

MFA **M. Flom Associates, Inc. - Global Compliance Center**
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T R A N S M I T T E R C E R T I F I C A T I O N

of

FCC ID: B5DM518
MODEL: TR-800

to

FEDERAL COMMUNICATIONS COMMISSION

Rule Parts 74 H, 74.861, Confidentiality

DATE OF REPORT: January 29, 2003

ON THE BEHALF OF THE APPLICANT:

Telex Communications, Inc.

AT THE REQUEST OF:

P.O. 269063

Telex Communications, Inc.
8601 E. Cornhusker Highway
P.O. Box 5579
Lincoln, NE 68505-5579

Attention of:

Jim Andersen, Pro Audio Engineering
(402) 467-5321; FAX: -3279
email: jim.andersen@telex.com

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 85225
- c) Report Number: d0310045
- d) Client: Telex Communications, Inc.
 8601 E. Cornhusker Highway
 P.O. Box 5579
 Lincoln, NE 68505-5579
- e) Identification: TR-800
 FCC ID: B5DM518
 EUT Description: Wireless Intercom Beltpack
- f) EUT Condition: Not required unless specified in individual tests.
- g) Report Date: January 29, 2003
 EUT Received: December 16, 2002
- 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

74 H, 74.861, Confidentiality

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:

Telex Communications, Inc.

(c)(2): FCC ID: B5DM518MODEL NO: TR-800(c)(3): INSTRUCTION MANUAL(S):

PLEASE SEE ATTACHED EXHIBITS

(c)(4): TYPE OF EMISSION: 83K0F3E(c)(5): FREQUENCY RANGE, MHz: 470 to 608
614 to 746(c)(6): POWER RATING, Watts: 0.050
x Switchable ___ Variable ___ N/A(c)(7): MAXIMUM POWER RATING, Watts: 0.250DUT RESULTS: Passes x Fails _____

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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 = 9.0

(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 C63.4-1992/2000 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.

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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

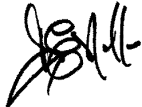
1. The EUT was connected to a resistive coaxial attenuator of normal load impedance, and the unmodulated output power was measured by means of an R. F. Power Meter.
2. Measurement accuracy is $\pm 3\%$.

MEASUREMENT RESULTS
(Worst case)

FREQUENCY OF CARRIER, MHz = 479.0, 470.1, 487.9

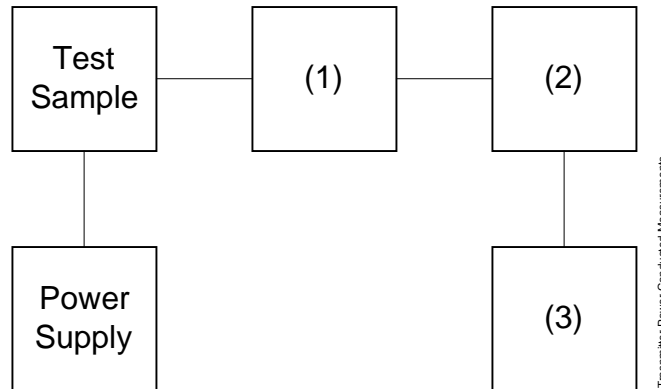
| <u>POWER SETTING</u> | <u>R. F. POWER, WATTS</u> |
|----------------------|---------------------------|
| High | 0.050 |

PERFORMED BY:


Doug Noble, B.A.S. E.E.T.

TRANSMITTER POWER CONDUCTED MEASUREMENTS

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



| Asset | Description (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 |

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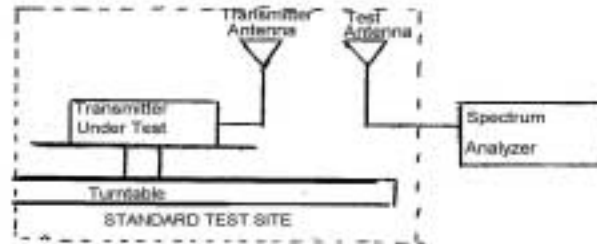
NAME OF TEST: ERP Carrier Power (Radiated)

SPECIFICATION: TIA/EIA 603A (Substitution Method)

2.2.17.1 Definition: The average radiated power of a licensed device is the equivalent power required, when delivered to a half-wave dipole or horn antenna, to produce at a distant point the same average received power as produced by the licensed device.

2.2.17.2 Method of Measurement:

a) Connect the equipment as illustrated. Place the transmitter to be tested on the turntable in the standard test site.



b) Raise and lower the test antenna from 1m to 6 m with the transmitter facing the antenna and record the highest received signal in dB as LVL.

c) Repeat step b) for seven additional readings at 45° interval positions of the turntable.

d) Replace the transmitter under test with a half-wave or horn vertically polarized antenna. The center of the antenna should be at the same location as the transmitter under test. Connect the antenna to a signal generator with a known output power and record the path loss in dB or LOSS.

e) Calculate the average radiated output power from the readings in step c) and d) by the following:

$$\text{average radiated power} = 10 \log_{10} \Sigma 10(\text{LVL} - \text{LOSS})/10 \text{ (dBm)}$$

| | <u>RESULTS</u> | | | | | |
|---------------------|------------------|------------------|----------------|------------------|------------------|------------------|
| | <u>470.1 MHz</u> | | <u>479 MHz</u> | | <u>487.9 MHz</u> | |
| | LVL, dbm | Path Loss, db | LVL, dbm | Path Loss, db | LVL, dbm | Path Loss, db |
| 0° | 11.4 | -1.3 | 17.9 | 1.0 | 14.5 | -0.9 |
| 45° | 12.3 | -1.3 | 18.5 | 1.0 | 17.3 | -0.9 |
| 90° | 13.6 | -1.3 | 19.1 | 1.0 | 16.8 | -0.9 |
| 135° | 11.6 | -1.3 | 19.3 | 1.0 | 16.8 | -0.9 |
| 180° | 13.6 | -1.3 | 19.6 | 1.0 | 15.3 | -0.9 |
| 225° | 11.8 | -1.3 | 17.9 | 1.0 | 15.7 | -0.9 |
| 270° | 12.9 | -1.3 | 18.8 | 1.0 | 18.6 | -0.9 |
| 315° | 18.6 | -1.3 | 20.0 | 1.0 | 17.8 | -0.9 |
| | 470.1 MHz | | 479 MHz | | 487.9 MHz | |
| Av. Radiated Power: | 14.7 dbm | | 17.89 dbm | | 17.5 dbm | |

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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

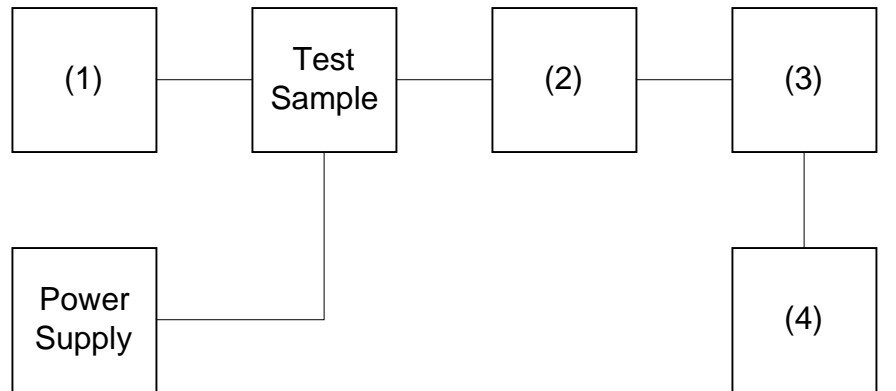
| | | |
|---------------------------|---|--------------------------|
| FREQUENCY OF CARRIER, MHz | = | 479.0, 470.1, 487.9 |
| SPECTRUM SEARCHED, GHz | = | 0 to 10 x F _c |
| MAXIMUM RESPONSE, Hz | = | 5620 |
| ALL OTHER EMISSIONS | = | ≥ 20 dB BELOW LIMIT |

PERFORMED BY:


Doug Noble, B.A.S. E.E.T.

TRANSMITTER SPURIOUS EMISSION

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



| Asset Description (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 |

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 NAME OF TEST: Unwanted Emissions (Transmitter Conducted)

LIMIT(S), dBc $-(43+10 \times \text{LOG P}) = -30$ (0 Watts)
 g0310074: 2003-Jan-14 Tue 13:20:00 STATE: 2:High Power

| FREQUENCY TUNED, MHz | FREQUENCY EMISSION, MHz | LEVEL, dBm | LEVEL, dBc | MARGIN, dB |
|-------------------------|----------------------------|------------|------------|------------|
| 470.100000 | 940.118000 | -60.5 | -79.4 | -47.5 |
| 479.000000 | 958.203600 | -61.1 | -80 | -48.1 |
| 487.900000 | 975.791000 | -60.8 | -79.7 | -47.8 |
| 470.100000 | 1410.275500 | -61.3 | -80.2 | -48.3 |
| 479.000000 | 1437.084000 | -61 | -79.9 | -48 |
| 487.900000 | 1463.865600 | -61.2 | -80.1 | -48.2 |
| 470.100000 | 1880.219900 | -60.7 | -79.6 | -47.7 |
| 479.000000 | 1915.981500 | -60.7 | -79.6 | -47.7 |
| 487.900000 | 1951.661000 | -60.6 | -79.5 | -47.6 |
| 470.100000 | 2350.527000 | -58.3 | -77.2 | -45.3 |
| 479.000000 | 2395.040000 | -59.2 | -78.1 | -46.2 |
| 487.900000 | 2439.710100 | -58.9 | -77.8 | -45.9 |
| 470.100000 | 2820.623500 | -61.9 | -80.8 | -48.9 |
| 479.000000 | 2874.073000 | -62.4 | -81.3 | -49.4 |
| 487.900000 | 2927.286500 | -62.7 | -81.6 | -49.7 |
| 470.100000 | 3290.881600 | -62.6 | -81.5 | -49.6 |
| 479.000000 | 3352.975000 | -62.8 | -81.7 | -49.8 |
| 487.900000 | 3415.259500 | -61.8 | -80.7 | -48.8 |
| 470.100000 | 3760.856000 | -63 | -81.9 | -50 |
| 479.000000 | 3832.155600 | -62.4 | -81.3 | -49.4 |
| 487.900000 | 3902.994400 | -62.6 | -81.5 | -49.6 |
| 470.100000 | 4230.688900 | -63 | -81.9 | -50 |
| 479.000000 | 4311.249600 | -63 | -81.9 | -50 |
| 487.900000 | 4391.264600 | -62.2 | -81.1 | -49.2 |
| 470.100000 | 4701.059500 | -61.5 | -80.4 | -48.5 |
| 479.000000 | 4789.875500 | -61.7 | -80.6 | -48.7 |
| 487.900000 | 4878.852400 | -62.8 | -81.7 | -49.8 |
| 470.100000 | 5171.309100 | -62.5 | -81.4 | -49.5 |
| 479.000000 | 5269.241600 | -62.5 | -81.4 | -49.5 |
| 487.900000 | 5366.998000 | -61.9 | -80.8 | -48.9 |
| 470.100000 | 5641.101000 | -62.7 | -81.6 | -49.7 |
| 479.000000 | 5747.968000 | -62.6 | -81.5 | -49.6 |
| 487.900000 | 5854.917100 | -55.6 | -74.5 | -42.6 |
| 470.100000 | 6111.451000 | -55.3 | -74.2 | -42.3 |
| 479.000000 | 6227.162900 | -56.4 | -75.3 | -43.4 |
| 487.900000 | 6342.474300 | -55.9 | -74.8 | -42.9 |
| 470.100000 | 6581.477700 | -55.8 | -74.7 | -42.8 |
| 479.000000 | 6706.244600 | -56.7 | -75.6 | -43.7 |
| 487.900000 | 6830.669200 | -56.1 | -75 | -43.1 |
| 470.100000 | 7051.251400 | -56.1 | -75 | -43.1 |
| 479.000000 | 7184.971600 | -56.6 | -75.5 | -43.6 |
| 487.900000 | 7318.624600 | -57.3 | -76.2 | -44.3 |

PERFORMED BY:


 Doug Noble, B.A.S. E.E.T.

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NAME OF TEST: Field Strength of Spurious Radiation

SPECIFICATION: 47 CFR 2.1053(a)

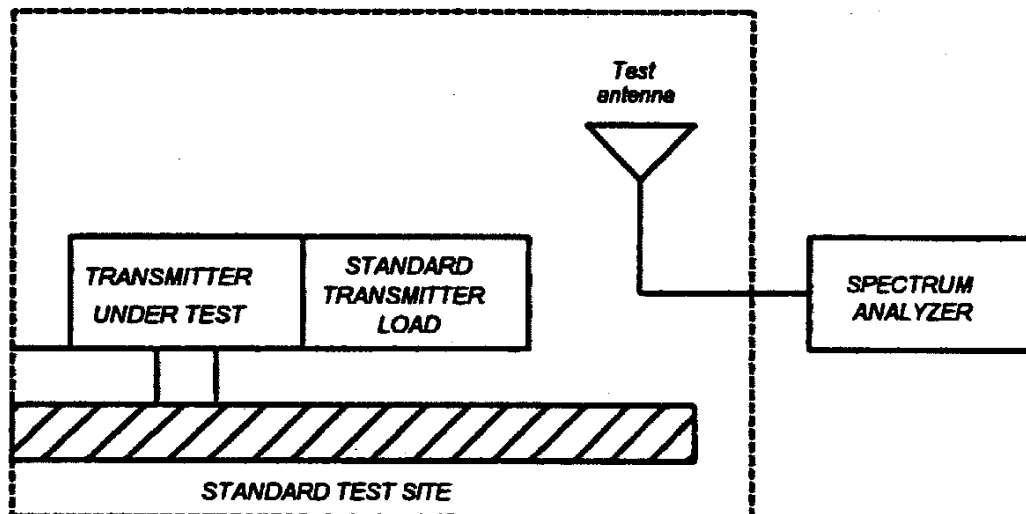
GUIDE: ANSI/TIA/EIA-603-1992/2001, Paragraph 1.2.12 and Table 16, 47 CFR 22.917

MEASUREMENT PROCEDURE

1.2.12.1 Definition: Radiated spurious emissions are emissions from the equipment when transmitting into a non-radiating load on a frequency or frequencies which are outside an occupied band sufficient to ensure transmission of information of required quality for the class of communications desired.

1.2.12.2 Method of Measurement

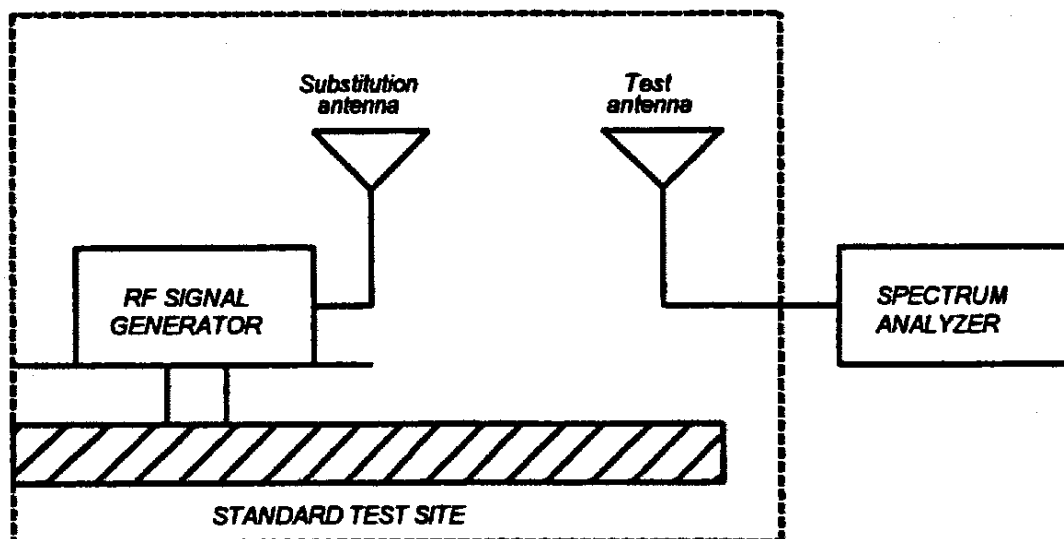
- A) Connect the equipment as illustrated
- B) Adjust the spectrum analyzer for the following settings:
- 1) Resolution Bandwidth 100 kHz (<1 GHz), 1 MHz (> 1GHz).
 - 2) Video Bandwidth ≥ 3 times Resolution Bandwidth, or 30 kHz (22.917)
 - 3) Sweep Speed ≤ 2000 Hz/second
 - 4) Detector Mode = Mean or Average Power
- C) Place the transmitter to be tested on the turntable in the standard test site. The transmitter is transmitting into a non-radiating load which is placed on the turntable. The RF cable to this load should be of minimum length.



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NAME OF TEST: Field Strength of Spurious Radiation (Cont.)

- D) For each spurious measurement the test antenna should be adjusted to the correct length for the frequency involved. This length may be determined from a calibration ruler supplied with the equipment. Measurements shall be made from the lowest radio frequency generated in the equipment to the tenth harmonic of the carrier, except for the region close to the carrier equal to \pm the test bandwidth (see section 1.3.4.4).
- E) For each spurious frequency, raise and lower the test antenna from 1 m to 4 m to obtain a maximum reading on the spectrum analyzer with the test antenna at horizontal polarity. Repeat this procedure to obtain the highest possible reading. Record this maximum reading.
- F) Repeat step E) for each spurious frequency with the test antenna polarized vertically.



- G) Reconnect the equipment as illustrated.
- H) Keep the spectrum analyzer adjusted as in step B).
- I) Remove the transmitter and replace it with a substitution antenna (the antenna should be half-wavelength for each frequency involved). The center of the substitution antenna should be approximately at the same location as the center of the transmitter. At lower frequencies, where the substitution antenna is very long, this will be impossible to achieve when the antenna is polarized vertically. In such case the lower end of the antenna should be 0.3 m above the ground.

PAGE NO. 15 of 33.

NAME OF TEST: Field Strength of Spurious Radiation (Cont.)

- J) Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a non-radiating cable. With the antennas at both ends horizontally polarized and with the signal generator tuned to a particular spurious frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.
- K) Repeat step J) with both antennas vertically polarized for each spurious frequency.
- L) Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps J) and K) by the power loss in the cable between the generator and the antenna and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna.
- M) The levels recorded in step L) are absolute levels of radiated spurious emissions in dBm. The radiated spurious emissions in dB can be calculated by the following:

Radiated spurious emissions dB =
 $10\log_{10}(\text{TX power in watts}/0.001) - \text{the levels in step l)}$

NOTE: It is permissible that other antennas provided can be referenced to a dipole.

Test Equipment:

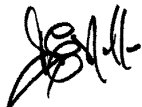
| Asset Description (as applicable) | s/n | Cycle | Last Cal |
|---|------------|--------------|--------------------------------------|
| <u>TRANSDUCER</u> | | | |
| i00088 EMCO 3109-B 25MHz-300MHz | 2336 | 12 mo. | Sep-02 |
| i00065 EMCO 3301-B Active Monopole | 2635 | 12 mo. | Sep-02 |
| i00089 Aprel 2001 200MHz-1GHz | 001500 | 12 mo. | Sep-02 |
| i00103 EMCO 3115 1GHz-18GHz | 9208-3925 | 12 mo. | Sep-02 |
| <u>AMPLIFIER</u> | | | |
| i00028 HP 8449A | 2749A00121 | 12 mo. | Mar-02 |
| <u>SPECTRUM ANALYZER</u> | | | |
| i00029 HP 8563E | 3213A00104 | 12 mo. | Jan-02 |
| i00033 HP 85462A | 3625A00357 | 12 mo. | Jan-02 |
| i00048 HP 8566B | 2511AD1467 | 6 mo. | Jul-02 |
| <u>MICROPHONE, ANTENNA PORT, AND CABELING</u> | | | |
| Microphone | <u>Y</u> | Cable Length | <u>1.0</u> Meters |
| Antenna Port Terminated | <u>N/A</u> | Load | <u>N/A</u> Antenna Gain <u>0</u> dBd |
| All Ports Terminated by Load | <u>Y</u> | Peripheral | <u>No</u> |

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NAME OF TEST: Field Strength of Spurious Radiation
 g0310061: 2003-Jan-08 Wed 15:32:00
 STATE: 2:High Power

| FREQUENCY TUNED, MHz | FREQUENCY EMISSION, MHz | ERP, dBm | ERP, dbc |
|-------------------------|----------------------------|----------|----------|
| 479.000000 | 958.006300 | -46.6 | ≤ -61.8 |
| 479.000000 | 1437.033800 | -56.7 | ≤ -61.8 |
| 479.000000 | 1916.000000 | -54.4 | ≤ -61.8 |
| 479.000000 | 2395.000000 | -51.6 | ≤ -61.8 |
| 479.000000 | 2874.000000 | -44.6 | ≤ -61.8 |
| 479.000000 | 3353.000000 | -59.6 | ≤ -61.8 |
| 479.000000 | 3832.000000 | -58 | ≤ -61.8 |
| 479.000000 | 4311.000000 | -57.7 | ≤ -61.8 |
| 479.000000 | 4790.000000 | -58.3 | ≤ -61.8 |

SUPERVISED BY:


 Doug Noble, B.A.S. E.E.T.

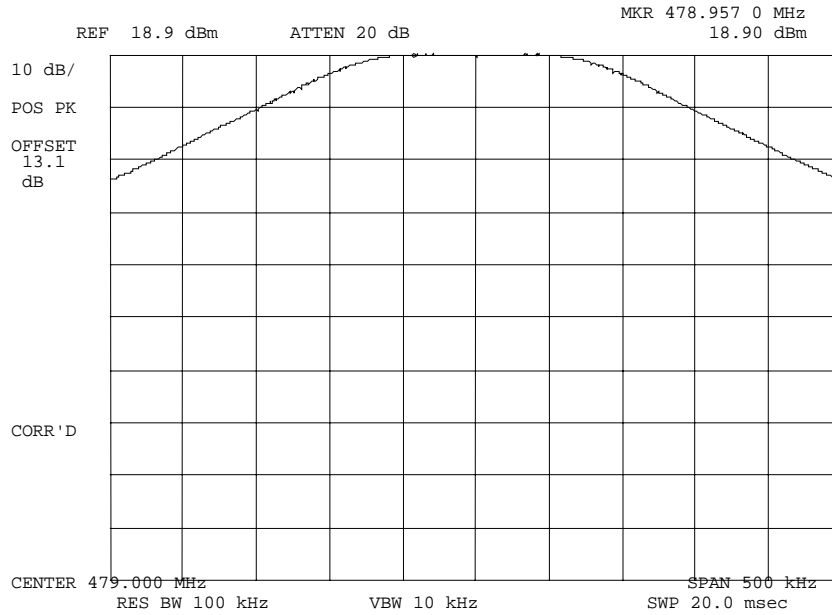
PAGE NO. 17 of 33.
NAME OF TEST: Emission Masks (Occupied Bandwidth)
SPECIFICATION: 47 CFR 2.1049(c)(1)
GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.11
TEST EQUIPMENT: As per previous page

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. 18 of 33.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
g0310065: 2003-Jan-13 Mon 13:34:00
STATE: 2:High Power



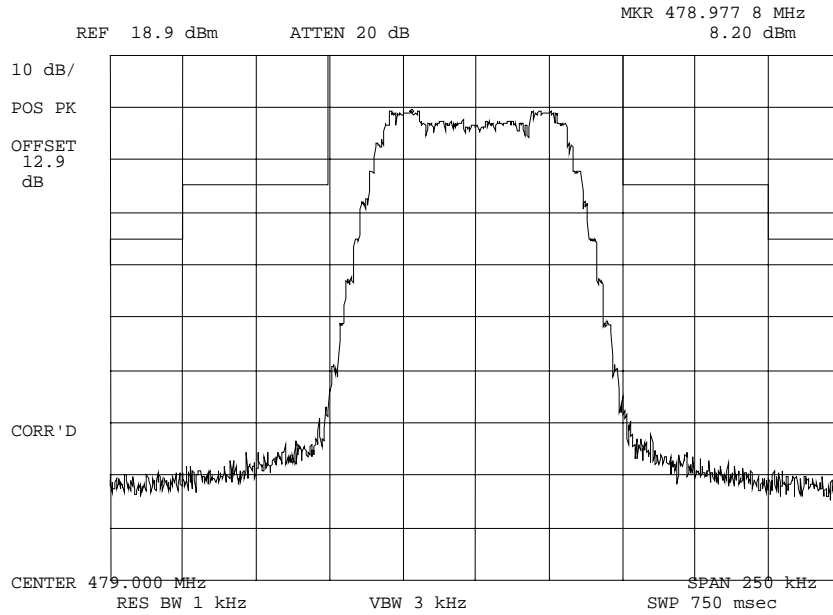
POWER: HIGH
MODULATION: NONE
REFERENCE LEVEL

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PAGE NO. 19 of 33.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
g0310066: 2003-Jan-13 Mon 13:45:00
STATE: 2:High Power



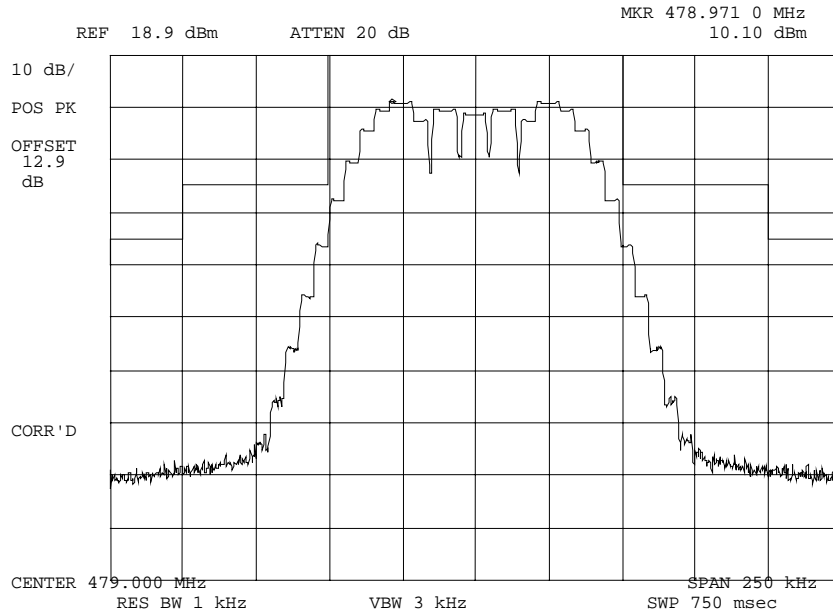
| | |
|-------------|---|
| POWER: | HIGH |
| MODULATION: | VOICE: 2500 HZ @ 20 DB ABOVE REFERENCE LEVEL MASK: Wireless Mic, 74.861 |

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PAGE NO. 20 of 33.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
g0310068: 2003-Jan-13 Mon 13:50:00
STATE: 2:High Power



POWER:
MODULATION:

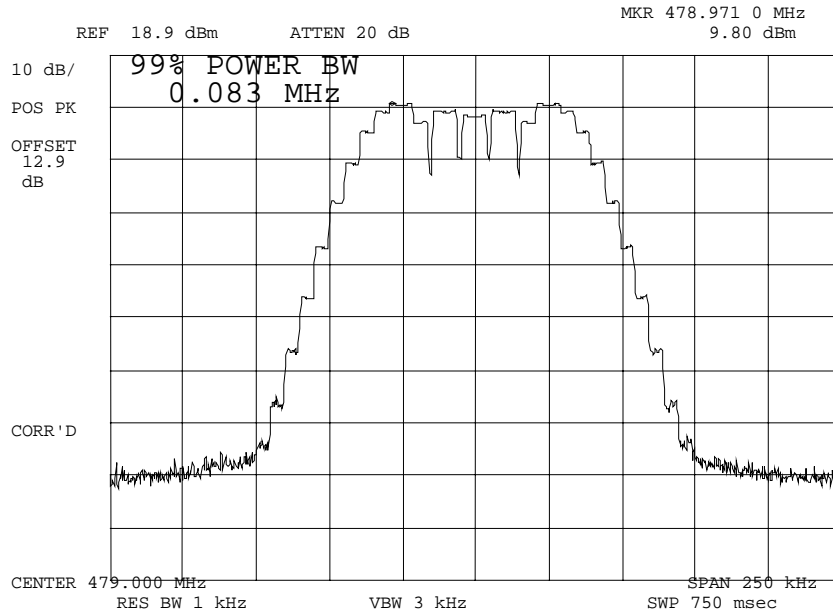
HIGH
VOICE: 5000 HZ @ 20 DB
ABOVE REFERENCE LEVEL
MASK: Wireless Mic, 74.861

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PAGE NO. 21 of 33.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
g0310069: 2003-Jan-13 Mon 13:52:00
STATE: 2:High Power



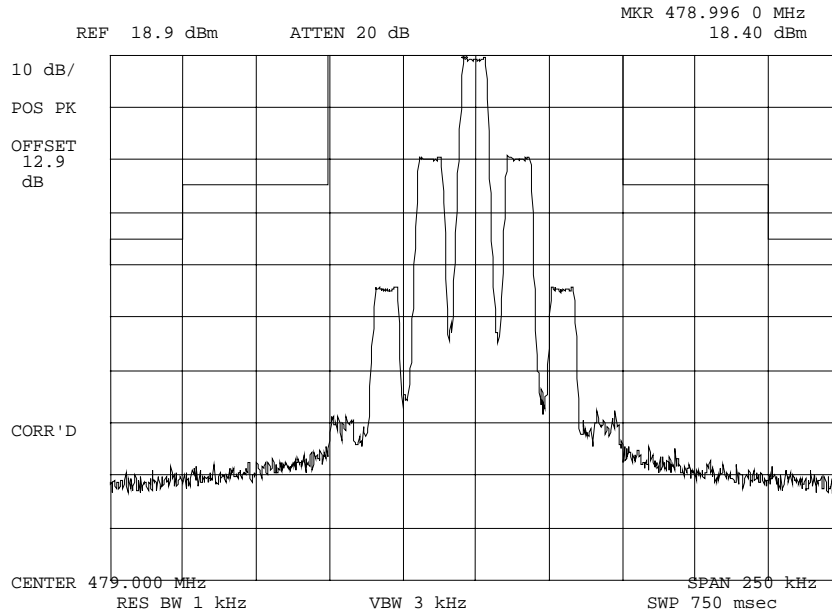
| | |
|-------------|---|
| POWER: | HIGH |
| MODULATION: | VOICE: 5000 HZ @ 20 DB ABOVE REFERENCE LEVEL 99 % POWER BANDWIDTH |

PERFORMED BY:

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PAGE NO. 22 of 33.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
g0310070: 2003-Jan-13 Mon 13:54:00
STATE: 2:High Power



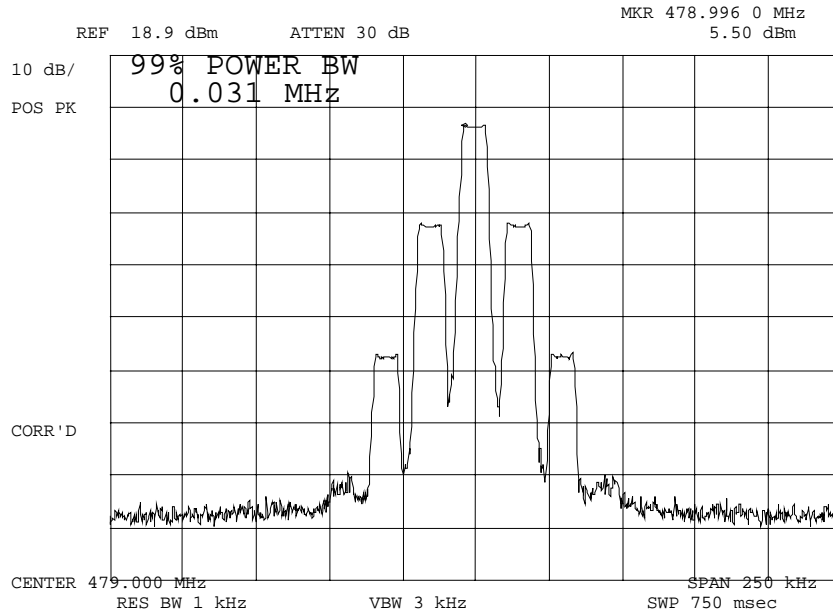
| | |
|-------------|--|
| POWER: | HIGH |
| MODULATION: | VOICE: 15000 HZ @ 20 DB ABOVE REFERENCE LEVEL MASK: Wireless Mic, 74.861 |

PERFORMED BY:

Doug Noble, B.A.S. E.E.T.

PAGE NO. 23 of 33.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
g0310071: 2003-Jan-13 Mon 13:57:00
STATE: 2:High Power



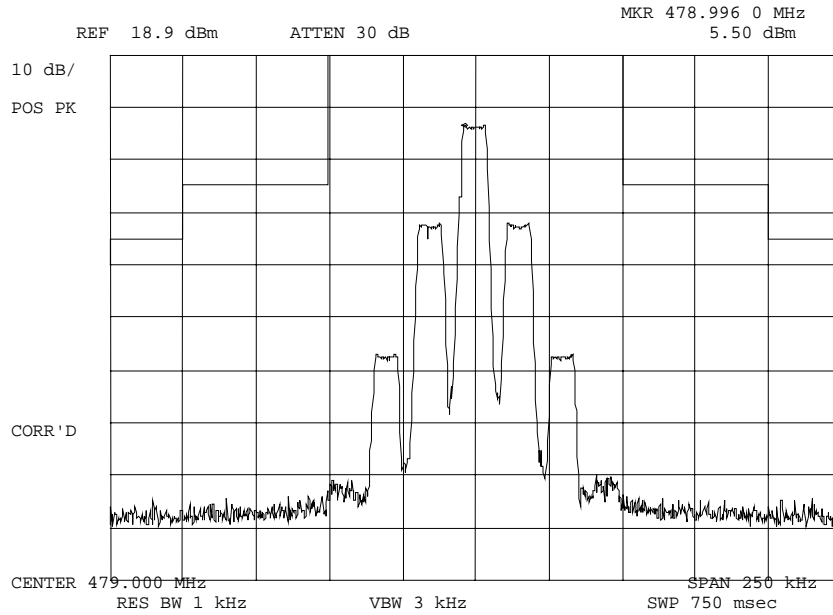
| | |
|-------------|--|
| POWER: | HIGH |
| MODULATION: | VOICE: 15000 HZ @ 20 DB ABOVE REFERENCE LEVEL 99 % POWER BANDWIDTH |

PERFORMED BY:

Doug Noble, B.A.S. E.E.T.

PAGE NO. 24 of 33.

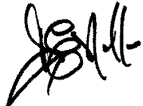
NAME OF TEST: Emission Masks (Occupied Bandwidth)
g0310072: 2003-Jan-13 Mon 13:58:00
STATE: 2:High Power



POWER:
MODULATION:

HIGH
VOICE: 15000 HZ @ 20 DB
ABOVE REFERENCE LEVEL
MASK: Wireless Mic, 74.861

PERFORMED BY:


Doug Noble, B.A.S. E.E.T.

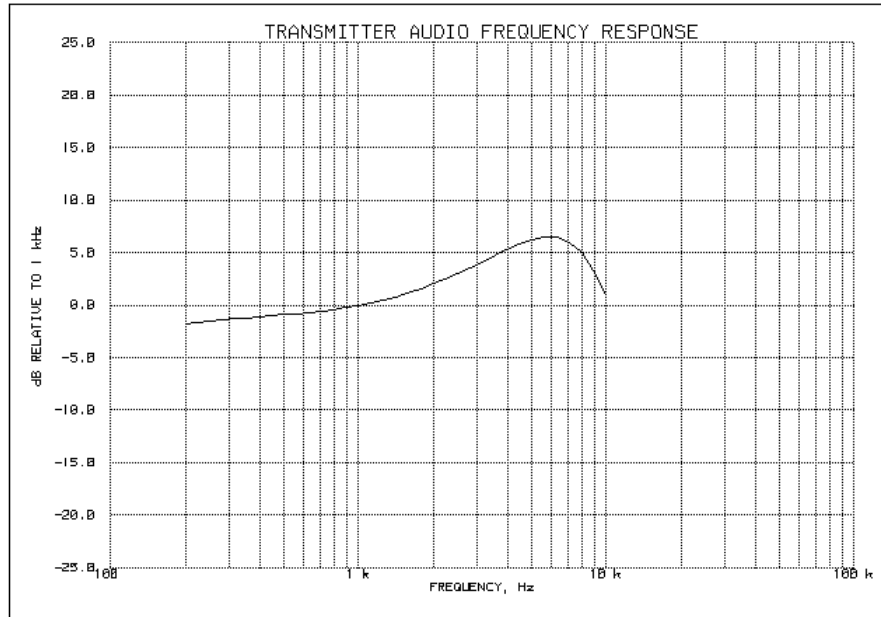
PAGE NO. 25 of 33.
NAME OF TEST: Audio Frequency Response
SPECIFICATION: 47 CFR 2.1047(a)
GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.6
TEST EQUIPMENT: As per previous page

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. 26 of 33.

NAME OF TEST: Audio Frequency Response
 g0310048: 2003-Jan-13 Mon 12:45:00
 STATE: 0:General



Frequency of Maximum Audio Response, Hz = 5620

Additional points:

| FREQUENCY, Hz | LEVEL, dB |
|---------------|-----------|
| 300 | -1.4 |
| 20000 | -19.71 |
| 30000 | -35.71 |
| 50000 | -58.10 |

PERFORMED BY:

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PAGE NO. 27 of 33.
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

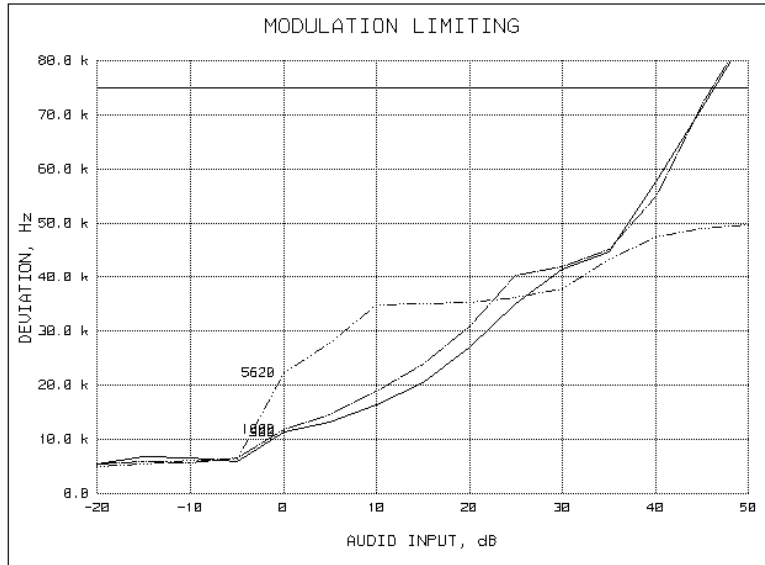
1. The signal generator was connected to the input of the EUT as for "Frequency Response of the Modulating Circuit."
2. The modulation response was measured for each of three frequencies (one of which was the frequency of maximum response), and the input voltage was varied and was observed on an HP 8901A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

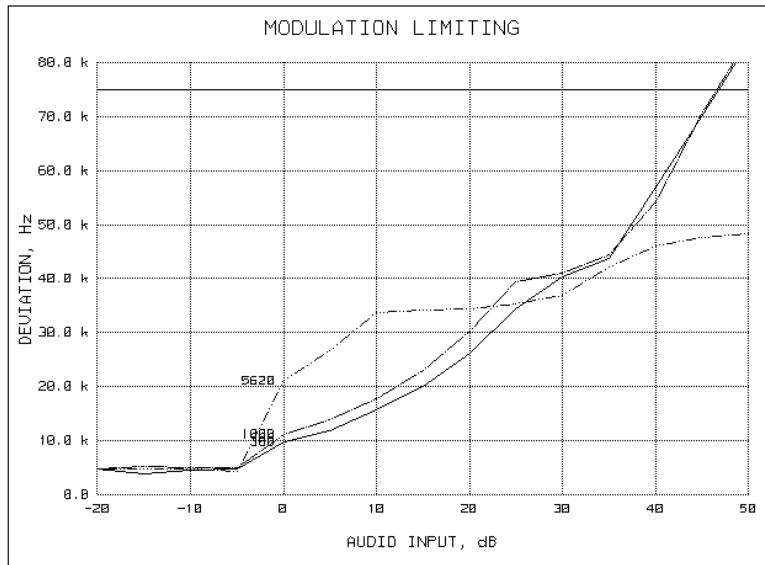
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NAME OF TEST: Modulation Limiting
g0310050: 2003-Jan-13 Mon 12:55:00
STATE: 0:General

Positive
Peaks:



Negative
Peaks:



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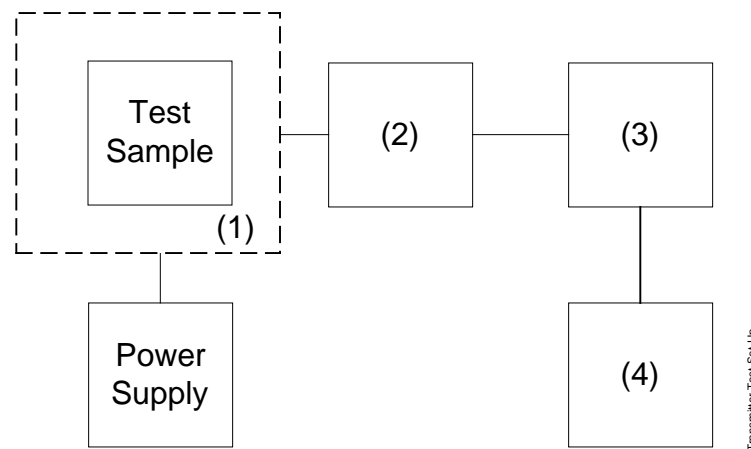
PAGE NO. 29 of 33.
NAME OF TEST: Frequency Stability (Temperature Variation)
SPECIFICATION: 47 CFR 2.1055(a)(1)
GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.2
TEST CONDITIONS: As Indicated
TEST EQUIPMENT: As per previous page

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

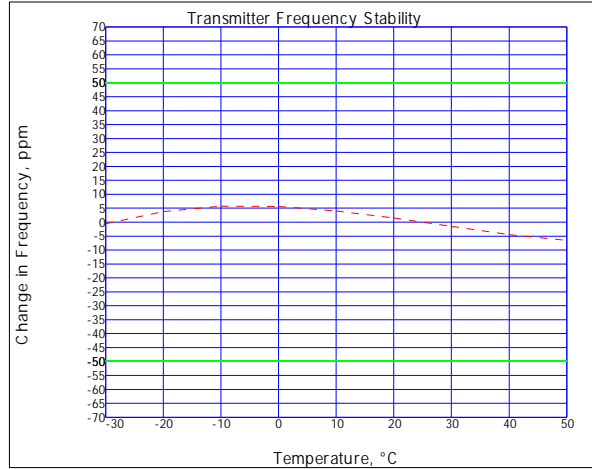
- TEST A. OPERATIONAL STABILITY
- TEST B. CARRIER FREQUENCY STABILITY
- TEST C. OPERATIONAL PERFORMANCE STABILITY
- TEST D. HUMIDITY
- TEST E. VIBRATION
- TEST F. ENVIRONMENTAL TEMPERATURE
- TEST G. FREQUENCY STABILITY: TEMPERATURE VARIATION
- TEST H. FREQUENCY STABILITY: VOLTAGE VARIATION



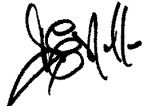
| Asset Description (as applicable) | s/n |
|---|--------------|
| <u>(1) TEMPERATURE, HUMIDITY, VIBRATION</u> | |
| i00027 Tenney Temp. Chamber | 9083-765-234 |
| i00 Weber Humidity Chamber | |
| i00 L.A.B. RVH 18-100 | |
| <u>(2) COAXIAL ATTENUATOR</u> | |
| i00122 NARDA 766-10 | 7802 |
| i00123 NARDA 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 |

PAGE NO. 31 of 33.

NAME OF TEST: Frequency Stability (Temperature Variation)
g0310051: 2003-Jan-14 Tue 13:18:02
STATE: 0:General



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Doug Noble, B.A.S. E.E.T.

PAGE NO. 32 of 33.
NAME OF TEST: Frequency Stability (Voltage Variation)
SPECIFICATION: 47 CFR 2.1055(d)(1)
GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.2
TEST EQUIPMENT: As per previous page

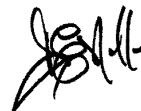
MEASUREMENT PROCEDURE

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)
g0310073: 2003-Jan-14 Tue 10:08:10
STATE: 0:General

LIMIT, ppm = 50
LIMIT, Hz = 23950
BATTERY END POINT (Voltage) = 7.2

| % of STV | Voltage | Frequency, MHz | Change, Hz | Change, ppm |
|----------|---------|----------------|------------|-------------|
| 85 | 7.65 | 478.999990 | -10 | -0.02 |
| 100 | 9 | 479.000000 | 0 | 0.00 |
| 115 | 10.35 | 479.000000 | 0 | 0.00 |
| 80 | 7.2 | 478.999990 | -10 | -0.02 |



PERFORMED BY:

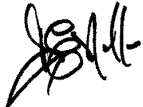
Doug Noble, B.A.S. E.E.T.

PAGE NO. 33 of 33.
NAME OF TEST: Necessary Bandwidth and Emission Bandwidth
SPECIFICATION: 47 CFR 2.202(g)

MODULATION = 83K0F3E

NECESSARY BANDWIDTH (B_N), kHz = 83, Measured

PERFORMED BY:


Doug Noble, B.A.S. E.E.T.

END OF TEST REPORT

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.