



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

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Date of Report: December 30, 2005
Date of Submission: February 9, 2006

Federal Communications Commission
Via: Electronic Filing

Attention: Authorization & Evaluation Division

Applicant: Telex Communications, Inc.
Equipment: XO-1
FCC ID: B5DM526
FCC Rules: 15.247

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, Business Manager

enclosure(s)
cc: Applicant
MCS/del



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Transmitter Certification

of

FCC ID: B5DM526

Model: XO-1

to

Federal Communications Commission

Rule Parts 15.247

Date Of Report: December 30, 2005

On the Behalf of the Applicant:

Telex Communications, Inc.

At the Request of:

P.O. 336058

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:

David E. Lee, FCC Compliance Manager

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

Applicant: Telex Communications, Inc.

FCC ID: B5DM526

By Applicant:

1. Letter Of Authorization
2. Identification Drawings
 - Label
 - Location of Label
 - Compliance Statement
 - Location of Compliance Statement
3. Documentation: 2.1033(B)
 - (3) User Manual
 - (4) Operational Description
 - (5) Block Diagram
 - (5) Schematic Diagram
 - (7) External Photographs
 - Internal Photographs
 - Parts List
 - Active Devices

By M.F.A. Inc.,

- A. Testimonial & Statement of Certification

The applicant has been cautioned as to the following:

15.21 Information to User.

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

15.27(a) Special Accessories.

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

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

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

a) **Test Report**

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

c) Report Number: d05c0045

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

e) Identification: XO-1
FCC ID: B5DM526

Description:

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

g) Report Date: December 30, 2005
EUT Received: December 27, 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:



David E. Lee, FCC Compliance 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.

List Of General Information Required For Certification

In Accordance with FCC Rules and Regulations,
Volume II, Part 2 and to 15.247

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:

Applicant

(c)(2): **FCC ID:** B5DM526

Model Number: XO-1

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

Please See Attached Exhibits

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

(c)(5): **FREQUENCY RANGE, MHz:** 2412 - 2462

(c)(6): **Power Rating:** 17.5dBm / 56mW @ 3m
☐ Switchable ☒ Variable ☐ N/A

(c)(7): **Maximum Power Rating:** [15.247(b)(3)] 30.0dBm / 1.0W @ 3m

15.203: Antenna Requirement:

- ☒ The antenna is permanently attached to the EUT
☐ The antenna uses a unique coupling
☐ The EUT must be professionally installed
☐ The antenna requirement does not apply

Subpart 2.1033 (continued)

(c)(8): Voltages & Currents in All Elements in Final RF Stage, Including Final Transistor or Solid State Device:

Collector Current, mA	=	100
Collector Voltage, Vdc	=	3.3
Supply Voltage, Vdc	=	7.2

(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

Sub-part
2.1033(b):

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 2.1031, 2.1033, 2.1035, 2.1041, 2.1043, 2.1045, and the following individual Parts:

_____	15.209	Radiated emission limits; general requirements
_____	15.211	Tunnel radio systems
_____	15.213	Cable locating equipment
_____	15.214	Cordless telephones
_____	15.217	Operation in the band 160-190 kHz
_____	15.219	Operation in the band 510-1705 kHz
_____	15.221	Operation in the band 525-1705 kHz (leaky coax)
_____	15.223	Operation in the band 1.705-10 MHz
_____	15.225	Operation in the band 13.553-13.567 MHz
_____	15.227	Operation in the band 26-27.28 MHz (remote control)
_____	15.229	Operation in the band 40.66-40.70 MHz
_____	15.231	Periodic operation in the band 40.66-40.70 MHz and above 70 MHz
_____	15.233	Operation within the bands 43.71-44.49, 46.60-46.98 MHz 48.75-49.51 MHz and 49.66-50.0 MHz
_____	15.235	Operation within the band 49.82-49.90 MHz
_____	15.237	Operation within the bands 72.0-73.0 MHz, 74.6-74.8 MHz and 75.2-76.0 MHz (auditory assistance)
_____	15.239	Operation in band 88-108 MHz
_____	15.241	Operation in the band 174-216 MHz (biomedical)
_____	15.243	Operation in the band 890-940 MHz (materials)
_____	15.245	Operation within the bands 902-928 MHz, 2435-2465 MHz, 5785-5815 MHz, 10500-10550 MHz, and 24075-24175 MHz (filed disturbance sensors)
_____ x	15.247	Operation within bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz (spread spectrum)
_____	15.249	Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz, and 24.0-24.25 GHz
_____	15.251	Operation within the bands 2.9-3.26 GHz, 3.267-3.332 GHz, 3.339-3.3458 GHz, and 3.358-3.6 GHz (vehicle identification systems)
_____	15.321	Specific requirements for asynchronous devices operating in the 1910-1920 MHz and 2390-2400 MHz bands (Unlicensed PCS)
_____	15.323	Specific requirements for isochronous devices operating in the 1920-1930 MHz sub-band (Unlicensed PCS)

Standard Test Conditions and Engineering Practices

Except as noted herein, the following conditions and procedures were observed during the testing:

In accordance with ANSI C63.4-1992/2003, 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**

Name of Test: EIRP Carrier Power (Radiated)

Specification: 47 CFR 15.247(b)
ANSI C63.4:2003

Spec. Limit: = 1 Watt peak

Test Equipment: Attached

Measurement Data

Antenna Gain, dBi = 0dBi
 Peak Output Power, Watts = 70mW conducted
 Worst Case For Radiated = 56mW
 All Channels

Radiated:
 g05c0040: 2005-Dec-28 Wed 12:38:00

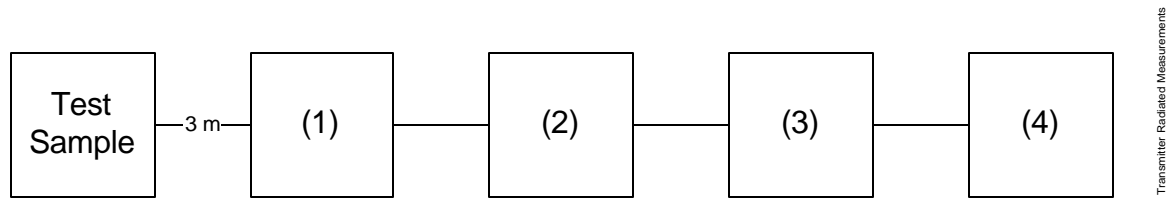
Frequency Tuned, MHz	Frequency Emission, MHz	Meter, dBuV	CF, dB	Path Loss, dB	EIRP, dBm	EIRP, W
2412.000000	2412.800000	88.68	32.62	+2.6	16.9	0.049
2437.000000	2437.500000	89.32	32.68	+2.5	17.5	0.056
2462.000000	2462.630000	88.45	32.75	+2.6	16.8	0.048



Supervised By:

David E. Lee, FCC Compliance Manager

Radiated Test Setup



Test Equipment

Asset	Description	s/n	Cycle	Last Cal	
(1) Transducer					
	i00088	EMCO 3109-B 25MHz-300MHz	2336	24 mo.	Sep-05
X	i00089	Apriel 2001 200MHz-1GHz	001500	24 mo.	Sep-05
X	i00103	EMCO 3115 1GHz-18GHz	9208-3925	24 mo.	Sep-05
(3) Amplifier					
X	i00028	HP 8449A	2749A00121	12 mo.	May-05
(4) Spectrum Analyzer					
X	i00029	HP 8563E	3213A00104	12 mo.	May-05
X	i00033	HP 85462A	3625A00357	12 mo.	Sep-05

Test Setup:

Radiated Emissions

State:



State:



Name of Test:	Out of Band Emissions	
Specification:	47 CFR 15.247(c), 15.209(a)	
Spec. Limit:	See Below	
Test Equipment:	As per previous page	
Search Antennas:	10 kHz – 32 MHz:	LOOP 94598-1
	32 MHz – 1 GHz:	SINGER DM105,T ₁ T ₂ T ₃
	1 GHz – 18 GHz:	EMCO 3115

Limit

In any 100 kHz bandwidth outside these frequency bands, radio frequency power that is produced by the modulation products of the spreading sequence, information sequence, and the carrier frequency shall be either:
at least 20 dB below that in any 100 kHz bandwidth within the band that contains the highest level of the desired power

or

shall not exceed the general levels specified in 15.209(a), whichever results in the lesser attenuation. All other emissions outside these bands shall not exceed the general radiated emission limits specified in 15.209(a).

Measurements Procedure:

At first, bench tests were performed to locate the emissions around the antenna terminals.

In the field, tests were conducted over the range shown. The test sample was set up on a wooden turntable above ground, and at a distance of three meters from the antenna connected to the spectrum analyzer.

In order to obtain the maximum response at each frequency, the turntable was rotated, and the search antenna was raised and lowered. The EUT was also adjusted for maximum response.

The field strength was calculated from:

$$E \text{ } \mu\text{V/m @ 3 m} = \text{LOG}_{10}^{-1}(\text{dBm} + 107 + \text{A.F.} + \text{C.L.})$$

The following results are worst case conditions. Tests were conducted in Horizontal and Vertical polarization modes.

Measurement Results: Attached

Name of Test: Out of Band Emissions

g0610044: 2006-Jan-30 Mon 17:41:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C

Frequency Tuned, MHz	Frequency Emission, MHz	Level, dBm	Level, dBc	Margin, dB
2412.000000	4823.526667	-67.9	-58.8	-54.9
2437.000000	4873.613333	-67.8	-58.7	-54.8
2462.000000	4923.611667	-67.8	-58.7	-54.8
2412.000000	7235.891667	-57.3	-48.2	-44.3
2437.000000	7311.083333	-51.4	-42.3	-38.4
2462.000000	7386.011667	-51.3	-42.2	-38.3
2412.000000	9647.748333	-66.4	-57.3	-53.4
2437.000000	9748.096667	-65.9	-56.8	-52.9
2462.000000	9847.568333	-66.6	-57.5	-53.6
2412.000000	12059.528333	-66.3	-57.2	-53.3
2437.000000	12184.640000	-65.9	-56.8	-52.9
2462.000000	12309.861667	-66.3	-57.2	-53.3
2412.000000	14472.448333	-62.4	-53.3	-49.4
2437.000000	14622.166667	-62.3	-53.2	-49.3
2462.000000	14771.733333	-62.4	-53.3	-49.4
2412.000000	16883.681667	-63.1	-54.0	-50.1
2437.000000	17058.876667	-63.9	-54.8	-50.9
2462.000000	17234.433333	-63.9	-54.8	-50.9
2412.000000	19295.626667	-63.1	-54.0	-50.1
2437.000000	19495.550000	-63.8	-54.7	-50.8
2462.000000	19696.216667	-62.6	-53.5	-49.6
2412.000000	21707.713333	-62.4	-53.3	-49.4
2437.000000	21932.586667	-62.6	-53.5	-49.6



Performed By:

Fred Chastain, Test Technician

Name of Test: Restricted Bands of Operation

Specification: 47 CFR 15.205

Test Equipment: As per attached page

Measurement Procedure

The EUT was set up on a three meter open field site according to the procedure on ANSI C63.4.

Sensitivity of system was measured:

Below 2 GHz:

CISPR Bandwidths	=	8 dB μ V
1 MHz RBW, 1 MHz VBW	=	12 dB μ V
1 MHz RBW, 10 Hz VBW	=	3 dB μ V

Above 2 GHz:

1 MHz RBW, 1 MHz VBW	=	33 dB μ V
1 MHz RBW, 10 Hz VBW	=	22 dB μ V

Sensitivity of system with preamps:

Below 2 GHz:

Preamps are not used in this range.

Above 2 GHz:

Peak	=	3 dB μ V
Average	=	-8 dB μ V

Cable Loss:

915 MHz	=	-0.8 dB μ V
2450 MHz	=	-3 dB μ V

Note:

dB loss vs. frequency included in programmed software.

Reference Level Offset:

set @ 1 dB, accounts for cable and connector loss.

Test Results: No harmonic or spurious emissions were detected in the restricted bands in excess of the limits of 15.205. System measurement sensitivity was -130 dBm.



Supervised By:

David E. Lee, FCC Compliance Manager

Name of Test: Emissions At Band Edges
Specification: 47 CFR
Test Equipment: As for "Out of Band Emissions"

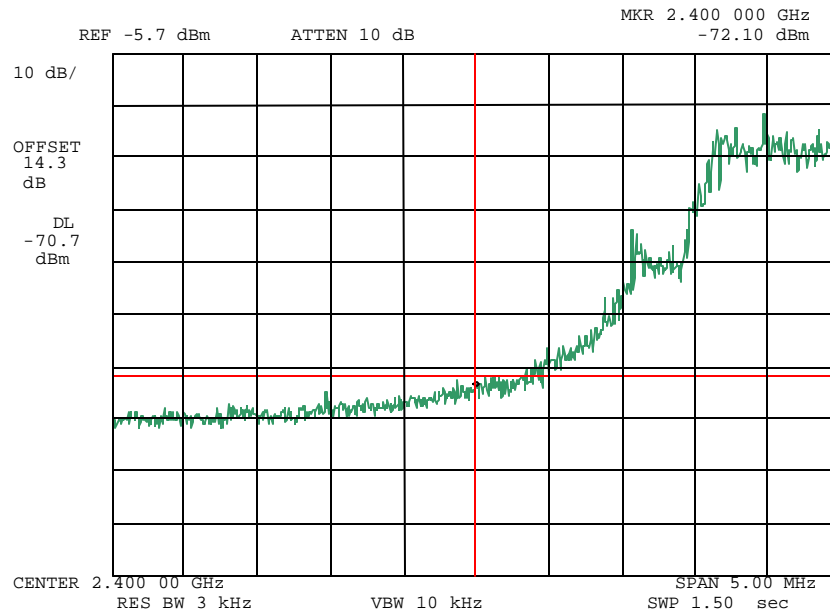
Measurement Results

Attached

Name of Test: Emission at Band Edges (Conducted)

g05c0050: 2005-Dec-28 Wed 12:14:00

State: 2:High Power



Power:
Modulation:

HIGH
DSSS
LOWER EDGE

Fred Chastain

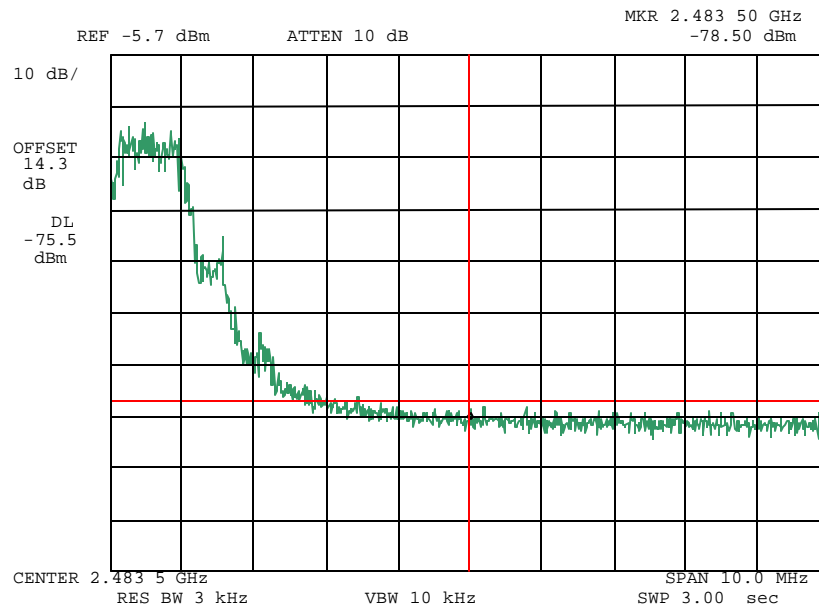
Performed By:

Fred Chastain, Test Technician

Name of Test: Emission at Band Edges (Conducted)

g05c0049: 2005-Dec-28 Wed 12:04:00

State: 2:High Power



Power:
Modulation:

HIGH
DSSS
UPPER EDGE

Fred Chastain

Performed By:

Fred Chastain, Test Technician

Name of Test: Allowed Occupied Bandwidth

Specification: 47 CFR 15.247(a)(2)

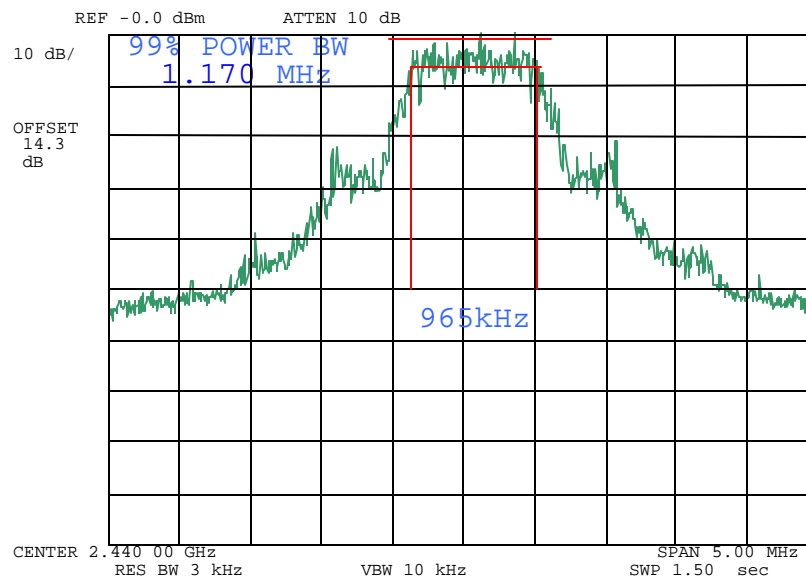
Test Equipment: As per attached page

Limits

Rule	Type	BANDS (MHz)	LIMIT (kHz)
15.247(a)(1)(i)	F.H.	902-928	20 dB BW = 500
15.247(a)(1)(ii)	F.H.	2400-2483.5, 5725-5850	20 dB BW = 1000
15.247(a)(2)	D.S.	ALL	6 dB BW = 500

Measurement Data

Measured 99% Power Bandwidth, MHz = 1.170
6dB Bandwidth, MHz = 0.965



Power:
Modulation:

LOOSE COUPLED
MID CHANNEL
6dB BW 965kHz (Marker Delta Method)
99% Power BW 1.170MHz

Fred Chastain

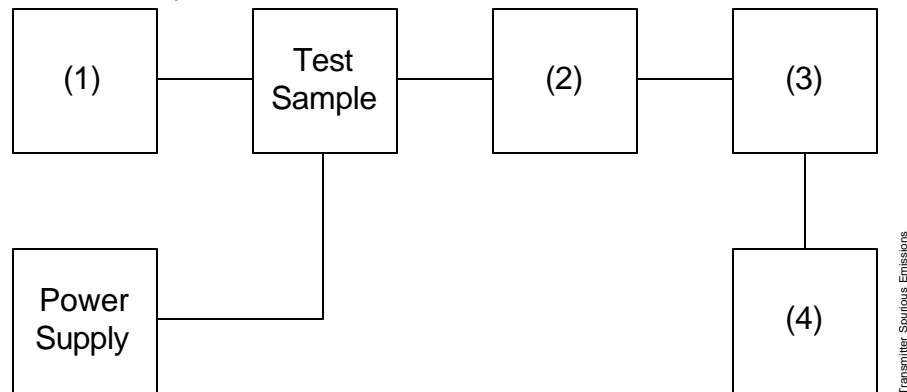
Performed by:

Fred Chastain, Test Technician

Transmitter Spurious Emission

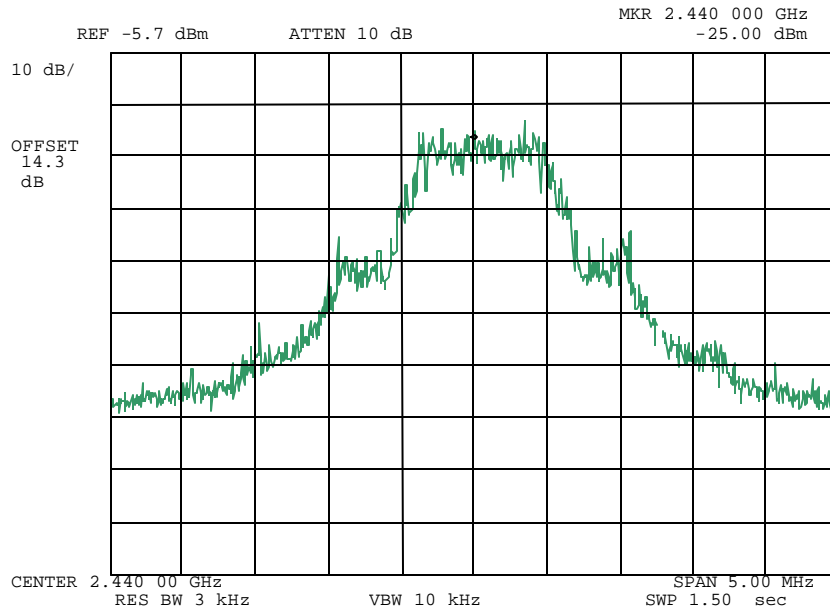
Test A. Occupied Bandwidth (In-Band Spurious)

Test B. Out-of-Band Spurious



Asset (as applicable)	Description	s/n		
(1) Audio Oscillator/Generator				
X i00017	HP 8903A Modulation Meter	2216A01753	12 mo.	Apr-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.	Jul-05
i00029	HP 8563E Spectrum Analyzer	3213A00104	12 mo.	May-05

Name of Test: Emission Masks (Occupied Bandwidth)
g05c0043: 2005-Dec-28 Wed 10:50:00
State: 2:High Power



Power:
Modulation:

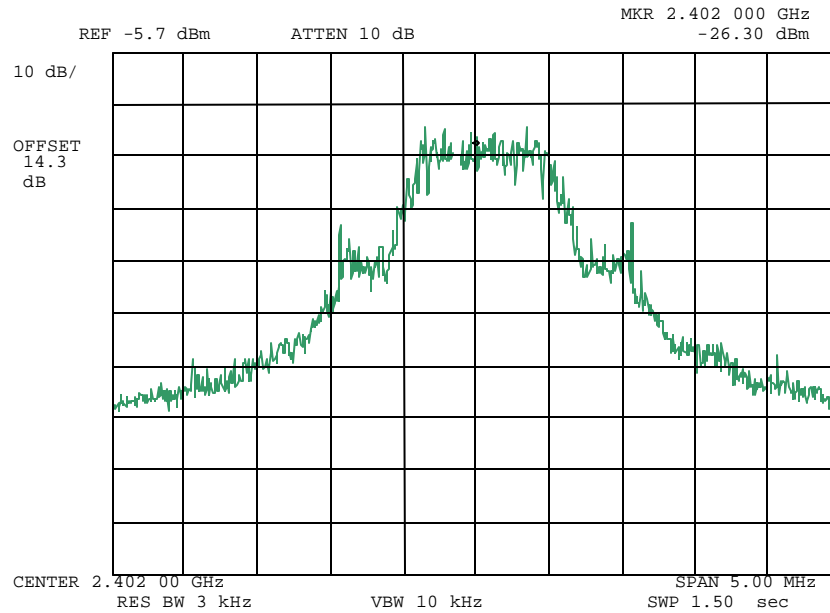
HIGH
DSSS
CHAN 6

Fred Chastain

Performed By:

Fred Chastain, Test Technician

Name of Test: Emission Masks (Occupied Bandwidth)
g05c0045: 2005-Dec-28 Wed 11:27:00
State: 2:High Power



Power:
Modulation:

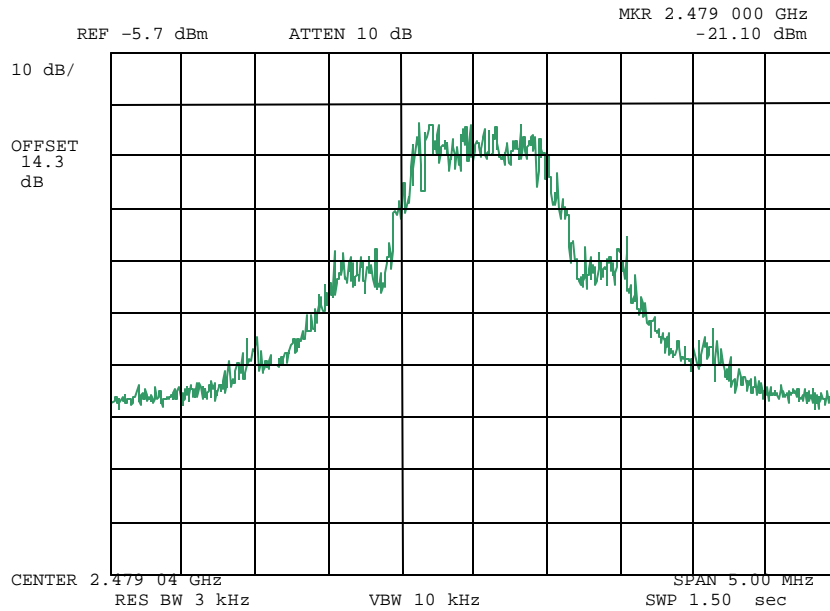
HIGH
DSSS
CHAN 1

Fred Chastain

Performed By:

Fred Chastain, Test Technician

Name of Test: Emission Masks (Occupied Bandwidth)
g05c0047: 2005-Dec-28 Wed 11:42:00
State: 2:High Power



Power:
Modulation:

HIGH
DSSS
CHAN 11

Fred Chastain

Performed By:

Fred Chastain, Test Technician

Name of Test: Spread Spectrum Technology
Direct Sequence Systems

15.247(d) Transmitter Power Density

Limit: The transmitter power density peak over any 1 second interval shall not be greater than 8dBm in any 3 kHz Bandwidth within these bands.

Results:

Frequency	Measured dBm @ 1Hz	Calculated dBm @ 3kHz	Margin dBm
2412.000	-32.50	2.30	-6.50
2440.000	-32.10	2.70	-5.30
2462.000	-31.95	3.05	-4.95

Power Spectral Density per 3-kHz bandwidth = Power Spectral Density per 1-Hz bandwidth + Bandwidth Correction Factor.
Bandwidth Correction Factor = $10 \cdot \log(3 \text{ kHz} / 1 \text{ Hz}) = 34.8 \text{ dB}$

15.247(e) Processing Gain

Limit: The processing gain shall be = 10 dB

Results: See Applicant's statement



Supervised By:

David E. Lee, FCC Compliance Manager

Name of Test: A/C Powerline Conducted Emissions

Specification: FCC: 47 CFR 15.207

Guide: IEEE Standard 213

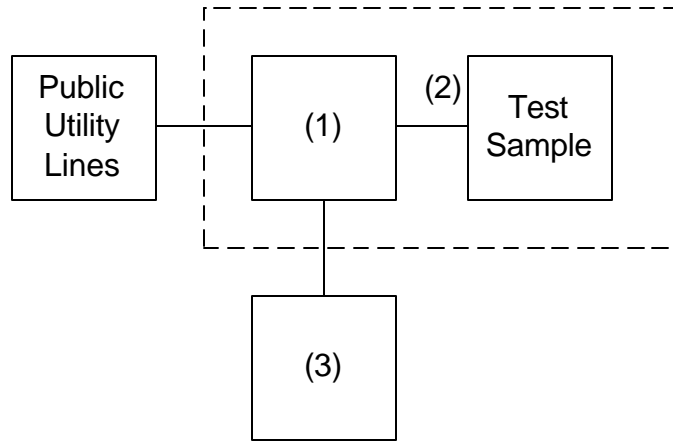
Test Conditions: S. T. & H.

Test Equipment: As per attached page

Measurement Procedure

1. A test sample was connected to the Public Utility lines through a LISN (50 μ H).
2. A reference level of 250 μ V was set on the Spectrum Analyzer. The spectrum was searched over the range of 150 kHz to 30 MHz.
3. All other emissions were 20 dB or more below limit.
4. ☒ The test sample used a charger.
☐ The test sample does not use a charger.
5. Measurement Results: Attached.

AC Powerline Conducted Measurements



Asset (as applicable)	Description	s/n	Cycle Per ANSI C63.4-1992/2000, 10.1.4	Last Cal
(1) Line Impedance Stabilization Network				
X i00244	Fischer 50-20-2-01	2047	NCR	
(2) Screen Room				
X i00170	Lindgren LG170	4999	NCR	
(3) Spectrum Analyzer				
X i00033	HP 85462A	3625A00357	12 mo.	Sep-05
i00048	HP 8566B	2511AD1467	12 mo.	May-05

State:



State:



Results:
A/C Powerline Conducted Emissions

g0590021: 2005-Sep-07 Wed 14:41:00

State: 0:General

Frequency Tuned, MHz	Frequency Emission, MHz	Level, dBuV	C.F., dB	μV/m
0.000000	0.151800	52.55	-8.17	165.58
0.000000	0.274300	47.63	-8.81	87.30
0.000000	0.481600	38.99	-8.88	32.03
0.000000	0.546300	38.18	-8.89	29.14
0.000000	0.683800	41.14	-8.90	40.93
0.000000	0.752500	41.14	-8.91	40.88
0.000000	0.893800	39.35	-8.92	33.23
0.000000	0.965000	37.11	-8.91	25.70
0.000000	1.920000	42.80	-8.91	49.49
0.000000	2.480000	43.09	-8.90	51.23
0.000000	3.990000	41.71	-8.86	43.90
0.000000	4.620000	41.31	-8.82	42.12
0.000000	8.450000	36.38	-8.63	24.41
0.000000	10.050000	36.83	-8.57	25.88
0.000000	12.950000	33.28	-8.42	17.50
0.000000	14.780000	37.82	-8.33	29.82
0.000000	18.190000	34.44	-7.90	21.23
0.000000	21.600000	29.65	-7.71	12.50
0.000000	25.880000	23.33	-7.89	5.92
0.000000	28.010000	21.80	-7.84	4.99



Performed by:

Fred Chastain, Test Technician

Results:
A/C Powerline Conducted Emissions

g0590022: 2005-Sep-07 Wed 14:57:00

State: 0:General

Frequency Tuned, MHz	Frequency Emission, MHz	Level, dBuV	C.F., dB	μV/m
0.000000	0.151800	53.46	-8.14	184.50
0.000000	0.274300	46.74	-8.78	79.07
0.000000	0.343400	39.99	-8.90	35.85
0.000000	0.481600	40.32	-8.90	37.24
0.000000	0.548800	35.66	-8.91	21.75
0.000000	0.686300	34.79	-8.94	19.61
0.000000	0.755000	33.70	-8.96	17.26
0.000000	0.893800	31.86	-8.97	13.95
0.000000	0.962500	31.86	-8.97	13.95
0.000000	1.780000	37.70	-8.99	27.26
0.000000	2.200000	39.58	-8.97	33.92
0.000000	3.660000	43.65	-8.87	54.83
0.000000	4.140000	44.06	-8.83	57.74
0.000000	5.180000	41.83	-8.77	44.98
0.000000	6.500000	39.93	-8.68	36.52
0.000000	11.850000	31.42	-8.43	14.11
0.000000	13.580000	34.68	-8.35	20.73
0.000000	15.340000	39.40	-8.21	36.27
0.000000	18.080000	36.10	-7.90	25.70
0.000000	25.350000	24.45	-7.72	6.86
0.000000	27.640000	25.32	-7.61	7.68



Performed by:

Fred Chastain, Test Technician

Name of Test: Necessary Bandwidth and Emission Bandwidth

Specification: 47 CFR 2.202(g)

Modulation = 1.170MHz

Necessary Bandwidth Calculation:



Supervised By:

David E. Lee, FCC Compliance Manager

END OF TEST REPORT

Radiated Measurements For Part 15 Transmitters with Integral Antennas

Radiated Measurements

Range of Measurement	Specification	Resolution B/W	Video B/A
30 to 1000 MHz	CISPR	=100 kHz	=100 kHz
>1000 MHz	FCC, 15.37(b)	1 MHz	=1 MHz
(if averaging)	FCC, 15.37(b)	1 MHz	10 Hz

Measuring Equipment

a. Antennas:

EMCO 3109	20 - 300 MHz
APREL AALP2001	200 - 1000 MHz
APREL AAB20200	20 - 200 MHz
APREL AAH118	1 - 18 GHz

b. Instruments:

HP8566B	Spectrum Analyzer
HP85685A	Preselector, w/ preamp below 2 GHz
HP85650A	Quasi Peak Adapter
HP8449	Preamp, above 2 GHz
HP8563E	Spectrum Analyzer, above 2 GHz

Occupied Bandwidth

Occupied Bandwidth is measured as a radiated signal without attenuators and/or filter. RBW, VBW and scan settings as shown were set to produce a meaningful result in accordance with ANSI C63.4, Section 13.1.7.

Part 15.21, Information to User

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

§ 15.205 Restricted Bands of Operation

(a) Except as shown in paragraph (b) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.25
0.495-0.505	16.69475-16.69625	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2655-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-339.4	3600-4400	
13.36-13.41			

**Testimonial
And
Statement Of Certification**

This is to certify that:

1. **That** the application was prepared either by, or under the direct supervision of, the undersigned.
2. **That** the technical data supplied with the application was taken under my direction and supervision.
3. **That** the data was obtained on representative units, randomly selected.
4. **That**, to the best of my knowledge and belief, the facts set forth in the application and accompanying technical data are true and correct.



Certifying Engineer:

David E. Lee, FCC Compliance Manager