APPLICANT:
ERICSSON INC

FCC ID NO.:
AXATR-369-A2

EXHIBIT LIST

Exhibit No.	Par. Ref. (FCC Part 2)	Description
1	2.909 (d)	Certification of Data
2A-C	2.983 (c, d) (1-5)	Technical Description of Equipment
3	2.983 (d) (6)	Parts List
4	2.983 (d) (7)	Circuit Diagrams
5	2.983 (d) (8)	Instruction Book
6A-B	2.983 (d) (9)	Alignment Procedure
7A-B	2.983 (d) (10-12)	Circuit and Device Description
8	2.985 (a)	RF Power Output
9B1-C2	2.987 (a, b, d)	Modulation Characteristics
10B-B4	2.989 (c, d, i) (h)	Occupied Bandwidth
11B3-N4	2.991, 2.993	Spurious Emissions
12A-C	2.995 (a1, b, d1)	Frequency Stability
13	2.983 (f)	Identification Plates

APPLICANT:
ERICSSON INC

FCC ID NO.:
AXATR-369-A2

EXHIBIT LIST

Exhibit No.	Par. Ref. (FCC Part 2)	Description
14A	2.983 (g)	Top and Rear view of the radio showing Antenna connector, and Connectors for Control and Power Cables.
14B	2.983 (g)	Top and front view of the radio.
14C	2.983 (g)	Top view of a radio with cover and shield removed, showing Control Circuit Board and Power
Amplifier.		
14D	2.983 (g)	Rear and bottom view of radio with covers removed, showing internal shielding over R.F Board.
14E	2.983 (g)	Top view of radio with cover removed showing internal shielding over power and control board.
14F	2.983(g)	Bottom of radio with FCC lable shown.
14G	2.983(g)	Remote Control head mount version of radio as seen from rear..
14H	2.983(g)	Remote Control Head mount version of radio as seen from front.
14I	2.983(g)	Top View of Control Board.
14J	2.983(g)	Bottom view of Control Board.
14K	2.983(g)	Top view of Control Board.
14L	2.983(g)	Bottom View of Control Board
14M	2.983(g)	Top view of display board.
14N	2.983(g)	Bottom View of Display Board.
14O	2.983(g)	Power supply board.
15C1-C4	90.214	Transient frequency behavior.

Exhibit 1

CERTIFICATION OF DATA

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

BSEE 1982, fifteen years experience in RF/microwave design with three years in land mobile radio industry.

Name: Kevin Markey

Position: Staff Engineer

Date: December 29, 1997

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: Eric Shaufert

Position: Manager - Sourcing

Date:_________________________________

Exhibit 2A

DESCRIPTION

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

2.983 (d) Transmitter Description

This transmitter is a microcomputer synthesized FM transceiver operating in the 136 to 174 MHz band.

From 1 to 128 channels may be programmed for use as determined by a PROM directing the microcomputer.

Features and Options are available as follows:

A. CTCSS Channel Guard encode/decode with STE
B. CDCSS Digital Channel Guard encode/decode with STE
C. Type 99 decode (Motorola and GE formats)
D. GE-STAR encode/decode
E. Multi-tone signalling encode/decode
F. DTMF encode (with optional DTMF mic only)
G. 5 digit numeric display - 16 channel models
H. 8 digit alphanumeric display - 128 channel models
I. Dual Priority Scan
J. Carrier Control Timer
K. 12.5/25.0 kHz Channel spacing

Exhibit 2B

DESCRIPTION

2.983 (d) (1) Type of Emission:
14K0F3E, 10K0F3E

(2) Frequency Range and Band Splits and Frequency Stability:

Band	Band Splits	Frequency Stability
(136-174 MHz)	(136-153 MHz),	+/- 2.5 PPM
	(150-174 MHz)	+/- 2.5 PPM

(3) Range of Operating Power:

The power amplifier consists of PA Module.

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 an earlier stage to hold the forward power constant. Output power is as follows:

(136-174 MHz) 20-40 watts

DESCRIPTION

2.983 (d) (continued)

(4) Maximum Power Rating: 40 Watts

Input Maximum	100 Watts
Output	40 Watts

(5) Final Amplifier Voltage and Currents in Normal Operation:

Power Supply Voltage	13.0 Volts
Current	10 Amps

DESCRIPTION

2.983 (d) (6) Active Parts Information

Schematic Designation	Function
Panel Unit = MD00-TD-0084 Numeric Type	
CD401-CD411	Light Emission
CD412	Zener
CD414	Protection
IC401	CPU
IC402	Voltage Detector(Reset)
IC403,IC404	Buffer
IC405	+5V Regulator
LCD401	LCD
TR401- TR404	Switch
TR406,TR407	Buffer
Panel Unit = MD00-TD-0085 Alpha Numeric Type	
CD401-CD411	Light Emission
CD412	Zener
CD414	Protection
IC401	CPU
IC402	Voltage Detector(Reset)
IC403,IC404	Buffer
IC405	+5V Regulator
LCD401	LCD
TR401- TR404	Switch
TR406,TR407	Buffer
Radio Control Unit = MD00-TC-0084	
CD501,CD601-CD602,CD607,CD625	Rectifier
CD608,CD611-CD624	Protection
IC501	ASP
IC502,IC602-IC604	Buffer
IC503-IC505	OP Amp
IC506	Programmable Potentiometer
IC507,IC605	Switch
IC508,IC612	+5V Regulator
IC509	Audio Power Amplifier
IC510	Multi Vibrator

Radio Control Unit = MD00-TC-0084 (con't)

IC601	CPU (Flash ROM)
IC606	Voltage Detector(Reset)
IC608	EEPROM
IC610	flip-flop
IC611	OP Amp
TR501,TR502,TR602-TR607,TR611-TR613, TR615-TR618	Buffer
TR601,TR609,TR610,TR614,TR619	Switch

DC Supply Unit = MD00-TB-0038

CD1-CD4	Protection

TRX Board Unit = MD00-TM-0172

CD101	Schottky Barrier
CD102-CD104	PIN diode
CD105-CD106,CD108,CD107,CD307	Rectifier
CD201-CD204,CD302,CD305	Variable Capacitor
CD303,CD306	Switch
IC101	PA Module (RF Power Amplifier)
IC201	IF Amplifier and FM Detector
IC202-IC204,IC303,IC304	Switch
IC205,IC206,IC305	OP Amp
IC301	Prescaler
IC302	PLL Synthesizer
IC306	+9V Regulator
IC307	+5Vregulator
TR101-TR102,TR111,TR207,TR209 TR304,TR308,TR311,TR317,TR318	Switch
TR103,TR105,TR106,TR208,TR312-TR313	DC Amplifier
TR108,TR110,TR113,TR201 TR301-TR303,TR306,TR307,TR310	RF Amplifier
TR112,TR314-Tr316	Buffer
TR202,TR203	Mixer
TR204	IF Amplifier

Exhibit 4

CIRCUIT DIAGRAMS

DRAWING NUMBER	DESCRIPTION	
MA00-TD-0084/TD-0085	LCD Board Unit (Numeric Type/Alpha Numeric Type)	Block Diagram
MA00-TC-0081	Radio Control Unit	Block Diagram
MA00-TM-0172	TRX Board Unit	Block Diagram
MD00-DTE-104S	Interconnection	Schematic Diagram
MD00-TD-0084	LCD Board Unit (Numeric Type)	Schematic Diagram
MD00-TD-0085	LCD Board Unit (Alpha Numeric Type)	Schematic Diagram
MD00-TS-0006	FPC and LCD Board Unit connection	Schematic Diagram
MD00-TC-0081	Radio Control Unit	Schematic Diagram
MD00-TB-0038	DC Power Supply Unit	Schematic Diagram
MD00-TM-0172	TRX Board Unit	Schematic Diagram

INSTRUCTION BOOK (DRAFT)

2.983 (d) (8) Instruction book (draft)

1, Receiver Circuit

The FM dual-conversion super heterodyne receiver is designed for operation in the 136-153 and 150-174 MHz frequency range.
The Receiver has intermediate frequencies of 45.1MHz and 455KHz.
Adjacent channel selectivity is obtained by using two band pass filters, a 45.1MHz crystal filter and a 455KHz ceramic filter.
The FM-detector is Quadrature discriminator.

1-1 Receiver Front-end

A RF signal from antenna is coupled though the low pass filters ,antenna switch, and band pass filter to the input of low noise amplifier TR201. The output of TR201 is coupled through band pass filter to input of 1’st Mixer TR202,TR203.
Front End selectivity is provided by these band pass filter.
RF band pass filter is controlled by BPFREF (D/A Voltage) from RADIO CONTROL UNIT for receiver spurious rejection.

1-2 1’st Mixer

The 1’st Mixer is a Balanced-Mixer(TR202 and TR203), that converts a RF signal 136-153 or 150-174MHz range to 45.1MHz 1’st IF frequency.
In the mixer stage ,A RF signal from the Front-end RF filter is applied to the input of the Balanced-Mixer.

1-3 1’st IF

The 45.1MHz 1’st IF output signal is coupled from the output of T201 through Crystal filter FL201 to IF-amplifier TR204.
The highly-selective crystal filters FL201-1 and FL 202-2 provide the first portion of the receiver IF selectivity. The out put of the filters is coupled through the impedance-matching net work L216,C233 and R218 to 1’st IF amplifier TR204.

1-4 2’nd Mixer, 2’nd IF filter,2’nd IF amplifier and FM detector

IC201 is a one-chip IC for FM communication system. It includes 2’nd Mixer,2’nd IF amplifier and FM detector.
The 2’nd Mixer is a Balanced Mixer, that converts a 1’st IF signal 45.1MHz range to 455KHz 2’nd IF frequency. The 2’nd IF signal is applied to Ceramic Filter FL202(Wide Band) or FL203(Narrow Band), which provides the 455KHz selectivity. And 2’nd IF filter is controlled by W/N (Wide band/Narrow band) from RADIO CONTROL UNIT. The output of the 2’nd IF filter is applied to 2’nd IF amplifier in IC201.
The 2’nd IF signal is then amplified, filtered and limited. Discriminator (DSC201) shifts the 2’nd IF signal by 90deg and applies it to the internal FM detector.
The FM detector compares the shifted IF signal to the internal IF signal to recover the audio modulation.
The audio output of IC201 is applied to audio amplifier buffer IC205.
The audio output of IC205 is then applied to the RADIO CONTROL UNIT.

2, Transmitter Circuit

The Transmitter Circuit consists of two Class-A Amplifier (TR110 and TR113), one Class-B Amplifier TR108, PA Module IC101, Automatic Power Control Circuit (TR103,TR105 and TR107), Antenna Switch(CD104,CD102 and CD103), Low Pass Filter(L101-L103 and C101-C109),.

2-1Class-A Amplifier

The 136-153 or 150-174MHz RF input from Synthesizer output of TR301 is applied to the amplifier TR110 through an attenuator pad R301-R303. RF input level is about 0dBm, that is amplified to +10dBm by TR110. The output of TR110 is applied to the amplifier TR113 through an attenuator pad R147-R149. The output of R148 is also amplified to about +16dBm by TR113. Two Class-A Amplifier are controlled by TXENB+.

2-2 Class-B Amplifier

The output of TR113 is applied to the Class-B Amplifier TR108 through an attenuator pad R163-R165. The output of R164 is amplified to about 200mW. The collector voltage of the TR108 is supplied by power control circuit for automatic power control.

2-3 PA Module

The input(about 200mW) of the PA Module is amplified to 40W.
Figure 2-3 shows the PA Module lineup for RF frequency band.

	136-153MHz	150-174MHz
40W	M68702L	M68702H

Figure 2-3

DC Supply voltage for the PA Module is connected from DC SUPPLY BOARD through C1. The PA Module consists of two stages RF amplifier. The first stage power supply voltage is supplied by power control circuit same as the Class-B Amplifier TR108. The second stage power supply voltage is supplied by A+ via C1. The second RF amplifier operates in Class-C.

2-4 Automatic Power Control

The Automatic Power Control circuit samples the output power to the antenna to maintain a constant power level across the band. Also, a thermistor circuit (TR102 and R121) senses the PA Module temperature to reduce the power level when the temperature is above +80°C. The Automatic Power Control circuit controls the supply voltage to the first stages in PA Module IC101. Directional coupler provides a sample of transmit power for diode CD105. Diode CD105 produce a positive DC voltage proportional to the transmit circuit output power level. When above VSWR 3, refract coupler provides a sample of refraction power for diode CD106. Diode CD105 and CD106 produce voltages are summed, then that is compared to APCREF (D/A Voltage) from RADIO CONTROL UNIT by the amplifier TR103. The collector of TR103 is applied to DC amplifier TR107 and TR105, then the output voltage of TR105 controls to the first stage of PA Module and the collector of TR108 for constant output power level.

2-5 Antenna Switch and Low Pass Filter

The Antenna Switch consists of CD102-CD104, and the Low Pass Filter consists of L101-L103 and C101-C109.
During transmit, DPTT+ line from RADIO CONTROL UNIT is high level. Transistor TR111 turns on supply +9VT to the Class-A Amplifier, Automatic Power Control circuit and PIN diode Antenna Switch CD102 ,CD103 and CD104. When transmitting, the Antenna Switch diode is low impedance.

3, Frequency Synthesizer Circuit

The Frequency Synthesizer circuit receives PLL data, and control information from the microcomputer and from this generates the Tx/Rx RF frequencies.
It also provides frequency lock status to RADIO CONTROL UNIT. It consist of the Reference Oscillator, PLL Frequency Synthesizer chip IC302, Loop filter, Rx VCO TR307, Tx VCO TR303, Feedback Buffer Amplifier, and Dual-Modulus Prescaler IC301. Rx VCO and Tx VCO are locked to the Reference Oscillator by a single direct-divide synthesis loop consisting of the Feedback Buffer, Prescaler, and PLL Frequency Synthesizer chip.

The Tx VCO operates over a frequency range of 136-153MHz or 150-174MHz.
The Rx VCO operates over a frequency range of 181.1-198.1MHz or 195.1-219.1MHz.

3-1 Reference Oscillator
The reference oscillator consists of a 2.5-PPM TCXO(Temperature Controlled Compensated Crystal Oscillator). The standard reference oscillator frequency is 12.8MHz.
The TCXO is enclosed in a RF shielded can. The TCXO is compensated by internal temperature compensated circuit for both low and high temperature. With no additional compensated the oscillator will provide 2.5 PPM stability from -30°C to +60°C.

3-2 PLL Frequency Synthesizer chip
PLL Frequency Synthesizer chip IC302 contains a programmable reference oscillator divider(R), phase detector, and programmable VCO dividers(+N, A).
The reference frequency 12.8MHz from the reference oscillator is divided by a fixed integer number to obtain a 6.25KHz or 5KHz channel reference for the synthesizer.
This divide value can be changed by PC PROGRAMMER.
The internal phase detector compares the output of the reference divider with the output of internal +N,A counter. The +N, A count counter receives as its input the VCO frequency divided by the Prescaler and programmed by the microcomputer.
This results in an error voltage when the phase differ and a constant output voltage when phase-detector input compare in frequency and phase.
If a phase error is detected, an error voltage is developed and applied to the VCO DC offset and loop filter to reset the VCO frequency. The count of the +N, A counters is controlled by the frequency data received on the SCK-,SDT- and PLLENB- line from RADIO CONTROLL UNIT.
When a different channel is selected or when changing to the transmit or receive mode an error voltage is generated and appears at the phase-detector output, APD(IC302-2), causing the Phase Locked Loop to acquire the new frequency.

3-3 Loop filter
The Loop filter consists of R355 through R353 and C356,C357 and C355.
This filter controls the bandwidth and stability of the synthesizer loop.
When a different channel changing or changing to the transmit or receive mode, analog switch is controlled by PLLFST- for PLL lock up first(aplox 20mSEC).
The output of the filter is applied to the varicaps in the transmit and receive VCO’s to adjust and maintain the VCO frequency. The use of to VCO’s allows rapid independent selection of transmit and receive frequencies across the frequency split.

3-4 Rx VCO
The Rx VCO consists of low-noise silicon transistor oscillator TR307, and followed by high-gain buffer TR306. TR306 prevents external loading and provides power gain.
The VCO is a colpitts oscillator with the various varactors, capacitors and coil the tank circuit. The tank circuit is controlled by VSFT+ for frequency shift.
The VCO is switched on and off VCOENB+ line. When VCOENB+ is high, the Rx VCO is turned on, transistor TR307 and TR306 is on. The oscillator output (through R302) is typically 0dBm. The output is applied to the feedback buffer for VCO frequency control and as the Receiver frequency to Rx 1’st Mixer through the Local oscillator buffer amplifier. The VCO voltage need only be set once at some frequency of the band and split, after which it operates over the entire split with no additional tuning.

3-5 Tx VCO
The Tx VCO is basically the same as the Rx VCO. The VCO consists of silicon transistor oscillator TR303 followed by high-gain buffer amplifier TR302. When DPTT+ is high, the Tx VCO is turned on, transistor TR303 and TR302 is on.

3-6 Feedback Buffer Amplifier
The output of Rx VCO and Tx VCO, from transistor TR306 and TR302 respectively, are supplied to Feedback Buffer Amplifier TR310. That drives the Dual-Modulus Prescaler IC301.

3-7 Dual-Modulus Prescaler
The Dual-Modulus Prescaler completes the Phase Lock Loop(PLL) feedback path from the PLL Frequency synthesizer chip to the Loop Filter, to the VCO's and Feedback Buffers and then back to the PLL Frequency synthesizer chip through the Prescaler.
The Prescaler divides the VCO by 64 or 65 under control of MC(IC301-6) from the PLL Frequency synthesizer chip. The output of the Prescaler is applied to the PLL Frequency synthesizer chip where it is divided down 5KHz or 6.25KHz by and internal +N,? A counter and compared in frequency and phase with the divided-down frequency for the Reference Oscillator. The result of this comparison is the error voltage used to maintain frequency lock. The +N, A counter is controlled by data received from the RADIO CONTROL UNIT. Depending on the operating frequency, the DC voltage at Test Point TP301 should be within 2.5 to 7.5 Vdc when the PLL is locked.

3-8 Lock Detect
The Lock Detect circuit consists of transistor TR311 and TR318.
If a large frequency error exists, the LD(IC302-14) positive lead from the PLL Frequency synthesizer chip will carry negative spikes to the RADIO CONTROL UNIT. When unlock ,PLLLOCK+ is low.

3-9 Loop Modulation Circuit
The Loop Modulation Circuit consists of IC305. Tx audio is integrated about fc= 0.15Hz for Loop Modulation. That signal is summed with the APD(IC302-2)

ALIGNMENT PROCEDURE

6A-C 2.983 (d) (9) Alignment Procedure

1, Test Equipment

Service Monitor	(HP8920B or equivalent)
DC Voltmeter	(Input Impedance > 1Megohm)
DC Power Supply	(13.6 Volts at 15A)
IBM Personal Computer	(or compatible equivalent)
Programming Interface	(TQ3370)
KMC Radio Programming Software	(______)
KMC Programming Cable	(_______)
KMC DC Power Cable	(U-PK-2223B)
KMC Microphone Cable	(_______)
BNC-BNC Cable	
50 ohm RF Power Attenuator	(10dB, 100watts)

Initial setup

Attach DC Power Cable to Radio and Power Supply.
Attach Programming Cable to Radio.
Attach Interface Cable to Programming Interface and personal Computer.
Set power supply to 13.6 Volts dc.
Apply power to Radio, and turn radio on/off switch to on position.
Execute radio programming software.
Under software direction, program radio for the following conventional (non-trunked) test channels: See the Figure 1.
(If test channel always set to figure 1, then it is not need to execute radio programming.)
Turn radio on/off switch to off position. Remove programming cable. Attach test cable.
Attach RF coaxial cable (50 ohms) between antenna connector and RF power attenuator.
Attach second coaxial cable between attenuator and service monitor(RF port).
Attach Microphone Cable to Radio. Attach BNC-BNC Cable between Programming Interface (RX AUDIO and TX AUDIO) and Service Monitor.
Turn radio on/off switch to on position.

2, Rx VCO Adjustment
a, No tuning for the operation.

3, Rx BPF Tuning
a. Set RF generator level to –100dBm and frequency.
b. Monitor DC voltage at test point TP202.
c. Set receiver frequency to 152.9MHz or 173.9MHz (CH6 in figure 1).
d. Set receiver channel to CH6.
e. Adjust Rx BPF CV201-CV204 until the DC voltage at TP202 is maximum.

4, Rx Noise Squelch Tuning
a. Monitor DC voltage at test point TP210.
b. Set receiver frequency to 144.25MHz or 161.250MHz(CH4 in figure 1).
c. Set RF generator level until the Rx SINAD is 8$\pm$2dB at RX AUDIO.
d. Adjust Noise Squelch RV201 until the DC voltage at TP210 is 1.9 volts.

5, Tx VCO Adjustment
a. No tuning for the operation.

Factory Programmed Frequencies

	136-153MHz		150-174MHz				
Channel	RX Frequency	TX Frequency	RX Frequency	TX Frequency	CTCSS /CDCSS	Wide /Narrow	TX power
CH1	136.100	136.000	150.100	150.000		W25	H
CH2	140.400	140.300	156.600	156.500		W25	H
CH3	143.750	143.850	160.750	160.850		W25	H
CH4	144.250	144.150	161.250	161.150		W25	H
CH5	149.100	149.000	168.100	168.000		W25	H
CH6	152.900	153.000	173.900	174.000		W25	H
CH7	136.100	136.000	150.100	150.000		W20	L
CH8	144.250	144.150	161.250	161.150		W20	L
CH9	152.900	153.000	173.900	174.000		W20	L
CH10	136.100	136.000	150.100	150.000		N	L
CH11	144.250	144.150	161.250	161.150		N	L
CH12	152.900	153.000	173.900	174.000		N	L
CH13	144.450	144.350	161.450	161.350	CTCSS 100Hz	W	L
CH14	144.450	144.350	161.450	161.350	CDCSS 627oct	W	L
CH15	144.450	144.350	161.450	161.350		W	L
CH16	144.550	144.550	161.550	161.550		W	L

ALIGNMENT PROCEDURE

6. TX Modulation Adjustments

a. Set transmitter frequency to 144.15MHz or 161.15MHz (CH4 in figure 1).
b. Set AF generator output level to 820mV.
c. Push PTT-key on Programming Interface.
d. Adjust TX Modulation RV302 until the FM Deviation is 4.5±0.1KHz.
e. Set transmitter frequency to 144.35MHz or 161.35MHz (CH13 in figure 1).
f. Set AF generator output level to zero.
g. Push PTT-key on Programming Interface.
h. Adjust TX Modulation RV301 until the FM Deviation is 0.8±0.1KHz.

7, Tx Frequency Adjustment

a. Set transmitter frequency to 144.15MHz or 161.15MHz (CH4 in figure 1).
b. Push PTT-key on Programming Interface.
c. Adjust Tx Frequency RV303 until the Frequency is ±0.1KHz.

8, Transmitter Power Adjustment.

a, No tuning for the operation.

EXHIBIT 7A

CIRCUIT & DEVICE DESCRIPTIONS

2.983 (d) (10-12)

(10) Oscillator and other Frequency Stabilizing Circuit Descriptions:

The frequency reference is a self-contained quartz crystal oscillator (TCXO) module, operating 12.8MHz.

The TCXO is compensated by internal temperature compensating circuit providing 2.5PPM stability from -30°C to +60°C.

(11) Circuit or devices employed for suppression of spurious radiation:

a. The radio has metal cover and metal cabinet.

b. Extensive use of discrete bypass capacitors in the Option and Remote Control Connector of the radio reduces radiation from remote cables.

c. Low pass harmonic filter follows power amplifier output.

d. Internal shields surround synthesizer, power amplifier and radio control logic circuitry.

e. In addition the Control Unit package is metallized to suppress microprocessor radiation.

f. During acquisition of the synthesizer phase lock loop, the transmitter output is inhibited by an RF gate and the removal of DC voltage to the gain control stage of the RF power chain.

EXHIBIT 7B

CIRCUIT & DEVICE DESCRIPTIONS

2.983 (d) (10-12)
(Continued)

(11) Circuit or Devices employed for limiting modulation:

a. Reference is made to the schematic diagram MD00-TC-0081 in Exhibit 4.

b. Instantaneous audio limiting is accomplished Audio IC (IC501).
The Audio IC provides both limiting and Post-Limiting filtering. The Audio IC runs from a regulated supply voltage, which prevents deviation changes vs. changes in radio power supply voltage. Following the Limiter, a summing amplifier is used to add in any optional tone modulation, such as CTCSS modulation, which is also temperature and voltage stable. The output from the summing amplifier then passes through the post-limiting filter to a modulation level adjust liner attenuator (also contain IC501), which is in turn coupled to the FM modulated oscillators. The attenuator insures maximum deviation $\pm$ 4.5KHz.

(12) Circuit or devices employed for suppression of spurious radiation:

a. The radio has metal cover and metal cabinet.

b. Extensive use of discrete bypass capacitors in the Option and Remote Control Connector of the radio reduces radiation from remote cables.

c. Low pass harmonic filter follows power amplifier output.

d. Internal shields surround synthesizer, power amplifier and radio control logic circuitry.

e. In addition the Panel Control Unit package is metallized to suppress microprocessor radiation.

f. During acquisition of the synthesizer phase lock loop, the transmitter output is inhibited by an RF gate and the removal of DC voltage to the gain control stage of the RF power chain.

Exhibit 8

RF POWER OUTPUT

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

VHF (136-174 MHz): 20 Watts Low Power
40 Watts High Power

The measurements were made per TIA/EIA-603 using the following equipment.

Radio Frequency 50 ohm load attached to the output terminals through a Directional Coupler. The power is measured on a Power Meter connected to the coupler through a Power Sensor.

Exhibit 9A

MODULATION CHARACTERISTICS

Ref. Par. 2.987 (a, b, d) the frequency and amplitude response to audio inputs measured per TIA/EIA 603 are shown on the following sheets:

<u>136-174 MHz</u>

Exhibit 9B1	Audio Frequency Response
Exhibit 9C1	Modulation Versus Modulation Input Voltage (25 kHz)
Exhibit 9C2	Modulation Versus Modulation Input Voltage (12.5 Hz)

Equipment used was:

Marconi Instruments Ltd. FM/AM Modulation Meter TF2300B
Hewlett Packard Audio Signal Generator 204D
Hewlett Packard Distortion Analyzer 333A

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.

TRANSMITTER AUDIO FREQUENCY RESPONCE

11/21/97

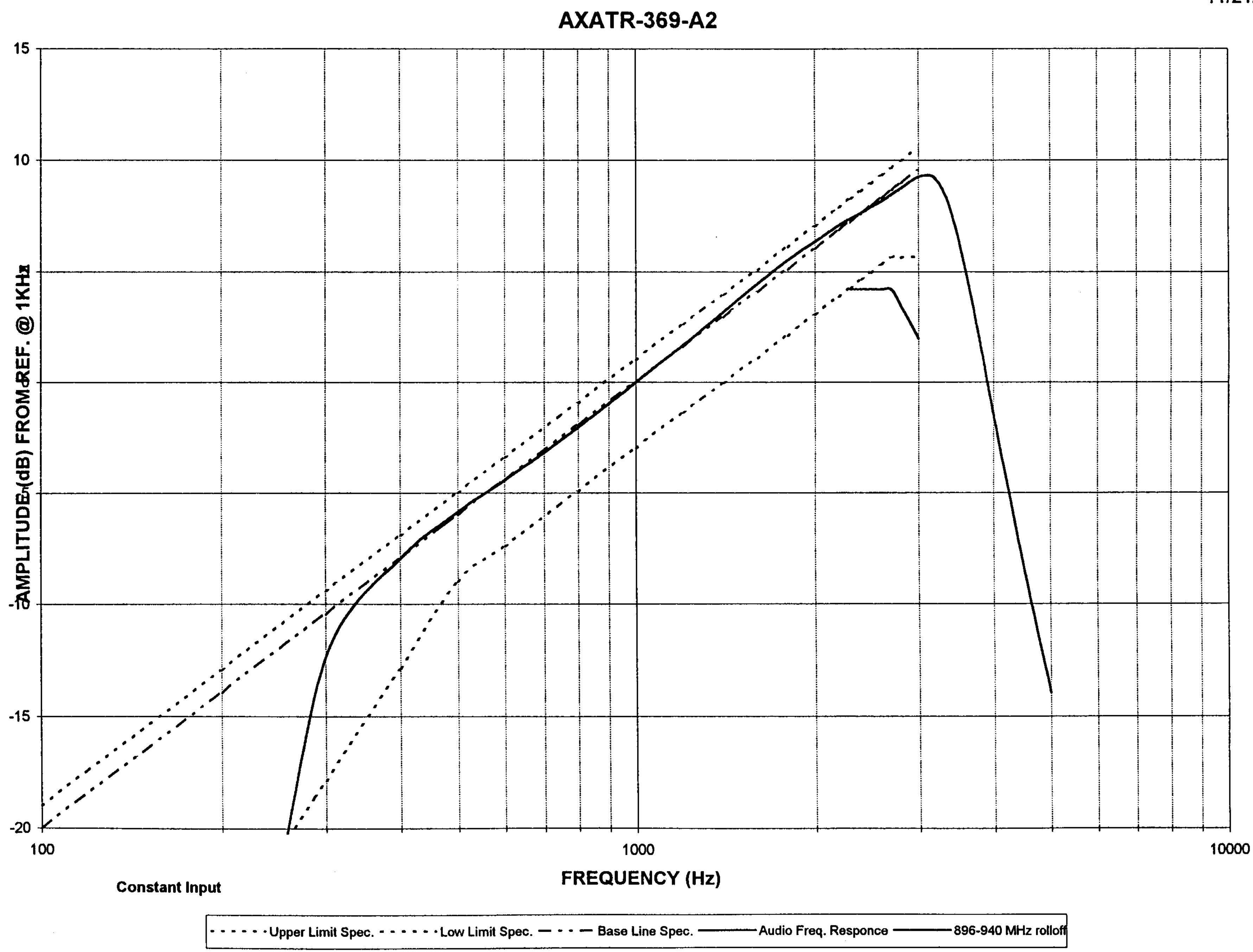
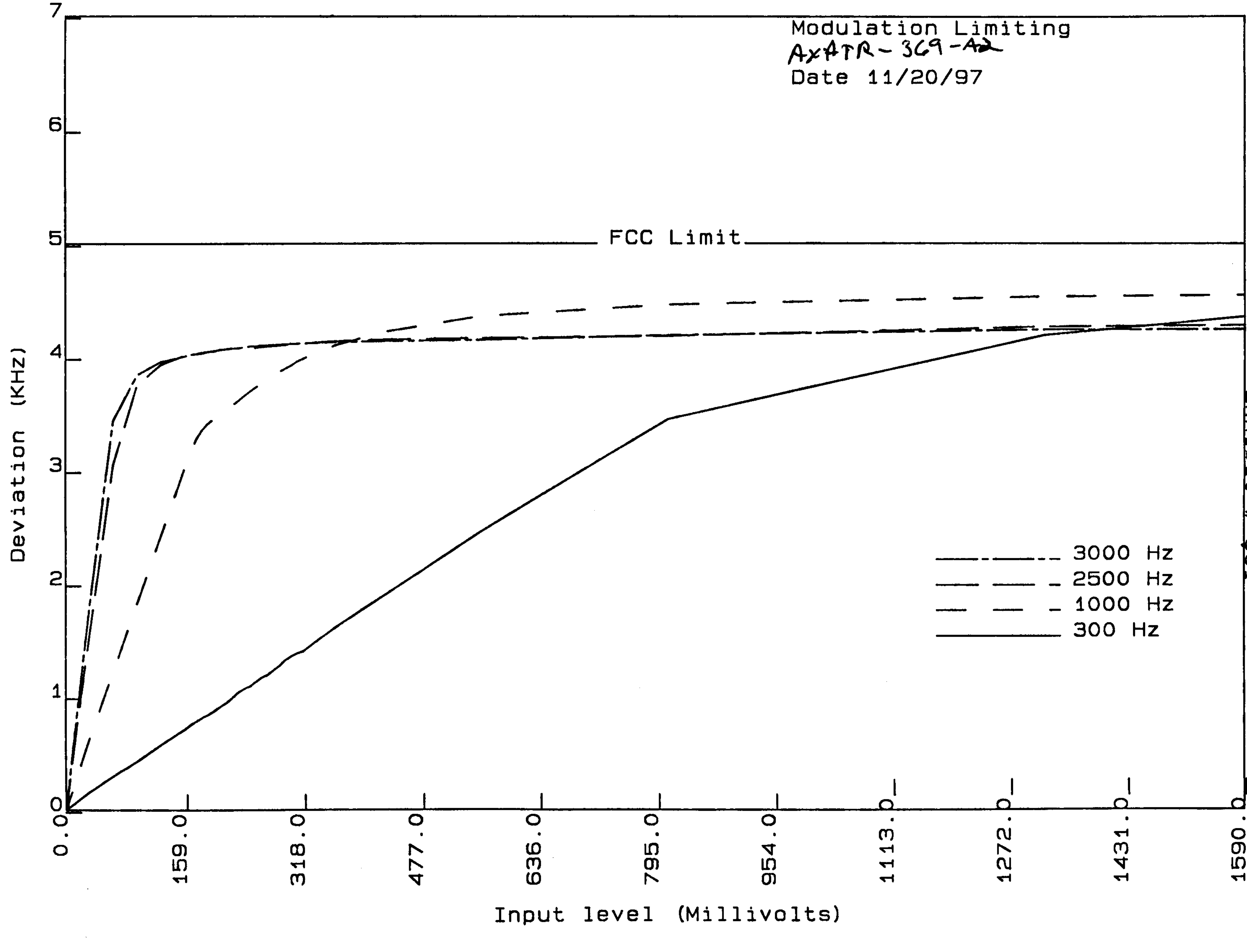
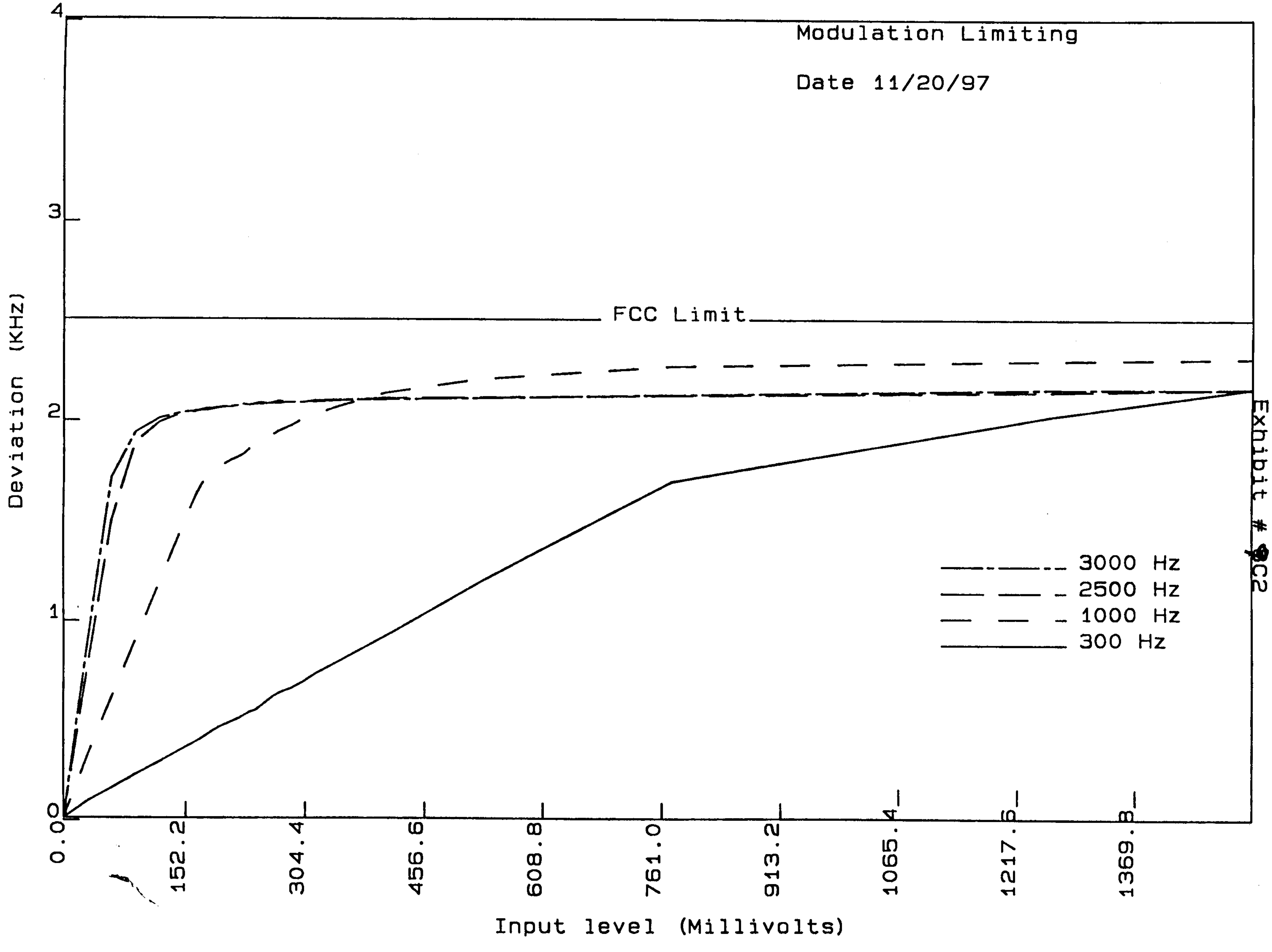


EXHIBIT #9B1



Modulation Limiting
AxATR-369-A2
Date 11/20/97
FCC Limit
3000 Hz
2500 Hz
1000 Hz
300 Hz
Deviation (KHz)
Input level (Millivolts)
0
1
2
3
4
5
6
7
0.0
159.0
318.0
477.0
636.0
795.0
954.0
1113.0
1272.0
1431.0
1590.0

Exhibit # 9C1


Modulation Limiting
Date 11/20/97
FCC Limit
3000 Hz
2500 Hz
1000 Hz
300 Hz
Exhibit # 9C2
Deviation (KHz)
0
1
2
3
4
0.0
152.2
304.4
456.6
608.8
761.0
913.2
1065.4
1217.6
1369.8
Input level (Millivolts)

OCCUPIED BANDWIDTH

Per 2.989 (c, 1) the measurements were made per TIA/EIA 603.

	144.15
EXHIBIT #10B1,B2	(25 kHz)
EXHIBIT #B3,B4	(12.5 kHz)

EXHIBIT 10A-1

OCCUPIED BANDWIDTH

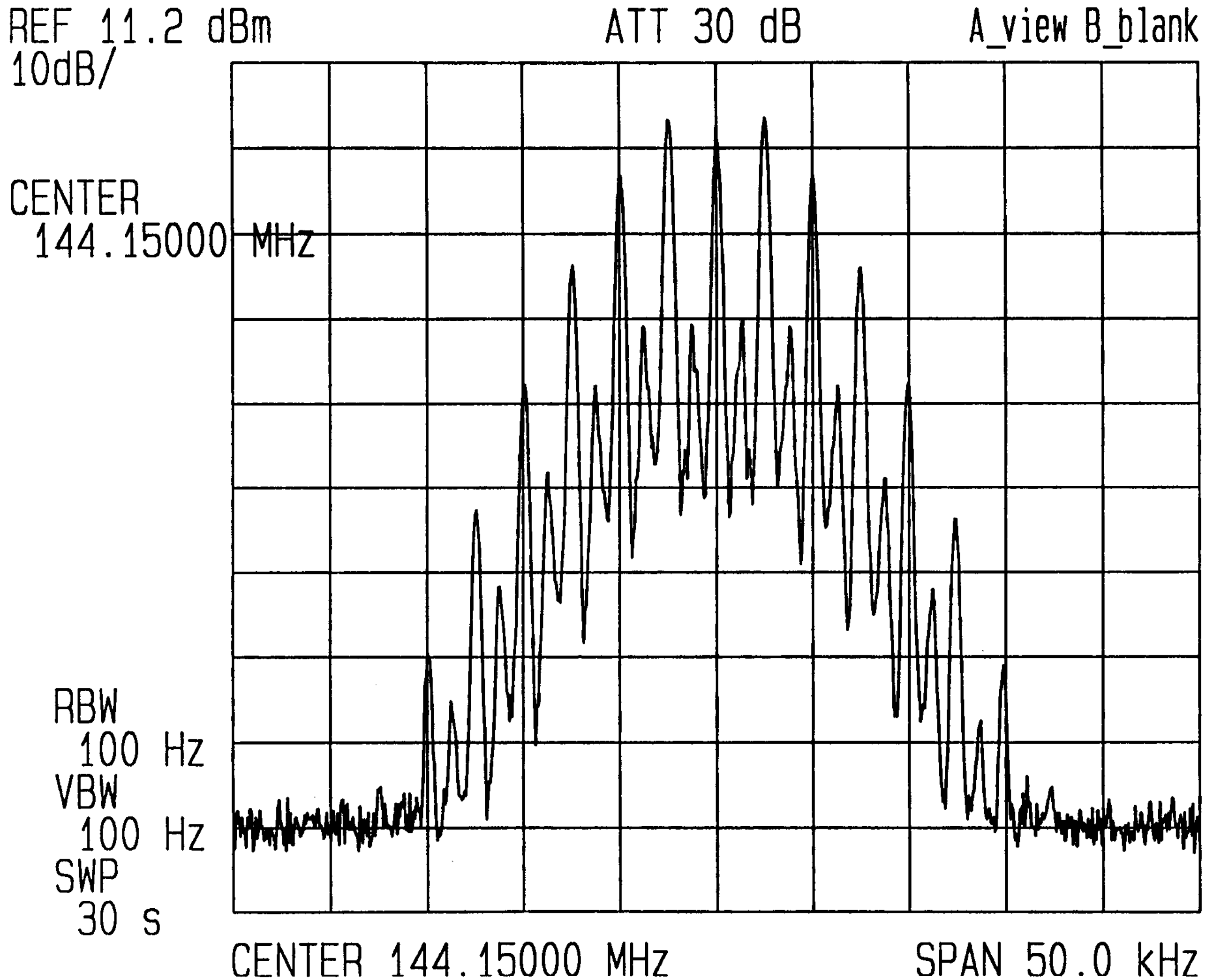
(FOR 25 kHz CHANNELIZATION)

Method of Measurement Per 2.989 (c,1) Data on Occupied Bandwidth is presented in the form of a spectrum analyzer plot which illustrates the transmitter sidebands. A plot is taken of the carrier sideband modulated with a 2500 Hz tone at a level 16 dB greater than that required to produce 50 percent modulation. (The spectrum analyzer grid indicates the reference level of the carrier unmodulated in all exhibits.)

EXHIBITS 10B &C	Bn = 2M + 2DK where	M = 3000 Hz
Telephony		D = 4000 Hz
		K = 1 (assumed)
	Bn = 14000 Hz	

Therefore, Emission Designator = 14K0F3E

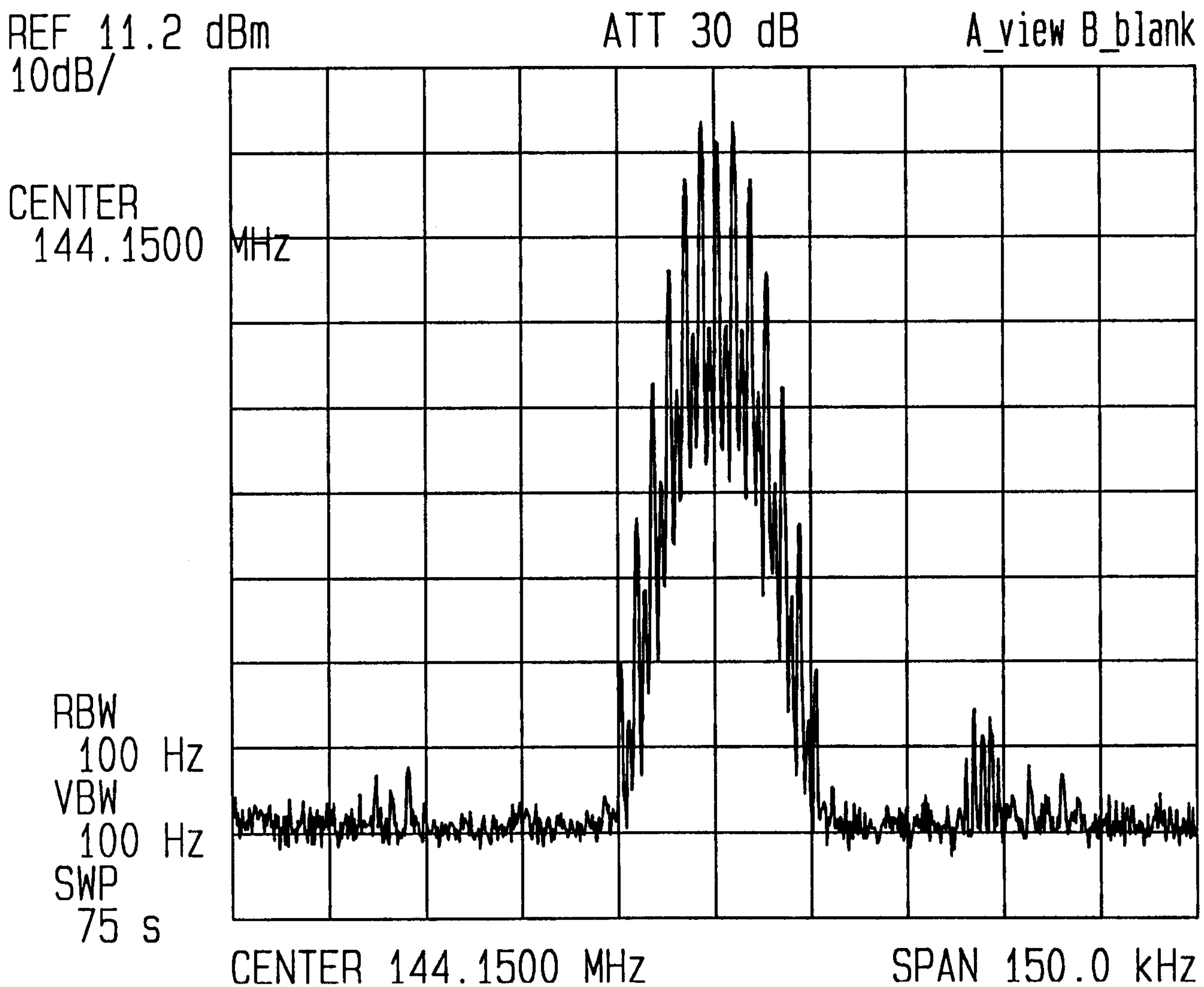
ERICSSON INC.
OCCUPIED BANDWIDTH
Modulation Sideband Spectrum
ID NO. AXATR-369-A2



Reference: Unmodulated Carrier
Modulated with
2500 Hz per 2.989 (c) (1)

EXHIBIT 10B1

ERICSSON INC.
OCCUPIED BANDWIDTH
Modulation Sideband Spectrum
ID NO. AXATR-369-A2



Reference: Unmodulated Carrier
Modulated with
2500 Hz per 2.989 (c) (1)

EXHIBIT 10B2

EXHIBIT 10A-2

OCCUPIED BANDWIDTH

(FOR 12.5 kHz CHANNELIZATION)

Method of Measurement Per Data on Occupied Bandwidth is presented in the form of a spectrum analyzer plot which illustrates the transmitter sidebands. A plot is taken of the carrier sideband modulated with a 2500 Hz tone at a level 16 dB greater than that required to produce 50 percent modulation. (The spectrum analyzer grid indicates the reference level of the carrier unmodulated in all exhibits.)

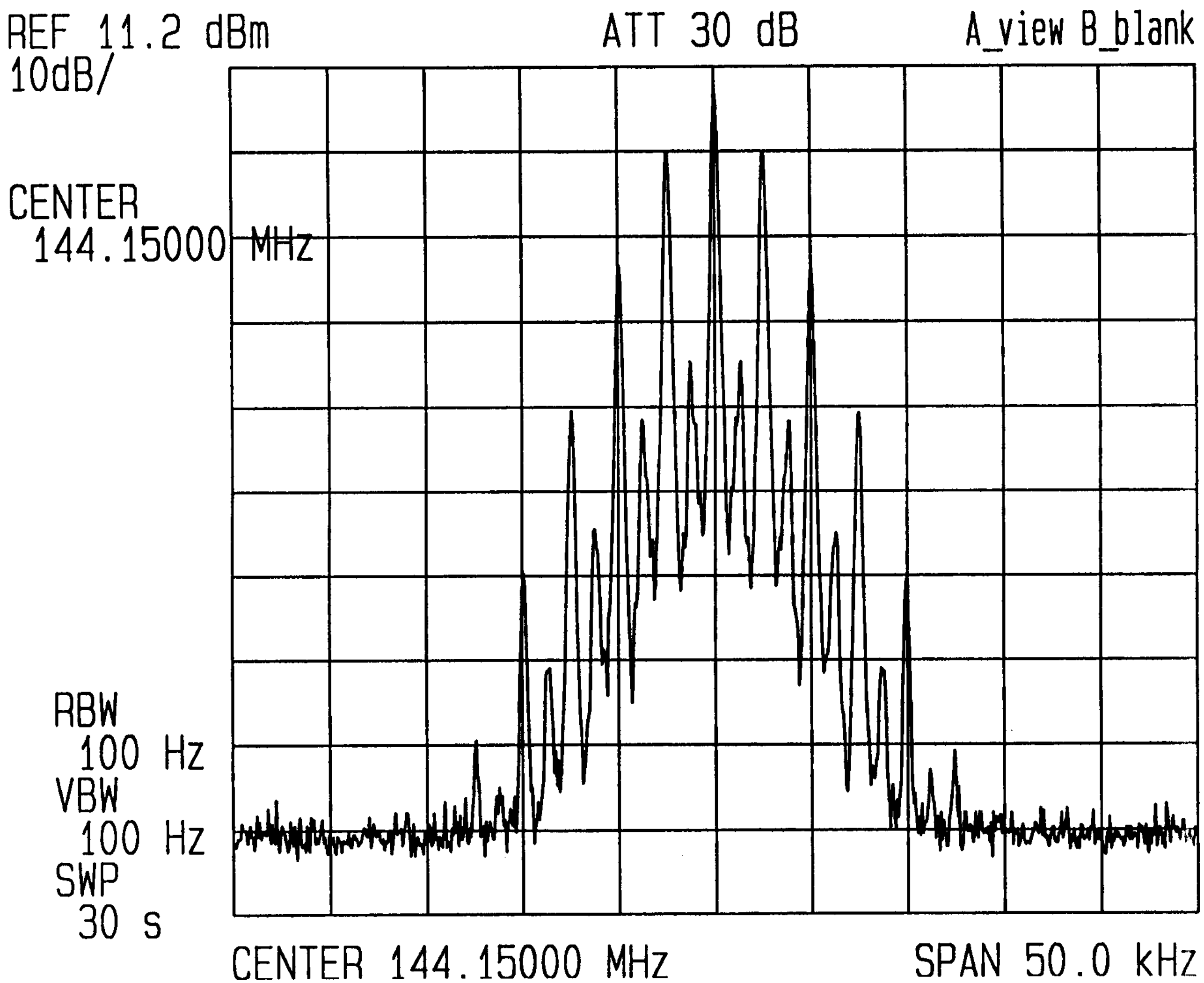
Exhibits 10E & 10F	Bn = 2M+2DK where	M = 3000 Hz
Telephony		D = 2000 Hz
		K = 1 (assumed)

Bn = 10000 Hz

Therefore, Emission Designator = 10K0F3E

ERICSSON INC.
OCCUPIED BANDWIDTH
Modulation Sideband Spectrum

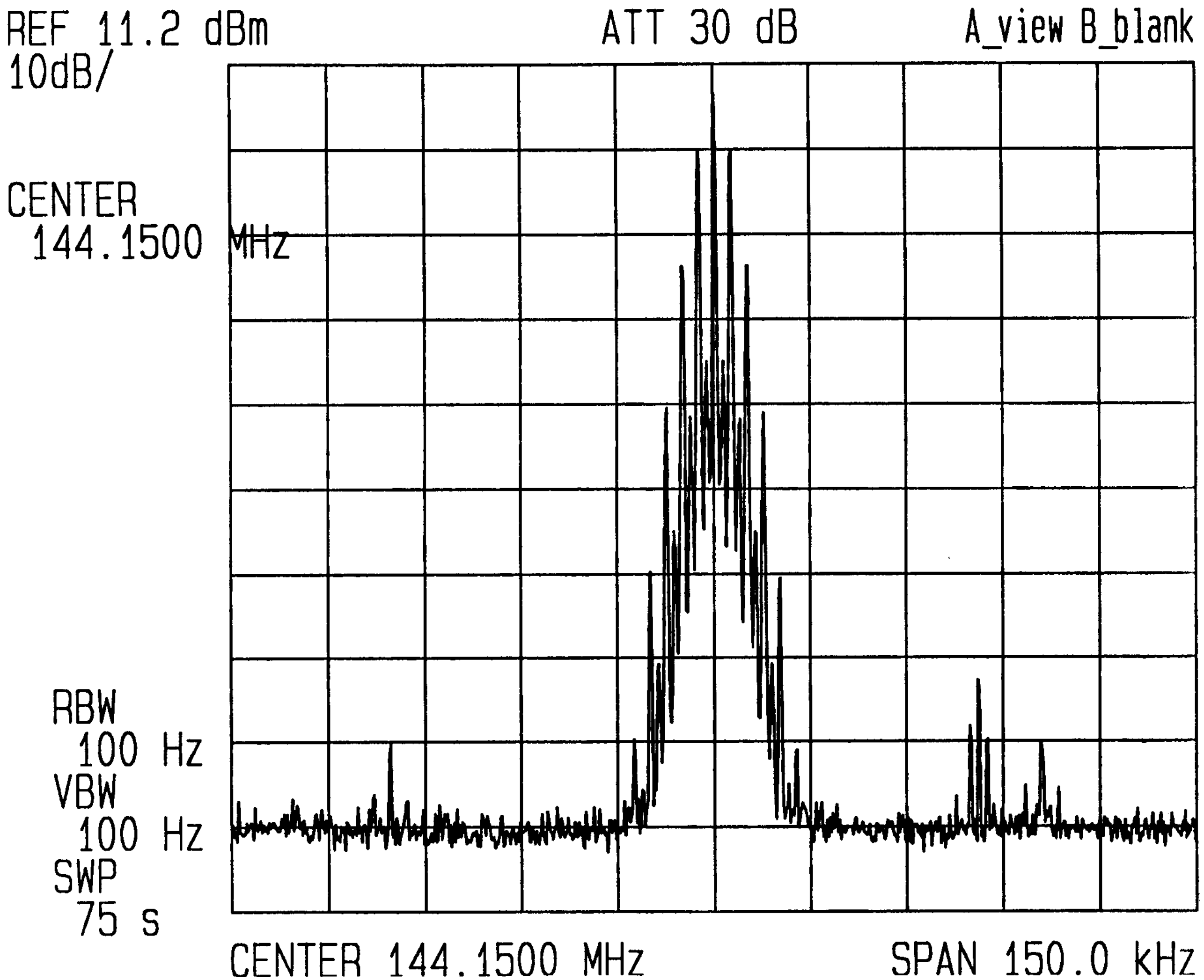
ID NO. AXATR-369-A2



Reference: Unmodulated Carrier
Modulated with
2500 Hz per 2.989 (c) (1)

EXHIBIT 10B3

ERICSSON INC.
OCCUPIED BANDWIDTH
Modulation Sideband Spectrum
ID NO. AXATR-369-A2



Reference: Unmodulated Carrier
Modulated with
2500 Hz per 2.989 (c) (1)

EXHIBIT 10B4

EXHIBIT 11A

SPURIOUS EMISSIONS

Reference 2.991 spurious emissions at the antenna terminals when properly loaded with an appropriate artificial antenna were measured per TIA\EIA 603.

Results are as shown in the following Exhibits:

Conducted Emissions

Exhibit		Carrier Frequency*
11B3	AXATR-369-A2	136.00 MHz, 20 Watt
11B4	AXATR-369-A2	153.00 MHz, 40 Watts
11C3	AXATR-369-A2	136.00 MHz, 20 Watts
11C4	AXATR-369-A2	153.00 MHz, 40 Watts

Equipment used was:

Hewlett Packard Spectrum Analyzer 140T Display, 8554-B-RF, 8552B-IF.

Reference 2.993 field strength of spurious radiation was measured on our three meter range. The site and equipment are described in the site description and attenuation measurements for the Ericsson Inc. three meter radiation site #2 filed with the FCC in Columbia, Maryland, in November of 1990. The measurement procedure is per TIA/EIA 603, but done on a three meter test site. Results are shown on the following exhibits:

Radiated Emissions

Exhibits		Carrier Frequency*
11M3	AXATR-369-A2	136.00 MHz, 20 Watt
11M4	AXATR-369-A2	153.00 MHz, 40 Watts
11N3	AXATR-369-A2	136.00 MHz, 20 Watts
11N4	AXATR-369-A2	153.00 MHz, 40 Watts

*SAME AS FOR 25 OR 12.5 kHz modes.

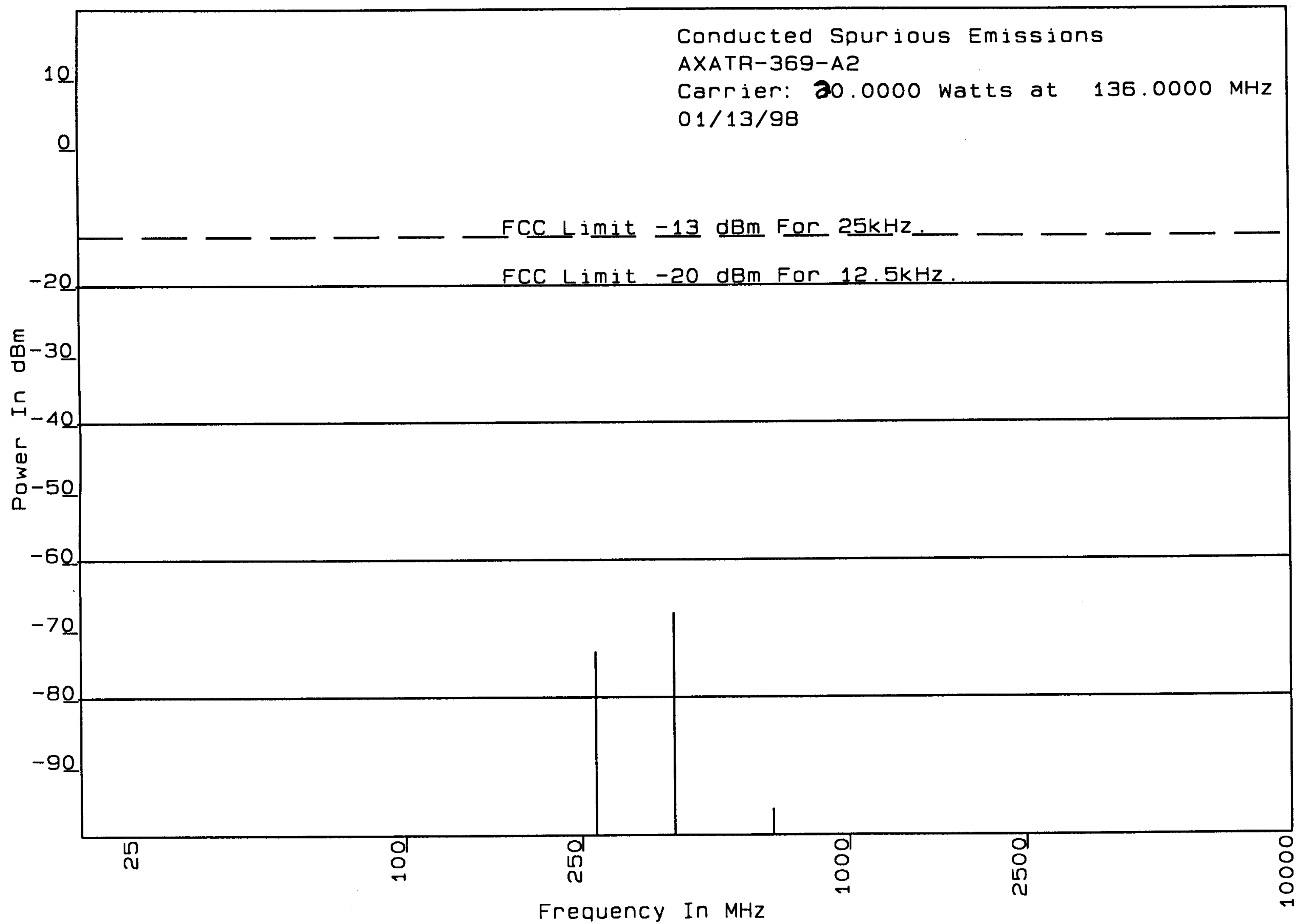


Exhibit #11B3

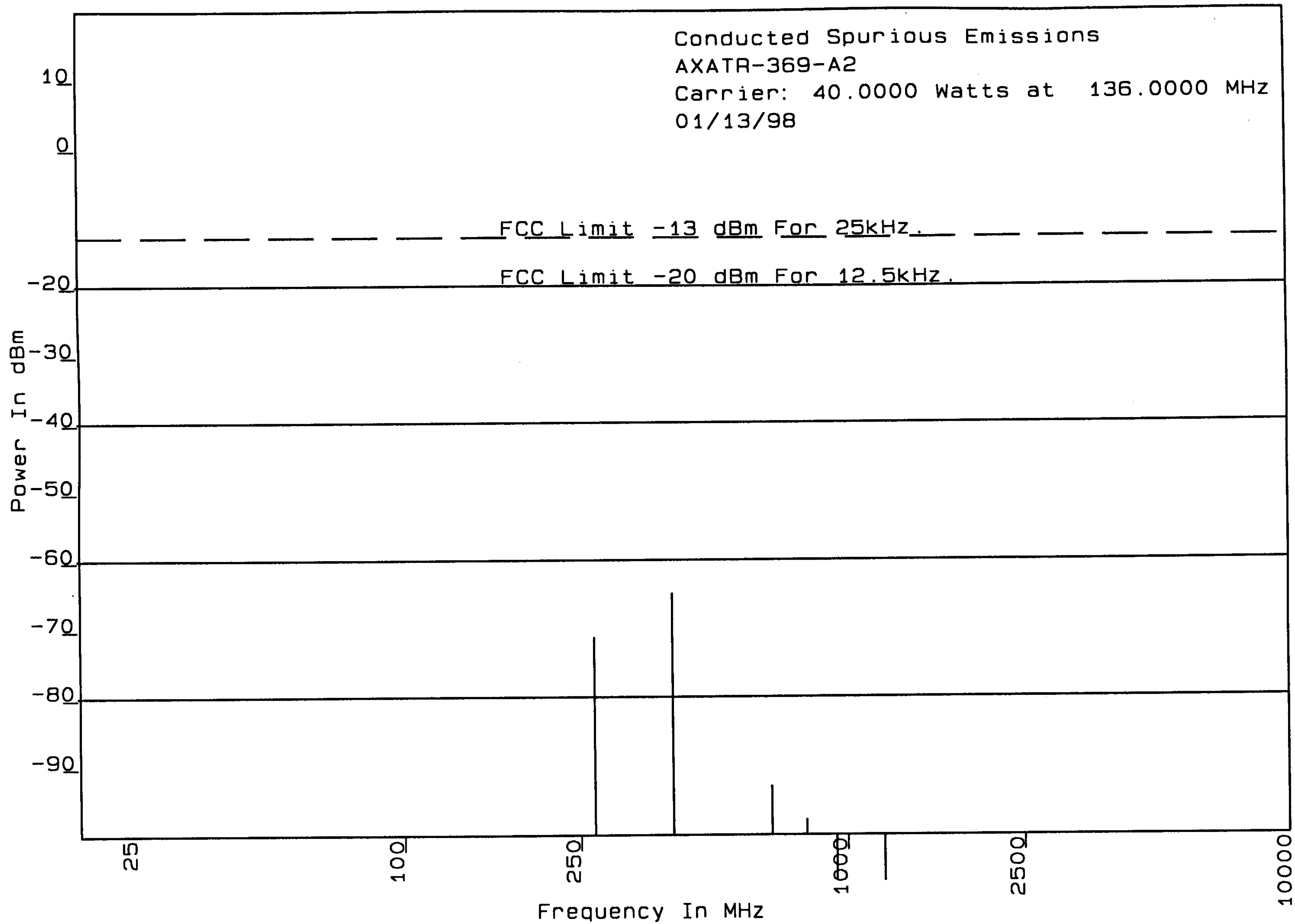


Exhibit #11B4

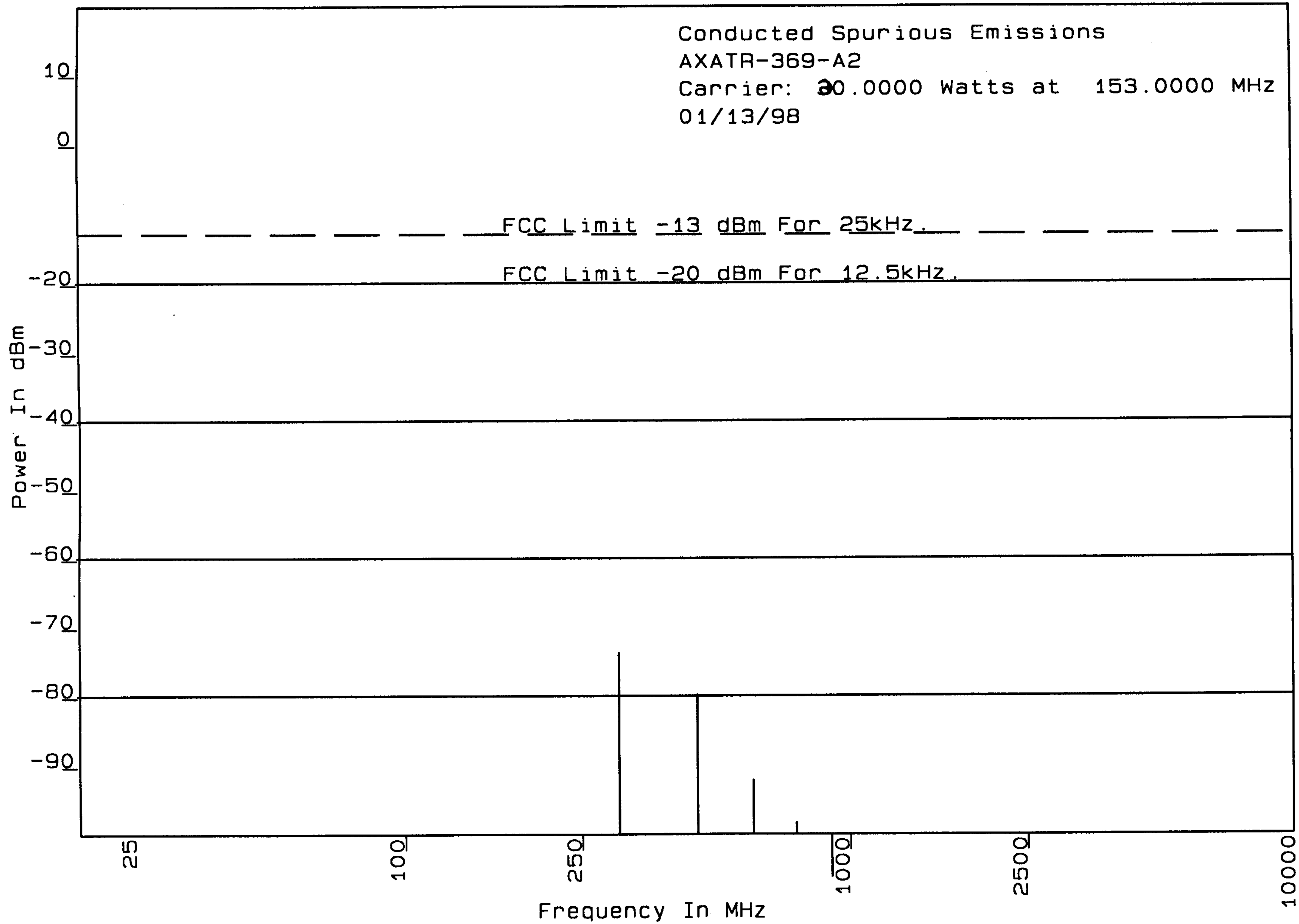


Exhibit #11C3

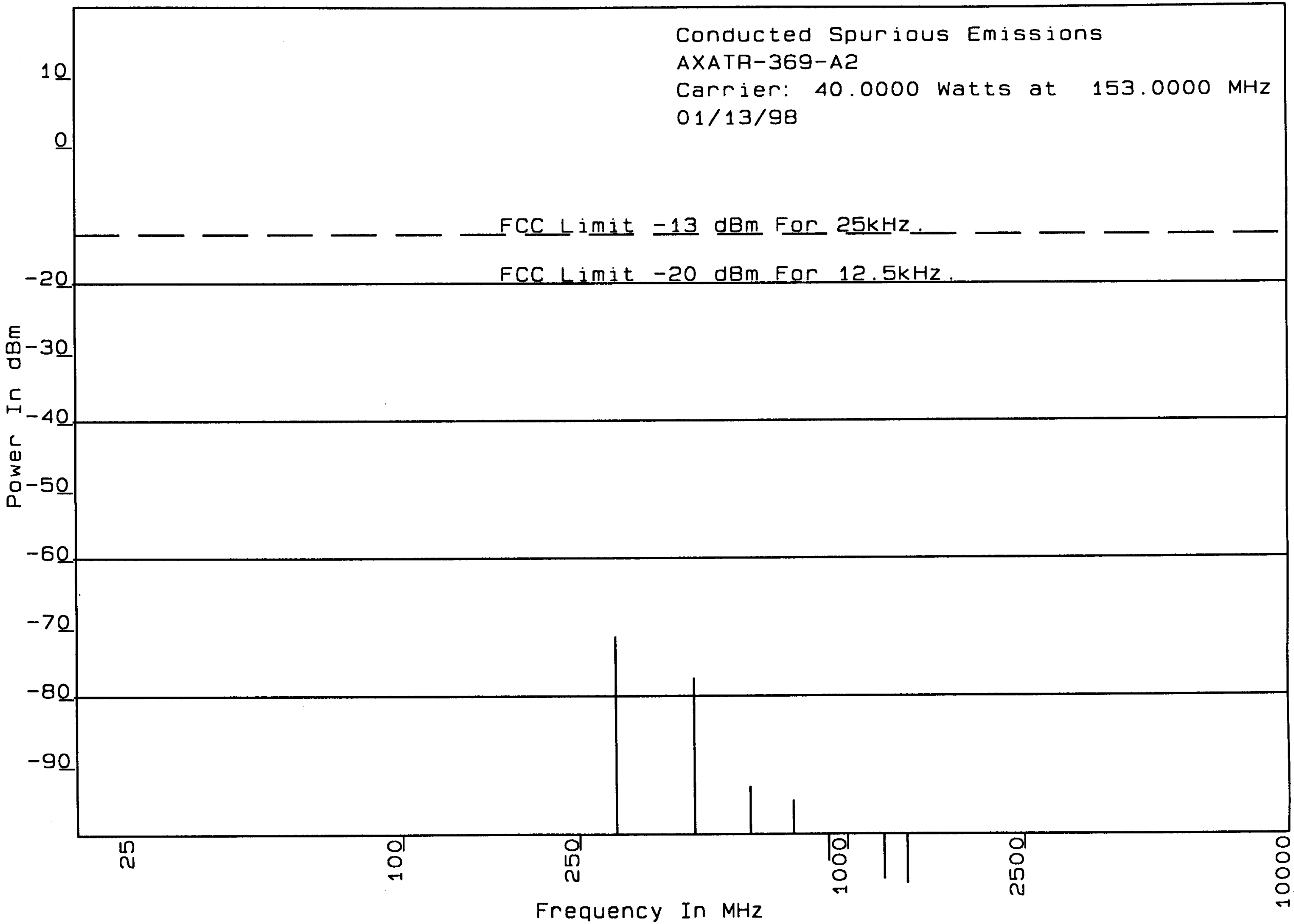
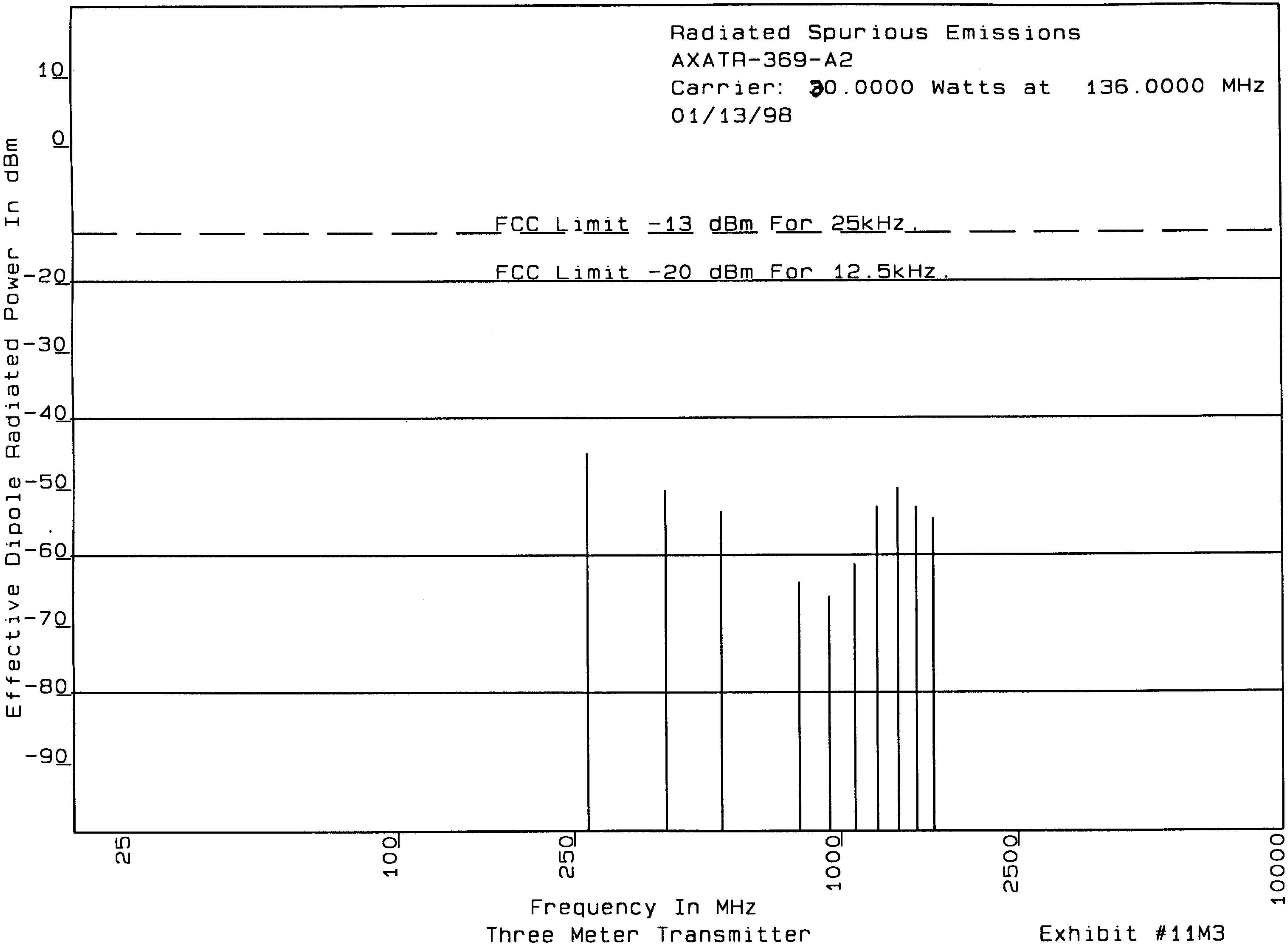


Exhibit #11C4



Radiated Spurious Emissions
AXATR-369-A2
Carrier: 30.0000 Watts at 136.0000 MHz
01/13/98
FCC Limit -13 dBm For 25kHz.
FCC Limit -20 dBm For 12.5kHz.
Effective Dipole Radiated Power In dBm
10
0
-20
-30
-40
-50
-60
-70
-80
-90
25
100
250
1000
2500
10000
Frequency In MHz
Three Meter Transmitter
Exhibit #11M3

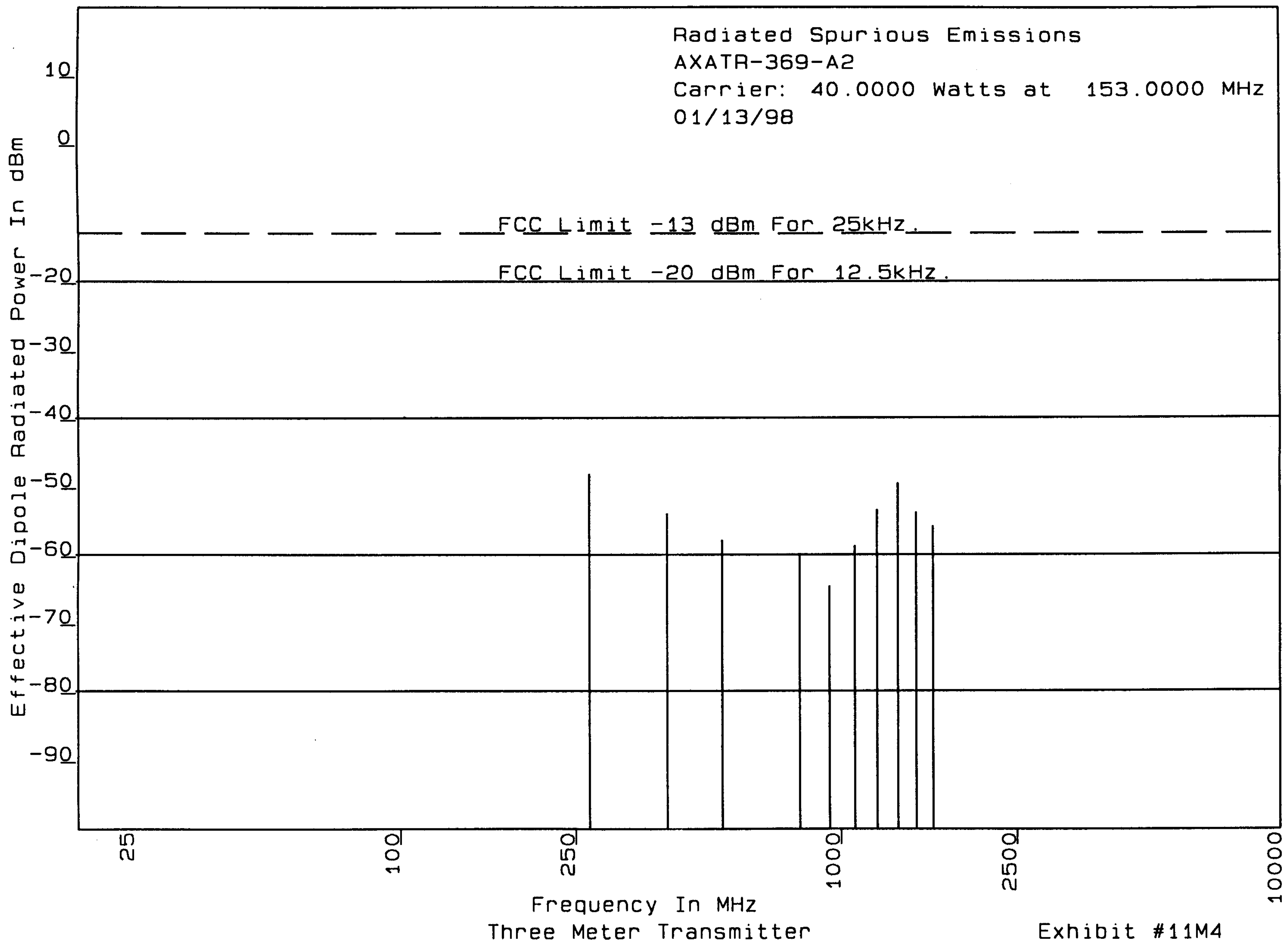


Exhibit #11M4

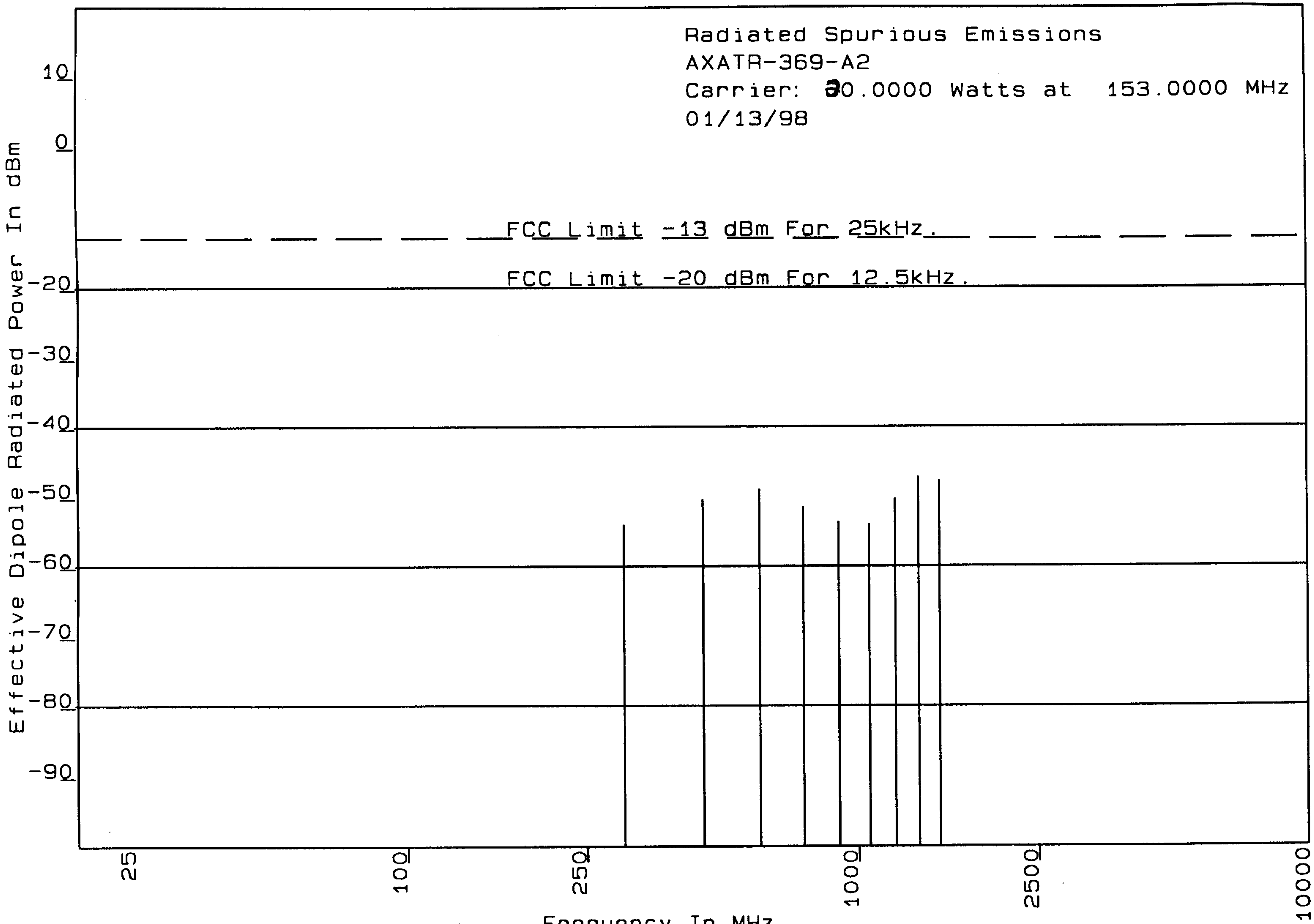


Exhibit #11N3

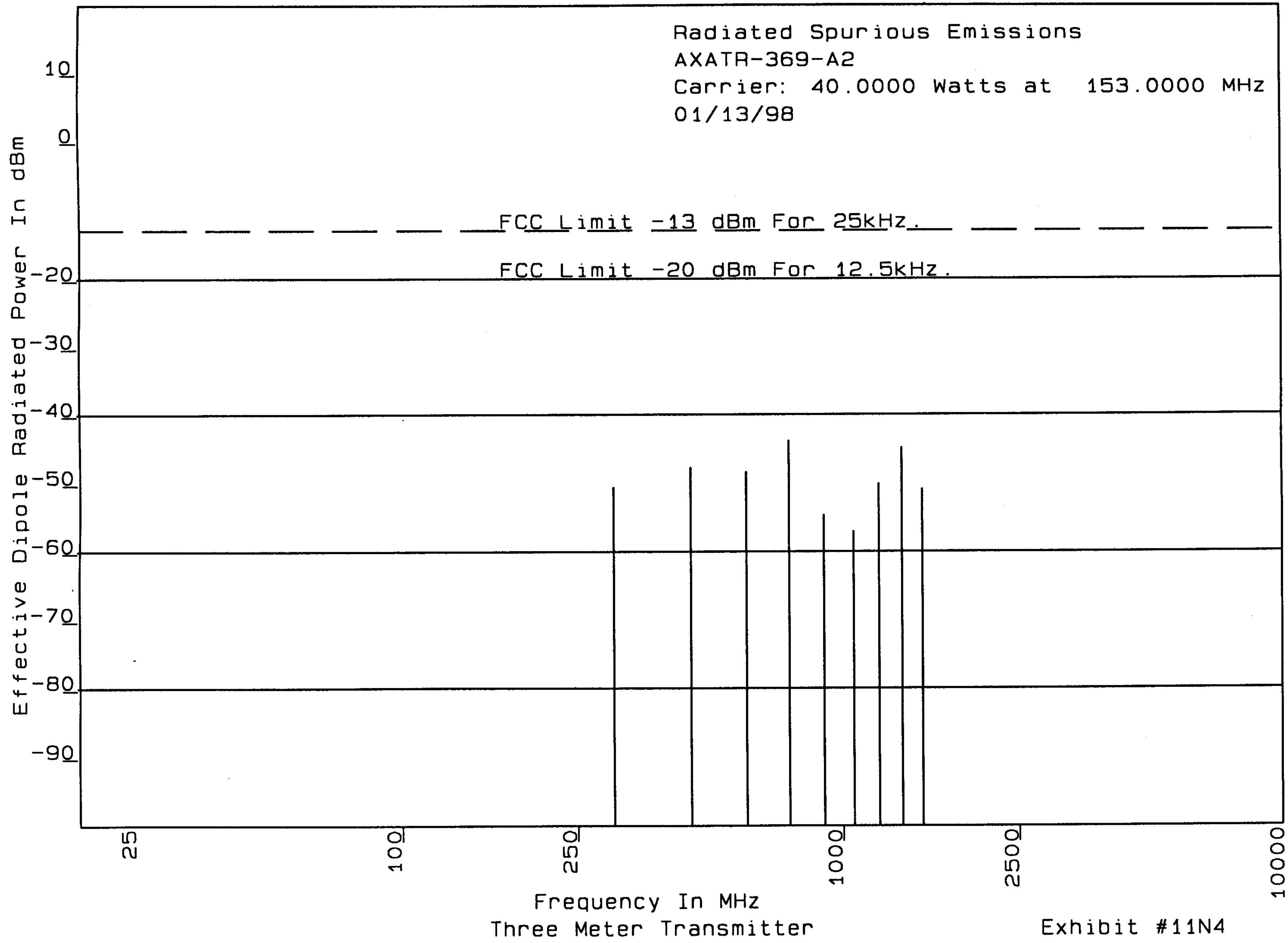


Exhibit #11N4

EXHIBIT 12A

FREQUENCY STABILITY

Par. 2.995 (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: (The battery is rated from 6 to 9 volts.)

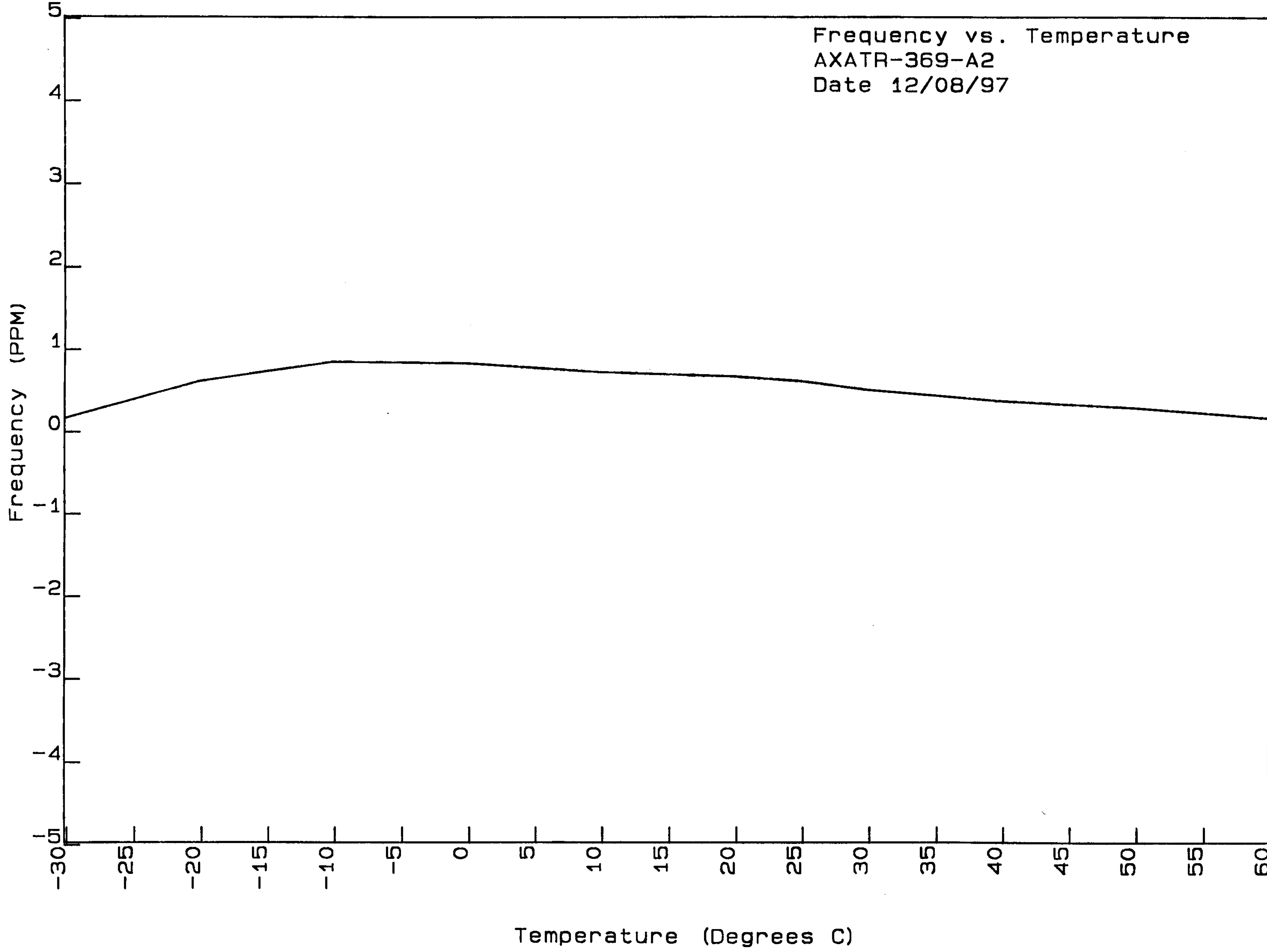
Exhibit 12B Carrier Frequency Vs Temperature

Exhibit 12C Carrier Frequency Vs Voltage

The Equipment used is:

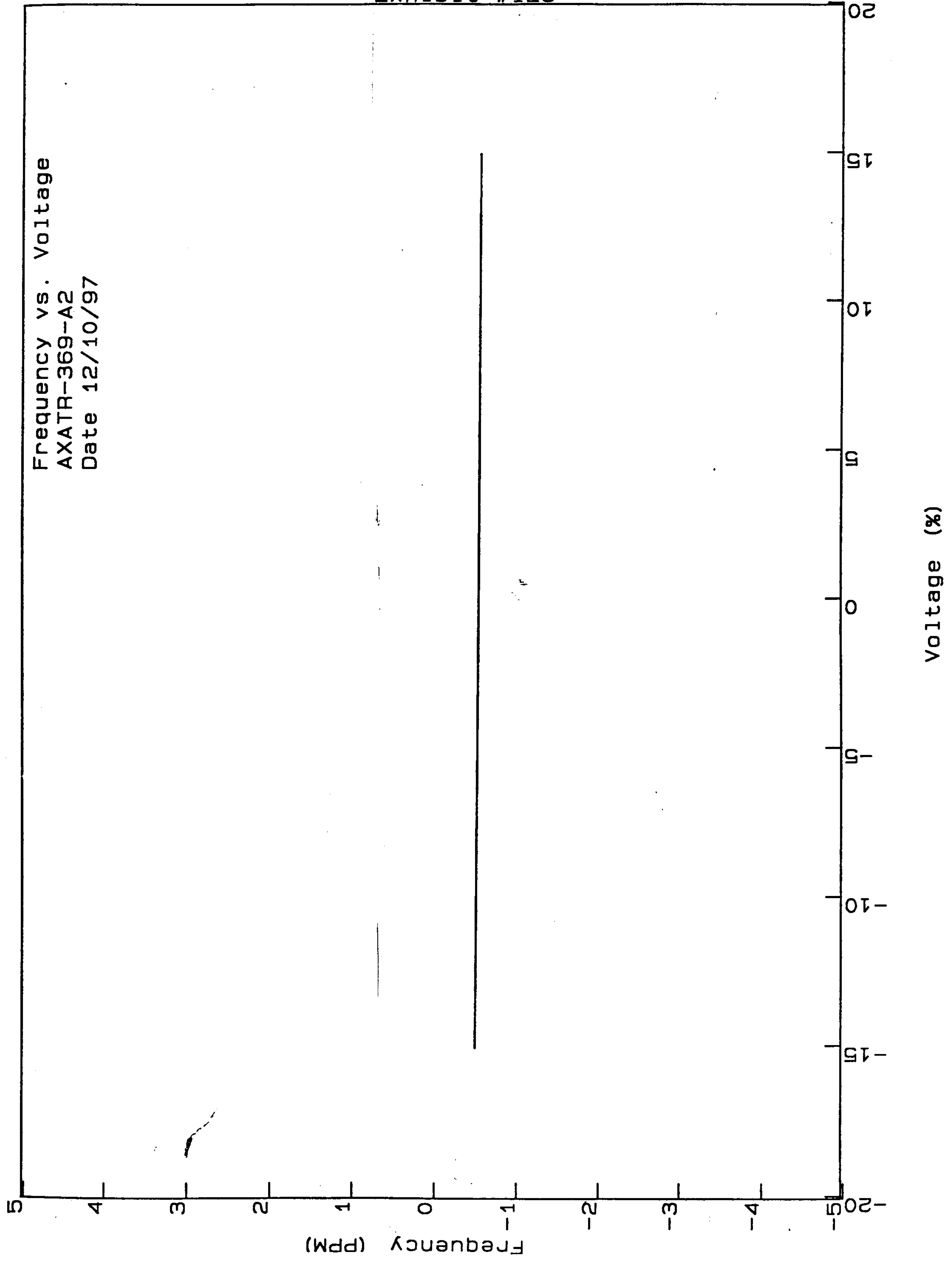
Hewlett Packard QUARTZ Thermometer Model 2804A
Takeda Counter TR5823AK
Takeda Digital Multimeter TR6878
Tabai Temperature chamber PL-2G

Exhibit #12B



Frequency vs. Temperature
AXATR-369-A2
Date 12/08/97
Frequency (PPM)
5
4
3
2
1
0
-1
-2
-3
-4
-5
-30
-25
-20
-15
-10
-5
0
5
10
15
20
25
30
35
40
45
50
55
60
Temperature (Degrees C)

Exhibit #12C

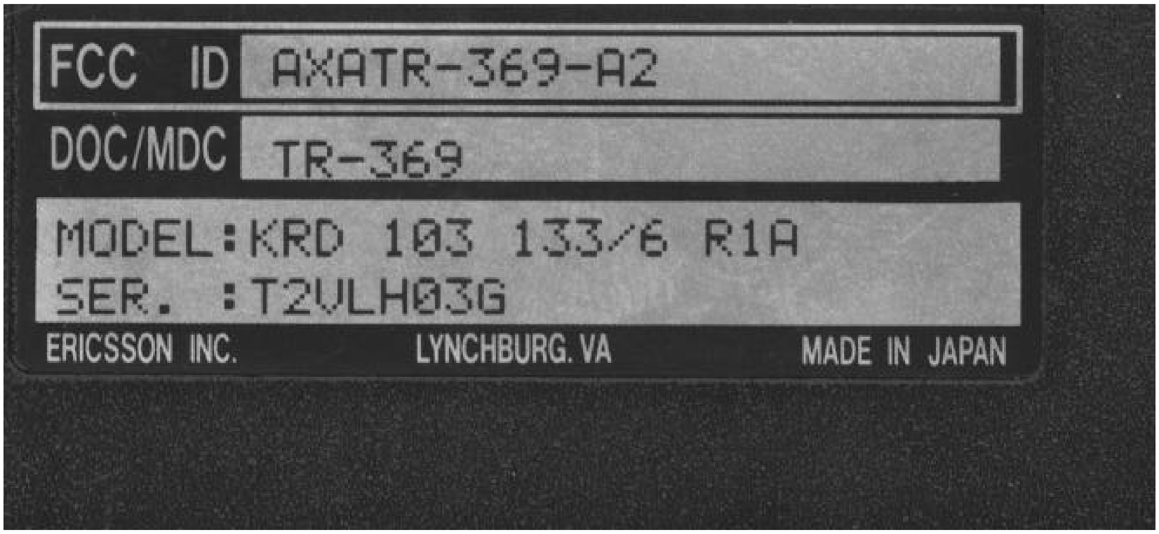

Frequency vs. Voltage
AXATR-369-A2
Date 12/10/97
Frequency (PPM)
Voltage (%)
5
4
3
2
1
0
-1
-2
-3
-4
-5
-20
-15
-10
-5
0
5
10
15
20

APPLICANT:
ERICSSON INC

FCC ID NO.:
AXATR-369-A2

EXHIBIT 13

IDENTIFICATION NAMEPLATE



TRANSIENT FREQUENCY BEHAVIOR

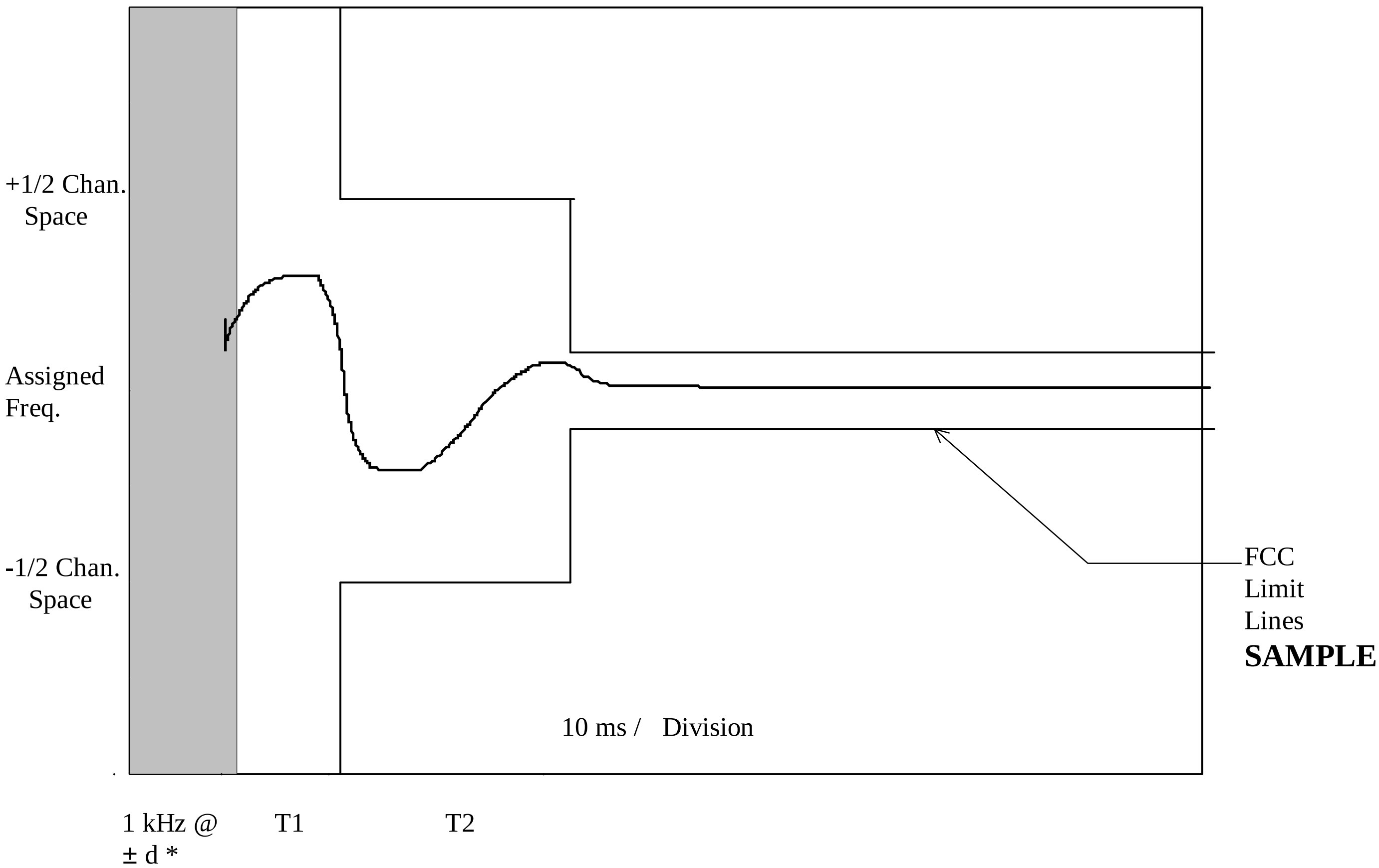
PER PT 90.214 USING EIA/TIA 603, THE FOLLOWING MEASUREMENTS WERE MADE:

EXHIBIT NO.	FREQUENCY	CHANNEL BANDWIDTH
15B1,B2	136.00	T! and T2, 1 and x10
15C1,C2	136.00	T1 and T2, 1 and x10

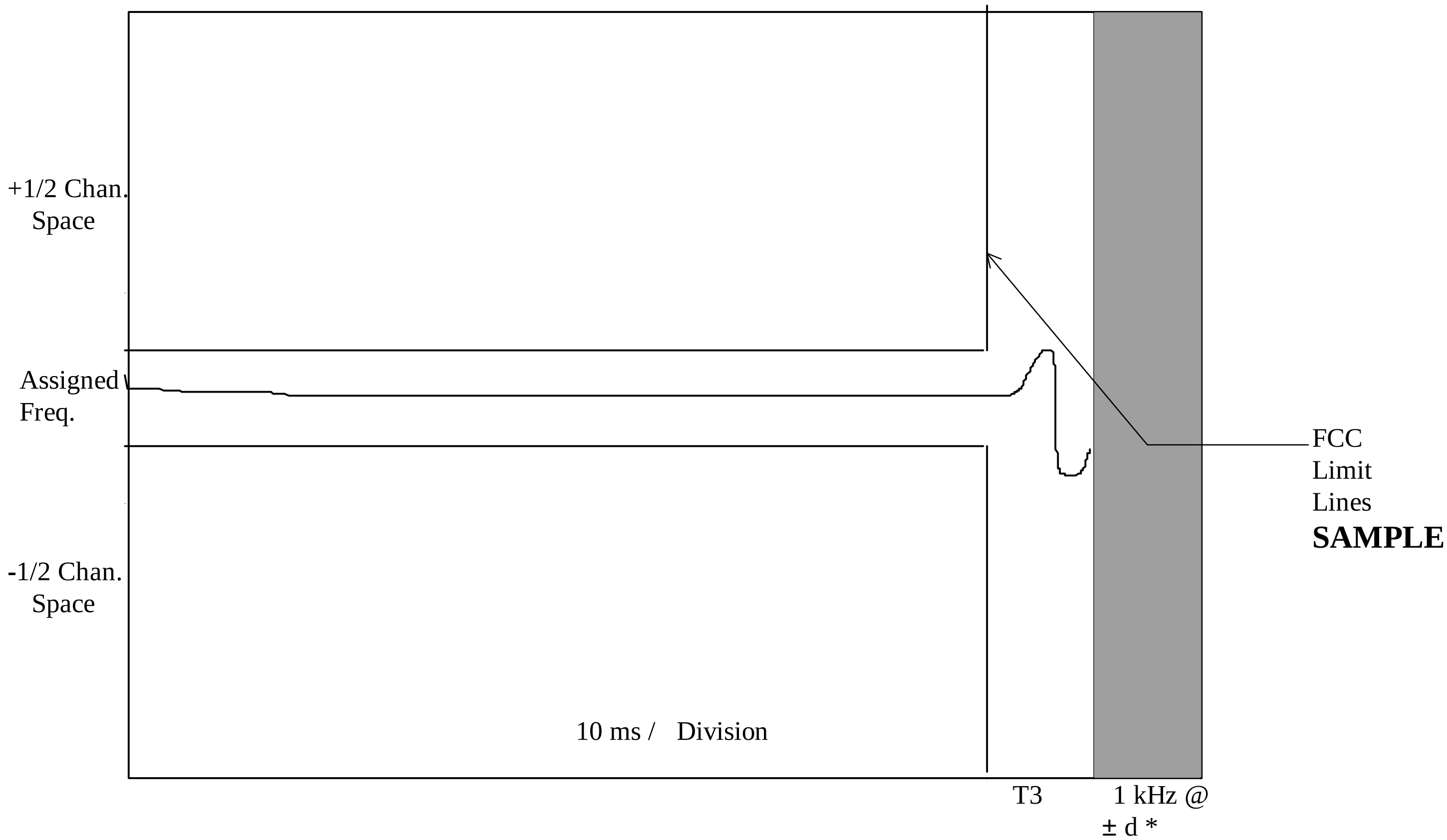
The Measurements taken are representative of the entire frequency band.

LIST OF EQUIPMENT	
HP 778D DUAL DIRECTIONAL COUPLER	HP432A RF DETECTOR
TEKTRONIX 2232 OSCILLOSCOPE	HP8657A SIGNAL GENERATOR
HP 8901A MODULATION ANALYZER	HP436A POWER METER
HP 8482A POWER SENSOR	6261 DC POWER SUPPLY
KEITHLY 179 TRMS DIGITAL MULTIMETER	TEKTRONIX HC100 PLOTTER
NARDA ATTENUATORS	MINICIRCUITS 15542 ZFRSC-2050

TRANSIENT FREQUENCY BEHAVIOR



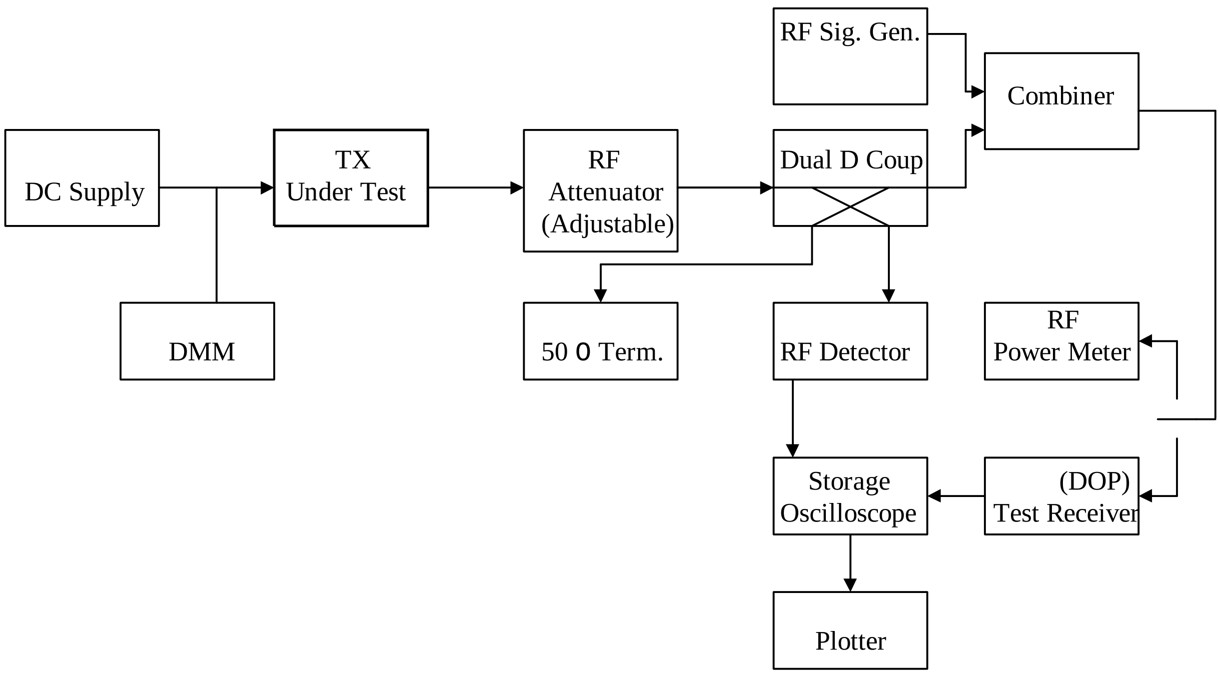
TRANSIENT FREQUENCY BEHAVIOR



* NOTE: d is set equal to the channel spacing (i.e. 25,12.5,or 6.25 kHz)

TRANSIENT FREQUENCY BEHAVIOR

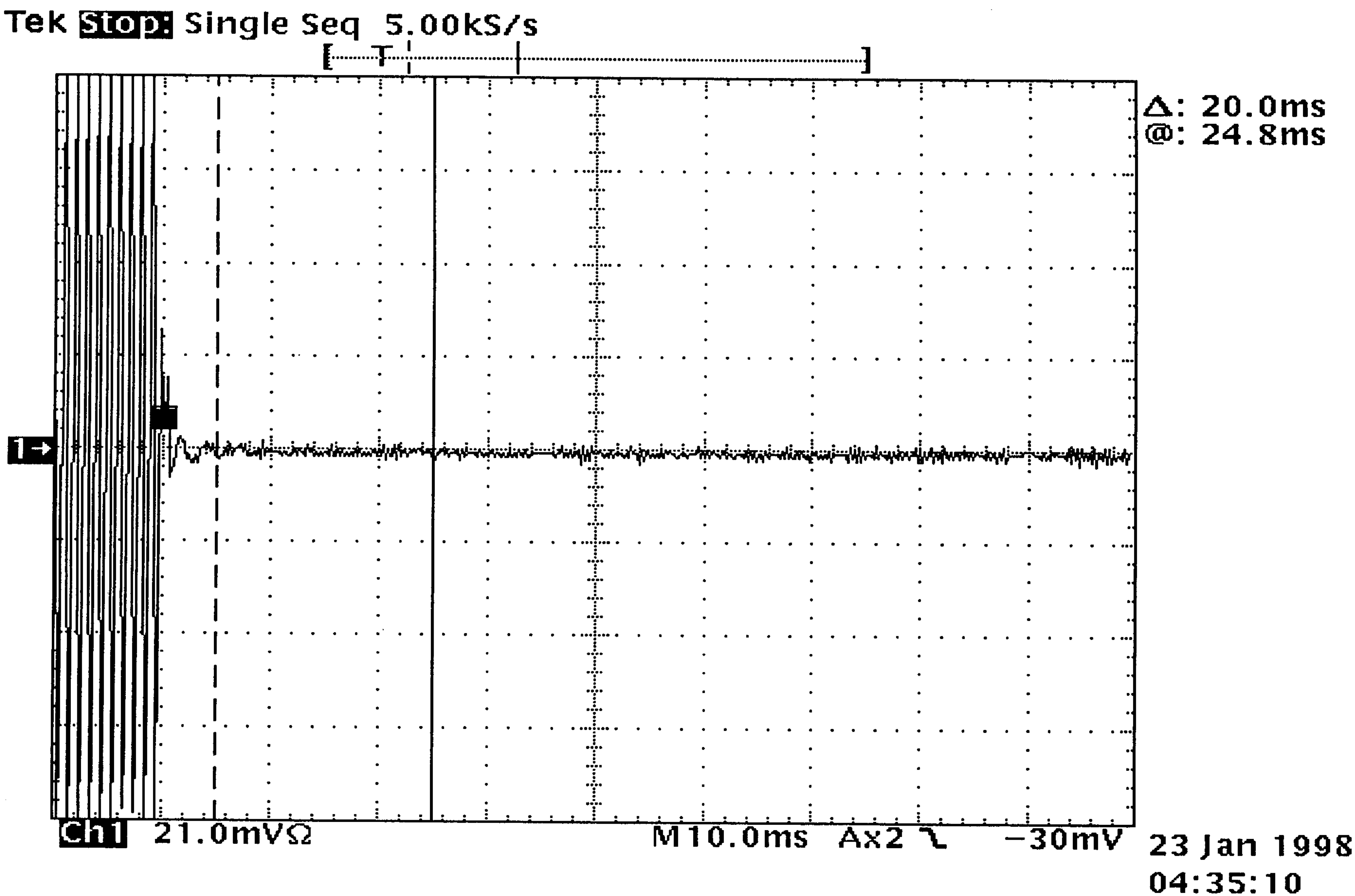
Transient Frequency Behavior Measurement Per TIA/EIA 603.



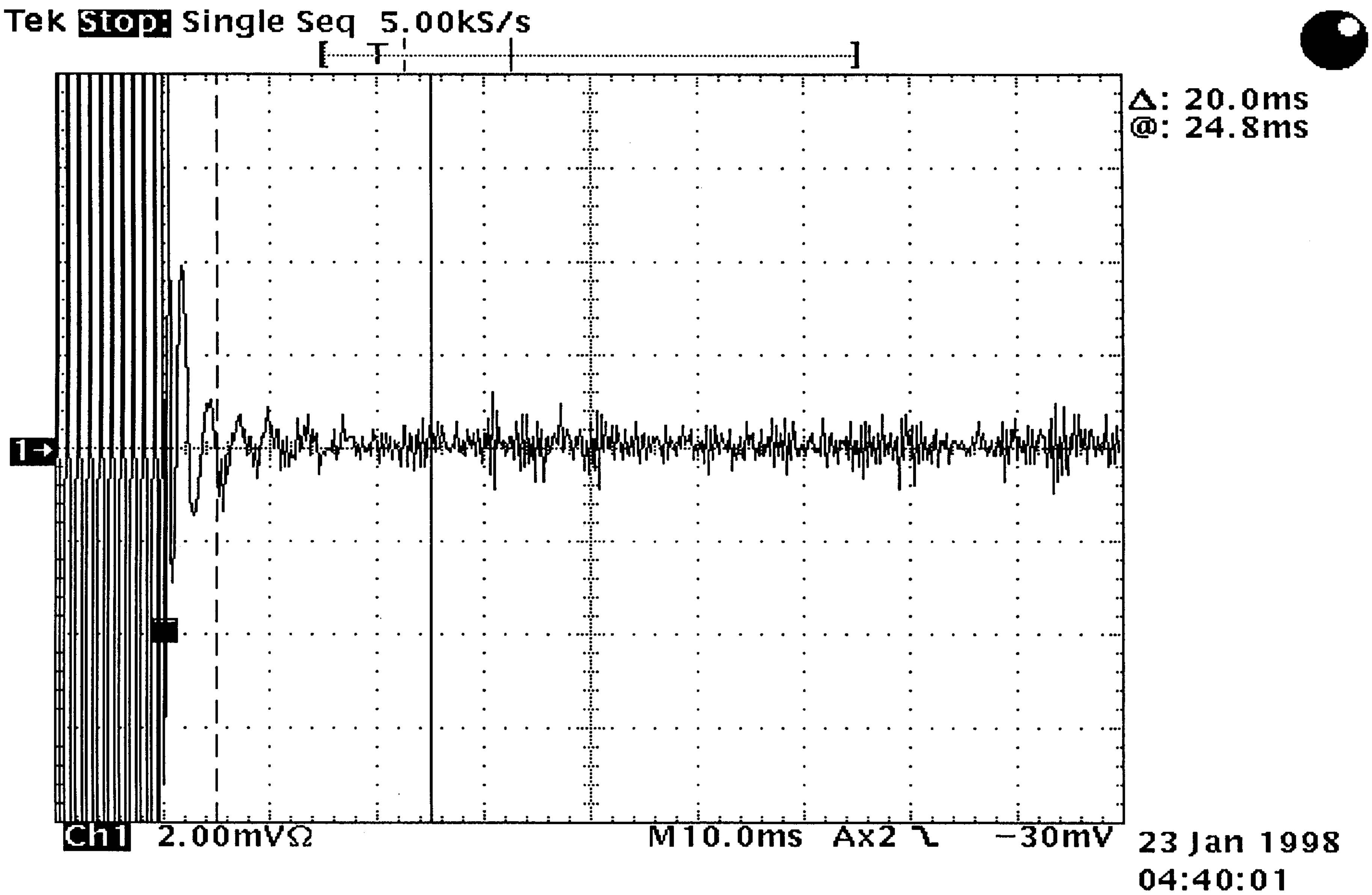
1. Equipment is connected as illustrated above.
2. Connect the test receiver's Demodulator Output Port (DOP) to the vertical input channel of the storage Oscilloscope. Connect the output of the RF detector the external trigger of the oscilloscope. Connect the output of the RF combiner the RF power meter.
3. Set the test receiver to measure FM deviation with the audio bandwidth set at =50 Hz to =15,000 Hz and tune the RF frequency to the transmitter assigned frequency.
4. Turn on the TUT (Transmitter Under Test). Adjust the RF attenuator to provide an input level of 20 dBm which is 10 dB below the maximum allowed input power to the test receiver. (TIA/EIA 603 first sets the level to 40 dB below the maximum allowed input level of the test receiver, then increases the level by 30 dB to 10 dB below the maximum allowed input level. The maximum input level of our test receiver is 30 dBm.) Turn off the TUT.
5. Set the signal generator to the assigned TX frequency and modulate it with a 1 kHz tone at +/- d, deviation equal to the Channel Spacing (i.e. 25,12.5, or 6.25 kHz) and set its power to -30 dBm (50 dB below the level of the TUT).
6. Disconnect the RF power meter and connect the output of the RF combiner network to the input of the test receiver.

TRANSIENT FREQUENCY BEHAVIOR

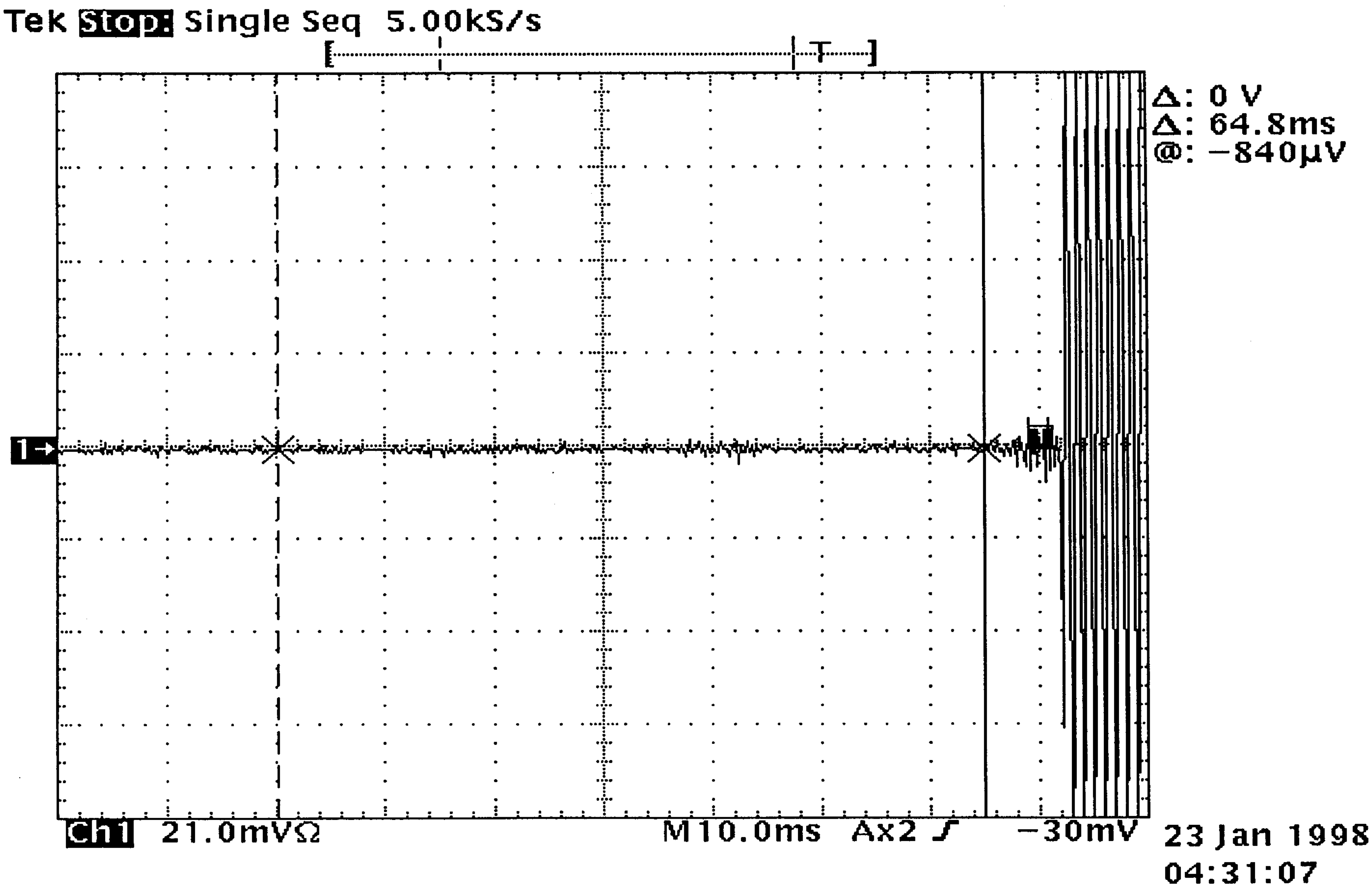
7. Set the horizontal sweep rate on the storage oscilloscope to 10 milliseconds per division and adjust the display to continuously view the 1000 Hz tone from the DOP. Adjust the vertical amplitude control of the oscilloscope to display the 1000 Hz at +/- 4 divisions vertically centered on the display.
8. Adjust the oscilloscope so it will trigger on an increasing magnitude from the RF peak detector at 1 division from the left side of the display, when the transmitter is turned on. Set the controls to store the display.
9. Turn on the TUT and observe the stored display. The output at the DOP, due to the change in ratio of power between the signal generator input power and the transmitter output power will, because of the capture effect of the test receiver, produce a change in display: For the first part of the sweep it will show the 1 kHz test signal. Then once the receiver's demodulator has been captured by the transmitter power, the display will show the frequency difference from the assigned frequency to the actual transmitter frequency versus time. The instant when the 1 kHz test signal is completely suppressed (including any capture time due to phasing) is considered to be "t on".
10. To test the transient frequency during the period of "t 3", the transmitter shall be switched on.
11. Adjust the oscilloscope so it will trigger on a decreasing magnitude from the RF peak detector at 1 division from the right side of the display, when the transmitter is turned off. Set the controls to store the display.
12. The transmitter shall be switched off.
13. Observe the display. The trace should remain with in the allowed divisions during the period "t 3", according to the specifications in 90.213,90.214.



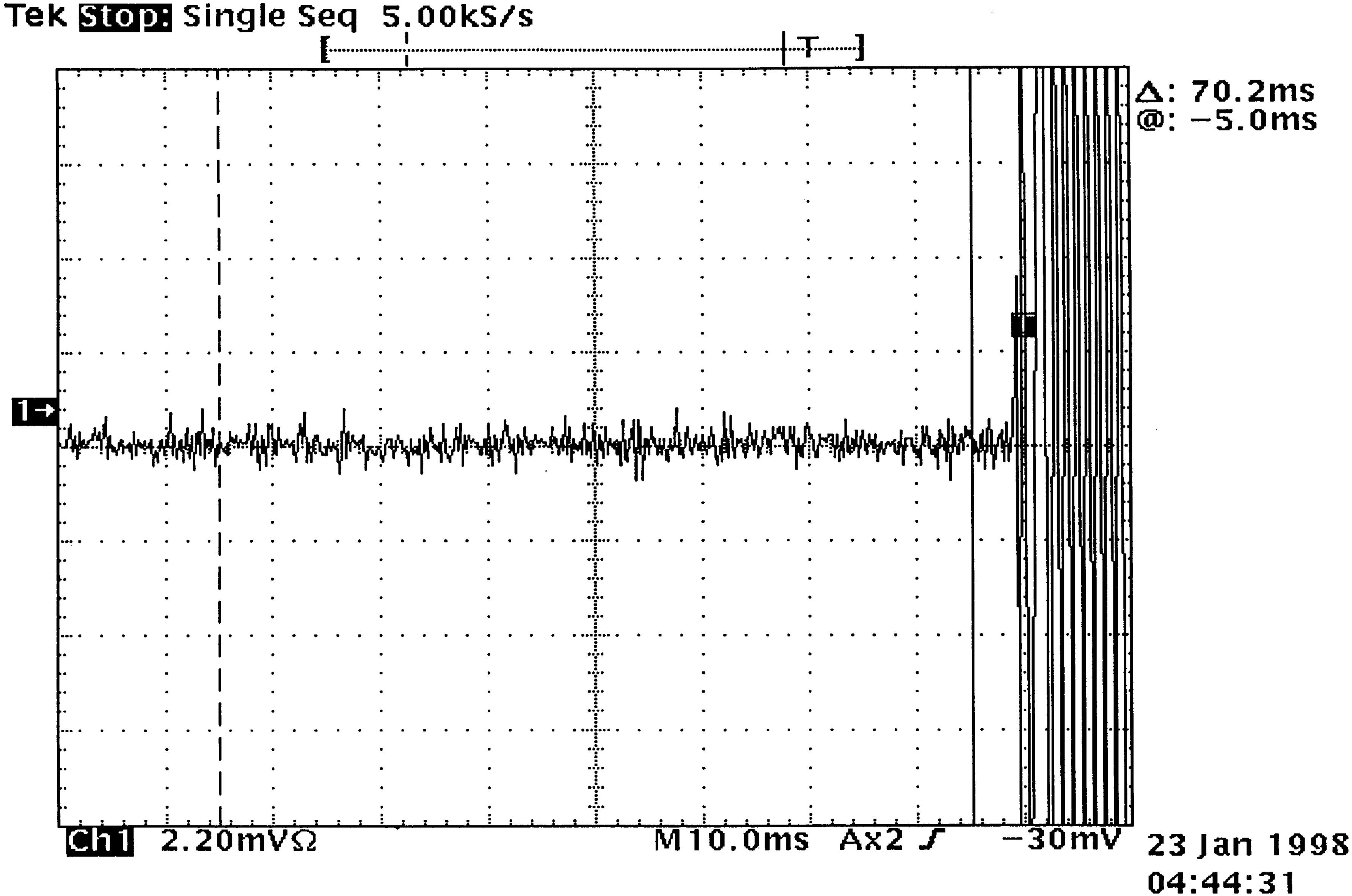
136.0000 MHz / 12.5 kHz Channel Space / Exhibit 15C1



136.0000 MHz / 12.5 kHz Channel Space / Vertical Expanded X10 Exhibit 15C2



136.0000 MHz / 12.5 kHz Channel Space / Exhibit 15C3



136.0000 MHz / 12.5 kHz Channel Space / Vertical Expanded X10 / Exhibit 15C4