APPENDIX 3

FUNCTION OF DEVICES
HP 125

TWO PAGE (2) FUNCTION OF DEVICES FOLLOWS THIS SHEET

List of Active Devices and Functions
Alan HP125

Reference	Device	Function
IC 101	S80740SN	Voltage detector
IC 102	TC4SU69F	Audio mute
IC 103	TA7368F	Audio amp
IC104	S81280GUP	Regulator
IC105	TC4053B	Data multplexer
IC106	TK11250B	Regulator
IC107	TA75S558F	VOX Amp
IC108	H8/3644	MCU
IC110	FX829DS	FFSK Processor, DTMF
IC112	TC4S66F	MIC/Data switch
IC114	FX828DS	CTCSS/DCS Processor
IC115	LC7385M	DTMF Decoder
IC116	TC4S66F	12.5/25 Switch
IC117	TA31136FN	Integrated FM receiver
IC118	TK11806M	DC/DC converter
IC119	24LC65	EEprom
IC120	S81230GUP	Regulator
IC121	TA75S558F	OP amp
IC122	TA75S558F	OP amp
IC301	HD66727	Display driver
IC601	PFO314	TX PA
IC602	LM358	APC
IC802	LMX1151TM	Frequency Synthesizer

List of Active Devices and Functions
Alan HP125

Reference	Device	Function
Q102	2SK1588	Audio Mute
Q103	DTA123YE	Mic Switch
Q104	2SB1132Q	Audio Mute
Q105	2SK1588	Audio Mute
Q106	DTA123YE	Low volt inhibit
Q107	2SC4116	Audio Mute
Q108	DTA144EE	Clock Frequency Shift
Q109	TTA123YE	VOX Enable
Q110	RTIP134M	Voltage Gate
Q111	RTIP434M	Voltage Gate
Q112	RTIP434M	Voltage Gate
Q113	2SC4116	Ripple Filter
Q114	2SB1132Q	Led Switch
Q115	RTIN140M	Led Switch
Q116	2SC4116	Noise Filter
Q117	UMG2/TL	12.5/25 Switch
Q118	UMG2/TL	Dif Amp
Q120	RTIN441M	Digital Mod Limit switch
Q301	2SC4154	LCD Temp Compensation
Q501	2SC3356	TX VCO
Q502	2SC4116GR	TX/RX Switch
Q503	2SC3356	RX VCO
Q504	RTIP441M	TX/RX Switch
Q505	2SC2246	VCO Buffer
Q506	2SC4116GR	TX Delay
Q601	RTIN140M	Pin Diode Driver
Q602	2SC3357	TX Amp
Q603	2SC4226	TX amp
Q604	RTIN441M	TX Inhibit
Q605	2SB1132Q	Power Control
Q606	UMW1/TL	Dif Amp
Q607	RTIN441M	TX Power Switch
Q608	RTIP434M	TX Power Switch
Q609	2SC4116	Q602 Gate
Q610	2SC4116	TX Inhibit
Q701	2SK302Y	RX RF Amp
Q703	3SK151GR	First Mixer
Q704	2SC4125Y	First IF
Q705	2SC4226	VCO Buffer
Q801	2SK0880GR	Tuning Signal to Front end
Q803	2SA1586GR	Charge Pump
Q804	2SA1586GR	Charge Pump
Q805	2SC4116GR	Charge Pump
Q806	2SC4116GR	Charge Pump
Q807	2SA1586GR	unlock Indicator
Q808	2SC4226	VCO/ Synthesizer Buffer

APPENDIX 4

SCHEMATIC DIAGRAMS

TWO (2) SCHEMATIC DIAGRAMS FOLLOW THIS SHEET

APPENDIX 6

TRANSMITTER ALIGNMENT

TWO (2) PAGE ALIGNMENT PROCEDURE FOLLOW THIS SHEET

Adjustments

HP125/425 is strictly controlled and aligned before leaving the factory, so the following paragraphs, which explain how to make adjustments of the main parameters such as modulation, RF power etc., must be followed only if you find them outside the specifications or after a service repair.

Setting default modulation

This operation restores the average value of the modulation (both main and ctcss one) and is recommended in two cases:

- If you note a coarse modulation misallignement and you don't have a modulation meter or a test set available in short time in order to perform a fine adjustment to the customer's required parameters.
- Before starting to adjust the main and ctcss modulation as per the paragraphs "Adjusting main modulation" and "Adjusting ctcss modulation" (it will help you to reduce the adjusting time and obtain it at the first shot).

In both cases we recommend to provide the real adjustments as soon as possible.

Do as follows:

1) From the menu **Options** select **Set default modulation** (or use the shortcut Ctrl+D): the **Default mode set** window will open.
2) Be sure the programmer cable is connected and click the **OK** button: the default modulation will be restored.

Should you have selected this procedure by mistake click the Cancel button to escape it.

If you haven't properly connected the programmer cable the message Communication error. Please check the connections will be displayed. Press OK and check the connections before attempting again this procedure.

Adjusting main modulation

This procedure is useful to provide a fine adjustment of the main modulation. Before starting this procedure, it's recommended to firstly restore the default modulation as per the par. "Restoring default modulation" in order to reduce the adjusting time and obtain the required main modulation level at the first tentative.

1) Make sure your Programmer cable is connected to the radio.
2) Connect the transceiver's antenna connector to a proper 50 Ohm dummy load and modulation meter (or test set) through an appropriate cable.
3) From the menu **Options** select **Main modulation adjust** (or use the shortcut Ctrl+M): the **Main modulation settings** window will open.
4) In the **Connection** area click the button **1.**: the **Main mod attenuation** drag down and radio buttons will be enabled and the transceiver will start transmitting in the **143-145 MHz** band for HP125 or **435 –440 MHz** for HP425.
5) Use the drag down button to attenuate or emphasize the modulation according to the level measured by your modulation meter.
6) Click on the next radio button band in order to activate the related drag down button.

7) Use the drag down button to attenuate or emphasize the modulation according to the level measured by your modulation meter.

8) Repeat steps 6 and 7 until you have adjusted all bands.

9) Click the **3.** Button to finish the main modulation adjustment: a window will confirm the procedure has been terminated correctly. Press **OK** to terminate the procedure.

Adjusting Ctcss modulation

This procedure is useful to provide a fine adjustment of the ctcss modulation. Before starting this procedure, it's recommended to firstly restore the default modulation as per the par. "Restoring default modulation" in order to reduce the adjusting time and obtain the required ctcss modulation level at the first tentative.

1) Make sure your Programmer cable is connected to the radio.

2) Connect the transceiver's antenna connector to a proper 50 Ohm dummy load and modulation meter (or test set) through an appropriate cable.

3) From the menu **Options** select **Ctcss modulation adjust** (or use the shortcut Ctrl+A): the **Ctcss modulation settings** window will open.

4) In the **Connection** area click the button **1.**: the **Ctcss Mod attenuation** drag down and radio buttons will be enabled and the transceiver will start transmitting in the **143-145 MHz** band for HP125 or **435 –440 MHz** for HP425.

5) Do the steps from 4) to 9) reported in paragraph "Adjusting main modulation" with the difference that you will have to adjust two values per band: the minimum (67 Hz) and maximum (250.3 Hz) sub audio tone frequency.

Adjusting the RF output power

This procedure must be done only if you note a significant difference between the lower and higher channel:

1) Make sure your Programmer cable is connected to the radio.

2) Connect the transceiver's antenna connector to a proper 50 Ohm dummy load and modulation meter (or test set) through an appropriate cable.

3) From the menu **Options** select **Rf Power adjust** (or use the shortcut Ctrl+W): the **RF power adjustment** window will open.

4) In the **Connection** area click the button **1.**: the **Ctcss Mod attenuation** drag down and radio buttons will be enabled and the transceiver will start transmitting in the **143-145 MHz** band for HP125 or **435 –440 MHz** for HP425.

5) Do the steps from 4) to 9) reported in paragraph "Adjusting main modulation" with the only difference that you will have to type the measured power of each band in the related box.

IMPORTANT! After you have performed the said adjustments don't forget to save again the data through the procedure described on par. "Uploading programming data to the radio".

APPENDIX 7

CIRCUITS AND DEVICES TO STABILIZE FREQUENCY

A 12.8 MHz referenced TCXO PLL circuit establishes and stabilizes output frequency.

APPENDIX 8

CIRCUITS TO SUPPRESS SPURIOUS RADIATION, LIMIT MODULATION AND CONTROL POWER

TRANSMITTER STAGE HARMONIC FILTER

L604, C607, L603, C606, C605, L602, C604, C603, L601, C602 and C601 form low pass filter. Unwanted harmonics are reduced by >70 dBc.

AUTOMATIC POWER CONTROL

The sampled RF signal is rectified by D604 to produce a DC voltage. IC602B is a differential amplifier. In transmit mode a reference level for IC620B is supplied, depending on customer programming power output level, by microcontroller (PWM output pin 54). The reference level and the detected level are compared and a difference signal is produced. The difference signal controls the supply voltage to the first amplifier stage in IC601. This control loop produces a constant power output at the antenna connector.

MICROPHONE AUDIO CIRCUIT

IC110 is a low voltage audio processor for audio processing, DTMF generation and FFSK generation and decoding. It contains high and low pass voiceband filters and an amplitude limiter. Path bandwidth is switchable for use in both 12.5 and 25 kHz channel spacing applications. Three variable attenuation blocks are available to set both RX volume and TX modulation levels. The TX modulation outputs provide two-point modulation drives.

APPENDIX 9

TRANSIENT FREQUENCY BEHAVIOR (90.214) TEST PROCEDURE

FOLLOWS THIS SHEET

90.214 REQUIREMENTS: In the 150 - 174 MHz frequency band, transient frequencies must be within the maximum frequency difference limits during the time interval indicated below for 25, 12.5 and 6.25 kHz channels:

12.5 kHz:

Time Interval	Maximum Frequency	Mobile Radios 150 - 174 MHz
t_1	±12.5 kHz	5.0 ms
t_2	±6.25 kHz	10.0 ms
t_3	±12.5 kHz	5.0 ms

25.0 kHz

Time Interval	Maximum Frequency	Mobile Radios 150 - 174 MHz
t_1	±25.0 kHz	5.0 ms
t_2	±12.5 kHz	20.0 ms
t_3	±25.0 kHz	5.0 ms

TEST PROCEDURE: TIA/EIA TS603, PARA. 2.219, the levels were set as follows:

1. Using the variable attenuator, the transmitter level was set to 40 dB below the test receivers maximum input level, then the transmitter was turned off.

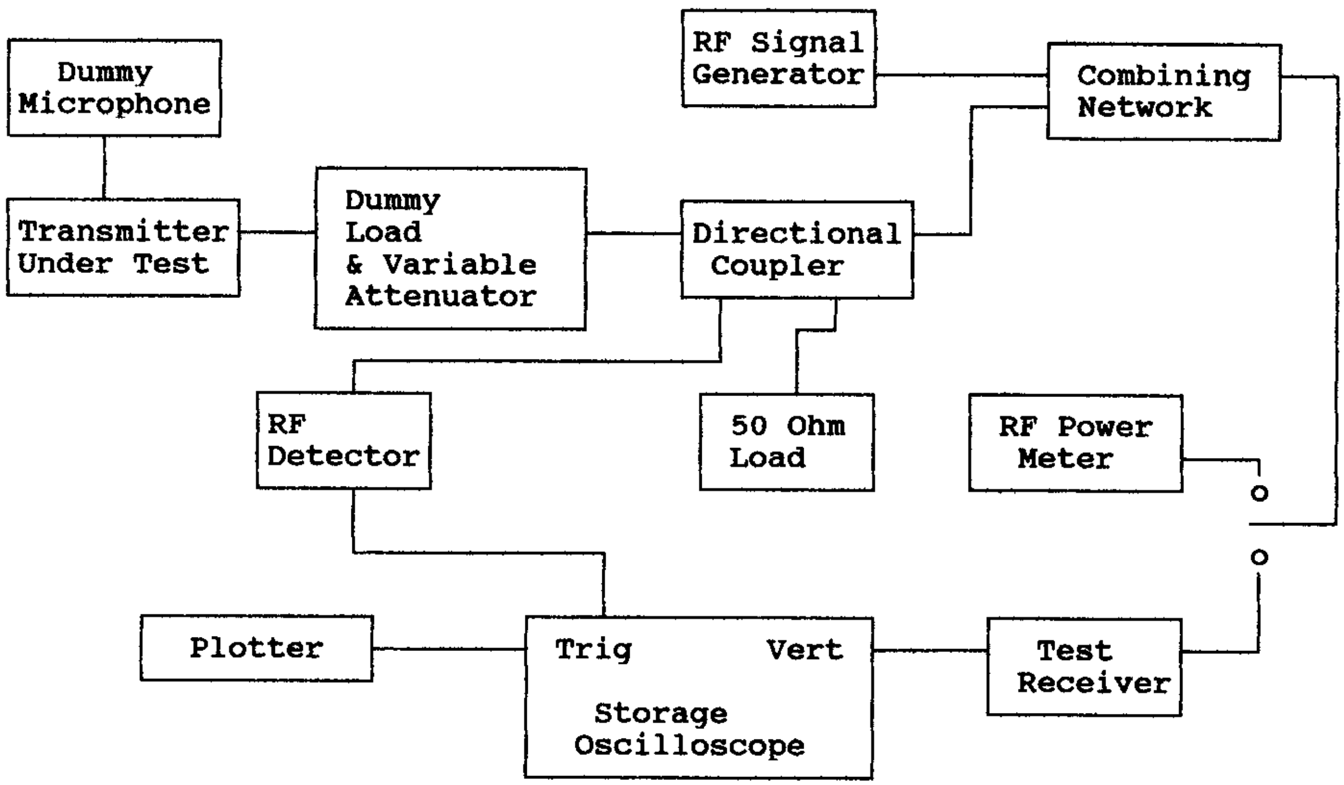
2. With the transmitter off, the signal generator was set 20 dB below the level of the transmitter in the above step (this level was maintained with the signal generator throughout the test).

3. Attenuation between the transmitter and the RF detector was reduced by 30 dB.

4. The transient frequency behavior was observed and recorded using a TEK TDS360 DSO.

Para. 2.995(a)(b)(d) Frequency stability

90.214 (continued) Transient Frequency Behavior



A. INTRODUCTION

The following data are submitted in connection with this request for Type Certification of the HP 125 transceiver in accordance with Part 2, Subpart J of the FCC Rules.

The HP 125 is a multi-bandwidth, VHF, frequency modulated transceiver intended for hand-held, portable applications in the 136 - 174 MHz band. It operates from a 7.2 volt battery pack. Output power rating is 1-5 watts. Both 25 kHz and 12.5 kHz channel operation is provided.

B. GENERAL INFORMATION REQUIRED FOR TYPE CERTIFICATION (Paragraph 2.983 of the Rules)

1. Name of applicant: Maxon America, Inc.

2. Identification of equipment: MMAALHP125

   a. The equipment identification label is shown in Appendix 1.
   b. Photographs of the equipment are included in Appendix 2.

3. Quantity production is planned.

4. Technical description:

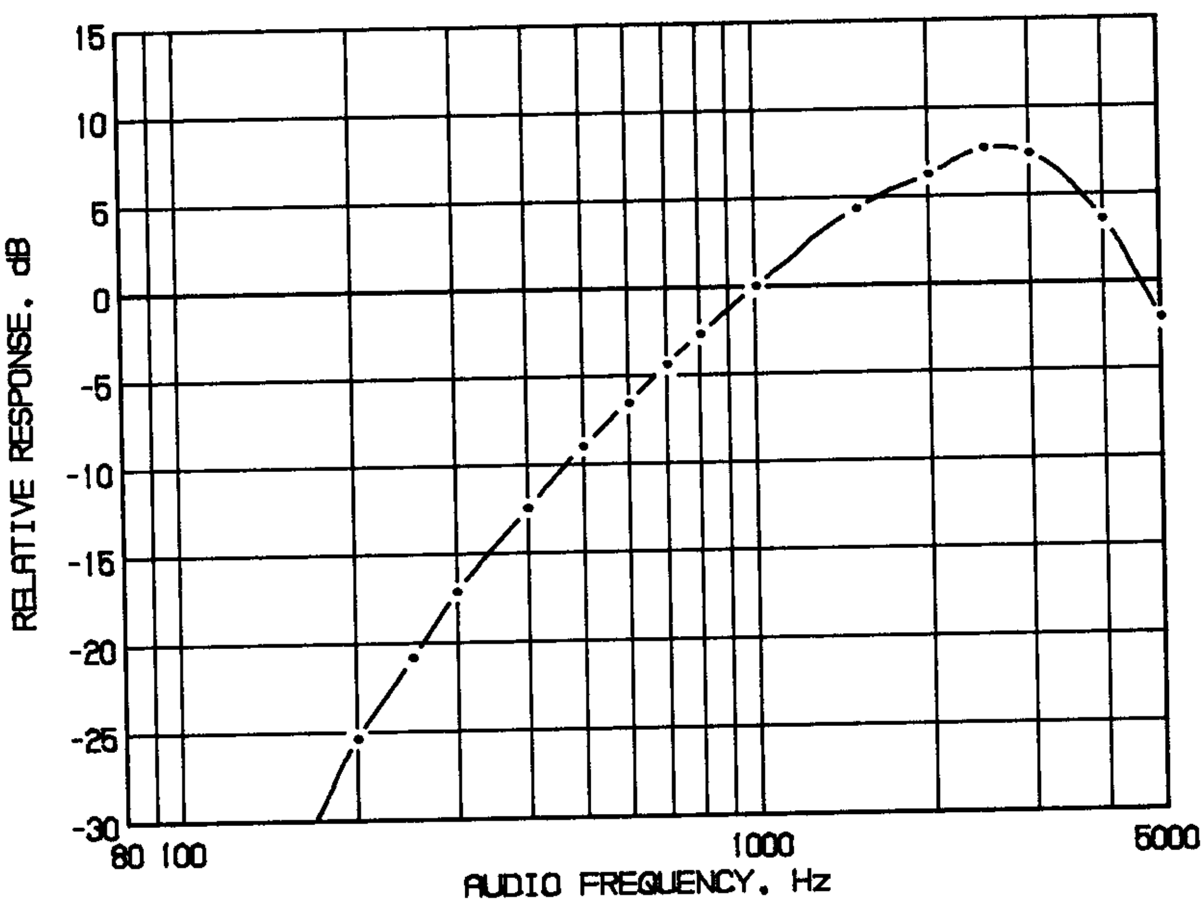
   a. 16k0F3E; 11k0F3E emission
   b. Frequency range: 136-174 MHz.
   c. Operating power of transmitter is fixed at the factory at 5 watts and can be reduced to a nominal 1 watt.
   d. Maximum power permitted under Part 90 of the FCC is 350 watts, and the HP 125 fully complied with those power limitations.
   e. The dc voltage and dc currents at final amplifier:

      Collector voltage: 7.1 Vdc
      Collector current: 1.1 A

   f. Function of each active semiconductor device: See Appendix 3.
   g. Complete circuit diagram is included in Appendix 4.
   h. A draft instruction book is submitted as Appendix 5.
   i. The transmitter tune-up procedure is included in Appendix 6.
   j. A description of circuits for stabilizing frequency is included in Appendix 7.
   k. A description of circuits and devices employed for suppression of spurious radiation and for limiting modulation is included in Appendix 8.
   l. Not applicable.

FIGURE 1

MODULATION FREQUENCY RESPONSE

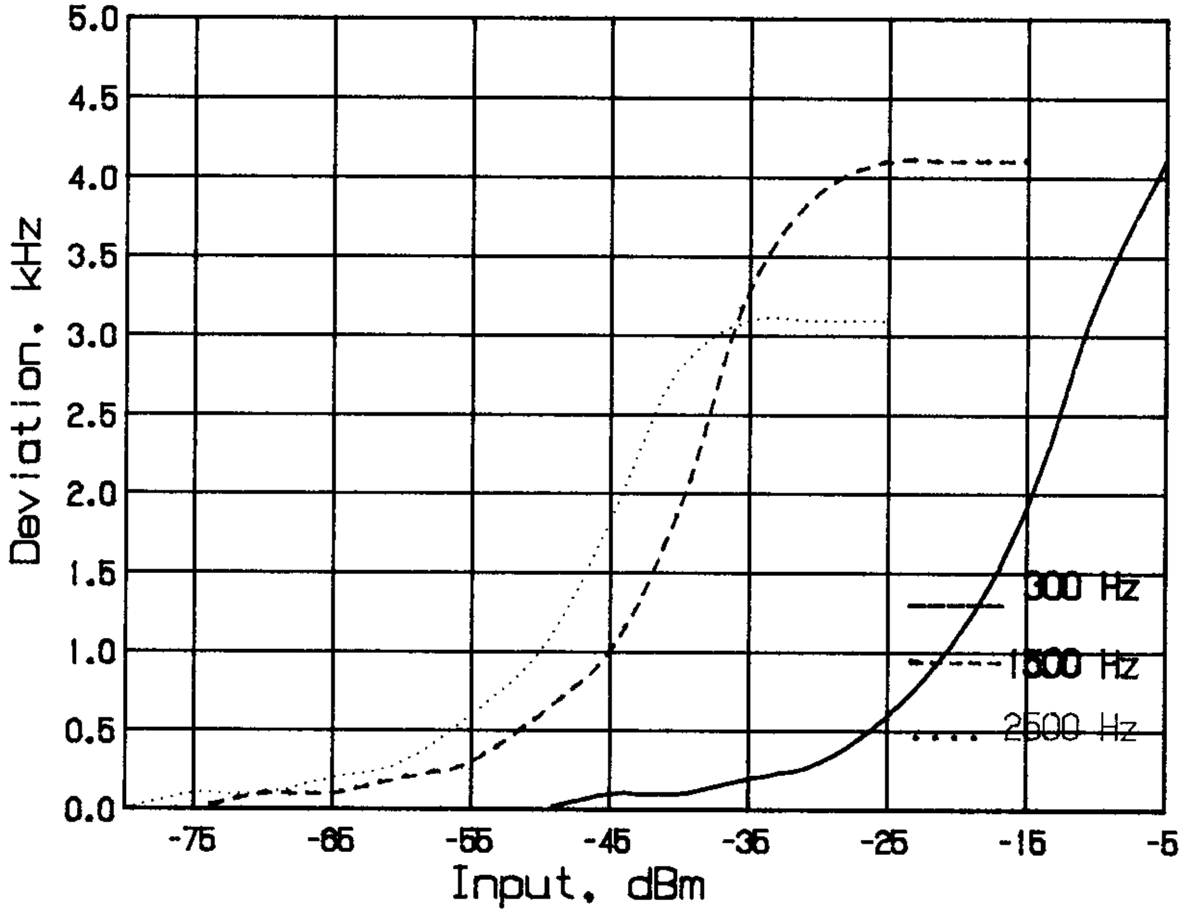


MODULATION FREQUENCY RESPONSE
FCC ID: MMAALHP125

FIGURE 1

FIGURE 2a

AUDIO LIMITER CHARACTERISTICS

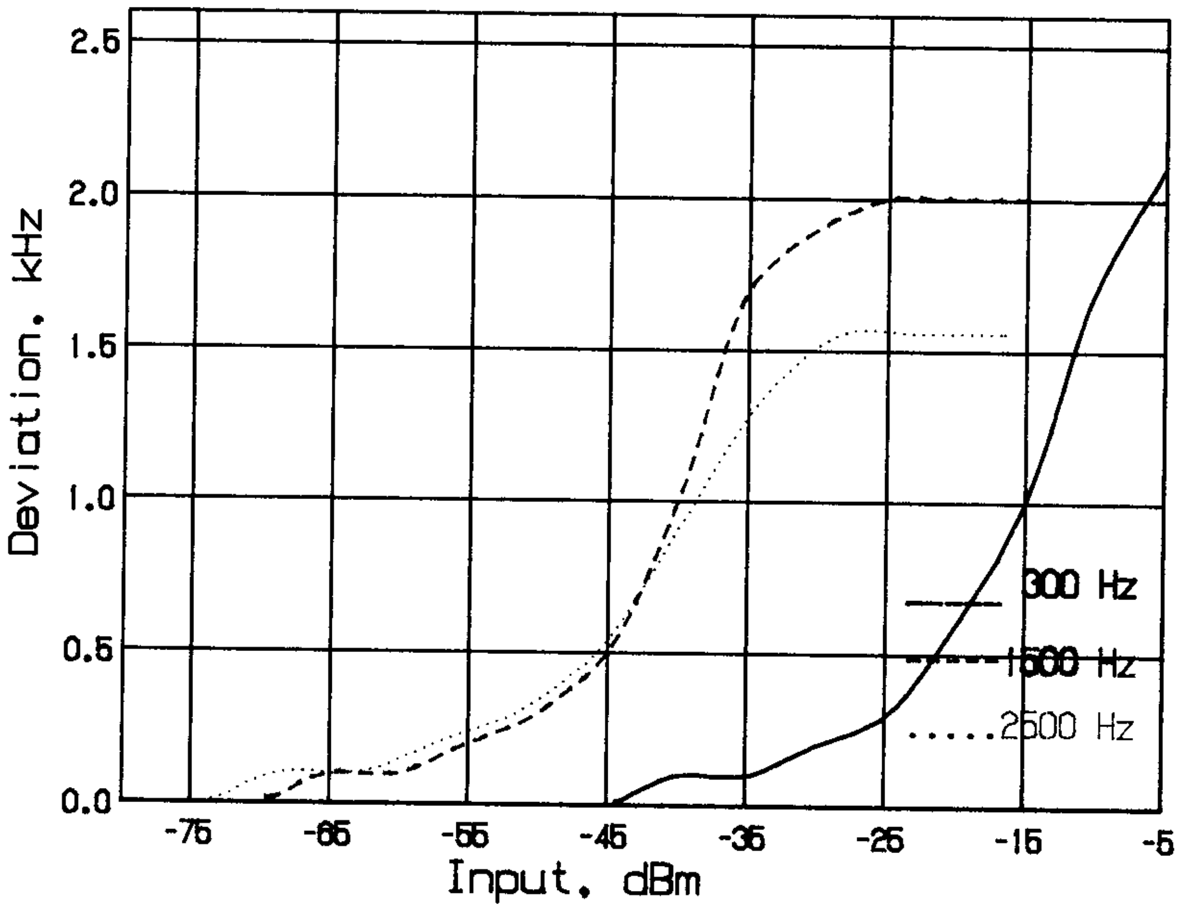


AUDIO LIMITER CHARACTERISTICS
FCC ID: MMAALHP125

FIGURE 2a Wideband (5 kHz)

FIGURE 2b

AUDIO LIMITER CHARACTERISTICS

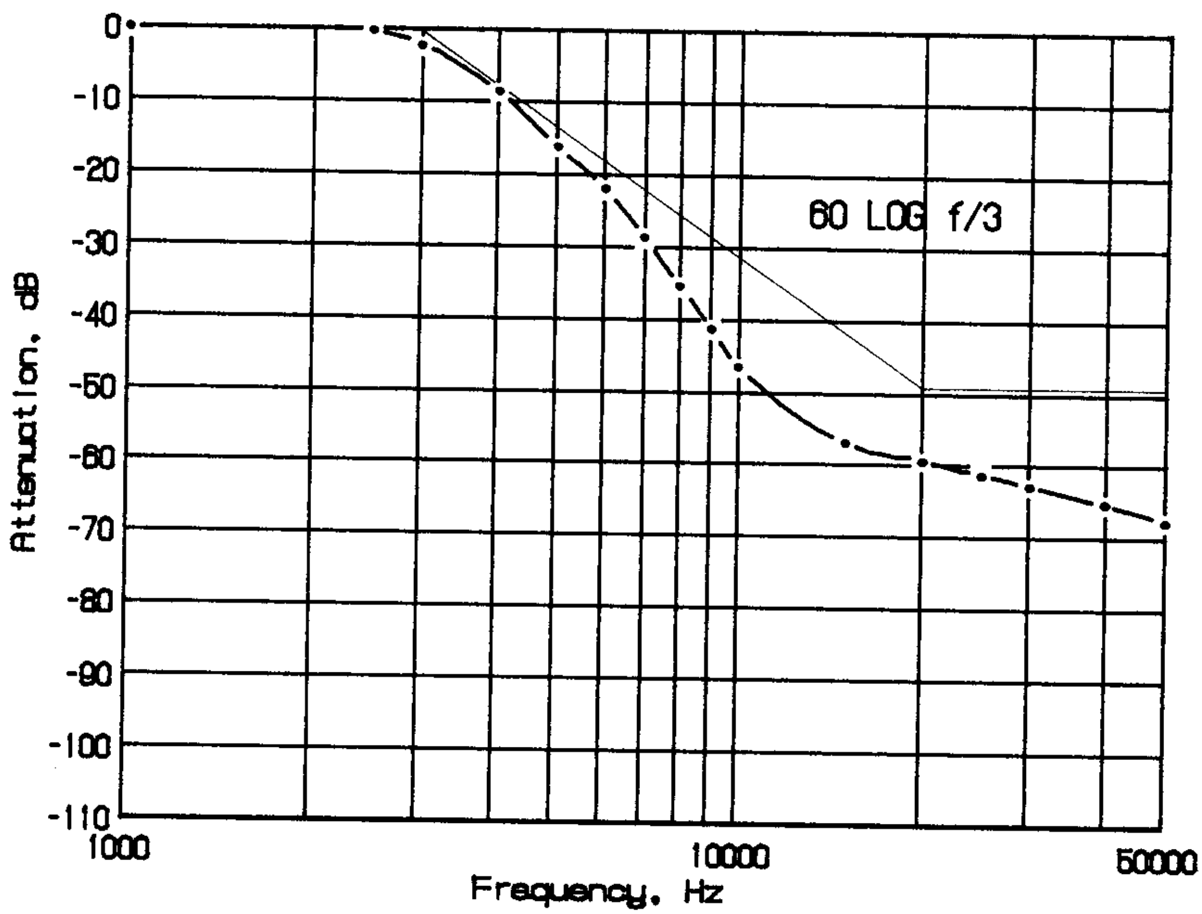


AUDIO LIMITER CHARACTERISTICS
FCC ID: MMAALHP125

FIGURE 2b Narrow band (2.5 kHz)

FIGURE 3

AUDIO LOW PASS FILTER RESPONSE

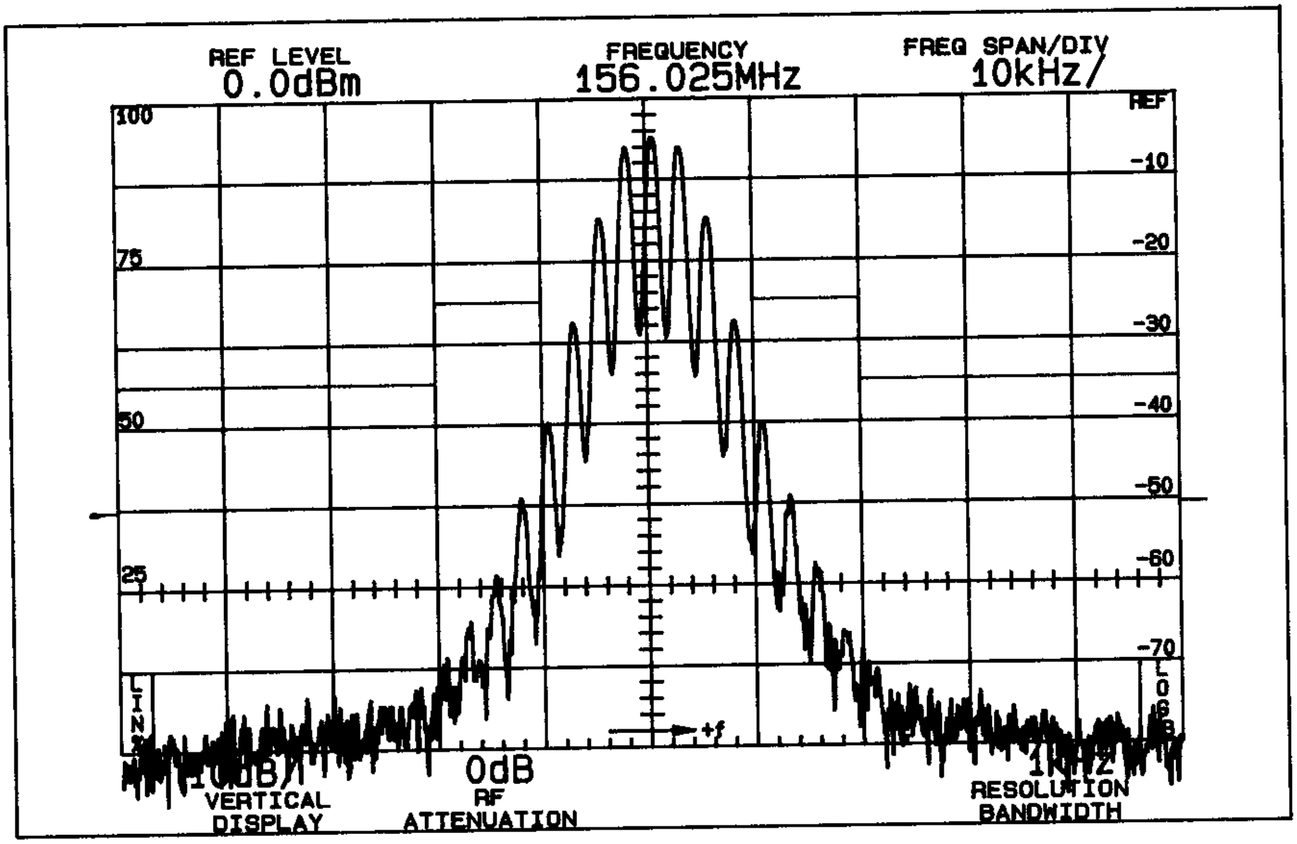


AUDIO LOW PASS FILTER RESPONSE
FCC ID: MMAALHP125

FIGURE 3

FIGURE 4a

OCCUPIED BANDWIDTH



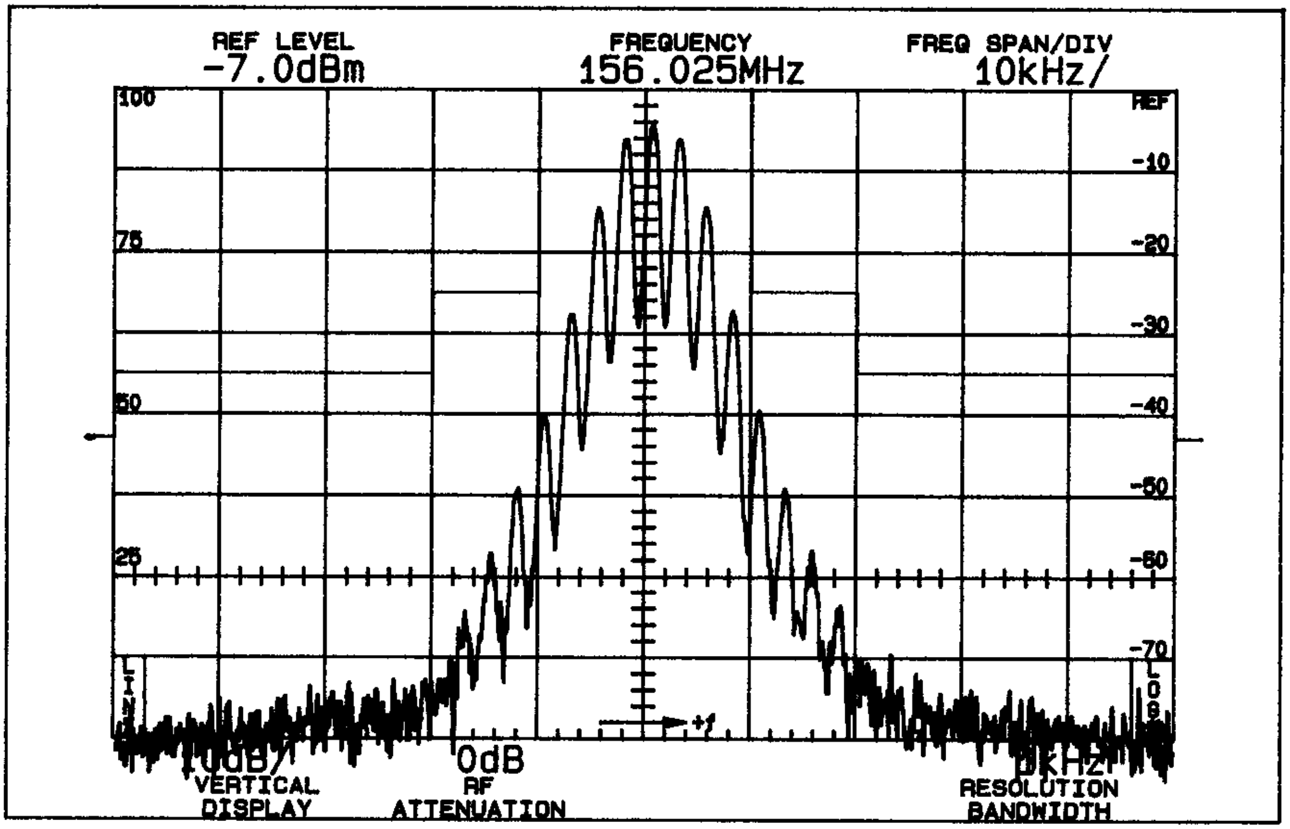
	ATTENUATION IN dB BELOW MEAN OUTPUT POWER Required
On any frequency more than 50% up to and including 100% of the authorized bandwidth, 20 kHz (10-20 kHz)	25
On any frequency more than 100%, up to and including 250% of the authorized bandwidth (20-50 kHz)	35
On any frequency removed from the assigned frequency by more than 250% of the authorized bandwidth (over 50 kHz)	43+10LogP = 51 (P = 5.6 W)

OCCUPIED BANDWIDTH (5.6 W)
FCC ID: MMAALHP125

FIGURE 4a (5 kHz)

FIGURE 4b

OCCUPIED BANDWIDTH



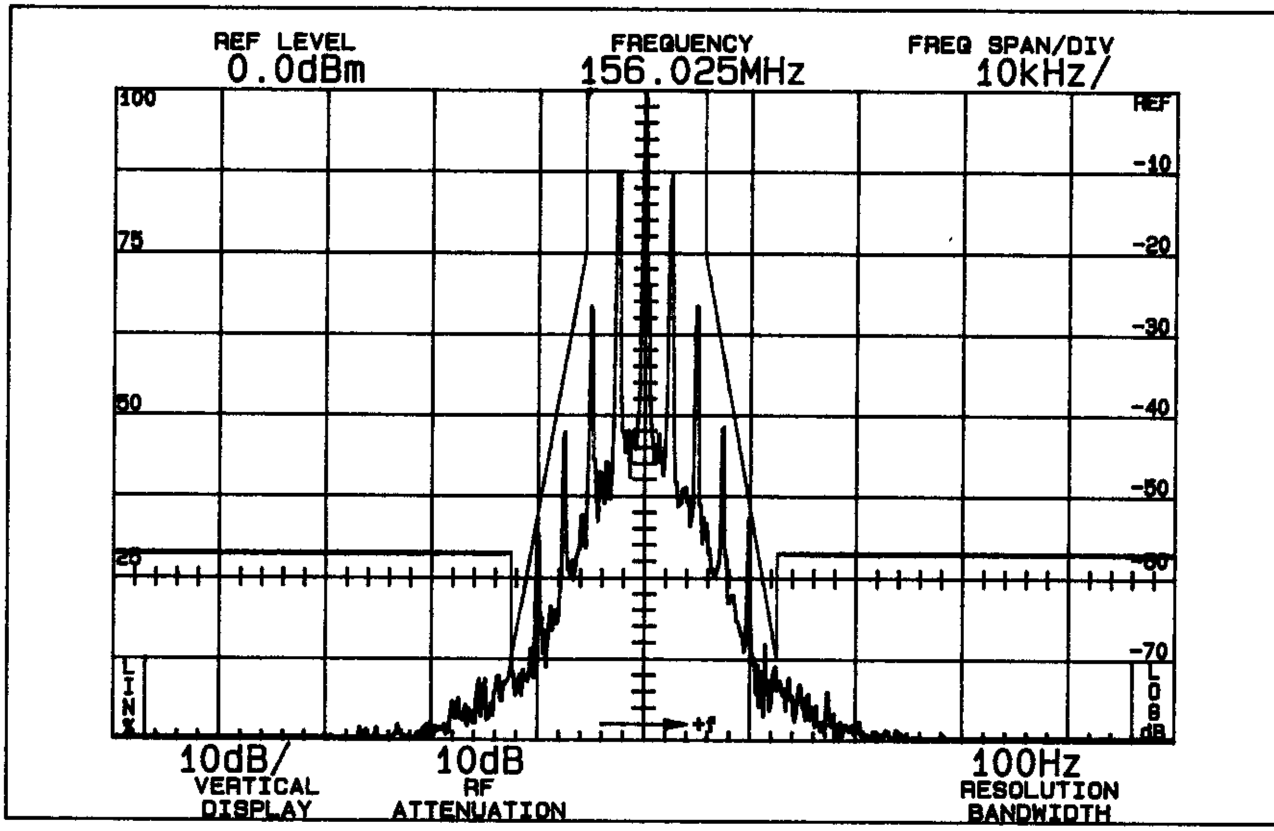
	ATTENUATION IN dB BELOW MEAN OUTPUT POWER Required
On any frequency more than 50% up to and including 100% of the authorized bandwidth, 20 kHz (10-20 kHz)	25
On any frequency more than 100%, up to and including 250% of the authorized bandwidth (20-50 kHz)	35
On any frequency removed from the assigned frequency by more than 250% of the authorized bandwidth (over 50 kHz)	43+10LogP = 42 (P = 0.8 W)

OCCUPIED BANDWIDTH (0.8 W)
FCC ID: MMAALHP125

FIGURE 4b (5 kHz)

FIGURE 4c

OCCUPIED BANDWIDTH



	ATTENUATION IN dB BELOW MEAN OUTPUT POWER Required
On any frequency from the center of the authorized bandwidth f_o to 5.625 kHz removed from f_o.	0 (>5.625 kHz)
On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 5.625 kHz but no more than 12.5 kHz: at least 7.27 (f_d - 2.88 kHz) dB.	70 (@ 12.5 kHz)
On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 12.5 kHz.	50+10LogP = 58 (>12.5 kHz) (P = 5.6W)

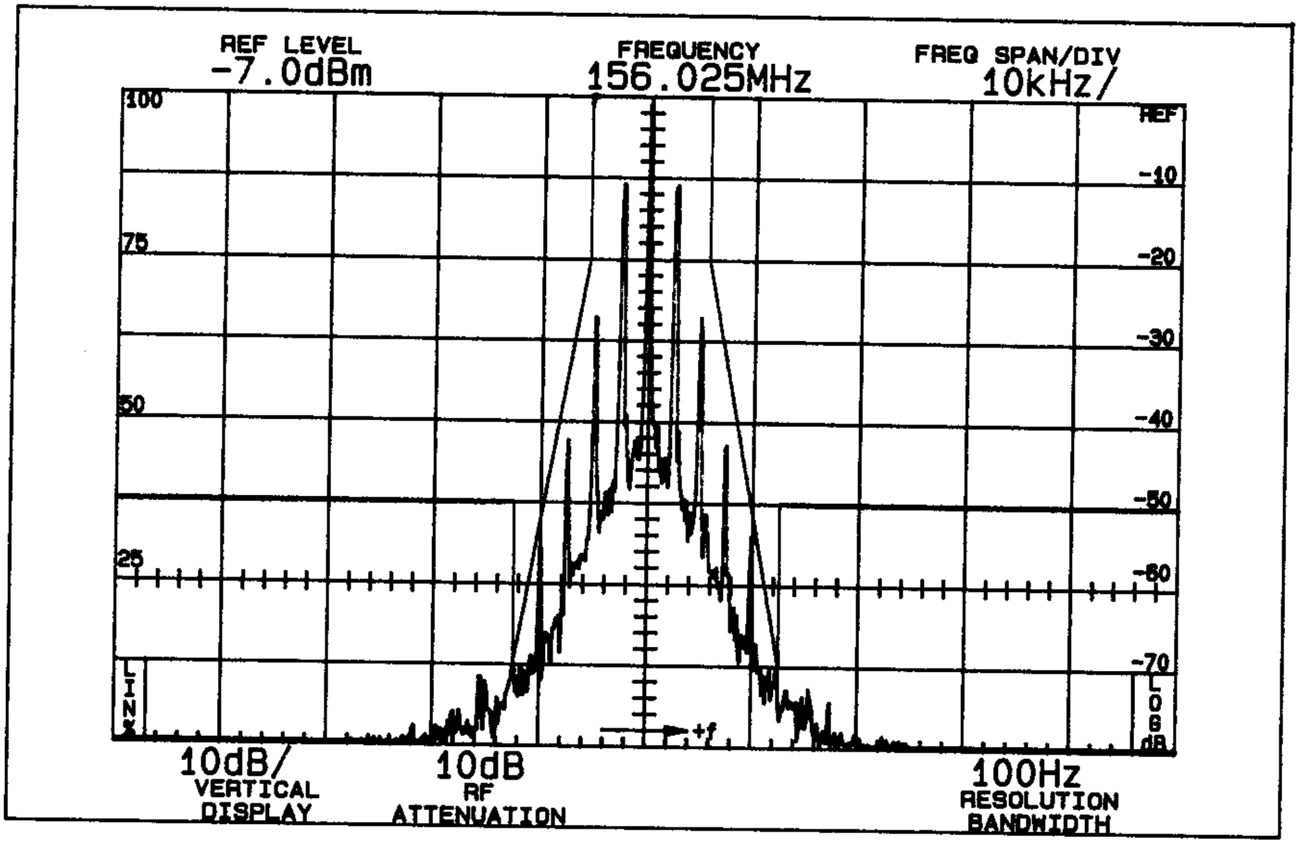
OCCUPIED BANDWIDTH (F3E 5.6W)
FCC ID: MMAALHP125

FIGURE 4c (2.5 kHz)

A:\HP125NRL.OBW

FIGURE 4d

OCCUPIED BANDWIDTH



	ATTENUATION IN dB BELOW MEAN OUTPUT POWER Required
On any frequency from the center of the authorized bandwidth f_o to 5.625 kHz removed from f_o.	0 (>5.625 kHz)
On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 5.625 kHz but no more than 12.5 kHz: at least 7.27 (f_d - 2.88 kHz) dB.	70 (@ 12.5 kHz)
On any frequency removed from the center of the authorized bandwidth by a displacement frequency (f_d in kHz) of more than 12.5 kHz.	50+10LogP = 49 (>12.5 kHz) (P = 0.8W)

OCCUPIED BANDWIDTH (F3E 0.8W)
FCC ID: MMAALHP125

FIGURE 4d (2.5 kHz)

D. MODULATION CHARACTERISTICS (Continued)

The plots are within the limits imposed by Paragraph 90.211(c) for frequency modulation. The horizontal scale (frequency) is 10 kHz per division and the vertical scale (amplitude) is a logarithmic presentation equal to 10 dB per division.

Resolution bandwidth was 100 Hz; video bandwidth 1 kHz; max store display; 20 second scan time.

E. SPURIOUS EMISSIONS AT THE ANTENNA TERMINALS (Paragraph 2.991 of the Rules)

The HP 125 transmitter was tested for spurious emissions at the antenna terminals while the equipment was modulated with a 2500 Hz signal, 16 dB above minimum input signal for 50% (2.5 kHz deviation) modulation at 2996 Hz, the frequency of highest sensitivity.

Measurements were made with Tektronix 494P spectrum analyzer coupled to the transmitter output terminal through a Narda 765-20 power attenuator. A notch filter was used to attenuate the carrier.

During the tests, the transmitter was terminated in the 50 ohm attenuator. Power was monitored on a Bird 43 Thru-Line wattmeter; dc supply was 7.2 volts throughout the tests.

Spurious emissions were measured at 5.6 and 0.8 watts output throughout the RF spectrum from 12 (lowest frequency generated in the transmitter is 12.8 MHz) to the tenth harmonic of the carrier.

Any emissions that were between the required attenuation and the noise floor of the spectrum analyzer were recorded. Data are shown in Table 1.

F. DESCRIPTION OF RADIATED SPURIOUS MEASUREMENT FACILITIES

A description of the Hyak Laboratories' radiation test facility is a matter of record with the FCC. The facility meets ANSI 63.4-1992 and was accepted for radiation measurements from 25 to 1000 MHz on October 1, 1976 and is currently listed as an accepted site.

TABLE 1

TRANSMITTER CONDUCTED SPURIOUS
156.025, 7.2 Vdc Input

	Spurious Frequency MHz	dB Below Carrier Reference	
5.6 W			
	312.050	86	
	468.075	73	
	624.100	97	
	780.125	92	
	936.150	93	
	1092.175	>100	
	1248.200	>102	
	1404.225	>105	
	1560.250	97	
	Required:	51	(58) 90.210(d)
0.8 W			
	312.050	72	
	483.075	68	
	624.100	98	
	780.125	92	
	936.150	> 93	
	1092.175	>103	
	1248.200	>106	
	1404.225	>101	
	1560.250	98	
	Required:	42	(49) 90.210(d)

All other emissions from 12 MHz to the tenth harmonic were 20 dB or more below FCC limit.

*Reference data only, more than 20 dB below FCC limit.

NOTE: Carrier notch filter used to increase dynamic range.

G. FIELD STRENGTH MEASUREMENTS OF SPURIOUS RADIATION

Field intensity measurements of radiated spurious emissions from the HP 125 were made with a Tektronix 494P spectrum analyzer using Singer DM-105A calibrated dipole antennas below 1 GHz, and Polarad CA-L, and CA-S or EMCO 3115 from 1-5.0 GHz.

The transmitter and dummy load were located in an open field 3 meters from the test antenna. Supply voltage was a power supply with a terminal voltage under load of 7.2 Vdc.

Output power was 5.6 watts at 156.025 MHz operating frequency. The transmitter and test antennas were arranged to maximize pickup. Both vertical and horizontal test antennae polarization were employed.

Reference level for the spurious radiations was taken as an ideal dipole excited by 5.6 watts, the output power of the transmitter according to the following relationship:

$$E = \frac{(49.2P_t)^{1/2}}{R} \qquad (1)$$

where E = electric-field intensity in volts/meter

P_t = transmitter power in watts

R = distance in meters

for this case $E = \frac{(49.2 \times 5.6)^{1/2}}{3} = 5.5$ V/m

Since the spectrum analyzer is calibrated in decibels above one milliwatt (dBm), a conversion, for convenience, was made from dBu to dBm.

$$5.5 \text{ volts/meter} = 5.6 \times 10^6 \text{ uV/m}$$

$$\text{dBu/m} = 20 \text{ Log}_{10}(5.6 \times 10^6)$$

$$= 135 \text{ dBu/m}$$

Since 1 uV/m = -107 dBm, the reference becomes

$$135 - 107 = 28 \text{ dBm}$$

---

(1) Reference Data for Radio Engineers, Fourth Edition, International Telephone and Telegraph Corp., p. 676.

G. FIELD STRENGTH MEASUREMENTS (Continued)

The transmitter and test antennae were arranged to maximize pickup. Both vertical and horizontal test antenna polarization were employed.

The measurement system was capable of detecting signals 95 dB or more below the reference level. Measurements were made from the lowest frequency generated within the unit (12 MHz), to 10 times operating frequency. Data after application of antenna factors and line loss corrections are shown in Table 2.

TABLE 2

TRANSMITTER CABINET RADIATED SPURIOUS

156.025 MHz, 7.2 Vdc, 5.6 watts

Spurious Frequency MHz	dB Below Carrier Reference[1]	
312.050	80V*	
468.075	79V*	
624.100	84V*	
780.121	92H*	
936.144	84V*	
1092.175	83V*	
1248.200	84H*	
1404.225	82H*	
1560.250	85V*	
Required:	51	(58) 90.210(d)

[1]Worst-case polarization, H-Horizontal, V-Vertical.

* Reference data only, more than 20 dB below FCC limit.

All other spurious from 12 MHz to 1.6 GHz were 20 dB or more below FCC limit.

H. FREQUENCY STABILITY
(Paragraph 2.995(a)(2) and 90.213 of the Rules)

Measurement of frequency stability versus temperature was made at temperatures from -30°C to +50°C. At each temperature, the unit was exposed to test chamber ambient a minimum of 60 minutes after indicated chamber temperature ambient had stabilized to within ±2° of the desired test temperature. Following the 1 hour soak at each temperature, the unit was turned on, keyed and frequency measured within 2 minutes. Test temperature was sequenced in the order shown in Table 3, starting with -30°C.

A Thermotron S1.2 temperature chamber was used. Temperature was monitored with a Keithley 871 digital thermometer. The transmitter output stage was terminated in a dummy load. Primary supply was 7.2 volts. Frequency was measured with a HP 5385A frequency counter connected to the transmitter through a power attenuator. Measurements were made at 156.025 MHz. No transient keying effects were observed.

TABLE 3

FREQUENCY STABILITY vs. TEMPERATURE

156.025 MHz; 7.2 Vdc; 5.6 W

Temperature, °C	Output Frequency, MHz	p.p.m.
-29.7	156.025161	1.0
-20.0	156.025269	1.7
- 9.3	161.025182	1.2
- 0.1	156.025106	0.7
10.0	156.025052	0.3
20.2	156.025011	0.1
30.5	156.024977	-0.1
40.5	156.024915	-0.5
50.5	156.024832	-1.1

Maximum frequency error: 156.025269
156.025000

\+ .000269 MHz

FCC Rule 90.213(a) specifies .00025% or a maximum of ± .000390 MHz, which corresponds to:

High Limit	156.025390 MHz
Low Limit	156.024610 MHz

I. FREQUENCY STABILITY AS A FUNCTION OF SUPPLY VOLTAGE
(Paragraph 2.995(d)(2) of the Rules)

Oscillator frequency as a function of power supply voltage was measured with a HP 5385A frequency counter as supply voltage provided by an HP 6264B variable dc power supply was varied from ±15% above the nominal 7.2 volt rating. A Fluke 197 digital voltmeter was used to measure supply voltage at transmitter primary input terminals. Measurements were made at 20°C ambient.

TABLE 4

FREQUENCY STABILITY AS A FUNCTION OF SUPPLY VOLTAGE

156.025 MHz, 7.2 Volts Nominal, 5.6 W

%	Supply Voltage	Output Frequency, MHz	p.p.m.
115	8.3	156.025032	0.2
110	7.9	156.025023	0.1
105	7.6	156.025015	0.1
100	7.2	156.025011	0.1
95	6.8	156.025008	0.1
90	6.5	156.025007	0.0
85	6.1	156.025010	0.1
80	5.8*	156.025011	0.1

Maximum frequency error: 156.025032
156.025000

\+ .000032 MHz

*MFR rated battery end-point

FCC Rule 90.213(a) specifies .00025% or a maximum of ± .000390 MHz, corresponding to:

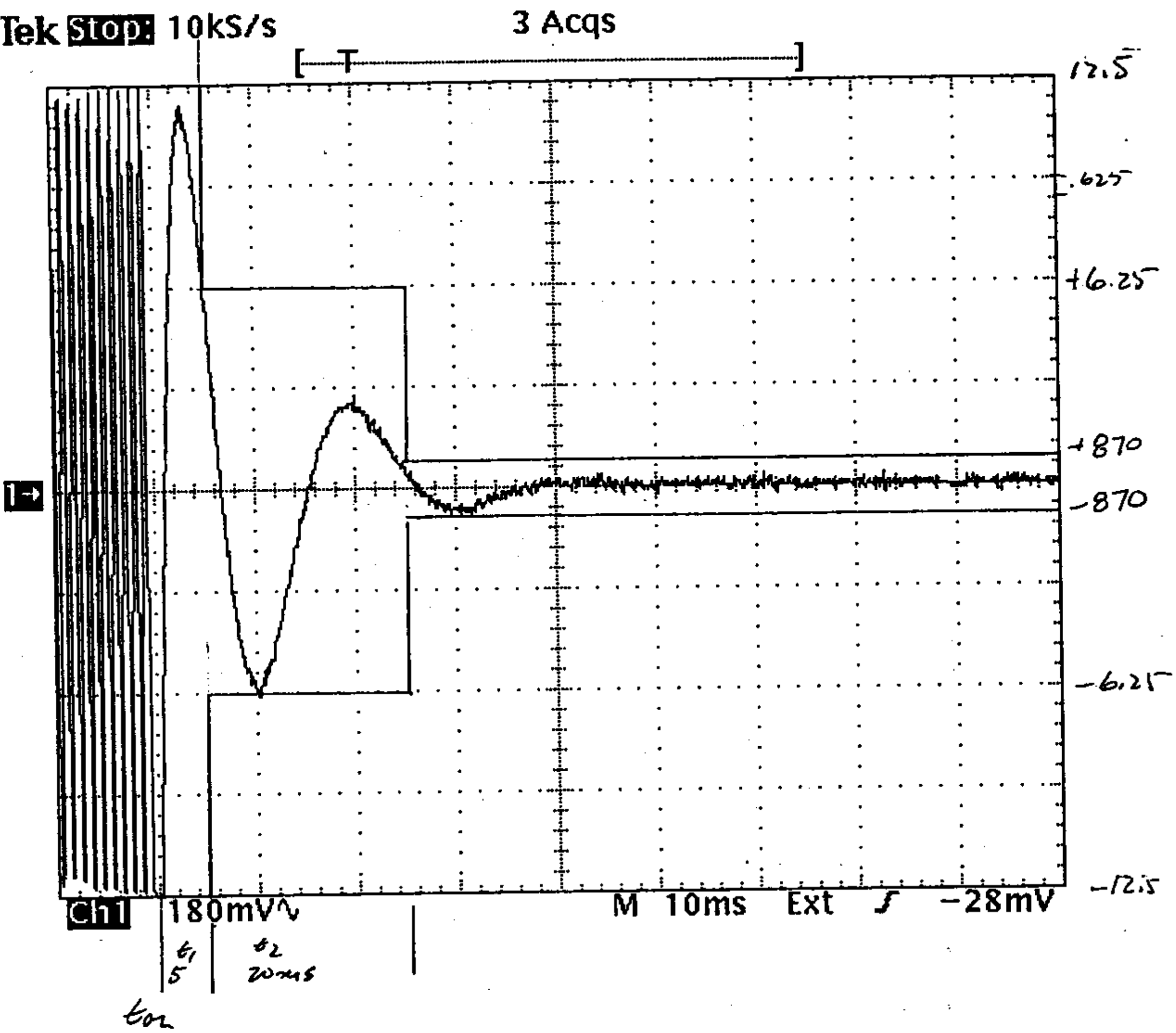
High Limit	156.025390 MHz
Low Limit	161.024610 MHz

J. TRANSIENT FREQUENCY BEHAVIOR
(Paragraph 90.214 of the Rules)

Plots identified as Figures 5 through 7 demonstrate TFB for 12.5 kHz or 25 kHz channel operation.

See Appendix 9 for test description.

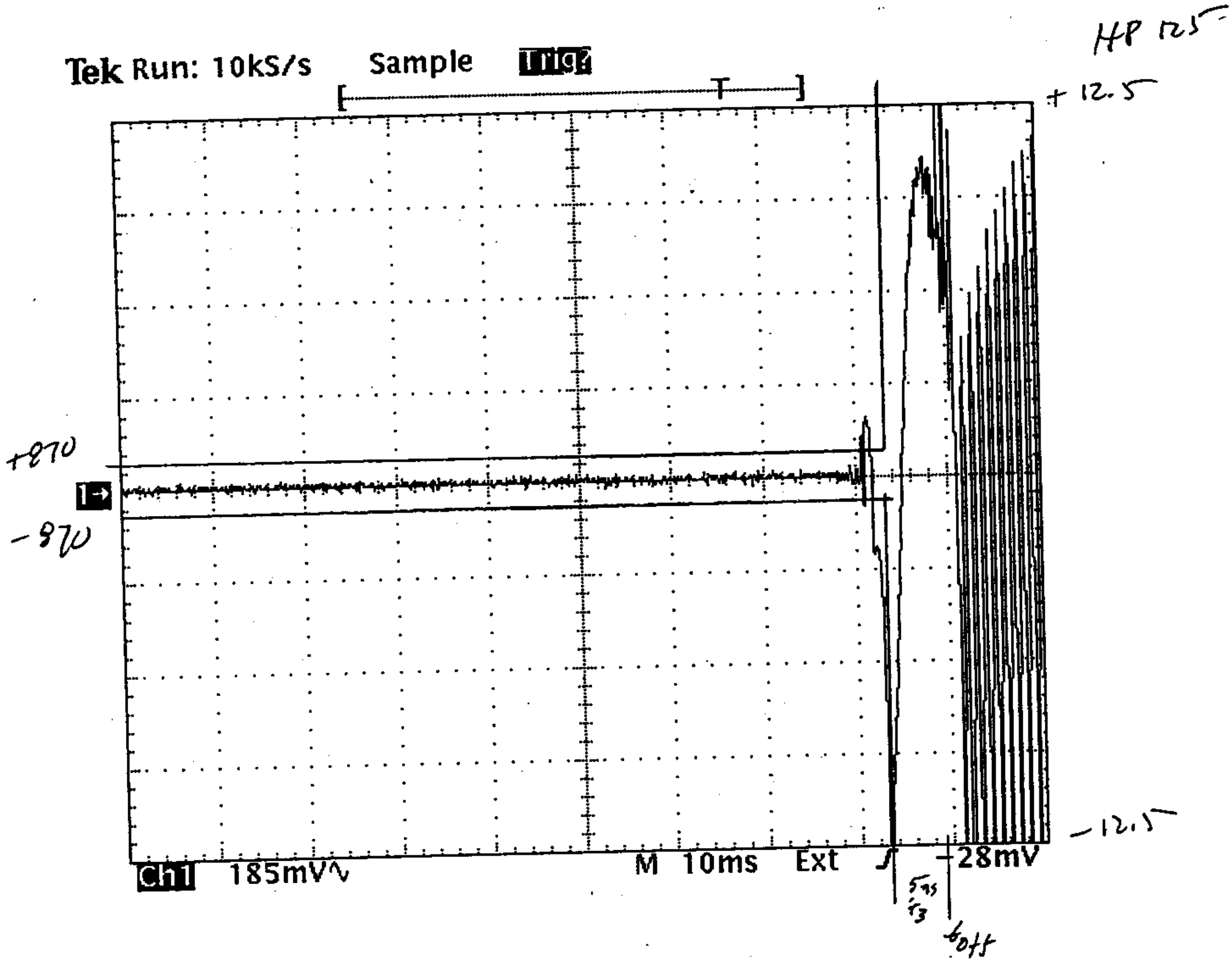
HT 125
175 MHz



174 x 5ppm =
870
[90.217 (as note 6]

TRANSIENT FREQUENCY BEHAVIOR
FCC ID: MMAALHP125

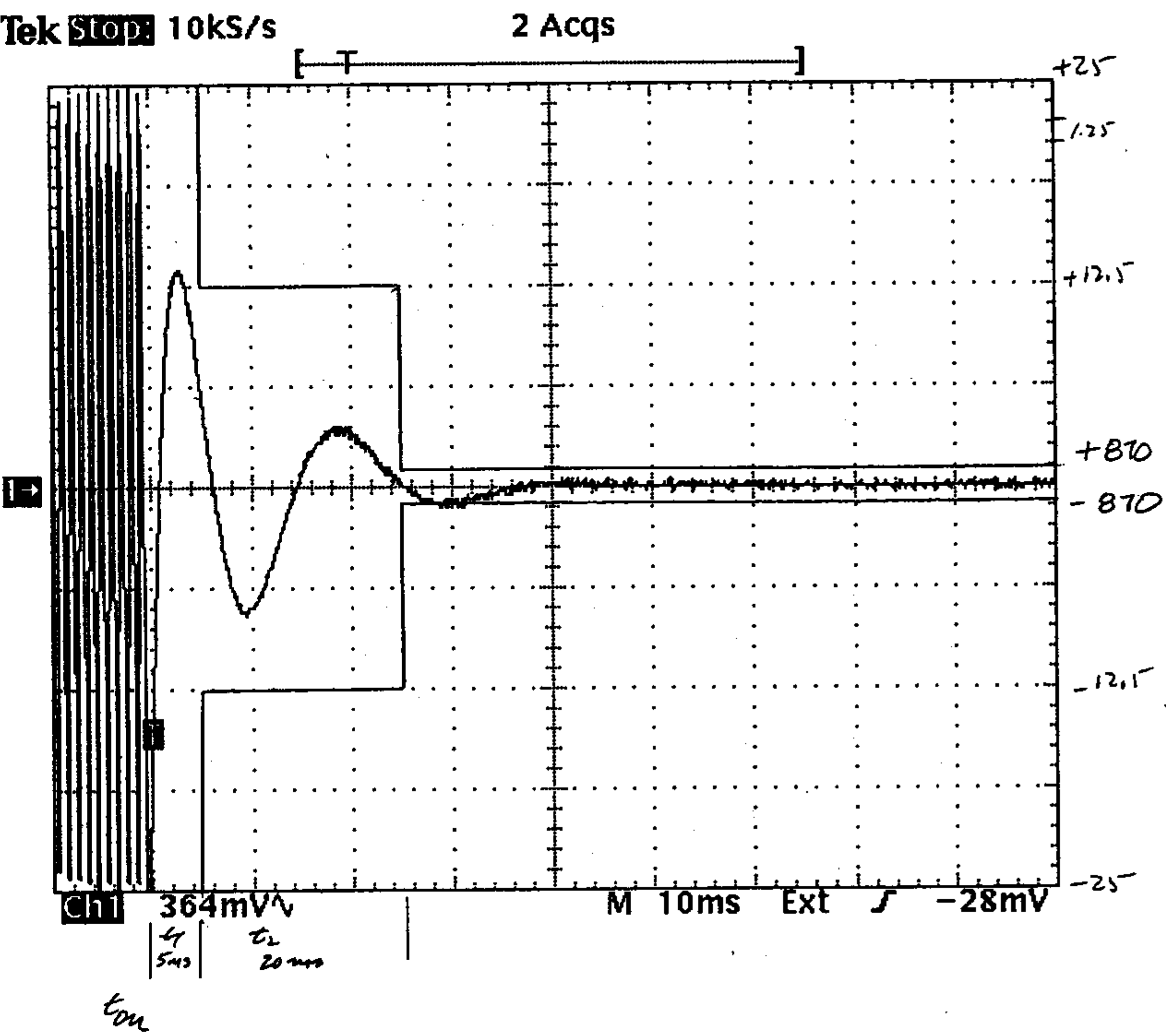
FIGURE 5 (12.5 kHz Turn-on)



TRANSIENT FREQUENCY BEHAVIOR
FCC ID: MMAALHP125

FIGURE 6 (12.5 kHz Turn-off)

HP125

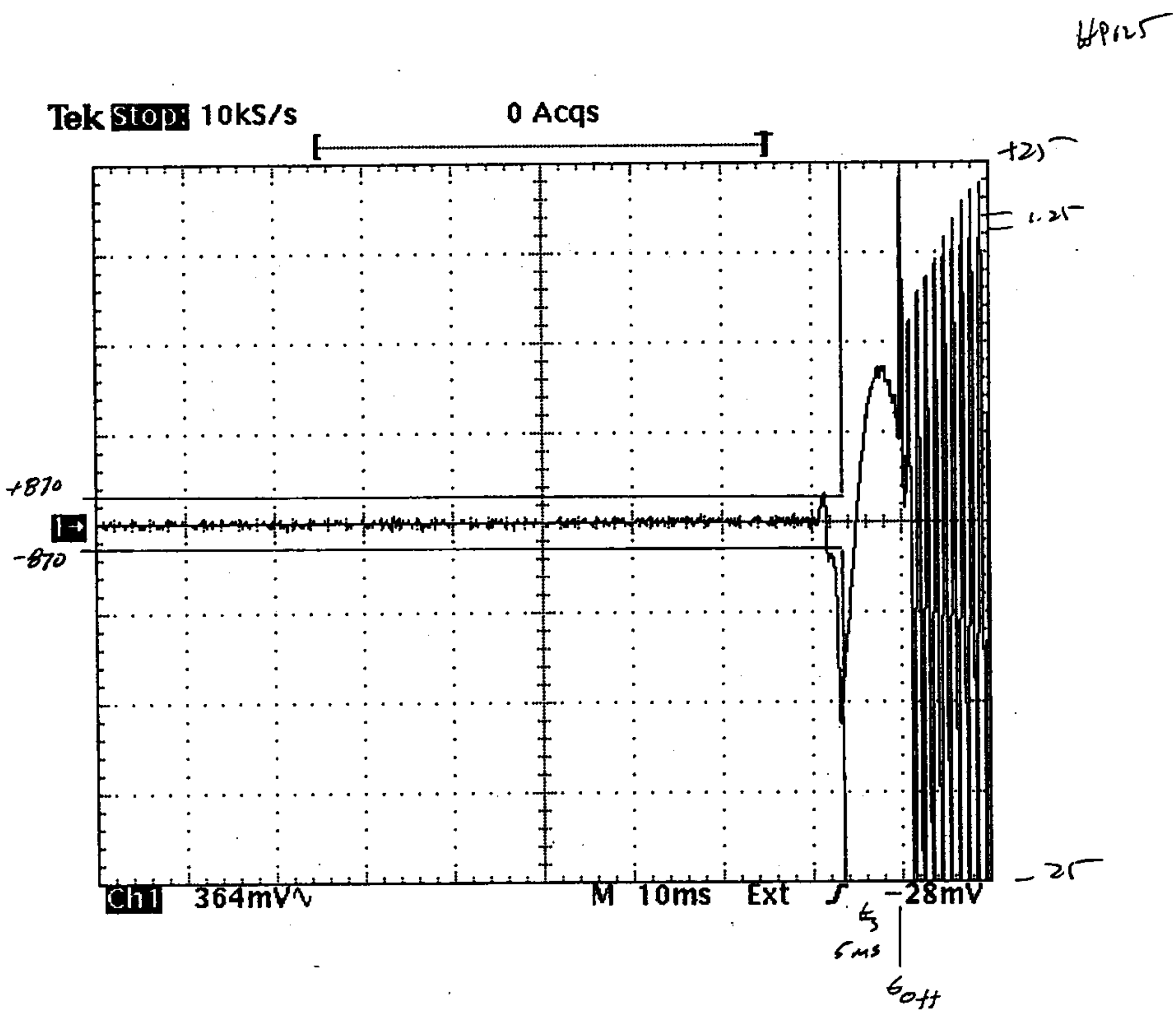


174 x 5ppm
= 870

[5ppm per
90.213 (a) note 6]

TRANSIENT FREQUENCY BEHAVIOR
FCC ID: MMAALHP125

FIGURE 7 (25 kHz Turn-on)



TRANSIENT FREQUENCY BEHAVIOR
FCC ID: MMAALHP125

FIGURE 8 (25 kHz Turn-off)