

National Panasonic

Kyushu Matsushita Electric Co., Ltd.

1-62, 4-chome, Minoshima, Hakata-ku, Fukuoka 812-8531 Japan Phone:Fukuoka(092)431-2111

Telex:723579"KMEFUK J" Cable Address:"KMEFUKUOKA" FUKUOKA

REPORT OF MEASUREMENT

1. Manufacturer : Kyushu Matsushita Electric Co., Ltd.
1-62, 4-chome, Minoshima, Hakata-ku, Fukuoka, 812-8531, Japan
2. Description Device : Cordless Terminal [Control Console Unit]
Tx: 904.00 ~ 926.04MHz
 - a) Type of EUT : Desk-top Type
 - b) Category : Intentional Radiator
 - c) FCC Identifier : ACJ96NKX-MC1CS
 - d) Trade Name : Panasonic
 - e) Model Number : KX-MC1CS
 - f) Serial Number : ES0001
 - g) Date of Manufacture : February 1999
 - h) Power Source : AC 120V, 60Hz
(AC Adaptor, Output rating DC 12V, 500mA)
3. Date of Measurement : February 23, 24 & 25, 1999
4. Regulation Applied : FCC Rules and Regulations Part 15, Subpart C
Intentional Radiator (§ 15.249)
5. Measurement Procedure : ANSI C63.4 - 1992
6. Place of Measurement : IPS Corporation, Nagano
1878-1 Harumiya Ono Tatsuno-machi, Kamiina-gun, Nagano-ken, 399-0601,
Japan
7. Measurement Results : The results obtained from the measuring of the above-mentioned device are
as shown in attached sheets.
8. Summary of Results : Test sample complies with FCC Rules and Regulations Part 15 Subpart C
Intentional Radiators

Signature : T. Yamashita
Tetsuo Yamashita, Manager of
Engineering Section of 4th Division of
Kyushu Matsushita Electric Co., Ltd.

Date: March 16, 1999

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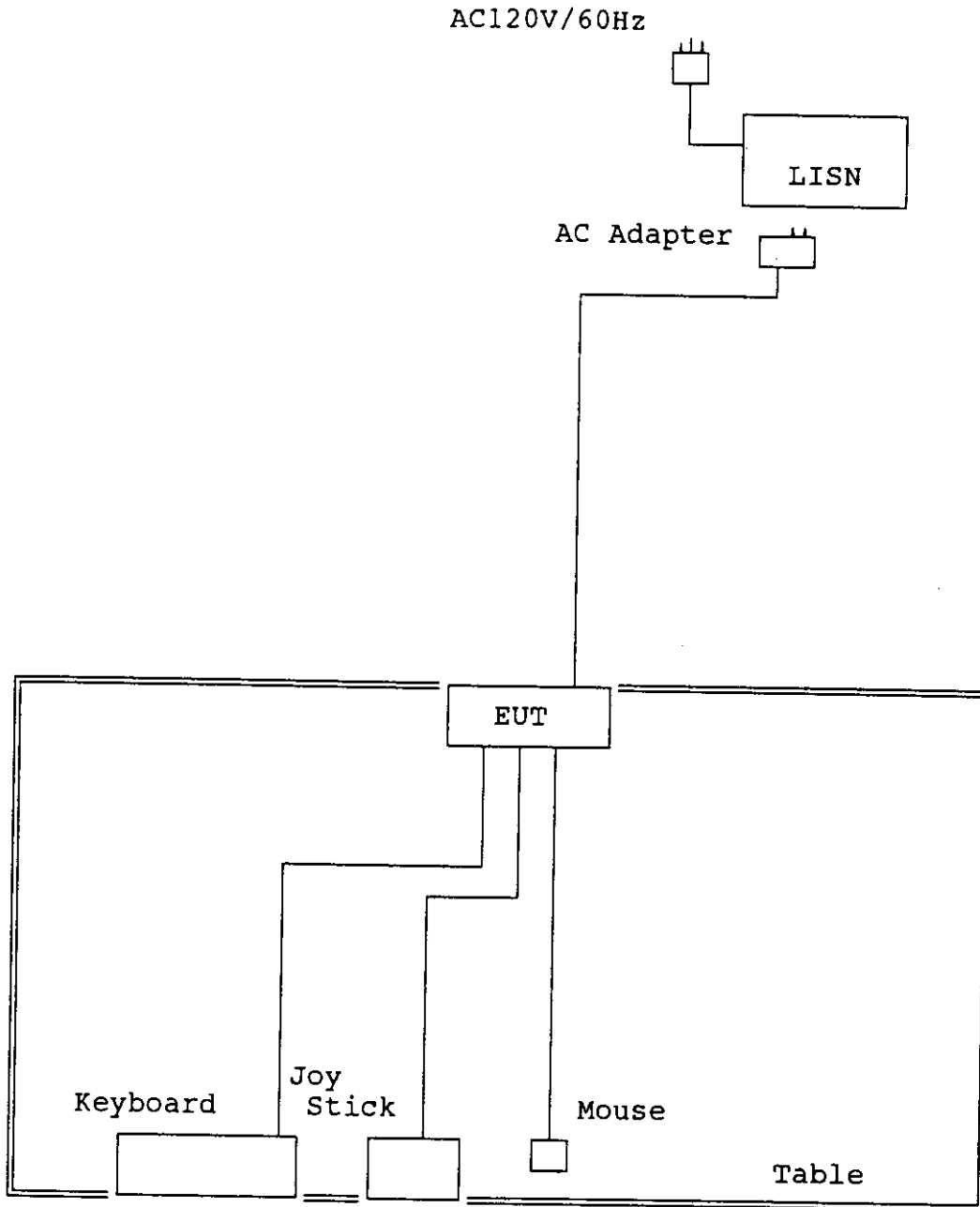
Test Facility

The Test Facility has been certified to Quality System for EMC Testing Service by TUV CERT. Proof has been furnished that the requirements according to DIN EN ISO 9002 / JIS Z 9902 are fulfilled. (Certificate Registration No. 09 100 6813)

Conducted Interference Voltage test was performed on a shielded room and Radiated interference Field Strength test was performed on a 10 meter open filed test site located at IPS Corp. 4593, Hosohora Ono Tatsuno-machi, Kamiina-gun, Nagano-ken, 399-0601, Japan. The spectrum investigation of radiated emission in the range of 30 MHz to 10 GHz (peak detector function) was performed on a 3 m semi-anechoic chamber located at IPS Corp. 1878-1, Harumiya Ono Tatsuno-machi, Kamiina-gun, Nagano-ken, 399-0601, Japan. This Laboratory is recognized under the National Voluntary Laboratory Accreditation Program (NVLAP) by United States Department of Commerce, National Institute of Standard and Technology (NIST) for satisfactory compliance with criteria established in Title 15, Part 285 Code of Federal Regulations. These criteria encompass the requirements of ISO / IEC Guide 25 and the relevant requirements of ISO 9002 (ANSI / ASQC Q92-1987) as suppliers of calibration or test results. Accreditation awarded for specific services, listed on the Scope of Accreditation for: ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS FCC. (NVLAP LAB CODE: 200012-0). And this Laboratory has been fully described in a report November 28, 1998 submitted to Federal Communications Commission Authorization and Evaluation Division, and accepted in a letter dated December 11, 1998 (Registration Number 90676).

This Laboratory is accredited by Japan Accreditation Board for Conformity Assessment for satisfactory compliance with JAB RL100 and RL152-1997 of JAB Regulations. These criteria encompass the requirements of ISO / IEC Guide 25 and the relevant requirements of JIS Z 9325 as suppliers of calibration or test results. Accreditation awarded for specific services, listed on the Scope of Accreditation for : ELECTROMAGNETIC COMPATIBILITY TESTING (JAB Accreditation No.: RTL00010).

CONFIGURATION OF TESTED SYSTEM



TEST CONDITION

CONDUCTED EMISSION TEST

The test setup was made according to ANSI STD C63.4-1992 clause 7 on a shielded room. The EUT, PC and peripherals were located on the non-conductive wooden table top. Rear of EUT shall be all aligned and flush with rear of this wooden table top. The height of this table was 0.8 m and 1.5 m wide x 1.0 m deep size. Rear of table top was 40 cm removed from a vertical wall of the shielded room. (conducting plane that is bonded to the floor ground plane) Spacing between the each equipment maintain 10 cm. The keyboard and Joy-Stick were flushed with front of table top and Mouse was flushed with back of keyboard. Connection of the EUT is located so that the distance between the boundary of the EUT and the closet surface of the artificial mains network is 0.8 m. Where a mains flexible cord is provided by the manufacture this is 1.9 m long and excess length of the EUT mains flexible cord was bundled to 0.8 m. Interconnecting cables of table top equipment were shortened to appropriate length on the table. The measurement has been conducted with both line and neutral power supply polarization. The highest voltage of the EUT has been recorded. By varying the configuration of the test sample and the cable routing it was attempted to maximize the voltage emission. For further description of the configuration refer to the pictures of this report.

List of the Instrumentation

- 1 Equipment : Spectrum Analyzer (For the spectrum analysis)
 Model No. : R3261C
 S/N : 81720408
 Manufacture : Advantest
 Frequency Range : 0.15 MHz to 30 MHz
 System Bandwidth : 100 kHz
 Detector : Peak
 Last Calibrate : 1999/02/19
 Next Calibrate : 2000/02/19

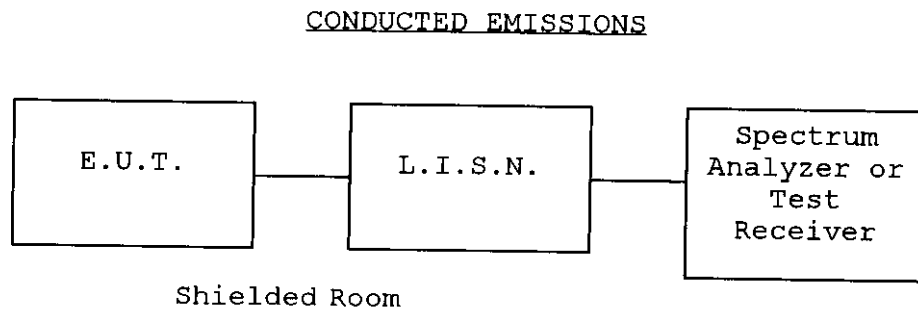
- 2 Equipment : Test Receiver (For the final measurement)
 Model No. : ESVS30
 S/N : 81360069
 Manufacture : Rhode & Schwarz
 Frequency Range : 0.15 MHz to 30 MHz
 System Bandwidth : 10 kHz
 Detector : Quasi-Peak
 Last Calibrate : 1999/02/02
 Next Calibrate : 2000/02/02

- 3 Equipment : LISN for EUT
 Model No. : ESH2-5
 S/N : 846953/0012
 Manufacture : Rhode & Schwarz
 Frequency Range : 0.15 MHz to 30 MHz
 RF Load : 50 ohm 50 micro henry
 Last Calibrate : 1998/05/28
 Next Calibrate : 1999/05/28

- 4 Equipment : Attenuator (10dB)
 Model No. : ESH3Z2
 S/N : 3/4
 Manufacture : Rhode & Schwarz
 Frequency Range : 9 kHz to 30 MHz
 Calibrated with the Cable system

- 5 Equipment : Cable system
- Consists of : Attenuator and Cable.
- Manufacture : IPS Corporation
- Frequency Range : 30 MHz to 300 MHz
- Last Calibrate : 1999/02/20
- Next Calibrate : 1999/08/20

BLOCK DIAGRAM



***** IPS Corporation *****
<<Conducted Emission>>

24 February, 1999 22:48
99207C03. dat

Standard : FCC Part15C
Model : KX-MC1CS
S/N : ES0001
Product Name : MicroCast
File No. : 003
Power Source : AC120V / 60Hz
Temp/Humi : 24deg / 41%
Test Mode :
Remarks :
Operator : Y. NAGAHARA



Final Result

--- N Phase ---

No.	Frequency	Reading	c. f	Result	Limit	Margin
	[MHz]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dB]
1	3.480	8.6	10.2	18.8	48.0	29.2
2	3.689	6.1	10.2	16.3	48.0	31.7
3	16.951	5.2	10.8	16.0	48.0	32.0
4	23.197	15.5	11.1	26.6	48.0	21.4
5	26.370	29.0	11.2	40.3	48.0	7.8
6	28.253	23.3	11.3	34.6	48.0	13.4

--- L1 Phase ---

No.	Frequency	Reading	c. f	Result	Limit	Margin
	[MHz]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dB]
1	3.267	4.5	10.2	14.7	48.0	33.3
2	3.478	7.1	10.2	17.3	48.0	30.7
3	16.956	12.7	10.8	23.5	48.0	24.5
4	22.609	13.1	11.1	24.2	48.0	23.8
5	26.381	27.9	11.2	39.1	48.0	8.9
6	28.255	21.7	11.3	33.0	48.0	15.0

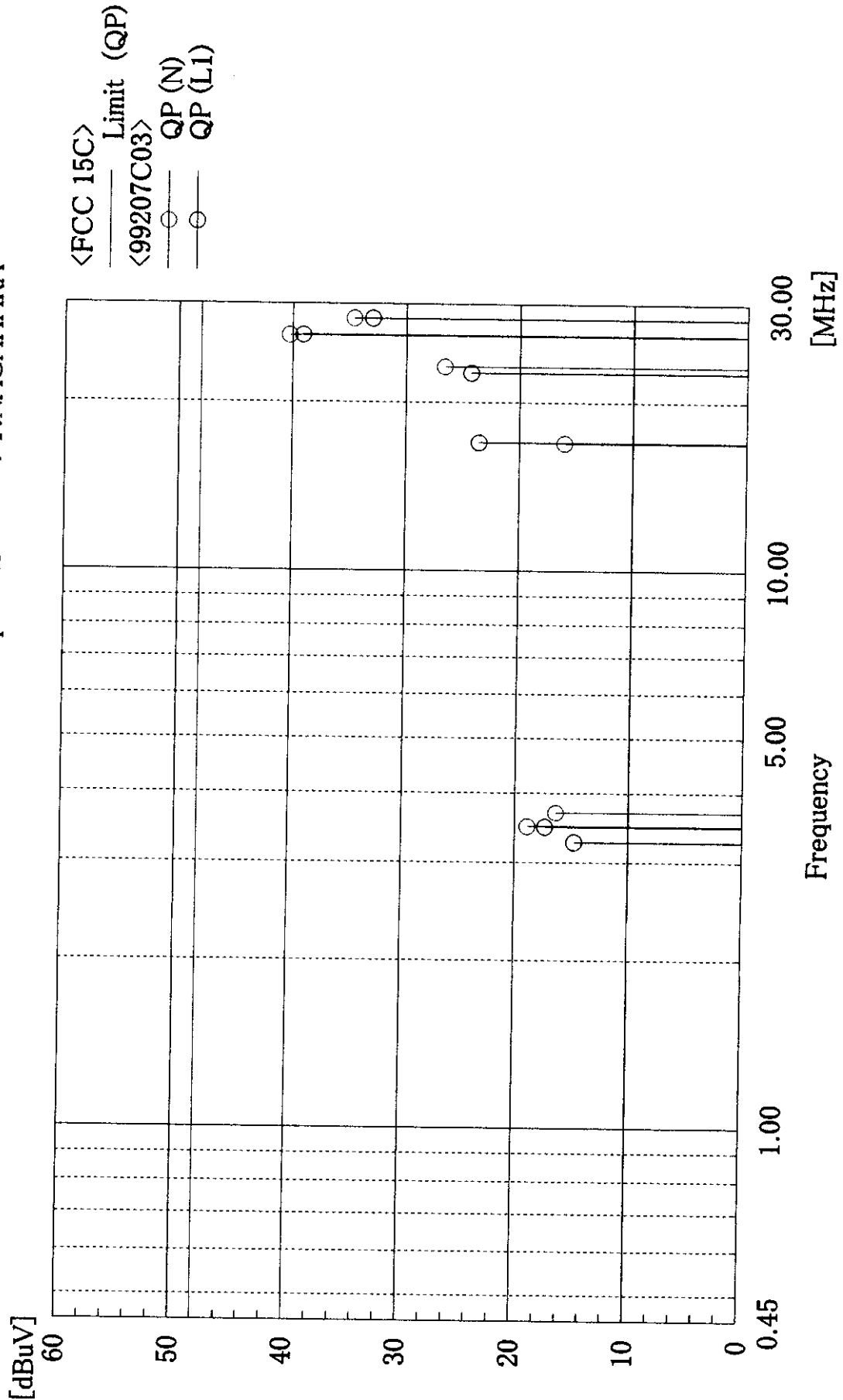
IPS Corporation
Open Site

<<Conducted Emission>>

24 February, 1999 22:48
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Model : KX-MC1CS
S/N : ES0001
Product Name : MicroCast
File No. : 003
Power Source : AC120V / 60Hz

Standard : FCC Part15C
Temp/Humi : 24deg / 41%
Test Mode :
Remarks :
Operator : Y.NAGAHARA



TEST CONDITION

RADIATED EMISSION

The test setup was made according to ANSI STD C63.4-1992 clause 8 on an open test site, which allows a 3 m distance measurement. The EUT shall be located on the non-conductive wooden table top and they are all aligned and flush with rear of this table top. The height of this table was 0.8 m and 1.5 m wide x 1.0 m deep size. Spacing between the each equipment maintain 10 cm. Connection of the EUT to the artificial mains network is required and artificial mains network is located under the turn table. The artificial mains network is 50 ohm terminated. The mains flexible cords were dropped to the floor and is routed over to receptacle. Interconnecting cables of table top equipment were shortened to appropriate length on the table. The measurement has been conducted with both horizontal and vertical antenna polarization. The turntable has been fully rotated. The highest radiation of the equipment has been recorded. By varying the configuration of the test sample and the cable routing it was attempted to maximize the radiated emission. For further description of the configuration refer to the pictures of this report.

Distance between equipment and antenna : 3 m
 Height of antenna : 1 m to 4 m

RADIATED EMISSION (9 kHz to 30 MHz)

The test setup for the frequency range 9 kHz to 30 MHz was on a 3 m meter anechoic chamber, which allows a 3 m distance measurement. The EUT and peripherals shall be located on the non-conductive wooden table top and they are all aligned and flush with rear of this table top. The height of this table was 0.8 m and 1.5 m wide x 1.0 m deep size. Spacing between the each equipment maintain 10 cm. The mains flexible cords were dropped to the floor and is routed over to receptacle. Interconnecting cables of table top equipment that hang closer than 0.4 m to the ground plane shall be folded back and forth forming a bungle 30 to 40 cm long, hanging approximately in the middle between ground plane and table. The measurement has been conducted with both horizontal and vertical antenna polarization. The turntable has been fully rotated. The highest radiation of the equipment has been recorded. By varying the configuration of the test sample and the cable routing it was attempted to maximize the radiated emission.

Distance between equipment and antenna : 3 m (9 kHz to 1 GHz)
 * due to Only for the spectrum investigation

Height of antenna : 1 m (9 kHz to 30 MHz)

List of the Instrumentation

- 1 Facility : Open Test Site
 - Manufacture : IPS Corporation
 - Frequency Range : 30 MHz to 1000 MHz
 - Last Calibrate : 1998/11/08
 - Next Calibrate : 1999/05/08

- 2 Equipment : Spectrum Analyzer (For the spectrum analysis)
 - Model No. : R3261C
 - S/N : 81720408
 - Manufacture : Advantest
 - Frequency Range : 0.15 MHz to 30 MHz
 - System Bandwidth : 100 kHz
 - Detector : Peak
 - Last Calibrate : 1999/02/19
 - Next Calibrate : 2000/02/19

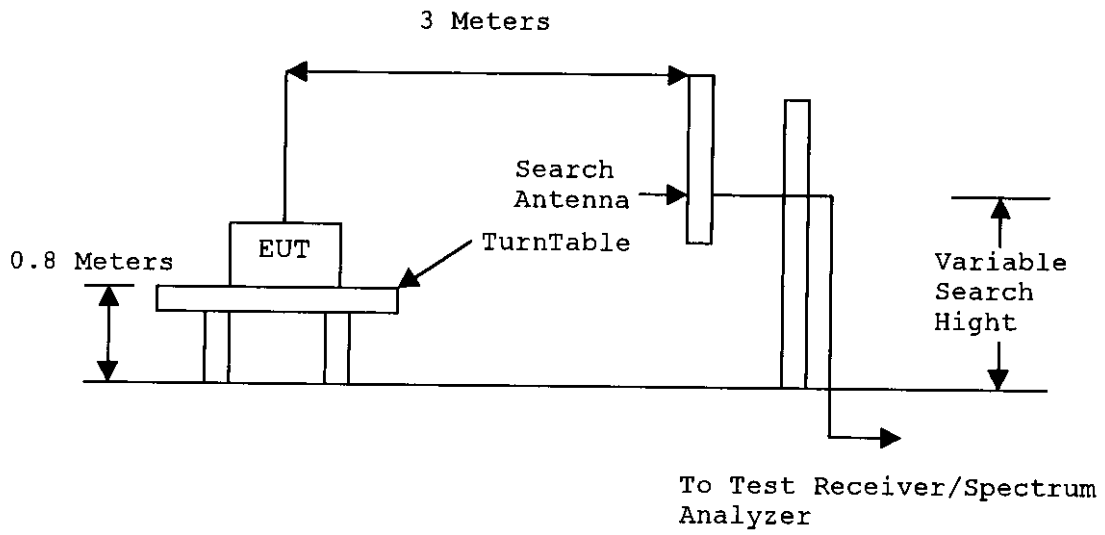
- 3 Equipment : Test Receiver (For the final measurement)
Model No. : ESVS30
S/N : 81360069
Manufacture : Rhode & Schwarz
Frequency Range : 30 MHz to 1000 MHz
System Bandwidth : 120 kHz
Detector : Quasi-Peak
Last Calibrate : 1999/02/02
Next Calibrate : 2000/02/02
- 4 Equipment : Bilog Antenna (For the spectrum analysis)
Model No. : CBL6111
S/N : 1279
Manufacture : Chase
Frequency Range : 30 MHz to 1000 MHz
Last Calibrate : 1998/09/06
Next Calibrate : 1999/09/06
- 5 Equipment : Tunable Dipole Antenna (For the final measurement)
Model No. : VHA9103
S/N : 91031694
Manufacture : Schwarzbeck
Frequency Range : 30 MHz to 300 MHz
Last Calibrate : 1998/06/12
Next Calibrate : 1999/06/12
- 6 Equipment : Tunable Dipole Antenna (For the final measurement)
Model No. : UHA9105
S/N : 91052145
Manufacture : Schwarzbeck
Frequency Range : 300 MHz to 1000 MHz
Last Calibrate : 1998/06/12
Next Calibrate : 1999/06/12
- 7 Equipment : Attenuator (Connected to the Antenna)
Model No. : 8491A
S/N : 31940
Manufacture : Hewlett Packard
Frequency Range : 30 MHz to 1000 MHz
Calibrated with the Cable system
- 8 Equipment : Step Attenuator (For the Pre-Amp. Saturation)
Model No. : HP8494B
S/N : 3308A33947
Manufacture : Hewlett Packard
Frequency Range : 30 MHz to 1000 MHz
Calibrated with the Cable system
- 9 Equipment : Pre Amplifier
Model No. : HP8447F
S/N : 3113A06877
Manufacture : Hewlett Packard
Frequency Range : 30 MHz to 1000 MHz
Calibrated with the Cable system
- 10 Equipment : Cable System
Consists of : Attenuator, Pre-Amplifier, and Cable.
Manufacture : IPS Corporation
Frequency Range : 30 MHz to 1000 MHz
Last Calibrate : 1998/11/08
Next Calibrate : 1999/05/08

- 11 Equipment : LISN for EUT & Peripherals
 Model No. : A
 S/N : 001 / 002
 Manufacture : IPS
 Frequency Range : 0.15 MHz to 30 MHz
 RF Load : 50 ohm 50 micro henry
 50 ohm terminated.
 Located under the turn table.
 Non calibration equipment.
- 12 Equipment : Spectrum Analyzer
 (For the spectrum analysis 1 GHz to 4 GHz)
 Model No. : 2784
 S/N : B020190
 Manufacture : Tektronix
 Frequency Range : 9 kHz to 40 GHz
 System Bandwidth : 1000 kHz
 Detector : Peak
 Last Calibrate : 1998/02/12
 Next Calibrate : 1999/02/28
- 13 Equipment : Pre Amplifier
 Model No. : HP83051A
 S/N : 3332A00357
 Manufacture : Hewlett Packard
 Frequency Range : 45 MHz to 50 GHz

 Calibrated with the Cable system
- 14 Equipment : 4 m Junflon Cable System (For 1 GHz - 40 GHz)
 Consists of : Pre-Amplifier and Cable.
 Manufacture : IPS Corporation
 Frequency Range : 1 GHz to 40 GHz
 Last Calibrate : 1998/11/28
 Next Calibrate : 1999/11/28
- 15 Equipment : Double Rigid Guide Antenna
 Model No. : 3115
 S/N : 9157-4617
 Manufacture : EMCO
 Frequency Range : 1 GHz to 18 GHz
 Last Calibrate : 1998/08/19
 Next Calibrate : 1999/08/19
- 16 Equipment : Double Rigid Guide Antenna
 Model No. : 3116
 S/N : 9157-2277
 Manufacture : EMCO
 Frequency Range : 18 GHz to 40 GHz
 Last Calibrate : 1998/08/20
 Next Calibrate : 1999/08/20
- 17 Equipment : Loop Antenna
 (For the spectrum analysis & final measurement)
 Model No. : HFH2-Z2
 S/N : 827945/011
 Manufacture : Rohde & Schwarz
 Frequency Range : 9 kHz to 30 MHz
 Last Calibrate : 1998/02/28
 Next Calibrate : 1999/02/28

BLOCK DIAGRAM

TEST SITE FOR RADIATED EMISSIONS



Standard : FCC Part15C. 249(a)
Model : KX-MC1CS
S/N : ES0001
Product Name : MicroCast
File No : 003
Power Source : AC120V / 60Hz
Temp /Humi : 16deg / 36 %
Test Mode :
Remarks :
Operator : T. YAMAGUCHI



Final Result

--- Horizontal Polarization (QP)---

No.	Frequency [MHz]	Reading [dBuV]	c. f [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]
1	911.117	83.9	-3.3	80.6	94.0	13.4

--- Vertical Polarization (QP)---

No.	Frequency [MHz]	Reading [dBuV]	c. f [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]
1	911.123	84.1	-3.3	80.8	94.0	13.2

IPS Corporation
EMC Center

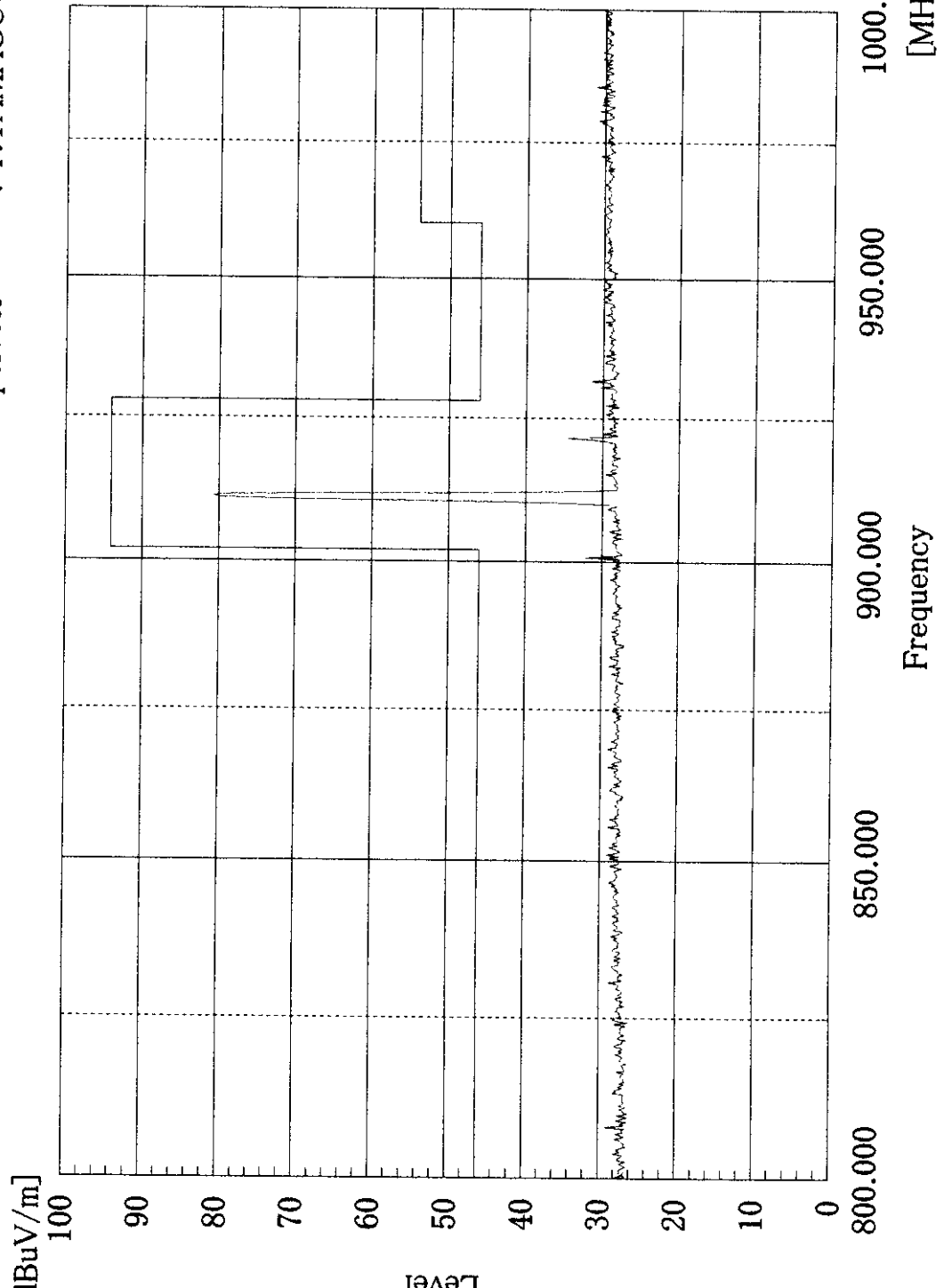
<<Radiated Emission>>

24 February, 1999 22:48
99207CO3.dat

Model : KX-MC1CS
S/N : ES0001
Product Name : MicroCast
File No : 003
Power Source : AC120V / 60Hz

Standard : FCC Part 15C.249(a)
Temp / Humi : 16deg / 36 %
Test Mode :
Remarks :
Operator : T.YAMAGUCHI

<FCC_15C>
—— Limit
<99207CO3>
—— Horizontal



PS Corporation
EMC Center

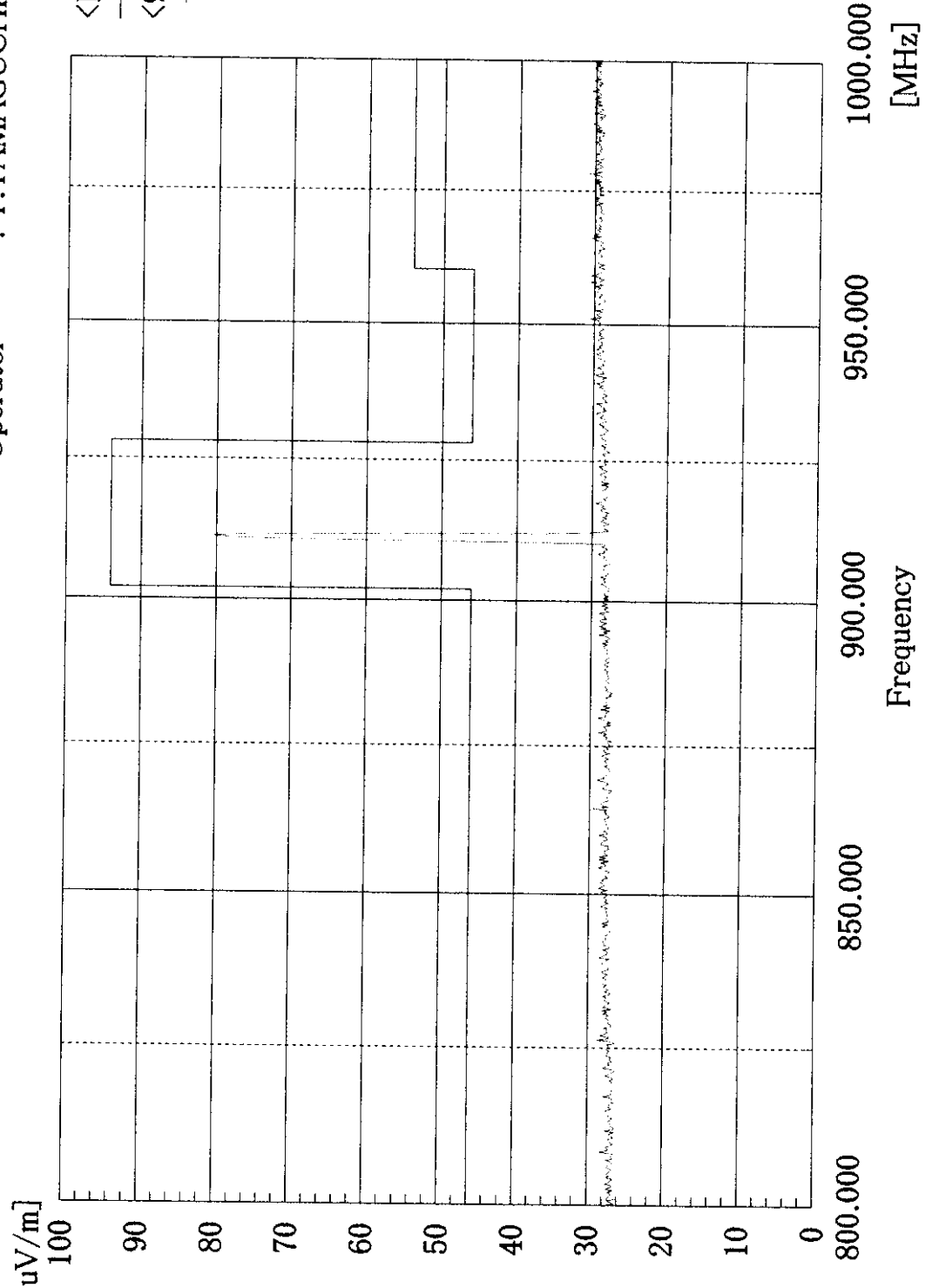
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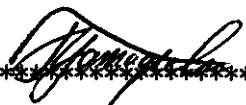
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S/N : ES0001
Product Name : MicroCast
File No : 003
Power Source : AC120V / 60Hz

Standard : FCC Part15C.249(a)
Temp /Humi : 16deg / 36 %
Test Mode :
Remarks :
Operator : T.YAMAGUCHI

<FCC_15C>
----- Limit
<99207CO3>
----- Vertical



Standard : FCC Part15C
Model : KX-MC1CS
S/N : ES0001
Product Name : MicroCast
File No : 003
Power Source : AC120V / 60Hz
Temp/Humi : 18deg / 67%
Test Mode :
Remarks :
Operator : T. YAMAGUCHI



Final Result

--- Horizontal Polarization (QP) ---

No.	Frequency [MHz]	Reading [dBuV]	c. f [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]
1	63.867	48.0	-17.4	30.6	40.0	9.4
2	117.122	44.9	-11.9	33.0	43.5	10.5
3	119.705	47.0	-11.5	35.5	43.5	8.0
4	128.463	42.4	-10.5	31.9	43.5	11.6
5	159.668	43.0	-8.1	34.9	43.5	8.6
6	921.099	22.4	12.1	34.5	46.0	11.5

--- Vertical Polarization (QP) ---

No.	Frequency [MHz]	Reading [dBuV]	c. f [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]
1	31.933	53.0	-22.9	30.1	40.0	9.9
2	63.874	46.3	-17.4	28.9	40.0	11.1
3	92.558	47.5	-14.5	33.0	43.5	10.5
4	94.449	47.1	-14.4	32.7	43.5	10.8
5	95.801	46.0	-14.2	31.8	43.5	11.7
6	117.124	42.8	-11.9	30.9	43.5	12.6

PS Corporation
Open Site

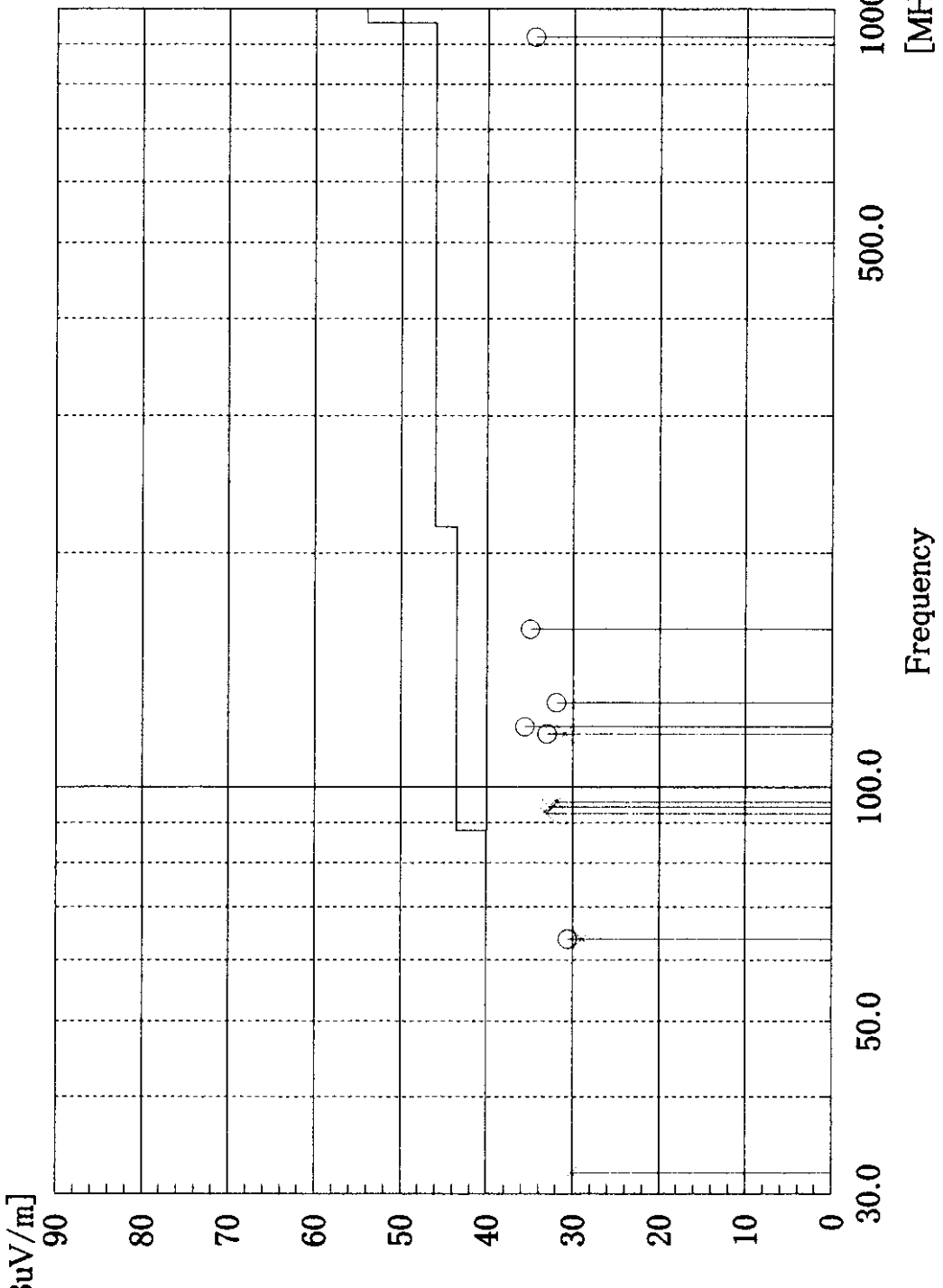
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23 February, 1999 16:25
99207C03.dat

Model : KX-MC1CS
S/N : ES0001
Product Name : MicroCast
File No. : 003
Power Source : AC120V / 60Hz

Standard : FCC Part15C
Temp/Humi : 18deg / 67%
Test Mode :
Remarks :
Operator : T.YAMAGUCHI

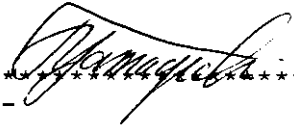
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—— Limit
<99207C03>
—— QP (Hor)
—— QP (Ver)



*****<I P S Corporation>*****
<<< RADIATED EMISSION >>>

23 February, 1999 20:21
Page 1

Model : KX-MC1CS
Serial No. : ES0001
Standard : FCC Part15C
Condition File : C210Gtk
Condition :
Remarks : EUT NAME : MicroCast
:
: FILE No. : 015
AC Power : 120 V 60 Hz
Temperature : 24 deg.
Humidity : 40 %
Operator : T.YAMAGUCHI



----- Spectrum Selection -----

- Horizontal Polarization -

No.	Frequency [MHz]	Reading [dBuV]	c.f. [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]
1	1823.924	34.6	1.5	36.1	54.0	17.9
2	2735.724	36.8	7.2	44.0	54.0	10.0

- Vertical Polarization -

No.	Frequency [MHz]	Reading [dBuV]	c.f. [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]
3	1823.924	33.2	1.5	34.7	54.0	19.3
4	2735.724	37.1	7.2	44.3	54.0	9.7

< I P S Corporation >

<<< RADIATED EMISSION >>>

Date/Time : 23 February, 1999 20:21

I P S EMC SITE

Model : KX-NC1CS

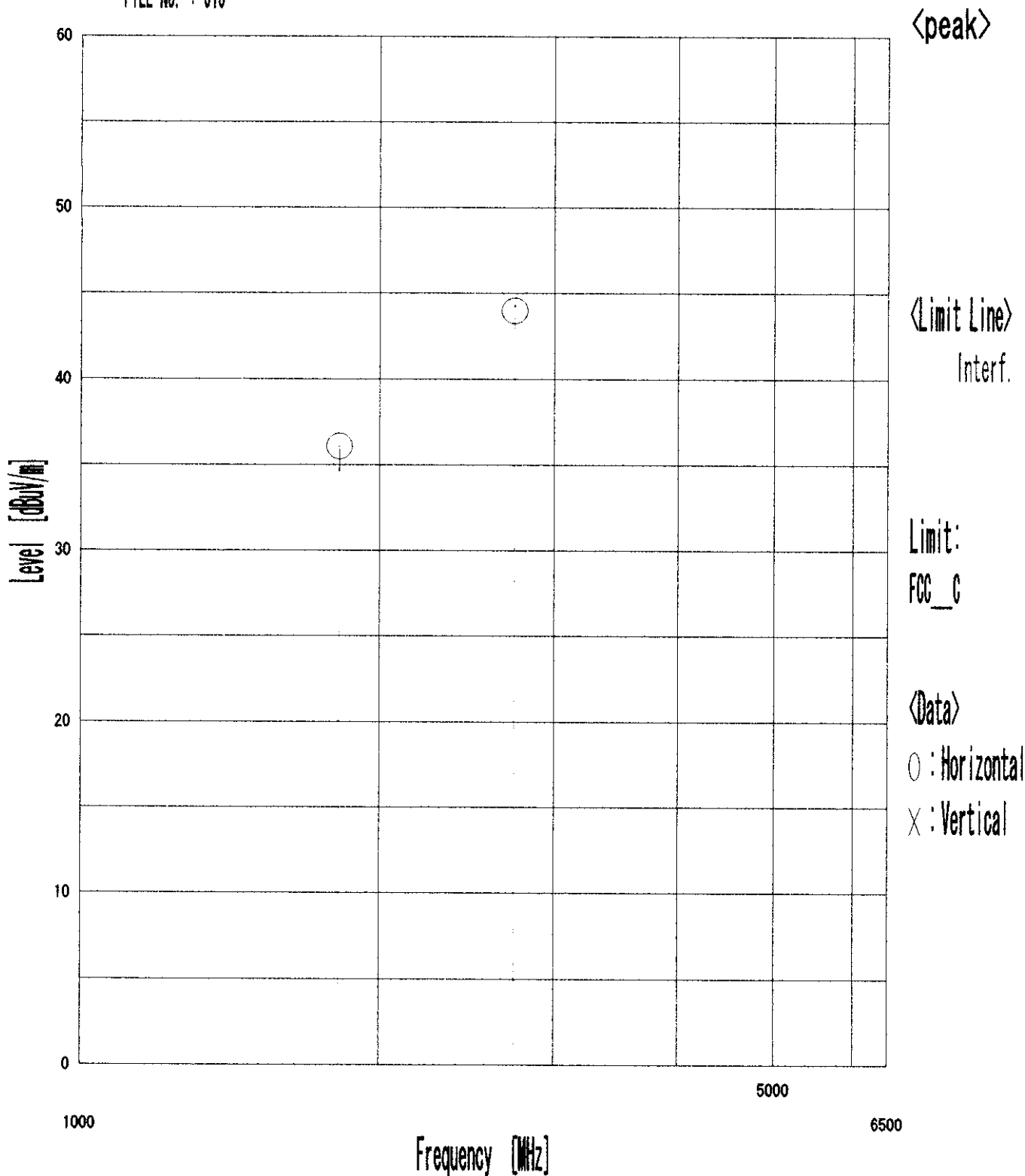
Standard : FCC Part15C

Serial No. : ES0001

Operator : T.YAMAGUCHI

Remarks : EUT NAME : MicroCast

FILE No. : 015



***** IPS Corporation *****
<<Magnetic Field Emission>>

25 February, 1999 21:09
99207M03. dat

Standard : FCC Part15C
Model : KX-MC1CS
S/N : ES0001
Product Name : MicroCast
File No : 003
Power Source : AC120V/60Hz
Temp/Humi : 19deg/36%
Test Mode :
Remarks :
Operator : T. YAMAGUCHI



Final Result

No.	Frequency [MHz]	Reading [dBuV/m]	c. f [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]
1	0.016	13.6	29.3	42.9	123.5	80.6
2	0.031	9.1	29.6	38.7	117.7	79.0
3	0.047	3.3	29.7	33.0	114.2	81.2
4	0.075	2.3	29.7	32.0	110.1	78.1
5	0.163	11.3	29.7	39.7	103.4	63.7
6	3.999	9.8	29.9	39.7	69.5	29.8

Model : KX-MC1CS
S/N : ES0001
Product Name : MicroCast
File No : 003
Power Source : AC120V/60Hz

Standard : FCC Part15C
Temp/Humi : 19deg/36%
Test Mode :
Remarks :
Operator : T.YAMAGUCHI

