

Issue Date : March 15, 1999

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EMC XXXXXXXXXX - TEST REPORT

JQA APPLICATION No. : KL8080365

Model/Type No. : UERW-301

Name of Product : Magnetic Card Reader/Writer

FCC ID : N8U199903ACR

Applicant : Sanwa Newtec Co., Ltd.

Address : 1-11, Shode, Kiyotake-cho, Miyazaki-gun, Miyazaki, Japan

Manufacturer : Sanwa Newtec Co., Ltd.

Address : 1-11, Shode, Kiyotake-cho, Miyazaki-gun, Miyazaki, Japan

Final Judgement : **Passed**

TEST RESULTS IN THIS REPORT are obtained in use of equipment that is traceable to Electro-technical Lab. of MITI Japan and Communications Research Lab. of PTT Japan.

THE TEST RESULTS only responds to the test sample. This test report shall not be reproduced except in full.

JAPAN QUALITY ASSURANCE ORGANIZATION (JQA)
KITA-KANSAI TESTING CENTER
EMC DIVISION

The logo for NVLAP (National Voluntary Laboratory Accreditation Program) is displayed in a stylized, outlined font. The letters 'N', 'V', 'L', 'A', and 'P' are connected, with the 'A' having a unique shape. A registered trademark symbol (®) is located at the top right of the 'P'.

LAB CODE: 200191-0

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Conducted Emission	450 kHz - 30 MHz <u>18 - 19</u>
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TEST REGULATION

FCC Rules and Regulations Part 15 Subpart A and B (April 17, 1997)

- Class A Digital Device
- Class B Digital Device

Test procedure:

Conducted and radiated emission test were performed according to the procedures in ANSI C63.4-1992.

GENERAL INFORMATION

Test facility:

- 1) Test Facility located at Kita-Kansai : 1st and 2nd Open Sites (3 m Site)
Test Facility located at Kameoka Open Site (3, 10 and 30 m, on common plane)
FCC filing No. : 31040/SIT 1300F2
- 2) KITA-KANSAI TESTING CENTER is recognized under the National Voluntary Laboratory Accreditation Program for satisfactory compliance established in Title 15, Part 285 Code of Federal Regulations.
NAVLAP Lab Code: 200191-0

Description of the Equipment Under Test (EUT):

- 1) Name : Magnetic Card Reader/Writer
- 2) Model/Type No. : UERW-301
- 3) Product Type : Prototype (S/N 8070001)
- 4) Category : Class B Digital Device
- 5) EUT Authorization : - Verification - Certification - D.o.C
- 6) Highest frequency used/generated : 16 MHz
- 7) Power Rating : AC 90-132V 50/60Hz

Definitions for symbols used in this test report:

- Black box indicates that the listed condition, standard or equipment is applicable for this Report.
- Blank box indicates that the listed condition, standard or equipment is not applicable for this Report.

TEST CONDITIONS

The measurement of the Conducted Emission (Disturbance Voltage)
was performed in the following test site.

Test location:

KITA-KANSAI Testing Center

7-7, Ishimaru, 1-Chome, Minoh-Shi, Osaka, 562-0027, Japan

● - Shielded room

KAMEOKA EMC Branch

9-1, Ozaki, Inukanno, Nishibetsuin-Cho, Kameoka-Shi, Kyoto, 621-0126, Japan

○ - Shielded room

○ - On metal plane of open site

Used test instruments and sites:

Model No.	Device I.D No.	Last Cal. Date	Cal. Interval
○ - ESH 3	A - 1		
● - ESH 2	A - 2	December, 1997	1 Year
○ - ESH 2	A - 3		
● - KNW-407	D - 6	February, 1998	1 Year
○ - KNW-408	D - 11		
● - KNW-242	D - 7	February, 1998	1 Year
○ - ESH3-25	D - 12		
○ - KNW-341C	D - 13		
○ - KNW-408	D - 14		
○ - KNW-244C	D - 77		
○ - KNW-408	D - 78		
○ - ESH2-25	D - 10		
○ - ESH2-23	D - 17		
○ - 8568B	A - 10		
○ - 8566B	A - 13		
○ - 8593A	A - 15		
● - Cable	H - 8	February, 1998	1 Year

Environmental conditions:

Temperature: 24 °C Humidity: 48 %

The measurement of the Radiated Emission (Electric Field)

was performed in horizontal and vertical polarization, in the frequency range of 30 MHz - 1000 MHz, in the following test site.

Test location:

KITA-KANSAI Testing Center

7-7, Ishimaru, 1-Chome, Minoh-Shi, Osaka, 562-0027, Japan

- - 1st site (3 meters)
- - 2nd site (3 meters)

KAMEOKA EMC Branch

9-1, Ozaki, Inukanno, Nishibetsuin-Cho, Kameoka-Shi, Kyoto, 621-0126, Japan

- - 3 meters
- - 10 meters

Validation of Site Attenuation:

- 1) Last Confirmed Date: November 21, 1997
- 2) Interval : 1 Year

Used test instruments:

Model No.	Device I.D No.	Last Cal. Date	Cal. Interval
● - ESV/ESV-Z3	A - 7 / A - 17	December, 1997	1 Year
○ - ESV/ESV-Z3	A - 6 / A - 18		
○ - ESV/ESV-Z3	A - 5 / A - 16		
○ - ESV/ESV-Z3	A - 4 / A - 20		
○ - ESV/ESV-Z3	A - 8 / A - 19		
● - KBA-511A	C - 12	December, 1997	1 Year
● - KBA-611	C - 22	December, 1997	1 Year
○ - KBA-511A	C - 13		
○ - KBA-611	C - 19		
○ - KBA-511A	C - 11		
○ - KBA-611	C - 21		
● - Cable	H - 2	November, 1997	1 Year

Environmental conditions:

Temperature: 25 °C Humidity: 64 %

The measurement of the Radiated Emission (Electric Field)

was performed in horizontal and vertical polarization, in the frequency range of 1 GHz - 2 GHz, in the following test site.

Test location:

KITA-KANSAI Testing Center

7-7, Ishimaru, 1-Chome, Minoh-Shi, Osaka, 562-0027, Japan

- - 1st site (3 meters)
- - 2nd site (3 meters)

KAMEOKA EMC Branch

9-1, Ozaki, Inukanno, Nishibetsuin-Cho, Kameoka-Shi, Kyoto, 621-0126, Japan

- - 3 meters
- - 10 meters

Used test instruments:

Model No.	Device I.D No.	Last Cal. Date	Cal. Interval
○ - 8566B	A - 13		
○ - 8593A	A - 15		
○ - ESV	A - 5		
○ - 4T-10	D - 73		
○ - 4T-10	D - 74		
○ - WJ-6611-513	A - 23		
○ - WJ-6882-824	A - 21		
○ - WJ-6870-506	A - 22		
○ - 91888-2	C - 41 - 1		
○ - 91889-2	C - 41 - 2		
○ - 94613-1	C - 41 - 3		
○ - 91891-2	C - 41 - 4		
○ - 94614-1	C - 41 - 5		
○ - TRA-603D	D - 24		
○ - 8494H/8595H	D - 76		
○ - Cable	C - 40 - 11		
○ - Cable	C - 40 - 12		

Setting of the spectrum analyzer:

RES B.W : Video B.W :
SCALE : Sweep Time:

Environmental conditions:

Temperature: _____ °C Humidity: _____ %

JQA Application No. : KL8080365
Model No. : UERW-301
FCC ID : N8U199903ACR

Regulation : CFR 47 FCC Rules Part 15
Issue Date : March 15, 1999

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CONFIGURATION OF EUT

The Equipment Under Test (EUT) consists of:

Description	Applicant (Manufacturer)	Model No. (Serial No.)	FCC ID
Magnetic Card Reader/Writer	Sanwa Newtec Co., Ltd. (Sanwa Newtec Co., Ltd.)	UERW-301 (8070001)	N8U199903ACR
AC Adapter	Tamura Corporation (Tamura Corporation)	J24-1800 (--)	N/A

The measurement was carried out with the following equipment connected:

Description	Grantee/Distributor	Model No. (Serial No.)	FCC ID
Personal Computer	Compaq Computer Corporation	LTE5280 (0508MB07)	DGIP5207
AC Adapter	Compaq Computer Corporation	Series 2882 (Q1618104097)	N/A
Printer	Hewlett-Packard Company	HP Laser 6L (JPHK016494)	N/A (D.o.C.)
Display	Hewlett-Packard Company	D2835 (KR80887006)	N/A (D.o.C.)
Mouse	IBM Corporation	13H6690 (23-D591655)	DZL210421

Type of Interference Cable(s) and the AC Power Cord used with the EUT:

No.	Cable	Shielded	Ferrite Core	Length
1	EUT "RS-232C" / Personal Computer "Serial"	YES	NO	1.6m
2	Personal Computer "Monitor" / Display	YES	YES (2 pcs.)	1.8m
3	Personal Computer "Parallel" / Printer	YES	NO	1.5m
4	Personal Computer "Mouse" / Mouse	YES	NO	1.8m
5	DC Power Cord (EUT / AC Adapter)	NO	NO	1.9m
6	AC Power Cord (EUT / AC Adapter) with 2-pin plug	NO	NO	1.8m
7	DC Power Cord (Personal Computer / AC Adapter)	NO	YES (1 pcs.)	1.8m
8	AC Power Cord (Personal Computer / AC Adapter) with 2-pin plug	NO	NO	1.9m
9	AC Power Cord (Display) with 3-pin plug	NO	NO	2.2m
10	AC Power Cord (Printer) with 3-pin plug	NO	NO	2.2m

Operation - mode of the EUT:

The exercise program used during radiated and conducted emission test was designed the following programed contents to exercise in a manner similar to typical use.

- (1) "H" string is continuously displayed on the display during the test.
- (2) "H" string is continuously printed out of the printer during the test.
- (3) The EUT reads and writes the data into the magnetic card repeatedly.

Test system:

The system was configured for testing in a typical fashion (as a system used on one table top normary).

The EUT has an RS-232C port and a DC IN port.

The RS-232C port was connected to the personal computer, and the DC IN port was connected to the AC adapter.

Special accessories:

None

The used (generated) frequencies in the EUT:

Magnetic Card Reader/Writer

CPU : 16 MHz

DC-DC Converter : 300 kHz

AC Adapter

Switching Power Supply : 50 kHz - 200 kHz

JQA Application No. : KL8080365
Model No. : UERW-301
FCC ID : N8U199903ACR

Regulation : CFR 47 FCC Rules Part 15
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EUT Modification

- - No modifications were conducted by JQA to achieve compliance to Class B levels.
- - To achieve compliance to Class B levels, the following change(s) were made by JQA during the compliance test.

The modification(s) will be implemented in all production models of this equipment.

Applicant : N/A Date : N/A
Typed Name : N/A Position : N/A

Responsible Party

Responsible Party of Test Item(Product)

Responsible party :

Contact Person :

Signatory

TEST RESULTS

Conducted Emission 450 kHz - 30 MHz

The requirements are	● - KEPT	○ - NOT KEPT
Min. limit margin	+ 3.9 dB	at 0.45 MHz
Max. limit exceeding	_____ dB	at _____ MHz
Uncertainty of measurement results	+ 2.1 dB(2σ)	- 2.1 dB(2σ)

Remarks: _____

Radiated Emission (Electric Field) 30 MHz - 1000 MHz

The requirements are	● - KEPT	○ - NOT KEPT
Min. limit margin	+ 1.9 dB	at 720.0 MHz
Max. limit exceeding	_____ dB	at _____ MHz
Uncertainty of measurement results	+ 4.1 dB(2σ)	- 4.2 dB(2σ)

Remarks: _____

Radiated Emission (Electric Field) 1 GHz - 2 GHz

The requirements are	○ - KEPT	○ - NOT KEPT
Min. limit margin	_____ dB	at _____ MHz
Max. limit exceeding	_____ dB	at _____ MHz
Uncertainty of measurement results	_____ dB(2σ)	_____ dB(2σ)

Remarks: Not Applicable

SUMMARY

GENERAL REMARKS :

The EUT was tested according to the requirements of FCC Rules and Regulations Part 15 Subpart A and B (April 17, 1997) under the test configuration, as shown in page 13.

The conclusion for the test items of which are required by the applied regulation is indicated under the final judgement.

FINAL JUDGEMENT :

The "as received" sample;


- - fulfill the test requirements of the regulation mentioned on page 3.
- - fulfill the test requirements of the regulation mentioned on page 3, but with certain qualifications.
- - doesn't fulfill the test regulation mentioned on page 3.

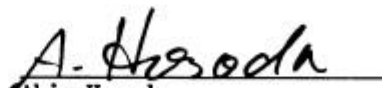
Begin of testing : September 1, 1998

End of testing : September 1, 1998

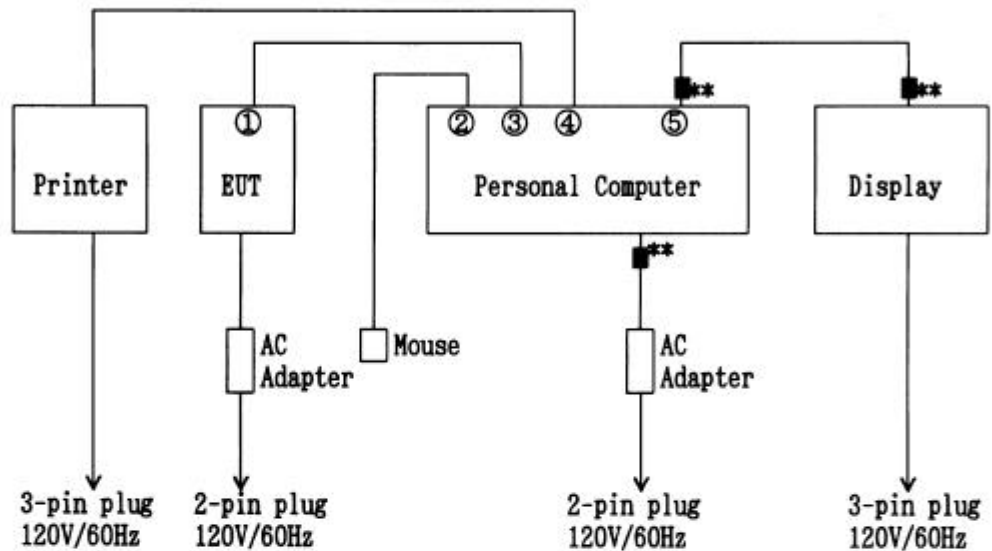
- JAPAN QUALITY ASSURANCE ORGANIZATION -

Approved Signatory :


Takashi Yamanaka
Manager
EMC Div.
JQA KITA-KANSAI Testing Center


Akio Hosoda
Project Manager
EMC Div.
JQA KITA-KANSAI Testing Center

Test System-Arrangement (Drawings)



Note)

** - Applied Ferrite Core

① - RS-232C port

② - Mouse port

③ - Serial port

④ - Parallel port

⑤ - Monitor port

Preliminary Test and Test-setup(Drawings)

Conducted Emission 450 kHz - 30 MHz:

The preliminary test was performed according to the description of ANSI C63.4-1992 Sec.7.2.3 (Preliminary AC Powerline Conducted Emissions Tests) and Sec.6.2.1 (Tabletop Equipment Tests). The preliminary test was carried out to investigate the frequency of the emission that has the highest amplitude relative to the limits within normal operating modes, cable positions, and a typical system configuration. In order to find out to the maximum emission, the preliminary test and a final test were performed in accordance with the following steps.

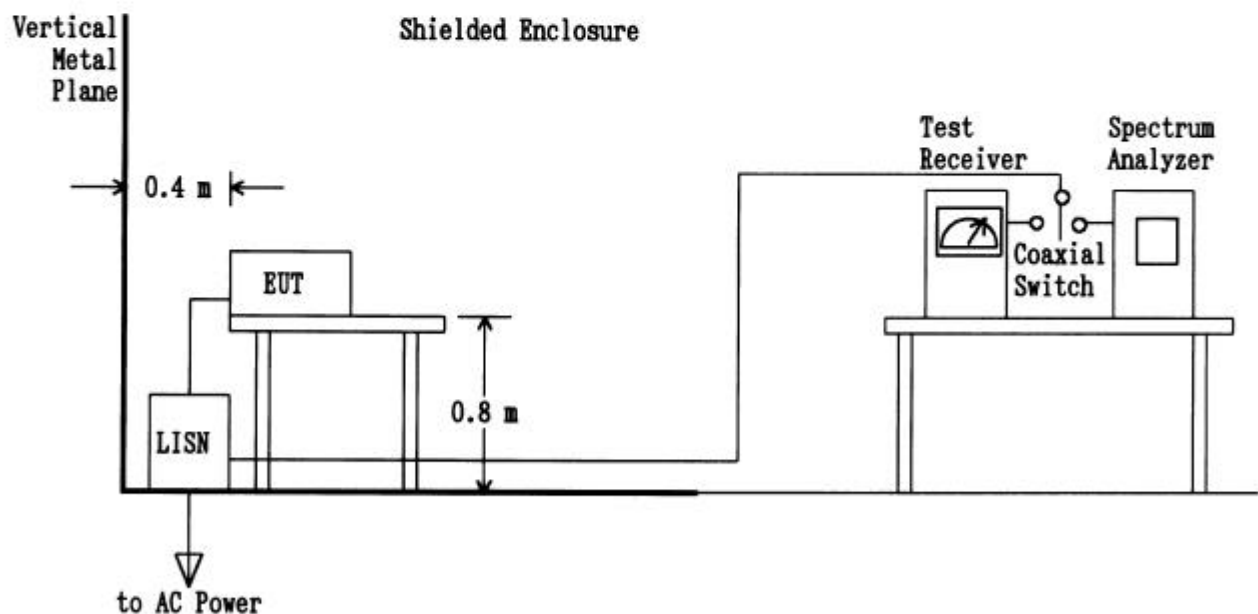
Step 1: One operation mode of the test system was setting.

Step 2: Using both of a spectrum analyzer and a test receiver, the emission's circumstance from the system was monitored in one of ten divided frequency bands of the specified frequency range (450 kHz - 30 MHz). The maximum emission in the band was found by changing the typical cable positions or cable manipulation under a typical system configuration and by selecting of current-carrying conductor. The level and the frequency at the one point which are regarded as relative high emission in the band was measured and recorded. This step was repeated until the ending frequency band.

Step 3: Return to step 1, if the other operation mode was possible to be setting.

Step 4: Based on the collected results, the operation mode produced the maximum emission was selected. The final test on the selected operation mode was performed. But if it was difficult to select the operation mode, the final tests on all operation modes were performed.

Step 5: Based on the same data, as result if the final measurement, at the worst point that has the highest amplitude relative to the limit the repeatability of the worst was reconfirmed. The photographs of the test system setup on the worst point were taken and recorded.



Radiated Emission (Electric Field) 30 MHz - 1000 MHz:

The preliminary test was performed according to the description of ANSI C63.4-1992 Sec.8.3.1.1 (Preliminary Radiated Emissions Tests) and Sec.6.2.1 (Tabletop Equipment Tests).

The preliminary test was carried out to investigate the frequency of the emission that has the highest amplitude relative to the limits within normal operating modes, cable positions, and a typical system configuration. In order to find out to the maximum emission, the preliminary test and a final test were performed in accordance with the following steps.

Step 1: One operation mode of the test system was setting.

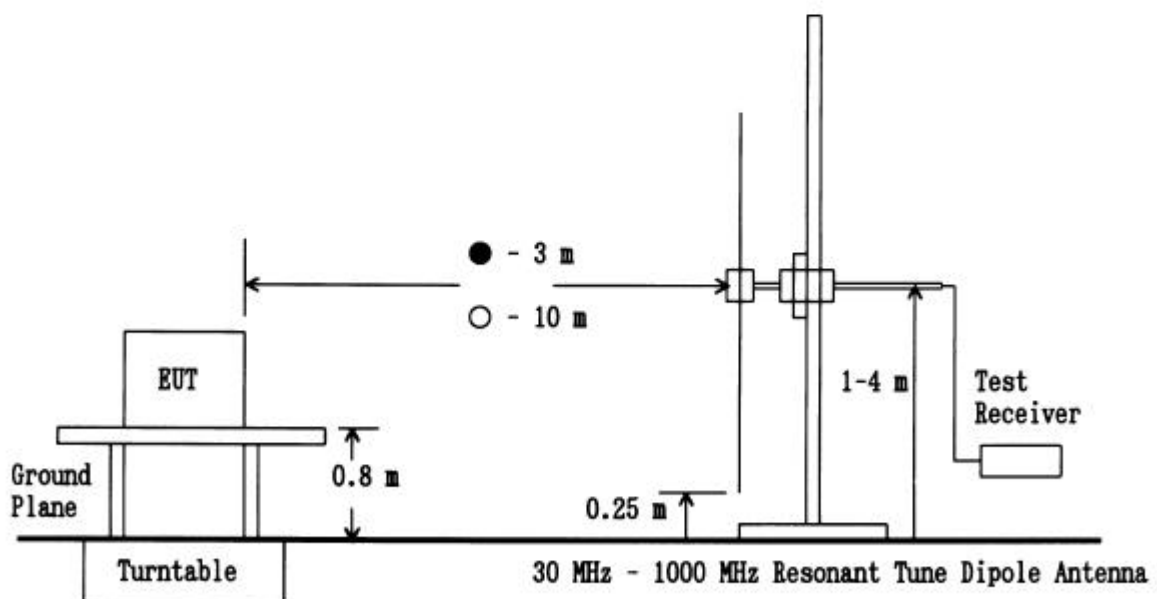
Step 2: Using a test receiver and a test antenna probe, the significant frequency of the emission's circumstance from the test system were investigated. These data were recorded every one of 22 divided bands in the specified frequency band (30 MHz - 1000 MHz).

Step 3: Using a test receiver and a resonant tuned dipole antenna, the emission's circumstance from the test system was measured in according with ANSI C63.4-1992 Sec.8.3.1.2 (Final Radiated Emissions Tests) at each frequency which was found the higher emission referred to level vs. frequency on the list and which was measured by the resonant tuned dipole antenna. The maximum emission was found by changing the cable positions or cable manipulation under a typical system configuration.

Step 4: Return to step 1, if the other operation mode was possible to be setting.

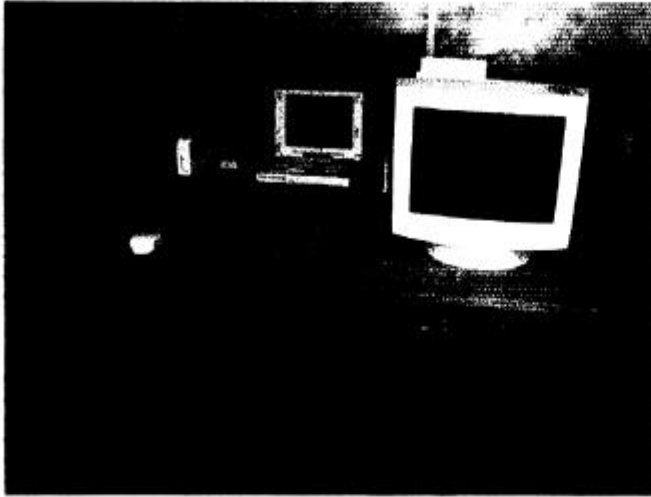
Step 5: The worst result was reported arranging data of which was obtained and performed by one or plural operation modes as the final test.

At the worst point that has the highest amplitude relative to the limit the repeatability of the level was reconfirmed. The photographs of the tests system setup on the worst point were taken and recorded.



Test-Setup (Photographs) at worst case

Conducted Emission 450kHz - 30MHz:

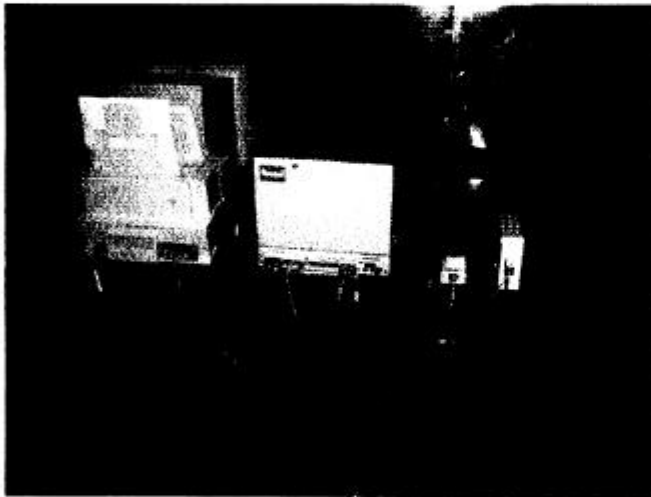


Front View

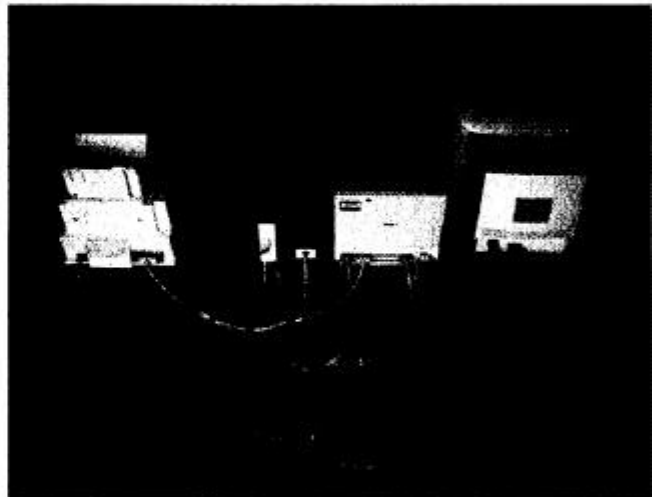
Radiated Emission 30MHz - 1000MHz:



Front View



Rear View

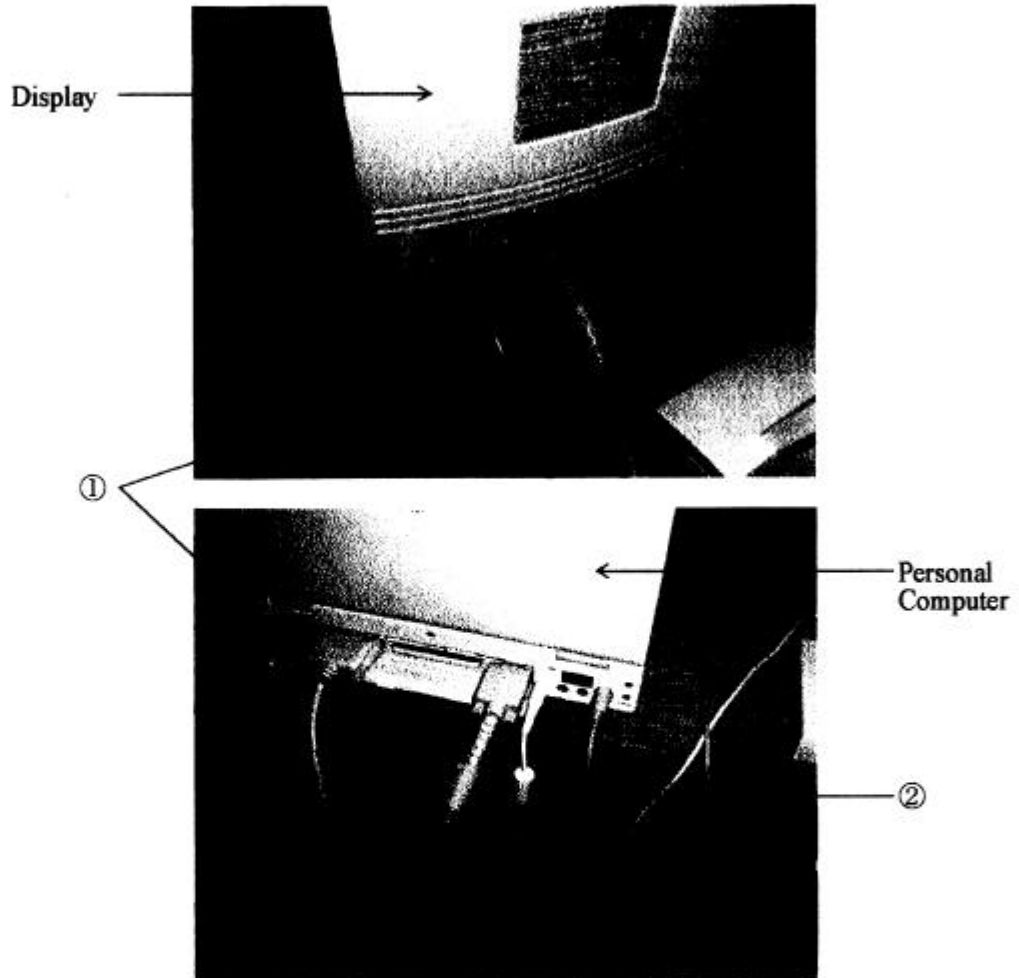


Rear View



Side View

Close up of Ferrite Core



- ① Monitor Cable
- ② DC Power Cord

Mains terminal Disturbance Measurement
 Class B Digital Device

Based on the test result of every test mode, the mode of operation that produce the Conducted emission that has the highest amplitude is shown as follows:

Test Date: September 1, 1998
 Temp.: 24 °C ; Humi.: 48 %

Frequency [MHz]	Correction Factor [dB]	Meter Readings [dB(μV)]				Limits [dB(μV)]	Results [dB(μV)]		Margin [dB]	Remarks (Note 2)
		VA-QP	VA-AV	VB-QP	VB-AV		QP	AV		
0.45	0.1	*50.0	44.0	*50.0	44.0	48.0	*37.1	44.1	+ 3.9	A/B
0.60	0.1	43.0	-	42.0	-	48.0	43.1	-	+ 4.9	A
0.91	0.1	42.0	-	42.0	-	48.0	42.1	-	+ 5.9	A
1.67	0.2	43.0	-	42.0	-	48.0	43.2	-	+ 4.8	A
2.12	0.2	37.0	-	37.0	-	48.0	37.2	-	+10.8	A
3.19	0.3	32.0	-	32.0	-	48.0	32.3	-	+15.7	A
4.83	0.3	31.0	-	30.0	-	48.0	31.3	-	+16.7	A
6.76	0.4	41.0	-	41.0	-	48.0	41.4	-	+ 6.6	A
8.94	0.5	36.0	-	37.0	-	48.0	37.5	-	+10.5	A
15.00	0.7	28.0	-	28.0	-	48.0	28.7	-	+19.3	A

Sample of calculated result at 0.45 MHz, as the Minimum Margin point:

Correction Factor = 0.1 dB

+) Meter Reading = 44.0 dB(μV)

Result = 44.1 dB(μV)

Minimum Margin : 48.0 - 44.1 = 3.9(dB)

The point shown on "___" is the Minimum Margin Point.

* According to § 15.107 (d), the margin between the level measured using the QP and average detector is 6dB, or more, the level obtained with the QP detector is reduced by 13dB for comparison to the limits.

Note 1:

1. The correction factors includes the LISN insertion loss and the cable loss.

Remarks:

Note 2	Detector Function	IF Bandwidth
A	CISPR QP	9 kHz
B	Average	10 kHz

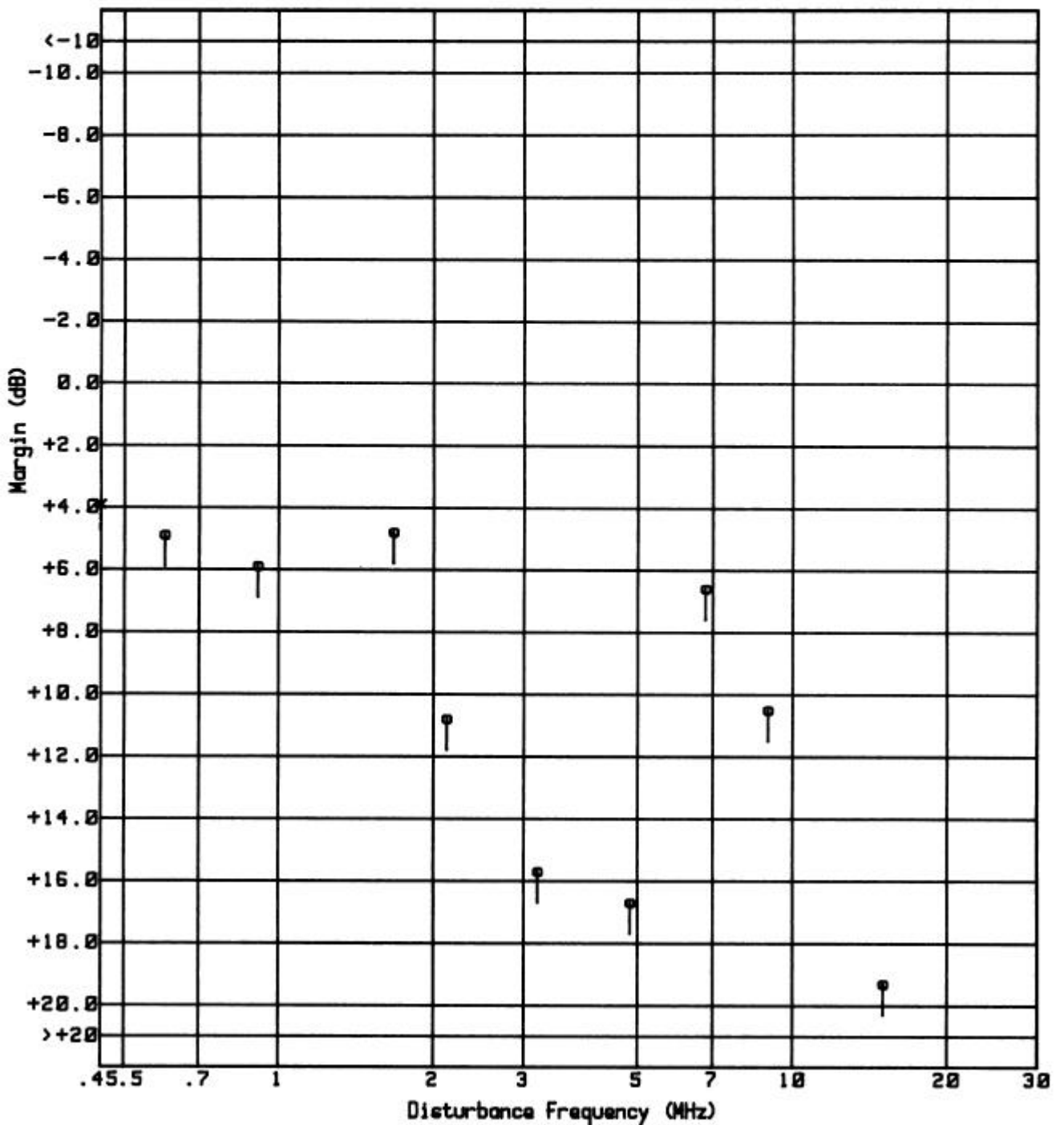
Tester Signature : A. Hosoda

Type Name : Akio Hosoda

Mains terminal Disturbance Voltage Measurement Model No.: UERW-301

Class B Digital Device ⊙ Quasi-peak
 × Average

QP Limits — : 48dB(uV)



Electromagnetic Radiation Disturbance Measurement Class B Digital Device

Based on the test result of every test mode, the mode of operation that produce the Radiated emission that has the highest amplitude is shown as follows:

Test Date: September 1, 1998
 Temp.: 25 °C ; Humi.: 64 %

Frequency [MHz]	Antenna Factor [dB(1/m)]	Cable Loss [dB]	Meter Readings [dB(μV)]		Limits [dB(μV/m)]	Results [dB(μV/m)]		Margin [dB]	Remarks (Note 2)
			Hori.	Vert.		Hori.	Vert.		
180.0	14.0	2.6	23.0	20.0	43.5	39.6	36.6	+ 3.9	A
240.0	16.5	3.1	24.0	15.0	46.0	43.6	34.6	+ 2.4	A
300.0	18.4	3.6	22.0	18.0	46.0	44.0	40.0	+ 2.0	A
480.0	22.9	4.6	10.0	16.0	46.0	37.5	43.5	+ 2.5	A
540.0	24.0	4.9	8.0	13.0	46.0	36.9	41.9	+ 4.1	A
600.0	25.0	5.2	8.0	13.0	46.0	38.2	43.2	+ 2.8	A
720.0	26.8	5.8	9.0	11.5	46.0	41.6	44.1	+ 1.9	A
780.0	27.5	6.1	8.0	9.0	46.0	41.6	42.6	+ 3.4	A
900.0	28.9	6.7	5.0	8.0	46.0	40.6	43.6	+ 2.4	A
960.0	29.5	7.0	5.0	7.0	46.0	41.5	43.5	+ 2.5	A

Sample of calculated result at 720.0 MHz, as the Minimum Margin point:

Antenna Factor = 26.8 dB(1/m)
 Cable Loss = 5.8 dB
 +) Meter Reading = 11.5 dB(μV)
 Result = 44.1 dB(μV/m)
 Minimum Margin : 46.0 - 44.1 = 1.9(dB)
 The point shown on "___" is the Minimum Margin Point.

Note 1:

- 1) The highest frequency generated or used in the EUT: 16 MHz
- 2) The upper frequency of measurement range : 1 GHz

Remarks:

Note 2	Detector Function	IF Bandwidth
A	CISPR QP	120 kHz
B	Average	120 kHz
C	Average	12 kHz
D	Average	7.5 kHz

Tester Signature : A. Hosoda
 Type Name : Akio Hosoda

Electromagnetic Radiation Disturbance Measurement Model No.: UERW-301

Class B Digital Device

⊙ Horizontal
× Vertical

Limits : ——— 40dB(uV/m) - - - - - 43.5dB(uV/m)
 — 46dB(uV/m) - - - - - 54dB(uV/m) (Above 960 MHz)

