

FCC PART 15 SUBPART B
CERTIFICATION REPORT for E-File

SANYO ELECTRIC CO., LTD.

CD-RW DRIVE

FCC ID: JBQCDR019

Report No.: Z01C-00149

Report Issue Date: June 12, 2000

ZACTA TECHNOLOGY CORPORATION
YONEZAWA TESTING CENTER

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



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CERTIFICATE COMPLIANCE

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

This device was measured pursuant to ANSI C63.4-1992 by Zacta Technology Corporation. The data in this application complies with the applicable technical standards as indicated in the measurements report and FCC Part 15 Class B limits. The EUT complies with section 15.37 "Transition provision for compliance with the rules".

APPLICANT : SANYO ELECTRIC CO., LTD.
FCC ID : JBQCDR019
FCC RULE PART : FCC Part 15 Subpart B, Docket 87-389
EQUIPMENT : Class B
CLASS
EUT TYPE : CD-RW Drive
DATE OF TEST : June 5, 2000
MEASUREMENT : ANSI C63.4-1992
TEST RESULT : Complied
REPORT NO. : Z01C-00149
REMARKS : No modification was made during testing.
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: Kiyoshi Endo
Manager of Technical Division

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

LABORATORY MEASUREMENTS

PURSUANT TO PART 15, SUBPART B

COMPANY NAME : SANYO ELECTRIC CO., LTD.
EUT : CD-RW Drive
FCC ID : JBQCDR019
MODEL NO. : CRD-BP1300P
SERIAL NO. : 38900003
MAX USED FREQ. : 33.86MHz
OSC : 20.0MHz, 33.86MHz
MEASUREMENT : ANSI C63.4-1992
EQUIPMENT : Class B
CLASS
DISTANCE : 3m
DATE OF TESTS : June 5, 2000
POWER SUPPLIED : DC +5V, +12V
REPORT NO. : Z01C-00149

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.

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
 IDE cable
- * All operating mode were tested.
- * Sufficient warm up time is proved for these testing.

Tested by: Hisatoshi Saito / EMC Engineer

SUMMARY OF TEST DATA

The minimum margins to the limits are as follows:

CONDUCTION DATA

<u>OPERATING MODE</u>	<u>FREQUENCY</u>	<u>MARGIN</u>
CD READ	1.965MHz	10.8dB
CD WRITE	1.964MHz	11.1dB
AUDIO CD READ	1.968MHz	11.1dB
	2.193MHz	11.1dB

Note: EUT is not directly connected to the AC power line, therefore the power conduction data of Host PC was reported.

RADIATION DATA

<u>OPERATING MODE</u>	<u>FREQUENCY</u>	<u>MARGIN</u>
CD READ	550.60MHz	3.2dB
CD WRITE	551.13MHz	5.7dB
AUDIO CD READ	66.41MHz	4.8dB

CONFIGURATION INFORMATION

DEVICE INFORMATION

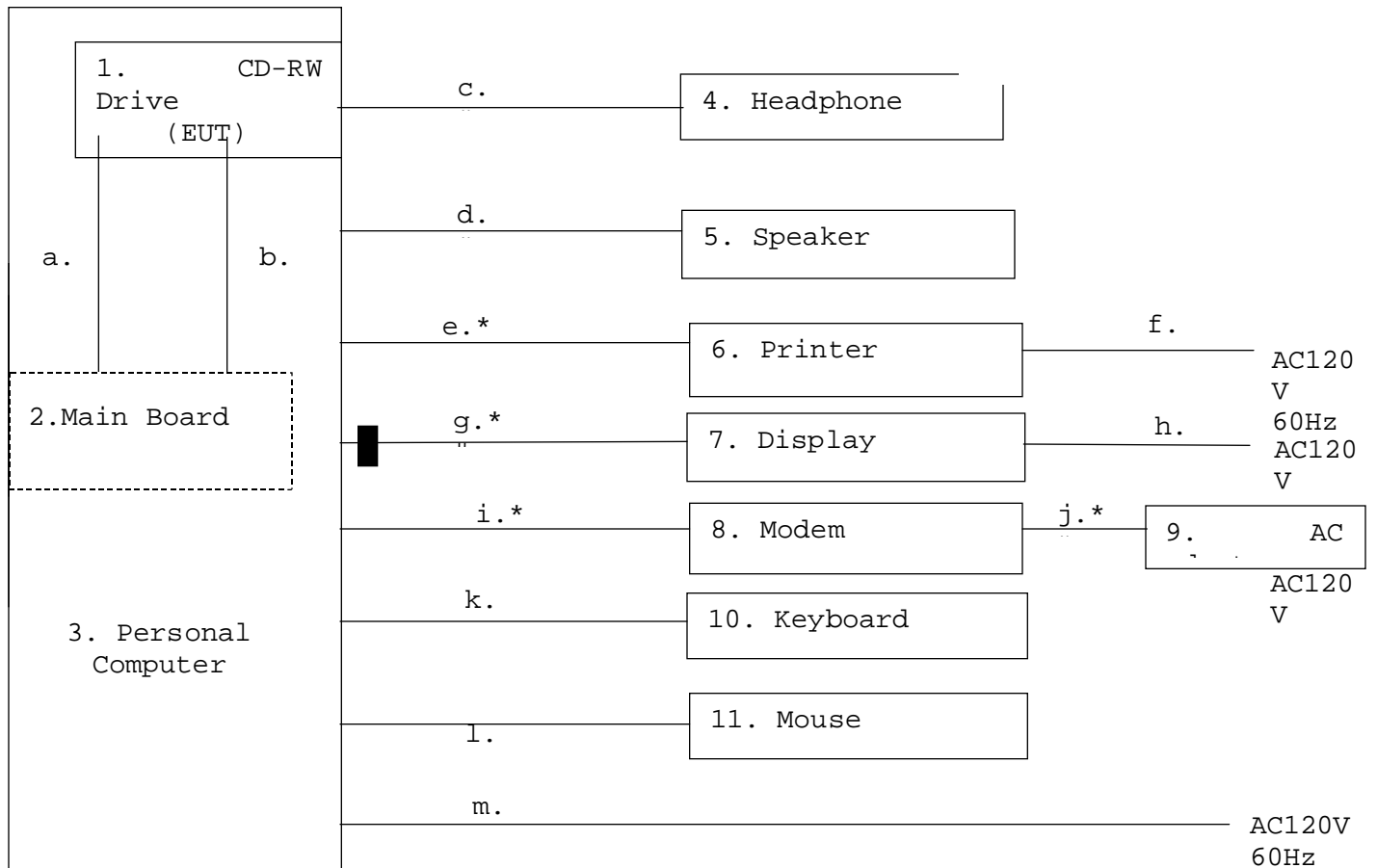
NO	EQUIPMENT	COMPANY	MODEL NO.	SERIAL NO.	FCC ID	COMMENT
1	CD-RW Drive	SANYO	CRD-BP1300P	38900003	JBQCDR019	EUT
2	Main board	COMPAQ	N/A	N/A	N/A	
3	Personal Computer	COMPAQ	3590	238334-001	CNT75MEZ6	
4	Headphone	FISHER	N/A	N/A	N/A	
5	Speaker	Panasonic	RP-SP30	N/A	N/A	
6	Printer	HP	C4555A	SG69A1425N	B94C4555X	
7	Display	Goldstar	Studio Works 56i	15005G004960	BEJCS585	
8	Modem	US Robotics	839	000839032BK6Y V4J	DoC	
9	AC adapter	US Robotics	N/A	N/A	N/A	For Modem
10	Keyboard	COMPAQ	Enhanced III Keyboard	140536-101	AQ6ZG-CCC	
11	Mouse	Microsoft	PS/2 Compatible Mouse	858487	C3K76FPS26C	

CABLES INFORMATION

NO	CABLE	LENGTH	SHIELD		Connected Situation		COMMENT
		[m]	Cable	Connector	From	To	
a	IDE cable	0.7	Unshielded	Plastic	EUT	Main board	
b	Audio cable	0.4	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	Bundled excess cable.
f	AC power cord	2.0	Shielded	Plastic	Printer	AC outlet	For Printer
g	Video cable	1.5	Shielded	Metal	PC	Display	Bundled excess cable.
h	AC power cord	2.2	Unshielded	Plastic	Display	AC outlet	For Display
i	RS232C cable	2.0	Shielded	Metal	PC	Modem	Bundled excess

			d				cable.
j	DC cable	2.0	Unshielded	Metal	Modem	AC adapter	For Modem
k	Keyboard cable	1.5	Unshielded	Metal	PC	Keyboard	Coiled
l	Mouse cable	1.5	Unshielded	Metal	PC	Mouse	
m	AC power cord	2.0	Shielded	Plastic	PC	AC outlet	For EUT

SYSTEM CONFIGURATION



*: Bundled to 1.0m
 ■: Ferrite core
 #: Un-detachable cable

Comment: Please note that No.7 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.

LABORATORY DESCRIPTION

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 OF SITE:

Site name : Site 1, Site 2, Site 3 and Site 4 - Total 4 sites.

3. THE TYPE OF SITE:

Whether protected site

4. TEST TYPE:

All sites could perform as follows tests:

- 1) 3/10m Radiation test
- 2) Conduction test

5. FACILITY FILING INFORMATION

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

Site name	Final filing date
Site 1, Site 2 Site 3 and Site 4	March 6, 2000

*3m/10m Radiation & Conduction testing could be performed on each site

- 2) VCCI FINAL SITE FILING: V-5/99.5 Pursuant to VCCI Regulations for Registration of measurement facilities

Site name	Radiation Registration No.	Conduction 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
Site 4	R-752	C-775	June 30, 2001

- 3) NVLAP ACCREDITATION:

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 CONDUCTION 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 supports Equipment were another KYORITSU LISN.

50•BNC connector of the KYORITSU LISN (for peripheral) 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 RADIATION 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.) were 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 exceeding 1 meter. Each emission was maximized by varying the mode of operation.

UNCERTAINTY

Conducted Emission Test

Total Uncertainty @95%min. Confidence probability	±1.78
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Radiated Emission Test

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

TEST SITE CONDITION & INSTRUMENTATION

TEST SITE CONDITION

Test date	June 5, 2000
Site #	3 site
Power supply	DC +5V, +12V
Weather	Weather: Sunny Temp.: 24• Humidity: 45%
Standard	ANSI C63.4-1992
Deviation from The standards	Not applicable

USED FOR CONDUCTED EMISSION MEASUREMENT

Equipment	Company	Model name / Serial No.	Calibration date	Period
Spectrum analyzer	Hewlett Packard	8568B / 2841A04243	Aug. 1999	1 year
Test Receiver	Kyoritsu Electrical Works, Ltd.	KNM-2402 / 4N-220-1	Aug. 1999	1 year
Line Impedance Stabilization Network	Kyoritsu Electrical Works, Ltd.	KNW-242C / 8-1096-3 (For EUT)	Feb. 2000	1 year
Line Impedance Stabilization Network	Kyoritsu Electrical Works, Ltd.	KNW-242C / 8-875-19 (For Peripheral)	Mar. 2000	1 year
Coaxial cable	FUJIKURA	8D-2W / H110601#3/15C	Jun. 1999	1 year

USED FOR RADIATED DISTURBANCE MEASUREMENT

Equipment	Company	Model name / Serial No.	Calibration date	Period
Spectrum analyzer	Hewlett Packard	8568B / 2841A04243	Aug. 1999	1 year
RF Preamp	Anritsu	MH648A / M96257	Nov. 1999	1 year
Test Receiver	Kyoritsu Electrical Works, Ltd.	KNM-5002 / 4N-195-2 KCV-6002 / 4-269-2	Jan. 2000	1 year
Biconical Antenna	Schwarzbeck	BBA9106/VHA9103LE / 02130847	Jun. 1999	1 year
Log Periodic	EMCO	3146 / 3853	Jun. 1999	1 year

Antenna				
Coaxial cable	FUJIKURA	8D-2W / H110601#3/08R	Jun. 1999	1 year
Coaxial cable	FUJIKURA	10D-SFA/ H110601#3/10D-SFA	Jun. 1999	1 year
Site attenuation	Zacta Technology Corp.	3 site	Dec. 1999	1 year

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

SAMPLE OF FIELD STRENGTH CALCULATION

$$\begin{aligned} \text{dB}\cdot\text{V} &= 20\log_{10} (\cdot\text{V}) \\ \text{dB}\cdot\text{V} / \text{m} &= 20\log_{10} (\cdot\text{V}/\text{m}) \end{aligned}$$

[Sample Calculation]

*CONDUCTION

@ 3.332MHz : Class B limit = 250·V = 48.0dB·V

Reading = 41.6dB·V

Cable Loss + LISN Factor = 0.2 + 0.5 = 0.7dB

Total = 41.6 + 0.7 = 42.3dB·V

Margin = 48.0 - 42.3 = 5.7dB

5.7 dB below the limit

*RADIATION

@ 147.6MHz : Class B limit = 150·V/m = 43.5dB·V/m

Reading = 42.8dB·V

Ant. Factor + Cable Loss - Amp. Gain = 14.2 + 3.0 - 30.0 = -12.8dB

Total = 42.8 - 12.8 = 30.0dB·V/m

Margin = 43.5 - 30.0 = 13.5dB

13.5 dB below the limit

***** CONDUCTION MEASUREMENTS *****

STANDARD :FCC Part15 SubpartB
CLASS :B

SHEET NO.:1
CHART NO.:

DATE OF TEST :2000/6/5
TEST SITE :3
TEMP. [] :24.0
HUMIDITY [%] :45.0
OPERATOR :H SAITO
COMPANY NAME : , r , m x n
EUT : , b c | q v, c # r ...
MODEL NO. : , b q c | a o p r q q o
SERIAL NO. :38900003
TEST MODE : , b c @ q d ; c
NOTE :

[QUASI-PEAK] FREQUENCY [MHz]	READING		FACTOR [dB]	EMISSION LEVEL		LIMIT [dBf @]	MARGIN [dB]	*	NOTE
	LINE A [dBf @]	LINE B [dBf @]		LINE A [dBf @]	LINE B [dBf @]				
1363	34.0	33.5	0.2	34.2	33.7	48.0	13.8		
1438	36.0	36.2	0.2	36.2	36.4	48.0	11.6		
1522	35.1	35.9	0.2	35.3	36.1	48.0	11.9		
1965	36.9	37.0	0.2	37.1	37.2	48.0	10.8	*	
2190	36.2	36.0	0.3	36.5	36.3	48.0	11.5		
2278	35.1	34.3	0.3	35.4	34.6	48.0	12.6		

***** CONDUCTION MEASUREMENTS *****

STANDARD :FCC Part15 SubpartB
CLASS :B

SHEET NO.:2
CHART NO.:

DATE OF TEST :2000/6/5
TEST SITE :3
TEMP. [] :24.0
HUMIDITY [%] :45.0
OPERATOR :H SAITO
COMPANY NAME : , r , m x n
EUT : , b c | q v @ C % r ...
MODEL NO. : , b q c | a o p r o o
SERIAL NO. :38900003
TEST MODE : , b c @ y q s d
NOTE :

[QUASI-PEAK] FREQUENCY [MHz]	READING		FACTOR [dB]	EMISSION LEVEL		LIMIT [dBf \hat{E}]	MARGIN [dB]	*	NOTE
	LINE A [dBf \hat{E}]	LINE B [dBf \hat{E}]		LINE A [dBf \hat{E}]	LINE B [dBf \hat{E}]				
1364	34.5	34.2	0.2	34.7	34.4	48.0	13.3		
1428	36.3	36.1	0.2	36.5	36.3	48.0	11.5		
1523	35.3	35.8	0.2	35.5	36.0	48.0	12.0		
1964	36.7	36.2	0.2	36.9	36.4	48.0	11.1	*	
2196	36.0	35.8	0.3	36.3	36.1	48.0	11.7		
2271	34.9	34.3	0.3	35.2	34.6	48.0	12.8		

-----The Worst Emission. FACTOR EISN+CableFactor Ver1.00 F3#003

***** CONDUCTION MEASUREMENTS *****

STANDARD : FCC Part15 SubpartB
CLASS : B

SHEET NO.: 3
CHART NO.:

DATE OF TEST : 2000/6/5
TEST SITE : 3
TEMP. [] : 24.0
HUMIDITY [%] : 45.0
OPERATOR : H SAITO
COMPANY NAME : , r ; m x n
EUT : , b c | q v, c % r ...
MODEL NO. : , b q c | a o p r q o o
SERIAL NO. : 38900003
TEST MODE : , ; t o n, b c, q d ; c
NOTE :

[QUASI-PEAK] FREQUENCY [MHz]	READING		FACTOR [dB]	EMISSDN LEVEL		LIMIT [dB]	MARGIN [dB]	*	NOTE
	LINE A [dBf @]	LINE B [dBf @]		LINE A [dBf @]	LINE B [dBf @]				
1361	33.3	33.1	0.2	33.5	33.3	48.0	14.5		
1437	35.5	35.4	0.2	35.7	35.6	48.0	12.3		
1524	36.0	36.0	0.2	36.2	36.2	48.0	11.8		
1968	36.7	36.2	0.2	36.9	36.4	48.0	11.1	*	
2193	36.6	36.3	0.3	36.9	36.6	48.0	11.1	*	
2271	35.0	34.0	0.3	35.3	34.3	48.0	12.7		

The worst emission.

FACTOR EISN+CableFactor

Ver1.00 F3#003

***** RADIATION MEASUREMENTS *****

STANDARD :FCC Part15 SubpartB
 CLASS :B
 DISTANCE [m] :3
 DATE OF TEST :2000/6/5
 TEST SITE :3
 TEMP.[] :24.0
 HUMIDITY [%] :45.0
 OPERATOR :H SAITO
 COMPANY NAME: , r , m x n
 EUT : , b c | q v, c # r ...
 MODEL NO. : , b q c | a q p r q q o
 SERIAL NO. :38900003
 TEST MODE : , b c @ q d ; c
 NOTE :

SHEET NO.:4
CHART NO.:

ANTENNA		TABLE	READING		FACTOR	EMISSON	LIMIT	MARGIN		NOTE
POL.	HEIGHT	RADIAN	FREQUENCY	LEVEL		LEVEL			*	
HOR/VER	[m]	[Deg.]	[MHz]	[dBf \hat{E}]	[dBf \hat{E} /m]	[dBf \hat{E} /m]	[dBf \hat{E} /m]	[dB]		
HOR	4.0	70	55.82	52.7	-17.6	35.1	40.0	4.9		
VER	1.5	190	99.60	56.4	-18.4	38.0	43.5	5.5		
HOR	2.5	300	132.79	45.7	-14.1	31.6	43.5	11.9		
VER	1.2	90	132.79	49.3	-14.1	35.2	43.5	8.3		
HOR	1.6	110	232.41	47.5	-10.4	37.1	46.0	8.9		
HOR	1.8	110	464.80	42.6	-8.9	33.7	46.0	12.3		
VER	1.3	80	464.82	41.2	-8.9	32.3	46.0	13.7		
HOR	2.0	0	550.60	49.6	-6.8	42.8	46.0	3.2	*	
VER	2.1	340	550.70	49.1	-6.8	42.3	46.0	3.7		

-The Worst Emission.

FACTOR Antenna Factor + Cable Loss - Amp Gain

Ver1.00 F3#003

***** RADATDN MEASUREMENTS *****

STANDARD :FCC Part15 SubpartB
 CLASS :B
 DISTANCE [m] :3
 DATE OF TEST :2000/6/5
 TEST SITE :3
 TEMP.[] :24.0
 HUMIDITY [%] :45.0
 OPERATOR :H SAITO
 COMPANY NAME: , r , m x n
 EUT : , b c | q v, c # r ...
 MODEL NO. : , b q c | a o p r q o o
 SERIAL NO. :38900003
 TEST MODE : , b c @ v q s d
 NOTE :

SHEET NO.:5
CHART NO.:

POL.	ANTENNA		TABLE		READING		FACTOR	EMISSON LEVEL	LIMIT	MARGIN	* NOTE
	HOR/VER	HEIGHT [m]	RADIAN [Deg.]	FREQUENCY [MHz]	LEVEL [dBf \hat{E}]	LEVEL [dBf \hat{E}/m]					
HOR	4.0	60	66.40	51.5	-20.8	30.7	40.0	9.3			
VER	1.5	190	99.60	46.3	-18.4	27.9	43.5	15.6			
HOR	2.5	300	132.79	47.4	-14.1	33.3	43.5	10.2			
VER	1.2	350	165.99	41.3	-12.1	29.2	43.5	14.3			
HOR	1.8	90	237.07	43.1	-10.4	32.7	46.0	13.3			
HOR	1.2	240	464.80	44.0	-8.9	35.1	46.0	10.9			
VER	1.3	80	464.82	42.5	-8.9	33.6	46.0	12.4			
VER	1.3	30	550.70	44.0	-6.8	37.2	46.0	8.8			
HOR	1.2	230	551.13	47.1	-6.8	40.3	46.0	5.7	*		

The worst emission.

FACTOR Antenna Factor + Cable Loss - Amp Gain

Ver1.00 F3#003

***** RADIATION MEASUREMENTS *****

STANDARD :FCC Part15 SubpartB
 CLASS :B
 DISTANCE [m] :3
 DATE OF TEST :2000/6/5
 TEST SITE :3
 TEMP.[] :24.0
 HUMIDITY [%] :45.0
 OPERATOR :H SAITO
 COMPANY NAME: , r , m x n
 EUT : , b c | q v
 MODEL NO. : , b q c | a o p r q q o
 SERIAL NO. :38900003
 TEST MODE : , , t o n , b c , q d , c
 NOTE :

SHEET NO.:6
CHART NO.:

ANTENNA		TABLE	READING		FACTOR	EM ISSION	LIMIT	MARGIN		NOTE
POL.	HEIGHT	RADIAN	FREQUENCY	LEVEL		LEVEL			*	
HOR/VER	[m]	[Deg.]	[MHz]	[dBf \hat{V}]	[dBf \hat{V}/m]	[dBf \hat{V}/m]	[dBf \hat{V}/m]	[dB]		
HOR	4.0	55	66.41	56.0	-20.8	35.2	40.0	4.8	*	
VER	1.5	190	99.60	54.8	-18.4	36.4	43.5	7.1		
VER	1.2	215	132.79	47.6	-14.1	33.5	43.5	10.0		
HOR	1.6	110	232.41	47.4	-10.4	37.0	46.0	9.0		
VER	1.3	80	464.82	43.3	-8.9	34.4	46.0	11.6		
HOR	2.0	0	550.60	46.8	-6.8	40.0	46.0	6.0		
VER	2.1	340	550.70	46.8	-6.8	40.0	46.0	6.0		

 -The Worst Emission. FACTOR Antenna Factor + Cable Loss - Amp Gain Ver1.00 F3#003