



M. Flom Associates, Inc. - Global Compliance Center

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Transmitter Certification

of

FCC ID: RF2A10IPLINK

Model: A10

to

Federal Communications Commission

Rule Part(s) 15.249(C), Confidentiality

Date Of Report: August 29, 2003

On the Behalf of the Applicant:

Helicomm, Inc.

At the Request of:

P.O. HC0 8803328

Helicomm, Inc.
1947 Camino Vida Roble, Suite 109
Carlsbad, CA 92008

Attention of:

Leon Gateno, Principle RF Engineer
(760) 918-0856; FAX -0338
Email: leon.gateno@Helicomm.com

Supervised By:

A handwritten signature in black ink, appearing to read 'M. Flom, P. Eng.'

Morton Flom, P. Eng.

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

Applicant: Helicomm, Inc.

FCC ID: RF2A10IPLINK

By Applicant:

| | |
|--|---|
| 1. Letter Of Authorization | x |
| 2. Identification Drawings | |
| <input checked="" type="checkbox"/> Label | |
| <input checked="" type="checkbox"/> Location of Label | |
| <input checked="" type="checkbox"/> Compliance Statement | |
| <input checked="" type="checkbox"/> 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) Photographs | x |
| Block Diagram | x |
| Active Devices | x |
| 4. Request for Confidentiality | 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.

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| 2.1049(c)(1) | Emission Masks (Occupied Bandwidth) | 12 |

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

a)

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

c) Report Number:

d0380074

d) Client:

Helicomm, Inc.
1947 Camino Vida Roble, Suite 109
Carlsbad, CA 92008

e) Identification:

A10
FCC ID: RF2A10IPLINK

Description:

Transceiver

f) EUT Condition:

Not required unless specified in individual tests.

g) Report Date:

August 29, 2003

EUT Received:

July 31, 2003

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.

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List Of General Information Required For Certification

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

15.249(C), Confidentiality

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

Helicomm, Inc.
1947 Camino Vida Roble, Suite 109
Carlsbad, CA 92008

Manufacturer:

Applicant

(c)(2): FCC ID:

RF2A10IPLINK

Model Number:

A10

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

Please See Attached Exhibits

(c)(4): Type of Emission:

N/A

(c)(5): FREQUENCY RANGE, MHz:

902.250 to 927.750

(c)(6): Power Rating, W:

Switchable Variable N/A

0.001

(c)(7): Maximum Power Rating, W:

50 mv/m @ 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

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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 | = 3.0 |

(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

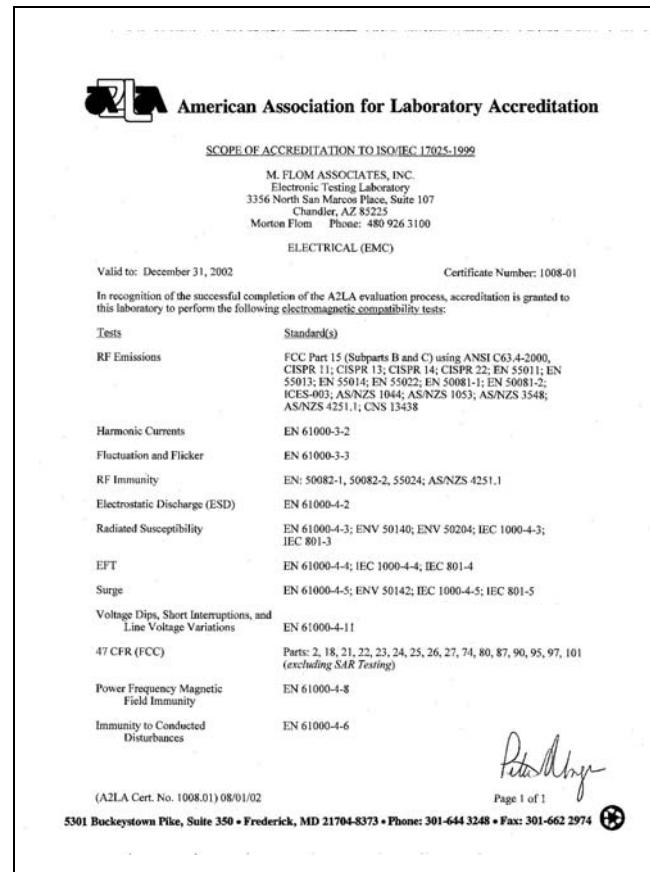
(c)(14): **Test and Measurement Data:**

Follows

Page Number

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M. Flom Associates, Inc. is accredited by the American Association for Laboratory Accreditation (A2LA) as shown in the scope below.



"This laboratory is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this report have been determined in accordance with the laboratory's terms of accreditation unless stated otherwise in the report."

Should this report contain any data for tests for which we are not accredited, or which have been undertaken by a subcontractor that is not A2LA accredited, such data would not be covered by this laboratory's A2LA accreditation.

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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)
- _____ 15.247 Operation within bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz
(spread spectrum)
- _____ x 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)

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Standard Test Conditions
And
Engineering Practices

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

In accordance with ANSIC63.4-1992/2000 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.

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Name of Test: Field Strength of Spurious Radiation

Specification: 47 CFR 2.1053(a)

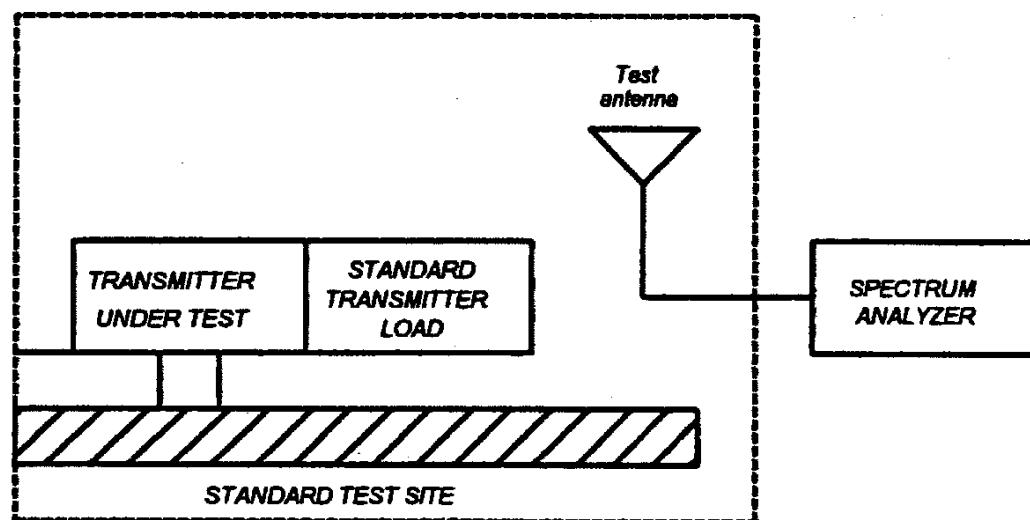
Guide: ANSI/TIA/EIA-603-1992/2001, Paragraph 1.2.12 and Table 16, 47 CFR 22.917

Measurement Procedure

1.2.12.1 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.

1.2.12.2 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 \geq 3 times Resolution Bandwidth, or 30 kHz (22.917)
 - 3) Sweep Speed \leq 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 which is placed on the turntable. The RF cable to this load should be of minimum length.

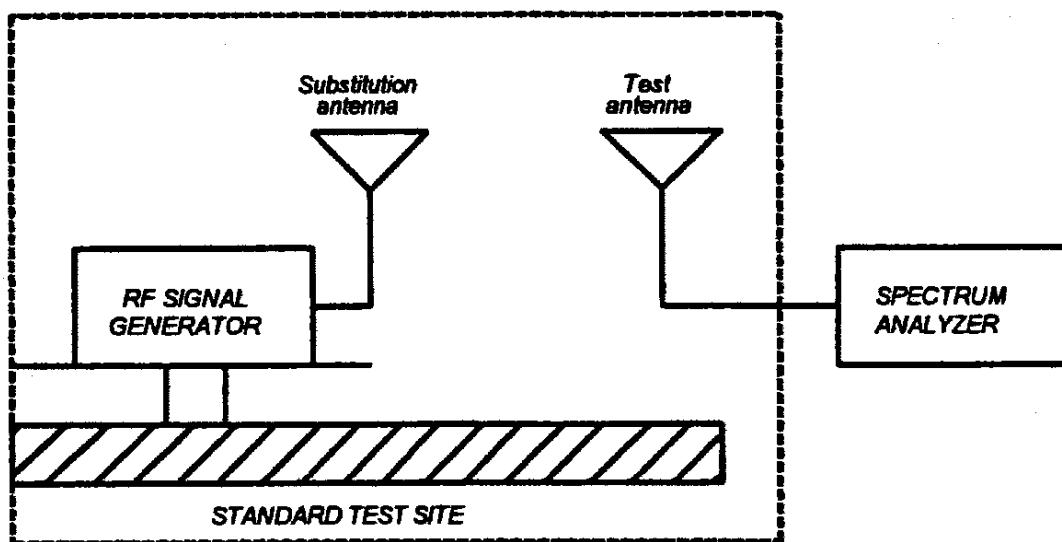


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Name of Test: Field Strength of Spurious Radiation (Cont.)

- 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.

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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:

$$\text{Radiated spurious emissions dB} = 10\log_{10}(\text{TX power in watts}/0.001) - \text{the levels in step I)}$$

NOTE: It is permissible that other antennas provided can be referenced to a dipole.

Test Equipment:

| Asset | Description (as applicable) | s/n | Cycle | Last Cal |
|---|--------------------------------|------------|--------|----------|
| <small>Per ANSI C63.4-1992/2000 Draft, 10.1.4</small> | | | | |
| Transducer | | | | |
| i00088 | EMCO 3109-B 25MHz-300MHz | 2336 | 12 mo. | Sep-02 |
| i00065 | EMCO 3301-B Active Monopole | 2635 | 12 mo. | Sep-02 |
| i00089 | Aprel 2001 200MHz-1GHz | 001500 | 12 mo. | Sep-02 |
| i00103 | EMCO 3115 1GHz-18GHz | 9208-3925 | 12 mo. | Sep-02 |
| Amplifier | | | | |
| i00028 | HP 8449A | 2749A00121 | 12 mo. | Mar-03 |
| Spectrum Analyzer | | | | |
| i00029 | HP 8563E | 3213A00104 | 12 mo. | Jan-03 |
| i00033 | HP 85462A | 3625A00357 | 12 mo. | Jan-03 |
| i00048 | HP 8566B | 2511AD1467 | 6 mo. | Jul-03 |

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Test Setup: Radiated Emissions



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Name of Test: Field Strength of Spurious Radiation
 g0370081: 2003-Jul-31 Thu 12:02:00
 State: 2:High Power

| Frequency Tuned, MHz | Frequency Emission, MHz | ERP, dBm | ERP, dbc |
|----------------------|-------------------------|----------|----------|
| 902.000000 | 1804.060000 | -59.1 | ≤ -53.5 |
| 915.000000 | 1829.991667 | -56.8 | ≤ -53.5 |
| 927.970000 | 1855.863333 | -54.3 | ≤ -53.5 |
| 902.000000 | 2706.141667 | -60 | ≤ -53.5 |
| 915.000000 | 2744.990000 | -59.1 | ≤ -53.5 |
| 927.970000 | 2783.778333 | -57.1 | ≤ -53.5 |
| 902.000000 | 3608.426667 | -58.7 | ≤ -53.5 |
| 915.000000 | 3660.041666 | -59.1 | ≤ -53.5 |
| 927.970000 | 3711.786667 | -57.5 | ≤ -53.5 |
| 902.000000 | 4510.105000 | -58.3 | ≤ -53.5 |
| 915.000000 | 4575.029999 | -58.7 | ≤ -53.5 |
| 927.970000 | 4639.756667 | -58.2 | ≤ -53.5 |
| 902.000000 | 5412.105000 | -58.8 | ≤ -53.5 |
| 915.000000 | 5490.018332 | -61 | ≤ -53.5 |
| 927.970000 | 5567.758333 | -57.2 | ≤ -53.5 |
| 902.000000 | 6314.105000 | -56.4 | ≤ -53.5 |
| 915.000000 | 6405.006665 | -57.6 | ≤ -53.5 |
| 927.970000 | 6495.728333 | -55.6 | ≤ -53.5 |
| 902.000000 | 7216.105000 | -56.9 | ≤ -53.5 |
| 915.000000 | 7319.994998 | -58.4 | ≤ -53.5 |
| 927.970000 | 7423.698333 | -53.8 | ≤ -53.5 |
| 902.000000 | 8118.105000 | -55.3 | ≤ -53.5 |
| 915.000000 | 8234.983331 | -55.2 | ≤ -53.5 |
| 927.970000 | 8351.668333 | -53.7 | ≤ -53.5 |
| 902.000000 | 9020.105000 | -55.9 | ≤ -53.5 |
| 915.000000 | 9149.971664 | -54.9 | ≤ -53.5 |
| 927.970000 | 9279.638333 | -53.5 | ≤ -53.5 |

Name of Test: RF Power Output – Radiated

| Tuned, MHz | Frequency Of Emission, MHz | R.F. Output, ERP dbm | R.F. Output, ERP μ v/m |
|------------|----------------------------|----------------------|----------------------------|
| 915 | 915 | -16 | 44 |

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Name of Test: Emission Masks (Occupied Bandwidth)

Specification: 47 CFR 2.1049(c)(1)

Guide: ANSI/TIA/EIA-603-1992, Paragraph 2.2.11

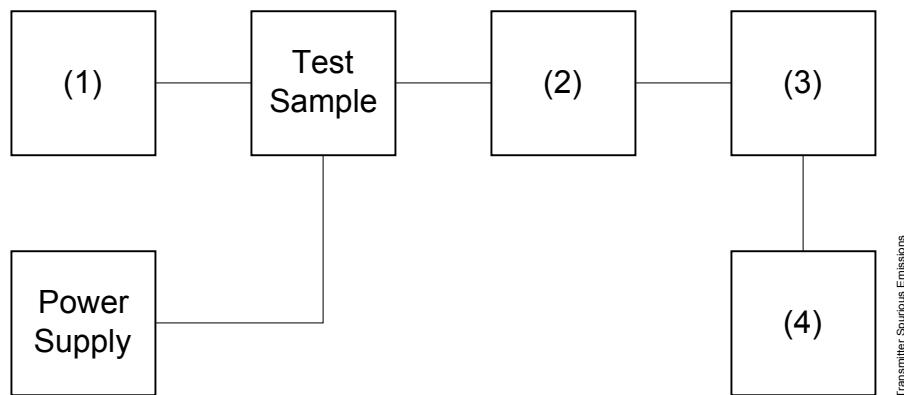
Test Equipment: As per previous page

Measurement Procedure

1. The EUT and test equipment were set up as shown on the following page, with the Spectrum Analyzer connected.
2. For EUTs supporting audio modulation, the audio signal generator was adjusted to the frequency of maximum response and with output level set for ± 2.5 kHz deviation (or 50% modulation). With level constant, the signal level was increased 16 dB.
3. For EUTs supporting digital modulation, the digital modulation mode was operated to its maximum extent.
4. The Occupied Bandwidth was measured with the Spectrum Analyzer controls set as shown on the test results.
5. Measurement Results: Attached

Transmitter Spurious Emission

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

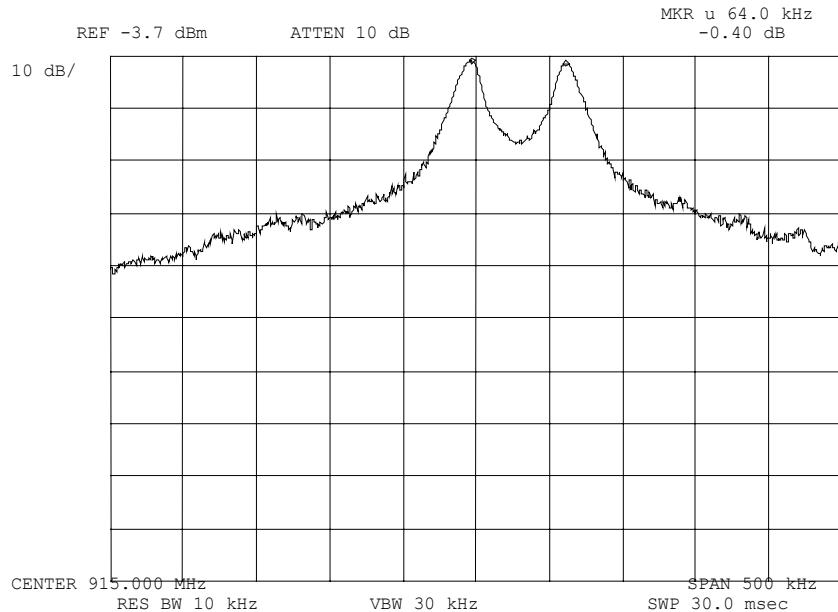


| Asset (as applicable) | Description | s/n |
|---------------------------------------|-------------------|------------|
| (1) Audio Oscillator/Generator | | |
| i00010 | HP 204D | 1105A04683 |
| i00017 | HP 8903A | 2216A01753 |
| i00012 | HP 3312A | 1432A11250 |
| (2) Coaxial Attenuator | | |
| i00122 | Narda 766-10 | 7802 |
| i00123 | Narda 766-10 | 7802A |
| i00069 | Bird 8329 (30 dB) | 1006 |
| i00113 | Sierra 661A-3D | 1059 |
| (3) Filters; Notch, HP, LP, BP | | |
| i00126 | Eagle TNF-1 | 100-250 |
| i00125 | Eagle TNF-1 | 50-60 |
| i00124 | Eagle TNF-1 | 250-850 |
| (4) Spectrum Analyzer | | |
| i00048 | HP 8566B | 2511A01467 |
| i00029 | HP 8563E | 3213A00104 |

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Name of Test: Emission Masks (Occupied Bandwidth)
g0370089: 2003-Jul-31 Thu 16:22:00
State: 2:High Power



Power: HIGH
Modulation: FSK 64KHZ
FUNDAMENTAL

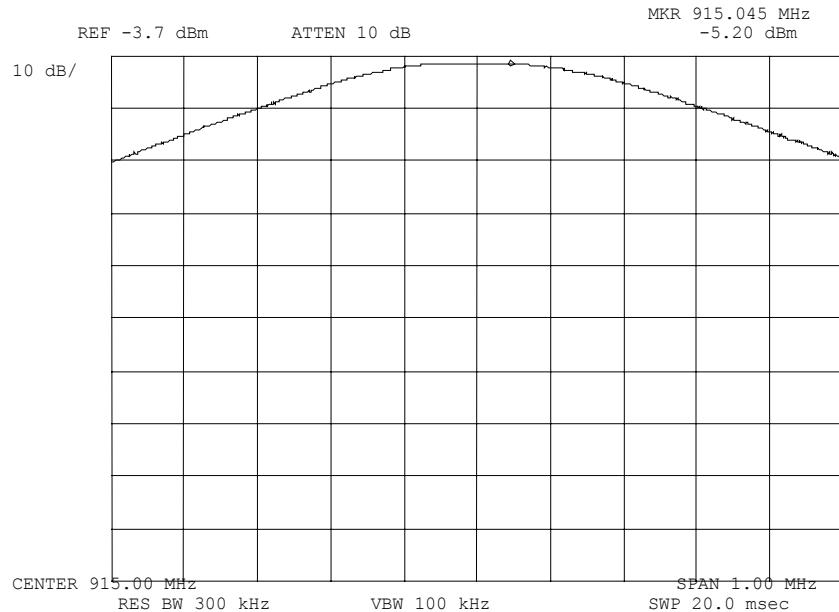
Performed By:

David Lee

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Name of Test: Emission Masks (Occupied Bandwidth)
g0370092: 2003-Jul-31 Thu 16:44:00
State: 2:High Power



Power: HIGH
Modulation: FSK 64KHZ
POWER OUTPUT

Performed By:

David Lee

**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 (if averaging) | FCC, 15.37(b) | 1 MHz | ≥1 MHz |
| | 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 |

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.