FCC PART 15 SUBPART B

CERTIFICATION REPORT for E-File

CD-RW DRIVE

FCC ID: JBQCDR018

Report No.: Z02C-99206

Report Issue Date: August 5, 1999

ZACTA TECHNOLOGY CORPORATION
YONEZAWA TESTING CENTER

4149-7 Hachimanpara 5-chome
Yonezawa-shi Yamagata
992-1128 Japan

NVLAP®
Lab code : 200306-0

TABLE OF CONTENTS

CERTIFICATE COMPLIANCE

ZACTA TECHNOLOGY CORPORATION
YONEZAWA TESTING CENTER
4149-7 Hachimanpara 5-chome
Yonezawa-shi Yamagata 992-1128 Japan

This device, as described herewith, was tested pursuant to test procedure C63.4-1992, by Zacta Technology Corporation and it was verified to comply with the requirements of Part 15 Class B of the FCC rules. The Test results are traceable to international or national standard. The EUT complies with section 15.37 “Transition provision for compliance with the rules”.

COMPANY NAME : SANYO ELECTRIC CO., LTD.
EUT : CD-RW Drive
MODEL : CRD-RW2
FCC ID : JBQCDR018
EUT CONDITION : Pre-Production

DATE FOR TEST	:	August 4, 1999
FCC RULE PART	:	FCC PART 15 SUBPART B, DOCKET 87-389
EUT CLASS	:	B
MEASUREMENT	:	ANSI C63.4-1992
TEST RESULT	:	PASS
REPORT NO.	:	Z02C-99206
REMARKS	:	Internal Interface Cables were Unshielded cable.

Zacta Technology Corporation certifies that no party to the application is subject to a denial of federal benefits, that includes FCC benefits, pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21U.S.C. 853(a).

Authorized by : Shin-ichi Abe
General Manager, Zacta Technology Corporation Yonezawa Testing Center

The results in this report apply only to the samples tested.
This report shall not be re-product except in full without the written approval of Zacta Technology Corporation.

EQUIPMENT DESCRIPTION

PRODUCT DESCRIPTION

The EUT is the Internal CD-RW drive, FCC ID:JBQCDR018. This model CDR-RW2 FCC ID:JBQCDR018 is provided at Max.X8 data transfer speed. This device is provided SCSI interface.

APPLICANT	:	SANYO ELECTRIC CO., LTD.
FCC ID	:	JBQCDR018
OSC	:	20.0MHz, 33.8MHz
POWER	:	DC input +5V, +12V
I/F CABLE(S)	:	Unshielded
PORT/Connectors	:	Headphones jack Audio connector SCSI connector DC connector (DC INPUT)

Equipment Modifications : No modification was made during testing

EUT EXERCISE

The EUT exercise program used during Radiated and Conducted emission testing was designed to exercise the various system components in a manner similar to a typical use. Once loaded, the program sequentially exercised each system component in turn.

LABORATORY DESCRIPTION

DESCRIPTION FOR TEST SITE

1. LOCATION:

ZACTA TECHNOLOGY CORPORATION YONEAZAWA TESTING CENTER
4149-7 Hachimanpara 5-chome, Yonezawa-shi Yamagata 992-1128 Japan
Phone: +81-238-28-2880 Fax: +81-238-28-2888

2. THE NUMBER OF SITE:

Total: 4 sites - #1 site, #2 site, #3 site, #4 site

3. THE TYPE OF SITE:

Whether protected site

4. TEST TYPE:

All sites could perform as follows tests:
1) 3/10m Radiated disturbance test
2) Conducted disturbance test

5. FACILITY FILING INFORMATION

FCC FINAL SITE FILING: 2.948 Pursuant to ANSI C63.4-1992

#1 site, #2 site, #3 site (Final date: January 29, 1997)

#4 site (Final date: June 18, 1998)

*3m/10m Radiated emission test & Conducted emission test could be performed on each site

VCCI FINAL SITE FILING: V–5/97.04 Pursuant to VCCI Regulations for Registration of measurement facilities

#1 site	R – 136	C - 132	(Final date: April 1, 1997)
#2 site	R – 137	C – 133	(Final date: April 1, 1997)
#3 site	R – 138	C – 134	(Final date: April 1, 1997)
#4 site	R – 752	C - 775	(Final date: June 23, 1998)

NVLAP ACCREDITION:

NVLAP CODE: 200306-0

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

DESCRIPTION OF CONDUCTED EMISSION TESTING

The line-conducted emissions testing facility is located inside of the site which used for radiated emissions testing.
A 1 meter x 1.5 meter surface, 0.8 meter height from conducting ground plane wooden table is placed 40 cm away from the vertical conducting surface.
Two 50 /50 H Line Impedance Stabilization Network (LISN) are placed on the conducting ground plane.
The EUT was powered from the KYORITSU LISN and the support Equipment were CDI LISN.
Unused 50 BNC connector of the CDI LISN is terminated in 50 .
An isolation transformer has 50A which is large enough to not affect the peak consumption current by the EUT.
All interconnecting cables more than 1 meter were bundled to 1 meter length.
Sufficient time for the EUT, support equipment, and test equipment were allowed in order for them to warm up to their normal operating condition.
The frequency range was scanned from 450KHz to 30 MHz. The detector function of the test receiver was set to CISPR quasi-peak mode and the bandwidth was set to 10KHz.

The EUT, support equipment and interconnecting cables were arranged and manipulated to maximize worst emissions for each emission in this test report.

DESCRIPTION OF RADIATED EMISSION TESTING

Measurements: were made at 3 meter using broadband antenna (Biconical Antenna and log-periodic antenna) & Test receiver. Frequency Range : 30MHz – 1GHz was scanned and investigated using receiver. Six highest emissions(Min.) was reported. The test results represents the worst case emissions for each emission with manipulating the EUT, support equipment and interconnecting cables maximize the worst emissions in this test report.

Condition:
The detector function of the test receiver was set to CISPR Quasi-peak mode and the bandwidth was set to 120kHz. Sufficient time for the EUT, support equipment, and test equipment were allowed in order for them to warm up to their normal operating condition.
The EUT and support equipment were placed on a top of a 0.8 meter height wooden table.
For Floor-Standing devices, the EUT and all cables were installed on electrical insulating material.
The antenna height was varied 1 to 4 meters and stopped at height producing the maximum emission. The turntable was rotated by 360 degrees and stopped at azimuth of producing the maximum emission.
Interconnecting cables which are connected to a peripheral was bundled in center, and its length was not exceed 1 meter.
Each emission was maximized by: varying the mode of operation; clock or data exchange speed; scrolling H pattern to the EUT and support equipment, and powering the monitor from the floor mounted outlet box and the computer aux. AC outlet; changing the polarity of the antenna, whichever determined the worst case emission.
The normalized site attenuation graph for the both horizontal and vertical polarization are shown in Description for site.

UNCERTAINTY

Conducted Emission Test

Total Uncertainty @95%min.Confidence probability	**±1.78**

Radiated Emission Test

Total Uncertainty @95%min.Confidence probability	**3m**	**10m**
	±2.66	**±2.01**

TEST SITE CONDITION & INSTRUMENTATION

TEST SITE CONDITION

Test date	August 4, 1999
Site #	1 site
Power supply	DC +5V, +12V
Weather	Weather: Sunny Temp.: 34 Humidity: 55%
Standard	ANSI C63.4-1992
Deviation from The standards	Not applicable

USED FOR CONDUCTED EMISSION MEASUREMENT

Equipment	Manufacture	Model name / Serial No.	Calibration date	Period
Spectrum analyzer	Hewlett Packard	8568B / 2634A02803	Jun. 1999	1 year
Test Receiver	Kyoritsu Electrical Works, Ltd.	KNM-2402 / 4N-192-1	Nov. 1998	1 year
Line Impedance Stabilization Network	Kyoritsu Electrical Works, Ltd.	KNW-242C / 8-1096-3 (For EUT)	Jan. 1999	1 year
Line Impedance Stabilization Network	Kyoritsu Electrical Works, Ltd.	KNW-242C / 8-875-19 (For peripheral)	Feb. 1999	1 year
Coaxial cable	FUJIKURA	8D-2W / H110601#1/15C	Jun. 1999	1 year

USED FOR RADIATED DISTURBANCE MEASUREMENT

Equipment	Manufacture	Model name / Serial No.	Calibration date	Period
Spectrum analyzer	Hewlett Packard	8568B / 2634A02803	Jun. 1999	1 year
RF Preamplifier	Anritsu	MH648A / M96057	Nov. 1998	1 year
Test Receiver	Kyoritsu Electrical Works, Ltd.	KNM-5002 / 4N-200-5 KCV-6002 / 4-288-2	Jun. 1999	1 year
Biconical Antenna	Schwarzbeck	BBA9106/VHA9103LE / 13130919	Jun. 1999	1 year
Log Periodic Antenna	Electro-Mechanics Co.	3146 / 8901-2336	Jun. 1999	1 year
Coaxial cable	FUJIKURA	8D-2W / H110601#1/08R	Jun. 1999	1 year
Coaxial cable	FUJIKURA	23D-HA/ H110601#1/23D-HA	Jun. 1999	1 year
Site attenuation	Zacta Technology Corp.	1 site	Dec. 1998	1 year

*** Measurement above 1GHz ***

Equipment	Manufacture	Model name / Serial No.	Calibration date	Period
Spectrum Analyzer	ADVANTEST	R3271A / 65050042	May. 1999	1 year
RF Preamplifier	HEWLETT-PACKARD Co	8449B / 3008A00589	May. 1999	2 year
Double Ridged Guide Antenna	Electro-Mechanics Co.	3115 / 4328	Jun. 1998	2 year
Coaxial cable	SUHNER	SUCOFLEX 104 108014/4 & 108015/4	May. 1999	2 year

Calibration is traceable to NIST or an equivalent standards reference organization.

SAMPLE OF FIELD STRENGTH CALCULATION

$$dB\ V = 20\log_{10}(V)$$

$$dB\ V/m = 20\log_{10}(V/m)$$

[Sample Calculation]

*For Conduction Class B limit = 250 V = 48.0dB V

@ 3.332MHz

Reading = 41.6dB V
Cable Loss = 0.2dB
Total = 41.6 + 0.2 = 41.8dB V

Margin = 41.8 - 48.0 = -6.2dB

6.2 dB below the limit

*For Radiation Class B limit = 150 V/m = 43.5dB V/m

@ 181.0MHz

Reading = 35.7dB V
Ant. Factor + Cable Loss - Amp. Gain = 15.8 + 1.4 - 15.0 = 2.2dB/m
Total = 35.7 + 2.2 = 37.9dB V/m

Margin = 37.9 - 43.5 = -5.6dB

5.6 dB below the limit

LABORATORY MEASUREMENTS

PURSUNT TO PART 15, SUBPART B

COMPANY NAME	:	SANYO ELECTRIC CO., LTD.
EUT	:	CD-RW DRIVE
MODEL NO.	:	CRD-RW2
FCC ID	:	JBQCDR018

SERIAL NO.	:	38900002
DATE OF TESTS	:	August 4, 1999
MEASUREMENT	:	[ ] MP-4 [*] ANSI C63.4-1992
FCC CLASS	:	[ ] A [*] B
RADIATED EMISSION AT	:	[*] 3m [ ] 10m
POWER SUPPLIED	:	DC 5V,12V
REPORT NO.	:	Z02C-99206

JUSTIFICATION / ENGINEERING COMMENT

The detector function in frequency range of 30MHz-1GHz was set to Quasi-peak mode.

Cables were manipulated to produce the worst case emissions.

Conducted data of Host PC was reported.
(Indirectly connect to the AC power line.)

Accessory used: Audio cable
SCSI cable

All operating mode were tested.
Sufficient warm up time is proved for these testing.

Tested by : Koji Taguchi / EMC Engineer

SUMMARY OF DATA RESULT

Minimum margins to the limits are as follows:

CONDUCTED EMISSION DATA

OPERATING MODE	FREQUEMCY	MARGIN
READ	0.524MHz	-14.3dB
WRITE	0.525MHz	-14.4dB

AUDIO CD READ	0.524MHz	-14.3dB

RADIATED EMISSION DATA

OPERATING MODE	FREQUEMCY	MARGIN
READ	66.43MHz	-4.4dB
WRITE	66.43MHz	-4.4dB
AUDIO CD READ	66.43MHz	-4.7dB

CONFIGURATION INFORMATION

DEVICES INFORMATION

NO.	EQUIPMENT	COMPANY	MODEL NO.	SERIAL NO.	DoC / FCC ID	COMMENT
1	CD-RW Drive	SANYO	CRD-RW2	38900002	JBQCDR018	EUT
2	SCSI II board	Adaptec	AHA-2940	BB0E64705T3	FGTAHA2940	
3	Main board	COMPAQ	N/A	N/A	N/A	
4	Personal Computer	COMPAQ	3590	238334-001	CNT75MEZ6	
5	Headphone	FISHER	N/A	N/A	N/A	
6	Speaker	Panasonic	RP-SP30	N/A	N/A	
7	Printer	HP	C4555A	SG69A1425N	B94C4555X	
8	Display	Goldstar	Studio Works 56i	15005G004960	BEJCS585	
9	Modem	US Robotics	839	000839032BK6 YV4J	DoC	
10	AC adapter	US Robotics	N/A	N/A	N/A	For Modem
11	Keyboard	COMPAQ	Enhanced III Keyboard	140536-101	AQ6ZG-CCC	
12	Mouse	Microsoft	PS/2 Compatible Mouse	858487	C3K76FPS26 C	

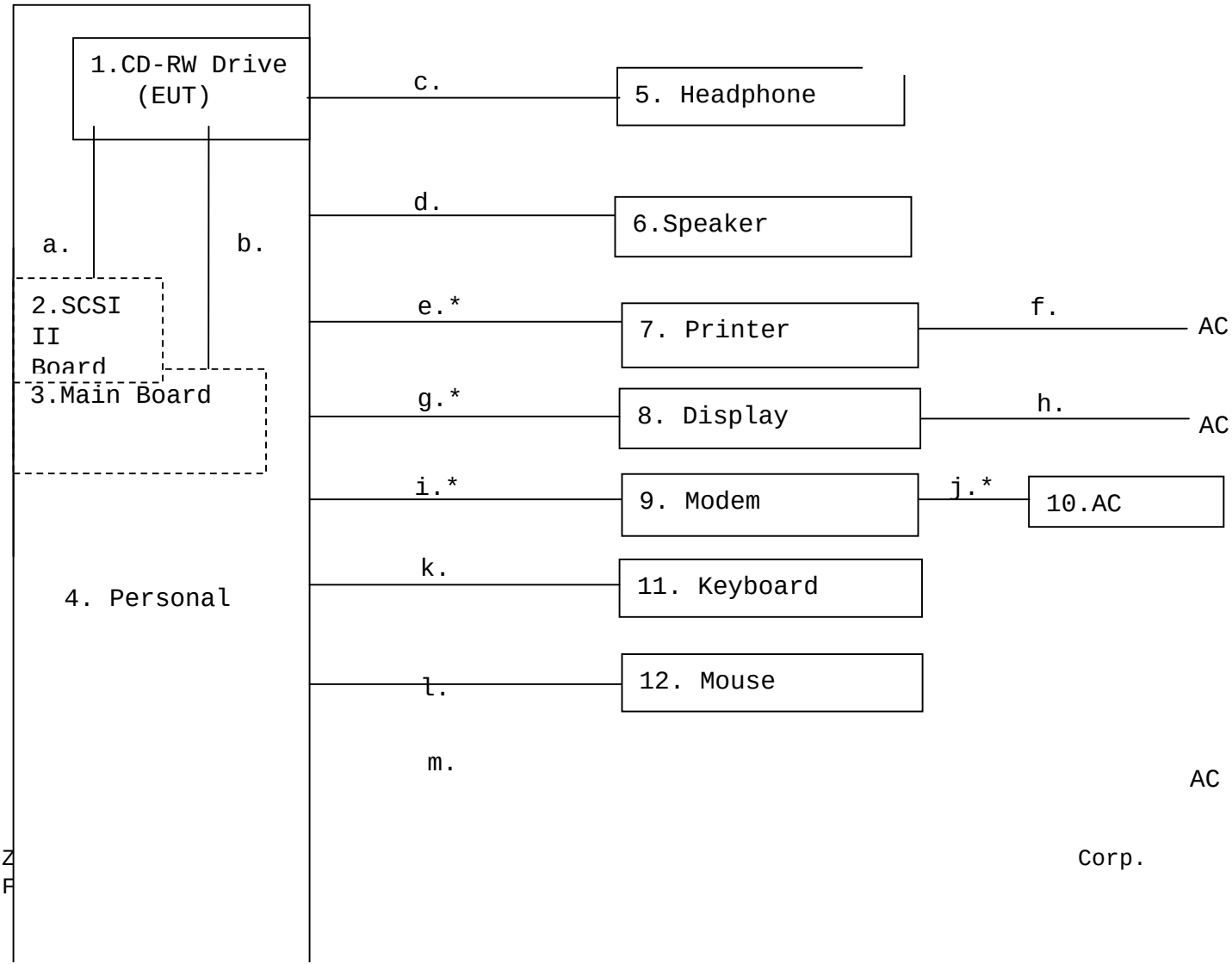
CABLES INFORMATION

NO.	CABLE	COMPANY	LENGTH	SHIELDED		Connected Situation		COMMENT
			[m]	Cable	Connector	From	To	
a	SCSI II cable	N/A	0.4	Unshielded	Plastic	EUT	SCSI board	
b	Audio cable	N/A	0.4	Unshielded	Plastic	EUT	Main board	
c	Headphone cable	N/A	2.0	Unshielded	Metal	EUT	Headphone	
d	Speaker cable	N/A	1.0	Unshielded	Metal	PC	Speaker	
e	Centronics cable	EPSON	2.0	Shielded	Metal	PC	Printer	*

f	AC power cord	N/A	2.0	Shielded	Plastic	Printer	AC outlet	For Printer
g	Video cable	Goldstar	1.5	Shielded	Metal	PC	Display	*
h	AC power cord	Goldstar	2.2	Unshielded	Plastic	Display	AC outlet	For Display
i	RS232C cable	INMAC	2.0	Shielded	Metal	PC	Modem	*
j	DC cable	N/A	2.0	Unshielded	Metal	Modem	AC adapter	For Modem
k	Keyboard cable	N/A	1.5	Unshielded	Metal	PC	Keyboard	Coiled
l	Mouse cable	N/A	1.5	Unshielded	Metal	PC	Mouse	
m	AC power cord	COMPAQ	2.0	Shielded	Plastic	PC	AC outlet	For EUT

* Bundled to 1.0m

SYSTEM CONFIGURATION



*: Bundled to 1.0m

[redacted]: Ferrite core

#: Un-detachable cable

Comment: Please note that No.8 Display in above diagram is certified with the molded ferrite
core on cable. I/F cable is Un-detachable from display and ferrite core is not added
during testing.

TEST DATA

= FCC PART15B class B LINE CONDUCTED DATA SHEET =

DATE OF TESTS : 99/08/04	SITE : 1	SHEET NO.: 1
COMPANY NAME : SANYO	MODEL: CRD-RW2	OPERATING MODE: READ

FREQ. [MHz]	READ.A [dBuV]	READ.B [dBuV]	FACTOR [dB]	NET A [dBuV]	NET B [dBuV]	LIMITS [dBuV]	MARGIN [dB]	COMMENT
0.524	33.0	33.6	0.1	33.1	33.7	48.0	-14.3	*
0.751	30.0	29.7	0.1	30.1	29.8	48.0	-17.9	
0.897	30.1	28.6	0.1	30.2	28.7	48.0	-17.8	
1.351	31.6	29.5	0.3	31.9	29.8	48.0	-16.1	
1.724	30.8	28.0	0.3	31.1	28.3	48.0	-16.9	
15.948	31.7	31.6	0.6	32.3	32.2	48.0	-15.7	

FACTOR=LISN.F+CABLE.F *: The Worst emission

VER.6.1

= FCC PART15B class B LINE CONDUCTED DATA SHEET =

DATE OF TESTS : 99/08/04	SITE : 1	SHEET NO.: 2
COMPANY NAME : SANYO	MODEL: CRD-RW2	OPERATING MODE: WRITE

FREQ. [MHz]	READ.A [dBuV]	READ.B [dBuV]	FACTOR [dB]	NET A [dBuV]	NET B [dBuV]	LIMITS [dBuV]	MARGIN [dB]	COMMENT
0.525	33.1	33.5	0.1	33.2	33.6	48.0	-14.4	*
0.750	29.9	29.6	0.1	30.0	29.7	48.0	-18.0	
0.897	30.1	28.7	0.1	30.2	28.8	48.0	-17.8	
1.350	31.7	29.5	0.3	32.0	29.8	48.0	-16.0	
1.724	30.8	27.9	0.3	31.1	28.2	48.0	-16.9	
15.947	31.6	31.6	0.6	32.2	32.2	48.0	-15.8	

FACTOR=LISN.F+CABLE.F *: The Worst emission

VER.6.1

= FCC PART15B class B LINE CONDUCTED DATA SHEET =

DATE OF TESTS : 99/08/04	SITE : 1	SHEET NO.: 3
COMPANY NAME : SANYO	MODEL: CRD-RW2	OPERATING MODE: AUDIO CD READ

FREQ. [MHz]	READ.A [dBuV]	READ.B [dBuV]	FACTOR [dB]	NET A [dBuV]	NET B [dBuV]	LIMITS [dBuV]	MARGIN [dB]	COMMENT
0.524	33.0	33.6	0.1	33.1	33.7	48.0	-14.3	*
0.750	29.8	29.6	0.1	29.9	29.7	48.0	-18.1	
0.899	30.0	28.5	0.1	30.1	28.6	48.0	-17.9	
1.350	31.7	29.3	0.3	32.0	29.86	48.0	-16.0	
1.723	30.8	27.9	0.3	31.1	28.2	48.0	-16.9	
15.947	31.4	31.5	0.6	32.0	32.1	48.0	-15.9	

FACTOR=LISN.F+CABLE.F *: The Worst emission

VER.6.1

= FCC PART15B class B 3m RADIATED DATA SHEET =

DATE OF TESTS : 99/08/04	SITE : 1	SHEET NO.: 4
COMPANY NAME : SANYO	MODEL: CRD-RW2	OPERATING MODE: READ

POL. [H/V]	FREQ. [MHz]	READ [dBuV]	FACTOR [dB/m]	NET [dBuV/m]	LIMITS [dBuV/m]	MARGIN [dB]	COMMENT
V	44.49	44.9	-14.1	30.8	40.0	-9.2	
H	66.43	55.1	-20.9	34.2	40.0	-5.8	
V	66.43	56.5	-20.9	35.6	40.0	-4.4	*
H	74.73	52.7	-22.2	30.2	40.0	-9.8	
V	75.77	54.9	-22.2	30.7	40.0	-7.3	
V	99.57	50.3	-18.5	31.8	43.5	-11.7	
H	132.83	46.7	-14.0	32.7	43.5	-10.8	
H	166.03	48.1	-11.8	36.3	43.5	-7.2	
H	232.40	48.3	-10.5	37.8	46.0	-8.2	
H	332.03	44.5	-12.9	31.6	46.0	-14.4	
H	533.36	44.7	-7.9	36.8	46.0	-9.2	
H	546.57	48.1	-7.7	40.4	46.0	-5.6	
V	546.63	49.2	-7.7	41.5	46.0	-4.5	
V	796.84	41.8	-3.2	38.6	46.0	-7.4	
H	796.85	43.3	-3.2	40.1	46.0	-5.9	

FACTOR=ANT.F+CABLE.F-AMP.G *: The Worst emission

VER.6.3

= FCC PART15B class B 3m RADIATED DATA SHEET =

DATE OF TESTS : SITE : 1 SHEET NO.: 5
99/08/04
COMPANY NAME : SANYO MODEL: CRD-RW2 OPERATING MODE: WRITE

POL. [H/V]	FREQ. [MHz]	READ [dBuV]	FACTOR [dB/m]	NET [dBuV/	LIMITS [dBuV/	MARGIN [dB]	COMMENT

				m]	m]		
V	45.70	43.6	-14.4	29.2	40.0	-10.8	
H	66.42	53.5	-20.9	32.6	40.0	-7.4	
V	66.43	56.5	-20.9	35.6	40.0	-4.4	*
H	74.73	52.4	-22.2	30.2	40.0	-9.8	
V	75.76	53.9	-22.2	31.7	40.0	-8.3	
V	99.57	48.9	-18.5	30.4	43.5	-13.1	
H	132.83	42.9	-14.0	28.9	43.5	-14.6	
H	166.03	42.8	-11.8	31.0	43.5	-12.5	
H	232.43	42.6	-10.5	32.1	46.0	-13.9	
H	332.03	47.3	-12.9	34.4	46.0	-11.6	
H	533.39	45.0	-7.9	37.1	46.0	-8.9	
V	546.63	45.0	-7.7	37.3	46.0	-8.7	
H	546.67	42.7	-7.7	35.0	46.0	-11.0	
V	796.80	41.9	-3.2	38.7	46.0	-7.3	
H	796.85	42.4	-3.2	39.2	46.0	-6.8	

FACTOR=ANT.F+CABLE.F-AMP.G *: The Worst emission

VER.6.3

= FCC PART15B class B 3m RADIATED DATA SHEET =

DATE OF TESTS : 99/08/04	SITE : 1	SHEET NO.: 6
COMPANY NAME : SANYO	MODEL: CRD-RW2	OPERATING MODE: AUDIO CD READ

POL. [H/V]	FREQ. [MHz]	READ [dBuV]	FACTOR [dB/m]	NET [dBuV/ m]	LIMITS [dBuV/ m]	MARGIN [dB]	COMMENT
V	45.32	44.1	-14.4	29.7	40.0	-10.3	
H	66.42	54.8	-20.9	33.9	40.0	-6.1	
V	66.43	56.2	-20.9	35.3	40.0	-4.7	*

H	74.73	52.6	-22.2	30.4	40.0	-9.6
V	75.76	54.4	-22.2	32.2	40.0	-7.8
V	99.57	50.1	-18.5	31.6	43.5	-11.9
H	132.83	45.8	-14.0	31.8	43.5	-11.7
H	166.03	47.7	-11.8	35.9	43.5	-7.6
H	232.43	47.6	-10.5	37.1	46.0	-8.9
H	332.03	46.9	-12.9	34.0	46.0	-12.0
H	533.39	45.2	-7.9	37.3	46.0	-8.7
V	545.83	45.8	-7.7	38.1	46.0	-7.9
H	545.98	46.7	-7.7	39.0	46.0	-7.0
V	796.80	41.9	-3.2	38.7	46.0	-7.3
H	796.85	43.3	-3.2	40.1	46.0	-5.9

FACTOR=ANT.F+CABLE.F-AMP.G *: The Worst emission

VER.6.3