



Flom Test Labs
EMI, EMC, RF Testing Experts Since 1963

toll-free: (866) 311-3268
fax: (480) 926-3598
<http://www.flomlabs.com>
info@flomlabs.com

Date: August 7, 2006

Federal Communications Commission
Via: Electronic Filing

Attention: Authorization & Evaluation Division

Applicant: Telex Communications, Inc.
Equipment: REV-BP C1, C3, C5
FCC ID: B5DB118
FCC Rules: 74H

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,

Hoosamuddin S. Bandukwala, Senior Test Engineer



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Transmitter Certification

of

FCC ID: B5DB118
Model: REV-BP C1, C3, C5

to

Federal Communications Commission

Rule Part(s) 74H

Date of report: August 7, 2006

On the Behalf of the Applicant:

Telex Communications, Inc.

At the Request of:

P.O. 346090

Telex Communications, Inc.
8601 E. Cornhusker Highway
P.O. Box 5579
Lincoln, NE 68505-5579

Attention of:

Charles E. Conner, Project Engineer
(402) 467-5321; FAX: -3279
E-mail: charlie.conner@us.telex.com
Jim Andersen
Email: jim.andersen@us.telex.com

Supervised by:

Hoosamuddin S. Bandukwala, Senior Test Engineer

List of Exhibits

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

Applicant: Telex Communications, Inc.

FCC ID: B5DB118

By Applicant:

1. Letter of Authorization
2. Confidentiality Request: 0.457 And 0.459
3. Part 90.203(e) & (g) Attestation
4. Identification Drawings, 2.1033(c)(11)
 - Label
 - Location of Label
 - Compliance Statement
 - Location of Compliance Statement
5. Photographs, 2.1033(c)(12)
6. Documentation: 2.1033(c)
 - (3) User Manual
 - (9) Tune Up Info
 - (10) Schematic Diagram
 - (10) Circuit Description
 - Block Diagram
 - Parts List
 - Active Devices
7. 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	4
2.1046(a)	Carrier Output Power (Conducted)	6
2.1046(a)	RF Power Output (Radiated)	8
2.1053(a)	Field Strength of Spurious Radiation	9
2.1049(c)(1)	Emission Masks (Occupied Bandwidth)	13
2.1047(b)	Modulation Limiting	21
2.1055(a)(1)	Frequency Stability (Temperature Variation)	23
2.1055(b)(1)	Frequency Stability (Voltage Variation)	26
2.202(g)	Necessary Bandwidth and Emission Bandwidth	28

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: d0680024

d) Client: Telex Communications, Inc.
8601 E. Cornhusker Highway
P.O. Box 5579
Lincoln, NE 68505-5579

e) Identification: REV-BP C1, C3, C5
FCC ID: B5DB118

EUT Description: UHF Beltpack Transmitter

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

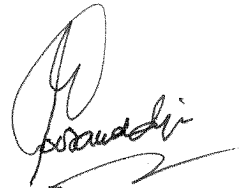
g) Report Date: August 7, 2006

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:



Hoosamuddin S. Bandukwala, Senior Test Engineer

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
- ☐ 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 C63.4-2003 Draft, section 6.1.9, and unless otherwise indicated in the specific measurement results, the ambient temperature of the actual EUT was maintained within the range of 10° to 40°C (50° to 104 °F) unless the particular equipment requirements specify testing over a different temperature range. Also, unless otherwise indicated, the humidity levels were in the range of 10% to 90% relative humidity.

Prior to testing, the EUT was tuned up in accordance with the manufacturer's alignment procedures. All external gain controls were maintained at the position of maximum and/or optimum gain throughout the testing.

Measurement results, unless otherwise noted, are worst-case measurements.



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**

List of General Information Required for Certification

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

74H

Sub-part 2.1033

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

Telex Communications, Inc.
8601 E. Cornhusker Highway
P.O. Box 5579
Lincoln, NE 68505-5579

Manufacturer:

Telex Communications, Inc.

(c)(2): **FCC ID:**

B5DB118

Model Number:

REV-BP C1, C3, C5

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

Please see attached exhibits

(c)(4): **Type of Emission:**

91K7F3E

(c)(5): **Frequency Range, MHz:**

C1: 614.100 to 746.000

(c)(6): **Power Rating, Watts:**

_____ Switchable

_____ Variable

0.05

_____ X _____ N/A

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

0.250

DUT Results:

Passes

_____ x _____

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	=	per manual
Collector Voltage, Vdc	=	per manual
Supply Voltage, Vdc	=	9

(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
☒ N/A

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

Follows

Name of Test: Carrier Output Power (Conducted)

Specification: 47 CFR 2.1046(a)

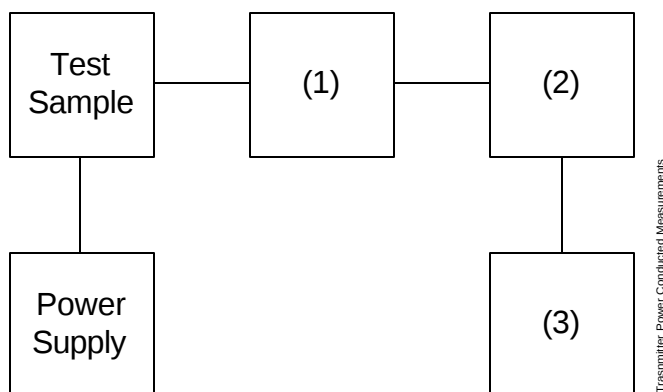
Guide: ANSI/TIA/EIA-603-1992, Paragraph 2.2.1

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				
i00231/2	PASTERNAK PE7021-30 (30 dB)	231 or 232	NCR	
i00122/3	NARDA 766 (10 dB)	7802 or 7802A	NCR	
(2) Power Meters				
i00020	HP 8901A Power Mode	2105A01087	12 mo.	Oct-05
(3) Frequency Counter				
X i00067	HP 5334B	I00019	12 mo.	Jul-06

Name of Test: Carrier Output Power (Conducted)

Measurement Results
(Worst case)

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

Power Setting

RF Power, Watts

The device has no antenna connector that can be used for conducted measurements

Performed by:



David McPherson, Compliance 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 ± 1.5 dB.

Measurement Results

g0670147: 2006-Jul-17 Mon 12:22:00

State: 2:High Power

Ambient Temperature: 23°C $\pm$ 3°C

Frequency Tuned, MHz	Frequency Emission, MHz	Meter, dBuV/m	CF, dB	ERP, dBm	ERP, mili-Watts
614.100000	614.095000	90.22	25.59	18.4	69.18

g0670148: 2006-Jul-17 Mon 12:34:00

State: 2:High Power

Ambient Temperature: 23°C $\pm$ 3°C

Frequency Tuned, MHz	Frequency Emission, MHz	Meter, dBuV/m	CF, dB	ERP, dBm	ERP, mili-Watts
680.000	680.000000	89.90	25.70	18.2	66.06

g0670149: 2006-Jul-17 Mon 13:03:00

State: 2:High Power

Ambient Temperature: 23°C $\pm$ 3°C

Frequency Tuned, MHz	Frequency Emission, MHz	Meter, dBuV/m	CF, dB	ERP, dBm	ERP, mili-Watts
746.000000	745.995000	89.56	26.53	18.7	74.13

Performed by:



David McPherson, Compliance Test Engineer

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

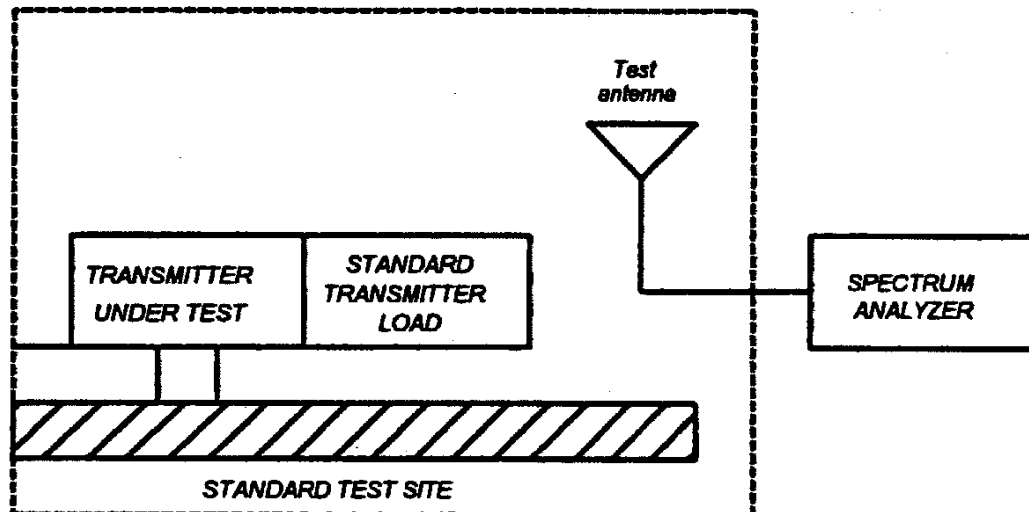
Measurement Procedure

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.

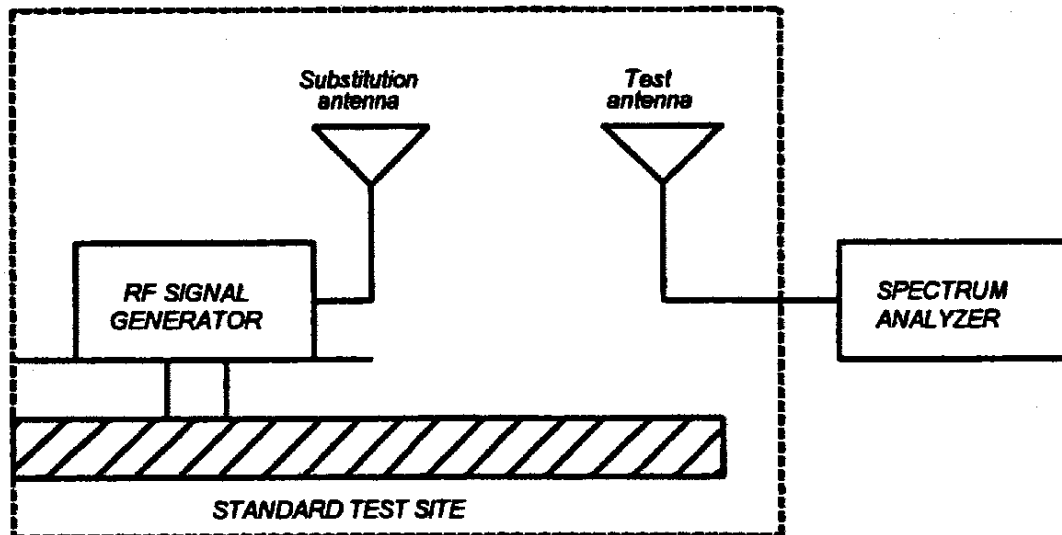
Method of Measurement:

- 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 ≤ 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 (as applicable)	Description	s/n	Cycle	Last Cal
Per ANSI C63.4-1992/2000 Draft, 10.1.4					
Transducer					
X	i00088	EMCO 3109-B 25MHz-300MHz	2336	36 mo.	Oct-05
X	i00089	Apriel 2001 200MHz-1GHz	001500	36 mo.	Oct-05
X	i00103	EMCO 3115 1GHz-18GHz	9208-3925	12 mo.	Aug-05
Spectrum Analyzer					
X	i00033	HP 85462A	3625A00357	12 mo.	Oct-05

Name of Test: Field Strength of Spurious Radiation

Measurement Results

g0670127: 2006-Jul-05 Wed 15:42:00

STATE: 2:High Power

Ambient Temperature: 23°C ± 3°C

Frequency Tuned, MHz	Frequency Emission, MHz	Level, dBuV	CF, dB	Calc. dBuV	EIRP, dBm
614.100000	1228.200000	26.4	27.2	53.6	-43.8
614.100000	1842.300000	15.5	30.7	46.2	-51.2
614.100000	2456.400000	12.9	34.0	46.9	-50.5
614.100000	3070.500000	11.5	36.1	47.6	-49.8
614.100000	3684.600000	9.7	38.7	48.4	-49.0
614.100000	4298.700000	14.1	40.4	54.5	-42.9
614.100000	4912.800000	4.2	42.3	46.5	-50.9
614.100000	5526.900000	9.4	44.1	53.5	-43.8
614.100000	6141.000000	10.6	45.5	56.1	-41.3

g0670128: 2006-Jul-05 Wed 16:05:00

STATE: 2:High Power

Ambient Temperature: 23°C ± 3°C

Frequency Tuned, MHz	Frequency Emission, MHz	Level, dBuV	CF, dB	Calc. dBuV	EIRP, dBm
677.000000	1354.003000	26	27.8	53.8	-43.6
677.000000	2031.000000	2.3	32.4	34.7	-62.7
677.000000	2708.000000	5.1	34.9	40.0	-57.4
677.000000	3385.000000	-0.3	37.4	37.1	-60.3
677.000000	4062.000000	-2.2	40.1	37.9	-59.4
677.000000	4739.000000	1.3	41.6	42.9	-54.6
677.000000	5416.000000	-0.3	43.8	43.5	-53.9
677.000000	6093.000000	1.5	45.4	46.9	-50.5

g0670129: 2006-Jul-06 Thu 09:20:00

STATE: 2:High Power

Ambient Temperature: 23°C ± 3°C

Frequency Tuned, MHz	Frequency Emission, MHz	Level, dBuV	CF, dB	Calc. dBuV	EIRP, dBm
746.000000	1492.000000	20.4	28.4	48.8	-43.6
746.000000	2238.000000	16.1	33.2	49.3	-62.7
746.000000	2984.000000	18.8	35.8	54.6	-57.4
746.000000	3730.000000	9.9	38.9	48.8	-60.3
746.000000	4476.000000	10.2	40.5	50.7	-59.4
746.000000	5222.000000	9.2	43.3	52.5	-54.6
746.000000	5968.000000	7.0	45.2	52.2	-53.9



Performed by:

Fred Chastain, Test Technician

Name of Test: Emission Masks (Occupied Bandwidth)

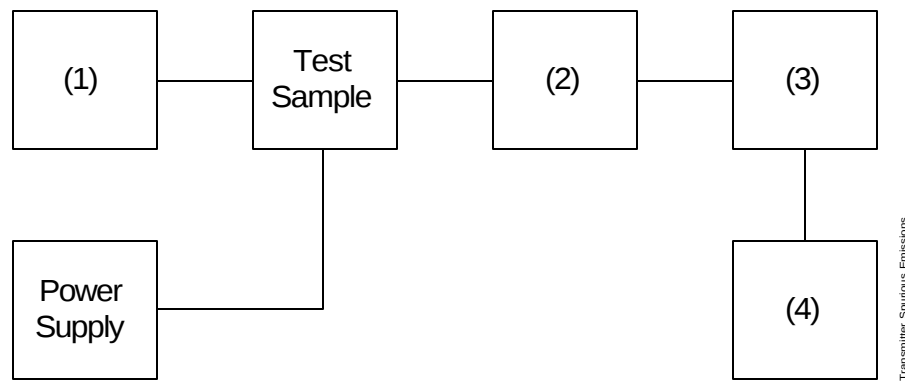
Specification : 47 CFR 2.1049(c)(1)

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.	Aug-05
(2) Coaxial Attenuator				
X i00231/2	PASTERNAK PE7021-30 (30 dB)	231 or 232	NCR	
i00123	NARDA 766 (10 dB)	7802A	NCR	
(3) Interface				
X i00021	HP 8954A Transceiver Interface	2146A00159	NCR	
(4) Spectrum Analyzer				
X i00048	HP 8566B Spectrum Analyzer	2511A01467	12 mo.	Jun-06
i00029	HP 8563E Spectrum Analyzer	3213A00104	12 mo.	Jan-06

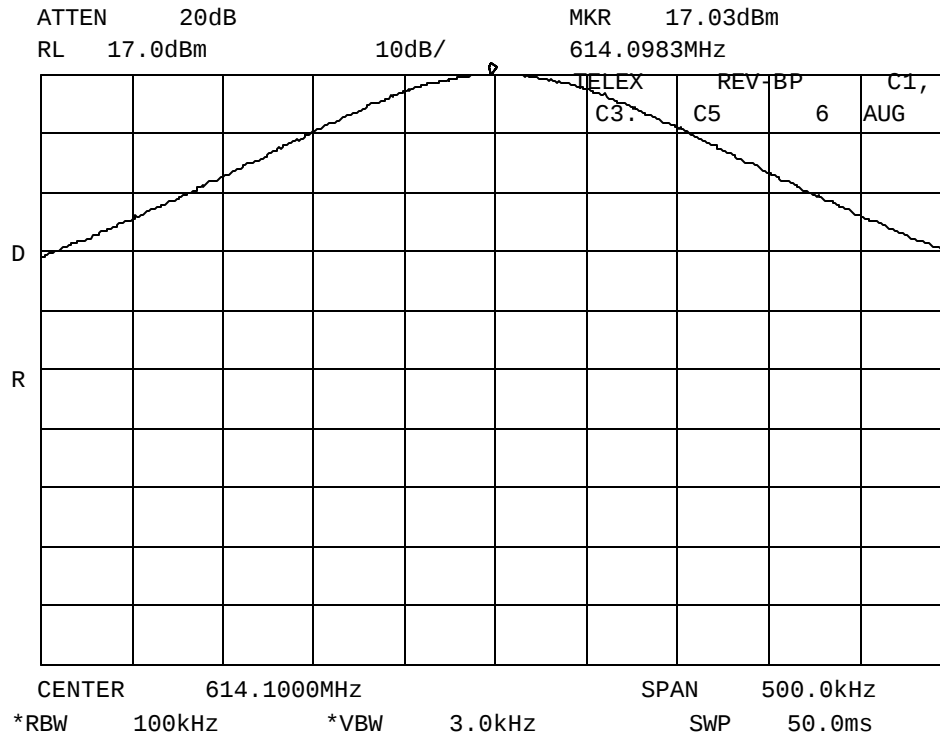
Name of Test: Emission Masks (Occupied Bandwidth)

Measurement Results

g0680083: 2006-Aug-06 Sun 18:04:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:

Modulation:

HIGH

NONE

Reference Level

Performed by:

David McPherson, Compliance Test Engineer

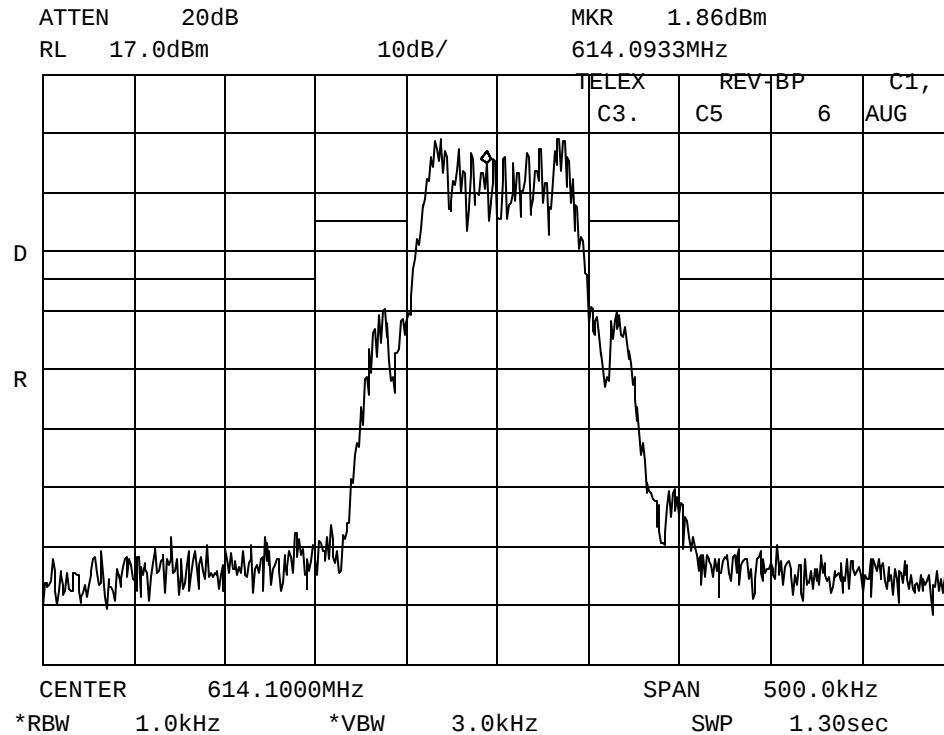
Name of Test: Emission Masks (Occupied Bandwidth)

Measurement Results

g0680085: 2006-Aug-06 Sun 18:25:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:

Modulation:

HIGH

FM 2.5KHZ @ 20 dB above Reference Level

MASK: Wireless Mic, 74.861

Performed by:

David McPherson, Compliance Test Engineer

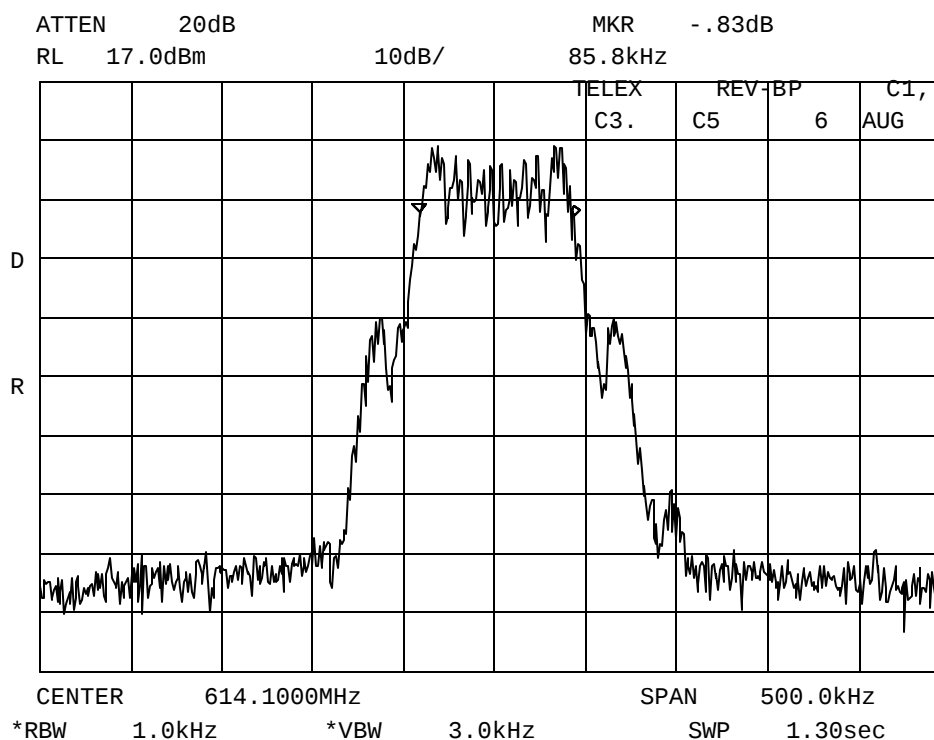
Name of Test: Emission Masks (Occupied Bandwidth)

Measurement Results

g0680086: 2006-Aug-06 Sun 18:27:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:

Modulation:

HIGH

FM 2.5KHZ @ 20 dB above Reference Level
99% Power Bandwidth

Performed by:

David McPherson, Compliance Test Engineer

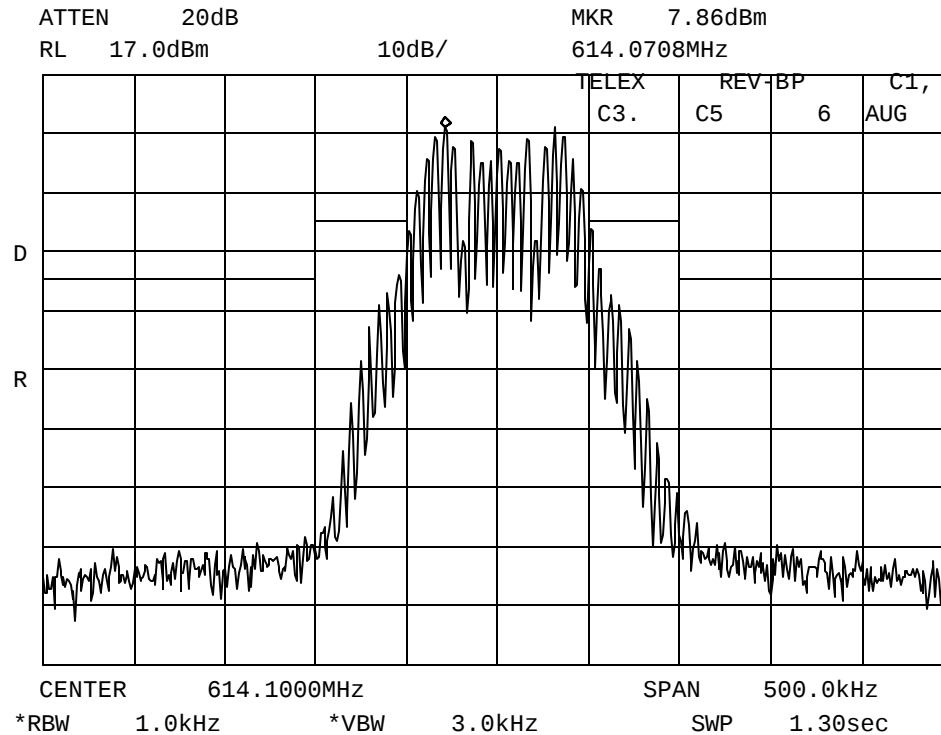
Name of Test: Emission Masks (Occupied Bandwidth)

Measurement Results

g0680087: 2006-Aug-06 Sun 18:30:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:

Modulation:

HIGH

FM 5KHZ @ 20 dB above Reference Level

MASK: Wireless Mic, 74.861

Performed by:

David McPherson, Compliance Test Engineer

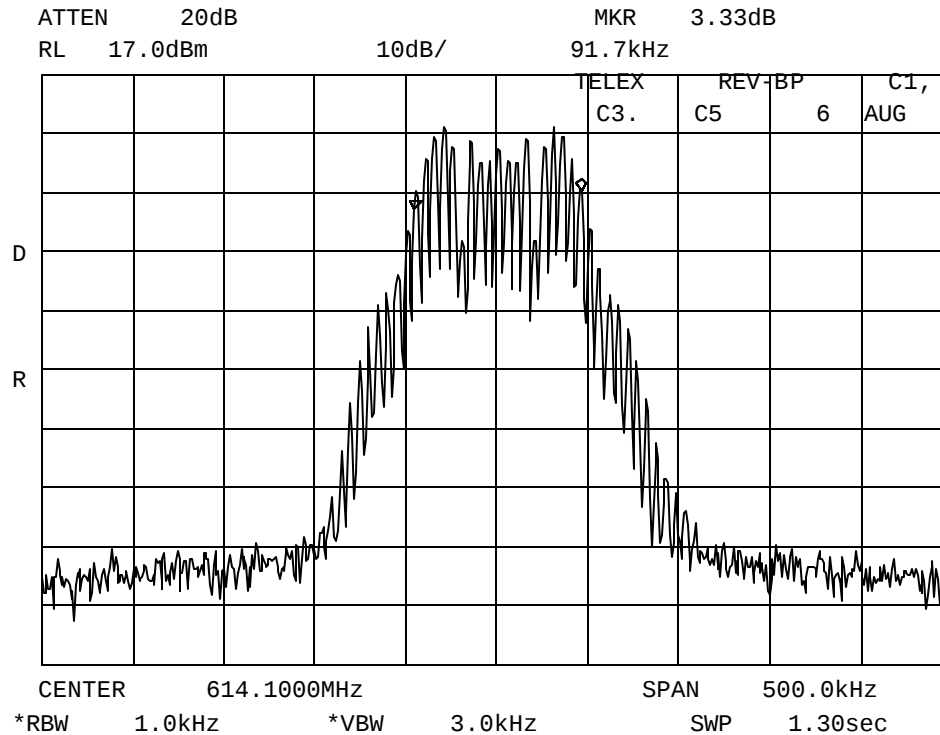
Name of Test: Emission Masks (Occupied Bandwidth)

Measurement Results

g0680088: 2006-Aug-06 Sun 18:31:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:

Modulation:

HIGH

FM 5KHZ @ 20 dB above Reference Level

99% Power Bandwidth

Performed by:

David McPherson, Compliance Test Engineer

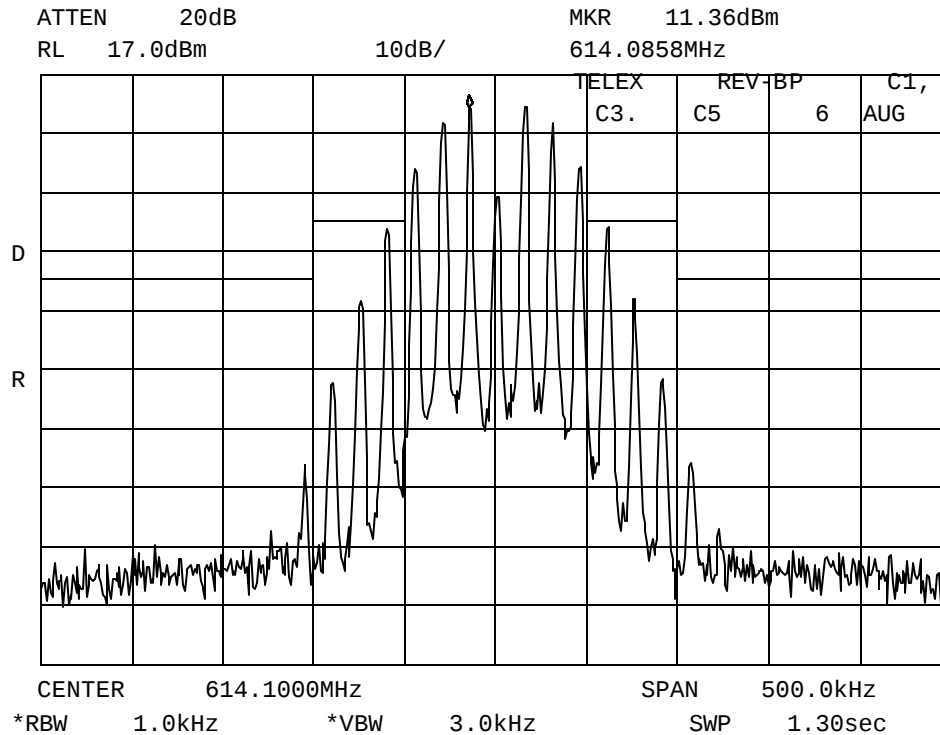
Name of Test: Emission Masks (Occupied Bandwidth)

Measurement Results

g0680089: 2006-Aug-06 Sun 18:36:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:

Modulation:

HIGH

FM 15KHZ @ 20 dB above Reference Level

MASK: Wireless Mic, 74.861

Performed by:

David McPherson, Compliance Test Engineer

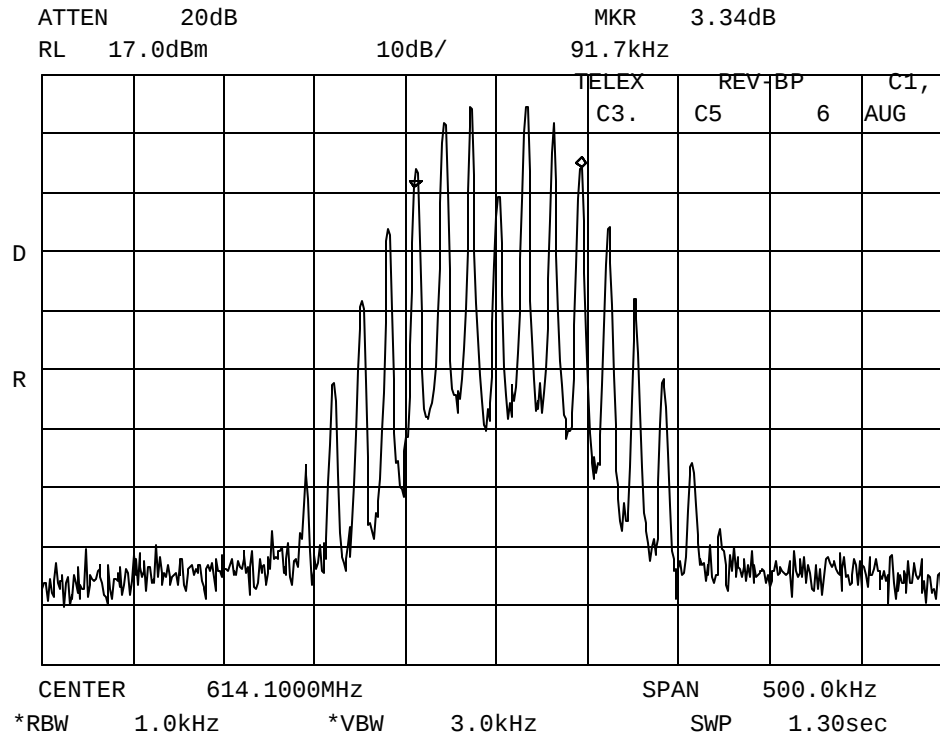
Name of Test: Emission Masks (Occupied Bandwidth)

Measurement Results

g0680090: 2006-Aug-06 Sun 18:38:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:

Modulation:

HIGH

FM 15KHZ @ 20 dB above Reference Level

99% Power Bandwidth

Performed by:

David McPherson, Compliance Test Engineer

Name of Test: Modulation Limiting

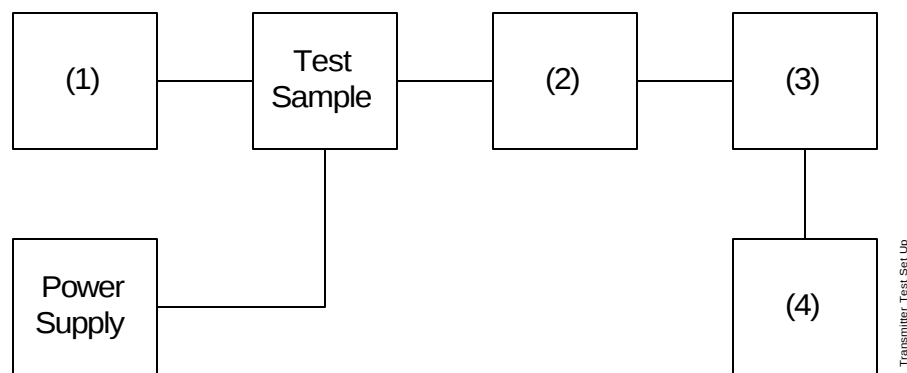
Specification : 47 CFR 2.1047(b)

Guide: ANSI/TIA/EIA-603-1992, Paragraph 2.2.3

Measurement Procedure

- A) The signal generator was connected to the input of the EUT as shown below.
- B) The modulation response was measured for each of three frequencies (one of which was the frequency of maximum response), and the input voltage was varied and was observed on an HP 8901A Modulation Analyzer.
- C) The input level was varied from 30% modulation (± 1.5 kHz deviation) to at least 20 dB higher than the saturation point.
- D) Measurements were performed for both negative and positive modulation and the respective results were recorded.

Transmitter Test Set-Up: Modulation Limiting



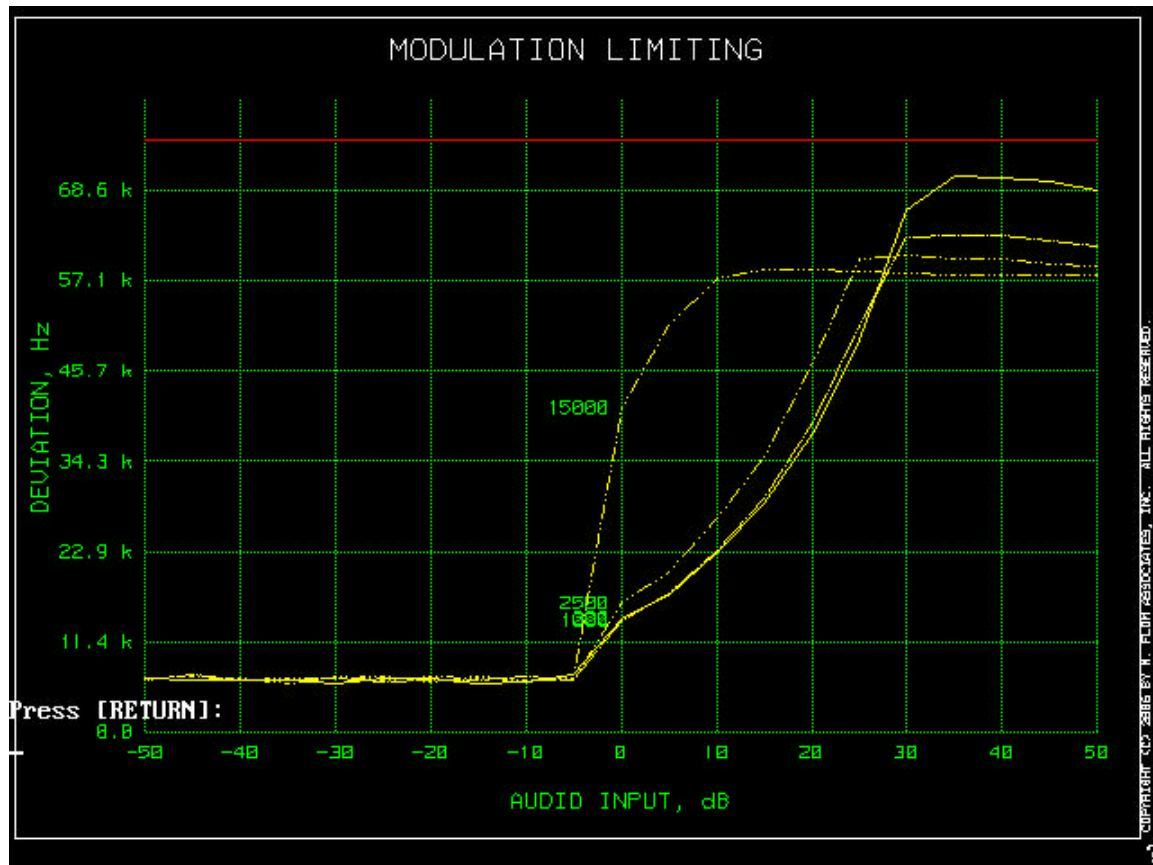
Asset	Description	s/n		
(1) Audio Oscillator				
X	i00017 HP 8903A Audio Analyzer	2216A01753	12 mo.	Aug-05
(2) Coaxial Attenuator				
	i0012/23 NARDA 766-(10 dB)	7802 or 7802A	NCR	
X	i00231/2 PASTERNAK PE7021-30 (30 dB)	231 or 232	NCR	
(3) Modulation Analyzer				
X	i00020 HP 8901A Modulation Meter	2105A01087	NCR	
(4) Audio Analyzer				
X	i00017 HP 8903A Audio Analyzer	2216A01753	12 mo.	Aug-05

Name of Test: Modulation Limiting

Measurement Results

g0680043: 2006-Aug-04 Fri 10:34:00
State: 0:General

Ambient Temperature: 23°C ± 3°C



Performed by:

David McPherson, Compliance Test Engineer

Name of Test: Frequency Stability (Temperature Variation)

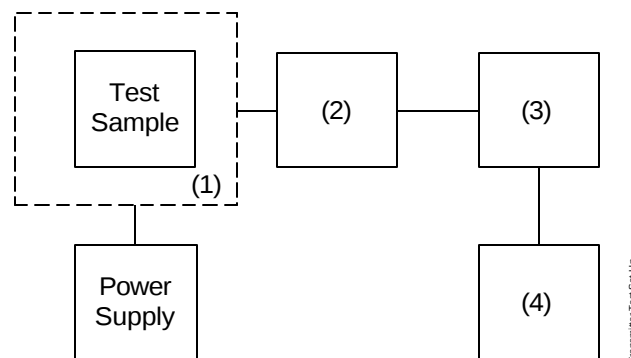
Specification: 47 CFR 2.1055(a)(1)

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				
X i00027	Tenney Temp. Chamber	9083-765-234	NCR	
(2) Coaxial Attenuator				
i00231/2	PASTERNAK PE7021-30 (30 dB)	231 or 232	NCR	
X i00122/3	NARDA 766 (10 dB)	7802 or 7802A	NCR	
(3) RF Power				
i00067	HP E4418A	US38261805	12 mo.	Oct-05
(4) Frequency Counter				
X i00067	HP 5334B	I00019	12 mo.	Jul-06

Name of Test: Frequency Stability (Temperature Variation)

Measurement Results

g0660137: 2006-Jun-16 Fri 14:18:00

State: 0:General

Ambient Temperature: 23°C ± 3°C

C1 REV-BP (614.1 to 638.0 MHz)

Temperature (° C)	Percent of Nominal Voltage	Supplied Voltage (VDC)	Measured Frequency (MHz)	Nominal Frequency (MHz)	Deviation (%)	Limit (%)	Deviation (Hz)	Limit (Hz)
+25 (ref)	100%	9.0 Battery	614.099500	614.100000	-0.00008	0.005	-500	30705
+50			614.104000	614.100000	0.00065	0.005	4000	30705
+40			614.101500	614.100000	0.00024	0.005	1500	30705
+30			614.100500	614.100000	0.00008	0.005	500	30705
+20			614.099500	614.100000	-0.00008	0.005	-500	30705
+10			614.099000	614.100000	-0.00016	0.005	-1000	30705
+0			614.096000	614.100000	-0.00065	0.005	-4000	30705
-10			614.094000	614.100000	-0.00098	0.005	-6000	30705
-20			614.089000	614.100000	-0.00179	0.005	-11000	30705
-30			614.079000	614.100000	-0.00342	0.005	-21000	30705

C3 REV-BP (674.1 to 698.0 MHz)

Temperature (° C)	Percent of Nominal Voltage	Supplied Voltage (VDC)	Measured Frequency (MHz)	Nominal Frequency (MHz)	Deviation (%)	Limit (%)	Deviation (Hz)	Limit (Hz)
+25 (ref)	100%	9.0 Battery	674.101500	674.100000	0.00022	0.005	1500	33705
+50			674.104000	674.100000	0.00059	0.005	4000	33705
+40			674.103000	674.100000	0.00045	0.005	3000	33705
+30			674.101500	674.100000	0.00022	0.005	1500	33705
+20			674.101000	674.100000	0.00015	0.005	1000	33705
+10			674.099000	674.100000	-0.00015	0.005	-1000	33705
+0			674.097000	674.100000	-0.00045	0.005	-3000	33705
-10			674.090500	674.100000	-0.00141	0.005	-9500	33705
-20			674.086000	674.100000	-0.00208	0.005	-14000	33705
-30			674.087500	674.100000	-0.00185	0.005	-12500	33705

Performed by:


David McPherson, Compliance Test Engineer

Name of Test: Frequency Stability (Temperature Variation)

Measurement Results

g0660137: 2006-Jun-16 Fri 14:18:00
 State: 0:General

Ambient Temperature: 23°C ± 3°C

C5 REV-BP (722.1 to 746.0 MHz)

Temperature (° C)	Percent of Nominal Voltage	Supplied Voltage (VDC)	Measured Frequency (MHz)	Nominal Frequency (MHz)	Deviation (%)	Limit (%)	Deviation (Hz)	Limit (Hz)
+25 (ref)	100%	9.0 Battery	745.999500	746.000000	-0.00007	0.005	-500	37300
+50			745.998500	746.000000	-0.00020	0.005	-1500	37300
+40			745.998000	746.000000	-0.00027	0.005	-2000	37300
+30			745.998500	746.000000	-0.00020	0.005	-1500	37300
+20			745.999500	746.000000	-0.00007	0.005	-500	37300
+10			745.999500	746.000000	-0.00007	0.005	-500	37300
+0			745.999000	746.000000	-0.00013	0.005	-1000	37300
-10			745.997000	746.000000	-0.00040	0.005	-3000	37300
-20			745.992500	746.000000	-0.00101	0.005	-7500	37300
-30			745.990500	746.000000	-0.00127	0.005	-9500	37300

Performed by:



David McPherson, Compliance Test Engineer

Name of Test: Frequency Stability (Voltage Variation)

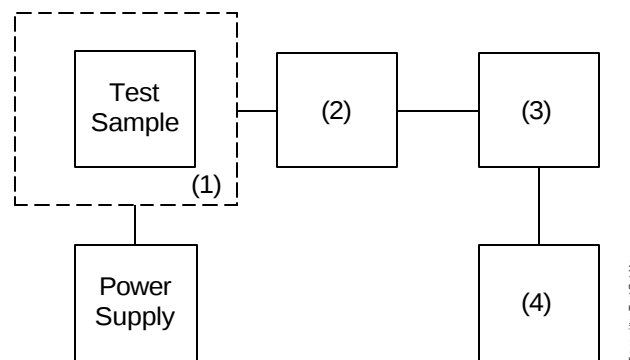
Specification: 47 CFR 2.1055(d)(1)

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

Measurement Procedure

- A) The EUT was placed in a temperature chamber (if required) at $25 \pm 5^\circ\text{C}$ 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				
X i00027	Tenney Temp. Chamber	9083-765-234	NCR	
(2) Coaxial Attenuator				
i00231/2	PASTERNAK PE7021-30 (30 dB)	231 or 232	NCR	
X i00122/3	NARDA 766 (10 dB)	7802 or 7802A	NCR	
(3) RF Power				
i00067	HP E4418A	US38261805	12 mo.	Oct-05
(4) Frequency Counter				
X i00067	HP 5334B	I00019	12 mo.	Jul-06

Results: Frequency Stability (Voltage Variation)

State: Ambient Temperature: 23°C ± 3°C

Temperature, ° C = +25 (ref)
 Battery End Point (Voltage) =

C1 REV-BP (614.1 to 638.0 MHz)

Percent of Nominal Voltage	Supplied Voltage (VDC)	Measured Frequency (MHz)	Nominal Frequency (MHz)	Deviation (%)	Limit (%)	Deviation (Hz)	Limit (Hz)
85%	7.65	614.099000	614.100000	-0.00016	0.005	-1000	30705
100%	9.00	614.099500	614.100000	-0.00008	0.005	-500	30705
115%	10.35	614.098500	614.100000	-0.00024	0.005	-1500	30705

C3 REV-BP (674.1 to 698.0 MHz) THIS

Percent of Nominal Voltage	Supplied Voltage (VDC)	Measured Frequency (MHz)	Nominal Frequency (MHz)	Deviation (%)	Limit (%)	Deviation (Hz)	Limit (Hz)
85%	7.65	674.101500	674.100000	0.00022	0.005	1500	33705
100%	9.00	674.101500	674.100000	0.00022	0.005	1500	33705
115%	10.35	674.103000	674.100000	0.00045	0.005	3000	33705

C5 REV-BP (722.1 to 746.0 MHz)

Percent of Nominal Voltage	Supplied Voltage (VDC)	Measured Frequency (MHz)	Nominal Frequency (MHz)	Deviation (%)	Limit (%)	Deviation (Hz)	Limit (Hz)
85%	7.65	745.998500	746.000000	-0.00020	0.005	-1500	37300
100%	9.00	745.999500	746.000000	-0.00007	0.005	-500	37300
115%	10.35	745.998500	746.000000	-0.00020	0.005	-1500	37300

Performed by:



David McPherson, Compliance Test Engineer

Name of Test: Necessary Bandwidth and Emission Bandwidth

Specification: 47 CFR 2.202(g)

Modulation = 91K0F3E

Necessary Bandwidth Calculation:

Maximum Modulation (M), kHz	= 15
Maximum Deviation (D), kHz	= 58
Constant Factor (K)	= 1
Necessary Bandwidth (B_N), kHz	= $(2 \times M) + (2 \times D \times K)$
	= 146.0 KHz Measured

Performed by:

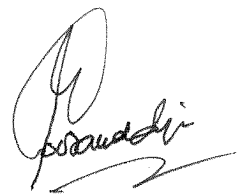

David McPherson, Compliance Test Engineer

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:

Hoosamuddin S. Bandukwala, Senior Test Engineer