

EPSON

SEIKO EPSON CORPORATION

FCC ID : BKMFBYBA-1

RFI MEASUREMENT TEST REPORT

FCC PART 15B CLASS B

***** CLASS B DIGITAL DEVICES AND PERIPHERALS *****

APPLICANT : SEIKO EPSON CORPORATION

EQUIPMENT : COLOR LASER PRINTER

TRADE NAME : EPSON

MODEL NUMBER : YBA-1

FCC ID NUMBER : BKMFBYBA-1

TEST REPORT No. : E-103-98035



NVLAP LAB CODE 200157-0

Test
Report

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TEST CERTIFICATION**Applicant Information**

Company : SEIKO EPSON Corporation
Division/Section : TP Product Safety Design Group
Imaging & Information Products Operations
Address : 80, Harashinden, Hirooka, Shiojiri-shi, Nagano, 399-0785 Japan
PHONE : +81-263-53-6024 FAX : +81-263-53-3544

Test Performed

Company : SEIKO EPSON Corporation
Division/Section : EMC Group, Production Management Division
Location : 80, Harashinden, Hirooka, Shiojiri-shi, Nagano, 399-0785 Japan
PHONE: +81-263-52-5094 FAX : +81-263-54-5806
10 meter Semi-anechoic Chamber
FCC File No. : 31040 / SIT 1300F2
NVLAP Lab Code : 200157-0
Test started : 27 April, 1998
Test completed : 28 April, 1998
Purpose of test : Compliance with standards
Test specification(s) : FCC Part 15B Class B (Unintentional Radiators)
Test procedure(s) : ANSI C63.4-1992
Test engineer : Toshiyuki Omori T. Omori
EMC group, Production Management Division
Report checked by : Atsushi Shinozaki A. Shinozaki
Chief Engineer / EMC group, Production Management Division
Report approved by : Yoshiyuki Sakurai Yoshiyuki Sakurai
Manager / EMC group, Production Management Division / NVLAP signatory
Report issue date : 18 June, 1998

The test item under the test conditions and configuration shown in this test report complies with above standard.

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1. DETAILED DESCRIPTION OF TEST ITEM

1-1 Equipment Under Test (EUT)

Kind of equipment	: Color laser printer
Shape	: Floor-standing type
Manufacturer	: SEIKO EPSON Corporation
Trade Name	: EPSON
Model Number	: YBA-1
FCC ID	: BKMFBYBA-1
Serial Number	: 000002
Voltage input	: AC 120 V / 60 Hz
Rated current	: 11 A
Port(s) / Connector(s)	: Parallel(Centronics, standard) Serial (RS-232C, option)
Oscillator(s) / Crystal(s)	: 66.7000 MHz, 33.35 MHz, 41.1699 MHz, 13.7233 MHz (Main Board) 20 MHz, 5 MHz, 10 MHz , 18.2 MHz, 9.1 MHz (Mechanical Control unit) 7.108 MHz, 5.121 MHz (Motor Control)
Operating frequency (Max.)	: 133 MHz (Main Board)
Remarks	: With Large capacity paper unit (YBA-2), Photo conductor unit (S051061), Option memory, serial I/F card (C82307) Built-in SD-RAM and flash DIMM x 3

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1-2 Auxiliary equipment (AE)

AE	Name	Model (Serial number)	Manufacturer	FCC ID	Voltage input Power consumption	
1	Large capacity paper unit	YBA-2 (N/A)	SEIKO EPSON Corporation	N/A	DC 24 V 0.6 A DC 5.0 V 0.3 A	a)
2	Photo conductor unit	S051061 (N/A)	SEIKO EPSON Corporation	N/A	- -	a)
3	Memory	VSG-32MK (N/A)	Melco INC.	N/A	- -	a) b)
4	Memory	VSF-128MK (N/A)	Melco INC.	N/A	- -	a) b)
5	Serial I/F card	C82307 (N/A)	SEIKO EPSON Corporation	BKMC82307	DC 5.0 V 0.16 A	a) b)
6	Personal computer	D4594B (SG74350438)	Hewlett Packard	(DOC)	AC 120 V / 60 Hz 3.0 A	
7	CRT monitor	D2830A (KR70913448)	Hewlett Packard	A3LCGC560	AC 120 V / 60 Hz 1.2 A	
8	Keyboard	RT6656TWJP (52370445)	Hewlett Packard	AQ6-MTN4C15	DC 5.0 V 0.3 A	c)
9	Mouse	M-S34 (LZA72026370)	Hewlett Packard	DZL211029	DC 5.0 V 15 mA	c)

- a) Supply from printer (EUT)
- b) Inserted into the printer (EUT)
- c) Supply from computer (AE6)

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1-3 Relevant Signal and Power lines

AE = Auxiliary equipment, EUT = Equipment Under Test = Test item

Line	Name	From	To	Length	Shield	Remarks
1	Parallel I/F cable	EUT Parallel in	AE6 Parallel out	2.0m	Yes	Metal connector
2	Serial I/F cable	AE5 Serial in	AE6 Com1 out	2.0 m	Yes	Metal connector
3	Serial I/F cable	AE5 Serial in	AE6 Com2 out	2.0 m	Yes	Metal connector
4	Signal I/F cable	EUT Signal in	AE1 Signal out	0.2 m	No	
5	Video I/F cable	AE7 Video in	AE6 Video out	1.5m	Yes	Metal connector
6	Keyboard I/F cable	AE8 Keyboard	AE6 Keyboard out	2.0m	Yes	Metal connector
7	Mouse I/F cable	AE9 Mouse	AE6 Mouse out	1.8 m	Yes	Metal connector
8	EUT AC cable	EUT AC 120 V in	Main AC 120 V	2.5 m	No	
9	Computer AC cable	AE6 AC 120 V in	Main AC 120 V	2.2 m	No	
10	CRT AC cable	AE7 AC 120 V in	Main AC 120 V	2.2 m	No	

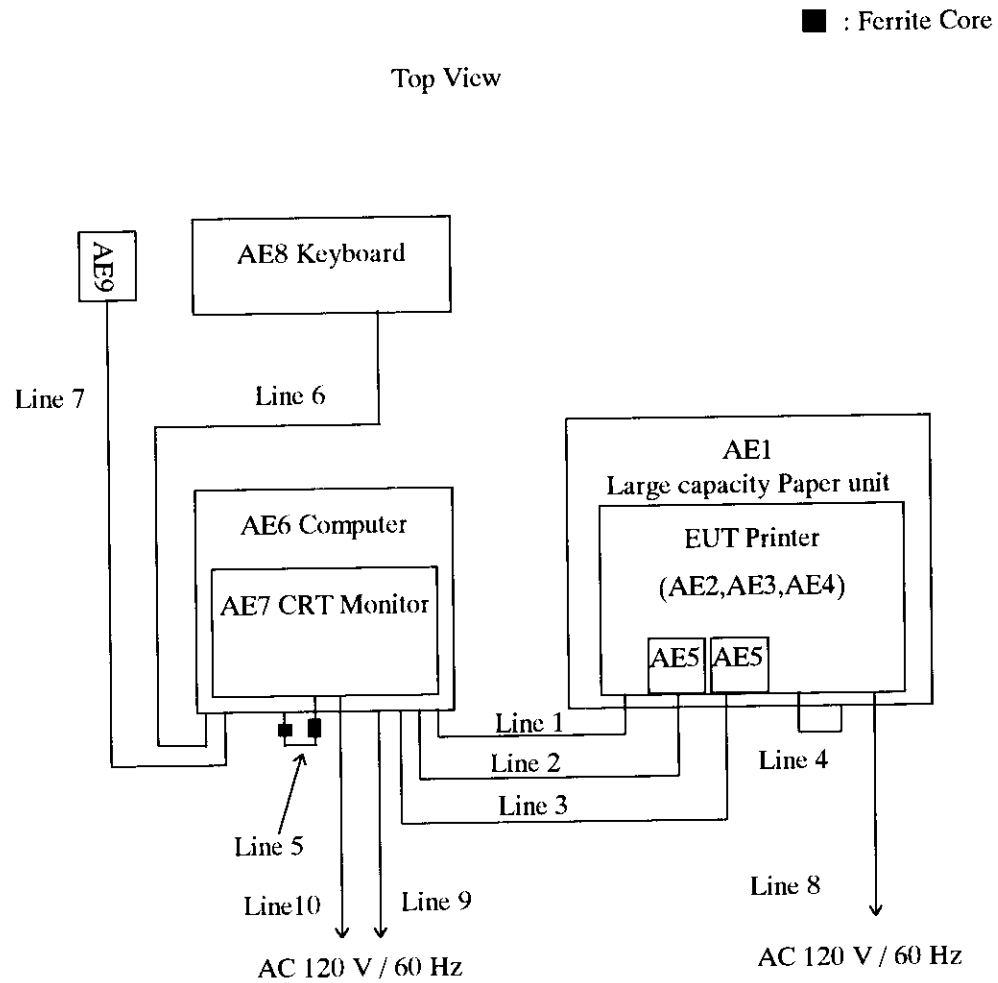
Note : Line 5 (video I/F cable) has two ferrite cores permanently attached .

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1-4 Positioning of Equipment

The positioning of EUT during testing is as follows.



Abbreviations shown in the above diagram correspond to equipment or cables in tables in Section 1-1, 1-2, 1-3.

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2. OPERATING CONDITIONS

The EUT is operated under the following conditions continuously during the tests.

2-1 Operating modes

- Mode 1 : Processing color printing via parallel I/F (line 1)
- Mode 2 : Processing color printing via serial I/F (line 2)
- Mode 3 : Processing color printing via serial I/F (line 3)
- Mode 4 : Processing monochrome printing via parallel I/F (line 1)
- Mode 5 : Processing monochrome printing via serial I/F (line 2)
- Mode 6 : Processing monochrome printing via serial I/F (line3)

2-2 Operating cycles

Performed following operation continuously.

- 1: Print data are transferred from computer(AE6)
- 2: Print 'H' characters by EUT
- 3: Monitor(AE7) displays 'H' characters on the full screen

Note : The data transfer rate on the serial I/F (RS-232C) is 9600 bps.

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3. TEST PROCEDURE(S)

This test is carried out with the test procedure(s) drawn up by our laboratory based on the following test procedure(s).

Test Item	Test procedure used	Scanned Frequency Range
Conducted Emission	ANSI C63.4 - 1992	0.45 - 30 MHz
Radiated Emission	ANSI C63.4 - 1992	30 - 2000 MHz

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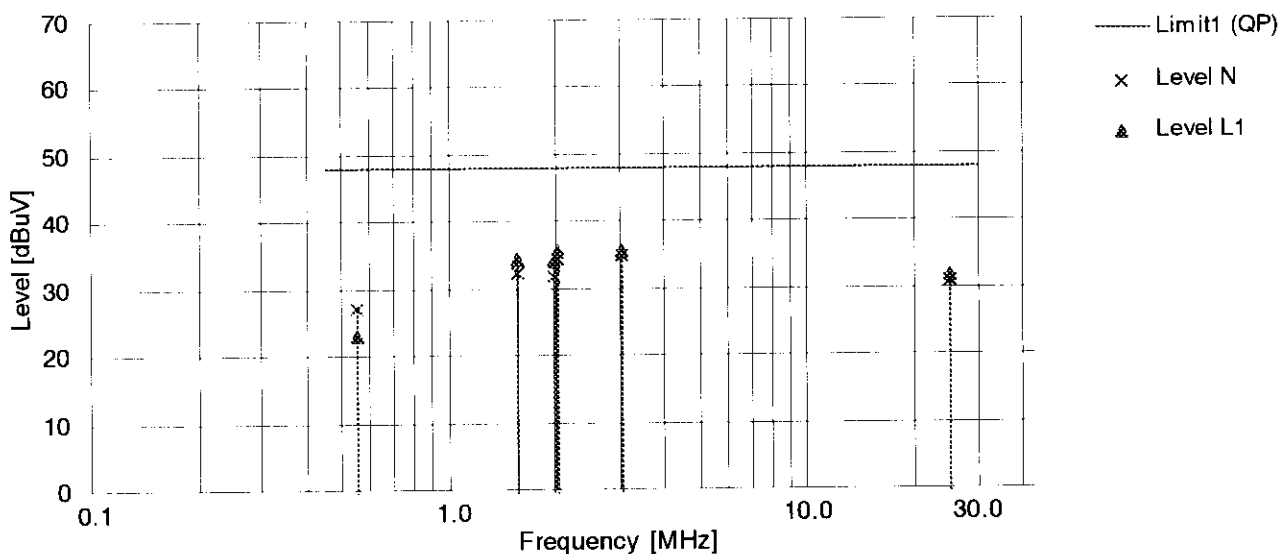
4. EVALUATION OF TEST RESULTS

4-1 Conducted Emission Test

Mode 1

Kind of Equipment	: Color laser printer	Temperature	: 22 C
Model Name	: YBA-1	Humidity	: 50 %
Serial No.	: 000002	Engineer	: T. Omori
Comment	: Color parallel		
Detector	: QP	Date	: 98/4/28
Points	: 6	EMI Receiver(s)	: ESS

Limit1 : [FCC] Class B



Frequency [MHz]	Reading N		Reading L1		QP-AVE [dB]	QP/AVE -13 [dB]	LISN Factor [dB]	Level N [dBuV]	Level L1 [dBuV]	Limit [dBuV]	Margin [dB]
	QP [dBuV]	AVE [dBuV]	QP [dBuV]	AVE [dBuV]							
0.5580	26.4	-	22.5	-	-	-	0.5	26.9	23.0	48.0	21.1
1.5630	31.7	-	33.6	-	-	-	0.6	32.3	34.2	48.0	13.8
1.9539	31.1	-	33.5	-	-	-	0.6	31.7	34.1	48.0	13.9
2.0227	33.5	-	34.6	-	-	-	0.7	34.2	35.3	48.0	12.7
3.0432	34.0	-	34.7	-	-	-	0.8	34.8	35.5	48.0	12.5
25.1080	27.6	-	28.4	-	-	-	3.3	30.9	31.7	48.0	16.3

Note : All other frequencies in the range from 450 kHz to 30 MHz have emission level of more than 10 dB below the limit.

Level is rounded off to one decimal place.

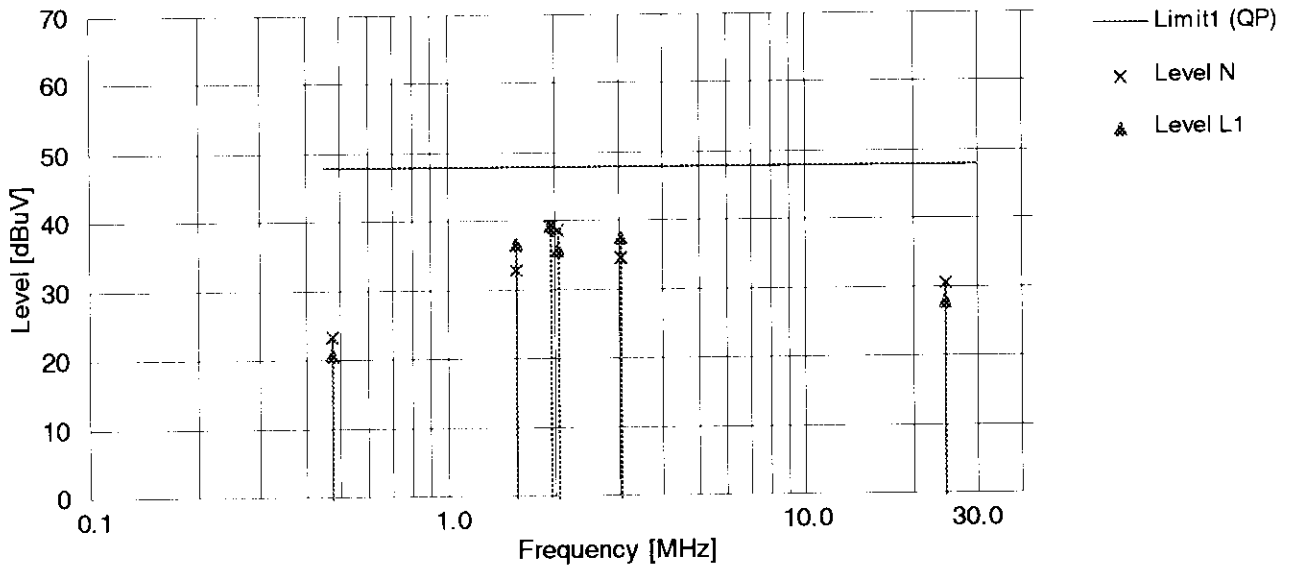
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Mode 2

Kind of Equipment	: Color laser printer	Temperature	: 22 C
Model Name	: YBA-1	Humidity	: 50 %
Serial No.	: 000002	Engineer	: T. Omori
Comment	: Color serial		
Detector	: QP	Date	: 98/4/28
Points	: 6	EMI Receiver(s)	: ESS

Limit1 : [FCC] Class B



Frequency [MHz]	Reading N		Reading L1		QP-AVE [dB]	QP/AVE -13 [dB]	LISN Factor [dB]	Level N [dBuV]	Level L1 [dBuV]	Limit [dBuV]	Margin [dB]
	QP [dBuV]	AVE [dBuV]	QP [dBuV]	AVE [dBuV]							
0.4750	22.9	-	20.1	-	-	-	0.4	23.3	20.5	48.0	24.7
1.5631	32.2	-	35.9	-	-	-	0.6	32.8	36.5	48.0	11.5
1.9496	38.5	-	38.7	-	-	-	0.6	39.1	39.3	48.0	8.7
2.0280	38.0	-	35.0	-	-	-	0.7	38.7	35.7	48.0	9.3
3.0433	33.9	-	36.7	-	-	-	0.8	34.7	37.5	48.0	10.5
24.6479	27.2	-	24.6	-	-	-	3.3	30.5	27.9	48.0	17.5

Note : All other frequencies in the range from 450 kHz to 30 MHz have emission level of more than 10 dB below the limit.

Level is rounded off to one decimal place.

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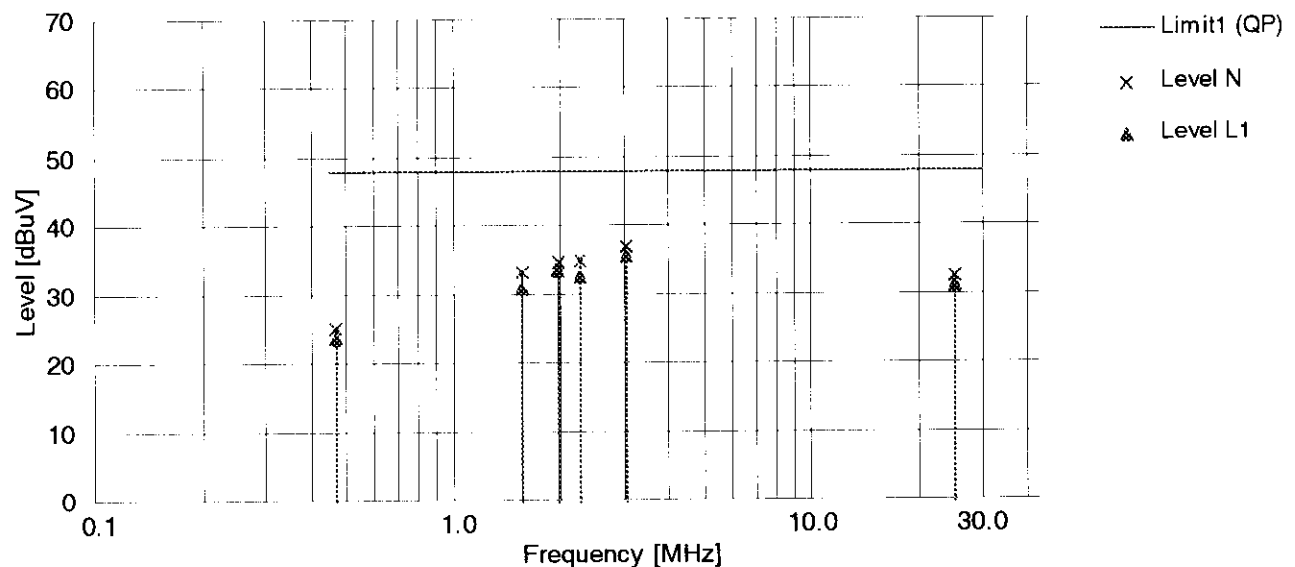
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Mode 3

Kind of Equipment : Color laser printer
 Model Name : YBA-1
 Serial No. : 000002
 Comment : Color serial
 Detector : QP
 Points : 6

Temperature : 22 C
 Humidity : 50 %
 Engineer : T. Omori
 Date : 98/4/28
 EMI Receiver(s) : ESS

Limit1 : [FCC] Class B



Frequency [MHz]	Reading N		Reading L1		QP-AVE [dB]	QP/AVE -13 [dB]	LISN Factor [dB]	Level N [dBuV]	Level L1 [dBuV]	Limit [dBuV]	Margin [dB]
	QP [dBuV]	AVE [dBuV]	QP [dBuV]	AVE [dBuV]							
0.4707	24.6	-	23.0	-	-	-	0.4	25.0	23.4	48.0	23.0
1.5640	32.5	-	30.1	-	-	-	0.6	33.1	30.7	48.0	14.9
1.9540	34.1	-	32.9	-	-	-	0.6	34.7	33.5	48.0	13.3
2.2656	34.2	-	31.8	-	-	-	0.7	34.9	32.5	48.0	13.1
3.0430	36.2	-	34.7	-	-	-	0.8	37.0	35.5	48.0	11.0
25.0241	29.2	-	27.8	-	-	-	3.3	32.5	31.1	48.0	15.5

Note : All other frequencies in the range from 450 kHz to 30 MHz have emission level of more than 10 dB below the limit.

Level is rounded off to one decimal place.

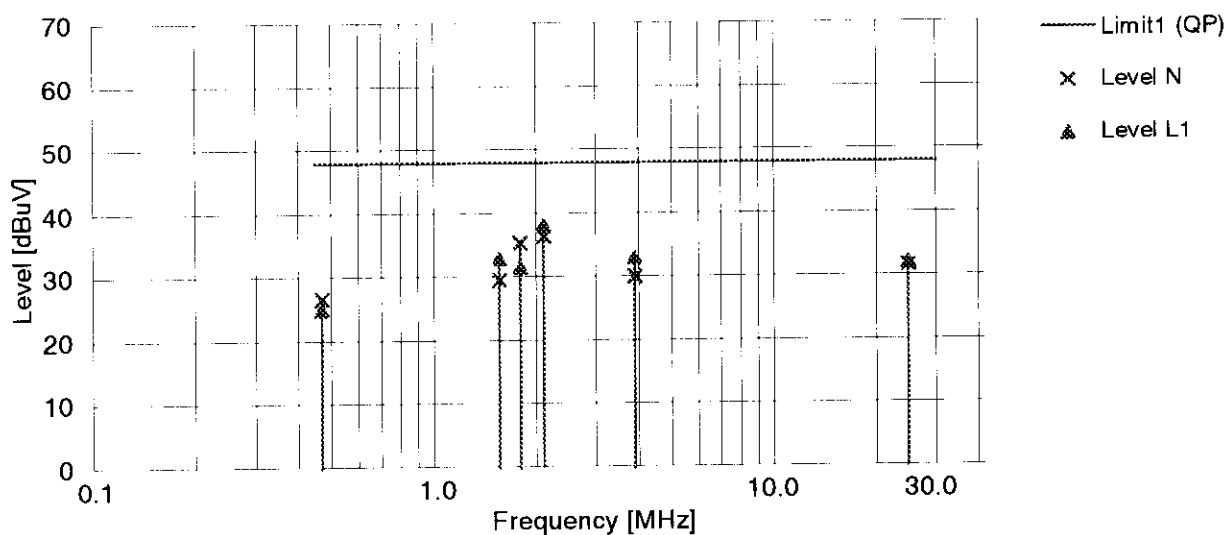
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Mode 4

Kind of Equipment	: Color laser printer	Temperature	: 22 C
Model Name	: YBA-1	Humidity	: 50 %
Serial No.	: 000002	Engineer	: T. Omori
Comment	: Monochrome Parallel		
Detector	: QP	Date	: 98/4/28
Points	: 6	EMI Receiver(s)	: ESS

Limit1 : [FCC] Class B



Frequency [MHz]	Reading N		Reading L1		QP-AVE [dB]	QP/AVE -13 [dB]	LISN Factor [dB]	Level N [dBuV]	Level L1 [dBuV]	Limit [dBuV]	Margin [dB]
	QP [dBuV]	AVE [dBuV]	QP [dBuV]	AVE [dBuV]							
0.4695	26.2	-	24.5	-	-	-	0.4	26.6	24.9	48.0	21.4
1.5620	28.8	-	32.2	-	-	-	0.6	29.4	32.8	48.0	15.2
1.7973	34.7	-	30.8	-	-	-	0.6	35.3	31.4	48.0	12.7
2.1082	35.6	-	37.4	-	-	-	0.7	36.3	38.1	48.0	9.9
3.9070	29.0	-	32.0	-	-	-	0.9	29.9	32.9	48.0	15.1
24.9133	28.3	-	28.7	-	-	-	3.3	31.6	32.0	48.0	16.0

Note : All other frequencies in the range from 450 kHz to 30 MHz have emission level of more than 10 dB below the limit.

Level is rounded off to one decimal place.

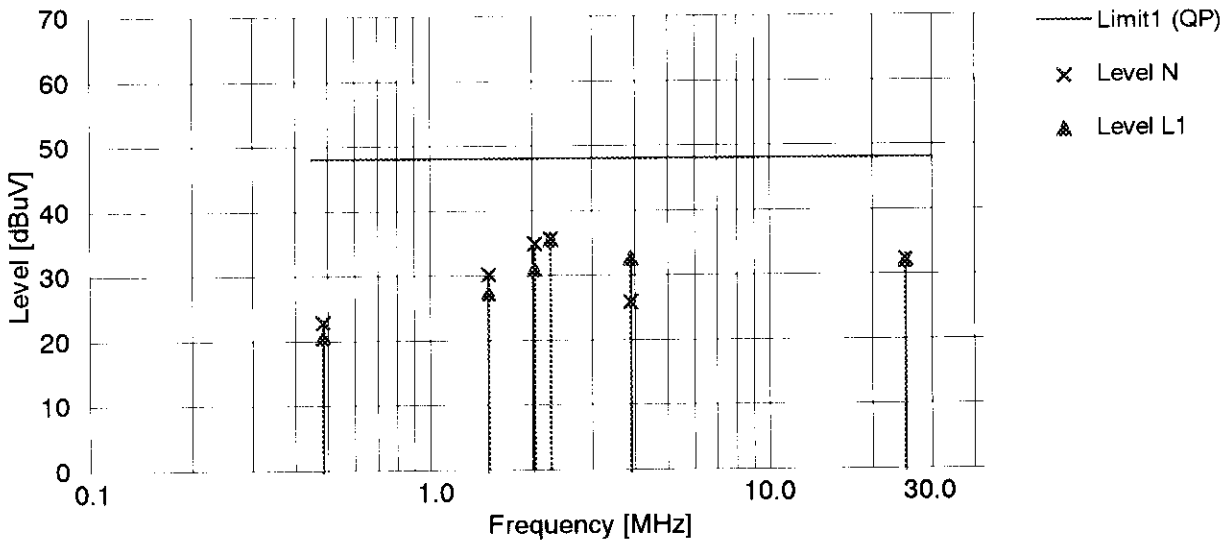
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Mode 5

Kind of Equipment	: Color laser printer	Temperature	: 22 C
Model Name	: YBA-1	Humidity	: 50 %
Serial No.	: 000002	Engineer	: T. Omori
Comment	: Monochrome serial	Date	: 98/4/28
Detector	: QP	EMI Receiver(s)	: ESS
Points	: 6		

Limit1 : [FCC] Class B



Frequency [MHz]	Reading N		Reading L1		QP-AVE [dB]	QP/AVE -13 [dB]	LISN Factor [dB]	Level N [dBuV]	Level L1 [dBuV]	Limit [dBuV]	Margin [dB]
	QP [dBuV]	AVE [dBuV]	QP [dBuV]	AVE [dBuV]							
0.4852	22.4	-	20.1	-	-	-	0.4	22.8	20.5	48.0	25.2
1.4890	29.5	-	26.6	-	-	-	0.6	30.1	27.2	48.0	17.9
2.0300	34.2	-	30.2	-	-	-	0.7	34.9	30.9	48.0	13.1
2.2664	34.8	-	34.7	-	-	-	0.7	35.5	35.4	48.0	12.5
3.9093	24.9	-	31.7	-	-	-	0.9	25.8	32.6	48.0	15.4
25.1303	28.9	-	28.7	-	-	-	3.3	32.2	32.0	48.0	15.8

Note : All other frequencies in the range from 450 kHz to 30 MHz have emission level of more than 10 dB below the limit.

Level is rounded off to one decimal place.

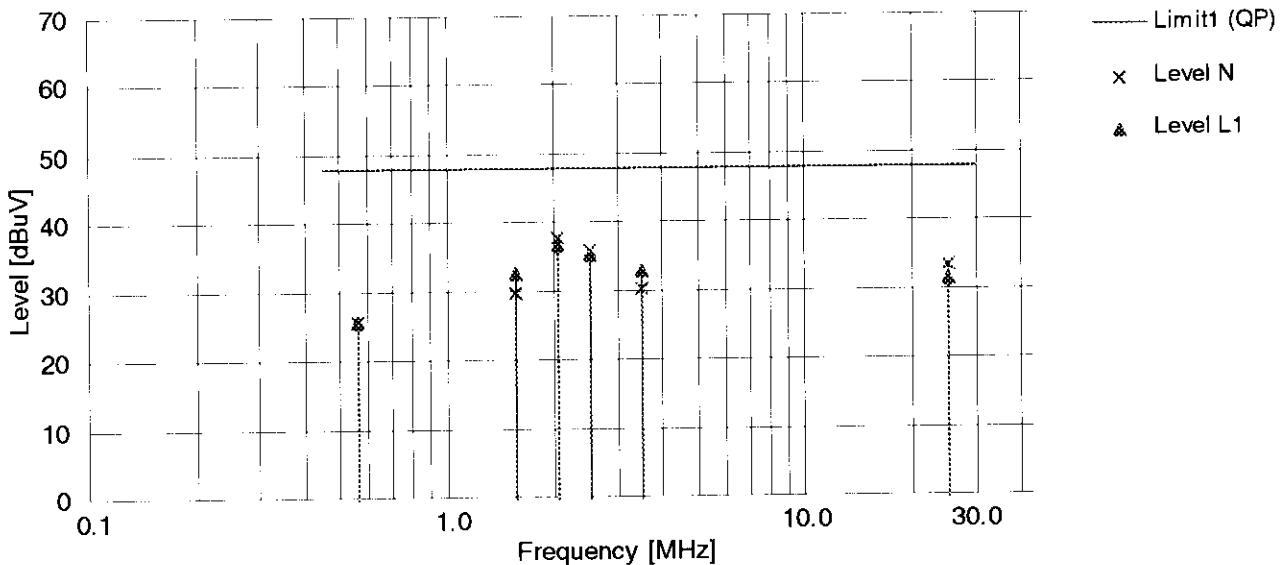
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Mode 6

Kind of Equipment	: Color laser printer	Temperature	: 22 C
Model Name	: YBA-1	Humidity	: 50 %
Serial No.	: 000002	Engineer	: T. Omori
Comment	: Monochrome serial	Date	: 98/4/28
Detector	: QP	EMI Receiver(s)	: ESS
Points	: 6		

Limit1 : { FCC } Class B



Frequency [MHz]	Reading N		Reading L1		QP-AVE [dB]	QP/AVE -13 [dB]	LISN Factor [dB]	Level N [dBuV]	Level L1 [dBuV]	Limit [dBuV]	Margin [dB]
	QP [dBuV]	AVE [dBuV]	QP [dBuV]	AVE [dBuV]							
0.5600	25.1	-	25.0	-	-	-	0.5	25.6	25.5	48.0	22.4
1.5640	28.9	-	32.0	-	-	-	0.6	29.5	32.6	48.0	15.4
2.0305	37.2	-	35.9	-	-	-	0.7	37.9	36.6	48.0	10.1
2.5017	35.1	-	34.5	-	-	-	0.7	35.8	35.2	48.0	12.2
3.5153	29.3	-	31.8	-	-	-	0.9	30.2	32.7	48.0	15.3
25.2117	30.0	-	28.2	-	-	-	3.3	33.3	31.5	48.0	14.7

Note : All other frequencies in the range from 450 kHz to 30 MHz have emission level of more than 10 dB below the limit.

Level is rounded off to one decimal place.

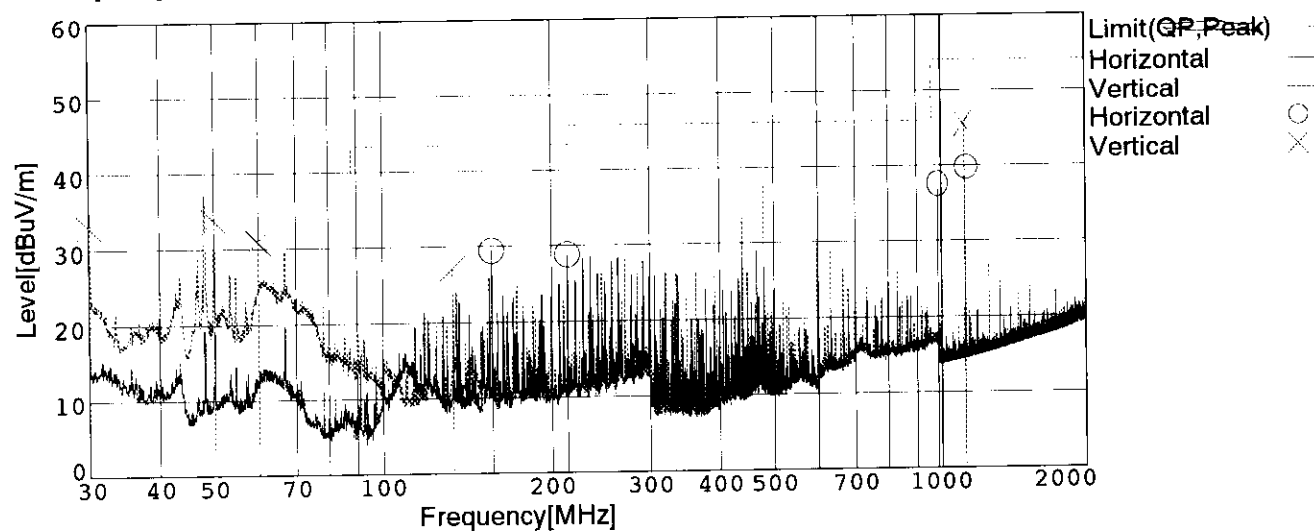
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4-3 Radiated Emission Test

Mode:1

Kind of Equipment	: Color laser printer	Temperature	: 20 C
Model Name	: YBA-1	Humidity	: 50%
Serial No.	: 000002	Engineer	: T. Omori
Comment	: Color Parallel	Date	: 1998/4/27 13:28
Detector	: QP(30-1000 MHz)	EMI Receiver(s)	: ESS(30-1000 MHz)
	: Peak(above 1000 MHz)		: 8566B(above 1000 MHz)
Points	: 9		
Limit	: [FCC] Class B<3m>		



Frequency [MHz]	Meter Reading [dBuV]	Ant. Type	Antenna Factor [dB]	Cable Loss [dB]	Level [dBuV/m]	Angle [degree]	Height [cm]	Pola.	Limit [dBuV/m]	Margin [dB]
30.001	34.2	BC	19.3	-20.5	33.0	141	100	Vert.	40.0	7.0
50.000	42.0	BC	11.6	-19.8	33.8	42	100	Vert.	40.0	6.2
59.995	42.0	BC	8.6	-19.7	30.9	290	100	Vert.	40.0	9.1
133.328	32.0	BC	13.7	-18.5	27.2	341	100	Vert.	43.5	16.3
156.374	32.6	BC	15.2	-18.3	29.5	53	400	Hori.	43.5	14.0
213.236	29.6	BC	16.9	-17.6	28.9	269	146	Hori.	43.5	14.6
1000.000	26.3	LP	23.1	-11.8	37.6	5	100	Hori.	54.0	16.4
1133.104	40.9	HN	25.3	-20.8	45.4	139	100	Vert.	54.0	8.6
1133.210	35.3	HN	25.3	-20.8	39.8	250	100	Hori.	54.0	14.2

Note : All other frequencies in the range from 30 MHz to 2000 MHz have emission level of more than 10 dB below the limit.

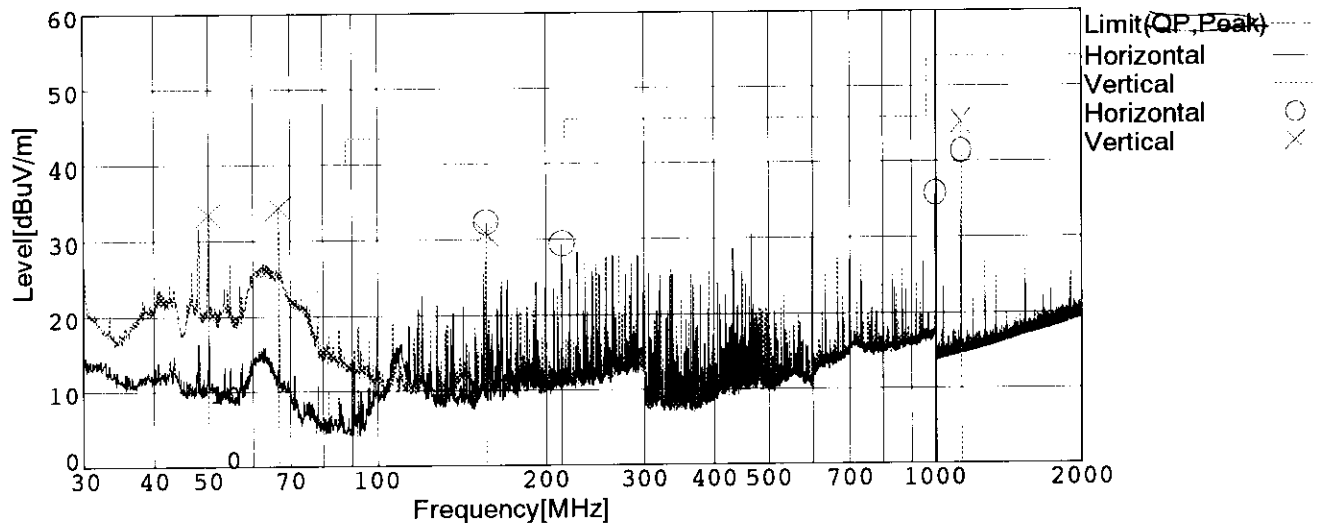
Level is rounded off to one decimal place.

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Mode:2

Kind of Equipment	: Color laser printer	Temperature	: 20 C
Model Name	: YBA-1	Humidity	: 50%
Serial No.	: 000002	Engineer	: T. Omori
Comment	: Color serial		
Detector	: QP(30-1000 MHz)	Date	: 1998/4/27 17:31
	: Peak(above 1000 MHz)	EMI Receiver(s)	: ESS(30-1000 MHz)
Points	: 9		: 8566B(above 1000 MHz)
Limit	: [FCC] Class B<3m>		



Frequency [MHz]	Meter Reading [dBuV]	Ant. Type	Antenna Factor [dB]	Cable Loss [dB]	Level [dBuV/m]	Angle [degree]	Height [cm]	Pola.	Limit [dBuV/m]	Margin [dB]
30.000	47.5	DP	-2.2	-20.5	24.8	152	264	Vert.	40.0	15.2
50.000	48.8	DP	4.4	-19.8	33.4	325	170	Vert.	40.0	6.6
66.669	46.3	BC	7.6	-19.6	34.3	225	100	Vert.	40.0	5.7
156.372	35.4	BC	15.2	-18.3	32.3	200	164	Hori.	43.5	11.2
156.373	33.9	BC	15.2	-18.3	30.8	291	100	Vert.	43.5	12.7
213.235	30.2	BC	16.9	-17.6	29.5	199	157	Hori.	43.5	14.0
999.991	24.6	LP	23.1	-11.8	35.9	81	100	Hori.	54.0	18.1
1133.220	36.9	HN	25.3	-20.8	41.4	136	100	Hori.	54.0	12.6
1133.030	40.8	HN	25.3	-20.8	45.3	168	100	Vert.	54.0	8.7

Note : All other frequencies in the range from 30 MHz to 2000 MHz have emission level of more than 10 dB below the limit.

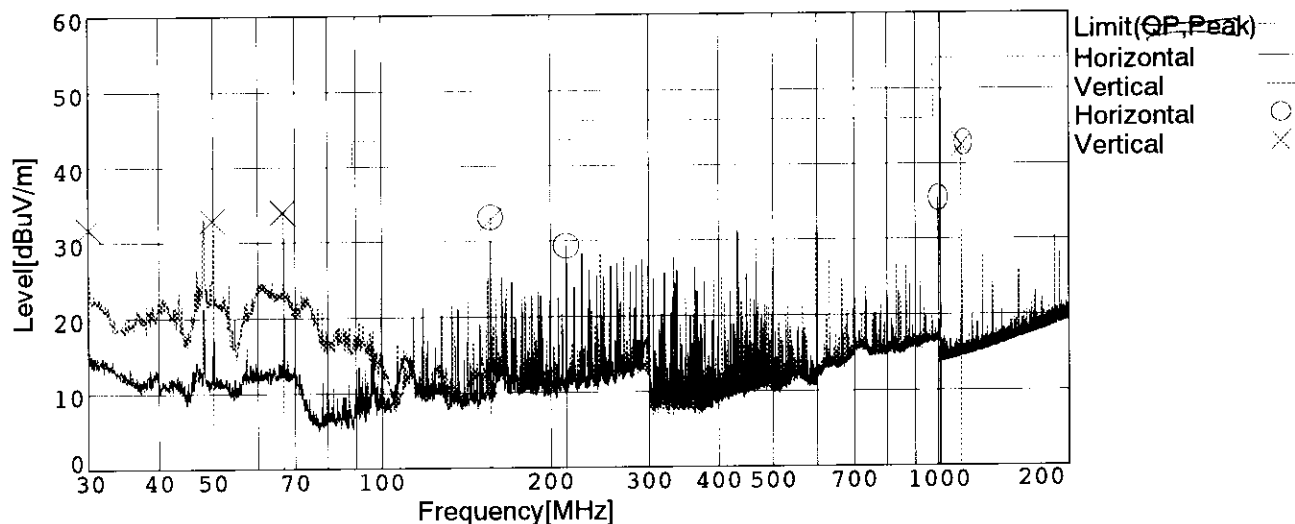
Level is rounded off to one decimal place.

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Mode:3

Kind of Equipment	: Color laser printer	Temperature	: 20 C
Model Name	: YBA-1	Humidity	: 50%
Serial No.	: 000002	Engineer	: T. Omori
Comment	: Color serial		
Detector	: QP(30-1000 MHz)	Date	: 1998/4/27 19:43
	Peak(above 1000 MHz)	EMI Receiver(s)	: ESS(30-1000 MHz)
Points	: 9		8566B(above 1000 MHz)
Limit	: [FCC] Class B<3m>		



Frequency [MHz]	Meter Reading [dBuV]	Ant. Type	Antenna Factor [dB]	Cable Loss [dB]	Level [dBuV/m]	Angle [degree]	Height [cm]	Pola.	Limit [dBuV/m]	Margin [dB]
30.000	33.0	BC	19.3	-20.5	31.8	107	100	Vert.	40.0	8.2
50.001	41.2	BC	11.6	-19.8	33.0	8	100	Vert.	40.0	7.0
66.666	46.0	BC	7.6	-19.6	34.0	228	100	Vert.	40.0	6.0
156.371	35.9	BC	15.2	-18.3	32.8	299	100	Vert.	43.5	10.7
156.373	36.4	BC	15.2	-18.3	33.3	214	211	Hori.	43.5	10.2
213.233	30.1	BC	16.9	-17.6	29.4	199	159	Hori.	43.5	14.1
999.996	24.2	LP	23.1	-11.8	35.5	161	100	Hori.	54.0	18.5
1133.165	37.8	HN	25.3	-20.8	42.3	126	100	Hori.	54.0	11.7
1133.165	37.9	HN	25.3	-20.8	42.4	200	100	Vert.	54.0	11.6

Note : All other frequencies in the range from 30 MHz to 2000 MHz have emission level of more than 10 dB below the limit.

Level is rounded off to one decimal place.

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Mode:4

Kind of Equipment : Color laser printer

Model Name : YBA-1

Serial No. : 000002

Comment : Monochro parallel

Detector : QP(30-1000 MHz)

Peak (above 1000 MHz)

Points : 9

Limit : [FCC] Class B<3m>

Temperature : 20 C

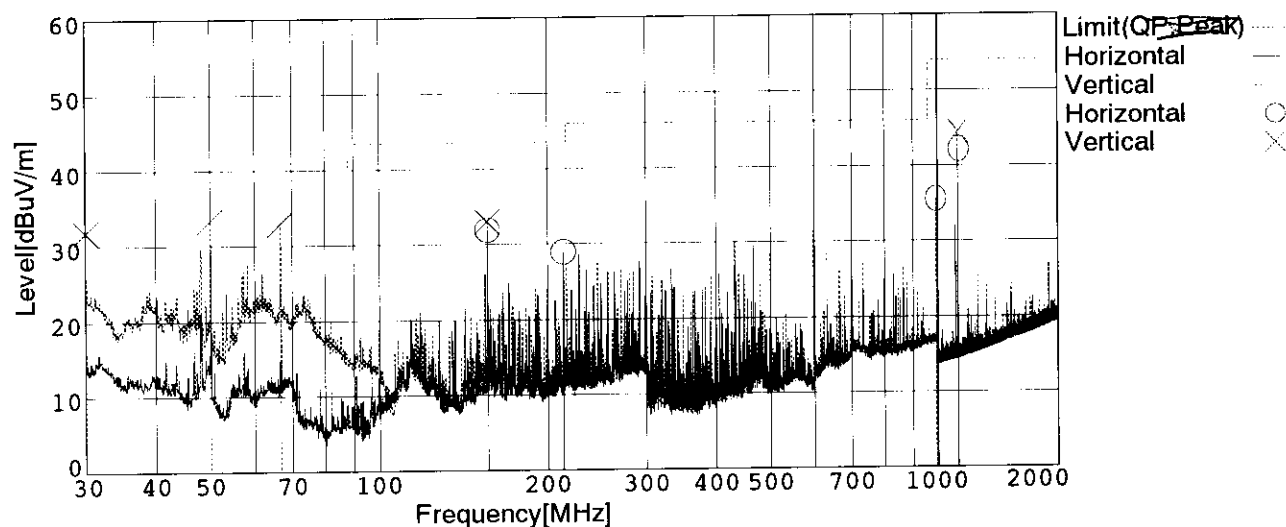
Humidity : 50%

Engineer : T. Omori

Date : 1998/4/27 20:37

EMI Receiver(s) : ESS(30-1000 MHz)

8566B (above 1000 MHz)



Frequency [MHz]	Meter Reading [dBuV]	Ant. Type	Antenna Factor [dB]	Cable Loss [dB]	Level [dBuV/m]	Angle [degree]	Height [cm]	Pola.	Limit [dBuV/m]	Margin [dB]
30.000	33.0	BC	19.3	-20.5	31.8	117	100	Vert.	40.0	8.2
50.001	41.5	BC	11.6	-19.8	33.3	345	100	Vert.	40.0	6.7
66.665	44.8	BC	7.6	-19.6	32.8	226	100	Vert.	40.0	7.2
156.371	36.1	BC	15.2	-18.3	33.0	328	100	Vert.	43.5	10.5
156.372	35.0	BC	15.2	-18.3	31.9	189	193	Hori.	43.5	11.6
213.234	29.7	BC	16.9	-17.6	29.0	211	149	Hori.	43.5	14.5
999.995	24.3	LP	23.1	-11.8	35.6	2	100	Hori.	54.0	18.4
1133.065	39.9	HN	25.3	-20.8	44.4	169	100	Vert.	54.0	9.6
1133.120	37.7	HN	25.3	-20.8	42.2	137	100	Hori.	54.0	11.8

Note : All other frequencies in the range from 30 MHz to 2000 MHz have emission level of more than 10 dB below the limit.

Level is rounded off to one decimal place.

Level is rounded off to one decimal place.

Level is rounded off to one decimal place.



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5. SUMMARY

5-1 Test Results

This test report clearly shows that the EUT complies with the FCC Part 15B Class B specification.

The minimum margins to the limits are as follows:

- Conducted measurement 8.7 dB at 1.9496 MHz (Mode 2)
- Radiation measurement 4.2 dB at 30.000 MHz (Mode 5)

This data represent the worst case emissions.

5-2 Sample Calculations

5-2-1 Conducted Emission

Example 1.9496 MHz

Emission Level	=	Meter Reading	38.7	dBuV
		+ *LISN Factor	+ 0.6	dB
			= 39.3	dBuV
Margin	=	Limit	48.0	dBuV
		- Emission Level	- 39.3	dBuV
			= 8.7	dB

* The above LISN factor includes cable loss.

The numerical value are rounded off to one decimal place.

5-2-2 Radiated Emission

(frequency range : 30 MHz - 1000 MHz)

Example 30.000 MHz

Emission Level	=	Meter Reading	37.0	dBuV
		+ Antenna Factor	+ 19.3	dB
		+ Cable Loss (*)	- 20.5	dB
			= 35.8	dBuV/m
Margin	=	Limit	40.0	dBuV/m
		- Emission Level	- 35.8	dBuV/m
			= 4.2	dB

Meter reading = Test Receiver reading

(*)The above Cable Loss means that add Antenna Pad Loss to Cable Loss and subtract Amplifier Gain

The numerical values are rounded off to one decimal place.

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(frequency range : above 1000 MHz)

Example 1133.104 MHz

Emission Level	=	Meter reading (*1)		40.9	dBuV
		+ Antenna Factor	+	25.3	dB
		+ Cable Loss (*2)	-	20.8	dB
			=	45.4	dBuV/m
Margin	=	Limit		54.0	dBuV/m
		- Emission Level	-	45.4	dBuV/m
			=	8.6	dB

(*1) Meter reading = Spectrum analyzer reading

Resolution band width and video band width set 1 MHz.

(*2) The above Cable Loss means that Amplifier Gain subtract from Cable Loss.

The numerical values are rounded off to one decimal place.

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6. LIST OF UTILIZED TEST EQUIPMENT

6-1 Conducted Emission Measurement

Instrument	Manufacturer	Model Number	Serial Number	Last Calibration Date	Period
Spectrum Analyzer	Hewlett Packard	8566B	2332A02675	July 25, 1997	1 Year
Quasi-peak Adapter	Hewlett Packard	85650A	2043A00284	July 25, 1997	1 Year
Test Receiver	Rhode & Schwarz	ESS	844362/001	August 14, 1997	1 Year
LISN	Rhode & Schwarz	ESH2-Z5	890484/004	August 20, 1997	1 Year

6-2 Radiated Emission Measurement

Instrument	Manufacturer	Model Number	Serial Number	Last Calibration Date	Period
Spectrum Analyzer	Hewlett Packard	8566B	2332A02675	July 25, 1997	1 Year
Quasi-peak Adapter	Hewlett Packard	85650A	2043A00284	July 25, 1997	1 Year
Test Receiver	Rhode & Schwarz	ESS	844362/001	August 14, 1997	1 Year
Dipole Antenna	Schwarzbeck	VHA9103	-	February 11, 1998	1 Year
Biconical Antenna	Schwarzbeck	BBA9106	-	February 11, 1998	1 Year
Log-periodic Antenna	EMCO	3146	8910-2511	November 24, 1997	1 Year
Double ridge guide horn antenna	EMCO	3115	4944	September 21, 1997	1 Year

Note : The utilized instruments are calibrated by a body that can provide traceability to a national standard.

The abbreviation of antenna types which indicate on the radiated emission test table are follows:

BC = Biconical Antenna LP = Log-periodic Antenna

HN = Double ridge guide horn antenna DP = Dipole Antenna

6-3 Measurement Uncertainties

Measurement uncertainties are shown as below.

Conducted Emission Measurement	± 2.33 dB
Radiated Emission Measurement	5.15 dB / - 4.56 dB

Repeating and reproducing maximum emission set-up are not discussed herein.

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7. VALIDITY OF TEST REPORT

- 1: The test result of this report is effective for equipment under test itself and test configuration described on the report.
- 2: This test report shall not be reproduced without the written approval of the laboratory.
- 3: This test report must not be used by client to claim product endorsement by NVLAP or any agency of the U.S. Government.

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8. DESCRIPTION OF TEST LABORATORY

Bibliography

Since commencing operation in 1942 as a watch manufacturer, Seiko Epson Corporation has utilized its own original micromechatronics technologies, gained while developing quartz watches, to diversify into a variety of fields, as computers, printers and electronic devices, including semiconductors and liquid crystal displays. The phrase “highly functional and highly compact” best describes the policy of our product development activities.

Since the initial electrical printer was manufactured in 1971, Seiko Epson Corporation has been working for EMC field. It is a combination of precise machine technology and electric technology.

Now EMC group has 3 semi-anechoic chambers and 8 EMI/EMC test facilities and full responsibilities on EMC testing. It is independent from any other business organizations and admired by the president as neutral and its independency.

Filing, Certification and Accreditation List

EMC testing

FCC	(USA)
NVLAP (Lab. Code: 200157-0)	(USA)
NMi	(Netherlands)
VCCI	(Japan)
NEMKO	(Norway)