



# 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 of Report: July 19, 2005  
Date of Submission: January 11, 2006

Federal Communications Commission  
Via: Electronic Filing

Attention: Authorization & Evaluation Division

Applicant: Honeywell International Inc.  
Equipment: HD-128  
FCC ID: GB8HD-128  
FCC Rules: 87

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,



Michael Schafer, President

enclosure(s)  
cc: Applicant  
MS/del



**M. Flom Associates, Inc.**  
International Compliance Testing Laboratory  
3256 N. San Marcos Place, Suite 107, San Jose, CA 95134-1627, USA  
Call Flom: (866) 211-3269, Email: [info@mflom.com](mailto:info@mflom.com)

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

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

## Transmitter Certification

(15.109 Digital Verified)

of

FCC ID: GB8HD-128

Model: HD-128

to

Federal Communications Commission

## Rule Part 87

Date of report: July 19, 2005

**On the Behalf of the Applicant:**

Honeywell International Inc.

**At the Request of:**

Honeywell Inc., Business & Commuter Aviation Systems  
5353 W. Bell Rd.  
Glendale, AZ 85308-3999

Supervised by:

Michael Lindley

Michael Findley, Laboratory Manager

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

FCC ID: GB8HD-128  
MFA p0570009, d0570030



## List of Exhibits

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

Applicant: Honeywell International Inc.

FCC ID: GB8HD-128

### 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.

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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:

d0570030

d) Client:

Honeywell Inc., Business & Commuter Aviation Systems  
5353 W. Bell Rd.  
Glendale, AZ 85308-3999

e) Identification:

HD-128  
FCC ID: GB8HD-128  
EUT Description: SATCOM Transceiver

f) EUT Condition:

Not required unless specified in individual tests.

g) Report Date:

July 19, 2005

EUT Received:

July 19, 2005

h, j, k):

As indicated in individual tests.

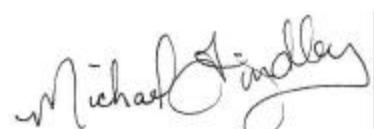
i) Sampling method:

No sampling procedure used.

l) Uncertainty:

In accordance with MFA internal quality manual.

m) Supervised by:



Michael Findley  
Michael Findley, Laboratory 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.

Accessories used during testing:

Type Test Fixture	Quantity	Manufacturer	Model	Serial No.	FCC ID
	1	Honeywell	-	-	-

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
- \_\_\_\_\_ 95 Subpart F - Interactive Video and Data Service (IVDS)
- \_\_\_\_\_ 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. Morton Flom  
 M. Flom Associates Inc.  
 3356 N. San Marcos Place, Suite 107  
 Chandler, AZ 85225

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 has been designated to act as a 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 the equipment to be imported into Chinese Taipei satisfies the applicable EMC requirements. You must include the BSMI number (SL2-IN-E-041R) when you 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 CMS 13421.

Please note that BSMI requires that the entity making application for the approval of regulated equipment must make such application in person at their Taipei office. BSMI also requires the name of the authorized signature who are authorized to sign the test reports. You can send this information via fax to C-Taiwan CAB Response Manager at 301-973-5414. I am also enclosing a copy of the cover sheet that, according to BSMI requirements, must accompany every test report.

NIST

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

Very truly yours,

*Belinda L. Collins, Ph.D.*  
 Belinda L. Collins, Ph.D.  
 Director, Office of Standards Services

Enclosure

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



## List of General Information Required for Certification

In Accordance with FCC Rules and Regulations,  
Volume II, Part 2 and to 87

### Sub-part 2.1033

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

Honeywell International Inc.  
Commercial Electronic Systems  
21111 N. 19th Avenue  
Phoenix, AZ 85027

#### **Manufacturer:**

EMS Technologies Ltd.  
1725 Woodward Drive  
Ottawa, Ontario K2C 0P9  
CANADA

(c)(2): **FCC ID:** GB8HD-128

**Model Number:** HD-128

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

Please see attached exhibits

(c)(4): **Type of Emission:** 38K0D7W (16QAM)  
7K20G1D (6BPSK)

(c)(5): **Frequency Range, MHz:** 1626.5 to 1660.5

(c)(6): **Power Rating, Watts:** 60  
\_\_\_\_ Switchable       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:** 100

**DUT Results:** Passes  Fails

**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	=
Collector Voltage, Vdc	=
Supply Voltage	= 115V, 400Hz

(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)

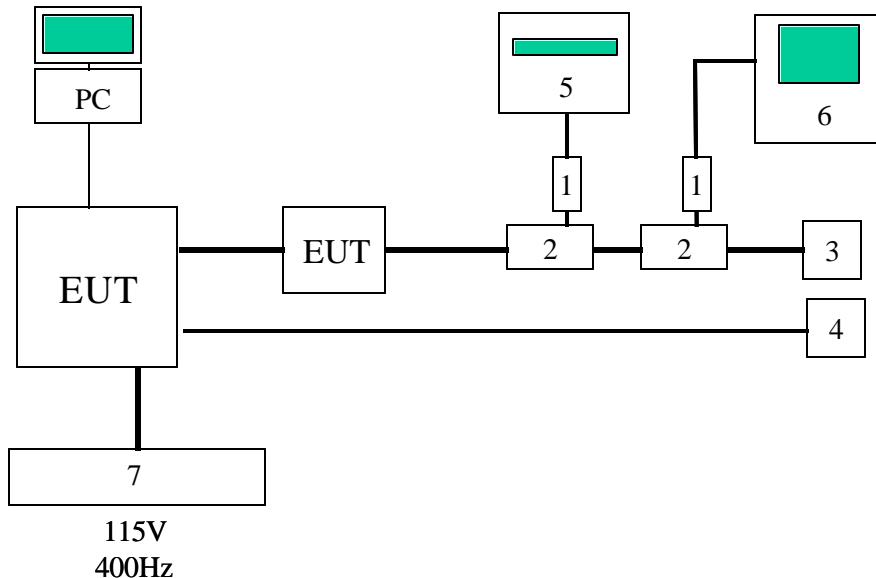
**Guide:** ANSI/TIA/EIA-603-1992, Paragraph 2.2.1

#### Measurement Procedure

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

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

#### Transmitter Test Set-Up: RF Power Output



Item	Asset	Description	s/n	Cycle	Last Cal
<b>Coaxial Attenuator</b>					
1		Attenuator (20 dB)	NSN	When Used	Jul-05
2		Bi-Directional Coupler (20dB)	NSN	When Used	Jul-05
3		50 Ohm 100W Load	NSN	When Used	Jul-05
4		50 Ohm Termination	NSN	When Used	Jul-05
<b>Power Meters</b>					
5		HP 438A / 8482A Power Meter	AV55652/AV03172	12 mo.	Jan-05
<b>Spectrum Analyser</b>					
6	i00048	HP 8566B Spectrum Analyzer	2511A01467	12 mo.	Oct-04
<b>Power Supply</b>					
7		CA Inst 1251RP	L07061	As Required	May-05

**Name of Test:** Carrier Output Power (Conducted)

**Measurement Results**  
(Worst case)

Frequency of Carrier, MHz = 1643.5, 1626.5, 1660.5  
Ambient Temperature = 23°C ± 3°C

Power Setting	RF Power, dBm	RF Power, Watts
High (Single Channel)	48	60
High (Total - Dual Channel)	48	60

Performed by:



David E. Lee, Test Engineer



**Name of Test:** RF Power Output (Radiated)

**Specification:** 47 CFR 2.1046(a)

**Test Equipment:** As per attached page

#### **Measurement Procedure (Radiated)**

1. The EUT was placed on an open-field site and its radiated field strength at a known distance was measured by means of a spectrum analyzer. Equivalent loading was calculated from the equation  $P_t = (E \times R)^2 / 49.2$  watts, where  $R = 3m$ .
2. Measurement accuracy is  $\pm 1.5$  dB. Correction factors for transmitter test antenna (EMCO3115) are included.

#### **Measurement Results**

g0570058: 2005-Jul-20 Wed 06:59:00

State: 2:High Power

Ambient Temperature:  $20^{\circ}\text{C} \pm 3^{\circ}\text{C}$

Amps Mode:

Frequency Tuned, MHz	Frequency Emission, MHz	Meter, dBuV/m	CF, dB	ERP, dBm	EIRP, dBm	EIRP, Watts
1626.500000	1626.496667	121.13	22.04	45.8	48.0	60
1643.500000	1643.496667	121.63	21.56	45.8	48.0	60
1660.500000	1660.496667	118.80	24.38	45.8	48.0	60

Performed by:

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

David E. Lee, Test Engineer

**Name of Test:** Unwanted Emissions (Transmitter Conducted)

**Specification:** 47 CFR 2.1051

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

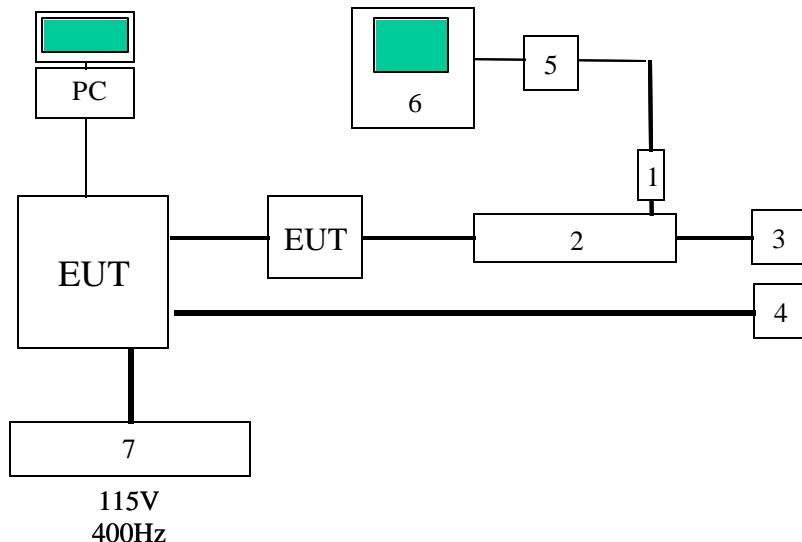
### Measurement Procedure

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



Item	Asset	Description	s/n	Cycle	Last Cal
<b>Coaxial Attenuator</b>					
1		Attenuator (20 dB)	NSN	When Used	Jul-05
2		Bi-Directional Coupler (20dB)	NSN	When Used	Jul-05
3		50 Ohm 100W Load	NSN	When Used	Jul-05
4		50 Ohm Termination	NSN	When Used	Jul-05
<b>High Pass Filter</b>					
5		1.8GHz High Pass Filter	NSN	NCR	
<b>Spectrum Analyser</b>					
6	i00048	HP 8566B Spectrum Analyzer	2511A01467	12 mo.	Oct-04
<b>Power Supply</b>					
7		CA Inst 1251RP	L07061	As Required	May-05



**Name of Test:** Unwanted Emissions (Transmitter Conducted)

**Measurement Results**  
(Worst Case)

Summary:

Frequency of carrier, MHz = 1643.5, 1626.5, 1660.5  
Spectrum Searched, GHz = 0 to 10 x  $F_C$   
All Other Emissions = 20 dB Below Limit

**Harmonically Related**

**Limit = -13dBm (43+Log10(P))**

g0570052: 2005-Jul-19 Tue 10:43:00

STATE: 2:High Power

Ambient Temperature: 23°C ± 3°C

Frequency Tuned, MHz	Frequency Emission, MHz	ERP, dBm	ERP, dBc
1643.500000	3287.000050	-66.8	-114.8
1643.500000	4930.500025	-65.7	-113.7

All other emissions in the required measurement range were more than 20 dB below the required limits

**Digital Scan [15.109(a) Limits]**

**Class A Radiated Limits**

Frequency of Emission, MHz	Field Strength, μV/m @ 10m	Field Strength, μV/m @ 3m
30 - 88	90	284
88 - 216	150	474
216 - 960	210	664
Above 960	300	949

g0570054: 2005-Jul-19 Tue 12:42:00

State: 0: Horizontal

Frequency Emission, MHz	Level, dBuV @ m	C.F., dB	μV/m @ m	Margin, dB
33.375000	16.33	3	7.81	16.11
33.675000	9.67	3	7.65	7.35
39.950000	17.50	3	4.62	12.76
41.350000	20.17	3	3.84	15.87
47.066667	17.83	3	0.88	8.62
55.633333	11.00	3	-2.43	2.68
83.466667	13.00	3	-0.28	4.33
125.333333	12.33	3	2.26	5.36
173.083333	20.67	3	1.29	12.53
215.166667	13.33	3	0.88	5.13
363.333333	10.50	3	8.08	8.49
674.166667	9.83	3	13.46	14.60
955.416667	10.17	3	15.52	19.25



**Name of Test:** Unwanted Emissions (Transmitter Conducted)

g0570055: 2005-Jul-19 Tue 13:06:00

State: 0: Vertical

Frequency Emission, MHz	Level, dBuV @ m	C.F., dB	µV/m @ m	Margin, dB
33.041667	10.67	3	7.99	8.57
41.083333	19.67	3	3.99	15.24
53.700000	12.50	3	-1.79	3.43
65.066667	10.00	3	-3.22	2.18
83.200000	11.83	3	-0.33	3.76
109.750000	12.33	3	2.03	5.22
131.916667	14.33	3	2.38	6.85
134.750000	21.67	3	2.44	16.05
155.000000	12.00	3	2.34	5.21
169.833333	11.17	3	1.47	4.29
209.250040	11.67	3	0.51	4.06
241.000061	10.50	3	2.51	4.47
443.000000	19.83	3	9.91	30.69
456.666667	16.33	3	10.08	20.92
542.083333	9.83	3	11.29	11.38
722.500000	9.50	3	13.89	14.77
972.500000	7.83	3	15.75	15.10

All other emissions in the required measurement range were more than 20 dB below the required limits

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

Performed by:

David E. Lee, Test Engineer



**Name of Test:** Radiated Spurious Emissions

For Part 87 Reports Only

**Measurement Results**

g0570057: 2005-Jul-20 Wed 06:32:00

STATE: 2:High Power

Ambient Temperature: 20°C ± 3°C

Frequency Tuned, MHz	Frequency Emission, MHz	ERP, dBm	ERP, dBc
1626.500000	3252.996667	-57.1	-105.10
1643.500000	3286.996667	-58.1	-106.10
1660.500000	3320.996667	-58.6	-106.60
1626.500000	4879.496667	-56.0	-104.00
1643.500000	4930.496667	-53.4	-101.40
1660.500000	4981.496667	-53.4	-101.40
1626.500000	6505.996667	-57.8	-105.80
1643.500000	6573.996667	-53.0	-101.00
1660.500000	6641.996667	-52.8	-100.80
1626.500000	8132.496667	-56.3	-104.30
1643.500000	8217.496667	-49.1	-97.10
1660.500000	8302.496667	-49.4	-97.40
1626.500000	9758.996667	-47.8	-95.80
1643.500000	9860.996667	-48.5	-96.50
1660.500000	9962.996667	-47.7	-95.70
1626.500000	11385.496667	-47.6	-95.60
1643.500000	11504.496667	-49.1	-97.10
1660.500000	11623.496667	-46.2	-94.20
1626.500000	13011.996667	-47.8	-95.80
1643.500000	13147.996667	-53.0	-101.00
1660.500000	13283.996667	-44.5	-92.50
1626.500000	14638.496667	-44.5	-92.50
1643.500000	14791.496667	-43.5	-91.50
1660.500000	14944.496667	-40.8	-88.80
1626.500000	16264.996667	-45.1	-93.10
1643.500000	16434.996667	-48.0	-96.00
1660.500000	16604.996667	-43.1	-91.10

Performed by:

David E. Lee, Test Engineer

**Name of Test:** Emission Masks (Occupied Bandwidth)

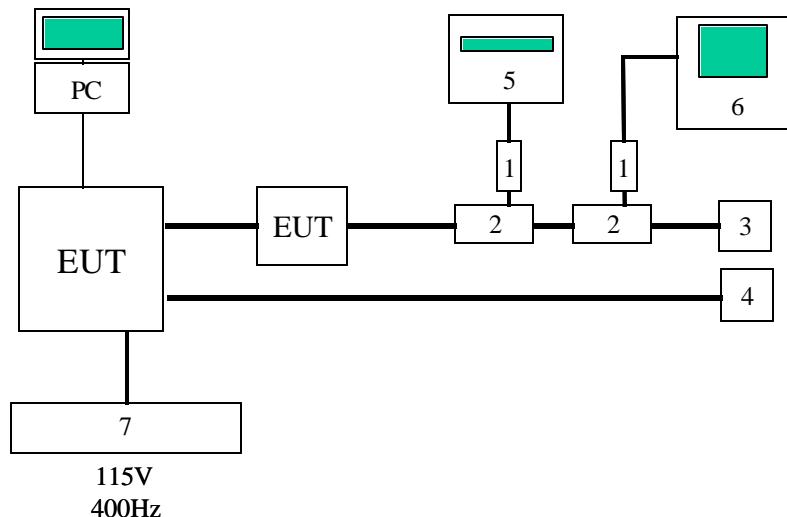
**Specification:** 47 CFR 2.1049(c)(1)

**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 digital modulation, the digital modulation mode was operated to its maximum extent.
- C) The Occupied Bandwidth was measured with the Spectrum Analyzer controls set as shown on the test results.

#### Transmitter Test Set-Up: Occupied Bandwidth



Item	Asset	Description	s/n	Cycle	Last Cal
<b>Coaxial Attenuator</b>					
1		Attenuator (20 dB)	NSN	When Used	Jul-05
2		Bi-Directional Coupler (20dB)	NSN	When Used	Jul-05
3		50 Ohm 100W Load	NSN	When Used	Jul-05
4		50 Ohm Termination	NSN	When Used	Jul-05
<b>Power Meters</b>					
5		HP 438A / 8482A Power Meter	AV55652/AV03172	12 mo.	Jan-05
<b>Spectrum Analyser</b>					
6	i00048	HP 8566B Spectrum Analyzer	2511A01467	12 mo.	Oct-04
<b>Power Supply</b>					
7		CA Inst 1251RP	L07061	As Required	May-05

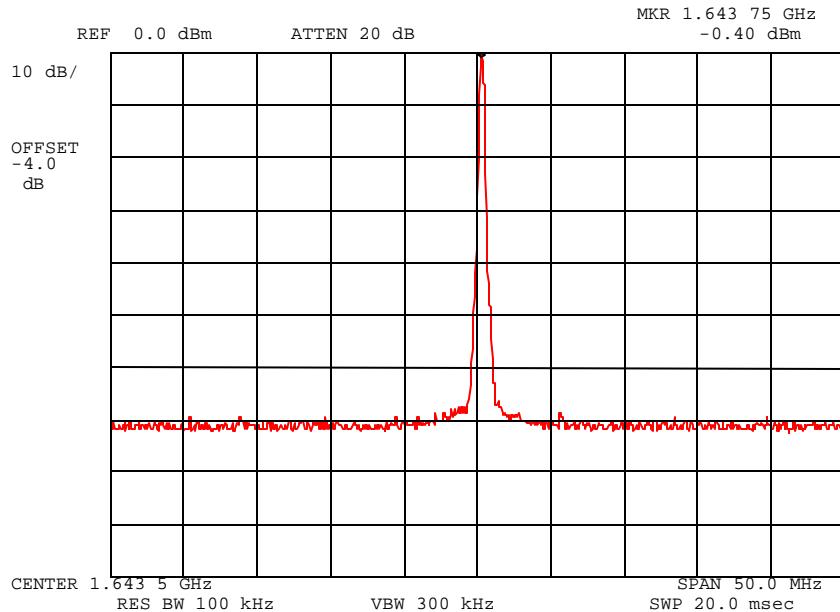
Name of Test: Emission Masks (Occupied Bandwidth)

### Measurement Results

g0570042: 2005-Jul-19 Tue 09:21:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:  
Modulation:

HIGH  
16QAM  
CENTER CHANNEL 60W



Performed by:

David E. Lee, Test Engineer

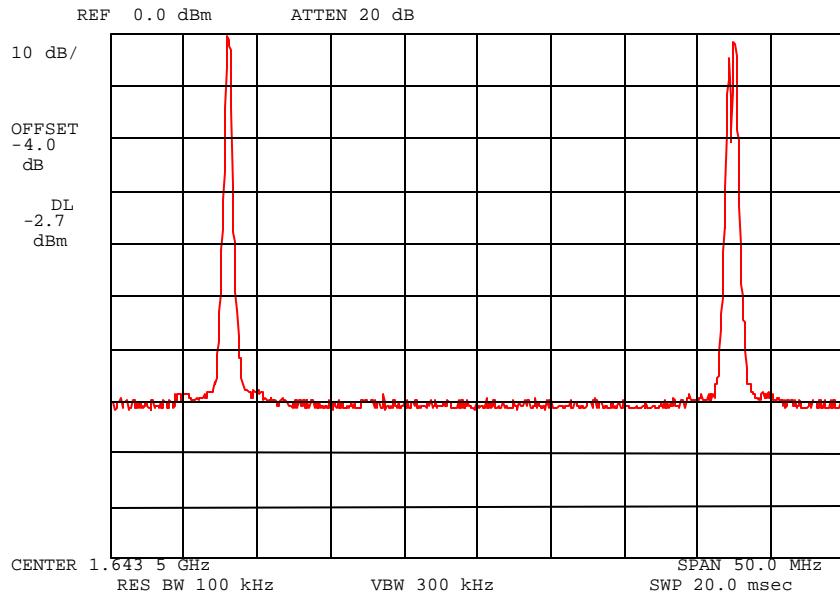
Name of Test: Emission Masks (Occupied Bandwidth)

### Measurement Results

g0570043: 2005-Jul-19 Tue 09:25:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:  
Modulation:

HIGH  
16QAM  
BOTTOM/TOP CHANNEL 60W TOTAL



Performed by:

David E. Lee, Test Engineer

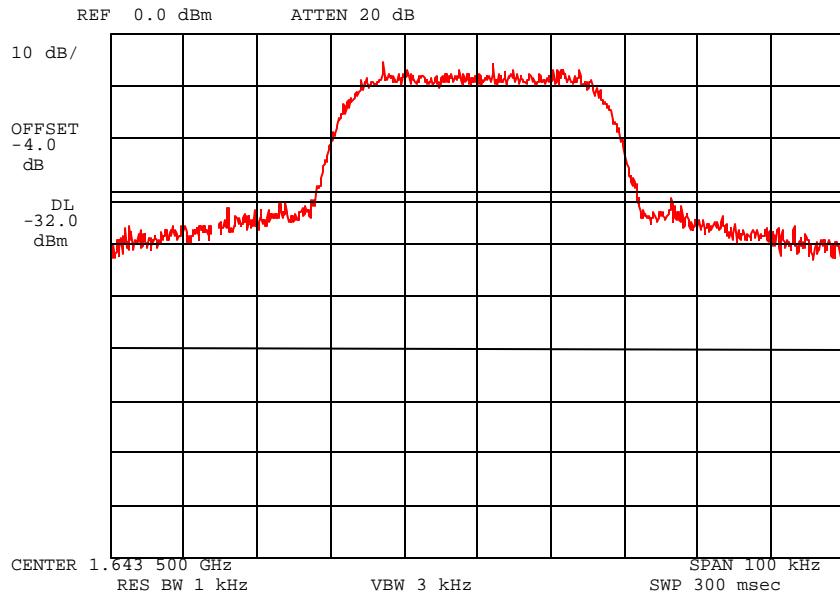
Name of Test: Emission Masks (Occupied Bandwidth)

### Measurement Results

g0570044: 2005-Jul-19 Tue 09:30:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:  
Modulation:

HIGH  
16QAM  
MID CHANNEL

Performed by:



David E. Lee, Test Engineer

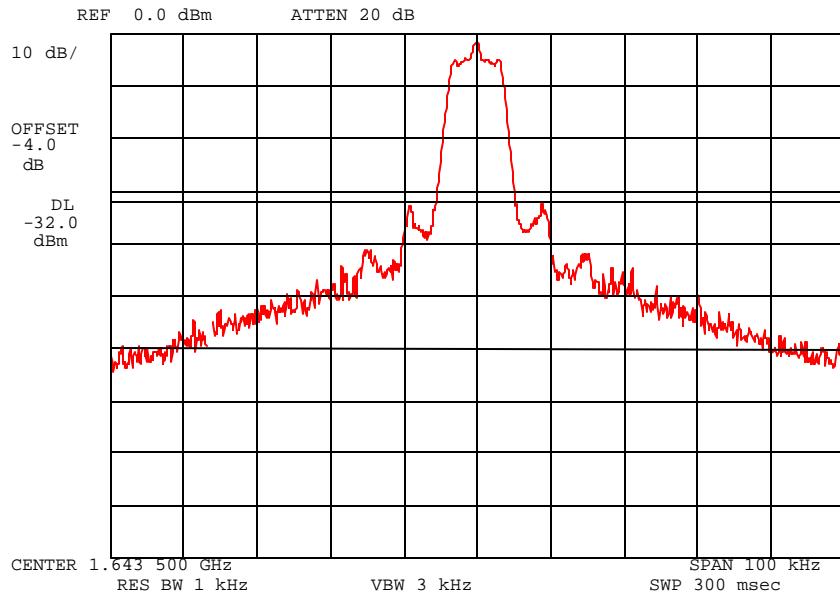
Name of Test: Emission Masks (Occupied Bandwidth)

### Measurement Results

g0570045: 2005-Jul-19 Tue 09:32:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:  
Modulation:

HIGH  
6BPSK  
MID CHANNEL

Performed by:



David E. Lee, Test Engineer

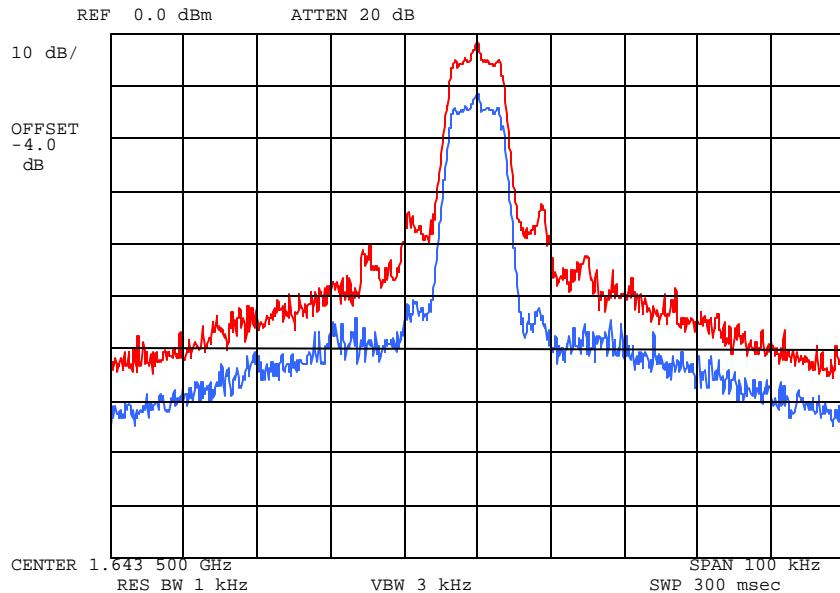
Name of Test: Emission Masks (Occupied Bandwidth)

### Measurement Results

g0570046: 2005-Jul-19 Tue 09:36:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:  
Modulation:

HIGH  
6BPSK  
MID CHANNEL  
**FULL POWER (RED)**  
**REDUCED POWER (BLUE)**

Performed by:

David E. Lee, Test Engineer



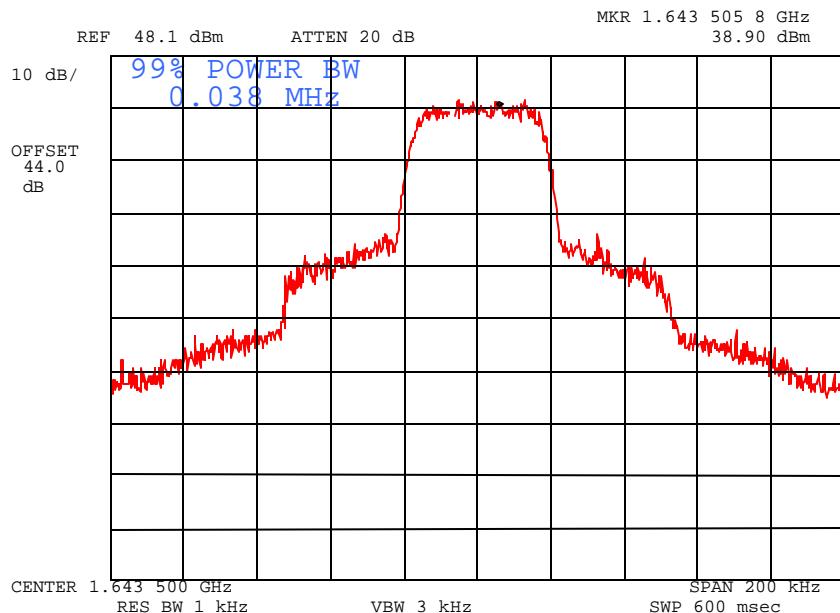
Name of Test: Emission Masks (Occupied Bandwidth)

### Measurement Results

g0570048: 2005-Jul-19 Tue 09:52:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:  
Modulation:

HIGH  
16QAM  
99% BW

Performed by:



David E. Lee, Test Engineer

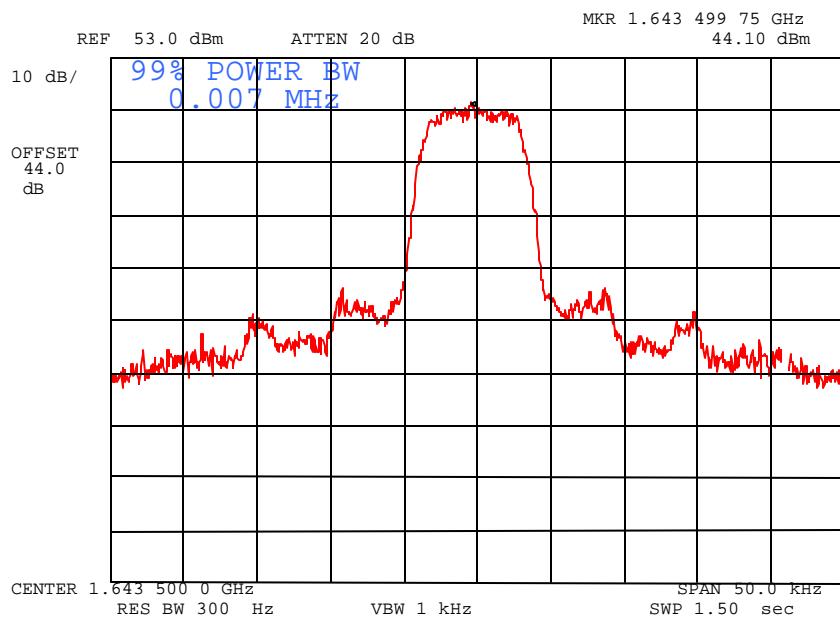
Name of Test: Emission Masks (Occupied Bandwidth)

### Measurement Results

g0570059: 2005-Jul-20 Wed 07:59:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:  
Modulation:

HIGH  
6BPSK  
99% BW

Performed by:

David E. Lee, Test Engineer



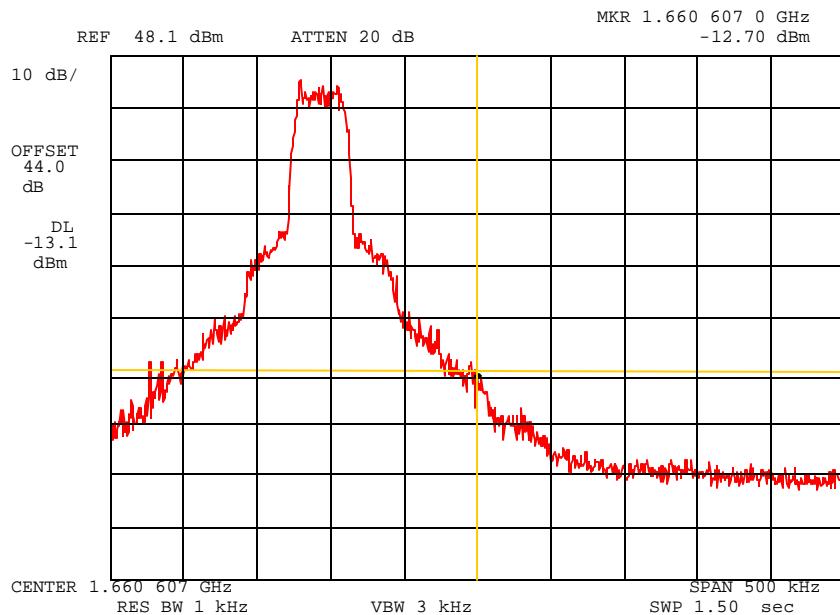
Name of Test: Emission Masks (Occupied Bandwidth)

### Measurement Results

g0570047: 2005-Jul-19 Tue 09:50:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:  
Modulation:

HIGH  
16QAM  
HIGH BAND EDGE

Performed by:

David E. Lee, Test Engineer

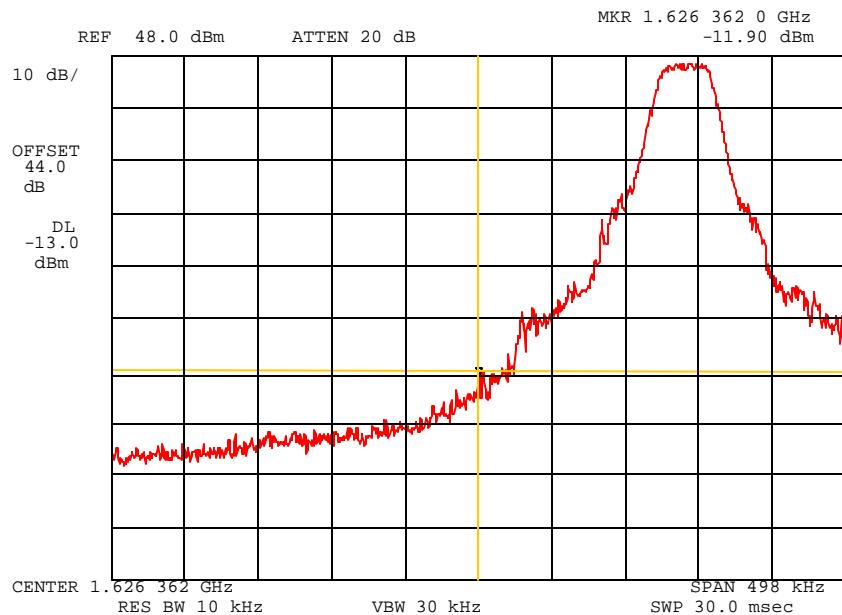
Name of Test: Emission Masks (Occupied Bandwidth)

### Measurement Results

g0570051: 2005-Jul-19 Tue 09:59:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:  
Modulation:

HIGH  
16QAM  
LOW BAND EDGE

Performed by:



David E. Lee, Test Engineer

**Name of Test:** Frequency Stability (Temperature Variation)

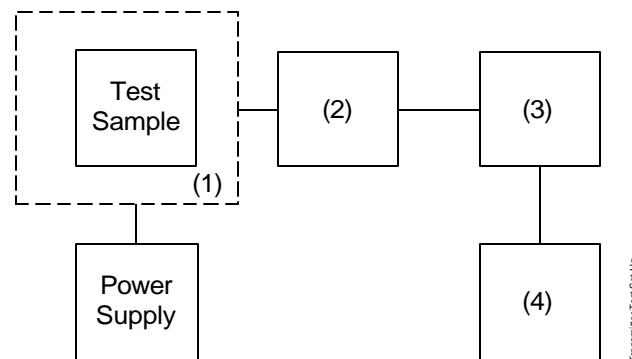
**Specification:** 47 CFR 2.1055(a)(1)

**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				
i00027	Tenney Temp. Chamber	9083-765-234	NCR	
(2) Coaxial Attenuator				
i00231/2	PASTERNACK PE7021-30 (30 dB)	231 or 232	NCR	
i00122/3	NARDA 766 (10 dB)	7802 or 7802A	NCR	
(3) RF Power				
i00067	HP 8920A Communications TS	3345U01242	12 mo.	Jun-05
(4) Frequency Counter				
i00067	HP 8920A Communications TS	3345U01242	12 mo.	Jun-05

Name of Test: Frequency Stability (Temperature Variation)

### Measurement Results

The frequency determining circuits of this device is locked to the satellite received frequency and can only be tested by inputting a satellite channel or a pseudo-satellite channel from a signal generator. In the later case the test result is in a large measure the frequency stability of the signal generator.

Below are the results of tests carried out by the applicant using an "on-the-air" test set up which more accurately reflects the stability in operational use.

**Honeywell**  
Date: 7/21/2005

HD-128  
P/N: 7520010-10200  
S/N: 31699654

**FCC Testing**  
**Frequency Stability versus Temperature**

Temperature (°C)	Measured Frequency with 1626.5 MHz Selected (Hz)	Measured Frequency with 1643.5 MHz Selected (Hz)	Measured Frequency with 1660.5 MHz Selected (Hz)
-55	1626499944	1643499944	1660499943
-50	1626499944	1643499944	1660499943
-40	1626499942	1643499942	1660499940
-30	1626499939	1643499938	1660499937
-20	1626499937	1643499936	1660499934
-10	1626499933	1643499932	1660499931
0	1626499930	1643499929	1660499928
10	1626499926	1643499926	1660499924
20	1626499923	1643499922	1660499920
30	1626499917	1643499916	1660499914
40	1626499912	1643499911	1660499910
50	1626499906	1643499905	1660499904
60	1626499901	1643499900	1660499898
70	1626499893	1643499892	1660499890
<b>Maximum Variation</b>	<b>51 Hz</b>	<b>52 Hz</b>	<b>53 Hz</b>

Attested by:



David E. Lee, Test Engineer

**Name of Test:** Frequency Stability (Voltage Variation)

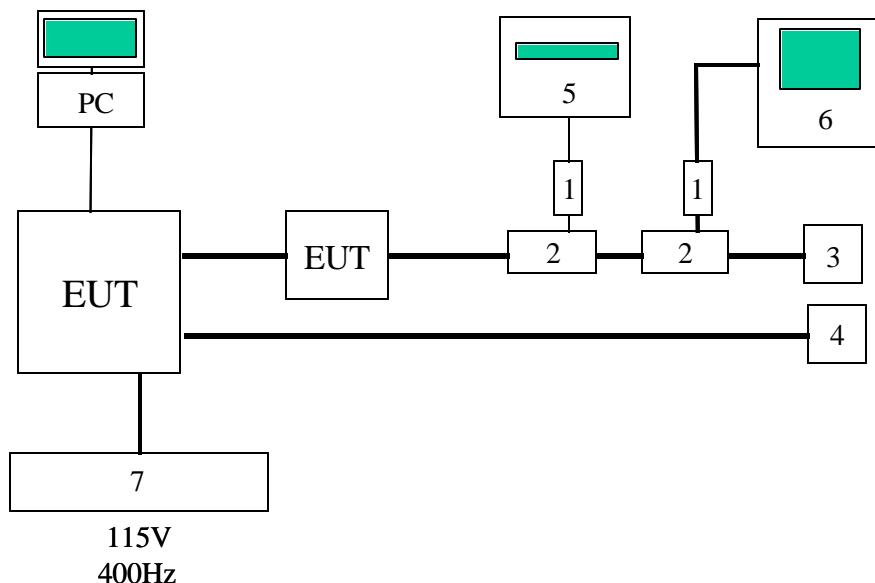
**Specification:** 47 CFR 2.1055(d)(1)

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

#### Measurement Procedure

- A) The EUT was placed in a temperature chamber (if required) at  $25\pm5^{\circ}\text{C}$  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



Item	Asset	Description	s/n	Cycle	Last Cal
<b>Coaxial Attenuator</b>					
1		Attenuator (20 dB)	NSN	When Used	Jul-05
2		Bi-Directional Coupler (20dB)	NSN	When Used	Jul-05
3		50 Ohm 100W Load	NSN	When Used	Jul-05
4		50 Ohm Termination	NSN	When Used	Jul-05
<b>Power Meters</b>					
5		HP 438A / 8482A Power Meter	AV55652/AV03172	12 mo.	Jan-05
<b>Spectrum Analyser</b>					
6	i00048	HP 8566B Spectrum Analyzer	2511A01467	12 mo.	Oct-04
<b>Power Supply</b>					
7		CA Inst 1251RP	L07061	As Required	May-05



**Results:** Frequency Stability (Voltage Variation)

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

The unit is ac powered, 115V / 400Hz, and no dc input is used. This is generated by an inverter on the aircraft system and is not connected to any public utility.

In the free running (unlocked) mode the input voltage was varied between 122V and 97V and the frequency between 460Hz and 340Hz with no noticeable variation in either output power or frequency.

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

Performed by:

David E. Lee, Test Engineer



**Name of Test:** Necessary Bandwidth and Emission Bandwidth

**Specification:** 47 CFR 2.202(g)

Modulation = 16QAM

**Necessary Bandwidth Calculation:** 38K0D7W  
Necessary Bandwidth (Measured), MHz = 0.038

Modulation = 6BPSK

**Necessary Bandwidth Calculation:** 7K20G1D  
Necessary Bandwidth (Measured), MHz = 0.007

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

David E. Lee, Test Engineer

Performed by:

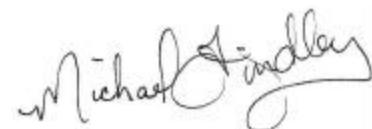
END OF TEST REPORT

## 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:



Michael Findley, Laboratory Manager