



December 21, 1993

Federal Communications Commission
Authorization & Evaluation Division
7435 Oakland Mills Road
Columbia, Maryland 21046

Attention: Equipment Authorization Branch

SUBJECT: Type Acceptance Application for FCC ID: AXATR-307-A2

Gentlemen:

Ericsson GE Mobile Communications Inc. requests a Grant of Authorization for the subject equipment.

The base station transceiver submitted in this filing operates in the 425-450 MHz frequency range and is part of our New MASTR III Station product line.

The station will be capable of both trunking and digital Voice Guard operation as indicated by Exhibit 10E.

This station is quite similar to the UHF station filed under FCC ID AXATR-307-B2, which is the 450-470 split of this product.

The transmitters and receivers utilize common circuitry in part, so a single identifier will be used for both.

Sincerely,

A handwritten signature in black ink, appearing to read "John P. Rothgeb", is written over the typed name and title.

John P. Rothgeb
Specialist, Regulatory Programs
Telephone: (804) 528-7476
Room 2669

/fmc

ERICSSON



December 21, 1993

Federal Communications Commission
Equipment Approval Services
P.O. Box 358315
Pittsburgh, Pennsylvania 15251-5315

SUBJECT: Enclosed is a check for Type Acceptance as follows:

FCC ID

FEE

AXATR-307-A2

\$370

John P. Rothgeb
Specialist, Regulatory Projects
Room 2669
Tel. (804) 528-7476

/fmc

ENCLOSURES: Check
Filing for Equipment Authorization Branch

ERICSSON 



ERICSSON GE MOBILE COMMUNICATIONS INC.
LYNCHBURG, VIRGINIA

THIS CHECK IS IN FULL PAYMENT OF THE ACCOUNT STATED ON VOUCHER WHICH
ACCOMPANIED IT. AND THE PAYEE ACCEPTS IT AS SUCH BY ENDORSEMENT.

66-35

531

12-13-93

No. 867464

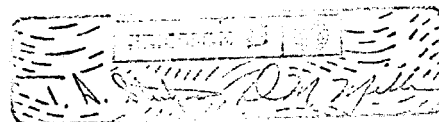
PAY EXACTLY*****370DOLLARS AND 00 CENTS

\$370.00

WACHOVIA
WACHOVIA BANK OF NORTH CAROLINA, N.A.

FEDERAL COMMUNICATIONS COMMISSION

TO
THE
ORDER
OF



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⑈0000867464⑈ ⑆053100355⑆010450 037796⑈

FCC FORM 731
APPLICATION FOR EQUIPMENT AUTHORIZATION

See 47 CFR 1.1103 for FEE TYPE CODES and FEES, and paragraph C of the attached instructions.

SECTION I - ALL ITEMS IN THIS SECTION MUST BE COMPLETED

APPLICANT'S FULL BUSINESS NAME

ERICSSON GE MOBILE COMMUNICATIONS, INC.

APPLICANT'S MAILING ADDRESS (Line 1) (Maximum 35 characters)

MOUNTAIN VIEW ROAD

APPLICANT'S MAILING ADDRESS (Line 2) (if required) (Maximum 35 characters)

CITY

LYNCHBURG

STATE OR COUNTRY (if foreign address)

VIRGINIA

ZIP CODE

24502

COMPLETE FCC IDENTIFIER:

GRANTEE CODE

A X A

EQUIPMENT PRODUCT CODE (14 characters maximum)

TR-307-A2

Enter in Column (A) the correct Fee Type Code for the service for which you are applying. Fee Type Codes may be found in FCC Fee Filing Guides and paragraph C of attached instructions. Enter in Column (C) the result obtained from multiplying the value of the Fee Type Code in Column (A) by the number entered in Column (B).

(A)

(B)

(C)

FEE TYPE CODE			FEE MULTIPLE				FEE DUE FOR FEE TYPE CODE IN COLUMN (A)		FOR FCC USE ONLY
(1)	E	F	T	0	0	0	1	\$ 370.00	

SECTION II - Use only when you are requesting concurrent actions which result in a requirement to list more than one Fee Type Code.

(A) FEE TYPE CODE	(B) FEE MULTIPLE	(C) FEE DUE FOR FEE TYPE CODE IN COLUMN (A)	FOR FCC USE ONLY
(2)	0 0 0 1	\$	
(3)	0 0 0 1	\$	
(4)	0 0 0 1	\$	
ADD ALL AMOUNTS SHOWN IN COLUMN C, LINES (1) THROUGH (4), AND ENTER THE TOTAL HERE. THIS AMOUNT SHOULD EQUAL YOUR ENCLOSED REMITTANCE.			
TOTAL AMOUNT REMITTED WITH THIS APPLICATION OR FILING			
\$ 370.00			FOR FCC USE ONLY

(5) NAME AND TITLE OF PERSON AT ABOVE ADDRESS FOR CONTACT, OR TO RECEIVE GRANT (THIS ITEM MUST BE COMPLETED):

JOHN P. ROTHGEB, SPECIALIST REGULATORY PROGRAMS

SECTION III

Bureau Use Only

1.(a) INSTEAD OF APPLICANT, FCC IS AUTHORIZED TO MAIL ORIGINAL GRANT TO (See instructions):

 Firm name,
number, street,
city,
state,
and ZIP Code

NA

LI

DN

DM

(b) NAME AND TITLE OF PERSON AT ABOVE ADDRESS TO RECEIVE GRANT:

NA

RG

Code

Reviewer

2. INFORMATION CONTACT, IF DIFFERENT FROM ITEM 5, PAGE 1 (See instructions):

 Firm name,
contact person,
number, street,
city,
state,
and ZIP Code

NA

3.(a) TELEPHONE NUMBER (include area code and extension - USA ONLY):

(804) 528-7476

3.(b) FAX NUMBER (include area code and extension - USA ONLY):

(804) 948-6510

4. Does this application include a request for confidentiality for any portion(s) of the data contained in this application pursuant to 47 CFR 0.459 of the Commission's Rules? (See instructions)

☐ Yes

☒ No

5. Does the applicant desire the Commission to defer grant of this application pursuant to 47 CFR 0.457(d)(1)(ii)? (See instructions)

☐ Yes

☒ No

6. Kind of equipment authorization requested (check ONE box only):

☐ Certification

☒ Type Acceptance

☐ Type Approval

☐ Notification

7.(a) Kind of equipment:

Base Station Transceiver

(b) Equipment will be operated under FCC Rule Part(s):

90

8. Application is for (Check ONE box only):

☒ 1 Original equipment

☐ 2 Change in identification of presently authorized equipment *

☐ 3 Class II permissive change or modification of presently authorized equipment

* If box 2 is checked, complete items 9(a) and (b).

9.(a) FCC ID before change in identification:

NA

(b) Grant date of FCC ID in 9(a) above:

NA

10. EQUIPMENT SPECIFICATIONS:

(a) Frequency range in MHz

(b) Rated RF power output in watts

(c) Frequency tolerance %, Hz, ppm

(d) Emission designator

(e) Microprocessor model number

425-450 MHz

45-90 Watts

+1.5 ppm

 16K0F3E
15K0F2D
15K0F2B
15K0F1D
15K0F1E

NA

11. Type of equipment tested:

☐ Production

☒ Pre-Production

☐ Prototype

12.(a) Is the equipment, or section(s) thereof, subject to more than one equipment authorization?

☐ Yes

☒ No

If YES, complete items 12(b), (c), (d), or (e) as appropriate.

(b) Additional equipment authorization(s) required for equipment:

☐ Certification

☐ Type Acceptance

☐ Type Approval

☐ Notification

(c) Granted FCC ID or FCC ID listed on RX or RX section application:

NA

(d) Granted FCC ID or FCC ID listed on TX or TX section application:

NA

(e) Granted FCC ID or FCC ID listed on other device application:

NA

APPLICANT:
ERICSSON GE MOBILE COMMUNICATIONS INC.

FCC ID NO.
AXATR-307-A2

EXHIBIT LIST

<u>EXHIBIT</u>	<u>PARA. REF.</u>	<u>DESCRIPTION</u>
1	2.909 (d)	Certification of Data
2	2.983 (c) (d, 1-5)	Technical Description of Equipment
3A-D	2.983 (d) (6)	Function of Active Circuit Devices
4	2.983 (d) (7)	Circuit Diagrams
5	2.983 (d) (8)	Instruction Book (Draft)
6	2.983 (d) (9)	Alignment Procedure
7A-B	2.983 (d) (10-12)	Circuit and Device Descriptions
8	2.985 (a)	RF Power Output
9A-E	2.987 (a, b, d)	Modulation Characteristics
10A-E	2.989 (c, d, i) (h)	Occupied Bandwidth
11A-I	2.991, 2.993	Spurious Emissions
12A-C	2.995 (a, b, d)	Frequency Stability
13	2.983 (f)	Identification Plate
14A	2.983 (g)	Front View of Station mounted showing top to bottom identification of assemblies: power amplifier, transceiver shelf and AC power supply.
14B	2.983 (g)	Side view of station showing location of FCC nameplate.
14C	2.983 (g)	Rear view of station rack configuration.
14D	2.983 (g)	Power amplifier assembly with cover open to show components and solid casting construction for RF shielding.
14E	2.983 (g)	Typical mounting for power amplifier accessories (if used), Top: antenna relay, Center: harmonic filter, Bottom: circulator.
14F	2.983 (g)	Exciter/synthesizer module showing front and solid casting for RF shielding.
14G	2.983 (g)	Exciter/Synthesizer with cover removed to show component board.
14H	2.983 (g)	System control module with cover removed to show components and solid casting for RF shielding.
14I	2.983 (g)	Switch mode supply module with cover removed to show components and solid casting for RF shielding.

APPLICANT:
ERICSSON GE MOBILE COMMUNICATIONS INC.

FCC ID NO.
AXATR-307-A2

EXHIBIT LIST

<u>EXHIBIT</u>	<u>PARA. REF.</u>	<u>DESCRIPTION</u>
14J	2.983 (g)	Receiver front end module with cover to show solid casting for RF shielding.
14K	2.983 (g)	Receiver front end module with cover removed to show component board.
14L	2.983 (g)	Receiver IF module with cover removed to show components and solid casting for RF shielding.
14M	2.983 (g)	Receiver synthesizer module with cover to show solid casting for RF shielding.
14N	2.983 (g)	Receiver synthesizer module with cover removed to show component board.
14O	2.983 (g)	Typical nameplate location when mounted in cabinet.

EXHIBIT 1

APPLICANT:
ERICSSON GE MOBILE COMMUNICATIONS INC.

FCC ID NO.
AXATR-307-A2

CERTIFICATION OF DATA

The technical data contained in this application has been taken under my supervision and is certified true and correct.

NAME

Hamlet Sarokhanian

POSITION:

H. SAROKHANIAN
Manager - DLMR Base Station Transceiver

DATE

1/3/94

I certify that this application was made at my direction. The data and statements made herein are to the best of my knowledge true and accurate.

NAME:

DL Bowen

POSITION:

David Bowen
Manager - Radio Control Eng.

DATE:

1/3/94

APPLICANT:
ERICSSON GE MOBILE COMMUNICATIONS INC.

FCC ID NO.
AXATR-307-A2

DESCRIPTION

2.983 (c) The transceiver is being prepared for quantity production.

2.983 (d) This MASTR III Station Transmitter is a synthesizer controlled, direct FM modulated transmitter designed to operate in the 425 MHz to 450 MHz frequency band. The transmitter consists of a solid-state synthesizer-exciter and power amplifier. The RF power output is adjustable from 45-90 Watts.

Options available as follows:

- A. Type 90/99 Tone Encoder
- B. DTMF Encoder
- C. Remote Alarm
- D. GE*STAR
- E. 9600 Baud Data
- F. Channel Guard
- G. Digital Channel Guard

- (1) Type of Emission: 16KOF3E, 15KOF2D, 15KOF2B, 16KOF1D, 16KOF1E
- (2) Frequency Range and Frequency Stability: 425-450 MHz $\pm$ 1.5 ppm
- (3) Range of Operating Power:

The power amplifier consists of broadband, fixed-tuned power IC's and transistor stages.

The RF power output is regulated by sensing variations in the forward power that is fed to the antenna from the final RF power amplifier and adjusting the voltage on the earlier stage to hold the forward power constant.

- (4) Maximum Power Ratings: 90 Watt Tx

Input Maximum	400 Watts
Output Maximum	90 Watts

- (5) Final Amplifier Voltage and Current in normal operation:
(Power rated is for two devices in the output stage.)

110 Watts

Collector Voltage	13.4 Volts DC
Collector Current	29 Amps DC

APPLICANT:
ERICSSON GE MOBILE COMMUNICATIONS INC.

FCC ID NO.
AXATR-307-A2

FUNCTION OF ACTIVE CIRCUIT DEVICES

<u>SCHEMATIC DESIGNATION</u>	<u>DEVICE</u>	<u>FUNCTION</u>	<u>GE DRAWING NO.</u>
<u>Power Amp 19D902797G3</u>			
Q2	Transistor	RF Final Amp	344A4134P1
Q3	Transistor	RF Final Amp	344A4134P1
Q1	Transistor	RF Driver	344A3948P1
U1	RF IC	RF Preamp	19A705457P2
U7	RF Module	RF Gain Block	344A3907P1
U100	IC	Voltage Regulator	19A705532P2
U3	IC	Linear Op-Amp	19A701789P4
Q4	Transistor	DC Switch	19A700076P2
Q5	Transistor	DC Amp	19A700076P2
Q203	Transistor	DC Amp	19A700055P1
Q7	Transistor	RF Pre-Amp	19A701940P1
<u>Tx Synthesizer Module 19D02780G3</u>			
U201	RF IC	RF Buffer	19A705927P1
U202	RF IC	RF Buffer	344A3907P1
U203	RF IC	RF Buffer	19A705927P1
Q1	FET	RF Oscillator	19A702524P2
Q101	Transistor	DC Switch	19A700076P2
Q102	Transistor	DC Switch	19A700076P2
Q301	Transistor	Linear Amp	19A134577P2
Q302	Transistor	Linear Amp	19A700059P2
Q401	Transistor	RF Amp	19A704708P2
Q501	Transistor	DC Switch	19A700076P2
Q701	Transistor	DC Switch	19A700076P2
Q702	Transistor	DC Switch	19A700076P2
Q703	Transistor	DC Switch	19A700076PD2
Q704	Transistor	DC Switch	19A700076PD2
U501	IC	Linear Amp	344A3070P1
U502	IC	Analog Gate	19A702705P4
U601	IC	Linear Amp	19A116297P7
U701	IC	Logic	19A703483P302
U702	IC	Logic	19A703471P120
U705	IC	Logic	19A703483P302
U301	IC	+ Voltage Regulator	19A704971P9
U302	IC	Linear Amp	19A116297P7
U303	IC	- Voltage Regulator	19A704491P7
U401	IC	PreScaler	19A149944P201
U402	IC	Synthesizer	19B800902P5
Q801	Transistor	RF Amp	19A704708P2
Q802	Transistor	RF Amp	19A704708P2
Q803	Transistor	Multiplier	19A704708P2
Q705	Transistor	DC Switch	19A700076P2
Q706	Transistor	DC Switch	19A700076P2

APPLICANT:
ERICSSON GE MOBILE COMMUNICATIONS INC.

FCC ID NO.
AXATR-307-A2

FUNCTION OF ACTIVE CIRCUIT DEVICES

<u>SCHEMATIC DESIGNATION</u>	<u>DEVICE</u>	<u>FUNCTION</u>	<u>GE DRAWING NO.</u>
<u>Rx Synthesizer Module 19D902781G1</u>			
Q1	FET	Oscillator	19A702524P2
Q2	Transistor	DC Switch	19A700076P2
Q3-6	Transistor	DC Switch	19A700076P2
Q7	Transistor	DC Switch	19A700076P2
Q8	Transistor	DC Switch	19A700059P2
Q9	Transistor	DC Switch	19A700076P2
Q10	Transistor	DC Switch	19A700076P2
Q11	Transistor	DC Switch	19A700076P2
Q12	Transistor	Linear Amp	19A700076P2
Q13	Transistor	Linear Amp	19A700076P2
Q14	Transistor	RF Amp	19A704708P2
Q15	Transistor	RF Amp	19A704708P2
Q16	Transistor	Multiplier	19A704708P2
U2	IC	RF Amp	19A705927P1
U3	IC	RF Amp	19A705927P1
U4	IC	RF Amp	19A705927P1
U5	IC	Prescaler	19A149944P201
U6	IC	Synthesizer	19B800902P5
U8	IC	Linear Amp	19A702293P3
U9	IC	Linear Amp	19A702293P3
U10	IC	Logic	19A703471P120
U12	IC	Logic	19A703483P302
U13	IC	Logic	19A703483P302
U14	IC	Analog Gate	19A702705P4
U15	IC	+ Voltage Regulator	19A704971P8
U16	IC	+ Voltage Regulator	19A704971P10
Y1	IC	TCXO Module	19B801351P12
<u>Rx Front End Module 19D902782G3</u>			
Q1	Transistor	RF Amp	344A3058P1
Q2	Transistor	Linear Amp	19A700059P2
Q3	Transistor	RF Amp	19A704708P3
Q4	Transistor	Linear Amp	19A700059P2
Q5	Transistor	DC Switch	19A700076P2
Q6	Transistor	DC Switch	19A700076P2
Q7	Transistor	Linear Amp	19A700059P2
Q8	Transistor	RF Amp	344A3058P1
U1	IC	Linear Amp	19A704125P1
<u>Rx IF Module 19D902783G1</u>			
U1	IC	RF Amp	19A705927P1
U2	IC	RF Amp	19A705927P1
U3	IC	IF Amp/DET	19A149980P2
U4	IC	Linear Amp	19A704125P1
U5	IC	Linear Amp	19A704125P1

APPLICANT:
ERICSSON GE MOBILE COMMUNICATIONS INC.

FCC ID NO.
AXATR-307-A2

FUNCTION OF ACTIVE CIRCUIT DEVICES

<u>SCHEMATIC DESIGNATION</u>	<u>DEVICE</u>	<u>FUNCTION</u>	<u>GE DRAWING NO.</u>
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Rx IF Module 19D902783G1 (Continued)

Q1	Transistor	RF Buffer	19A704708P2
Q2	Transistor	RF Buffer	19A704708P2
Q3	Transistor	DC Switch	19A700076P2
Q4-5	Transistor	DC Switch	19A700076P2
U6	IC	Linear Amp	19A701789P4
U7	IC	Linear Amp	19A701789P4
U8	IC	+ Voltage Regulator	19A704971P11

System Control Module 19D902590G2

Q2	Transistor	Switch	19A700076P2
Q3	FET	Gate	19A703795P1
Q5	Transistor	Switch	19A700059P2
Q7	Transistor	Switch	19A700059P2
Q8	Transistor	Switch	19A700059P2
Q9	Transistor	Switch	19A700076P2
Q10	Transistor	Switch	19A700076P2
Q11	Transistor	RF Amp	19A700059P2
Q12	Transistor	RF Amp	19A700059P2
U1	Microprocessor	System Control	10A705982P101
U2	Digital IC	Address Latch	19A703471P302
U3	Digital IC	Address Decoder	19A703471P120
U4	Digital IC	Read Only Memory	344A3307G1
U5	Digital IC	RAM	19A705603P5
U6	Digital IC	Address Latch	19A703952P102
U7	Digital IC	8 Bit Latch	19A704380P319
U8	Digital IC	Selector	19A702705P5
U9	Linear Amp	Buffer	19A704883P2
U10	Linear Amp	Filter	19A704883P2
U11	Linear Amp	Gain	19A116297P7
U12	Digital IC	Selector	19A702705P5
U13	Linear Amp	Gain	19A704883P2
U14	Digital IC	Multiplexer	19A702705P3
U15	Digital IC	Multiplexer	19A702705P3
U16	Linear Amp	Filter	19A704883P2
U17-A	Line Amp	DIF Amp	19A704883P2
U17-B	Line Amp	Buffer	19A704883P2
U17-C	Line Amp	Filter	19A704883P2
U17-D	Line Amp	Gain	19A704883P2
U18	Digital IC	D-F/F	19A704380P302

APPLICANT:
ERICSSON GE MOBILE COMMUNICATIONS INC.

FCC ID NO.
AXATR-307-A2

FUNCTION OF ACTIVE CIRCUIT DEVICES

SCHEMATIC DESIGNATION	DEVICE	FUNCTION	GE DRAWING NO.
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System Control Module 19D902590G2 (Continued)

U19	Digital IC	Watch Dog	19A149895P1
U20	Digital IC	Inverter	19A716180P575
U21	Digital IC	Inverter	19A703483P104
U22	Digital IC	Inverter	344A3039P201
U24	Digital IC	D-F/F	19A705980P101
U25	Digital IC	8 Bit Latch	19A703471P116
U26	Digital IC	Inverter	19A116180P575
U27	A-D	A-D	19A705979P101
U28	Digital IC	D-F/F	19A704380P302
U29	Counter	Clock Generator	19A149466P301
U30	Linear Amp	Filter	19A704883P2
U31	Linear Amp	Gain	19A704384P4
U32	Digital IC	Multiplexer	19A702705P3
U33	Multiplexer	Selector	19A702705P3
U34	Digital IC	I/O Expansion	19A705991P101
U35	Digital IC	Level Control	344A3041P201
U36	Digital IC	Level Control	344A3041P201
U37	Linear Amp	Gain	19A704883P2
U37-C	Linear Amp	Filter	19A704883P2
U40	Digital Amp	Inverter	19A116180PP575
U41	Digital IC	Inverter	19A700176P101

Interface Board 19D902975G1

Q102	Transistor	Switch	19A705953P1
Q103, Q104	Transistor	Switch	19A700023P2
Q108	Transistor	Current Gain	19A700023P2
Q109	Transistor	Switch	19A700054P1
U101	Linear IC	Opto-Coupler	19A705952P1
U102	Linear IC	Opto-Coupler	19A705952P1
U103	Transistor	Switch	19A705953P1
U104	Linear IC	Audio PA	19A701630P1
U105	Digital IC	Shift Register	19A703987P21
U106	Digital IC	Shift Register	19A703987P24
U107	Digital IC	Decoder	19A704445P1
U108	Digital IC	Pot	19S705180P2
U109	Digital IC	Logic	19A703483P11
U110-1	Linear IC	Buffer	19A701789P1
U110-2	Linear IC	Gain	19A701789P1
Q110-3	Linear IC	Driver	19A701789P1
Q110-4	Linear IC	Comparator	19A701789P1

APPLICANT:
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CIRCUIT DIAGRAMS

<u>DRAWING NUMBER</u>	<u>DESCRIPTION</u>
19D903635 (sh1-3)	Interconnection Block Diagram
19D903622	Power Amplifier Schematic Diagram
19D903363 (sh1-3)	Tx Synthesizer, Exciter Schematic Diagram
19D902907 (sh1-6)	System Board Schematic Diagram
19D904091 (sh1-3)	Rx Synthesizer, Ref Osc Schematic Diagram
19D903498	Receiver Front End Schematic Diagram
19D902504 (sh1,2)	Receiver IF Schematic Diagram
19D902977 (sh1,2)	Interface Board Schematic Diagram
Figure 2	Crystal Oscillator Outline Drawing
19B801351	Crystal Oscillator Purchase Part Drawing

EXHIBIT 5

APPLICANT:
ERICSSON GE MOBILE COMMUNICATIONS INC.

FCC ID NO.
AXATR-307-A2

DRAFT INSTRUCTION BOOK

2.983 (d) (8) Instruction Book (Draft)

See attached draft instruction book.

APPLICANT:
ERICSSON GE MOBILE COMMUNICATIONS INC.

FCC ID NO.
AXATR-307-A2

ALIGNMENT PROCEDURE

RADIO TUNING PROCEDURE

1.0 SCOPE

This document outlines the procedure for transmitter turn-on and frequency set.

2.0 TEST EQUIPMENT

Audio Oscillator	HP201C
RF Power Meter	HP436A
Frequency Counter	HP5386A
Modulation Meter	HP8901A
Power Meter	Bird 6154
RS-232 Computer Terminal	IBM Compatible with "MDIA" software

3.0 TURN-ON PROCEDURE

The system board loads the transmit and receive frequency code to the Tx and Rx synthesizer boards of the UHF station.

Upon power up or reset, the microcontroller loads the receive synthesizer with 32 bits of serial data that sets the local oscillator to the desired frequency. A fault indication is provided by the receive synthesizer and sampled by the microcontroller. If the synthesizer is not locked onto frequency (fault flag true) the microcontroller will initiate another load sequence until lock occurs.

Upon a PTT, the microcontroller loads the transmit synthesizer with 32 bits of serial data that sets the transmit carrier to the proper frequency. A fault indication is provided by the transmit synthesizer and sampled by the microcontroller. If the synthesizer is not locked onto frequency, the microcontroller will not key the RF power amplifier, and will initiate another load sequence until lock occurs. It should be noted that the power amplifier will not be keyed as long as the synthesizer is unlocked.

APPLICANT:
ERICSSON GE MOBILE COMMUNICATIONS INC.

FCC ID NO.
AXATR-307-A2

CIRCUIT & DEVICE DESCRIPTIONS

2.983 (d) (10-11)

(10) Oscillator and Other Frequency Stabilizing Circuit
Descriptions:

Reference Oscillator

The reference oscillator is a self-contained high stability reference generator which supplies 12.8 MHz to transmitter and receiver synthesizers in the UHF system.

The oscillator module is located in the receive synthesizer. The module is a quartz crystal controlled oscillator with temperature compensation providing $\pm .5$ ppm over a wide temperature range. Measured performance for temperature and supply voltage is shown in Exhibit 12. Reference for the transmitter is coupled from the receive synthesizer module by an external coax cable. The oscillator is supplied by an outside vendor (TOYCOM). The vendor catalogue and our purchase part drawing are shown in Exhibit 4.

The oscillator frequency is adjusted by a multi-turn piston trimmer capacitor for frequency setability of less than ± 0.3 ppm.

(11) Circuits or Devices Employed for Suppression of Spurious Radiation:

The transmit synthesizer board uses a casting on top and bottom side of the board. A lowpass filter is used to reject out-of-band spurious frequencies of the exciter output stage at J2. Tuned circuits are utilized in the input and output of the final amplifier along with a lowpass filter following the final amplifier output to suppress harmonics of the carrier frequency.

APPLICANT:
ERICSSON GE MOBILE COMMUNICATIONS INC.

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AXATR-307-A2

CIRCUIT & DEVICE DESCRIPTIONS

The PA is totally encased in a casted housing with fingerstock shields. Power and control leads exit and enter through bulkhead feedthrough capacitors. RF enters and exits through bulkhead RF connectors.

Circuits or Devices Employed for Limiting Modulation:

The audio processing circuitry has three high gain integrated circuit audio amplifiers with appropriate feedback. The first stage (UIA) of the limiter and post limiter filters provides preemphasized gain and limiting. Amplitude limiting of the audio occurs when diodes conduct and produce 100% feedback, thereby amplitude limiting the input signal.

Active filters provide 18 dB per octave attenuation beginning at 2.8 kHz for post limiter filtering. Measured characteristics are shown in Exhibit 9.

2.983 (d) (12) GETC Filters:

The filters on the GETC used to perform wave shaping on the digital and audio signals include the low speed data encode filter, the low speed data decode filter and high speed data filter.

The low speed data encode filter is used to smooth out the subaudible signalling generated by the GETC.

The low speed data decode filter is used to low pass the subaudible signalling and eliminate voice audio in order that the low speed data can be detected by the microcomputer. The characteristics of this filter are identical to the low speed data encode filter.

The high speed data filter is a GMSK filter used to filter the 9600 baud NRZ signalling used by the GETC.

APPLICANT:
ERICSSON GE MOBILE COMMUNICATIONS INC.

FCC ID NO.
AXATR-307-A2

RF POWER OUTPUT

2.985 (a) The RF power measured at the output terminals:

AXATR-307-A2 90 Watts

The measurement was made per EIA RS-152B using the following equipment:

Radio Frequency 50 ohm load attached to the output terminal through directional coupler P-910-20. The power is measured on a HP436A power meter.

APPLICANT:
ERICSSON GE MOBILE COMMUNICATIONS INC.

FCC ID NO.
AXATR-307-A2

MODULATION CHARACTERISTICS

Reference Paragraph 2.987 (a, b, d) the frequency and amplitude response to audio inputs measured per EIA RS-152B, Paragraph 7.3 are shown on the following sheets.

Exhibit 9B	Audio Frequency Response
Exhibit 9C	Post Limiter Frequency Response *
Exhibit 9D	Modulation Versus modulation Input Voltage
Exhibit 9E	Data Filter Response

Equipment used was:

Hewlett Packard Modulation Analyzer	HP8901A
Hewlett Packard Audio Analyzer	HP8903B
Hewlett Packard Power Meter	HP436A
Weinschel Power Attenuator	49-30-34

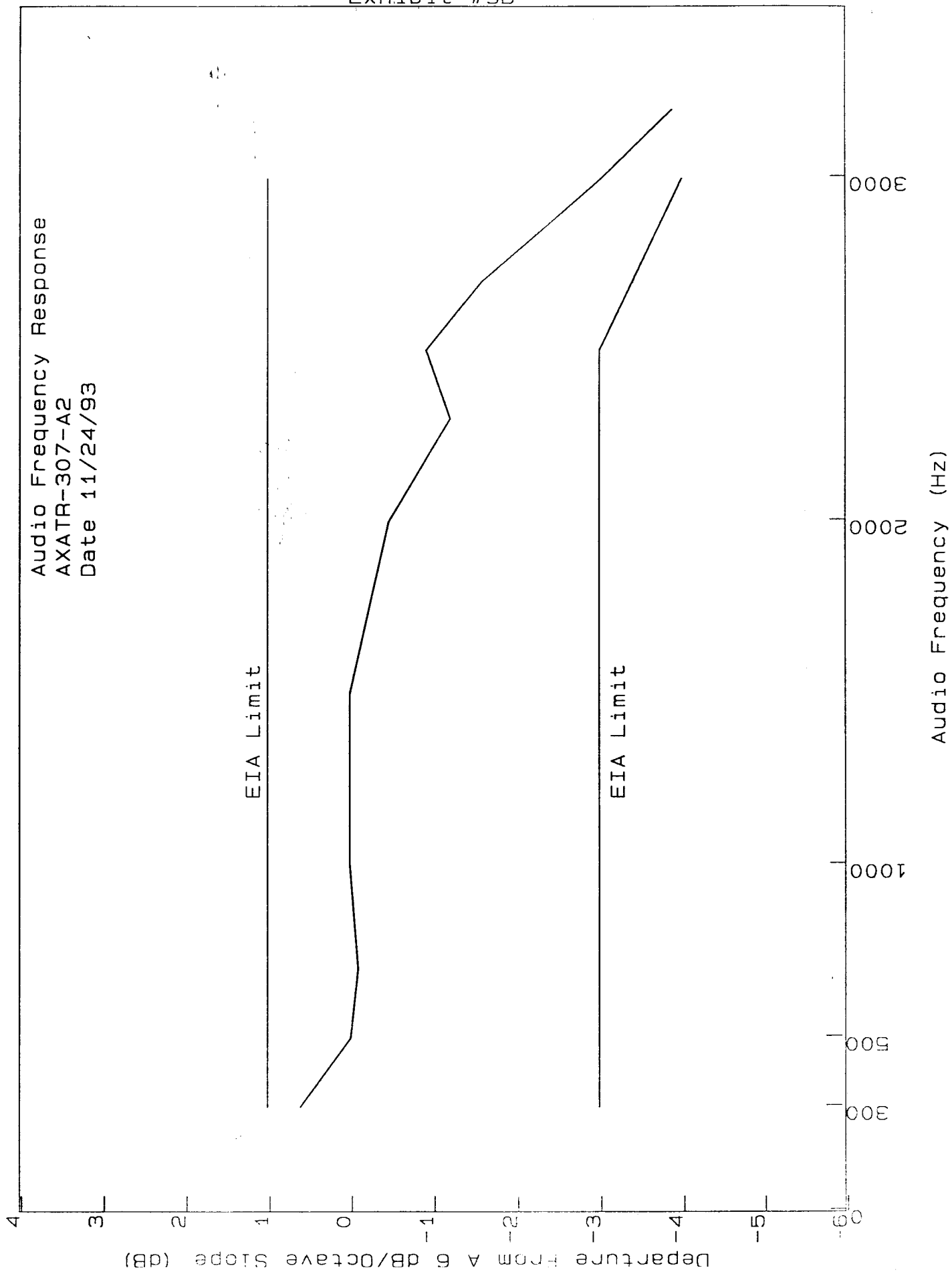
At those modulation frequencies at which the transmitter is not capable of producing 30% of system deviation, audio response is calculated from measurement of input voltage producing a lesser deviation.

* Post Limiter Filter Response Measurement Procedure

1. Adjust transmitter deviation according to tune-up procedure.
2. Disconnect internal microphone and any input to the external microphone input.
3. Connect Hewlett Packard modulation analyzer to transmitter output through directional coupler.

Connect HP audio analyzer to the microphone input.

Connect HP audio analyzer to the audio output of modulation analyzer.
4. Apply 13.8 volts to the power input and key the transmitter.
5. Set the frequency of the HP audio analyzer to 1 kHz. Increase the output voltage until the transmitter is deviating 3 kHz.
6. Measure the audio output voltage. This is the reference voltage.
7. Keeping the HP audio analyzer output level constant, sweep the frequency from 10 kHz to over 50 kHz. Record the output voltage versus frequency.
8. Plot 20 log (audio output level/reference voltage) versus frequency normalized to a 6 dB per octave curve.



POST LIMITING FILTER
AXATR-307-A2

11/23/93

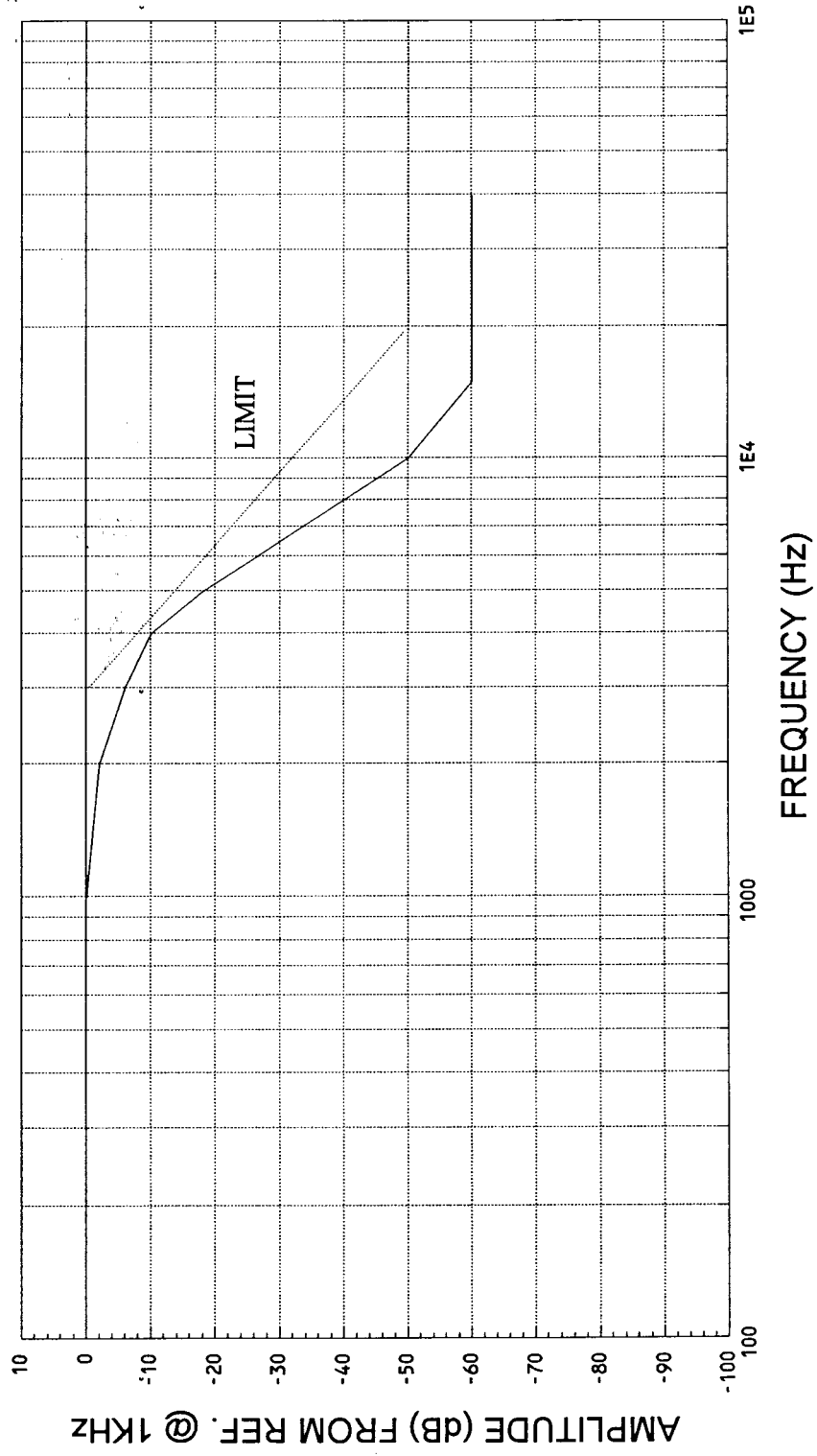


EXHIBIT # 9C

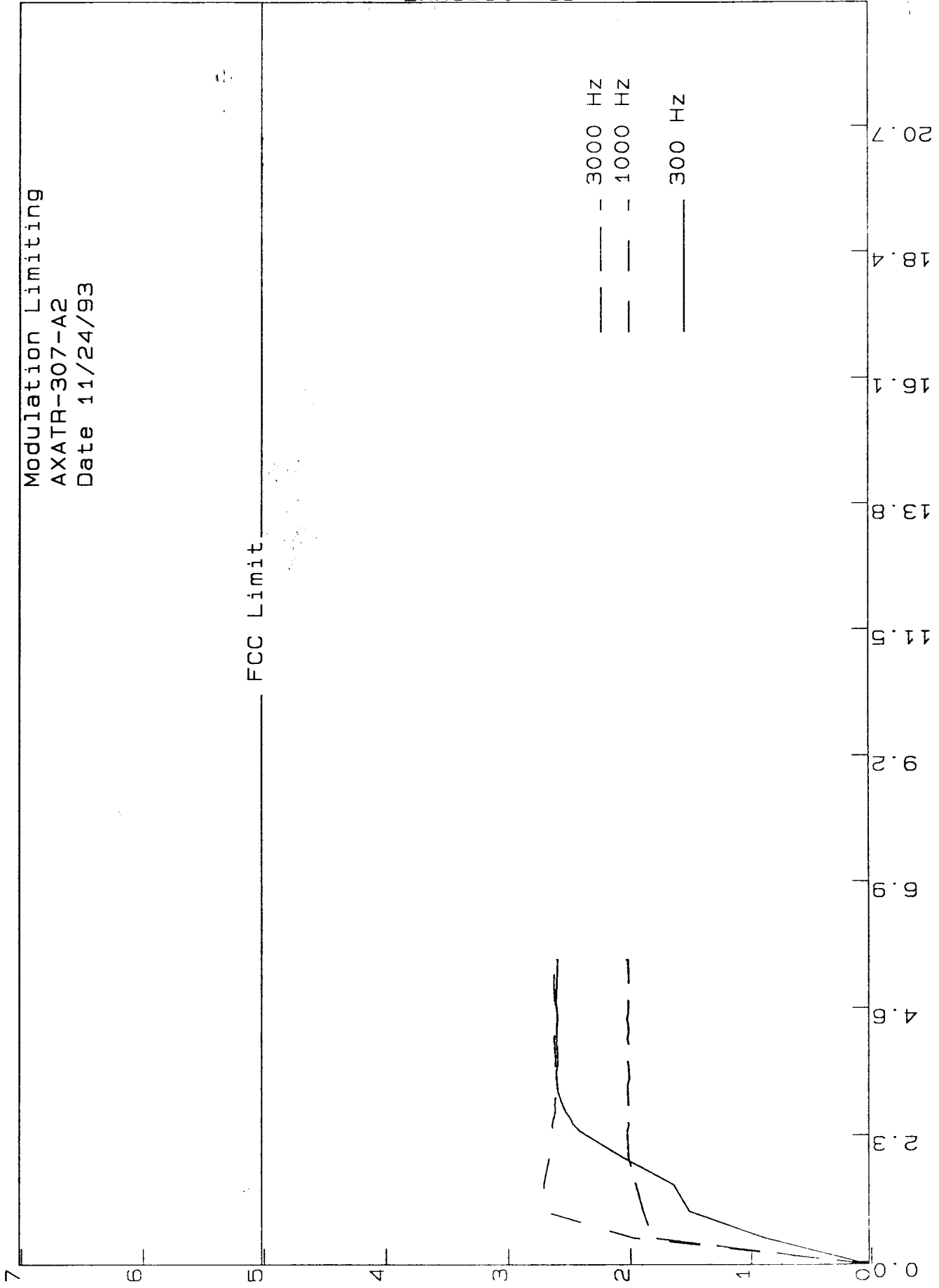
Modulation Limiting
AXATR-307-A2
Date 11/24/93

FCC Limit

Deviation (KHz)

Input level (Volts)

3000 Hz
1000 Hz
300 Hz



DATA FILTER RESPONSE
9600 BAUD HIGH SPEED
AXATR-307-A2

11/23/93

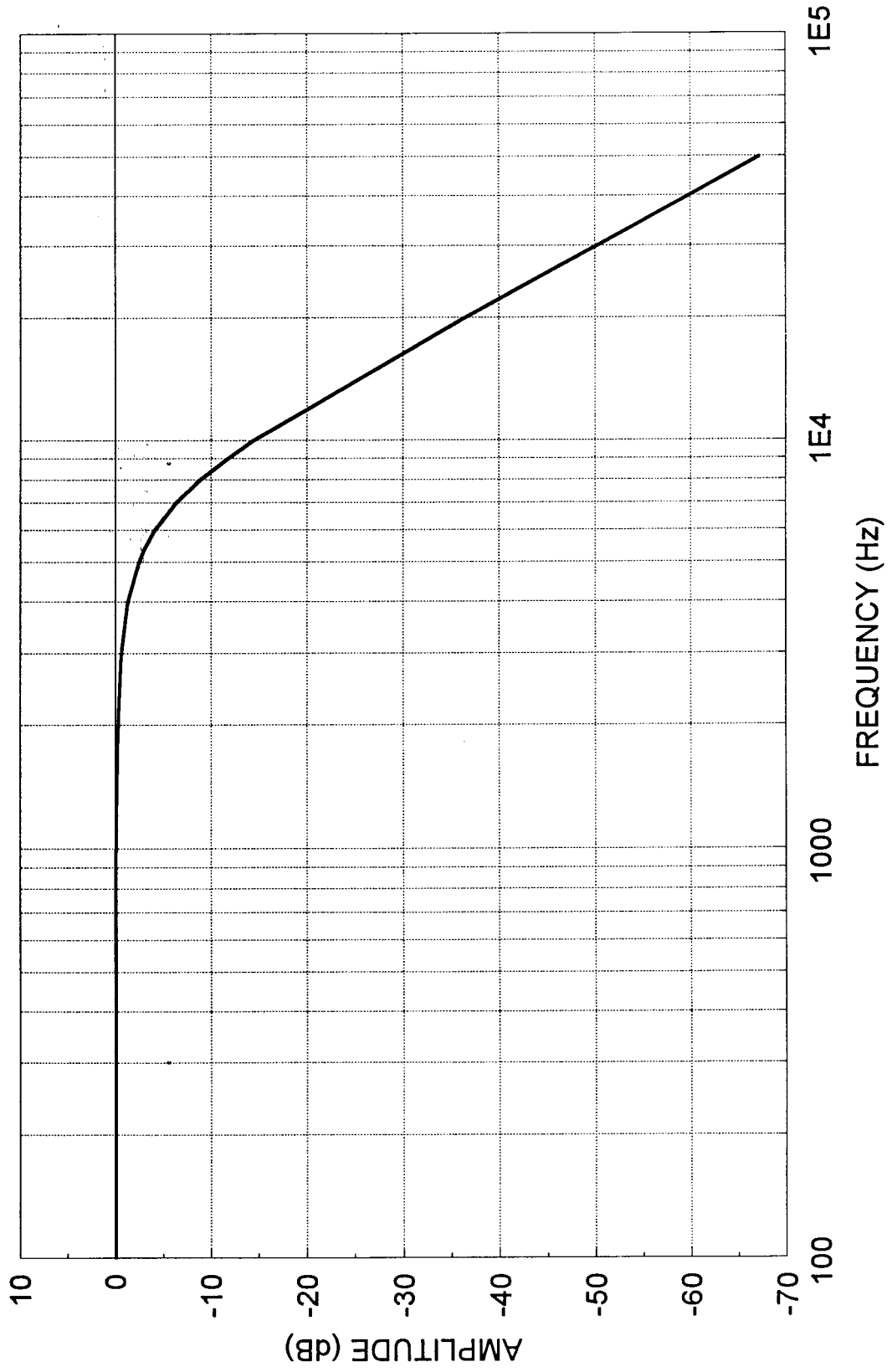


EXHIBIT # 9E

APPLICANT:
ERICSSON GE MOBILE COMMUNICATIONS INC.

FCC ID NO.
AXATR-307-A2

OCCUPIED BANDWIDTH

Per 2.989 (c, 1) the measurements were made per EIA Rs-152B, Paragraph 17.3.1, were used to obtain the results in Exhibits 10B-10E modulated sideband spectrum.

Exhibit 10B	Telephony	$B_n = 2M+2DK$	where $M = 3000$ Hz $D = 5000$ Hz $K = 1$ (assumed)
		$B_n = 16000$ Hz	
	Therefore,	Emission Designator = 16K0F3E	
Exhibit 10C	Telemetry	$B_n = 2M+2DK$	where $M = 2500$ Hz $D = 5000$ Hz $K = 1$ (assumed)
		$B_n = 15000$ Hz	
	Therefore,	Emission Designator = 15K0F2D	
Exhibit 10D	Telegraphy	$B_n = 2M+2DK$	where $M = 2500$ Hz $D = 5000$ Hz $K = 1$ (assumed)
		$B_n = 15000$ Hz	
	Therefore,	Emission Designator = 15K0F2B	
Exhibit 10E	Digital Data, Direct FM	$B_n = 2(B/2)+2DK$	where $B = 9600$ Bd $D = 3200$ Hz $K = 1$ (assumed)
		$B_n = 16000$ Hz	
	Therefore,	Emission Designators = 16K0F1D (Data Transmission) 16K0F1E (Digital Voice)	

APPLICANT: Ericsson GE Mobile Communications Inc.

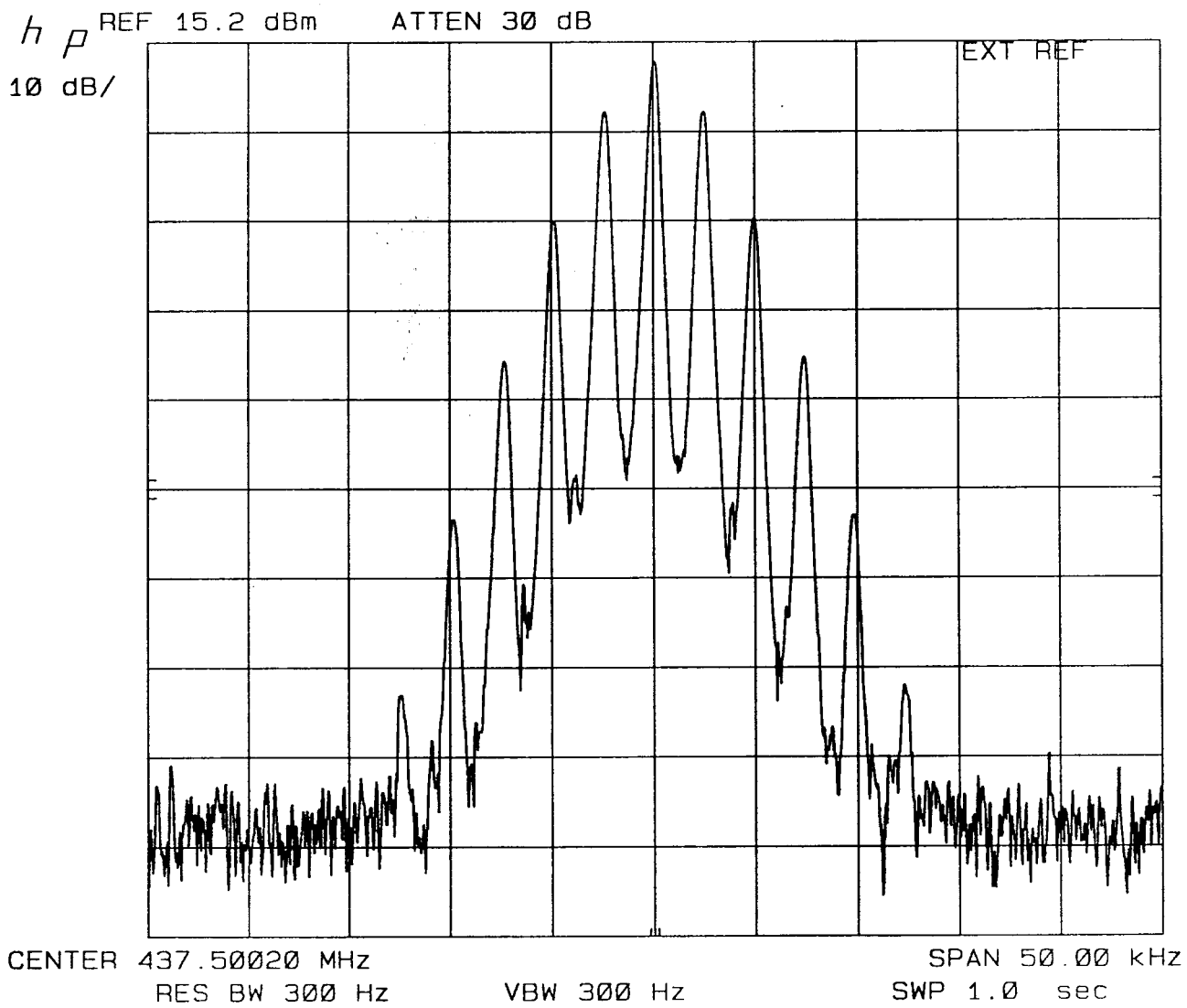
EXHIBIT 10B

FCC ID NO. AXATR-307-A2

OCCUPIED BANDWIDTH

Modulation Sideband Spectrum

Measured Per EIA RS-152-B



Referenced to the Unmodulated Carrier

Modulated with 2500 Hz @ 3 KHz

Analyzer: Vertical = 10 dB/Div.

APPLICANT: Ericsson GE Mobile Communications Inc.

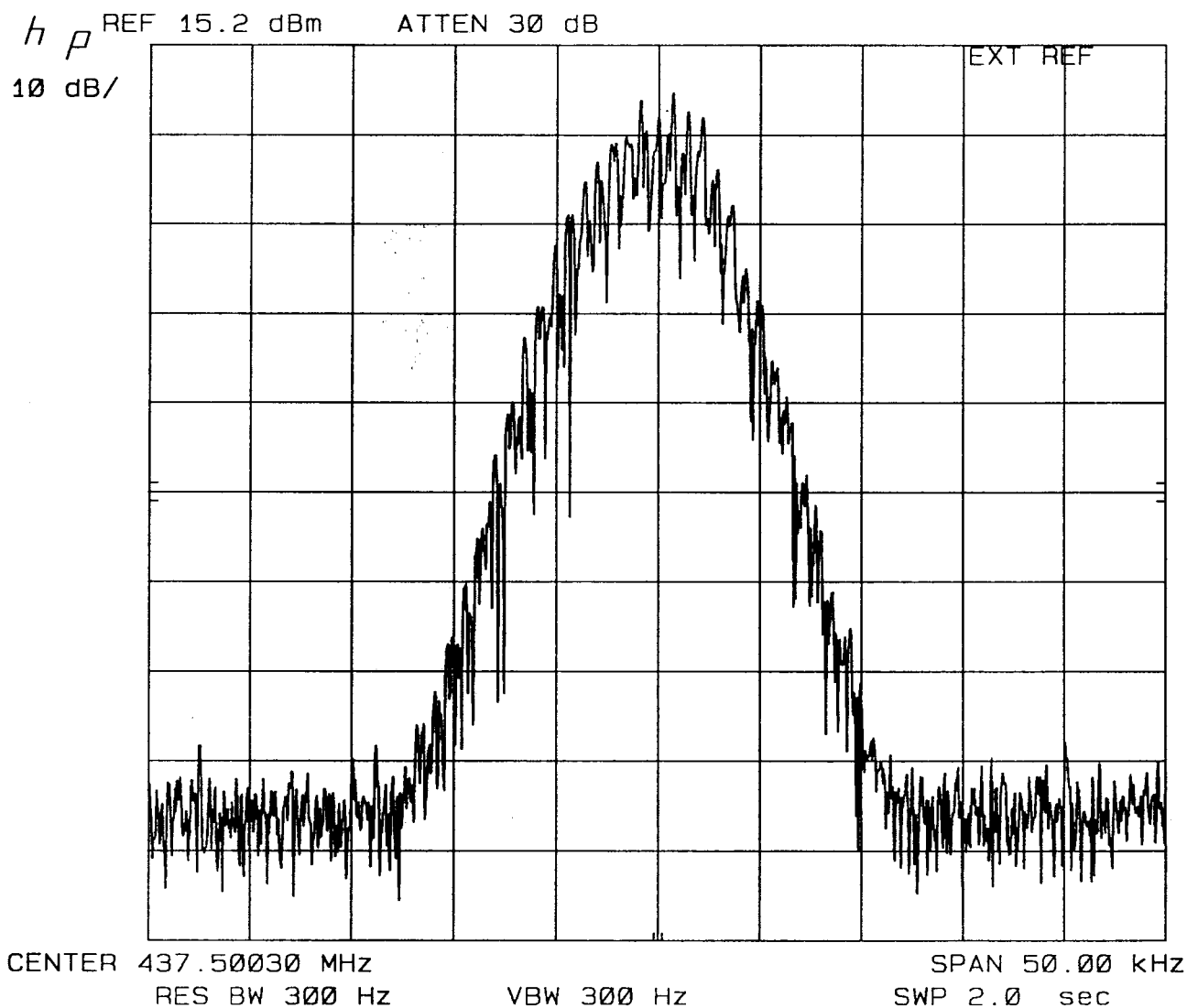
EXHIBIT 10C

FCC ID NO. AXATR-307-A2

OCCUPIED BANDWIDTH

Modulation Sideband Spectrum

Measured Per EIA RS-152-B



Referenced to the Unmodulated Carrier
Modulated with DTMF DIGIT 3 @ 3 KHz DEV.

Analyzer: Vertical = 10 dB/Div.

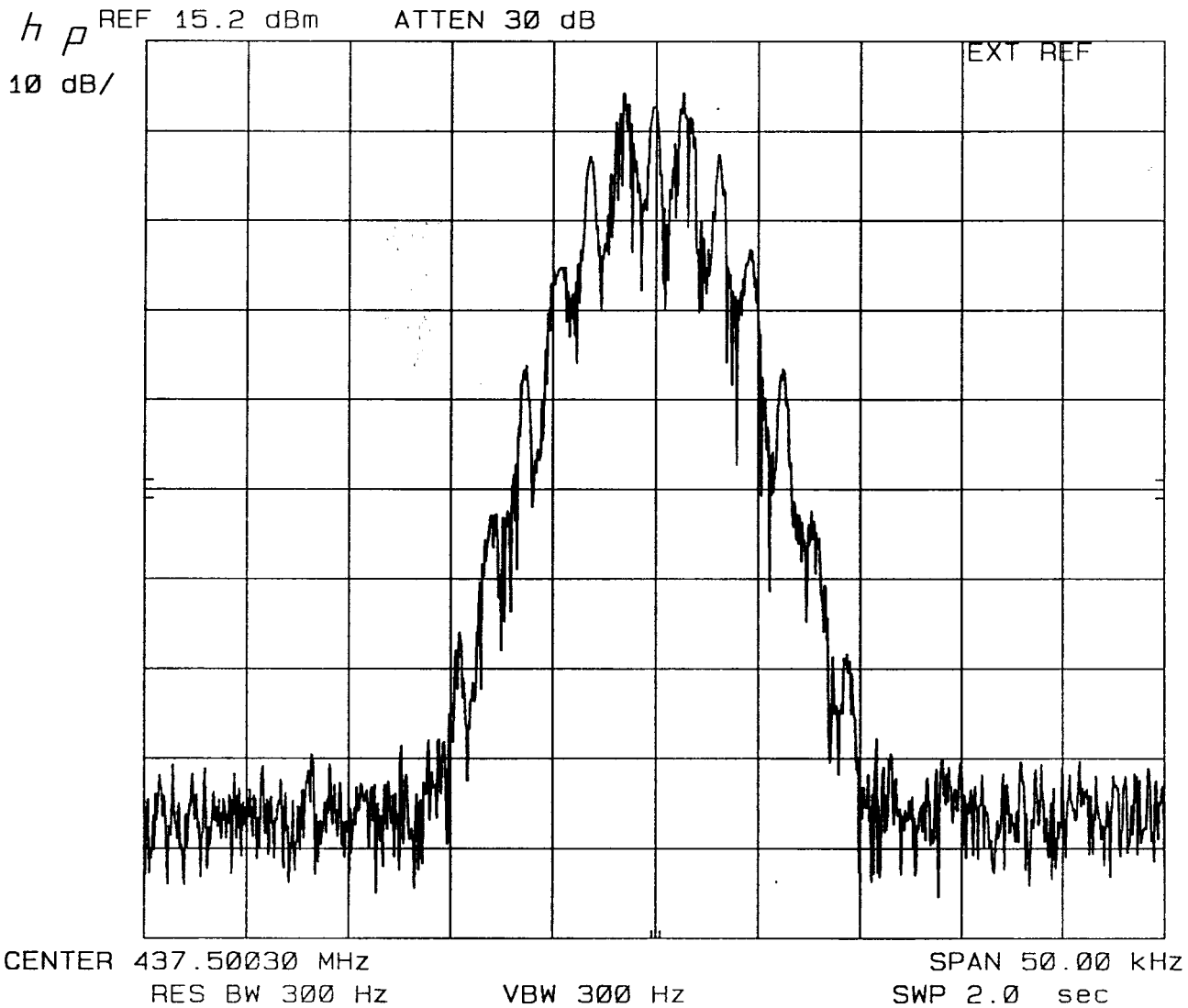
APPLICANT: Ericsson GE Mobile Communications Inc.

FCC ID NO. AXATR-307-A2

OCCUPIED BANDWIDTH

Modulation Sideband Spectrum

Measured Per EIA RS-152-B



Referenced to the Unmodulated Carrier

Modulated with GEXSTAR ID CODE 100 @ 3 KHz DEV.

Analyzer: Vertical = 10 dB/Div.

APPLICANT: Ericsson GE Mobile Communications Inc.

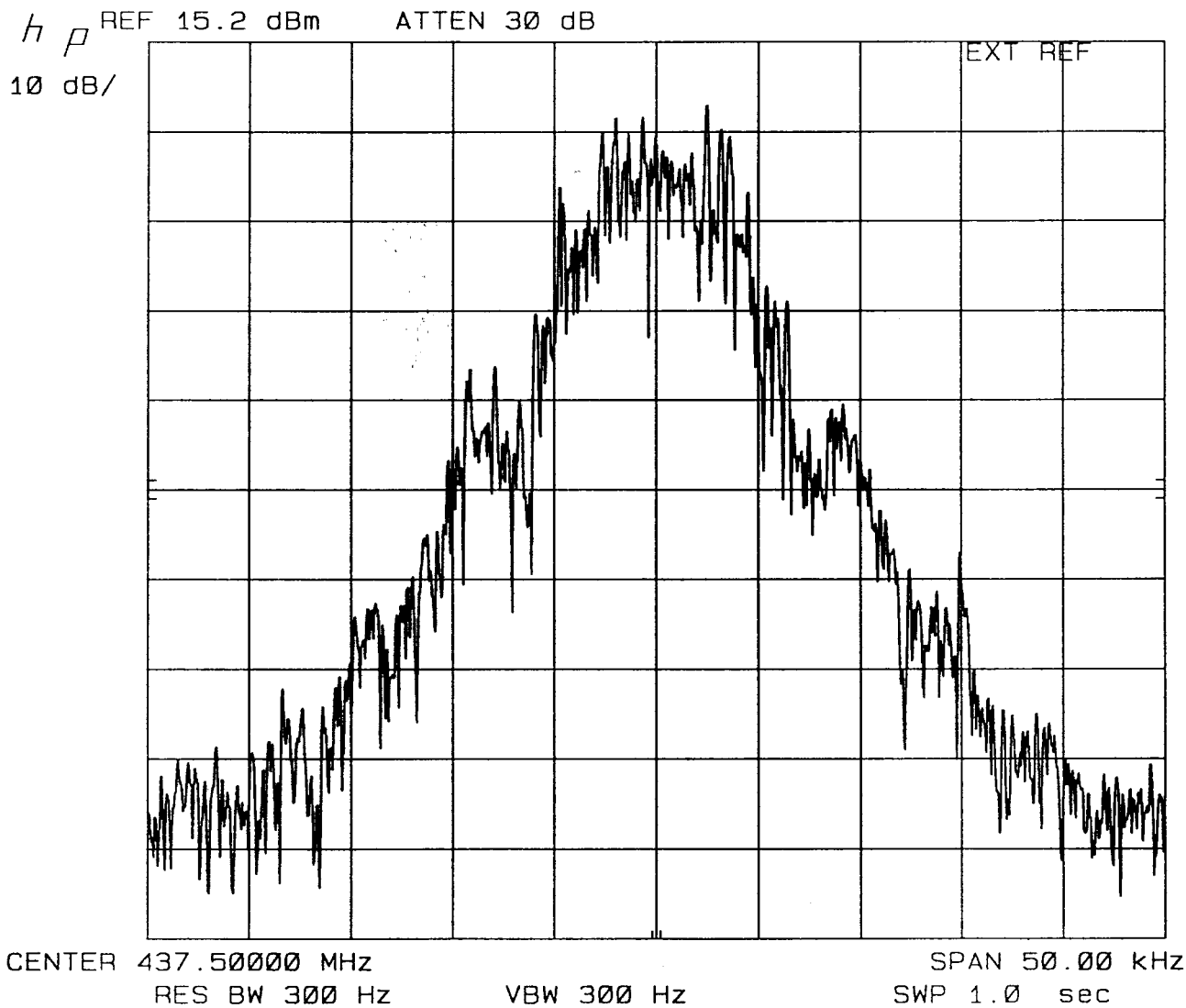
EXHIBIT 10E

FCC ID NO. AXATR-307-A2

OCCUPIED BANDWIDTH

Modulation Sideband Spectrum

Measured Per EIA RS-152-B



Referenced to the Unmodulated Carrier

Modulated with PSEUDORANDOM DATA 9600 BAUD @ 3 KHz DEV.

Analyzer: Vertical = 10 dB/Div.

APPLICANT:
ERICSSON GE MOBILE COMMUNICATIONS INC.

FCC ID NO.
AXATR-307-A2

SPURIOUS EMISSIONS

Reference 2.991 spurious emissions at the antenna terminals (conducted) when properly loaded with an appropriate artificial antenna were measured per EIA RS-152B, Paragraph 4.3.

Results are as shown in the following Exhibits:

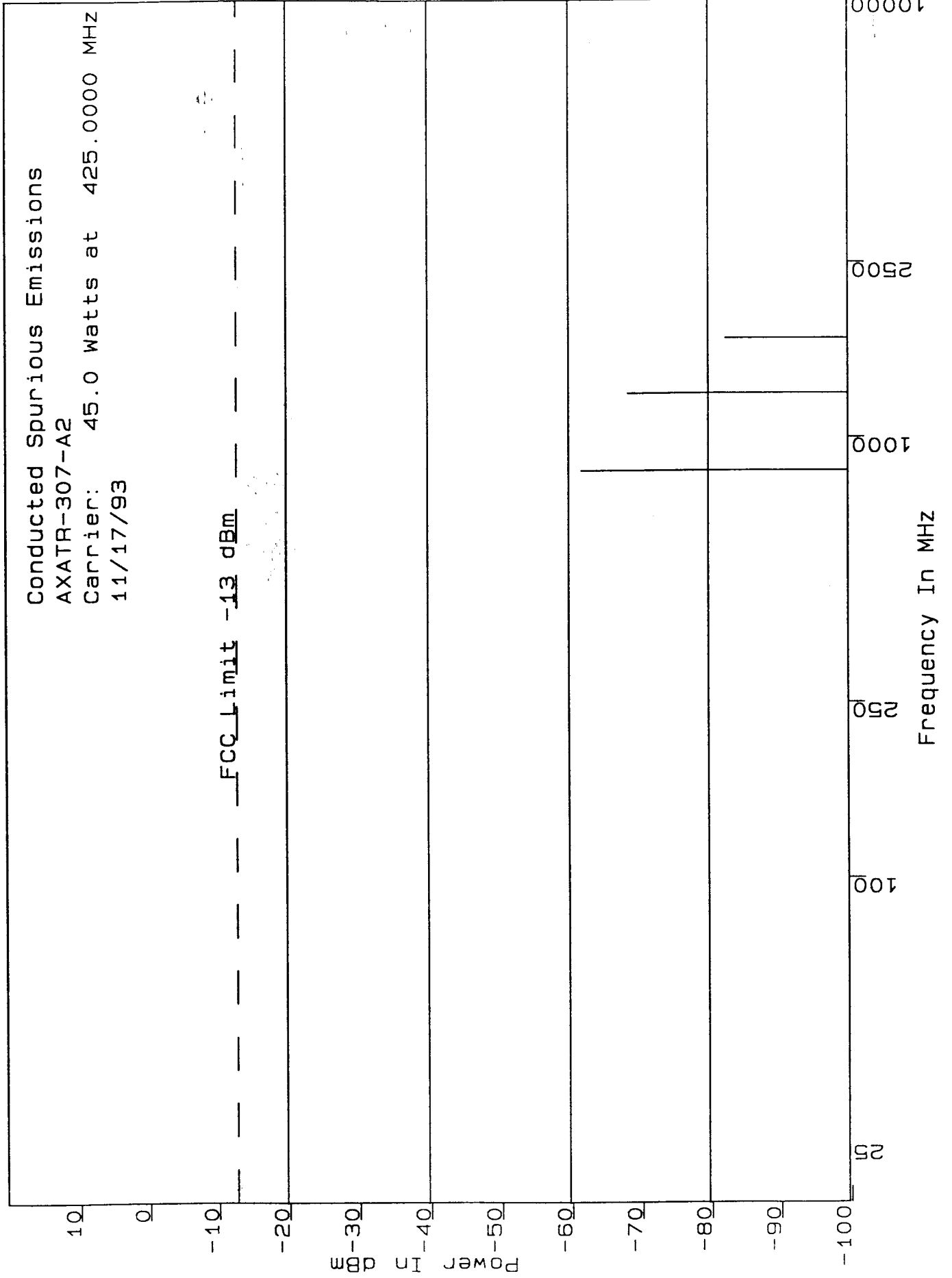
<u>Exhibit</u>		<u>Carrier Frequency</u>
11B	AXATR-307-A2	425 MHz, 45 Watts
11C	AXATR-307-A2	425 MHz, 90 Watts
11D	AXATR-307-A2	450 MHz, 45 Watts
11E	AXATR-307-A2	450 MHz, 90 Watts

Equipment used was:

Hewlett Packard Spectrum Analyzer 8566B.

Reference 2.993 field strength of spurious radiations was measured on our three meter range. The site and equipment are described in the site description and attenuation measurements for the Ericsson/GE three meter radiation site #2 filed with the FCC in Columbia, Maryland, in November of 1990. The measurement procedure is per EIA RS-152B, but done on a three meter test site. Results are shown on the following Exhibits:

<u>Exhibits</u>		<u>Carrier Frequency</u>
11F	AXATR-307-A2	425 MHz, 45 Watts
11G	AXATR-307-A2	425 MHz, 90 Watts
11H	AXATR-307-A2	450 MHz, 45 Watts
11I	AXATR-307-A2	450 MHz, 90 Watts



Conducted Spurious Emissions

AXATR-307-A2

Carrier: 90.0 Watts at 425.0000 MHz
11/17/93

FCC Limit -13 dBm

Power In dBm

Frequency In MHz

10000
2500
1000
250
100
25

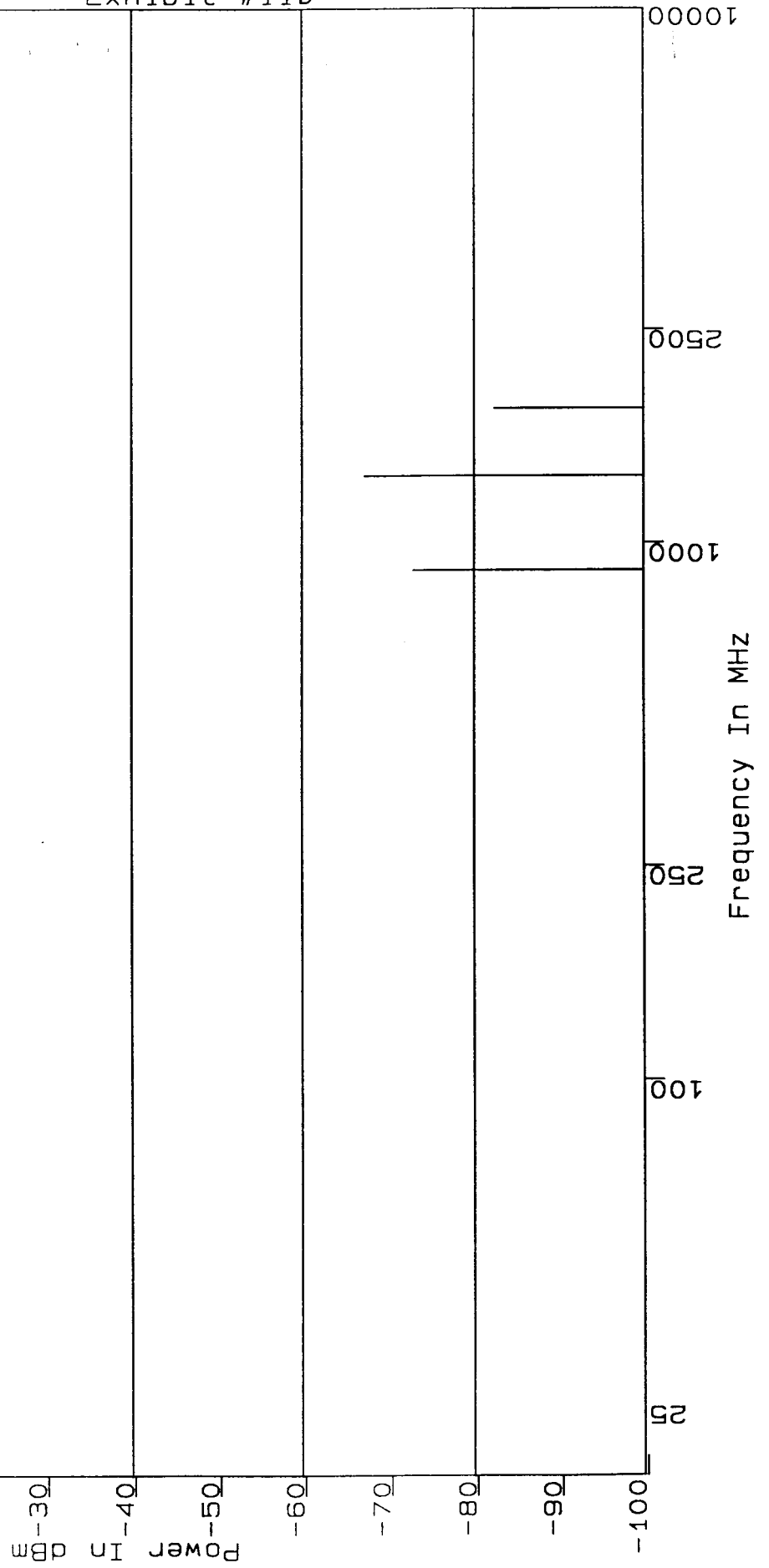
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100

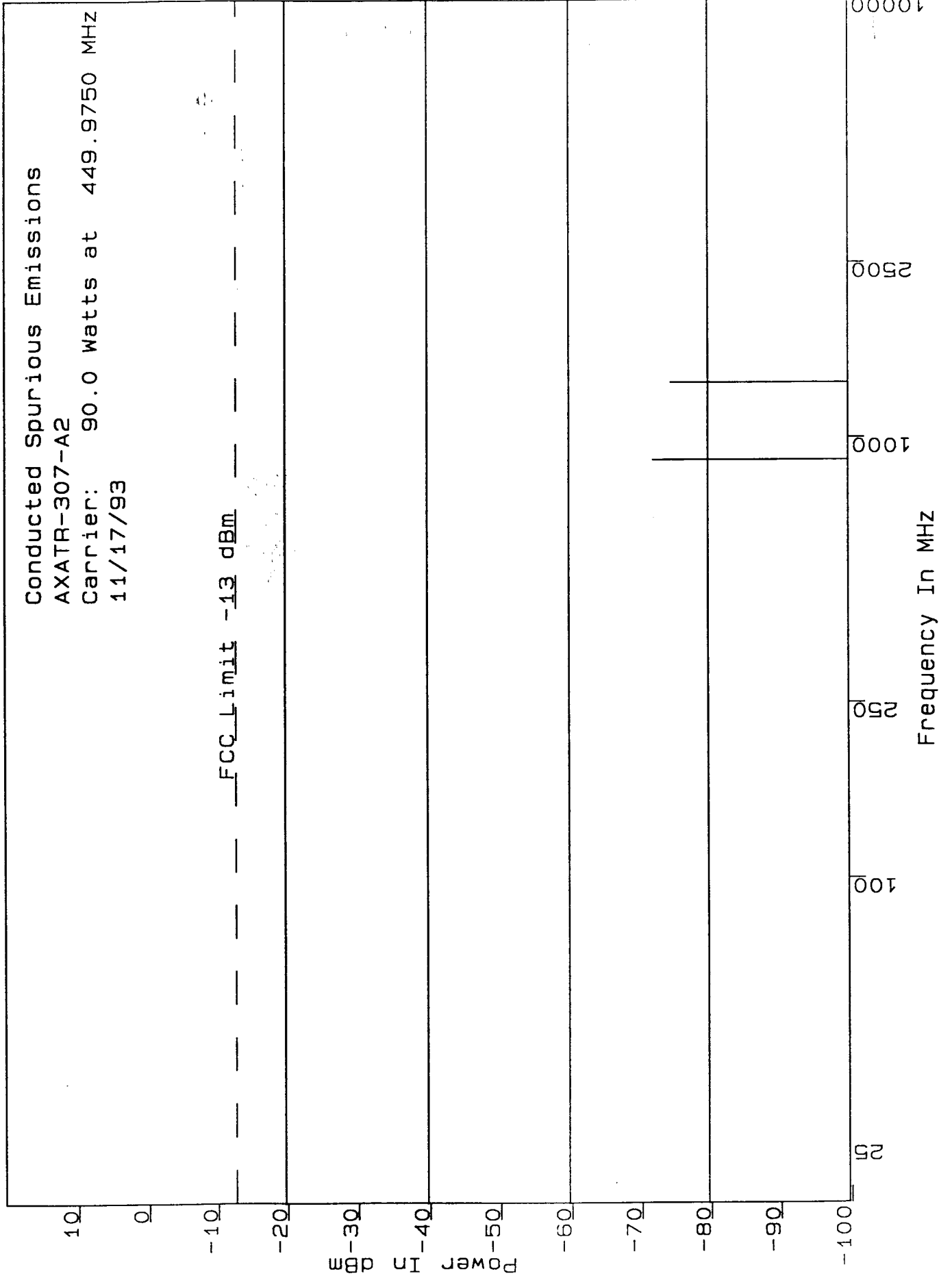
Conducted Spurious Emissions

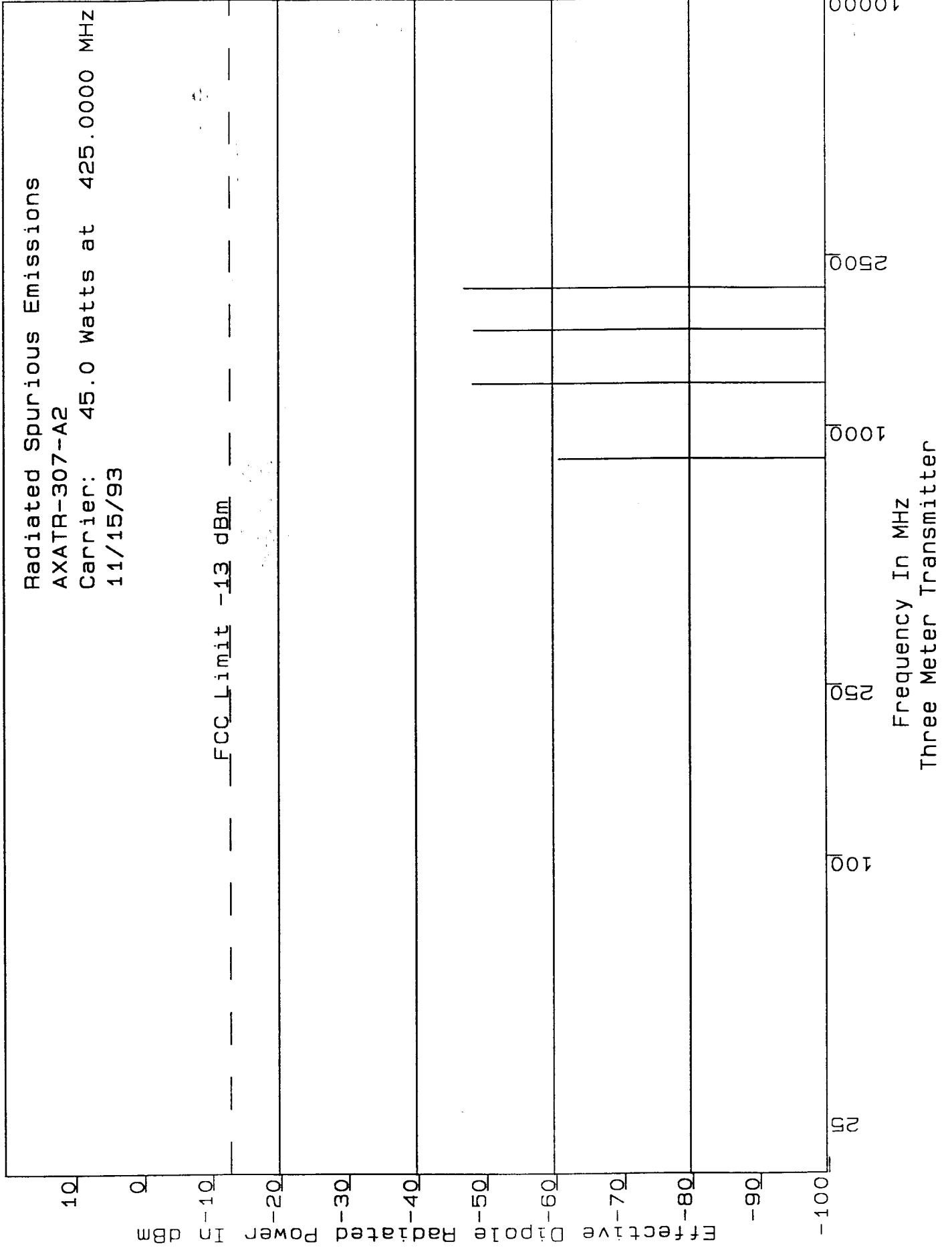
AXATR-307-A2

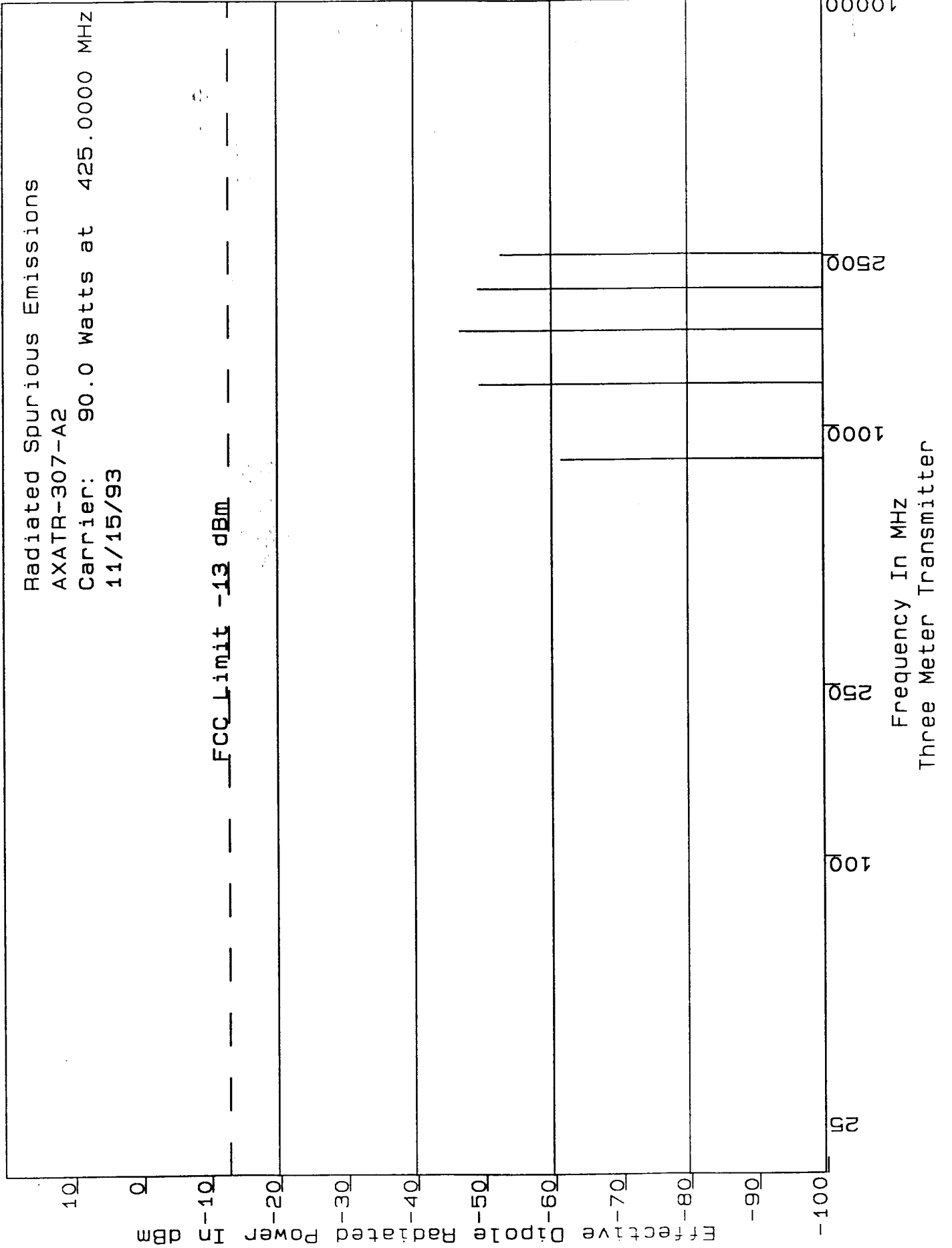
Carrier: 45.0 Watts at 449.9750 MHz
11/17/93

FCC Limit -13 dBm









Radiated Spurious Emissions

AXATR-307-A2

Carrier: 45.0 Watts at 449.9750 MHz
11/17/93

FCC Limit -13 dBm

10000

2500

1000

250

100

25

Frequency In MHz
Three Meter Transmitter

10

0

-10

-20

-30

-40

-50

-60

-70

-80

-90

-100

Effective Radiated Power In dBm

Radiated Spurious Emissions

AXATR-307-A2

Carrier: 90.0 Watts at 449.9750 MHz
11/17/93

FCC Limit -13 dBm

Effective Power In dBm

Frequency In MHz
Three Meter Transmitter

Exhibit #11I

10000

2500

1000

250

100

25

10

0

-10

-20

-30

-40

-50

-60

-70

-80

-90

-100

EXHIBIT 12A

APPLICANT:
ERICSSON GE MOBILE COMMUNICATIONS INC.

FCC ID NO.
AXATR-307-A2

FREQUENCY STABILITY

Paragraph (a, 1) (b) (d, 1) variation of output frequency as a result of either temperature or voltage variation is reported in the graphs on the following sheets.

Frequency Stability:

Measurement Procedure: Please reference amended KT-140-A filing for Supplemental Report on Oscillator Measurements.

Exhibit 12B

Frequency Versus Temperature

Exhibit 12C

Frequency Versus Voltage

Test Equipment Used:

Hewlett Packard Counter

Model 5386A

Thermotron Temperature Chamber

Model 2800

Hewlett Packard Voltmeter

Model 3478A

FREQUENCY Vs TEMPERATURE
AXATR-307-A2

12/01/93.

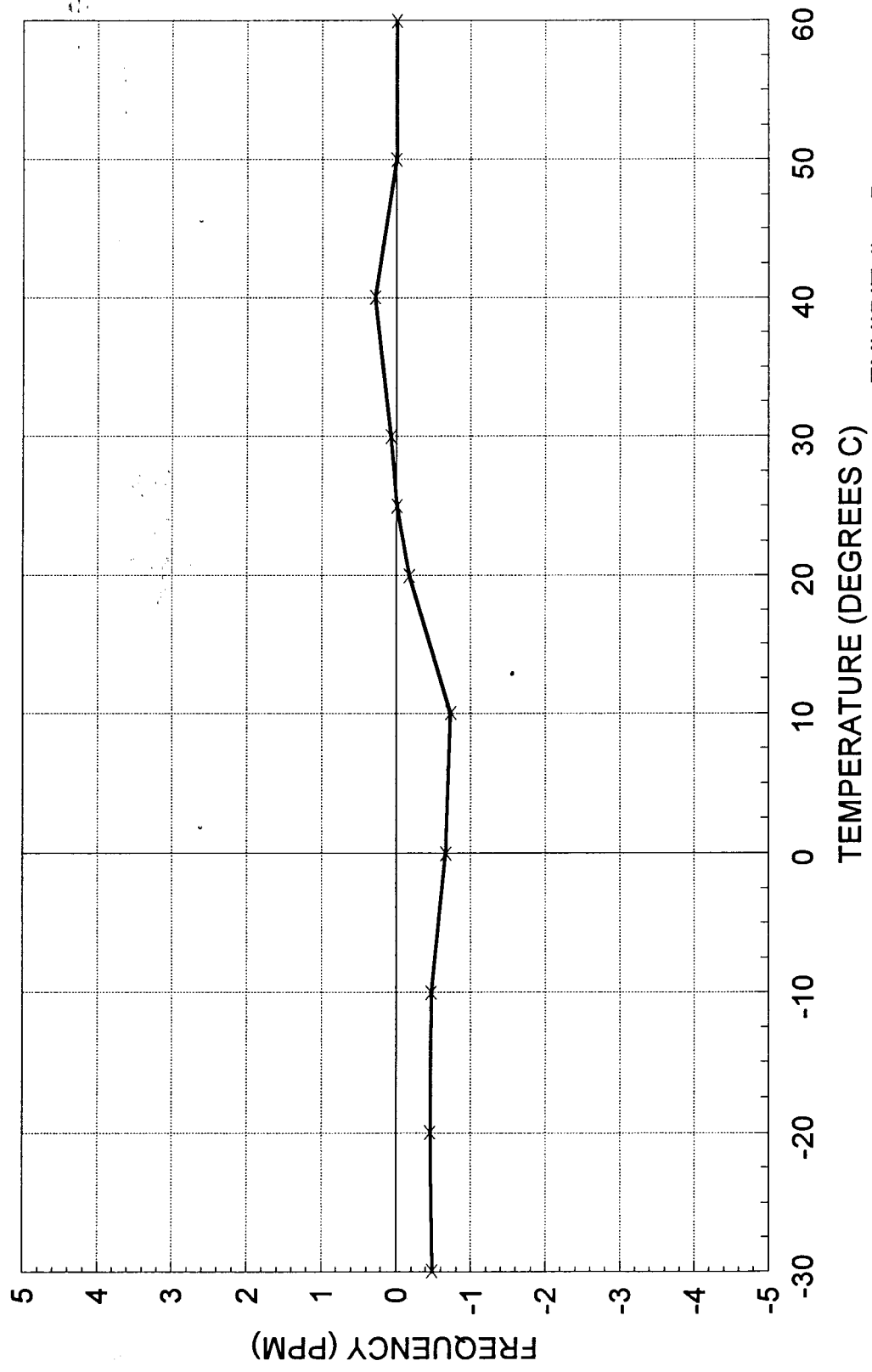


EXHIBIT # 12B

FREQUENCY Vs VOLTAGE
AXATR-307-A2

12/01/93

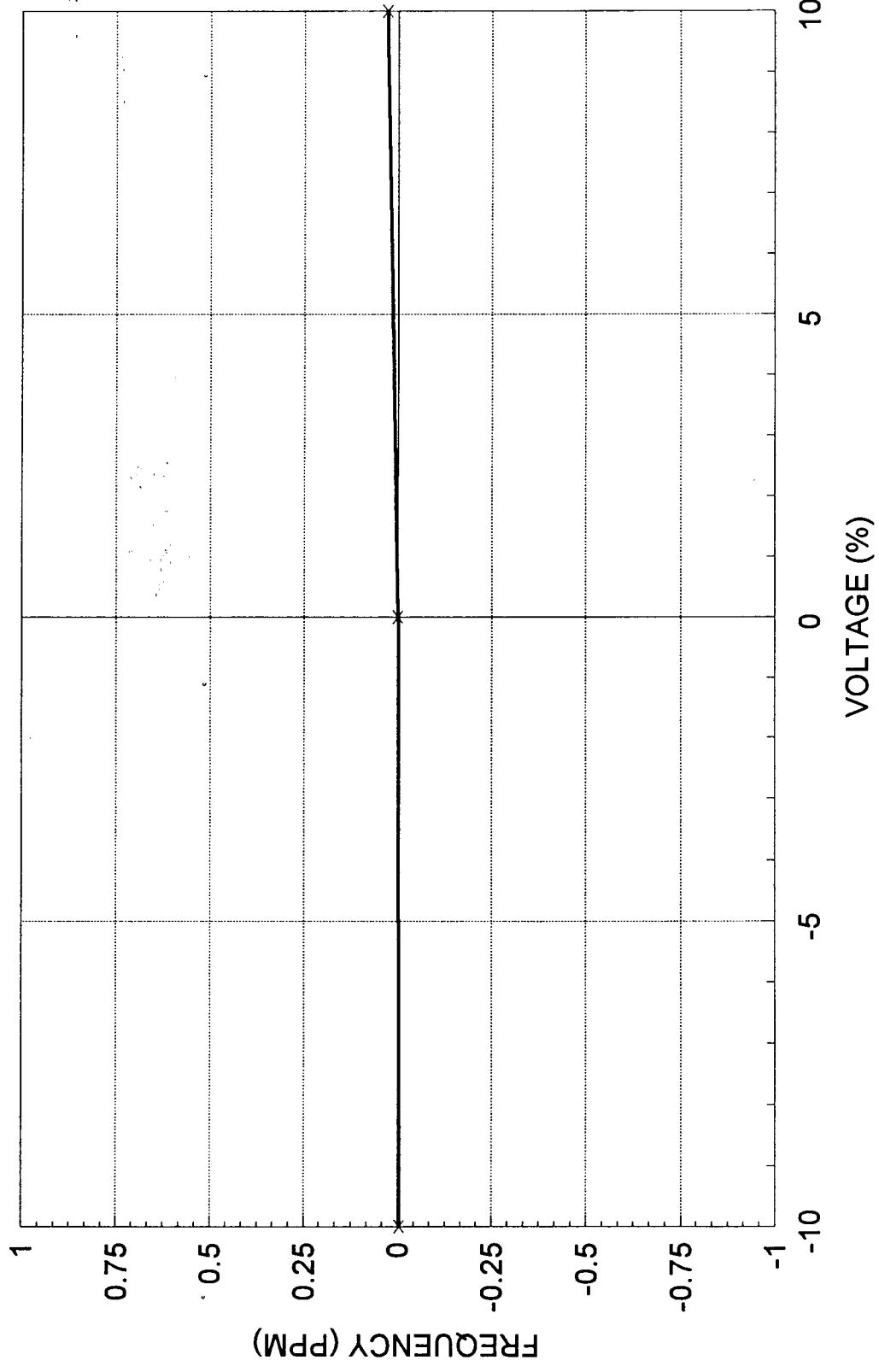


EXHIBIT # 12C

EXHIBIT 13

APPLICANT:
ERICSSON GE MOBILE COMMUNICATIONS INC.

FCC ID NO.
AXATR-307-A2

IDENTIFICATION NAMEPLATE

ERICSSON GE

COMB:
SER#: 7654321



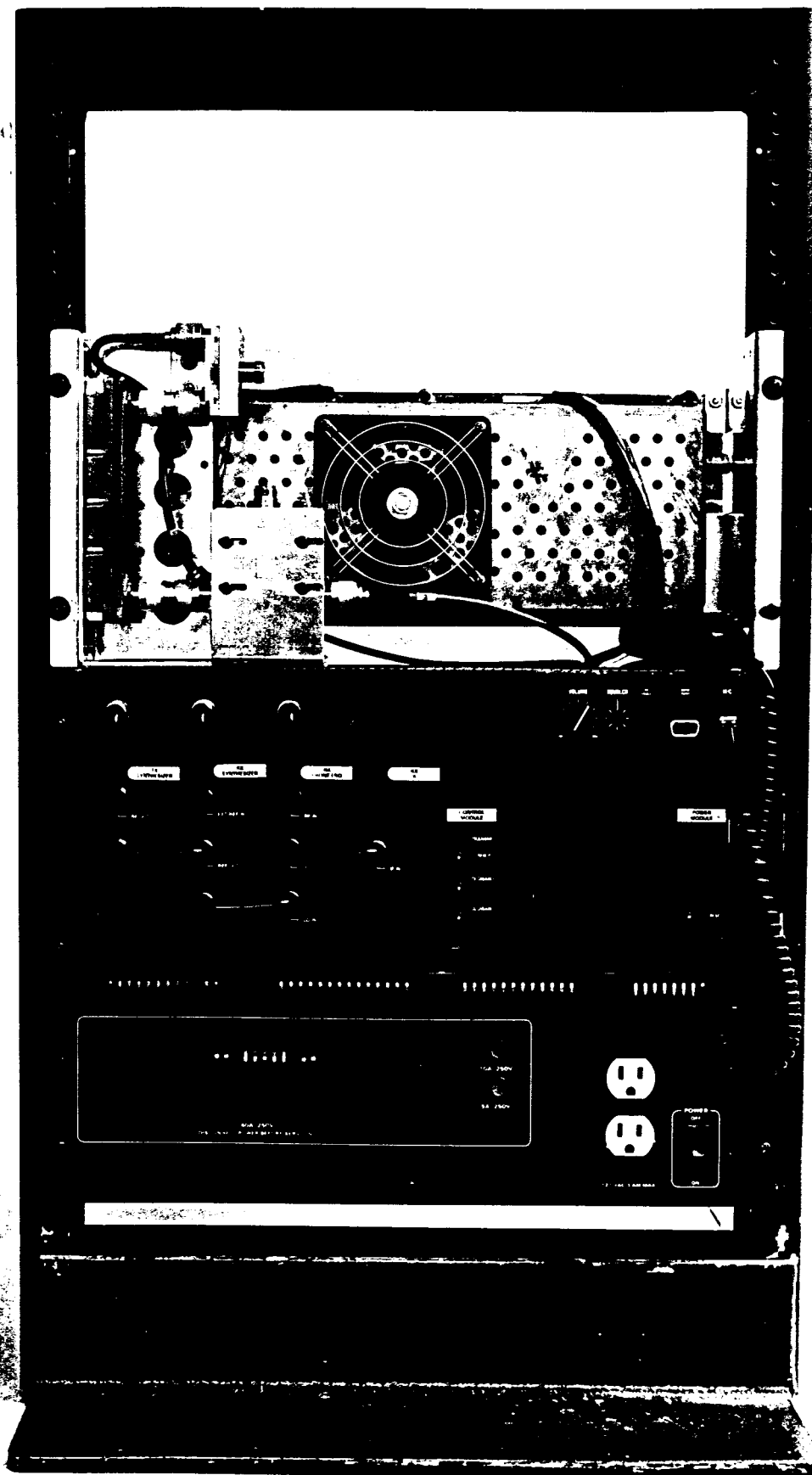
FCC ID: AXATR-307-A2

DOC:
INPUT:
120/240 VAC Single Phase 60 HZ
9/5 A 1100 W

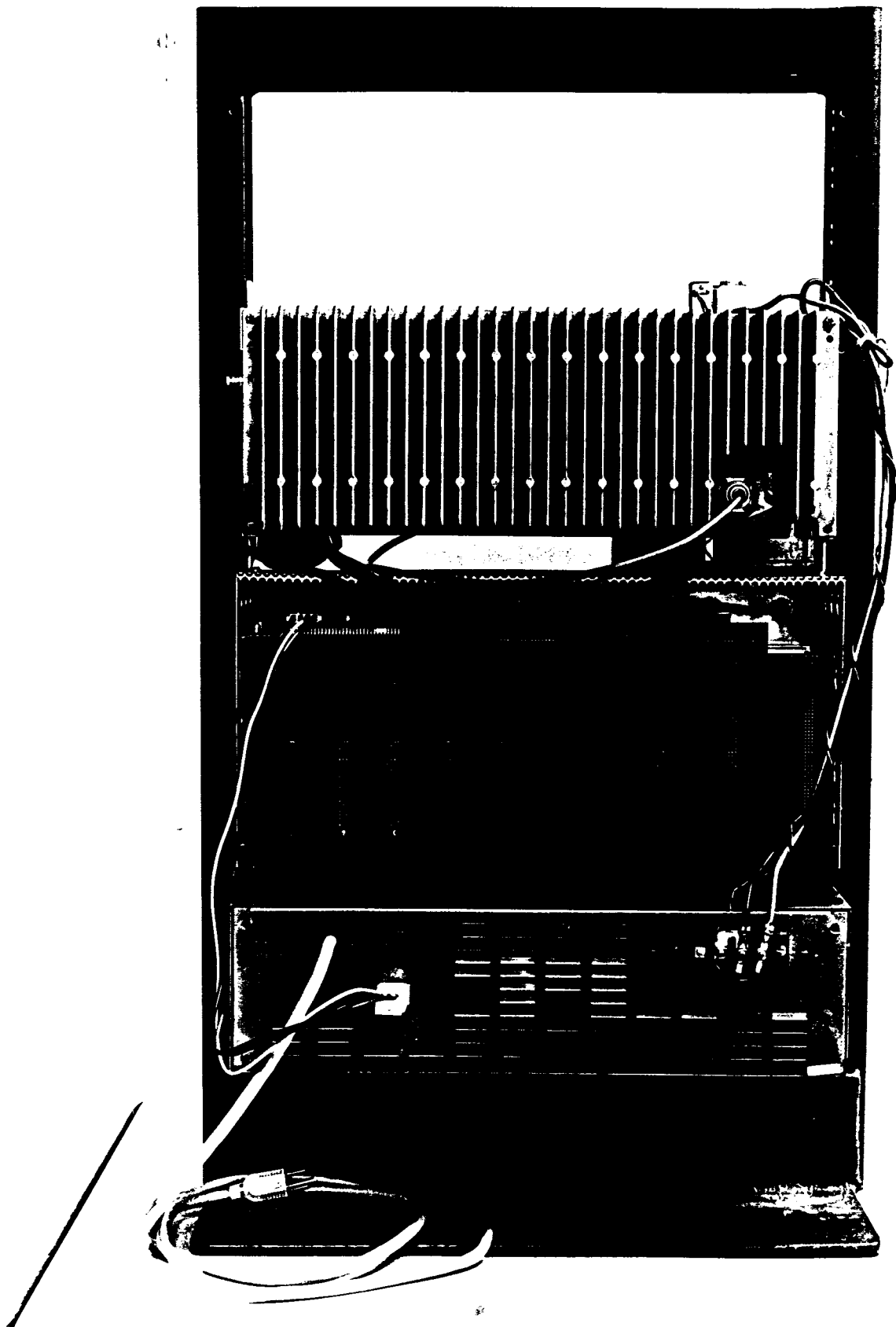
91432

MADE IN LYNCHBURG, VA. USA

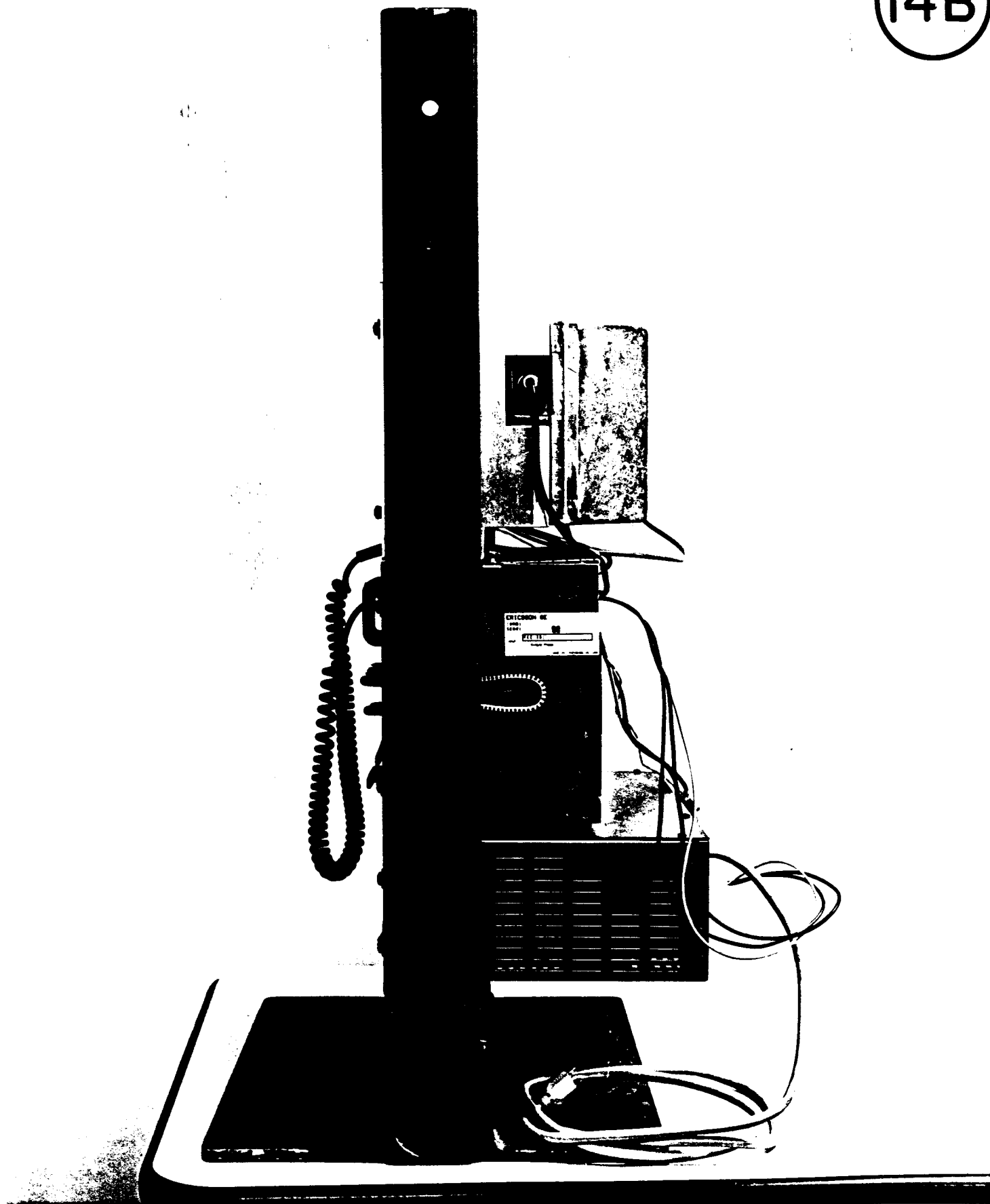
14A



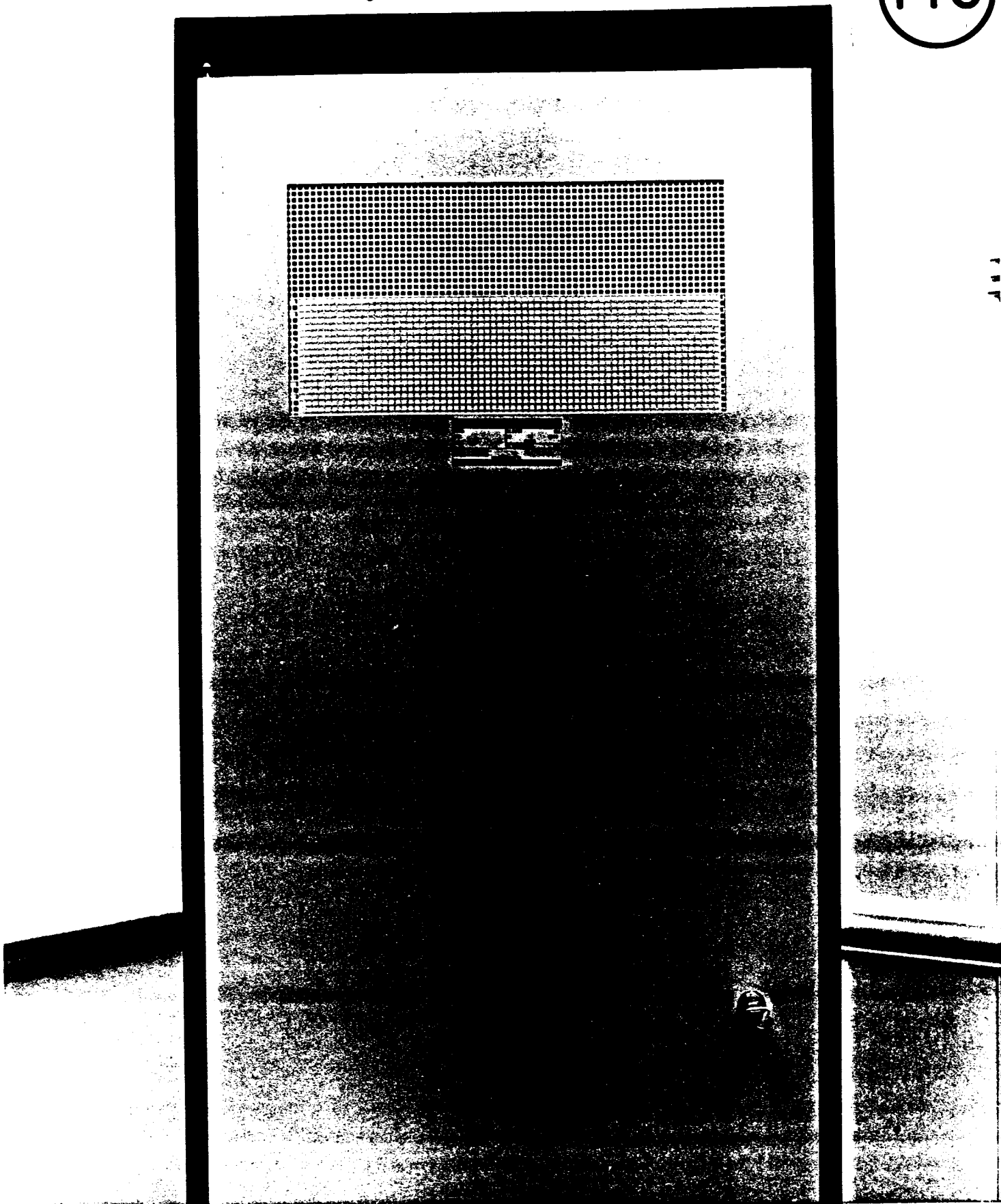
8-6-91-2



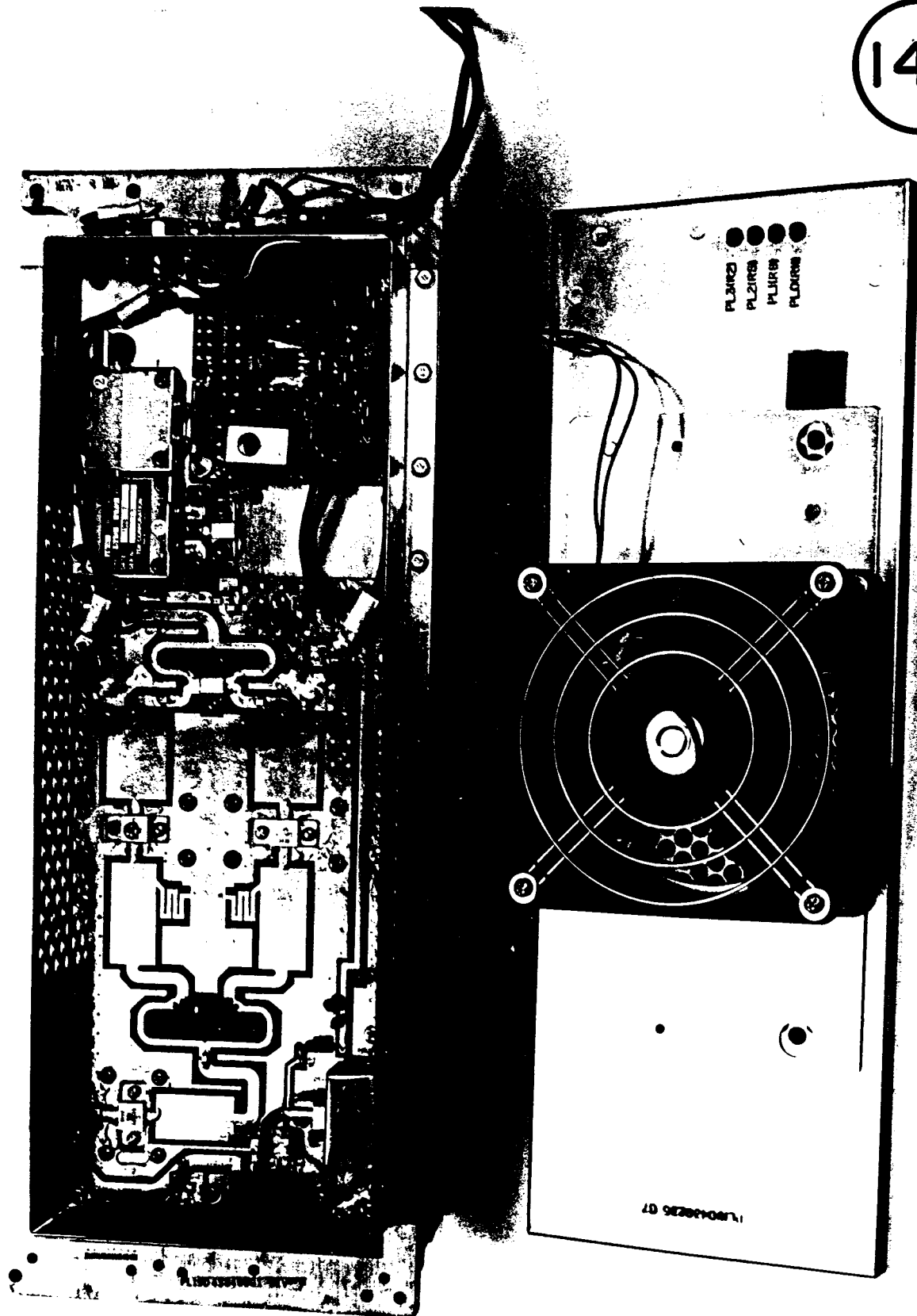
14B



8-6-91-3

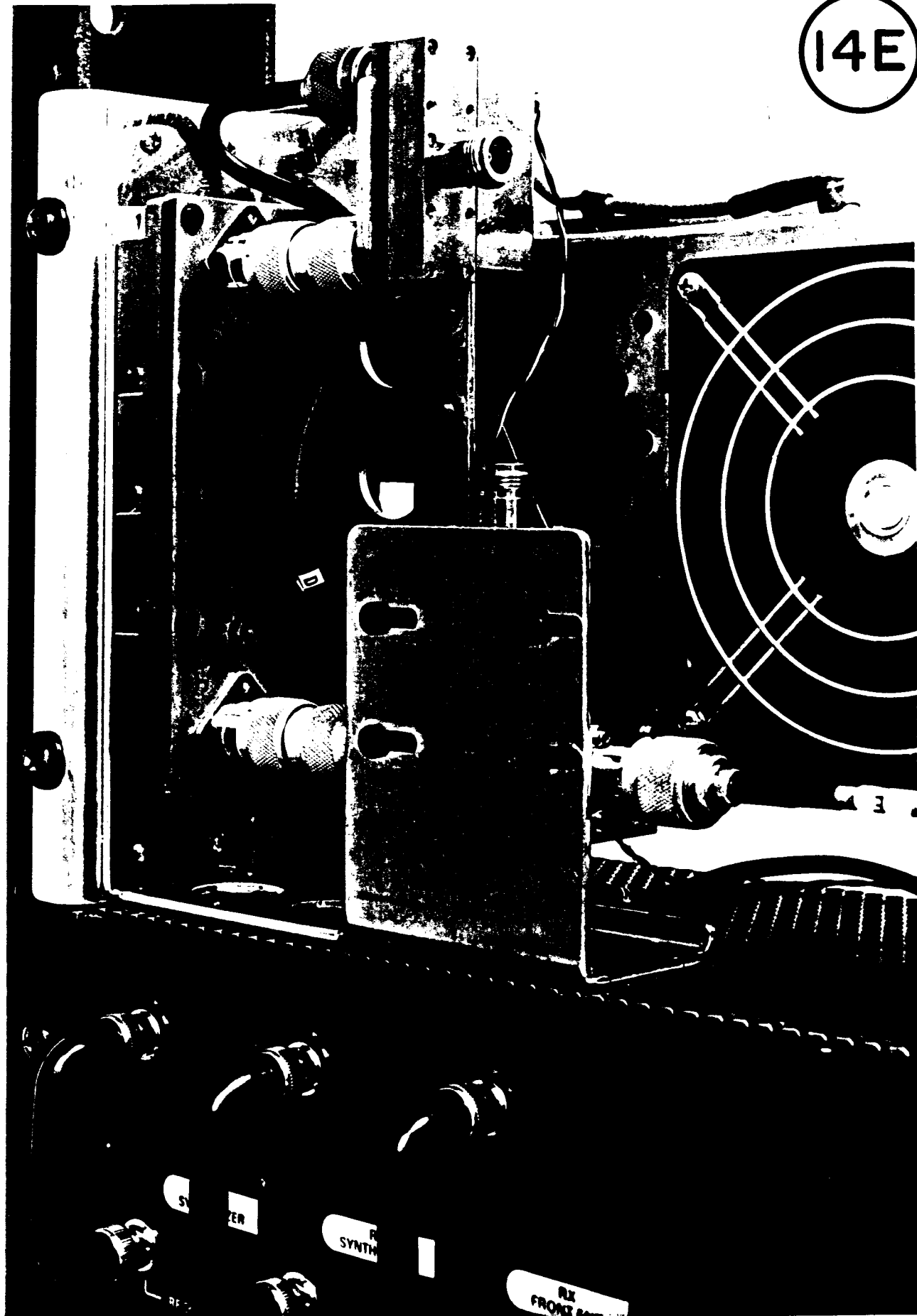


14D

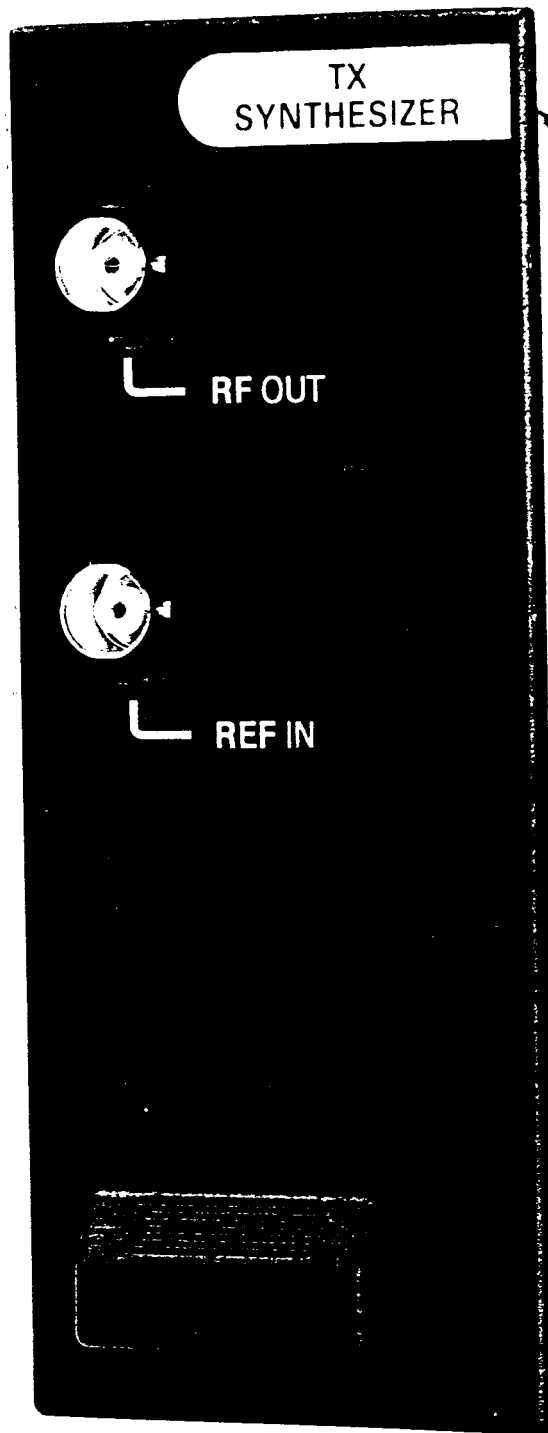


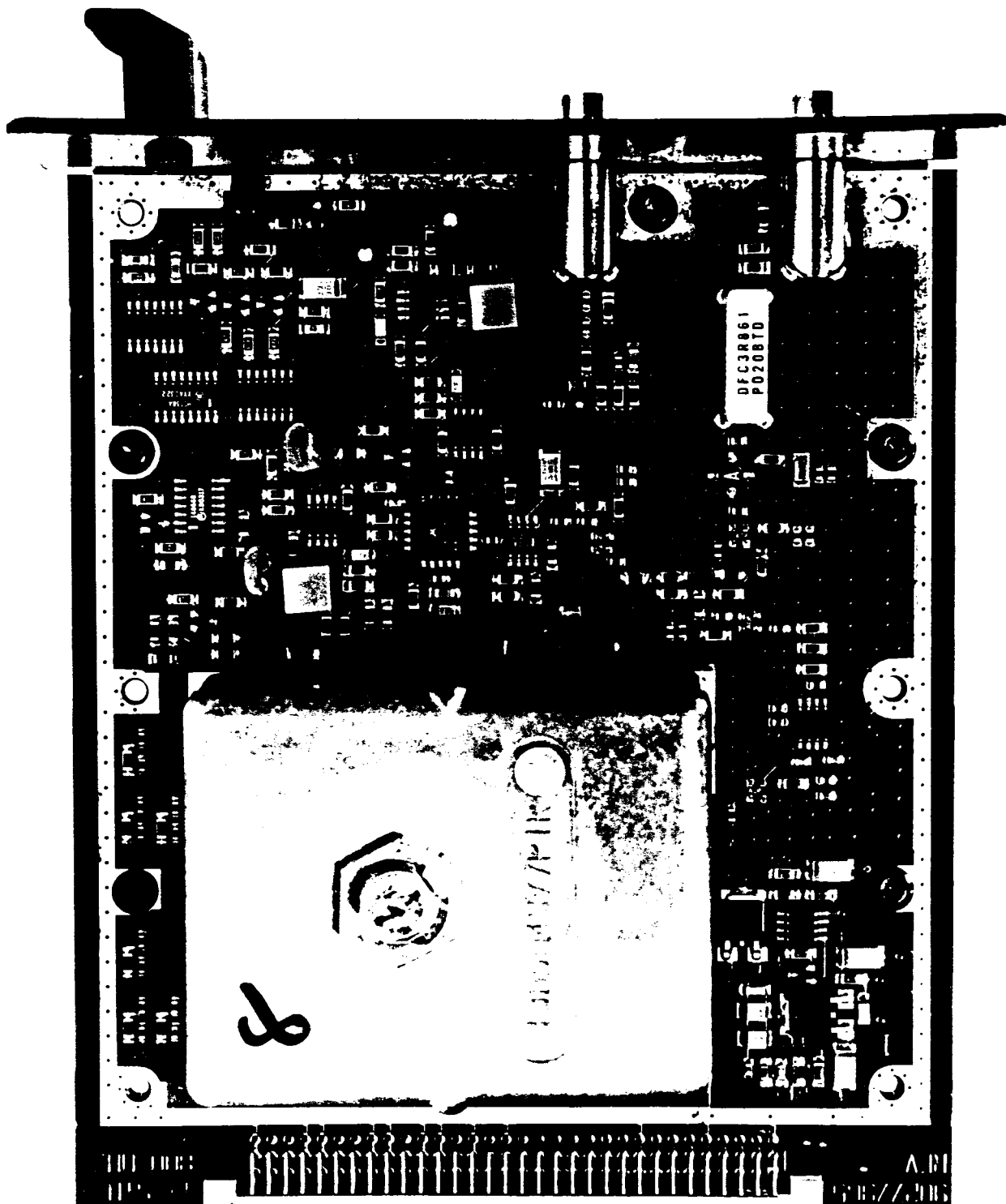
3-15-90-4

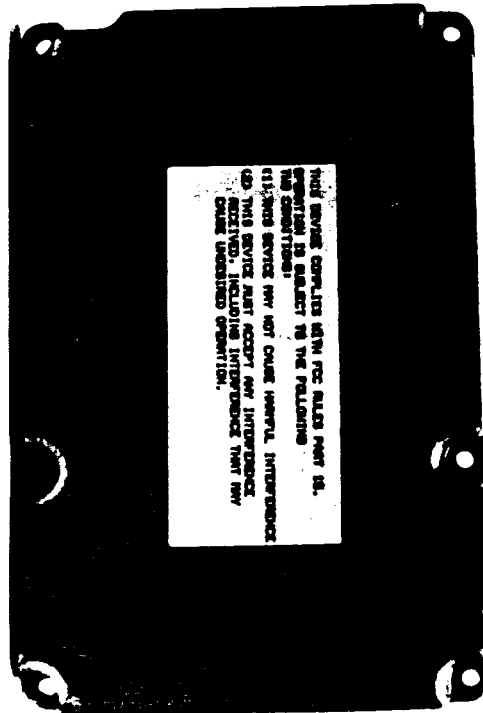
14E



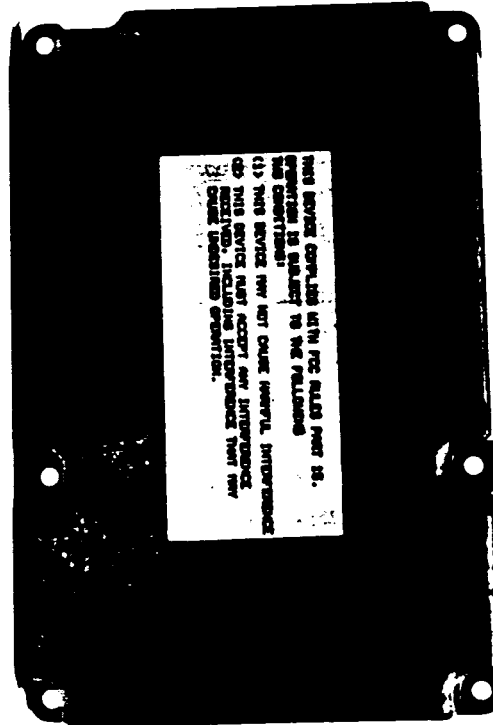
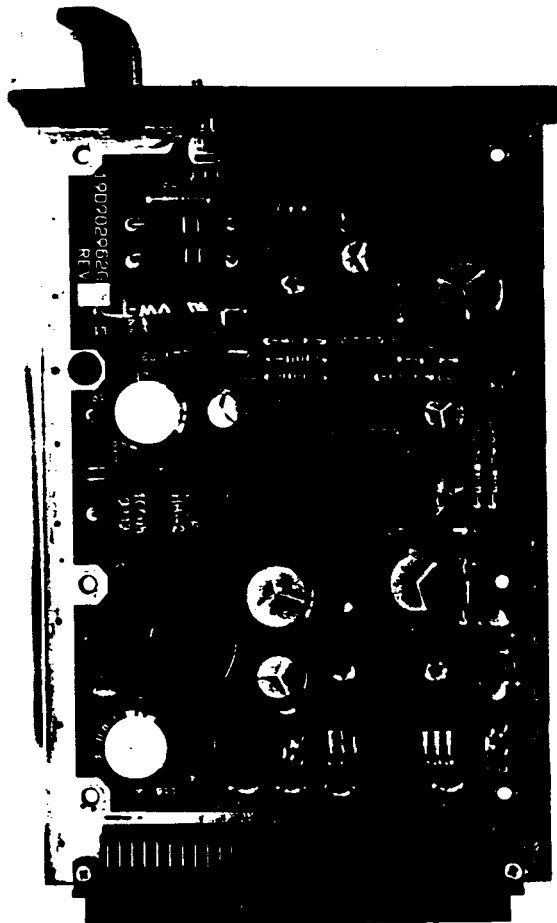
8-6-91-5



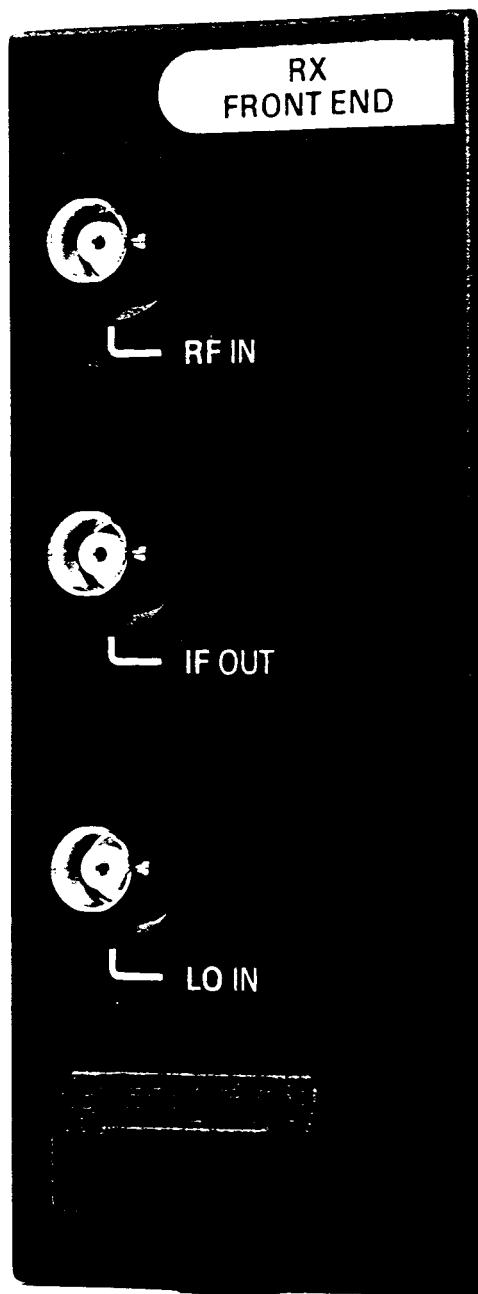




8-6-91-7

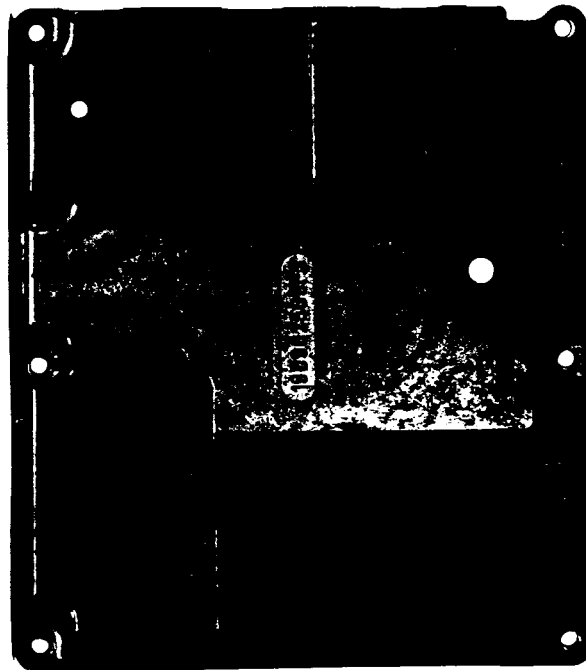
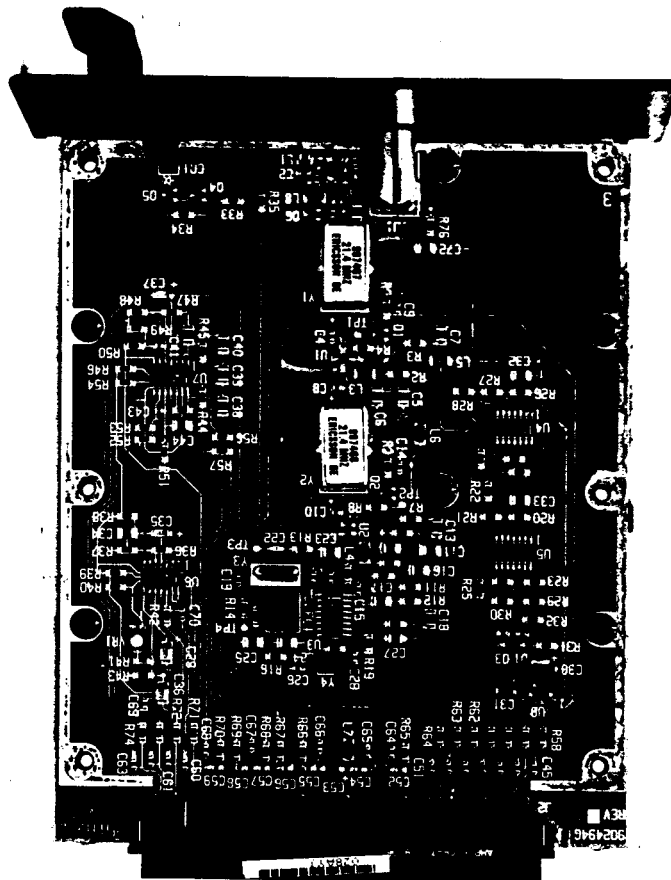


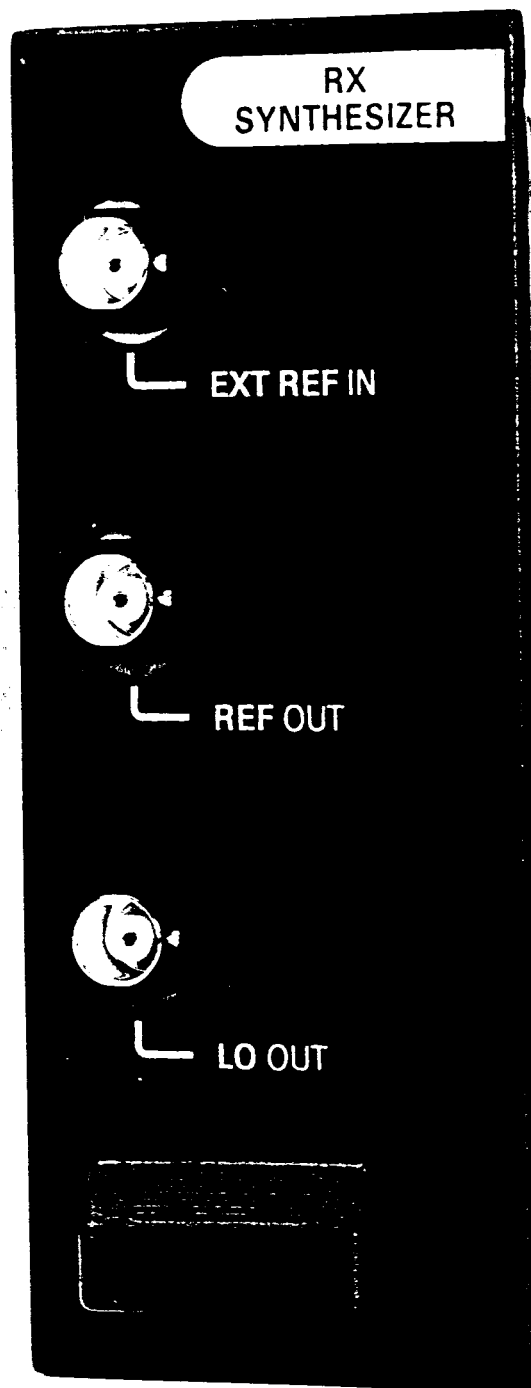
8-6-91-8





10-19-93-6







10-19-93-3

Facsimile Cover Sheet

To: George Tannahill
Company: Federal Communications
Commission
Phone: 301-725-1585 ex 237
Fax: 301-344-2050

From: John Rothgeb
Company: Ericsson GE Mobile
Communications INC.
Phone: 804-528-7476
Fax: 804-948-6510

Date: 3-08-94

**Pages including this
cover page:** 3

Comments:

I received your fax, dated 2/21/94, referencing AXATR-307-A2, requesting information on the modulation limiting and audio frequency response curves. Enclosed are new curves which eliminate the present confusion. Additionally, the emission designators should be 16KOF1D and 16KOF1E, instead of 15KOF1D and 15KOF1E as requested on the 731 form. A revised 731 form is being mailed to you via courier.

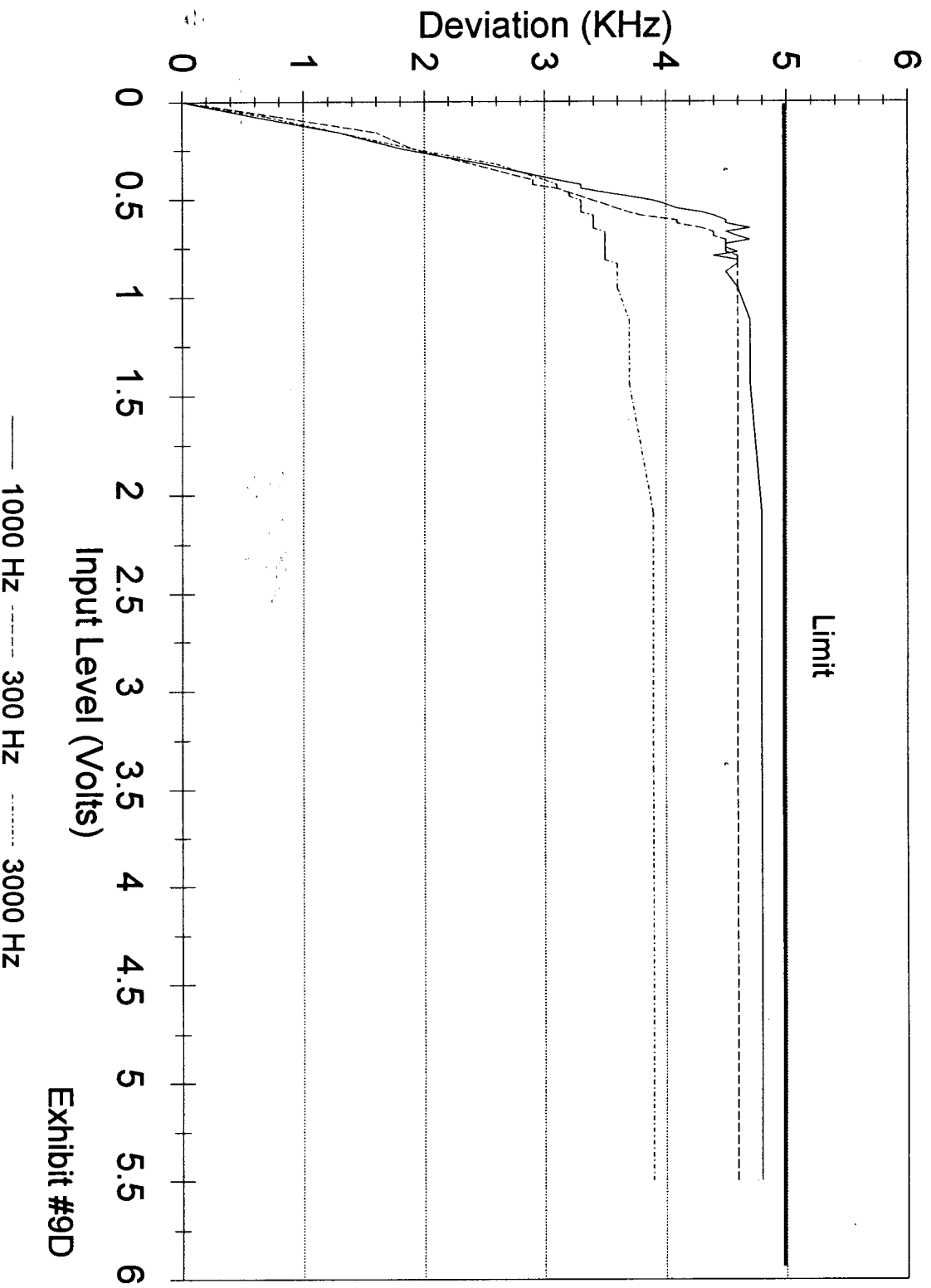
Regards,

SECTION III				Bureau Use Only	
1.(a) INSTEAD OF APPLICANT, FCC IS AUTHORIZED TO MAIL ORIGINAL GRANT TO (See instructions): Firm name, number, street, city, NA state, and ZIP Code				LI DN DM	
(b) NAME AND TITLE OF PERSON AT ABOVE ADDRESS TO RECEIVE GRANT: NA				RG	
2. INFORMATION CONTACT, IF DIFFERENT FROM ITEM 5, PAGE 1 (See instructions): Firm name, contact person, NA number, street, city, state, and ZIP Code				Code Reviewer	
3.(a) TELEPHONE NUMBER (include area code and extension - USA ONLY): (804) 528-7476		3.(b) FAX NUMBER (include area code and extension - USA ONLY): (804) 948-6510			
4. Does this application include a request for confidentiality for any portion(s) of the data contained in this application pursuant to 47 CFR 0.459 of the Commission's Rules? (See instructions) ☐ Yes ☒ No					
5. Does the applicant desire the Commission to defer grant of this application pursuant to 47 CFR 0.457(d)(1)(ii)? (See instructions) ☐ Yes ☒ No					
6. Kind of equipment authorization requested (check ONE box only): ☐ Certification ☒ Type Acceptance ☐ Type Approval ☐ Notification					
7.(a) Kind of equipment:			(b) Equipment will be operated under FCC Rule Part(s): 90		
8. Application is for (Check ONE box only): ☒ 1 Original equipment ☐ 2 Change in identification of presently authorized equipment * ☐ 3 Class II permissive change or modification of presently authorized equipment <i>* If box 2 is checked, complete items 9(a) and (b).</i>				9.(a) FCC ID before change in identification: NA (b) Grant date of FCC ID in 9(a) above: NA	
10. EQUIPMENT SPECIFICATIONS:					
(a) Frequency range in MHz 425-450 MHz	(b) Rated RF power output in watts 45-90 Watts	(c) Frequency tolerance % , Hz, ppm +1.5 ppm	(d) Emission designator 16K0F3E 15K0F2D 15K0F2B 16K0F1D 16K0F1E	(e) Microprocessor model number NA	
11. Type of equipment tested: ☐ Production ☒ Pre-Production ☐ Prototype					
12.(a) Is the equipment, or section(s) thereof, subject to more than one equipment authorization? ☐ Yes ☒ No <i>If YES, complete items 12(b), (c), (d), or (e) as appropriate.</i>					
(b) Additional equipment authorization(s) required for equipment: ☐ Certification ☐ Type Acceptance ☐ Type Approval ☐ Notification					
(c) Granted FCC ID or FCC ID listed on RX or RX section application: NA		(d) Granted FCC ID or FCC ID listed on TX or TX section application: NA		(e) Granted FCC ID or FCC ID listed on other device application: NA	

Modulation Limiting

AXATR-307-A2

02/25/94



TRANSMITTER AUDIO FREQUENCY RESPONSE
AXATR-307-A2

02/22/94

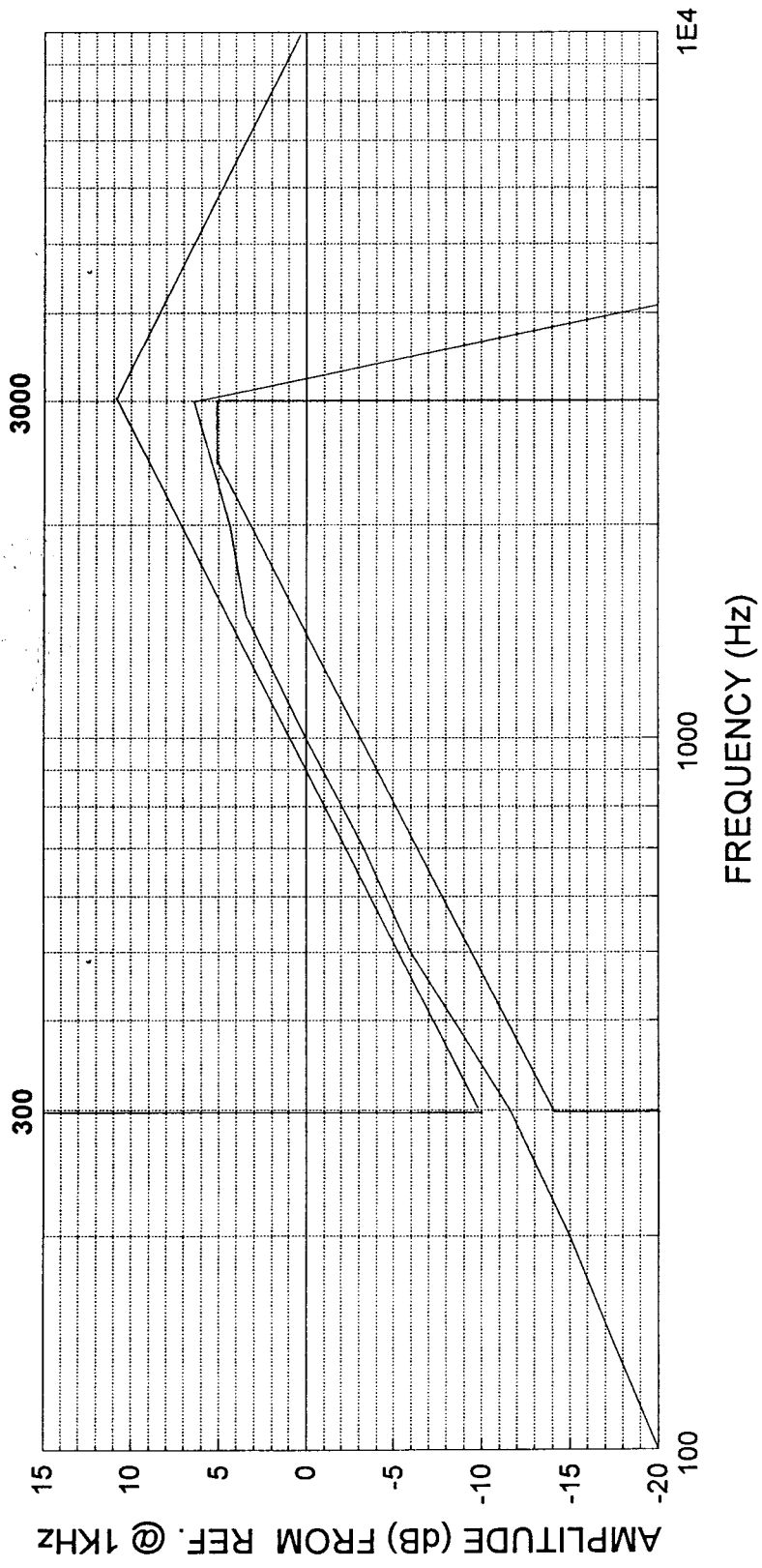


EXHIBIT # 9B

Modulation Limiting

AXATR-307-A2

02/25/94

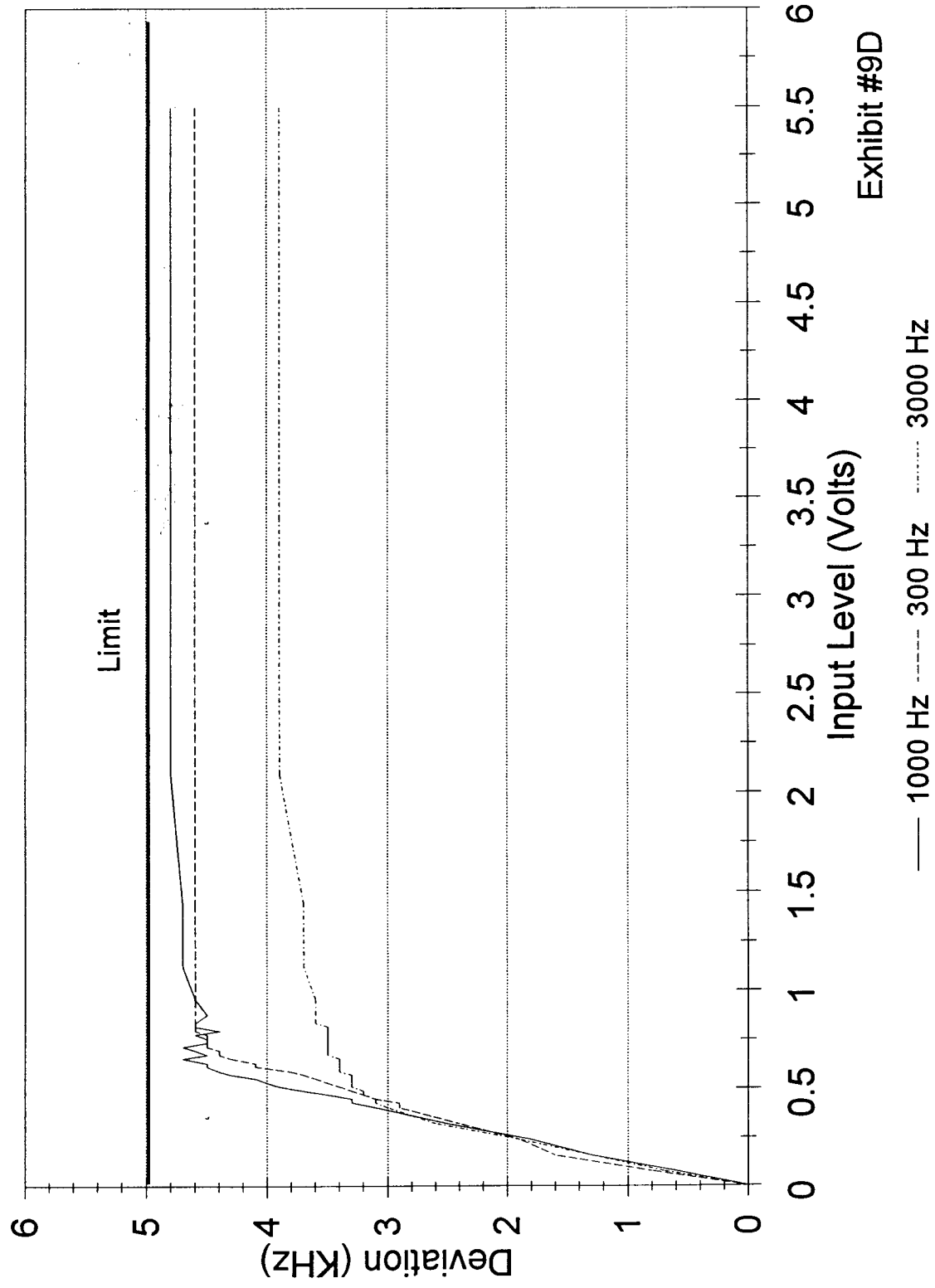


Exhibit #9D

FEDERAL COMMUNICATIONS COMMISSION
 Authorization and Evaluation Division, Equipment Authorization Branch
 7435 Oakland Mills Road, Columbia, MD 21046
 Telephone: (301) 725-1585, Facsimile: (301) 344-2050

Date: 2/18/94 Time: _____
 From: George F. Tannahill Extension: 237
 To: John Rothgeb
 Organization: Ericsson GE Mobile
 Telephone: (804) 528-7476 Facsimile: (804) 948-6510
 This cover sheet is page 1 of 1 pages. Please direct inquiries to the sender at the above extension.
 Reference: FCC ID AXATR-307A2 Device: _____
 Applicant: Ericsson GE

The items indicated below or on the attachment must be submitted before processing can continue on the above referenced application. Failure to provide the requested information within 60 days may result in application dismissal pursuant to Section 2.917(c) and forfeiture of the filing fee pursuant to Section 1.1106.

- ☐ Block diagram(s) showing all clocks/oscillators
- ☐ Schematic diagrams
- ☐ A list of all operating speeds of the subject computer, excluding speeds generated by software wait states, and a list of the speeds which were tested
- ☐ A list of all available video resolutions (e.g., 1024 X 768) for the subject device
- ☐ A statement clarifying which video resolutions were investigated and which resolutions were used in generating the submitted test data
- ☐ A list of all interface cables which incorporated ferrite cores during certification testing
- ☐ Additional detailed photographs of _____

☒ Other ① Exhibit 9D, your modulation limiting plot doesn't show 50% modulation. Please correct. ② From exhibit 9B, your frequency response plot, it is not clear what the frequency response is, and it should go to 5 kHz. Please correct. ③ In Exhibit 10E please explain why the deviation is lower than for the rest of your emissions. ④ Your 731 form and your exhibit 10A list different ~~bandwidths~~ necessary bandwidths, please clarify which is correct. lBaker