

JAN 04 1999

FCC ID:AK8CAVPX1

MEASUREMENT / TECHNICAL REPORT

COMPANY NAME : Sony Corporation
MODEL : CAV-PX1
FCC ID : AK8CAVPX1
DATE OF REPORT : Dec 1. 1998

This report concerns(check one) : ☐ Original grant ☐ Class II change

Equipment type: Connector ☐ Class A Digital Devices
☒ Class B Digital Devices
☐ All Other Device

Deferred grant requested per CFR 0.457(d) (1) (ii) ? ☐ Yes ☒ No

If yes, defer until : N/A
date

Sony Corporation agrees to notify the Commission by N/A
date

of the intended date of announcement of the product so that the grant can
be issued on the date.

Transition Rules Request per 15.37? ☐ Yes ☒ No

If no, assumed Part 15, Subpart B for unintentional radiators-the new 47 CFR
[10-1-90 Edition]provision.

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1 GENERAL INFORMATION**1.1 Product Description**

Trade Name : SONY	Model Name : CAV-PX1	Product Name : Connector	Description : Media Communicator
Type of Processor : IC2 M38513M4		Processor Clock Speed : 8 MHz	
Number of Storage : N/A		Interface Ports : Control I : RS232C	
Power Supply : AC 120V 60Hz		: : :	
Similar Model (to be covered) : N/A : : : :		Description for Deference(s)	
<u>Accessories</u> (to be sold with the model tested)			
Model Name : : : :	Description : : : :	Model Name : : : :	Description : : : :

Note : See attached user manual for further description.

1.2 Related Submittal(s)/Grant(s)· ☒ [X] Original application☐ [] Modification and class II permissive change

If this is a filing for class II permissive change.
List here the FCC's file on the original grant.

Original FCC ID : AK8CAVPX1

FCC's file :

Home A & V Products Company, Sony Corp.

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1.3 Tested System Details

<u>Host Digital Device</u> (Certified or Verified)					
Trade Name	Model Name	FCC ID Number	Description		
:SONY	:PCG-731	:Doc	:NOTEBOOK COMPUTER		
<u>Peripheral Device</u> (Certified or Verified)					
Trade Name	Model Name	Serial No.	FCC ID Number	Description	
:SONY	:DHC-MD555	: -	:N/A	:COMPACT DISC DECK RECEIVER	
:LEXMARK	:LEXMARK 1000	:0558138	:Doc	:COLOR JET PRINTER	
:	:	:	:	:	
:	:	:	:	:	
:	:	:	:	:	
<u>Accessories</u>					
Trade Name	Model Name	Description			
:SONY	:PCGA-AC71	:AC ADAPTER			
:SONY	:MDR-35	:HEADPHONES			
:	:	:			
<u>Power Supply Cord</u>					
☐ 2P		☒ 3P			
☐ Shielded		☒ Unshielded		☐ Equipped with filter	
<u>Connection Cables</u>					
Type of Cable	Construction	Length	Type of Cable	Construction	Length
:Printer Cable	<u>S</u> <u>P</u> <u> </u>	1.5m	:	<u> </u> <u> </u> <u> </u>	:
:	<u> </u> <u> </u> <u> </u>	:	:	<u> </u> <u> </u> <u> </u>	:
:	<u> </u> <u> </u> <u> </u>	:	:	<u> </u> <u> </u> <u> </u>	:
:	<u> </u> <u> </u> <u> </u>	:	:	<u> </u> <u> </u> <u> </u>	:
Notes 1: S: shielded P: plastic hoods F: ferrite beads on cable					
U: unshielded M: metallic hoods					
2: For location of cables used, refer to photographs in item 5.					

1.4 Test Methodology

Measurement Procedure : [X] C63.4(1992)

Radiation Measurement distance : [X] 3 meters [] 10 meters

1.5 Test Facility

Site for Radiated Emissions

- [] Okada B Site , 2254 Okada, Atsugi-shi, Kanagawa-ken, Japan
- [] Okada C Site , 2254 Okada, Atsugi-shi, Kanagawa-ken, Japan
- [] Hase 3m Site , 1061-3 Hase, Atsugi-shi, Kanagawa-ken, Japan
- [] Sony Anechoic Site , 1-28-13 Nakaikegami, Ohta-ku, Tokyo, Japan
- [] Tomoe Anechoic Site , 4-5-17 Kachidoki, Chuo-ku, Tokyo, Japan
- [] Ikegami Open Site , 1-28-13 Nakaikegami, Ohta-ku, Tokyo, Japan
- [X] EMC Itakura Site , 10-1 Aza Futoi Oaza Okura Itakura-machi
Ora-gun, Gunma, Japan

Site for Conducted Emissions

- [] Kamata Site , 8-15 Nishikojiya 2-chome, Ohta-ku, Tokyo, Japan
- [X] EMC Itakura Site , 10-1 Aza Futoi Oaza Okura Itakura-machi
Ora-gun, Gunma, Japan

FCC Filing for The Sites

The above sites have been fully reported to FCC and accepted as follows.

Site	Date of Report	Date of Acceptance
[] Okada B Site / Kamata Site	: Apr. 12, 1994	: May. 24, 1994 (31040/SIT)
[] Okada C Site / Kamata Site	: Apr. 12, 1994	: May. 24, 1994 (31040/SIT)
[] Hase 3m Site / Kamata Site	: Apr. 12, 1994	: May. 24, 1994 (31040/SIT)
[] Sony Anechoic Site / Kamata Site	: Jun 8, 1993	: Aug 5, 1993 (31040/SIT)
[] Tomoe Anechoic Site	: Apr 1, 1997	: May 29, 1997 (31040/SIT)
[] Ikegami Open Site / Kamata Site	: Aug 26, 1993	: Sep 27, 1993 (31040/SIT)
[X] EMC Itakura Site	: May 12, 1995	: May 31, 1995 (31040/SIT)

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2 PRODUCT LABELING

2.1 FCC ID Label

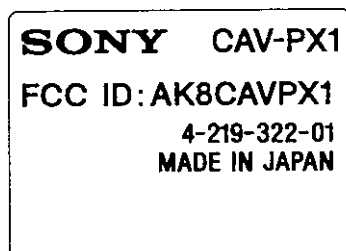


Fig. 2.1

2.2 Location of Label on EUT

The FCC ID & Name plate on Bottom of EUT

Home A & V Products Company, Sony Corp.

AF-98-I051I

3 SYSTEM TEST CONFIGURATION

3. 1 J u s t i f i c a t i o n

The system was configured for testing in a typical fashion (as a customer would normally use it). Refer to §1.3 Tested System Details for details. The tests were conducted with the worst case modes as follows.

	Specification	Worst Case
User Accessible Processor :	<u>N/A</u>	<u>N/A</u>
Band Rates (Modem) :	<u>N/A</u>	<u>N/A</u>
video modes*1		
[X] Default test mode :	<u>80X25</u>	<u>80X25</u>
[] Resolution :	<u></u>	<u></u>
Power connection of Monitor:	<u>N/A</u>	<u>N/A</u>
Other :	<u>N/A</u>	<u>N/A</u>

*1:Applicable only for monitors

3. 2 E U T E x e r c i s e S o f t w a r e

Program that has been used during measurement for conducted emission & Radiated Emission

【Program to operate EUT】

Name of Software:	<u>Media Communicator</u>	<u>Rocket Mouse98</u>
Version :	<u>1.12E</u>	<u>3.33</u>

EUT is connected between RS-232C port on Personal Computer and Control A1 on Audio System, DHC-MD555. And Protocol data is converted by EUT. Command of Protocol Data is sent to Audio System via EUT, CAV-PX1, and Audio System is turned to start of recording or stop of recording by this command data. It is impossible to sent command data by Media Communicator continuously. So it is possible to operate Media Communicator by Software "Rocket Mouse" automatically. And it is repeated as operation for 10 second of recording and zero second of stop(recording)during measurement of Radiated & Conducted emission. Software "Media Communicator" and "Rocket Mouse" are Windows application.

【Program to operate Monitor & Printer】

Name of Software:	<u>print H</u>
Version :	<u>1.00</u>

Monitor and printer is operated by Software "Print H" during measurement of Radiated & Conducted Emission.

If this Software is started, it is perform to display a letter "H" on Monitor copntinuosi, and Printer is repeated operation to print letter "H" for 50 seconds and to stop printing of letter "H" mutually.

Home A & V Products Company, Sony Corp.

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3. 3. S p e c i a l A c c e s s o r i e s

Special Accessories needed connecting EUT to achieve compliance:

N/A

Notes :

1.Refer to Item 1.3(Connection Cables), for the details.

2.Shielded Cable :The specific type name is described in instruction manual.

3.Cable with Ferrite :The specific cable and/or ferrite is packed with EUT.

3. 4. E q u i p m e n t M o d i f i c a t i o n s

Not Applicable

3. 5. C o n f i g u r a t i o n o f T e s t e d S y s t e m

Refer to sheet 9.

4 B L O C K D I A G R A M (S)

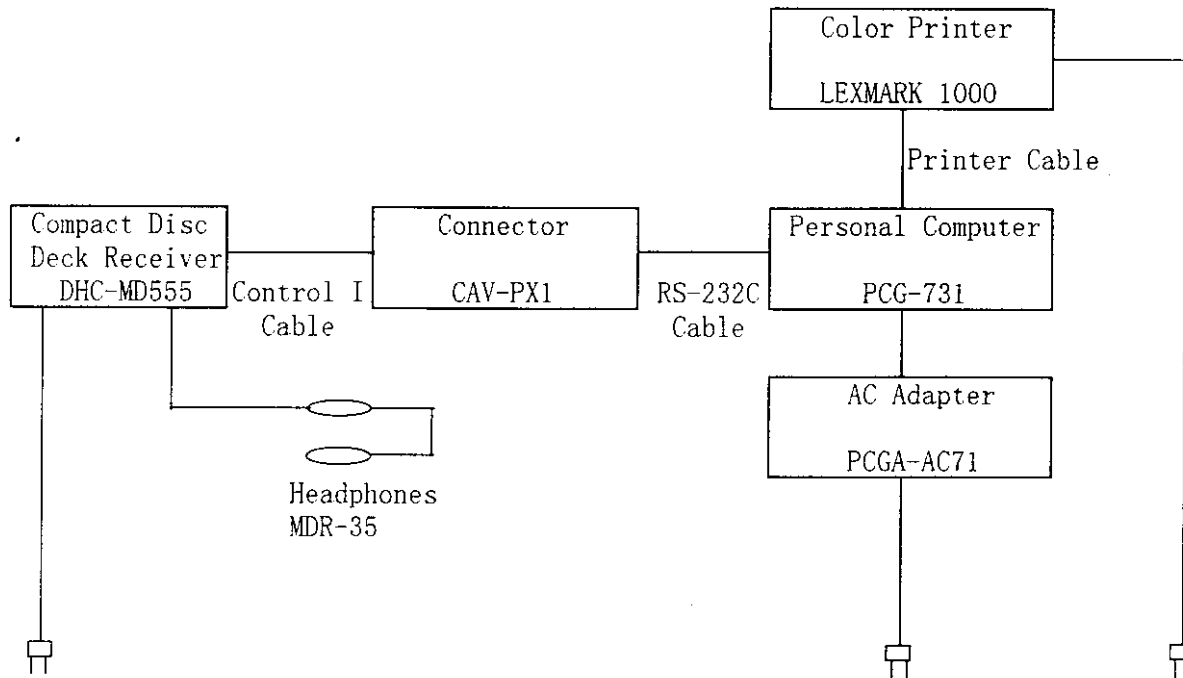
4. 1 B l o c k C o n s t r u c t i o n

Refer to sheet 10 and 11.

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Refer to the following block diagram for system configuration

Display monitor was rowered from ☐ an accessory outlet.
☐ a floor / wall mounted receptacle.
☒ N/A



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Explanation for CAV-PX1 action

[Overview]

CAV-PX1 is the protocol conversion device for the communication between personal computers and audio systems (RS-232C - CONTROL-I).

*CONTROL-I is the Sony's original communication protocol that is intended to control audio apparatuses made by Sony. They are connected with the external equipment using five lines. SCL,SDA,DTR,+5V and GND.

[Action]

<Power>

The VCC of CONTROL-I is +5V and applied to IC1,2,3,4 as the power.

<Data>

The TXD signal from Serial Port is converted its voltage level at IC1 and then inputted to IC2. The input data is protocol-converted by IC2 to SCL,SDA signals (I2C), then buffered by IC4 and transferred from CONTROL-I ports.

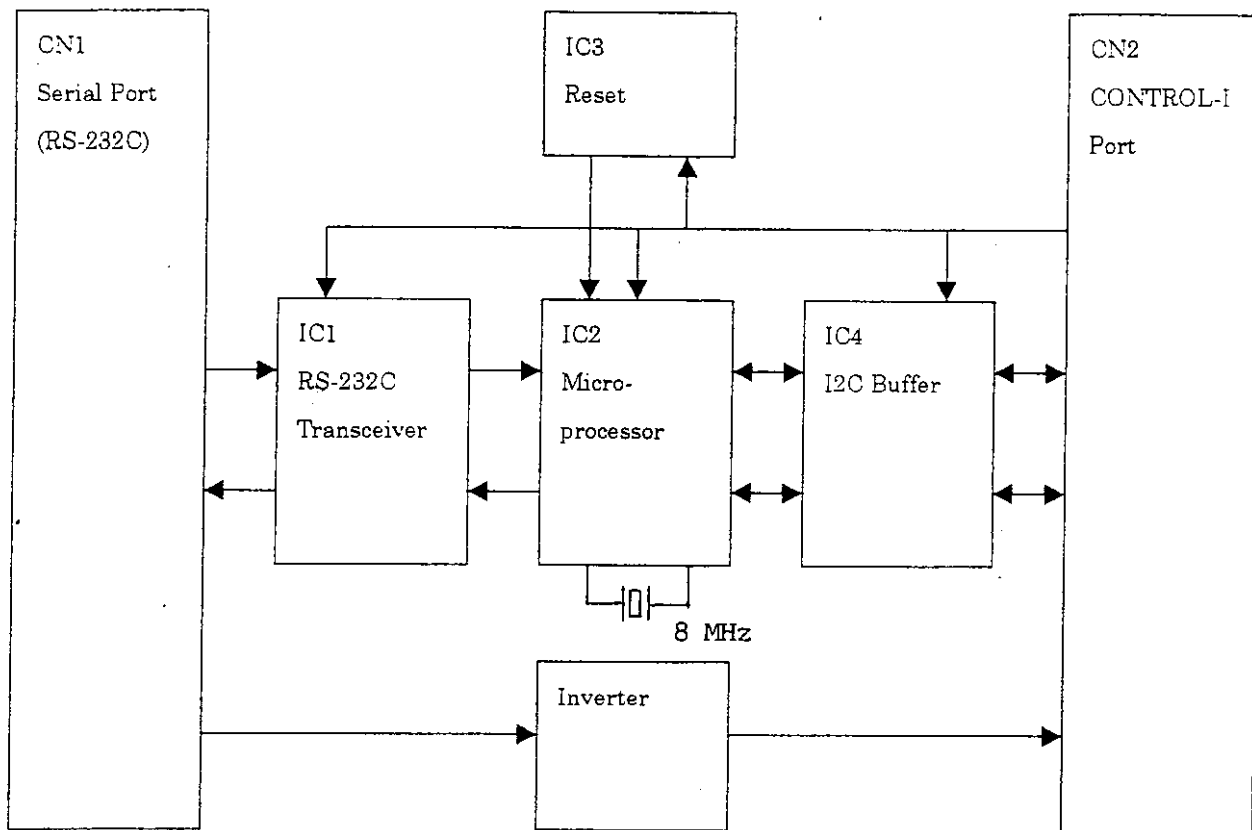
The input data from the CONTROL-I port is transferred to IC2 through IC4 and then protocol-converted. The converted data is changed its voltage level at IC1 and transferred to RXD of Serial Port.

<DTR>

The DTR signal from Serial Port is inverted by open-collector transistor and connected to CONTROL-I port. This signal is the power on trigger of audio systems.

<RESET>

IC3 detect the voltage level of the VCC and apply reset signal to IC2 when the VCC is below +4.5V.



6 CONDUCTED EMISSION DATA

- 6.1 The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page , and these signals are then quasi-peaked.

Test Personnel :

Tester Signature *K. Nagano* Date Dec 5. 1998

Typed/Printed Name Kazuhiko Nagano

***** ITAKURA EMC SITE *****
 <<< Conducted Emission >>>

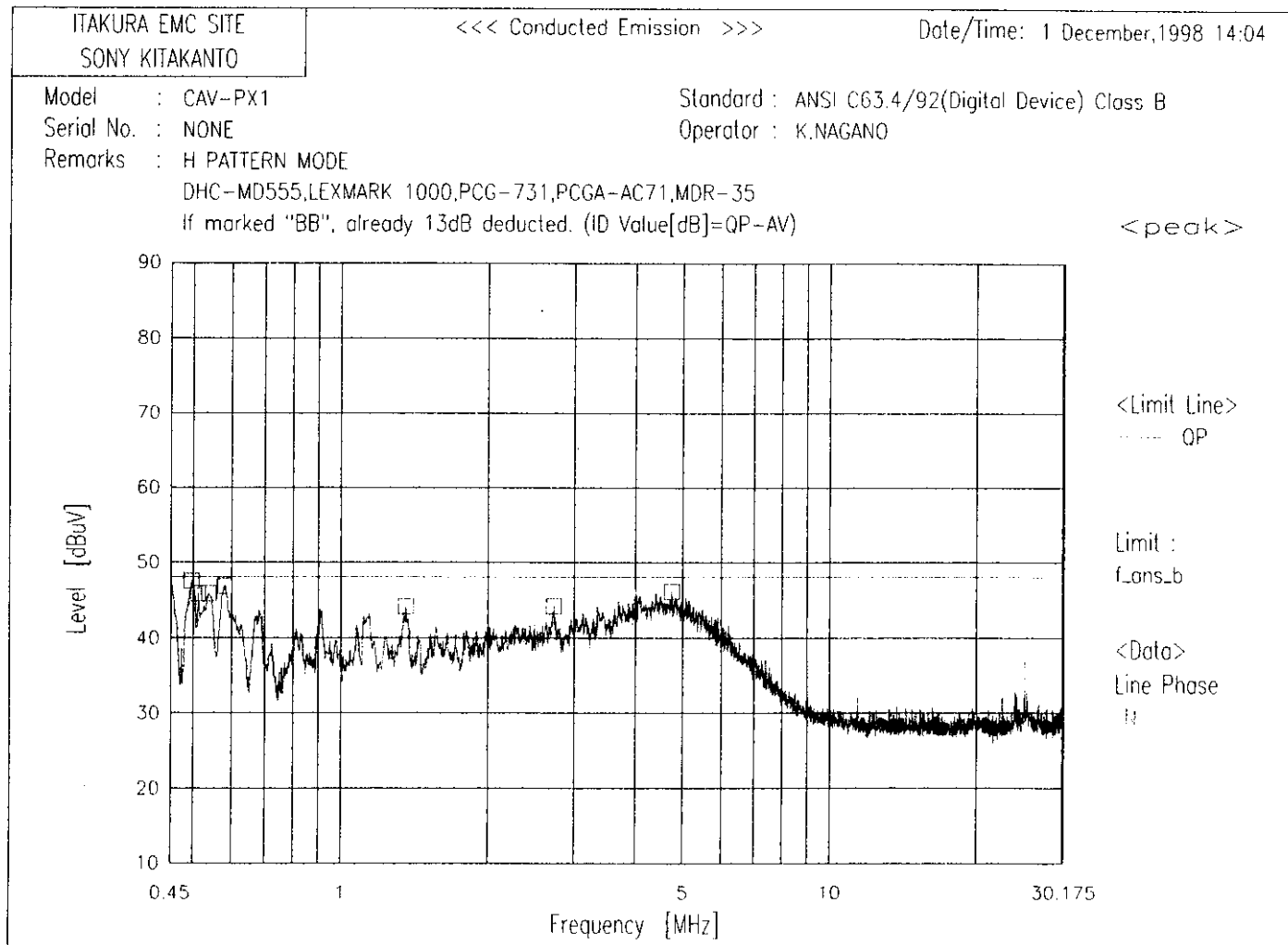
1 December, 1998 14:10

Page 1

Model : CAV-PX1
 Serial No. : NONE
 Standard : ANSI C63.4/92 (Digital Device) Class B
 Condition File : F_ANS_B
 Remark : H PATTERN MODE
 : DHC-MD555, LEXMARK 1000, PCG-731, PCGA-AC71, MDR-35
 : If marked "BB", already 13dB deducted. (ID Value[dB]=QP-AV)
 AC Power : 120 V 60 Hz
 Temperature : 20 deg.
 Humidity : 52 %
 Operator : K.NAGANO

 ----- Results -----

No.	Frequency [MHz]	Reading [dBuV]	c.f. [dB]	ID Value [dB]	ID Result [dBuV]	Limit [dBuV]	Margin [dB]
1	0.49398	16.5	10.3	7.4 BB	26.8	48.0	21.2
2	0.50983	26.7	10.3	3.6	37.0	48.0	11.0
3	0.53662	31.5	10.3	4.3	41.8	48.0	6.2
4	0.57851	32.0	10.2	4.4	42.2	48.0	5.8
5	1.36177	16.2	10.4	7.5 BB	26.6	48.0	21.4
6	2.74268	16.0	10.5	7.4 BB	26.5	48.0	21.5
7	4.70381	29.6	10.6	6.0	40.2	48.0	7.8



AF-98-1051 I

***** ITAKURA EMC SITE *****
 <<< Conducted Emission >>>

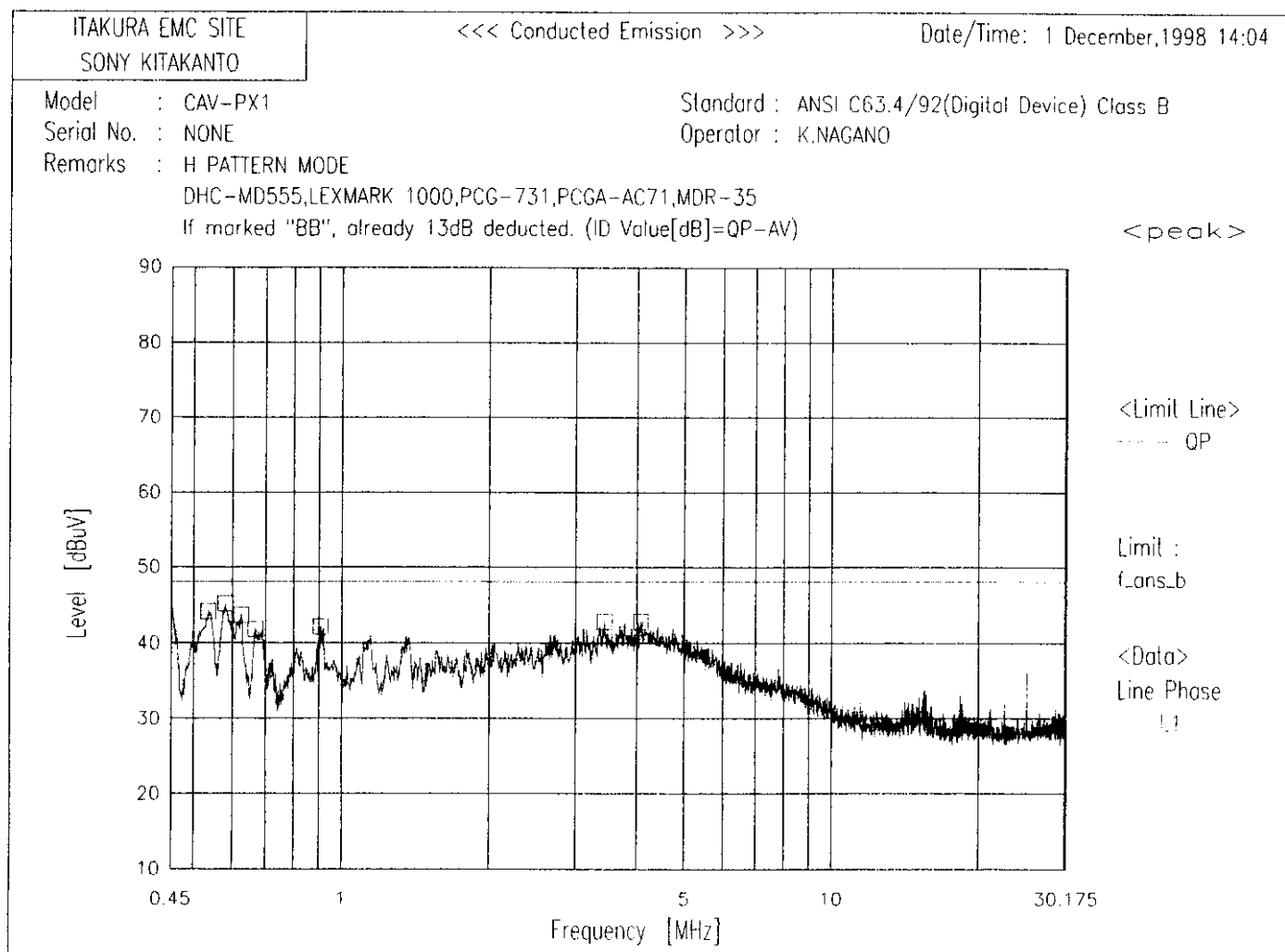
1 December, 1998 14:20

Page 1

Model : CAV-PX1
 Serial No. : NONE
 Standard : ANSI C63.4/92(Digital Device) Class B
 Condition File : F_ANS_B
 Remark : H PATTERN MODE
 : DHC-MD555, LEXMARK 1000, PCG-731, PCGA-AC71, MDR-35
 : If marked "BB", already 13dB deducted. (ID Value[dB]=QP-AV)
 AC Power : 120 V 60 Hz
 Temperature : 20 deg.
 Humidity : 52 %
 Operator : K.NAGANO

 ----- Results -----

No.	Frequency	Reading	c.f.	ID	ID	Result	Limit	Margin
	[MHz]	[dBuV]	[dB]	Value		[dBuV]	[dBuV]	[dB]
Phase L1								
1	0.53546	29.8	10.3	4.2		40.1	48.0	7.9
2	0.57953	30.2	10.2	4.3		40.4	48.0	7.6
3	0.62762	12.5	10.2	6.5	BB	22.7	48.0	25.3
4	0.66963	14.2	10.4	10.7	BB	24.6	48.0	23.4
5	0.90379	13.7	10.5	6.4	BB	24.2	48.0	23.8
6	3.43821	26.0	10.5	5.3		36.5	48.0	11.5
7	4.08615	27.0	10.5	5.5		37.5	48.0	10.5



7 RADIATED EMISSION DATA

- 7.1 The following data lists the significant emission frequencies , measured levels , correction factor (includes cable and antenna corrections) , the corrected reading , plus the limit. Explanation of the Correction factor is given in paragraph 8 .

The data was shown on the following page.

Test Personnel :

Tester Signature

K. Nagano

Date

Dec 5. 1998

Typed/Printed Name

Kazuhiko Nagano

*****ITAKURA EMC SITE*****

<<< Radiated Emission >>>

1 December, 1998 13:31

Page 1

Model : CAV-PX1
 Serial No. : NONE
 Standard : FCC New Part15(Digital)B
 Condition File : fcc_n_db
 Condition :
 Remarks : H PATTERN MODE
 : DHC-MD555, LEXMARK 1000, PCG-731, PCGA-AC71, MDR-35
 :
 AC Power : 120 V 60 Hz
 Temperature : 20 deg.
 Humidity : 52 %
 Operator : K.NAGANO

----- Final Result -----

- Horizontal Polarization -

No.	Frequency [MHz]	Reading [dBuV]	c.f. [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]
1	96.172	28.4	11.9	40.3	43.5	3.2
2	199.262	19.7	19.3	39.0	43.5	4.5
3	208.376	18.1	19.6	37.7	43.5	5.8
4	210.231	20.8	19.7	40.5	43.5	3.0
5	464.840	17.5	21.9	39.4	46.0	6.6
6	569.840	11.2	24.5	35.7	46.0	10.3

- Vertical Polarization -

No.	Frequency [MHz]	Reading [dBuV]	c.f. [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]
7	96.172	29.8	11.9	41.7	43.5	1.8
8	464.838	21.5	21.9	43.4	46.0	2.6

 ITAKURA EMC SITE
 SONY KITAKANTO

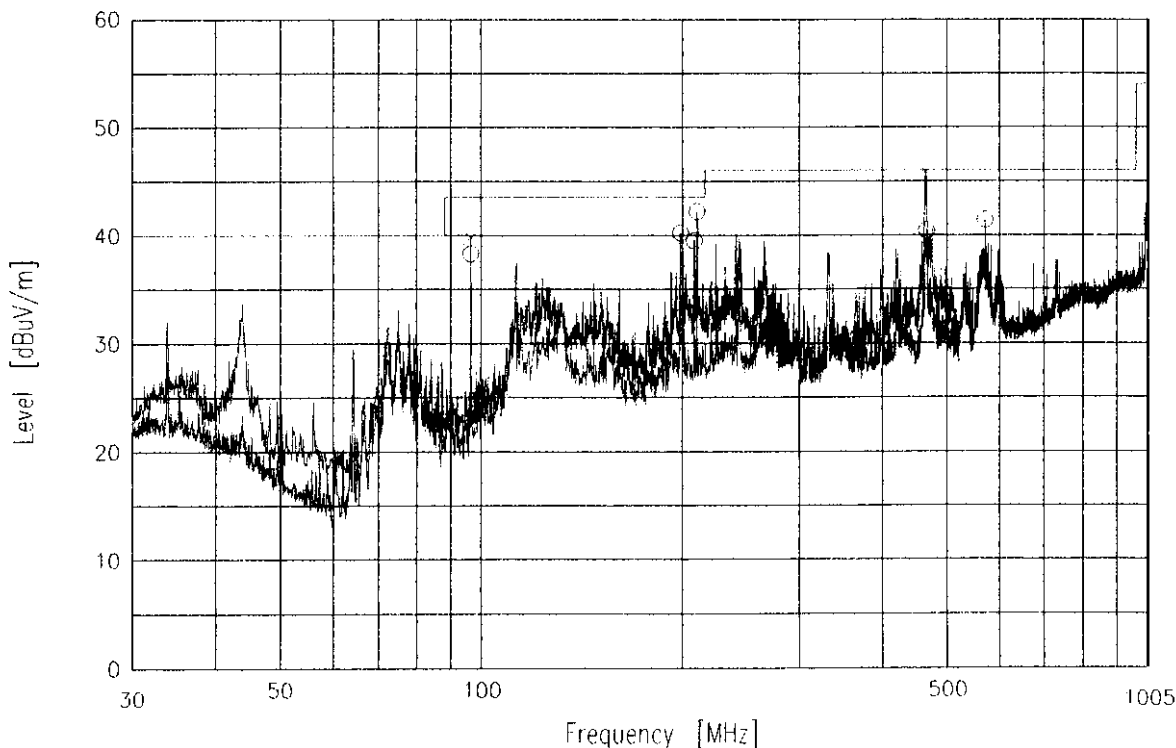
<<< Radiated Emission >>>

Date/Time: 1 December, 1998 12:08

Model : CAV-PX1
 Serial No. : NONE
 Remarks : H PATTERN MODE
 : DHC-MD555, LEXMARK 1000, PCG-731, PCGA-AC71, MDR-35

Standard : FCC New Part15(Digital)B
 Operator : K.NAGANO

<peak>



<Limit Line>

----- Interference

 Limit :
 fcc_n_db

<Data>

Range : ALL
 Both H & V
 Total(Hor)
 Total(Ver)

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8 METHOD OF CALCULATION

8.1 Radiated Emissions

$$\text{Field Strength (dB[uV/m])} = \text{S.A. Reading (dB[uV])} + \text{C.F.}$$

Notes :

(a) S.A. Reading : Reading of Spectrum Analyzer

(b) C.F. : [X] Antenna Factor (including Balun Loss)
+ Cable Loss

[] Antenna Factor (including Balun Loss)
+ Cable Loss + $20\text{Log}(3\text{m}/10\text{m})$

8.2 Conducted Emissions

$$\text{RF Voltage (dB[uV])} = \text{S.A. Reading (dB[uV])} + \text{C.F. 1 (dB)} + \text{C.F. 2 (dB)}$$

Notes :

(a) S.A. Reading : Reading of Spectrum Analyzer

(b) C.F. 1 : Correction Factor of LISN.

(c) C.F. 2 : Correction Factor of Band Pass Filter and
Cable Loss.

9. LIST OF COMPONENT

If component(s) was (were) used to achieve compliance to Class B level by client,
the component(s) is (are) mentioned below.

None

Home A & V Products Company, Sony Corp.

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10. Photos of Tested EUT

The following photos are attached:

- Fig. 10.1 Top View
- Fig. 10.2 Bottom View
- Fig. 10.3 Bottom View (Nameplate)
- Fig. 10.4 Top Cover Removed
- Fig. 10.5 Printed Wiring Board, Side A
- Fig. 10.6 Printed Wiring Board, Side B

Home A & V Products Company, Sony Corp.

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1 1 L I S T O F T E S T E Q U I P M E N T

	<u>Equipment</u>	<u>Model No.</u>	<u>Manufacturer</u>
[X] 1.	Spectrum Analyzer	8594E	HEWLETT PACKRD
	EMI Receiver	ESVS10	ROHDE&SCHWARZ
	RF selector	NS4000	TOYO
	Amplifier	8447D	HEWLETT PACKRD
[X] 2.	Biconical Antenna	BBA9106	SCHWARZBECK
	Log-Periodic Antenna	UHALP9107	SCHWARZBECK
[X] 3.	Balun	VHA9103	SCHWARZBECK
[] 4.	LISN	KNW-403D	KYORITSU ELE.
[] 5.	LISN	KNW-242C	KYORITSU ELE.
[] 6.	LISN	KNW-404	KYORITSU ELE.
[X] 7.	LISN	KNW-407	KYORITSU ELE.
[X] 8.	Spectrum Analyzer	8594E	HEWLETT PACKRD
	EMI Receiver	ESVS10	ROHDE&SCHWARZ
	EMI Receiver	ESHS10	ROHDE&SCHWARZ
	RF selector	NS4000	TOYO
	Amplifier	8447D	HEWLETT PACKRD
[] 9.	EMI Clamp	MDS-21	SCHWARZBECK
[] 10.	Min. Loss Pad	11852B	HEWLETT PACKRD
[] 11.	Attenuator	8491A	HEWLETT PACKRD
[X] 12.	AC Power Supply	EA-2100A	NF ELE INS.