 3.0 [m]  
 TEMPERATURE : 25.0 [degC]  
 HUMIDITY : 60.0 [%]

*K. Takagi*

ENGINEER : Kenichi Takagi



FREQUENCY No	[MHz]	ANT.	READING [dBuV]		FACTOR [dB]		EMISSION [dBuV/m]		LIMIT [dBuV/m]	MARGIN [dB]	
			Hori	Vert	Hori	Vert	Hori	Vert		Hori	Vert
1	192.05	BBA	-	35.1	-9.1	-9.1	-	26.0	43.5	-	17.5
2	200.00	BBA	<u>44.9</u>	38.2	-9.2	-9.2	<u>35.7</u>	29.0	43.5	<u>7.8</u>	14.5
3	320.00	BBA	40.0	-	-4.7	-4.7	35.3	-	46.0	10.7	-
4	400.00	BBA	37.6	-	-2.4	-2.4	35.2	-	46.0	10.8	-
5	498.88	BBA	<u>39.1</u>	-	0.0	0.0	<u>39.1</u>	-	46.0	<u>6.9</u>	-
6	698.40	BBA	<u>32.9</u>	-	4.0	4.0	<u>36.9</u>	-	46.0	<u>9.1</u>	-
7	912.23	BBA	<u>32.4</u>	-	6.8	6.8	<u>39.2</u>	-	46.0	<u>6.8</u>	-
8	1097.40	BBA	<u>49.1</u>	49.0	-3.0	-3.0	<u>46.1</u>	46.0	54.0	<u>7.9</u>	8.0
9	1197.60	BBA	44.0	46.7	-2.7	-2.7	41.3	44.0	54.0	12.7	10.0
10	1396.30	BBA	<u>48.1</u>	47.2	-2.1	-2.1	<u>46.0</u>	45.1	54.0	<u>8.0</u>	8.9

Higher six points are underlined.

Other frequencies : Below the FCC Part15B CLASS B limit

Emission Level = Read + Factor(Antenna, Antenna Pad, Cable, Preamp)

ANT. : Used antenna(BBA = Broadband antenna, DIP = Dipole antenna)



## 9.2.2 Sequential Write mode at CD-R Disc

## Akzo Kashima Limited

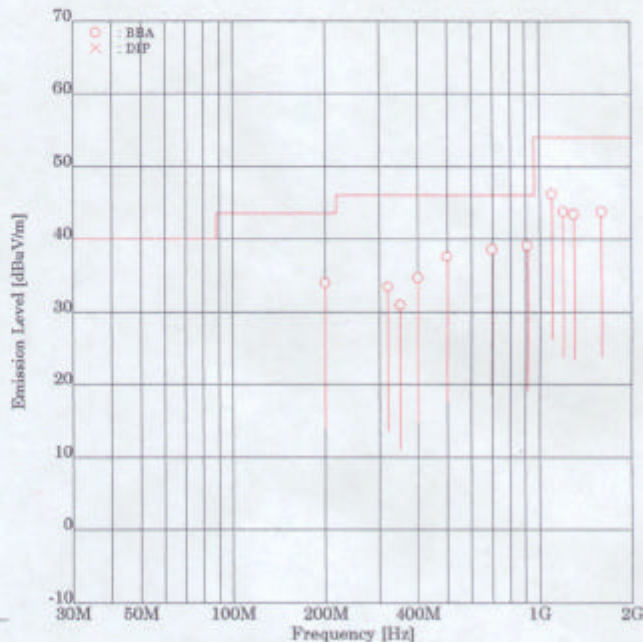
## Kashima No.1 Test Site

## INTERFERENCE RADIATION TEST

APPLICANT : TOSHIBA CORPORATION DIGITAL  
 MEDIA EQUIPMENT COMPANY  
 YANAGICHO OPERATIONS-DIGITAL  
 MEDIA EQUIPMENT  
 EUT NAME : CD-RW/DVD-ROM Drive  
 MODEL NO. : SD-R1002  
 SERIAL NO. : 2S3-100  
 TEST MODE : Write at CD-R Disc  
 POWER SOURCE : DC+5V/1.6A DC+12V/1.2A  
 DATE TESTED : Sep 27 1999  
 FILE NO. : AKL-199353  
 REGULATION : FCC Part15B CLASS B  
 TEST METHOD : ANSI C63.4-1992  
 DISTANCE : 3.0 [m]  
 TEMPERATURE : 25.0 [degC]  
 HUMIDITY : 60.0 [%]

K. Takagi

ENGINEER : Kenichi Takagi



No	FREQUENCY [MHz]	ANT.	READING [dBuV]		FACTOR [dB]		EMISSION [dBuV/m]		LIMIT [dBuV/m]	MARGIN [dB]	
			Hori	Vert	Hori	Vert	Hori	Vert		Hori	Vert
1	200.00	BBA	<u>43.2</u>	-	-9.2	-9.2	<u>34.0</u>	-	43.5	<u>9.5</u>	-
2	320.00	BBA	38.2	34.0	-4.7	-4.7	33.5	29.3	46.0	12.5	16.7
3	350.00	BBA	34.6	-	-3.6	-3.6	31.0	-	46.0	15.0	-
4	400.00	BBA	37.1	-	-2.4	-2.4	34.7	-	46.0	11.3	-
5	498.88	BBA	<u>37.6</u>	-	0.0	0.0	<u>37.6</u>	-	46.0	<u>8.4</u>	-
6	698.38	BBA	<u>34.6</u>	-	4.0	4.0	<u>38.6</u>	-	46.0	<u>7.4</u>	-
7	912.20	BBA	<u>32.3</u>	-	6.8	6.8	<u>39.1</u>	-	46.0	<u>6.9</u>	-
8	1097.40	BBA	48.9	<u>49.2</u>	-3.0	-3.0	45.9	<u>46.2</u>	54.0	8.1	<u>7.8</u>
9	1197.60	BBA	44.7	<u>46.5</u>	-2.7	-2.7	42.0	<u>43.8</u>	54.0	12.0	<u>10.2</u>
10	1297.00	BBA	37.8	45.8	-2.4	-2.4	35.4	43.4	54.0	18.6	10.6
11	1595.80	BBA	44.9	<u>45.0</u>	-1.2	-1.2	43.7	<u>43.8</u>	54.0	10.3	<u>10.2</u>

Higher six points are underlined.

Other frequencies : Below the FCC Part15B CLASS B limit

Emission Level = Read + Factor(Antenna, Antenna Pad, Cable, Preamp)

ANT. : Used antenna(BBA = Broadband antenna, DIP = Dipole antenna)

### 9.3 Sample Calculations

#### 9.3.1 Conducted Emission

---

Example @ 3.8062 MHz

Emission Level	=	Meter Reading	30.1 dBuV
	+	Factor	+ 6.6 dB
			= 36.7 dBuV
Margin	=	Limit	48.0 dBuV
	-	Emission Level	- 36.7 dBuV
			= 11.3 dB

---

$$\text{Factor} = \text{LISN Factor} + \text{Cable Loss} + \text{Pad Loss}$$

#### 9.3.2 Radiated Emission

---

Example @ 912.23 MHz

Emission Level	=	Meter Reading	32.4 dBuV
	+	Factor	+ 6.8 dB
			= 39.2 dBuV/m
Margin	=	Limit	46.0 dBuV/m
	-	Emission Level	- 39.2 dBuV/m
			= 6.8 dB

---

$$\text{Factor} = \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain} + \text{Pad Loss} - \text{Distance Conversion Factor}$$

## SECTION 10. PHOTOGRAPHS OF MAXIMUM EMISSION SET-UP

### 10.1 Conducted Emission Test

Test setup in accordance with ANSI C63.4-1992



Front view



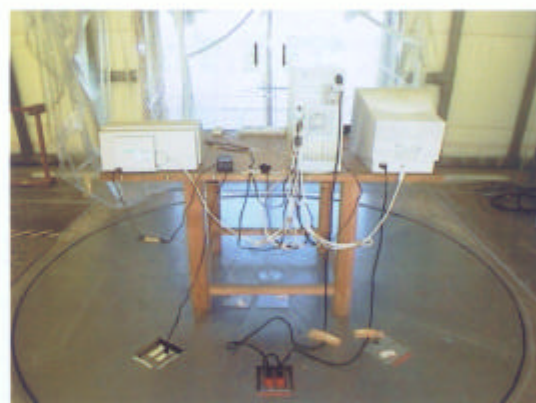
Side view

### 10.2 Radiated Emission Test

Test setup in accordance with ANSI C63.4-1992



Front view



Rear view

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

**SECTION 11. INSTRUMENTS USED FOR FINAL TEST**

Instrument	Model No.	Serial No.	Manufacturer	Last cal. date	Period
Spectrum Analyzer	8563E	3821A09565	HEWLETT PACKARD	Dec. 4, 98	1 Year
Amplifier	8447D	1937A03130	HEWLETT PACKARD	Jul. 8, 99	1 Year
	8449B	3008A01182	HEWLETT PACKARD	Dec. 4, 98	1 Year
Test receiver	ESS	847151/012	ROHDE & SCHWARZ	Apr. 28, 99	1 Year
Broad Band antenna	LPB-2513/A	1072	A.R.A.	May 25, 99	1 Year
Double ridged antenna	3115	9903-5699	EMCO	Mar. 26, 99	1 Year
LISN	ESH2-Z5	882395/022	ROHDE & SCHWARZ	Aug. 6, 99	1 Year
	ESH2-Z5	890484/002	ROHDE & SCHWARZ	May 17, 99	1 Year
	KNW-242	8-851-21	KYORITSU	Aug. 6, 99	1 Year
Step Attenuator	8494B	2726A14513	HEWLETT PACKARD	Oct. 15, 98	1 Year
6dB Attenuator	MP721B	M09834	ANRITSU	Jan. 6, 99	1 Year
	CFA-01	None	TME	Jan. 6, 99	1 Year
	8493C	18493	SUHNER	Dec. 4, 98	1 Year
RF Switch	ACX-150	None	AKZO	Oct. 15, 98	1 Year
Coaxial cable	5D-2W (7.0m)	C1	AKZO	Oct. 15, 98	1 Year
Coaxial cable	5D-2W (2.0 m)	C2	AKZO	Oct. 15, 98	1 Year
Coaxial cable	5D-2W (9.0 m)	R1	AKZO	Oct. 15, 98	1 Year
Coaxial cable	10D-2W (5.5 m)	R2	AKZO	Oct. 15, 98	1 Year
Coaxial cable	5D-2W (2.0 m)	R3	AKZO	Oct. 15, 98	1 Year
Coaxial cable	5D-2W (0.2 m)	R4	AKZO	Oct. 15, 98	1 Year
Coaxial cable	5D-2W (1.0 m)	R5	AKZO	Oct. 15, 98	1 Year
Coaxial cable	5D-2W (1.0 m)	R6	AKZO	Oct. 15, 98	1 Year
Coaxial cable	5D-2W (1.0 m)	R7	AKZO	Oct. 15, 98	1 Year
Coaxial cable	SUCOFLEX 104 (6.0 m)	R14 126777/4	SUHNER	Dec. 4, 98	1 Year
Coaxial cable	SUCOFLEX 104 (1.5 m)	R15 126776/4	SUHNER	Dec. 4, 98	1 Year
Site Attenuation				Oct. 19, 98	1 Year

Note : Test instruments are calibrated according to Quality Manual and Calibration Rules of EMC division.

## SECTION 12. UNCERTAINTY OF MEASUREMENT

### Uncertainty of measurement

The uncertainty of the measurements performed for this report lies:

#### Radiated emission at 3m

30 MHz – 1000 MHz ..... +/- 3.6 dB

Above 1 GHz ..... +/- 3.9 dB

#### Conducted emission

9 kHz – 30 MHz ..... +/- 1.8 dB

These figures indicate the uncertainty of the measurements when the same staff performs the test with the same testing equipment and facility.

The uncertainty of the measurements when a different staff with different equipment and facility are under study.

Please note that these uncertainty are not reflected to the compliance judgement of the test results in this report.

**SECTION 13. VALIDITY OF TEST REPORT**

- 13.1 The test result of this report is effective for equipment under test itself and under the test configuration described on the report.
- 13.2 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.
- 13.3 Copying of this report without permission is prohibited.



## SECTION 14. DESCRIPTION OF TEST LABORATORY

### 14.1 Outline of Akzo Kashima Limited, EMC Division

Akzo Kashima Ltd. was established in 1975 for manufacturing specialty chemicals. The shares are owned by Akzo Nobel KK (70%), the country organization in Japan for Akzo Nobel nv., and TOSOH Corporation (30%), one of the leading petrochemical manufacturers in Japan. Akzo Nobel, headquartered in the Netherlands, is one of the world's leading companies in selected areas of chemicals, coatings, healthcare products and fibers with work force of approximately 70,000 people in over 50 countries.

In 1984, in order to respond to the growing testing demand, in particular, for FCC filing, Akzo Kashima started EMI testing business, installing the first open air test site in Kashima, Ibaraki prefecture. Further the business has been expanded by installing additional testing facilities not only in Kashima but also in other areas such as Shizuoka, Nagano, Kanagawa and Tochigi. As results, Akzo Kashima has now 16 open air test sites and 4 anechoic chambers for EMI/EMC testing. As the largest EMC testing laboratory in number of testing facilities and staffs, EMC Division has been organized separately in the company and independently operated in conformity with the requirements of ISO Guide 25 (EN 45000) for its competency as a testing laboratory.

Akzo Kashima EMC Division is the first foreign private laboratory accredited by NVLAP, National Voluntary Laboratory Accreditation Program-NIST, USA. The division has been certified, authorized and/or filed as a competent testing laboratory by various testing organizations/authorities as described below.

### 14.2 Filing, certification, authorization and accreditation list

<u>EMI/EMC testing</u>		<u>Telecommunications terminal testing</u>	
FCC	(USA)	FCC	(USA)
NVLAP	(USA)	NVLAP	(USA)
NEMKO	(Norway)	NATA	(Australia)
VCCI	(Japan)	IC	(Canada)
NMi	(The Netherlands)		
TÜV PRODUCT SERVICE	(Germany)		

Note : NVLAP accreditation does not constitute any product endorsement by NVLAP or any agent of the U.S. Government.