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

Date: October 19, 2000

Federal Communications Commission
Via: Electronic Filing

Attention: Authorization & Evaluation Division

Applicant: Nokia Mobile Phones
Equipment: 7160, Type NSW-5NY
FCC ID: LJPNSW-5NY
FCC Rules: 22H, 24E, 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,

Morton Flom, P. Eng.

enclosure(s)
cc: Applicant
MF/cvr

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

APPLICANT: Nokia Mobile Phones

FCC ID: LJPNSW-5NY

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

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

T R A N S M I T T E R C E R T I F I C A T I O N

of

FCC ID: LJPNSW-5NY
MODEL: 7160, Type NSW-5NY
S/N: 25315471011

to

FEDERAL COMMUNICATIONS COMMISSION
Rule Parts 22H, 24E, Confidentiality

DATE OF REPORT: October 19, 2000

ON THE BEHALF OF THE APPLICANT:

Nokia Mobile Phones

AT THE REQUEST OF: P.O. Kare Oksanen 10/12/2000

Nokia Mobile Phones
Elektroniikkatie 10
Fin-90570
Oulu, Finland

Attention of: Olli Kautio, Senior Engineering Manager,
Testing & Type Approvals
olli.kautio@nokia.com
Kare Oksanen, R&D Type Approvals
kare.oksanen@nokia.com
011 358 105051; FAX: 011 358 10505 7222

SUPERVISED BY: Morton Flom, P. Eng.

THE APPLICANT HAS BEEN CAUTIONED AS TO THE FOLLOWING:

15.21 INFORMATION TO USER.

The users manual or instruction manual for an intentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

15.27(a) SPECIAL ACCESSORIES.

Equipment marketed to a consumer must be capable of complying with the necessary regulations in the configuration in which the equipment is marketed. Where special accessories, such as shielded cables and/or special connectors are required to enable an unintentional or intentional radiator to comply with the emission limits in this part, the equipment must be marketed with, i.e. shipped and sold with, those special accessories. However, in lieu of shipping or packaging the special accessories with the unintentional or intentional radiator, the responsible party may employ other methods of ensuring that the special accessories are provided to the consumer, without additional charge.

Information detailing any alternative method used to supply the special accessories for a grant of equipment authorization or retained in the verification records, as appropriate. The party responsible for the equipment, as detailed in § 2.909 of this chapter, shall ensure that these special accessories are provided with the equipment. The instruction manual for such devices shall include appropriate instructions on the first page of text concerned with the installation of the device that these special accessories must be used with the device. It is the responsibility of the user to use the needed special accessories supplied with the equipment.

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

a) TEST REPORT

b) Laboratory: M. Flom Associates, Inc.
(FCC: 31040/SIT) 3356 N. San Marcos Place, Suite 107
(Canada: IC 2044) Chandler, AZ 85225

c) Report Number: d00a0027

d) Client: Nokia Mobile Phones
Elektroniikkatie 10
Fin-90570
Oulu, Finland

e) Identification: 7160, Type NSW-5NY
FCC ID: LJPNSW-5NY
Description: Dual Band, Tri-Mode Cellular Telephone

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

g) Report Date: October 19, 2000
EUT Received: October 12, 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.

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LIST OF GENERAL INFORMATION REQUIRED FOR CERTIFICATION

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

22H, 24E, Confidentiality

Sub-part 2.1033

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

Nokia Mobile Phones
Elektroniikkatie 10
Fin-90570
Oulu, Finland

MANUFACTURER:

Nokia Manufacturing Inc U.S.A.
5650 Alliance Gateway
Fort Worth, TX 76155

(c)(2): FCC ID: LJPNSW-5NY

MODEL NO: 7160, Type NSW-5NY

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

PLEASE SEE ATTACHED EXHIBITS

(c)(4): TYPE OF EMISSION: 40K0FXW, 40K0F1D Amps
30K0DXW TDMA
30K0DXW TDMA PCS

(c)(5): FREQUENCY RANGE, MHz: 824.04 to 848.97 Amps/TDMA
1850.04 to 1909.92 TDMA PCS

(c)(6): POWER RATING, Watts: 0.331 ERP Amps
0.776 ERP TDMA
0.437 EIRP TDMA PCS

___ Switchable x Variable ___ N/A

FCC GRANT NOTE: BC - The output power is continuously variable from the value listed in this entry to 5%-10% of the value listed.

(c)(7): MAXIMUM POWER RATING, Watts: 0.6

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Subpart 2.1033 (continued)

(c)(8): VOLTAGES & CURRENTS IN ALL ELEMENTS IN FINAL R. F. STAGE, INCLUDING FINAL TRANSISTOR OR SOLID STATE DEVICE:

COLLECTOR CURRENT, A = per manual
COLLECTOR VOLTAGE, Vdc = per manual
SUPPLY VOLTAGE, Vdc = 3.9

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

PLEASE SEE ATTACHED EXHIBITS

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

PLEASE SEE ATTACHED EXHIBITS

(c)(11): LABEL INFORMATION:

PLEASE SEE ATTACHED EXHIBITS

(c)(12): PHOTOGRAPHS:

PLEASE SEE ATTACHED EXHIBITS

(c)(13): DIGITAL MODULATION DESCRIPTION:

N/A

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

FOLLOWS

ACCESSORIES USED DURING TESTING:

Chargers: ACP-8U and ACP-7U

Desktop Stands: DCH-8 (1 Slot) and DCH-9 (2 Slots)

Headset HDC-9P

Loopset LPS-1

Batteries: BLS-2S, BPS-1, BMS-2V, BMS-2S, BLS-2N

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

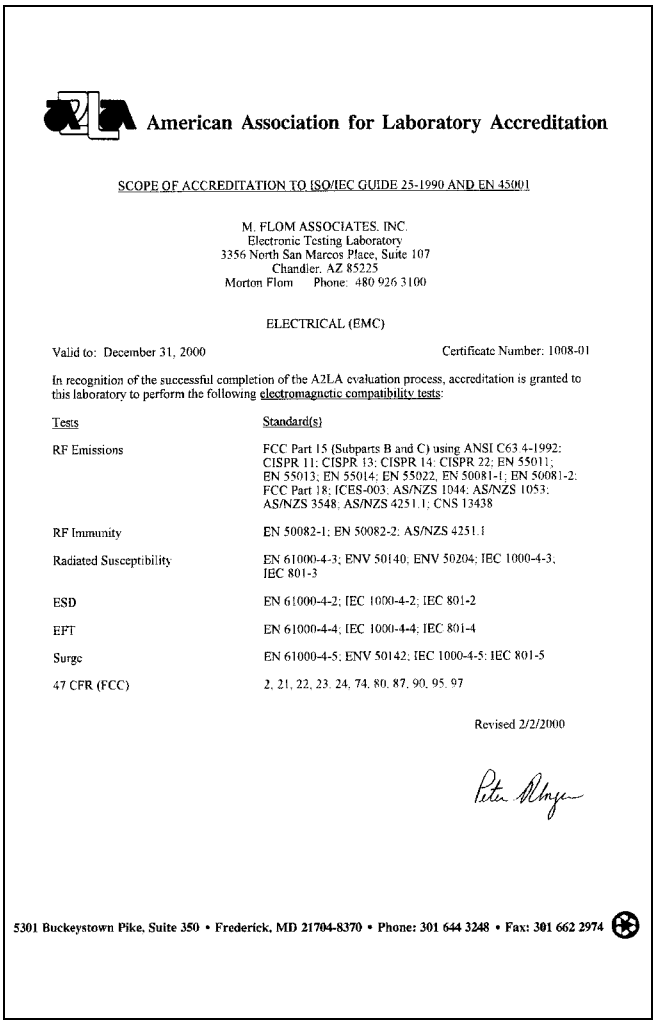
Electrical (EMC) Testing

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.

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

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



American Association for Laboratory Accreditation

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

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

ELECTRICAL (EMC)

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

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

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

Revised 2/2/2000

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

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

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

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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
_x_ 22 Subpart H - Cellular Radiotelephone Service
____ 22.901(d) - Alternative technologies and auxiliary services
____ 23 – International Fixed Public Radiocommunication services
_x_ 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

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
   - [x] (h) TDMA
   - [ ] (i) NAMPS VOICE
   - [ ] (j) NAMPS DSAT
   - [ ] (k) NAMPS ST
   - [ ] (l) NAMPS VOICE + DSAT

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, 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-136A-1997

PAGE NO. 8 of 72.

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 ±3%.

MEASUREMENT RESULTS

NOMINAL, MHz	CHANNEL	R. F. POWER, WATTS Lo	Hi
AMPS MODE:			
824.040	991	0.006	0.275
836.400	380	0.006	0.282
848.970	799	0.006	0.282
TDMA MODE:			
824.040	991	0.389µ	0.479
836.400	380	0.389µ	0.490
848.970	799	0.389µ	0.468
PCS MODE:			
1850.04	2	0.457µ	0.339
1879.98	1000	0.457µ	0.339
1909.92	1998	0.457µ	0.331

SUPERVISED BY: Morton Flom, P. Eng.

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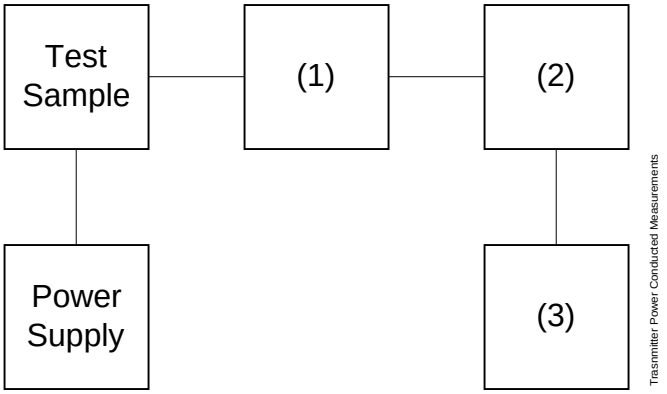
TRANSMITTER POWER CONDUCTED MEASUREMENTS

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



Trasnmitter Power Conducted Measurements

Asset	Description (as applicable)	s/n
(1)	COAXIAL ATTENUATOR	
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
i00039	HP 436A	2709A26776
i00020	HP 8901A POWER MODE	2105A01087
(3)	FREQUENCY COUNTER	
i00042	HP 5383A	1628A00959
i00019	HP 5334B	2704A00347
i00020	HP 8901A FREQUENCY MODE	2105A01087

PAGE NO. 10 of 72.

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 equations $P_t=((E \times R)^2/49.2)$ ERP watts and $P_t=((E \times R)^2/30)$ EIRP watts, where R = 3m.

2. Measurement accuracy is ±1.5 dB.

MEASUREMENT RESULTS

g00a0213: 2000-Oct-12 Thu 09:18:00
STATE: 2:High Power Amps

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	METER, dBuV/m	CF, dB	ERP, dBm	ERP, Watts
824.040000	824.040000	92.96	29.58	25.2	0.331
836.400000	836.400000	92.11	29.61	24.3	0.269
848.970000	848.970000	92.27	29.64	24.5	0.331

g00a0214: 2000-Oct-12 Thu 11:49:00
STATE: 1:Low Power Amps-TDMA

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	METER, dBuV	CF, dB	ERP, dBm	ERP, Watts
824.040000	824.040000	96.66	29.58	28.9	0.776
836.400000	836.393000	96.11	29.61	28.3	0.676
848.970000	848.978000	95.05	29.64	27.3	0.537

g00a0215: 2000-Oct-12 Thu 12:05:00
STATE: 2:High Power PCS-TDMA

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	METER, dBuV	CF, dB	EIRP, dBm	EIRP, Watts
1850.04	1850.068000	81.29	40.37	26.4	0.437
1879.98	1880.005000	80.08	40.6	25.5.	0.355
1909.92	1909.925000	79.38	40.83	25.0	0.316

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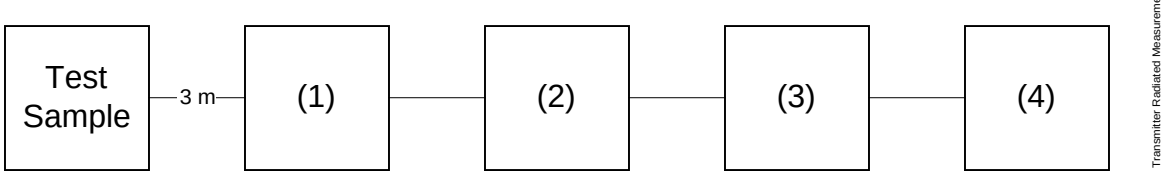
TRANSMITTER RADIATED MEASUREMENTS



Transmitter Radiated Measurements

Asset	Description (as applicable)	s/n
(1) TRANSDUCER		
i00091	Emco 3115	001469
i00089	Aprel Log Periodic	001500
(2) HIGH PASS FILTER		
i00	Narda µPAD (In-Band Only)	
i00	Trilithic (Out-Of-Band Only)	
(3) PREAMP		
i00028	HP 8449 (+30 dB)	2749A00121
(4) SPECTRUM ANALYZER		
i00048	HP 8566B	2511A01467
i00043	HP 8558B	2004A02076
i00057	HP 8557A	1531A00191
i00029	HP 8563E	3213A00104

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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

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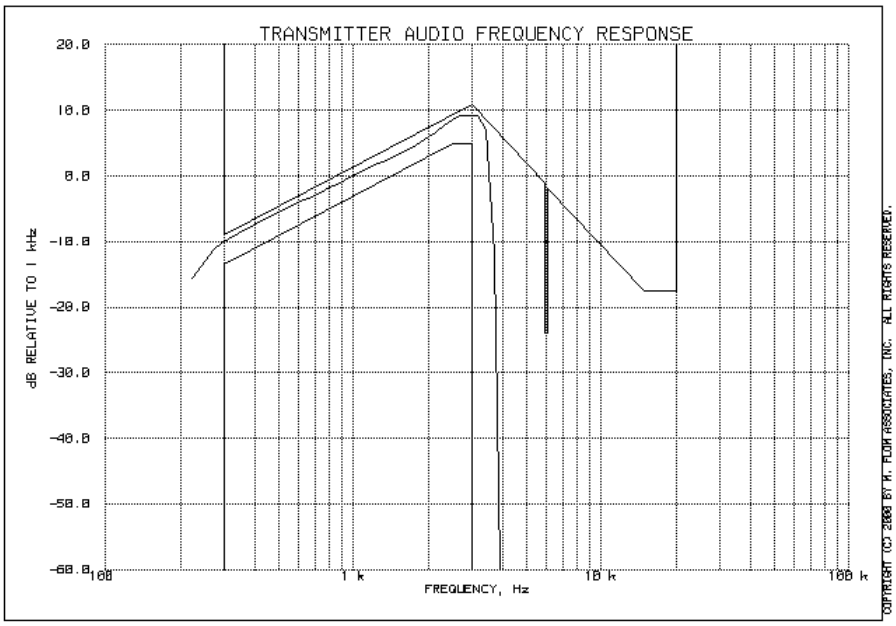
NAME OF TEST: Audio Frequency Response
g00a0133: 2000-Oct-12 Thu 15:22:00
STATE: 0:General



SUPERVISED BY: Morton Flom, P. Eng.

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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

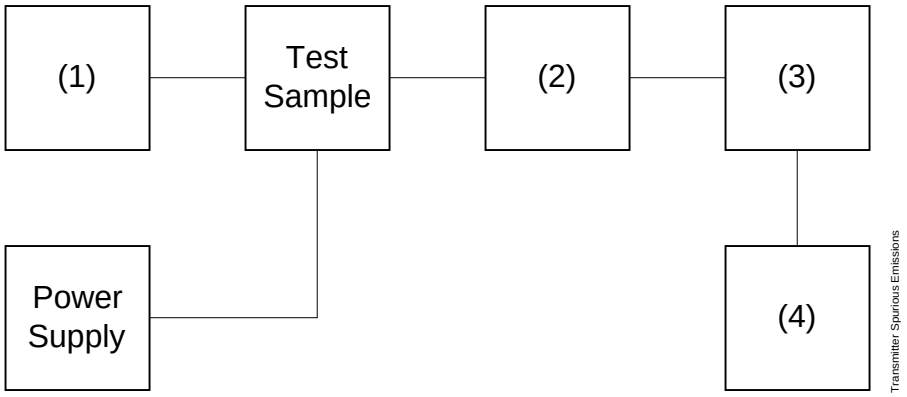
1. The EUT and test equipment were set up such that the audio input was connected at the input to the modulation limiter, and the modulated stage.

2. The audio output was connected at the output to the modulated stage.

3. MEASUREMENT RESULTS: ATTACHED

TRANSMITTER SPURIOUS EMISSION

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



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

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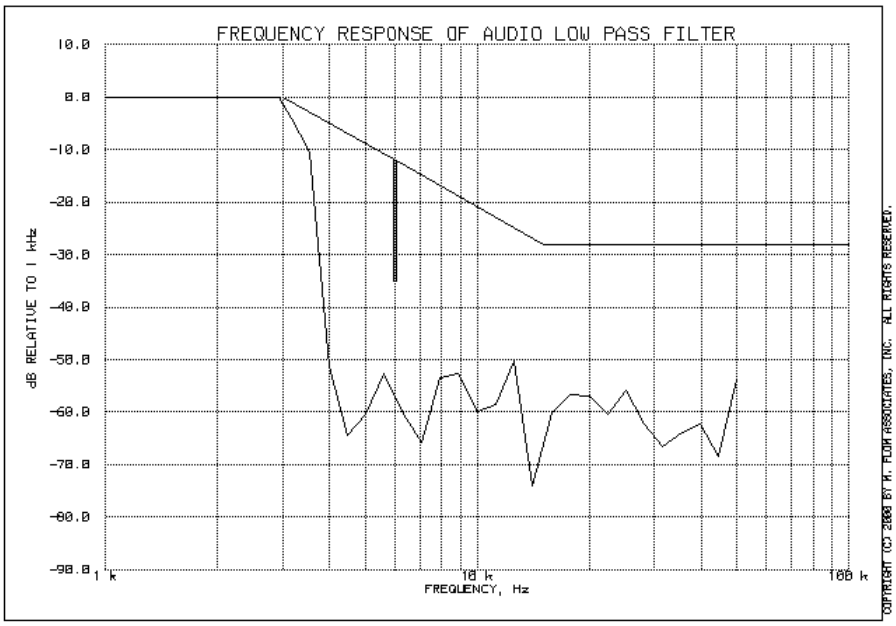
NAME OF TEST: Audio Low Pass Filter (Voice Input)
g00a0136: 2000-Oct-12 Thu 15:33:00
STATE: 0:General



SUPERVISED BY: Morton Flom, P. Eng.

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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.

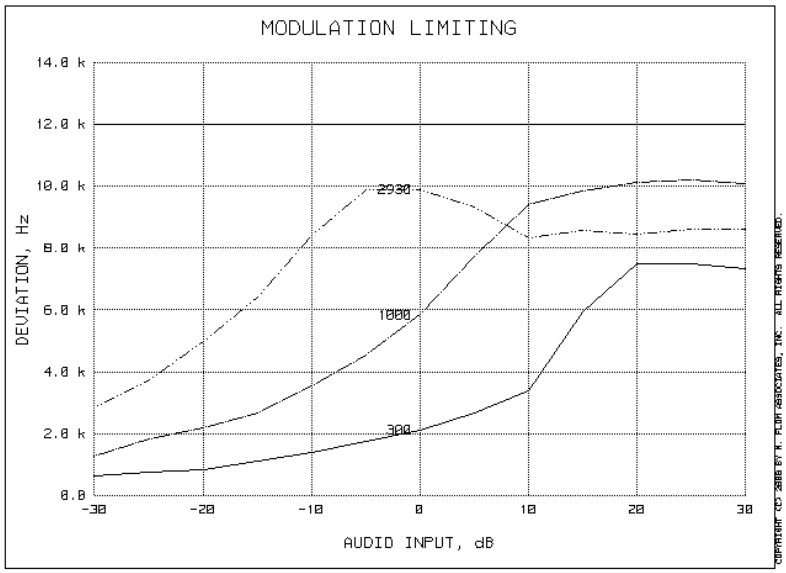
5. MEASUREMENT RESULTS ATTACHED FOR:

COMPANDER ON:
_x_ VOICE
_x_ VOICE + SAT

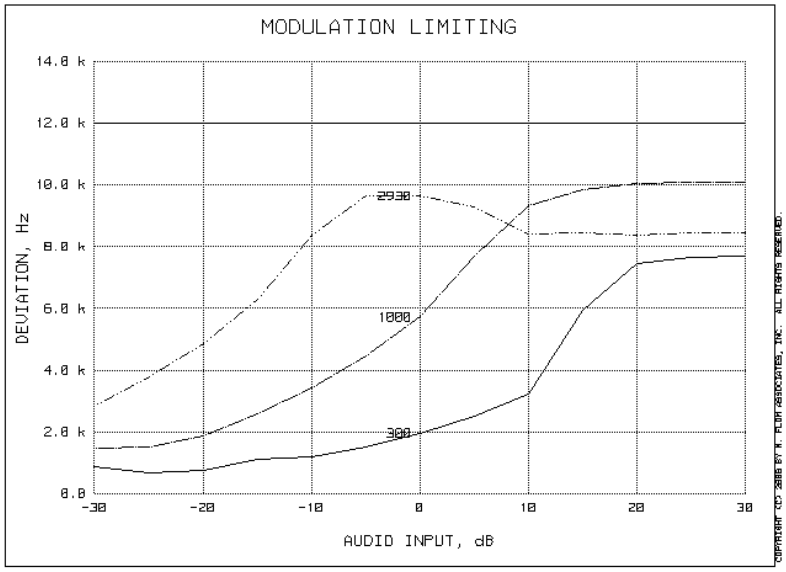
PAGE NO. 18 of 72.

NAME OF TEST: Modulation Limiting
g00a0139: 2000-Oct-12 Thu 15:43:00
STATE: 0:General

Positive Peaks:



Negative Peaks:



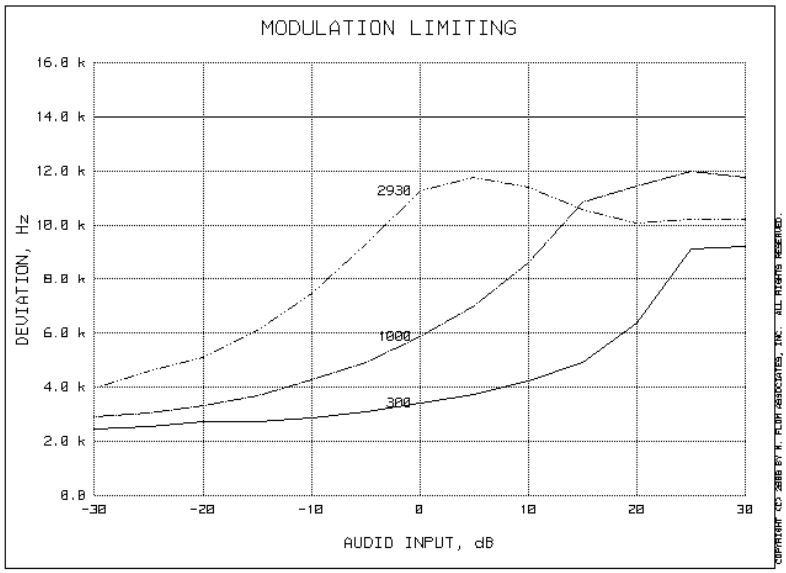
SUPERVISED BY: Morton Flom, P. Eng.

MFA p00a0003, d00a0027

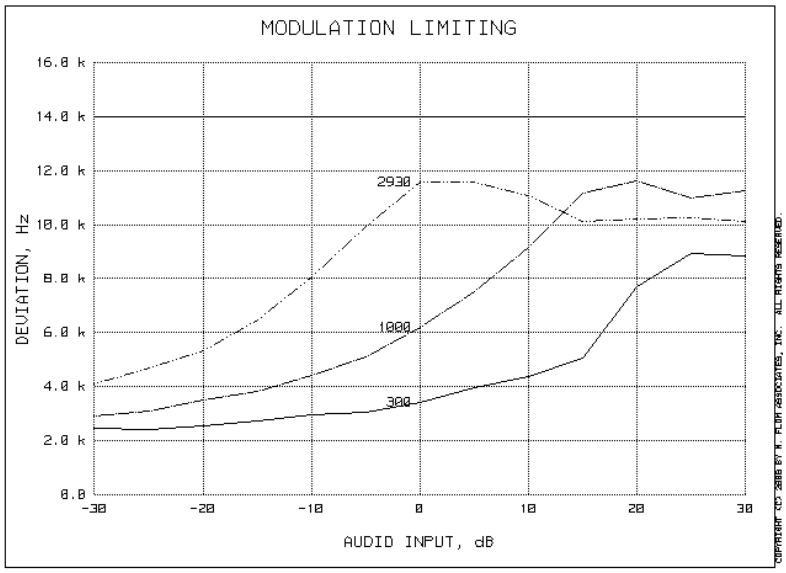
PAGE NO. 19 of 72.

NAME OF TEST: Modulation Limiting
g00a0140: 2000-Oct-12 Thu 15:49:00
STATE: 0:General

Positive Peaks:



Negative Peaks:



SUPERVISED BY: Morton Flom, P. Eng.

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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

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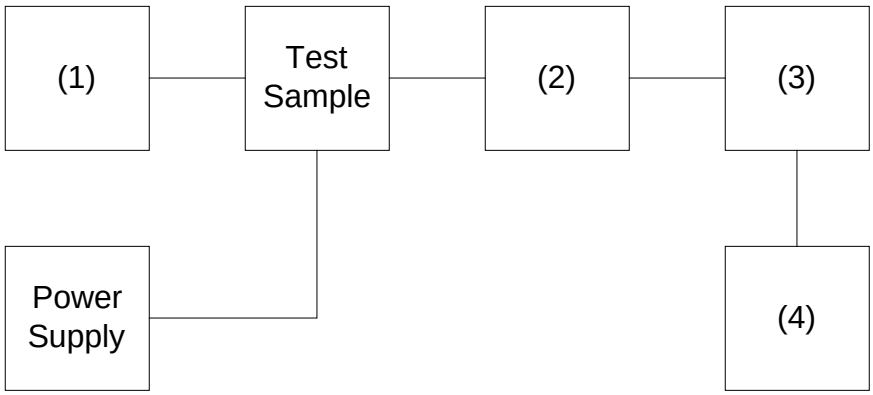
TRANSMITTER TEST SET-UP

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



Transmitter Test Set Up

Asset	Description (as applicable)	s/n
(1)	Audio Oscillator	
i00010	HP 204D	1105A04683
i00017	HP 8903A	2216A01753
i00118	HP 33120A	US36002064
(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)	MODULATION ANALYZER	
i00020	HP 8901A	2105A01087
(4)	AUDIO ANALYZER	
i00017	HP 8903A	2216A01753

MEASUREMENT SUMMARY: Measurement Of Maximum Deviation

MODULATION	LIMIT, kHz	DEVIATION, MHz
(a) Voice	≥ 10.8 & ≤ 13.2	10.8
(b) Wideband Data	≥ 7.2 & ≤ 8.8	8.7
(c) SAT	≥ 1.8 & ≤ 2.2	2.0
(d) ST	≥ 7.2 & ≤ 8.8	7.8
(e) SAT + VOICE	N/A	11.9
(f) SAT + DTMF	N/A	11.3
(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

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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 72.

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	10.8	≥ 10.8 & ≤ 13.2	25
WIDEBAND DATA	8.7	≥ 7.2 & ≤ 8.8	24
SAT + VOICE	11.9	N/A	29
SAT + DTMF	11.3	N/A	24
CDMA	N/A	N/A	N/A
TDMA	N/A	N/A	31
NAMPS	N/A	N/A	N/A

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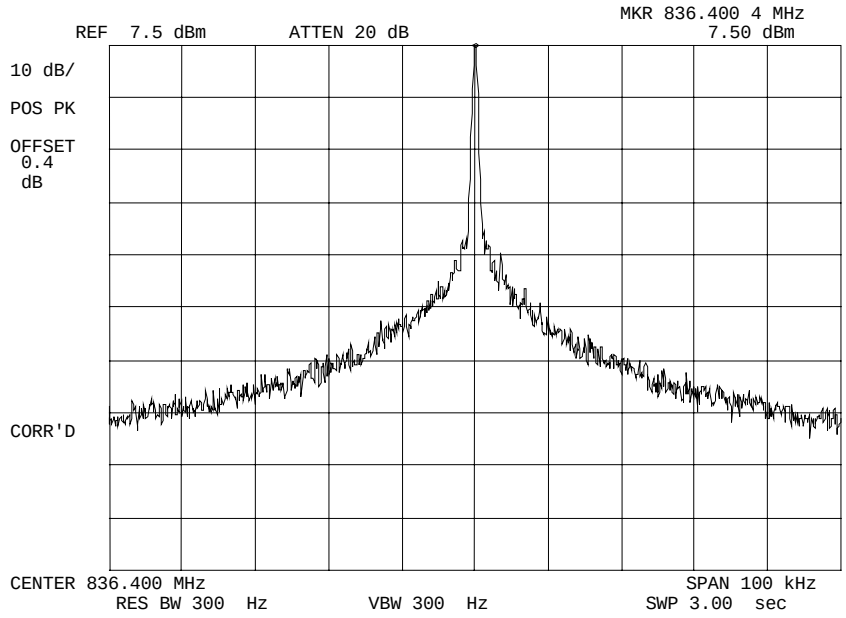
NAME OF TEST: Emission Masks (Occupied Bandwidth)
g00a0222: 2000-Oct-13 Fri 08:51:00
STATE: 1:Low Power



POWER: LOW
MODULATION: NONE

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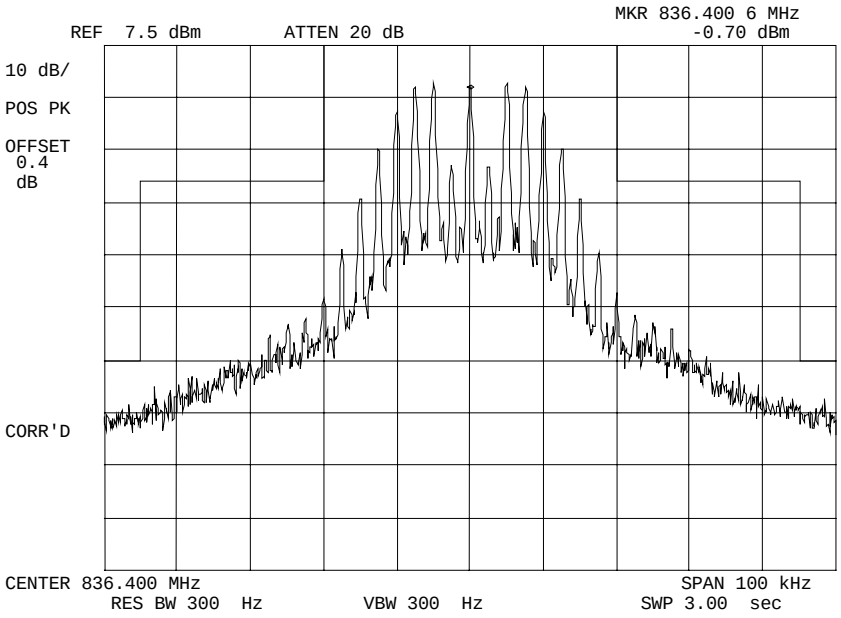
NAME OF TEST: Emission Masks (Occupied Bandwidth)
g00a0224: 2000-Oct-13 Fri 09:11:00
STATE: 1:Low Power



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

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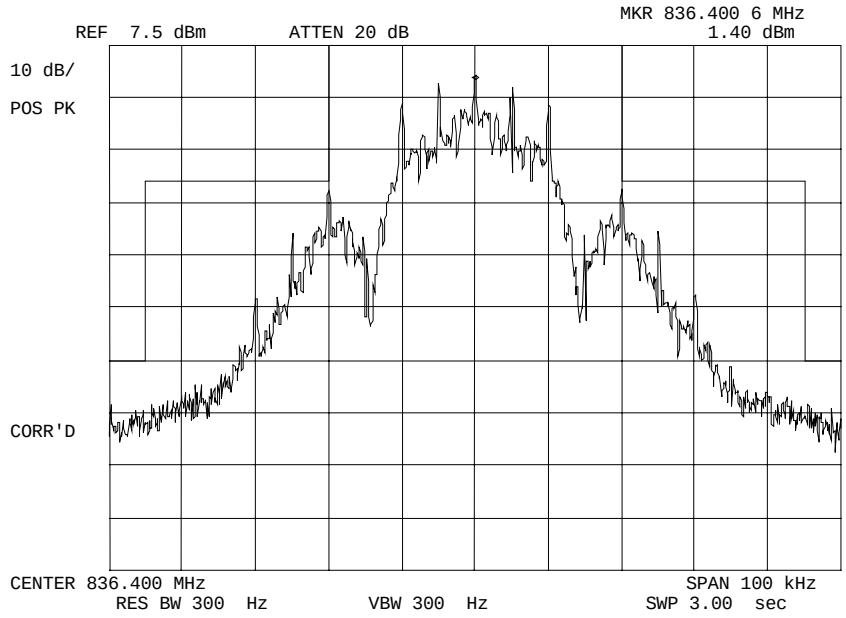
NAME OF TEST: Emission Masks (Occupied Bandwidth)
g00a0233: 2000-Oct-13 Fri 09:28:00
STATE: 1:Low Power



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

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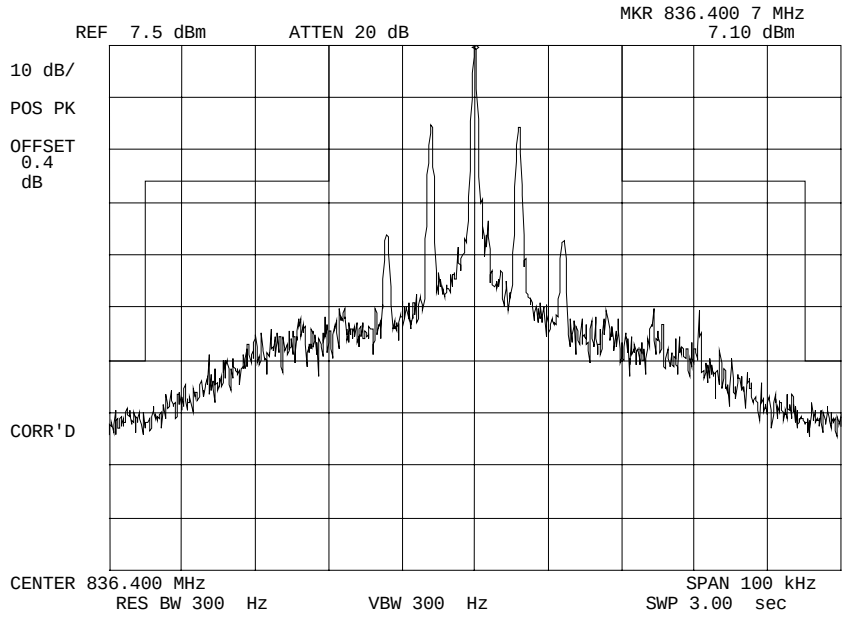
NAME OF TEST: Emission Masks (Occupied Bandwidth)
g00a0228: 2000-Oct-13 Fri 09:19:00
STATE: 1:Low Power



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

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MFA p00a0003, d00a0027

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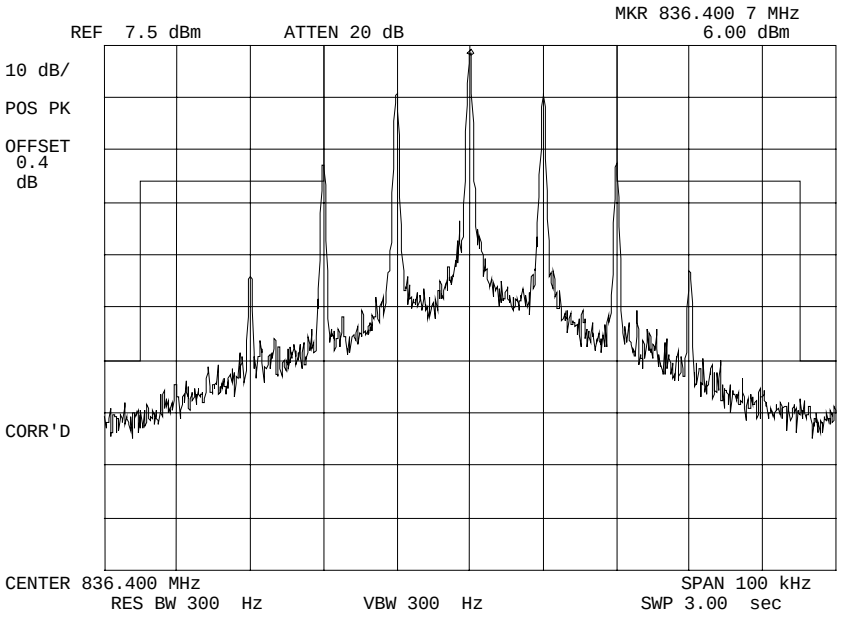
NAME OF TEST: Emission Masks (Occupied Bandwidth)
g00a0232: 2000-Oct-13 Fri 09:25:00
STATE: 1:Low Power



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

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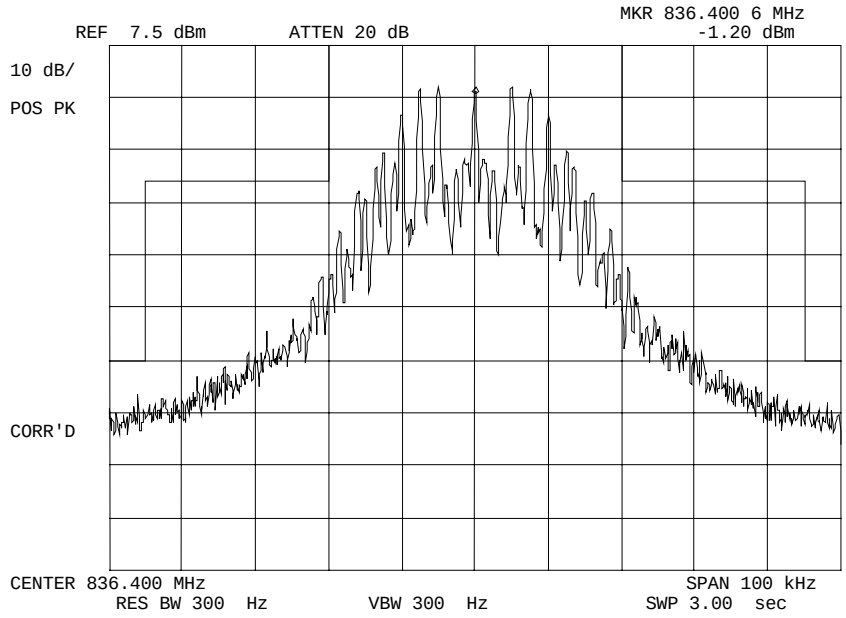
NAME OF TEST: Emission Masks (Occupied Bandwidth)
g00a0225: 2000-Oct-13 Fri 09:12:00
STATE: 1:Low Power



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

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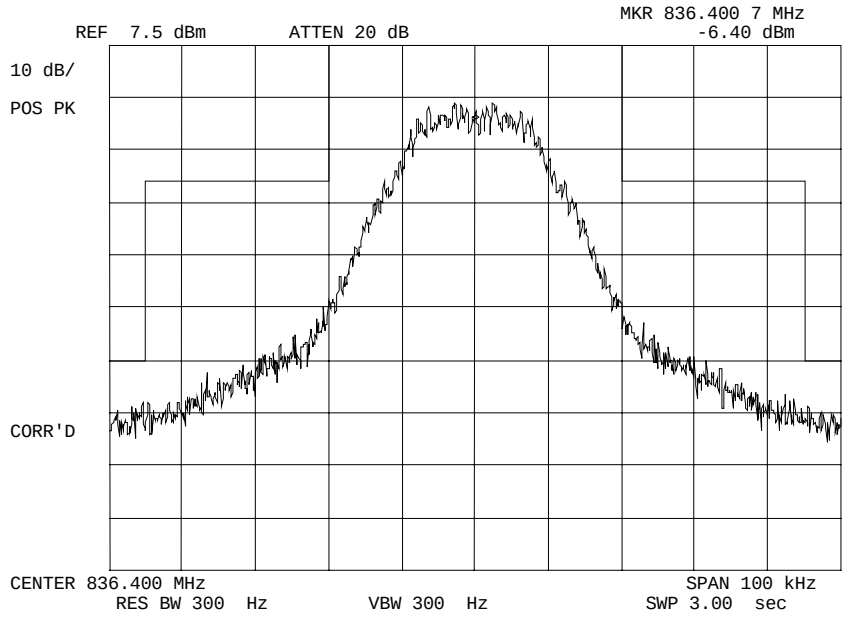
NAME OF TEST: Emission Masks (Occupied Bandwidth)
g00a0229: 2000-Oct-13 Fri 09:21:00
STATE: 1:Low Power



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

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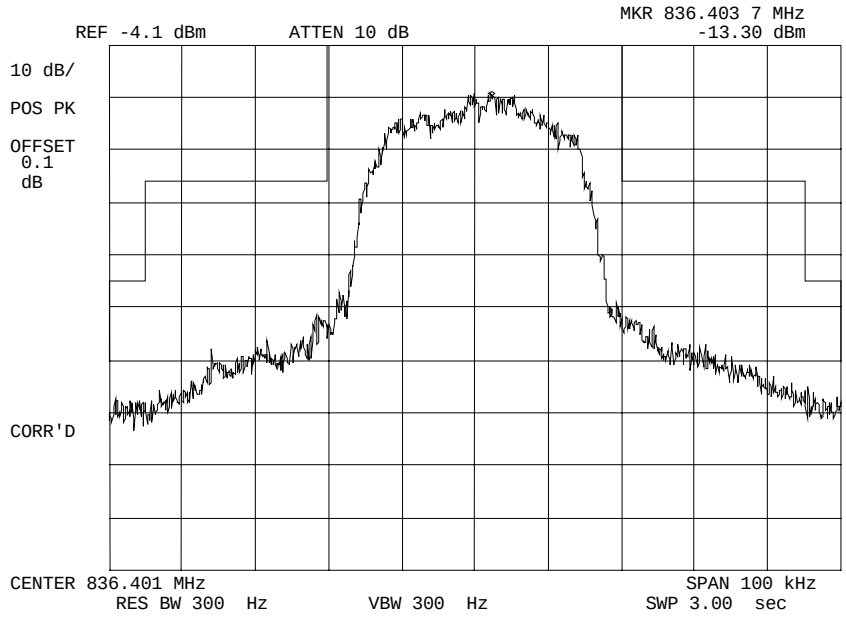
NAME OF TEST: Emission Masks (Occupied Bandwidth)
g00a0244: 2000-Oct-13 Fri 10:20:00
STATE: 1:Low Power



POWER: LOW
MODULATION: TDMA 800
MASK: AMPS CELLULAR, F1D, DATA

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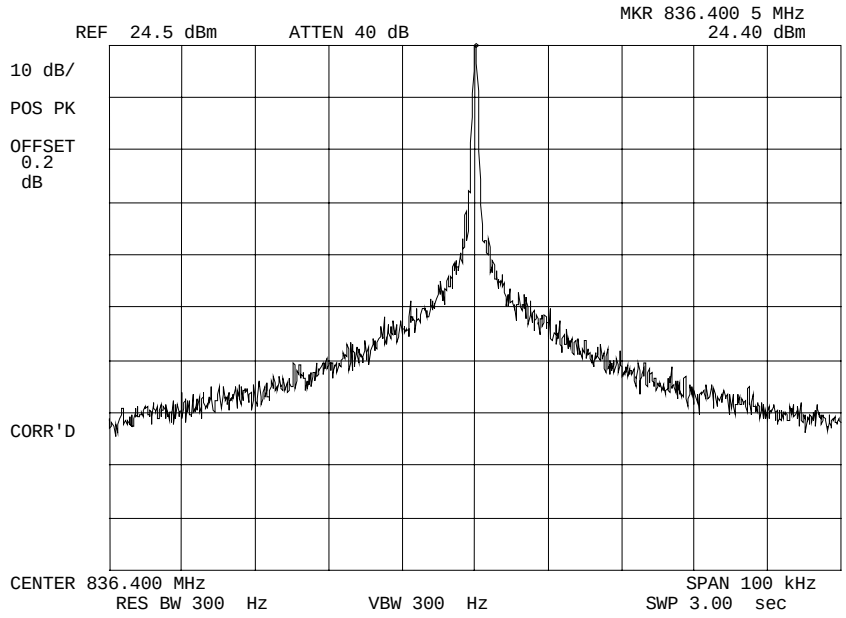
NAME OF TEST: Emission Masks (Occupied Bandwidth)
g00a0221: 2000-Oct-13 Fri 08:48:00
STATE: 2:High Power



POWER: HIGH
MODULATION: NONE

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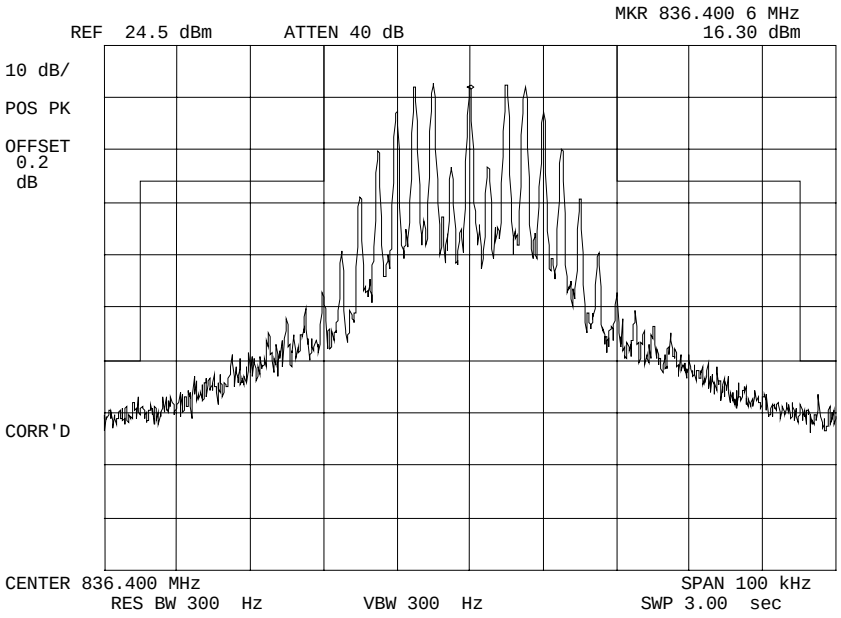
NAME OF TEST: Emission Masks (Occupied Bandwidth)
g00a0223: 2000-Oct-13 Fri 09:06:00
STATE: 2:High Power



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

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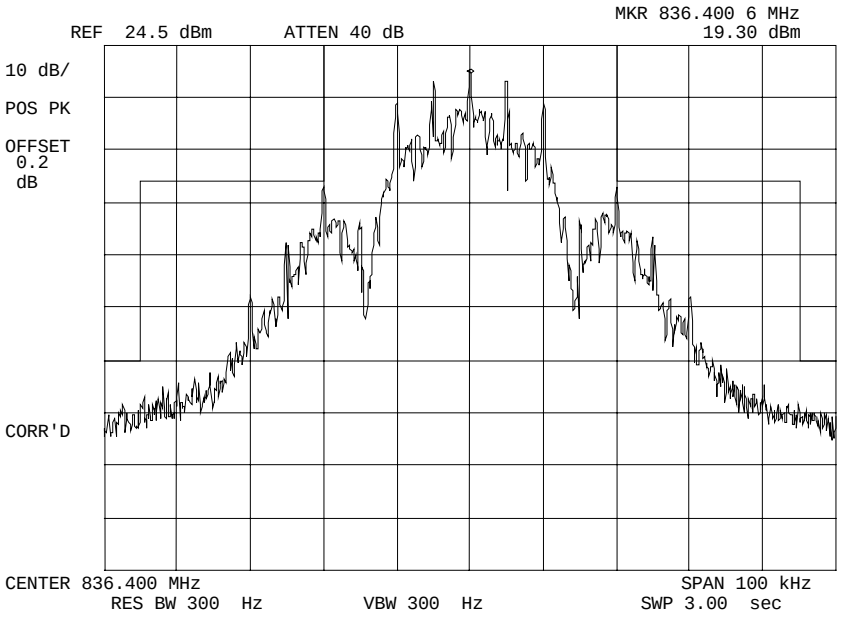
NAME OF TEST: Emission Masks (Occupied Bandwidth)
g00a0234: 2000-Oct-13 Fri 09:29:00
STATE: 2:High Power



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

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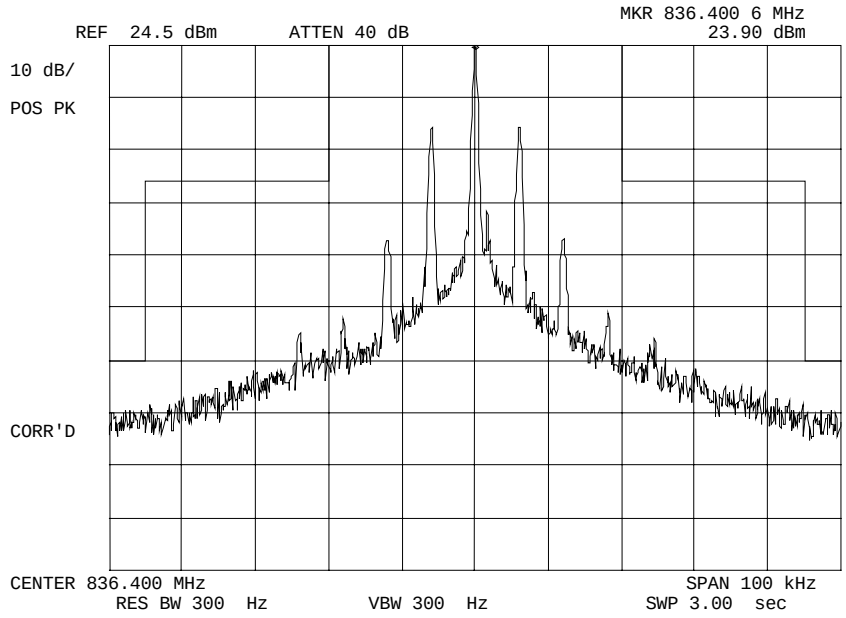
NAME OF TEST: Emission Masks (Occupied Bandwidth)
g00a0227: 2000-Oct-13 Fri 09:15:00
STATE: 2:High Power



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

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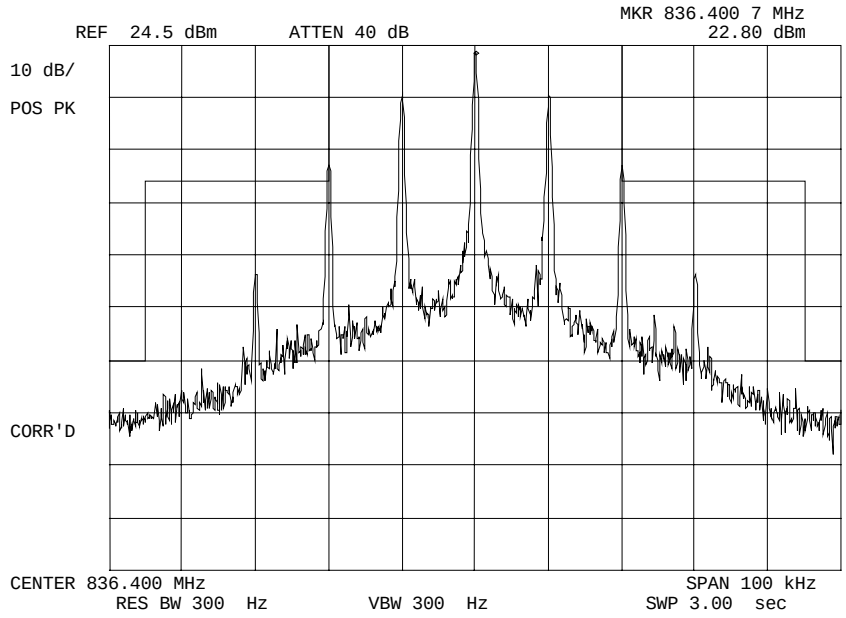
NAME OF TEST: Emission Masks (Occupied Bandwidth)
g00a0231: 2000-Oct-13 Fri 09:23:00
STATE: 2:High Power



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

SUPERVISED BY: Morton Flom, P. Eng.

MFA p00a0003, d00a0027

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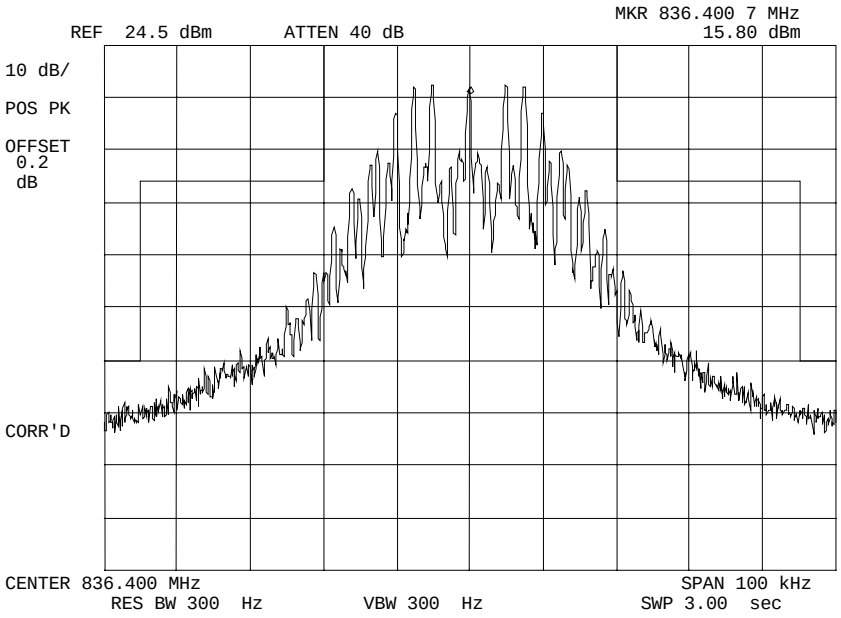
NAME OF TEST: Emission Masks (Occupied Bandwidth)
g00a0226: 2000-Oct-13 Fri 09:13:00
STATE: 2:High Power



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

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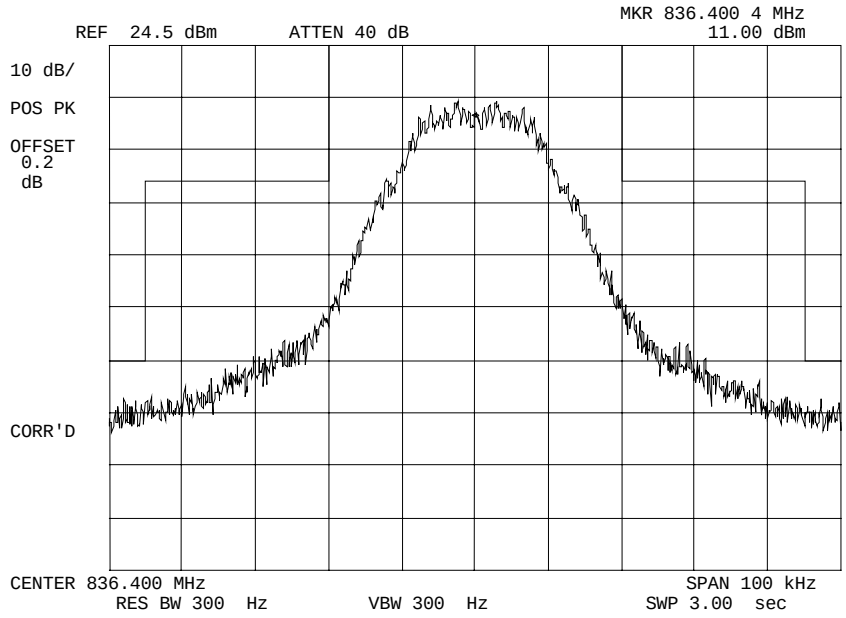
NAME OF TEST: Emission Masks (Occupied Bandwidth)
g00a0230: 2000-Oct-13 Fri 09:21:00
STATE: 2:High Power



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

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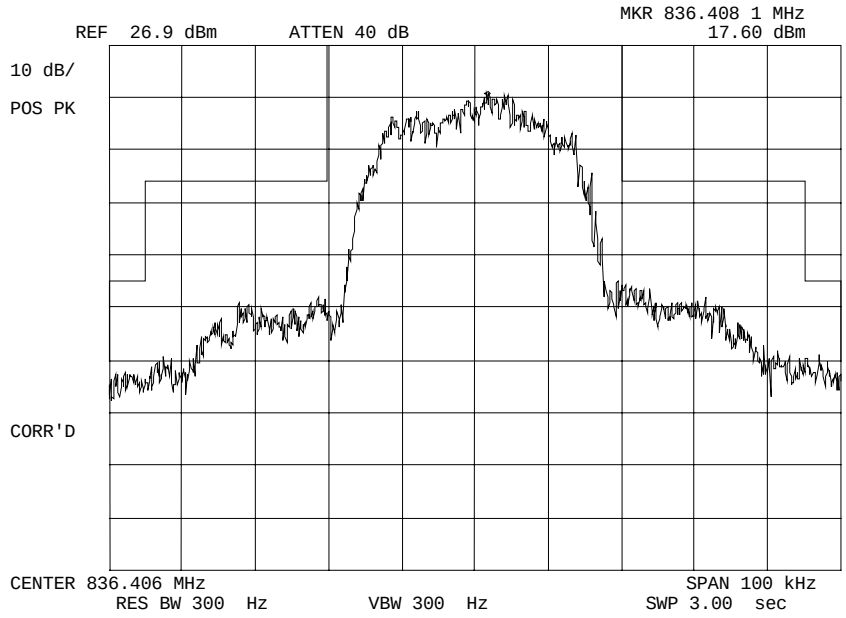
NAME OF TEST: Emission Masks (Occupied Bandwidth)
g00a0243: 2000-Oct-13 Fri 10:17:00
STATE: 2:High Power



POWER: HIGH
MODULATION: TDMA 800
MASK: AMPS CELLULAR, F1D, DATA

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NAME OF TEST: Transmitter Conducted Measurements

SPECIFICATION: 47 CFR 2.1051: Unwanted (spurious) Emissions
2.1049(c), 24.238(b): Occupied Bandwidth
24: Emissions at Band Edges

GUIDE: As indicated on page 7

TEST EQUIPMENT: As per attached page

MEASUREMENT PROCEDURE

1. The EUT and test equipment were set up as shown on the following page with the Spectrum Analyzer connected.

2. The low and high channels for all RF powers within the designated frequency block(s) were measured.

3. MEASUREMENT RESULTS: ATTACHED

SUPERVISED BY: Morton Flom, P. Eng.

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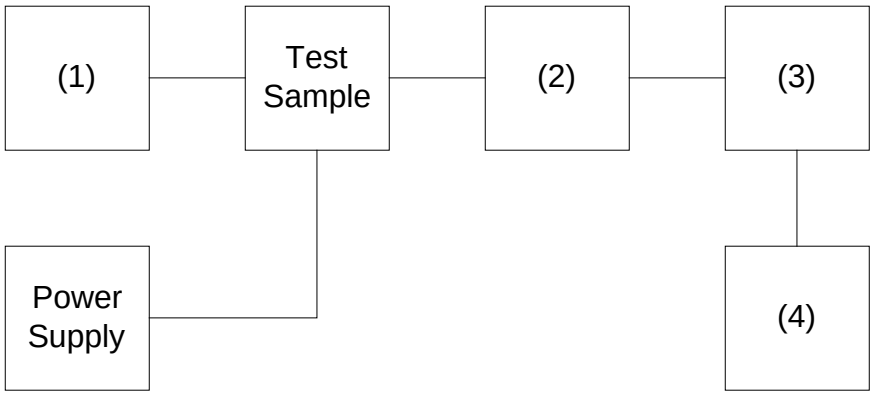
TRANSMITTER SPURIOUS EMISSION

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



Transmitter Test Set Up

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

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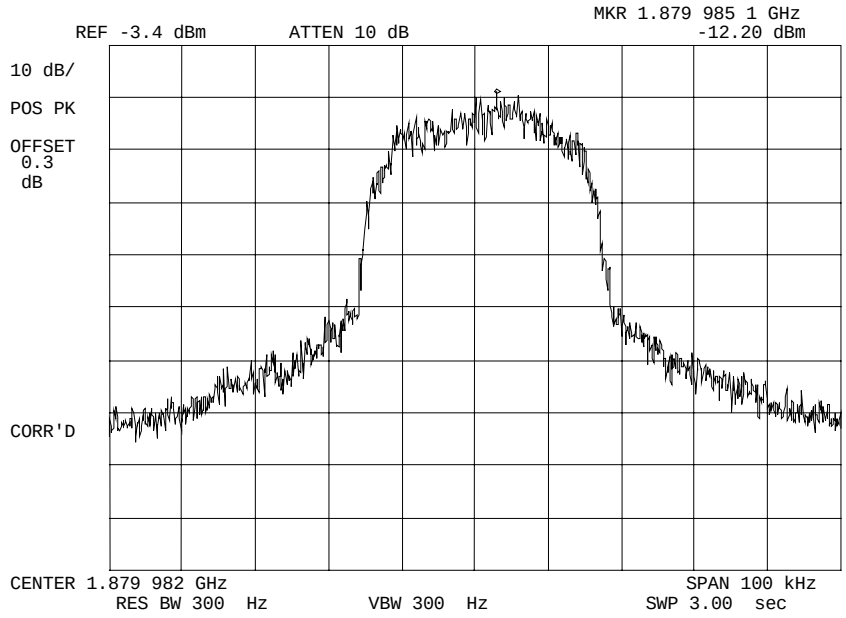
NAME OF TEST: Emission Masks (Occupied Bandwidth)
g00a0246: 2000-Oct-13 Fri 10:43:00
STATE: 1:Low Power



POWER: LOW
MODULATION: TDMA PCS

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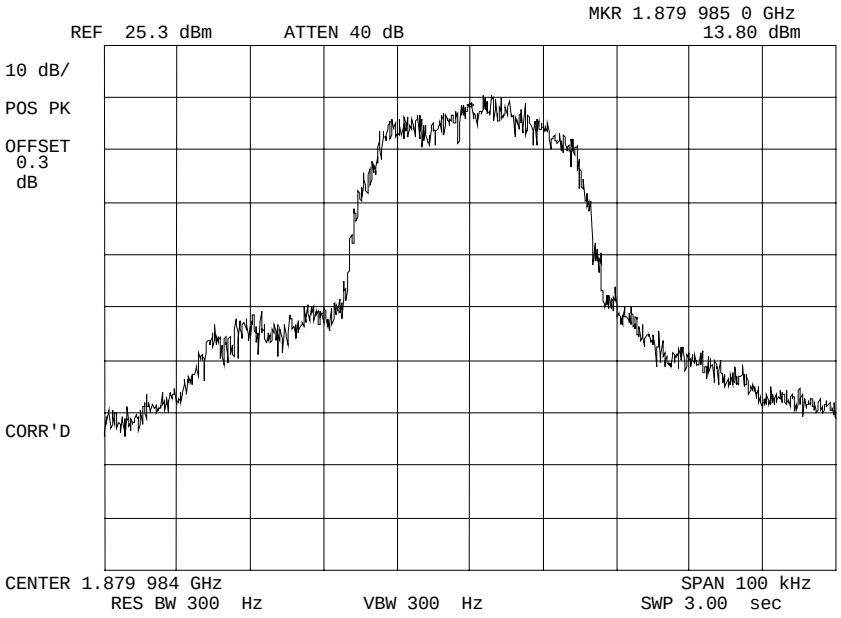
NAME OF TEST: Emission Masks (Occupied Bandwidth)
g00a0245: 2000-Oct-13 Fri 10:40:00
STATE: 2:High Power



POWER: HIGH
MODULATION: TDMA PCS

SUPERVISED BY: Morton Flom, P. Eng.

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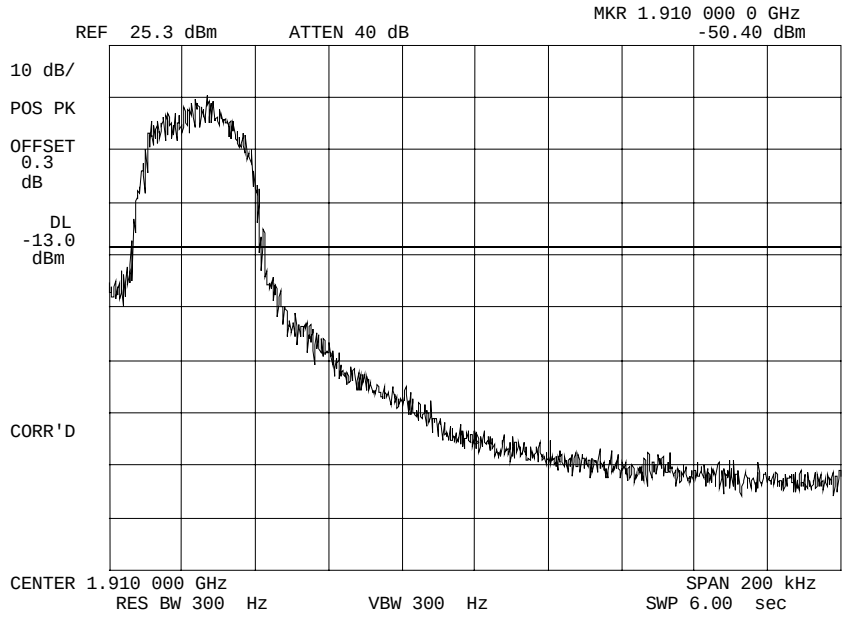
NAME OF TEST: Emission Masks (Occupied Bandwidth)
g00a0247: 2000-Oct-13 Fri 10:57:00
STATE: 2:High Power



POWER: HIGH
MODULATION: TDMA PCS
UPPER BANDEDGE

SUPERVISED BY: Morton Flom, P. Eng.

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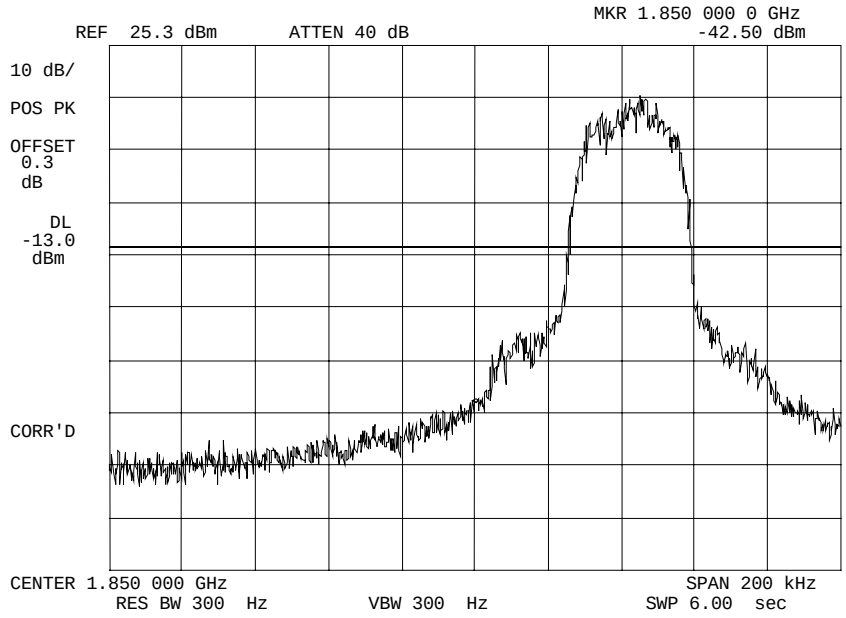
NAME OF TEST: Emission Masks (Occupied Bandwidth)
g00a0248: 2000-Oct-13 Fri 11:10:00
STATE: 2:High Power



POWER: HIGH
MODULATION: TDMA PCS
LOWER BANDEDGE

SUPERVISED BY: Morton Flom, P. Eng.

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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 10^{th} 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

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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	≤-43	≤-43
F0 + 45 kHz to 2nd Harmonic	≤-60 or 43 + 10 log P	≤-68	≤-70
2nd to 10th	(≤-13 dBm)	≤-59	≤-60

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	≤-86.9	≤-86.5

MEASUREMENT RESULTS = ATTACHED PLOTS

SUPERVISED BY: Morton Flom, P. Eng.

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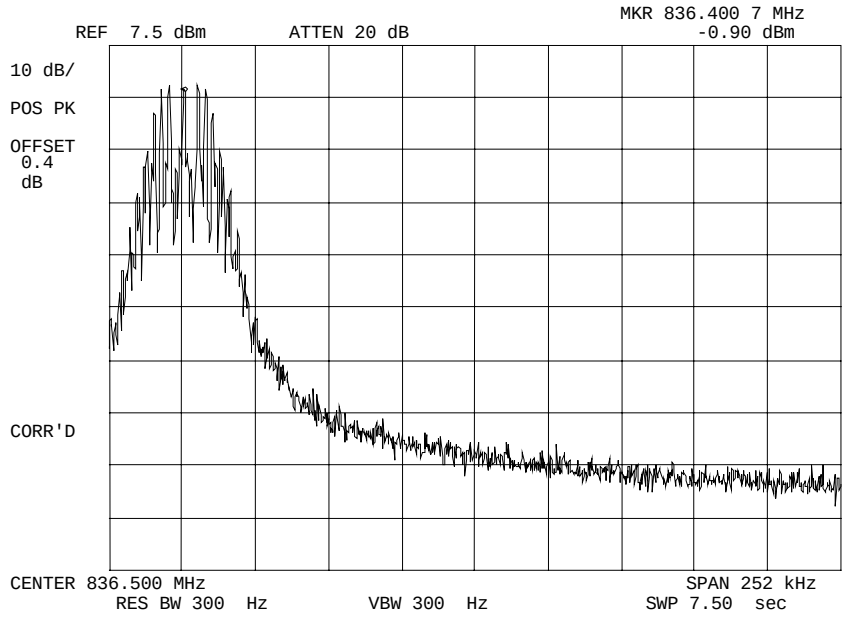
NAME OF TEST: Emission Masks (Occupied Bandwidth)
g00a0241: 2000-Oct-13 Fri 09:47:00
STATE: 1:Low Power



POWER: LOW
MODULATION: SAT+VOICE
OFFSET OCCUPIED BANDWIDTH

SUPERVISED BY: Morton Flom, P. Eng.

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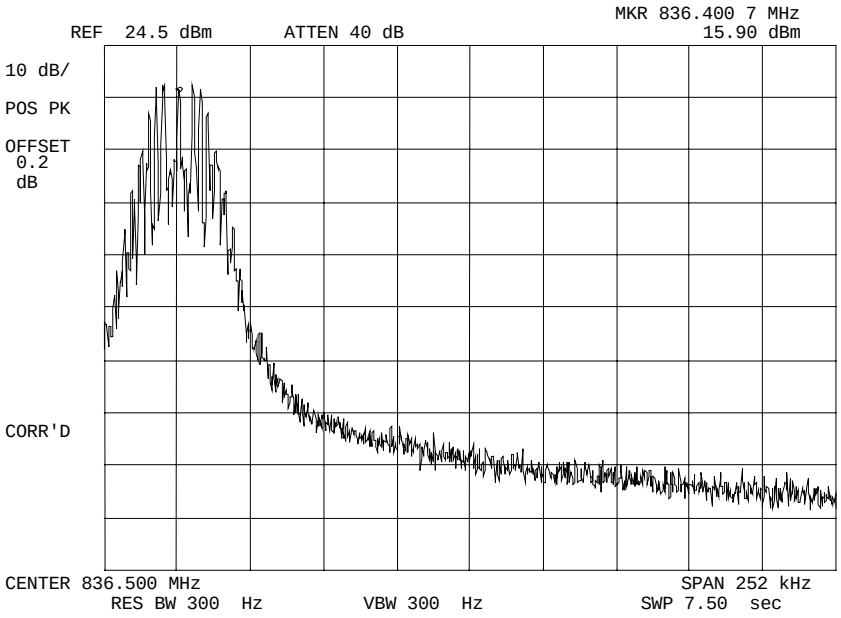
NAME OF TEST: Emission Masks (Occupied Bandwidth)
g00a0239: 2000-Oct-13 Fri 09:44:00
STATE: 2:High Power



POWER: HIGH
MODULATION: SAT+VOICE
OFFSET OCCUPIED BANDWIDTH

SUPERVISED BY: Morton Flom, P. Eng.

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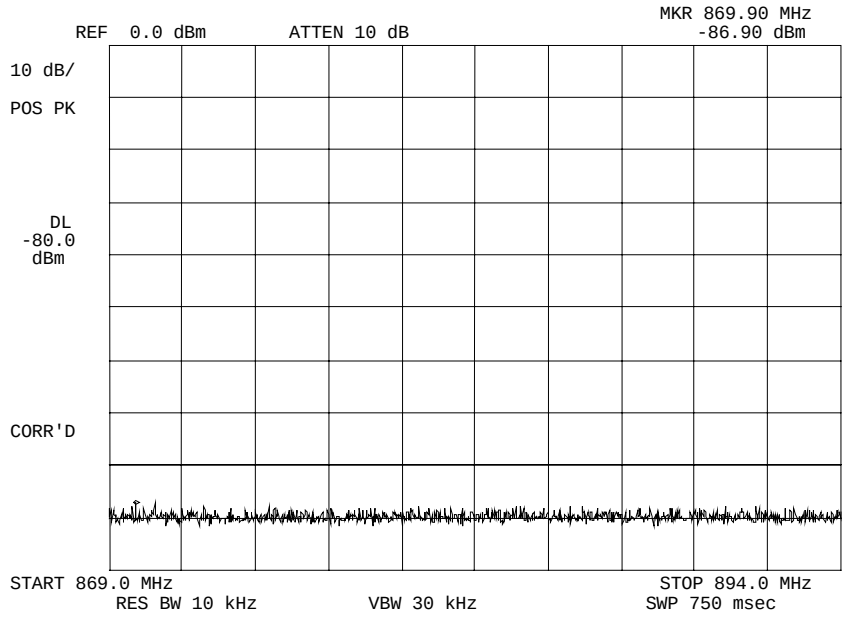
NAME OF TEST: Emission Masks (Occupied Bandwidth)
g00a0242: 2000-Oct-13 Fri 09:47:00
STATE: 1:Low Power



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

SUPERVISED BY: Morton Flom, P. Eng.

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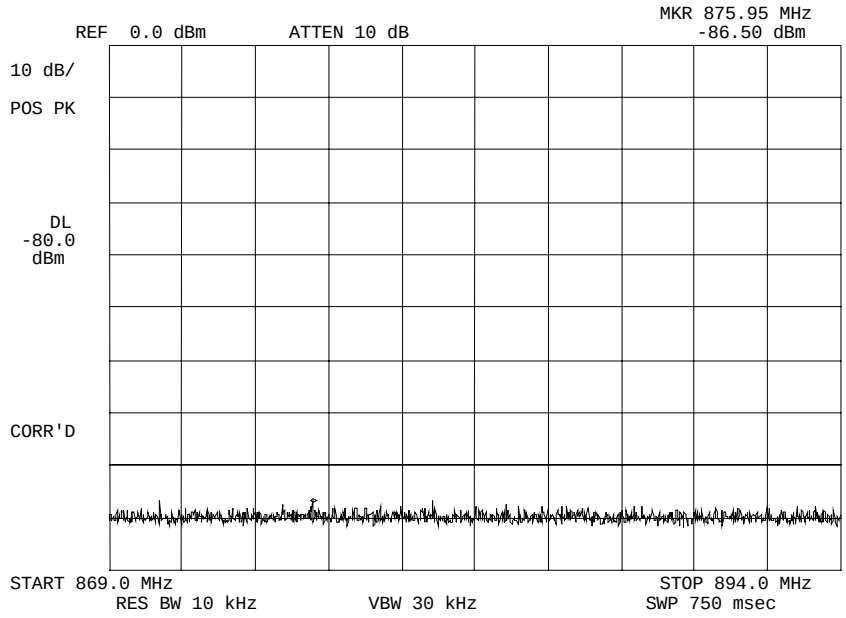
NAME OF TEST: Emission Masks (Occupied Bandwidth)
g00a0240: 2000-Oct-13 Fri 09:45:00
STATE: 2:High Power



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

SUPERVISED BY: Morton Flom, P. Eng.

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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	≤-28	≤-28
F0 + 45 kHz to F0 + 90 kHz	≤-45	≤-69	≤-69
F0 + 90 kHz to 2nd Harmonic	≤-60 (≤-13 dBm)	≤-54	≤-51
2nd to 10th	(≤-13 dBm)	≤-59	≤-60

MEASUREMENT RESULTS = ATTACHED OFFSET PLOTS

EMISSION IN THE RECEIVER CRITICAL BAND

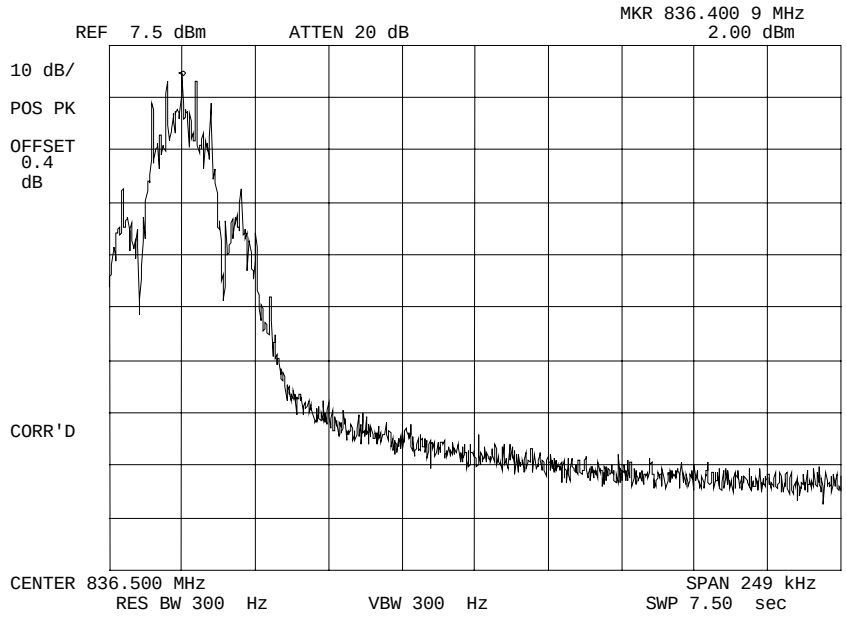
EMISSION, MHz/HARM.	LIMIT, dBm	SPURIOUS EMISSIONS, dBm Lo	Hi
869 to 894	≤-80	≤-86.9	≤-86.5

MEASUREMENT RESULTS = ATTACHED PLOTS

SUPERVISED BY: Morton Flom, P. Eng.

PAGE NO. 54 of 72.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
g00a0236: 2000-Oct-13 Fri 09:36:00
STATE: 1:Low Power

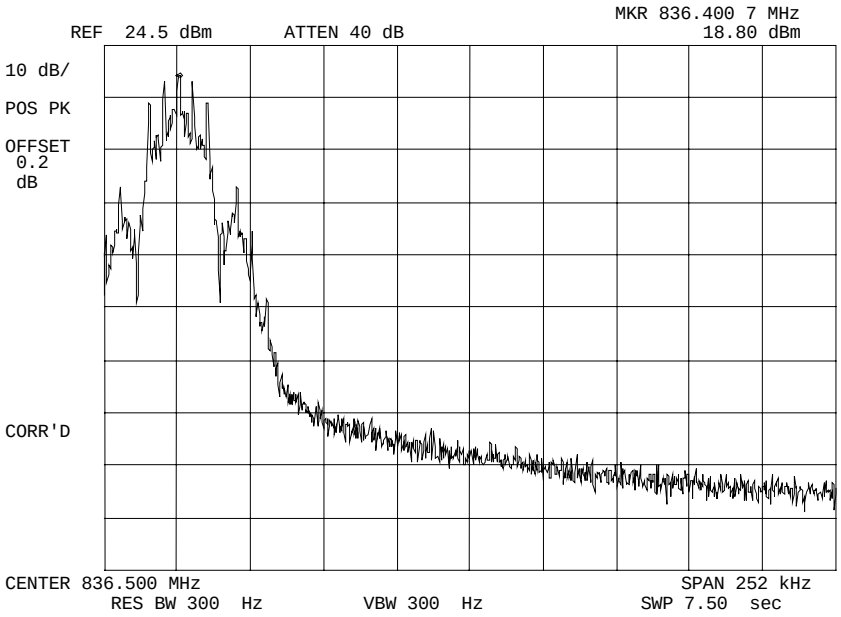


POWER: LOW
MODULATION: WBD
OFFSET OCCUPIED BANDWIDTH

SUPERVISED BY: Morton Flom, P. Eng.

PAGE NO. 55 of 72.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
g00a0235: 2000-Oct-13 Fri 09:34:00
STATE: 2:High Power

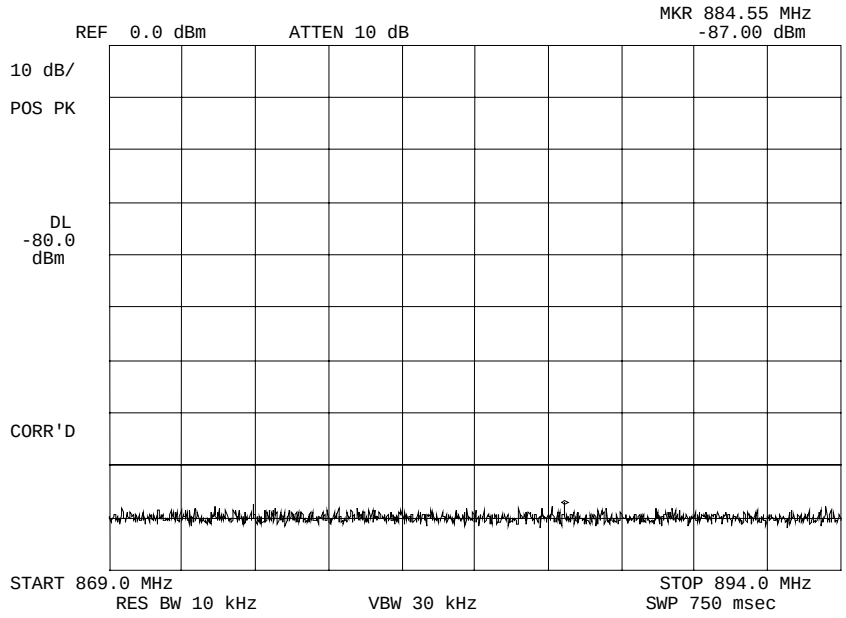


POWER: HIGH
MODULATION: WBD
OFFSET OCCUPIED BANDWIDTH

SUPERVISED BY: Morton Flom, P. Eng.

PAGE NO. 56 of 72.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
g00a0237: 2000-Oct-13 Fri 09:38:00
STATE: 1:Low Power

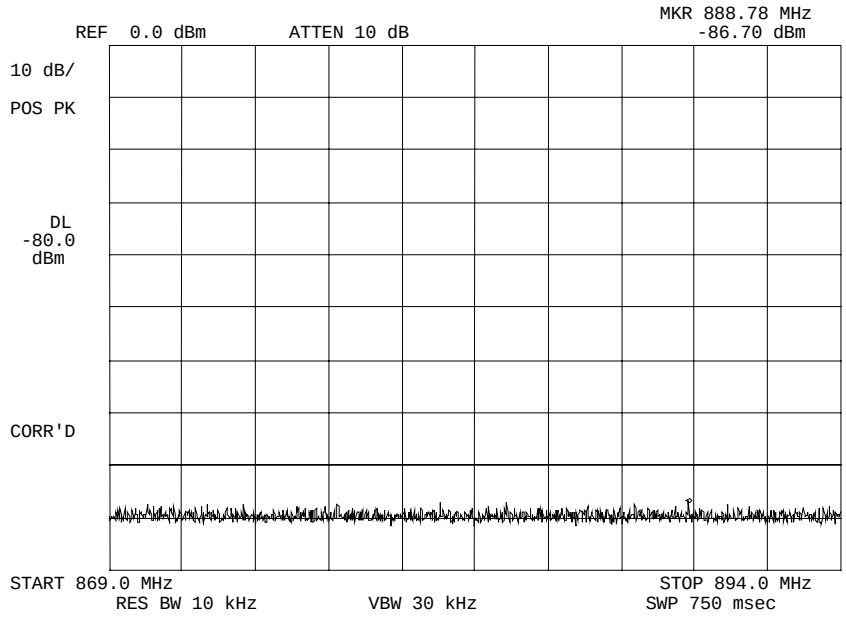


POWER: LOW
MODULATION: ANY
TX SPURS IN RX CRITICAL BAND

SUPERVISED BY: Morton Flom, P. Eng.

PAGE NO. 57 of 72.

NAME OF TEST: Emission Masks (Occupied Bandwidth)
g00a0238: 2000-Oct-13 Fri 09:39:00
STATE: 2:High Power



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

SUPERVISED BY: Morton Flom, P. Eng.

PAGE NO. 58 of 72.

NAME OF TEST: Spurious Emissions at Antenna Terminals

SPECIFICATION: 47 CFR 2.1051, 22.917

GUIDE: As indicated on page 7

TEST EQUIPMENT: As per attached page

MEASUREMENT PROCEDURE

1. The EUT was connected to a coaxial attenuator and then to a Spectrum Analyzer.

2. A notch filter was introduced to reduce or eliminate spurious emission which could be generated internally in the spectrum analyzer.

3. Measurements were made over the range from 45 kHz to 10 GHz for the worst case modulation so both the highest and lowest R.F. power settings.

4. All other emissions were 20 dB or more below the limit.

5. Spectrum analyzer bandwidth was set to section 22.917(h) as applicable.

6. MEASUREMENT RESULTS: ATTACHED

PAGE NO. 59 of 72.

NAME OF TEST: Unwanted Emissions (Transmitter Conducted)
g00a0261: 2000-Oct-13 Fri 15:55:00
STATE: 1:Low Power AMPS

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	LEVEL, dBm	LEVEL, dBc	MARGIN, dB
824.040000	1648.070000	-47.3	-54.8	-34.3
836.400000	1672.816000	-70.1	-77.6	-57.1
848.970000	1697.929000	-54.2	-61.7	-41.2
824.040000	2472.100000	-52.4	-59.9	-39.4
836.400000	2509.214000	-70.8	-78.3	-57.8
848.970000	2547.236000	-72.6	-80.1	-59.6
824.040000	3296.380000	-75.4	-82.9	-62.4
836.400000	3345.699000	-74.1	-81.6	-61.1
848.970000	3395.407000	-74.5	-82	-61.5
824.040000	4119.726000	-75.6	-83.1	-62.6
836.400000	4182.184000	-75.1	-82.6	-62.1
848.970000	4244.736000	-75	-82.5	-62
824.040000	4944.656000	-74.2	-81.7	-61.2
836.400000	5018.198000	-75.3	-82.8	-62.3
848.970000	5093.723000	-74.3	-81.8	-61.3
824.040000	5768.250000	-74.7	-82.2	-61.7
836.400000	5854.504000	-69	-76.5	-56
848.970000	5943.031000	-69.5	-77	-56.5
824.040000	6592.100000	-68.4	-75.9	-55.4
836.400000	6691.118000	-68.7	-76.2	-55.7
848.970000	6792.201000	-70	-77.5	-57
824.040000	7416.583000	-69.2	-76.7	-56.2
836.400000	7527.207000	-68.8	-76.3	-55.8
848.970000	7640.493000	-69.8	-77.3	-56.8
824.040000	8240.199000	-70.3	-77.8	-57.3
836.400000	8363.750000	-68.3	-75.8	-55.3
848.970000	8489.625000	-70.2	-77.7	-57.2
824.040000	9064.767000	-69.7	-77.2	-56.7
836.400000	9200.091000	-69.6	-77.1	-56.6
848.970000	9338.441000	-69.9	-77.4	-56.9
824.040000	9888.167000	-69.3	-76.8	-56.3
836.400000	10036.333000	-69.1	-76.6	-56.1
848.970000	10187.786000	-68.6	-76.1	-55.6
824.040000	10712.818000	-69	-76.5	-56
836.400000	10873.520000	-69.5	-77	-56.5
848.970000	11037.012000	-69.3	-76.8	-56.3
824.040000	11536.830000	-68.3	-75.8	-55.3
836.400000	11709.330000	-69.9	-77.4	-56.9
848.970000	11885.306000	-68.9	-76.4	-55.9
824.040000	12360.898000	-68.2	-75.7	-55.2
836.400000	12546.093000	-63.4	-70.9	-50.4
848.970000	12734.947000	-64.8	-72.3	-51.8

PAGE NO. 60 of 72.

NAME OF TEST: Unwanted Emissions (Transmitter Conducted)
g00a0251: 2000-Oct-13 Fri 13:46:00
STATE: 2:High Power AMPS – Without Notch Filter

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	LEVEL, dBm	LEVEL, dBc	MARGIN, dB
824.040000	1648.540000	-27.3	-51.8	-14.3
836.400000	1672.791000	-36.9	-61.4	-23.9
848.970000	1697.942000	-38	-62.5	-25
824.040000	2472.101000	-39.6	-64.1	-26.6
836.400000	2509.230000	-47.1	-71.6	-34.1
848.970000	2546.899000	-47.4	-71.9	-34.4
824.040000	3295.914000	-55.2	-79.7	-42.2
836.400000	3345.199000	-55.9	-80.4	-42.9
848.970000	3395.660000	-55.6	-80.1	-42.6
824.040000	4120.610000	-55.5	-80	-42.5
836.400000	4181.968000	-53.6	-78.1	-40.6
848.970000	4244.814000	-55.4	-79.9	-42.4
824.040000	4944.164000	-55.4	-79.9	-42.4
836.400000	5018.577000	-56	-80.5	-43
848.970000	5093.962000	-55.5	-80	-42.5
824.040000	5767.810000	-54.7	-79.2	-41.7
836.400000	5854.611000	-49.7	-74.2	-36.7
848.970000	5942.612000	-50.1	-74.6	-37.1
824.040000	6592.068000	-49.5	-74	-36.5
836.400000	6690.863000	-49.1	-73.6	-36.1
848.970000	6791.964000	-49.7	-74.2	-36.7
824.040000	7415.909000	-48.9	-73.4	-35.9
836.400000	7527.250000	-49.3	-73.8	-36.3
848.970000	7640.398000	-50.4	-74.9	-37.4
824.040000	8239.904000	-49.3	-73.8	-36.3
836.400000	8363.968000	-48.9	-73.4	-35.9
848.970000	8489.529000	-49.4	-73.9	-36.4
824.040000	9064.888000	-50	-74.5	-37
836.400000	9200.793000	-49.9	-74.4	-36.9
848.970000	9338.897000	-50.6	-75.1	-37.6
824.040000	9888.099000	-49.9	-74.4	-36.9
836.400000	10036.962000	-49.7	-74.2	-36.7
848.970000	10187.202000	-50.1	-74.6	-37.1
824.040000	10712.232000	-49.5	-74	-36.5
836.400000	10873.105000	-49.9	-74.4	-36.9
848.970000	11037.093000	-49.4	-73.9	-36.4
824.040000	11536.860000	-49	-73.5	-36
836.400000	11709.803000	-50	-74.5	-37
848.970000	11885.544000	-49.3	-73.8	-36.3
824.040000	12360.955000	-49.8	-74.3	-36.8
836.400000	12546.319000	-45.8	-70.3	-32.8
848.970000	12734.710000	-45.2	-69.7	-32.2

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NAME OF TEST: Unwanted Emissions (Transmitter Conducted)
g00a0254: 2000-Oct-13 Fri 15:09:00
STATE: 2:High Power TDMA

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	LEVEL, dBm	LEVEL, dBc	MARGIN, dB
824.040000	1648.087000	-29.6	-56.5	-16.6
836.400000	1672.659000	-53.9	-80.8	-40.9
848.970000	1698.369000	-54.7	-81.6	-41.7
824.040000	2471.687000	-53.6	-80.5	-40.6
836.400000	2508.921000	-55.1	-82	-42.1
848.970000	2546.926000	-46.4	-73.3	-33.4
824.040000	3295.938000	-56.4	-83.3	-43.4
836.400000	3345.267000	-55.3	-82.2	-42.3
848.970000	3395.886000	-54.9	-81.8	-41.9
824.040000	4120.529000	-54.3	-81.2	-41.3
836.400000	4181.612000	-55.6	-82.5	-42.6
848.970000	4244.413000	-55.7	-82.6	-42.7
824.040000	4944.376000	-54.7	-81.6	-41.7
836.400000	5017.958000	-55.6	-82.5	-42.6
848.970000	5093.520000	-55.5	-82.4	-42.5
824.040000	5768.007000	-54.6	-81.5	-41.6
836.400000	5854.802000	-50.2	-77.1	-37.2
848.970000	5942.390000	-49.7	-76.6	-36.7
824.040000	6592.004000	-49.6	-76.5	-36.6
836.400000	6690.862000	-48.8	-75.7	-35.8
848.970000	6791.493000	-49.2	-76.1	-36.2
824.040000	7416.268000	-49	-75.9	-36
836.400000	7527.160000	-50	-76.9	-37
848.970000	7640.892000	-50.3	-77.2	-37.3
824.040000	8240.876000	-49.4	-76.3	-36.4
836.400000	8364.283000	-50.1	-77	-37.1
848.970000	8489.723000	-50.4	-77.3	-37.4
824.040000	9064.291000	-49.7	-76.6	-36.7
836.400000	9200.486000	-50.3	-77.2	-37.3
848.970000	9339.161000	-48.2	-75.1	-35.2
824.040000	9888.311000	-50.3	-77.2	-37.3
836.400000	10037.167000	-50.8	-77.7	-37.8
848.970000	10187.954000	-49.3	-76.2	-36.3
824.040000	10712.433000	-50.7	-77.6	-37.7
836.400000	10873.581000	-49	-75.9	-36
848.970000	11036.783000	-49.4	-76.3	-36.4
824.040000	11536.286000	-49.4	-76.3	-36.4
836.400000	11709.799000	-49.9	-76.8	-36.9
848.970000	11885.355000	-49.2	-76.1	-36.2
824.040000	12360.505000	-49.8	-76.7	-36.8
836.400000	12545.946000	-45.7	-72.6	-32.7
848.970000	12734.781000	-44.6	-71.5	-31.6

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NAME OF TEST: Unwanted Emissions (Transmitter Conducted)
g00a0259: 2000-Oct-13 Fri 15:35:00
STATE: 2:High Power TDMA-PCS

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	LEVEL, dBm	LEVEL, dBc	MARGIN, dB
1850.040000	3699.990000	-55	-80.3	-42
1879.980000	3759.987000	-49.7	-75	-36.7
1909.920000	3820.324000	-54	-79.3	-41
1850.040000	5549.808000	-53.6	-78.9	-40.6
1879.980000	5640.283000	-54.8	-80.1	-41.8
1909.920000	5729.346000	-54.9	-80.2	-41.9
1850.040000	7399.946000	-48.4	-73.7	-35.4
1879.980000	7520.257000	-48.6	-73.9	-35.6
1909.920000	7639.391000	-49.1	-74.4	-36.1
1850.040000	9250.602000	-49.3	-74.6	-36.3
1879.980000	9400.127000	-48.9	-74.2	-35.9
1909.920000	9549.118000	-49	-74.3	-36
1850.040000	11100.226000	-49.3	-74.6	-36.3
1879.980000	11279.977000	-48.1	-73.4	-35.1
1909.920000	11459.204000	-49.3	-74.6	-36.3
1850.040000	12950.752000	-43.8	-69.1	-30.8
1879.980000	13159.445000	-44.9	-70.2	-31.9
1909.920000	13369.869000	-44.3	-69.6	-31.3
1850.040000	14800.521000	-44.1	-69.4	-31.1
1879.980000	15040.097000	-43.9	-69.2	-30.9
1909.920000	15279.225000	-43.4	-68.7	-30.4
1850.040000	16650.259000	-43.4	-68.7	-30.4
1879.980000	16919.610000	-43.4	-68.7	-30.4
1909.920000	17188.985000	-42.6	-67.9	-29.6
1850.040000	18500.067000	-42.4	-67.7	-29.4
1879.980000	18799.670000	-37.6	-62.9	-24.6
1909.920000	19098.763000	-38	-63.3	-25
1850.040000	20350.912000	-36.6	-61.9	-23.6
1879.980000	20680.254000	-35.5	-60.8	-22.5
1909.920000	21009.438000	-35.7	-61	-22.7

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NAME OF TEST: Field Strength of Spurious Radiation

SPECIFICATION: 47 CFR 2.1053(a)

GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 1.2.12

MEASUREMENT PROCEDURE

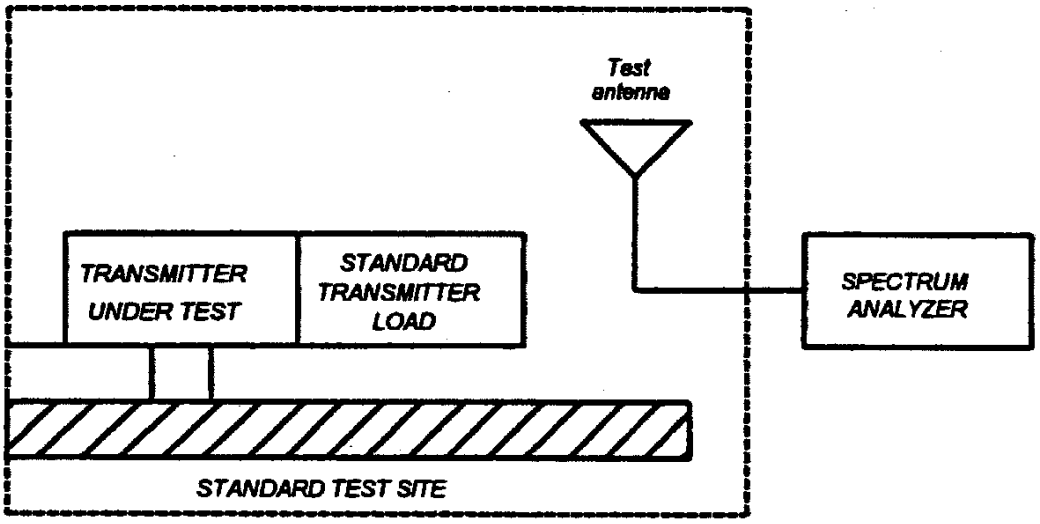
1.2.12.1 Definition: Radiated spurious emissions are emissions from the equipment when transmitting into a non-radiating load on a frequency or frequencies which are outside an occupied band sufficient to ensure transmission of information of required quality for the class of communications desired.

1.2.12.2 Method of Measurement

A) Connect the equipment as illustrated

B) Adjust the spectrum analyzer for the following settings:
1) Resolution Bandwidth ≤3 kHz.
2) Video Bandwidth ≥10 kHz
3) Sweep Speed ≤2000 Hz/second
4) Detector Mode = Positive Peak

C) Place the transmitter to be tested on the turntable in the standard test site. The transmitter is transmitting into a non-radiating load which is placed on the turntable. The RF cable to this load should be of minimum length.



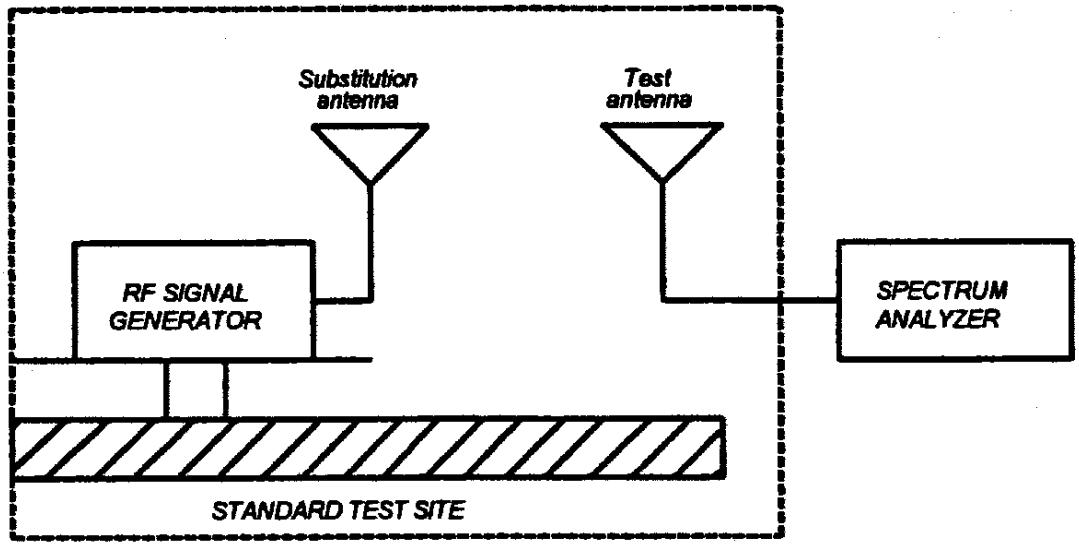
PAGE NO. 64 of 72.

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

D) For each spurious measurement the test antenna should be adjusted to the correct length for the frequency involved. This length may be determined from a calibration ruler supplied with the equipment. Measurements shall be made from the lowest radio frequency generated in the equipment to the tenth harmonic of the carrier, except for the region close to the carrier equal to ± the test bandwidth (see section 1.3.4.4).

E) For each spurious frequency, raise and lower the test antenna from 1 m to 4 m to obtain a maximum reading on the spectrum analyzer with the test antenna at horizontal polarity. Repeat this procedure to obtain the highest possible reading. Record this maximum reading.

F) Repeat step E) for each spurious frequency with the test antenna polarized vertically.



G) Reconnect the equipment as illustrated.

H) Keep the spectrum analyzer adjusted as in step B).

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

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

J) Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a non-radiating cable. With the antennas at both ends horizontally polarized and with the signal generator tuned to a particular spurious frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.

K) Repeat step J) with both antennas vertically polarized for each spurious frequency.

L) Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps J) and K) by the power loss in the cable between the generator and the antenna and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna.

M) The levels recorded in step L) are absolute levels of radiated spurious emissions in dBm. The radiated spurious emissions in dB can be calculated by the following:

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

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

Test Equipment:

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

MEASUREMENT RESULTS: FIELD STRENGTH OF SPURIOUS RADIATION

Measurement Distance, m = 3

Spectrum Searched, GHz = 0 to 10

AMPS BAND

TUNED, MHz	CHANNEL NUMBER	EMISSION MHz/HARM.	LEVEL, dBc Lo	LEVEL, dBc Hi
824.040	991	2^{nd} – 10^{th}	<-51	<-51
836.400	380	2^{nd} – 10^{th}	<-51	<-51
848.970	799	2^{nd} – 10^{th}	<-51	<-51

TDMA BAND

TUNED, MHz	CHANNEL NUMBER	EMISSION MHz/HARM.	LEVEL, dBc Lo	LEVEL, dBc Hi
824.040	991	2^{nd} – 10^{th}	<-56	<-56
836.400	380	2^{nd} – 10^{th}	<-56	<-56
848.970	799	2^{nd} – 10^{th}	<-56	<-56

PCS-TDMA BAND

TUNED, MHz	CHANNEL NUMBER	EMISSION MHz/HARM.	LEVEL, dBc Lo	LEVEL, dBc Hi
1850.04	2	2^{nd} – 10^{th}	<-60	<-60
1879.98	1000	2^{nd} – 10^{th}	<-60	<-60
1909.92	1998	2^{nd} – 10^{th}	<-60	<-60

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.

NAME OF TEST: Field Strength of Spurious Radiation
g00a0219: 2000-Oct-13 Fri 09:10:00
STATE: 2:High Power AMPS

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	METER, dBuV	CF, dB	ERP, dBm	MARGIN, dB
836.400000	1672.795000	56	-0.38	-41.8	-28.8
836.400000	2509.200000	55.33	3.06	-39	-26
836.400000	3345.586166	41.67	5.7	-50	-37
836.400000	5018.391483	32	9.26	-56.1	-43.1
836.400000	5854.803150	30	10.78	-56.6	-43.6
836.400000	6691.196201	33.17	12.2	-52	-39
836.400000	7527.601201	30.5	13.5	-53.4	-40.4
836.400000	8364.007867	31.5	14.55	-51.3	-38.4
836.400000	9200.396201	32	15.34	-50	-37.1

NAME OF TEST: Field Strength of Spurious Radiation
g00a0217: 2000-Oct-12 Thu 15:58:00
STATE: 2:High Power TDMA

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	METER, dBuV	CF, dB	ERP, dBm	MARGIN, dB
836.400000	1672.793333	51.17	-0.38	-46.6	-33.6
836.400000	2509.215000	56.17	3.06	-38.1	-25.2
836.400000	3345.600833	41.17	5.7	-50.5	-37.5
836.400000	4182.006667	41.5	7.53	-48.3	-35.4
836.400000	5018.406667	41.33	9.26	-46.8	-33.8
836.400000	5854.803333	34.67	10.78	-51.9	-39
836.400000	6691.203333	33.33	12.2	-51.8	-38.9
836.400000	7527.590000	31.17	13.5	-52.7	-39.7
836.400000	8363.998333	31.33	14.55	-51.5	-38.5

NAME OF TEST: Field Strength of Spurious Radiation
g00a0216: 2000-Oct-12 Thu 13:00:00
STATE: 2:High Power TDMA-PCS

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	METER, dBuV	CF, dB	EIRP, dBm	MARGIN, dB
1879.980000	3759.996667	49.5	6.61	-39.1	-26.1
1879.980000	5639.993333	56	10.4	-28.8	-15.8
1879.980000	7519.988333	42	13.49	-39.7	-26.7
1879.980000	9399.991667	42.17	15.51	-37.5	-24.5
1879.980000	11279.995000	42.67	17.4	-35.2	-22.1
1879.980000	13159.996667	41.83	17.62	-35.8	-22.8
1879.980000	15039.991667	43.83	18.19	-33.2	-20.2
1879.980000	16919.991667	43.17	19.65	-32.4	-19.4

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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.

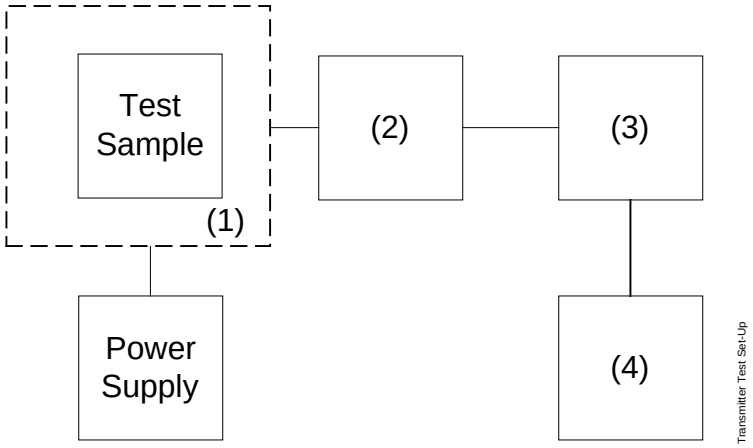
4. The temperature tests were performed for the worst case.

5. MEASUREMENT RESULTS: ATTACHED

PAGE NO. 69 of 72.

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
(as applicable)		
(1)	TEMPERATURE, HUMIDITY, VIBRATION	
i00027	Tenney 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

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NAME OF TEST: Frequency Stability (Temperature Variation)

AMPS MODE:

°C	Change, Hz	Change, ppm
-30	17	0.02
-20	0	0.00
-10	-25	-0.03
0	-25	-0.03
10	-8	-0.01
20	33	0.04
25	-92	-0.11
30	8	0.01
40	167	0.20
50	259	0.31
60	8	0.01

NAME OF TEST: Frequency Stability (Temperature Variation)

TDMA MODE:
Subscriber equipment is synchronized to base station frequency. No variance in transmitter frequency stability observed under any variation of temperature and/or voltage.

SUPERVISED BY: Morton Flom, P. Eng.

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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±5°C and connected as for "Frequency Stability - Temperature Variation" test.

2. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.

3. The variation in frequency was measured for the worst case.

RESULTS: Frequency Stability (Voltage Variation)
g00a0218: 2000-Oct-12 Thu 17:20:04
STATE: 0:General

LIMIT, ppm = 5
LIMIT, Hz = 4182
BATTERY END POINT (Voltage) = 3.3

% of STV	Voltage	Frequency, MHz	Change, Hz	Change, ppm
85	3.3	836.399925	-75	-0.09
100	3.9	836.400017	17	0.02
115	4.5	836.399833	-167	-0.20
B.E.P.	3.3	836.399925	-75	-0.09

Subscriber equipment is synchronized to base station frequency. No variance in transmitter frequency stability observed under any variation of temperature and/or voltage.

LIMIT: Must remain within authorized frequency block.

SUPERVISED BY: Morton Flom, P. Eng.

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NAME OF TEST: Necessary Bandwidth and Emission Bandwidth

SPECIFICATION: 47 CFR 2.202(g)

MODULATION = 40K0FXW
NECESSARY BANDWIDTH:
NECESSARY BANDWIDTH (B_N), kHz = 40K0FXW
(measured at the 99.75% power bandwidth)

MODULATION = 40K0F1D
NECESSARY BANDWIDTH:
NECESSARY BANDWIDTH (B_N), kHz = 40K0F1D
(measured at the 99.75% power bandwidth)

MODULATION = 30K0DXW
NECESSARY BANDWIDTH:
NECESSARY BANDWIDTH (B_N), kHz = 30K0DXW
(measured at the 99.75% power bandwidth)

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.