FCC TEST REPORT

FCC ID : **CBRFB-900AI**

TEST REPORT NO. : **KFB99120**

PRODUCT NAME : **Printer**

MODEL NUMBER : **FB-900AI**

TYPE OF PRINTER : **Serial impact dot matrix**

DATE OF TEST : **Feb.23th,1999 & Feb.24th,1999**

APPLICANT : **SEIKO Precision Inc.**

Seiko I Techno Research Co., Ltd.
140-16 Itagawa,Sanbu-machi,Sanbu-gun, Chiba 289-1201 Japan
Tel. +81-475-89-1190 Fax. +81-475-89-1688

CERTIFICATE OF COMPLIANCE

1. Applicant	SEIKO Precision Inc. 1-1-1 Akanehama, Narashino-shi, Chiba 275-8558 Japan
2. Regulation	47 CFR Part 15 Subpart B Class B Digital Device
3. Measurement Procedure	ANSI C63.4 - 1992
4. FCC ID	CBRFB-900AI
5. Trade Name	SEIKO Precision
6. Product Name	Printer
7. Model Number	FB-900AI
8. Date of Test	Feb.23th,1999 & Feb.24th,1999
9. Test Site	Seiko I Techno Research Chiba Test Site
10. Report Number	KFB99120

This equipment is in compliance with above regulation.
Seiko I Techno Research Co., Ltd. certifies that the data are accurate and contain a true representation of the emissions profile.
The test result shown below show compliance with the FCC Part 15 Subpart B Class B limited as tested.

DATE: March 15th.1999

T. Suzuki

TATSUO SUZUKI
Test Engineer

T. Nakamura

TAKATOSHI NAKAMURA
Manager of EMC Department

TABLE OF CONTENTS

(Note)
The block diagram and the photograph of the EUT are described in the manufacturer (applicant). Therefore, this report dose not contain them.

1. GENERAL INFORMATION

1.1 Product Description

The SEIKO Precision's Model FB-900AI (refereed to as EUT this report) is a serial impact dot matrix printer.
This printer has two interfaces of the parallel and the serial interface.
This printer's CPU is used MB90705H (Fujitsu), and main use clock frequency is 12.5 MHz and 25 MHz.
This printer provides a wide range of print functions, as shown below:

(1) High-speed printing
(2) Original plus 8 multi part forms printing
(3) Bar code printing function
(4) Enlarged character printing
(5) Zooming function
etc.

1.2 Tested System Details

Printer FB-900AI receives the power supply from the AC power line. This printer has two interfaces of the parallel and serial. A parallel port of the printer was connected with the LPT1 port of the computer and the serial port was connected with the COM1 port of the computer.
After that, the other serial port COM2 of the computer was connected with serial port of support printer DPU-411.
Additionally, the connection with the monitor etc are Figure 1.
The printer was made to print "H" characters by such a test system composition.

Model	FCC ID	Description	Cable Description
PRT1 (1)	CBRFB-900AI	Printer Parallel I/F Serial I/F	Unshielded AC power cord Shielded parallel cable Shielded serial cable
PC	A09-PC741	Personal Computer LPT1(Parallel I/F) COM1(Serial I/F) COM2(Serial I/F)	Unshielded AC Power cord
KB	none	Keyboard	Shielded keyboard cable (2)
MS	DZLMSF14R	MOUSE	Shielded mouse cable
MON	GQBCDS-431X	Monitor RGB Terminal	Unshielded AC Power Cord Shielded Video cable (3)
PRT2	C4Z7NSPS0001	Thermal Printer Serial I/F	Unshielded AC adapter cord Shielded serial cable with AC Adapter

(1) EUT submitted for grant.

(2) Keyboard cable includes grantee supplied ferrite.

(3) Monitor's attached video cable includes grantee supplied ferrite.

1.3 Test Methodology

Both conducted and radiated emissions testing were performed according to the procedures in ANSI C63.4-1992.
Radiated emission testing was performed at an antenna to the EUT distance of 3 meters.

1.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on the flatlands at Sanbu-gun, Chiba in Japan. This site has been fully described in a report dated February 14, 1997 submitted to your office, and accepted in a letter dated April 15, 1997 (31040/SIT).
And the facsimile letter of the acknowledge to the company name change report was gotten on May 4,1998.
These letters are appended to section 6.

2. SYSTEM TEST CONFIGURATION

2.1 Justification

This system was configured for testing in a typical fashion (as a customer would normally use it).
Because printer FB-900AI has two interface ports, each port was connected with the correspondence port of the personal computer. The personal computer has two serial ports. One was connected with the EUT, and other one was connected the serial port of the printer DPU-411 which was a supplementary equipment.
The monitor connected with the personal computer by a video cable, and displayed "H" character in white.
Because printer FB-900AI (EUT) had two communicate modes, each of the state of a parallel communication and the state of the serial communication was tested.

2.2 EUT Exercise Software

The content of the exercise program using radiated and conducted testing is as follows. This program is used for testing printer FB-900AI.
The BASIC program operated the system as follows.

(1) Printer FB-900AI (EUT) is operated to print "H" of 136 characters.
(2) "H" of 80 characters are displayed on a monitor.
(3) Support printer DPU-411 is operated to print "H" of 80 characters.

(1) to (3) is repeated.

2.3 Special Accessories

As shown in Figure 1, all interface cables used for compliance testing are shielded. Moreover, a video cable and a keyboard cable are used shielded cable with ferrite attached.
As for the interface cable oh the printer FB-900AI, the shielded cable is demanded.

2.4 Configuration of Test System

The figure below shows the system composition.

The ferrite core shown in figure is the cable attached goods.

(Note) ▬▬ : Ferrite Core

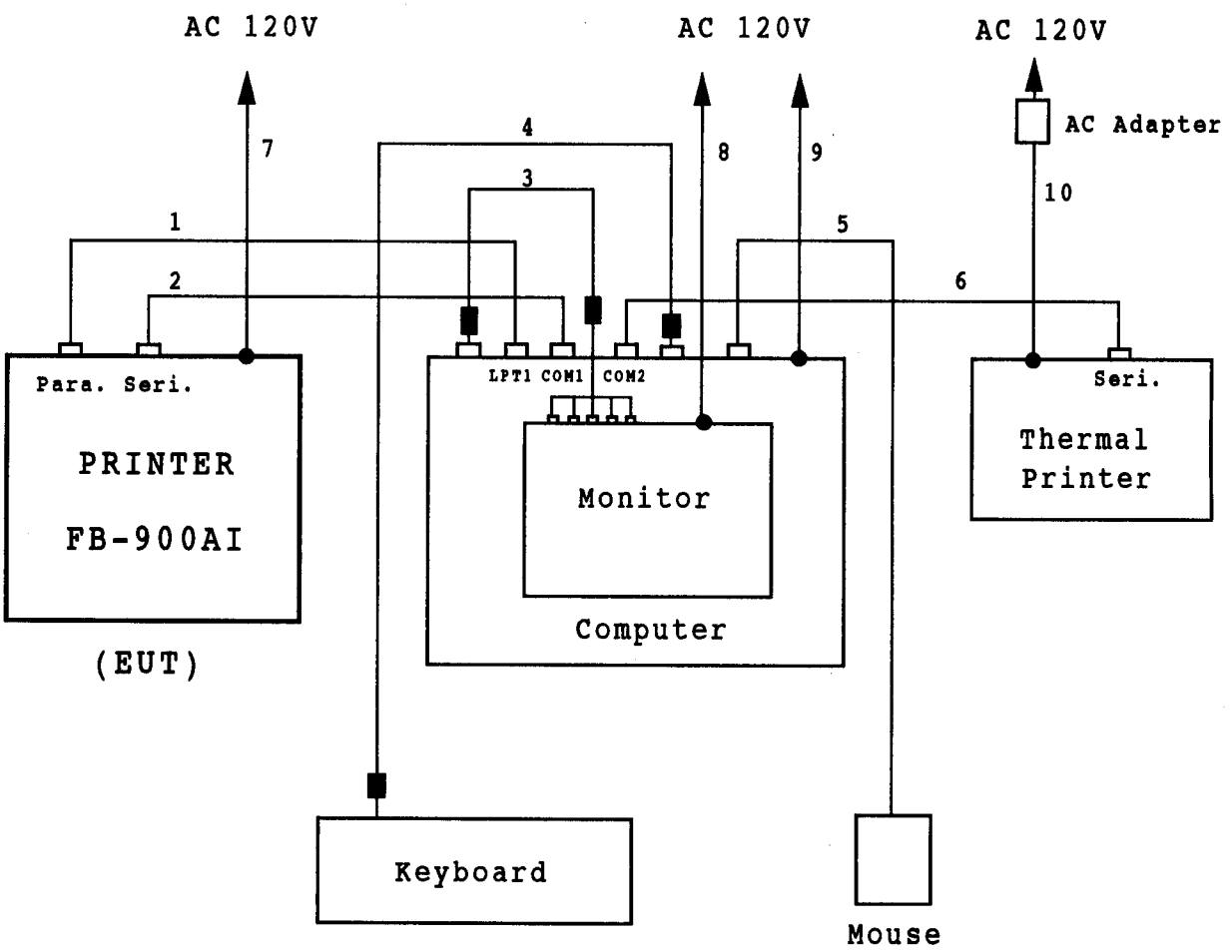


Figure. 1

2.5 Tested Equipments

2.5.1 Equipment Under Test (EUT)

Item	Model No.	FCC ID	Serial No.	Company
Printer	FB-900AI	CBRFB-900AI	0005	SEIKO Precision

Note; (1) Power ratings of EUT : 120V AC/ 60 Hz.

(2) SEIKO Precision is a trade name of SEIKO Precision Inc.

2.5.2 Support Equipment Used

Item	Model No.	FCC ID	Serial No.	Company
Personal computer	PC743	A09-PC741	TA3054F698	digital
Keyboard	PCXAJ-AA	none	TB30503003	digital
Mouse	PC7XS-AA	DZLMSF14R	LT502C00291	digital
Monitor	VC14J	GQBCDS-431X	316431600025	DEL
Thermal Printer	DPU-411-043	C4Z7NSPS0001	073070	SII
AC Adapter	DPU-411-01	none	9210	SII

Note; (1) SII is a trade name of Seiko Instruments Inc..

2.6 List of Cables

No.	Cable Name	Length (m)	Core (Y/N)	Shieled (Y/N)	Note
1	Parallel I/F cable	1.8	None	Yes	D-sub 25p -- Centro. 36p
2	Serial I/F cable	1.5	None	Yes	D-sub 9p -- D-sub 25p
3	Video cable	2.8	Yes	Yes	D-sub 9p -- BNC x 5 (R,G,B,H,V)
4	Keyboard cable (attached)	1.1	Yes	Yes	mini DIN 6 pin
5	Mouse cable (attached)	1.8	none	Yes	mini DIN 6 pin
6	Serial I/F cable	1.8	None	Yes	D-sub 9p -- D-sub 25p
7	for Printer FB-900AI AC power cord	1.8	None	None	3-wires type
8	for Monitor AC power cord	1.8	None	None	3-wires type
9	for Personal Computer AC power cord	1.8	None	none	3-wires type
10	AC Adapter cord (attached)	2.0	None	None	2-wires type

- Note - Cable No.1,2 and 7 are used with the Printer FB-900AI (EUT).

SECTION 3. PHOTOGRAPHS OF TEST CONFIGURATIONS

3.1 Conducted measurement photos

3.2 Radiated measurement photos

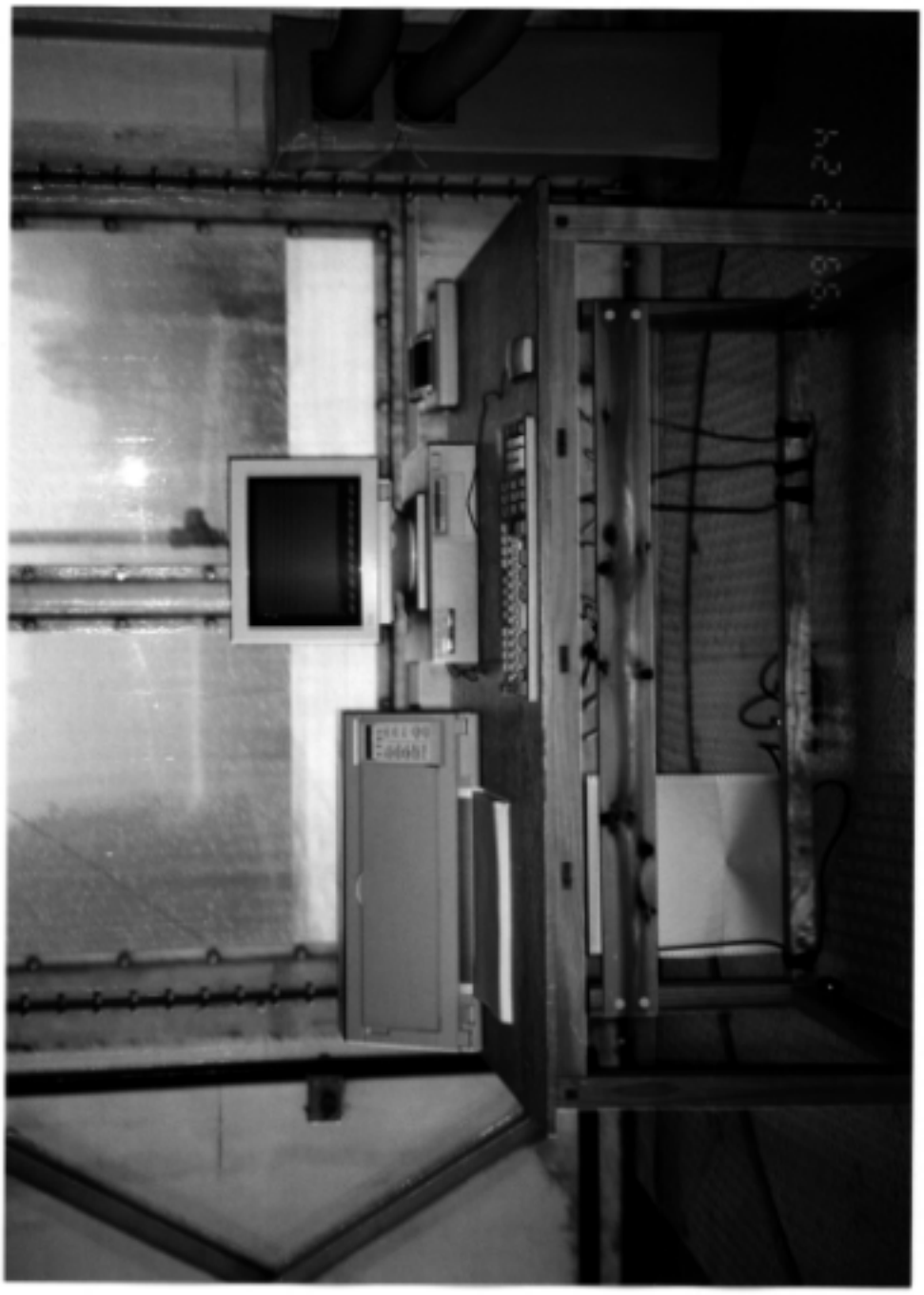
3.1 Conducted measurement photos (1/2)

Front View

3.1 Conducted measurement photos (2/2)

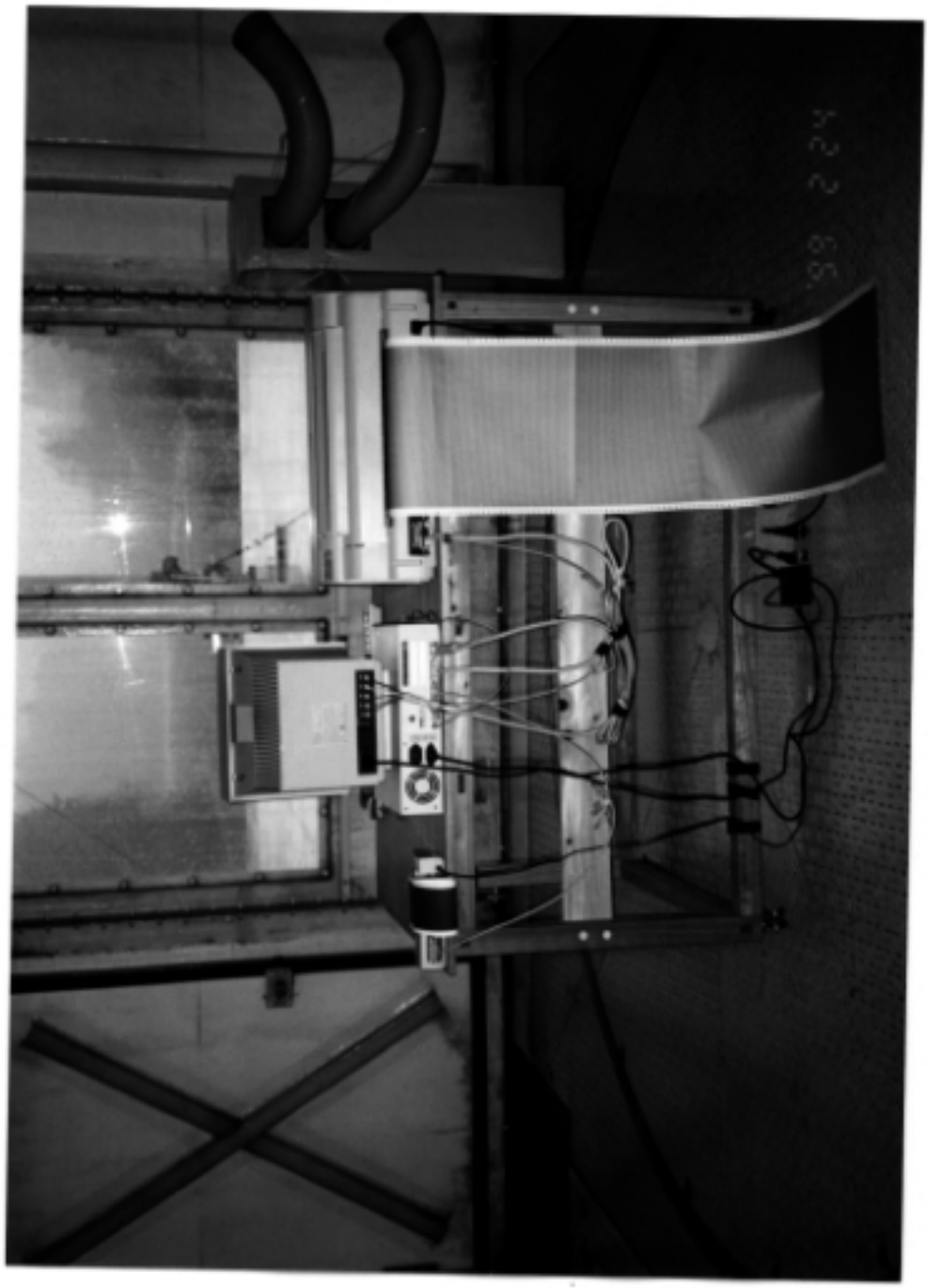
Side View

3.2 Radiated measurement photos (1/2)



Front View

3.2 Radiated measurement photos (2/2)



Rear View

4. CONDUCTED EMISSION DATA

4.1 Test Procedure

The initial step in collecting conducted data is spectrum analyzer peak scan of the measurement range. Significant peak are then marked, and these signals are then quasi-peaked.

4.2 Measurement Data

The graphical plot chart and measurement data are appended to the next page.

4.2.1 Parallel I/F

(1) Graphical plot chart
(2) Conducted test data
(3) Spectrum chart

4.2.2 Serial I/F

(1) Graphical plot chart
(2) Conducted test result
(3) Spectrum chart

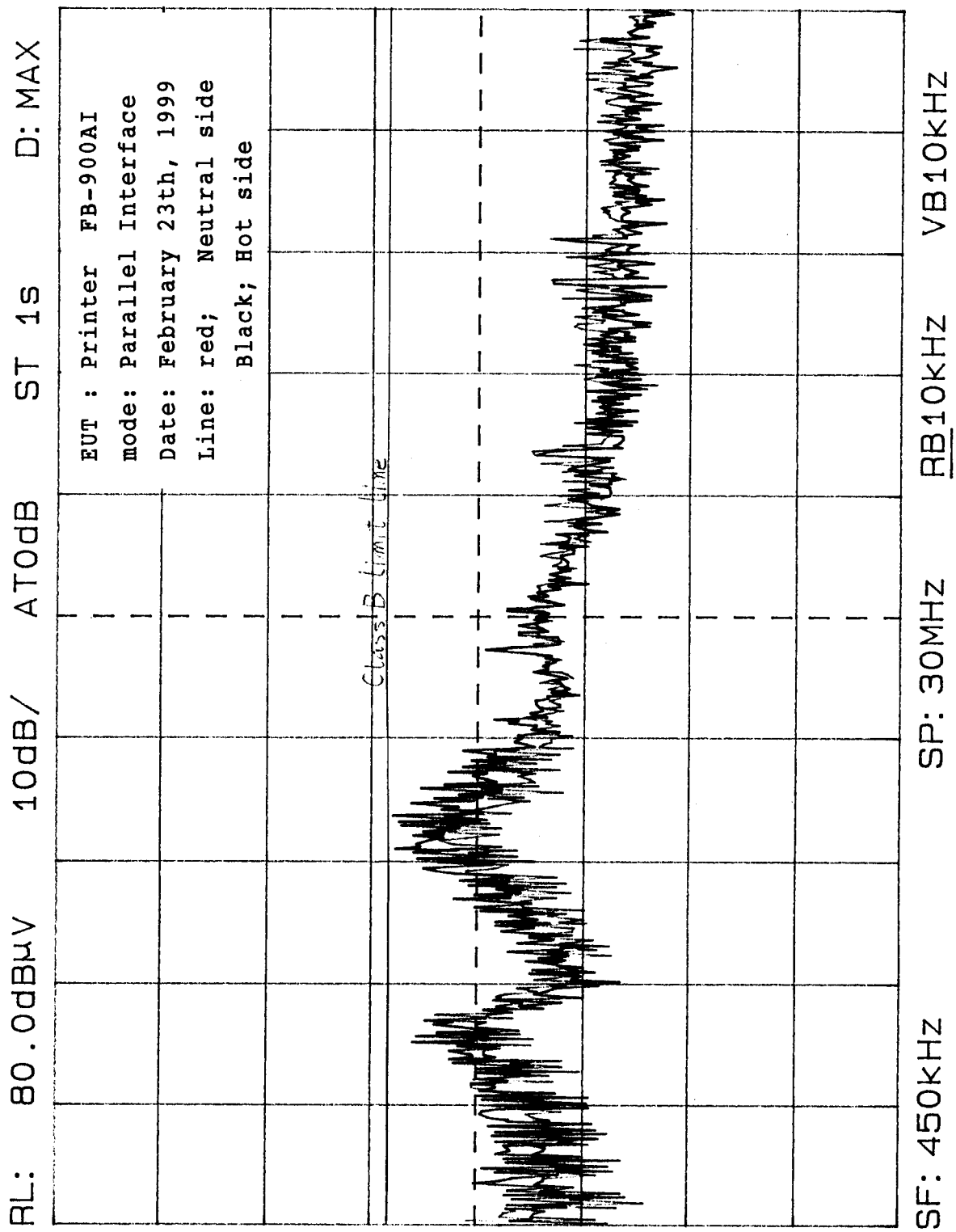
Section 4.2.1 Conducted measurement data

Parallel Interface mode

(1) Graphical plot chart

(2) Conducted test data

(3) Spectrum chart


RL: 80.0dBµV
10dB/
ATOdB
ST 1s
D: MAX
EUT : Printer FB-900AI
mode: Parallel Interface
Date: February 23th, 1999
Line: red; Neutral side
Black; Hot side
Class B limit line
SF: 450KHz
SP: 30MHz
RB10KHz
VB10KHz

Seiko I Techno Research Co., Ltd. EMI Test Site
CONDUCTED EMISSION TEST REPORT

TESTED FOR COMPLIANCE WITH: FCC 47 CFR, PART 15 B Class B Digital device

APPLICANT	: SEIKO Precision Inc.	DATE TESTED	: Feb. 23th 1999
MANUFACTURER	: SEIKO Precision Inc.	TEMPERATURE	: 22 deg.C
EQUIPMENT TESTED	: PRINTER		
MODEL NUMBER	: FB-900AI	RECEIBER	: KNM-2402 (Kyoritu Denshi)
FCC ID	: CBRFB-900AI	SERIAL NUMBER	: 4N-164-5
SERIAL NUMBER	: 0005	L.I.S.N	: KNW-407(Kyoritu Densi)
TEST MODE	: Parallel I/F		

No.	Freq. [MHz]	Reading[dBuV] N QP	Reading[dBuV] L1 QP	C.F. [dB]	Emission[dBuV] N QP	Emission[dBuV] L1 QP	Spec. Limit[dBuV] QP	Div. Limit [dB]
1	0.4510	35.0	36.6	0.1	35.1	36.7	48.0	-11.3
2	4.4850	38.7	40.4	0.1	38.8	40.5	48.0	-7.5
3	5.3850	41.2	43.0	0.1	41.3	43.1	48.0	-4.9
4	9.9830	39.5	43.6	0.1	39.6	43.7	48.0	-4.3
5	10.4300	38.8	44.6	0.1	38.9	44.7	48.0	-3.3
6	14.7470	37.1	37.2	0.1	37.2	37.3	48.0	-10.7

Note :N. Neutral side
:L. Hot side
:Emission Level = Reading + Corr.factor
:Corr.factor = Cable + L.I.S.N factor

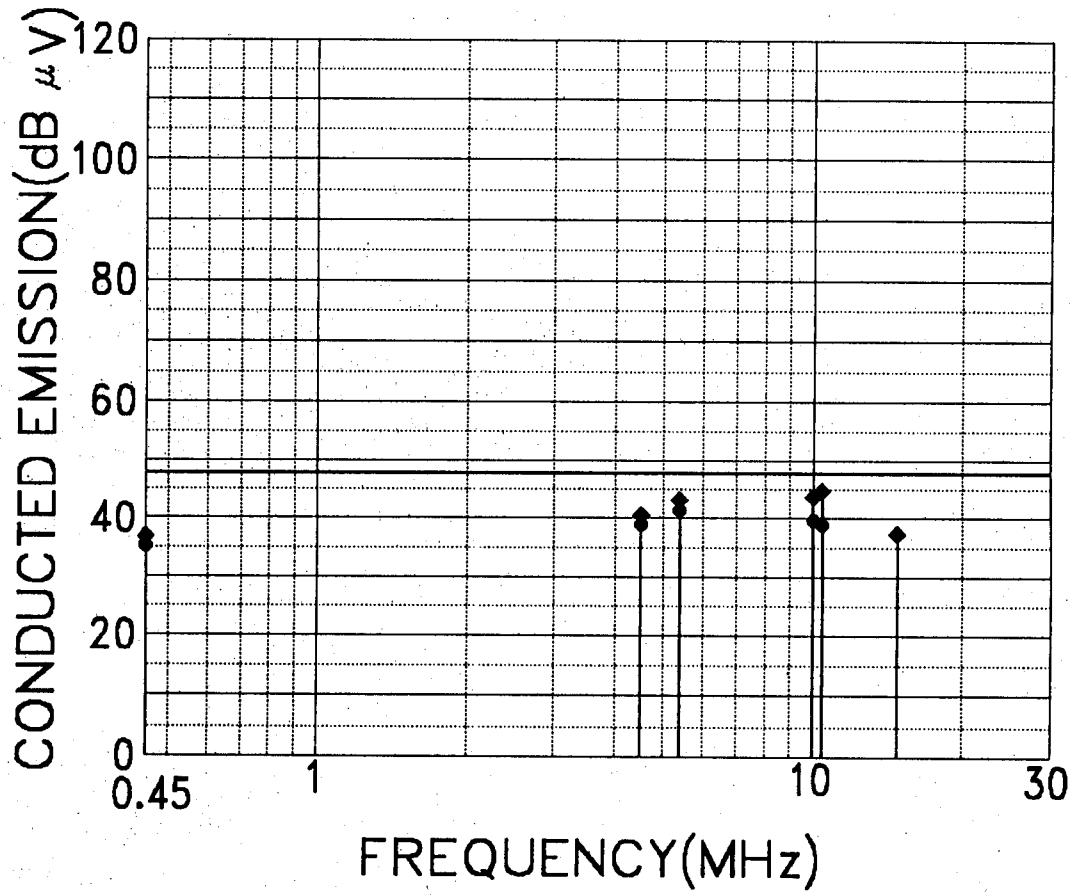
Judgement : Passed by 3.3dB at 10.4300 MHz

Test Personal : T. Suzuki Data : Feb. 23th, 1999
: Tatuo Suzuki

Seiko I Techno Research Co., Ltd. EMI Test site
FCC CONDUCTED EMISSION TEST

MANUFACTURER	: SEIKO Precision Inc.
EQUIPMENT TESTED	: PRINTER
MODEL NUMBER	: FB-900AI
SERIAL NUMBER	: 0005
DATE TESTED	: Feb. 23th 1999
TEMPERATURE	: 22 deg.C
TEST MODE	: Parallel I/F

● GND-One end
◆ GND-Other end



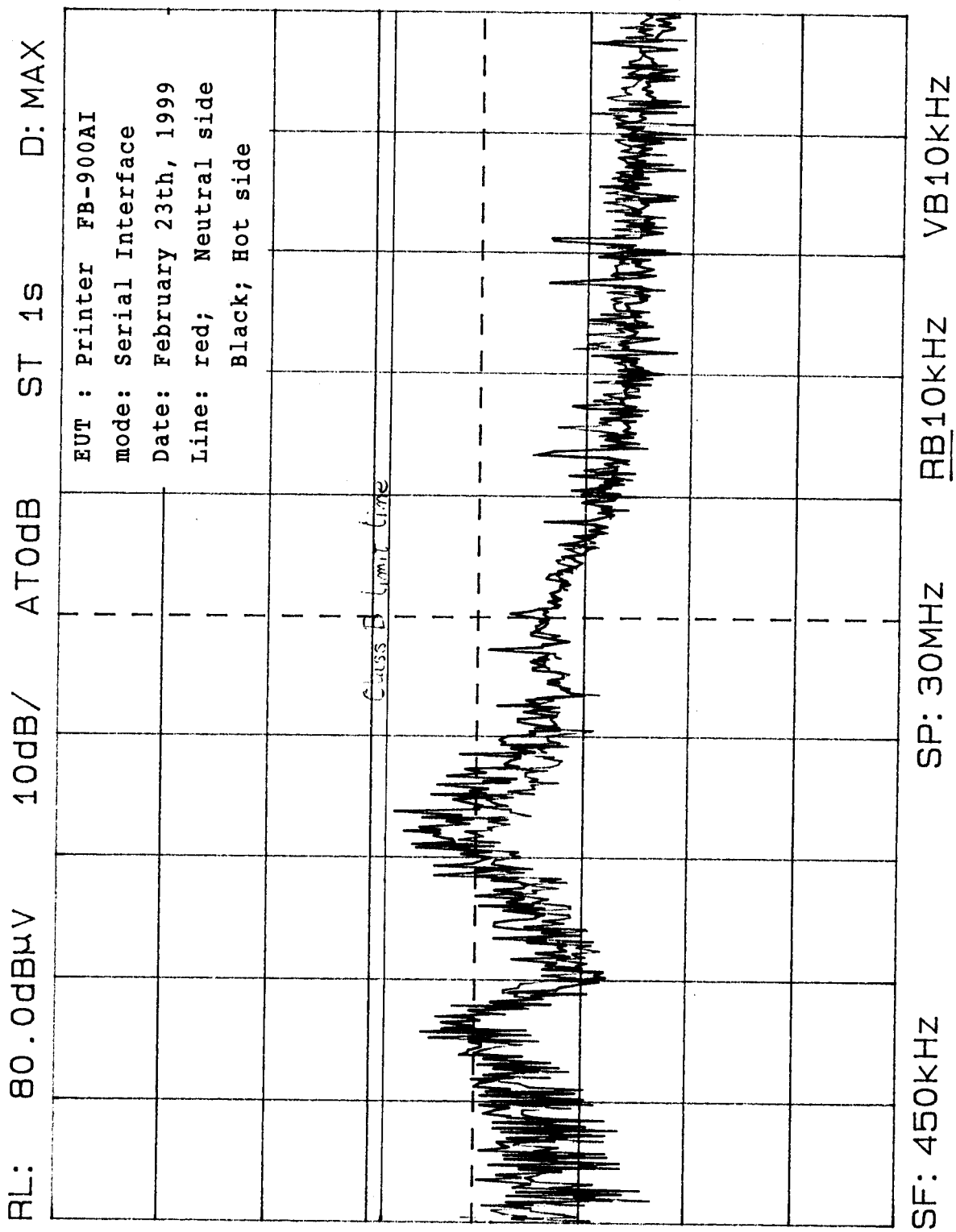
Section 4.2.2 Conducted measurement data

Serial Interface mode

(1) Graphical plot chart

(2) Conducted test data

(3) Spectrum chart


RL: 80.0dBµV
10dB/
ATOdB
ST 1s
D: MAX
EUT : Printer FB-900AI
mode: Serial Interface
Date: February 23th, 1999
Line: red; Neutral side
Black; Hot side
Class B limit line
SF: 450KHz
SP: 30MHz
RB10KHz
VB10KHz

Seiko I Techno Research Co., Ltd. EMI Test Site
CONDUCTED EMISSION TEST REPORT

TESTED FOR COMPLIANCE WITH: FCC 47 CFR, PART 15 B Class B Digital device

APPLICANT	: SEIKO Precision Inc.	DATE TESTED	: Feb. 23th 1999
MANUFACTURER	: SEIKO Precision Inc.	TEMPERATURE	: 20 deg.C
EQUIPMENT TESTED	: PRINTER		
MODEL NUMBER	: FB-900AI	RECEIBER	: KNM-2402 (Kyoritu Denshi)
FCC ID	: CBRFB-900AI	SERIAL NUMBER	: 4N-164-5
SERIAL NUMBER	: 0005	L.I.S.N	: KNW-407(Kyoritu Densi)
TEST MODE	: Serial I/F		

No.	Freq. [MHz]	Reading[dBuV] N QP	Reading[dBuV] L1 QP	C.F. [dB]	Emission[dBuV] N QP	Emission[dBuV] L1 QP	Spec. Limit[dBuV] QP	Div. Limit [dB]
1	0.4510	35.1	37.7	0.1	35.2	37.8	48.0	-10.2
2	4.8230	39.3	40.6	0.1	39.4	40.7	48.0	-7.3
3	5.3850	40.6	41.7	0.1	40.7	41.8	48.0	-6.2
4	9.8720	38.1	42.3	0.1	38.2	42.4	48.0	-5.6
5	10.2100	39.0	42.6	0.1	39.1	42.7	48.0	-5.3
6	14.7480	37.3	37.4	0.1	37.4	37.5	48.0	-10.5

Note :N. Neutral side
:L. Hot side
:Emission Level = Reading + Corr.factor
:Corr.factor = Cable + L.I.S.N factor

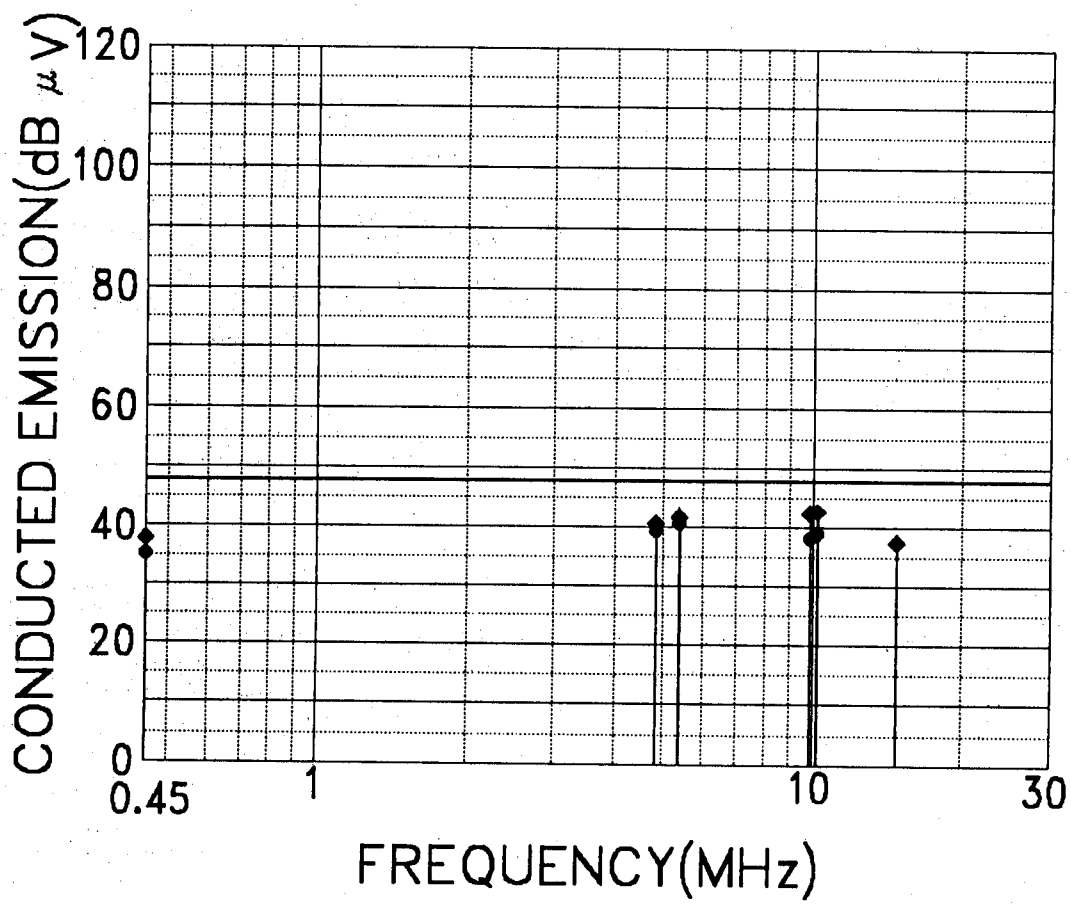
Judgement : Passed by 5.3dB at 10.2100 MHz

Test Personal : T. Suzuki Data : Feb. 23th, 1999
: Tatuo Suzuki

Seiko I Techno Research Co., Ltd. EMI Test site
FCC CONDUCTED EMISSION TEST

MANUFACTURER : SEIKO Precision Inc.
EQUIPMENT TESTED : PRINTER
MODEL NUMBER : FB-900AI
SERIAL NUMBER : 0005
DATE TESTED : Feb. 23th 1999
TEMPERATURE : 20 deg.C
TEST MODE : Serial I/F

● GND-One end
◆ GND-Other end



4.3 Conducted Emission Calculation

The conducted emission data is calculated by adding the correction factor to the measured reading. The basic equation with a measured sample calculation is as follows:

EL = RA (LISN factor include) + CF (Cable loss)

where EL = Emission Level
RA = Receiver Amplitude
CF = Correction Factor

* Sample calculation *

Test mode: Parallel I/F mode

Frequency = 4.4850 MHz : Neutral Side

EL = RA + CF = 38.7 + 0.1 = 38.8 dBuV

The LISN factor is added to read value by the function switch of the receiver operation. Moreover, the cable loss in this frequency is 0.1 dB. As a result, correction factor which adds LISN factor and cable loss becomes 0.1 dB.

4.4 Test Instrumentation Used, Conducted Measurement

Item	Model No. (Manufacturer)	Serial No.	Last Cal.	Cal. Interval
Spectrum Analyzer	MS2601A (Anritsu)	MT65956	Nov.16,1998	6 months
Receiver	KNM-2402 (Kyoritsu)	4N-164-5	Jan.26,1999	6 months
LISN	KNW-407 (Kyoritsu)	8-840-14	Jan.12,1998	12 months
LISN	KNW-407 (Kyoritsu)	8-1097-6	Jan.13,1998	12 months

5. RADIATED EMISSION DATA

5.1 Test Procedure

The following data lists the significant emission frequencies, measured levels, correction factor (includes antenna factor and cable loss), the corrected reading, plus the limit. Explanation of the correction factor is given in paragraph 5.3. The frequency range investigated was 30 MHz to 1000 MHz.

5.2 Measurement Data

The graphical plot chart and measurement data are appended to the next page.

5.2.1 Ambient noise Graphical plot chart

5.2.2 Parallel I/F

(1) Graphical plot chart
(2) Conducted test data
(3) Spectrum chart

5.2.3 Serial I/F

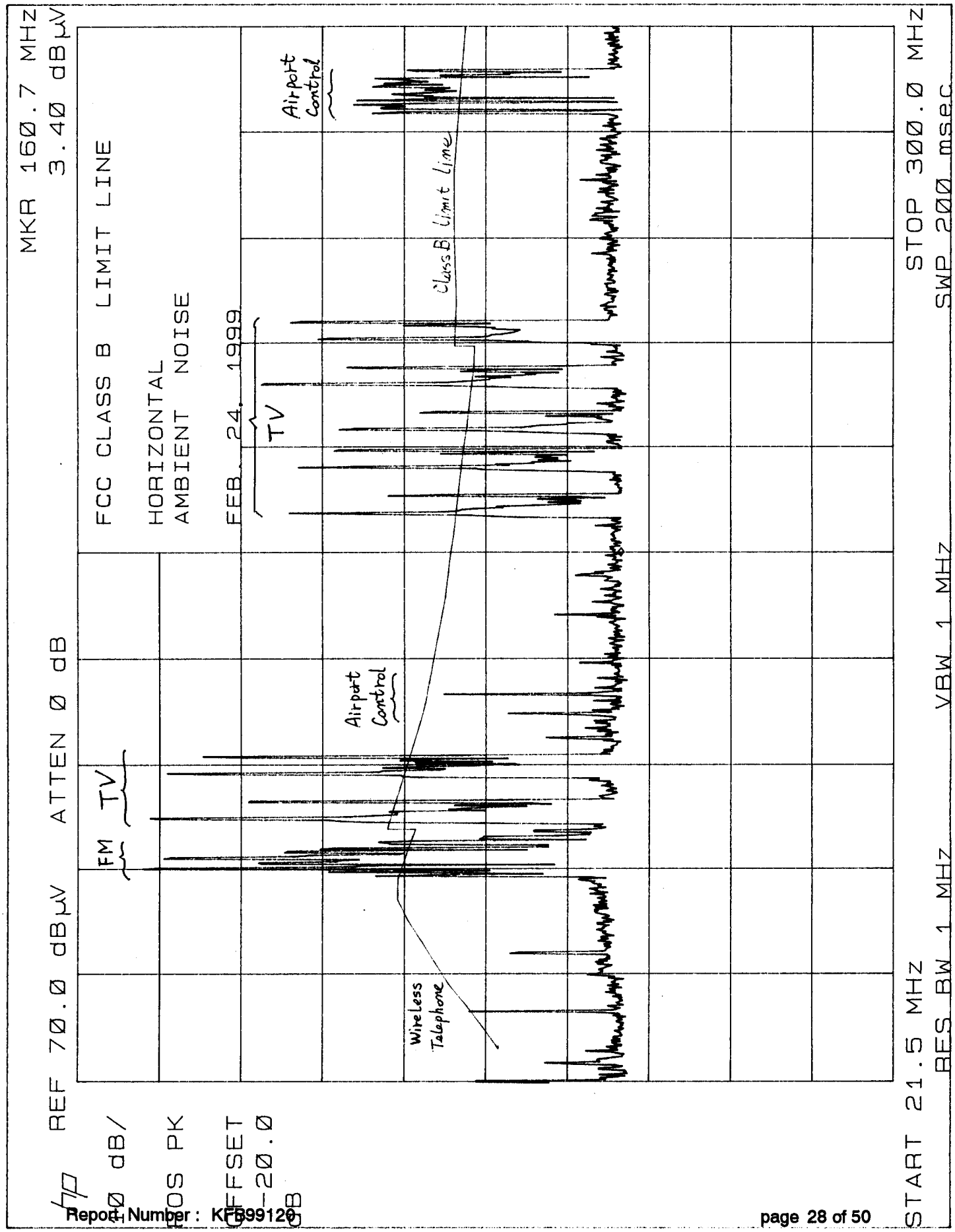
(1) Graphical plot chart
(2) Conducted test result
(3) Spectrum chart

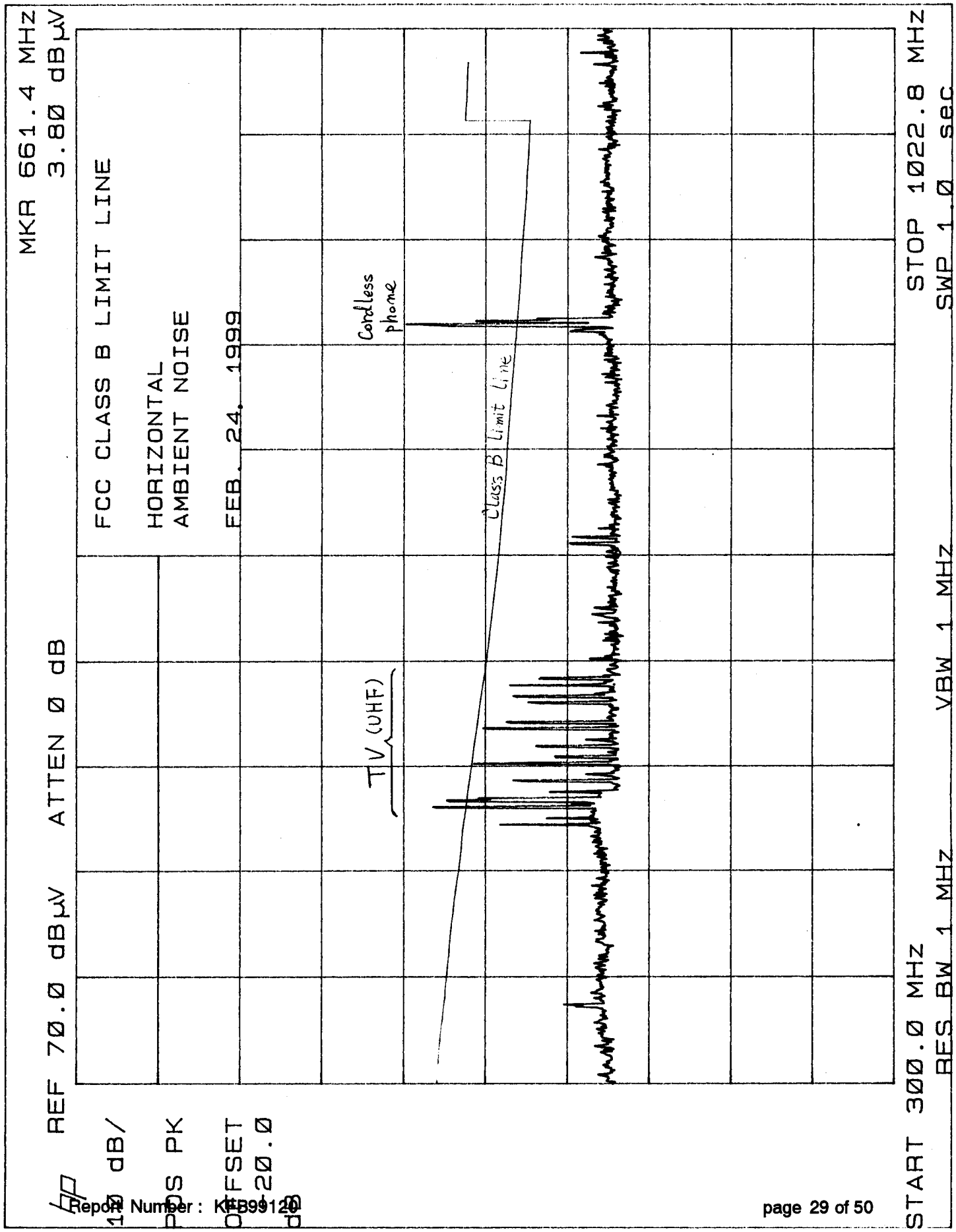
Section 5.2.1 Radiated measurement data

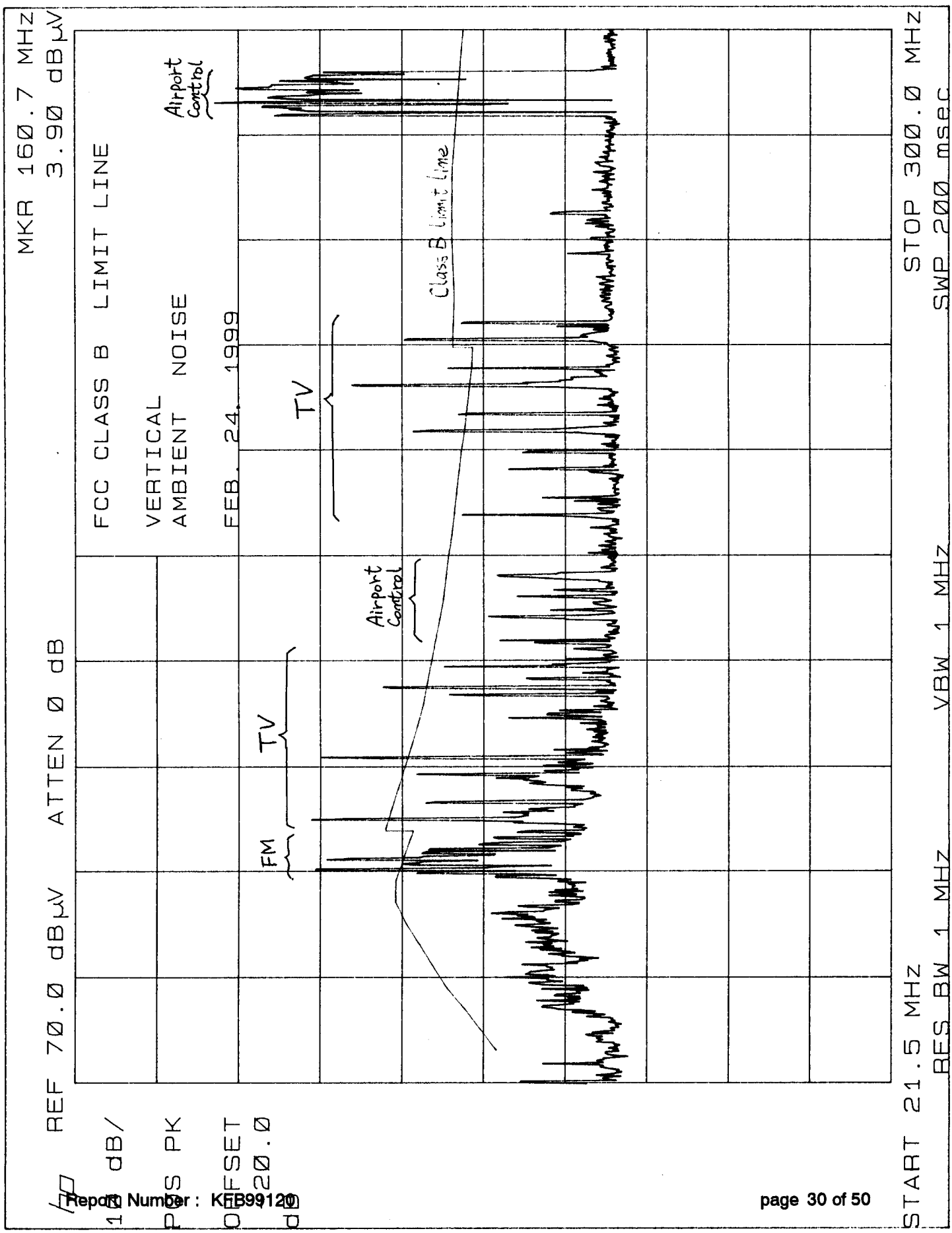
Ambient noise Graphical plot chart

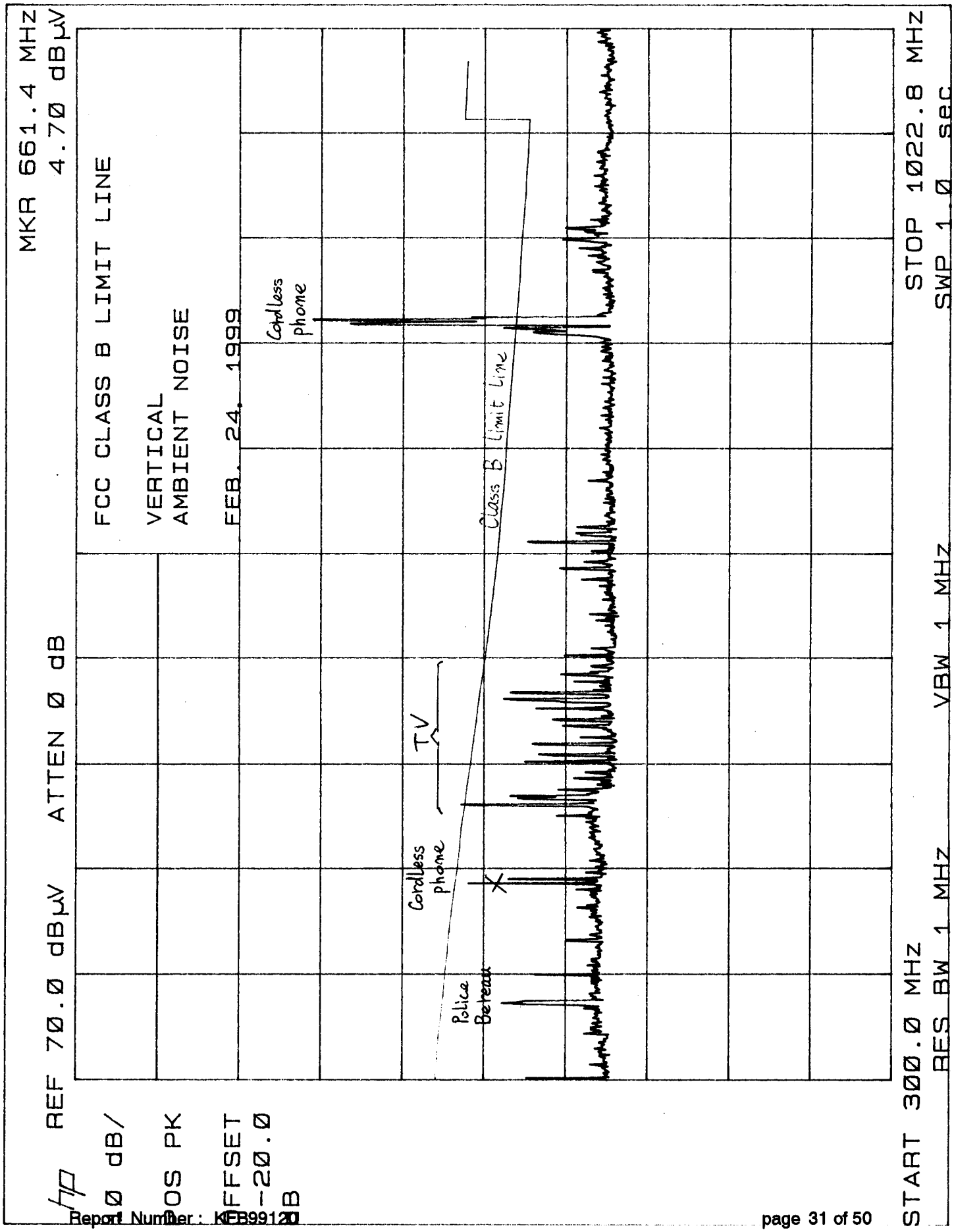
(a) Horizontal polarization

(b) Vertical polarization


MKR 160.7 MHz
3.40 dBµV
FCC CLASS B LIMIT LINE
HORIZONTAL
AMBIENT NOISE
FEB. 24. 1999
TV
Airport Control
Class B limit line
FM TV
Airport Control
Wireless Telephone
REF 70.0 dBµV
ATTEN 0 dB
Ø dB/
POS PK
OFFSET -20.0 dB
START 21.5 MHz
RES BW 1 MHz
VBW 1 MHz
STOP 300.0 MHz
SWP 200 msec


MKR 661.4 MHz
3.80 dBµV
FCC CLASS B LIMIT LINE
HORIZONTAL
AMBIENT NOISE
FEB. 24. 1999
Cordless phone
Class B Limit Line
TV (UHF)
REF 70.0 dBµV
ATTEN 0 dB
10 dB/
POS PK
OFFSET 20.0 dB
START 300.0 MHz
RES BW 1 MHz
VBW 1 MHz
STOP 1022.8 MHz
SWP 1.0 sec


MKR 160.7 MHz
3.90 dBµV
FCC CLASS B LIMIT LINE
VERTICAL
AMBIENT NOISE
FEB. 24. 1999
Airport Control
Class B Limit Line
TV
Airport Control
TV
FM
REF 70.0 dBµV
ATTEN 0 dB
10 dB/
LOG
PK
OFFSET 20.0 dB
START 21.5 MHz
RES BW 1 MHz
VBW 1 MHz
STOP 300.0 MHz
SWP 200 msec


MKR 661.4 MHz
4.70 dBµV
FCC CLASS B LIMIT LINE
VERTICAL
AMBIENT NOISE
FEB. 24, 1999
Cordless phone
Class B limit line
TV
Cordless phone
Police Betreau
REF 70.0 dBµV
ATTEN Ø dB
Ø dB/
POS PK
OFFSET -20.0 dB
START 300.Ø MHz
RES BW 1 MHz
VBW 1 MHz
STOP 1022.8 MHz
SWP 1.Ø sec

Section 5.2.2 Radiated measurement data

Parallel Interface mode

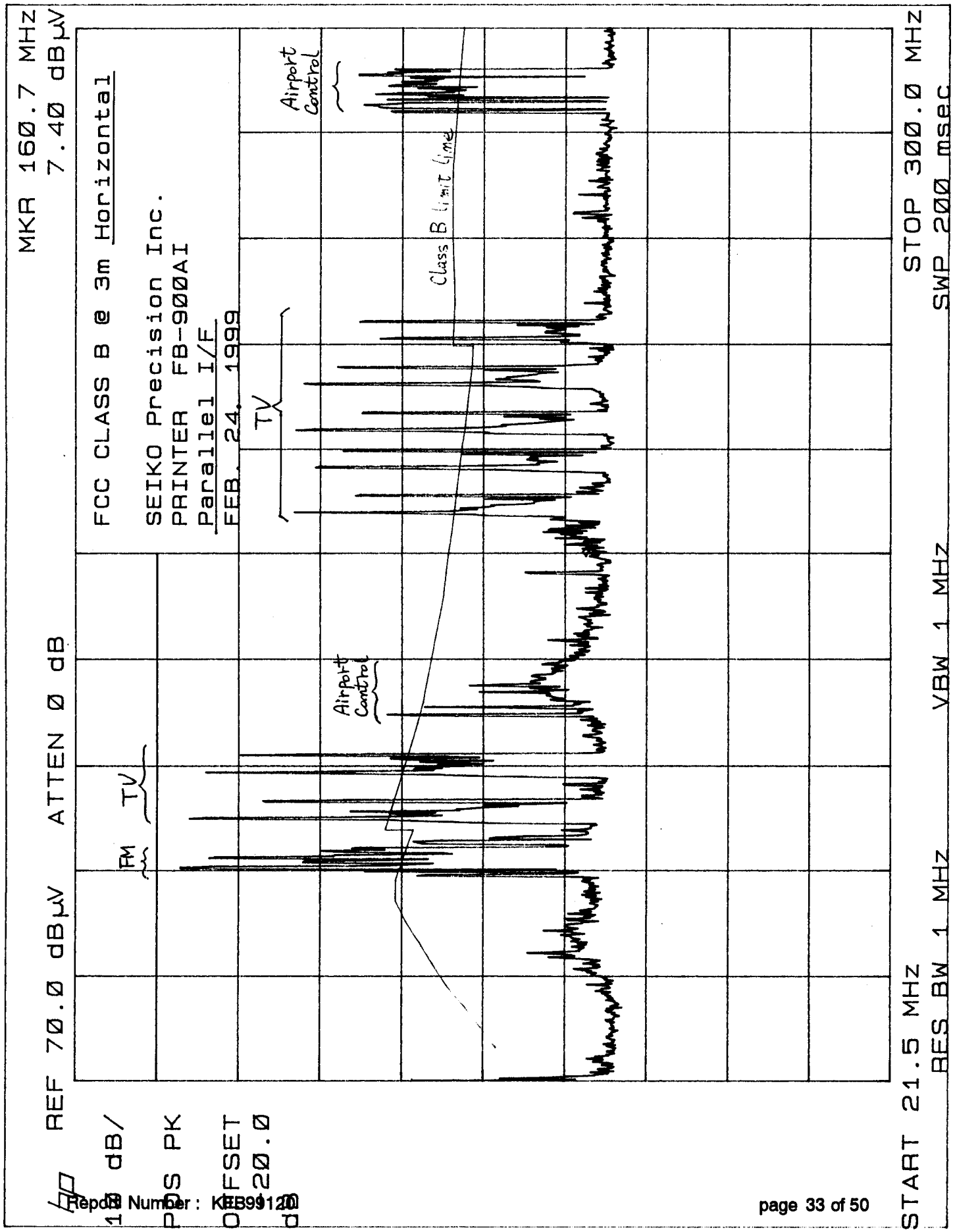
(1) Graphical plot chart

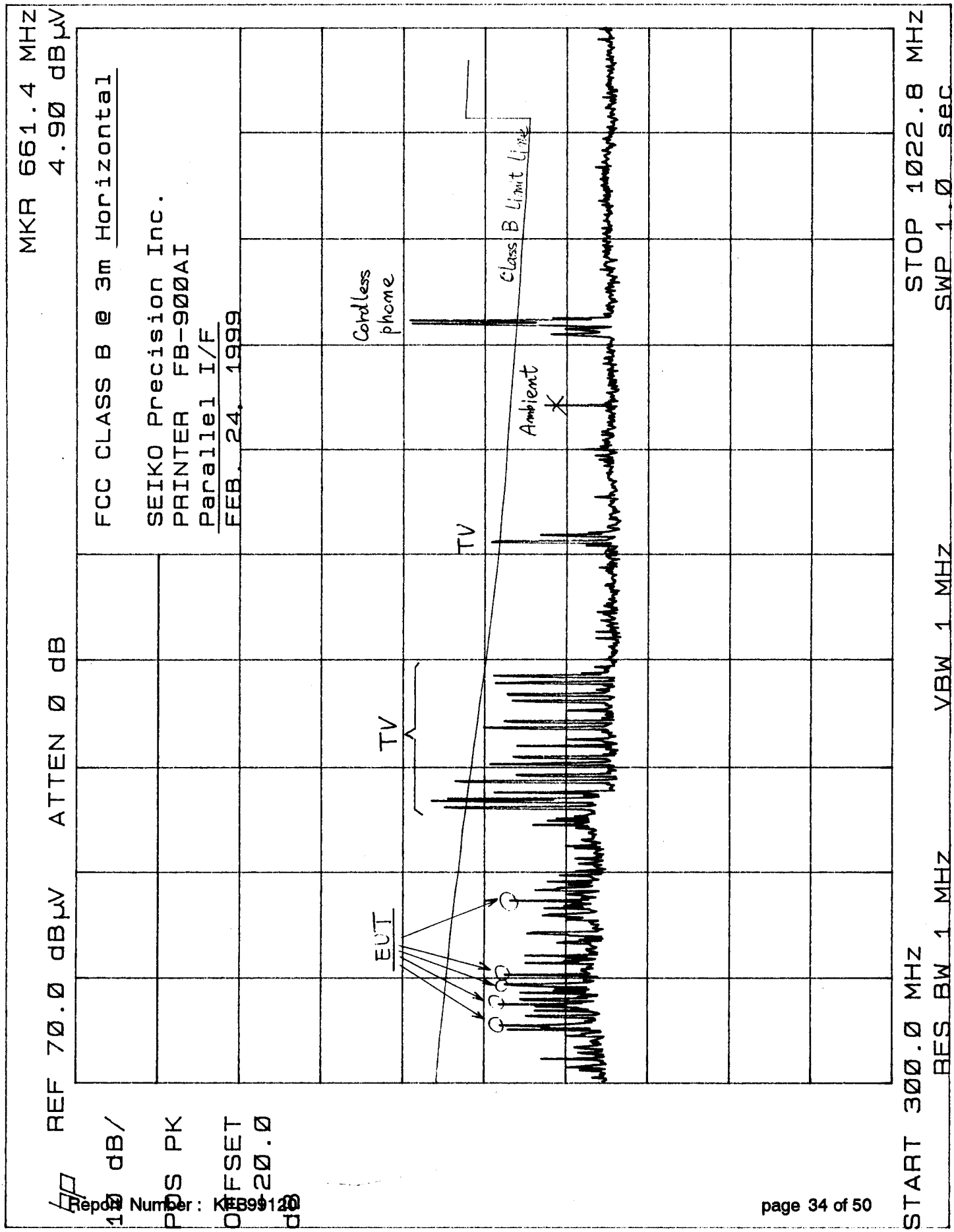
  (a) Horizontal polarization

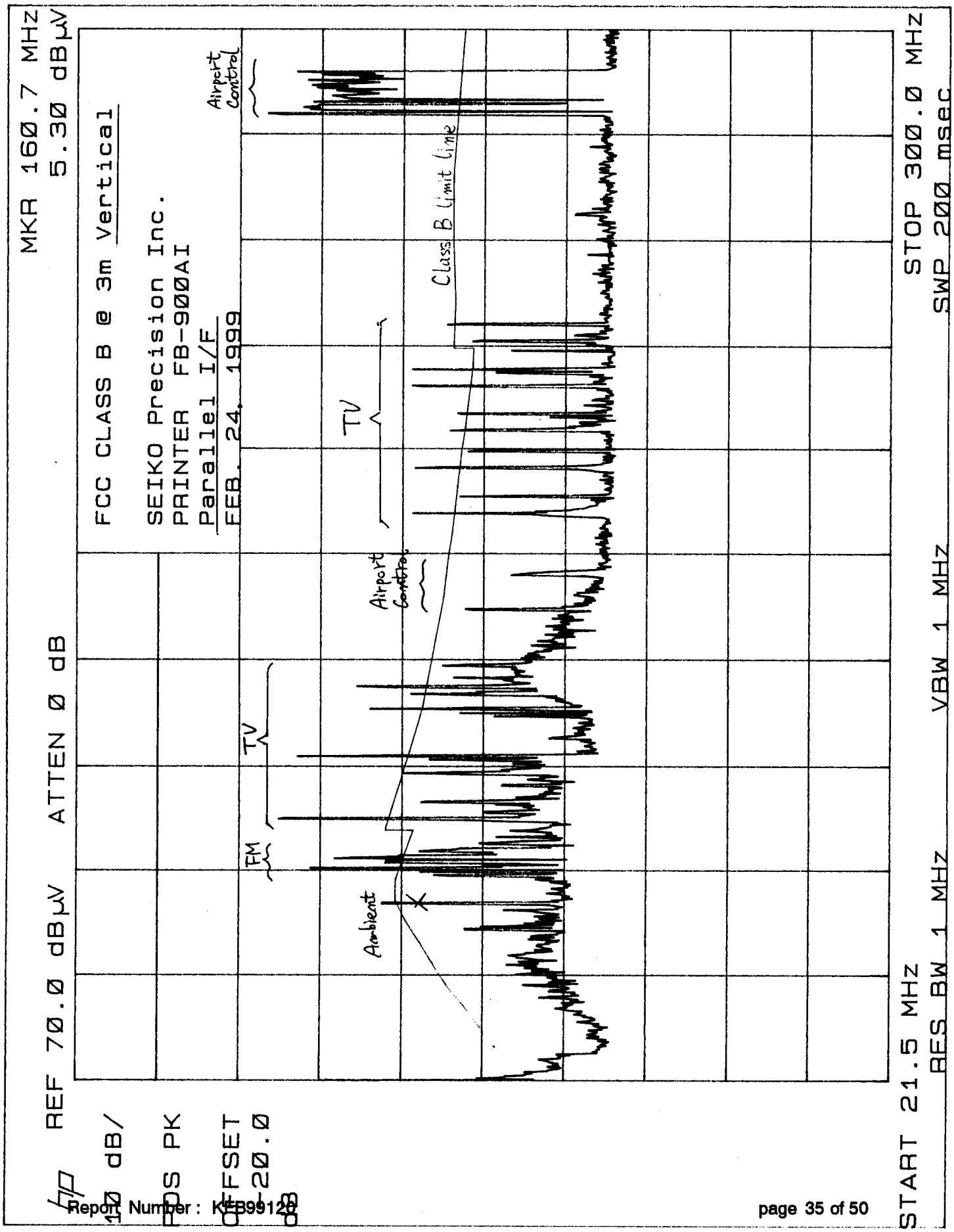
  (b) Vertical polarization

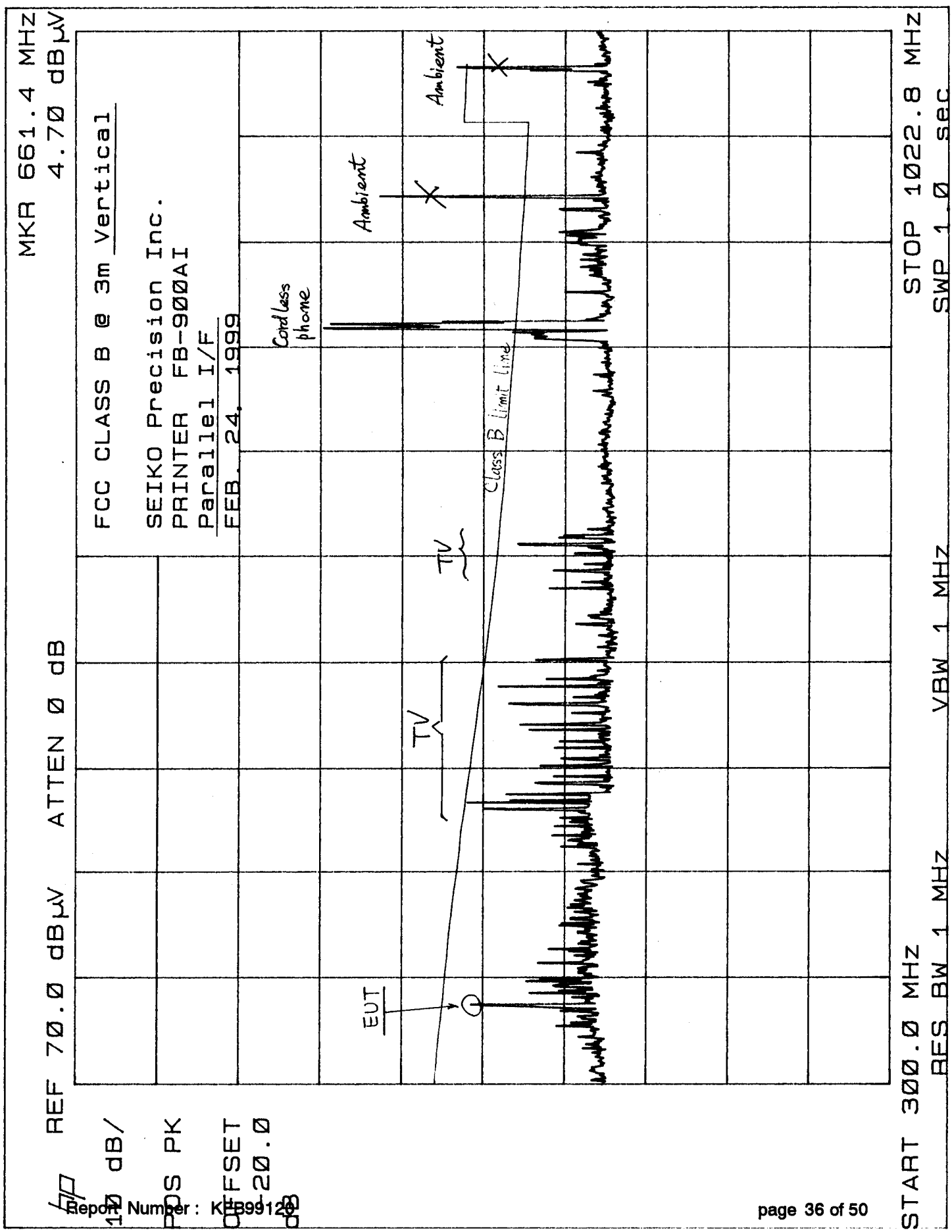
(2) Conducted test data

(3) Spectrum chart


MKR 160.7 MHz
7.40 dBµV
FCC CLASS B @ 3m Horizontal
SEIKO Precision Inc.
PRINTER FB-900AI
Parallel I/F
FEB. 24, 1999
Airport Control
TV
Class B Limit Line
Airport Control
FM
TV
REF 70.0 dBµV
ATTEN 0 dB
10 dB/
POS PK
OFFSET 20.0 dB
START 21.5 MHz
RES BW 1 MHz
VBW 1 MHz
STOP 300.0 MHz
SWP 200 msec


MKR 661.4 MHz
4.90 dBµV
FCC CLASS B @ 3m Horizontal
SEIKO Precision Inc.
PRINTER FB-900AI
Parallel I/F
FEB. 24. 1999
REF 70.0 dBµV
ATTEN 0 dB
10 dB/
POS PK
OFFSET 20.0 dB
Cordless phone
Class B Limit Line
Ambient
TV
TV
EUT
START 300.0 MHz
RES BW 1 MHz
VBW 1 MHz
STOP 1022.8 MHz
SWP 1.0 sec


MKR 160.7 MHz
5.30 dBµV
FCC CLASS B @ 3m Vertical
SEIKO Precision Inc.
PRINTER FB-900AI
Parallel I/F
FEB. 24. 1999
Airport Control
Class B Limit Line
TV
Airport Control
TV
FM
Ambient
REF 70.0 dBµV
ATTEN 0 dB
10 dB/
POS PK
OFFSET 20.0 dB
START 21.5 MHz
RES BW 1 MHz
VBW 1 MHz
STOP 300.0 MHz
SWP 200 msec


MKR 661.4 MHz
4.70 dBµV
FCC CLASS B @ 3m Vertical
SEIKO Precision Inc.
PRINTER FB-900AI
Parallel I/F
FEB. 24. 1999
REF 70.0 dBµV
ATTEN 0 dB
10 dB/
POS PK
OFFSET
20.0
dB
START 300.0 MHz
RES BW 1 MHz
VBW 1 MHz
STOP 1022.8 MHz
SWP 1.0 sec
EUT
TV
TV
Cordless phone
Ambient
Ambient
Class B limit line

Seiko I Techno Research Co., Ltd. EMI Test Site
RADIATED EMISSION TEST REPORT

TESTED FOR COMPLIANCE WITH : FCC 47 CFR, PART 15 B Class B Digital device

APPLICANT	:SEIKO Precision Inc.	DATE TESTED	:FEB. 24th 1999
MANUFACTURER	:SEIKO Precision Inc.	TEMPERATURE	:25 deg. C
EQUIPMENT TESTED	:PRINTER	DISTANCE	:3m
MODEL NUMBER	:FB-900AI	RECEIVER	:ESVP(Rohde & Schwarz)
FCC ID	:CBRFB-900AI	SERIAL NUMBER	:881121/018
SERIAL NUMBER	:0005	ANTENNA	:BBA9106
			:UHALP9107
TEST MODE	:Parallel I/F	PREAMP	:8447D (2944A06479)

No.	Frequency [MHz]	Reading Hor. [dBuV]	Reading Ver. [dBuV]	Corr. Factor [dB]	Emission level Hor. [dBuV/m]	Emission level Ver. [dBuV/m]	Spec. Limit [dBuV/m]	Margin Hor. [dBuV/m]	Margin Ver. [dBuV/m]
1	368.470	40.7	35.5	-4.3	36.4	31.2	46.0	-9.6	-14.8
2	379.860	40.0	40.3	-4.2	35.8	36.1	46.0	-10.2	-9.9
3	387.650	41.2	40.0	-4.1	37.1	35.9	46.0	-8.9	-10.1
4	425.170	42.5	35.4	-3.4	39.1	32.0	46.0	-6.9	-14.0
5	432.970	42.1	35.9	-3.2	38.9	32.7	46.0	-7.1	-13.3
6	470.500	39.0	34.0	-2.4	36.6	31.6	46.0	-9.4	-14.4

Note :Emission Level = Reading + Corr.factor
:Corr.factor = Antenna factor + Cable loss(include 3 dB ATT) - Preampgain

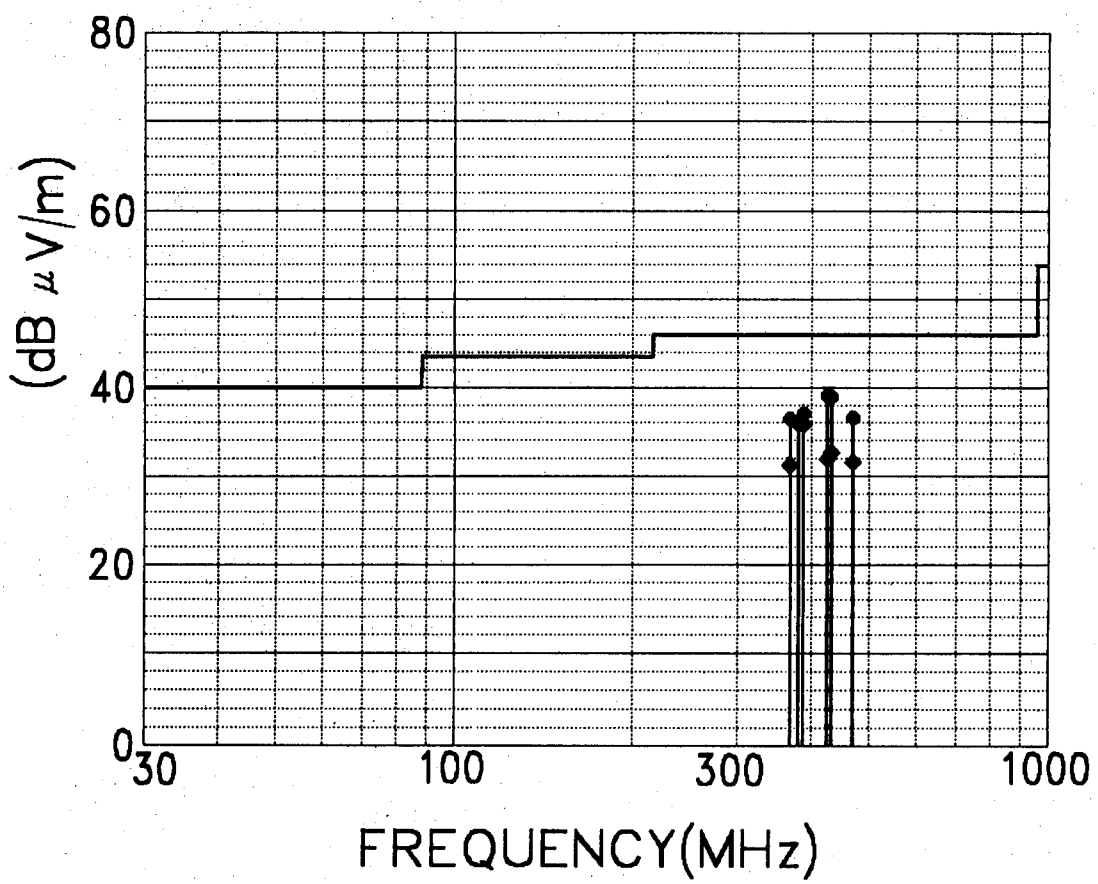
Judgement : Passed by 6.9dB at 425.170MHz

Test Performed :T. Suzuki Date : Feb. 24th. 1999
Tatuo Suzuki

Seiko I Techno Research Co., Ltd. EMI Test site
FCC RADIATED EMISSION TEST

MANUFACTURER :SEIKO Precision Inc.
EQUIPMENT TESTED :PRINTER
MODEL NUMBER :FB-900AI
SERIAL NUMBER :0005
DATE TESTED :FEB. 24th 1999
TEMPERATURE :25 deg. C
TEST MODE :Parallel I/F

● Horizontal polarization
◆ Vertical polarization



Section 5.2.3 Radiated measurement data

Serial Interface mode

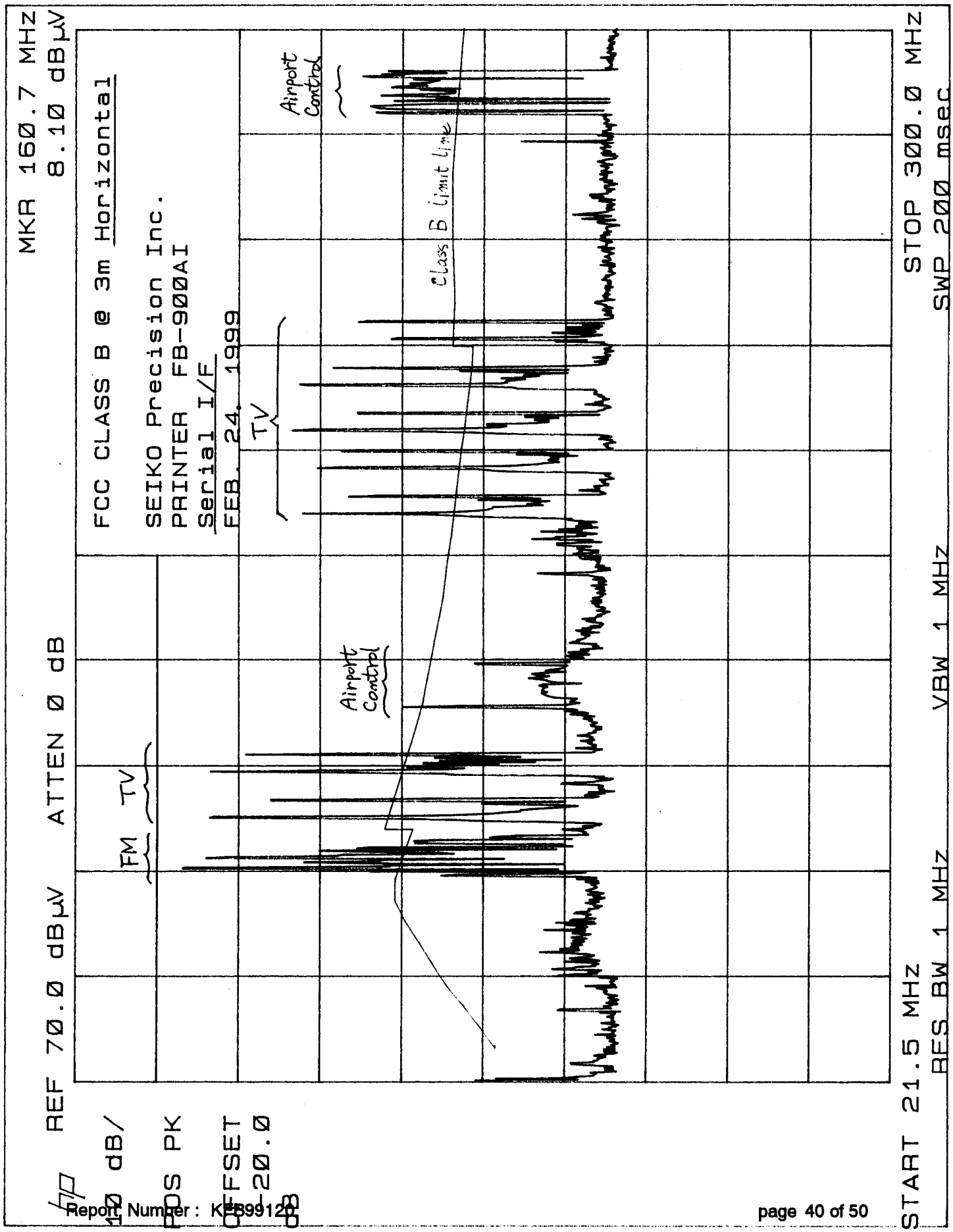
(1) Graphical plot chart

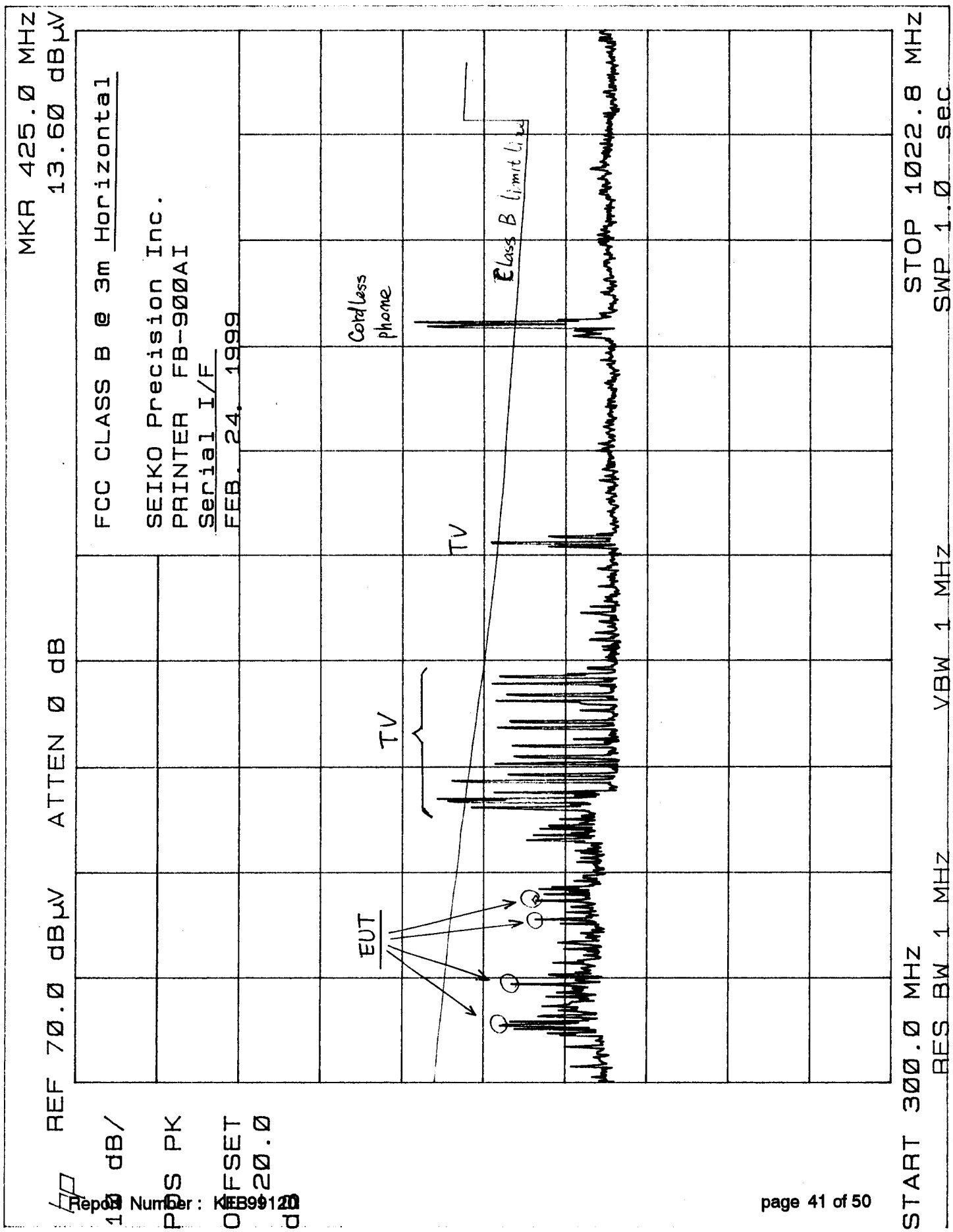
  (a) Horizontal polarization

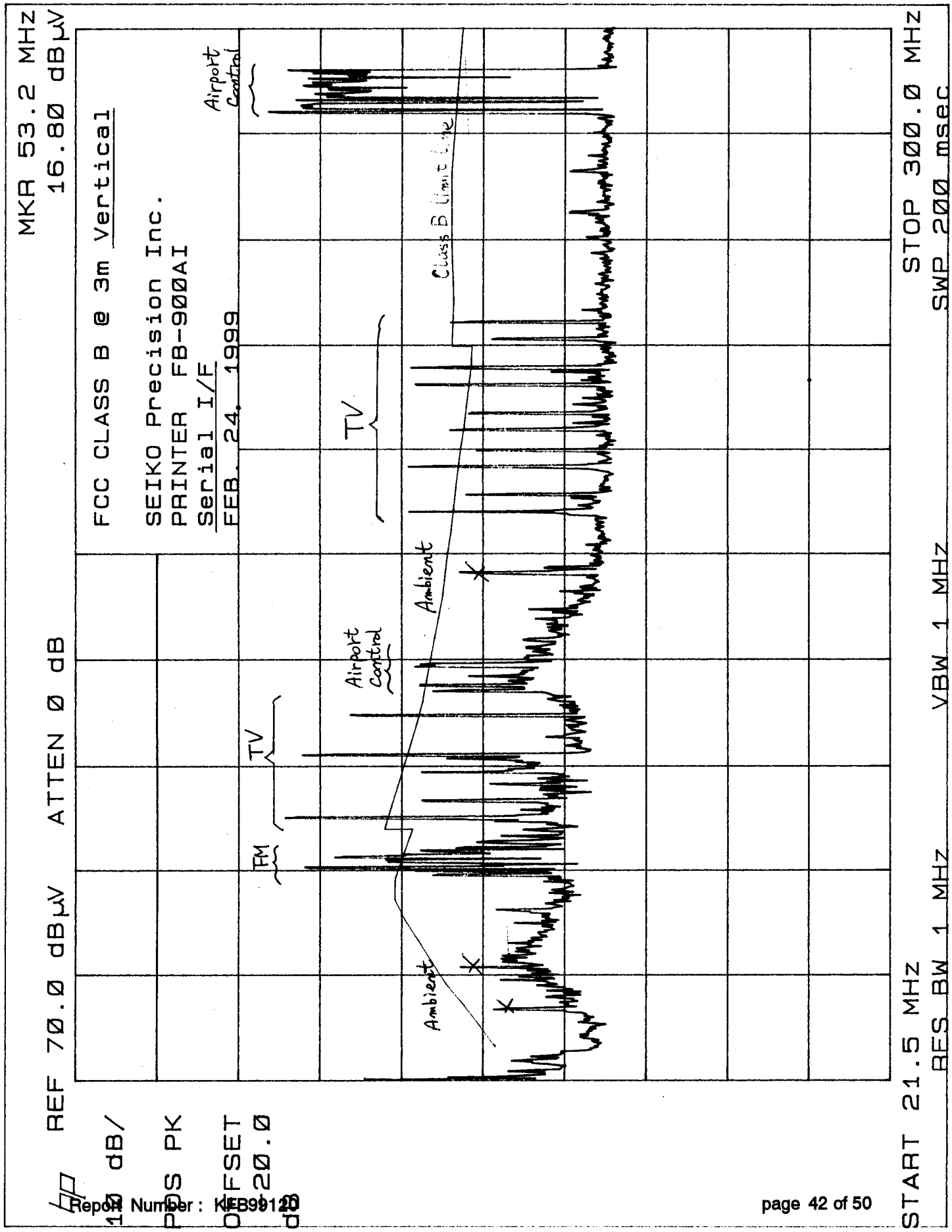
  (b) Vertical polarization

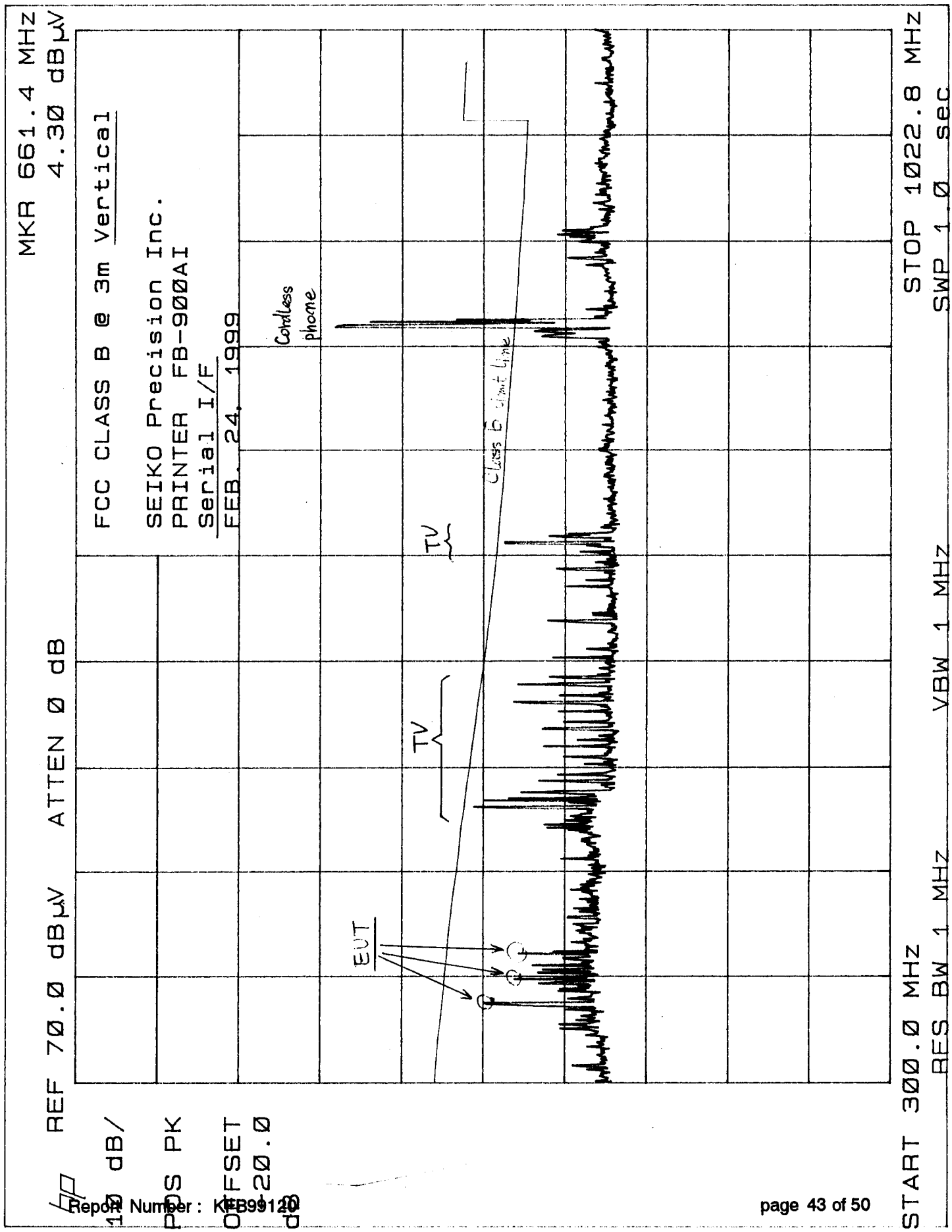
(2) Conducted test data

(3) Spectrum chart


MKR 160.7 MHz
8.10 dBµV
FCC CLASS B @ 3m Horizontal
SEIKO Precision Inc.
PRINTER FB-900AI
Serial I/F
FEB. 24. 1999
REF 70.0 dBµV
ATTEN 0 dB
10 dB/
POS PK
OFFSET
20.0
dB
FM
TV
TV
Airport Control
Airport Control
Class B limit line
START 21.5 MHz
RES BW 1 MHz
VBW 1 MHz
STOP 300.0 MHz
SWP 200 msec


MKR 425.0 MHz
13.60 dBµV
FCC CLASS B @ 3m Horizontal
SEIKO Precision Inc.
PRINTER FB-900AI
Serial I/F
FEB. 24. 1999
Cordless phone
Class B limit Line
TV
TV
EUT
REF 70.0 dBµV
ATTEN 0 dB
10 dB/
PS PK
OFSET 20.0 d
START 300.0 MHz
RES BW 1 MHz
VBW 1 MHz
STOP 1022.8 MHz
SWP 1.0 sec


MKR 53.2 MHz
16.80 dBµV
FCC CLASS B @ 3m Vertical
SEIKO Precision Inc.
PRINTER FB-900AI
Serial I/F
FEB. 24. 1999
Airport Control
Class B Limit Line
TV
Ambient
Airport Control
TV
FM
Ambient
REF 70.0 dBµV
ATTEN 0 dB
10 dB/
POS PK
OFSET 20.0 dB
START 21.5 MHz
RES BW 1 MHz
VBW 1 MHz
STOP 300.0 MHz
SWP 200 msec


MKR 661.4 MHz
4.30 dBµV
FCC CLASS B @ 3m Vertical
SEIKO Precision Inc.
PRINTER FB-900AI
Serial I/F
FEB. 24, 1999
Cordless phone
Class B limit line
TV
TV
EUT
REF 70.0 dBµV
ATTEN 0 dB
10 dB/
POS PK
OFSET 20.0 dB
START 300.0 MHz
RES BW 1 MHz
VBW 1 MHz
STOP 1022.8 MHz
SWP 1.0 sec

Seiko I Techno Research Co., Ltd. EMI Test Site
RADIATED EMISSION TEST REPORT

TESTED FOR COMPLIANCE WITH : FCC 47 CFR, PART 15 B Class B Digital device

APPLICANT	:SEIKO Precision Inc.	DATE TESTED	:FEB. 24th 1999
MANUFACTURER	:SEIKO Precision Inc.	TEMPERATURE	:25 deg. C
EQUIPMENT TESTED	:PRINTER	DISTANCE	:3m
MODEL NUMBER	:FB-900AI	RECEIVER	:ESVP(Rohde & Schwarz)
FCC ID	:CBRFB-900AI	SERIAL NUMBER	:881121/018
SERIAL NUMBER	:0005	ANTENNA	:BBA9106
			:UHALP9107
TEST MODE	:Serial I/F	PREAMP	:8447D (2944A06479)

No.	Frequency [MHz]	Reading Hor. [dBuV]	Reading Ver. [dBuV]	Corr. Factor [dB]	Emission level Hor. [dBuV/m]	Emission level Ver. [dBuV/m]	Spec. Limit [dBuV/m]	Margin Hor. [dBuV/m]	Margin Ver. [dBuV/m]
1	368.470	41.1	35.2	-4.3	36.8	30.9	46.0	-9.2	-15.1
2	379.860	40.2	40.3	-4.2	36.0	36.1	46.0	-10.0	-9.9
3	387.650	40.5	38.4	-4.1	36.4	34.3	46.0	-9.6	-11.7
4	425.170	39.0	33.9	-3.4	35.6	30.5	46.0	-10.4	-15.5
5	433.000	40.8	32.5	-3.2	37.6	29.3	46.0	-8.4	-16.7
6	470.500	37.5	34.5	-2.4	35.1	32.1	46.0	-10.9	-13.9

Note :Emission Level = Reading + Corr.factor
:Corr.factor = Antenna factor + Cable loss(include 3 dB ATT) - Preampgain

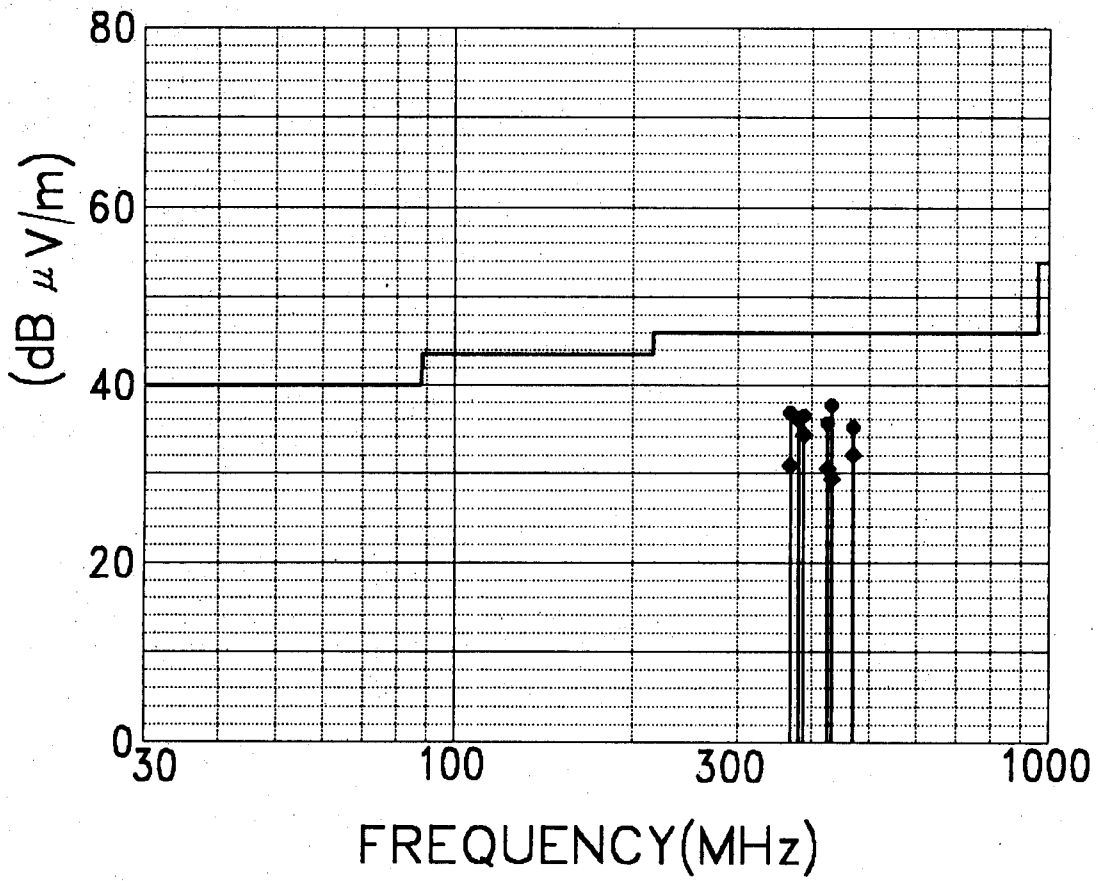
Judgement : Passed by 8.4dB at 433.000MHz

Test Performed : T. Suzuki Date : Feb. 24th, 1999
Tatuo Suzuki

Seiko I Techno Research Co., Ltd. EMI Test site
FCC RADIATED EMISSION TEST

MANUFACTURER :SEIKO Precision Inc.
EQUIPMENT TESTED :PRINTER
MODEL NUMBER :FB-900AI
SERIAL NUMBER :0005
DATE TESTED :FEB. 24th 1999
TEMPERATURE :25 deg. C
TEST MODE :Serial I/F

● Horizontal polarization
◆ Vertical polarization



5.3 Radiated Emission Calculation

The field strength is calculated by adding the Antenna Factor and Cable Loss from the measured reading. The basic equation with a measured sample calculation is as follows:

FS = RA + AF + CL - PG

where FS = Field Strength
RA = Receiver Amplitude
AF = Antenna Factor
CL = Cable Loss (included 3 dB attenuator)
PG = Preamplifier Gain

* Sample calculation *

Test mode: Parallel I/F mode

Frequency = 368.470 MHz : Horizontal polarization

FS = RA + AF + CL - PG = 40.7 + 16.3 + 4.9 - 25.5 = 36.4 dBuV/m

Assume a receiver reading of 40.7 dBuV is obtained. The antenna Factor of 16.3 and a Cable Loss of 4.9 is added.
The Preamplifier Gain of 25.5 dB is subtracted, giving a field strength of 36.4 dBuV/m.

5.4 Test Instrumentation Used, Radiated Measurement

Item	Model No. (Manufacturer)	Serial No.	Last Cal.	Cal. Interval
Spectrum Analyzer	8568B (HP)	2634A03056	Sep.17,1998	6 months
Quasi-Peak Adapter	85650A (HP)	2521A00845	Sep.17,1998	6 months
Preselecter	85685A (HP)	2648A00430	Sep.17,1998	6 months
Receiver	ESVP (Rohde & S.)	881121/018	Nov.25,1998	6 months
Preamplifire	8447D (HP)	2944A06479	Feb. 3,1999	6 months
Biconical Antenna	BBA9106 (Schwarzbeck)	-----	Oct.12,1998	6 months
Log-periodic Antenna	UHALP9107 (Schwarzbeck)	9107496	Oct.14,1998	6 months
Attenuator	8491A 3dB (HP)	27919 & 29916	Oct.14,1998	6 months

6. FCC SITE REGISTRATION

An authorized letter of the site registration is appended to next page.

FEDERAL COMMUNICATIONS COMMISSION

7435 Oakland Mills Road
Columbia, MD 21046
Telephone: 301-725-1585 (ext-218)
Facsimile: 301-344-2050

April 15, 1997

IN REPLY REFER TO
31040/SIT
1300F2

Kanto E.M.C. Co., Ltd.
140-16 Itagawa
Sanbu-machi, Sanbu-gun
Chiba, 289-12 Japan

Attention: Takatoshi Nakamura

Re: Measurement facility located at above address
(3 and 10 meter site)

Gentlemen:

Your submission of the description of the subject measurement facility has been reviewed and found to be in compliance with the requirements of Section 2.948 of the FCC Rules. The description has, therefore, been placed on file and the name of your organization added to the Commission's list of facilities whose measurement data will be accepted in conjunction with applications for certification or notification under Parts 15 or 18 of the Commission's Rules. Our list will also indicate that the facility complies with the radiated and AC line conducted test site criteria in ANSI C63.4-1992. Please note that this filing must be updated for any changes made to the facility, and at least every three years the data on file must be certified as current.

Per your request, the above mentioned facility has been also added to our list of those who perform these measurement services for the public on a fee basis. This list is published periodically and is also available on the Laboratory's Public Access Link as described in the enclosed Public Notice.

Sincerely,

Thomas W. Phillips
Electronics Engineer
Customer Service Branch

Enclosure:
PAL PN

FEDERAL COMMUNICATIONS COMMISSION
Equipment Authorization Division, Customer Service Branch
7435 Oakland Mills Road, Columbia, MD 21046
Telephone: (301) 725-1585, Facsimile: (301) 344-2050
May 4, 1998

Ref: 31040/SIT

TO: Takatoshi Nakamura
ORGANIZATION: Seiko I Techno Research

PHONE NUMBER: **FAX NUMBER:** 81-475-89-1688

FROM: Thomas W. Phillips
NO. OF PAGES: 1

Please direct inquiries, if any, to the sender at extension 218.

****

Dear Mr. Nakamura:

The following is in response to your letter of April 10,1998.

This is to acknowledge the name change of Kanto E.M.C. Co., Ltd. to Seiko I Techno Research Co., Ltd. Our test site records have been revised to show this change.