MEASUREMENT/TECHNICAL REPORT
Matsushita Electric Industrial Co., Ltd. MODEL TX-D9S45NMB
FCC ID: ACJ93312141 & GSS19005

This report concerns (check one): Original grant Class II change X
Equipment type: 19" CRT Display Monitor

Unintentional Radiator 47 CFR [10-1-95 Edition] Part 15, Subpart B.

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? yes no X
If yes, defer until: date

Company Name agrees to notify the Commission by date

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

Applicant: Matsushita Electric Industrial Co., Ltd.
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251-0043 Japan

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Submitted by: H. Yoda August 26 , 1999
Date

(Reviewer): M. Shiro August 26 , 1999
Date

MEASUREMENT/TECHNICAL REPORT
FCC PART 15, Class B (ANSI C63.4:1992)

Issued: August 5, 1999

Name and Address of: the Client	Matsushita Electric Industrial Co., Ltd. 6-4-1 Tsujidomoto-machi, Fujisawa-shi, Kanagawa-ken 251-0043 Japan
Phone / Fax	+81-466-35-1303 / +81-466-35-5557
Test Item:	19" CRT Display Monitor
Identification:	TX-D9S45NMB FCC ID: AOJ93312141
Serial No.:	FP9420005 FCC ID: CSS19005
Sample No.:	1
Sample Receipt Date:	July 28, 1999
Test Result:	PASS

Report Prepared by:
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Tested by: K. Hasegawa — July 29, 1999 (Date)

Reviewed by: K. Hamaguchi — August 5, 1999 (Date)

Note:
1. This report should not be reproduced except in full without the written approval of Cosmos Corporation.
2. The results in this report apply only to the sample tested.
3. This test report is issued by private test house (Cosmos Corp.), therefore NVLAP or US government does not endorse a reliability of this report.
4. All measurement data contained in this report may have uncertainty. A judgement for the limitation should be taken into the count.

Table of Contents

1. General Information

1.1 Product Description

Matsushita Electric Industrial Co., Ltd., Model TX-D9S45NMB (referred to as the EUT in this report) is a 19" CRT Display Monitor.

Clock and power supply switching frequencies are as following;

PARTS	ADDRESS	FUNDAMENTAL FREQUENCY
Crystal Oscillator	X101	10 MHz

We chose and measured TX-D9S45NMB as representative model in family machines because it was the same circuit construction and performance as them. This report and FCC ID ACJ93312141 covers the family machine which is TX-D9S45MB and FCC ID GSS19005 covers the family machine which is VCDTS21476-1*.

1.1.1 Rating

Input Voltage:	AC 100 – 240 V	(AC 120 V)*1
Frequency:	50 / 60 Hz	(60 Hz)*1
Input Current:	2.7 A	(1.2 A)*1

Note: *1 is measured value during test.

1.2 Related Submittal Grant

Original FCC ID : ACJ93312141.

1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4:1992. Radiated testing was performed at an antenna to EUT distance of 10 meters. Final Result was converted in 3m, using 20 log 10m / 3m.

1.4 Test Facility

The open area test site, Cosmos EMC Lab., and conducted measurement facility used to the radiated data is located at 543 Shimesasu, Watarai-cho, Watarai-gun, Mie-ken, 516-2119, Japan. This site has been fully described in a report dated May 23, 1996 submitted to FCC, and accepted in a letter dated July 10, 1996 (31040/SIT 1300F2). The listing letter has updated on July 2, 1999.

1. General Information (Continued)

1.5 Tested System Details

The FCC IDs for all equipment, plus descriptions of all cables used in the tested system(including inserted cards, which have grants) are:

Model No.	Serial No.	FCC ID	Description	Cable Description
TX-D9S45NMB	FP9420005	ACJ93312141	EUT	AC Power Cord 1.8m Unshielded Monitor Cable 1.8m Shielded w/ 2 FERRITE CORES
D4553A	SG-71403712	Doc	Personal Computer	AC Power Cord 2.0m Unshielded
RT6656TWJP	80660864	AQ6-MTN4C15	Keyboard	Keyboard Cable 2.2m Shielded
M-S34	LZA70972048	DZL211029	Mouse	Mouse Cable 1.8m Shielded
C4565A	SG-73I140TZ	B94C4555X	Printer	AC Power Cord 1.8m Unshielded Printer Cable 3.0m Shielded
C202A	010808	BKM552C202A	Modem	Modem Cable 1.0m Shielded
PAC70-2.5	1390048	N / A	Regulated DC Power Supply	AC Power Cord 2.0m Unshielded DC Power Cord 1.0m Unshielded

2. Product Labeling

Figure 2.1 FCC ID Label

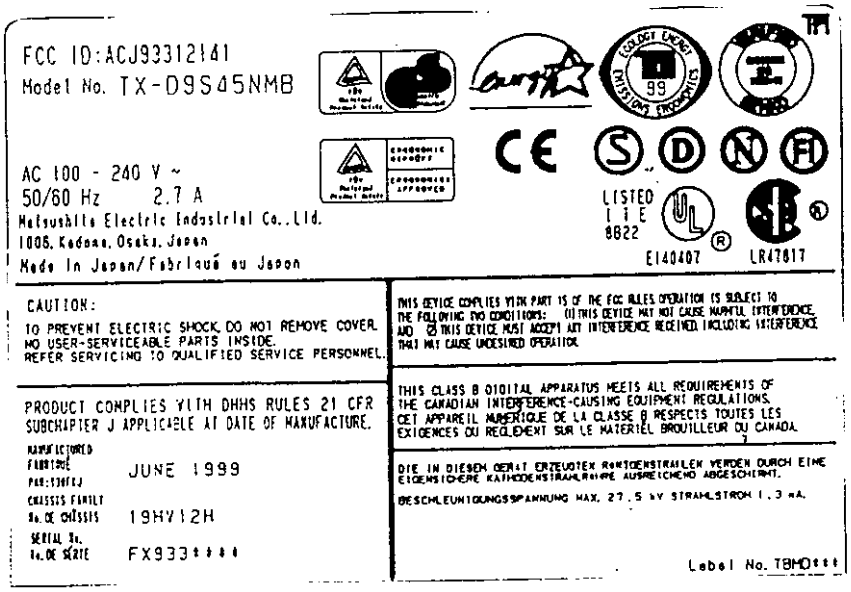
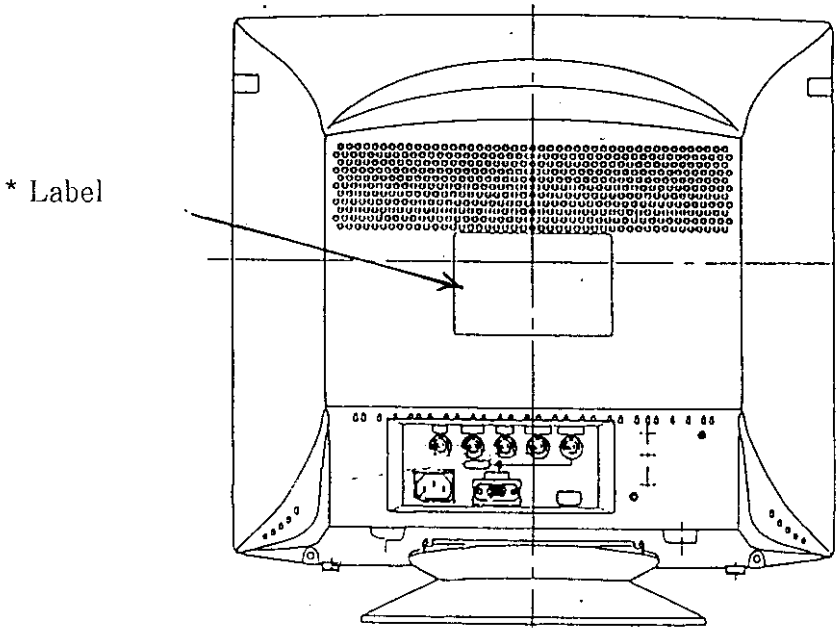


Figure 2.2 Location of Label on EUT



3. System Test Configuration

3.1 Justification

EUT was measured by max radiation mode user specified.

3.2 EUT Exercise Software

EUT did not use exercise program during radiated and conducted testing.

3.3 Special Accessories

This cable model and part numbers are instructed with their instruction manual.

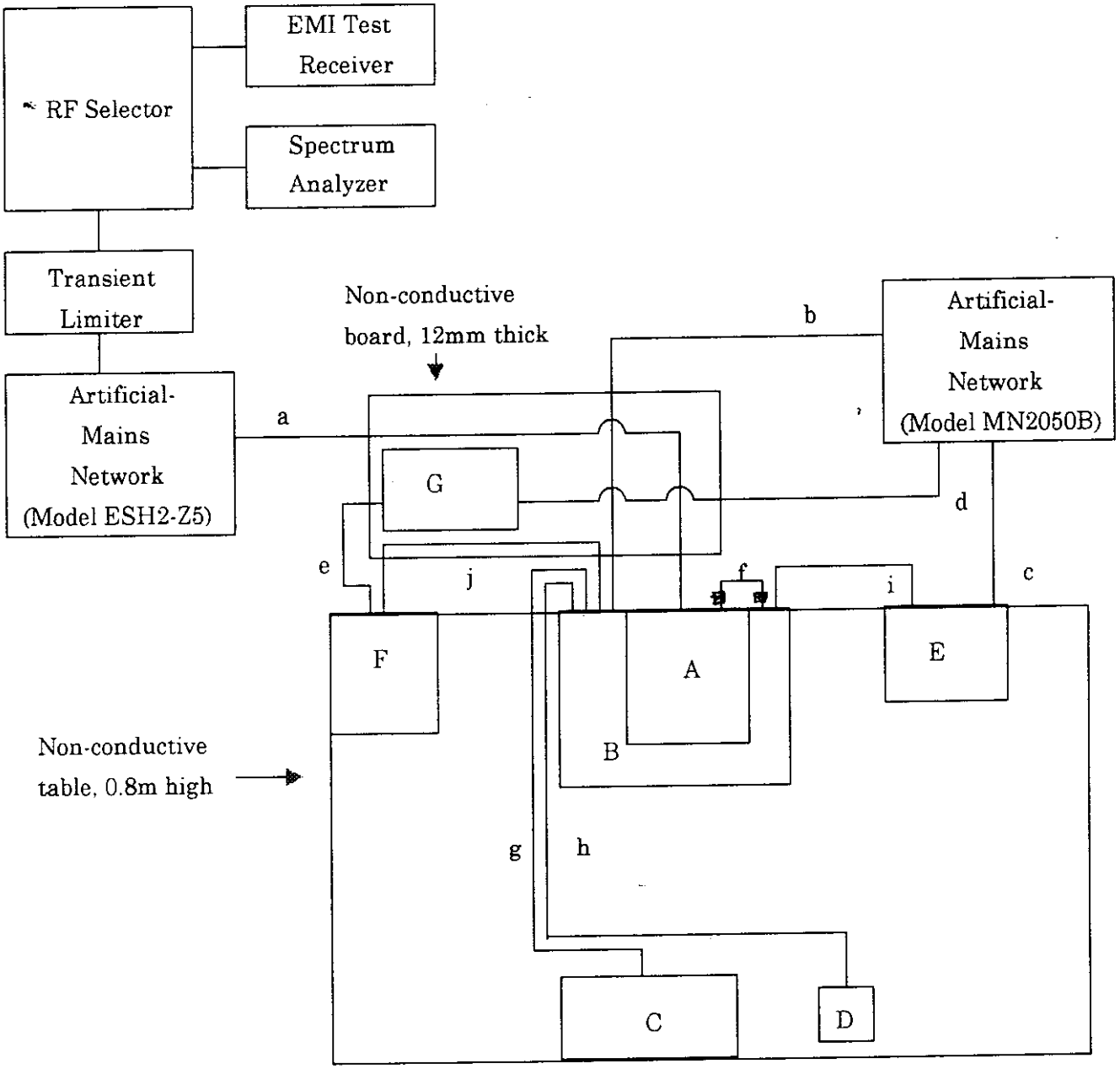
3.4 Equipment Modifications

No equipment modification to achieve compliance to Class B levels was done during test.

3. System Test Configuration (Continued)

3.5 Configuration of Tested System (Continued)

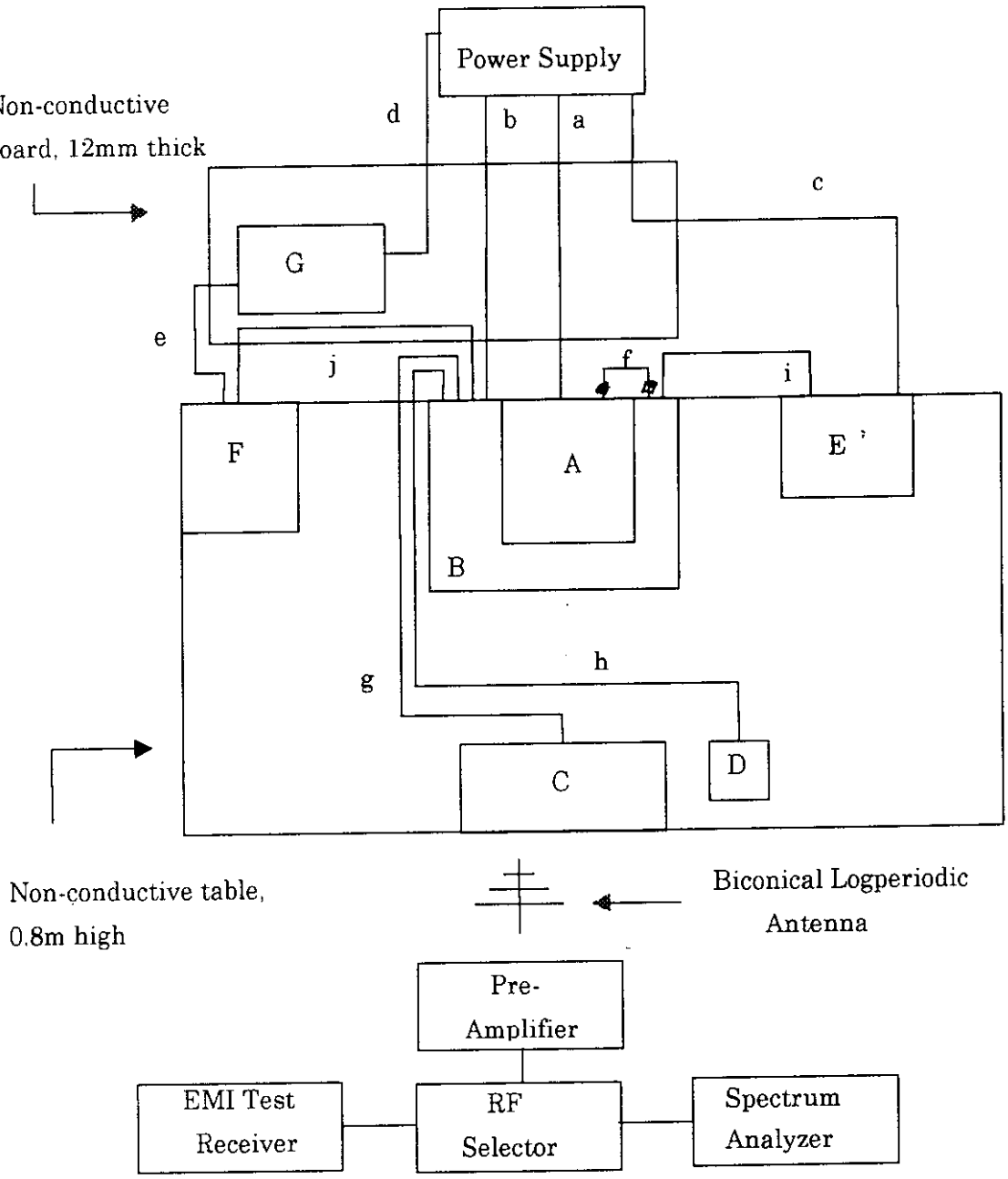
Conducted Emission



3. System Test Configuration (Continued)

3.5 Configuration of Tested System (Continued)

Radiated Emission



3. System Test Configuration (Continued)

3.5 Configuration of Tested System (Continued)

Independent modes of operation are:

A) Continuous Operating (Resolution: 1600 × 1200 "H" Pattern)
B) Continuous Operating (Resolution: 640 × 480 "H" Pattern)

Conducted Emission

1) EUT was put on Personal Computer.
2) Personal Computer, Keyboard, Mouse, Printer and Modem were put on the Non-conductive table.
3) Regulated DC Power Supply was put on the Non-conductive board.
4) Personal Computer and Printer located at 0.1m intervals.
5) Personal Computer and Modem located at 0.1m intervals.
6) Keyboard and Mouse located at 0.1m intervals.
7) EUT was connected to Artificial-Mains Network (Model ESH2-Z5) with the AC Power Cord. The Excess Cord was folded back and forth forming a bundle 0.35m length at the center of the Cord.
8) Personal Computer was connected to Artificial-Mains Network (Model MN2050B) with the AC Power Cord. The Excess Cord was folded back and forth forming a bundle 0.35m length at the center of the Cord.
9) Printer was connected to Artificial-Mains Network (Model MN2050B) with the AC Power Cord.
10) Regulated DC Power Supply was connected to Artificial-Mains Network (Model MN2050B) with the AC Power Cord. The Excess Cord was folded back and forth forming a bundle 0.3m length at the center of the Cord.
11) Modem was connected to Regulated DC Power Supply with the DC Power Cord.
12) EUT was connected to Personal Computer with the Monitor Cable. The Excess Cable was folded back and forth forming a bundle 0.4m length at the center of the Cable and hung in the middle between ground and table.
13) Personal Computer was connected to Printer with the Printer Cable. The Excess Cable was folded back and forth forming a bundle 0.35m length at the center of the Cable and hung in the middle between ground and table.
14) Personal Computer was connected to Modem with the Modem Cable.
15) Personal Computer was connected to Keyboard with the Keyboard Cable.
16) Personal Computer was connected to Mouse with the Mouse Cable.

3. System Test Configuration (Continued)

3.5 Configuration of Tested System (Continued)

Radiated Emission

1) EUT was put on Personal Computer.
2) Personal Computer, Keyboard, Mouse, Printer and Modem were put on the Non-conductive table.
3) Regulated DC Power Supply was put on the Non-conductive board.
4) Personal Computer and Printer located at 0.1m intervals.
5) Personal Computer and Modem located at 0.1m intervals.
6) Keyboard and Mouse located at 0.1m intervals.
7) EUT was connected to Power Supply with the AC Power Cord. The Excess Cord was folded back and forth forming a bundle 0.35m length at the center of the Cord.
8) Personal Computer was connected to Power Supply with the AC Power Cord. The Excess Cord was folded back and forth forming a bundle 0.35m length at the center of the Cord.
9) Printer was connected Power Supply with the AC Power Cord.
10) Regulated DC Power Supply was connected to Power Supply with the AC Power Cord. The Excess Cord was folded back and forth forming a bundle 0.3m length at the center of the Cord.
11) Modem was connected to Regulated DC Power Supply with the DC Power Cord.
12) EUT was connected to Personal Computer with the Monitor Cable. The Excess Cable was folded back and forth forming a bundle 0.4m length at the center of the Cable and hung in the middle between ground and table.
13) Personal Computer was connected to Printer with the Printer Cable. The Excess Cable was folded back and forth forming a bundle 0.35m length at the center of the Cable and hung in the middle between ground and table.
14) Personal Computer was connected to Modem with the Modem Cable.
15) Personal Computer was connected to Keyboard with the Keyboard Cable.
16) Personal Computer was connected to Mouse with the Mouse Cable.

	Instrument		Cord / Cable
A)	EUT	a)	AC Power Cord 1.8m Unshielded
B)	Personal Computer	b)	AC Power Cord 2.0m Unshielded
C)	Keyboard	c)	AC Power Cord 1.8m Unshielded
D)	Mouse	d)	AC Power Cord 2.0m Unshielded
E)	Printer	e)	DC Power Cord 1.0m Unshielded
F)	Modem	f)	Monitor Cable 1.8m Shielded w/ 2 Ferrite Cores
G)	Regulated DC Power Supply	g)	Keyboaed Cable 2.2m Shielded
		h)	Mouse Cable 1.8m Shielded
		i)	Printer Cable 3.0m Shielded
		k)	Modem Cable 1.0m Shielded

5. Conducted Emission Data

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.
The measurement was conducted for the resolution 640 × 480 and 1600 × 1200.
The Monitor Cable was conducted in D-Sub = D-Sub 1.5m length or D-Sub = D-Sub 1.8m length
Following was the worst condition:

B) Continuous Operating (Resolution: 640 × 480 "H" Pattern)

Dot Clock Frequency : 25.17 MHz
Vertical Frequency : 60 Hz
Horizontal Frequency : 31.5kHz
Monitor Cable : D-Sub = D-Sub 1.8m length

		Frequency (MHz)	Measured * (dB μ V)	Limit (dB μ V)
Neutral	Line	0.45283	28.7	48.0
Neutral	Line	0.50002	25.3	48.0
Neutral	Line	0.60335	35.8	48.0
Neutral	Line	0.90169	31.9	48.0
Neutral	Line	1.30682	28.9	48.0
Neutral	Line	1.80879	28.6	48.0
L	Line	0.45081	28.0	48.0
L	Line	0.60208	33.0	48.0
L	Line	0.90345	28.8	48.0
L	Line	1.05486	27.3	48.0
L	Line	17.89525	24.6	48.0
L	Line	18.19691	23.3	48.0

* All readings are quasi-peak unless stated otherwise.
For more detailed test results, refer to Attachment, EMI Test Data.
Uncertainty of measurement result: ± 2.26 dB

Environment:
Temperature 33 ℃ Humidity 62 %

Tested Personnel:

Tester Signature : K. Hasegawa Date of Testing : July 29, 1999

Typed/Printed Name : Kouhei Hasegawa

6. Radiated Emission Data

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.
The measurement was conducted for the resolution 640 × 480 and 1600 × 1200.
The Monitor Cable was conducted in D-Sub = D-Sub 1.5m length or D-Sub = D-Sub 1.8m length
Following was the worst condition:

A) Continuous Operating (Resolution 1600 × 1200 "H" Pattern)
Dot Clock Frequency : 202.5 MHz
Vertical Frequency : 75 Hz
Horizontal Frequency : 94 kHz
Monitor Cable : D-Sub = D-Sub 1.8m length

Frequency (MHz)	Polarity (H/V)	Receiver * Reading (dB μ V)	Correction Factor (dB/m)	Corrected Reading (dB μ V/m)	3 Meter Limit (dB μ V/m)
385.061	Horizontal	52.9	-11.0	41.9	46.0
54.961	Vertical	49.8	-23.0	26.8	40.0
165.054	Vertical	45.7	-18.2	27.5	43.5
220.092	Vertical	48.5	-18.5	30.0	46.0
269.988	Vertical	49.6	-14.3	35.3	46.0
330.011	Vertical	46.8	-12.5	34.3	46.0

*All readings are quasi-peak unless stated otherwise, with an IF bandwidth of 120 kHz, along with an 1 S sweep time. A video filter was not used.

For more detailed test results, refer to Attachment, EMI Test Data.

Uncertainty of measurement result: ± 3.234 dB

Environment:

Temperature 30 ℃
Humidity 62 %

Tested Personnel:

Tester Signature : K. Hasegawa Date of Testing : July 29, 1999

Typed/Printed Name : Kouhei Hasegawa

6. Radiated Emission Data (Continued)

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading.
The basic equation with a sample calculation is as follows:

FS = RA + AF +CF−AG

where FS = Field Strength

RA = Receiver Amplitude
AF = Antenna Factor
CF = Cable Attenuation Factor
AG = Amplifier Gain

Assume a receiver reading of 52.5 dBuV is obtained. The Antenna Factor of 7.4 and a Cable Factor of 1.1 is added. The Amplifier Gain of 29 dB is subtracted, giving a field strength of 32 dBuV/m. The 32 dBuV/m value was mathematically converted to its corresponding level in uV/m.

FS = 52.5+ 7.4 + 1.1−29 =32 dBuV/m

Level in uV/m = Common Antilogarithm [(32 dBuV/m)/20] = 39.8 uV/m

7. List of Test and Measurement Instruments

Conducted Emission

Manufacturer	Instruments	Model / Type	Serial No.	Calibration Date Next Calibration
ROHDE & SCHWARZ	Spectrum Analyzer	FSB / DISPLAY	838497/005 / 838301/009	May, 1999 May, 2000
ROHDE & SCHWARZ	EMI Test Receiver	ESHS10	842121/012	May, 1999 May, 2000
ROHDE & SCHWARZ	Artificial-Mains Network	ESH2-Z5	842210/010	May, 1999 May, 2000
CHASE ELECTRONICS LIMITED	Artificial-Mains Network	MN2050B	1140	May, 1999 May, 2000

Radiated Emission

Manufacturer	Instruments	Model / Type	Serial No.	Calibration Date Next Calibration
ROHDE & SCHWARZ	Spectrum Analyzer	FSB / DISPLAY	838497/005 / 838301/009	May, 1999 May, 2000
ROHDE & SCHWARZ	EMI Test Receiver	ESVS10	842122/014	May, 1999 May, 2000
CHASE ELECTRONICS LIMITED	Pre-Amplifier	CPA9231	3045	February, 1999 February, 2000
SCHAFFNER CHASE EMC LTD.	Biconical Logperiodic Antenna	CBL6111C	2531	April, 1999 April, 2000

Attachment

- Schematic Diagram for Model TX-D9S45NMB: Page 23.

- EMI Test Data

I) Total 7 pages: Page 24 to 30.

Conducted Emission: Page 24 to 27.
Final result: Page 24, 26.
Pre Check: Page 25, 27.

Radiated Emission: Page 28 to 30.
Final result: Page 28.
Pre Check: Page 29, 30.

II) Calculation:

Result = Reading + c.f.
Margin = Limit - Result

- User Manual

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<<< Conducted Emission >>>

29 July,1999 14:47

Model : TX-D9S45NMB
Serial No. : FP9420005
Standard : FCC Part 15 Class B
Condition File : FCC-B
: Operated ("H" Pattern)
Remark : 640 X 480
: fH: 31.5 kHz, fV: 60.0 Hz
: D-Sub=BNC Cable 1.8m
AC Power : 120 V 60 Hz
Temperature : 33 deg.
Humidity : 62 %
Operator : K.Hasegawa

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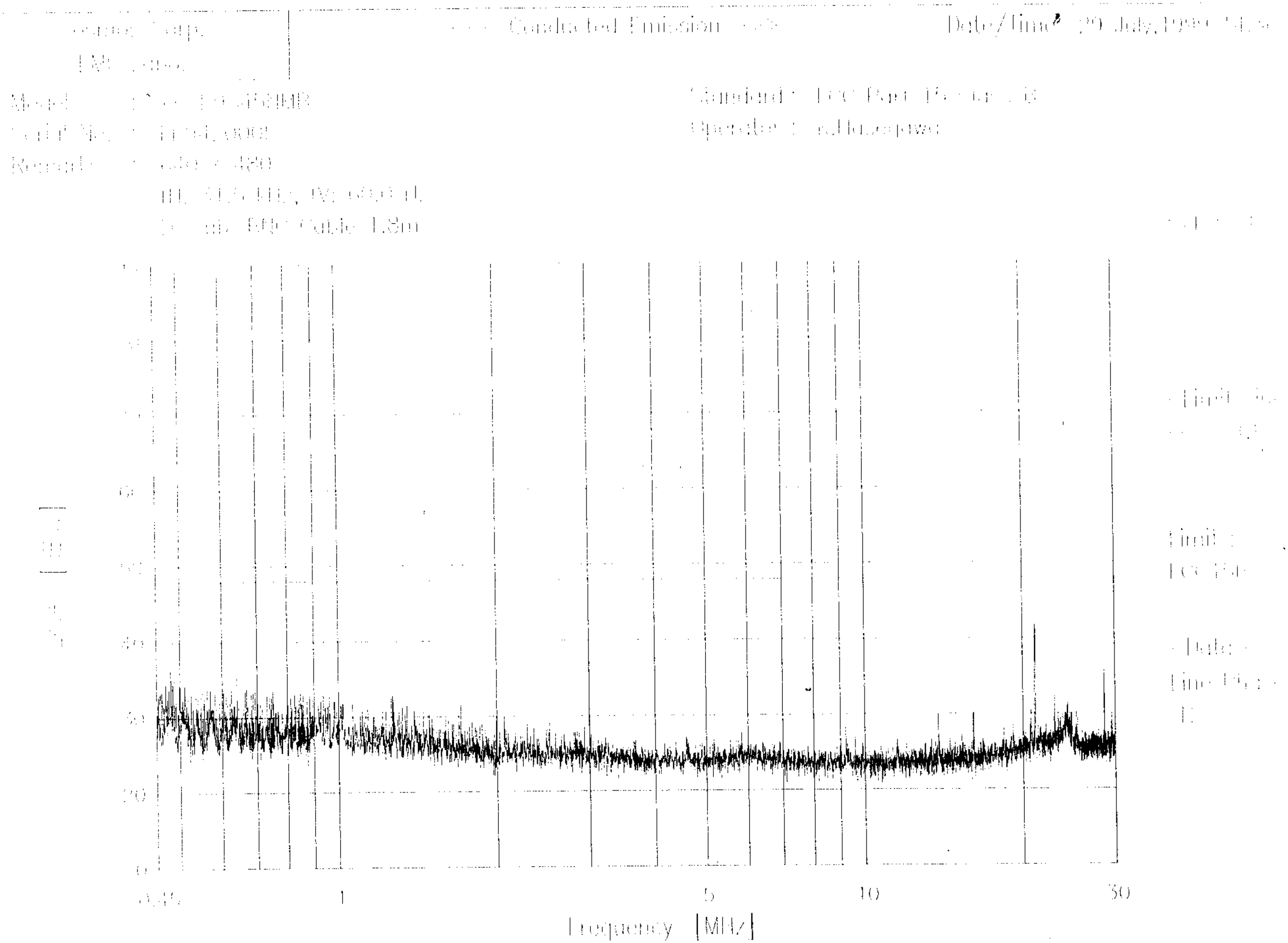
----- Results -----

No.	Frequency [MHz]	Reading [dBuV]	c.f. [dB]	Result [dBuV]	Limit [dBuV]	Margin [dB]
Phase N						
1	0.45657	12.9	10.7	23.6	48.0	24.4
2	0.50875	15.9	10.7	26.6	48.0	21.4
3	0.66508	12.2	10.9	23.1	48.0	24.9
4	20.72218	15.2	12.7	27.9	48.0	20.1
5	21.13062	28.7	12.6	41.3	48.0	6.7
6	28.63878	22.3	13.3	35.6	48.0	12.4


Conducted Emission
1
5
10
30
Frequency [MHz]

********** Cosmos Corp. **********

<<< Conducted Emission >>>

29 July,1999 14:41

Model : TX-D9S45NMB
Serial No. : FP9420005
Standard : FCC Part 15 Class B
Condition File : FCC-B
: Operated ("H" Pattern)
Remark : 640 X 480
: fH: 31.5 kHz, fV: 60.0 Hz
: D-Sub=BNC Cable 1.8m
AC Power : 120 V 60 Hz
Temperature : 33 deg.
Humidity : 62 %
Operator : K.Hasegawa

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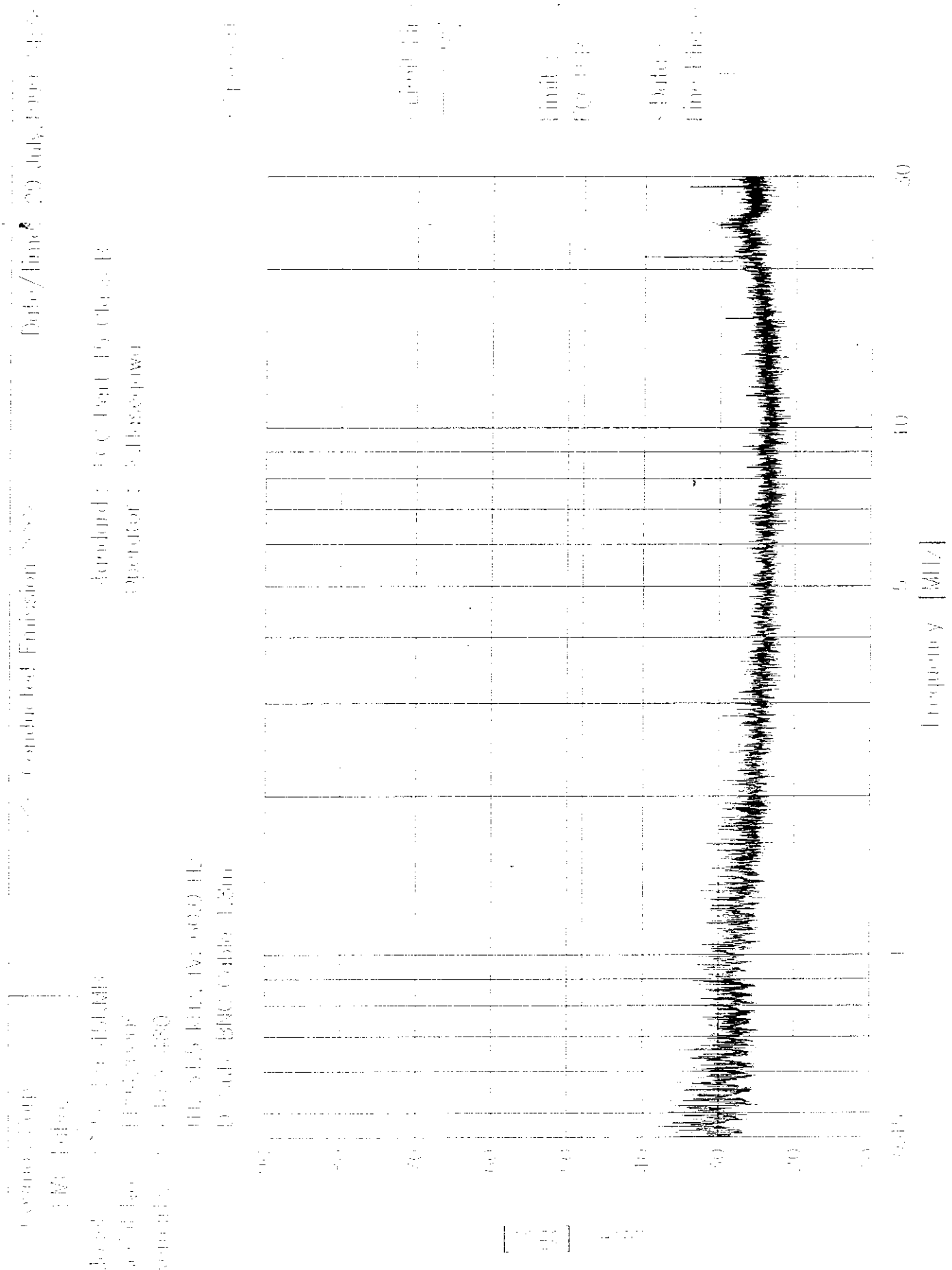
----- Results -----

No.	Frequency [MHz]	Reading [dBuV]	c.f. [dB]	Result [dBuV]	Limit [dBuV]	Margin [dB]
Phase L1						
1	0.46418	12.3	10.7	23.0	48.0	25.0
2	0.50692	16.5	10.7	27.2	48.0	20.8
3	20.72287	15.0	12.7	27.7	48.0	20.3
4	21.13171	27.8	12.6	40.4	48.0	7.6
5	24.22448	13.4	13.1	26.5	48.0	21.5
6	28.63617	20.8	13.3	34.1	48.0	13.9



**********Cosmos Corp**********

<<< Radiated Emission >>>

29 July,1999 11:18

Model : TX-D9S45NMB
Serial No. : FP9420005
Standard : FCC Part 15 Class B 10m
Condition File : 10(m)
Condition : Operated ("H" Pattern)
Remarks : 1600 X 1200
: fH: 93.8 kHz, fV: 75.0 Hz
: D-Sub=BNC Cable 1.8m
AC Power : 120 V 60 Hz
Temperature : 30 deg.
Humidity : 62 %
Operator : K.Hasegawa

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

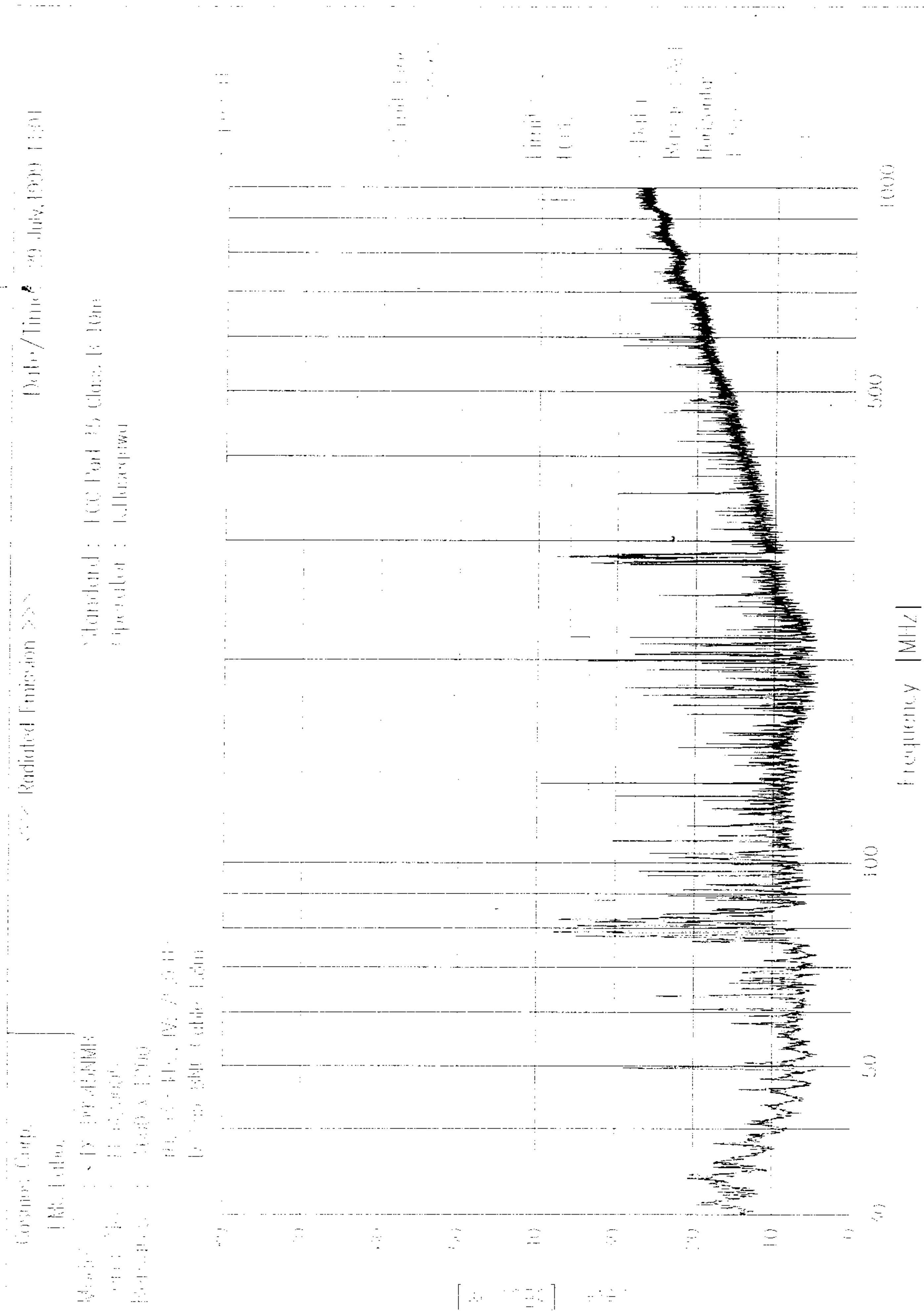
Q P

- Horizontal Polarization -

No.	Frequency [MHz]	Reading [dBuV]	c.f. [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]
1	202.789	34.8	-18.9	15.9	33.5	17.6
2	374.446	29.1	-11.4	17.7	36.0	18.3
3	421.249	30.4	-9.7	20.7	36.0	15.3
4	468.068	28.9	-8.6	20.3	36.0	15.7

- Vertical Polarization -

No.	Frequency [MHz]	Reading [dBuV]	c.f. [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]
5	234.010	39.3	-17.0	22.3	36.0	13.7
6	265.218	34.8	-14.4	20.4	36.0	15.6


Radiated Emission
Frequency [MHz]
30
50
100
500
1000

Frequency [MHz]