



M. Flom Associates, Inc.

International Compliance Testing Laboratory

3356 N. San Marcos Place, Suite 107
Chandler, AZ 85225

toll-free: (866) 311-3268
fax: (480) 926-3598

<http://www.mflom.com>
info@mflom.com

Date: August 16, 2005

Federal Communications Commission
Via: Electronic Filing

Attention: Authorization & Evaluation Division

Applicant: Raveon Technologies Corporation
Equipment: RRE
FCC ID: TJ2-RRE
FCC Rules: 95J

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,

David E. Lee, Quality Assurance Manager

enclosure(s)
cc: Applicant
DEL/del



M. Flom Associates, Inc.

International Compliance Testing Laboratory

3356 N. San Marcos Place, Suite 107
Chandler, AZ 85225

toll-free: (866) 311-3268
fax: (480) 926-3598

<http://www.mflom.com>
info@mflom.com

Transmitter Certification

of

Model: RRE
FCC ID: TJ2-RRE

to

Federal Communications Commission

Rule Part(s) 95J, Modular and Confidentiality

Date of report: August 16, 2005

On the Behalf of the Applicant:

CALSENSE

At the Request of:

P.O. 1135

Raveon Technologies Corporation
2722 Loker Avenue West, Suite D
Carlsbad, CA 92008

Attention of:

John Sonnenberg
760-931-8001; fax: 760-931-8004
Email: js@raveontech.com

Supervised by:

David E. Lee, Quality Assurance Manager



List of Exhibits

(FCC Certification (Transmitters) - Revised 9/28/98)

Applicant: Raveon Technologies Corporation

FCC ID: TJ2-RRE

By Applicant:

1. Letter of Authorization
2. Confidentiality Request: 0.457 And 0.459
3. Identification Drawings, 2.1033(c)(11)
 - Label
 - Location of Label
 - Compliance Statement
 - Location of Compliance Statement
4. Photographs, 2.1033(c)(12)
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. MPE Report

By M.F.A. Inc.:

- A. Testimonial & Statement of Certification

The Applicant has been cautioned as to the following:

15.21 Information to the 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

<u>Rule</u>	<u>Description</u>	<u>Page</u>
2.1033(c)(14)	Rule Summary	2
	Standard Test Conditions and Engineering Practices	3
2.1033(c)	General Information Required	5
2.1046(a)	Carrier Output Power (Conducted)	8
2.1051	Unwanted Emissions (Transmitter Conducted)	10
2.1053(a)	Field Strength of Spurious Radiation	12
2.1049(c)(1)	Emission Masks (Occupied Bandwidth)	17
2.1055(a)(1)	Frequency Stability (Temperature Variation)	25
2.1055(b)(1)	Frequency Stability (Voltage Variation)	27
2.202(g)	Necessary Bandwidth and Emission Bandwidth	29



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

a)

Test Report

b) Laboratory:
(FCC: 31040/SIT)
(Canada: IC 2044)

M. Flom Associates, Inc.
3356 N. San Marcos Place, Suite 107
Chandler, AZ 85225

c) Report Number:

d0580020

d) Client:

Raveon Technologies Corporation
2722 Loker Avenue West, Suite D
Carlsbad, CA 92008

e) Identification:

RRE
FCC ID: TJ2-RRE
EUT Description:
MURS Data Modem

f) EUT Condition:

Not required unless specified in individual tests.

g) Report Date:

August 16, 2005
EUT Received:
August 2, 2005

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:

A handwritten signature in black ink, appearing to read "D. Lee".

David E. Lee, Quality Assurance Manager

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.

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 Radio Beacons (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
- _____ X 95 Subpart J - MURS
- _____ 97 - Amateur Radio Service
- _____ 101 - Fixed Microwave Services



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.



A2LA

"A2LA has accredited M. Flom Associates, Inc. Chandler, AZ for technical competence in the field of Electrical 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 17025 - 1999 'General Requirements for the Competence of Testing and Calibration Laboratories' and any additional program requirements in the identified field of testing."

Certificate Number: **2152-01**



UNITED STATES DEPARTMENT OF COMMERCE
National Institute of Standards and Technology
Gaithersburg, Maryland 20899

September 15, 1999

Mr. Morris Flom
M. Flom Associates Inc.
3356 N. San Marcos Place, Suite 107
Chandler, AZ 85224

Dear Mr. Flom:

I am pleased to inform you that your laboratory has been validated by the Chinese Taipei Bureau of Standards, Metrology and Inspection (BSMI) under the Asia Pacific Economic Cooperation Mutual Recognition Arrangement (APEC MRA). Your laboratory is now formally designated as set out in the Conformity Assessment Body (CAB) under Appendix B, Phase I Procedures, of the APEC MRA between the American Institute in Taiwan (AIT) and the Taipei Economic and Cultural Representative Office (TECRO) in the United States, covering equipment subject to Electro-Magnetic Compatibility (EMC) requirements. The names of all validated and nominated laboratories will be posted on the NIST website at <http://ts.nist.gov/mra> under the "Asia" category.

As of August 1, 1999, you may submit test data to BSMI to verify that the equipment to be imported into Chinese Taipei satisfies the applicable EMC requirements. Your assigned BSMI number is **SL2-IN-E-041R**; you must use this number when sending test reports to BSMI. Your designation will remain in force as long as your NVLAP and/or A2LA and/or BSMI accreditation remains valid for the CMM 13438.

Please note that BSMI requires that the entity making application for the approval of regulated equipment must make an application in person at the Taipei Economic and Cultural Representative Office of the Republic of China, who are authorized to sign the test reports. You can send this information via fax to C-Taipei CAB Response Manager at 101-973-5414. I am also enclosing a copy of the cover sheet that, according to BSMI requirements, must accompany every test report.

If you have any questions, please contact Robert Gladhill at 301-975-4273 or Joe Shilling at 301-973-5521. We appreciate your continued interest in our international conformity assessment activities.

Sincerely,


Linda L. Collins, Ph.D.
Director, Office of Standards Services

Enclosure

NIST

BSMI Number: **SL2-IN-E-041R**

M. Flom Associates, Inc.
3356 North San Marcos Place, Suite 107
Chandler, Arizona 85225-7176
(480) 926-3100 phone, (480) 926-3598 fax

Page 4 of 29
FCC ID: TJ2-RRE
MFA p0580001, d0580020

List of General Information Required for Certification

In Accordance with FCC Rules and Regulations,
Volume II, Part 2, Part 95J, Modular, and Confidentiality

Sub-part 2.1033

(c)(1): Name and Address of Applicant:

CALSENSE
2075 Corte del Nogal Suite P
Carlsbad, CA 92011-1415

Manufacturer:

Applicant

(c)(2): FCC ID: TJ2-RRE

Model Number: RRE

(c)(3): Instruction Manual(s):

Please see attached exhibits

(c)(4): Type of Emission: 11K2F1D

(c)(5): Frequency Range, MHz: 151.820 to 154.600

(c)(6): Power Rating, Watts: 2.0
____ Switchable ____ Variable N/A

(c)(7): Maximum Power Rating, Watts: 2.0

DUT Results: Passes Fails _____

Information for Push-To-Talk Devices

Type and number of antenna to be used for this device:

1

Maximum antenna gain for antenna indicated above:

Unity Gain

Can this device sustain continuous operation with respect to its hardware capabilities and allowable operating functions?

No. 10% Duty Cycle

Other hardware or operating restrictions that could limit a person's RF Exposure:

No.

Source-based time-averaging (see 2.1093 of rules) applicable to reduce the average output power:

No.

If device has headset and belt-clip accessories that would allow body-worn operations, what is the minimum separation distance between the antenna and the user's body in this operating configuration?

N/A

Can device access wire-line services to make phone calls, either directly or through an operator?

No.

Can specific operating instructions be given to users to eliminate any potential RF Exposure concerns for both front-of-the-face and body-worn operating configurations?

N/A

Other applicable information the applicant may provide that can serve as effective means for ensuring RF Exposure compliance:

Installation Instructions.

Subpart 2.1033 (continued)

(c)(8): Voltages & currents in all elements in final RF stage, including final transistor or solid-state device:

Collector Current, A	= 3.0
Collector Voltage, Vdc	= 5.0
Supply Voltage, Vdc	= 5.0

(c)(9): **Tune-Up Procedure:**

Please see attached exhibits

(c)(10): **Circuit Diagram/Circuit Description:**

Including description of circuitry & devices provided for determining and stabilizing frequency, for suppression of spurious radiation, for limiting modulation and limiting power.

Please see attached exhibits

(c)(11): **Label Information:**

Please see attached exhibits

(c)(12): **Photographs:**

Please see attached exhibits

(c)(13): **Digital Modulation Description:**

 Attached Exhibits
X N/A

(c)(14): **Test and Measurement Data:**

Follows

Name of Test: Carrier Output Power (Conducted)

Specification: 47 CFR 2.1046(a)

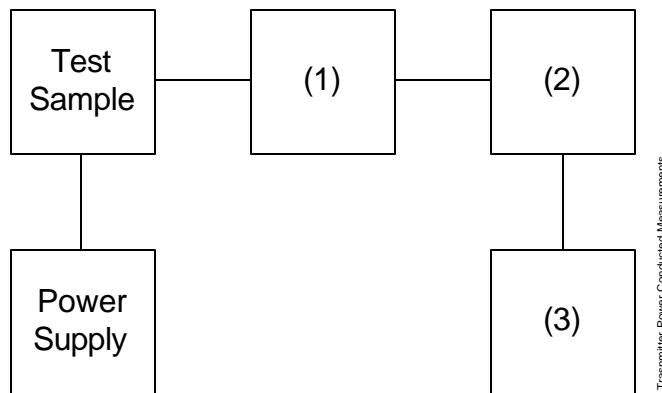
Guide: ANSI/TIA/EIA-603-1992, Paragraph 2.2.1

Measurement Procedure

A) The EUT was connected to a resistive coaxial attenuator of normal load impedance, and the unmodulated output power was measured by means of an RF Power Meter.

B) Measurement accuracy is $\pm 3\%$.

Transmitter Test Set-Up: RF Power Output



	Asset	Description	s/n	Cycle	Last Cal
(1)	Coaxial Attenuator				
X	i00231/2	PASTERNACK PE7021-30 (30 dB)	231 or 232	NCR	
	i00122/3	NARDA 766 (10 dB)	7802 or 7802A	NCR	
(2)	Power Meters				
X	i00020	HP 8901A Power Mode	2105A01087	12 mo.	Apr-05
(3)	Frequency Counter				
X	i00020	HP 8901A Frequency Mode	2105A01087	12 mo.	Apr-05



Name of Test: Carrier Output Power (Conducted)

Measurement Results
(Worst case)

Frequency of Carrier, MHz = 151.820, 151.880, 151.940, 154.570,
154.600

Ambient Temperature = 23°C ± 3°C

Power Setting	RF Power, dBm	RF Power, Watts
High	33.0	2.0

A handwritten signature in black ink that reads "Fred Chastain".

Performed By:

Fred Chastain, Test Technician

Name of Test: Unwanted Emissions (Transmitter Conducted)

Specification: 47 CFR 2.1051

Guide: ANSI/TIA/EIA-603-1992, Paragraph 2.2.13

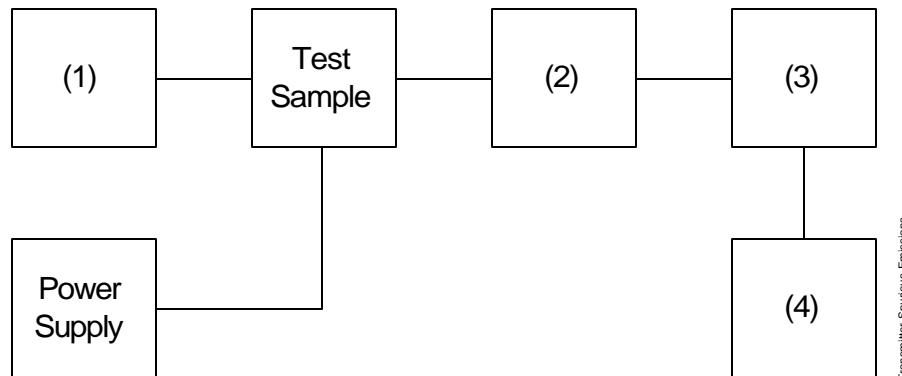
Measurement Procedure

A) The emissions were measured for the worst case as follows:

- 1). within a band of frequencies defined by the carrier frequency plus and minus one channel.
- 2). from the lowest frequency generated in the EUT and to at least the 10th harmonic of the carrier frequency, or 40 GHz, whichever is lower.

B) The magnitude of spurious emissions that are attenuated more than 20 dB below the permissible value need not be specified.

Transmitter Test Set-Up: Spurious Emission



Asset	Description	s/n		
(1) Audio Oscillator/Generator				
X i00017	HP 8903A Audio Analyzer	2216A01753	12 mo.	Apr-05
i0002	HP 3336B Synthesizer / Level Gen.	1931A01465	12 mo.	Apr-05
(2) Coaxial Attenuator				
X i00231/2	PASTERNACK PE7021-30 (30 dB)	231 or 232	NCR	
i0012/3	NARDA 766 (10 dB)	7802 or 7802A	NCR	
(3) Filters; Notch, HP, LP, BP	None required			
(4) Spectrum Analyzer				
X i00048	HP 8566B Spectrum Analyzer	2511A01467	12 mo.	Oct-04
i00029	HP 8563E Spectrum Analyzer	3213A00104	12 mo.	May-05



Name of Test: Unwanted Emissions (Transmitter Conducted)

Measurement Results
(Worst Case)

Summary:

Frequency of carrier, MHz	=	151.820, 151.880, 151.940, 154.570, 154.600
Spectrum Searched, GHz	=	0 to 10 x F_C
Maximum Response, Hz	=	N/A
All Other Emissions	=	= 20 dB Below Limit
Limit(s), dBc	(43 + Log10(P)) =	-13dBm

Tabulated Results follow:

Measurement Results

All readings were less than -33dBm

A handwritten signature in black ink that reads "Fred Chastain".

Performed By:

Fred Chastain, Test Technician

Name of Test: Field Strength of Spurious Radiation

Specification: 47 CFR 2.1053(a)

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

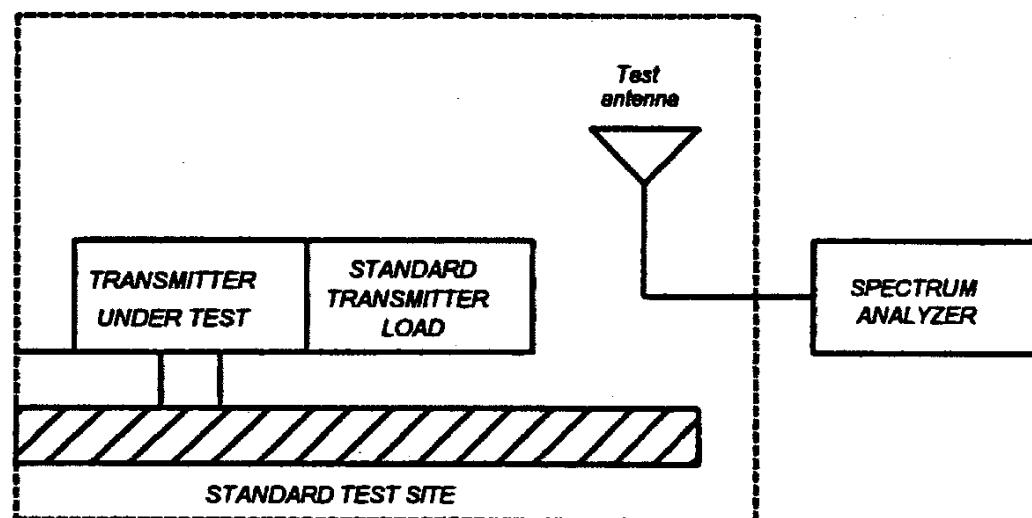
Measurement Procedure

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.

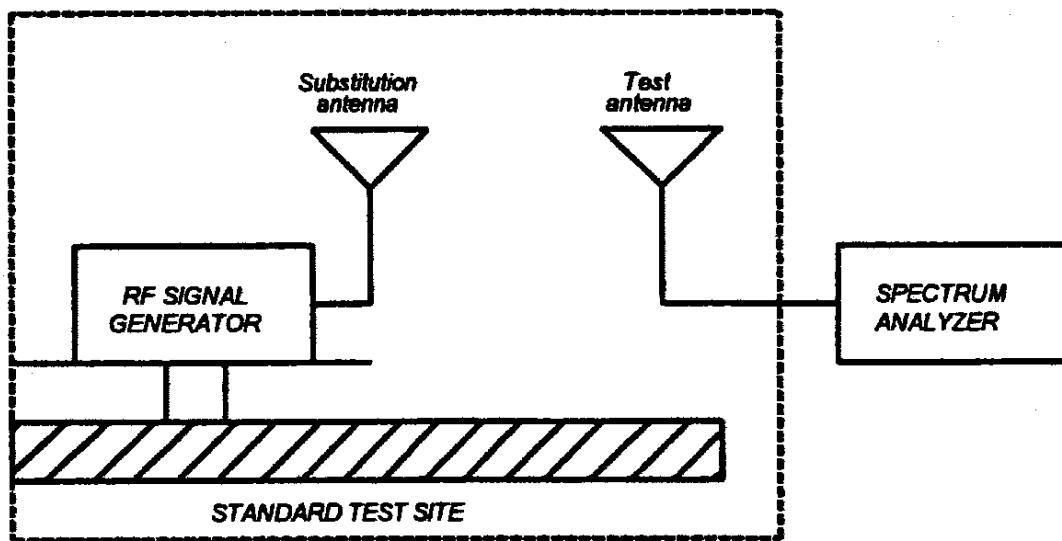
Method of Measurement:

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



Name of Test: Field Strength of Spurious Radiation (Cont.)

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



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

Name of Test: Field Strength of Spurious Radiation (Cont.)

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

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

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

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

Radiated spurious emissions dB =

$$10\log_{10}(\text{TX power in watts}/0.001) - \text{the levels in step I)}$$

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

Test Equipment

Asset	Description	s/n	Cycle	Last Cal
Transducer				
	i00088	EMCO 3109-B 25MHz-300MHz	2336	24 mo.
X	i00089	Aprel 2001 200MHz-1GHz	001500	24 mo.
X	i00103	EMCO 3115 1GHz-18GHz	9208-3925	24 mo.
Amplifier				
X	i00028	HP 8449A	2749A00121	12 mo.
Spectrum Analyzer				
X	i00029	HP 8563E	3213A00104	12 mo.
X	i00033	HP 85462A	3625A00357	12 mo.
Substitution Generator				
X	i00067	HP 8920A Communication TS	3345U01242	12 mo.
	i00207	HP 8753D Network Analyzer	3410A08514	12 mo.

Microphone, Antenna Port, and Cabling

Microphone	No	Cable Length	Meters
Antenna Port Terminated	Yes	Load	Yes
All Ports Terminated by Load	Yes	Peripheral	No

Name of Test: Field Strength of Spurious Radiation

Measurement Results

g0580148: 2005-Aug-23 Tue 12:57:00

STATE: 2:High Power

Ambient Temperature: 23°C ± 3°C

Frequency Tuned, MHz	Frequency Emission, MHz	ERP, dBm	ERP, dBc
151.820000	303.640000	-71.50	-104.50
154.600000	309.178000	-68.40	-101.40
154.600000	309.203000	-65.10	-98.10
151.820000	455.460000	-55.00	-88.00
154.600000	463.710000	-55.30	-88.30
154.600000	463.803000	-55.60	-88.60
154.600000	618.310000	-63.90	-96.90
154.600000	618.403000	-63.70	-96.70
151.820000	759.100000	-63.70	-96.70
154.600000	772.910000	-61.00	-94.00
154.600000	772.978000	-60.40	-93.40
154.600000	773.003000	-58.50	-91.50
151.820000	910.920000	-60.80	-93.80
154.600000	927.510000	-60.60	-93.60
154.600000	927.578000	-59.60	-92.60
154.600000	927.603000	-59.10	-92.10
151.820000	1062.690000	-58.50	-91.50
151.820000	1062.690000	-61.20	-94.20
151.940000	1063.530000	-62.10	-95.10
151.940000	1063.530000	-60.20	-93.20
154.600000	1082.150000	-60.70	-93.70
154.600000	1082.150000	-61.60	-94.60
151.820000	1214.510000	-59.90	-92.90
151.820000	1214.510000	-56.70	-89.70
151.940000	1215.470000	-56.50	-89.50
151.940000	1215.470000	-62.80	-95.80
154.600000	1236.750000	-61.70	-94.70
154.600000	1236.750000	-56.00	-89.00
151.820000	1366.330000	-60.80	-93.80
151.820000	1366.330000	-61.20	-94.20
151.940000	1367.410000	-58.90	-91.90
151.940000	1367.410000	-58.80	-91.80
154.600000	1391.350000	-59.40	-92.40
154.600000	1391.350000	-60.60	-93.60



Name of Test: Field Strength of Spurious Radiation

Continued

Frequency Tuned, MHz	Frequency Emission, MHz	ERP, dBm	ERP, dBc
151.820000	1518.150000	-57.50	-90.50
151.820000	1518.150000	-56.10	-89.10
151.940000	1519.350000	-58.30	-91.30
151.940000	1519.350000	-58.60	-91.60
154.600000	1545.950000	-55.60	-88.60
154.600000	1545.950000	-57.80	-90.80

A handwritten signature in black ink that reads "Fred Chastain".

Performed By:

Fred Chastain, Test Technician

Name of Test: Emission Masks (Occupied Bandwidth)

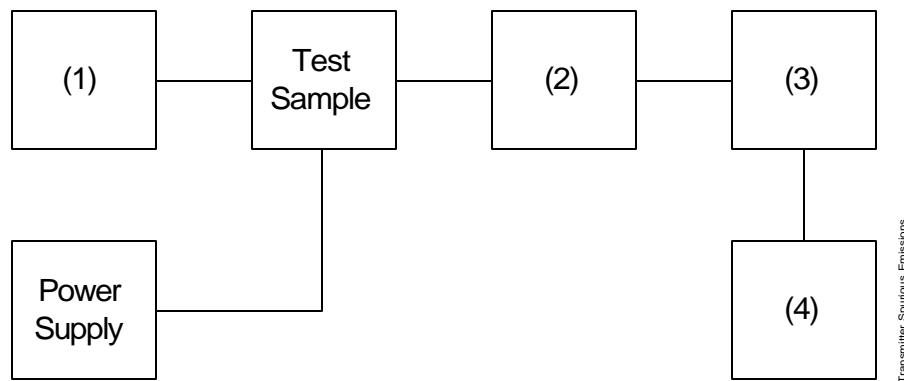
Specification: 47 CFR 2.1049(c)(1)

Guide: ANSI/TIA/EIA-603-1992, Paragraph 2.2.11

Measurement Procedure

- A) The EUT and test equipment were set up as shown below
- B) For EUTs supporting audio modulation, the audio signal generator was adjusted to the frequency of maximum response and with output level set for $\pm 2.5/\pm 1.25$ kHz deviation (or 50% modulation). With level constant, the signal level was increased 16 dB.
- C) For EUTs supporting digital modulation, the digital modulation mode was operated to its maximum extent.
- D) The Occupied Bandwidth was measured with the Spectrum Analyzer controls set as shown on the test results.

Transmitter Test Set-Up: Occupied Bandwidth



Asset	Description	s/n	Cycle	Last Cal
(1) Audio Oscillator/Generator X i00017	HP 8903A Modulation Meter	2216A01753	12 mo.	Apr-05
(2) Coaxial Attenuator X i00231/2 i00123	PASTERACK PE7021-30 (30 dB) NARDA 766 (10 dB)	231 or 232 7802A	NCR NCR	
(3) Interface X i00021	HP 8954A Transceiver Interface	2146A00159	NCR	
(4) Spectrum Analyzer X i00048 i00029	HP 8566B Spectrum Analyzer HP 8563E Spectrum Analyzer	2511A01467 3213A00104	12 mo. 12 mo.	Oct-04 May-05



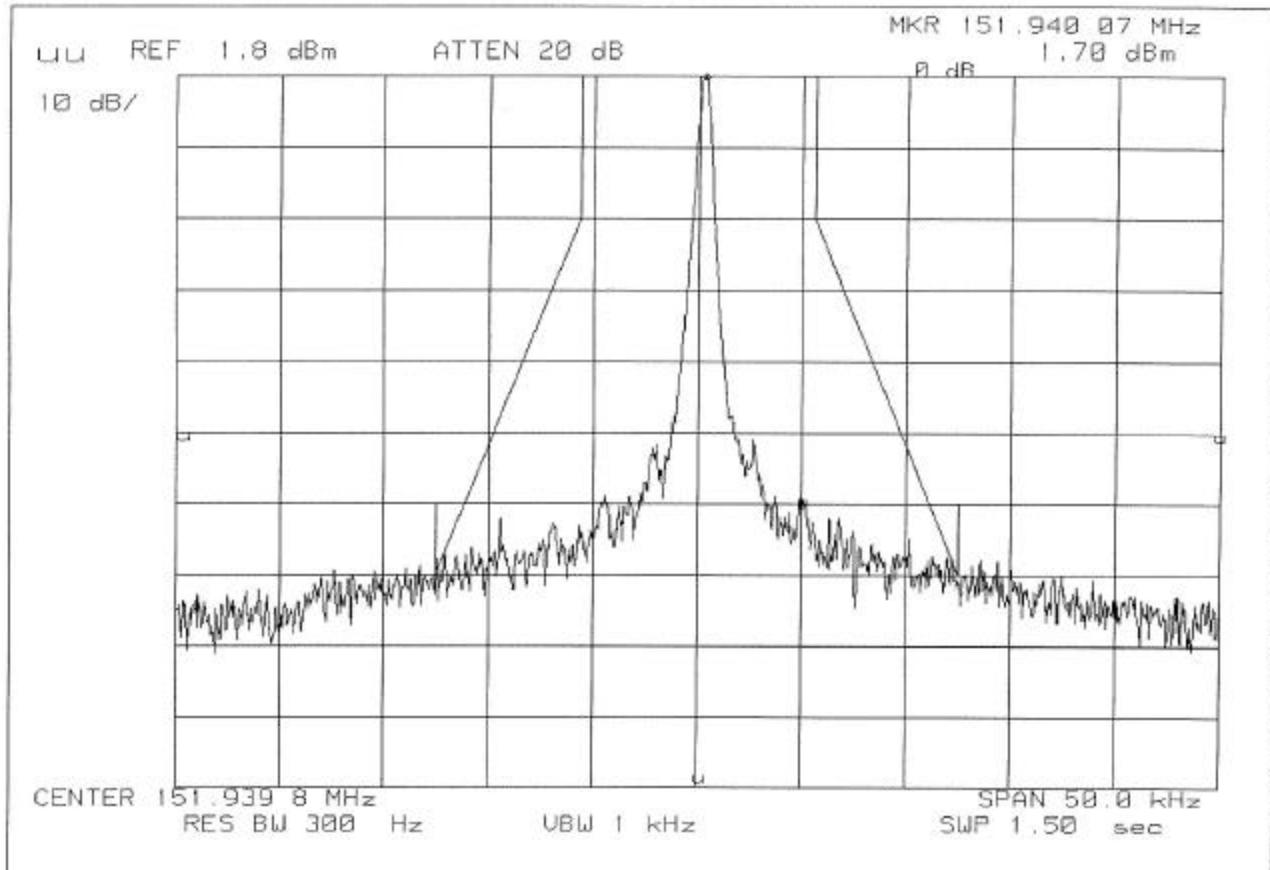
Name of Test: Emission Masks (Occupied Bandwidth)

Measurement Results

Ambient Temperature: $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$

2005-AUG-12, 14:55, FRI

POWER: HIGH
MODULATION:
REMARK: CW MODE CH 3



Performed By:

Fred Chastain, Test Technician

M. Flom Associates, Inc.
3356 North San Marcos Place, Suite 107
Chandler, Arizona 85225-7176
(480) 926-3100 phone, (480) 926-3598 fax



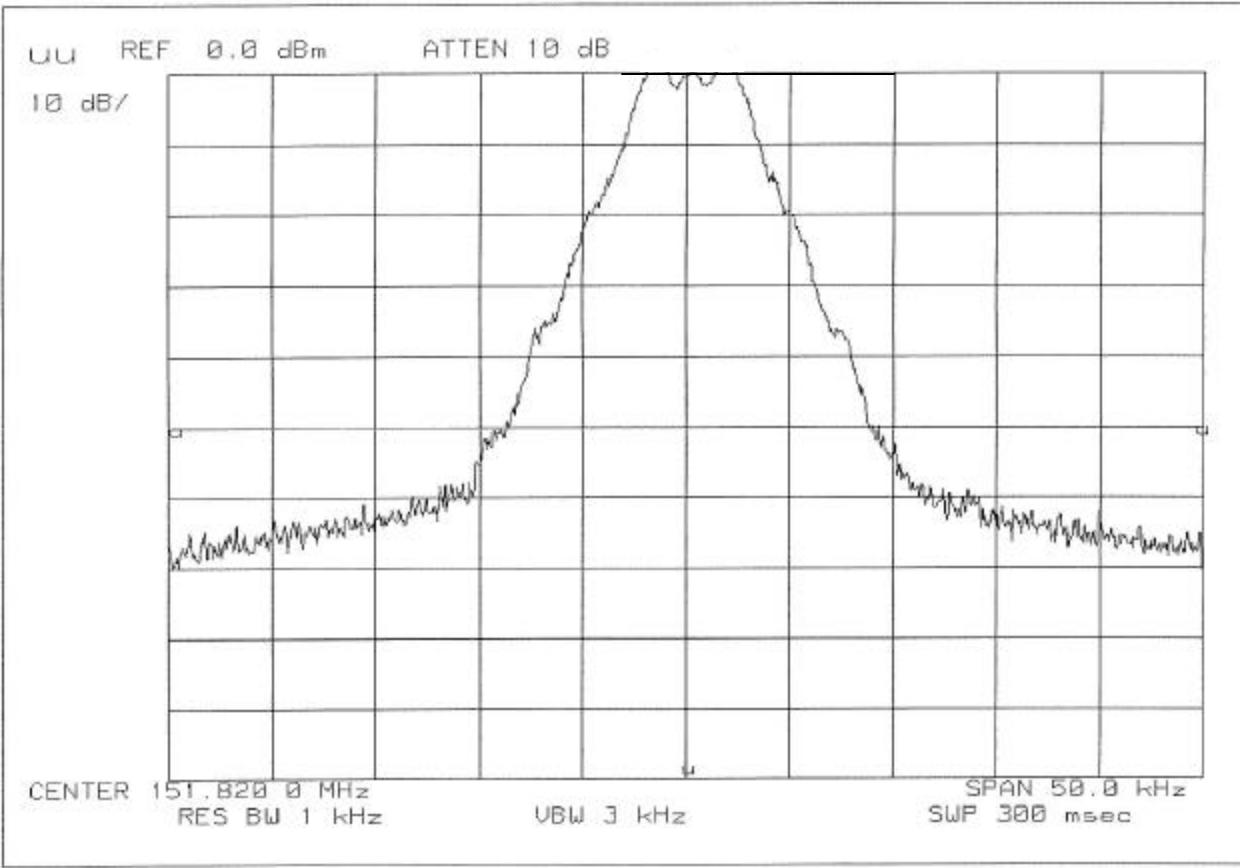
Name of Test: Emission Masks (Occupied Bandwidth)

Measurement Results

Ambient Temperature: $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$

2005-AUG-12, 14:24, FRI

POWER: HIGH
MODULATION: RANDOM DATA
REMARK: MAX PWR CH 1



Channel 1 Frequency and Level

Performed By:

Fred Chastain, Test Technician

M. Flom Associates, Inc.
3356 North San Marcos Place, Suite 107
Chandler, Arizona 85225-7176
(480) 926-3100 phone, (480) 926-3598 fax

Page 19 of 29
FCC ID: TJ2-RRE
MFA p0580001, d0580020



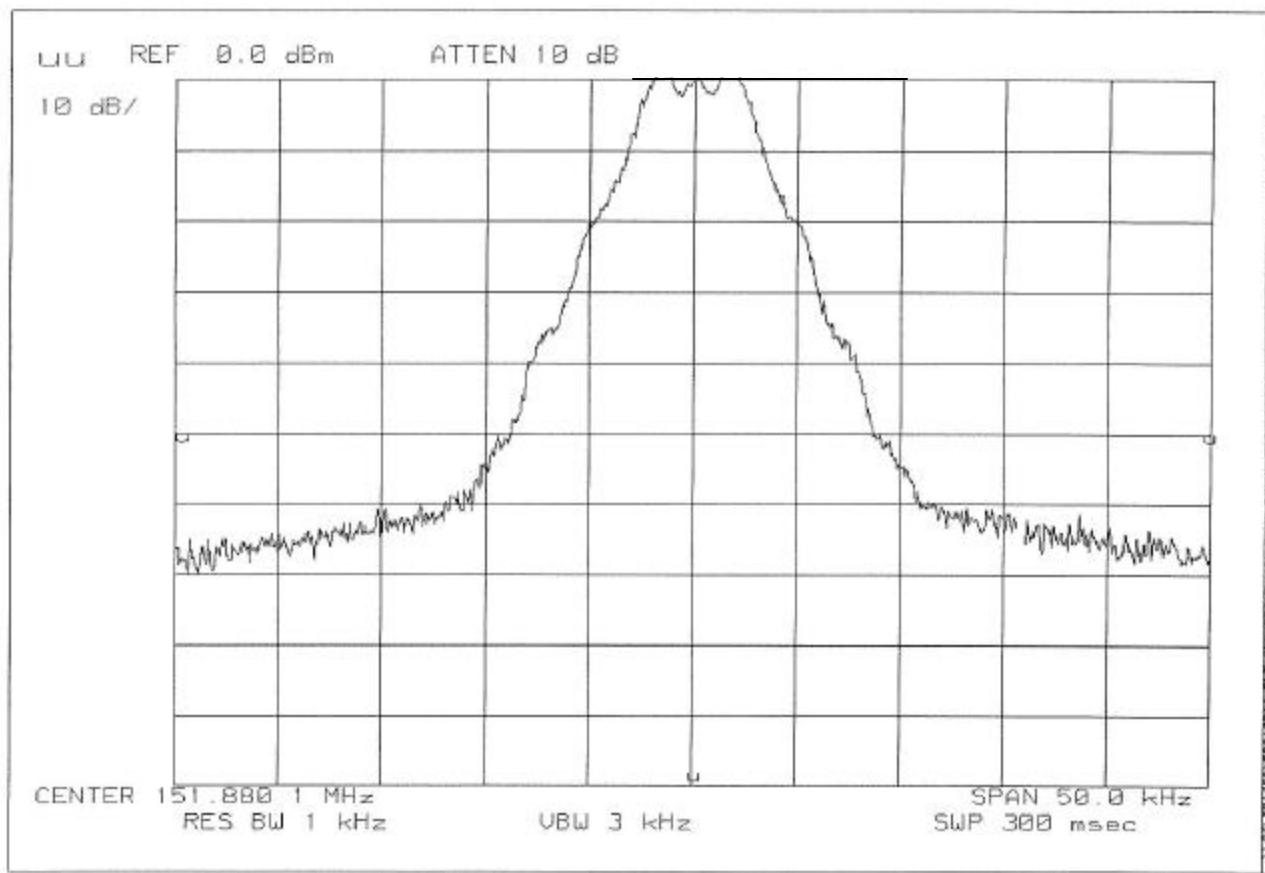
Name of Test: Emission Masks (Occupied Bandwidth)

Measurement Results

Ambient Temperature: 23°C ± 3°C

2005-AUG-12, 14:28, FRI

POWER: HIGH
MODULATION: RANDOM DATA
REMARK: MAX PWR CH 2



Channel 2 Frequency and Level

Performed By:

Fred Chastain, Test Technician

M. Flom Associates, Inc.
3356 North San Marcos Place, Suite 107
Chandler, Arizona 85225-7176
(480) 926-3100 phone, (480) 926-3598 fax

Page 20 of 29
FCC ID: TJ2-RRE
MFA p0580001, d0580020

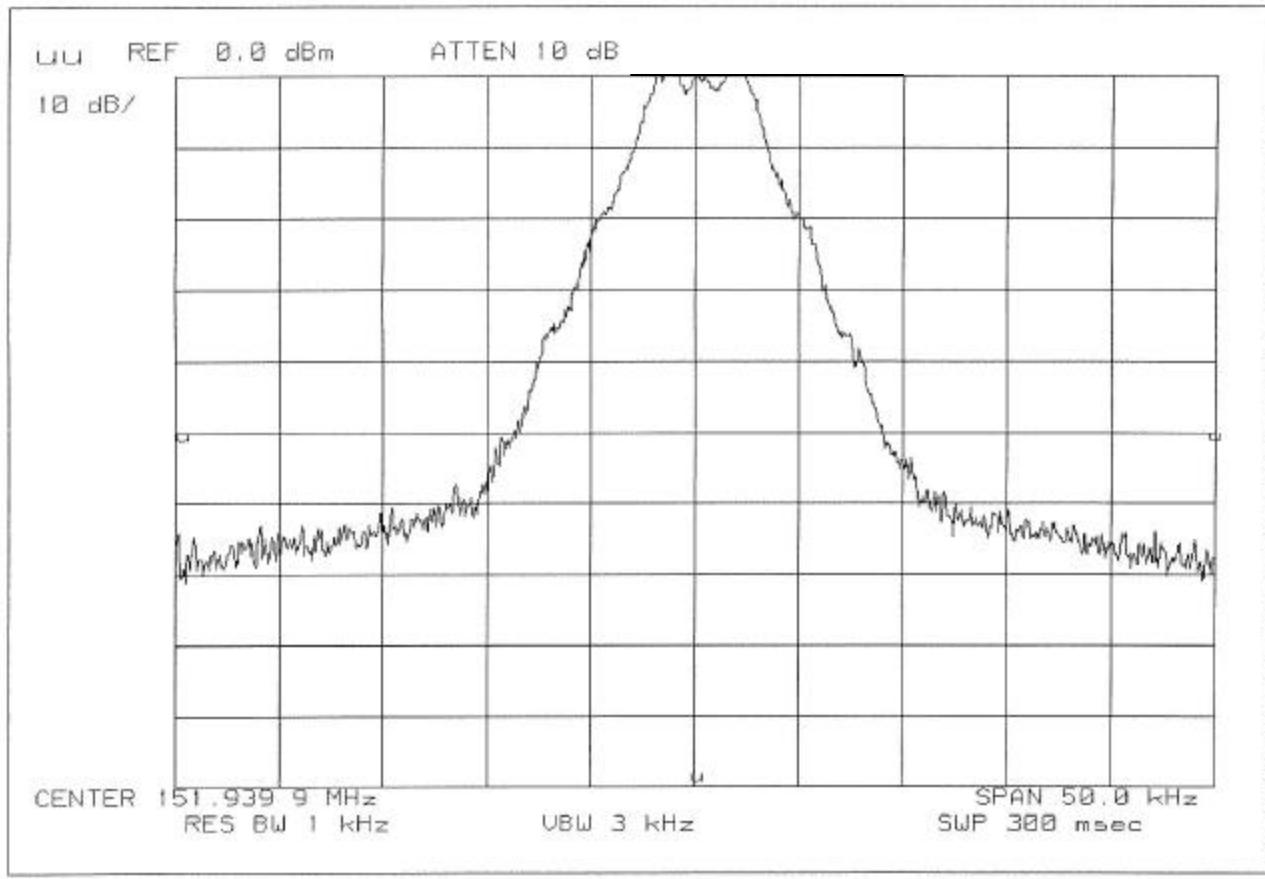
Name of Test: Emission Masks (Occupied Bandwidth)

Measurement Results

Ambient Temperature: 23°C ± 3°C

2005-AUG-12, 14:31, FRI

POWER: HIGH
MODULATION: RANDOM DATA
REMARK: MAX PWR CH 3



Channel 3 Frequency and Level



Performed By:

Fred Chastain, Test Technician

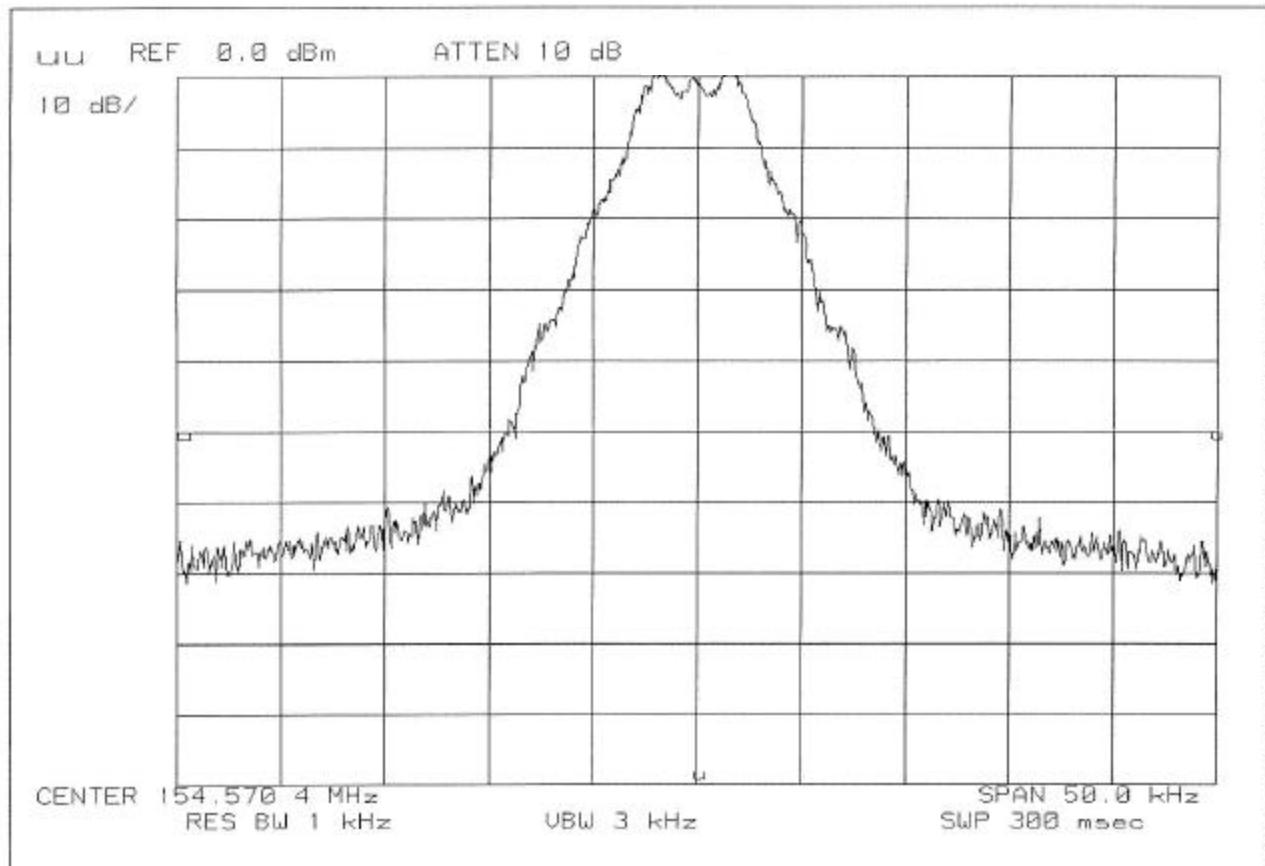
Name of Test: Emission Masks (Occupied Bandwidth)

Measurement Results

Ambient Temperature: $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$

2005-AUG-12, 14:34, FRI

POWER: HIGH
MODULATION: RANDOM DATA
REMARK: MAX PWR CH 4



© 2005 M. Flom Associates, Inc. All rights reserved. 3 PLT Copyright © 2005 by M. Flom Associates, Inc.

Channel 4 Frequency and Level



Performed By:

Fred Chastain, Test Technician

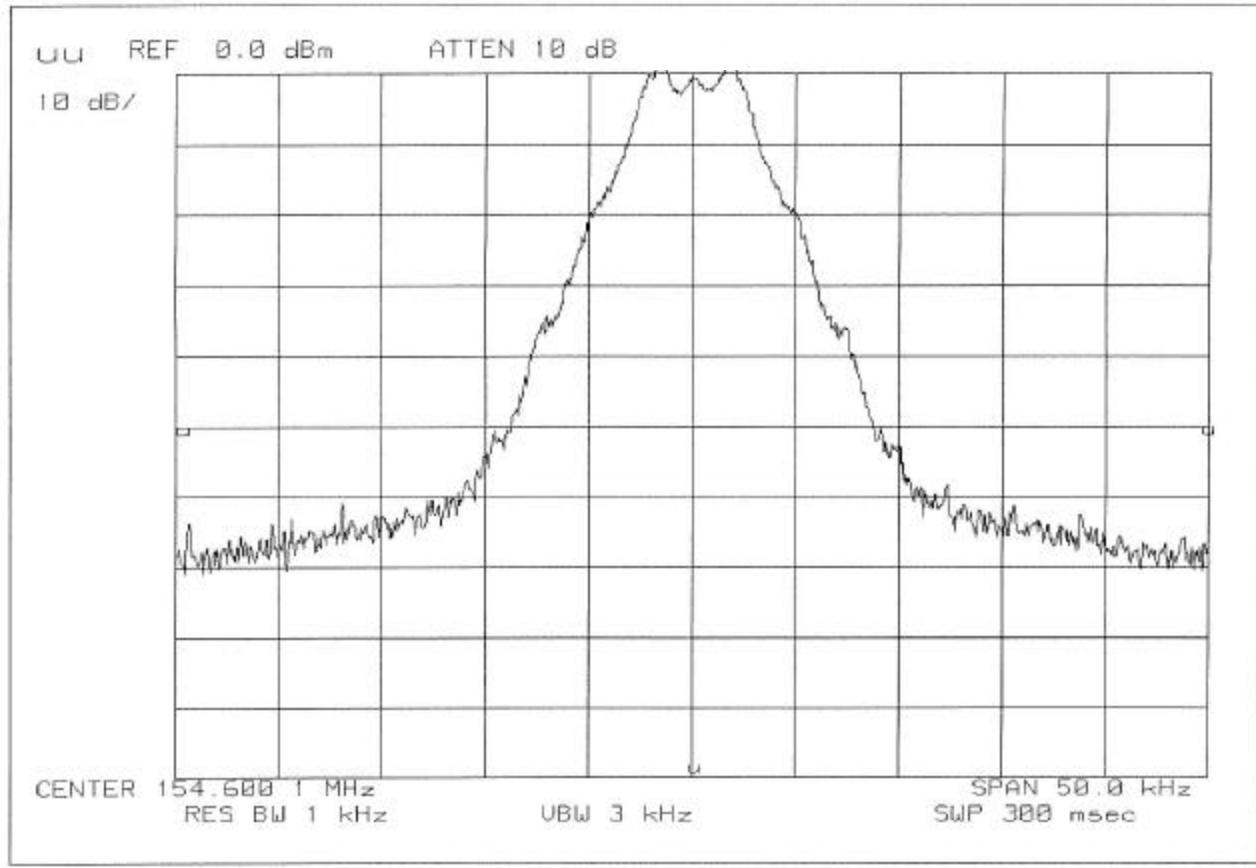
Name of Test: Emission Masks (Occupied Bandwidth)

Measurement Results

Ambient Temperature: $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$

2005-AUG-12, 14:36, FRI

POWER: HIGH
MODULATION: RANDOM DATA
REMARK: MAX PWR CH 5



Channel 5 Frequency and Level



Performed By:

Fred Chastain, Test Technician

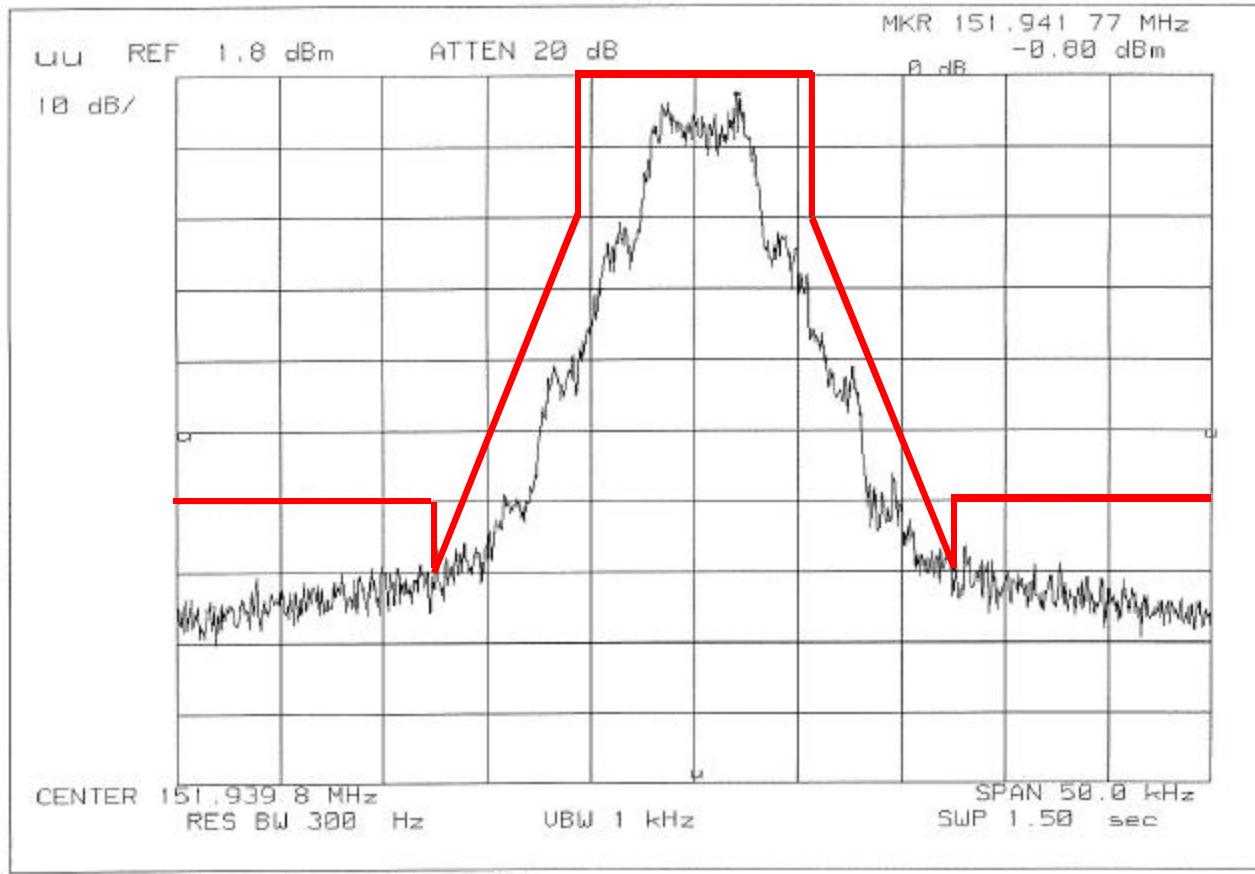
Name of Test: Emission Masks (Occupied Bandwidth)

Measurement Results

Ambient Temperature: 23°C ± 3°C

2005-AUG-12, 14:53, FRI

POWER: HIGH
MODULATION: RANDOM DATA
REMARK: BW CH 3



Occupied Bandwidth 12.5kHz Channel / 11K2F1D, Mask 95J



Performed By:

Fred Chastain, Test Technician

Name of Test: Frequency Stability (Temperature Variation)

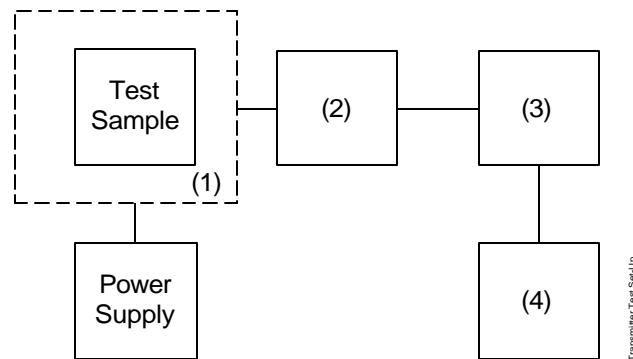
Specification: 47 CFR 2.1055(a)(1)

Guide: ANSI/TIA/EIA-603-1992, Paragraph 2.2.2

Measurement Procedure

- A) The EUT and test equipment were set up as shown on the following page.
- B) 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.
- C) 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.
- D) The temperature tests were performed for the worst case.

Transmitter Test Set-Up: Temperature Variation



Asset	Description	s/n	Cycle	Last Cal
(1) Temperature, Humidity, Vibration				
X i00027	Tenney Temp. Chamber	9083-765-234	NCR	
(2) Coaxial Attenuator				
X i00231/2	PASTERNACK PE7021-30 (30 dB)	231 or 232	NCR	
i00122/3	NARDA 766 (10 dB)	7802 or 7802A	NCR	
(3) RF Power				
X i00067	HP 8920A Communications TS	3345U01242	12 mo.	Jun-05
(4) Frequency Counter				
X i00067	HP 8920A Communications TS	3345U01242	12 mo.	Jun-05

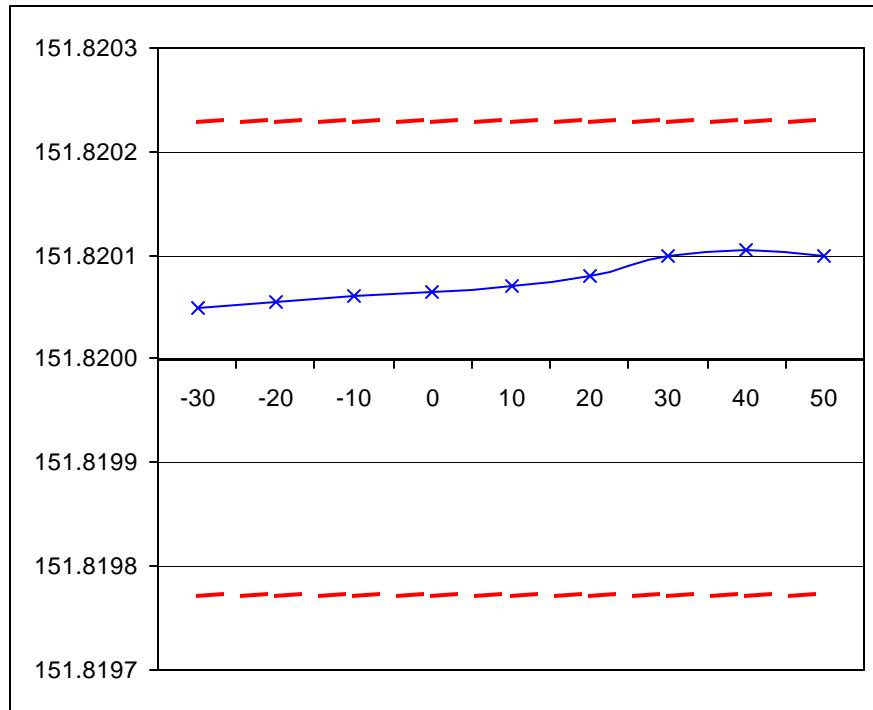
Name of Test: Frequency Stability (Temperature Variation)

Measurement Results

g0580063: 2005-Aug-12 Fri 15:11:27

State: 0:General

Ambient Temperature: $23^{\circ}\text{C} \pm 3^{\circ}\text{C}$



Performed By:

Fred Chastain, Test Technician

Name of Test: Frequency Stability (Voltage Variation)

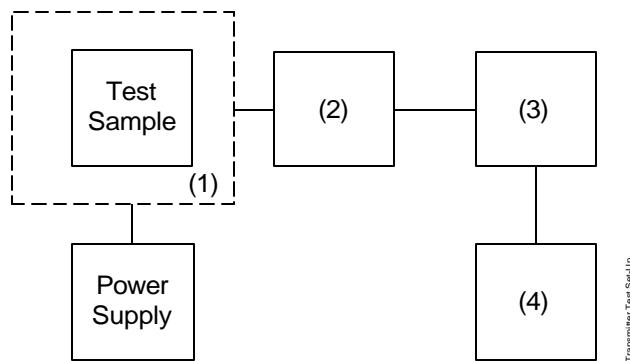
Specification: 47 CFR 2.1055(d)(1)

Guide: ANSI/TIA/EIA-603-1992, Paragraph 2.2.2

Measurement Procedure

- A) The EUT was placed in a temperature chamber (if required) at $25\pm 5^{\circ}\text{C}$ and connected as shown below.
- B) The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.
- C) The variation in frequency was measured for the worst case.

Transmitter Test Set-Up: Voltage Variation



Asset	Description	s/n	Cycle	Last Cal
(1) Temperature, Humidity, Vibration				
i00027	Tenney Temp. Chamber	9083-765-234	NCR	
(2) Coaxial Attenuator				
X i00231/2	PASTERNACK PE7021-30 (30 dB)	231 or 232	NCR	
i00122/3	NARDA 766 (10 dB)	7802 or 7802A	NCR	
(3) RF Power				
X i00020	HP 8901A Power Mode	2105A01087	12 mo.	Apr-05
(4) Frequency Counter				
X i00020	HP 8901A Frequency Mode	2105A01087	12 mo.	Apr-05

Results: Frequency Stability (Voltage Variation)

State: General

Ambient Temperature: 23°C ± 3°C

Limit, ppm	= <u>± 1.5</u>
Limit, Hz	= <u>± 227</u>
Battery End Point (Voltage)	= 4.2

% of STV	Voltage	Frequency, mph	Change, Hz	Change, ppm
115	5.75	151.820100	+100	
100	5.00	151.820080	+80	>1.0
85	4.25	151.820080	+80	
BEP	4.20	151.820070	+70	



Performed By:

Fred Chastain, Test Technician



Name of Test: Necessary Bandwidth and Emission Bandwidth

Specification: 47 CFR 2.202(g)

Modulation = 11K2F1D

Necessary Bandwidth Calculation:

Maximum Modulation (M), kHz	1.875
Maximum Deviation (D), kHz	= 3.75
Constant Factor (K)	= 1
Necessary Bandwidth (B _N), kHz	= (2xM)+(2xDxK)
	= 11.2

A handwritten signature in black ink that reads "Fred Chastain".

Performed By:

Fred Chastain, Test Technician

END OF TEST REPORT



Testimonial and Statement of Certification

This is to Certify:

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:

A handwritten signature in black ink, appearing to read "David E. Lee".

David E. Lee, Quality Assurance Manager