

FEDERAL COMMUNICATIONS COMMISSION

WASHINGTON, D.C. 20554

GRANT OF EQUIPMENT AUTHORIZATION

Type Acceptance

HM Electronics Inc
6675 Mesa Ridge Road
San Diego, CA 92121

Date of Grant: December 12, 1994 ✓

File No.: 31010/EQU 17.9

Application dated: October 31, 1994

Attention: Elden R. Davisson

NOT TRANSFERABLE

EQUIPMENT AUTHORIZATION is hereby issued to the named GRANTEE, and is VALID ONLY for the equipment identified hereon for use under the Commission's Rules and Regulations listed below.

FCC IDENTIFIER

BYMC2KS

Name of Grantee

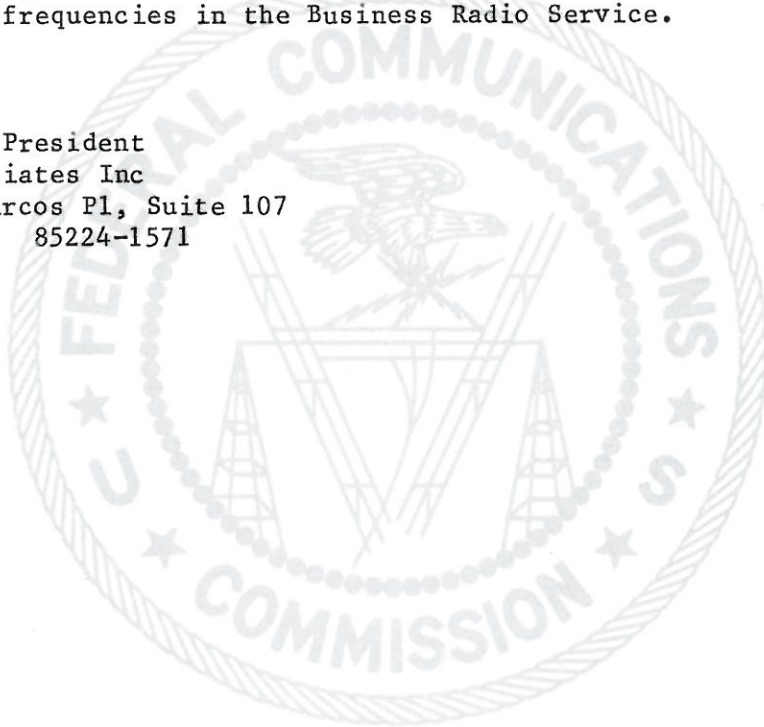
HM Electronics Inc

Equipment Class : Non-Broadcast Transmitter

<u>Note(s)</u>	<u>Rule Part(s)</u>	<u>Frequency Range (MHz)</u>	<u>Output Watts</u>	<u>Frequency Tolerance</u>	<u>Emission</u>
MM	90.217	151.65-154.6	.05	-	16K6F3E

MM: Type accepted in accordance with Section 90.217. Acceptable for use only on frequencies in the Business Radio Service.

Mail to:
Morton Flom, President
M. Flom Associates Inc
3356 N San Marcos Pl, Suite 107
Chandler, AZ 85224-1571



80

Sub-part
2.903 (f):

EQUIPMENT IDENTIFICATION

FCC ID: BYMC2KS

NAMEPLATE DRAWING

ATTACHED, EXHIBIT 1.

LOCATION

AS PER LABEL DRAWING(S)

DATE OF REPORT

October 27, 1994

SUPERVISED BY:
MF:glk


MORTON FLOM, P. Eng.

THE APPLICANT HAS BEEN CAUTIONED AS TO THE FOLLOWING:

15.21 INFORMATION TO USER.

The users manual or instruction manual for an intentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

15.27(a) SPECIAL ACCESSORIES.

Equipment marketed to a consumer must be capable of complying with the necessary regulations in the configuration in which the equipment is marketed. Where special accessories, such as shielded cables and/or special connectors are required to enable an unintentional or intentional radiator to comply with the emission limits in this part, the equipment must be marketed with, i.e. shipped and sold with, those special accessories. However, in lieu of shipping or packaging the special accessories with the unintentional or intentional radiator, the responsible party may employ other methods of ensuring that the special accessories are provided to the consumer, without additional charge.

Information detailing any alternative method used to supply the special accessories for a grant of equipment authorization or retained in the verification records, as appropriate. The party responsible for the equipment, as detailed in § 2.909 of this chapter, shall ensure that these special accessories are provided with the equipment. The instruction manual for such devices shall include appropriate instructions on the first page of text concerned with the installation of the device that these special accessories must be used with the device. It is the responsibility of the user to use the needed special accessories supplied with the equipment.

TABLE OF CONTENTS

BYMC2KS

<u>RULE</u>	<u>DESCRIPTION</u>	<u>PAGE</u>
2.983	LIST OF GENERAL INFORMATION REQUIRED	2
2.985(a)	R. F. POWER OUTPUT	6
2.987(a)	FREQUENCY RESPONSE OF AUDIO MODULATING CIRCUIT	8
2.987(a)	FREQUENCY RESPONSE OF AUDIO LOW PASS FILTER	10
2.987(b)	MODULATION LIMITING	13
2.989(c)	OCCUPIED BANDWIDTH	15
2.991	SPURIOUS EMISSIONS AT ANTENNA TERMINALS	18
2.993(a)	FIELD STRENGTH OF SPURIOUS RADIATION	20
2.995(a)	FREQUENCY STABILITY - TEMPERATURE VARIATION	23
2.995(d)	FREQUENCY STABILITY - VOLTAGE VARIATION	26

LIST OF GENERAL INFORMATION REQUIRED FOR TYPE ACCEPTANCE

IN ACCORDANCE WITH FCC RULES AND REGULATIONS,
VOLUME II, PART 2 AND TO

90.217

Sub-part

2.983(a): NAME AND ADDRESS OF APPLICANT:

HM ELECTRONICS, INC.
6675 Mesa Ridge Road
San Diego, CA 92121

VENDOR:

APPLICANT

2.983(b): FCC ID:

BYMC2KS

MODEL NO:

COM2000S (PORTABLE)

2.983(c): QUANTITY PRODUCTION PLANNED.

2.983(d): TECHNICAL DESCRIPTION:

SEE ATTACHED EXHIBITS

(1):

TYPE OF EMISSION:

16K6F3E

(2):

FREQUENCY RANGE, MHz:

151.655 to 154.600

(3):

POWER RATING, Watts:

0.05

SWITCHABLE ADJUSTABLE N/A

(4):

MAXIMUM POWER RATING, Watts:

0.12

2.983(d)

(5): VOLTAGES & CURRENTS IN ALL ELEMENTS IN FINAL R. F. STAGE, INCLUDING FINAL TRANSISTOR OR SOLID STATE DEVICE:

COLLECTOR CURRENT, A = per manual
COLLECTOR VOLTAGE, Vdc = per manual
SUPPLY VOLTAGE, Vdc = 6

(6): FUNCTION OF ACTIVE CIRCUIT DEVICES:

PLEASE SEE ATTACHED EXHIBITS

(7): CIRCUIT DIAGRAM:

PLEASE SEE ATTACHED EXHIBITS

(8): MANUAL:

PLEASE SEE ATTACHED EXHIBITS

(9): TUNE-UP PROCEDURE:

PLEASE SEE ATTACHED EXHIBITS

(10): DESCRIPTION OF CIRCUITRY & DEVICES PROVIDED FOR DETERMINING AND STABILIZING FREQUENCY:

PLEASE SEE ATTACHED EXHIBITS

(11): DESCRIPTION OF CIRCUITS OR DEVICES EMPLOYED FOR

- (a) SUPPRESSION OF SPURIOUS RADIATION,
- (b) LIMITING MODULATION,
- (c) LIMITING POWER:

PLEASE SEE ATTACHED EXHIBITS

(12): DIGITAL MODULATION DESCRIPTION:

ATTACHED EXHIBITS
N/A

x

2.983(e): TEST AND MEASUREMENT DATA:

FOLLOWS

2.983(f): LABEL INFORMATION:

PLEASE SEE ATTACHED EXHIBITS

2.983(g): PHOTOGRAPHS:

PLEASE SEE ATTACHED EXHIBITS

Sub-part
2.983(e):

TEST AND MEASUREMENT DATA

All tests and measurement data shown were performed in accordance with FCC Rules and Regulations, Volume II; Part 2, Sub-part J, Sections 2.981, 2.983, 2.985, 2.987, 2.989, 2.991, 2.993, 2.995, 2.997, 2.999 and the following individual Parts:

- 21 DOMESTIC PUBLIC RADIO SERVICES _____
- 22 PUBLIC MOBILE SERVICE _____
- 22K DOMESTIC PUBLIC CELLULAR RADIO TELECOMMUNICATION SERVICE _____
- 23 INTERNATIONAL FIXED PUBLIC RADIO COMMUNICATIONS SERVICE _____
- 74 EXPERIMENTAL, AUXILIARY & SPECIAL BROADCAST AND OTHER PROGRAM DISTRIBUTION SERVICES _____
- 74H LOW POWER AUXILIARY STATIONS _____
- 80 STATIONS IN THE MARITIME SERVICE _____
- 80.209(5)(i): TRANSMITTER FREQUENCY TOLERANCES, 156-162 MHz, COAST STATIONS _____
- 80K PRIVATE COAST STATIONS & MARINE UTILITY STATIONS _____
- 80S COMPULSORY R/T INSTALLATIONS FOR SMALL PASSENGER BOATS _____
- 80T RADIO TELEGRAPH INSTALLATION REQUIRED FOR VESSELS ON THE GREAT LAKES _____
- 80U RADIO TELEGRAPH INSTALLATION REQUIRED BY THE BRIDGE-to-BRIDGE ACT _____
- 80V, 80.1061 SPECIAL REQUIREMENTS FOR 406.025 MHz EPIRBs _____
- 80W GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM (GMDSS) _____
- 87 AVIATION SERVICES _____
- 90 PRIVATE LAND MOBILE RADIO SERVICES x
- 94 PRIVATE OPERATIONAL-FIXED MICROWAVE SERVICES _____
- 95 GENERAL MOBILE RADIO SERVICE _____

STANDARD TEST CONDITIONS
and
ENGINEERING PRACTICES

Except as noted herein, the following conditions and procedures were observed during the testing:

ROOM TEMPERATURE	=	25±5°C
ROOM HUMIDITY	=	20-50%
D.C. SUPPLY VOLTAGE, Vdc	=	6
A.C. SUPPLY VOLTAGE, Vac	=	
A.C. SUPPLY FREQUENCY, Hz	=	

Prior to testing, the E.U.T. was tuned up in accordance with the manufacturer's alignment procedures. All external gain controls were maintained at the position of maximum and/or optimum gain throughout the testing.

Measurement results, unless otherwise noted, are worst case measurements.

NAME OF TEST: R. F. POWER OUTPUT
PARAGRAPH: 47 CFR 2.985 (a)
GUIDE: EIA STANDARD RS 152B, Paragraph 3.3
TEST CONDITIONS: STANDARD TEMPERATURE & HUMIDITY
TEST EQUIPMENT: AS PER ATTACHED PAGE

MEASUREMENT PROCEDURE

1. The E.U.T. was connected to a resistive coaxial attenuator of normal load impedance, and the unmodulated output power was measured by means of an R. F. Power Meter.
2. Measurement accuracy is $\pm 3\%$.

MEASUREMENT RESULTS

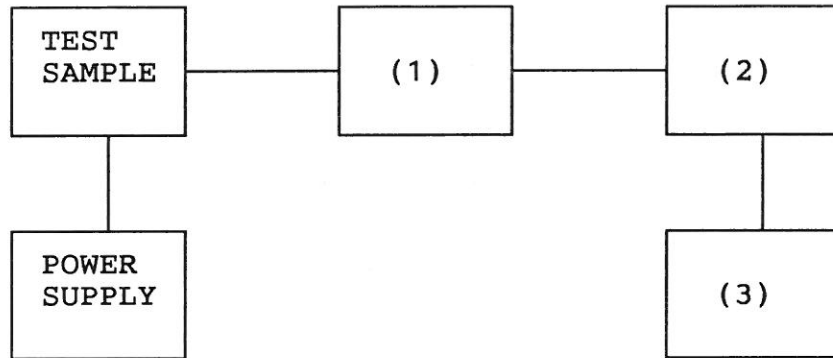
NOMINAL, MHz	<u>R.F. POWER OUTPUT, WATTS</u>
154.57	0.05

SUPERVISED BY:


MORTON FLOM, P. Eng.

R.F. POWER OUTPUT (A.M. OR F.M.)

TEST 1: R. F. POWER OUTPUT
TEST 2: FREQUENCY STABILITY



(1) COAXIAL ATTENUATOR

NARDA 766-10	---
SIERRA 661A-30	<u>x</u>
BIRD 8329 (30 dB)	---
_____	---

(2) POWER METERS

HP 435A	---
HP 436A	<u>x</u>
HP 8901A	<u>x</u>
_____	---

(3) FREQUENCY COUNTER

HP 5383A	---
HP 5334B	<u>x</u>
HP 8901A FREQUENCY MODE	<u>x</u>
_____	---

NAME OF TEST: MODULATION CHARACTERISTICS -
FREQUENCY RESPONSE OF AUDIO MODULATING CIRCUIT

PARAGRAPH: 47 CFR 2.987 (a)

GUIDE: EIA STANDARD RS 152B, Paragraph 6

TEST CONDITIONS: S. T. & H.

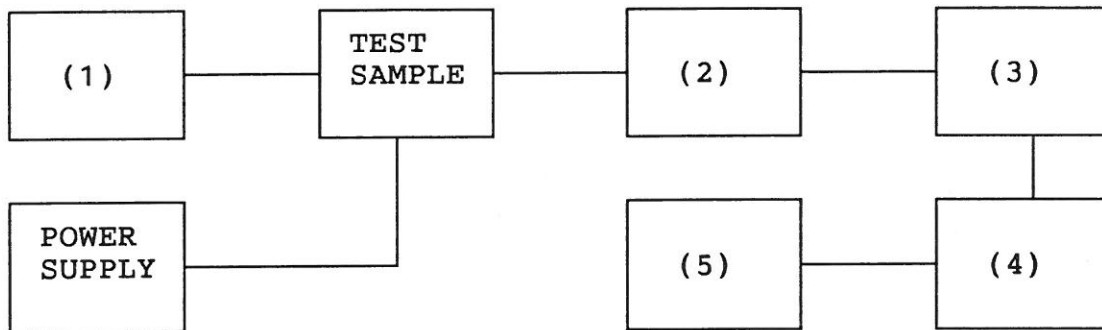
TEST EQUIPMENT: AS PER ATTACHED PAGE

MEASUREMENT PROCEDURE

1. The E.U.T. and test equipment were set up as shown on the following page.
2. The audio signal generator was connected to the audio input circuit/microphone of the E.U.T.
3. The audio signal input was adjusted to obtain 50% modulation at 1 kHz, and this point was taken as the 0 dB reference level.
4. With input levels held constant and below limiting at all frequencies, the audio signal generator was varied from 100 Hz to 50 kHz.
5. The response in dB relative to 1 kHz was then measured, using the HP 8901A Modulation Analyzer.
6. MEASUREMENT RESULTS: ATTACHED

TRANSMITTER TEST SET-UP

- TEST A. MODULATION CAPABILITY/DISTORTION
- TEST B. AUDIO FREQUENCY RESPONSE
- TEST C. HUM AND NOISE LEVEL
- TEST D. RESPONSE OF LOW PASS FILTER
- TEST E. MODULATION LIMITING



(1) AUDIO OSCILLATOR/GENERATOR

HP 204D	---
HP 8903A	---
HP 3312A	<u>x</u>
_____	<u>x</u>

(2) COAXIAL ATTENUATOR

NARDA 766-10	---
SIERRA 661A-30	<u>x</u>
BIRD 8329 (30 dB)	---
_____	---

(3) MODULATION ANALYZER

HP 8901A	<u>x</u>
_____	---

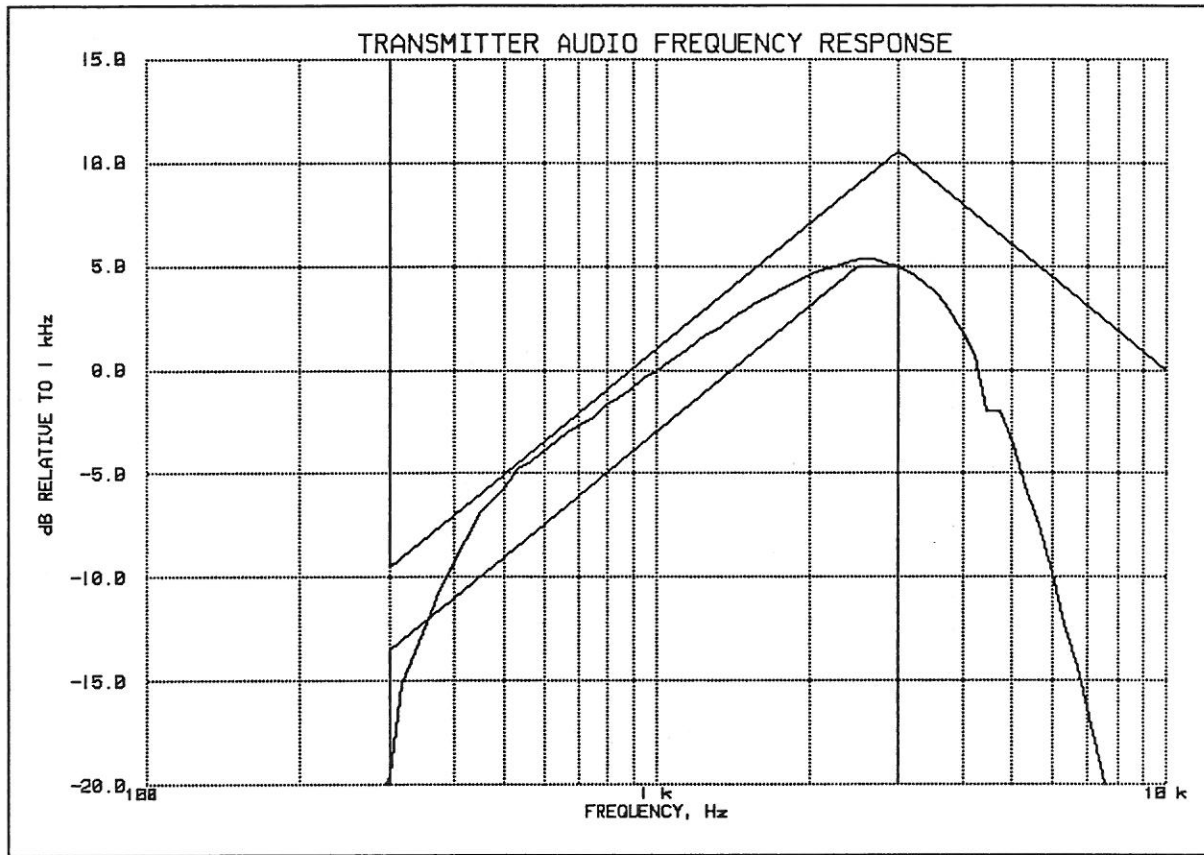
(4) AUDIO ANALYZER

HP 8903A	<u>x</u>
_____	---

(5) SCOPE

HP 1741A	---
HP 181T	---
TEK 935	---
_____	---

TRANSMITTER AUDIO FREQUENCY RESPONSE
HME, COM2000S (PORTABLE)
11 OCT 1994, 09:37



PEAK AUDIO FREQUENCY, Hz: 2510

TABLE VALUES:

FREQUENCY, Hz	LEVEL, dB	FREQUENCY, Hz	LEVEL, dB	FREQUENCY, Hz	LEVEL, dB
300	-17.6	30000	-53.8		
20000	-52.5	50000	-52.3		

Morton Flom P. Eng.

SUPERVISED BY:

MORTON FLOM, P. Eng.

NAME OF TEST: MODULATION CHARACTERISTICS -
FREQUENCY RESPONSE OF AUDIO LOW PASS FILTER

PARAGRAPH: 47 CFR 2.987 (a)

GUIDE: EIA STANDARD RS 152B, Paragraph 6

TEST CONDITIONS: S. T. & H.

TEST EQUIPMENT: AS PER PREVIOUS PAGE

MEASUREMENT PROCEDURE

1. The E.U.T. and test equipment were set up such that the audio input was connected at the input to the modulation limiter, and the modulated stage.
2. The audio output was connected at the output to the modulated stage.
3. MEASUREMENT RESULTS: ATTACHED

PAGE 12.

BYMC2KS

NAME OF TEST:

MODULATION CHARACTERISTICS -
FREQUENCY RESPONSE OF AUDIO LOW PASS FILTER

NOT APPLICABLE

NAME OF TEST: MODULATION CHARACTERISTICS -
MODULATION LIMITING

PARAGRAPH: 47 CFR 2.987 (b)

GUIDE: EIA STANDARD RS 152B, Paragraph 9

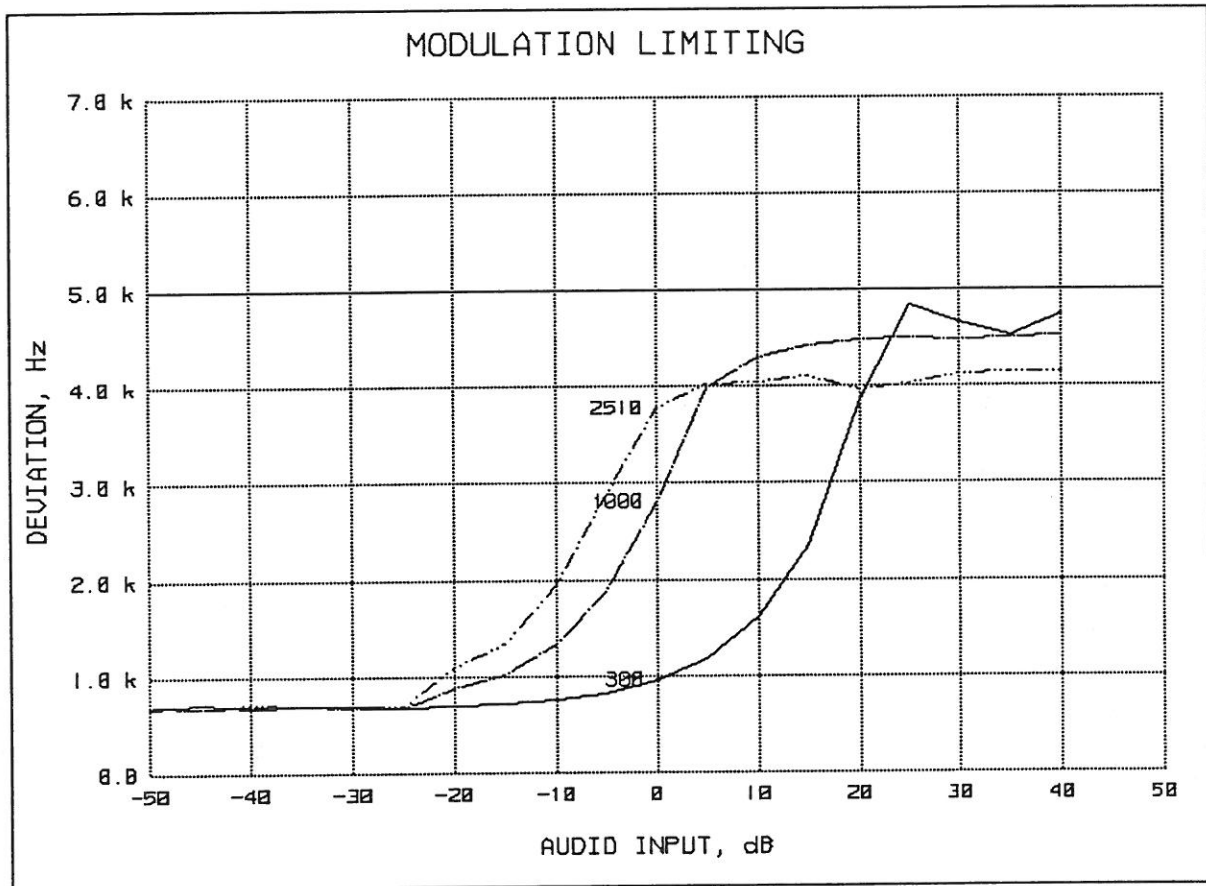
TEST CONDITIONS: S. T. & H.

TEST EQUIPMENT: AS PER PREVIOUS PAGE

MEASUREMENT PROCEDURE

1. The signal generator was connected to the input of the E.U.T. as for "Frequency Response of the Modulating Circuit."
2. The modulation response was measured for each of three frequencies (one of which was the frequency of maximum response), and the input voltage was varied and was observed on an HP 8901A Modulation Analyzer.
3. The input level was varied from 30% modulation (± 1.5 kHz deviation) to at least 20 dB higher than the saturation point.
4. Measurements were performed for both negative and positive modulation and the respective results were recorded.
5. MEASUREMENT RESULTS: ATTACHED

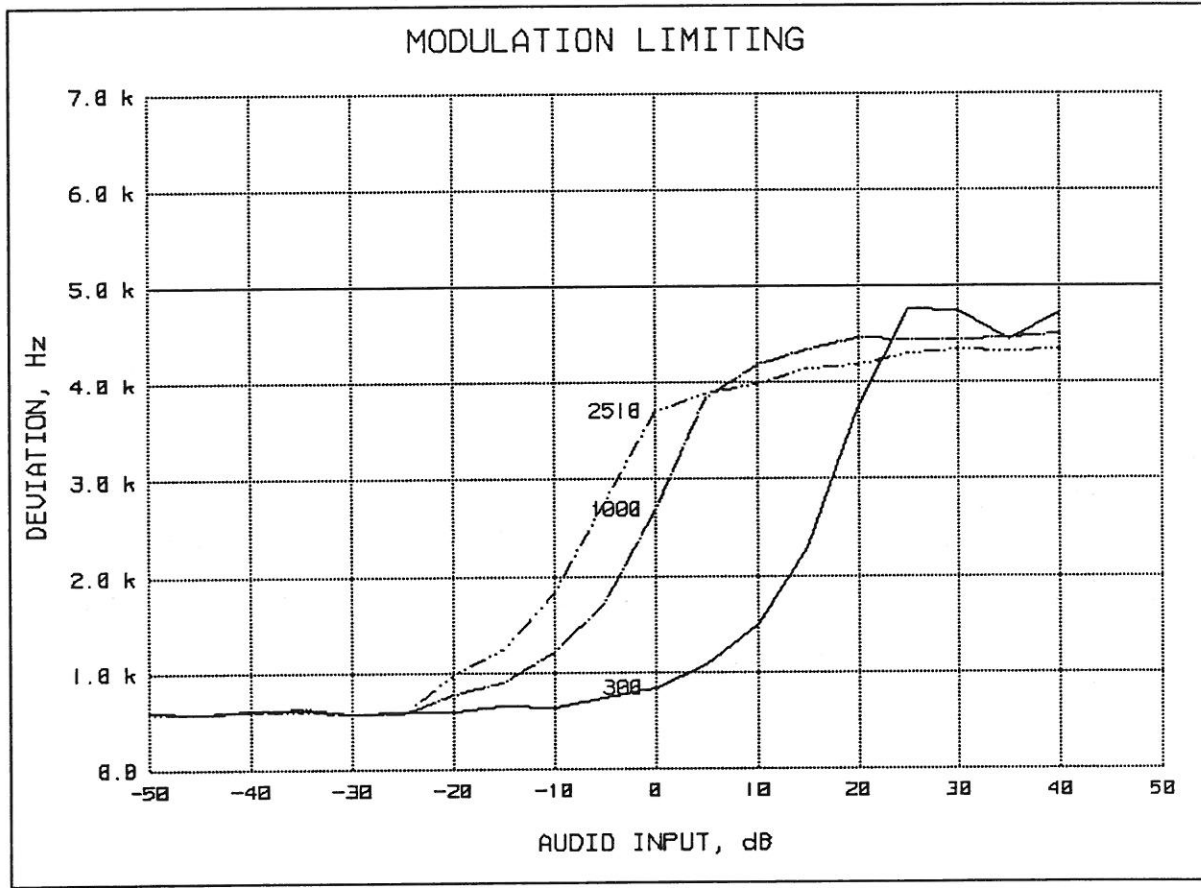
MODULATION LIMITING
HME, COM2000S (PORTABLE)
1994-OCT-11, 12:47



COPYRIGHT © 1994 BY H. FLUOR ASSOCIATES, INC. ALL RIGHTS RESERVED.

REFERENCE DEVIATION, kHz = 2.5
PEAKS = POSITIVE
AUDIO AMPLITUDE, mV = 6.01

MODULATION LIMITING
HME, COM2000S (PORTABLE)
1994-OCT-11, 12:47



REFERENCE DEVIATION, kHz = 2.5
PEAKS = NEGATIVE
AUDIO AMPLITUDE, mV = 6.01