



**M. Flom Associates, Inc.**  
**International Compliance Testing Laboratory**  
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[info@mflom.com](mailto:info@mflom.com)

Date: May 17, 2005

Federal Communications Commission  
Via: Electronic Filing

Attention: Authorization & Evaluation Division

Applicant: Nimble Motorsports, LLC  
Equipment: Nimble Motorsports Remote  
FCC ID: R65DART1  
FCC Rules: 15.247, Confidentiality

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,

David E. Lee, Quality Manager

enclosure(s)  
cc: Applicant  
DEL/del

M. Flom Associates, Inc.  
3356 North San Marcos Place, Suite 107  
Chandler, Arizona 85225-7176  
(480) 926-3100 phone, (480) 926-3598 fax

FCC ID: R65DART1 FCC ID: R65DART1  
MFA p0540003, d0550034



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## Transmitter Certification

of

FCC ID: R65DART1

Model: Nimble Motorsports Remote

to

**Federal Communications Commission**

Rule Part(s) 15.247, Confidentiality

**Date Of Report:** May 17, 2005

**On the Behalf of the Applicant:**

Nimble Motorsports, LLC

**At the Request of:**

P.O. K.M. Credit Card

Nimble Motorsports, LLC  
7100 Rob River Way  
Sacramento, CA 95831

Attention of:

Kelly Murray  
916-428-1423  
Email: [kelly@nimblemotorsports.com](mailto:kelly@nimblemotorsports.com)

Supervised by:

Michael Findley, Laboratory Manager

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

Applicant: Nimble Motorsports, LLC

FCC ID: R65DART1

**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
  - Tune Up Info
  - Active Devices
4. Draft Specification Information

**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: d0550034
- d) Client: Nimble Motorsports, LLC  
7100 Rob River Way  
Sacramento, CA 95831
- e) Identification: Nimble Motorsports Remote  
FCC ID: R65DART1  
Description: 2.4 GHz Remote control
- f) EUT Condition: Not required unless specified in individual tests.
- g) Report Date: May 17, 2005  
EUT Received: April 6, 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.
- n) Results: The results presented in this report relate only to the item tested.
- m) Supervised by:
- 
- Michael Findley, Laboratory Manager
- 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:**

Nimble Motorsports, LLC  
7100 Rob River Way  
Sacramento, CA 95831

**Manufacturer:**

Applicant

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

R65DART1

**Model Number:**

Nimble Motorsports Remote

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

Please See Attached Exhibits

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

DSSS

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

2435.800 - 2463.300

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

☐ Switchable

☐ Variable

0.0001

☒ N/A

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

Non FH  $\leq$  1W Peak

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, A   | = | per manual |
| Collector Voltage, Vdc | = | per manual |
| Supply Voltage, Vdc    | = | 6.0        |

(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:**

|              |                   |
|--------------|-------------------|
| <u>    </u>  | Attached Exhibits |
| <u>  x  </u> | N/A               |

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

Follows

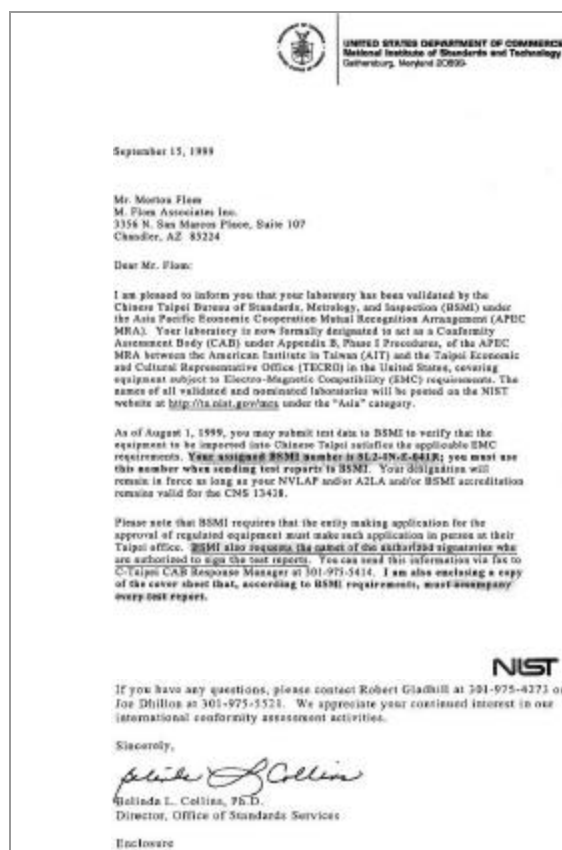




## A2LA

"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**



## NIST

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 Agreement (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."

BSMI Number: **SL2-IN-E-041R**

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<br>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<br>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<br>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<br>spectrum)   |
| _____   | 15.249 | Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz, and 24.0-<br>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-<br>3.6 GHz (vehicle identification systems)        |
| _____   | 15.321 | Specific requirements for asynchronous devices operating in the 1910-1920 MHz and 2390-<br>2400 MHz bands (Unlicensed PCS)                |
| _____   | 15.323 | Specific requirements for isochronous devices operating in the 1920-1930 MHz sub-band<br>(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 C63.4-1992/2001, 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.

**Name of Test:** Maximum Peak Output Power

**Specification:** 47 CFR 15.247(b)

**Spec. Limit:** = 1 Watt peak (0.25 if <50 Hopping Channels)

**Test Equipment:** Attached

#### Measurement Data

Antenna Gain, dBi = -12.8  
 Peak Output Power, Watts = 0.0001  
 Worst Case For  
 All Channels

Radiated:  
 g0540063: 2005-Apr-07 Thu 09:42:00

| Frequency Tuned, MHz | Frequency Emission, MHz | Meter, dBuV | CF, dB | uV/m @ 3m | EIRP, dBm | EIRP, W   |
|----------------------|-------------------------|-------------|--------|-----------|-----------|-----------|
| 2450.000000          | 2449.935300             | 23.98       | 48.4   | 4159.11   | -22.8     | 0.0000052 |

g0550012: 2005-May-17 Tue 09:24:00

| Frequency Tuned, MHz | Frequency Emission, MHz | Meter, dBuV | CF, dB | uV/m @ 3m | EIRP, dBm | EIRP, W   |
|----------------------|-------------------------|-------------|--------|-----------|-----------|-----------|
| 0.000000             | 2435.800000             | 36.87       | 32.68  | 3002.62   | -25.7     | 0.0000027 |

g0550013: 2005-May-17 Tue 09:29:00

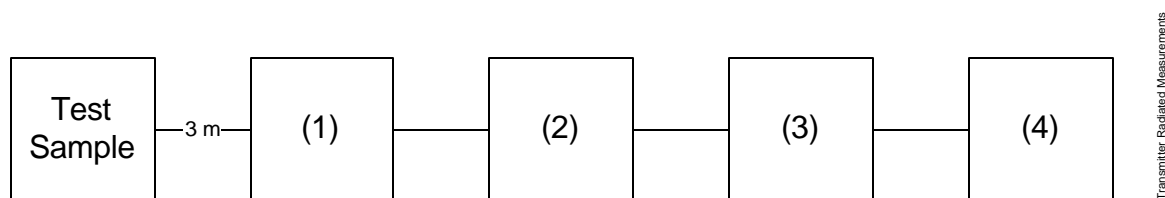
| Frequency Tuned, MHz | Frequency Emission, MHz | Meter, dBuV | CF, dB | uV/m @ 3m | EIRP, dBm | EIRP, W   |
|----------------------|-------------------------|-------------|--------|-----------|-----------|-----------|
| 0.000000             | 2463.300000             | 37.58       | 32.75  | 3284.73   | -24.9     | 0.0000032 |



Supervised by:

Michael Findley, Laboratory Manager

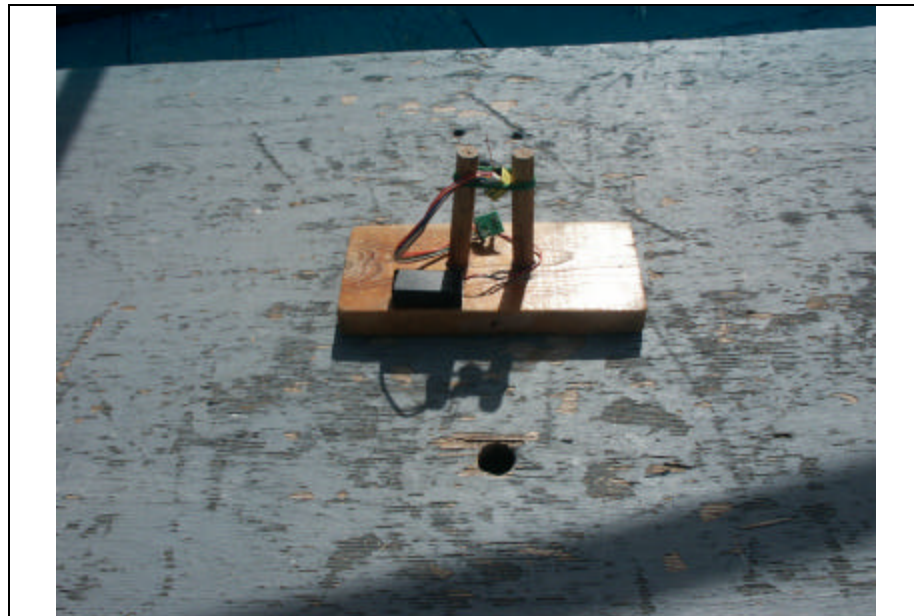
## Transmitter Radiated Measurements



| Asset                                     | Description | s/n                   |            |               |
|---|-------------|-----------------------|------------|---------------|
| (1) <b>Transducer</b>                     |             |                       |            |               |
| X   | i00091      | Emco 3115             | 001469     | 24 mo. Jan-04 |
|   | i00089      | Apriel Log Periodic   | 001500     | 24 mo. Sep-03 |
|   | i00088      | EMCO 3301-B Biconical | 2336       | 24 mo. Sep-03 |
| (2) <b>High Pass Filter (if required)</b> |             |                       |            |               |
| (3) <b>Preamp</b>                         |             |                       |            |               |
| X   | i00028      | HP 8449 (+30 dB)      | 2749A00121 |               |
| (4) <b>Spectrum Analyzer</b>              |             |                       |            |               |
|   | i00048      | HP 8566B              | 2511A01467 | 12 mo. Aug-04 |
|   | i00057      | HP 8557A              | 1531A00191 | 12 mo. Jul-04 |
| X   | i00029      | HP 8563E              | 3213A00104 | 12 mo. May-04 |

**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 <sub>1</sub> T <sub>2</sub> T <sub>3</sub> |
| 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

### Measurement Results

g0550014: 2005-May-17 Tue 09:46:00  
STATE: 2:High Power

Ambient Temperature: 23°C ± 3°C

| Frequency Tuned, MHz | Frequency Emission, MHz | ERP, dBm |
|----------------------|-------------------------|----------|
| 2440.250000          | 4880.500000             | -44.8    |
| 2440.250000          | 7249.500000             | -25.1    |
| 2440.250000          | 9726.000000             | -22.1    |
| 2440.250000          | 12161.000000            | -24.5    |
| 2440.250000          | 14596.000000            | -24.0    |
| 2440.250000          | 17031.000000            | -29.4    |



Supervised by:

Michael Findley, Laboratory Manager



**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 $\mu$ V  |
| 1 MHz RBW, 1 MHz VBW | = | 12 dB $\mu$ V |
| 1 MHz RBW, 10 Hz VBW | = | 3 dB $\mu$ V  |

Above 2 GHz:

|                      |   |               |
|----------------------|---|---------------|
| 1 MHz RBW, 1 MHz VBW | = | 33 dB $\mu$ V |
| 1 MHz RBW, 10 Hz VBW | = | 22 dB $\mu$ V |

Sensitivity of system with preamps:

Below 2 GHz:

Preamps are not used in this range.

Above 2 GHz:

|         |   |               |
|---------|---|---------------|
| Peak    | = | 3 dB $\mu$ V  |
| Average | = | -8 dB $\mu$ V |

Cable Loss:

|          |   |                 |
|----------|---|-----------------|
| 915 MHz  | = | -0.8 dB $\mu$ V |
| 2450 MHz | = | -3 dB $\mu$ 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:

Michael Findley, Laboratory Manager

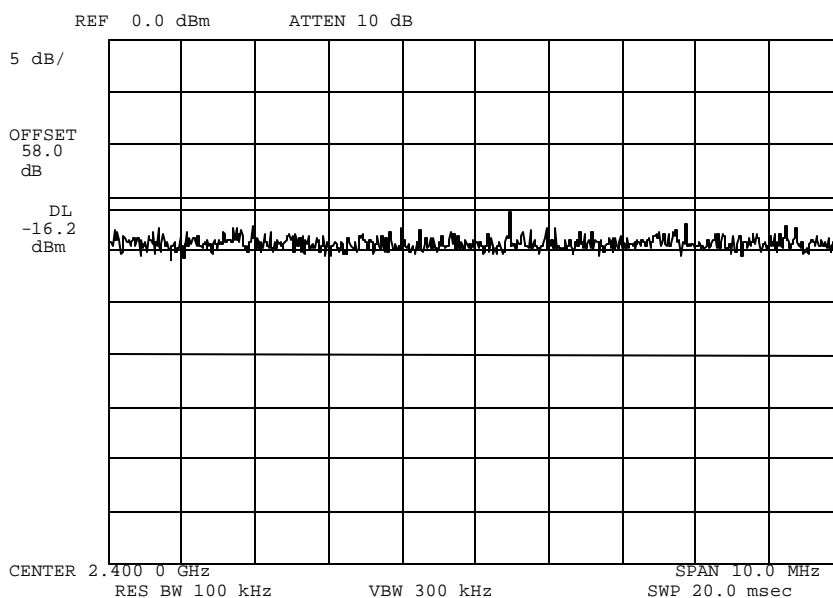
**Name of Test:** Emissions At Band Edges

**Test Equipment:** As for "Out of Band Emissions"

g0540066: 2005-Apr-27 Wed 10:19:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:  
Modulation:

High  
Lower Band Edge

Performed by:



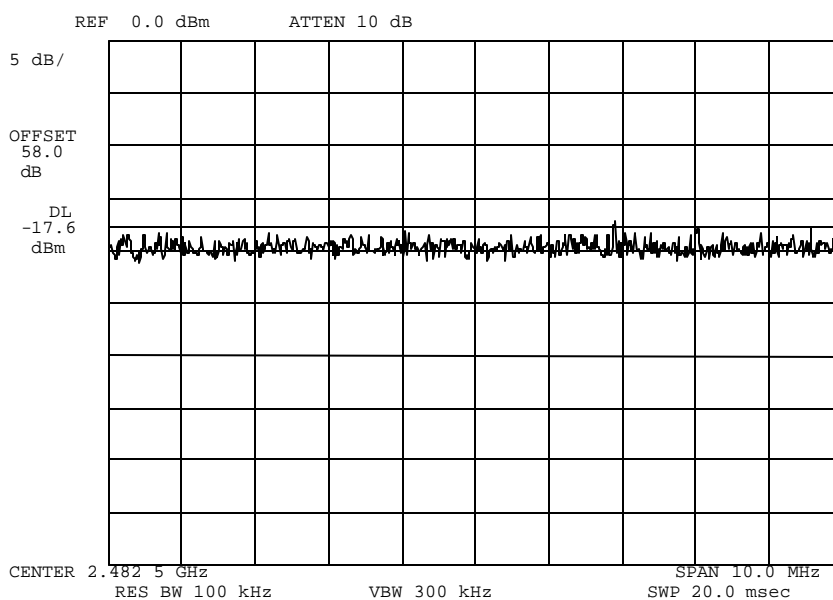
Bobby Leanio

**Name of Test:** Emissions At Band Edges

g0540067: 2005-Apr-27 Wed 10:20:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:  
Modulation:

High  
Upper Band Edge

Supervised By:



Michael Findley, Laboratory 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 = 880  
Results = Attached



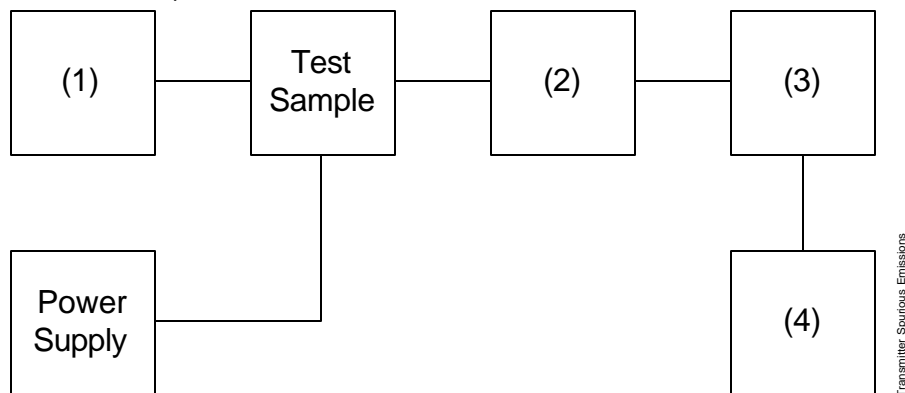
Supervised By:

Michael Findley, Laboratory Manager

## Transmitter Spurious Emission

Test A. Occupied Bandwidth (In-Band Spurious)

Test B. Out-of-Band Spurious



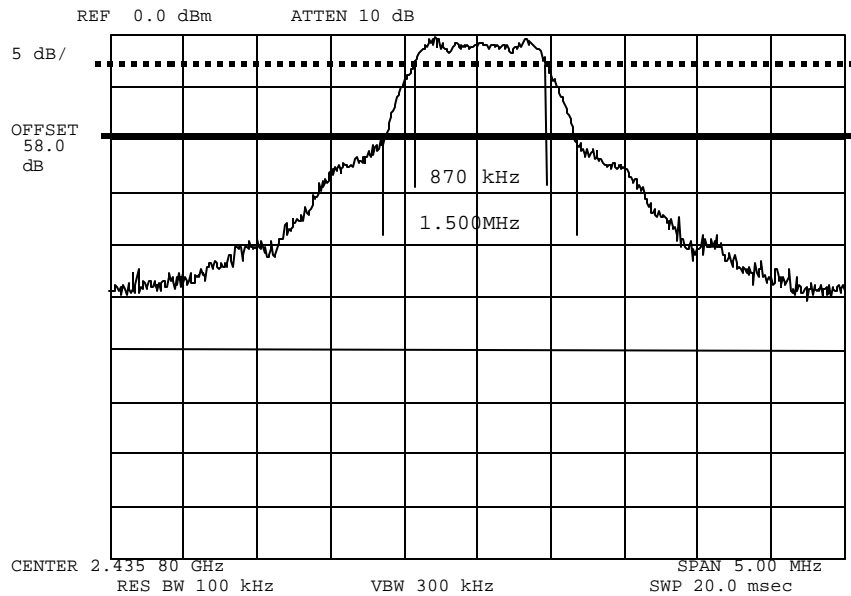
| Asset<br>(as applicable) | Description                                     | s/n        |            |               |
|--------------------------|---|------------|------------|---------------|
| (1)                      | <b>Audio Oscillator/Generator</b>               |            |            |               |
| i00017                   | HP 8903A  | 2216A01753 | 12 mo.     | May-05        |
| (2)                      | <b>Coaxial Attenuator (if required)</b>         |            |            |               |
| i00122                   | Narda 766-10                                    | 7802       | NCR        |               |
| i00123                   | Narda 766-10                                    | 7802A      | NCR        |               |
| i00069                   | Bird 8329 (30 dB)                               | 1006       | NCR        |               |
| i00113                   | Sierra 661A-3D                                  | 1059       | NCR        |               |
| (3)                      | <b>Filters; Notch, HP, LP, BP (if required)</b> |            |            |               |
| i00126                   | Eagle TNF-1                                     | 100-250    | NCR        |               |
| i00125                   | Eagle TNF-1                                     | 50-60      | NCR        |               |
| i00124                   | Eagle TNF-1                                     | 250-850    | NCR        |               |
| (4)                      | <b>Spectrum Analyzer</b>                        |            |            |               |
| X                        | i00048  | HP 8566B   | 2511A01467 | 12 mo. Aug-04 |
|                          | i00029  | HP 8563E   | 3213A00104 | 12 mo. May-04 |

**Name of Test:** Emission Masks (Occupied Bandwidth)  
Indicating 6/20 dB Bandwidth

### Measurement Results

g0540063: 2005-Apr-27 Wed 10:10:00  
State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:  
Channel:

High  
Low

Performed by:

*Bobby Leanio*  
Bobby Leanio

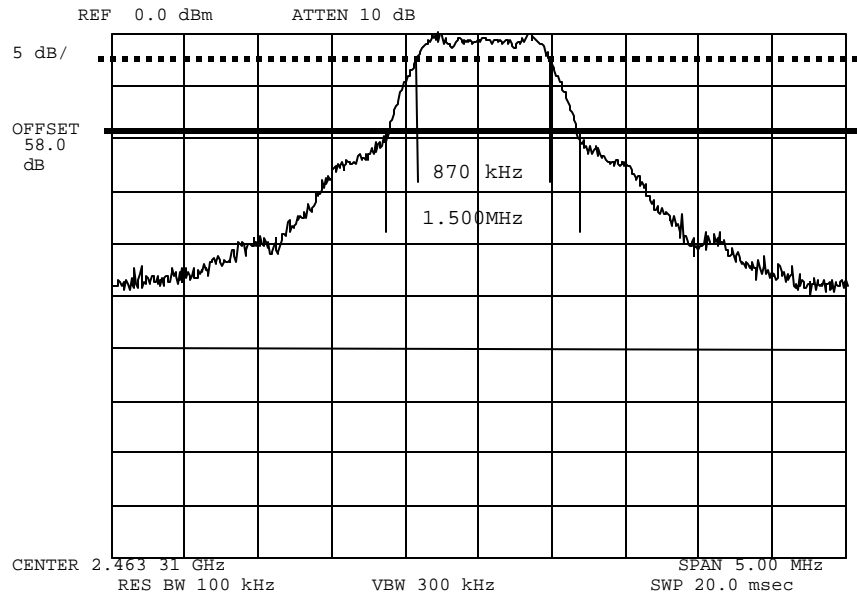
Name of Test: Emission Masks (Occupied Bandwidth)

### Measurement Results

g0540064: 2005-Apr-27 Wed 10:13:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:  
Channel:

High  
High

*Bobby Leanio*

Performed by:

Bobby Leanio

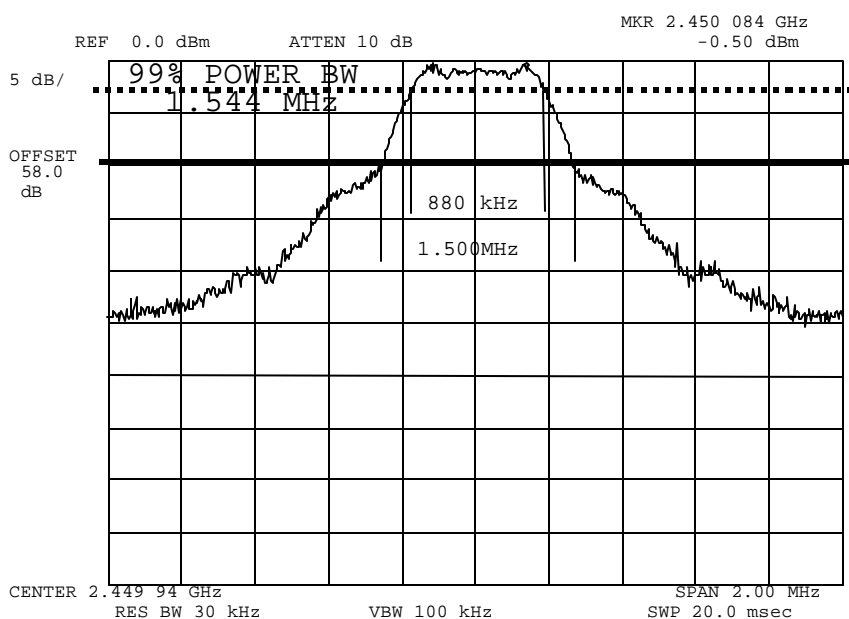
Name of Test: Emission Masks (Occupied Bandwidth)

### Measurement Results

g0540065: 2005-Apr-27 Wed 10:15:00

State: 2:High Power

Ambient Temperature: 23°C ± 3°C



Power:  
Channel:  
Modulation:

High  
Middle  
99% Power Bandwidth

*Bobby Leanio*

Performed by:

Bobby Leanio



**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"

**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 8 dBm in any 3 kHz Bandwidth within these bands.

Results:

| Frequency | Measured dBm @ 1Hz | Calculated dBm @ 3kHz | Margin dBm |
|-----------|--------------------|-----------------------|------------|
| 2435.800  | -50.60             | -15.8                 | -23.80     |
| 2440.000  | -59.10             | -24.3                 | -32.30     |
| 2463.300  | -57.10             | -22.3                 | -30.30     |

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

NOTE:

Device uses Nordic n RF 2401A chip.



Supervised By:

Michael Findley, Laboratory Manager

**Name of Test:** Necessary Bandwidth and Emission Bandwidth

**Specification:** 47 CFR 2.202(g)

Modulation

**Necessary Bandwidth (Measured):** 1.544MHz



Supervised By:

Michael Findley, Laboratory 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     |

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     |             |
| 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:



Michael Findley, Laboratory Manager