

**MFA** **M. Flom Associates, Inc. - Global Compliance Center**  
3356 North San Marcos Place, Suite 107, Chandler, Arizona 85225-7176  
www.mflom.com general@mflom.com (480) 926-3100, FAX: 926-3598

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Date: September 22, 2000

Federal Communications Commission  
Via: Electronic Filing VIA T.C.B.

Attention: Authorization & Evaluation Division

Applicant: Kenwood Communications Corporation  
Equipment: TK-860HG-2 and TK-862HG-2  
FCC ID: ALH29383220  
FCC Rules: 90

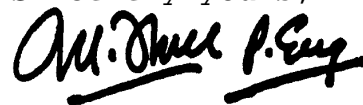
Gentlemen:

On behalf of the Applicant, enclosed please find Application Form 731, Engineering Test Report and all pertinent documentation, the whole for approval of the referenced equipment as shown.

Filing fees are attached.

We trust the same is in order. Should you need any further information, kindly contact the writer who is authorized to act as agent.

Sincerely yours,



Morton Flom, P. Eng.

enclosure(s)  
cc: Applicant  
MF/cvr

LIST OF EXHIBITS  
(FCC **CERTIFICATION** (TRANSMITTERS) - REVISED 9/28/98)

APPLICANT: Kenwood Communications Corporation

FCC ID: ALH29383220

BY APPLICANT:

1. LETTER OF AUTHORIZATION
2. IDENTIFICATION DRAWINGS, 2.1033(c)(11)
  - \_\_\_ LABEL
  - \_\_\_ LOCATION OF LABEL
  - \_\_\_ COMPLIANCE STATEMENT
  - \_\_\_ LOCATION OF COMPLIANCE STATEMENT
3. PHOTOGRAPHS, 2.1033(c)(12)
4. DOCUMENTATION: 2.1033(c)
  - (3) USER MANUAL
  - (9) TUNE UP INFO
  - (10) SCHEMATIC DIAGRAM
  - (10) CIRCUIT DESCRIPTION
  - BLOCK DIAGRAM
  - PARTS LIST
  - ACTIVE DEVICES
5. PART 90.203(e) & (g) ATTESTATION

BY M.F.A. INC.

- A. TESTIMONIAL & STATEMENT OF CERTIFICATION
- B. STATEMENT OF QUALIFICATIONS

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Sub-part  
2.1033(c):

EQUIPMENT IDENTIFICATION

FCC ID: ALH29383220

NAMEPLATE DRAWING

ATTACHED, EXHIBIT 1.

LOCATION

AS PER LABEL DRAWING(S)

DATE OF REPORT

September 22, 2000

SUPERVISED BY:



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.

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*Required information per ISO/IEC Guide 25-1990, paragraph 13.2:*

- a) TEST REPORT
- b) Laboratory: M. Flom Associates, Inc.  
(FCC: 31040/SIT) 3356 N. San Marcos Place, Suite 107  
(Canada: IC 2044) Chandler, AZ 85224
- c) Report Number: d0090050
- d) Client: Kenwood Communications Corporation  
P.O. Box 22745  
Long Beach, CA 90801-5745
- e) Identification: TK-860HG-2 and TK-862HG-2  
FCC ID: ALH29383220  
Description: UHF FM Transceiver
- f) EUT Condition: Not required unless specified in individual tests.
- g) Report Date: September 22, 2000  
EUT Received: September 13, 2000
- h, j, k): As indicated in individual tests.
- i) Sampling method: No sampling procedure used.
- l) Uncertainty: In accordance with MFA internal quality manual.
- m) Supervised by:   
Morton Flom, P. Eng.
- n) Results: The results presented in this report relate only to the item tested.
- o) Reproduction: This report must not be reproduced, except in full, without written permission from this laboratory.

PAGE NO. 2 of 57.

LIST OF GENERAL INFORMATION REQUIRED FOR CERTIFICATION

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

90

Sub-part 2.1033

(c)(1): NAME AND ADDRESS OF APPLICANT:

Kenwood Communications Corporation  
2201 E. Dominguez St  
P.O. Box 22745  
Long Beach, CA 90801-5745

MANUFACTURER:

Kenwood Electronics Technologies PTE Ltd.  
1 Ang Mo Kio Street 63  
Singapore 569110

(c)(2): FCC ID: ALH29383220

MODEL NO: TK-860HG-2 and TK-862HG-2

(c)(3): INSTRUCTION MANUAL(S):

PLEASE SEE ATTACHED EXHIBITS


(c)(4): TYPE OF EMISSION: 16K0F3E, 11K0F3E, 19K2F1D

(c)(5): FREQUENCY RANGE, MHz: 485 to 512

(c)(6): POWER RATING, Watts: 10 to 40  
     Switchable    x Variable      N/A

(c)(7): MAXIMUM POWER RATING, Watts: 500

M. Flom Associates, Inc. is accredited by the American Association for Laboratory Association (A2LA) as shown in the scope below.



**THE AMERICAN ASSOCIATION FOR LABORATORY ACCREDITATION**

**ACCREDITED LABORATORY**

A2LA has accredited


**M. FLOM ASSOCIATES, INC.**  
Chandler, AZ

for technical competence in the field of

**Electrical (EMC) Testing**


The accreditation covers the specific tests and types of tests listed on the agreed scope of accreditation. This laboratory meets the requirements of ISO/IEC Guide 25-1990 "General Requirements for the Competence of Calibration and Testing Laboratories" (equivalent to relevant requirements of the ISO 9000 series of standards) and any additional program requirements in the identified field of testing.

Presented this 24<sup>th</sup> day of November, 1998.



*Peter Abney*  
President  
For the Accreditation Council  
Certificate Number 1008.01  
Valid to December 31, 2000

For tests or types of tests to which this accreditation applies, please refer to the laboratory's Electrical (EMC) Scope of Accreditation



**American Association for Laboratory Accreditation**

SCOPE OF ACCREDITATION TO ISO/IEC GUIDE 25-1990 AND EN 45001

M. FLOM ASSOCIATES, INC.  
Electronic Testing Laboratory  
3356 North San Marcos Place, Suite 107  
Chandler, AZ 85225  
Morton Flom Phone: 480 926 3100

**ELECTRICAL (EMC)**

Valid to: December 31, 2000 Certificate Number: 1008-01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following electromagnetic compatibility tests:

| Tests                   | Standard(s)  |
|-------------------------|--|
| RF Emissions            | FCC Part 15 (Subparts B and C) using ANSI C63 4-1992; CISPR 11; CISPR 13; CISPR 14; CISPR 22; EN 55011; EN 55013; EN 55014; EN 55022; EN 50081-1; EN 50081-2; FCC Part 18; ICES-003; AS/NZS 1044; AS/NZS 1053; AS/NZS 3548; AS/NZS 4251.1; CNS 13438 |
| RF Immunity             | EN 50082-1; EN 50082-2; AS/NZS 4251.1  |
| Radiated Susceptibility | EN 61000-4-3; ENV 50140; ENV 50204; IEC 1000-4-3; IEC 801-3  |
| ESD                     | EN 61000-4-2; IEC 1000-4-2; IEC 801-2  |
| EFT                     | EN 61000-4-4; IEC 1000-4-4; IEC 801-4  |
| Surge                   | EN 61000-4-5; ENV 50142; IEC 1000-4-5; IEC 801-5   |
| 47 CFR (FCC)            | 2, 21, 22, 23, 24, 74, 80, 87, 90, 95, 97  |

Revised 2/2/2000

*Peter Abney*

5301 Buckeystown Pike, Suite 350 • Frederick, MD 21704-8370 • Phone: 301 644 3248 • Fax: 301 662 2974

"This laboratory is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this report have been determined in accordance with the laboratory's terms of accreditation unless stated otherwise in the report."

Should this report contain any data for tests for which we are not accredited, or which have been undertaken by a subcontractor that is not A2LA accredited, such data would not covered by this laboratory's A2LA accreditation.



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Subpart 2.1033 (continued)

(c)(8): 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 = 13.6

(c)(9): TUNE-UP PROCEDURE:

PLEASE SEE ATTACHED EXHIBITS

(c)(10): CIRCUIT DIAGRAM/CIRCUIT DESCRIPTION:

Including description of circuitry & devices provided for determining and stabilizing frequency, for suppression of spurious radiation, for limiting modulation and limiting power.

PLEASE SEE ATTACHED EXHIBITS

(c)(11): LABEL INFORMATION:

PLEASE SEE ATTACHED EXHIBITS

(c)(12): PHOTOGRAPHS:

PLEASE SEE ATTACHED EXHIBITS

(c)(13): DIGITAL MODULATION DESCRIPTION:

     ATTACHED EXHIBITS  
  x   N/A

(c)(14): TEST AND MEASUREMENT DATA:

FOLLOWS

PAGE NO.

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Sub-part  
2.1033(c)(14):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 2.947, 2.1033(c), 2.1041, 2.1046, 2.1047, 2.1079, 2.1051, 2.1053, 2.1055, 2.1057 and the following individual Parts:

- \_\_\_\_\_ 21 - Domestic Public Fixed Radio Services
- \_\_\_\_\_ 22 - Public Mobile Services
- \_\_\_\_\_ 22 Subpart H - Cellular Radiotelephone Service
- \_\_\_\_\_ 22.901(d) - Alternative technologies and auxiliary services
- \_\_\_\_\_ 23 - International Fixed Public Radiocommunication services
- \_\_\_\_\_ 24 - Personal Communications Services
- \_\_\_\_\_ 74 Subpart H - Low Power Auxiliary Stations
- \_\_\_\_\_ 80 - Stations in the Maritime Services
- \_\_\_\_\_ 80 Subpart E - General Technical Standards
- \_\_\_\_\_ 80 Subpart F - Equipment Authorization for Compulsory Ships
- \_\_\_\_\_ 80 Subpart K - Private Coast Stations and Marine Utility Stations
- \_\_\_\_\_ 80 Subpart S - Compulsory Radiotelephone Installations for Small Passenger Boats
- \_\_\_\_\_ 80 Subpart T - Radiotelephone Installation Required for Vessels on the Great Lakes
- \_\_\_\_\_ 80 Subpart U - Radiotelephone Installations Required by the Bridge-to-Bridge Act
- \_\_\_\_\_ 80 Subpart V - Emergency Position Indicating Radiobeacons (EPIRB'S)
- \_\_\_\_\_ 80 Subpart W - Global Maritime Distress and Safety System (GMDSS)
- \_\_\_\_\_ 80 Subpart X - Voluntary Radio Installations
- \_\_\_\_\_ 87 - Aviation Services
- x 90 - Private Land Mobile Radio Services
- \_\_\_\_\_ 94 - Private Operational-Fixed Microwave Service
- \_\_\_\_\_ 95 Subpart A - General Mobile Radio Service (GMRS)
- \_\_\_\_\_ 95 Subpart C - Radio Control (R/C) Radio Service
- \_\_\_\_\_ 95 Subpart D - Citizens Band (CB) Radio Service
- \_\_\_\_\_ 95 Subpart E - Family Radio Service
- \_\_\_\_\_ 95 Subpart F - Interactive Video and Data Service (IVDS)
- \_\_\_\_\_ 97 - Amateur Radio Service
- \_\_\_\_\_ 101 - Fixed Microwave Services

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STANDARD TEST CONDITIONS  
and  
ENGINEERING PRACTICES

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

In accordance with ANSI C63.4-1992/2000 Draft, section 6.1.9, and unless otherwise indicated in the specific measurement results, the ambient temperature of the actual EUT was maintained within the range of 10° to 40°C (50° to 104 °F) unless the particular equipment requirements specify testing over a different temperature range. Also, unless otherwise indicated, the humidity levels were in the range of 10% to 90% relative humidity.

Prior to testing, the EUT 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.

PAGE NO. 7 of 57.  
NAME OF TEST: Carrier Output Power (Conducted)  
SPECIFICATION: 47 CFR 2.1046(a)  
GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.1  
TEST EQUIPMENT: As per attached page

MEASUREMENT PROCEDURE

1. The EUT 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  
(Worst case)

FREQUENCY OF CARRIER, MHz = 498.6, 485.1, 511.9

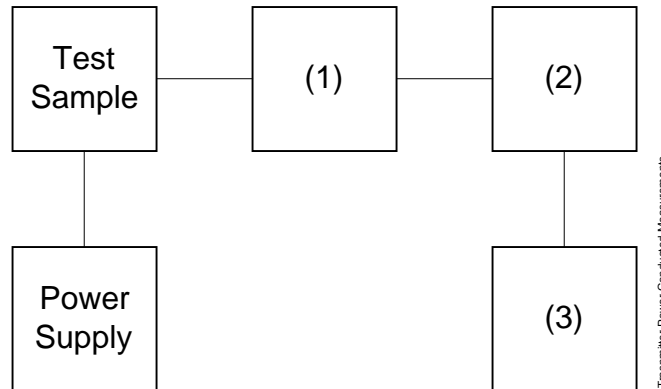
| POWER SETTING | R. F. POWER, WATTS |
|---------------|--------------------|
| Low           | 10                 |
| High          | 40                 |

SUPERVISED BY:

Morton Flom, P. Eng.

TRANSMITTER POWER CONDUCTED MEASUREMENTS

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



| Asset  | Description<br>(as applicable) | s/n        |
|--------|--------------------------------|------------|
| (1)    | <u>COAXIAL ATTENUATOR</u>      |            |
| i00122 | Narda 766-10                   | 7802       |
| i00123 | Narda 766-10                   | 7802A      |
| i00069 | Bird 8329 (30 dB)              | 1006       |
| i00113 | Sierra 661A-3D                 | 1059       |
| (2)    | <u>POWER METERS</u>            |            |
| i00014 | HP 435A                        | 1733A05836 |
| i00039 | HP 436A                        | 2709A26776 |
| i00020 | HP 8901A POWER MODE            | 2105A01087 |
| (3)    | <u>FREQUENCY COUNTER</u>       |            |
| i00042 | HP 5383A                       | 1628A00959 |
| i00019 | HP 5334B                       | 2704A00347 |
| i00020 | HP 8901A FREQUENCY MODE        | 2105A01087 |

PAGE NO. 9 of 57.

NAME OF TEST: Unwanted Emissions (Transmitter Conducted)

SPECIFICATION: 47 CFR 2.1051

GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.13

TEST EQUIPMENT: As per attached page

MEASUREMENT PROCEDURE

1. The emissions were measured for the worst case as follows:
  - (a): within a band of frequencies defined by the carrier frequency plus and minus one channel.
  - (b): from the lowest frequency generated in the EUT and to at least the 10th harmonic of the carrier frequency, or 40 GHz, whichever is lower.
2. The magnitude of spurious emissions that are attenuated more than 20 dB below the permissible value need not be specified.
3. MEASUREMENT RESULTS: ATTACHED FOR WORST CASE

|                           |                 |                          |
|---------------------------|-----------------|--------------------------|
| FREQUENCY OF CARRIER, MHz | =               | 498.6, 485.1, 511.9      |
| SPECTRUM SEARCHED, GHz    | =               | 0 to 10 x F <sub>c</sub> |
| MAXIMUM RESPONSE, Hz      | =               | 3160                     |
| ALL OTHER EMISSIONS       | =               | ≥ 20 dB BELOW LIMIT      |
| LIMIT(S), dBc             |                 |                          |
|                           | - (50+10xLOG P) | = -60 (10 Watts)         |
|                           | - (50+10xLOG P) | = -66 (40 Watts)         |

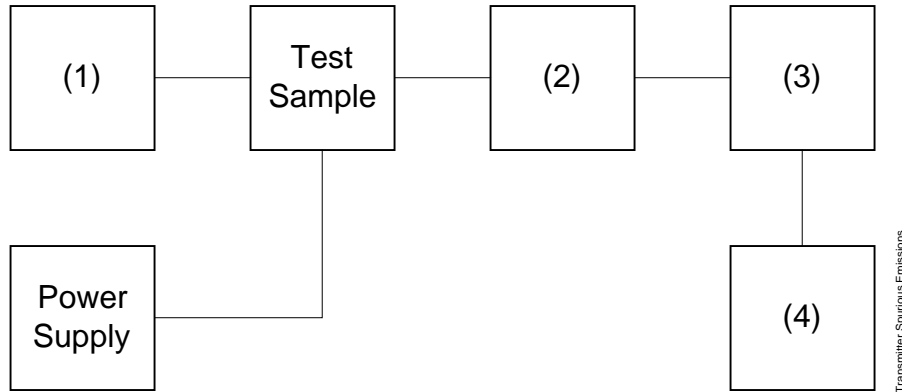
SUPERVISED BY:



Morton Flom, P. Eng.

TRANSMITTER SPURIOUS EMISSION

TEST A. OCCUPIED BANDWIDTH (IN-BAND SPURIOUS)  
 TEST B. OUT-OF-BAND SPURIOUS



| Asset Description<br>(as applicable)  | s/n        |
|---------------------------------------|------------|
| <u>(1) AUDIO OSCILLATOR/GENERATOR</u> |            |
| i00010 HP 204D                        | 1105A04683 |
| i00017 HP 8903A                       | 2216A01753 |
| i00012 HP 3312A                       | 1432A11250 |
| <u>(2) COAXIAL ATTENUATOR</u>         |            |
| i00122 Narda 766-10                   | 7802       |
| i00123 Narda 766-10                   | 7802A      |
| i00069 Bird 8329 (30 dB)              | 1006       |
| i00113 Sierra 661A-3D                 | 1059       |
| <u>(3) FILTERS; NOTCH, HP, LP, BP</u> |            |
| i00126 Eagle TNF-1                    | 100-250    |
| i00125 Eagle TNF-1                    | 50-60      |
| i00124 Eagle TNF-1                    | 250-850    |
| <u>(4) SPECTRUM ANALYZER</u>          |            |
| i00048 HP 8566B                       | 2511A01467 |
| i00029 HP 8563E                       | 3213A00104 |

PAGE NO. 11 of 57.

NAME OF TEST: Unwanted Emissions (Transmitter Conducted)  
 g0090222: 2000-Sep-14 Thu 12:02:00  
 STATE: 1:Low Power

| FREQUENCY TUNED,<br>MHz | FREQUENCY<br>EMISSION, MHz | LEVEL, dBm | LEVEL, dBc | MARGIN, dB |
|-------------------------|----------------------------|------------|------------|------------|
| 485.100000              | 970.209000                 | -33.2      | -73.2      | -13.2      |
| 498.600000              | 997.209000                 | -35.3      | -75.3      | -15.3      |
| 511.900000              | 1023.800000                | -34.8      | -74.8      | -14.8      |
| 485.100000              | 1455.296000                | -42        | -82        | -22        |
| 498.600000              | 1495.797000                | -41        | -81        | -21        |
| 511.900000              | 1535.693000                | -38.9      | -78.9      | -18.9      |
| 485.100000              | 1940.687000                | -40.7      | -80.7      | -20.7      |
| 498.600000              | 1994.111000                | -40.1      | -80.1      | -20.1      |
| 511.900000              | 2047.334000                | -41        | -81        | -21        |
| 485.100000              | 2425.773000                | -40.1      | -80.1      | -20.1      |
| 498.600000              | 2493.005000                | -39.3      | -79.3      | -19.3      |
| 511.900000              | 2559.503000                | -42.1      | -82.1      | -22.1      |
| 485.100000              | 2910.139000                | -43.1      | -83.1      | -23.1      |
| 498.600000              | 2991.863000                | -42.2      | -82.2      | -22.2      |
| 511.900000              | 3071.556000                | -43        | -83        | -23        |
| 485.100000              | 3396.072000                | -42.4      | -82.4      | -22.4      |
| 498.600000              | 3490.653000                | -43.4      | -83.4      | -23.4      |
| 511.900000              | 3583.048000                | -43        | -83        | -23        |
| 485.100000              | 3880.649000                | -43.6      | -83.6      | -23.6      |
| 498.600000              | 3988.903000                | -43.7      | -83.7      | -23.7      |
| 511.900000              | 4095.030000                | -43.1      | -83.1      | -23.1      |
| 485.100000              | 4365.758000                | -42.9      | -82.9      | -22.9      |
| 498.600000              | 4487.143000                | -42.1      | -82.1      | -22.1      |
| 511.900000              | 4607.441000                | -42.5      | -82.5      | -22.5      |
| 485.100000              | 4850.686000                | -43.2      | -83.2      | -23.2      |
| 498.600000              | 4986.165000                | -43.1      | -83.1      | -23.1      |
| 511.900000              | 5118.849000                | -43        | -83        | -23        |
| 485.100000              | 5336.038000                | -42.6      | -82.6      | -22.6      |
| 498.600000              | 5484.654000                | -42.7      | -82.7      | -22.7      |
| 511.900000              | 5630.799000                | -42.6      | -82.6      | -22.6      |
| 485.100000              | 5820.828000                | -38.1      | -78.1      | -18.1      |
| 498.600000              | 5983.643000                | -37.3      | -77.3      | -17.3      |
| 511.900000              | 6142.354000                | -38.3      | -78.3      | -18.3      |
| 485.100000              | 6305.967000                | -36.8      | -76.8      | -16.8      |
| 498.600000              | 6481.830000                | -36.6      | -76.6      | -16.6      |
| 511.900000              | 6654.295000                | -37.4      | -77.4      | -17.4      |
| 485.100000              | 6791.561000                | -37.7      | -77.7      | -17.7      |
| 498.600000              | 6980.070000                | -37        | -77        | -17        |
| 511.900000              | 7166.393000                | -36.7      | -76.7      | -16.7      |
| 485.100000              | 7276.123000                | -37.8      | -77.8      | -17.8      |
| 498.600000              | 7479.242000                | -37.9      | -77.9      | -17.9      |
| 511.900000              | 7678.128000                | -37.3      | -77.3      | -17.3      |



PAGE NO. 12 of 57.

NAME OF TEST: Unwanted Emissions (Transmitter Conducted)  
 g0090221: 2000-Sep-14 Thu 12:00:00  
 STATE: 2:High Power

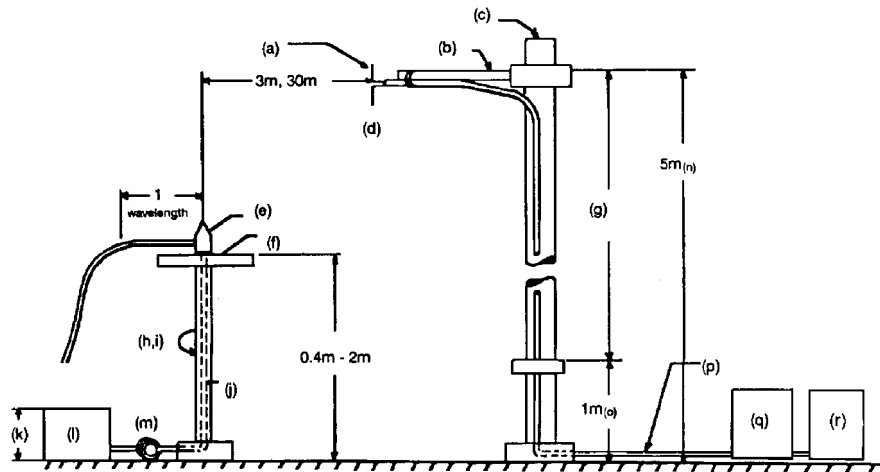
| FREQUENCY TUNED,<br>MHz | FREQUENCY<br>EMISSION, MHz | LEVEL, dBm | LEVEL, dBc | MARGIN, dB |
|-------------------------|----------------------------|------------|------------|------------|
| 485.100000              | 970.223000                 | -30.6      | -76.6      | -10.6      |
| 498.600000              | 997.185000                 | -30.6      | -76.6      | -10.6      |
| 511.900000              | 1023.740000                | -30.4      | -76.4      | -10.4      |
| 485.100000              | 1454.881000                | -30.9      | -76.9      | -10.9      |
| 498.600000              | 1495.801000                | -30.9      | -76.9      | -10.9      |
| 511.900000              | 1535.710000                | -31.2      | -77.2      | -11.2      |
| 485.100000              | 1940.860000                | -31.8      | -77.8      | -11.8      |
| 498.600000              | 1994.091000                | -30.2      | -76.2      | -10.2      |
| 511.900000              | 2047.335000                | -31.1      | -77.1      | -11.1      |
| 485.100000              | 2425.106000                | -30        | -76        | -10        |
| 498.600000              | 2492.784000                | -29.9      | -75.9      | -9.9       |
| 511.900000              | 2559.506000                | -31.5      | -77.5      | -11.5      |
| 485.100000              | 2910.716000                | -33.5      | -79.5      | -13.5      |
| 498.600000              | 2991.388000                | -32.1      | -78.1      | -12.1      |
| 511.900000              | 3071.574000                | -32.7      | -78.7      | -12.7      |
| 485.100000              | 3395.927000                | -33.6      | -79.6      | -13.6      |
| 498.600000              | 3490.328000                | -33.2      | -79.2      | -13.2      |
| 511.900000              | 3582.813000                | -33.3      | -79.3      | -13.3      |
| 485.100000              | 3880.647000                | -33.9      | -79.9      | -13.9      |
| 498.600000              | 3988.438000                | -33.2      | -79.2      | -13.2      |
| 511.900000              | 4095.263000                | -33        | -79        | -13        |
| 485.100000              | 4365.634000                | -33.4      | -79.4      | -13.4      |
| 498.600000              | 4487.808000                | -33.4      | -79.4      | -13.4      |
| 511.900000              | 4607.417000                | -33.2      | -79.2      | -13.2      |
| 485.100000              | 4850.761000                | -32.8      | -78.8      | -12.8      |
| 498.600000              | 4985.911000                | -33.1      | -79.1      | -13.1      |
| 511.900000              | 5118.857000                | -33.3      | -79.3      | -13.3      |
| 485.100000              | 5335.963000                | -32.3      | -78.3      | -12.3      |
| 498.600000              | 5485.020000                | -32.1      | -78.1      | -12.1      |
| 511.900000              | 5630.463000                | -33.5      | -79.5      | -13.5      |
| 485.100000              | 5821.399000                | -27.2      | -73.2      | -7.2       |
| 498.600000              | 5982.797000                | -28.2      | -74.2      | -8.2       |
| 511.900000              | 6143.184000                | -27        | -73        | -7         |
| 485.100000              | 6305.850000                | -27.7      | -73.7      | -7.7       |
| 498.600000              | 6481.716000                | -26.9      | -72.9      | -6.9       |
| 511.900000              | 6654.510000                | -27.7      | -73.7      | -7.7       |
| 485.100000              | 6791.314000                | -27.6      | -73.6      | -7.6       |
| 498.600000              | 6980.814000                | -28.3      | -74.3      | -8.3       |
| 511.900000              | 7166.930000                | -28.3      | -74.3      | -8.3       |
| 485.100000              | 7276.898000                | -27.2      | -73.2      | -7.2       |
| 498.600000              | 7478.599000                | -27.7      | -73.7      | -7.7       |
| 511.900000              | 7678.930000                | -27.2      | -73.2      | -7.2       |

PAGE NO. 13 of 57.  
NAME OF TEST: Field Strength of Spurious Radiation  
SPECIFICATION: 47 CFR 2.1053(a)  
GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.12  
TEST EQUIPMENT: As per attached page

MEASUREMENT PROCEDURE

1. A description of the measurement facilities was filed with the FCC and was found to be in compliance with the requirements of Section 2.948, by letter from the FCC dated March 3, 1997, FILE 31040/SIT. All pertinent changes will be reported to the Commission by up-date prior to March 2003.
2. At first, in order to locate all spurious frequencies and approximate amplitudes, and to determine proper equipment functioning, the test sample was set up at a distance of three meters from the test instrument. Valid spurious signals were determined by switching the power on and off.
3. In the field, the test sample was placed on a wooden turntable above ground at three (or thirty) meters away from the search antenna. Excess power leads were coiled near the power supply.  
  
The cables were oriented in order to obtain the maximum response. At each emission frequency, the turntable was rotated and the search antennas were raised and lowered vertically.
4. The emission was observed with both a vertically polarized and a horizontally polarized search antenna and the worst case was used.
6. The field strength of each emission within 20 dB of the limit was recorded and corrected with the appropriate cable and transducer factors.
7. The worst case for all channels is shown.
8. Measurement results: ATTACHED FOR WORST CASE

RADIATED TEST SETUP



NOTES:

- (a) Search Antenna - Rotatable on boom
- (b) Non-metallic boom
- (c) Non-metallic mast
- (d) Adjustable horizontally
- (e) Equipment Under Test
- (f) Turntable
- (g) Boom adjustable in height.
- (h) External control cables routed horizontally at least one wavelength.
- (i) Rotatable
- (j) Cables routed through hollow turntable center
- (k) 30 cm or less
- (l) External power source
- (m) 10 cm diameter coil of excess cable
- (n) 25 cm (V), 1 m-7 m (V, H)
- (o) 25 cm from bottom end of 'V', 1m normally
- (p) Calibrated Cable at least 10m in length
- (q) Amplifier (optional)
- (r) Spectrum Analyzer

| Asset Description<br>(as applicable) | s/n | Cycle | Last Cal |
|--------------------------------------|-----|-------|----------|
|--------------------------------------|-----|-------|----------|

Per ANSI C63.4-1992/2000 Draft, 10.1.4

TRANSDUCER

|        |                             |           |        |        |
|--------|-----------------------------|-----------|--------|--------|
| i00088 | EMCO 3109-B 25MHz-300MHz    | 2336      | 12 mo. | Sep-99 |
| i00065 | EMCO 3301-B Active Monopole | 2635      | 12 mo. | Sep-99 |
| i00089 | Apral 2001 200MHz-1GHz      | 001500    | 12 mo. | Sep-99 |
| i00103 | EMCO 3115 1GHz-18GHz        | 9208-3925 | 12 mo. | Sep-99 |

AMPLIFIER

|        |          |            |        |        |
|--------|----------|------------|--------|--------|
| i00028 | HP 8449A | 2749A00121 | 12 mo. | Mar-00 |
|--------|----------|------------|--------|--------|

SPECTRUM ANALYZER

|        |           |            |        |        |
|--------|-----------|------------|--------|--------|
| i00029 | HP 8563E  | 3213A00104 | 12 mo. | Aug-00 |
| i00033 | HP 85462A | 3625A00357 | 12 mo. | May-00 |
| i00048 | HP 8566B  | 2511AD1467 | 6 mo.  | May-00 |

PAGE NO. 15 of 57.

NAME OF TEST: Field Strength of Spurious Radiation

ALL OTHER EMISSIONS =  $\geq$  20 dB BELOW LIMIT

---

| <u>EMISSION, MHz/HARMONIC</u> | <u>SPURIOUS LEVEL, dBc</u> |
|-------------------------------|----------------------------|
| 2nd to 10th                   | <-70                       |

---

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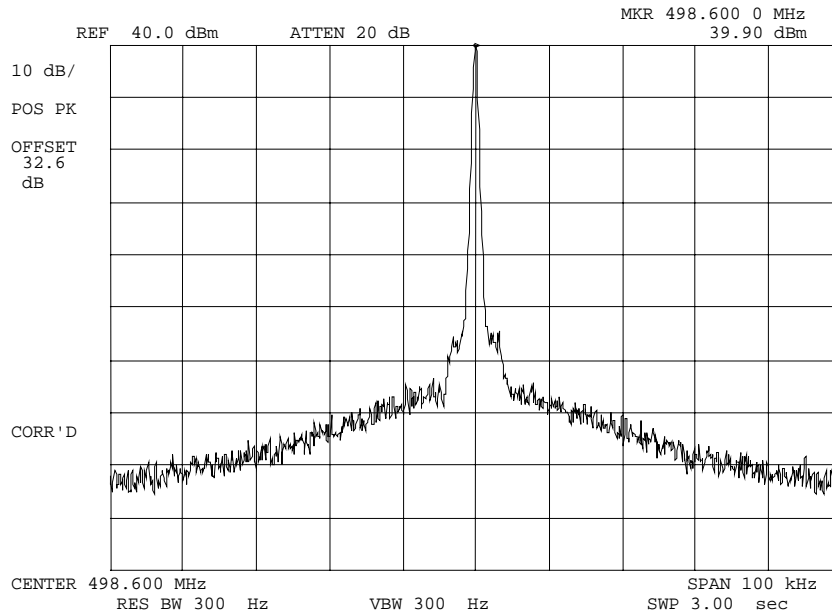
PAGE NO. 16 of 57.  
NAME OF TEST: Emission Masks (Occupied Bandwidth)  
SPECIFICATION: 47 CFR 2.1049(c)(1)  
GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.11  
TEST EQUIPMENT: As per previous page

MEASUREMENT PROCEDURE

1. The EUT and test equipment were set up as shown on the following page, with the Spectrum Analyzer connected.
2. For EUTs supporting audio modulation, the audio signal generator was adjusted to the frequency of maximum response and with output level set for  $\pm 2.5/\pm 1.25$  kHz deviation (or 50% modulation). With level constant, the signal level was increased 16 dB.
3. For EUTs supporting digital modulation, the digital modulation mode was operated to its maximum extent.
4. The Occupied Bandwidth was measured with the Spectrum Analyzer controls set as shown on the test results.
5. MEASUREMENT RESULTS: ATTACHED

PAGE NO. 17 of 57.

NAME OF TEST: Emission Masks (Occupied Bandwidth)  
g0090212: 2000-Sep-14 Thu 11:21:00  
STATE: 1:Low Power



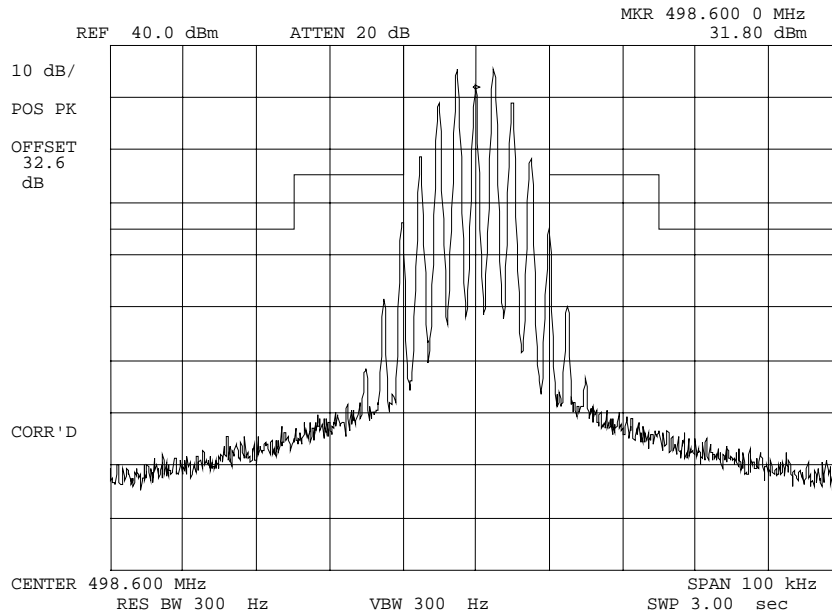
POWER: LOW  
MODULATION: NONE

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NAME OF TEST: Emission Masks (Occupied Bandwidth)  
g0090213: 2000-Sep-14 Thu 11:23:00  
STATE: 1:Low Power



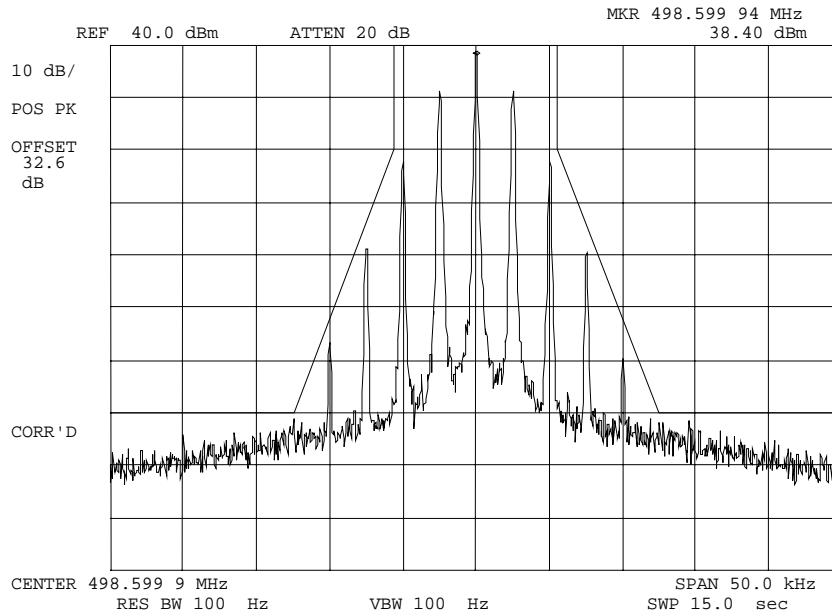
|             |                          |
|-------------|--------------------------|
| POWER:      | LOW                      |
| MODULATION: | VOICE: 2500 Hz SINE WAVE |
|             | MASK: B, VHF/UHF 25kHz,  |
|             | w/LPF                    |

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NAME OF TEST: Emission Masks (Occupied Bandwidth)  
g0090216: 2000-Sep-14 Thu 11:32:00  
STATE: 1:Low Power



POWER:  
MODULATION:

LOW  
VOICE: 2500 Hz SINE WAVE  
MASK: D, VHF/UHF 12.5kHz BW

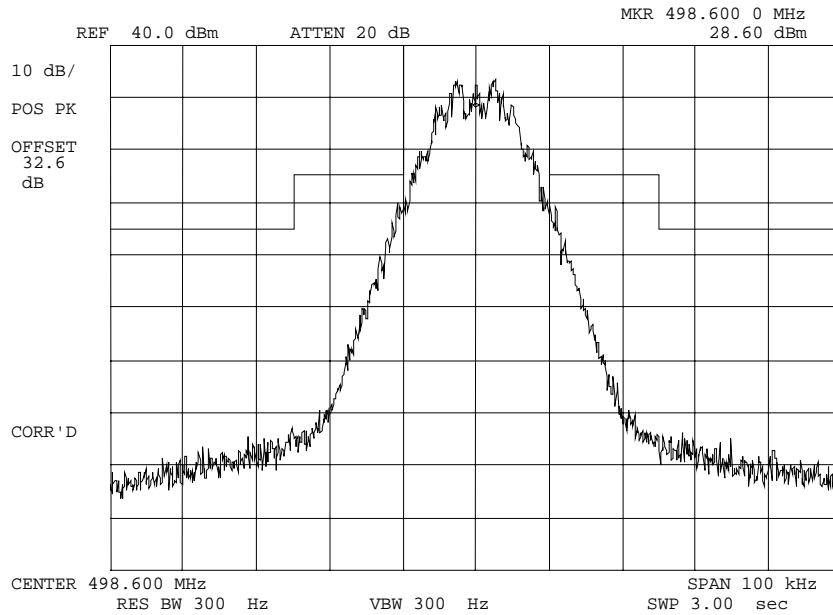
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NAME OF TEST: Emission Masks (Occupied Bandwidth)  
g0090220: 2000-Sep-14 Thu 11:59:00  
STATE: 1:Low Power



POWER:  
MODULATION:

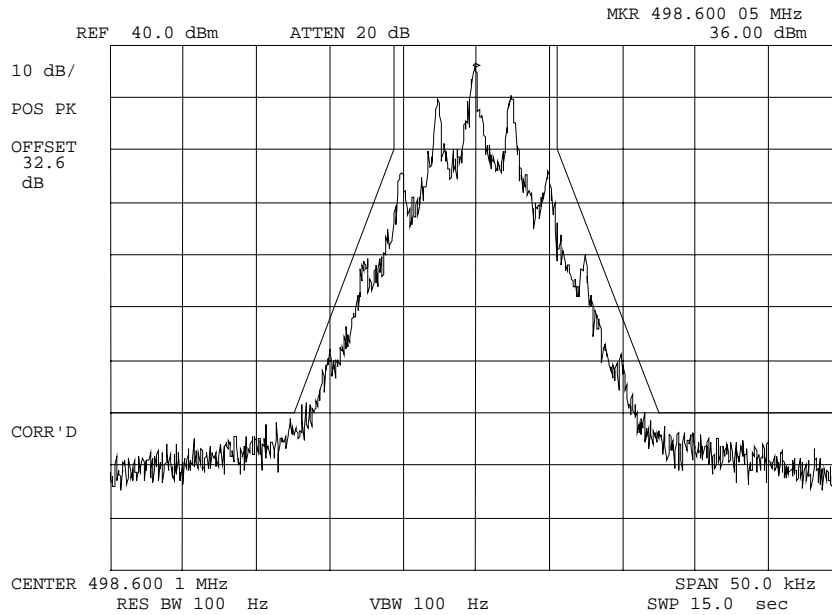
LOW  
DATA 19200 BITS PER SECOND  
MASK: B, VHF/UHF 25kHz,  
w/LPF

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NAME OF TEST: Emission Masks (Occupied Bandwidth)  
g0090218: 2000-Sep-14 Thu 11:53:00  
STATE: 1:Low Power



POWER:  
MODULATION:

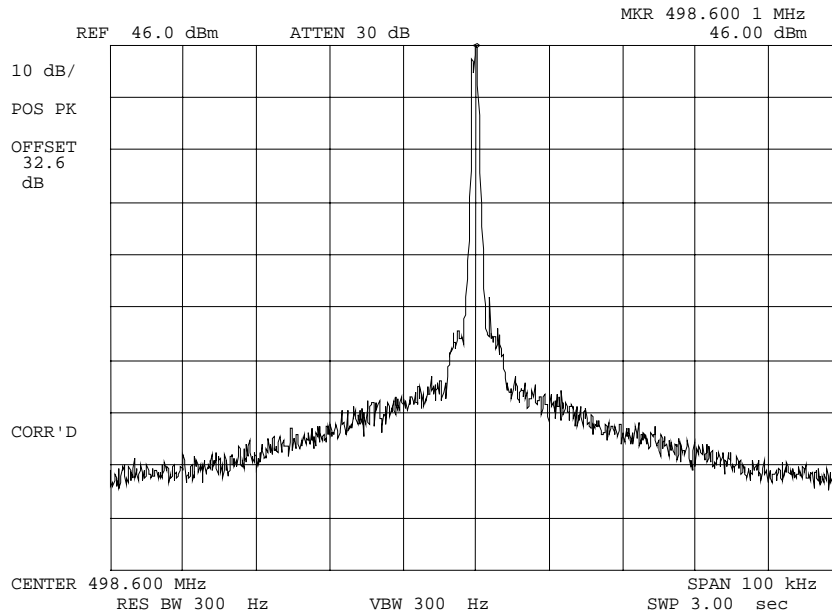
LOW  
DATA 9600 BITS PER SECOND  
MASK: D, VHF/UHF 12.5kHz BW

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NAME OF TEST: Emission Masks (Occupied Bandwidth)  
g0090211: 2000-Sep-14 Thu 11:19:00  
STATE: 2:High Power



POWER: HIGH  
MODULATION: NONE

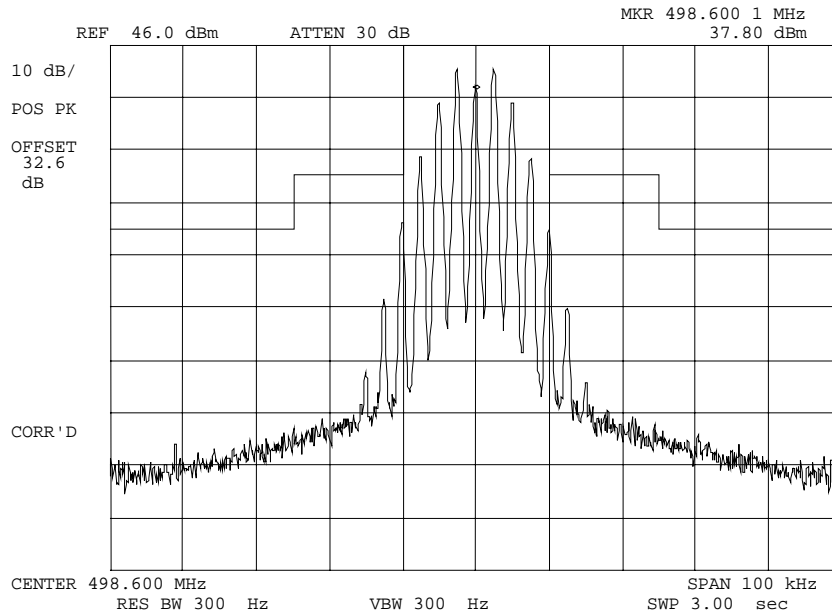
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NAME OF TEST: Emission Masks (Occupied Bandwidth)  
g0090214: 2000-Sep-14 Thu 11:25:00  
STATE: 2:High Power



POWER:  
MODULATION:

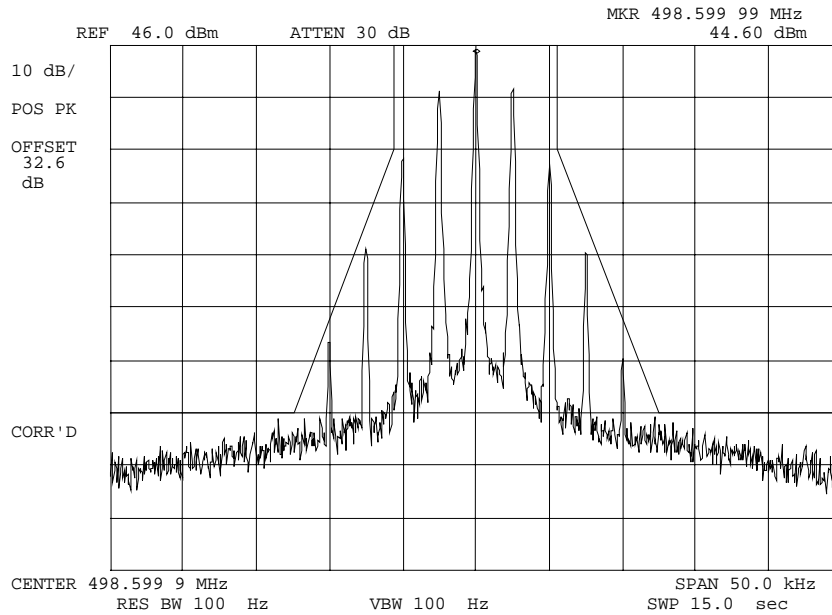
HIGH  
VOICE: 2500 Hz SINE WAVE  
MASK: B, VHF/UHF 25kHz,  
w/LPF

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NAME OF TEST: Emission Masks (Occupied Bandwidth)  
g0090215: 2000-Sep-14 Thu 11:30:00  
STATE: 2:High Power



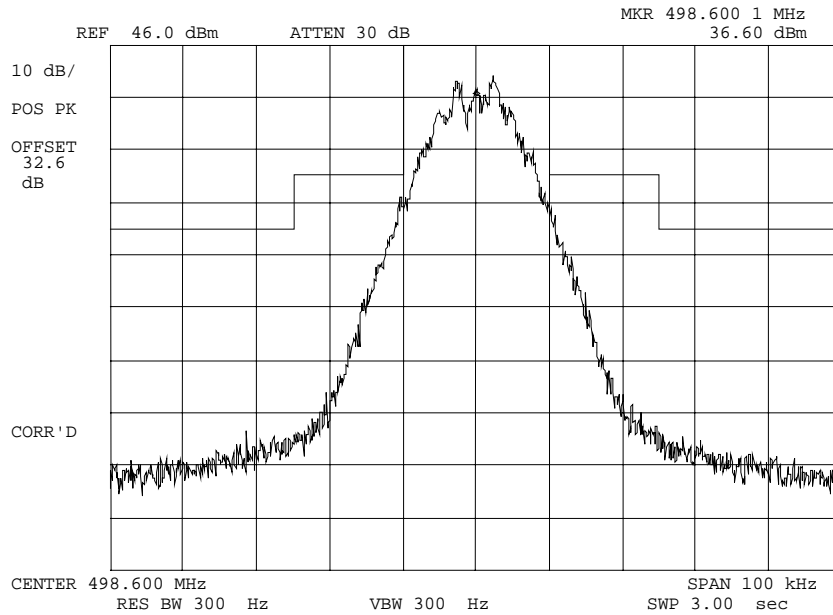
|             |                             |
|-------------|-----------------------------|
| POWER:      | HIGH                        |
| MODULATION: | VOICE: 2500 Hz SINE WAVE    |
|             | MASK: D, VHF/UHF 12.5kHz BW |

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NAME OF TEST: Emission Masks (Occupied Bandwidth)  
g0090219: 2000-Sep-14 Thu 11:58:00  
STATE: 2:High Power



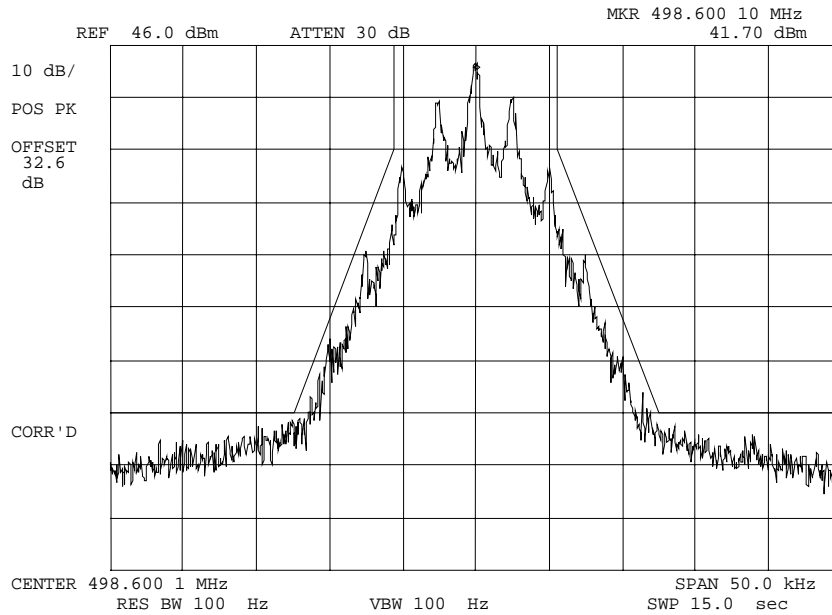
|             |                            |
|-------------|----------------------------|
| POWER:      | HIGH                       |
| MODULATION: | DATA 19200 BITS PER SECOND |
|             | MASK: B, VHF/UHF 25kHz,    |
|             | w/LPF                      |

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PAGE NO. 26 of 57.

NAME OF TEST: Emission Masks (Occupied Bandwidth)  
g0090217: 2000-Sep-14 Thu 11:51:00  
STATE: 2:High Power



POWER: HIGH  
MODULATION: DATA 9600 BITS PER SECOND  
MASK: D, VHF/UHF 12.5kHz BW

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PAGE NO. 27 of 57.

NAME OF TEST: Transient Frequency Behavior

SPECIFICATION: 47 CFR 90.214

GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.19

TEST EQUIPMENT: As per attached page

MEASUREMENT PROCEDURE

1. The EUT was setup as shown on the attached page, following TIA/EIA-603 steps a, b, and c as a *guide*.
2. The transmitter was turned on.
3. Sufficient attenuation was provided so that the transmitter carrier level measured at the output of the combiner was 40 dB below the maximum input level of the test receiver. This level was recorded as step f.
4. The transmitter was turned off.
5. An RF signal generator (1) modulated with a 1 kHz tone at either 25, 12.5, or 6.25 kHz deviation, and set to the same frequency as the assigned transmitter frequency, (2) was adjusted to a level -20 dB below the level recorded for step f, as measured at the output of the combiner. This level was then fixed for the remainder of the test and is recorded at step h.
6. The oscilloscope was setup using TIA/EIA-603 steps j and k as a guide, and to either 10 ms/div (UHF) or 5 ms/div (VHF).
7. The 30 dB attenuator was removed, the transmitter was turned on, and the level of the carrier at the output of the combiner was recorded as step l.
8. The carrier on-time as referenced in TIA/EIA-603 steps m, n, and o was captured and plotted. The carrier off-time as referenced in TIA/EIA-603 steps p, q, r, and s was captured and plotted.

LEVELS MEASURED:

|                     |         |
|---------------------|---------|
| <u>step f</u> , dBm | = -14.6 |
| <u>step h</u> , dBm | = -46.3 |
| <u>step l</u> , dBm | = 3.7   |

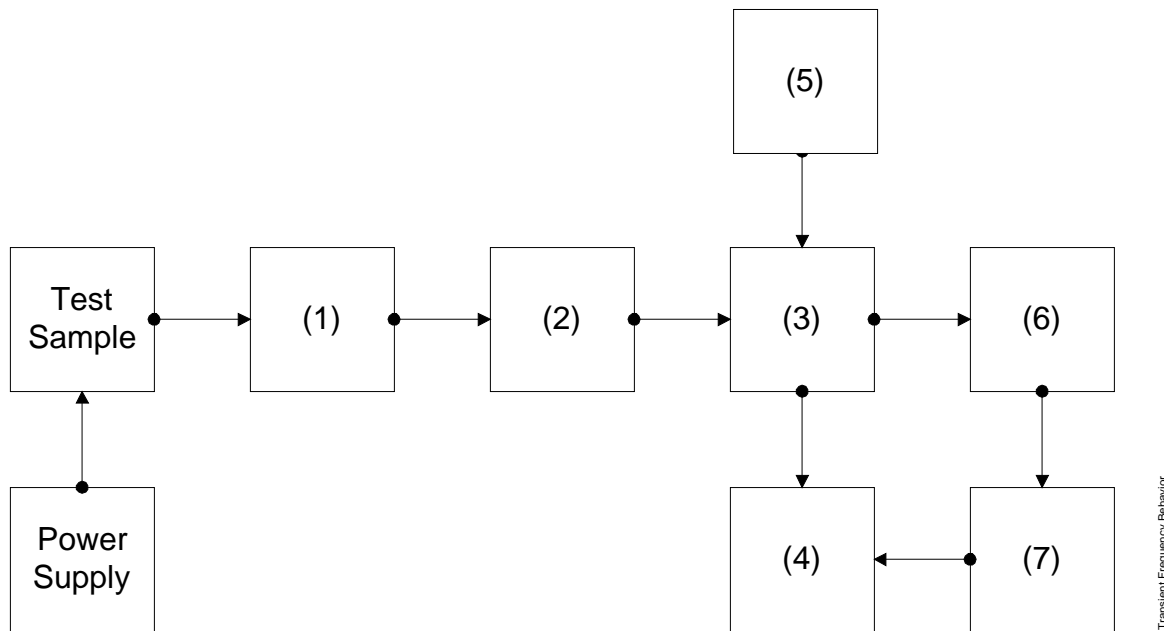


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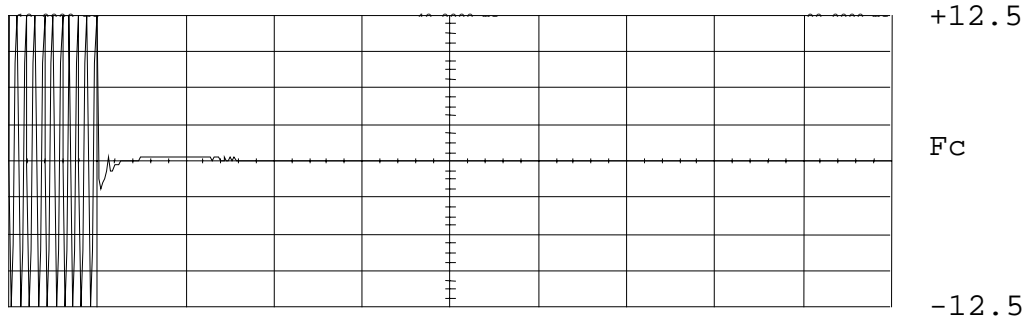
TRANSIENT FREQUENCY BEHAVIOR



| Asset | Description<br>(as applicable)   | s/n                                    |
|-------|--|--|
| (1)   | <u>ATTENUATOR</u> (Removed after 1st step)<br>i00112 Philco 30 dB  | 989                                    |
| (2)   | <u>ATTENUATOR</u><br>i00112 Philco 30 dB<br>i00172 Bird 30 dB<br>i00122 Narda 10 dB<br>i00123 Narda 10 dB<br>i00110 Kay Variable | 989<br>989<br>7802<br>7802A<br>145-387 |
| (3)   | <u>COMBINER</u><br>i00154 4 x 25 Ω COMBINER  | 154                                    |
| (4)   | <u>CRYSTAL DETECTOR</u><br>i00159 HP 8470B   | 1822A10054                             |
| (5)   | <u>RF SIGNAL GENERATOR</u><br>i00018 HP 8656A<br>i00031 HP 8656A<br>i00067 HP 8920A  | 2228A03472<br>2402A06180<br>3345U01242 |
| (6)   | <u>MODULATION ANALYZER</u><br>i00020 HP 8901A  | 2105A01087                             |
| (7)   | <u>SCOPE</u><br>i00030 HP 54502A   | 2927A00209                             |

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NAME OF TEST: Transient Frequency Behavior  
 g0090227: 2000-Sep-14 Thu 16:25:00  
 STATE: 2:High Power



```

Main           Minibases      Rate/Sec      RefGen - Mod-
              10.0 MHz/div      40.0000 Hz
              975 MHz/div      0.00000 V      1.000 1 2 (1M chn)
    Modulation mode: FSK
    Modulation Rate: 40.000
    Modulation Type: 1
    Mod2: 4.000
    Mod3: 40.000
    
```

POWER:  
 MODULATION:  
 DESCRIPTION:

HIGH  
 Ref Gen=12.5 kHz Deviation  
 CARRIER ON TIME

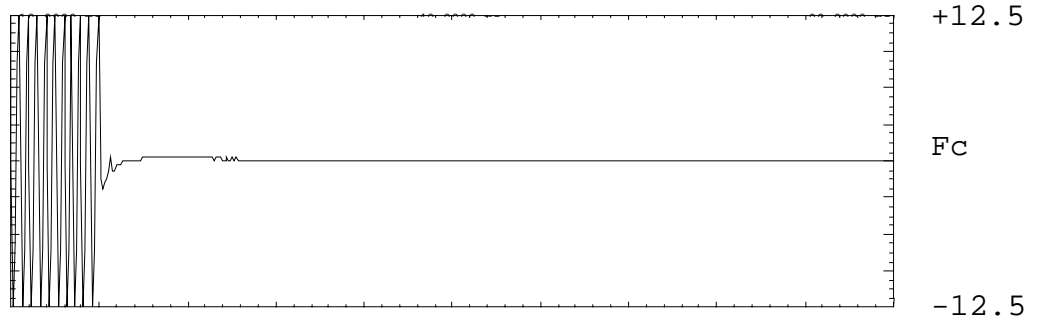
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NAME OF TEST: Transient Frequency Behavior  
g0090228: 2000-Sep-14 Thu 16:25:00  
STATE: 2:High Power



```

             Min:Max      Ref:Ref      Ref:Ref      Mod:
             10.000000  40.000000  1000000000  1000000000
             375.000000  0.000000  1.000000  2.000000
             Mod:Mod      Ref:
             10.000000  40.000000
             375.000000  0.000000
             1.000000  2.000000
             10.000000  40.000000

```

POWER:  
MODULATION:  
DESCRIPTION:

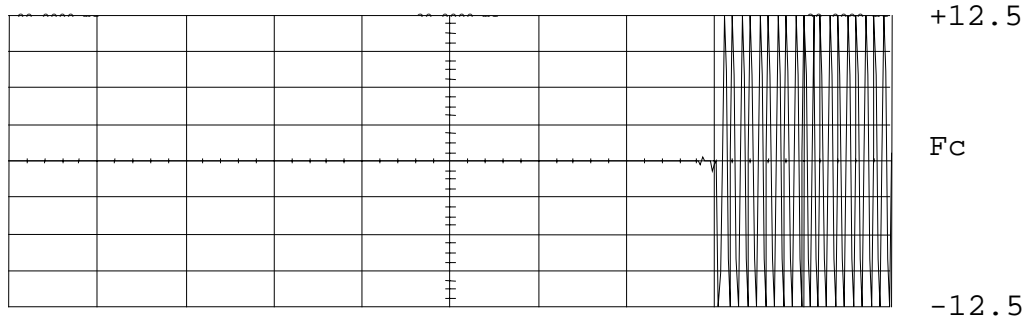
HIGH  
Ref Gen=12.5 kHz Deviation  
CARRIER ON TIME

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NAME OF TEST: Transient Frequency Behavior  
g0090229: 2000-Sep-14 Thu 16:27:00  
STATE: 2:High Power



```

             MinLevel      Resol(Res)  RefLevel  Mod-
             10.0 mV/div    20.0000 Hz   0.0000   0.0000
             -----
             Channel 1     Resolution  Offset    Scale    Units
             -----
             275 mV/div    0.00000  0.0000  1.000  1  dB (1M ohm)
             -----
             Modulation  Mode  Band
             -----
             20.000000  0.00  2000
             -----
             Span 2  143.250 MHz (Carrier Width 5.0MHz)
             10.00000  40.000 Hz

```

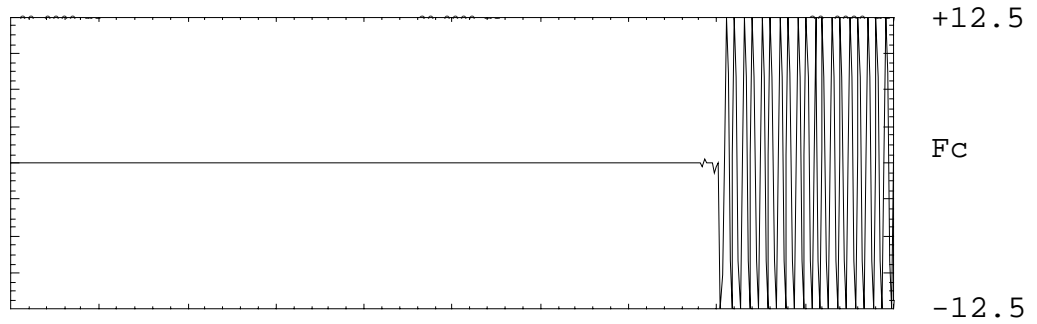
POWER: HIGH  
 MODULATION: Ref Gen=12.5 kHz Deviation  
 DESCRIPTION: CARRIER OFF TIME

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NAME OF TEST: Transient Frequency Behavior  
g0090230: 2000-Sep-14 Thu 16:27:00  
STATE: 2:High Power



```

Waveform Data:
-----
Wave: 10.0 ns/div, 20.0000 V, 1.000 1, 2 (1M ohm)
Channel 1: 275 ns/div, 0.0000 V, 1.000 1, 2 (1M ohm)
-----
Module: 143.250 MHz (Carrier)
Module: 40.000 MHz

```

POWER:  
MODULATION:  
DESCRIPTION:

HIGH  
Ref Gen=12.5 kHz Deviation  
CARRIER OFF TIME

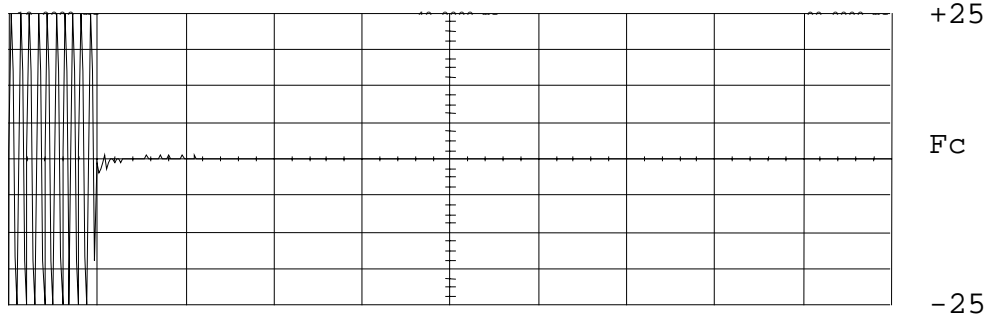
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NAME OF TEST: Transient Frequency Behavior  
g0090223: 2000-Sep-14 Thu 16:20:00  
STATE: 2:High Power



| Chan      | Min/Max   | Reflex/Dev | Reflex - | Mod        |
|-----------|-----------|------------|----------|------------|
| channel 1 | EE0 MW/Hz | 0.00000 V  | 1.000 1  | 2 (1M chn) |

Modulation mode: Freq  
 As measured: 2500 Hz  
 Modulation: Freq  
 Span: 4.000 MHz (center mode: 0.000)  
 Resolution: 40.000 Hz

POWER:  
MODULATION:  
DESCRIPTION:

HIGH  
Ref Gen=25 kHz Deviation  
CARRIER ON TIME

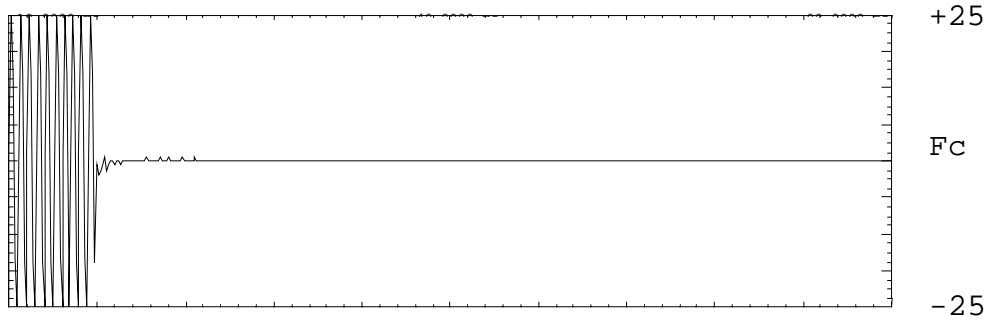
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NAME OF TEST: Transient Frequency Behavior  
g0090224: 2000-Sep-14 Thu 16:20:00  
STATE: 2:High Power



```

             Min/Max      Ref/Res      Ref/Res      Mod
             10.0 MHz/20  40.0000 Hz  1000000 Hz  1000000 Hz
             -----
             Channel 1    Resolution  25.0000 Hz  1.000 1 2 (1M ch)
             -----
             Modulation  Mod  Ref
             25.0000 MHz  40.0000
             Modulation  Ref
             40.000  25.0000 (1M ch)  1.000
             10.0000  40.0000 Hz

```

POWER:  
MODULATION:  
DESCRIPTION:

HIGH  
Ref Gen=25 kHz Deviation  
CARRIER ON TIME

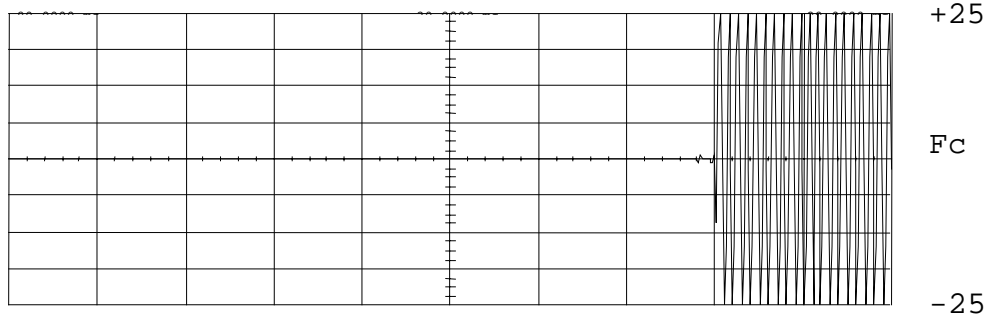
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NAME OF TEST: Transient Frequency Behavior  
g0090225: 2000-Sep-14 Thu 16:22:00  
STATE: 2:High Power



```

             Minibits  Rate/Sec  RefGen  Mod-
             10.0 MHz/div  30.0000 Hz  10000  1  2 (FM dev)

             Channel 1  Resolution  256000  1  1  2 (1M chn)

             Modulation  256  256
             As resolution 256  256
             Modulation  256
             256  256  256  256  256  256
             10.0 MHz/div  30.0000 Hz
  
```

POWER:  
MODULATION:  
DESCRIPTION:

HIGH  
Ref Gen=25 kHz Deviation  
CARRIER OFF TIME

SUPERVISED BY:

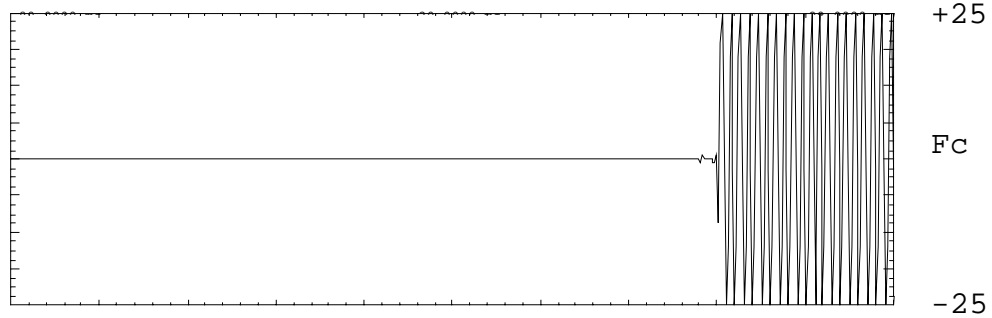
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NAME OF TEST: Transient Frequency Behavior  
g0090226: 2000-Sep-14 Thu 16:22:00  
STATE: 2:High Power



```

             Min/Max      Ref/Res      Ref/Res      Mod
             10.0 mV/div  20.0000 Hz  20.0000 Hz  2
-----
channel 1    Resolution    Offset      Scale      Position
             500.0 mV/div  0.00000 V  1.000 1    2 (1M ohm)

             Min/Max      Ref/Res      Ref/Res      Mod
             10.0 mV/div  20.0000 Hz  20.0000 Hz  2
-----
channel 1    Resolution    Offset      Scale      Position
             500.0 mV/div  0.00000 V  1.000 1    2 (1M ohm)

```

POWER:  
MODULATION:  
DESCRIPTION:

HIGH  
Ref Gen=25 kHz Deviation  
CARRIER OFF TIME

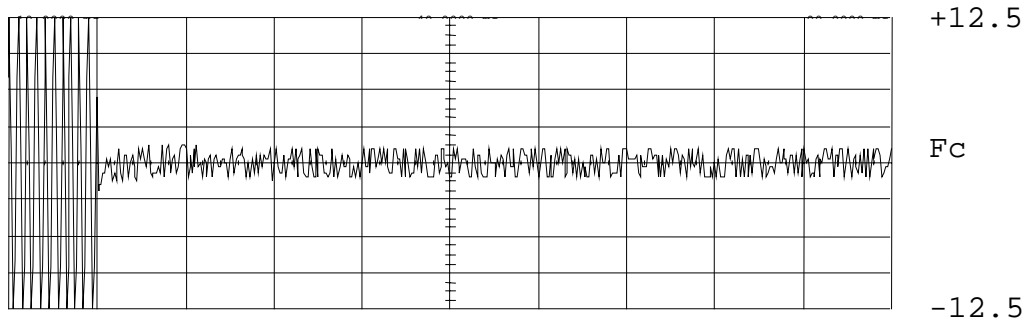
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NAME OF TEST: Transient Frequency Behavior  
g0090231: 2000-Sep-14 Thu 16:29:00  
STATE: 2:High Power



| Chan      | Min/Max     | Reflex/Dev | Reflex - | Mod        |
|-----------|-------------|------------|----------|------------|
| channel 1 | 975 MHz/div | 0.00000 V  | 1.000 1  | 2 (1M ohm) |

20.00000 MHz 0.00000 V  
 20.00000 MHz 0.00000 V  
 20.00000 MHz 0.00000 V  
 20.00000 MHz 0.00000 V

POWER:  
MODULATION:  
DESCRIPTION:

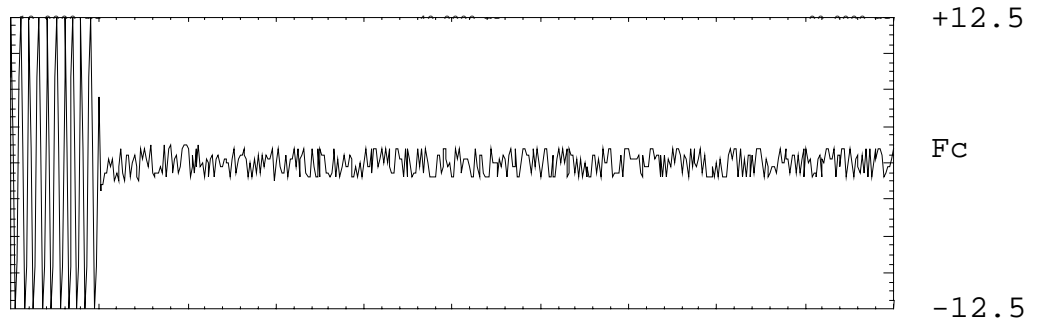
HIGH  
Ref Gen=12.5 kHz Deviation  
CARRIER ON TIME

SUPERVISED BY:

*Morton Flom P. Eng.*  
Morton Flom, P. Eng.

PAGE NO. 38 of 57.

NAME OF TEST: Transient Frequency Behavior  
g0090232: 2000-Sep-14 Thu 16:30:00  
STATE: 2:High Power



| Chan      | Min/Max     | Reflex/Dev | Reflex  | Mod        |
|-----------|-------------|------------|---------|------------|
| channel 1 | 975 MHz/div | 0.00000 V  | 1.000 1 | 2 (1M ohm) |

Time: 0.000000 - 0.000000  
Amplitude: 0.000000 - 0.000000  
Resolution: 1.000000  
Time: 0.000000 - 0.000000  
Amplitude: 0.000000 - 0.000000

POWER:  
MODULATION:  
DESCRIPTION:

HIGH  
Ref Gen=12.5 kHz Deviation  
CARRIER ON TIME

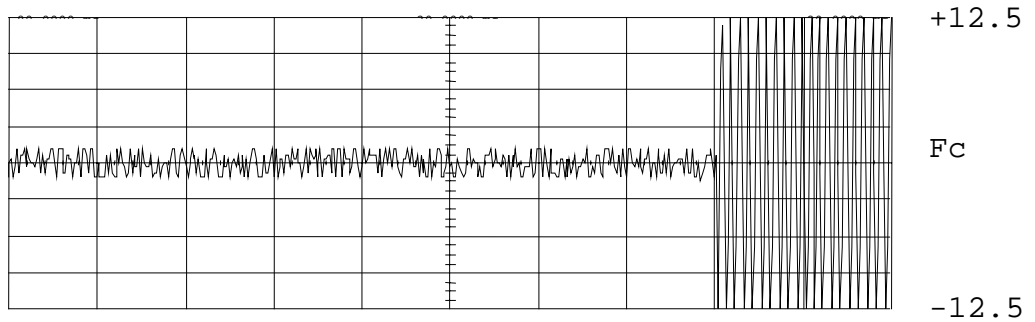
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PAGE NO.

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NAME OF TEST: Transient Frequency Behavior  
g0090233: 2000-Sep-14 Thu 16:31:00  
STATE: 2:High Power



```

             Minibits  Rate/Sec  RefGen  Mod-
File         10.0 MW/dm  30.0000  0.0000  0.0000
-----
Channel 1    275 MW/dm  0.0000  1.000  1  2 (1M chn)
-----
           Modulation  Rate
As Received Rate 0.0000
Modulation Rate 1
Rate 143.250 MHz (Carrier Mode 1.0M)
U-12-55 40.000 Hz

```

POWER:  
MODULATION:  
DESCRIPTION:

HIGH  
Ref Gen=12.5 kHz Deviation  
CARRIER OFF TIME

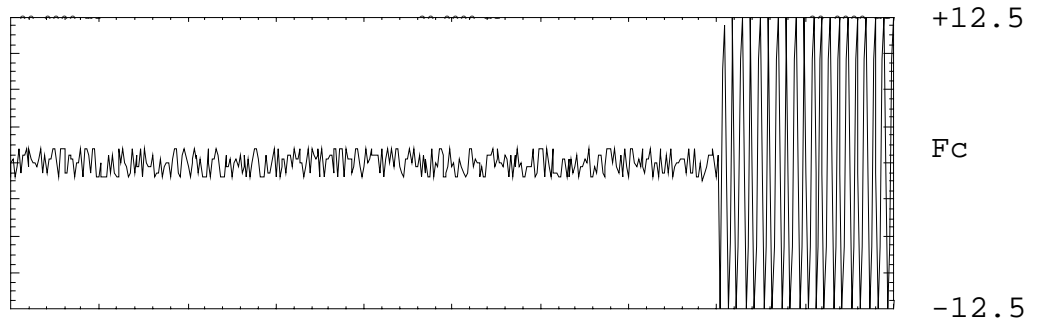
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NAME OF TEST: Transient Frequency Behavior  
g0090234: 2000-Sep-14 Thu 16:31:00  
STATE: 2:High Power



| Chan      | Min/Max      | Reflex/Dev | Reflex - | Mod       |
|-----------|--------------|------------|----------|-----------|
| 1         | 10.0 MHz/div | 20.0000 Hz | 0.0000   | 2 (1M ch) |
| channel 1 | 275 MHz/div  | 0.00000 Hz | 1.000 1  | 2 (1M ch) |

Modulation mode: FSK  
 Fc position: 8300.000 Hz  
 Modulation: FSK  
 FSK2: 143.250 MHz (carrier mode: FSK)  
 U-12-55: 40.000 Hz

POWER:  
MODULATION:  
DESCRIPTION:

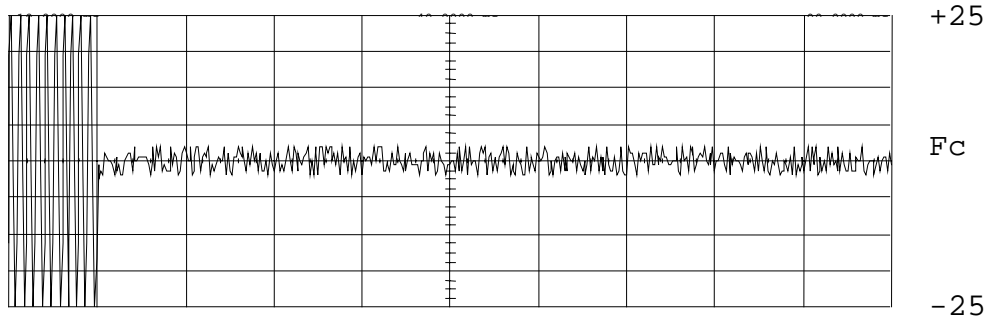
HIGH  
Ref Gen=12.5 kHz Deviation  
CARRIER OFF TIME

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PAGE NO. 41 of 57.

NAME OF TEST: Transient Frequency Behavior  
g0090235: 2000-Sep-14 Thu 16:36:00  
STATE: 2:High Power



| Chan      | Min/Max   | Reflex/Dev | Reflex - | Mod        |
|-----------|-----------|------------|----------|------------|
| channel 1 | EE0 MW/Hz | 0.00000 V  | 1.000 1  | 2 (1M chn) |

Modulation mode: Freq  
 No. Modulation Modes: 05  
 Modulation Rate: 1  
 Mod: 4.000 MHz (center mode 5.0MHz)  
 10-10-00 40.000 Hz

POWER:  
MODULATION:  
DESCRIPTION:

HIGH  
Ref Gen=25 kHz Deviation  
CARRIER ON TIME

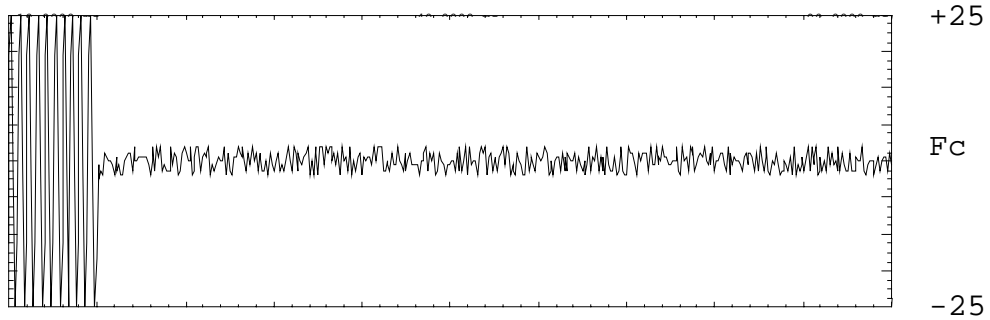
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NAME OF TEST: Transient Frequency Behavior  
g0090236: 2000-Sep-14 Thu 16:36:00  
STATE: 2:High Power



```

Wave      Min/Max      Rate/Sec      Refs     Mode
-----
channel 1  0.000000      0.000000      1.000  1  2 (1M ch)

-----
Waveform 0.00  0.00
As shown in 0.00  0.00
Waveform 0.00  0.00
Waveform 0.00  0.00
Waveform 0.00  0.00
Waveform 0.00  0.00

```

POWER:  
MODULATION:  
DESCRIPTION:

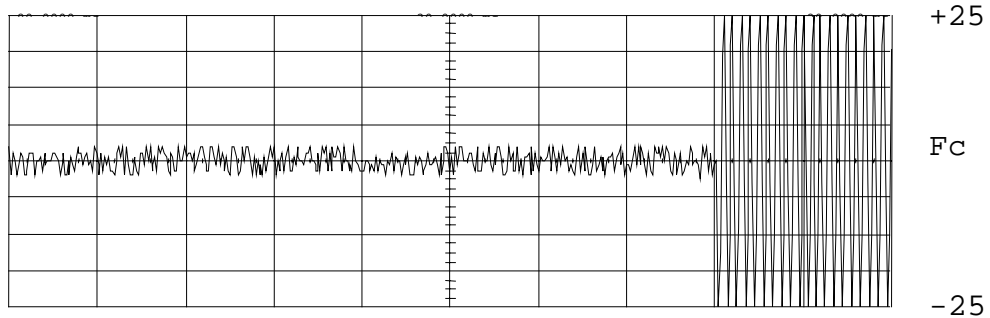
HIGH  
Ref Gen=25 kHz Deviation  
CARRIER ON TIME

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PAGE NO. 43 of 57.

NAME OF TEST: Transient Frequency Behavior  
 g0090237: 2000-Sep-14 Thu 16:38:00  
 STATE: 2:High Power



| Chan      | Min/Max   | Relat/Dev | Reflex  | Mod        |
|-----------|-----------|-----------|---------|------------|
| channel 1 | EE0 MW/Hz | 0.00000 V | 1.000 1 | 2 (1M chn) |

Modulation: 25 kHz  
 Ref Gen: 25 kHz  
 Carrier: 143.250 MHz  
 Modulation: 25 kHz

POWER:  
 MODULATION:  
 DESCRIPTION:

HIGH  
 Ref Gen=25 kHz Deviation  
 CARRIER OFF TIME

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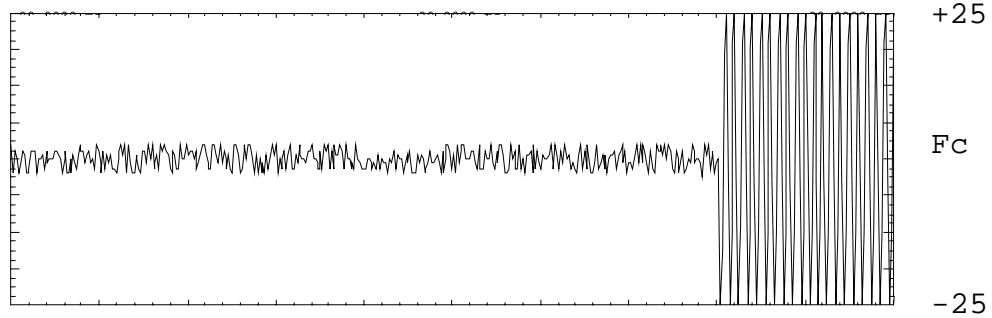
*Morton Flom P. Eng.*  
 Morton Flom, P. Eng.



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NAME OF TEST: Transient Frequency Behavior  
g0090238: 2000-Sep-14 Thu 16:38:00  
STATE: 2:High Power



```

             Minibases  Rate/Sec  RefGen -  Mod-
             10.0 MHz/Hz  20.0000 Hz  RefGen -  Mod-
             -----
             Channel 1  250.0000 MHz  0.00000 V  1.000  1  2 (1M chn)
             -----
             Modulation 250.0000 MHz
             Ref Gen=25 kHz Deviation
             CARRIER OFF TIME
             250.0000 MHz
             10.0000 Hz
  
```

POWER:  
MODULATION:  
DESCRIPTION:

HIGH  
Ref Gen=25 kHz Deviation  
CARRIER OFF TIME

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Morton Flom, P. Eng.

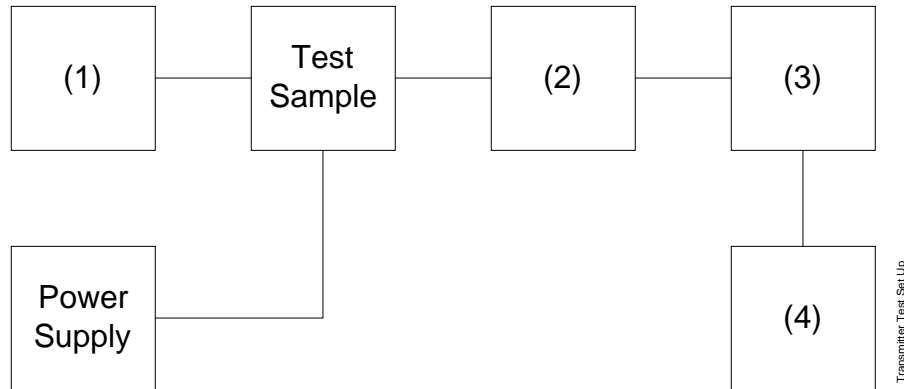
PAGE NO. 45 of 57.  
NAME OF TEST: Audio Low Pass Filter (Voice Input)  
SPECIFICATION: 47 CFR 2.1047(a)  
GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.15  
TEST EQUIPMENT: As per attached page

MEASUREMENT PROCEDURE

1. The EUT 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

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

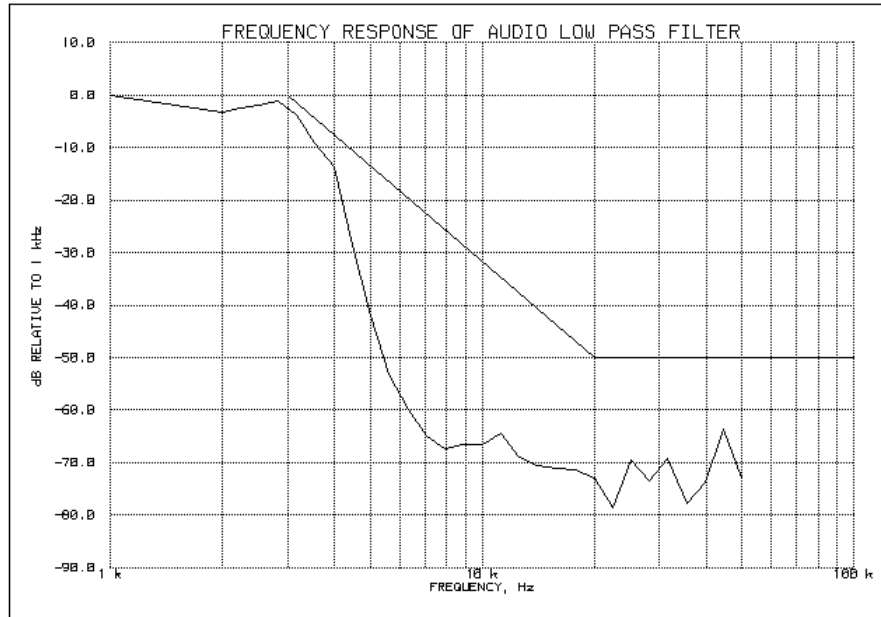


| Asset Description<br>(as applicable) | s/n        |
|--------------------------------------|------------|
| (1) <u>Audio Oscillator</u>          |            |
| i00010 HP 204D                       | 1105A04683 |
| i00017 HP 8903A                      | 2216A01753 |
| i00118 HP 33120A                     | US36002064 |
| (2) <u>COAXIAL ATTENUATOR</u>        |            |
| i00122 NARDA 766-10                  | 7802       |
| i00123 NARDA 766-10                  | 7802A      |
| i00113 SIERRA 661A-3D                | 1059       |
| i00069 BIRD 8329 (30 dB)             | 10066      |
| (3) <u>MODULATION ANALYZER</u>       |            |
| i00020 HP 8901A                      | 2105A01087 |
| (4) <u>AUDIO ANALYZER</u>            |            |
| i00017 HP 8903A                      | 2216A01753 |

PAGE NO.

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NAME OF TEST: Audio Low Pass Filter (Voice Input)  
g0090191: 2000-Sep-14 Thu 10:30:00  
STATE: 0:General



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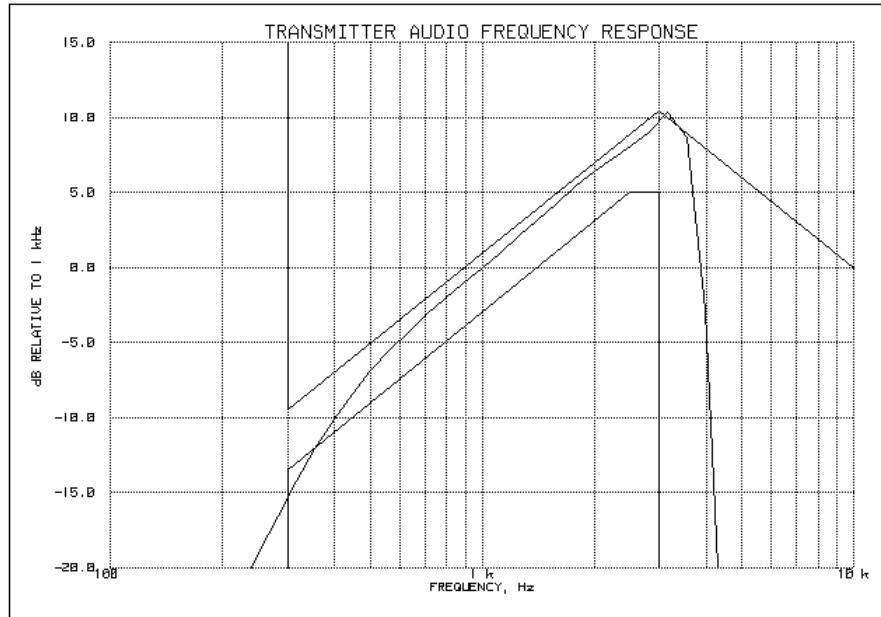
PAGE NO. 48 of 57.  
NAME OF TEST: Audio Frequency Response  
SPECIFICATION: 47 CFR 2.1047(a)  
GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.6  
TEST EQUIPMENT: As per previous page

MEASUREMENT PROCEDURE

1. The EUT 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 EUT.
3. The audio signal input was adjusted to obtain 20% 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

PAGE NO. 49 of 57.

NAME OF TEST: Audio Frequency Response  
 g0090190: 2000-Sep-14 Thu 10:27:00  
 STATE: 0:General



Frequency of Maximum Audio Response, Hz = 3160

Additional points:

| FREQUENCY, Hz | LEVEL, dB |
|---------------|-----------|
| 300           | -15.31    |
| 20000         | -31.79    |
| 30000         | -31.24    |
| 50000         | -32.14    |

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PAGE NO. 50 of 57.  
NAME OF TEST: Modulation Limiting  
SPECIFICATION: 47 CFR 2.1047(b)  
GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.3  
TEST EQUIPMENT: As per previous page

MEASUREMENT PROCEDURE

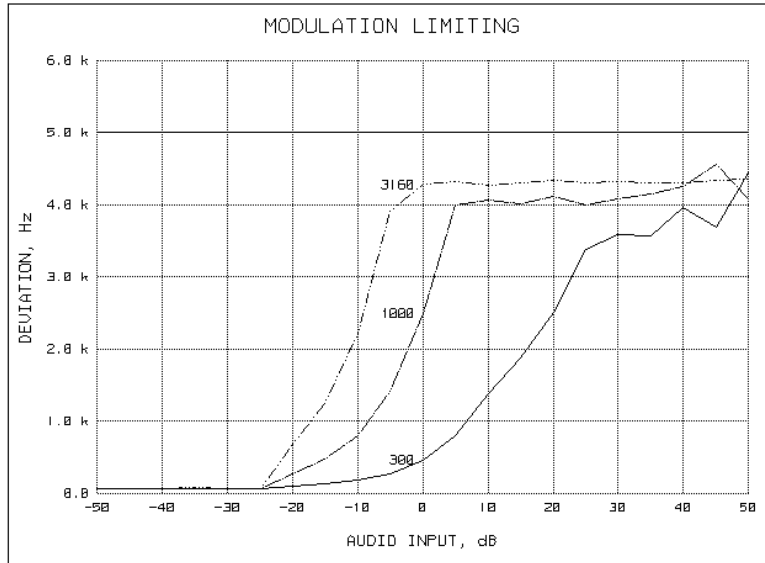
1. The signal generator was connected to the input of the EUT as for "Frequency Response of the Modulating Circuit."
2. The modulation response was measured for each of three frequencies (one of which was the frequency of maximum response), and the input voltage was varied and was observed on an HP 8901A Modulation Analyzer.
3. The input level was varied from 30% modulation ( $\pm 1.5$  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

PAGE NO.

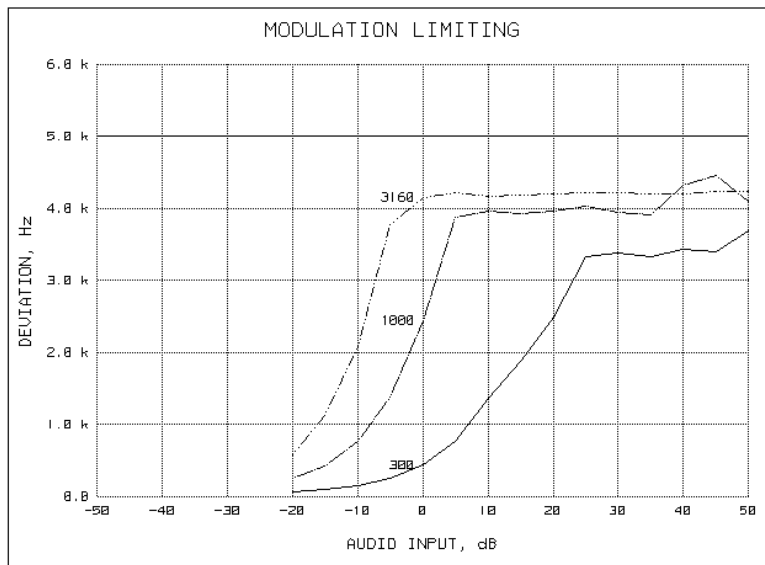
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NAME OF TEST: Modulation Limiting  
g0090197: 2000-Sep-14 Thu 10:38:00  
STATE: 0:General

Positive  
Peaks:



Negative  
Peaks:



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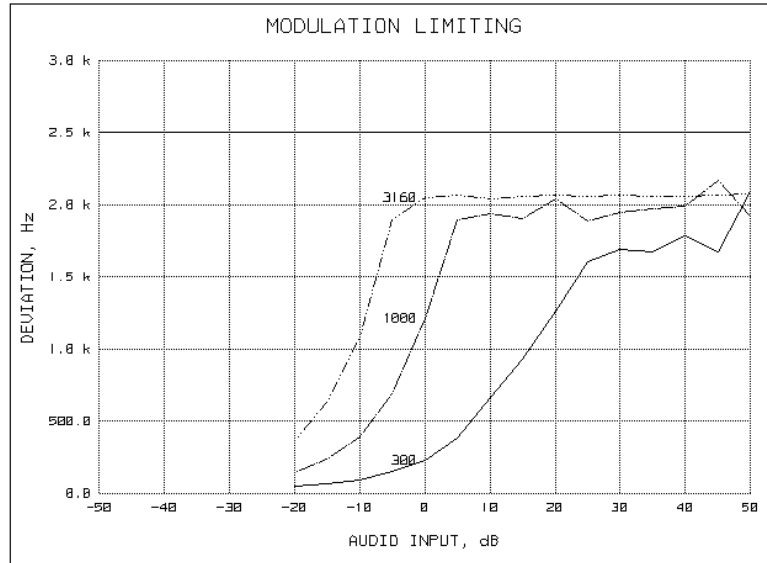


PAGE NO.

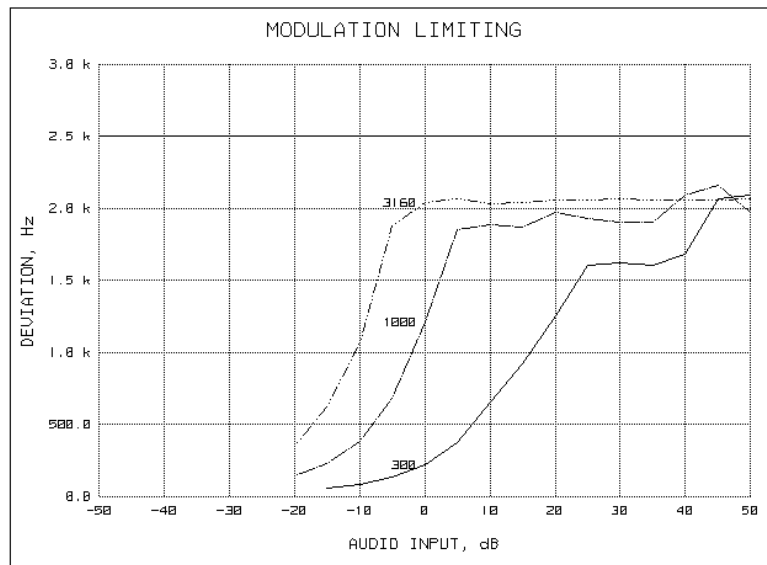
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NAME OF TEST: Modulation Limiting  
g0090199: 2000-Sep-14 Thu 10:46:00  
STATE: 0:General

Positive  
Peaks:



Negative  
Peaks:



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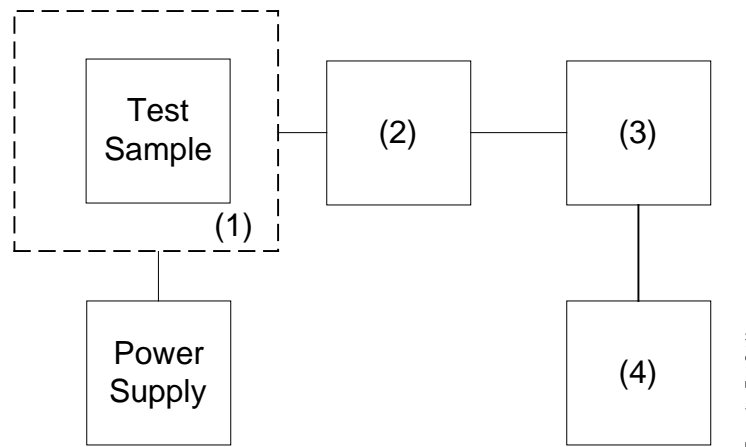
PAGE NO. 53 of 57.  
NAME OF TEST: Frequency Stability (Temperature Variation)  
SPECIFICATION: 47 CFR 2.1055(a)(1)  
GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.2  
TEST CONDITIONS: As Indicated  
TEST EQUIPMENT: As per previous page

MEASUREMENT PROCEDURE

1. The EUT and test equipment were set up as shown on the following page.
2. With all power removed, the temperature was decreased to -30°C and permitted to stabilize for three hours. Power was applied and the maximum change in frequency was noted within one minute.
3. With power OFF, the temperature was raised in 10°C steps. The sample was permitted to stabilize at each step for at least one-half hour. Power was applied and the maximum frequency change was noted within one minute.
4. The temperature tests were performed for the worst case.
5. MEASUREMENT RESULTS: ATTACHED

TRANSMITTER TEST SET-UP

- TEST A. OPERATIONAL STABILITY
- TEST B. CARRIER FREQUENCY STABILITY
- TEST C. OPERATIONAL PERFORMANCE STABILITY
- TEST D. HUMIDITY
- TEST E. VIBRATION
- TEST F. ENVIRONMENTAL TEMPERATURE
- TEST G. FREQUENCY STABILITY: TEMPERATURE VARIATION
- TEST H. FREQUENCY STABILITY: VOLTAGE VARIATION

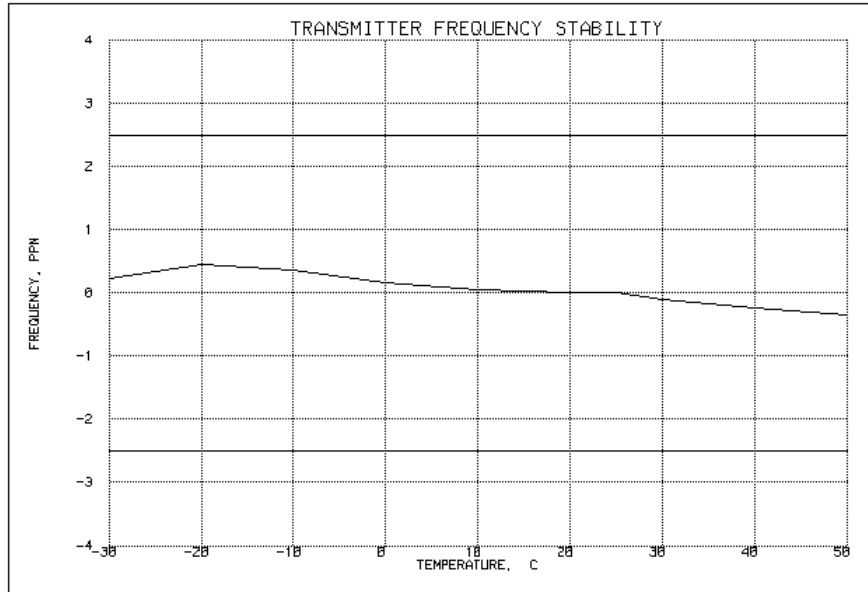


| Asset Description<br>(as applicable)        | s/n          |
|---|--------------|
| <u>(1) TEMPERATURE, HUMIDITY, VIBRATION</u> |              |
| i00027 Tenny Temp. Chamber                  | 9083-765-234 |
| i00 Weber Humidity Chamber                  |              |
| i00 L.A.B. RVH 18-100                       |              |
| <u>(2) COAXIAL ATTENUATOR</u>               |              |
| i00122 NARDA 766-10                         | 7802         |
| i00123 NARDA 766-10                         | 7802A        |
| i00113 SIERRA 661A-3D                       | 1059         |
| i00069 BIRD 8329 (30 dB)                    | 10066        |
| <u>(3) R.F. POWER</u>                       |              |
| i00014 HP 435A POWER METER                  | 1733A05839   |
| i00039 HP 436A POWER METER                  | 2709A26776   |
| i00020 HP 8901A POWER MODE                  | 2105A01087   |
| <u>(4) FREQUENCY COUNTER</u>                |              |
| i00042 HP 5383A                             | 1628A00959   |
| i00019 HP 5334B                             | 2704A00347   |
| i00020 HP 8901A                             | 2105A01087   |

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NAME OF TEST: Frequency Stability (Temperature Variation)  
g0090207: 2000-Sep-14 Thu 16:47:00  
STATE: 0:General



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PAGE NO. 56 of 57.  
NAME OF TEST: Frequency Stability (Voltage Variation)  
SPECIFICATION: 47 CFR 2.1055(b)(1)  
GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.2  
TEST EQUIPMENT: As per previous page

MEASUREMENT PROCEDURE

1. The EUT was placed in a temperature chamber at 25±5°C and connected as for "Frequency Stability - Temperature Variation" test.
2. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.
3. The variation in frequency was measured for the worst case.

RESULTS: Frequency Stability (Voltage Variation)  
g0090210: 2000-Sep-14 Thu 11:11:27  
STATE: 0:General

LIMIT, ppm = 2.5  
LIMIT, Hz = 1247  
BATTERY END POINT (Voltage) = 10

| % of STV | Voltage | Frequency, MHz | Change, Hz | Change, ppm |
|----------|---------|----------------|------------|-------------|
| 85       | 11.56   | 498.600010     | 10         | 0.02        |
| 100      | 13.6    | 498.600000     | 0          | 0.00        |
| 115      | 15.64   | 498.600030     | 30         | 0.06        |
| 74       | 10      | 498.600610     | 610        | 1.22        |

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NAME OF TEST: Necessary Bandwidth and Emission Bandwidth

SPECIFICATION: 47 CFR 2.202(g)

MODULATION = 16K0F3E

NECESSARY BANDWIDTH CALCULATION:

MAXIMUM MODULATION (M), kHz = 3  
 MAXIMUM DEVIATION (D), kHz = 5  
 CONSTANT FACTOR (K) = 1  
 NECESSARY BANDWIDTH (B<sub>N</sub>), kHz = (2xM)+(2xDxK)  
 = 16.0

MODULATION = 11K0F3E

NECESSARY BANDWIDTH CALCULATION:

MAXIMUM MODULATION (M), kHz = 3  
 MAXIMUM DEVIATION (D), kHz = 2.5  
 CONSTANT FACTOR (K) = 1  
 NECESSARY BANDWIDTH (B<sub>N</sub>), kHz = (2xM)+(2xDxK)  
 = 11.0

MODULATION = 19K2F1D

NECESSARY BANDWIDTH CALCULATION:

MAXIMUM MODULATION (M), kHz = 3  
 MAXIMUM DEVIATION (D), kHz = 5  
 CONSTANT FACTOR (K) = 1.3  
 NECESSARY BANDWIDTH (B<sub>N</sub>), kHz = (2xM)+(2xDxK)  
 = 19.2

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Morton Flom, P. Eng.

TESTIMONIAL  
AND  
STATEMENT OF CERTIFICATION

THIS IS TO CERTIFY THAT:

1. THAT the application was prepared either by, or under the direct supervision of, the undersigned.
2. THAT the technical data supplied with the application was taken under my direction and supervision.
3. THAT the data was obtained on representative units, randomly selected.
4. THAT, to the best of my knowledge and belief, the facts set forth in the application and accompanying technical data are true and correct.

CERTIFYING ENGINEER:



Morton Flom, P. Eng.