

# FEDERAL COMMUNICATIONS COMMISSION

Approved by OMB  
3060-0057

# FCC FORM 731

## APPLICATION FOR EQUIPMENT AUTHORIZATION

For  
FCC  
use  
only

### SECTION I - ALL ITEMS IN THIS SECTION MUST BE COMPLETED

|  |                                      |  |   |
|--|--------------------------------------|--|---|
| 1. Applicant's complete, legal business name<br><b>TELEX COMMUNICATIONS, INC.</b>  |                                      | <input type="checkbox"/> Check here if this is a change in name and/or address not previously reported (See 47 CFR §2.934) |   |
| 2. Applicant's mailing address (Line 1)<br><b>8601 E. Cornhusker Highway</b>   |                                      | Bureau Use Only<br>Equipment Code:   |   |
| Applicant's mailing address (Line 2) (if required)<br><b>P.O. Box 5579</b>   |                                      | Engineer:  |   |
| City<br><b>Lincoln,</b>  |                                      | Examiner:  |   |
| State or Country (if foreign address)<br><b>Nebraska</b>   | ZIP/Postal Code<br><b>68505 5579</b> | 3. FCC ID:<br>(a) Grantee Code<br><b>B 5 D</b>   | (b) Equipment Product Code<br>(14 characters maximum, show zeros as 0)<br><b>M511</b> |
| 4. Name, Title and Mail Stop, if any, of person at the applicant's address to receive grant, or for contact: (See instructions)<br><b>Charlie Conner, Project Engineer</b> |                                      |  |   |
| 5.(a) Telephone No. (Area/Country/City code, No. and Ext.)<br><b>402 467 5321</b>  |                                      | (b) FAX No. (Area/Country/City code and No.)<br><b>402 467 3279</b>  |   |
| (c) Internet e-mail address: <b>Charlie.conner@telex.com</b>   |                                      |  |   |

### SECTION II - See 47 CFR §1.1103 for Fee Type Codes and Fees. Fee Type Codes are listed in Paragraph C of the attached instructions.

Enter in Column (A) the correct Fee Type Code for the service for which you are applying. Enter in Column (B) the result obtained from multiplying the Fee amount for the Fee Type Code in Column (A) by the number entered in Column (B). If requesting more than ONE service, enter additional Fee Type Code(s) in Section III below.

| (A)  | (B) | (C) | FOR FCC USE ONLY |   |   |   |   |   |  |  |
|--|-----|-----|------------------|---|---|---|---|---|--|--|
| (1) FEE TYPE CODE<br><table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td>E</td><td>F</td><td>T</td></tr></table> | E   | F   | T                | FEE MULTIPLE<br><table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td>0</td><td>0</td><td>0</td><td>1</td></tr></table> | 0 | 0 | 0 | 1 | FEE DUE FOR FEE TYPE CODE IN COLUMN (A)<br>\$ 475.00 |  |
| E  | F   | T   |                  |   |   |   |   |   |  |  |
| 0  | 0   | 0   | 1                |   |   |   |   |   |  |  |

### SECTION III - Use when requesting more than one service. If only one service is requested, complete only Section II and Section III, Item (5).

| (A)   | (B)          | (C)                                     | FOR FCC USE ONLY                                      |   |   |   |   |   |   |  |
|---|--------------|---|---|---|---|---|---|---|---|--|
| FEE TYPE CODE   | FEE MULTIPLE | FEE DUE FOR FEE TYPE CODE IN COLUMN (A) |   |   |   |   |   |   |   |  |
| (2) <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td> </td><td> </td><td> </td></tr></table>   |              |   |   | <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td>0</td><td>0</td><td>0</td><td>1</td></tr></table> | 0 | 0 | 0 | 1 | \$ <table border="1" style="display: inline-table; border-collapse: collapse; width: 100px; height: 20px;"></table> |  |
|   |              |   |   |   |   |   |   |   |   |  |
| 0   | 0            | 0                                       | 1   |   |   |   |   |   |   |  |
| (3) <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td> </td><td> </td><td> </td></tr></table>   |              |   |   | <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td>0</td><td>0</td><td>0</td><td>1</td></tr></table> | 0 | 0 | 0 | 1 | \$ <table border="1" style="display: inline-table; border-collapse: collapse; width: 100px; height: 20px;"></table> |  |
|   |              |   |   |   |   |   |   |   |   |  |
| 0   | 0            | 0                                       | 1   |   |   |   |   |   |   |  |
| (4) <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td> </td><td> </td><td> </td></tr></table>   |              |   |   | <table border="1" style="display: inline-table; border-collapse: collapse;"><tr><td>0</td><td>0</td><td>0</td><td>1</td></tr></table> | 0 | 0 | 0 | 1 | \$ <table border="1" style="display: inline-table; border-collapse: collapse; width: 100px; height: 20px;"></table> |  |
|   |              |   |   |   |   |   |   |   |   |  |
| 0   | 0            | 0                                       | 1   |   |   |   |   |   |   |  |
| Add all amounts shown in column C, lines (1) through (4), and enter the total here.<br>(5) This amount should equal your enclosed remittance. <span style="font-size: 2em;">→</span>          |              |   |   |   |   |   |   |   |   |  |
| <table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td>TOTAL AMOUNT REMITTED WITH THIS APPLICATION OR FILING</td> </tr> <tr> <td>\$ 475.00</td> </tr> </table> |              |   | TOTAL AMOUNT REMITTED WITH THIS APPLICATION OR FILING | \$ 475.00   |   |   |   |   |   |  |
| TOTAL AMOUNT REMITTED WITH THIS APPLICATION OR FILING   |              |   |   |   |   |   |   |   |   |  |
| \$ 475.00   |              |   |   |   |   |   |   |   |   |  |

**SECTION IV - Enter FCC ID from Page 1, Section I**

B5DM511

1.(a) Instead of Applicant, FCC is authorized to mail original Grant to: (See instructions)  
 Firm name, **M. FLOM ASSOCIATES, INC.**  
 number, street, **3356 N. San Marcos Place, Suite 107**  
 City, State/Country, **CHANDLER, ARIZONA, U.S.A.**  
 ZIP/Postal Code **85228-1571**

(b) Name, Title and Mail Stop, if any, of person at above address to receive Grant: (If 1.(a) is completed, this item must be completed)  
**MORTON FLOM, P. Eng., President**

|   |   |   |
|---|---|---|
| 2.(a) Technical contact:<br>Firm name,<br>contact person,<br>number, street,<br>City, State/Country,<br>ZIP/Postal Code | <b>M. FLOM ASSOCIATES, INC.<br/>MORTON FLOM, President<br/>3356 No. San Marcos Place, #107<br/>CHANDLER, ARIZONA, U.S.A.<br/>85225 1571</b> | (b) Telephone No. (Area/Country/City code, No. and Ext.)<br><b>1 480 926 3100</b> |
|   |   | (c) FAX No. (Area/Country/City code and No.)<br><b>1 480 926 3598</b>             |

(d) Internet e-mail address: **www.mflom.com** e-mail: **general@mflom.com**

|   |   |  |
|---|---|--|
| 2.(a) Non-Technical contact:<br>Firm name,<br>contact person,<br>number, street,<br>City, State/Country,<br>ZIP/Postal Code | <b>M. FLOM ASSOCIATES, INC.<br/>MORTON FLOM, President<br/>3356 No. San Marcos Place, #107<br/>CHANDLER, ARIZONA, U.S.A.<br/>85225 1571</b> | (f) Telephone No. (Area/Country/City code, No. and Ext.)<br><b>1 480: 926 3100</b> |
|   |   | (g) FAX No. (Area/Country/City code and No.)<br><b>1 480: 926 3598</b>             |

(h) Internet e-mail address: **www.mflom.com** e-mail: **general@mflom.com**

3. Does this application include a request for confidentiality for any portion(s) of the data contained in this application pursuant to 47 CFR §0.459 of the Commission's Rules? *If "Yes" see instructions.*  Yes  No

4. Does the applicant request that the Commission defer grant of this application pursuant to 47 CFR §0.457(d)(1)(ii)? (See instructions)  Yes  No

5. Type of equipment authorization requested: (check one box only)  Certification  Type Acceptance  Notification

6.(a) Equipment Code and description: (See instructions, page 4)  T  N  B Wireless Microphone Base Station  
 (b) Equipment will be operated under FCC Rule Part(s): 74

7. Application is for: (Check one box only)

|   |  |  |
|---|--|--|
| <input checked="" type="checkbox"/> 1. Original equipment<br>(See instructions) | <input type="checkbox"/> 2. Change in identification of presently authorized equipment<br><br>ORIGINAL FCC ID _____ Grant date _____ | <input type="checkbox"/> 3. Class II permissive change or modification of presently authorized equipment<br>(See instructions) |
|---|--|--|

8. EQUIPMENT SPECIFICATIONS: (See instructions)

| (a) Frequency range in MHz | (b) Rated RF power output in watts | (c) Frequency tolerance %, Hz, ppm | (d) Emission designator (See 47 CFR §2.201 and §2.202) | (e) Microprocessor mode number |
|----------------------------|------------------------------------|------------------------------------|--|--------------------------------|
| 174 - 216                  | 0.050 Watts                        | 50 ppm                             | 20K0F3E  | -                              |

9. Is the equipment in this application:  
 (a) a composite device subject to more than one type of equipment authorization?  Yes  No

(b) part of a system that operates with, or is marketed with, another device that requires an equipment authorization?  Yes  No

If either of the above questions is answered "Yes" complete items 10.(a) and (b). (See instructions)

**SECTION IV (continued) - Enter FCC ID from Page 1, Section I**

B5DM511

10.(a) Additional type of equipment authorization required:  Certification  Type Acceptance  Notification

(b) The related application checked in item 10.(a) (Check one box only)

- has been filed at the same time as this application under the FCC ID listed below
- has been granted under the FCC ID listed below
- is in the process of being filed under the FCC ID listed below
- is pending with the FCC under the FCC ID listed below

**FCC ID**

11.(a) Name of test firm on file with the FCC, if different from applicant or contact person:

**M. FLOM ASSOCIATES, INC. (FCC FILE: 31040/SIT)**

|  |  |
|--|--|
| (b) Mailing address, number, street, City, State/Country, ZIP/Postal Code<br><b>3356 N. San Marcos Place #107<br/>                 CHANDLER, ARIZONA, U.S.A.<br/>                 85225-1571</b> | (c) Telephone No. (Area/Country/City code, No. and Ext.)<br><b>1 480: 926 3100</b> |
|  | (d) FAX No. (Area/Country/City code and No.)<br><b>1 480: 926 3598</b>             |

(e) Internet e-mail address: **www.mflom.com** e-mail: **general@mflom.com**

12. Number of exhibits submitted with this application: \_\_\_\_\_

**SECTION V - Read each certification carefully before answering and signing this application.**

**WILLFUL FALSE STATEMENTS MADE ON THIS FORM ARE PUNISHABLE BY FINE AND/OR IMPRISONMENT (U.S. CODE, TITLE 18, SECTION 1001), AND/OR REVOCATION OF ANY STATION LICENSE OR CONSTRUCTION PERMIT (U.S. CODE, TITLE 47, SECTION 312(a)(1)), AND/OR FORFEITURE (U.S. CODE, TITLE 47, SECTION 503).**

**1. SECTION 5301 (ANTI-DRUG ABUSE) CERTIFICATION:**

The applicant must certify that neither the applicant nor any party to the application is subject to a denial of Federal benefits, that include FCC benefits, pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. §862 because of a conviction for possession or distribution of a controlled substance. See 47 CFR 1.2002(b) for the definition of a "party" for these purposes.

Does the applicant or authorized agent so certify?  Yes  No

**2.(a) APPLICANT/AGENT CERTIFICATION:**

I certify that I am authorized to sign this application. All of the statements herein and the exhibits attached hereto, are true and correct to the best of my knowledge and belief. In accepting a Grant of Equipment Authorization issued by the FCC as a result of the representations made in this application, the applicant is responsible for (1) labeling the equipment with the exact FCC ID specified in this application, (2) compliance statement labeling pursuant to the applicable rules, and (3) compliance of the equipment with the applicable technical rules. If the applicant is not the actual manufacturer of the equipment, appropriate arrangements have been made with the manufacturer to ensure that production units of this equipment will continue to comply with the FCC's technical requirements.

Authorizing an agent to sign this application, is done solely at the applicant's discretion; however, the applicant remains responsible for all statements in this application.

If an agent has signed this application on behalf of the applicant, a written letter of authorization which includes information to enable the agent to respond to the above Section 5301 (Anti-Drug Abuse) Certification statement has been provided by the applicant. It is understood that the letter of authorization must be submitted to the FCC upon request, and that the FCC reserves the right to contact the applicant directly at any time.



Original written signature of authorized signer  
**MORTON FLOM, P. Eng., President**

or  
 ▲ Typed/printed name of authorized signer

October 28, 1999

▲ Date (Month, Day, Year)

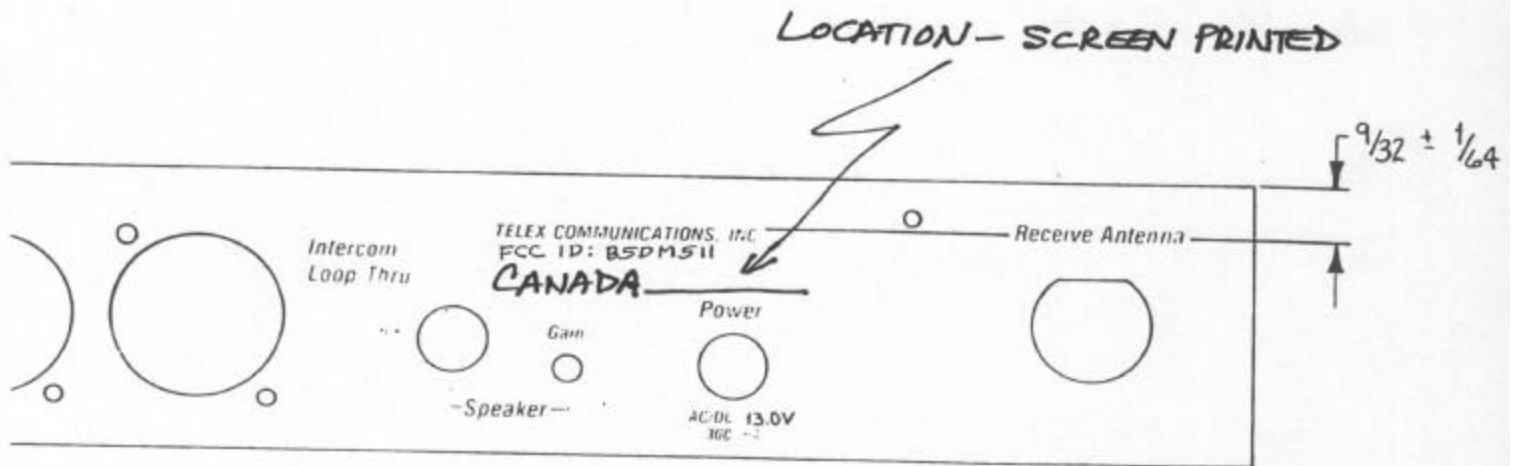
**PRESIDENT -or- Director-Operations**

▲ Title of authorized signer

▼ Complete items below if an agent signs the application.

|   |  |
|---|--|
| (b) Agent's business name, number, street, City, State/Country, ZIP/Postal Code<br><b>M. FLOM ASSOCIATES, INC.<br/>                 3356 N. San Marcos Place, #107<br/>                 Chandler, Arizona, U.S.A.<br/>                 85225-1571</b> | (c) Telephone No. (Area/Country/City code, No. and Ext.)<br><b>1 480: 926-3100</b> |
|   | (d) FAX No. (Area/Country/City code and No.)<br><b>1 480: 926-3598</b>             |

(e) Internet e-mail address: **www.mflom.com** e-mail: **general@mflom.com**



| DESCRIPTION |        | ITEM        | PART NO.   | SPECIFICATION |
|-------------|--------|-------------|--|---------------|
| 3<br>SE     | DATE   | 7-13-99     | <b>TELEX hy-gain</b><br>TELEX COMMUNICATIONS, INC.<br>1000 W. 10th St. - 100 |               |
|             | DR BY  | J. WARNER   |  |               |
|             | CHK BY |             | TITLE  |               |
|             | APPD.  | JRC 7-13-99 | CHASSIS ASSEMBLY, BTR-300A   |               |
|             | PROD.  |             | FCC ID, CANADA, LABEL & LOCATION   |               |
| CONTRACT    |        | SIZE        | CODE IDENT   | DWG. NO.      |
|             |        | D           | 57010  | X-300A        |
| SCALE       |        |             | SHEET 1-1  |               |

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

APPLICANT: Telex Communications, Inc.

FCC ID: B5DM511

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
5. PART 90.203(e) & (g) ATTESTATION

BY M.F.A. INC.

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

**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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Sub-part  
2.1033(c) :

EQUIPMENT IDENTIFICATION

FCC ID: B5DM511

NAMEPLATE DRAWING

ATTACHED, EXHIBIT 1.

LOCATION

AS PER LABEL DRAWING(S)

DATE OF REPORT

October 27, 1999

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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PAGE NO. 1 of 27.

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: d99a0099
- d) Client: Telex Communications, Inc.  
 8601 E. Cornhusker Highway  
 P.O. Box 5579  
 Lincoln, NE 68505-5579
- e) Identification: BTR-300A  
 FCC ID: B5DM511  
 Description: Wireless Microphone Base Station
- f) EUT Condition: Not required unless specified in individual tests.
- g) Report Date: October 27, 1999  
 EUT Received: October 13, 1999
- 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.

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LIST OF GENERAL INFORMATION REQUIRED FOR CERTIFICATIONIN ACCORDANCE WITH FCC RULES AND REGULATIONS,  
VOLUME II, PART 2 AND TO

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Sub-part 2.1033(c) (1): NAME AND ADDRESS OF APPLICANT:Telex Communications, Inc.  
8601 E. Cornhusker Highway  
P.O. Box 5579  
Lincoln, NE 68505-5579MANUFACTURER:

Applicant

(c) (2): FCC ID: B5DM511MODEL NO: BTR-300A(c) (3): INSTRUCTION MANUAL(S):

PLEASE SEE ATTACHED EXHIBITS

(c) (4): TYPE OF EMISSION: 20K0F3E(c) (5): FREQUENCY RANGE, MHz: 174 to 216(c) (6): POWER RATING, Watts: 0.050  
Switchable Variable x N/A(c) (7): MAXIMUM POWER RATING, Watts:

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 Blaylock*  
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 FOR ISO/IEC GUIDE 25:1990 (A2LA 1008.01)**

**M. FLOM ASSOCIATES, INC.**  
Electronics Testing Laboratory  
2126 North Oak Meadow Place, Suite 107  
Chandler, AZ 85224-1771  
Market Place Phone: 480-975-7100

**03 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 ISO/IEC 17025:1999 SCOPE:

| Tests                   | Standards  |
|-------------------------|--|
| RF Disturbance          | FCC Part 15 (Subpart B) Field Emission, ANSI C63.4-1992, CISPR 11, CISPR 12, CISPR 15, CISPR 22, IEC 57011, IEC 57012, IEC 57014, IEC 57015, IEC 57016-1, IEC 57016-2, FCC Part 18, FCC Part 19, ANSI C63.10-1, ANSI C63.10-2, ANSI C63.10-3, ANSI C63.10-4  |
| RF Immunity             | EN 55022-1, EN 55022-2, ANSI C63.10-1  |
| Radiated Susceptibility | EN 55024-1-1, IEC 55024, EN 55024-2, IEC 55024-2, IEC 55025  |
| ESD                     | IEC 61000-4-2, IEC 61000-4-3, IEC 61010-2  |
| IEFT                    | IEC 61000-4-4, IEC 61000-4-5, IEC 61010-4  |
| Surge                   | IEC 61000-4-5, IEC 61010-4, IEC 61010-5, IEC 61010-6   |
| RF (FEM) (EMC)          | 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100 |

*Peter Blaylock*

5300 Redwood Forest Place, Suite 350 • Frederick, MD 21704-6207 • Phone: 301-444-2200 • Fax: 301-444-2824

"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 be 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 = 12 - 14 Vdc and 13 Vac

(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
- x 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
- \_\_\_ 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, 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 27.  
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 = 177.7987

| <u>POWER SETTING</u> | <u>R. F. POWER, WATTS</u> |
|----------------------|---------------------------|
| High                 | 0.050                     |

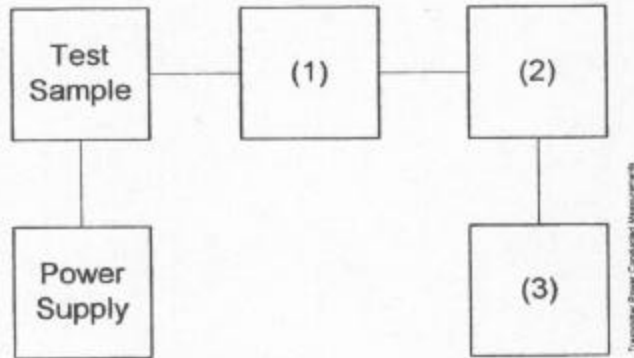
SUPERVISED BY:

*Morton Flom P. Eng.*

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 27.  
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 = 177.7987  
 SPECTRUM SEARCHED, GHz = 0 to 10 x F<sub>c</sub>  
 MAXIMUM RESPONSE, Hz = 5010  
 ALL OTHER EMISSIONS = ≥ 20 dB BELOW LIMIT  
 LIMIT(S), dBc  
 $-(43+10 \times \text{LOG } P) = -30 \text{ (0.05 Watts)}$

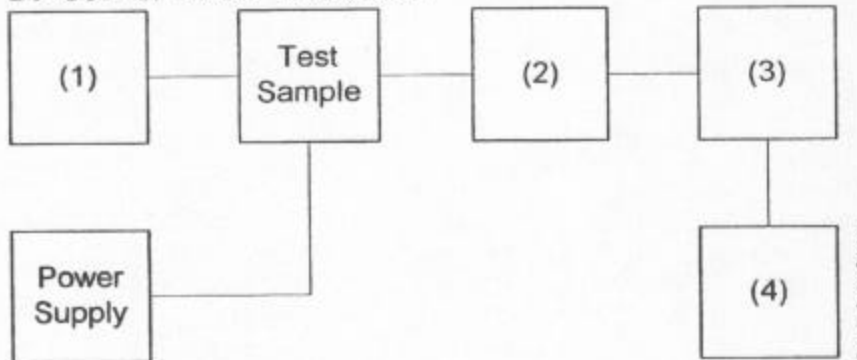
SUPERVISED BY:

*Morton Flom P. Eng.*

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        |
|---------------------------------------|------------|
| (1) <u>AUDIO OSCILLATOR/GENERATOR</u> |            |
| i00010 HP 204D                        | 1105A04683 |
| i00017 HP 8903A                       | 2216A01753 |
| i00012 HP 3312A                       | 1432A11250 |
| (2) <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       |
| (3) <u>FILTERS; NOTCH, HP, LP, BP</u> |            |
| i00126 Eagle TNF-1                    | 100-250    |
| i00125 Eagle TNF-1                    | 50-60      |
| i00124 Eagle TNF-1                    | 250-850    |
| (4) <u>SPECTRUM ANALYZER</u>          |            |
| i00048 HP 8566B                       | 2511A01467 |
| i00029 HP 8563E                       | 3213A00104 |

PAGE NO. 11 of 27.

NAME OF TEST: Unwanted Emissions (Transmitter Conducted)  
 g99a0314: 1999-Oct-22 Fri 15:51:00  
 STATE: 2:High Power

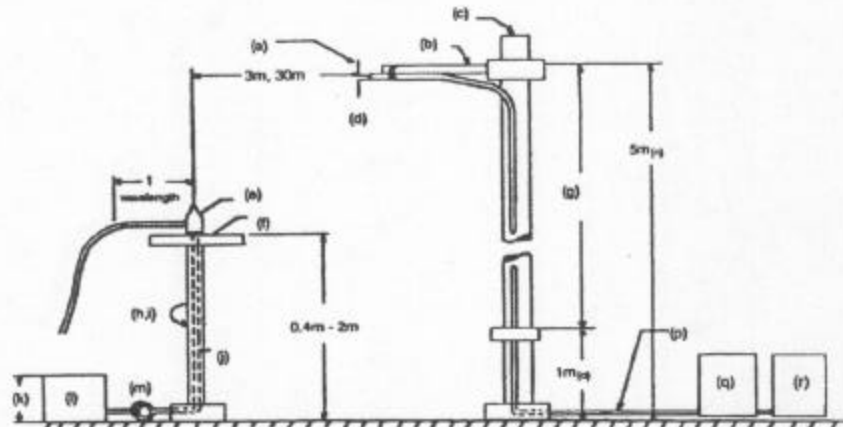
| FREQUENCY TUNED,<br>MHz | FREQUENCY<br>EMISSION, MHz | LEVEL, dBm | LEVEL, dBc | MARGIN, dB |
|-------------------------|----------------------------|------------|------------|------------|
| 177.798700              | 355.599067                 | -41        | -56.5      | -21        |
| 177.798700              | 533.402767                 | -58.7      | -74.2      | -38.7      |
| 177.798700              | 710.744800                 | -59.3      | -74.8      | -39.3      |
| 177.798700              | 888.990167                 | -50.3      | -65.8      | -30.3      |
| 177.798700              | 1066.798867                | -53.5      | -69        | -33.5      |
| 177.798700              | 1244.804233                | -59.2      | -74.7      | -39.2      |
| 177.798700              | 1422.887933                | -58        | -73.5      | -38        |
| 177.798700              | 1600.663300                | -58.5      | -74        | -38.5      |
| 177.798700              | 1777.905333                | -59.8      | -75.3      | -39.8      |
| 177.798700              | 1955.827367                | -58.8      | -74.3      | -38.8      |
| 177.798700              | 2134.027733                | -58.8      | -74.3      | -38.8      |
| 177.798700              | 2311.403100                | -55.7      | -71.2      | -35.7      |
| 177.798700              | 2489.113467                | -57.2      | -72.7      | -37.2      |
| 177.798700              | 2666.905500                | -57.8      | -73.3      | -37.8      |

PAGE NO. 12 of 27.  
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 2000.
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 |
|--------------------------------------|------------|--------|----------|
| <u>TRANSDUCER</u>                    |            |        |          |
| i00088 EMCO 3109-B 25MHz-300MHz      | 2336       | 12 mo. | Sep-99   |
| i00065 EMCO 3301-B Active Monopole   | 2635       | 12 mo. | Sep-99   |
| i00089 April 2001 200MHz-1GHz        | 001500     | 12 mo. | Sep-99   |
| i00103 EMCO 3115 1GHz-18GHz          | 9208-3925  | 12 mo. | Sep-99   |
| <u>AMPLIFIER</u>                     |            |        |          |
| i00028 HP 8449A                      | 2749A00121 | 12 mo. | Mar-99   |
| <u>SPECTRUM ANALYZER</u>             |            |        |          |
| i00029 HP 8563E                      | 3213A00104 | 12 mo. | Aug-99   |
| i00033 HP 85462A                     | 3625A00357 | 12 mo. | May-99   |
| i00048 HP 8566B                      | 2511AD1467 | 6 mo.  | May-99   |

PAGE NO. 14 of 27.

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><br>High |
|-------------------------------|------------------------------------|
| 2nd to 10th                   | <-45                               |

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PAGE NO. 15 of 27.  
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

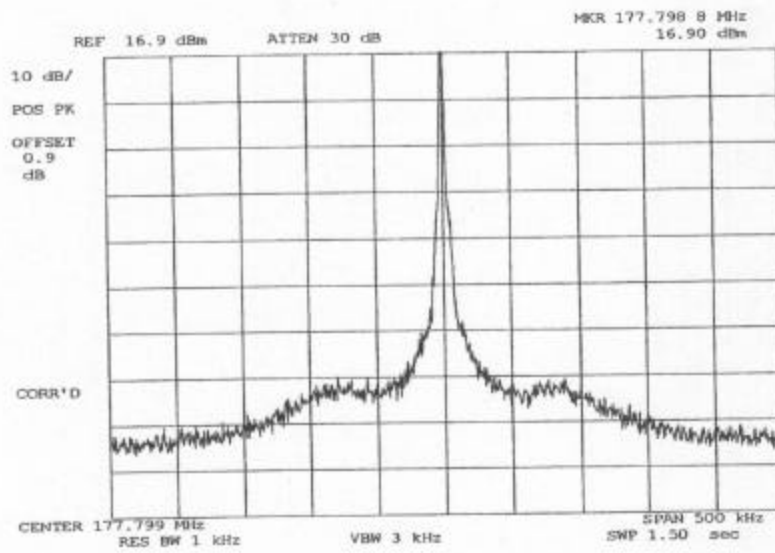
MEASUREMENT PROCEDURE

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  $\pm 2.5$  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.

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NAME OF TEST: Emission Masks (Occupied Bandwidth)  
g99a0308: 1999-Oct-13 Wed 14:22:00  
STATE: 2:High Power



POWER:  
MODULATION:

HIGH  
NONE

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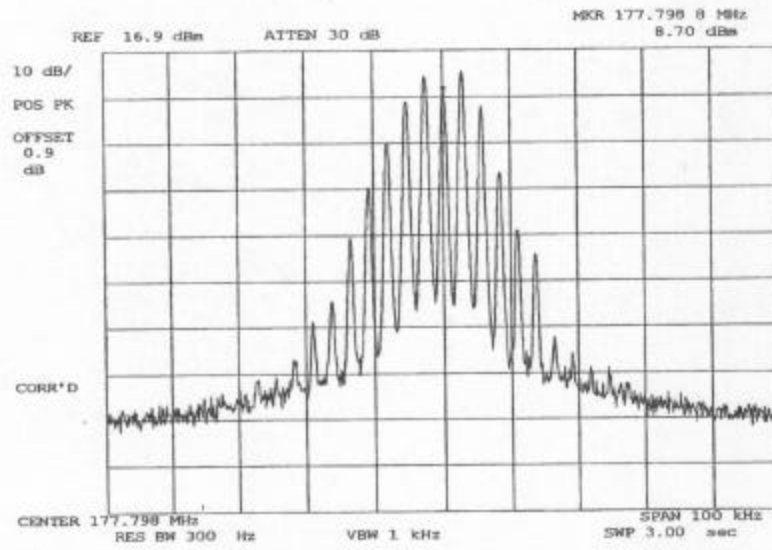
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PAGE NO.

17 of 27.

NAME OF TEST: Emission Masks (Occupied Bandwidth)  
g99a0309: 1999-Oct-13 Wed 14:29:00  
STATE: 2:High Power



POWER:  
MODULATION:

HIGH  
2500 HZ @ 20 DB ABOVE  
REFERENCE LEVEL

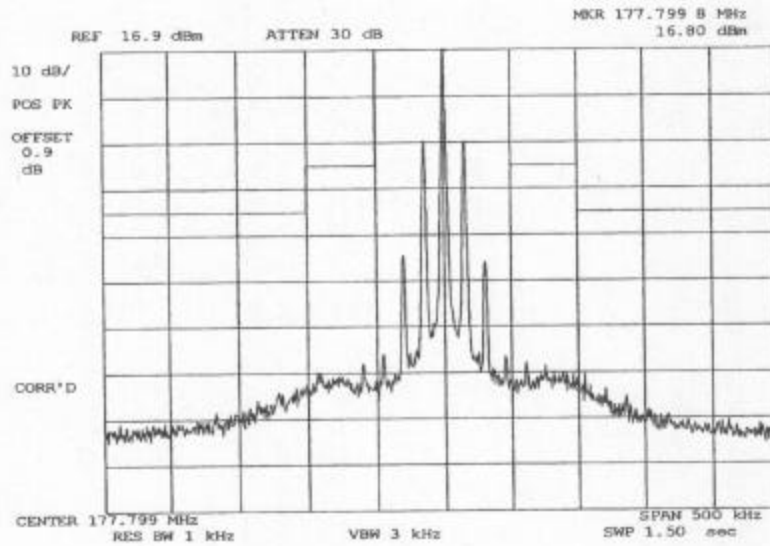
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PAGE NO.

18 of 27.

NAME OF TEST: Emission Masks (Occupied Bandwidth)  
g99a0311: 1999-Oct-13 Wed 14:34:00  
STATE: 2:High Power



POWER:  
MODULATION:

HIGH  
15 KHZ @ 20 DB ABOVE  
REFERENCE LEVEL  
MASK: Wireless Mic, 74.861

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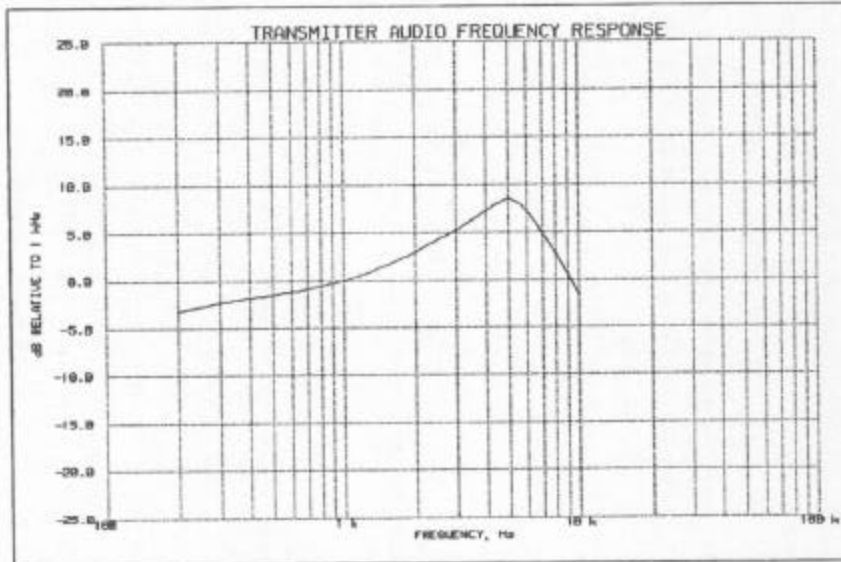
PAGE NO. 19 of 27.  
NAME OF TEST: Audio Frequency Response  
SPECIFICATION: 47 CFR 2.1047(a)  
GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.6  
TEST EQUIPMENT: As per previous page

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. 20 of 27.

NAME OF TEST: Audio Frequency Response  
 g99a0173: 1999-Oct-13 Wed 11:46:00  
 STATE: 0:General



Frequency of Maximum Audio Response, Hz = 5010

Additional points:

| FREQUENCY, Hz | LEVEL, dB |
|---------------|-----------|
| 300           | -2.30     |
| 20000         | -11.69    |
| 30000         | -11.67    |
| 50000         | -11.52    |

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*Morton Flom P. Eng.*

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PAGE NO. 21 of 27.  
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

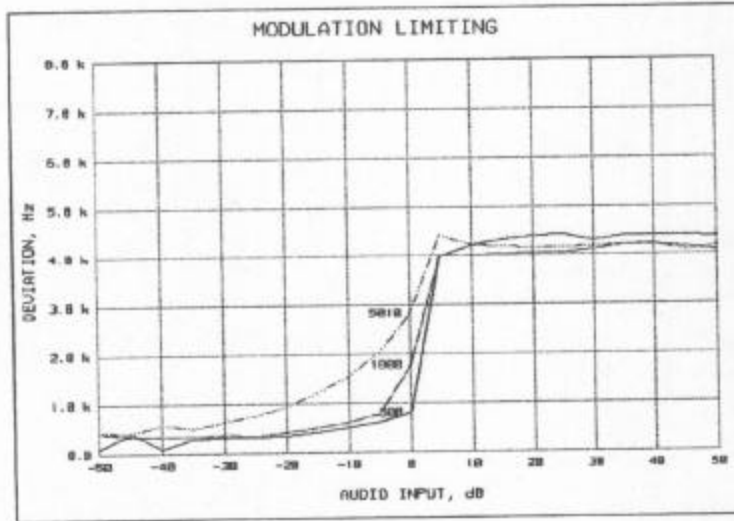
1. The signal generator was connected to the input of the EUT as for "Frequency Response of the Modulating Circuit."
2. The modulation response was measured for each of three frequencies (one of which was the frequency of maximum response), and the input voltage was varied and was observed on an HP 8901A 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.

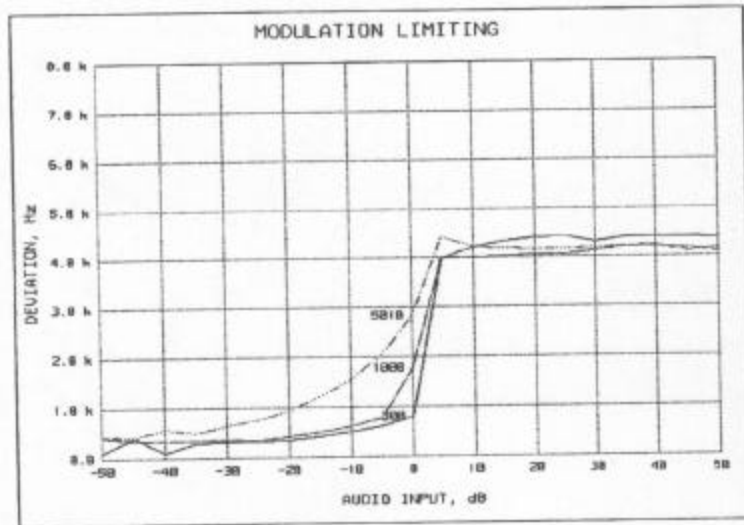
22 of 27.

NAME OF TEST: Modulation Limiting  
g99a0175: 1999-Oct-13 Wed 11:53:00  
STATE: 0:General

Positive  
Peaks:



Negative  
Peaks:



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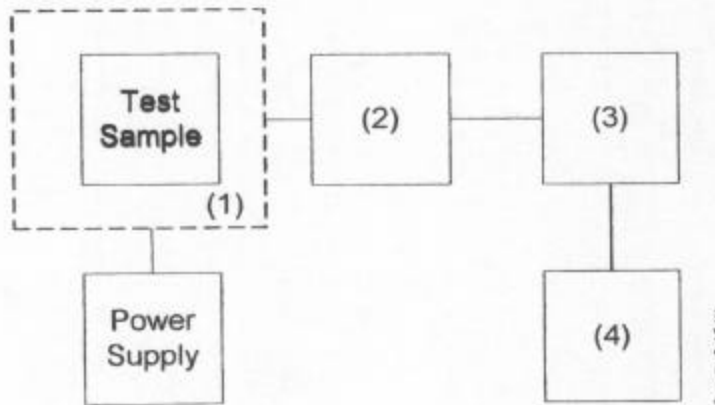
PAGE NO. 23 of 27.  
NAME OF TEST: Frequency Stability (Temperature Variation)  
SPECIFICATION: 47 CFR 2.1055(a)(1)  
GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.2  
TEST CONDITIONS: As Indicated  
TEST EQUIPMENT: As per previous page

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



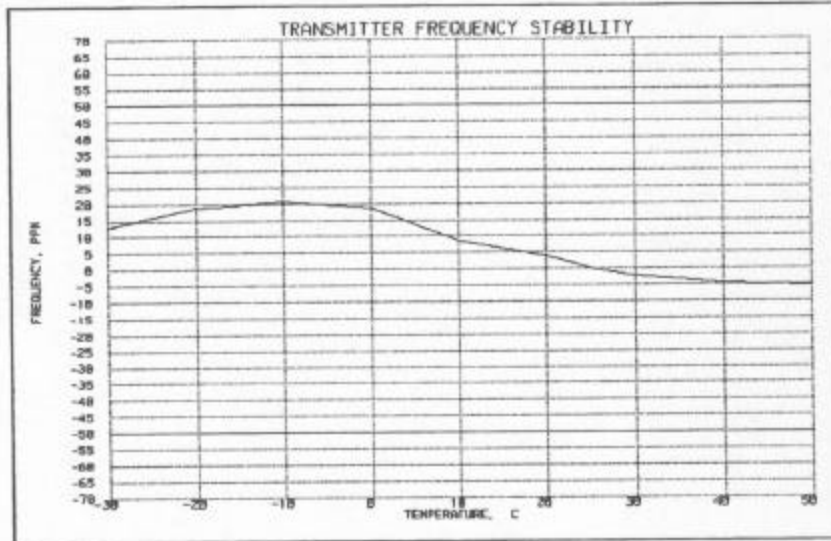
| Asset  | Description<br>(as applicable)          | s/n          |
|--------|---|--------------|
| (1)    | <u>TEMPERATURE, HUMIDITY, VIBRATION</u> |              |
| i00027 | Tenny Temp. Chamber                     | 9083-765-234 |
| i00    | Weber Humidity Chamber                  |              |
| i00    | L.A.B. RVH 18-100                       |              |
| (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>R.F. POWER</u>                       |              |
| i00014 | HP 435A POWER METER                     | 1733A05839   |
| i00039 | HP 436A POWER METER                     | 2709A26776   |
| i00020 | HP 8901A POWER MODE                     | 2105A01087   |
| (4)    | <u>FREQUENCY COUNTER</u>                |              |
| i00042 | HP 5383A                                | 1628A00959   |
| i00019 | HP 5334B                                | 2704A00347   |
| i00020 | HP 8901A                                | 2105A01087   |



PAGE NO.

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NAME OF TEST: Frequency Stability (Temperature Variation)  
g99a0185: 1999-Oct-14 Thu 06:37:00  
STATE: 0:General



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PAGE NO. 26 of 27.  
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  $25 \pm 5^\circ\text{C}$  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)  
g99a0307: 1999-Oct-13 Wed 13:54:21  
STATE: 0:General

LIMIT, ppm = 50  
LIMIT, Hz = 8890  
BATTERY END POINT (Voltage) = 8.5

| % of STV | Voltage | Frequency, MHz | Change, Hz | Change, ppm |
|----------|---------|----------------|------------|-------------|
| 85       | 11.05   | 177.798650     | -50        | -0.28       |
| 100      | 13      | 177.798700     | 0          | 0.00        |
| 115      | 14.95   | 177.798710     | 10         | 0.06        |
| 65       | 8.5     | 177.798410     | -290       | -1.63       |

SUPERVISED BY:

*Morton Flom P. Eng.*

Morton Flom, P. Eng.

PAGE NO. 27 of 27.  
NAME OF TEST: Necessary Bandwidth and Emission Bandwidth  
SPECIFICATION: 47 CFR 2.202(g)

MODULATION = 20K0F3E

NECESSARY BANDWIDTH CALCULATION:

|                                    |  |
|------------------------------------|--|
| MAXIMUM MODULATION (M), kHz        | = 5000                                   |
| MAXIMUM DEVIATION (D), kHz         | = 5000                                   |
| CONSTANT FACTOR (K)                | = 1                                      |
| NECESSARY BANDWIDTH ( $B_N$ ), kHz | = $(2 \times M) + (2 \times D \times K)$ |
|                                    | = 20.0                                   |

SUPERVISED BY:



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.