



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

Date: September 24, 1999

Federal Communications Commission
EQUIPMENT APPROVAL SERVICES
P.O. Box 358315
Pittsburgh, PA 15251-5315

Attention: Authorization & Evaluation Division

Applicant: Niigata Seimitsu Co Ltd
Equipment: NSA2010
FCC ID: NTRNSA2010
FCC Rules: 22H

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)
Electronically Filed

cc: Applicant
MF/cvr

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

APPLICANT: Niigata Seimitsu Co Ltd

FCC ID: NTRNSA2010

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. CONFIDENTIALITY REQUEST: 0.457 and 0.459
5. DOCUMENTATION: 2.1033(c)
 - (3) USER MANUAL
 - (9) TUNE UP INFO
 - (10) SCHEMATIC DIAGRAM
 - (10) CIRCUIT DESCRIPTION
6. ATTESTATION: ESN: Section 22.919
7. ATTESTATION: OET: Section 22.933

BY M.F.A. INC.

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



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

Sub-part
2.1033(c):

EQUIPMENT IDENTIFICATION

FCC ID: NTRNSA2010

NAMEPLATE DRAWING

ATTACHED, EXHIBIT 1.

LOCATION

AS PER LABEL DRAWING(S)

DATE OF REPORT

September 24, 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.

TABLE OF CONTENTS

| RULE | DESCRIPTION | PAGE |
|------------------|--|------|
| | Test Report | 1 |
| 2.1033(c) | General Information Required | 2 |
| 2.1033(c)(14) | Rule Summary | 5 |
| | General Information | 6 |
| | Standard Test Conditions and Engineering Practices | 7 |
| 2.1046(a) | Carrier Output Power (Conducted) | 8 |
| 2.1046(a) | R. F. Power Output (Radiated) | 10 |
| 2.1047(a) | Audio Frequency Response | 12 |
| 2.1047(a) | Audio Low Pass Filter (Voice Input) | 14 |
| 2.1047(b) | Modulation Limiting | 17 |
| | Measurement Of Maximum Deviation | 20 |
| 2.1049(c)(1), 22 | | |
| | Emission Masks (Occupied Bandwidth) | 23 |
| 22.917 | Emission Requirements - | |
| | Worst Case Modulation & Wideband Data | 39 |
| 2.1053(a) | Field Strength of Spurious Radiation | 50 |
| 2.1055(a)(1) | Frequency Stability (Temperature Variation) | 54 |
| 2.1055(b)(1) | Frequency Stability (Voltage Variation) | 57 |

PAGE NO. 1 of 57.

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: d9990060

d) Mailing Client: Modus Operandi, Inc
308 Lakeland Drive
Highland Village, TX 75077

e) Identification: NSA2010
Description: FCC ID: NTRNSA2010
AMPS-FM CELLULAR TRANSCEIVER

f) EUT Condition: Not required unless specified in individual tests.

g) Report Date: September 24, 1999
EUT Received: July 29, 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.

PAGE NO. 2 of 57.

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

22H

Sub-part 2.1033

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

Niigata Seimitsu Co Ltd
Shiba Daimon
116 Bldg 8F, 16-3, 1 Chome
Minato-Ku, Tokyo, Japan

MANUFACTURER:

Applicant

(c)(2): FCC ID: NTRNSA2010MODEL NO: NSA2010(c)(3): INSTRUCTION MANUAL(S):

PLEASE SEE ATTACHED EXHIBITS

(c)(4): TYPE OF EMISSION: 40K0F8W, 40K0F1D(c)(5): FREQUENCY RANGE, MHz: 824.04 to 848.97(c)(6): POWER RATING, Watts: 0.36 ERP
 Switchable Variable N/A(c)(7): MAXIMUM POWER RATING, Watts: 0.6

PAGE NO.

3 of 57.

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 = 3.6

(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.

4 of 57.

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

| | | | | | | | | | | | | | | | | | | | | | |
|--|---|-----------------------------|-----------------------------|---|--|--------------|--------------------|--------------|---|-------------|---------------------------------------|-------------------------|---|-----|---------------------------------------|-----|---------------------------------------|-------|--|--------------|---|
|  <p>THE AMERICAN ASSOCIATION FOR LABORATORY ACCREDITATION</p> <p>ACCREDITED LABORATORY</p> <p>A2LA has accredited</p> <p>M. FLOM ASSOCIATES, INC. Chandler, AZ</p> <p>for technical competence in the field of</p> <p>Electrical (EMC) Testing</p> <p>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.</p> <p>Presented this 24th day of November, 1998.</p> <p> <i>Pete Flom</i> President For the Accreditation Council Certificate Number 1008-01 Valid to December 31, 2000</p> <p>For tests or types of tests to which this accreditation applies, please refer to the laboratory's Electrical (EMC) Scope of Accreditation</p> |  <p>American Association for Laboratory Accreditation</p> <p>SCOPE OF ACCREDITATION TO ISO/IEC GUIDE 25-1990 AND EN 45001</p> <p>M. FLOM ASSOCIATES, INC. Electronic Testing Laboratory 3356 North San Marcos Drive Suite 107 Chandler, AZ 85224-1571 Morton Flom Phone: 602 926 3100</p> <p>ELECTRICAL (EMC)</p> <table border="0"> <tr> <td>Valid to: December 31, 2000</td> <td>Certificate Number: 1008-01</td> </tr> <tr> <td colspan="2">In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following <u>electromagnetic compatibility tests</u>:</td> </tr> <tr> <td>Tests</td> <td>Standard(s)</td> </tr> <tr> <td>RF Emissions</td> <td>FCC Part 15 (Subparts B and C) using ANSI C63.4-1992; CISPR 11, CISPR 12, 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</td> </tr> <tr> <td>RF Immunity</td> <td>EN 50082-1; EN 50082-2; AS/NZS 4251.1</td> </tr> <tr> <td>Radiated Susceptibility</td> <td>EN 61000-4-3; ENV 50140; ENV 50204; IEC 1000-4-3; IEC 801-3</td> </tr> <tr> <td>ESD</td> <td>EN 61000-4-2; IEC 1000-4-2; IEC 801-2</td> </tr> <tr> <td>EFT</td> <td>EN 61000-4-4; IEC 1000-4-4; IEC 801-4</td> </tr> <tr> <td>Surge</td> <td>EN 61000-4-5; ENV 50142; IEC 1000-4-5; IEC 801-5</td> </tr> <tr> <td>47 CFR (FCC)</td> <td>2, 21, 22, 23, 24, 74, 80, 87, 90, 95, 97</td> </tr> </table> <p><i>Pete Flom</i></p> <p>5301 Buckeystown Pike, Suite 350 • Frederick, MD 21704-8307 • Phone: 301 644 3200 • Fax: 301 662 2974</p> | 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 <u>electromagnetic compatibility tests</u> : | | Tests | Standard(s) | RF Emissions | FCC Part 15 (Subparts B and C) using ANSI C63.4-1992; CISPR 11, CISPR 12, 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 | 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 |
| 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 <u>electromagnetic compatibility tests</u> : | | | | | | | | | | | | | | | | | | | | | |
| Tests | Standard(s) | | | | | | | | | | | | | | | | | | | | |
| RF Emissions | FCC Part 15 (Subparts B and C) using ANSI C63.4-1992; CISPR 11, CISPR 12, 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 | | | | | | | | | | | | | | | | | | | | |
| 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 | | | | | | | | | | | | | | | | | | | | |

"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.

PAGE NO.

5 of 57.

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
- ____ 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

PAGE NO.

6 of 57.

GENERAL INFORMATION

1. Prior to testing, the deviation for audio modulation and each of the respective SAT + ST tones were set as close as possible to the required limit.
2. Except for audio modulation, which was applied externally, Wideband Data SAT, ST and all other tones and operational modes were provided by a test control unit incorporating appropriate software. Worst case repetition rate for Wideband Data was 10 kb/s.
3. Spurious radiation was measured at three (3) meters.
4. The two cellular frequency bands are available to the user automatically. Please refer to the manual contained in the documentation.
5. The normal modes of modulation are:
 - x (a) VOICE
 - x (b) WIDEBAND DATA
 - x (c) SAT
 - x (d) ST
 - x (e) SAT + VOICE
 - x (f) SAT + DTMF
 - (g) CDMA
 - (h) TDMA
 - (i) NAMPS VOICE
 - (j) NAMPS DSAT
 - (k) NAMPS ST
 - (l) NAMPS VOICE + DSAT

PAGE NO.

7 of 57.

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.

GUIDES:

This device was tested using the following Guide(s):

TIA/EIA IS-19-B 1998

PAGE NO. 8 of 57.

NAME OF TEST: Carrier Output Power (Conducted)

SPECIFICATION: 47 CFR 2.1046(a)

GUIDE: As indicated on page 7

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

| NOMINAL, MHz | CHANNEL | R. F. POWER, Watts | |
|-------------------|---------|--------------------|------|
| | | Low | High |
| AMPS MODE: | | | |
| 824.040 | 991 | 0.005 | 0.32 |
| 836.400 | 380 | 0.005 | 0.31 |
| 848.970 | 799 | 0.005 | 0.31 |

SUPERVISED BY:

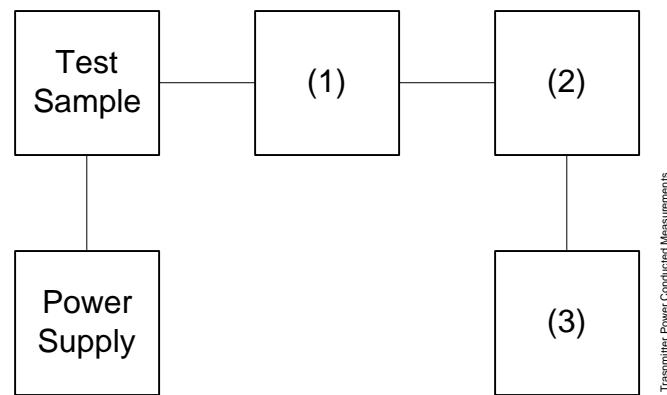

Morton Flom, P. Eng.

PAGE NO.

9 of 57.

TRANSMITTER POWER CONDUCTED MEASUREMENTS

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



Transmitter Power Conducted Measurements

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

PAGE NO. 10 of 57.
NAME OF TEST: R. F. Power Output (Radiated)
SPECIFICATION: 47 CFR 2.1046(a)
GUIDE: As indicated on page 7
TEST EQUIPMENT: As per attached page

MEASUREMENT PROCEDURE (RADIATED)

1. The EUT was placed on an open-field site and its radiated field strength at a known distance was measured by means of a spectrum analyzer. Equivalent loading was calculated from the equation $P_t = ((E \times R)^2 / 49.2)$ watts, where $R = 3m$.
2. Measurement accuracy is ± 1.5 dB.

MEASUREMENT RESULTS

g9990133: 1999-Sep-10 Fri 08:58:00

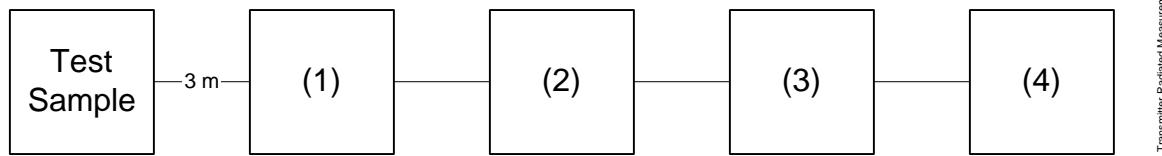
STATE: 2:High Power

AMPS MODE:

| FREQUENCY TUNED, MHz | FREQUENCY EMISSION, MHz | METER, dBuV/m | CF, dB | ERP, dBm | ERP, Watts |
|-------------------------|----------------------------|------------------|--------|----------|------------|
| 824.040000 | 824.040000 | 92.49 | 29.98 | 25.1 | 0.32 |
| 836.520000 | 836.520000 | 91.71 | 30.01 | 24.3 | 0.27 |
| 848.970000 | 848.970000 | 92.96 | 30.04 | 25.6 | 0.36 |

PAGE NO.

11 of 57.

TRANSMITTER RADIATED MEASUREMENTS

Transmitter Radiated Measurements

| Asset | Description | s/n |
|-----------------------|---------------------------------|------------|
| (1) TRANSDUCER | | |
| <u>x</u> i00091 | Emco 3115 | 001469 |
| <u>x</u> i00089 | Aprel Log Periodic | 001500 |
| (2) HIGH PASS FILTER | | |
| <u>x</u> i00 | Narda μ PAD (In-Band Only) | |
| <u>x</u> i00 | Trilithic (Out-Of-Band Only) | |
| (3) PREAMP | | |
| <u>x</u> i00028 | HP 8449 (+30 dB) | 2749A00121 |
| (4) SPECTRUM ANALYZER | | |
| <u>x</u> i00048 | HP 8566B | 2511A01467 |
| <u> </u> i00057 | HP 8557A | 1531A00191 |
| <u>x</u> i00029 | HP 8563E | 3213A00104 |

PAGE NO. 12 of 57.
NAME OF TEST: Audio Frequency Response
SPECIFICATION: 47 CFR 2.1047(a)
GUIDE: As indicated on page 7
TEST EQUIPMENT: As per previous page

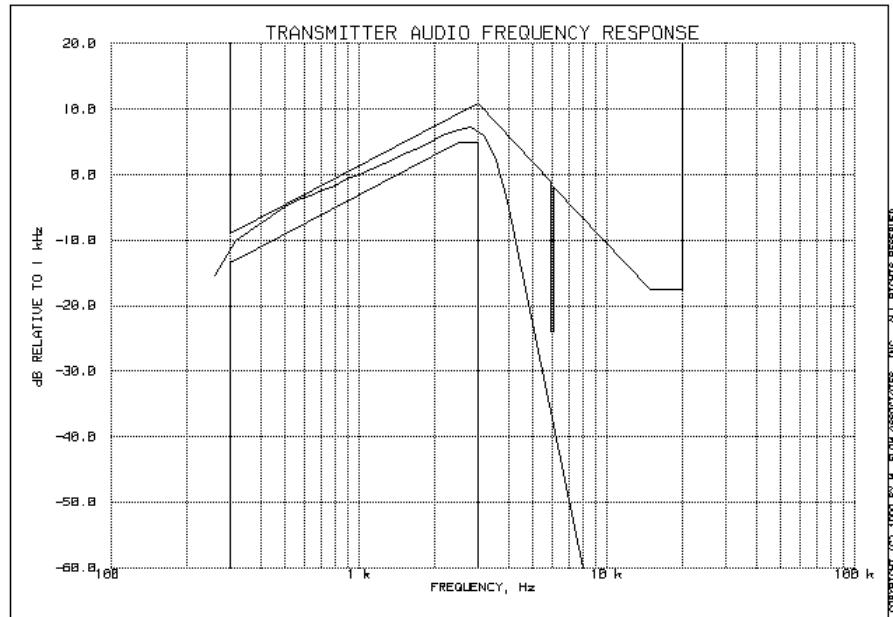
MEASUREMENT PROCEDURE

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.

13 of 57.

NAME OF TEST: Audio Frequency Response
g9960280: 1999-Jun-30 Wed 09:01:00
STATE: 0:General



SUPERVISED BY:

Morton Flom, P. Eng.

PAGE NO. 14 of 57.

NAME OF TEST: Audio Low Pass Filter (Voice Input)

SPECIFICATION: 47 CFR 2.1047(a)

GUIDE: As indicated on page 7

TEST EQUIPMENT: As per attached page

MEASUREMENT PROCEDURE

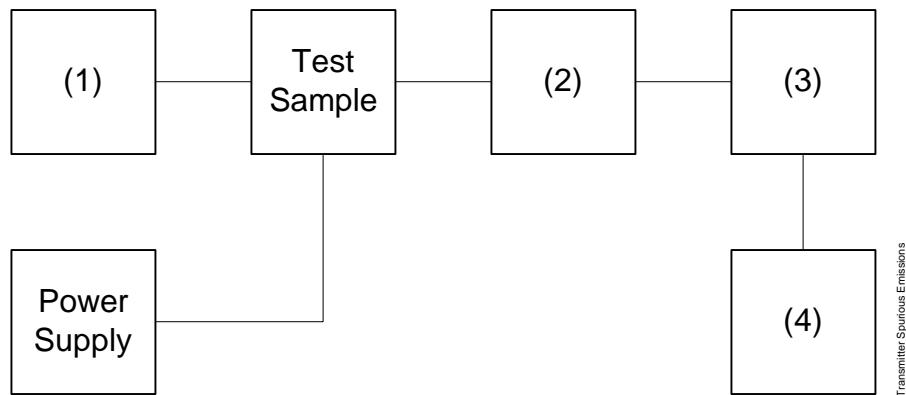
1. The EUT and test equipment were set up such that the audio input was connected at the input to the modulation limiter, and the modulated stage.
2. The audio output was connected at the output to the modulated stage.
3. MEASUREMENT RESULTS: ATTACHED

PAGE NO.

15 of 57.

TRANSMITTER SPURIOUS EMISSION

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

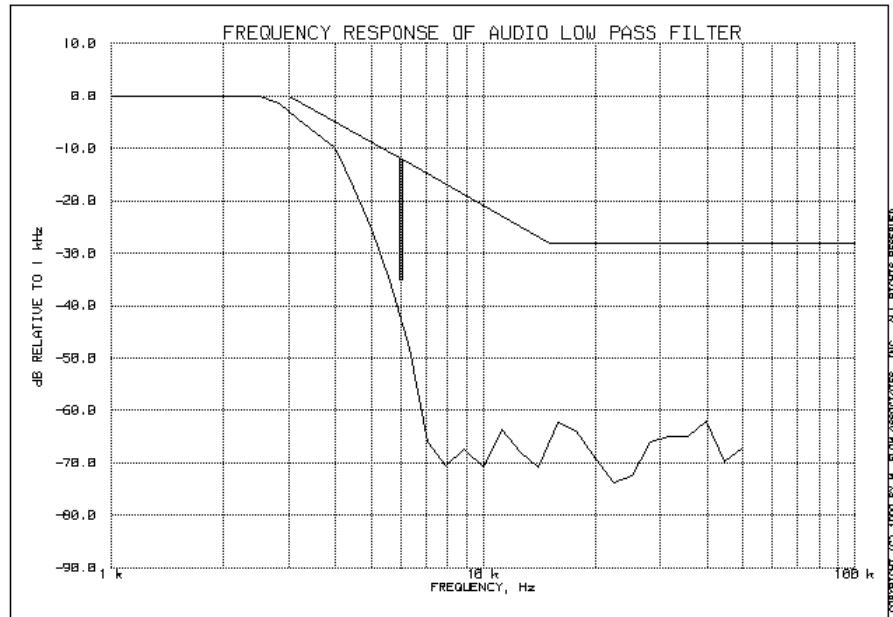


| Asset | Description | s/n |
|--------------------------------|-------------------|------------|
| (1) AUDIO OSCILLATOR/GENERATOR | | |
| i00010 | HP 204D | 1105A04683 |
| i00017 | HP 8903A | 2216A01753 |
| x i00012 | HP 3312A | 1432A11250 |
| (2) COAXIAL ATTENUATOR | | |
| i00122 | Narda 766-10 | 7802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

PAGE NO.

16 of 57.

NAME OF TEST: Audio Low Pass Filter (Voice Input)
g9960279: 1999-Jun-30 Wed 08:55:00
STATE: 0:General



SUPERVISED BY:


Morton Flom, P. Eng.

PAGE NO. 17 of 57.
NAME OF TEST: Modulation Limiting
SPECIFICATION: 47 CFR 2.1047(b)
GUIDE: As indicated on page 7
TEST EQUIPMENT: As per previous page

MEASUREMENT PROCEDURE

1. The audio signal generator was connected to the audio input circuit/microphone of the EUT as for Frequency Response of the Audio Modulating Circuit.
2. The modulation response was measured for each of three tones (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 audio input level was varied from 30% modulation (± 3.6 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 FOR:

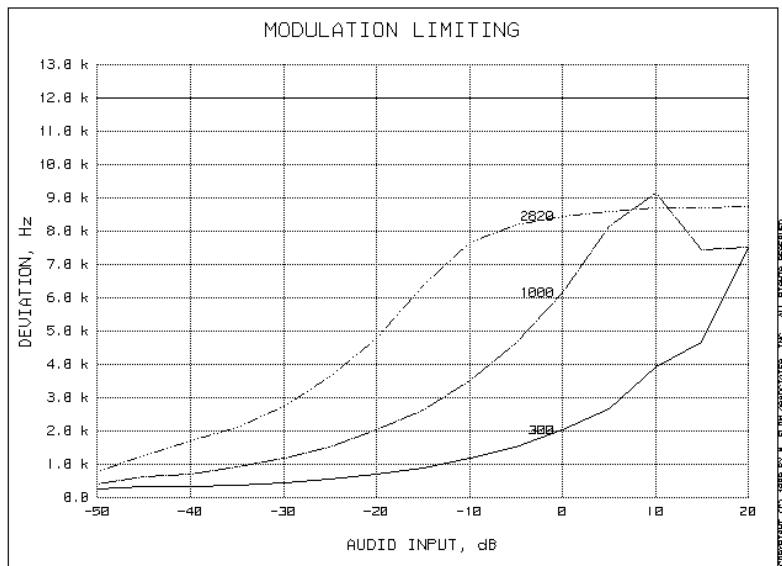
COMPANDER ON:
 VOICE
 VOICE + SAT

PAGE NO.

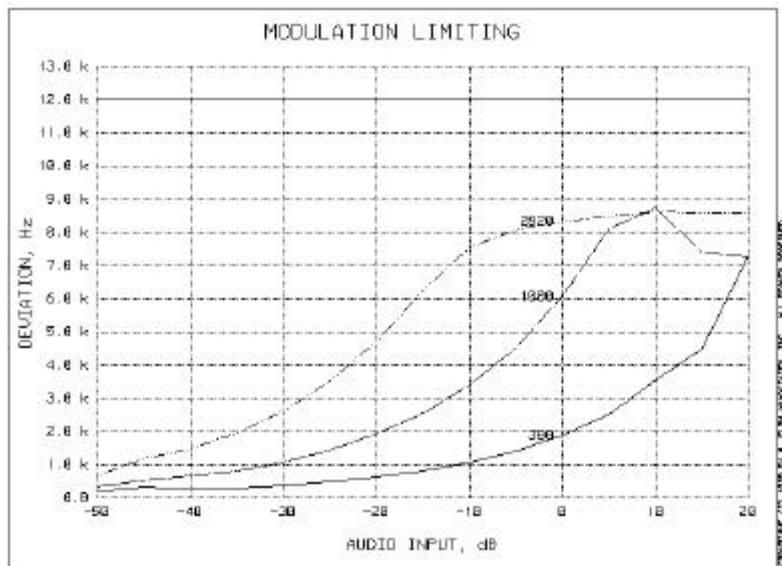
18 of 57.

NAME OF TEST: Modulation Limiting
g9960281: 1999-Jun-30 Wed 09:09:00
STATE: 0:General Voice only

Positive Peaks:



Negative Peaks:

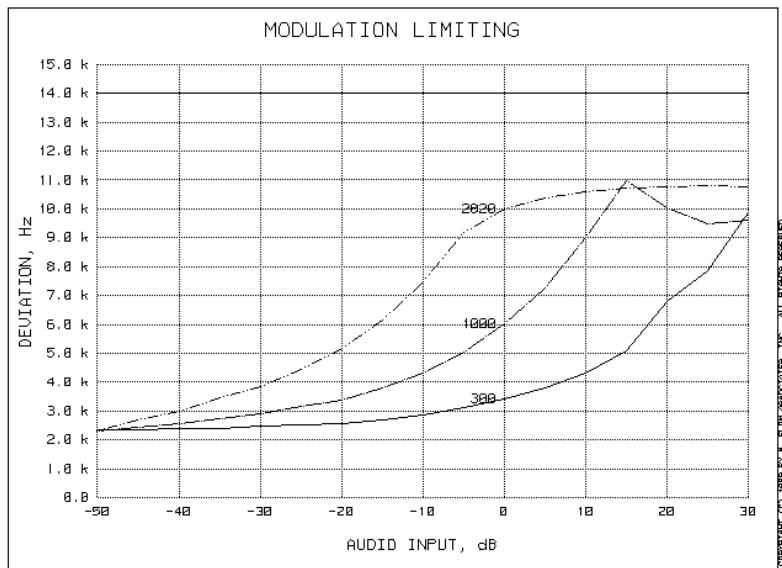


PAGE NO.

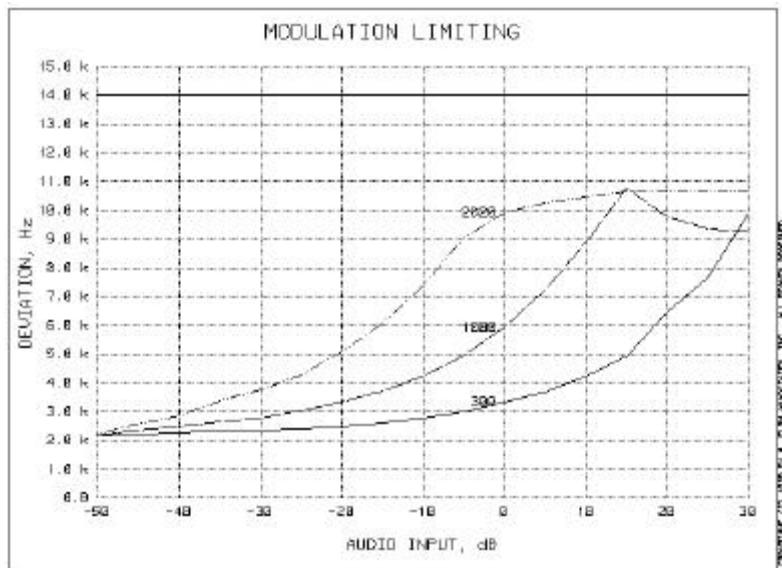
19 of 57.

NAME OF TEST: Modulation Limiting
g9960283: 1999-Jun-30 Wed 09:23:00
STATE: 0:General Voice + SAT

Positive Peaks:



Negative Peaks:



PAGE NO. 20 of 57.

NAME OF TEST: Measurement Of Maximum Deviation

GUIDE: As indicated on page 7

TEST EQUIPMENT: As per attached page

MEASUREMENT PROCEDURE

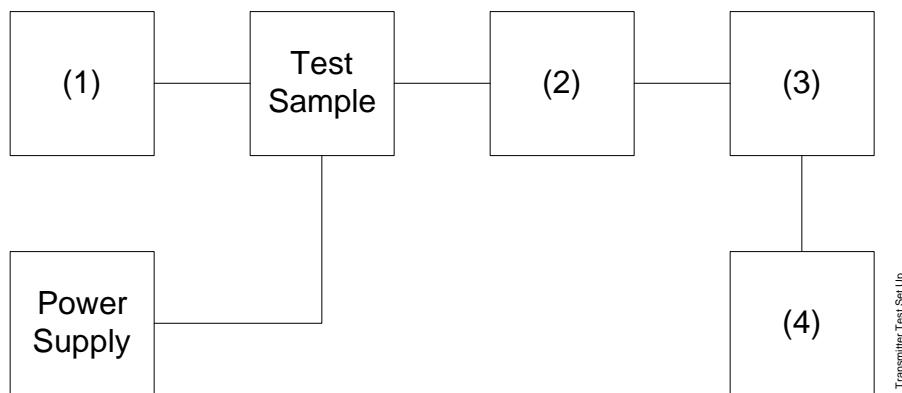
1. The presentation of tones was obtained by attaching the HP 8903A Oscilloscope to the Modulation Output of the HP 8901 Modulation Analyzer.
2. The EUT was modulated by an HP 8903 Audio Analyzer and/or internally generated signals.
3. Maximum deviation measurements were recorded for the various configurations.
4. MEASUREMENT RESULTS: ATTACHED SUMMARY FOR DEVIATION

PAGE NO.

21 of 57.

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

PAGE NO.

22 of 57.

MEASUREMENT SUMMARY: Measurement Of Maximum Deviation

| MODULATION | LIMIT, kHz | DEVIATION, kHz |
|-------------------|----------------------------------|----------------|
| (a) Voice | $\geq 10.8 \text{ & } \leq 13.2$ | 10.9 |
| (b) Wideband Data | $\geq 7.2 \text{ & } \leq 8.8$ | 8.0 |
| (c) SAT | $\geq 1.8 \text{ & } \leq 2.2$ | 2.2 |
| (d) ST | $\geq 7.2 \text{ & } \leq 8.8$ | 8.2 |
| (e) SAT + VOICE | N/A | 11.4 |
| (f) SAT + DTMF | N/A | 12.4 |
| (i) NAMPS VOICE | N/A | N/A |
| (j) NAMPS DSAT | N/A | N/A |
| (k) NAMPS ST | N/A | N/A |
| (l) NAMPS VOICE | N/A | N/A |

SUPERVISED BY:



Morton Flom, P. Eng.

PAGE NO. 23 of 57.

NAME OF TEST: Emission Masks (Occupied Bandwidth)

SPECIFICATION: 47 CFR 2.1049(c)(1), 22

GUIDE: As indicated on page 7

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 ± 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.

24 of 57.

MEASUREMENT SUMMARY: Emission Masks (Occupied Bandwidth)

| MODULATION | MEASURED DEVIATION ±kHz (HP 8901A) | LIMIT ±kHz | B/W @-26 dB PLOTS, kHz |
|---------------|---------------------------------------|-----------------|---------------------------|
| NONE | 0.0 | 0.0 | 0.0 |
| VOICE | 10.9 | ≥ 10.8 & ≤ 13.2 | -27 |
| WIDEBAND DATA | 8.0 | ≥ 7.2 & ≤ 8.8 | -23 |
| SAT + VOICE | 11.4 | N/A | -29 |
| SAT + DTMF | 12.4 | N/A | -28 |
| CDMA | N/A | N/A | N/A |
| TDMA | N/A | N/A | N/A |
| NAMPS | N/A | N/A | N/A |

SUPERVISED BY:

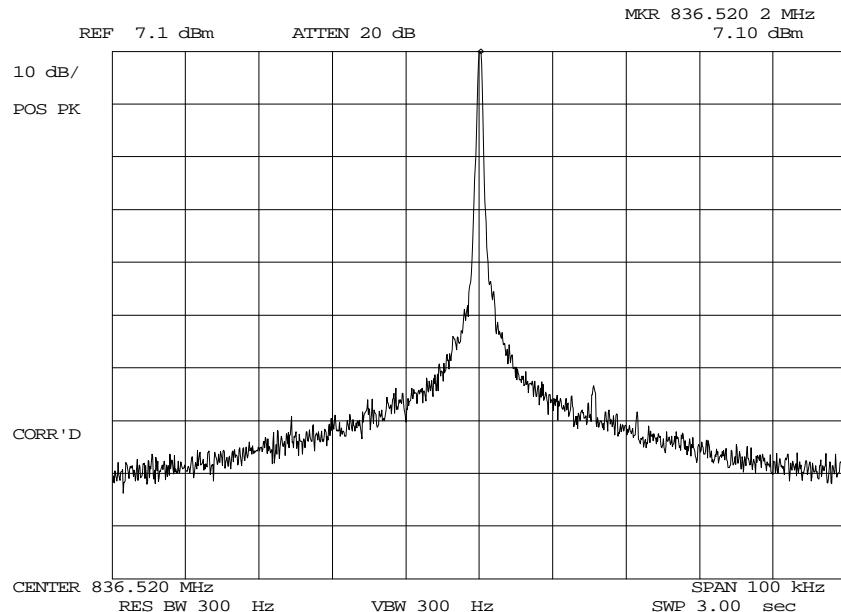


Morton Flom, P. Eng.

PAGE NO.

25 of 57.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g9970401: 1999-Jul-22 Thu 10:44:00
 STATE: 1:Low Power



POWER: LOW
 MODULATION: NONE

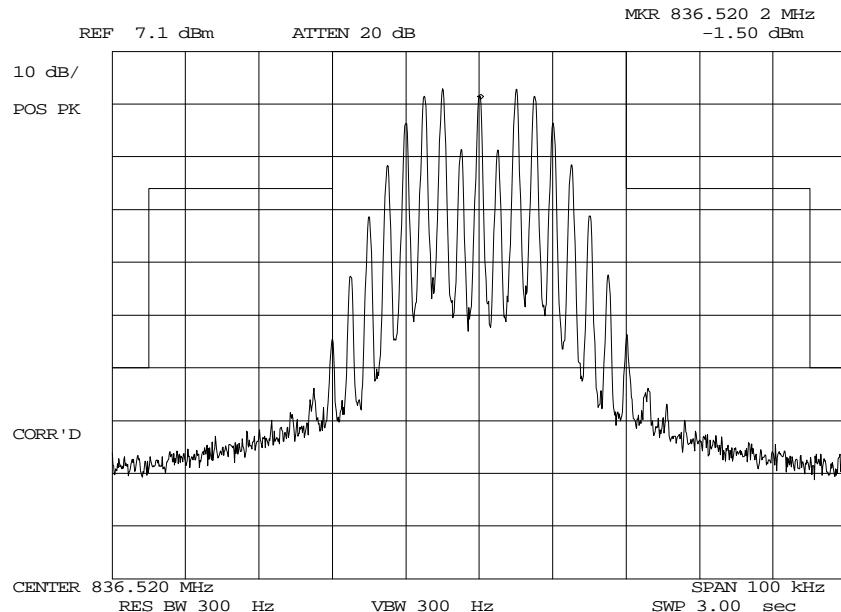
SUPERVISED BY:

M. Flom, P. Eng.
 Morton Flom, P. Eng.

PAGE NO.

26 of 57.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g9970402: 1999-Jul-22 Thu 11:01:00
 STATE: 1:Low Power



POWER:
 MODULATION:

LOW
 VOICE: 2500 Hz SINE WAVE
 MASK: AMPS CELLULAR,
 F3E/F3D w/LPF

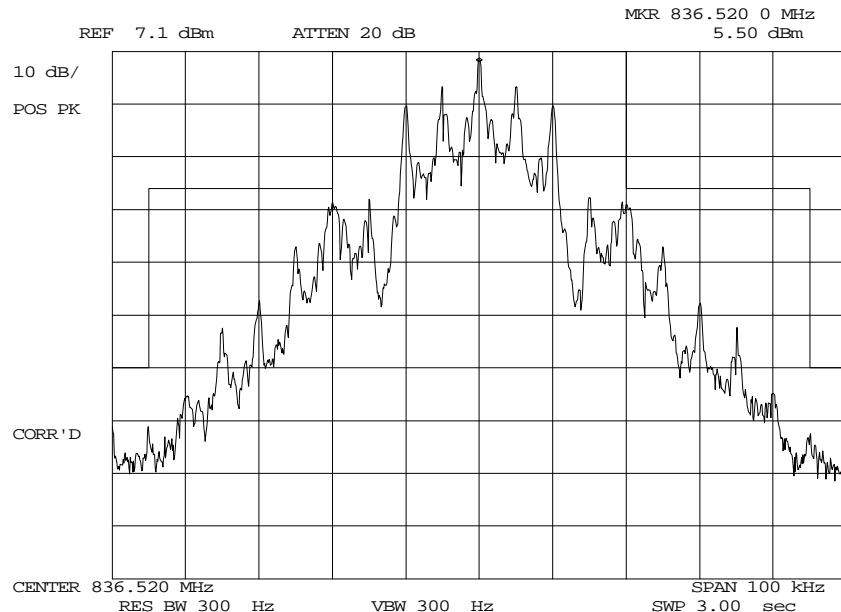
SUPERVISED BY:


 Morton Flom, P. Eng.

PAGE NO.

27 of 57.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g9970404: 1999-Jul-22 Thu 11:07:00
 STATE: 1:Low Power



POWER: LOW
 MODULATION: WBD
 MASK: AMPS CELLULAR,
 F3E/F3D w/LPF

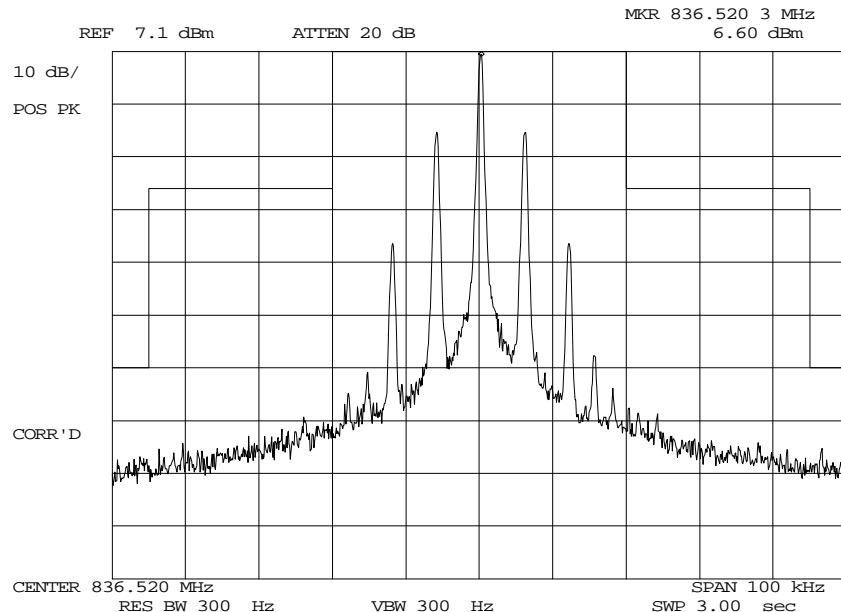
SUPERVISED BY:


 Morton Flom, P. Eng.

PAGE NO.

28 of 57.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g9970405: 1999-Jul-22 Thu 11:11:00
 STATE: 1:Low Power



POWER: LOW
 MODULATION: SAT
 MASK: AMPS CELLULAR,
 F3E/F3D w/LPF

SUPERVISED BY:

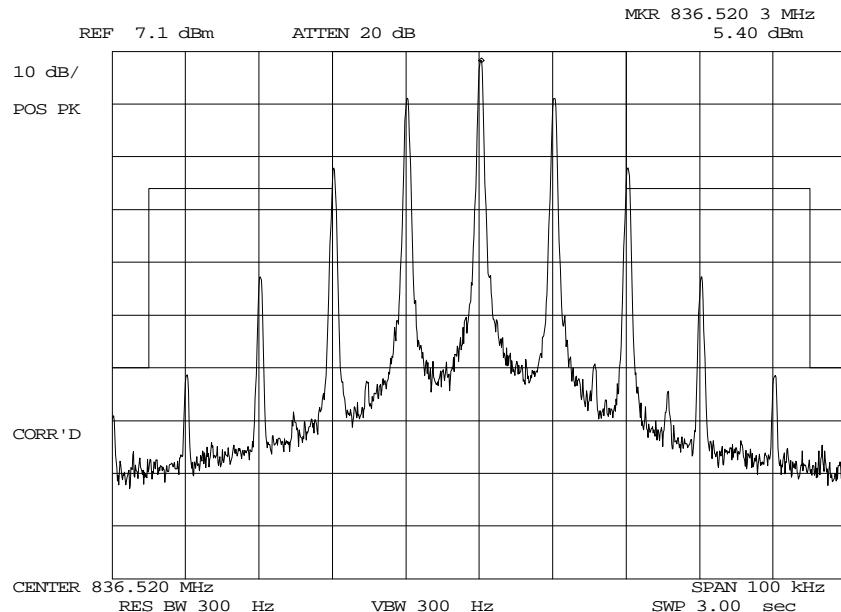


Morton Flom, P. Eng.

PAGE NO.

29 of 57.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g9970406: 1999-Jul-22 Thu 11:13:00
 STATE: 1:Low Power



POWER: LOW
 MODULATION: ST
 MASK: AMPS CELLULAR,
 F3E/F3D w/LPF

SUPERVISED BY:

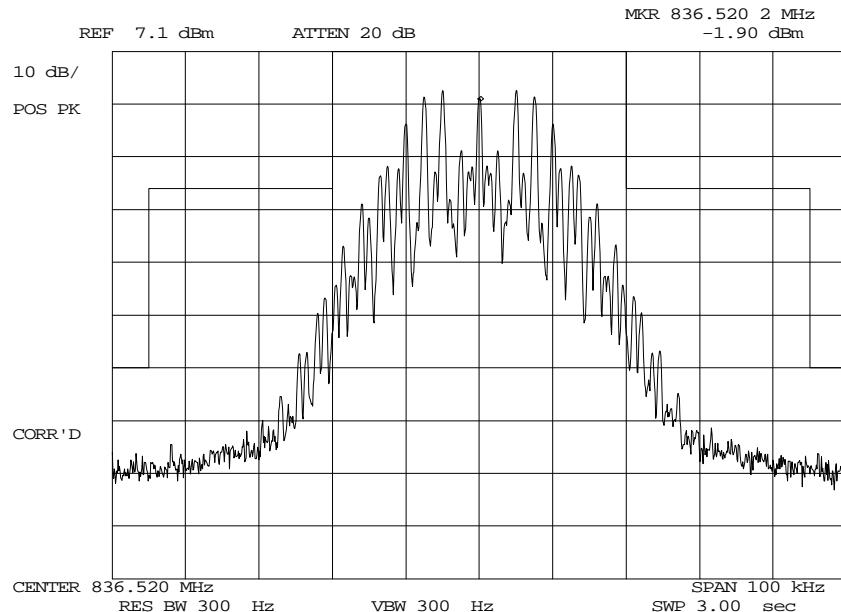


Morton Flom, P. Eng.

PAGE NO.

30 of 57.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g9970403: 1999-Jul-22 Thu 11:03:00
 STATE: 1:Low Power



POWER: LOW
 MODULATION: SAT+VOICE
 MASK: AMPS CELLULAR,
 F3E/F3D w/LPF

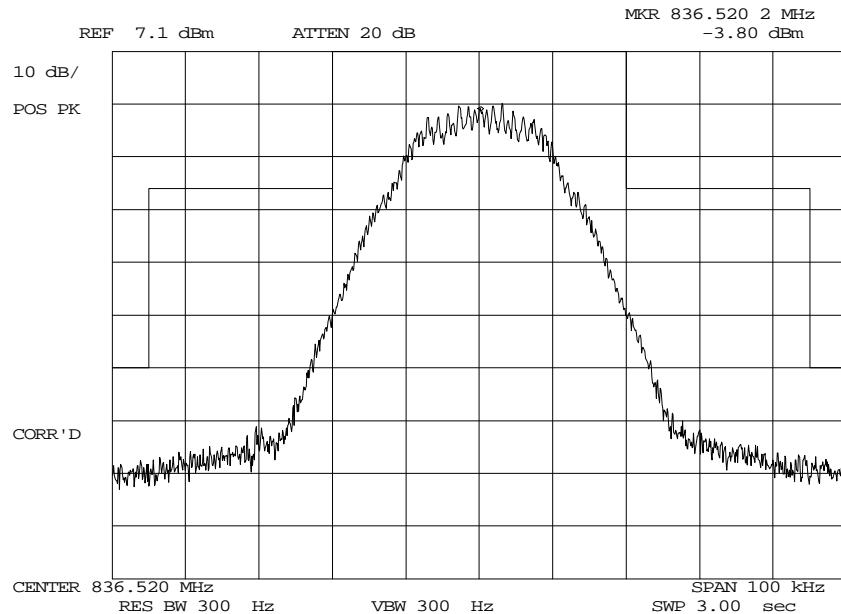
SUPERVISED BY:


 Morton Flom, P. Eng.

PAGE NO.

31 of 57.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g9970407: 1999-Jul-22 Thu 11:15:00
 STATE: 1:Low Power



POWER: LOW
 MODULATION: SAT+DTMF
 MASK: AMPS CELLULAR,
 F3E/F3D w/LPF

SUPERVISED BY:

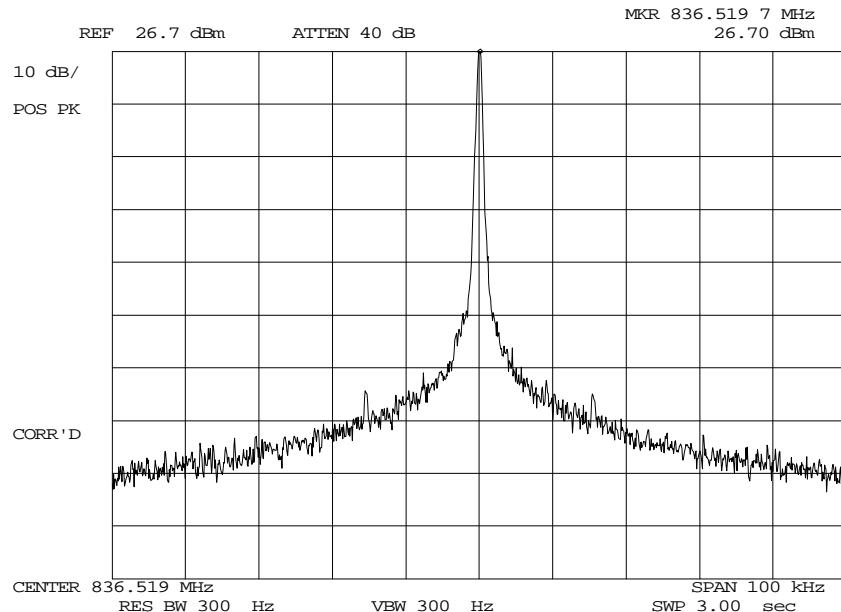


Morton Flom, P. Eng.

PAGE NO.

32 of 57.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g9960292: 1999-Jun-30 Wed 10:39:00
 STATE: 2:High Power



POWER: HIGH
 MODULATION: NONE

SUPERVISED BY:

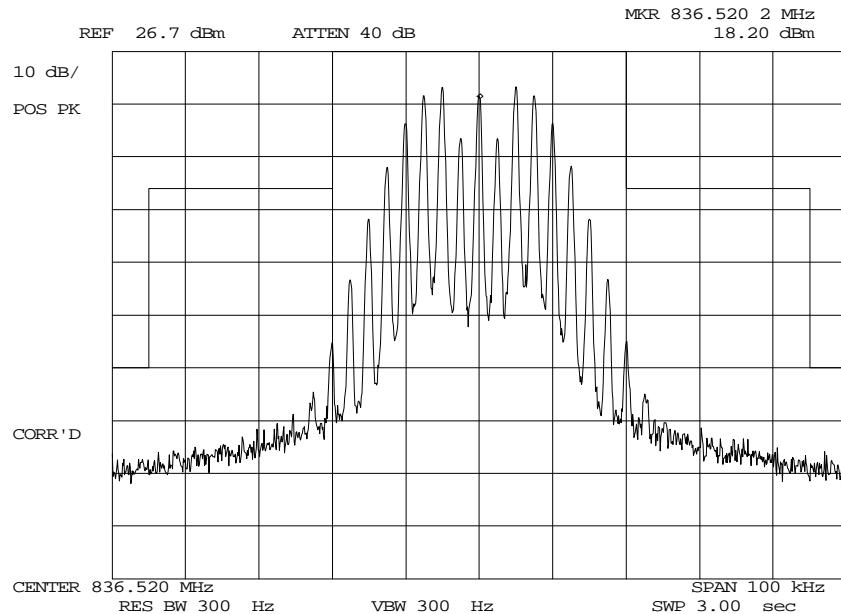


Morton Flom, P. Eng.

PAGE NO.

33 of 57.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g9970408: 1999-Jul-22 Thu 11:36:00
 STATE: 2:High Power



POWER:
 MODULATION:

HIGH
 VOICE: 2500 Hz SINE WAVE
 MASK: AMPS CELLULAR,
 F3E/F3D w/LPF

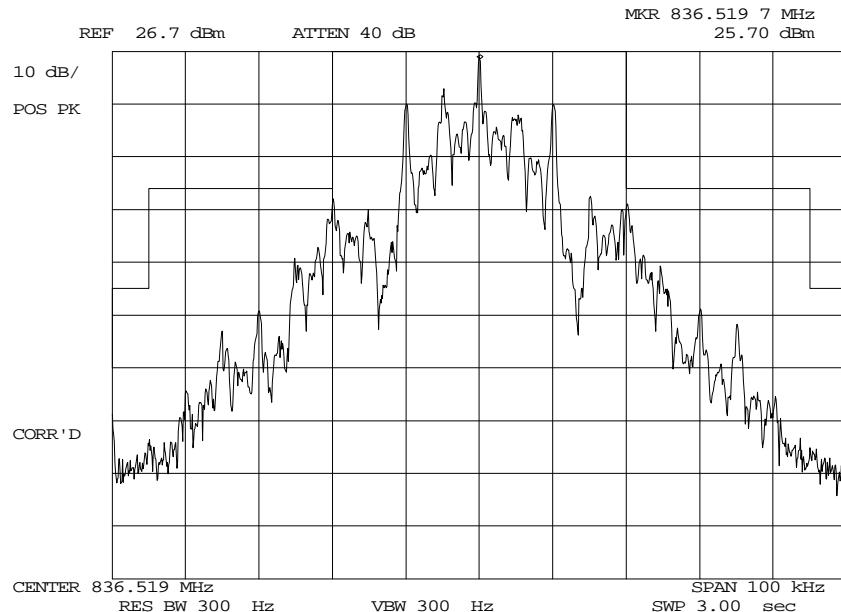
SUPERVISED BY:


 Morton Flom, P. Eng.

PAGE NO.

34 of 57.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g9960304: 1999-Jun-30 Wed 11:58:00
 STATE: 2:High Power



POWER: HIGH
 MODULATION: WBD
 MASK: AMPS CELLULAR, F1D,
 DATA

SUPERVISED BY:

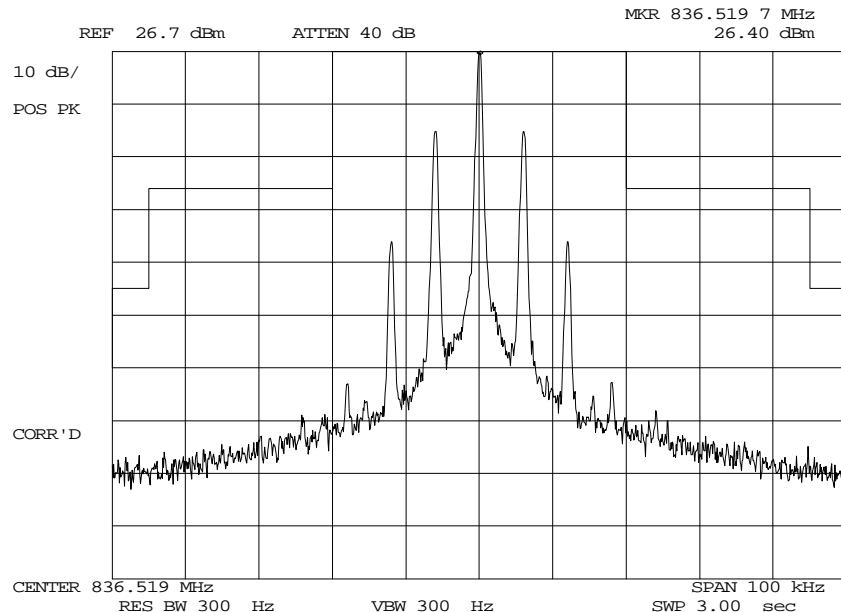


Morton Flom, P. Eng.

PAGE NO.

35 of 57.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g9960299: 1999-Jun-30 Wed 11:34:00
 STATE: 2:High Power



POWER: HIGH
 MODULATION: SAT
 MASK: AMPS CELLULAR, F1D,
 DATA

SUPERVISED BY:

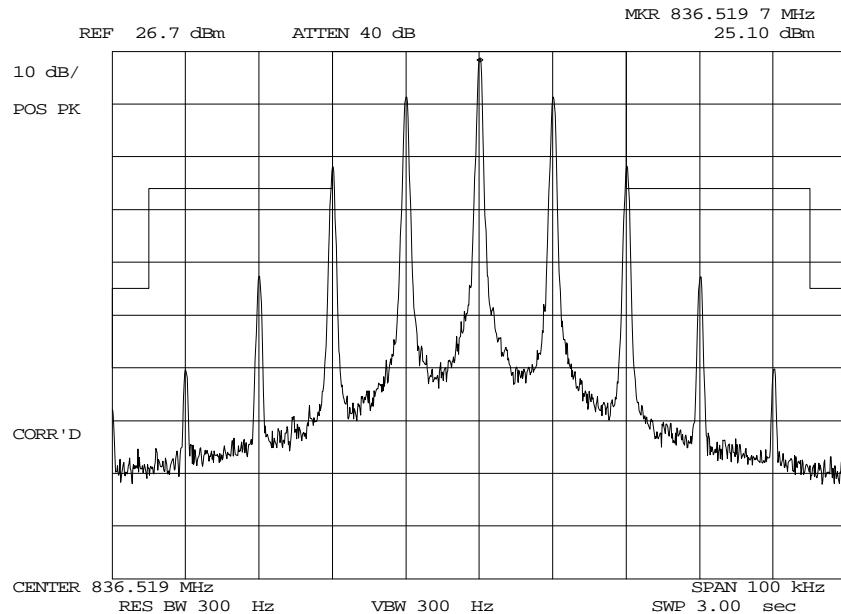


Morton Flom, P. Eng.

PAGE NO.

36 of 57.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g9960302: 1999-Jun-30 Wed 11:46:00
 STATE: 2:High Power



POWER:
 MODULATION:

HIGH
 ST
 MASK: AMPS CELLULAR, F1D,
 DATA

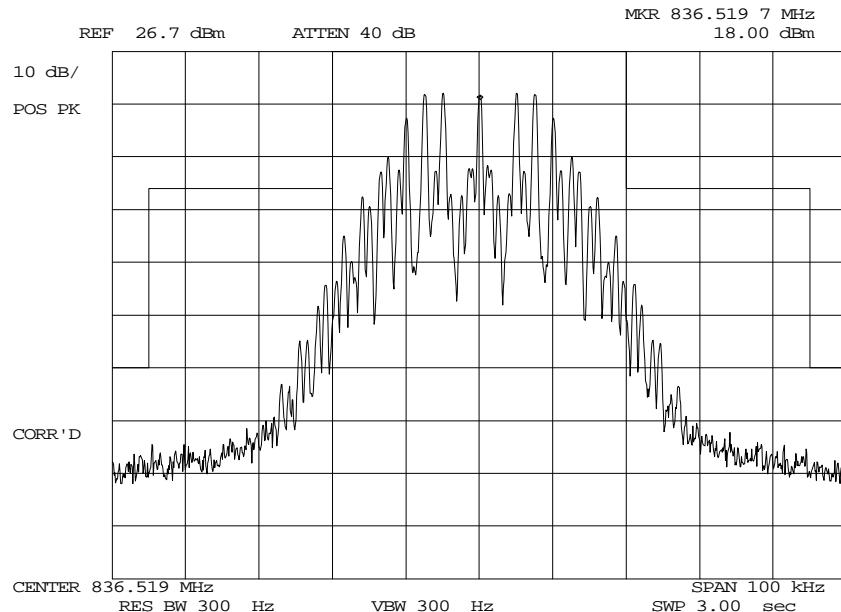
SUPERVISED BY:


 Morton Flom, P. Eng.

PAGE NO.

37 of 57.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g9960296: 1999-Jun-30 Wed 11:24:00
 STATE: 2:High Power



POWER: HIGH
 MODULATION: SAT+VOICE
 MASK: AMPS CELLULAR,
 F3E/F3D w/LPF

SUPERVISED BY:

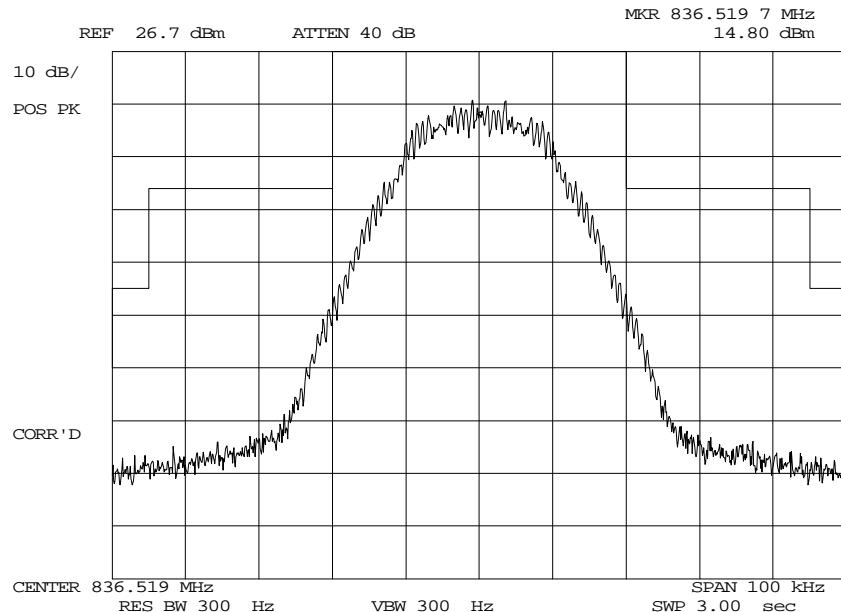


Morton Flom, P. Eng.

PAGE NO.

38 of 57.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g9960300: 1999-Jun-30 Wed 11:40:00
 STATE: 2:High Power



POWER: HIGH
 MODULATION: SAT+DTMF
 MASK: AMPS CELLULAR, F1D,
 DATA

SUPERVISED BY:



Morton Flom, P. Eng.

PAGE NO. 39 of 57.

NAME OF TEST: Emission Requirements -
Worst Case Modulation & Wideband Data

SPECIFICATION: 47 CFR 22.917

GUIDE: As indicated on page 7

TEST EQUIPMENT: As per previous page

MEASUREMENT PROCEDURE

1. The EUT was connected to a coaxial attenuator and then to a spectrum analyzer. The unmodulated carrier was set for 0 dB reference level.
2. A notch filter was introduced to reduce or eliminate any spectrum analyzer internally generated spurious for measurements of the harmonics and the carrier level.
3. Spectrum analyzer bandwidth was set to section 22.917(h) as applicable.
4. Measurements were made on channels 380, 799 and 991. The equipment was first modulated for the Worst Case Modulation, then for Wideband Data (F8W, F1D).
5. All other spurious emissions over the range of 0 the beyond the 10th harmonic (10 GHz) were 20 dB or more below the limit
6. The data presented here is for the Worst Case.
7. MEASUREMENT RESULTS: ATTACHED

PAGE NO.

40 of 57.

MEASUREMENT SUMMARY: Emission Requirements -
Worst Case Modulation

WORST CASE MODULATION = VOICE +_SAT

| EMISSION, MHz/HARM. | LIMIT, dBc | SPURIOUS EMISSIONS, dBc | |
|--|--------------------------|-------------------------|--------|
| | | Lo | Hi |
| F0 + 20 kHz to F0 + 45 kHz | ≤-26 | ≤-45.0 | ≤-46.0 |
| F0 + 45 kHz to 2 nd Harmonic | ≤-60 or 43 + 10 log P | ≤-77.0 | ≤-79.0 |
| 2 nd to 10 th | (≤-13 dBm) | ≤-70.8 | ≤-72.8 |

MEASUREMENT RESULTS = ATTACHED OFFSET PLOTS

EMISSION IN THE RECEIVER CRITICAL BAND

| EMISSION, MHz/HARM. | LIMIT, dBm | SPURIOUS EMISSIONS, dBm | |
|------------------------|------------|-------------------------|--------|
| | | Lo | Hi |
| 869 to 894 | ≤-80 | ≤-83.2 | ≤-83.3 |
| MEASUREMENT RESULTS | | = ATTACHED PLOTS | |

SUPERVISED BY:

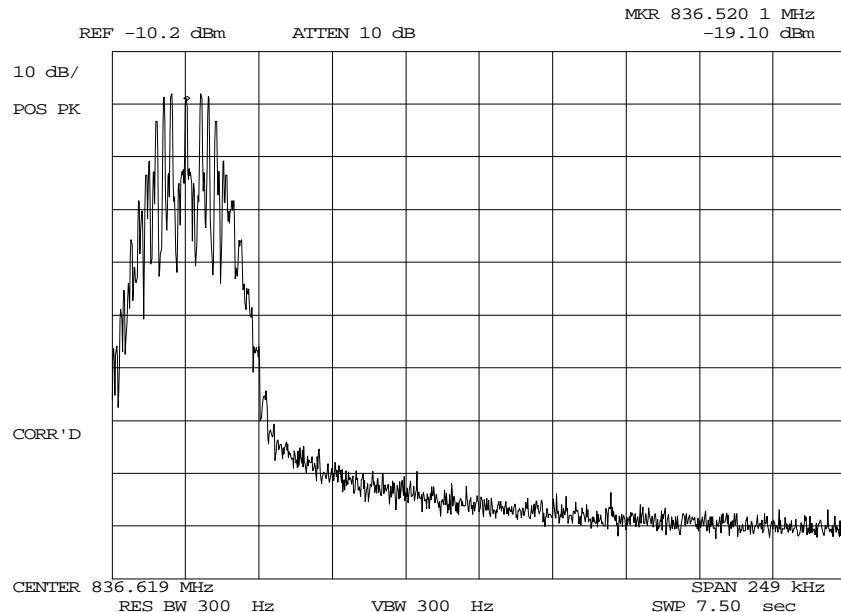


Morton Flom, P. Eng.

PAGE NO.

41 of 57.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g9970032: 1999-Jul-01 Thu 10:41:00
 STATE: 1:Low Power



POWER: LOW
 MODULATION: SAT+VOICE
 OFFSET OCCUPIED BANDWIDTH

SUPERVISED BY:

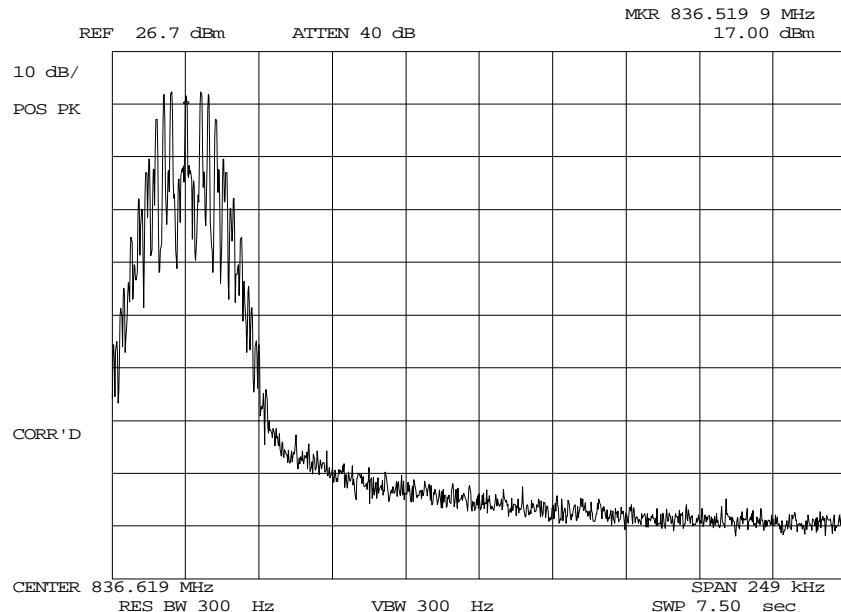


Morton Flom, P. Eng.

PAGE NO.

42 of 57.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g9970031: 1999-Jul-01 Thu 10:39:00
 STATE: 2:High Power



POWER: HIGH
 MODULATION: SAT+VOICE
 OFFSET OCCUPIED BANDWIDTH

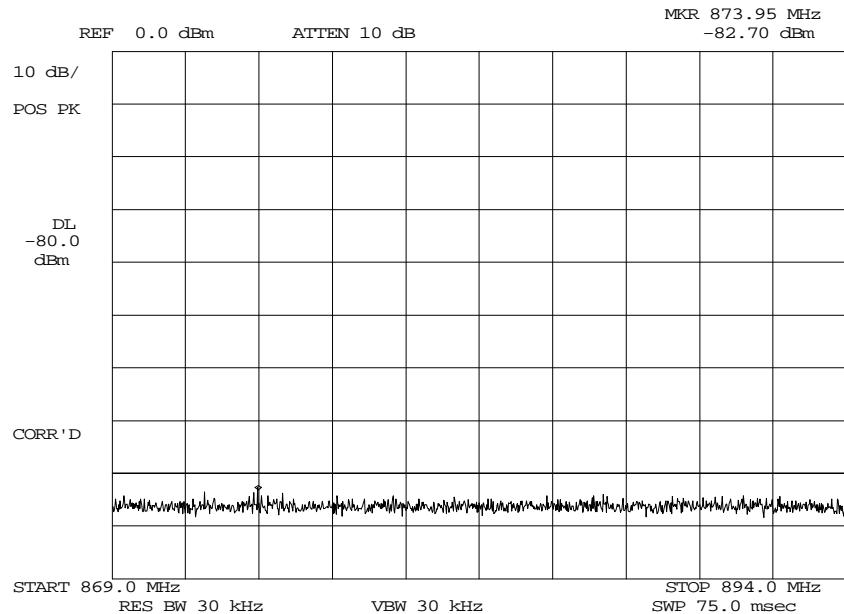
SUPERVISED BY:

Morton Flom, P. Eng.

PAGE NO.

43 of 57.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g9960313: 1999-Jun-30 Wed 14:07:00
 STATE: 1:Low Power



POWER: LOW
 MODULATION: ANY
 TX SPURS IN RX CRITICAL
 BAND

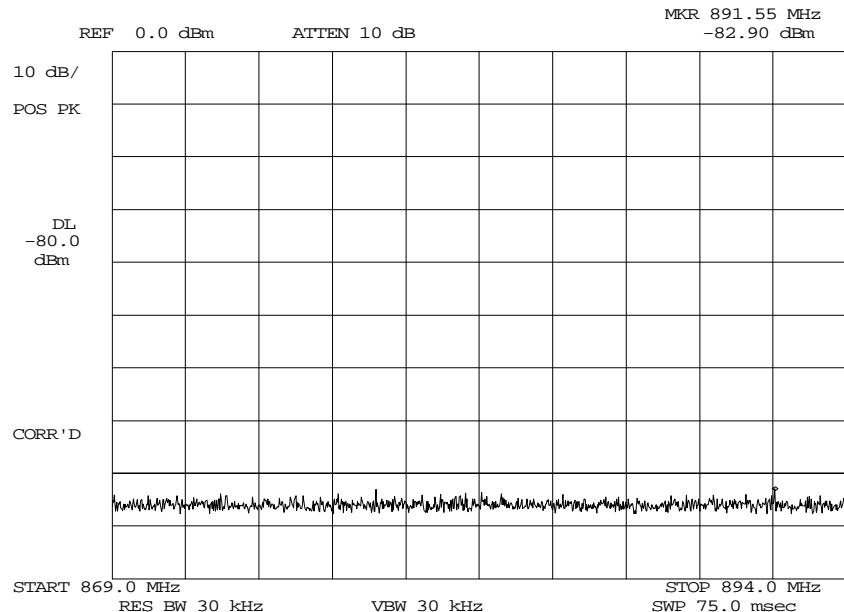
SUPERVISED BY:


 Morton Flom, P. Eng.

PAGE NO.

44 of 57.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g9960314: 1999-Jun-30 Wed 14:09:00
 STATE: 2:High Power



POWER: HIGH
 MODULATION: ANY
 TX SPURS IN RX CRITICAL
 BAND

SUPERVISED BY:



Morton Flom, P. Eng.

PAGE NO. 45 of 57.

MEASUREMENT SUMMARY: Emission Requirements -
Wideband Data (F1D, 10 kb/s)

| EMISSION, MHz/HARM. | LIMIT, dBc | SPURIOUS EMISSIONS, dBc | |
|--|--------------------|-------------------------|--------|
| | | Lo | Hi |
| F0 + 20 kHz to F0 + 45 kHz | ≤-26 | ≤-38.0 | ≤-38.0 |
| F0 + 45 kHz to F0 + 90 kHz | ≤-45 | ≤-70.0 | ≤-70.0 |
| F0 + 90 kHz to 2 nd Harmonic | ≤-60 (≤-13 dBm) | ≤-53.4 | ≤-58.2 |
| 2 nd to 10 th | (≤-13 dBm) | ≤-70.8 | ≤-72.2 |

MEASUREMENT RESULTS = ATTACHED OFFSET PLOTS

EMISSION IN THE RECEIVER CRITICAL BAND

| EMISSION, MHz/HARM. | LIMIT, dBm | SPURIOUS EMISSIONS, dBm | |
|------------------------|------------|-------------------------|--------|
| | | Lo | Hi |
| 869 to 894 | ≤-80 | ≤-83.2 | ≤-83.3 |
| MEASUREMENT RESULTS | | = ATTACHED PLOTS | |

SUPERVISED BY:

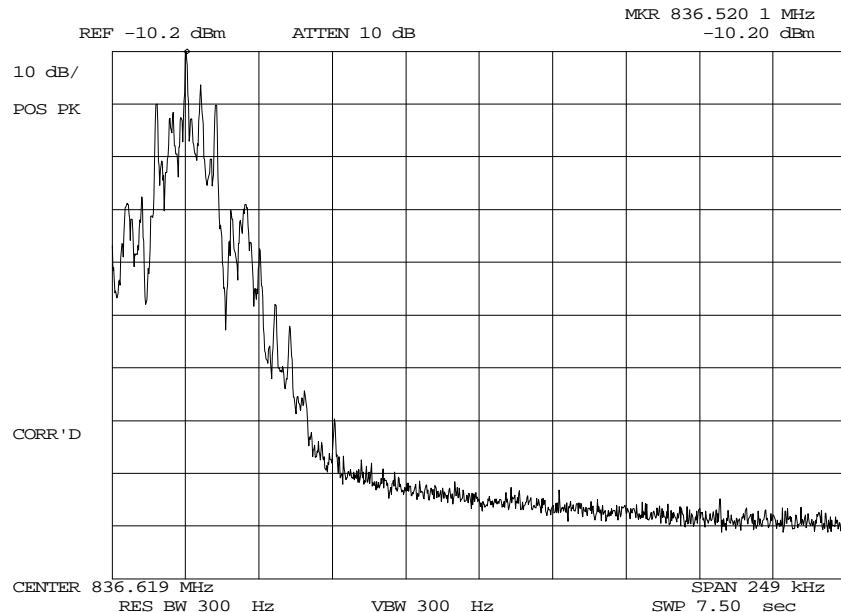


Morton Flom, P. Eng.

PAGE NO.

46 of 57.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g9960320: 1999-Jun-30 Wed 15:00:00
 STATE: 1:Low Power



POWER: LOW
 MODULATION: WBD
 OFFSET OCCUPIED BANDWIDTH

SUPERVISED BY:

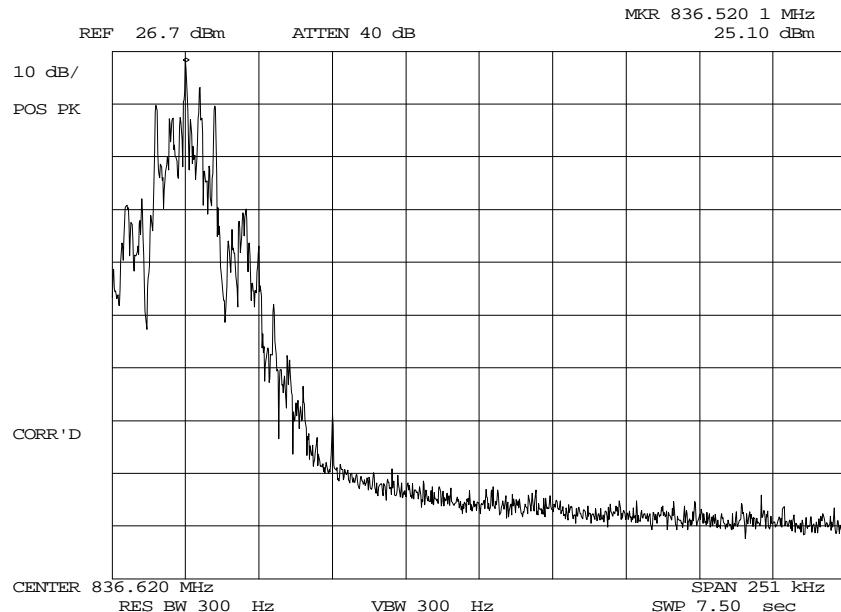


Morton Flom, P. Eng.

PAGE NO.

47 of 57.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g9960319: 1999-Jun-30 Wed 14:57:00
 STATE: 2:High Power



POWER: HIGH
 MODULATION: WBD
 OFFSET OCCUPIED BANDWIDTH

SUPERVISED BY:

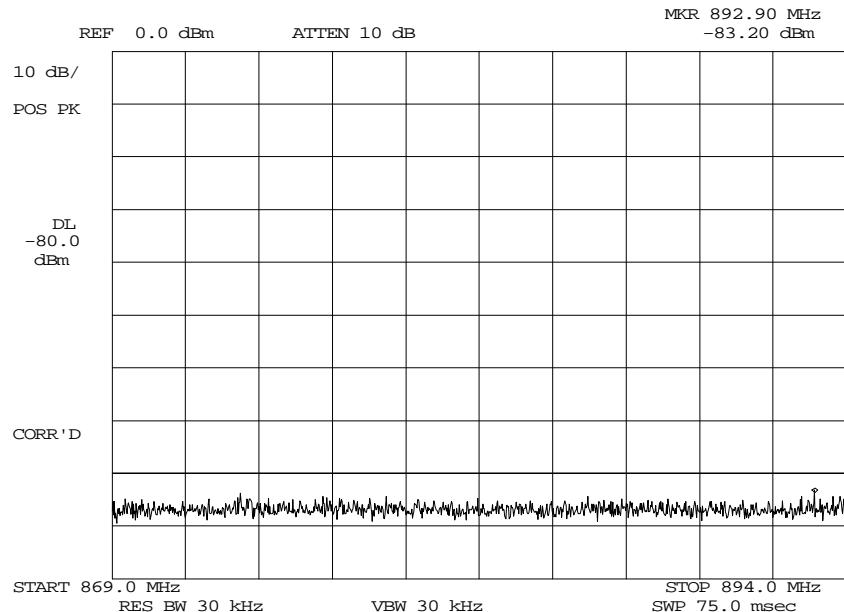


Morton Flom, P. Eng.

PAGE NO.

48 of 57.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g9960322: 1999-Jun-30 Wed 15:08:00
 STATE: 1:Low Power



POWER: LOW
 MODULATION: ANY
 TX SPURS IN RX CRITICAL
 BAND

SUPERVISED BY:

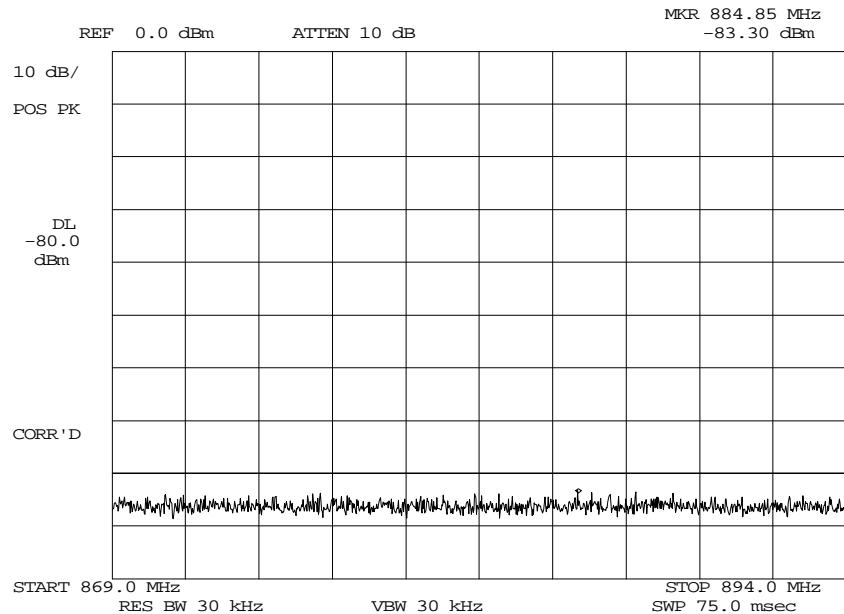


Morton Flom, P. Eng.

PAGE NO.

49 of 57.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g9960321: 1999-Jun-30 Wed 15:07:00
 STATE: 2:High Power



POWER: HIGH
 MODULATION: ANY
 TX SPURS IN RX CRITICAL
 BAND

SUPERVISED BY:



Morton Flom, P. Eng.

PAGE NO. 50 of 57.

NAME OF TEST: Field Strength of Spurious Radiation

SPECIFICATION: 47 CFR 2.1053(a)

GUIDE: As indicated on page 7

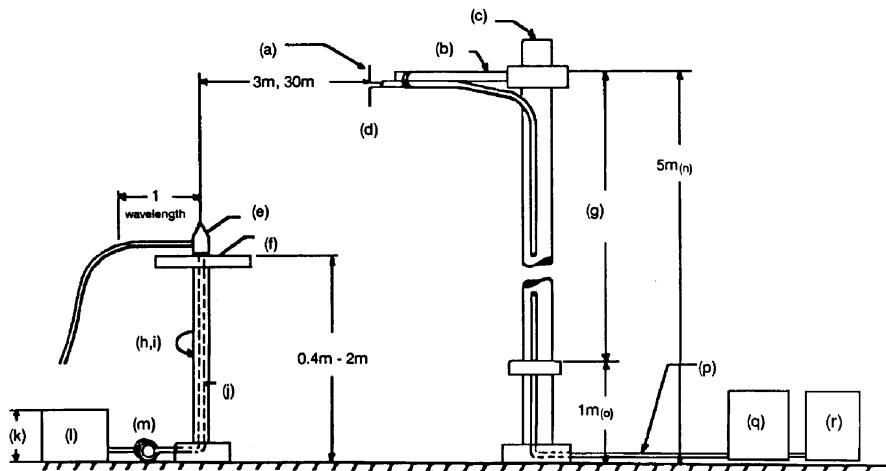
TEST EQUIPMENT: As per attached page

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 15.38, 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.
5. The field strength of each emission within 20 dB of the limit was recorded and corrected with the appropriate cable and transducer factors.
6. The worst case for all channels is shown.
7. 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 | s/n | Cycle | Last Cal |
|-----------------------------|----------------------------|------------|--------|----------|
| Per ANSI C63.4-1992, 10.1.4 | | | | |
| <u>TRANSDUCER</u> | | | | |
| i00065 | EMCO 3109B 100Hz-50MHz | 2336 | 12 mo. | |
| i00033 | Singer 94593-1 10kHz-32MHz | 0219 | 12 mo. | |
| x i00088 | EMCO 3109-B 25MHz-300MHz | 2336 | 12 mo. | Oct-98 |
| x i00089 | Aprel 2001 200MHz-1GHz | 001500 | 12 mo. | Oct-98 |
| x i00103 | EMCO 3115 1GHz-18GHz | 9208-3925 | 12 mo. | Oct-98 |
| i00085 | EMCO 3116 10GHz-40GHz | 2076 | 12 mo. | |
| <u>AMPLIFIER</u> | | | | |
| i00028 | HP 8449A | 2749A00121 | 12 mo. | Mar-99 |
| <u>SPECTRUM ANALYZER</u> | | | | |
| i00029 | HP 8563E | 3213A00104 | 12 mo. | Aug-99 |
| x i00033 | HP 85462A | 3625A00357 | 12 mo. | May-99 |
| i00048 | HP 8566B | 2511AD1467 | 6 mo. | May-99 |

PAGE NO.

52 of 57.

MEASUREMENT RESULTS: FIELD STRENGTH OF SPURIOUS RADIATION

Measurement Distance, m = 3

Spectrum Searched, GHz = 0 to 10

| TUNED, MHz | CHANNEL NUMBER | EMISSION MHz / HARM. | LEVEL, dBc | |
|---------------|-------------------|------------------------------------|------------|--|
| | | | Hi | |
| 824.040 | 991 | 2 nd - 10 th | -63 | |
| 836.400 | 380 | 2 nd - 10 th | -59 | |
| 848.970 | 799 | 2 nd - 10 th | -63 | |

NOTE:

For channels 380, 799 and 991, the field strength of spurious radiation over the above noted range measured 20 dB or more below the limit.

SUPERVISED BY:



Morton Flom, P. Eng.

PAGE NO.

53 of 57.

NAME OF TEST: Field Strength of Spurious Radiation
 g9960310: 1999-Jun-30 Wed 11:42:00
 STATE: 2:High Power

| FREQUENCY TUNED, MHz | FREQUENCY EMISSION, MHz | METER, dBuV | CF, dB | ERP, dBm | MARGIN, dB |
|-------------------------|----------------------------|----------------|--------|----------|------------|
| 824.040000 | 1648.072000 | 20.95 | 38.1 | -38.35 | -25.4 |
| 836.400000 | 1672.792000 | 21.08 | 38.33 | -37.95 | -25 |
| 848.970000 | 1697.932500 | 12.28 | 38.57 | -46.55 | -33.6 |
| 824.040000 | 2472.118700 | 13.63 | 44.98 | -38.75 | -25.8 |
| 836.400000 | 2509.198450 | 11.69 | 45.18 | -40.55 | -27.5 |
| 848.970000 | 2546.909750 | 2.28 | 45.4 | -49.65 | -36.7 |
| 824.040000 | 3296.159732 | 50.17 | 4.02 | -43.15 | -30.2 |
| 836.400000 | 3345.599367 | 52 | 4.16 | -41.25 | -28.2 |
| 848.970000 | 3395.879599 | 51.83 | 4.31 | -41.25 | -28.3 |
| 824.040000 | 4120.200265 | 51.67 | 6.14 | -39.55 | -26.6 |
| 836.400000 | 4181.999967 | 56.33 | 6.26 | -34.75 | -21.8 |
| 848.970000 | 4244.850865 | 53.17 | 6.38 | -37.85 | -24.9 |
| 824.040000 | 4944.240499 | 41.5 | 7.62 | -48.25 | -35.3 |
| 836.400000 | 5018.400633 | 41.83 | 7.74 | -47.85 | -34.8 |
| 848.970000 | 5093.820665 | 39.83 | 7.89 | -49.65 | -36.7 |
| 824.040000 | 5768.279531 | 8.5 | 9.19 | -79.65 | -66.7 |
| 836.400000 | 5854.799567 | 1.5 | 9.35 | -86.55 | -73.6 |
| 848.970000 | 5942.789398 | -3 | 9.5 | -90.85 | -77.9 |
| 824.040000 | 6592.319464 | 5.67 | 11.49 | -80.25 | -67.2 |
| 836.400000 | 6691.199367 | 8.5 | 11.79 | -77.05 | -64.1 |
| 848.970000 | 6791.759331 | 4.33 | 12.09 | -80.95 | -68 |
| 824.040000 | 7416.359397 | 6.17 | 12.56 | -78.65 | -65.7 |
| 836.400000 | 7527.599167 | -3 | 12.52 | -87.85 | -74.9 |
| 848.970000 | 7640.729264 | 6.17 | 12.48 | -78.75 | -65.8 |
| 824.040000 | 8240.399330 | -2.83 | 12.4 | -87.85 | -74.8 |
| 836.400000 | 8363.998967 | 8.67 | 12.42 | -76.25 | -63.3 |
| 848.970000 | 8489.699197 | 10.33 | 12.44 | -74.65 | -61.6 |

PAGE NO. 54 of 57.

NAME OF TEST: Frequency Stability (Temperature Variation)

SPECIFICATION: 47 CFR 2.1055(a)(1)

GUIDE: As indicated on page 7

TEST CONDITIONS: As Indicated

TEST EQUIPMENT: As per previous page

MEASUREMENT PROCEDURE

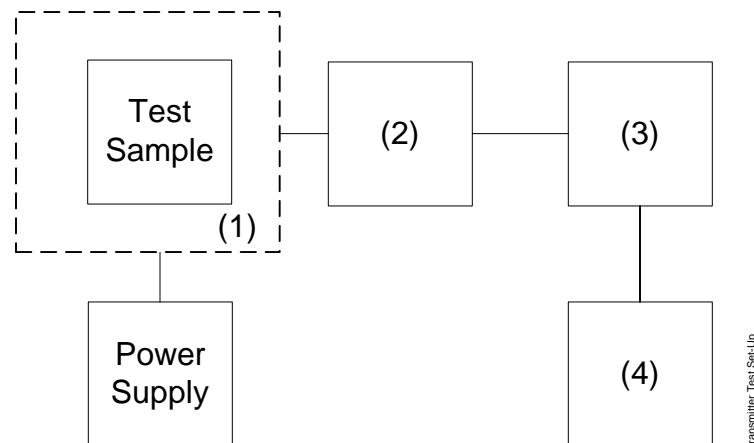
1. The EUT and test equipment were set up as shown on the following page.
2. With all power removed, the temperature was decreased to -30°C and permitted to stabilize for three hours. Power was applied and the maximum change in frequency was noted within one minute.
3. With power OFF, the temperature 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

PAGE NO.

55 of 57.

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



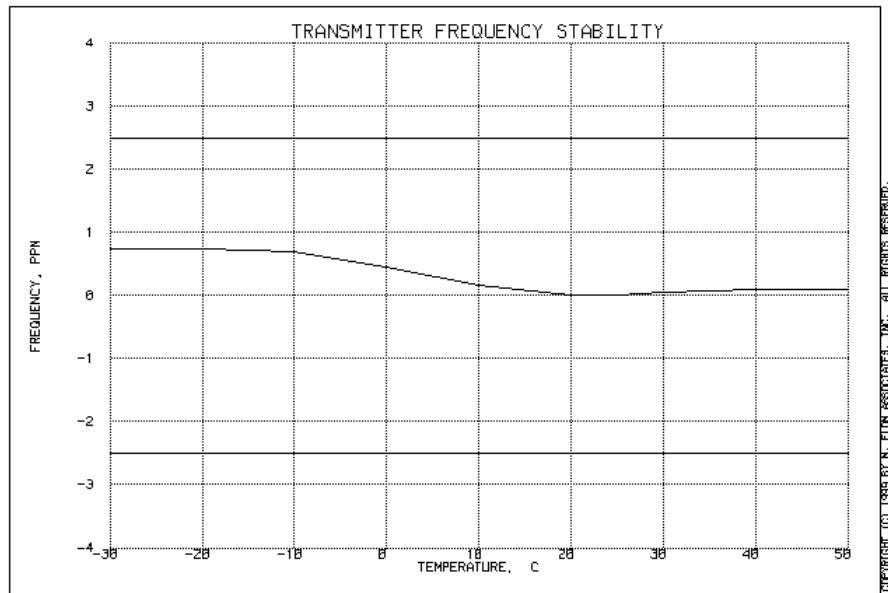
Transmitter Test Set-Up

| Asset | Description | s/n |
|-------|---|--------------|
| (1) | <u>TEMPERATURE, HUMIDITY, VIBRATION</u> | |
| x | i00027 Tenny Temp. Chamber | 9083-765-234 |
| — | i00 Weber Humidity Chamber | |
| — | i00 L.A.B. RVH 18-100 | |
| (2) | <u>COAXIAL ATTENUATOR</u> | |
| x | 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 |
| x | i00039 HP 436A POWER METER | 2709A26776 |
| x | i00020 HP 8901A POWER MODE | 2105A01087 |
| (4) | <u>FREQUENCY COUNTER</u> | |
| — | i00042 HP 5383A | 1628A00959 |
| x | i00019 HP 5334B | 2704A00347 |
| x | i00020 HP 8901A | 2105A01087 |

PAGE NO.

56 of 57.

NAME OF TEST: Frequency Stability (Temperature Variation)
g9970014: 1999-Jul-02 Fri 09:03:00
STATE: 0:General



SUPERVISED BY:

A handwritten signature in black ink, appearing to read "M. Flom, P. Eng."

Morton Flom, P. Eng.

PAGE NO. 57 of 57.

NAME OF TEST: Frequency Stability (Voltage Variation)

SPECIFICATION: 47 CFR 2.1055 (b)(1)

GUIDE: As indicated on page 7

TEST EQUIPMENT: As per previous page

MEASUREMENT PROCEDURE

1. The EUT was placed in a temperature chamber at $25\pm5^{\circ}\text{C}$ 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. Use 'best' data only.'');

RESULTS: Frequency Stability (Voltage Variation)

g9960289: 1999-Jun-30 Wed 09:36:49

STATE: 0:General

| | |
|-----------------------------|--------|
| LIMIT, ppm | = 2.5 |
| LIMIT, Hz | = 2091 |
| BATTERY END POINT (Voltage) | = 3.6 |

| % of STV | Voltage | Frequency, MHz | Change, Hz | Change, ppm |
|----------|---------|----------------|------------|-------------|
| 85 | 3.57 | 836.520000 | 0 | 0.00 |
| 100 | 4.2 | 836.520000 | 0 | 0.00 |
| 115 | 4.83 | 836.519980 | -20 | -0.02 |
| 86 | 3.6 | 836.520010 | 10 | 0.01 |

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.