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TEST REPORT

Report No.: Z01C-01167

Issue Date: May 17, 2001

The device, as described herewith, was tested pursuant to applicable test procedure indicated below and complies with the requirements of;

FCC Part15 Subpart B, Class B

The EUT complies with section 15.37 "Transition provision for compliance with the rules".

The test results are traceable to international or national standards.

Applicant	: Sanyo Electric Co., Ltd. Information Products Division 1-1-1, Sakata, Oizumi-machi Ora-gun , Gunma-ken 370-0596 Phone: +81-276-61-8006 Fax.: +81-276-61-8752
Equipment under test (EUT)	: CD-RW Drive
FCC ID	: JBQCDR023
Trade Name	: SANYO
Model Number	: CRD-BP5
Serial Number	: PP005
EUT Condition	: Pre-production

Test procedure : ANSI C63.4-1992

Date of test : May 3, 2001

Test place : Site 2

Test results : Complied

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

The results in this report are applicable only to the samples tested.

This report shall not be re-produced except in full without the written approval of ZACTA Technology Corporation.

Test performed by: Takuya Osato / EMC engineer

Authorized by: Kiyoshi Endo / Manager of Technical Division



NVLAP LAB CODE 200306-0

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1. Equipment description

1.1 EUT information

No.	EUT	Company	Model No.	Serial No.	FCC ID/DoC	Comment
1	CD-RW Drive	SANYO	CRD-BP5	PP005	JBQCDR023	-

Max. used frequency : 310.00MHz ($\pm 25\%$)

Oscillator(s)/Crystal(s) : 20.00MHz, 33.86MHz, 310.00MHz ($\pm 25\%$)

Operating frequency

Power ratings : DC +5V, +12V
[EUT is powered from Host PC.
Power supply for Host PC in testing was AC 120V 60Hz.]

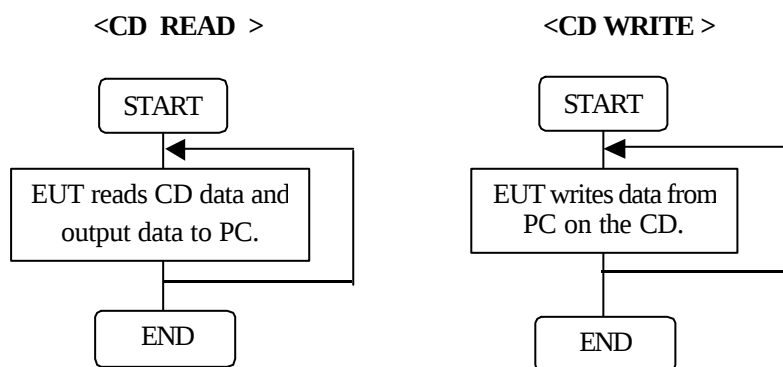
Port(s) : Headphones jack
Audio connector (Analog, Digital)
SCSI connector
DC connector (DC input)

Size : (W) 146 x (H) 41.3 x (D) 188.5 mm

Operating mode : CD READ mode
CD WRITE mode

Variation of model(s) : Not applicable

1.2 Operating flow



2. Configuration information

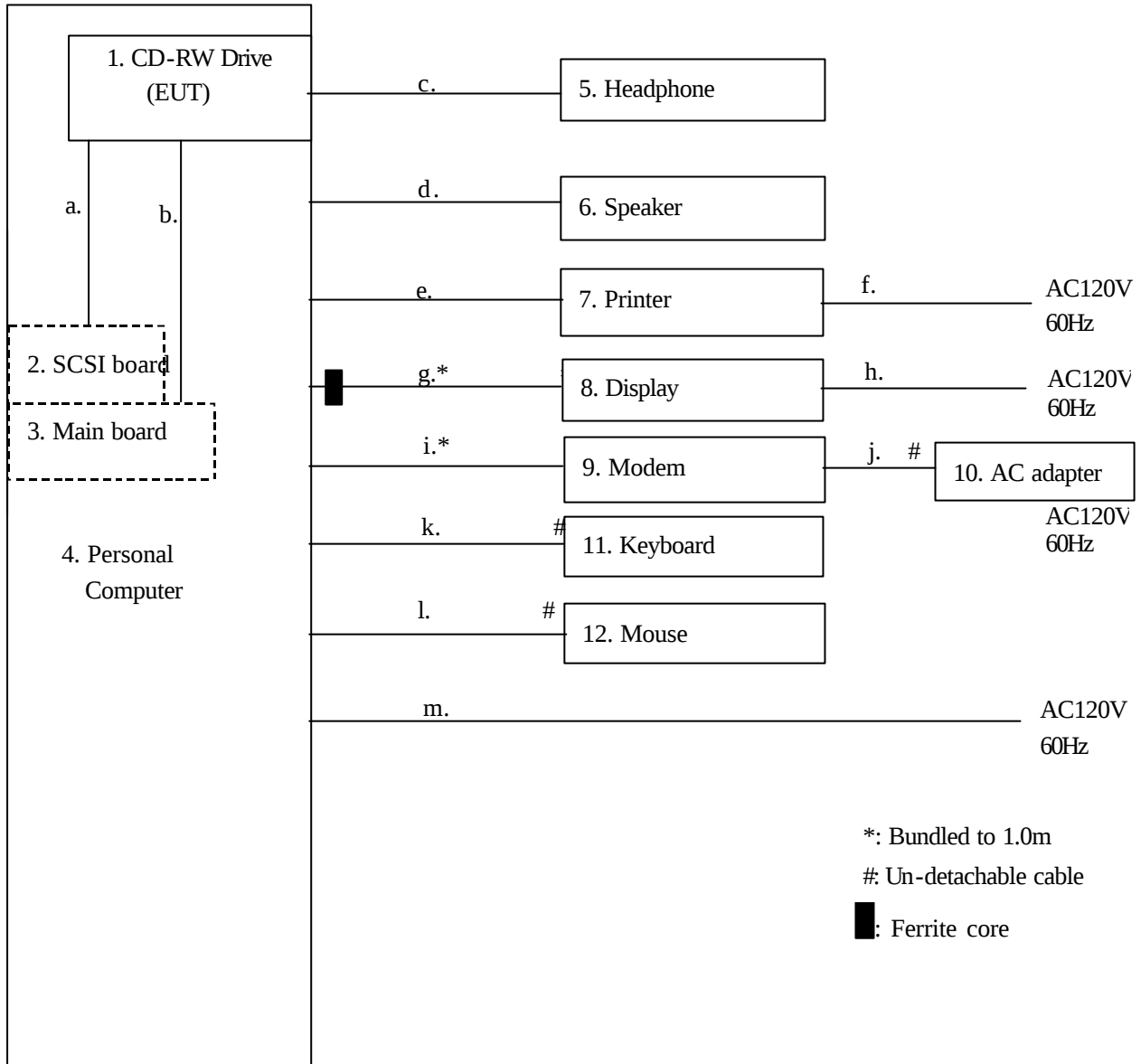
2.1 Peripheral(s) information

No.	Equipment	Company	Model No.	Serial No.	DoC / FCC ID	Comment
2	SCSI board	Adaptec	AHA-2940U2W	BB0F03705NG	DoC	-
3	Main board	COMPAQ	N/A	N/A	N/A	-
4	Personal Computer	COMPAQ	Prosig 320 C500/ M1 JPN2	7016 CZLIP0116	DoC	-
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	000839032BK6YV4J	DoC	-
10	AC adapter for Modem	US Robotics	N/A	N/A	N/A	-
11	Keyboard	COMPAQ	KB-9965	B13B00WBUJ6150	DoC	-
12	Mouse	COMPAQ	Intel liMouse	0805393-5	DoC	-

2.2 Cable(s) information

No.	Cable	Length [m]	Shield	Connector	From	To	Comment
a	SCSI cable	0.4	Unshielded	Plastic	EUT	SCSI board	-
b	Audio cable	0.5	Unshielded	Plastic	EUT	Main board	-
c	Headphone cable	2.0	Unshielded	Metal	EUT	Headphone	-
d	Speaker cable	1.0	Unshielded	Metal	PC	Speaker	-
e	Centronics cable	2.0	Shielded	Metal	PC	Printer	-
f	AC power cord for Printer	2.0	Shielded	Plastic	Printer	AC outlet	-
g	Video cable	1.5	Shielded	Metal	PC	Display	Bundled excess cable. With one ferrite core
h	AC power cord for Display	2.2	Unshielded	Plastic	Display	AC outlet	-
i	RS232C cable	2.0	Shielded	Metal	PC	Modem	Bundled excess cable.
j	DC cable for Modem AC adapter	2.0	Unshielded	Metal	Modem	AC adapter	-
k	Keyboard cable	2.0	Unshielded	Metal	PC	Keyboard	Coiled
l	Mouse cable	1.8	Unshielded	Metal	PC	Mouse	-
m	AC power cord for PC	2.0	Shielded	Plastic	PC	AC outlet	-

2.3 System configuration



Note 1: Numbers assigned to equipment or cables on this diagram are corresponded to the list in “1.1 EUT information”, “2.1 Peripheral(s) information” and “2.2 Cable(s) information”.

Note 2: Display is certified with the molded ferrite core on cable (No. g). I/F cable is Un-detachable and ferrite core is not added during testing

3. Test procedure

3.1 Description of Conducted Emission testing

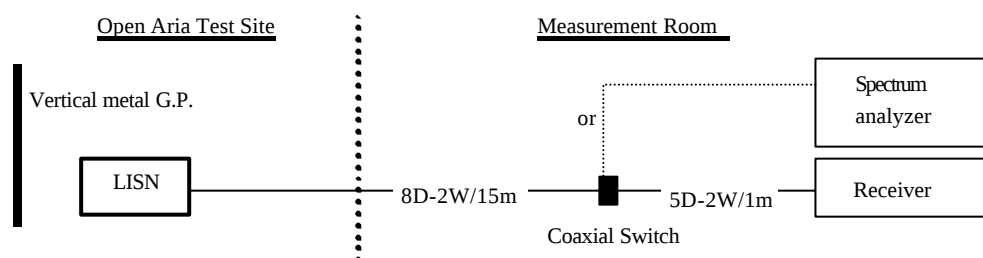
Conducted emission testing is performed using test receiver. The detector function of the receiver is set to CISPR quasi-peak mode and the bandwidth is set to 9kHz. The frequency range from 450kHz to 30 MHz is scanned, and six highest emissions (Min.) are reported. The test results represent the worst-case emission for each emission with manipulating the EUT, support equipment, interconnecting cables and varying the mode of operation.

EUT and support equipment is on a 1 meter x 1.5 meter surface, 0.8-meter height wooden table that is placed 40 cm away from the vertical metal ground plane.

Conducted emission of Host PC was tested because EUT is powered from Host PC. 50Ω/50uH Line Impedance Stabilization Network (LISN) are 80cm away from the Host PC and placed on the conducting ground plane. LISN for peripheral is terminated in 50 Ω.

Sufficient time for the EUT, support equipment and test equipment are allowed in order for them to warm up to their normal operating condition.

Test Configuration for Conducted emission Test



3.2 Test equipment for Conducted emission

Equipment	Company	Model No.	Serial No.	Calibration date	Period
Spectrum analyzer	Agilent Technologies	8568B	2634A03228	Sep. 2000	1 year
Test Receiver	ROHDE&SHWARZ	ESHS10	842884/009	Oct. 2000	1 year
Line Impedance Stabilization Network for Host PC	Kyoritsu Electrical Works, Ltd.	KNW-242C	8-1096-3	Mar. 2001	1 year
Line Impedance Stabilization Network for Peripheral	Kyoritsu Electrical Works, Ltd.	KNW-242	8-1094-5	May. 2000	1 year
50Ω terminator	Agilent Technologies	11593A	N/A	Aug. 2000	1 year
Coaxial cable	FUJIKURA	8D-2W/15m 5D-2W/1m	H120601#2/C	Jun. 2000	1 year
Coaxial Switch	ANRITSU	MP59B	M26050	Jun. 2000	1 year

*The above equipment calibration is traceable to NIST or an equivalent standards reference organization.

3.3 Description of Radiated emission testing

Radiated emission testing is performed at 3m distance using broadband antenna (Biconical antenna, log-periodic antenna and double-ridged guide antenna). The antenna is positioned both the horizontal and vertical planes of polarization and height is varied 1 to 4 meters and stopped at height producing the maximum emission. Frequency Range: 30MHz –1GHz is scanned and investigated using receiver, and above 1GHz, using spectrum analyzer. The detector function of the test receiver is set to CISPR Quasi-peak mode and the bandwidth is set to 120kHz. Peak and average detectors are used for measurements above 1GHz. The bandwidth of spectrum analyzer is set to 1MHz.

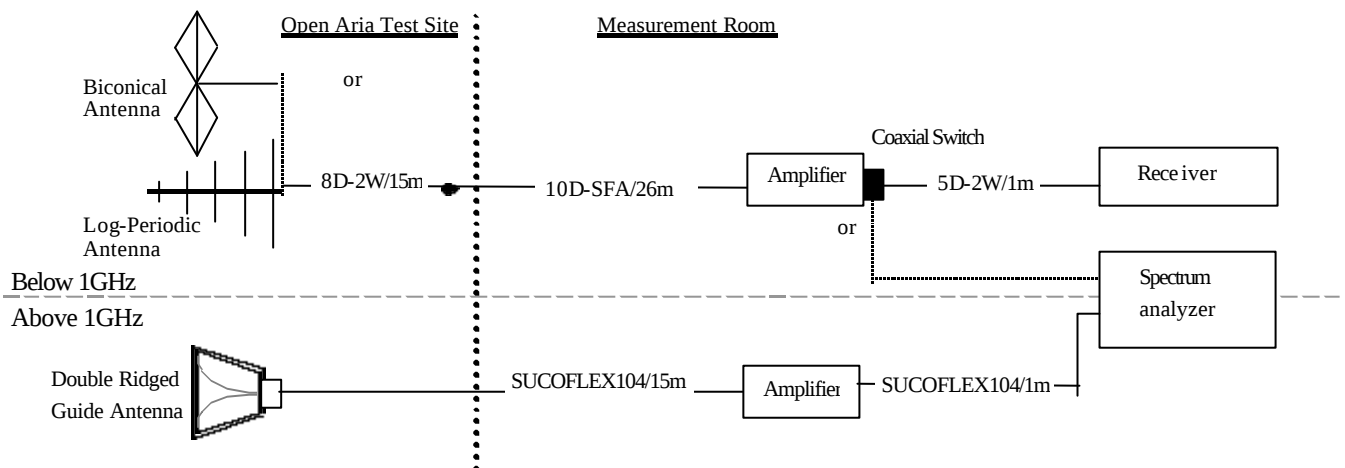
The EUT and support equipment are placed on a 1 meter x 1.5 meter surface, 0.8 meter height wooden table. The turntable is rotated by 360 degrees and stopped at azimuth of producing the maximum emission.

Interconnecting cables, which hanging closer than 40cm to the horizontal metal ground plane are bundled its excess in center. Six highest emissions (Min.) are reported. The test results represent the worst-case emission for each emission with manipulating the EUT, support equipment, interconnecting cables and varying the mode of operation.

Sufficient time for the EUT, support equipment, and test equipment are allowed in order for them to warm up to their normal operating condition.

The highest frequency used in the EUT is 310MHz, therefore, the frequency range is investigated from 30MHz up to the frequency 2GHz, as specified in CFR section 15.33.

Test Configuration for Radiated emission Test



3.4 Test equipment for Radiated emission

[Testing below 1GHz]

Equipment	Company	Model No.	Serial No.	Calibration date	Period
Spectrum analyzer	Agilent Technologies	8568B	2634A03228	Sep. 2000	1 year
RF Preamplifier	Anritsu	MH648A	M96157	Aug. 2000	1 year
Test Receiver	Kyoritsu Electrical Works, Ltd.	KNM-5002 KCV-6002	4N-187-10 4-257-1	Dec. 2000	1 year
Biconical Antenna	Schwarzbeck	BBA9106/VHA9103LE	02130879	Jun. 2000	1 year
Log Periodic Antenna	EMCO	3146	9406-3853	May. 2000	1 year
Coaxial cable	FUJIKURA	8D-2W/15m 10D-SFA/26m 5D-2W/1m	H120601#2/R3	Jun. 2000	1 year
Coaxial Switch	ANRITSU	MP59B	M26050	Jun. 2000	1 year
Site attenuation	ZACTA Technology Corp.	Site 2	N/A	Dec.2000	1 year

[Testing above 1GHz]

Equipment	Company	Model No.	Serial No.	Calibration date	Period
Spectrum Analyzer	ADVANTEST	R3271A	65050042	May. 2000	1 year
RF Preamplifier	Agilent Technologies	8449B	3008A00589	May. 2000	1 year
Double Ridged Guide Antenna	EMCO	3115	4328	Sep. 2000	1 year
Coaxial cable	SUHNER	SUCOFLEX 104/15m SUCOFLEX 104/1m	108014/4 108015/4	May. 2000	1 year

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

4. Laboratory description

4.1 Description for Test Site

1. Location: ZACTA Technology Corporation Yonezawa 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 and Type of Site:

Site name: Site 1, Site 2 and Site 3 - Total 3 sites.

Site type : Whether protected site

*3m/10m Radiated emission & Conducted emission testing can be performed on each site

3. Facility filing information:

1) FCC site filing: Pursuant to CFR47§2.948

Site name	Final filing date
Site 1, Site 2 and Site 3	March 6, 2000

2) VCCI site filing: Pursuant to V-5/99.05 VCCI Regulations for Registration of measurement facilities

Site name	Radiated emission Registration No.	Conducted emission Registration No.	Duration of Registration
Site 1	R-136	C-132	September 30, 2003
Site 2	R-137	C-133	September 30, 2003
Site 3	R-138	C-134	September 30, 2003

3) NVLAP Accreditation:

NVLAP Lab. code: **200306-0**

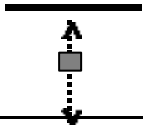
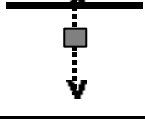
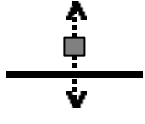
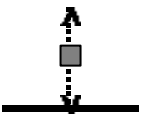
NVLAP information: NVLAP accreditation does not constitute any product endorsement by NVLAP or any agent of the U.S. Government

4.2 Uncertainty

Expanded Uncertainties stated were calculated with a coverage Factor $k=2$.

$\pm 2.97\text{dB}$	• • • For Conducted Emission
$\pm 5.23\text{dB}$	• • • For 3m Radiated Emission
$\pm 4.26\text{dB}$	• • • For 10m Radiated Emission

Judgment of Uncertainty under the measurement data and the scope of permission

Example A	Example B	Example C	Example D
			
Judgment: Complied	Judgment: Complied	Judgment: Not complied	Judgment: Not complied
The result of measurement is compliance with the limit in 95% or more confidence probability.	The result of measurement is compliance with the limit with less extent of uncertainty of the measurement. It is impossible to consider it complies with the limit in 95% confidence probability, but the result satisfies the limit in high probability.	The result of measurement is not compliance with the limit with less extent of uncertainty of the measurement. It is impossible to consider it complies with the limit in 95% confidence probability, but the result does not satisfy the limit in high probability.	The result of measurement is not compliance with the limit.

———— : Limit ■ : Result of the measurements - - - - - : Uncertainty

5. Results of the measurements

5.1 Results of the measurements

The minimum margins to the limits are as follows.

Conducted emission	Margin	Frequency	Detector	Phase	Operating mode	Data sheet
	9.1dB	0.482MHz	Quasi-peak	L2	CD Write mode	No. 2

Radiated emission	Margin	Frequency	Antenna Polarity	Antenna Height	Table degree	Operating mode	Data sheet
	2.5dB	359.77MHz	Horizontal	1.0m	85°	CD Write mode	No. 4

5.2 Deviation from the standard

Not applicable.

5.3 Sample of field strength calculation

Conducted Emission [Sample Calculation] $\text{dBuV} = 20\log_{10}(\text{uV})$

Class B
Limit @3.332MHz = 250uV = 48.0dBuV
Reading = 41.6dBuV Cable Loss + LISN Factor = 0.2 + 0.5 = 0.7dB Total = 41.6 + 0.7 = 42.3dBuV Margin = 48.0 - 42.3 = <u>5.7dB</u>

Radiated Emission [Sample Calculation] $\text{dBuV/m} = 20\log_{10}(\text{uV/m})$

Class B
Limit @147.6MHz = 150uV/m = 43.5dBuV/m
Reading = 42.8dBuV Ant. Factor + Cable Loss - Amp. Gain = 14.2 + 3.0 - 30.0 = -12.8dB Total = 42.8 - 12.8 = 30.0dBuV/m Margin = 43.5 - 30.0 = <u>13.5dB</u>

6. Test Data

***** CONDUCTED EMISSION *****

Standard : FCC Part15 SubpartB
Class : B

Sheet Number : 1

Date of test : 2001/5/3
Test Site : 2
Temperature [] : 18.0
Humidity [%] : 58.0
Operator : T.Osato
Company Name : SANYO
EUT : CD-RW Drive
Model Number : CRD-BP5
Serial Number : PP005
Test Mode : CD Read Mode
Comment :

Signature : _____

[Quasi-Peak] Phase	Frequency [MHz]	Reading [dB μ V]	Factor [dB]	Emission Level [dB μ V]	Limit [dB μ V]	Margin [dB]	Comment
L1	0.481	37.0	0.1	37.1	48.0	10.9	
L1	0.571	35.3	0.1	35.4	48.0	12.6	
L1	0.621	34.0	0.1	34.1	48.0	13.9	
L1	0.897	35.2	0.1	35.3	48.0	12.7	
L1	0.965	33.3	0.1	33.4	48.0	14.6	
L1	1.241	35.9	0.2	36.1	48.0	11.9	
L2	0.480	38.0	0.1	38.1	48.0	9.9	*
L2	0.620	35.9	0.1	36.0	48.0	12.0	
L2	0.690	36.0	0.1	36.1	48.0	11.9	
L2	0.897	36.0	0.1	36.1	48.0	11.9	
L2	0.965	35.4	0.1	35.5	48.0	12.5	
L2	1.244	33.4	0.2	33.6	48.0	14.4	

* : The worst emission.

Factor 1:ISN Factor + Cable Loss

Ver.2.00 F2#007

***** CONDUCTED EMISSION *****

Standard : FCC Part15 SubpartB
Class : B

Sheet Number : 2

Date of test : 2001/5/3
Test Site : 2
Temperature [] : 18.0
Humidity [%] : 58.0
Operator : T.Osato
Company Name : SANYO
EUT : CD-RW Drive
Model Number : CRD-BP5
Serial Number : PP005
Test Mode : CD Write Mode
Comment :

Signature : _____

[Quasi-Peak]		Reading	Factor	Emission Level	Limit	Margin	Comment
Phase	Frequency						
	[MHz]	[dB μ V]	[dB]	[dB μ V]	[dB μ V]	[dB]	
L1	0.482	38.2	0.1	38.3	48.0	9.7	
L1	0.576	36.3	0.1	36.4	48.0	11.6	
L1	0.620	34.2	0.1	34.3	48.0	13.7	
L1	0.896	35.5	0.1	35.6	48.0	12.4	
L1	0.965	37.0	0.1	37.1	48.0	10.9	
L1	1.244	35.3	0.2	35.5	48.0	12.5	
L2	0.482	38.8	0.1	38.9	48.0	9.1	*
L2	0.620	35.9	0.1	36.0	48.0	12.0	
L2	0.690	36.5	0.1	36.6	48.0	11.4	
L2	0.897	35.4	0.1	35.5	48.0	12.5	
L2	0.965	35.9	0.1	36.0	48.0	12.0	
L2	1.243	33.3	0.2	33.5	48.0	14.5	

* : The worst emission.

Factor : LISN Factor + Cable Loss

Ver.2.00 F2#007

***** RADIATED EMISSION *****

Standard : FCC Part15 SubpartB
Class : B
Distance [m] : 3
Date of test : 2001/5/3
Test Site : 2
Temperature [] : 18.0
Humidity [%] : 58.0
Operator : T.Osato
Company Name : SANYO
EUT : CD-RW Drive
Model Number : CRD-BP5
Serial Number : PP005
Test Mode : CD Read Mode
Comment :

Sheet Number : 3

Signature : _____

Antenna Pol.	Antenna Height	Table Radian	Reading Frequency	Reading Level	Factor	Emission Level	Limit	Margin	Comment
HOR/VER	[m]	[Deg.]	[MHz]	[dB μ V]	[dB μ V/m]	[dB μ V/m]	[dB μ V/m]	[dB]	
HOR	2.0	100	146.56	45.6	-12.4	33.2	43.5	10.3	
HOR	2.0	95	157.81	47.1	-11.8	35.3	43.5	8.2	
VER	1.0	55	214.11	40.3	-9.5	30.8	43.5	12.7	
HOR	2.0	160	219.72	38.7	-9.4	29.3	46.0	16.7	
VER	1.0	15	255.41	39.7	-8.7	31.0	46.0	15.0	
HOR	1.5	85	359.80	53.2	-10.3	42.9	46.0	3.1	*
VER	1.0	205	359.81	50.1	-10.3	39.8	46.0	6.2	
VER	1.0	5	367.12	36.1	-10.1	26.0	46.0	20.0	
HOR	1.0	0	368.93	38.5	-10.1	28.4	46.0	17.6	
HOR	1.5	325	575.72	42.5	-6.2	36.3	46.0	9.7	
VER	1.0	55	759.89	36.2	-2.7	33.5	46.0	12.5	
VER	1.0	195	998.35	34.2	4.0	38.2	54.0	15.8	
HOR	1.0	145	1131.65	34.7	-7.5	27.2	54.0	26.8	Ave
HOR	1.0	145	1131.65	43.5	-7.5	36.0	54.0	18.0	Peak

* : The worst emission.

Factor :Antenna Factor + Cable Loss - Amp Gain

Ver.2.00 F2#007

***** RADIATED EMISSION *****

Standard : FCC Part15 SubpartB
Class : B
Distance [m] : 3
Date of test : 2001/5/3
Test Site : 2
Temperature [] : 18.0
Humidity [%] : 58.0
Operator : T.Osato
Company Name : SANYO
EUT : CD-RW Drive
Model Number : CRD-BP5
Serial Number : PP005
Test Mode : CD Write Mode
Comment :

Sheet Number : 4

Signature : _____

Antenna Pol.	Height	Table Radian	Reading Frequency	Level	Factor	Emission Level	Limit	Margin	Comment
HOR/VER	[m]	[Deg.]	[MHz]	[dB μ V]	[dB μ V/m]	[dB μ V/m]	[dB μ V/m]	[dB]	
VER	2.0	125	90.96	48.5	-19.5	29.0	43.5	14.5	
HOR	2.0	90	146.10	45.1	-12.4	32.7	43.5	10.8	
HOR	2.0	90	157.64	43.6	-11.8	31.8	43.5	11.7	
VER	1.0	200	166.53	38.7	-11.3	27.4	43.5	16.1	
VER	1.0	50	214.10	40.0	-9.5	30.5	43.5	13.0	
HOR	2.0	100	219.59	38.0	-9.4	28.6	46.0	17.4	
HOR	2.0	205	242.03	44.7	-9.1	35.6	46.0	10.4	
VER	1.0	215	359.77	47.7	-10.3	37.4	46.0	8.6	
HOR	1.0	85	359.77	53.8	-10.3	43.5	46.0	2.5	*
VER	1.0	200	998.35	34.1	4.0	38.1	54.0	15.9	
HOR	1.0	225	998.37	33.3	4.0	37.3	54.0	16.7	
HOR	1.0	285	1131.37	34.8	-7.5	27.3	54.0	26.7	Ave
HOR	1.0	285	1131.37	41.4	-7.5	33.9	54.0	20.1	Peak

* : The worst emission.

Factor Antenna Factor + Cable Loss - Amp Gain

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