



Flom Test Labs
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Transmitter Certification

of

FCC ID: THX-LFLR1-01
Model: LFBT

to

Federal Communications Commission

Rule Part(s) 15.247

Date Of Amended Report: March 6, 2006
Date Of Report: January 25, 2006

On the Behalf of the Applicant:

Privaris, Inc.

At the Request of:

CC 1/20/2006

Privaris, Inc.
11208 Waples Mill Road, Suite 103
Fairfax, VA 22030

Attention of:

Michael Cherniawski
434-244-4207; fax: 434-293-4033
E-mail: mcherniawski@privaris.com

Supervised By:

David E. Lee, FCC Compliance Manager

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

Applicant: Privaris, Inc.

FCC ID: THX-LFLR1-01

By Applicant:

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

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: d0610035

d) Client: Privaris, Inc.
11208 Waples Mill Road, Suite 103
Fairfax, VA 22030

e) Identification: LFBT
FCC ID: THX-LFLR1-01
Description: Entry Keyfob

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

g) Report Date: January 25, 2006
EUT Received: January 20, 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:



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:**

Privaris, Inc.
11208 Waples Mill Road, Suite 103
Fairfax, VA 22030

Manufacturer:

Applicant

(c)(2): **FCC ID:** THX-LFLR1-01

Model Number: LFBT

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

Please See Attached Exhibits

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

(c)(5): **FREQUENCY RANGE, MHz:** 2400 to 2483.5

(c)(6): **Power Rating,** 1mW
_____ Switchable _____ Variable X N/A

(c)(7): **Maximum Power Rating:** 1W

15.203: **Antenna Requirement:**

- X 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, A	=	Less than 1mA
Collector Voltage, Vdc	=	3.3
Supply Voltage, Vdc	=	3.6

(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

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.

Name of Test: Maximum Peak Output Power

Specification: 47 CFR 15.247(b)

Spec. Limit: = 1 Watt peak

Test Equipment: Attached

Measurement Data

Stated Antenna Gain, dBi = 1.1dBi
 Stated Conducted Power = 1mW
 Peak Output Power = 0.339mW Worst Case For All Channels

Radiated:
 g0610019: 2006-Jan-23 Mon 12:42:00

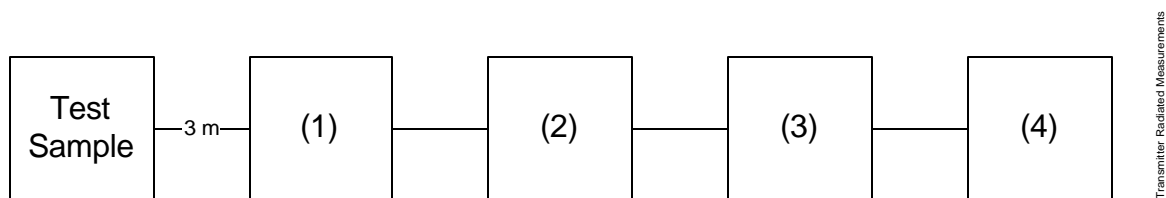
Frequency Tuned, MHz	Frequency Emission, MHz	Meter, dBuV	CF, dB	Path Loss, dB	EIRP, dBm	EIRP, mW
2405.000000	2405.400000	51.77	33.20	+2.6	-7.7	0.169
2435.000000	2435.750000	53.51	33.30	+2.8	-5.6	0.275
2480.000000	2480.880000	54.46	33.44	+2.6	-4.7	0.339



Supervised By:

David E. Lee, FCC Compliance Manager

Transmitter Radiated Measurements



Test Equipment

Asset (as applicable)	Description	s/n	Cycle <small>Per ANSI C63.4-1992/2000 Draft, 10.1.4</small>	Last Cal
(1) Transducer				
X i00088	EMCO 3109-B 25MHz-300MHz	2336	24 mo.	Sep-05
	i00065 EMCO 3301-B Active Monopole	2635	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.	Jan-04
(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
	i00048 HP 8566B	2511AD1467	12 mo.	Jun-05

Test Setup:

Radiated Emissions



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

g0610043: 2006-Jan-30 Mon 15:36:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C

Limit: 500uV/m @ 3m

Frequency Tuned, MHz	Frequency Emission, MHz	Level, dBuV/m @ 3m	Level, uV/m @ 3m
2405.000000	4809.865000	39.9	98.86
2445.000000	4890.015000	37.4	74.13
2480.000000	4960.021667	41.1	113.50
2405.000000	7215.210000	40.4	104.71
2445.000000	7335.305000	39.9	98.86
2480.000000	7440.210000	40.2	102.33
2405.000000	9620.415000	40.2	102.33
2445.000000	9779.795000	40.2	102.33
2480.000000	9920.463333	39.6	95.50
2405.000000	12024.940000	39.2	91.20
2445.000000	12225.150000	39.4	93.33
2480.000000	12399.925000	39.4	93.33
2405.000000	14429.903333	42.9	139.64
2445.000000	14670.015000	43.1	142.89
2480.000000	14879.830000	44.4	165.96
2405.000000	16835.065000	44.9	175.79
2445.000000	17115.430000	42.1	127.35
2480.000000	17359.961667	42.4	131.83
2405.000000	19240.155000	42.6	134.90
2445.000000	19559.983333	43.1	142.89
2480.000000	19840.233333	42.7	136.46
2405.000000	21645.031667	44.2	162.18
2405.000000	25007.858333	45.2	181.97



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

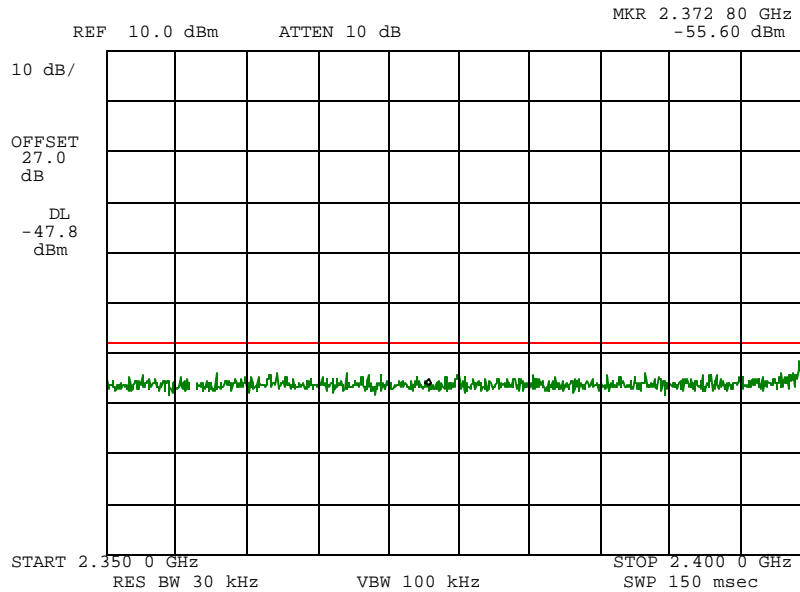
Attached



Supervised By:

David E. Lee, FCC Compliance Manager

Name of Test: Emission at Band Edges (Conducted)
g0610026: 2006-Jan-25 Wed 09:22:00
State: 2:High Power



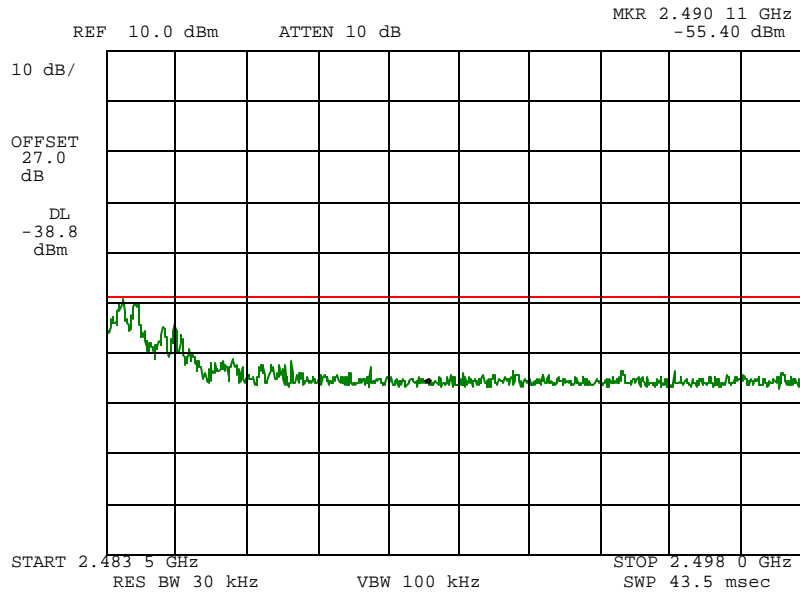
Power:
Modulation:

LOOSE COUPLED
LOWER BAND EDGE
-57.8dBc

Supervised By:

David E. Lee, FCC Compliance Manager

Name of Test: Emission at Band Edges (Conducted)
g0610025: 2006-Jan-25 Wed 09:20:00
State: 2:High Power



Power:
Modulation:

LOOSE COUPLED
UPPER BAND EDGE
-48.8dBc

Supervised By:

David E. Lee, FCC Compliance Manager

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 Bandwidth, kHz	= 2930
Results	= Attached



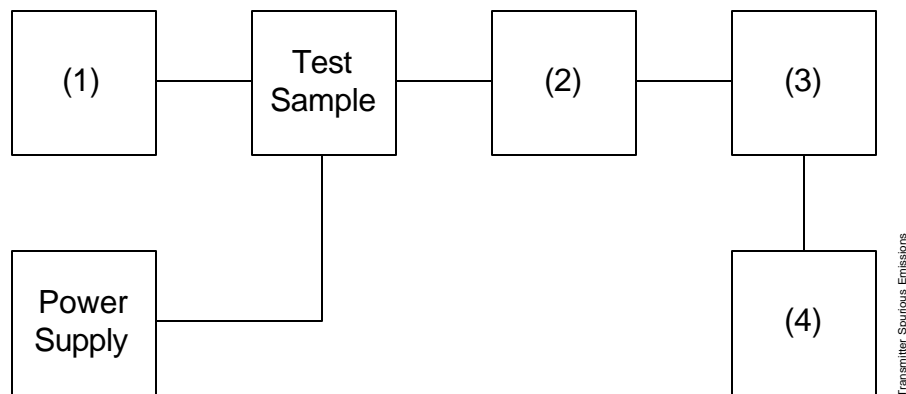
Supervised By:

David E. Lee, FCC Compliance Manager

Transmitter Spurious Emission

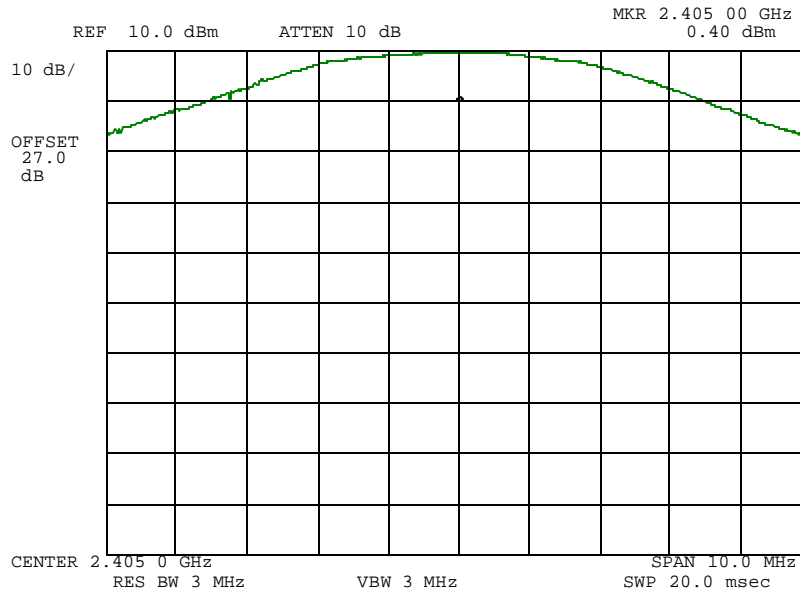
Test A. Occupied Bandwidth (In-Band Spurious)

Test B. Out-of-Band Spurious



Asset (as applicable)	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	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)
g0610021: 2006-Jan-25 Wed 09:10:00
State: 2:High Power



Power:
Modulation:

LOOSE COUPLED
NONE
POWER REFERENCE

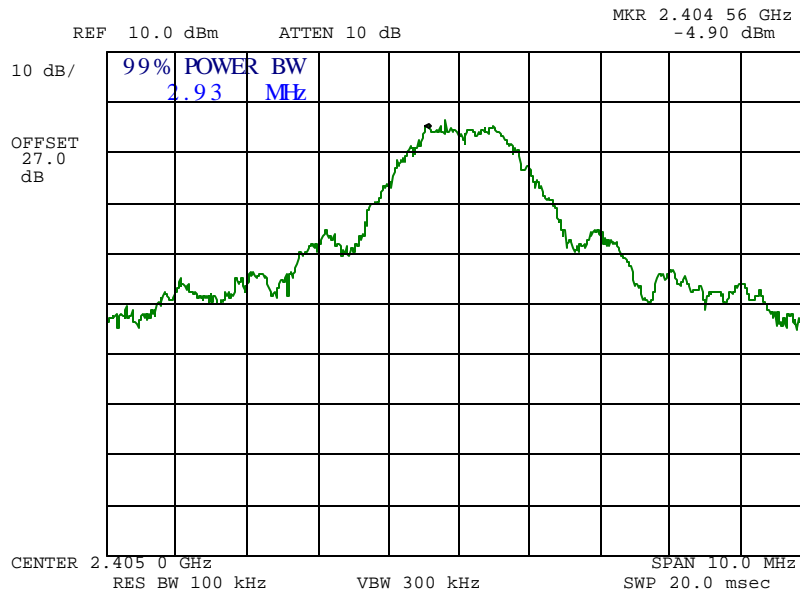
Supervised By:

David E. Lee, FCC Compliance Manager

Name of Test: Emission Masks (Occupied Bandwidth)

g0610022: 2006-Jan-25 Wed 09:14:00

State: 2:High Power



Power:
Modulation:

LOOSE COUPLED
LOW CHAN

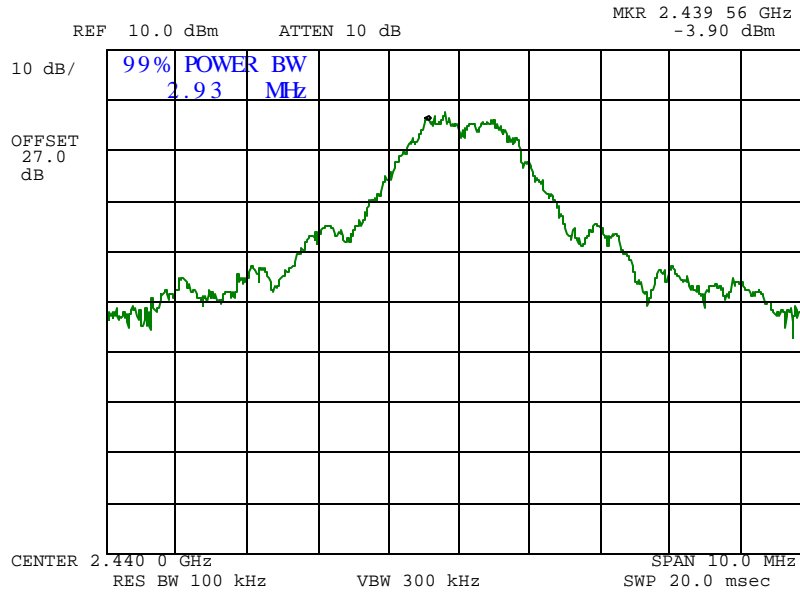
Supervised By:

David E. Lee, FCC Compliance Manager

Name of Test: Emission Masks (Occupied Bandwidth)

g0610023: 2006-Jan-25 Wed 09:16:00

State: 2:High Power



Power:
Modulation:

LOOSE COUPLED
MID CHAN

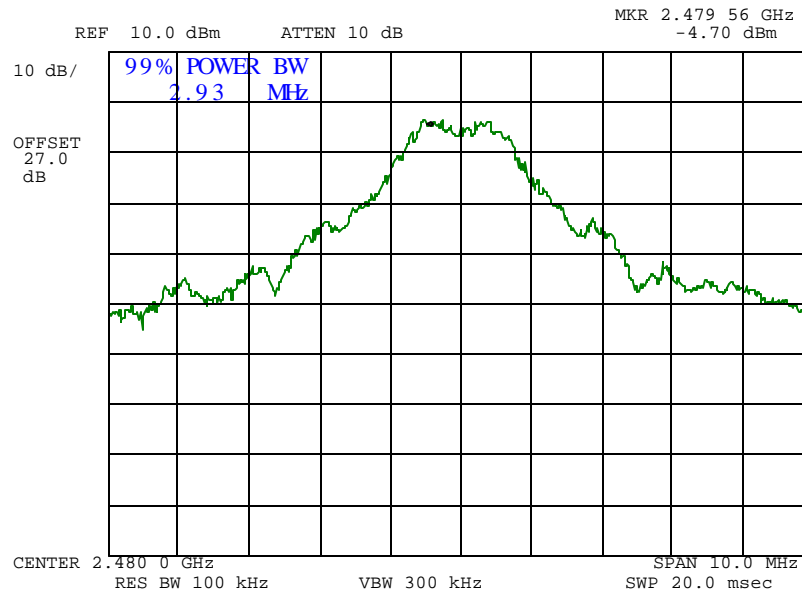
Supervised By:

David E. Lee, FCC Compliance Manager

Name of Test: Emission Masks (Occupied Bandwidth)

g0610024: 2006-Jan-25 Wed 09:18:00

State: 2:High Power



Power:
Modulation:

LOOSE COUPLED
HIGH CHAN

Supervised By:

David E. Lee, FCC Compliance Manager

Name of Test: Spread Spectrum Technology
Direct Sequence Systems

15.247(a)(2) Minimum 6 dB Bandwidth

Results: Please see results for "Allowed Occupied Bandwidth"

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
2405.000	-36.90	-2.10	-10.10
2437.000	-38.40	-3.60	-11.60
2480.000	-35.76	-0.96	-8.96

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

Pseudorandom Sequence Description

Results: See Applicant's statement



Supervised By:

David E. Lee, FCC Compliance Manager

Name of Test: Necessary Bandwidth and Emission Bandwidth

Specification: 47 CFR 2.202(g)

Modulation = GSPK

Necessary Bandwidth (Measured)

2.93MHz



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