



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 8, 2000

Federal Communications Commission
Via: Electronic Filing

Attention: Authorization & Evaluation Division

Applicant: Telson Electronics Co. Ltd.
Equipment: TDC8020
FCC ID: MC6TDC8020
FCC Rules: 22H, Confidentiality

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,

A handwritten signature in black ink, appearing to read 'M. Flom P. Eng.' The signature is written in a cursive style with a horizontal line underneath the name.

Morton Flom, P. Eng.

enclosure(s)
cc: Applicant
MF/cvr

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

APPLICANT: Telson Electronics Co. Ltd.

FCC ID: MC6TDC8020

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
 - BLOCK DIAGRAM
 - PARTS LIST
 - ACTIVE DEVICES
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: MC6TDC8020

NAMEPLATE DRAWING

ATTACHED, EXHIBIT 1.

LOCATION

AS PER LABEL DRAWING(S)

DATE OF REPORT

September 8, 2000

SUPERVISED BY:

A handwritten signature in black ink, appearing to read 'M. Flom, P. Eng.' with a long horizontal line underneath.

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) Error! Bookmark not defined.	
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	41
2.1053(a)	Field Strength of Spurious Radiation	52
2.1055(a)(1)	Frequency Stability (Temperature Variation)	56
2.1055(b)(1)	Frequency Stability (Voltage Variation)	59

PAGE NO.

1 of 59.

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: d0090007

d) Client: Telson Electronics U.S.A., Inc.
460 Bergen Blvd Suite 205
Palisade Park, NJ 07650

e) Identification: TDC8020
FCC ID: MC6TDC8020
Description: Dual Mode Cellphone Held To Ear

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

g) Report Date: September 8, 2000
EUT Received: August 15, 2000

h, j, k): As indicated in individual tests.

i) Sampling method: No sampling procedure used.

l) Uncertainty: In accordance with MFA internal quality manual.

m) Supervised by:


Morton Flom, P. Eng.

n) Results: The results presented in this report relate only to the item tested.

o) Reproduction: This report must not be reproduced, except in full, without written permission from this laboratory.

PAGE NO. 2 of 59.

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

22H, Confidentiality

Sub-part 2.1033(c)(1): NAME AND ADDRESS OF APPLICANT:

Telson Electronics Co. Ltd.
17 Telson Venture Tower
949-3 Dogok-Dong
Kangnam-Ku, Seoul 135 270, Korea

MANUFACTURER:

Applicant

(c)(2): FCC ID: MC6TDC8020MODEL NO: TDC8020(c)(3): INSTRUCTION MANUAL(S):

PLEASE SEE ATTACHED EXHIBITS

(c)(4): TYPE OF EMISSION: 40K0F1D, 40K0F8W, 1M25F9W(c)(5): FREQUENCY RANGE, MHz: 824.04 to 848.97 AMPS
824.64 to 848.37 CDMA(c)(6): POWER RATING, Watts: 0.006 to 0.417 AMPS
0.006 to 0.257 CDMA
 Switchable Variable N/A

FCC GRANT NOTE:

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

PAGE NO.

3 of 59.

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 = 3.35

(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 59.

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 24th day of November, 1998.



Pete Flom
President
For the Accreditation Council
Certificate Number 1008.01
Valid to December 31, 2000

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



American Association for Laboratory Accreditation

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

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

ELECTRICAL (EMC)

Valid to: December 31, 2000

Certificate Number: 1008-01

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

Tests	Standard(s)
RF Emissions	FCC Part 15 (Subparts B and C) using ANSI C63.4-1992; CISPR 11; CISPR 13; CISPR 14; CISPR 22; EN 55011; EN 55013; EN 55014; EN 55022; EN 50081-1; EN 50081-2; FCC Part 18; ICES-003; AS/NZS 1044; AS/NZS 1053; AS/NZS 3548; AS/NZS 4251.1; CNS 13439
RF Immunity	EN 50082-1; EN 50082-2; AS/NZS 4251.1
Radiated Susceptibility	EN 61000-4-3; ENV 50140; ENV 50204; IEC 1000-4-3; IEC 801-3
ESD	EN 61000-4-2; IEC 1000-4-2; IEC 801-2
EFT	EN 61000-4-4; IEC 1000-4-4; IEC 801-4
Surge	EN 61000-4-5; ENV 50142; IEC 1000-4-5; IEC 801-5
47 CFR (FCC)	2, 21, 22, 23, 24, 74, 80, 87, 90, 95, 97

Revised 2/2/2000

Pete Flom

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



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

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

PAGE NO.

5 of 59.

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 59.

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
 - (f) SAT + DTMF
 - x (g) CDMA
 - (h) TDMA
 - (i) NAMPS VOICE
 - (j) NAMPS DSAT
 - (k) NAMPS ST
 - (l) NAMPS VOICE + DSAT

PAGE NO.

7 of 59.

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.

GUIDES:

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

TIA/EIA/IS-95A-1995

PAGE NO.

8 of 59.

PAGE INTENTIONALLY LEFT BLANK

PAGE NO.

9 of 59.

PAGE INTENTIONALLY LEFT BLANK

PAGE NO. 10 of 59.
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

AMPS Mode 2000-Aug-21 Mon 10:42:00

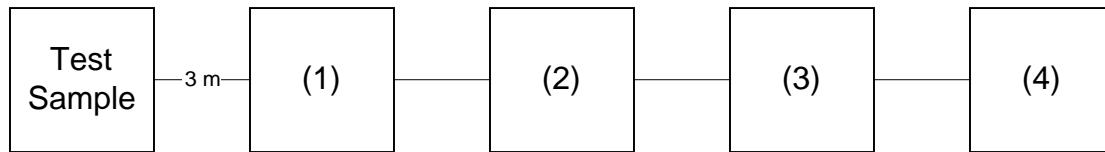
FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	METER, dBuV/m	CF, dB	ERP, dBm	ERP, Watts
824.040	824.040000	94.97	29.6	26.2	0.417
836.400	836.400000	93.87	29.6	26.1	0.407
848.970	848.970000	93.77	29.6	26.0	0.398

CDMA Mode 2000-Aug-21 Mon 10:42:00

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	METER, dBuV/m	CF, dB	ERP, dBm	ERP, Watts
824.730	824.694000	91.66	29.6	23.9	0.245
836.400	836.472000	91.87	29.6	24.1	0.257
848.190	848.226000	91.58	29.6	23.8	0.240

PAGE NO.

11 of 59.

TRANSMITTER RADIATED MEASUREMENTS

Transmitter Radiated Measurements

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

PAGE NO. 12 of 59.
NAME OF TEST: Audio Frequency Response
SPECIFICATION: 47 CFR 2.1047(a)
GUIDE: As indicated on page 7
TEST EQUIPMENT: As per previous page

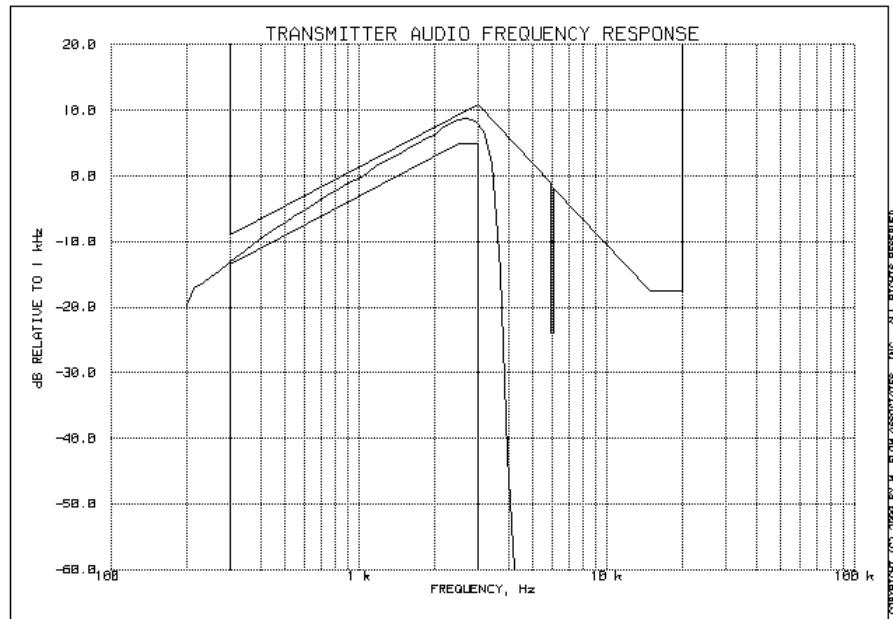
MEASUREMENT PROCEDURE

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 59.

NAME OF TEST: Audio Frequency Response
g0080547: 2000-Aug-21 Mon 10:37:00
STATE: 0:General



SUPERVISED BY:


Morton Flom, P. Eng.

PAGE NO. 14 of 59.

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

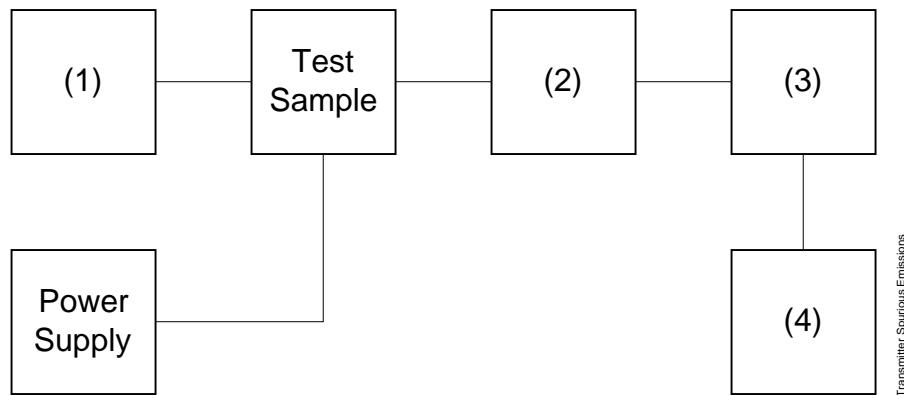
1. The EUT and test equipment were set up such that the audio input was connected at the input to the modulation limiter, and the modulated stage.
2. The audio output was connected at the output to the modulated stage.
3. MEASUREMENT RESULTS: ATTACHED

PAGE NO.

15 of 59.

TRANSMITTER SPURIOUS EMISSION

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

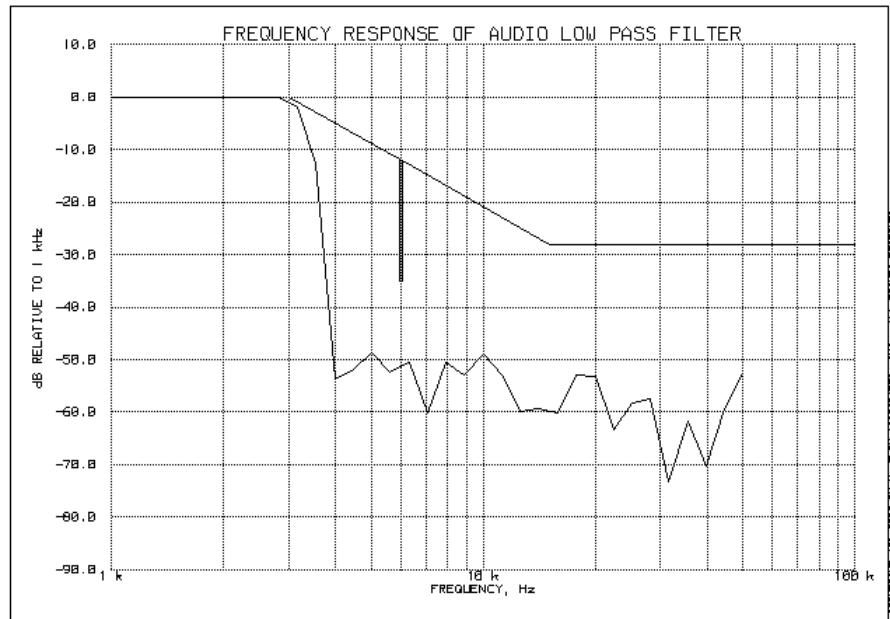


Asset Description (as applicable)	s/n
(1) <u>AUDIO OSCILLATOR/GENERATOR</u> i00010 HP 204D i00017 HP 8903A i00012 HP 3312A	1105A04683 2216A01753 1432A11250
(2) <u>COAXIAL ATTENUATOR</u> i00122 Narda 766-10 i00123 Narda 766-10 i00069 Bird 8329 (30 dB) i00113 Sierra 661A-3D	7802 7802A 1006 1059
(3) <u>FILTERS;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

PAGE NO.

16 of 59.

NAME OF TEST: Audio Low Pass Filter (Voice Input)
g0080549: 2000-Aug-21 Mon 10:59:00
STATE: 0:General



SUPERVISED BY:


Morton Flom, P. Eng.

PAGE NO. 17 of 59.

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:

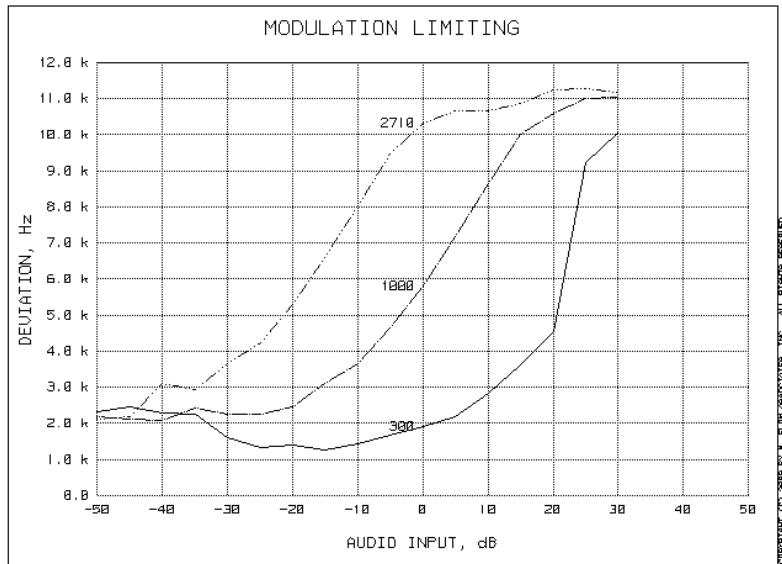
VOICE
 VOICE + SAT

PAGE NO.

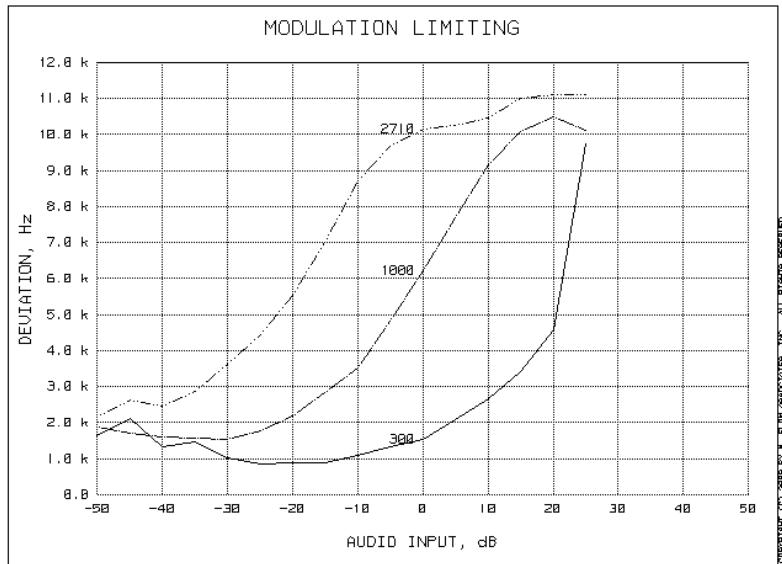
18 of 59.

NAME OF TEST: Modulation Limiting
 g0080552: 2000-Aug-21 Mon 11:11:00
 STATE: 0:General VOICE ONLY

Positive Peaks:



Negative Peaks:



SUPERVISED BY:



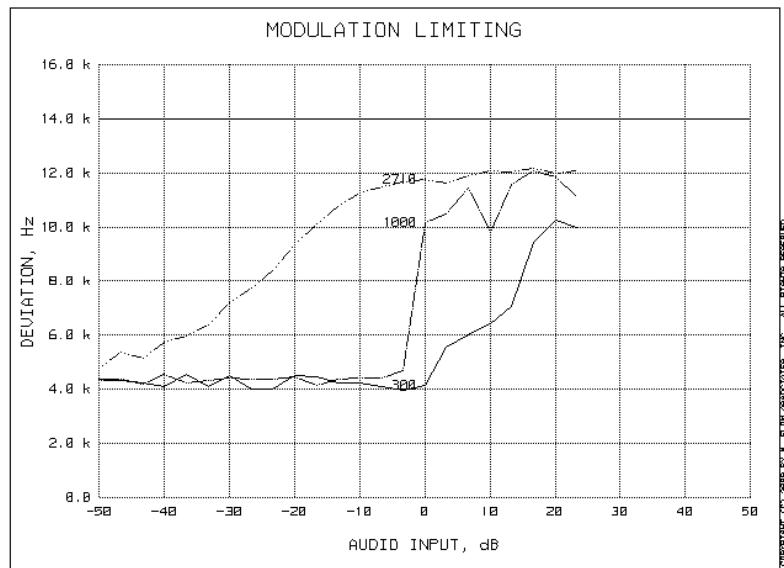
Morton Flom, P. Eng.

PAGE NO.

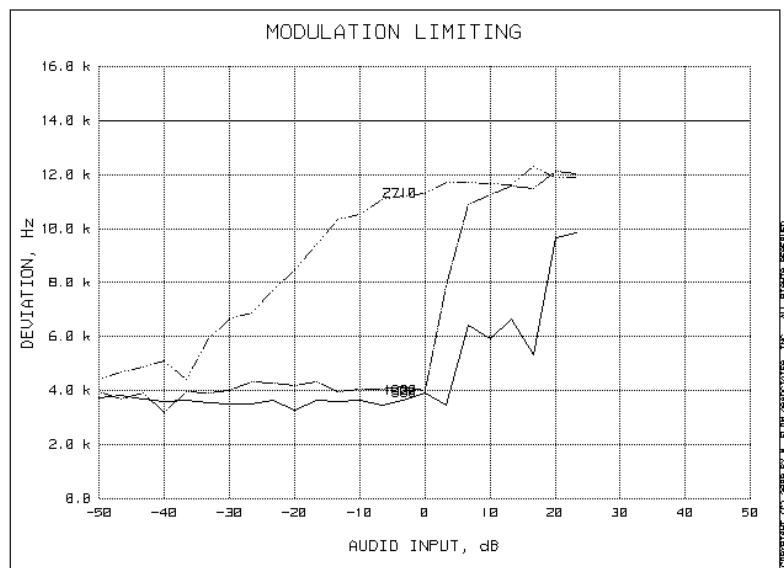
19 of 59.

NAME OF TEST: Modulation Limiting
 g0080556: 2000-Aug-21 Mon 11:36:00
 STATE: 0:General VOICE + SAT

Positive Peaks:



Negative Peaks:



SUPERVISED BY:


 Morton Flom, P. Eng.

PAGE NO. 20 of 59.

NAME OF TEST: Measurement Of Maximum Deviation

GUIDE: As indicated on page 7

TEST EQUIPMENT: As per attached page

MEASUREMENT PROCEDURE

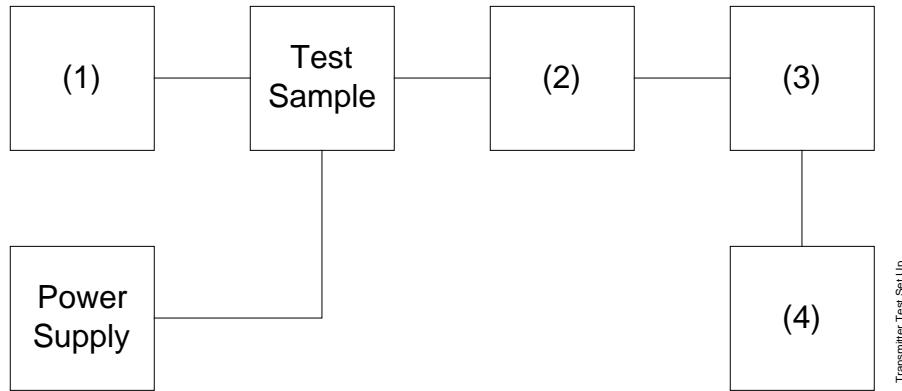
1. The presentation of tones was obtained by attaching the HP 8903A Oscilloscope to the Modulation Output of the HP 8901 Modulation Analyzer.
2. The EUT was modulated by an HP 8903 Audio Analyzer and/or internally generated signals.
3. Maximum deviation measurements were recorded for the various configurations.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

PAGE NO.

21 of 59.

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

PAGE NO.

22 of 59.

MEASUREMENT SUMMARY: Measurement Of Maximum Deviation

MODULATION	LIMIT, kHz	DEVIATION, MHz
(a) Voice	$\geq 10.8 \& \leq 13.2$	9.4
(b) Wideband Data	$\geq 7.2 \& \leq 8.8$	7.6
(c) SAT	$\geq 1.8 \& \leq 2.2$	2.1
(d) ST	$\geq 7.2 \& \leq 8.8$	7.4
(e) SAT + VOICE	N/A	11.6
(f) SAT + DTMF	N/A	N/A
(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 59.

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 59.

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	9.4	≥ 10.8 & ≤ 13.2	26
WIDEBAND DATA	7.6	≥ 7.2 & ≤ 8.8	24
SAT + VOICE	11.6	N/A	28
SAT + DTMF	N/A	N/A	N/A
CDMA	N/A	N/A	48
TDMA	N/A	N/A	N/A
NAMPS	N/A	N/A	N/A

SUPERVISED BY:

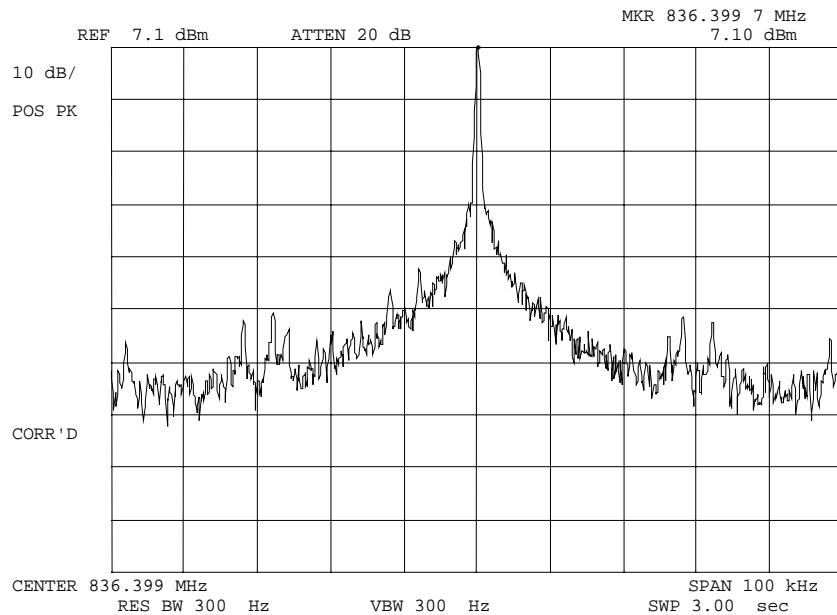


Morton Flom, P. Eng.

PAGE NO.

25 of 59.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g0080686: 2000-Aug-21 Mon 12:19:00
 STATE: 1:Low Power



POWER: LOW
 MODULATION: NONE

SUPERVISED BY:

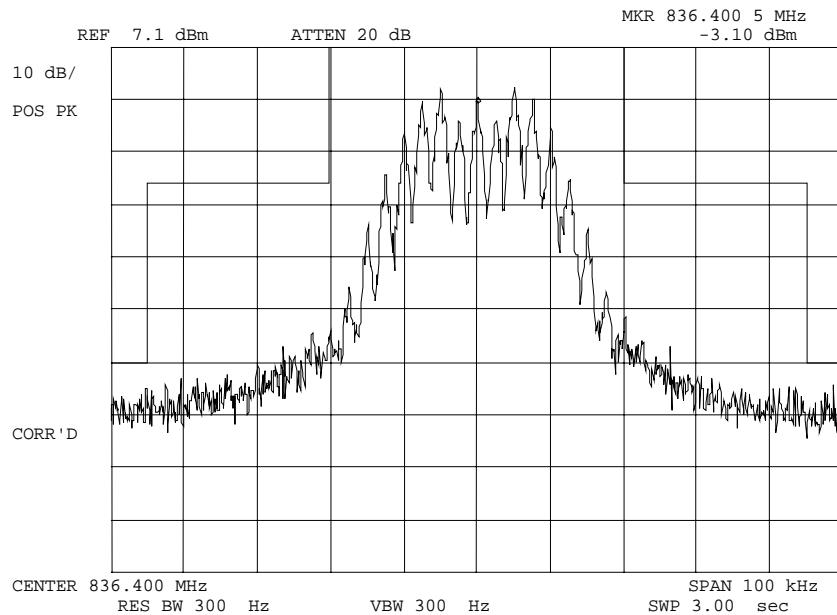


Morton Flom, P. Eng.

PAGE NO.

26 of 59.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g0080689: 2000-Aug-21 Mon 15:09:00
 STATE: 1:Low Power



POWER:
 MODULATION:

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

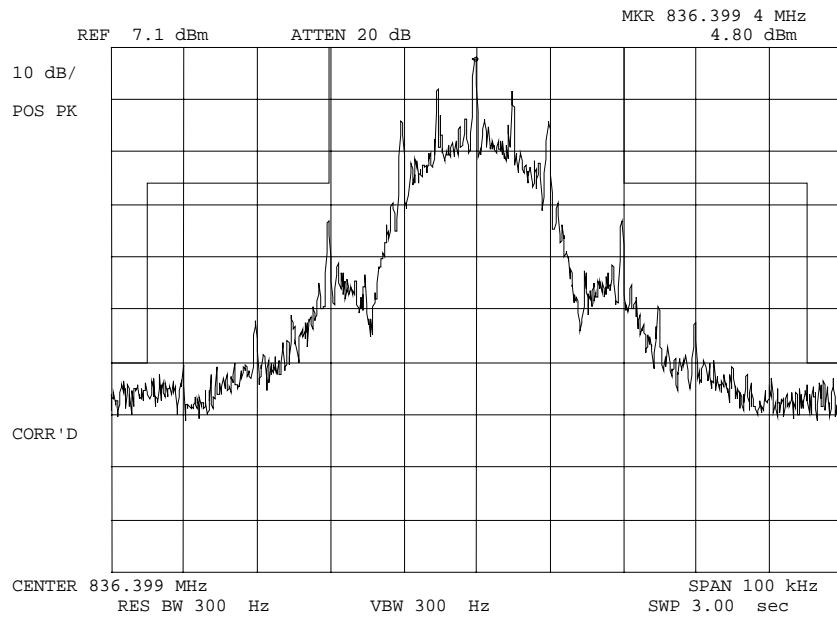
SUPERVISED BY:


 Morton Flom, P. Eng.

PAGE NO.

27 of 59.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g0080695: 2000-Aug-21 Mon 15:31:00
 STATE: 1:Low Power



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

SUPERVISED BY:

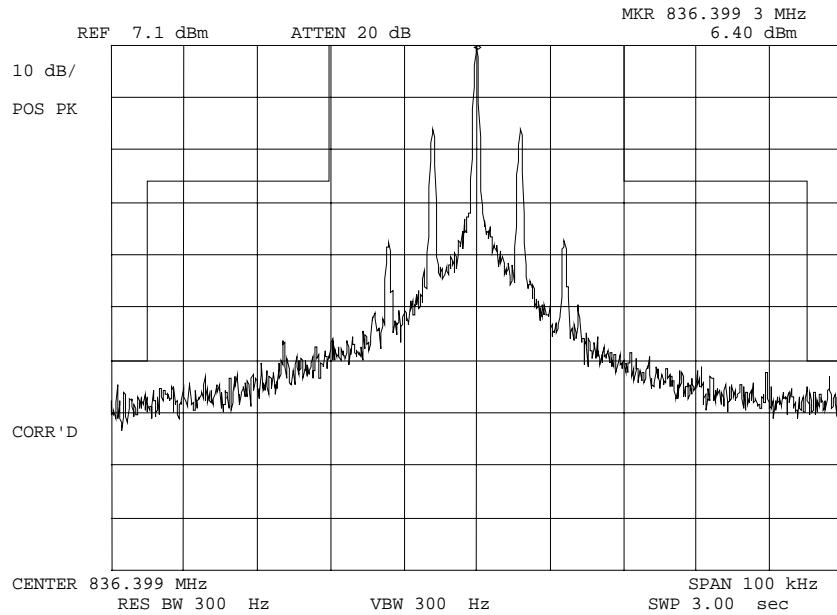


Morton Flom, P. Eng.

PAGE NO.

28 of 59.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g0080692: 2000-Aug-21 Mon 15:24:00
 STATE: 1:Low Power



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

SUPERVISED BY:

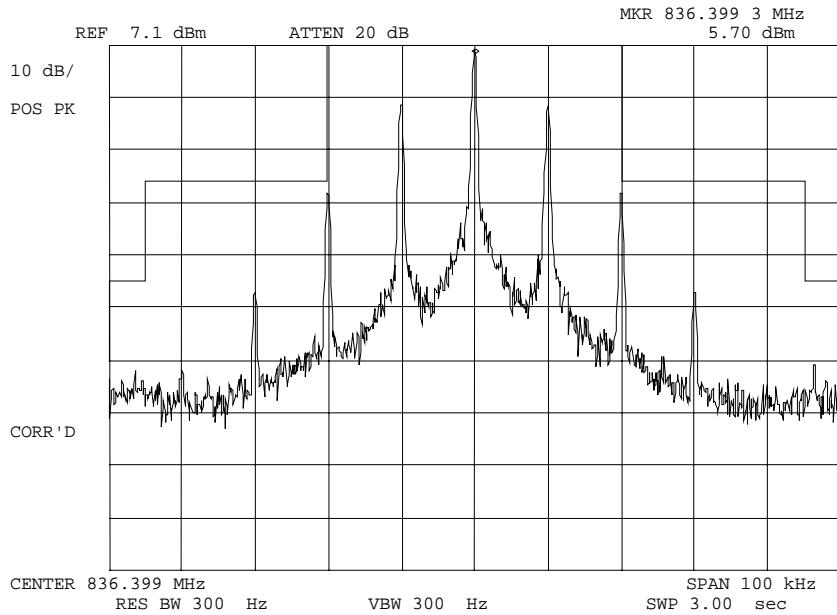


Morton Flom, P. Eng.

PAGE NO.

29 of 59.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g0080696: 2000-Aug-21 Mon 15:34:00
 STATE: 1:Low Power



POWER: LOW
 MODULATION: ST
 MASK: AMPS CELLULAR, F1D,
 DATA

SUPERVISED BY:

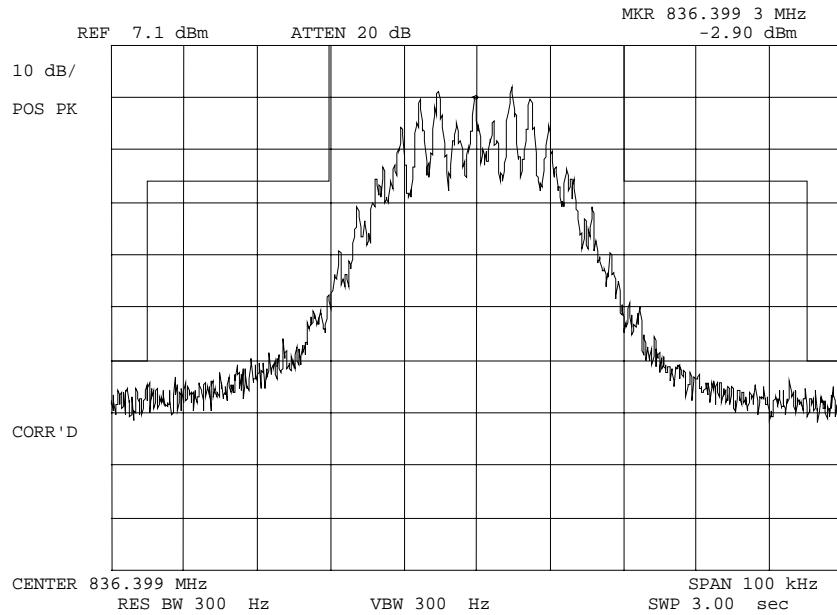


Morton Flom, P. Eng.

PAGE NO.

30 of 59.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g0080691: 2000-Aug-21 Mon 15:22:00
 STATE: 1:Low Power



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

SUPERVISED BY:

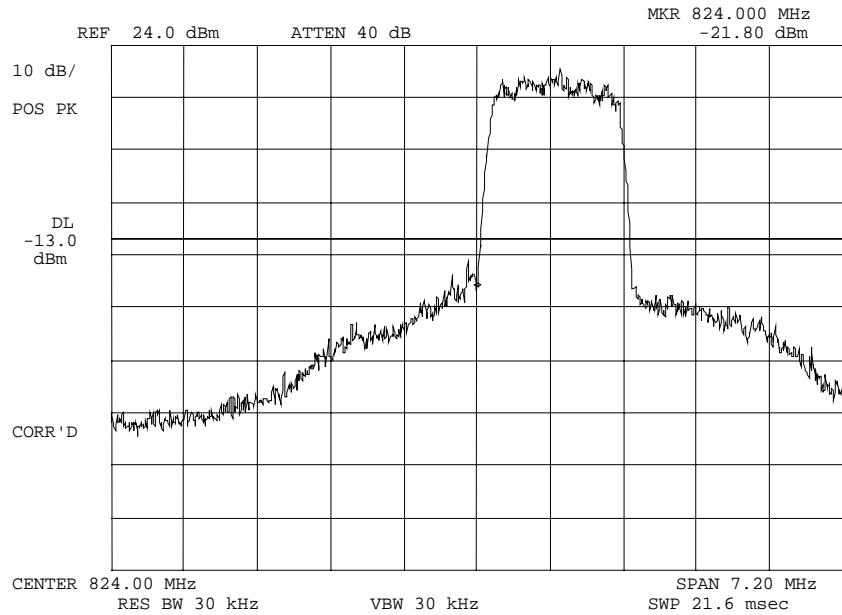


Morton Flom, P. Eng.

PAGE NO.

31 of 59.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g0080709: 2000-Aug-22 Tue 08:44:00
 STATE: 1:Low Power



POWER: LOW
 MODULATION: CDMA 800
 LOWER BANDEDGE CH 1014

SUPERVISED BY:

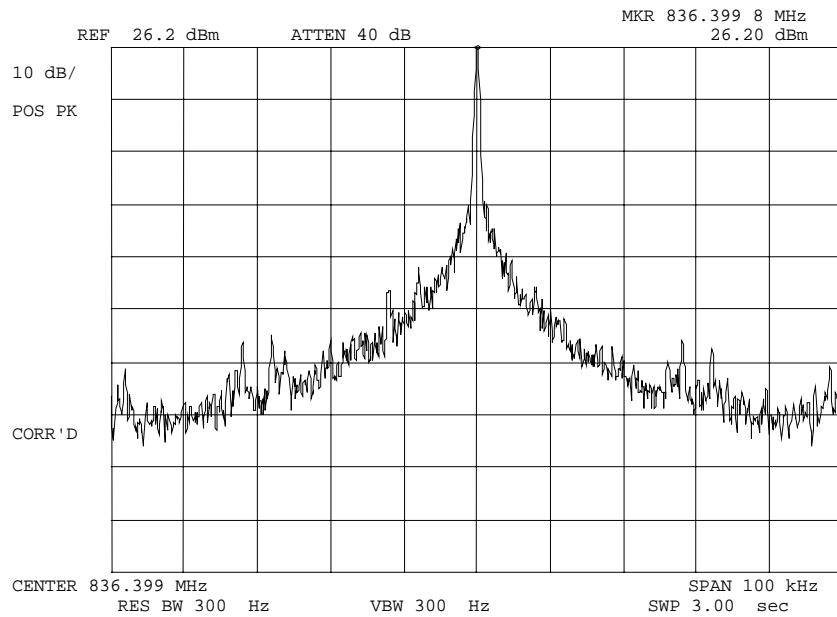


Morton Flom, P. Eng.

PAGE NO.

32 of 59.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g0080685: 2000-Aug-21 Mon 12:17:00
 STATE: 2:High Power



POWER: HIGH
 MODULATION: NONE

SUPERVISED BY:

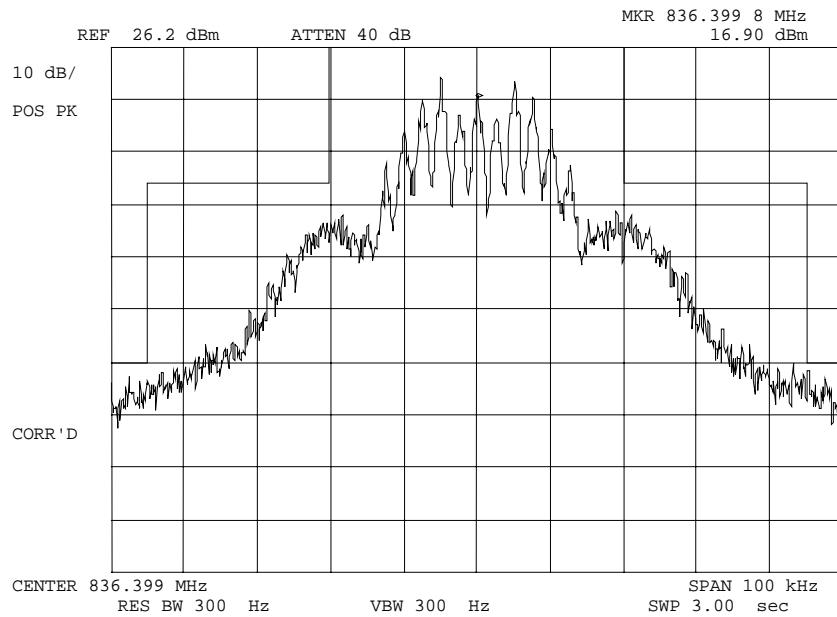


Morton Flom, P. Eng.

PAGE NO.

33 of 59.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g0080687: 2000-Aug-21 Mon 12:29:00
 STATE: 2:High Power



POWER:
 MODULATION:

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

SUPERVISED BY:

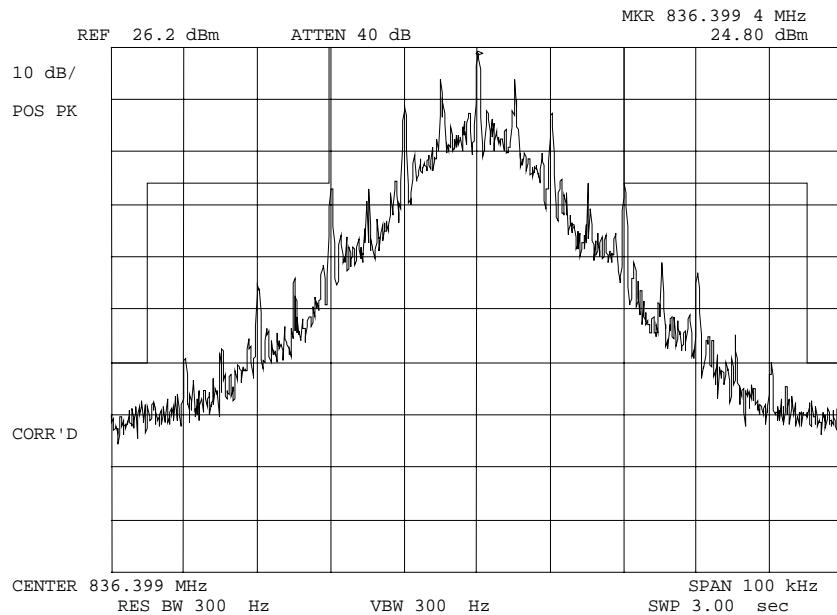


Morton Flom, P. Eng.

PAGE NO.

34 of 59.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g0080694: 2000-Aug-21 Mon 15:29:00
 STATE: 2:High Power



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

SUPERVISED BY:

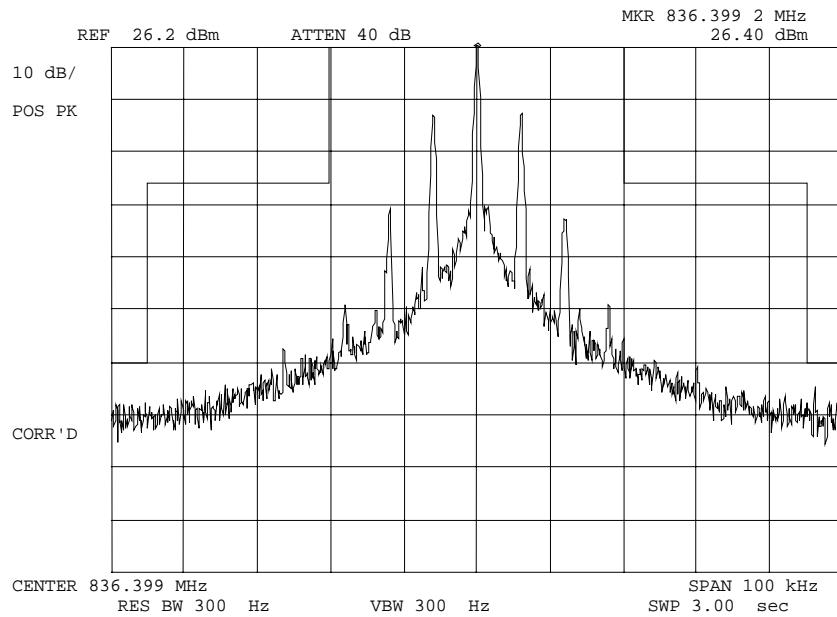


Morton Flom, P. Eng.

PAGE NO.

35 of 59.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g0080693: 2000-Aug-21 Mon 15:25:00
 STATE: 2:High Power



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

SUPERVISED BY:

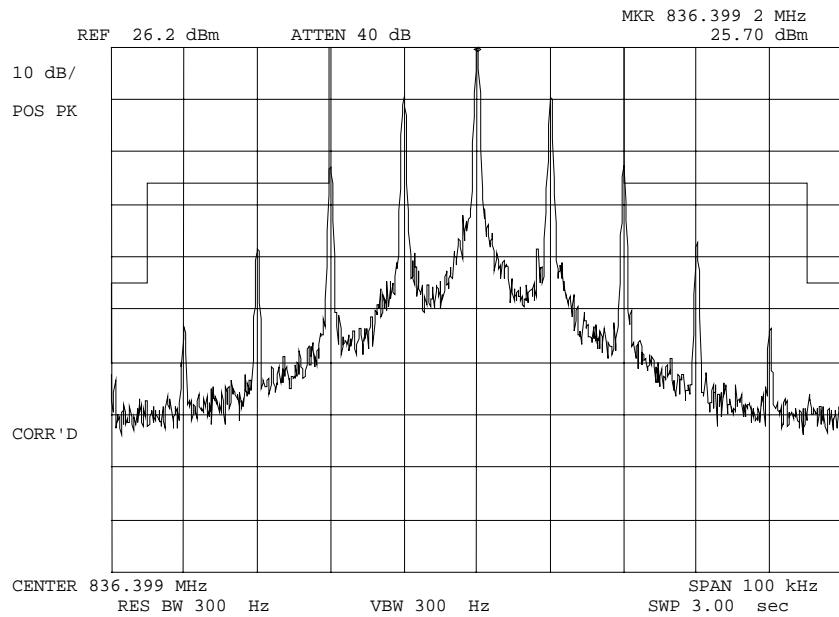


Morton Flom, P. Eng.

PAGE NO.

36 of 59.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g0080697: 2000-Aug-21 Mon 15:35:00
 STATE: 2:High Power



POWER:
 MODULATION:

HIGH
 ST
 MASK: AMPS CELLULAR, F1D,
 DATA

SUPERVISED BY:

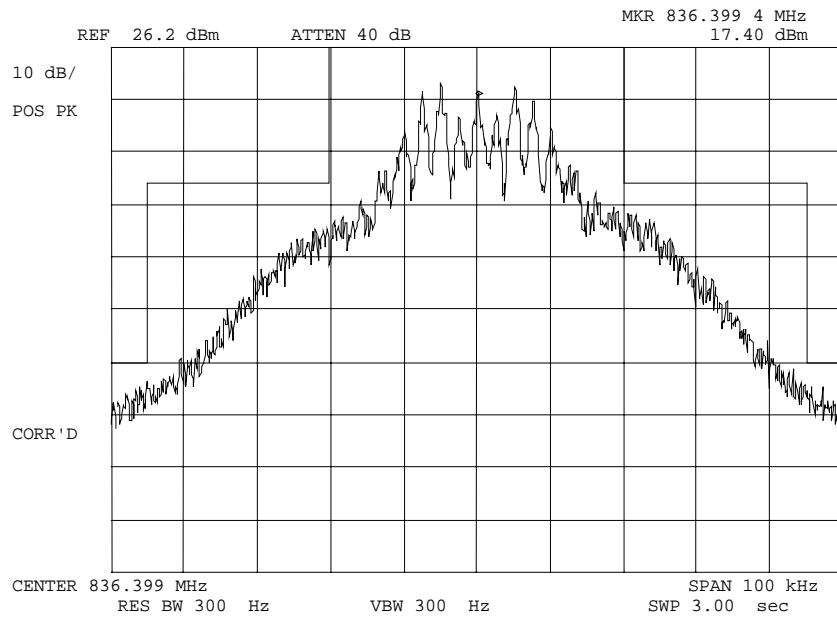


Morton Flom, P. Eng.

PAGE NO.

37 of 59.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g0080690: 2000-Aug-21 Mon 15:21:00
 STATE: 2:High Power



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

SUPERVISED BY:

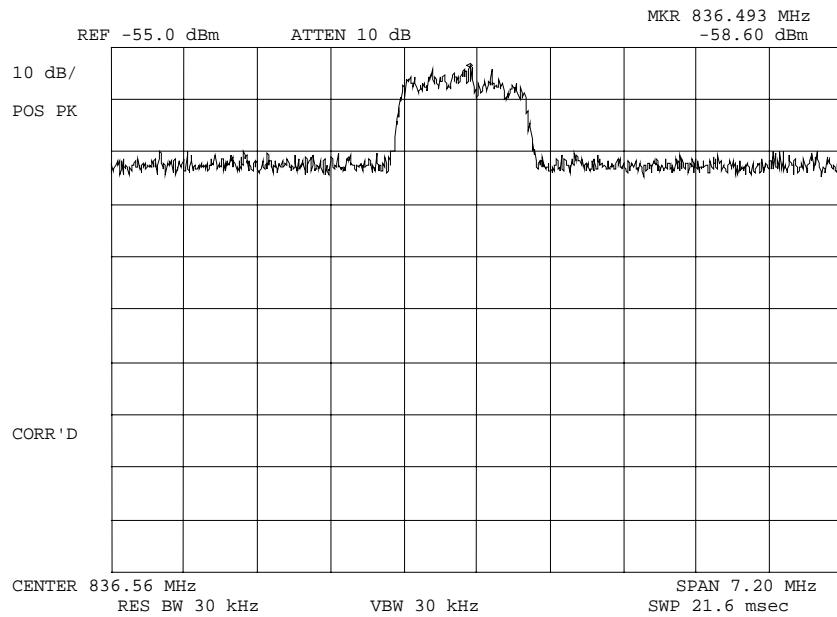


Morton Flom, P. Eng.

PAGE NO.

38 of 59.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g0080711: 2000-Aug-22 Tue 08:49:00
 STATE: 2:High Power



POWER: HIGH
 MODULATION: CDMA 800

SUPERVISED BY:

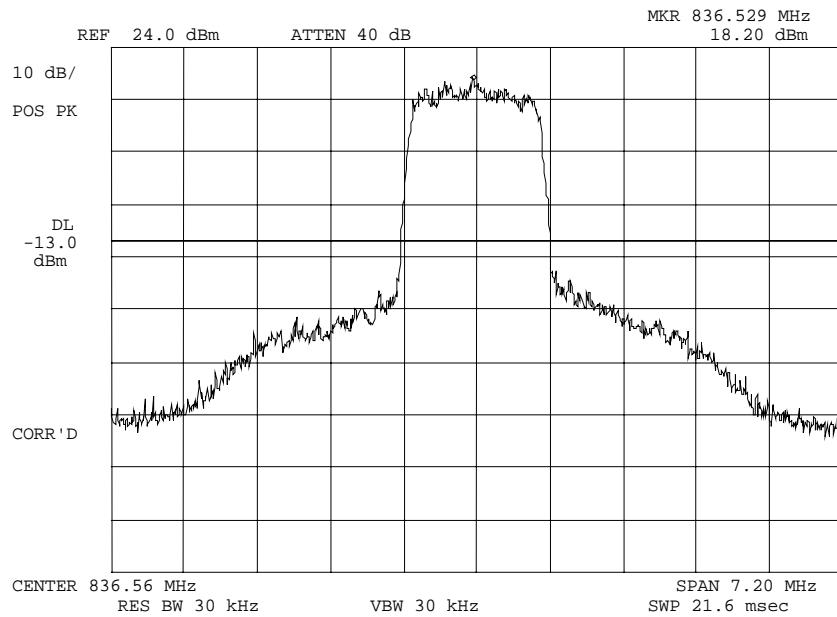


Morton Flom, P. Eng.

PAGE NO.

39 of 59.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g0080708: 2000-Aug-22 Tue 08:06:00
 STATE: 2:High Power



POWER: HIGH
 MODULATION: CDMA 800

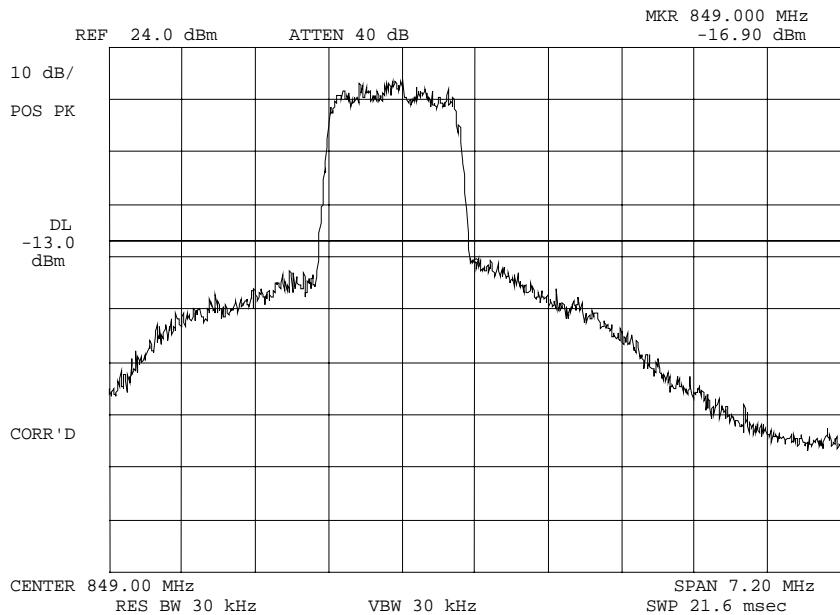
SUPERVISED BY:

Morton Flom, P. Eng.

PAGE NO.

40 of 59.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g0080710: 2000-Aug-22 Tue 08:46:00
 STATE: 2:High Power



POWER: HIGH
 MODULATION: CDMA 800
 UPPER BANDEDGE CH 773

SUPERVISED BY:



Morton Flom, P. Eng.

PAGE NO. 41 of 59.

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.

42 of 59.

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	≤-51	≤-29
F0 + 45 kHz To 2 nd Harmonic	≤-60 or 43 + 10 log P	≤-60	≤-59
2 nd to 10 th	(≤-13 dBm)	≤-72	≤-69

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	≤-86.5	≤-86.9
MEASUREMENT RESULTS		= ATTACHED PLOTS	

SUPERVISED BY:

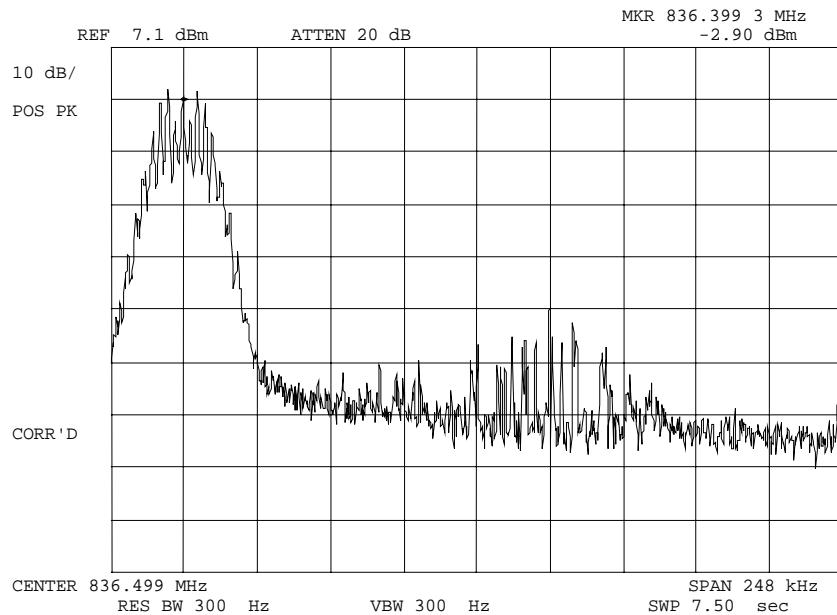


Morton Flom, P. Eng.

PAGE NO.

43 of 59.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g0080699: 2000-Aug-21 Mon 15:52:00
 STATE: 1:Low Power



POWER: LOW
 MODULATION: SAT+VOICE
 OFFSET OCCUPIED BANDWIDTH

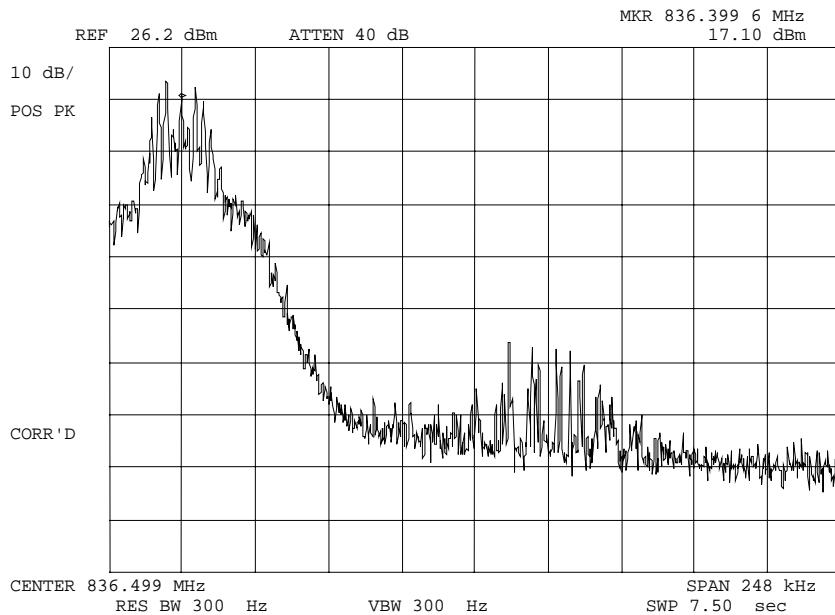
SUPERVISED BY:

Morton Flom, P. Eng.

PAGE NO.

44 of 59.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g0080698: 2000-Aug-21 Mon 15:49:00
 STATE: 2:High Power



POWER: HIGH
 MODULATION: SAT+VOICE
 OFFSET OCCUPIED BANDWIDTH

SUPERVISED BY:

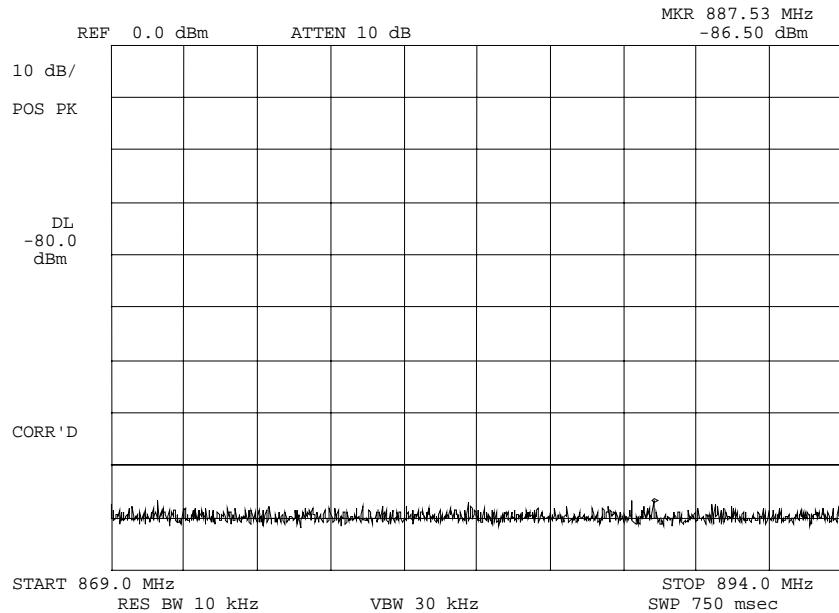


Morton Flom, P. Eng.

PAGE NO.

45 of 59.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g0080700: 2000-Aug-21 Mon 15:54:00
 STATE: 1:Low Power



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

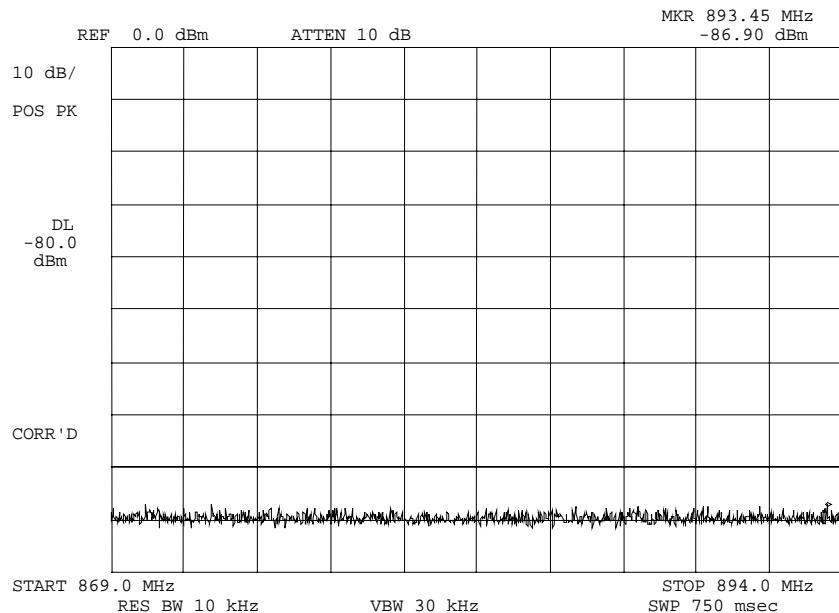
SUPERVISED BY:


 Morton Flom, P. Eng.

PAGE NO.

46 of 59.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g0080701: 2000-Aug-21 Mon 15:55:00
 STATE: 2:High Power



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

SUPERVISED BY:


 Morton Flom, P. Eng.

PAGE NO.

47 of 59.

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	≤-32	≤-28
F0 + 45 kHz to F0 + 90 kHz	≤-45	≤-59	≤-61
F0 + 90 kHz to 2 nd Harmonic	≤-60 (≤-13 dBm)	≤-48	≤-53
2 nd to 10 th	(≤-13 dBm)	≤-72	≤-69

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	≤-86.5	≤-86.9
MEASUREMENT RESULTS		= ATTACHED PLOTS	

SUPERVISED BY:

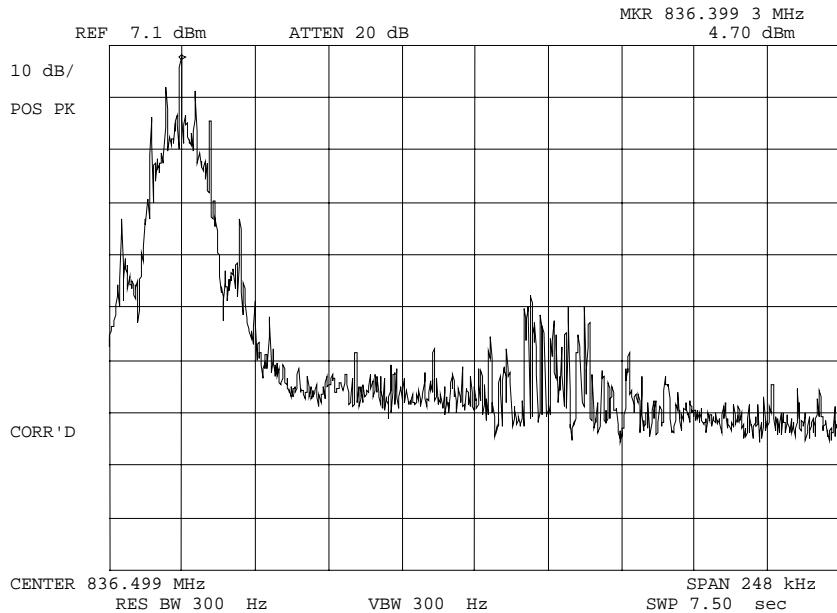


Morton Flom, P. Eng.

PAGE NO.

48 of 59.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g0080703: 2000-Aug-21 Mon 16:00:00
 STATE: 1:Low Power



POWER: LOW
 MODULATION: WBD
 OFFSET OCCUPIED BANDWIDTH

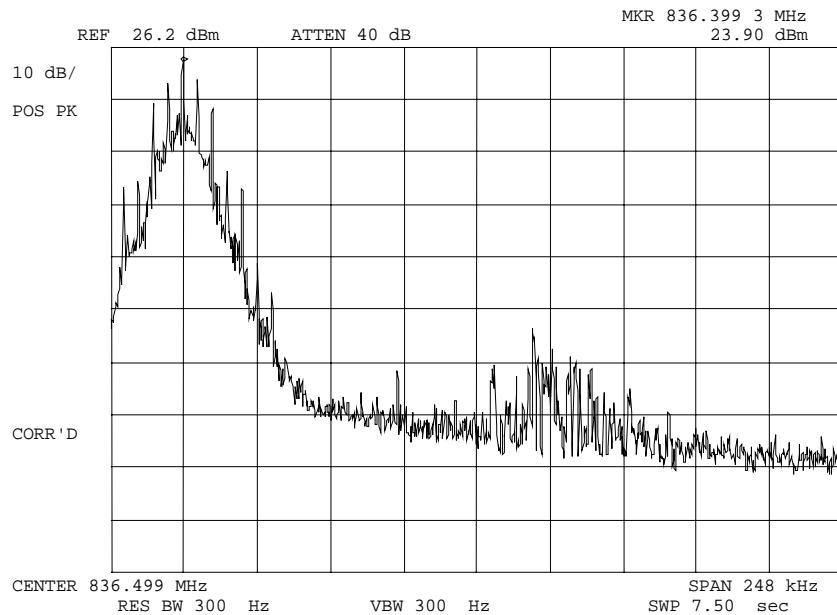
SUPERVISED BY:

Morton Flom, P. Eng.

PAGE NO.

49 of 59.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g0080702: 2000-Aug-21 Mon 15:58:00
 STATE: 2:High Power



POWER: HIGH
 MODULATION: WBD
 OFFSET OCCUPIED BANDWIDTH

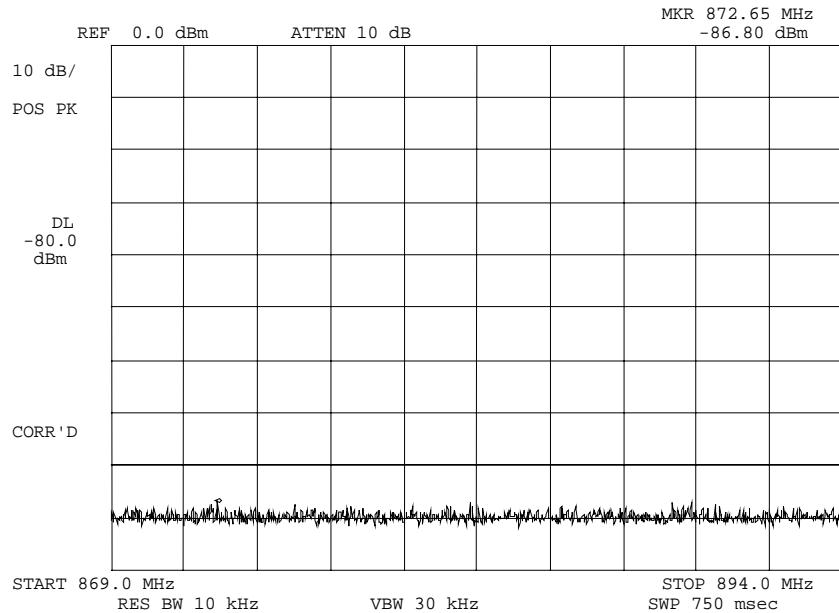
SUPERVISED BY:

Morton Flom, P. Eng.

PAGE NO.

50 of 59.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g0080704: 2000-Aug-21 Mon 16:02:00
 STATE: 1:Low Power



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

SUPERVISED BY:

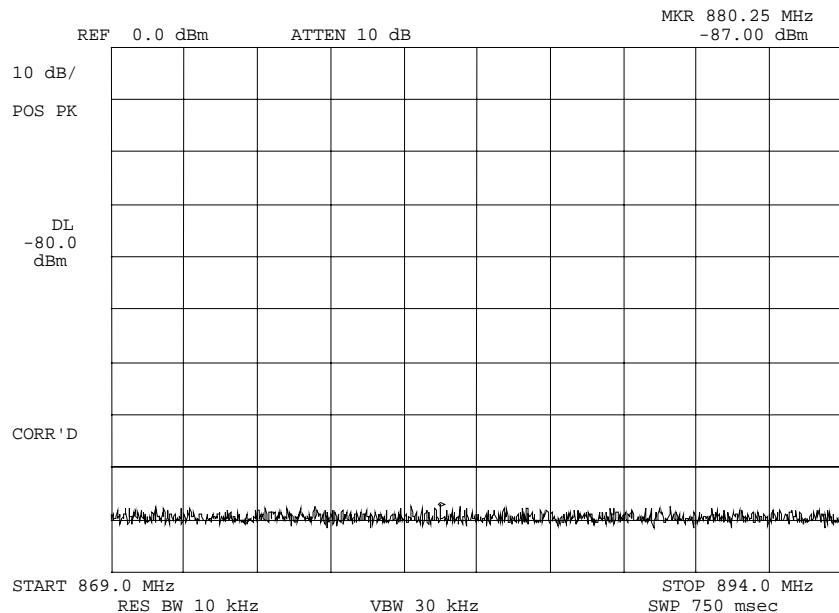


Morton Flom, P. Eng.

PAGE NO.

51 of 59.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g0080705: 2000-Aug-21 Mon 16:02:00
 STATE: 2:High Power



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

SUPERVISED BY:



Morton Flom, P. Eng.

PAGE NO. 52 of 59.

NAME OF TEST: Field Strength of Spurious Radiation

SPECIFICATION: 47 CFR 2.1053(a)

GUIDE: As indicated on page 7

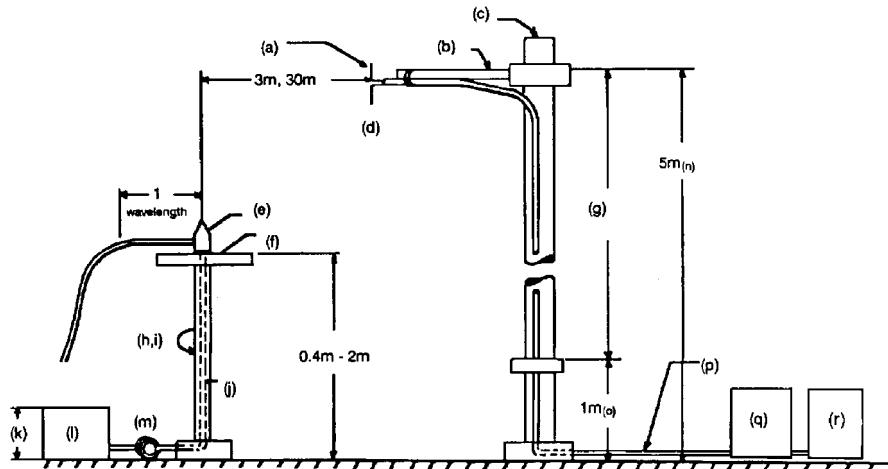
TEST EQUIPMENT: As per attached page

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 (as applicable)	s/n	Cycle	Last Cal
Per ANSI C63.4-1992/2000 Draft, 10.1.4			
<u>TRANSDUCER</u>			
i00088 EMCO 3109-B 25MHz-300MHz	2336	12 mo.	Sep-99
i00089 Aprel 2001 200MHz-1GHz	001500	12 mo.	Sep-99
i00103 EMCO 3115 1GHz-18GHz	9208-3925	12 mo.	Sep-99
i00065 EMCO 3301-B Active Monopole	2635	12 mo.	Sep-99
<u>AMPLIFIER</u>			
i00028 HP 8449A	2749A00121	12 mo.	Mar-00
<u>SPECTRUM ANALYZER</u>			
i00029 HP 8563E	3213A00104	12 mo.	Aug-00
i00033 HP 85462A	3625A00357	12 mo.	May-00
i00048 HP 8566B	2511AD1467	6 mo.	May-00

PAGE NO.

54 of 59.

MEASUREMENT RESULTS: FIELD STRENGTH OF SPURIOUS RADIATION

Measurement Distance, m = 3

Spectrum Searched, GHz = 0 to 10

AMPS:

TUNED, MHz	CHANNEL NUMBER	EMISSION MHz / HARM.	LEVEL, dBc	
			Lo	Hi
824.040	991	2 nd - 10 th	<-70	<-70
836.400	380	2 nd - 10 th	<-70	<-70
848.970	799	2 nd - 10 th	<-70	<-70

CDMA:

TUNED, MHz	CHANNEL NUMBER	EMISSION MHz / HARM.	LEVEL, dBc	
			Lo	Hi
824.040	991	2 nd - 10 th	<-70	<-70
836.400	380	2 nd - 10 th	<-70	<-70
848.970	799	2 nd - 10 th	<-70	<-70

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.

55 of 59.

NAME OF TEST: Field Strength of Spurious Radiation

g0080718: 2000-Aug-22 Tue 11:35:00

STATE: 2:High Power AMPS

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	METER, dBuV	CF, dB	ERP, dBm	MARGIN, dB
836.400000	1672.800000	68.67	-0.38	-29.1	-16.1
836.400000	2509.190000	63.33	3.06	-31	-18
836.400000	3345.600000	64.5	5.7	-27.2	-14.2
836.400000	4182.000000	50.17	7.53	-39.7	-26.7
836.400000	5018.390000	54.5	9.26	-33.6	-20.6
836.400000	5854.796667	51.33	10.78	-35.3	-22.3
836.400000	6691.211667	44.17	12.2	-41	-28
836.400000	7527.611667	34.33	13.5	-49.5	-36.6
836.400000	8364.011667	34	14.55	-48.8	-35.9

NAME OF TEST: Field Strength of Spurious Radiation

g0080719: 2000-Aug-22 Tue 14:08:00

STATE: 2:High Power CDMA

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	METER, dBuV	CF, dB	ERP, dBm	MARGIN, dB
836.400000	1673.050000	60.67	-0.38	-37.1	-24.1
836.400000	2509.575000	59.83	3.06	-34.5	-21.5
836.400000	3346.087500	60	5.71	-31.7	-18.7
836.400000	4182.641667	44	7.53	-45.8	-32.9
836.400000	5019.066667	47	9.26	-41.1	-28.1
836.400000	5855.641667	38.83	10.78	-47.8	-34.8
836.400000	6692.158333	35.83	12.2	-49.3	-36.4
836.400000	7528.558333	32	13.5	-51.9	-38.9
836.400000	8363.816667	33.33	14.55	-49.5	-36.5

PAGE NO. 56 of 59.

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

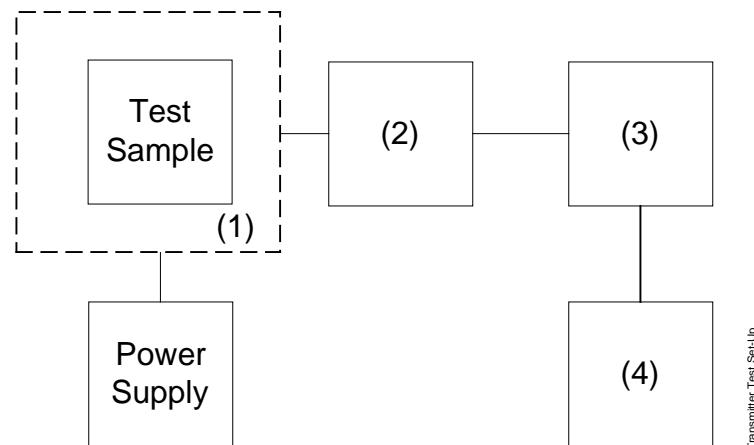
1. The EUT and test equipment were set up as shown on the following page.
2. With all power removed, the temperature was decreased to -30°C and permitted to stabilize for three hours. Power was applied and the maximum change in frequency was noted within one minute.
3. With power OFF, the temperature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

57 of 59.

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



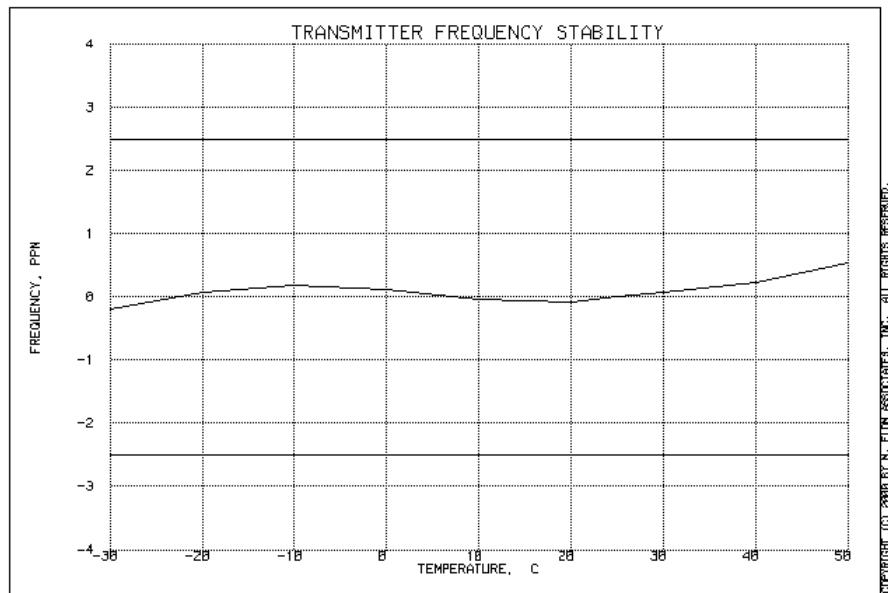
Transmitter Test Set Up

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

PAGE NO.

58 of 59.

NAME OF TEST: Frequency Stability (Temperature Variation)
g0080568: 2000-Aug-21 Mon 16:32:00
STATE: 0:General



SUPERVISED BY:


Morton Flom, P. Eng.

PAGE NO. 59 of 59.

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.

RESULTS: Frequency Stability (Voltage Variation)

g0080706: 2000-Aug-21 Mon 16:26:37

STATE: 0:General

LIMIT, ppm	= 5
LIMIT, Hz	= 4182
BATTERY END POINT (Voltage)	= 4.1

% of STV	Voltage	Frequency, MHz	Change, Hz	Change, ppm
85	4.25	836.399980	-20	-0.02
100	5	836.400000	0	0.00
115	5.75	836.399970	-30	-0.04
82	4.1	836.399970	-30	-0.04

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.