



JAPAN QUALITY ASSURANCE ORGANIZATION
21-25, KINUTA 1-CHOME, SETAGAYA-KU, TOKYO 157 JAPAN
PHONE (03) 3416-0111, TELEX 242-2531 JQA J FAX (03) 3416-9691

FCC ID : CBRBP-9000A1

Regulation : FCC Part 15 Sub. B
Model No. : BP-9000
Issue Date : March 10, 1998

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85-70591
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EMI TEST REPORT

JQA APPLICATION NO. (TEST REPORT) : 85-70591

Applicant : SEIKO Precision Inc.
1-1 Akanehama 1-chome, Narashino-shi
Chiba-ken, 275-8558 JAPAN

Description of Equipment : Printer

FCC ID : CBRBP-9000A1

Regulations Applied : FCC Part 15 Subpart B

Place of Measurement : JQA EMC Engineering Dept. Tsuru Branch

NVLAP Lab. Code : 200192-0 (Effective through : June 30, 1998)

TEST FACILITY : This test facility is recognized the National Voluntary Laboratory Accreditation Program for satisfactory compliance with criteria established in Title 15, Part 285 Code of Federal Regulations.

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

THE TEST RESULTS only responds to the tested sample.

It is not allowed to copy this report even partly without the allowance of the JQA EMC Engineering Dept.

Signed:

Masahiko Shimada, Director
Tsuru Branch
JQA EMC Engineering Dept.

This report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government.



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GENERAL EQUIPMENT INFORMATION :**DESCRIPTION OF EQUIPMENT:**

- | | | |
|---|---|--------------------|
| 1) Type of EUT | : | Pr-production |
| 2) Category | : | Class B |
| 3) Trade Name | : | - |
| 4) Model No. | : | BP-9000 |
| 5) Serial No. | : | None |
| 6) Source of Interference
& Internal Frequencies | : | 25.0 MHz, 12.5 MHz |
| 7) Date of Manufacture | : | - |
| 8) Power Rating | : | 120VAC 60Hz |

TEST CONDITION OF DIGITAL DEVICE :

- | | | |
|-------------------------|---|---|
| 1) Configuration of EUT | : | Refer to Page Nos. 12 to 17. |
| 2) Operating Condition | : | Printing |
| 3) EUT Grounding | : | Grounded at the plug end of the power
line cord. |
| 4) EUT Warm-up Time | : | 5 minutes |

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CONCLUSIONS OF THE TEST RESULTS:

The data shown in this report were made in accordance with the procedures given in FCC Part 15 Sub.B Class B as detailed from page 4 to page 11.

1) Mains Terminal Disturbance Voltage : PASSED

Test Interface	Min. limit margin	Page No.
Serial	Q.P 2.8 dB at 4.58 MHz	4 - 5
Parallel	Q.P 1.4 dB at 4.58 MHz	6 - 7

Measurement Uncertainty : $\pm$ 2.0 dB

Tested by: H. Kajiwara
Hideki Kajiwara

2) Radiated Disturbance : PASSED

Test Interface	Min. limit margin	Page No.
Serial	8.1 dB at 32.4 MHz	8 - 9
Parallel	7.6 dB at 32.4 MHz	10 - 11

Measurement Uncertainty : $\pm$ 3.0 dB

Tested by: H. Kajiwara
Hideki Kajiwara

EQUIPMENT (EUT) MODIFICATION:

No modifications were conducted by JQA to achieve compliance to Class B levels.

I HEREBY CERTIFY THAT : The data shown in this report were made in accordance with the procedures given in ANSI C63.4-1992 and the energy emitted by the equipment was found to be within the limits applicable.

I assume full responsibility for accuracy and completeness of these data.

Approved Signatory : M. Takahashi
Masaaki Takahashi, Deputy Director

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MEASUREMENT OF MAINS TERMINAL DISTURBANCE VOLTAGE

* Test Condition : Serial Interface

Date : March 2, 1998
Temp.: 21°C Humi.:43 %

Frequency (MHz)	AMN Factor (dB)	Meter Reading (dB/uV)				Limits (dB/uV)		Emission Level (dB/uV)		Margin (dB)		Comment
		V-A		V-B		Q.P	AVE	Q.P	AVE	Q.P	AVE	
		Q.P	AVE	Q.P	AVE							
0.45	0.1	31.9	-	31.8	-	48.0	48.0	32.0	-	16.0	-	
0.56	0.1	32.2	-	32.3	-	48.0	48.0	32.4	-	15.6	-	
0.78	0.1	33.6	-	33.4	-	48.0	48.0	33.7	-	14.3	-	
1.01	0.1	32.3	-	32.9	-	48.0	48.0	33.0	-	15.0	-	
1.56	0.1	33.7	-	33.9	-	48.0	48.0	34.0	-	14.0	-	
2.46	0.1	34.8	-	35.0	-	48.0	48.0	35.1	-	12.9	-	
3.46	0.1	34.8	-	33.6	-	48.0	48.0	34.9	-	13.1	-	
4.58	0.1	45.1	-	44.3	-	48.0	48.0	45.2	-	2.8	-	
5.36	0.1	30.8	-	29.4	-	48.0	48.0	30.9	-	17.1	-	
7.48	0.1	16.3	-	12.7	-	48.0	48.0	16.4	-	31.6	-	
10.21	0.2	18.7	-	18.3	-	48.0	48.0	18.9	-	29.1	-	
12.23	0.2	28.9	-	27.6	-	48.0	48.0	29.1	-	18.9	-	
14.34	0.3	27.4	-	27.4	-	48.0	48.0	27.7	-	20.3	-	
16.19	0.3	25.4	-	25.1	-	48.0	48.0	25.7	-	22.3	-	
18.54	0.4	26.0	-	26.2	-	48.0	48.0	26.6	-	21.4	-	
20.64	0.4	21.4	-	21.3	-	48.0	48.0	21.8	-	26.2	-	
23.47	0.5	18.4	-	19.3	-	48.0	48.0	19.8	-	28.2	-	
25.00	0.5	29.1	-	29.7	-	48.0	48.0	30.2	-	17.8	-	
27.50	0.6	19.9	-	19.8	-	48.0	48.0	20.5	-	27.5	-	
30.00	0.6	18.7	-	18.9	-	48.0	48.0	19.5	-	28.5	-	

- Notes: 1) Test Location : Shielded Room
2) The spectrum was checked from 0.45 to 30 MHz.
3) LISN(Line Impedance Stabilization Network) factor includes the cable loss for 5 meter.
4) The symbol of "<" means "or less".
5) The symbol of ">" means "more than".
6) The symbol of "-" means "Not applicable".
7) V-A : One end & Ground V-B : The other end & Ground
8) Q.P : Quasi-Peak Detector AVE : Average Detector
9) Setting of measuring instrument :
a). Quasi-Peak
Detector Function : CISPR Quasi-Peak
IF Bandwidth : 9 KHz (0.15-30 MHz)
b). Average
Detector Function : Average
IF Bandwidth : 10 KHz (0.15-30 MHz)

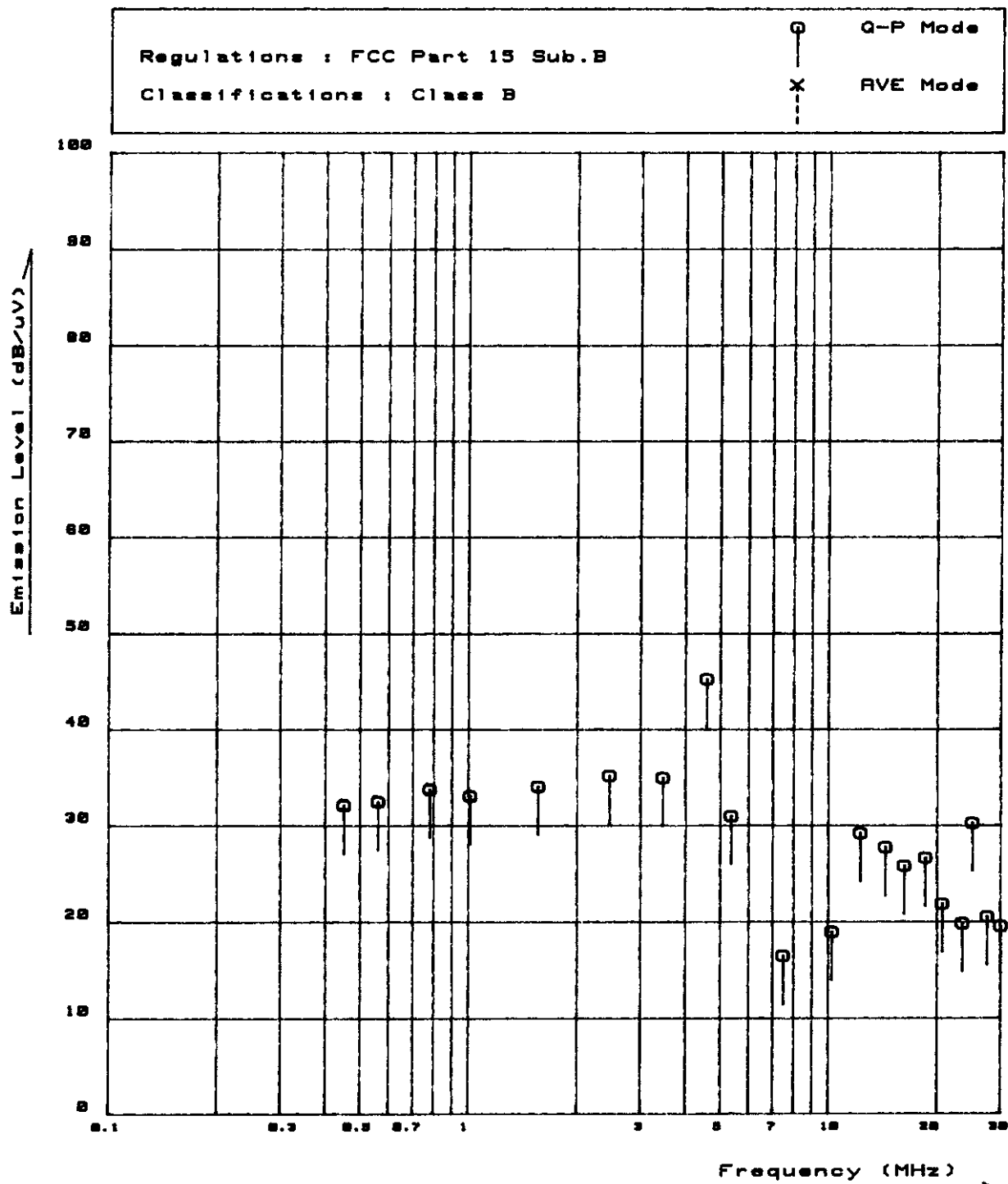
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POWER LINE CONDUCTED EMISSION MEASUREMENTS

Model No.: BP-9000

Test Condition : Serial Interface



Regulation : FCC Part 15 Sub.B
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MEASUREMENT OF MAINS TERMINAL DISTURBANCE VOLTAGE

* Test Condition : Parallel Interface

Date : March 2, 1998
Temp.: 21°C Humi.:43 %

Frequency (MHz)	AMN Factor (dB)	Meter Reading (dB/uV)				Limits (dB/uV)		Emission Level (dB/uV)		Margin (dB)		Comment
		V-A		V-B		Q.P	AVE	Q.P	AVE	Q.P	AVE	
		Q.P	AVE	Q.P	AVE							
0.45	0.1	32.9	-	32.3	-	48.0	48.0	33.0	-	15.0	-	
0.56	0.1	32.1	-	32.3	-	48.0	48.0	32.4	-	15.6	-	
0.78	0.1	33.7	-	33.9	-	48.0	48.0	34.0	-	14.0	-	
1.01	0.1	32.7	-	33.6	-	48.0	48.0	33.7	-	14.3	-	
1.56	0.1	33.8	-	34.4	-	48.0	48.0	34.5	-	13.5	-	
2.46	0.1	35.1	-	35.6	-	48.0	48.0	35.7	-	12.3	-	
3.46	0.1	34.1	-	35.0	-	48.0	48.0	35.1	-	12.9	-	
4.58	0.1	46.5	42.4	45.5	-	48.0	48.0	46.6	42.5	1.4	5.5	
5.36	0.1	30.6	-	28.7	-	48.0	48.0	30.7	-	17.3	-	
7.48	0.1	16.6	-	12.2	-	48.0	48.0	16.7	-	31.3	-	
10.21	0.2	17.9	-	17.8	-	48.0	48.0	18.1	-	29.9	-	
12.23	0.2	27.3	-	28.6	-	48.0	48.0	28.8	-	19.2	-	
14.31	0.3	25.5	-	25.0	-	48.0	48.0	25.8	-	22.2	-	
16.19	0.3	23.7	-	23.4	-	48.0	48.0	24.0	-	24.0	-	
18.54	0.4	24.6	-	24.1	-	48.0	48.0	25.0	-	23.0	-	
20.64	0.4	21.6	-	21.5	-	48.0	48.0	22.0	-	26.0	-	
23.47	0.5	22.0	-	22.0	-	48.0	48.0	22.5	-	25.5	-	
25.00	0.5	26.8	-	26.8	-	48.0	48.0	27.3	-	20.7	-	
27.50	0.6	20.1	-	20.0	-	48.0	48.0	20.7	-	27.3	-	
30.00	0.6	19.2	-	18.6	-	48.0	48.0	19.8	-	28.2	-	

- Notes: 1) Test Location : Shielded Room
2) The spectrum was checked from 0.45 to 30 MHz.
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7) V-A : One end & Ground V-B : The other end & Ground
8) Q.P : Quasi-Peak Detector AVE : Average Detector
9) Setting of measuring instrument :
a). Quasi-Peak
Detector Function : CISPR Quasi-Peak
IF Bandwidth : 9 KHz (0.15-30 MHz)
b). Average
Detector Function : Average
IF Bandwidth : 10 KHz (0.15-30 MHz)

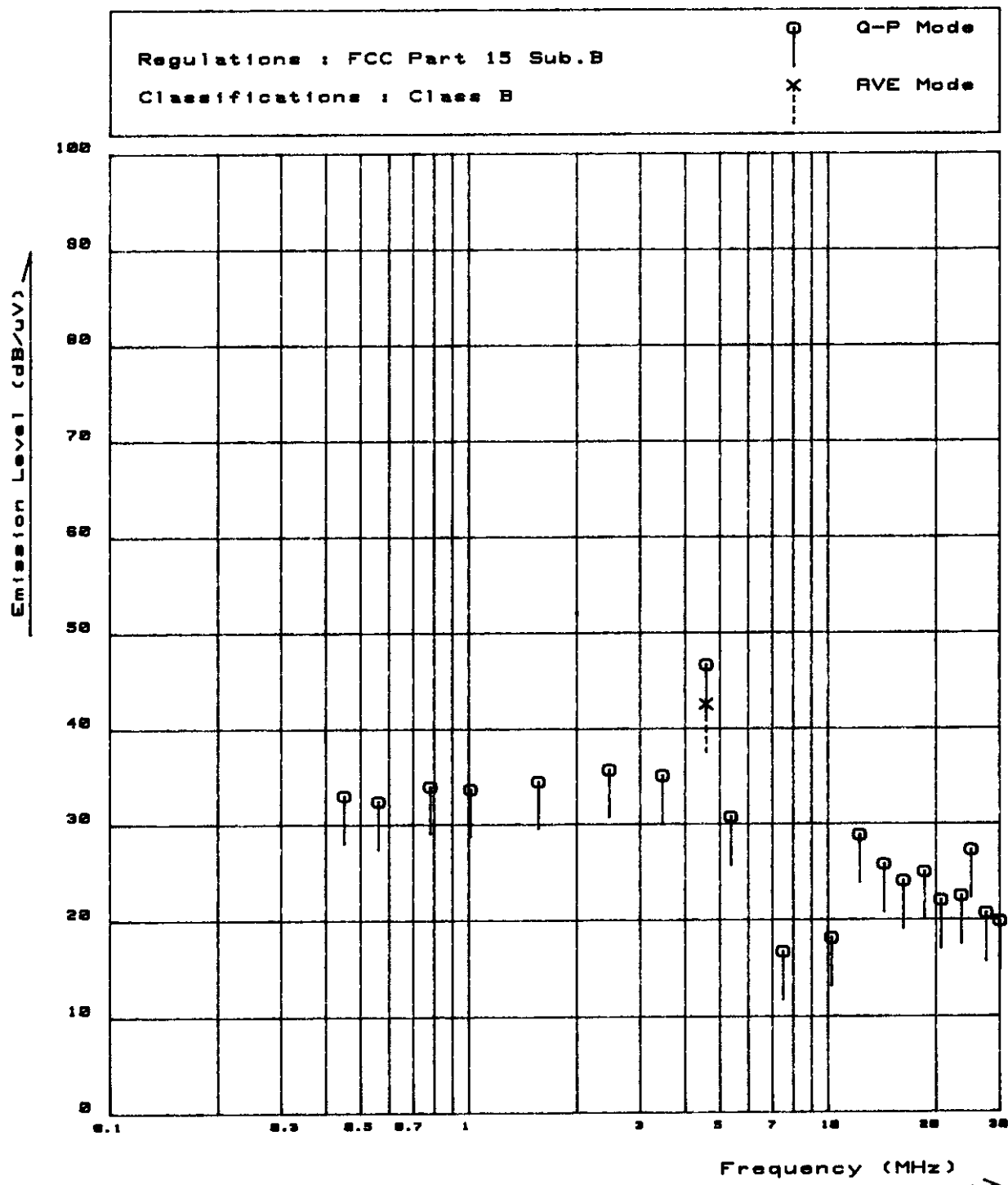
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POWER LINE CONDUCTED EMISSION MEASUREMENTS

Model No.: BP-9000

Test Condition : Parallel Interface



Regulation : FCC Part 15 Sub.B
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MEASUREMENT OF RADIATED DISTURBANCE

* Test Condition : Serial Interface

Date : March 3, 1998
 Temp.: 5°C Humi.:84 %

Frequency (MHz)	Antenna Factor (dB)	Meter Reading (dB/uV)		Limits (dB/uV/m)	Emission Level (dB/uV/m)		Margin (dB)		Comment
		Horiz.	Vert.		Horiz.	Vert.	Horiz.	Vert.	
32.4	18.4	-1.5	13.5	40.0	16.9	31.9	23.1	8.1	
37.0	16.8	3.0	14.0	40.0	19.8	30.8	20.2	9.2	
44.1	14.4	4.0	14.3	40.0	18.4	28.7	21.6	11.3	
50.0	12.7	9.0	13.0	40.0	21.7	25.7	18.3	14.3	
63.0	9.2	7.5	14.5	40.0	16.7	23.7	23.3	16.3	
75.0	7.7	13.5	15.5	40.0	21.2	23.2	18.8	16.8	
87.5	10.0	13.5	16.0	40.0	23.5	26.0	16.5	14.0	
100.0	12.1	21.0	23.0	43.5	33.1	35.1	10.4	8.4	
125.0	15.5	17.0	16.0	43.5	32.5	31.5	11.0	12.0	
137.5	16.8	13.0	14.0	43.5	29.8	30.8	13.7	12.7	
162.5	18.9	6.0	12.0	43.5	24.9	30.9	18.6	12.6	
200.0	21.2	7.5	6.5	43.5	28.7	27.7	14.8	15.8	
224.0	22.2	-1.5	4.0	46.0	20.7	26.2	25.3	19.8	
250.0	22.2	10.0	6.7	46.0	32.2	28.9	13.8	17.1	
262.6	22.3	6.0	1.5	46.0	28.3	23.8	17.7	22.2	
300.1	20.0	9.5	2.0	46.0	29.5	22.0	16.5	24.0	
352.9	21.6	6.8	11.5	46.0	28.4	33.1	17.6	12.9	
378.1	22.3	12.0	8.7	46.0	34.3	31.0	11.7	15.0	
400.0	22.7	5.0	4.5	46.0	27.7	27.2	18.3	18.8	
500.0	24.7	2.0	1.0	46.0	26.7	25.7	19.3	20.3	
600.0	26.5	1.5	4.0	46.0	28.0	30.5	18.0	15.5	
700.0	28.4	1.5	6.0	46.0	29.9	34.4	16.1	11.6	
1000.0	33.8	<-2.0	<-2.0	54.0	<31.8	<31.8	>22.2	>22.2	

- Notes: 1) Test Location : Open Site No.1
 2) Test Distance : 3 m
 3) The spectrum was checked from 30 to 1000 MHz.
 4) Antenna factor includes the cable loss for 58 meters.
 5) The symbol of "<" means "or less".
 6) The symbol of ">" means "more than".
 7) A sample calculation was made at 32.4 MHz.
 $Af + Mr = 18.4 + -1.5 = 16.9 \text{ dB/uV/m}$
 Af : Antenna Factor
 Mr : Meter Reading
 8) Setting of measuring instrument :
 Detector Function : CISPR Quasi-Peak
 IF Bandwidth : 120 KHz

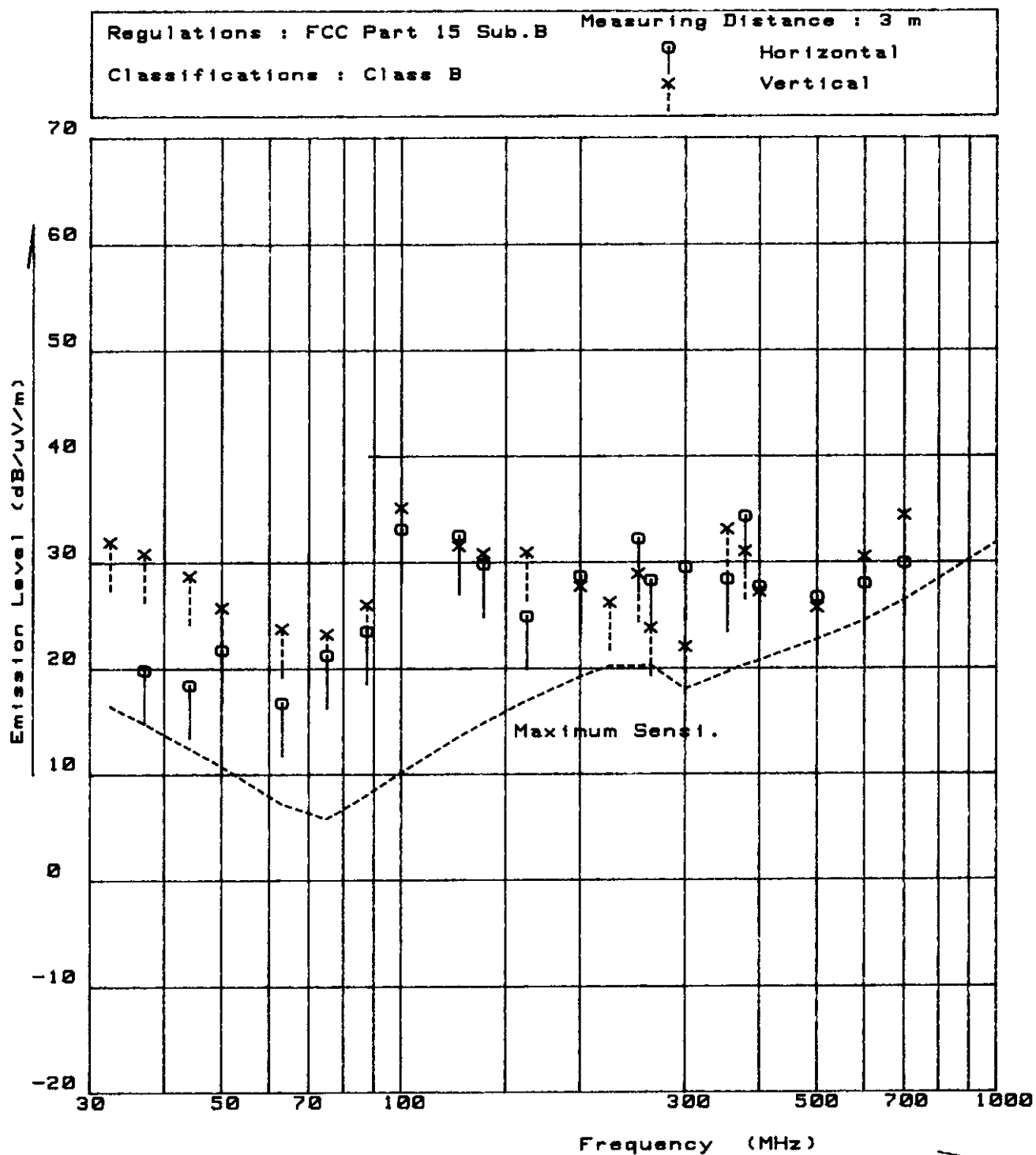
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RADIATED INTERFERENCE EMISSION MEASUREMENTS

Model No. : BP-9000

Test Condition :Serial Interface



Regulation : FCC Part 15 Sub.B
Model No. : BP-9000
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MEASUREMENT OF RADIATED DISTURBANCE

* Test Condition : Parallel Interface

Date : March 3, 1998
Temp.: 5° C Humi.:84 %

Frequency (MHz)	Antenna Factor (dB)	Meter Reading (dB/uV)		Limits (dB/uV/m)	Emission Level (dB/uV/m)		Margin (dB)		Comment
		Horiz.	Vert.		Horiz.	Vert.	Horiz.	Vert.	
32.4	18.4	-1.5	14.0	40.0	16.9	32.4	23.1	7.6	
37.0	16.8	3.0	14.0	40.0	19.8	30.8	20.2	9.2	
44.1	14.4	5.5	14.5	40.0	19.9	28.9	20.1	11.1	
50.0	12.7	8.0	13.0	40.0	20.7	25.7	19.3	14.3	
63.0	9.2	8.7	16.0	40.0	17.9	25.2	22.1	14.8	
75.1	7.7	15.0	17.0	40.0	22.7	24.7	17.3	15.3	
87.5	10.0	12.0	15.7	40.0	22.0	25.7	18.0	14.3	
100.0	12.1	19.8	21.0	43.5	31.9	33.1	11.6	10.4	
125.0	15.5	17.0	14.0	43.5	32.5	29.5	11.0	14.0	
137.6	16.8	12.5	11.0	43.5	29.3	27.8	14.2	15.7	
162.5	18.9	11.0	12.5	43.5	29.9	31.4	13.6	12.1	
200.0	21.2	7.3	11.5	43.5	28.5	32.7	15.0	10.8	
224.0	22.2	-1.5	5.0	46.0	20.7	27.2	25.3	18.8	
250.0	22.2	9.7	6.3	46.0	31.9	28.5	14.1	17.5	
262.0	22.3	<-2.0	1.0	46.0	<20.3	23.3	>25.7	22.7	
300.1	20.0	4.5	5.0	46.0	24.5	25.0	21.5	21.0	
340.3	21.3	3.0	1.0	46.0	24.3	22.3	21.7	23.7	
378.1	22.3	11.5	9.4	46.0	33.8	31.7	12.2	14.3	
400.0	22.7	4.0	6.5	46.0	26.7	29.2	19.3	16.8	
500.0	24.7	2.0	2.0	46.0	26.7	26.7	19.3	19.3	
630.9	27.1	1.0	3.5	46.0	28.1	30.6	17.9	15.4	
699.3	28.4	3.0	7.0	46.0	31.4	35.4	14.6	10.6	
1000.0	33.8	<-2.0	<-2.0	54.0	<31.8	<31.8	>22.2	>22.2	

- Notes: 1) Test Location : Open Site No.1
 2) Test Distance : 3 m
 3) The spectrum was checked from 30 to 1000 MHz.
 4) Antenna factor includes the cable loss for 58 meters.
 5) The symbol of "<" means "or less".
 6) The symbol of ">" means "more than".
 7) A sample calculation was made at 32.4 MHz.
 $Af + Mr = 18.4 + -1.5 = 16.9 \text{ dB/uV/m}$
 Af : Antenna Factor
 Mr : Meter Reading
 8) Setting of measuring instrument :
 Detector Function : CISPR Quasi-Peak
 IF Bandwidth : 120 KHz

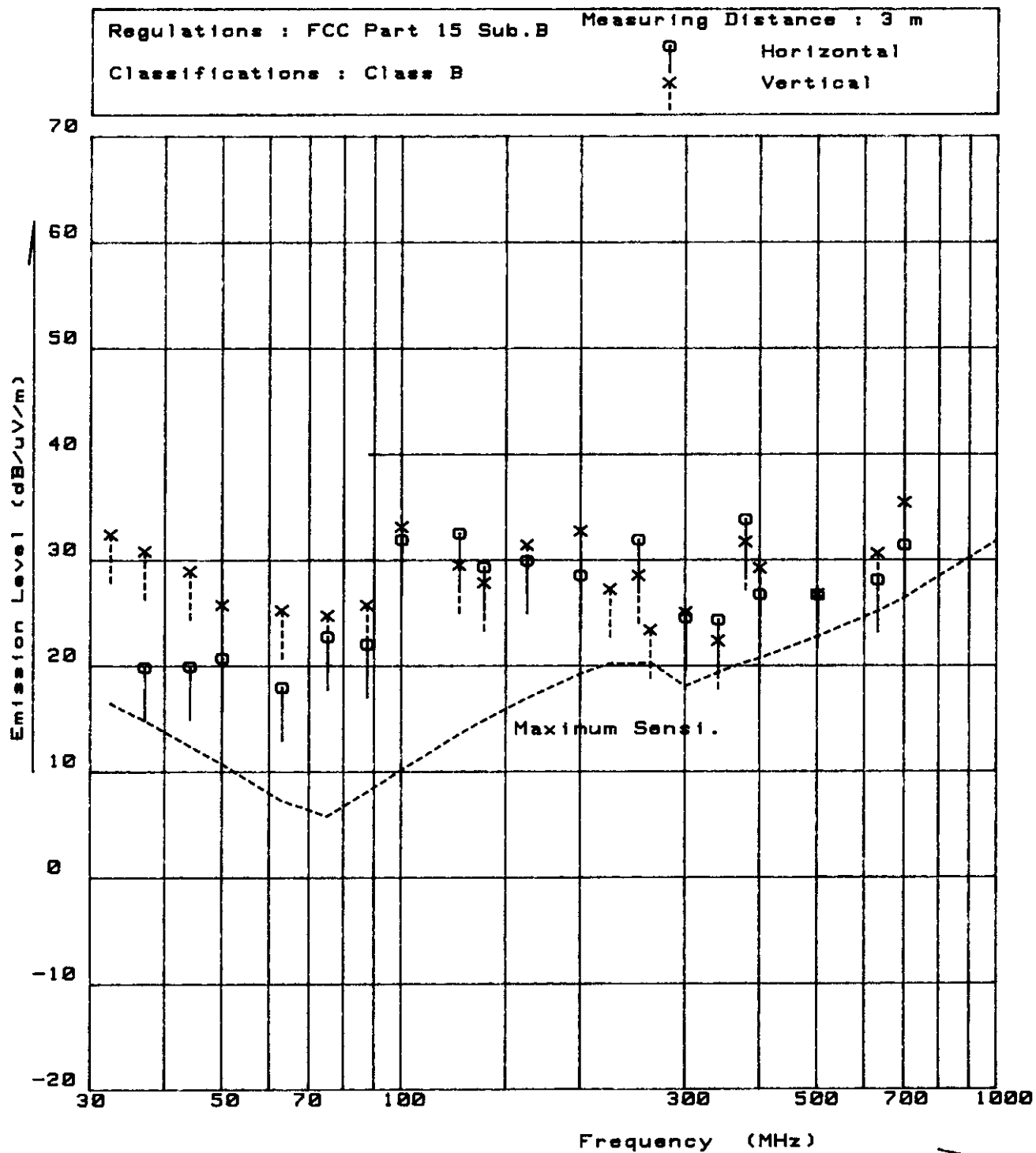
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RADIATED INTERFERENCE EMISSION MEASUREMENTS

Model No.: BP-9000

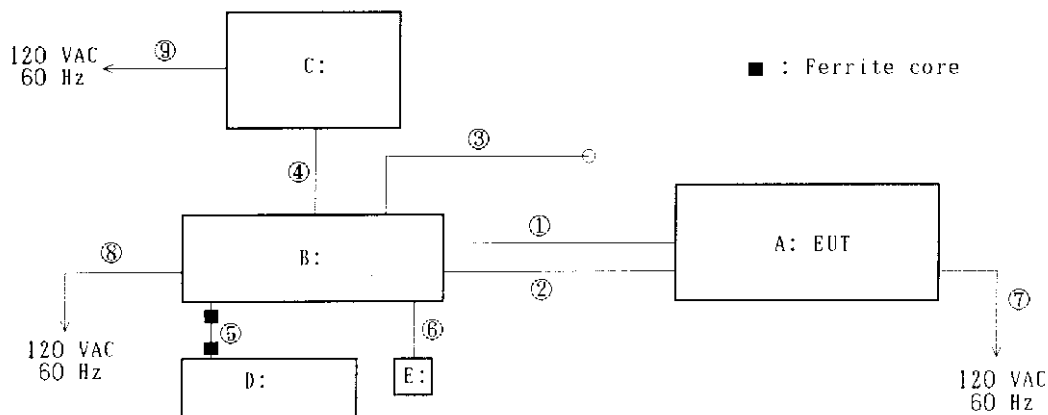
Test Condition : Parallel Interface



Regulation : FCC Part 15 Sub. B
Model No. : BP-9000
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Configuration of Tested System



1. Tested System :

Description	Manufacturer	Model No.	FCC ID	Serial No.
A: Printer(EUT)	SEIKO Precision Inc.	BP-9000	CBRBP-9000A1	-
B: Personal Computer	digital	PC743	A09-PC741	TA3054F698
C: CRT Display	digital	PC7XV-DA	GWG-XXX449XC	TA243A0743
D: Keyboard	digital	PCXAJ-AA	-	TB30503003
E: Mouse	digital	PC7XS-AA	DZLMSF14R	LT502C00291

2. Type of cables :

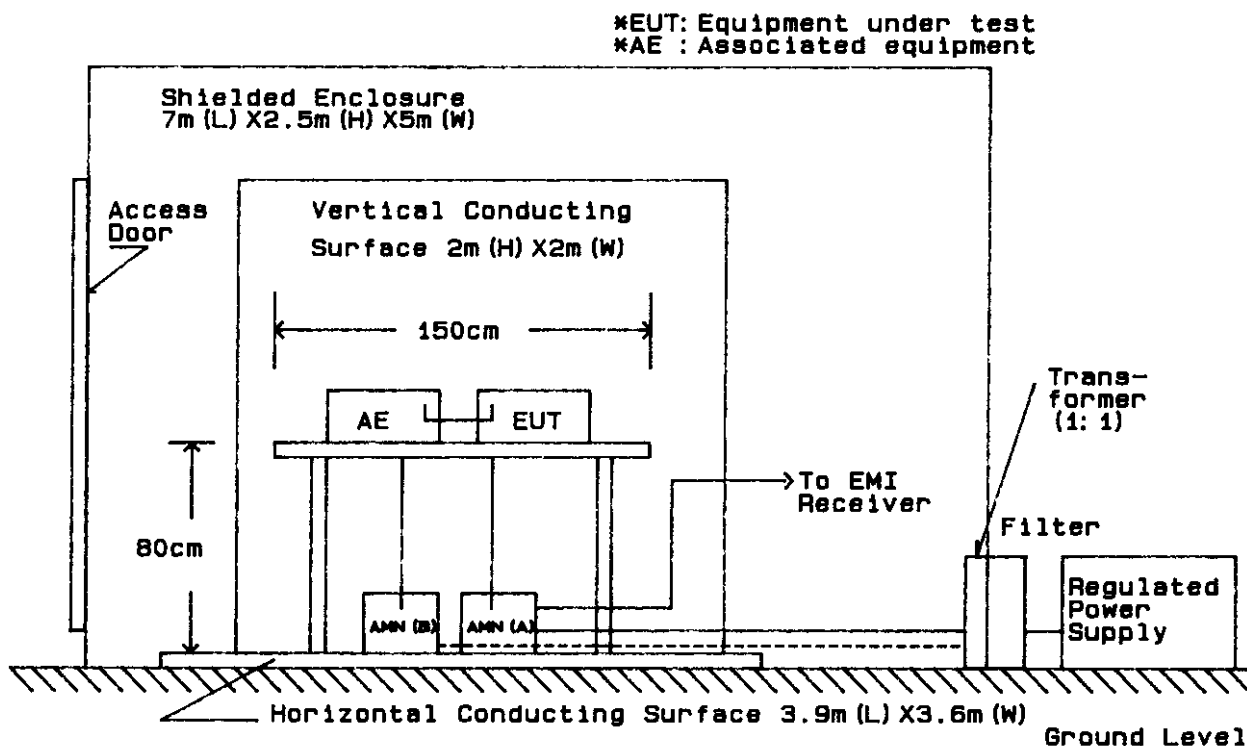
Description	Shielded	Ferrite Core	Length (m)	Other
① Parallel I/F Cable	YES	NO	1.8	-
② Serial I/F Cable	YES	NO	1.5	-
③ RS-232C Cable	YES	NO	1.5	Open
④ CRT Cable	YES	NO	1.5	-
⑤ Keyboard Cable	YES	YES	1.1	-
⑥ Mouse Cable	YES	NO	1.8	-
⑦ Power Cable(EUT)	NO	NO	2.0	-
⑧ Power Cable(CPU)	NO	NO	1.8	-
⑨ Power Cable(CRT)	NO	NO	2.0	-

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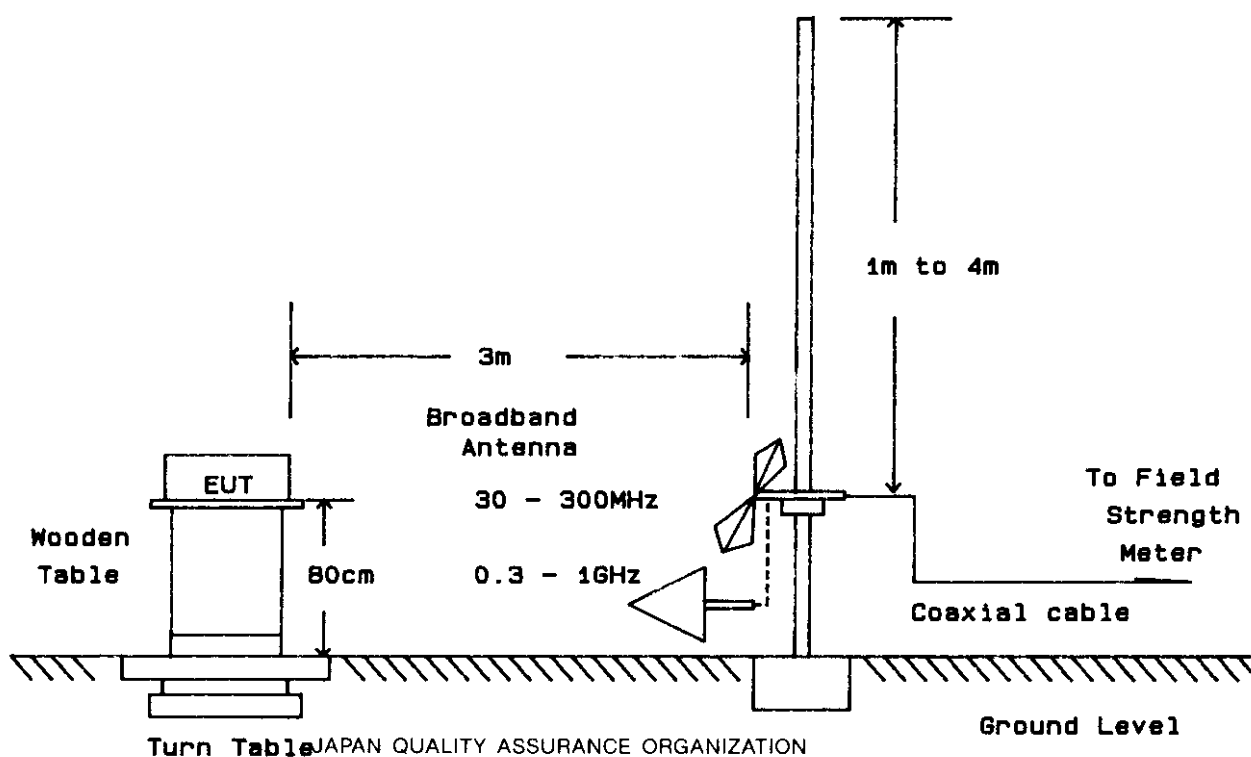
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Test-setup (Drawings) :

Conducted Emissions 450 KHz - 30 MHz :



Radiated Emissions 30 - 1000 MHz :



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Test Instrumentation Used, Conducted Measurement:

Type	Manufacturer Model No. / Serial No.	Last Cal.	Cal. Interval
Receiver(*)	Rohde & Schwarz ESH 3 / 872994/047	May 1997	1 year
LISN (50Ω 50 μH)	Kyoritsu Electrical KNW-407 / 8-833-5	Aug. 1997	1 year
RF CABLE (Length:5m)	Fujikura 3D-2W / S-1	May 1997	1 year

(*) Setting of measuring instrument:

a) Quasi-Peak Mode

Detector Function : CISPR Quasi-Peak
IF Bandwidth : 9 KHz (0.15 - 30 MHz)

b) Average Mode

Detector Function : Average
10 KHz (0.15 - 30 MHz)

Regulation : FCC Part 15 Sub. B
Model No. : BP-9000
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Test Instrumentation Used, Radiated Measurement:

Type	Manufacturer Model No. / Serial No.	Last Cal.	Cal. Interval
Receiver(*)	Rohde & Schwarz ESV / 863796/015	May 1997	1 year
Spectrum Analyzer	Hewlett Packard 8560E	May. 1997	1 year
Bi-Coni Antenna	Schwarzbeck UHALP9106 / 119-05-048-2	Oct. 1997	1 year
Log-Periodic Antenna	Schwarzbeck UHALP9107 / 91071212	Oct. 1997	1 year
Open Site	JQA JQA-NO. 1	Sep 1997	1 year
RF Cable	Fujikura 5D2W / No. 1-2	May 1997	1 year
RF Cable	Fujikura 20D2W / No. 1-1	May 1997	1 year

(*) Setting of measuring instrument:

Detector Function : CISPR Quasi-Peak

IF Bandwidth : 120 KHz (30 - 1000 MHz)