



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

toll-free: (866) 311-3268  
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<http://www.flomlabs.com>  
[info@flomlabs.com](mailto:info@flomlabs.com)

Date: August 22, 2007

Federal Communications Commission  
Via: Electronic Filing

Attention: Authorization & Evaluation Division

Applicant: International Electronics Inc.  
Equipment: MiniGap II  
FCC ID: JLFOMG2  
FCC Rules: 15.249

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.

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,

Hoosamuddin S. Bandukwala, Lab Director

enclosure(s)  
cc: Applicant  
HSB/mdw

Flom Test Labs  
3356 N. San Marcos Place, Suite 107  
Chandler, Arizona 85225-7176  
(866) 311-3268 phone, (480) 926-3598 fax

p0690002, d0780025

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

Applicant: International Electronics Inc.

FCC ID: JLFOMG2

**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
  - Active Devices

**By F.T.L. Inc.**

- A. Testimonial & Statement of Certification
- B. Statement of Qualifications



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## Transmitter Certification

of

FCC ID: JLFOMG2  
Model: MiniGap II

to

**Federal Communications Commission**

Rule Part(s) 15.249

**Date Of Report:** August 22, 2007

**On the Behalf of the Applicant:** International Electronics Inc.  
5913-C NE 127th Ave, Suite 800  
Vancouver, WA 98682

**Attention of:** Shary Nassimi, President  
(360) 241-9090  
email: [iei@nwlink.com](mailto:iei@nwlink.com)

Supervised By:

Hoosamuddin S. Bandukwala, Lab Director

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p0690002, d0780025

**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.

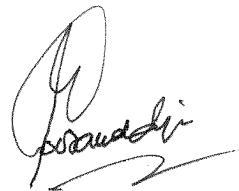
Equipment marketed to a consumer must be capable of complying with the necessary regulations in the configuration in which the equipment is marketed. Where special accessories, such as shielded cables and/or special connectors are required to enable an unintentional or intentional radiator to comply 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.

## 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:

Hoosamuddin S. Bandukwala, Lab Director

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Required information per ISO 17025-2005, paragraph 5.10:

a) **Test Report**

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

c) Report Number: d0780025

d) Client: International Electronics Inc.

e) Identification: MiniGap II

Description: Transmitter

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

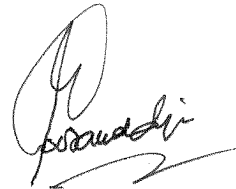
g) Report Date: August 22, 2007  
EUT Received:

h, j, k): As indicated in individual tests.

i) Sampling method: No sampling procedure used.

l) Uncertainty: In accordance with FTL internal quality manual.

m) Supervised by:



Hoosamuddin S. Bandukwala, Lab Director

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

15.249

**Sub-Part 2.1033**

(c)(1):

**Name and Address of Applicant:** International Electronics Inc.

(c)(2): **FCC ID:** JLFOMG2

**Model Number:** MiniGap II

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

Please See Attached Exhibits

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

(c)(5): **FREQUENCY RANGE, MHz:** 903 to 926

(c)(6): **Power Rating, dBuV/m:** 90.7  
           \_\_\_\_\_ Switchable                    \_\_\_\_\_ Variable                      X   N/A

(c)(7): **Maximum Power Rating, dBuV/m:** 93.97

**15.203: Antenna Requirement:**

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

**The unit was tested with a quarter wave stub antenna with a gain of 3.0 dBi.**



**Subpart 2.1033** (continued)**(c)(8): 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)(9): Label Information:**

Please See Attached Exhibits

**(c)(10): Photographs:**

Please See Attached Exhibits

**(c)(11): Digital Modulation Description:**

Attached Exhibits

N/A

**(c)(12): Test And Measurement Data :**

Follows

Sub-part  
2.1033(b):

### Test And Measurement Data

All tests and measurement data shown were performed in accordance with FCC Rules and Regulations, Volume II; Part 2 and the following individual Parts:

15.249      Operation within bands 902 - 928 MHz

### Standard Test Conditions and Engineering Practices

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

In accordance with ANSI C63.4-2004, and unless otherwise indicated in the specific measurement results, the ambient temperature of the actual EUT was maintained within the range of 10° to 40°C (50° to 104 °F) unless the particular equipment requirements specify testing over a different temperature range. Also, unless otherwise indicated, the humidity levels were in the range of 10% to 90% relative humidity.

Prior to testing, the EUT was tuned up in accordance with the manufacturer's alignment procedures. All external gain controls were maintained at the position of maximum and/or optimum gain throughout the testing.

Measurement results, unless otherwise noted, are worst-case measurements.

### A2LA

"A2LA has accredited Flom Test Labs, 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 17025:2005 'General Requirements for the Competence of Testing and Calibration Laboratories' and any additional program requirements in the identified field of testing."

Please refer to [www.a2la.org](http://www.a2la.org) for current scope of accreditation.

Certificate number: 2152.01



**IC O.A.T.S. Number:** 2044A-1

### Test Results Summary

| Specification | Test Name                     | Pass, Fail, N/A | Comments |
|---------------|-------------------------------|-----------------|----------|
| 15.249(a)     | Field Strength of Fundamental | Pass            |          |
| 15.249(a)     | Field Strength of Harmonics   | Pass            |          |
| 15.249        | Radiated Spurious Emissions   | Pass            |          |

**Name of Test:** Field Strength of Fundamental  
**Specification:** 15.249(a)  
**Test Equipment Utilized** i00228, i00317

### Test Procedure

15.249(a) The field strength of emissions from intentional radiators operating in the 903 – 928 band shall comply with the following:

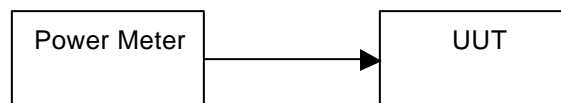
| Fundamental frequency, MHz | Field strength of fundamental, mV / meter | Field strength of harmonics, mV /meter |
|----------------------------|---|--|
| 902 - 928                  | 50  | 500                                    |

1mV = 1000uV 50000uV/mtr converts to **93.97 dBuV/mtr** (20X log(E))

500000uV/mtr converts to **113.97 dBuV/mtr**

The UUT was tested on an Open Area Test Site (OATS) set 3 meters from the receiving antenna. A spectrum analyzer was used to verify the UUT met the requirements for Radiated Spurious Emissions. The UUT was tested with the appropriate antenna in both the vertical and horizontal orientation and raised from 1 to 4 meters while rotating the UUT 360° to ensure the TX signal levels were maximized.

### Test Setup



### Field Strength of Fundamental table

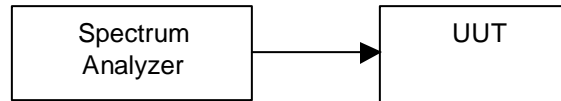
| Tuned Frequency MHz | Emission Frequency MHz | Recorded Measurement, dBuV/m | Correction factor, dB | Corrected Measurement, dBuV/m | Specification Limit, dBuV/m | Result |
|---------------------|------------------------|------------------------------|-----------------------|-------------------------------|-----------------------------|--------|
| 903.000000          | 903.181962             | 62.2                         | 28.6                  | 90.7                          | 93.97                       | Pass   |
| 915.000000          | 915.627454             | 59.5                         | 29.0                  | 88.5                          | 93.97                       | Pass   |
| 926.000000          | 927.685000             | 56.8                         | 29.2                  | 86.0                          | 93.97                       | Pass   |

**Name of Test:** Field Strength of Harmonics  
**Specification:** 15.249  
**Spec. Limit**  
**Test Equipment Utilized** i00029, i00329

**Test Procedure**

The UUT was tested on an Open Area Test Site (OATS) set 3 meters from the receiving antenna. A spectrum analyzer was used to verify the UUT met the requirements for Radiated Spurious Emissions. The UUT was tested with the appropriate antenna in both the vertical and horizontal orientation and raised from 1 to 4 meters while rotating the UUT 360° to ensure the TX signal levels were maximized. Only the worst case is recorded in the Field Strength of Harmonics table.

**Test Setup**



**Field Strength of Harmonics Table**

**903MHz**

| Tuned Frequency MHz | Emission Frequency MHz | Recorded Measurement, dBuV/m | Corrected level, dB | Corrected Measurement, dBuV/m | Specification Limit, dBuV/m | Result |
|---------------------|------------------------|------------------------------|---------------------|-------------------------------|-----------------------------|--------|
| 903.000000          | 1806.346000            | 10.40                        | 30.8                | 41.2                          | 113.97                      | Pass   |
| 903.000000          | 2709.574000            | 2.60                         | 34.4                | 37.0                          | 113.97                      | Pass   |
| 903.000000          | 3612.740000            | 0.10                         | 36.3                | 36.4                          | 113.97                      | Pass   |
| 903.000000          | 4516.016000            | 1.30                         | 37.6                | 38.9                          | 113.97                      | Pass   |
| 903.000000          | 5419.493000            | 0.40                         | 40.3                | 40.7                          | 113.97                      | Pass   |
| 903.000000          | 6322.555000            | 6.10                         | 41.4                | 46.5                          | 113.97                      | Pass   |

**915MHz**

| Tuned Frequency MHz | Emission Frequency MHz | Recorded Measurement, dBuV/mtr | Corrected level, dB | Corrected Measurement, dBuV/mtr | Specification Limit, dBuV/mtr | Result |
|---------------------|------------------------|--------------------------------|---------------------|---------------------------------|-------------------------------|--------|
| 915.000000          | 1831.235000            | 14.1                           | 30.9                | 45.0                            | 113.97                        | Pass   |
| 915.000000          | 2746.840000            | 2.0                            | 34.5                | 36.5                            | 113.97                        | Pass   |
| 915.000000          | 3662.600000            | 0.6                            | 36.4                | 37.0                            | 113.97                        | Pass   |
| 915.000000          | 4578.005000            | -0.8                           | 37.8                | 37.0                            | 113.97                        | Pass   |
| 915.000000          | 5493.370000            | -2.1                           | 40.4                | 38.3                            | 113.97                        | Pass   |
| 915.000000          | 6409.040000            | 4.6                            | 41.6                | 46.2                            | 113.97                        | Pass   |

**927MHz**

| Tuned Frequency MHz | Emission Frequency MHz | Recorded Measurement, dBuV/m | Corrected level, dB | Corrected Measurement, dBuV/m | Specification Limit, dBuV/m | Result |
|---------------------|------------------------|------------------------------|---------------------|-------------------------------|-----------------------------|--------|
| 927.000000          | 1853.344000            | 10.3                         | 31.0                | 41.3                          | 113.97                      | Pass   |
| 927.000000          | 2780.004000            | 0.8                          | 34.7                | 35.5                          | 113.97                      | Pass   |
| 927.000000          | 3706.678000            | 2.0                          | 36.5                | 38.5                          | 113.97                      | Pass   |
| 927.000000          | 4633.418000            | -0.4                         | 38.0                | 37.6                          | 113.97                      | Pass   |
| 927.000000          | 5560.172000            | 0.2                          | 40.5                | 40.7                          | 113.97                      | Pass   |
| 927.000000          | 6487.016000            | 4.7                          | 41.7                | 46.4                          | 113.97                      | Pass   |

The EUT was tested out to the 10<sup>th</sup> harmonic. There were no observable spurious emissions past the 6<sup>th</sup> harmonic.

**Name of Test:** Radiated Spurious Emissions

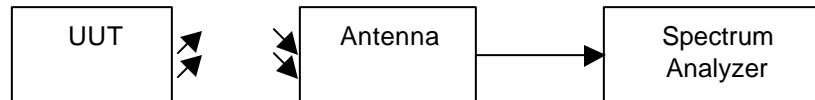
Flom Test Labs  
 3356 N. San Marcos Place, Suite 107  
 Chandler, Arizona 85225-7176  
 (866) 311-3268 phone, (480) 926-3598 fax

**Specification:** 15.249(c), 15.209(a), 15.205  
**Spec. Limit**  
**Test Equipment Utilized** i00029, i00033, i00088, i00089, i00103

### Test Procedure

The UUT was tested on an Open Area Test Site (OATS) set 3 meters from the receiving antenna. A spectrum analyzer was used to verify the UUT met the requirements for Radiated Spurious Emissions. The UUT was tested with the appropriate antenna in both the vertical and horizontal orientation and raised from 1 to 4 meters while rotating the UUT 360° to ensure the TX signal levels were maximized.

### Test Setup



#### Settings

RBW = 100 KHz  
 VBW = 100KHz  
 Detector – Quasi Peak

#### Sample Calculations

Corrected Level = Recorded Level + Correction factor

Correction factor = ACF + Cable loss + Distance Correction factor

Distance Correction factor =  $10 \log D1/D2$

### Radiated Spurious Emissions

| Tuned Freq (MHz) | Emission Freq (MHz) | Monitored Level (dBuV/m) | Correction Factor (dB) | Corrected Value (dBuV/m) | Limit (dBuV/m) | Result |
|------------------|---------------------|--------------------------|------------------------|--------------------------|----------------|--------|
| 915.000000       | 33.051400           | 18.1                     | 13.7                   | 31.8                     | 40.0           | Pass   |
| 915.000000       | 35.977300           | 16.1                     | 13.4                   | 29.5                     | 40.0           | Pass   |
| 915.000000       | 347.688300          | 16.0                     | 17.8                   | 33.8                     | 46.0           | Pass   |
| 915.000000       | 471.939700          | 16.0                     | 20.3                   | 36.3                     | 46.0           | Pass   |
| 915.000000       | 587.539600          | 17.0                     | 23.0                   | 40.0                     | 46.0           | Pass   |
| 915.000000       | 649.760200          | 16.3                     | 23.6                   | 39.9                     | 46.0           | Pass   |

### Test Equipment Utilized

| Description          | MFG   | Model Number | FTL Asset Number | Last Cal Date | Cal Due Date |
|----------------------|-------|--------------|------------------|---------------|--------------|
| RF Pre-Amplifier     | HP    | 8449         | i00028           | 1/23/07       | 1/23/09      |
| Bi-conical Antenna   | EMCO  | 3109B        | i00088           | 10/14/05      | 10/14/07     |
| Log Periodic Antenna | Aprel | 2001         | i00089           | 10/20/05      | 10/20/07     |
| Horn Antenna         | EMCO  | 3115         | i00103           | 9/5/06        | 9/5/07       |
| Spectrum Analyzer    | HP    | 8566B        | i00290           | 6/16/06       | 6/16/07      |
| Spectrum Analyzer    | HP    | 8566B        | i00329           | 4/16/07       | 4/16/08      |

In addition to the above listed equipment standard RF connectors and cables were utilized in the testing of the described equipment. Prior to testing these components were tested to verify proper operation.

END OF TEST REPORT