MFA **M. Flom Associates, Inc. - Global Compliance Center**
3356 North San Marcos Place, Suite 107, Chandler, Arizona 85225-7176
www.mflom.com general@mflom.com (480) 926-3100, FAX: 926-3598

Transmitter Certification

of

FCC ID: FJ6-302395
Model: 302395

to

Federal Communications Commission

Rule Part(s) 15.247, Confidentiality

Date Of Report: February 16, 2004

On the Behalf of the Applicant:

Modular Mining Systems Inc

At the Request of:

P.O. Deposit Check #85258

Modular Mining Systems Inc
3289 East Hemisphere Loop
Tucson, AZ 85706-5028

Attention of:

(520) 806-9127; FAX: 889-5790 (Headquarters)
Les Zoschke, Vice President, Product Development
Email: zoschke@mmsi.com
Romer Johnson, Supervisor, Product Design
(520) 806-3603; FAX: 3344
Email: johnsonr@mmsi.com

Supervised By:

Morton Flom, P. Eng.

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

Applicant: Modular Mining Systems Inc

FCC ID: FJ6-302395

By Applicant:

1. Letter Of Authorization x

2. Identification Drawings
   - x ID Label
   - x Location Info
   - x Attestation Statement(S)
   - x Location of Compliance Statement

3. Documentation: 2.1033(B)

(3)	User Manual	x
(4)	Operational Description	x
(5)	Block Diagram	x
(5)	Schematic Diagram	x
(7)	External Photographs	x
	Internal Photographs	x
	Parts List	x
	Tune Up Info	x
	Active Devices	

4. Draft Specification Information x

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.

Table Of Contents

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: d0420032

d) Client: Modular Mining Systems Inc
3289 East Hemisphere Loop
Tucson, AZ 85706-5028

e) Identification: 302395
FCC ID: FJ6-302395
S/N: Prototype
Description: 802.11b Unit

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

g) Report Date: February 16, 2004
EUT Received:

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:

Morton Flom, P. Eng.

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, Confidentiality

Sub-Part 2.1033
(c)(1): **Name and Address of Applicant**:

Modular Mining Systems Inc
3289 East Hemisphere Loop
Tucson, AZ 85706-5028

Manufacturer:
Applicant

(c)(2): **FCC ID**: FJ6-302395

Model Number: 302395

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

Please See Attached Exhibits

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

(c)(5): **FREQUENCY RANGE, MHz**: 2412 to 2454

(c)(6): **Power Rating, W**: 0.361 EIRP to 0.380 EIRP
____ Switchable ____ Variable _x_ N/A

(c)(7): **Maximum Power Rating, W**: 1 Watt, Peak

15.203: **Antenna Requirement**:
____ The antenna is permanently attached to the EUT
____ The antenna uses a unique coupling
_x_ 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	=	0.475
Collector Voltage, Vdc	=	8
Supply Voltage, Vdc	=	24

(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

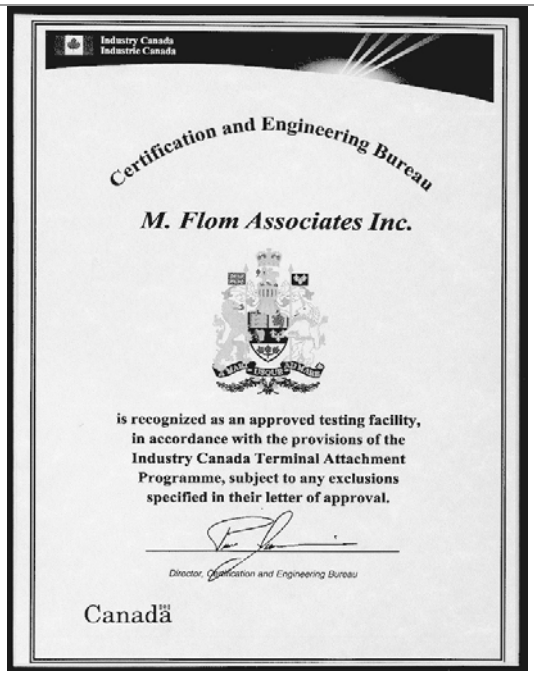
(c)(13): **Digital Modulation Description**:

___ Attached Exhibits
_x_ N/A

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

Follows

Industry Canada



Industry Canada
Industrie Canada

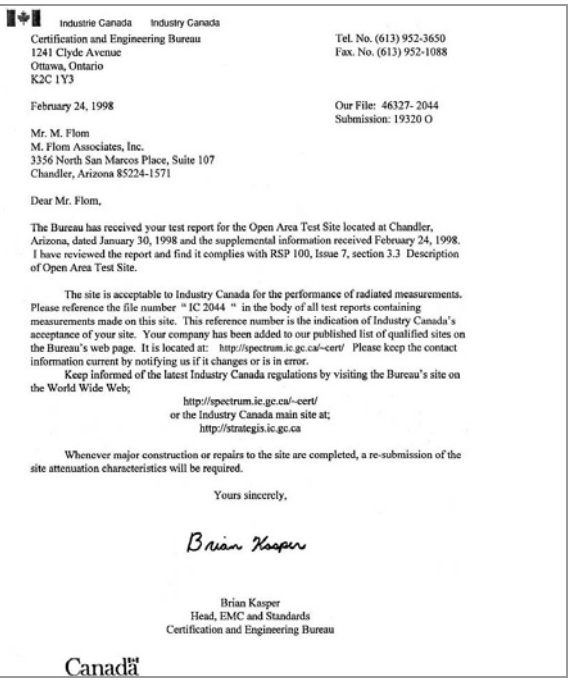
Certification and Engineering Bureau

M. Flom Associates Inc.

is recognized as an approved testing facility, in accordance with the provisions of the Industry Canada Terminal Attachment Programme, subject to any exclusions specified in their letter of approval.

Director, Certification and Engineering Bureau

Canada



Industrie Canada Industry Canada

Certification and Engineering Bureau
1241 Clyde Avenue
Ottawa, Ontario
K2C 1Y3

Tel. No. (613) 952-3650
Fax. No. (613) 952-1088

February 24, 1998

Our File: 46327- 2044
Submission: 19320 O

Mr. M. Flom
M. Flom Associates, Inc.
3356 North San Marcos Place, Suite 107
Chandler, Arizona 85224-1571

Dear Mr. Flom,

The Bureau has received your test report for the Open Area Test Site located at Chandler, Arizona, dated January 30, 1998 and the supplemental information received February 24, 1998. I have reviewed the report and find it complies with RSP 100, Issue 7, section 3.3 Description of Open Area Test Site.

The site is acceptable to Industry Canada for the performance of radiated measurements. Please reference the file number " IC 2044 " in the body of all test reports containing measurements made on this site. This reference number is the indication of Industry Canada's acceptance of your site. Your company has been added to our published list of qualified sites on the Bureau's web page. It is located at: http://spectrum.ic.gc.ca/~cert/ Please keep the contact information current by notifying us if it changes or is in error.

Keep informed of the latest Industry Canada regulations by visiting the Bureau's site on the World Wide Web;

http://spectrum.ic.gc.ca/~cert/
or the Industry Canada main site at;
http://strategis.ic.gc.ca

Whenever major construction or repairs to the site are completed, a re-submission of the site attenuation characteristics will be required.

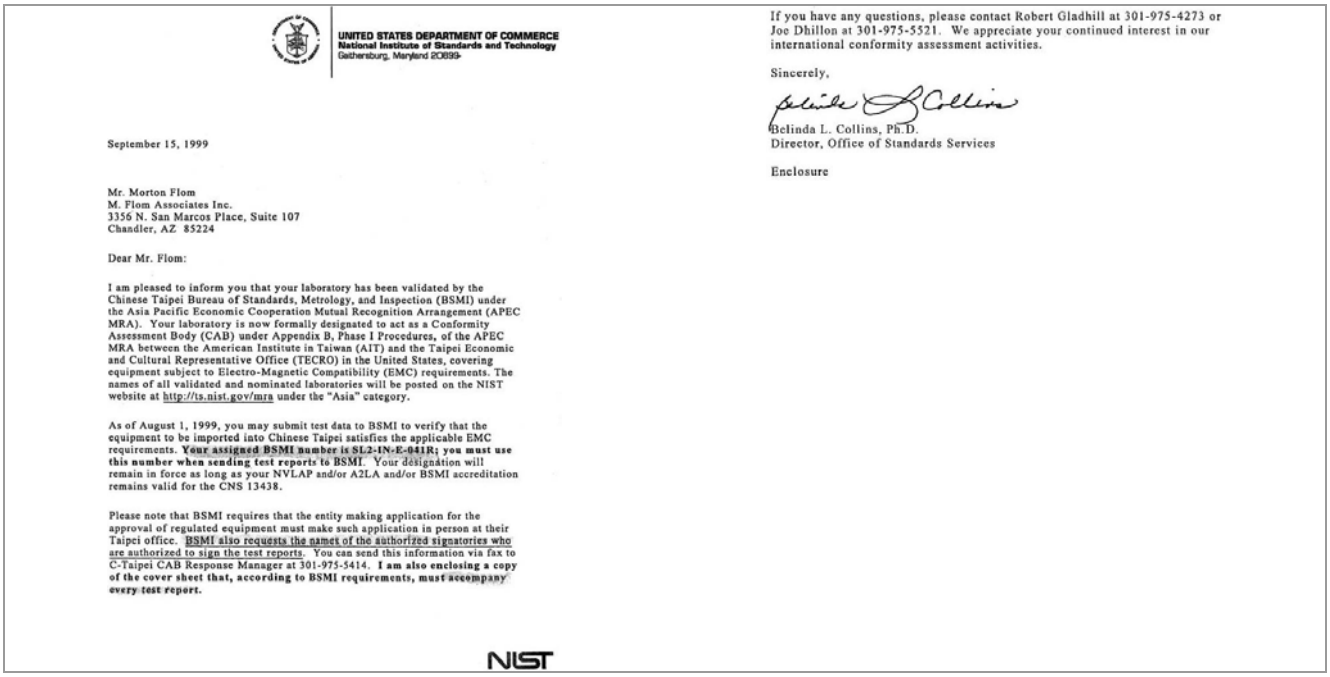
Yours sincerely,

Brian Kasper

Brian Kasper
Head, EMC and Standards
Certification and Engineering Bureau

Canada

NIST



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 85224

Dear Mr. Flom:

I am pleased to inform you that your laboratory has been validated by the Chinese Taipei Bureau of Standards, Metrology, and Inspection (BSMI) under the Asia Pacific Economic Cooperation Mutual Recognition Arrangement (APEC MRA). Your laboratory is now formally designated 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 that the equipment to be imported into Chinese Taipei satisfies the applicable EMC requirements. **Your assigned BSMI number is SL2-IN-E-041R; you must use this number when sending test reports to BSMI.** Your designation will remain in force as long as your NVLAP and/or A2LA and/or BSMI accreditation remains valid for the CNS 13438.

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 requests the names of the authorized signatories who are authorized to sign the test reports. You can send this information via fax to C-Taipei CAB Response Manager at 301-975-5414. **I am also enclosing a copy of the cover sheet that, according to BSMI requirements, must accompany every test report.**

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

Sincerely,

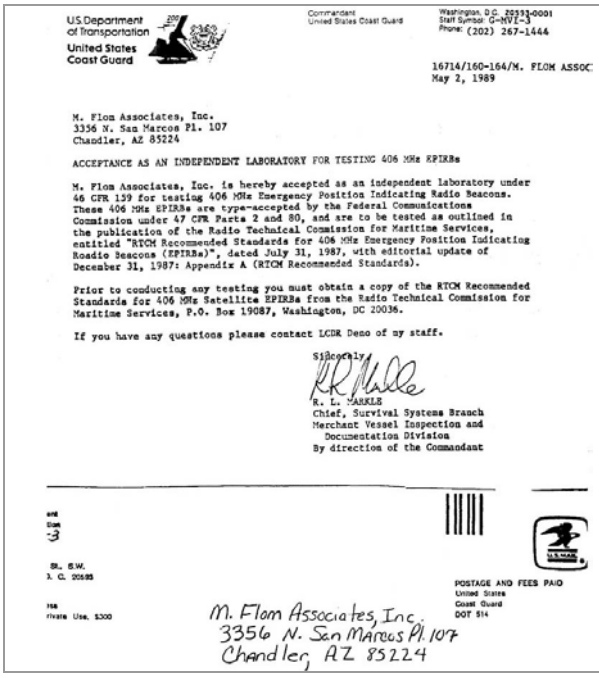
Belinda L. Collins, Ph.D.
Director, Office of Standards Services

Enclosure

NIST

Page Number 5 of 32.

U.S. Coast Guard



U.S. Department of Transportation
United States Coast Guard

Commandant
United States Coast Guard

Washington, D.C. 20593-0001
Staff Symbol: G-MVI-3
Phone: (202) 267-1444

16714/160-164/M. FLOM ASSOC
May 2, 1989

M. Flom Associates, Inc.
3356 N. San Marcos Pl. 107
Chandler, AZ 85224

ACCEPTANCE AS AN INDEPENDENT LABORATORY FOR TESTING 406 MHz EPIRBs

M. Flom Associates, Inc. is hereby accepted as an independent laboratory under 46 CFR 159 for testing 406 MHz Emergency Position Indicating Radio Beacons. These 406 MHz EPIRBs are type-accepted by the Federal Communications Commission under 47 CFR Parts 2 and 80, and are to be tested as outlined in the publication of the Radio Technical Commission for Maritime Services, entitled "RTCM Recommended Standards for 406 MHz Emergency Position Indicating Roadio Beacons (EPIRBs)", dated July 31, 1987, with editorial update of December 31, 1987: Appendix A (RTCM Recommended Standards).

Prior to conducting any testing you must obtain a copy of the RTCM Recommended Standards for 406 MHz Satellite EPIRBs from the Radio Technical Commission for Maritime Services, P.O. Box 19087, Washington, DC 20036.

If you have any questions please contact LCDR Deno of my staff.

Sincerely,

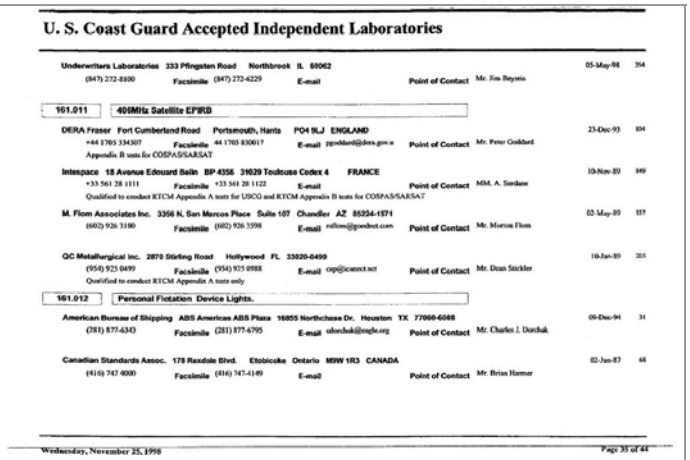
R. L. MARKLE
Chief, Survival Systems Branch
Merchant Vessel Inspection and
Documentation Division
By direction of the Commandant

St., S.W.
). C. 20593

ate
rivate Use, $300

POSTAGE AND FEES PAID
United States
Coast Guard
DOT 514

M. Flom Associates, Inc.
3356 N. San Marcos Pl. 107
Chandler, AZ 85224



U. S. Coast Guard Accepted Independent Laboratories

Underwriters Laboratories 333 Pfingsten Road Northbrook IL 60062 — 05-May-98 — 354
(847) 272-8800 Facsimile (847) 272-6229 E-mail Point of Contact Mr. Jim Beyrau

161.011 406MHz Satellite EPIRB

DERA Fraser Fort Cumberland Road Portsmouth, Hants PO4 9LJ ENGLAND — 23-Dec-93 — 104
+44 1705 334307 Facsimile 44 1705 830017 E-mail jrgoddard@dera.gov.u Point of Contact Mr. Peter Goddard
Appendix B tests for COSPAS/SARSAT

Intespace 18 Avenue Edouard Belin BP 4356 31029 Toulouse Cedex 4 FRANCE — 10-Nov-89 — 149
+33 561 28 1111 Facsimile +33 561 28 1122 E-mail Point of Contact MM. A. Serdane
Qualified to conduct RTCM Appendix A tests for USCG and RTCM Appendix B tests for COSPAS/SARSAT

M. Flom Associates Inc. 3356 N. San Marcos Place Suite 107 Chandler AZ 85234-1571 — 02-May-89 — 157
(602) 926 3100 Facsimile (602) 926 3598 E-mail mflom@goodnet.com Point of Contact Mr. Morton Flom

QC Metallurgical Inc. 2870 Stirling Road Hollywood FL 33020-6499 — 16-Jan-89 — 205
(954) 925 0499 Facsimile (954) 925 0988 E-mail qcp@icanect.net Point of Contact Mr. Dean Stickler
Qualified to conduct RTCM Appendix A tests only

161.012 Personal Flotation Device Lights.

American Bureau of Shipping ABS Americas ABS Plaza 16855 Northchase Dr. Houston TX 77060-6008 — 09-Dec-94 — 31
(281) 877-6343 Facsimile (281) 877-6795 E-mail odorchak@eagle.org Point of Contact Mr. Charles J. Dorchak

Canadian Standards Assoc. 178 Rexdale Blvd. Etobicoke Ontario M9W 1R3 CANADA — 02-Jun-87 — 68
(416) 747 4000 Facsimile (416) 747-4149 E-mail Point of Contact Mr. Brian Harmer

Wednesday, November 25, 1998 Page 35 of 44

Page Number 6 of 32.

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 C63.4-1992/2000, 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.

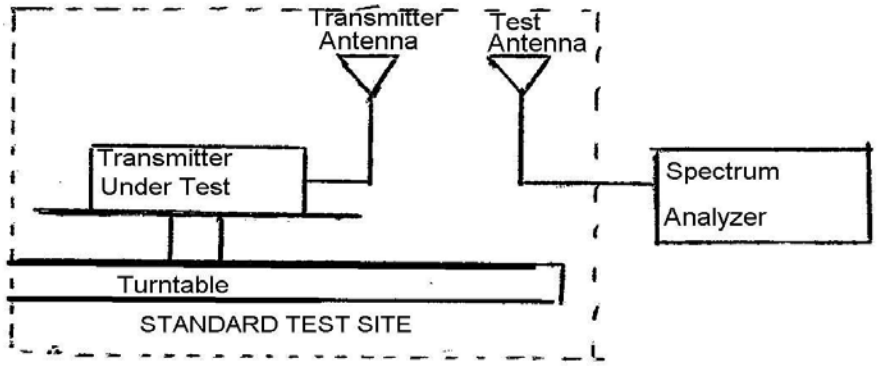
Page Number 8 of 32.

Name of Test: EIRP Carrier Power (Radiated)

Specification: TIA/EIA 603A (Substitution Method)

2.2.17.1 Definition: The average radiated power of a licensed device is the equivalent power required, when delivered to a half-wave dipole or horn antenna, to produce at a distant point the same average received power as produced by the licensed device.

2.2.17.2 Method of Measurement:
a) Connect the equipment as illustrated. Place the transmitter to be tested on the turntable in the standard test site.



b) Raise and lower the test antenna from 1m to 6 m with the transmitter facing the antenna and record the highest received signal in dB as LVL.

c) Repeat step b) for seven additional readings at 45° interval positions of the turntable.

d) Replace the transmitter under test with a half-wave or horn vertically polarized antenna. The center of the antenna should be at the same location as the transmitter under test. Connect the antenna to a signal generator with a known output power and record the path loss in dB or LOSS.

e) Calculate the average radiated output power from the readings in step c) and d) by the following:

average radiated power = $10 \log_{10} \Sigma\, 10(LVL - LOSS)/10$ (dBm)

Measurements attached.

Page Number 9 of 32.

Name of Test: EIRP Carrier Power (Radiated)

2.5 dbi OMNI Antenna Results

	2412 MHz		2437 MHz		2462 MHz	
	LVL, dbm	Path Loss, db	LVL, dbm	Path Loss, db	LVL, dbm	Path Loss, db
0°	20.7	2.6	20.6	2.6	18.4	2.6
45°	22.0	2.6	21.9	2.6	19.0	2.6
90°	20.2	2.6	20.6	2.6	19.2	2.6
135°	20.4	2.6	20.9	2.6	19.2	2.6
180°	20.1	2.6	22.3	2.6	19.7	2.6
225°	18.8	2.6	22.1	2.6	20.7	2.6
270°	18.7	2.6	20.6	2.6	20.2	2.6
315°	21.0	2.6	21.1	2.6	19.0	2.6

	2412 MHz	2437 MHz	2462 MHz
Av. Radiated Power:	22.84 dbm	23.86 dbm	22.03 dbm

6 dbi Stubby Antenna Results

	2412 MHz		2437 MHz		2462 MHz	
	LVL, dbm	Path Loss, db	LVL, dbm	Path Loss, db	LVL, dbm	Path Loss, db
0°	26.1	2.6	25.3	2.6	22.0	2.6
45°	27.6	2.6	24.4	2.6	24.0	2.6
90°	26.2	2.6	24.6	2.6	23.2	2.6
135°	25.9	2.6	24.7	2.6	23.4	2.6
180°	27.2	2.6	26.1	2.6	22.1	2.6
225°	27.0	2.6	25.6	2.6	22.4	2.6
270°	26.3	2.6	24.8	2.6	21.6	2.6
315°	25.7	2.6	25.5	2.6	21.9	2.6

	2412 MHz	2437 MHz	2462 MHz
Av. Radiated Power:	29.1 dbm	27.73 dbm	25.18 dbm

10 dbi Antenna Results

	2412 MHz		2437 MHz		2462 MHz	
	LVL, dbm	Path Loss, db	LVL, dbm	Path Loss, db	LVL, dbm	Path Loss, db
0°	10.4	2.6	11.7	2.6	6.2	2.6
45°	13.4	2.6	12.6	2.6	15.3	2.6
90°	19.0	2.6	28.0	2.6	9.3	2.6
135°	27.6	2.6	29.2	2.6	27.1	2.6
180°	29.6	2.6	31.9	2.6	29.2	2.6
225°	31.8	2.6	16.0	2.6	25.0	2.6
270°	18.6	2.6	19.6	2.6	16.5	2.6
315°	10.7	2.6	11.3	2.6	8.4	2.6

	2412 MHz	2437 MHz	2462 MHz
Av. Radiated Power:	22.74 dbm	22.64 dbm	19.73 dbm

Page Number 10 of 32.

Name of Test: EIRP Carrier Power (Radiated)

13 dbi Antenna Results

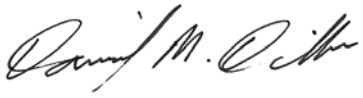
	2412 MHz		2437 MHz		2462 MHz	
	LVL, dbm	Path Loss, db	LVL, dbm	Path Loss, db	LVL, dbm	Path Loss, db
0°	4.7	2.6	6.2	2.6	4.4	2.6
45°	13.1	2.6	31.4	2.6	11.1	2.6
90°	24.1	2.6	31.8	2.6	29.8	2.6
135°	21.2	2.6	22.5	2.6	9.3	2.6
180°	29.7	2.6	30.3	2.6	27.8	2.6
225°	31.5	2.6	24.3	2.6	29.5	2.6
270°	14.0	2.6	11.2	2.6	22.8	2.6
315°	31.4	2.6	12.5	2.6	18.9	2.6

	2412 MHz	2437 MHz	2462 MHz
Av. Radiated Power:	23.81 dbm	23.88 dbm	21.8 dbm

24 dbi Directional Antenna Results

	2412 MHz		2437 MHz		2462 MHz	
	LVL, dbm	Path Loss, db	LVL, dbm	Path Loss, db	LVL, dbm	Path Loss, db
0°	14.3	2.6	10.7	2.6	4.9	2.6
45°	16.7	2.6	8.7	2.6	7.3	2.6
90°	38.6	2.6	11.1	2.6	8.7	2.6
135°	17.7	2.6	9.7	2.6	9.0	2.6
180°	16.1	2.6	36.8	2.6	10.2	2.6
225°	17.3	2.6	12.9	2.6	10.4	2.6
270°	14.8	2.6	10.1	2.6	7.7	2.6
315°	19.2	2.6	9.8	2.6	36.4	2.6

	2412 MHz	2437 MHz	2462 MHz
Av. Radiated Power:	21.94 dbm	16.33 dbm	14.43 dbm



Performed By: Daniel M. Dillon, Test Engineer

Page Number 11 of 32.

Test Setup: Radiated Emissions

Page Number 12 of 32.

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,$T_1T_2T_3$
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:

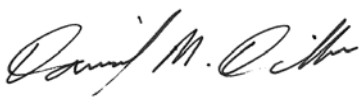
$$E\ \mu V/m\ @\ 3\ m = LOG_{10}^{-1}(dBm + 107 + A.F. + C.L.)$$

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
g0410137: 2004-Jan-26 Mon 10:19:00
State: 2:High Power

Frequency Tuned, MHz	Frequency Emission, MHz	EIRP, dBm	EIRP, dBc
2412.000000	4823.946667	-31.7	≤ -57.7
2437.000000	4874.483333	-34.7	≤ -57.7
2462.000000	4924.040000	-34	≤ -57.7
2412.000000	7235.593334	-33.6	≤ -57.7
2437.000000	7310.906667	-34.4	≤ -57.7
2462.000000	7385.006667	-32.5	≤ -57.7
2412.000000	9648.216667	-25	≤ -57.7
2437.000000	9747.906667	-31.3	≤ -57.7
2462.000000	9848.373333	-29.3	≤ -57.7
2412.000000	12060.216667	-39.9	≤ -57.7
2437.000000	12184.906667	-41.4	≤ -57.7
2462.000000	12310.373333	-41.3	≤ -57.7
2412.000000	14472.216667	-41.9	≤ -57.7
2437.000000	14621.906667	-43.3	≤ -57.7
2462.000000	14772.373333	-36.7	≤ -57.7
2412.000000	16884.216667	-47.8	≤ -57.7
2437.000000	17058.906667	-48.1	≤ -57.7
2462.000000	17234.373333	-46.1	≤ -57.7



Performed By: Daniel M. Dillon, Test Engineer

Page Number 14 of 32.

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 dBμV
1 MHz RBW, 1 MHz VBW	= 12 dBμV
1 MHz RBW, 10 Hz VBW	= 3 dBμV

Above 2 GHz:

1 MHz RBW, 1 MHz VBW	= 33 dBμV
1 MHz RBW, 10 Hz VBW	= 22 dBμV

Sensitivity of system with preamps:

Below 2 GHz:

Preamps are not used in this range.

Above 2 GHz:

Peak	= 3 dBμV
Average	= -8 dBμV

Cable Loss:

915 MHz	= -0.8 dBμV
2450 MHz	= -3 dBμV

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.

Performed By: Daniel M. Dillon, Test Engineer

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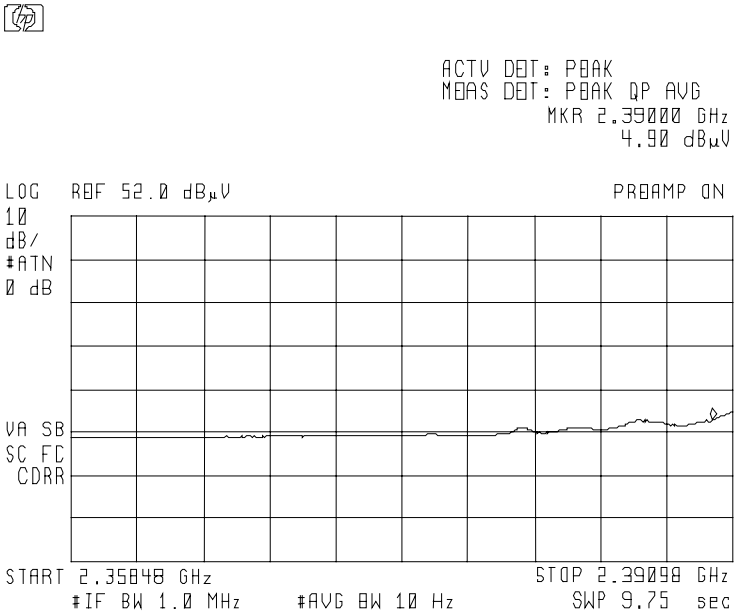
Name of Test: Restricted Bands of Operation

g0410153: 2004-Jan-27 Tue 13:52:00



Power: HIGH
Modulation: Low Side
Restricted Band 2390

Performed By: Daniel M. Dillon, Test Engineer

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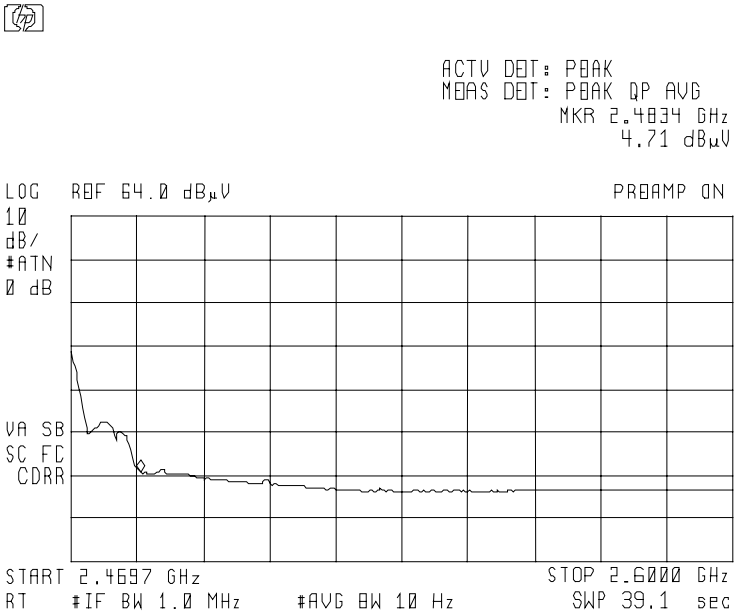
Name of Test: Restricted Bands of Operation

g0410154: 2004-Jan-27 Tue 14:04:00



Power: HIGH
Modulation: High Side
Restricted Band

Performed By: Daniel M. Dillon, Test Engineer

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Name of Test: Restricted Bands of Operation

g0410152: 2004-Jan-27 Tue 13:04:00
State: 2:Restricted Band, Low Side

Frequency Tuned, MHz	Frequency Emission, MHz	EIRP, dBm	EIRP, dbc
2412.000000	2361.730000	-46.7	≤ -68
2412.000000	2364.980000	-46.5	≤ -68
2412.000000	2368.230000	-46.3	≤ -68
2412.000000	2371.480000	-46.2	≤ -68
2412.000000	2374.810000	-46	≤ -68
2412.000000	2377.980000	-45.8	≤ -68
2412.000000	2381.230000	-45.1	≤ -68
2412.000000	2384.390000	-44.6	≤ -68
2412.000000	2387.730000	-43.3	≤ -68
2412.000000	2390.000000	-42	≤ -68

g0410154: 2004-Jan-27 Tue 13:52:00
State: 2:Restricted Band, High Side

Frequency Tuned, MHz	Frequency Emission, MHz	EIRP, dBm	EIRP, dbc
2462.000000	2483.400000	-41.8	≤ -67.7
2462.000000	2487.000000	-41.7	≤ -67.7
2462.000000	2495.800000	-43.1	≤ -67.7
2462.000000	2508.800000	-44.4	≤ -67.7
2462.000000	2521.800000	-45.6	≤ -67.7
2462.000000	2534.900000	-45.8	≤ -67.7
2462.000000	2547.900000	-45.7	≤ -67.7
2462.000000	2560.900000	-45.6	≤ -67.7
2462.000000	2573.900000	-45.5	≤ -67.7
2462.000000	2587.000000	-45.3	≤ -67.7

Performed By: Daniel M. Dillon, Test Engineer

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Name of Test: Allowed Occupied Bandwidth

Specification: 47 CFR 15.247(a)(2)

Test Equipment: As per attached page

Limits

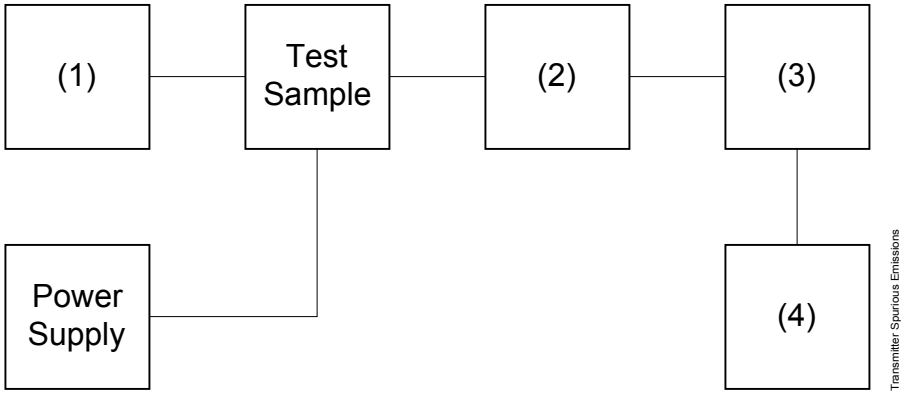
Rule	Type	BANDS (MHz)	LIMIT (kHz)
15.247(a)(1)(i)	F.H.	902-928	20 dB BW ≤ 500
15.247(a)(1)(ii)	F.H.	2400-2483.5, 5725-5850	20 dB BW ≤ 1000
15.247(a)(2)	D.S.	ALL	6 dB BW ≥ 500

Measurement Data

Measured Bandwidth, kHz = 17.68×10^3
Results = Attached

Transmitter Spurious Emission

Test A. Occupied Bandwidth (In-Band Spurious)
Test B. Out-of-Band Spurious



	Asset	Description	s/n
(1) **Audio Oscillator/Generator**			
X	i00017	HP 8903A Audio Analyzer	2216A01753
	i00002	HP 3336B Synthesizer / Level Gen.	1931A01465
(2) **Coaxial Attenuator**			
X	i00231/2	PASTERNACK PE7021-30 (30 dB)	231 or 232
	i0012/3	NARDA 766 (10 dB)	7802 or 7802A
(3) **Filters; Notch, HP, LP, BP**			
	i00126	Eagle TNF-1 Notch Filter	100-250
	i00125	Eagle TNF-1 Notch Filter	50-60
	i00124	Eagle TNF-1 Notch Filter	250-850
(4) **Spectrum Analyzer**			
X	i00048	HP 8566B Spectrum Analyzer	2511A01467
	i00029	HP 8563E Spectrum Analyzer	3213A00104

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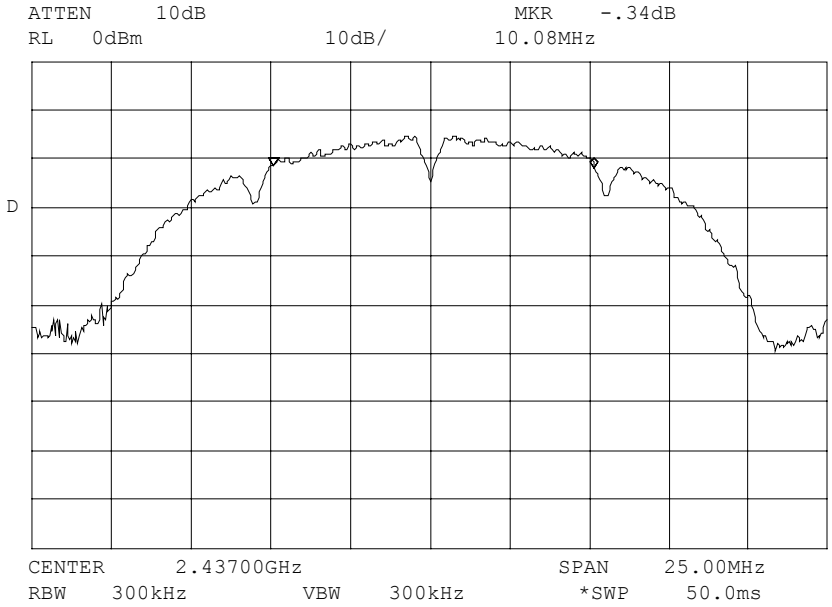
Name of Test: Emission Masks (Occupied Bandwidth)
g0410157: 2004-Jan-27 Tue 15:41:00
State: 2:High Power



Power: HIGH
Modulation: 1 MB/SEC PSEUDO RANDOM DATA
6 DB BANDWIDTH

Performed By: Daniel M. Dillon, Test Engineer

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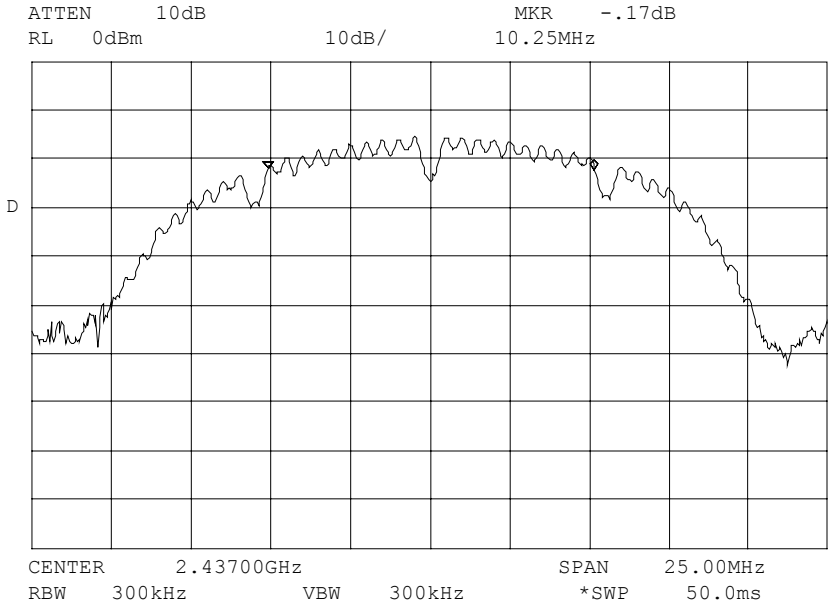
Name of Test: Emission Masks (Occupied Bandwidth)
g0410158: 2004-Jan-27 Tue 15:43:00
State: 2:High Power



Power: HIGH
Modulation: 2 MB/SEC PSEUDO RANDOM DATA
6 DB BANDWIDTH

Performed By: Daniel M. Dillon, Test Engineer

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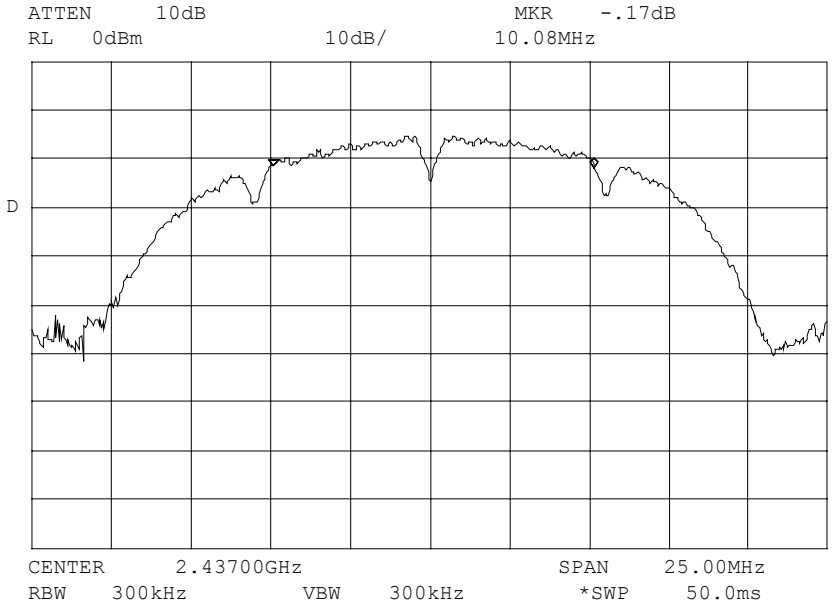
Name of Test: Emission Masks (Occupied Bandwidth)
g0410159: 2004-Jan-27 Tue 15:45:00
State: 2:High Power



Power: HIGH
Modulation: 5.5 MB/SEC PSEUDO RANDOM DATA
6 DB BANDWIDTH

Performed By: Daniel M. Dillon, Test Engineer

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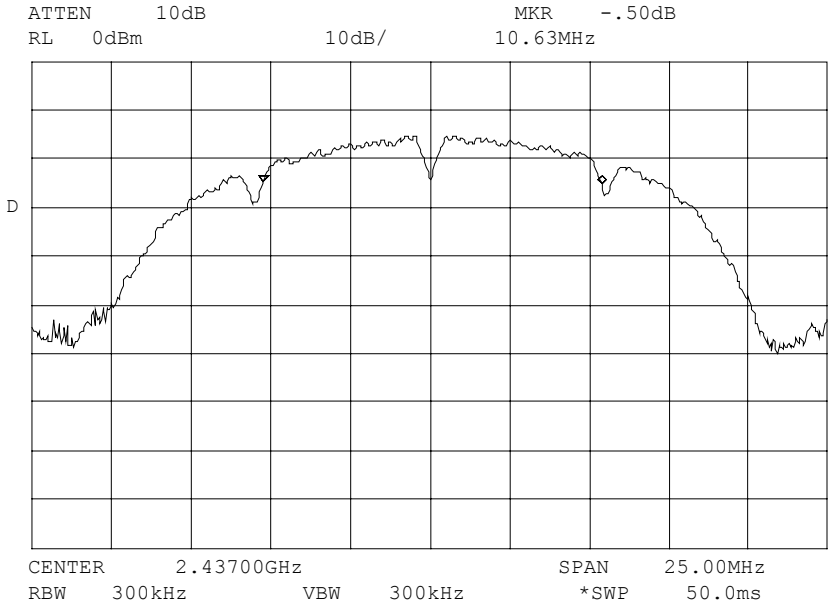
Name of Test: Emission Masks (Occupied Bandwidth)
g0410160: 2004-Jan-27 Tue 15:47:00
State: 2:High Power



Power: HIGH
Modulation: 11 MB/SEC PSEUDO RANDOM DATA
6 DB BANDWIDTH

Performed By: Daniel M. Dillon, Test Engineer

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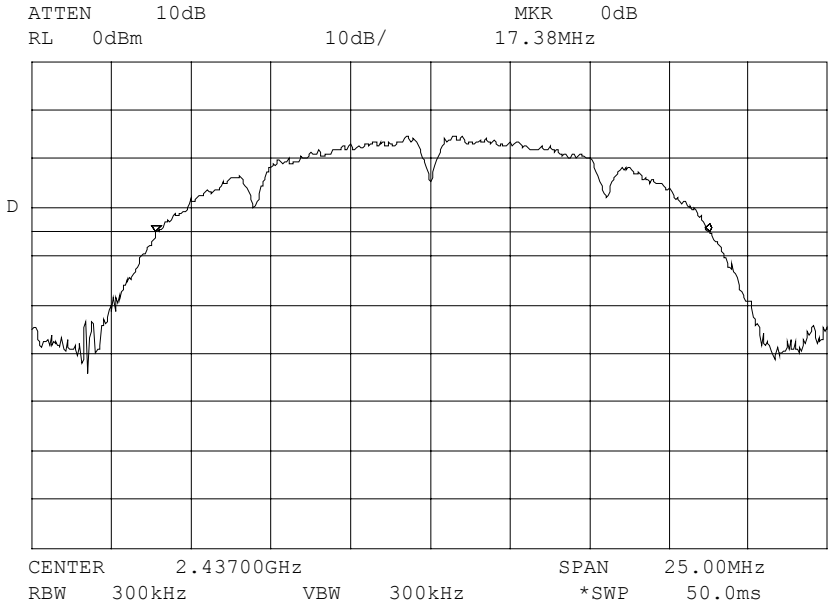
Name of Test: Emission Masks (Occupied Bandwidth)
g0410164: 2004-Jan-27 Tue 15:58:00
State: 2:High Power



Power: HIGH
Modulation: 1 MB/SEC PSEUDO RANDOM DATA
20 DB BANDWIDTH

Performed By: Daniel M. Dillon, Test Engineer

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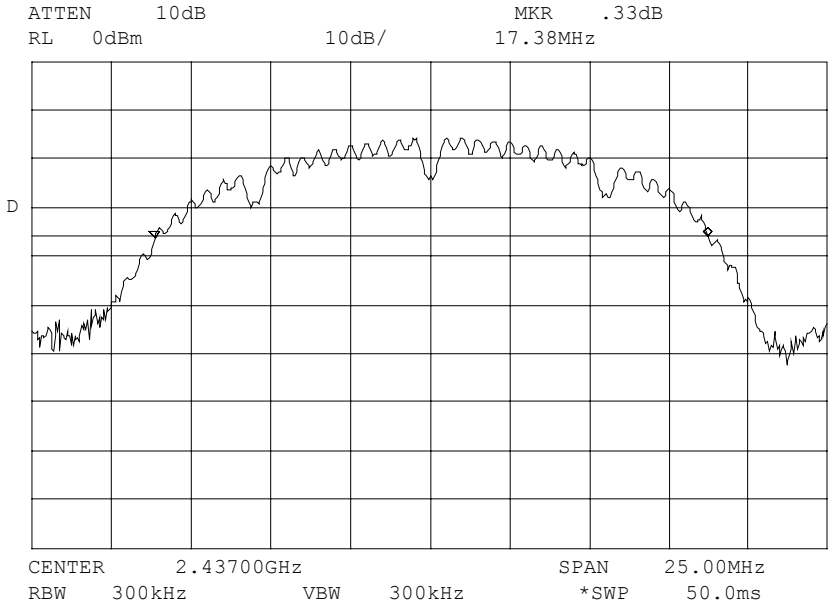
Name of Test: Emission Masks (Occupied Bandwidth)
g0410163: 2004-Jan-27 Tue 15:56:00
State: 2:High Power



Power: HIGH
Modulation: 2 MB/SEC PSEUDO RANDOM DATA
20 DB BANDWIDTH

Performed By: Daniel M. Dillon, Test Engineer

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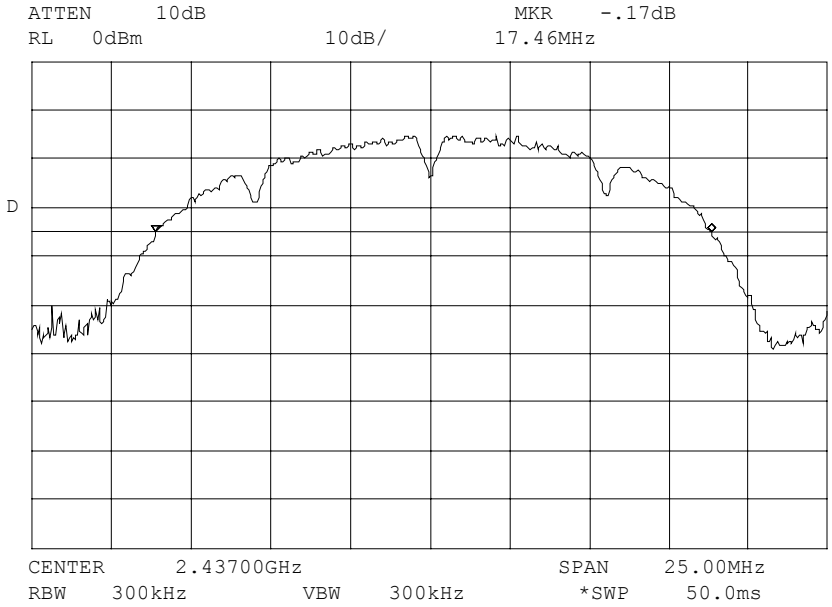
Name of Test: Emission Masks (Occupied Bandwidth)
g0410162: 2004-Jan-27 Tue 15:54:00
State: 2:High Power



Power: HIGH
Modulation: 5.5 MB/SEC PSEUDO RANDOM DATA
20 DB BANDWIDTH

Performed By: Daniel M. Dillon, Test Engineer

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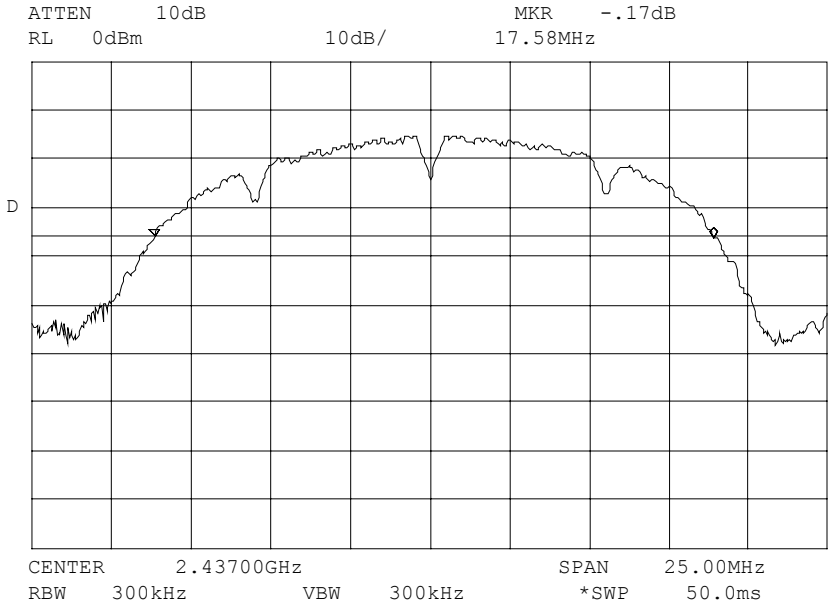
Name of Test: Emission Masks (Occupied Bandwidth)
g0410161: 2004-Jan-27 Tue 15:51:00
State: 2:High Power



Power: HIGH
Modulation: 11 MB/SEC PSEUDO RANDOM DATA
20 DB BANDWIDTH

Performed By: Daniel M. Dillon, Test Engineer

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 that 8 dBm in any 3 kHz Bandwidth within these bands.
Results: Please see attached plots.
Transmitter Power Density, dBm = ≤ -0.5

15.247(e) Processing Gain
Limit: The processing gain shall be ≥ 10 dB
Results: See Applicant's statement
Processing Gain, dB = N/A

Psuedorandom Sequence Description
Results: See Applicant's statement

Chip Rate
Results: See Manual

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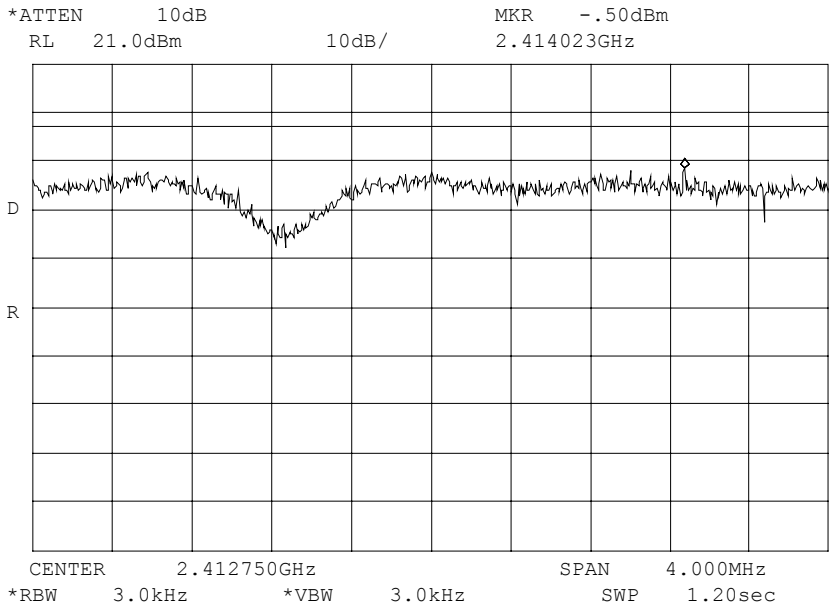
Name of Test: Spectrum Analyzer plots indicating Transmitter Power Density

g0410165: 2004-Jan-28 Wed 08:47:00
State: 2:High Power



Power: HIGH
Modulation: 1 MB/SEC PSEUDO RANDOM DATA
SPECTRAL POWER DENSITY

Performed By: Daniel M. Dillon, Test Engineer

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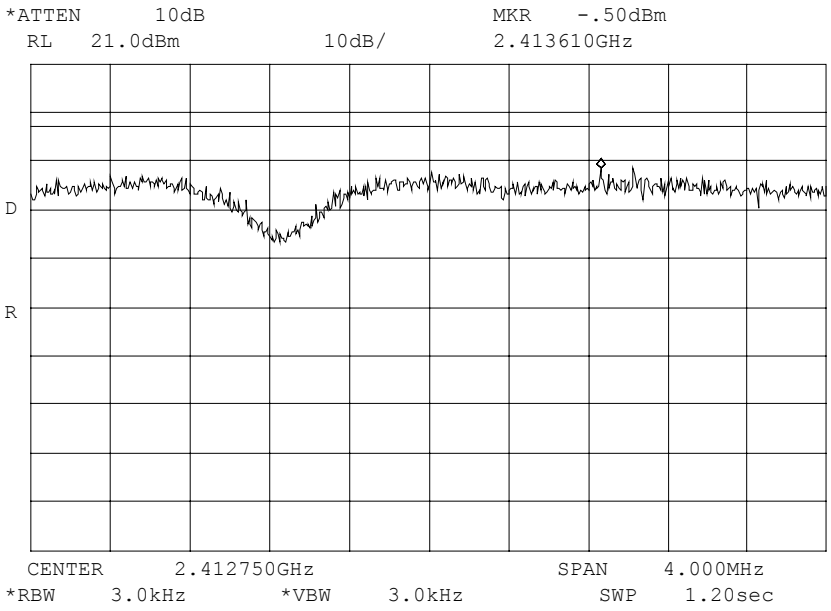
Name of Test: Spectrum Analyzer plots indicating Transmitter Power Density

g0410166: 2004-Jan-28 Wed 08:48:00
State: 2:High Power



Power: HIGH
Modulation: 2 MB/SEC PSEUDO RANDOM DATA
SPECTRAL POWER DENSITY

Performed By: Daniel M. Dillon, Test Engineer

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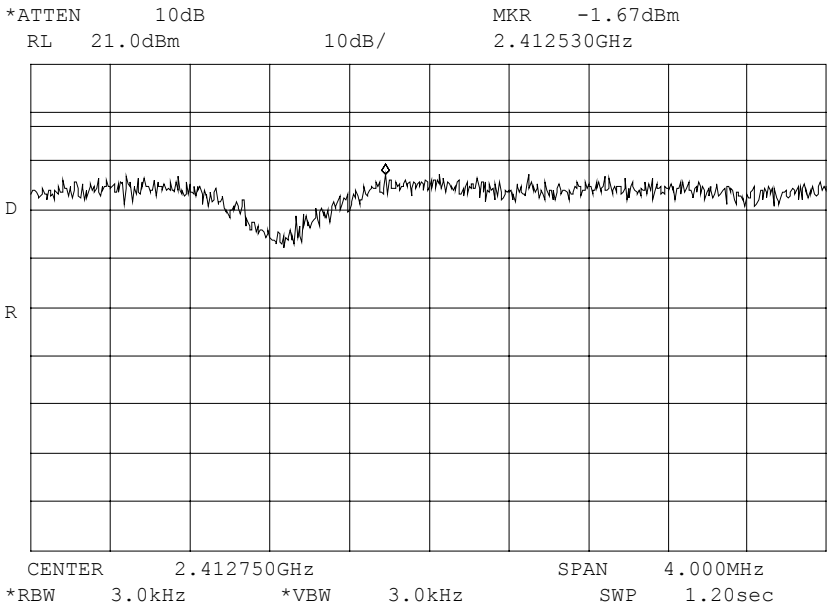
Name of Test: Spectrum Analyzer plots indicating Transmitter Power Density

g0410167: 2004-Jan-28 Wed 08:50:00
State: 2:High Power



Power: HIGH
Modulation: 5.5 MB/SEC PSEUDO RANDOM DATA SPECTRAL POWER DENSITY

Performed By: Daniel M. Dillon, Test Engineer

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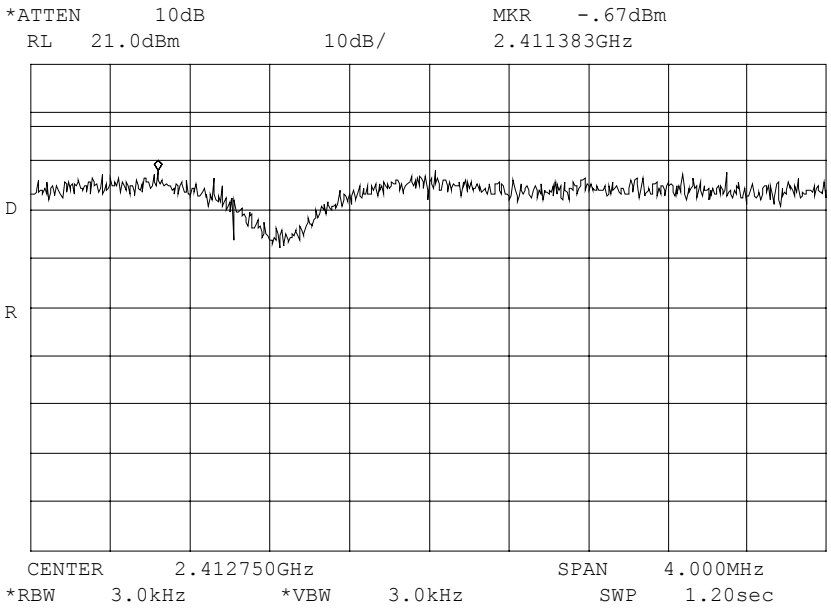
Name of Test: Spectrum Analyzer plots indicating Transmitter Power Density

g0410168: 2004-Jan-28 Wed 08:51:00
State: 2:High Power



Power: HIGH
Modulation: 11 MB/SEC PSEUDO RANDOM DATA
SPECTRAL POWER DENSITY

Performed By: Daniel M. Dillon, Test Engineer

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

All test instrumentation is calibrated every January and every July. In addition, all test instrumentation is calibrated daily, or as required by the manufacturer. A Calibration Agreement is maintained with Hewlett Packard.

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	(2)
13.36-13.41			

Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz. Above 38.6

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: Morton Flom, P. Eng.