

TEST REPORT

Report No.: Z01C-00344

Issue Date: November 9, 2000

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	: JBQCDR021
Trade Name	: SANYO
Model Number	: CRD-BP1400P
Serial Number	: 38900005
EUT Condition	: Pre-production

Test procedure	: ANSI C63.4-1992
Date of test	: October 30, 31, 2000
Test place	: Site 1
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: Shigeo Senda / 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-BP1400P	38900005	JBQCDR021	-

Max. used frequency : 48.00MHz

Oscillator(s)/Crystal(s) : 20.00MHz, 38.86MHz

Operating frequency

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

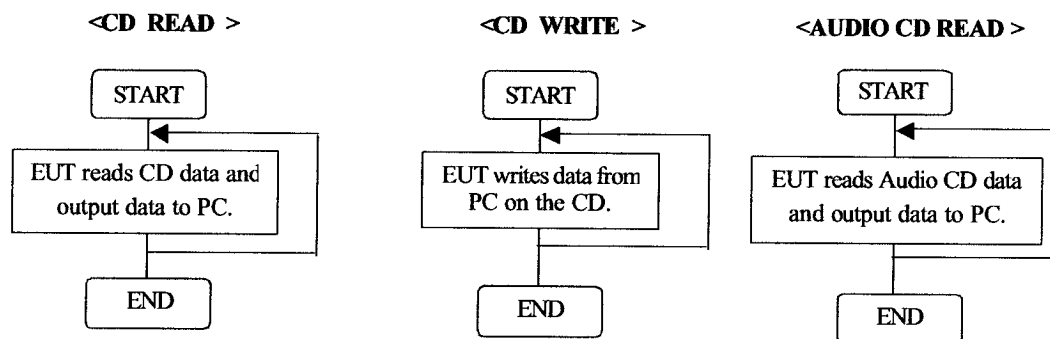
Port(s) : Headphones jack
Audio connector
IDE connector
DC connector (DC input)

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

Operating mode : CD READ mode
CD WRITE mode
AUDIO CD READ mode

Variation of model(s) : Not applicable

1.2 Operating flow



2. Configuration information

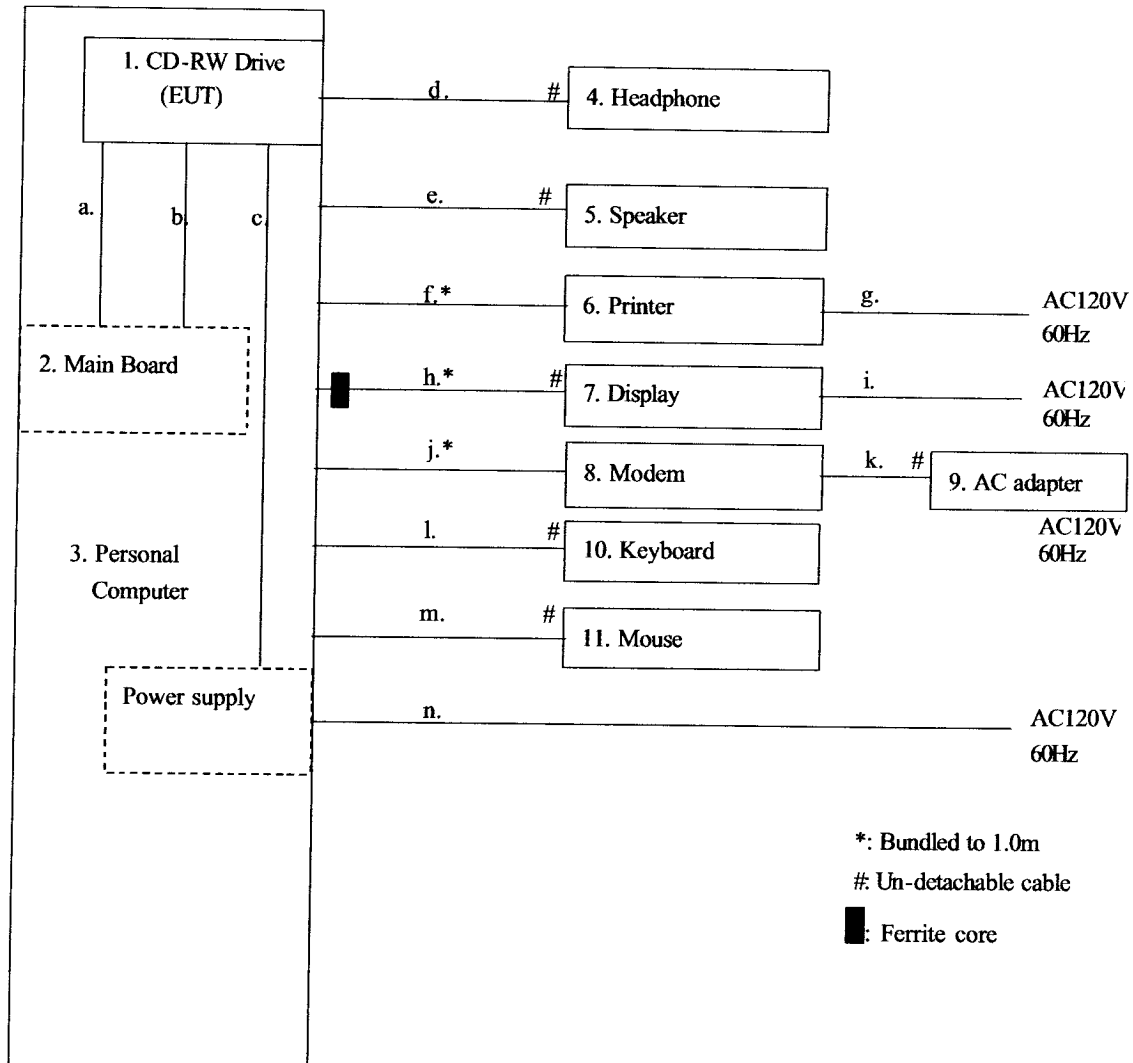
2.1 Peripheral(s) information

No.	Equipment	Company	Model No.	Serial No.	DoC / FCC ID	Comment
2	Main board	COMPAQ	N/A	N/A	N/A	-
3	Personal Computer	COMPAQ	3590	238334-001	CNT75MEZ6	-
4	Headphone	FISHER	N/A	N/A	N/A	-
5	Speaker	Panasonic	RP-SP30	N/A	N/A	-
6	Printer	HP	C4555A	SG69A1425N	B94C4555X	-
7	Display	Goldstar	Studio Works 56i	15005G004960	BEJCS585	-
8	Modem	US Robotics	839	000839032BK6YV4J	DoC	-
9	AC adapter for Modem	US Robotics	N/A	N/A	N/A	-
10	Keyboard	COMPAQ	Enhanced III Keyboard	140536-101	AQ6ZG-CCC	-
11	Mouse	Microsoft	PS/2 Compatible Mouse	858487	C3K76FPS26C	-

2.2 Cable(s) information

No.	Cable	Length [m]	Shield	Connector	From	To	Comment
a	IDE cable	0.4	Unshielded	Plastic	EUT	Main board	-
b	Audio cable	0.5	Unshielded	Plastic	EUT	Main board	-
c	DC cable	0.2	Unshielded	Plastic	EUT	Power supply	-
d	Headphone cable	2.0	Unshielded	Metal	EUT	Headphone	-
e	Speaker cable	1.0	Unshielded	Metal	PC	Speaker	-
f	Centronics cable	2.0	Shielded	Metal	PC	Printer	Bundled excess cable.
g	AC power cord for Printer	2.0	Shielded	Plastic	Printer	AC outlet	-
h	Video cable	1.5	Shielded	Metal	PC	Display	Bundled excess cable.
i	AC power cord for Display	2.2	Unshielded	Plastic	Display	AC outlet	-
j	RS232C cable	2.0	Shielded	Metal	PC	Modem	Bundled excess cable.
k	DC cable for Modem AC adapter	2.0	Unshielded	Metal	Modem	AC adapter	-
l	Keyboard cable	1.5	Unshielded	Metal	PC	Keyboard	Coiled
m	Mouse cable	1.5	Unshielded	Metal	PC	Mouse	-
n	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. h). I/F cable is Un-detachable and ferrite core is not added during testing

3. Test procedure

3.1 Description of Conducted Emission testing

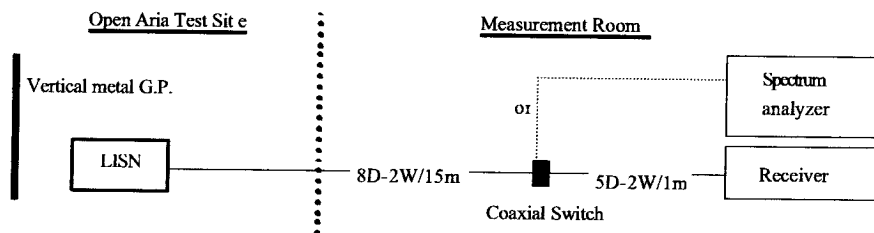
Conducted emission testing is performed using test receiver. The detector function of the receiver is set to CISPR quasi-peak mode and the bandwidth is set to 9kHz. The frequency range from 450kHz to 30 MHz is scanned, and six highest emissions (Min.) are reported. The test results represent the worst-case 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. 50 Ω /50 μ H 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.

Cables for Conducted emission Test



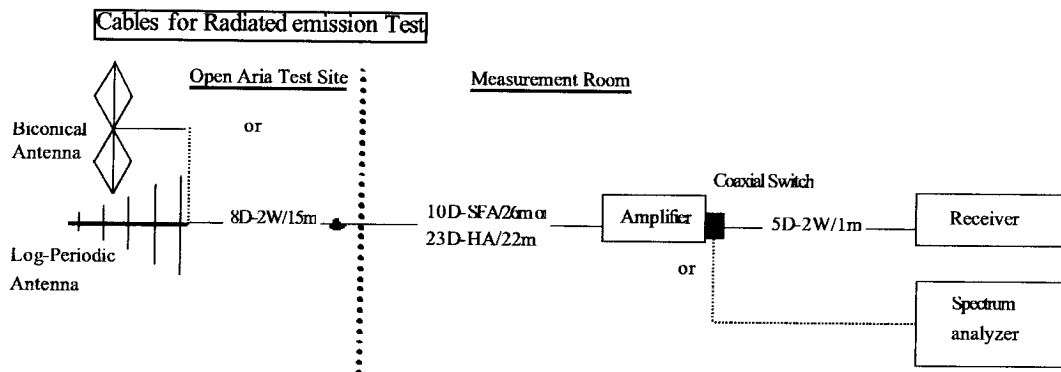
3.2 Test equipment for Conducted emission

Equipment	Company	Model No.	Serial No.	Calibration date	Period
Spectrum analyzer	Agilent Technologies	8568B	2634A02803	Jul. 2000	1 year
Test Receiver	Kyoritsu Electrical Works, Ltd.	KNM-2402	4N-192-1	Nov. 1999	1 year
Line Impedance Stabilization Network for Host PC	Kyoritsu Electrical Works, Ltd.	KNW-242C	8-1096-3	Feb. 2000	1 year
Line Impedance Stabilization Network for Peripheral	Kyoritsu Electrical Works, Ltd.	KNW-242C	8-875-19	Mar. 2000	1 year
50 Ω terminator	Agilent Technologies	11593A	N/A	Aug. 2000	1 year
Coaxial cable	FUJIKURA	8D-2W/15m 5D-2W/1m	H120601#1/C	Jun. 2000	1 year
Coaxial Switch	ANRITSU	MP59B	M26850	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 and log-periodic 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. The detector function of the test receiver is set to CISPR Quasi-peak mode and the bandwidth is set to 120kHz. 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 48.0MHz, therefore, the frequency range is investigated from 30MHz up to the frequency 1GHz, as specified in CFR section 15.33.



3.4 Test equipment for Radiated emission

Equipment	Company	Model No.	Serial No.	Calibration date	Period
Spectrum analyzer	Agilent Technologies	8568B	2634A02803	Jul. 2000	1 year
RF Preamplifier	Anritsu	MH648A	M96057	Oct. 2000	1 year
Test Receiver	Kyoritsu Electrical Works, Ltd.	KNM-5002 KCV-6002	4N-200-5 4-288-2	Jul. 2000	1 year
Biconical Antenna	Schwarzbeck	BBA9106/VHA9103LE	I3130919	Jun. 2000	1 year
Log Periodic Antenna	EMCO	3146	8901-2336	Jun. 2000	1 year
Coaxial cable	FUJIKURA	8D-2W/15m 23D-HA/22m 5D-2W/1m	H120601#1/R3	Jun. 2000	1 year
Coaxial Switch	ANRITSU	MP59B	M26850	Jun. 2000	1 year
Site attenuation	ZACTA Technology Corp.	Site 1	N/A	Dec.1999	1 year

※The above equipment 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

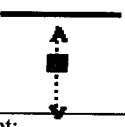
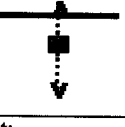
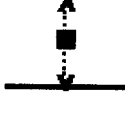
$\pm 5.23\text{dB}$

• • • 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.

	Margin	Frequency	Detector	Operating mode	Data sheet
Conducted emission	11.1dB	11.090MHz	Quasi-peak	CD Write mode	No. 1
	11.1dB	11.089MHz	Quasi-peak	CD Read mode	No. 2
	11.1dB	11.089MHz	Quasi-peak	Audio CD Read mode	No. 3

	Margin	Frequency	Antenna Polarity	Antenna Height	Table degree	Operating mode	Data sheet
Radiated emission	3.2dB	43.84MHz	Vertical	1.0m	75°	CD Read mode	No. 5

5.2 Deviation from the standard

Not applicable.

5.3 Sample of field strength calculation

Conducted Emission [Sample Calculation] $\text{dB } \mu\text{V} = 20\log_{10} (\mu\text{V})$

Class B
Limit @3.332MHz = $250 \mu\text{V} = 48.0\text{dB } \mu\text{V}$
Reading = $41.6\text{dB } \mu\text{V}$
Cable Loss + LISN Factor = $0.2 + 0.5 = 0.7\text{dB}$
Total = $41.6 + 0.7 = 42.3\text{dB } \mu\text{V}$
Margin = $48.0 - 42.3 = \underline{5.7\text{dB}}$

Radiated Emission [Sample Calculation] $\text{dB } \mu\text{V/m} = 20\log_{10} (\mu\text{V/m})$

Class B
Limit @147.6MHz = $150 \mu\text{V/m} = 43.5\text{dB } \mu\text{V/m}$
Reading = $42.8\text{dB } \mu\text{V}$
Ant. Factor + Cable Loss - Amp. Gain = $14.2 + 3.0 - 30.0 = -12.8\text{dB}$
Total = $42.8 - 12.8 = 30.0\text{dB } \mu\text{V/m}$
Margin = $43.5 - 30.0 = \underline{13.5\text{dB}}$

6. Test Data

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

Standard : FCC Part15 SubpartB
Class : B

Sheet Number : 1

Date of test : October 31, 2000
Test Site : 1
Temperature [°C] : 23.0
Humidity [%] : 32.0
Operator : S.Senda
Company Name : SANYO
EUT : CD-RW Drive
Model Number : CRD-BP1400P
Serial Number : 38900005
Test Mode : CD Write Mode
Comment :

[Quasai-Peak] Frequency [MHz]	Reading		Factor [dB]	Emission Level		Limit [dB/μV]	Margin [dB]	Comment
	Line A [dB/μV]	Line B [dB/μV]		Line A [dB/μV]	Line B [dB/μV]			
0.604	33.5	33.3	0.1	33.6	33.4	48.0	14.4	
1.663	33.1	31.3	0.2	33.3	31.5	48.0	14.7	
9.021	32.3	32.4	0.5	32.8	32.9	48.0	15.1	
9.304	33.0	33.0	0.5	33.5	33.5	48.0	14.5	
10.840	36.0	36.1	0.5	36.5	36.6	48.0	11.4	
11.090	36.3	36.4	0.5	36.8	36.9	48.0	11.1	*

* : The worst emission.

Factor : LISN Factor + Cable Loss

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

Standard : FCC Part15 SubpartB
Class : B

Sheet Number : 2

Date of test : October 31, 2000
Test Site : 1
Temperature [℃] : 23.0
Humidity [%] : 32.0
Operator : S.Senda
Company Name : SANYO
EUT : CD-RW Drive
Model Number : CRD-BP1400P
Serial Number : 38900005
Test Mode : CD Read Mode
Comment :

[Quasai-Peak] Frequency	Reading		Factor	Emission Level		Limit	Margin	Comment
	Line A	Line B		Line A	Line B			
[MHz]	[dB μV]	[dB μV]	[dB]	[dB μV]	[dB μV]	[dB μV]	[dB]	
0.604	33.4	33.2	0.1	33.5	33.3	48.0	14.5	
1.662	33.1	31.0	0.2	33.3	31.2	48.0	14.7	
9.021	32.2	32.4	0.5	32.7	32.9	48.0	15.1	
9.303	32.9	33.0	0.5	33.4	33.5	48.0	14.5	
10.839	35.8	36.1	0.5	36.3	36.6	48.0	11.4	
11.089	36.2	36.4	0.5	36.7	36.9	48.0	11.1	*

* : The worst emission

Factor : LISN Factor + Cable Loss

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

Standard : FCC Part15 SubpartB
Class : B

Sheet Number : 3

Date of test : October 31, 2000
Test Site : 1
Temperature [℃] : 23.0
Humidity [%] : 32.0
Operator : S.Senda
Company Name : SANYO
EUT : CD-RW Drive
Model Number : CRD-BP1400P
Serial Number : 38900005
Test Mode : Audio CD Read Mode
Comment :

[Quasai-Peak] Frequency	Reading		Factor	Emission Level		Limit	Margin	Comment
	Line A	Line B		Line A	Line B			
[MHz]	[dB μV]	[dB μV]	[dB]	[dB μV]	[dB μV]	[dB μV]	[dB]	
0.605	33.5	33.3	0.1	33.6	33.4	48.0	14.4	
1.663	33.3	31.0	0.2	33.5	31.2	48.0	14.5	
9.022	32.2	32.5	0.5	32.7	33.0	48.0	15.0	
9.303	33.0	33.0	0.5	33.5	33.5	48.0	14.5	
10.840	36.0	36.2	0.5	36.5	36.7	48.0	11.3	
11.089	36.3	36.4	0.5	36.8	36.9	48.0	11.1	*

* : The worst emission.

Factor : LISN Factor + Cable Loss

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

Standard : FCC Part15 SubpartB
Class : B
Distance [m] : 3
Date of test : October 31, 2000
Test Site : 1
Temperature [℃] : 23.0
Humidity [%] : 32.0
Operator : S.Senda
Company Name : SANYO
EUT : CD-RW Drive
Model Number : CRD-BP1400P
Serial Number : 38900005
Test Mode : CD Write Mode
Comment :

Sheet Number : 4

Antenna Pol.	Height [m]	Table Radian [Deg.]	Reading Frequency [MHz]	Level [dB μ V]	Factor [dB μ V/m]	Emission Level [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]	Comment
HOR/VER	3.0	250	66.41	56.7	-21.1	35.6	40.0	4.5	*
VER	1.0	5	132.81	47.0	-14.3	32.7	43.5	10.8	
VER	1.0	0	166.02	46.2	-12.2	34.0	43.5	9.5	
HOR	2.0	275	169.35	45.0	-12.1	32.9	43.5	10.6	
HOR	1.0	240	332.02	52.5	-12.7	39.8	46.0	6.2	
VER	2.0	85	539.47	44.2	-9.0	35.2	46.0	10.8	CD
HOR	2.0	70	539.81	48.2	-9.0	39.2	46.0	6.8	CD
HOR	2.1	145	553.20	45.7	-8.7	37.0	46.0	9.0	CD
VER	2.0	330	553.20	44.9	-8.7	36.2	46.0	9.8	CD
VER	1.0	140	597.60	43.3	-8.1	35.2	46.0	10.8	
VER	1.3	5	841.25	41.1	-4.9	36.2	46.0	9.8	

* : The worst emission.

Factor :Antenna Factor + Cable Loss - Amp Gain

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

Standard : FCC Part15 SubpartB
Class : B
Distance [m] : 3
Date of test : October 30, 2000
Test Site : 1
Temperature [℃] : 16.0
Humidity [%] : 56.0
Operator : S.Senda
Company Name : SANYO
EUT : CD-RW Drive
Model Number : CRD-BP1400P
Serial Number : 38900005
Test Mode : CD Read Mode
Comment :

Sheet Number : 5

Antenna Pol.	Height	Table Radian	Reading Frequency	Level	Factor	Emission Level	Limit	Margin	Comment
HOR/VER	[m]	[Deg.]	[MHz]	[dB μV]	[dB μV/m]	[dB μV/m]	[dB μV/m]	[dB]	
VER	1.0	75	43.84	51.0	-14.2	36.8	40.0	3.2	*
HOR	3.1	255	66.41	56.8	-21.1	35.7	40.0	4.3	
VER	1.0	10	132.81	46.4	-14.3	32.1	43.5	11.4	
VER	1.0	195	166.01	44.5	-12.2	32.3	43.5	11.2	
HOR	1.0	225	332.03	52.7	-12.7	40.0	46.0	6.0	
VER	1.2	180	398.43	47.9	-11.8	36.1	46.0	9.9	
HOR	1.5	15	522.93	46.1	-9.3	36.8	46.0	9.2	CD
HOR	1.8	20	540.15	50.1	-8.9	41.2	46.0	4.8	CD
VER	1.0	30	590.43	44.7	-8.1	36.6	46.0	9.4	CD
VER	1.2	10	841.26	40.7	-4.9	35.8	46.0	10.2	

* : The worst emission.

Factor :Antenna Factor + Cable Loss - Amp Gain

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

Standard : FCC Part15 SubpartB
Class : B
Distance [m] : 3
Date of test : October 30, 2000
Test Site : 1
Temperature [°C] : 16.0
Humidity [%] : 56.0
Operator : S.Senda
Company Name : SANYO
EUT : CD-RW Drive
Model Number : CRD-BP1400P
Serial Number : 38900005
Test Mode : Audio CD Read Mode
Comment :

Sheet Number : 6

Antenna Pol.	Antenna Height [m]	Table Radian [Deg.]	Reading Frequency [MHz]	Reading Level [dB μ V]	Factor [dB μ V/m]	Emission Level [dB μ V/m]	Limit [dB μ V/m]	Margin [dB]	Comment
HOR/VER	1.0	150	44.57	44.3	-14.1	30.2	40.0	9.8	
HOR	3.1	90	66.41	50.6	-21.1	29.5	40.0	10.5	
VER	1.0	350	166.01	46.0	-12.2	33.8	43.5	9.7	
HOR	2.0	270	169.35	44.5	-12.1	32.4	43.5	11.1	
HOR	1.0	220	332.03	51.9	-12.7	39.2	46.0	6.8	*
HOR	1.0	300	398.43	46.3	-11.8	34.5	46.0	11.5	
HOR	1.0	230	540.15	45.7	-8.9	36.8	46.0	9.2	
VER	1.0	140	597.61	43.0	-8.1	34.9	46.0	11.1	
VER	1.1	355	865.20	38.7	-4.4	34.3	46.0	11.7	

* : The worst emission.

Factor :Antenna Factor + Cable Loss - Amp Gain

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