



Flom Test Labs

EMI, EMC, RF Testing Experts Since 1963

toll-free: (866) 311-3268
fax: (480) 926-3598
<http://www.flomlabs.com>
info@flomlabs.com

Date: June 26, 2008

Federal Communications Commission
Via: Electronic Filing

Attention: Authorization & Evaluation Division

Applicant: American Micro-Fuel Device Corp.
Equipment: Engine Control Unit Device
FCC ID: WG2FM001
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



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

toll-free: (866) 311-3268
fax: (480) 926-3598
<http://www.flomlabs.com>
info@flomlabs.com

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

Applicant: American Micro-Fuel Device Corp.

FCC ID: WG2FM001

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



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

toll-free: (866) 311-3268
fax: (480) 926-3598
<http://www.flomlabs.com>
info@flomlabs.com

Test Report

for

FCC ID: WG2FM001
Model: FM001

to

Federal Communications Commission

Rule Part(s)15.249

Date Of Report: June 26, 2008

On the Behalf of the Applicant: American Micro-Fuel Device Corp.
2181 Buchanan Loop
Ferndale, WA 98248

Attention of: Perienne DeJaray
Ph: 360-380-2923
Fax: 360-380-2942
Email: perienne@americanmicrofuel.com

Supervised By:

Hoosamuddin S. Bandukwala, Lab Director

Revision History

Revision	Date	Revised By	Reason for revision
1.0	June 26, 2008	J. Erhard	Original Document
2.0	July 24, 2008	J Erhard	Edit model number

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.

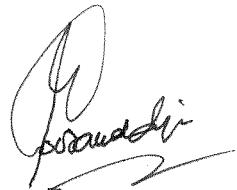
Equipment marketed to a consumer must be capable of complying with the necessary regulations in the configuration in which the equipment is marketed. Where special accessories, such as shielded cables and/or special connectors are required to enable an unintentional or intentional radiator to comply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

Table Of Contents

Rule	Description	Page
	Test Report	1
2.1033(c)	General Information Required	2
	Standard Test Conditions and Engineering Practices	4
	Test Results Summary	5
15.249(a)	Fundamental Field Strength	6
15.249(d)	Radiated Spurious Emissions	6
RSS 210	99% Occupied Bandwidth	12
	Test Equipment Utilized	16



Required information per ISO 17025-2005, paragraph 5.10.2:

a) **Test Report**

b) Laboratory: Flom Test Lab, Inc.
(FCC: 31040/SIT) 3356 N. San Marcos Place, Suite 107
(Canada: IC 2044A-1) Chandler, AZ 85225

c) Report Number: d0860034

d) Client: American Micro-Fuel Device Corp.

e) Identification: FCC ID: WG2FM001
Description: Engine Control Unit

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

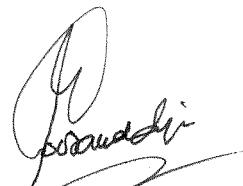
g) Report Date: June 26, 2008
EUT Received:

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: American Micro-Fuel Device Corp.

(c)(2): **FCC ID:** WG2FM001

Model Number: FM001

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

Please See Attached Exhibits

(c)(4): **Type of Emission:** Low power FHSS

Frequency, MHz 2402 to 2480 (Bluetooth) and 2405 to 2480 (Zigbee)

(c)(6): **Power Rating, W:** 7.9 μ W (Bluetooth) and 1.58 μ W (Zigbee)
 Switchable Variable N/A

(c)(7): **Maximum Power Rating, W:** 5 mW 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

The unit was tested with a PCB mounted antenna with a gain of 1.1 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
x 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, 2400-2483.5, 5725-5825 MHz and 24.0-24.25 GHz

Standard Test Conditions and Engineering Practices

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

In accordance with ANSI C63.4-2003 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.

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 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)	Fundamental Field Strength	Pass	
15.249(d)	Out of Band Spurious Emissions	Pass	
RSS-210	99% occupied Bandwidth	Pass	

Fundamental Field Strength

Name of Test:
Specification:

15.249(a)

Test Equipment Utilized

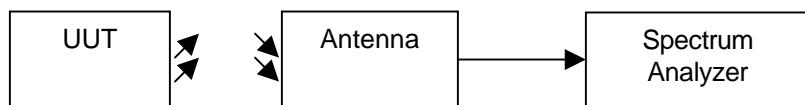
i00103, i00331

Test Date: 6/24/08

Test Procedure

The UUT was tested on an Open Area Test Site (OATS) at a distance of 3 meters from the receiving antenna. A spectrum analyzer was used to verify that the UUT met the requirements for Fundamental Field Strength. All correction factors were input into the analyzer to ensure a correct reading.

Test Setup



Analyzer Settings

Detector Settings	RBW	VBW
Peak	1 MHz	1 MHz

Fundamental Field Strength (Bluetooth)

Tuned Freq (MHz)	Peak Measured Level (dBuV/m)	Peak Limit (dBuV/m)	Result
2402	85.75	114.0	Pass
2442	81.97	114.0	Pass
2480	80.05	114.0	Pass

Fundamental Field Strength (Zigbee)

Tuned Freq (MHz)	Peak Measured Level (dBuV/m)	Peak Limit (dBuV/m)	Result
2405	78.94	114.0	Pass
2440	74.55	114.0	Pass
2480	70.72	114.0	Pass

For both transmitters the peak-radiated power was below the average limit therefore no additional testing is required.

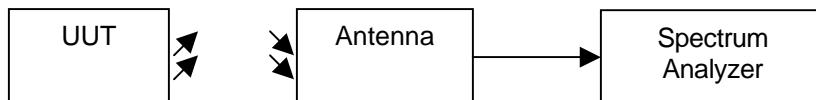
Name of Test: Radiated Spurious Emissions
Specification: 15.249(d)
Test Equipment Utilized i00103, i00331

Test Date: 6/24/08

Test Procedure

The UUT was tested on an Open Area Test Site (OATS) at a distance of 3 meters from the receiving antenna. A spectrum analyzer was used to verify that the UUT met the requirements for radiated Spurious. All correction factors were input into the analyzer to ensure a correct reading. Plots are provided to show compliance to the band edge and restricted band requirements.

Test Setup



Radiated Spurious Emissions (Bluetooth)

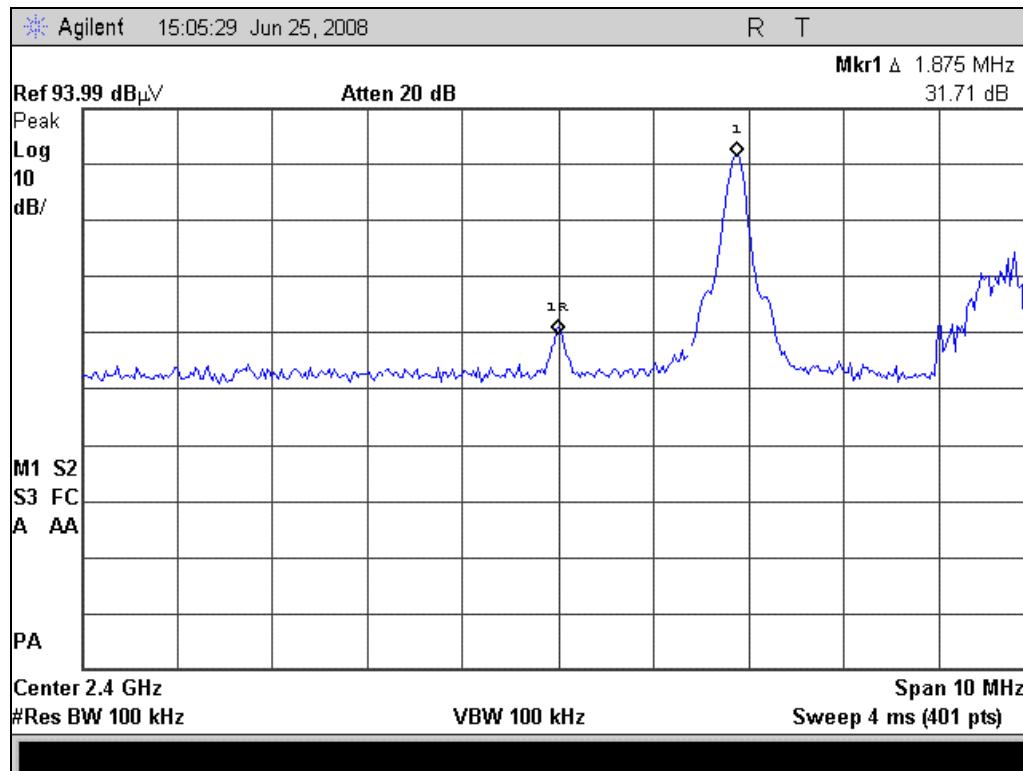
Tuned Freq (MHz)	Emission Freq (MHz)	Peak Measured Level (dBuV/m)	Peak Limit (dBuV/m)	Result
2402	4808.525	51.4	74.0	Pass
2442	4880.375	52.35	74.0	Pass
2480	4960.000	50.98	74.0	Pass

Radiated Spurious Emissions (Zigbee)

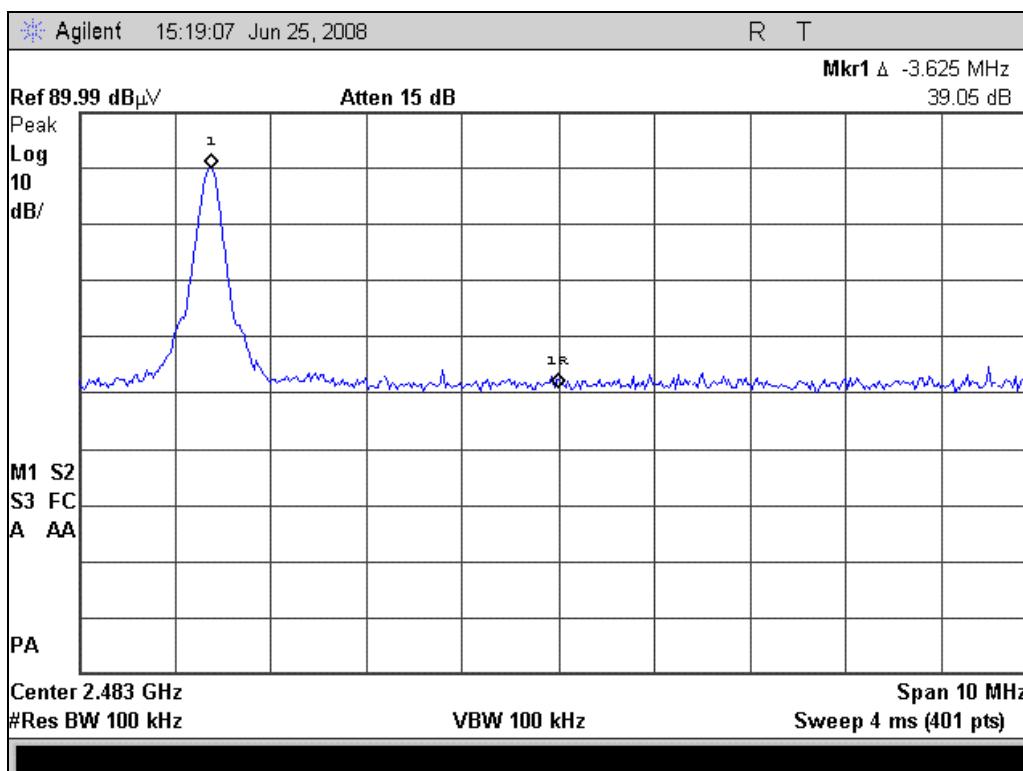
Tuned Freq (MHz)	Emission Freq (MHz)	Peak Measured Level (dBuV/m)	Peak Limit (dBuV/m)	Result
2405	4803.35	52.98	74.0	Pass
2440	4893.75	56.89	74.0	Pass
2440	4893.75	44.55	54.0**	Pass
2480	4961.75	51.64	74.0	Pass

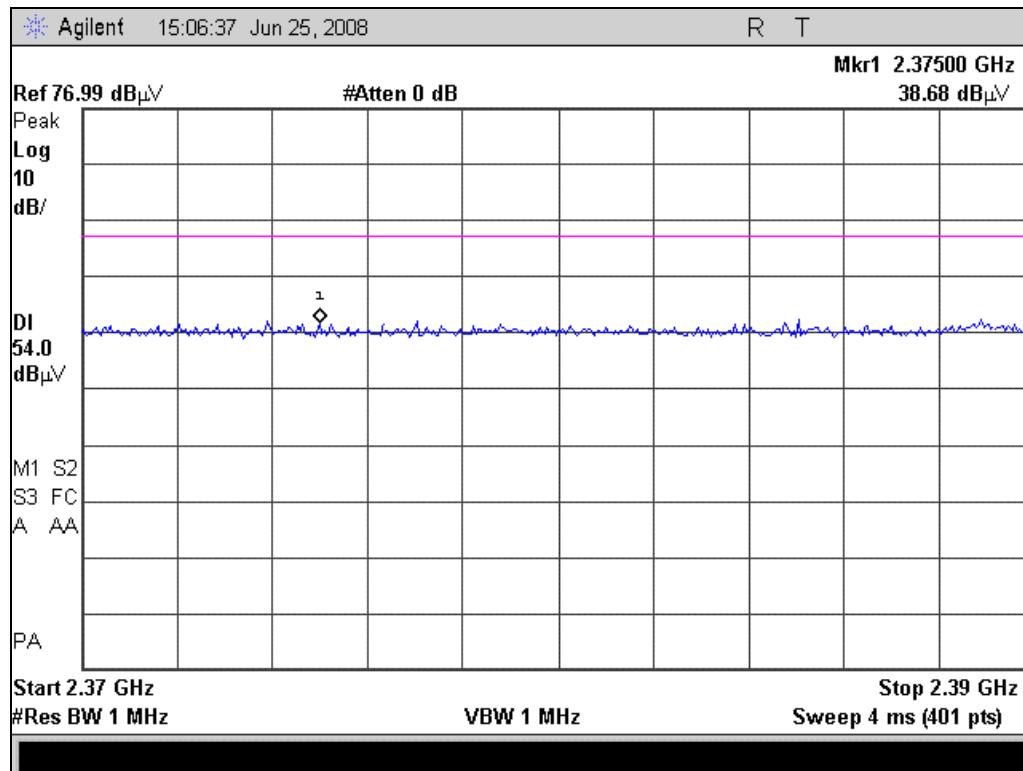
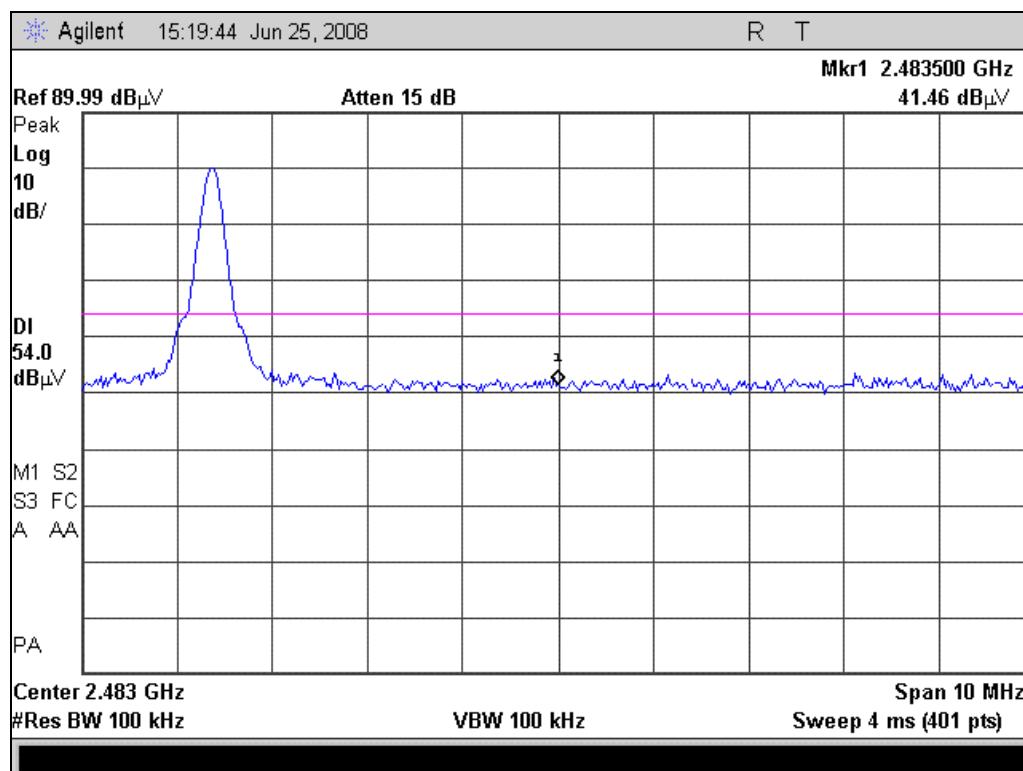
For both transmitters the peak spurious emissions were below the average limits except where indicated by **. Except for this one frequency no additional testing is required.

Band Edge 2400 MHz (Bluetooth)

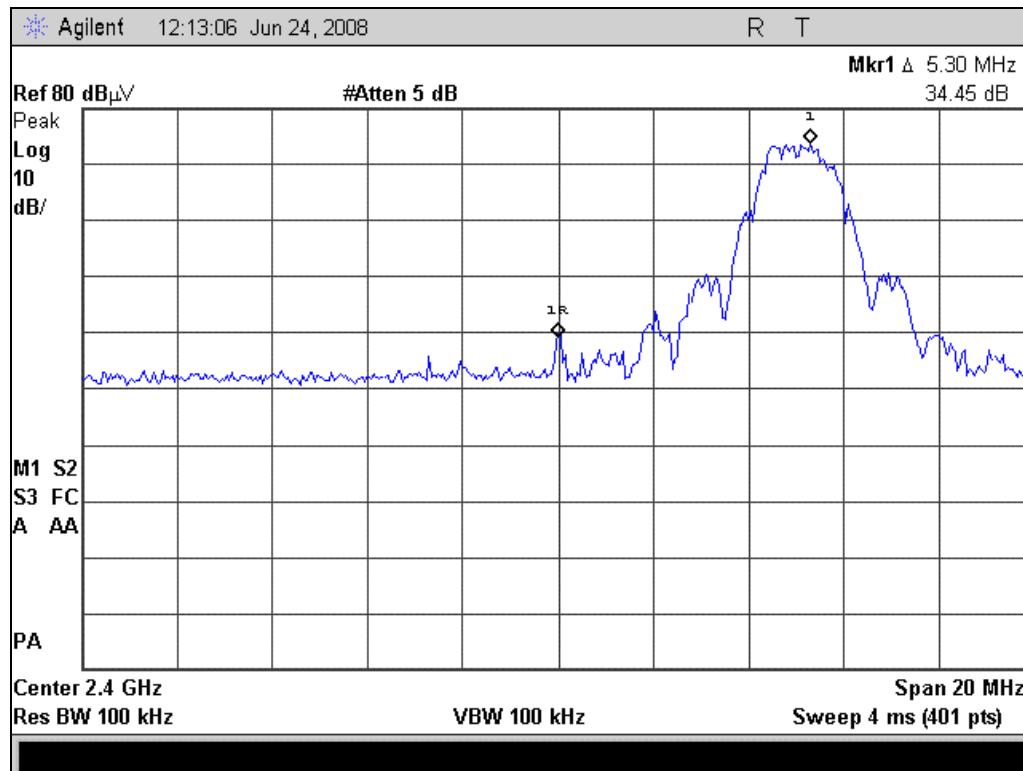


Band Edge 2438.5 MHz (Bluetooth)

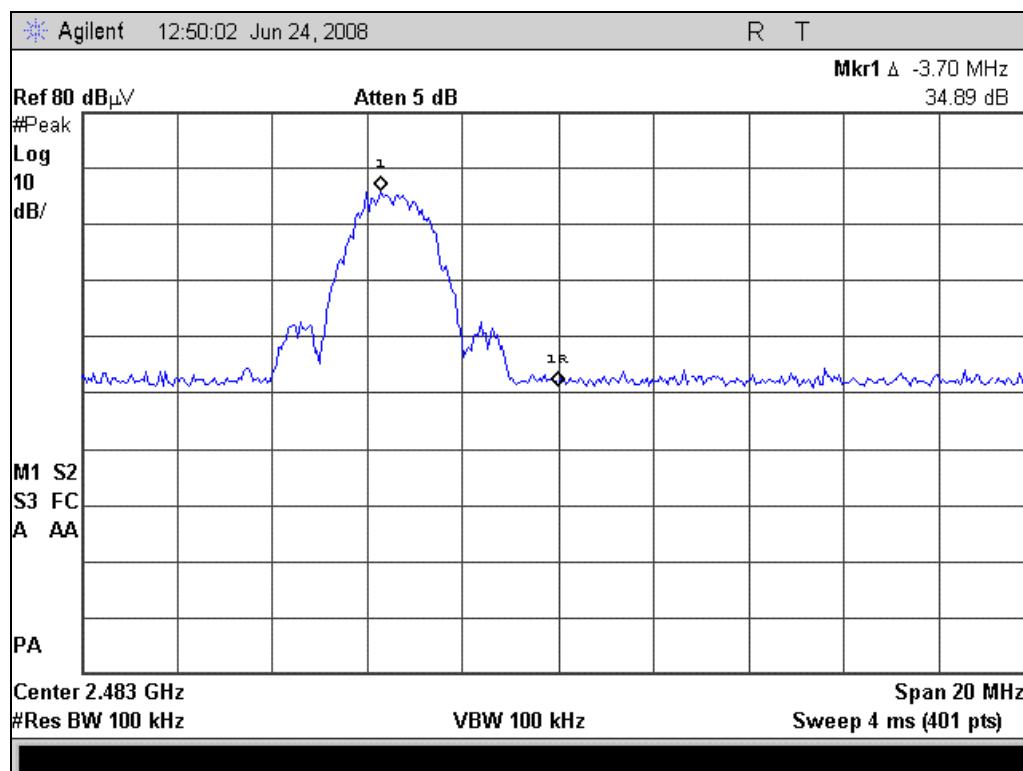


Restricted Band 2390 MHz (Bluetooth)

Restricted Band 2483.5 MHz (Bluetooth)


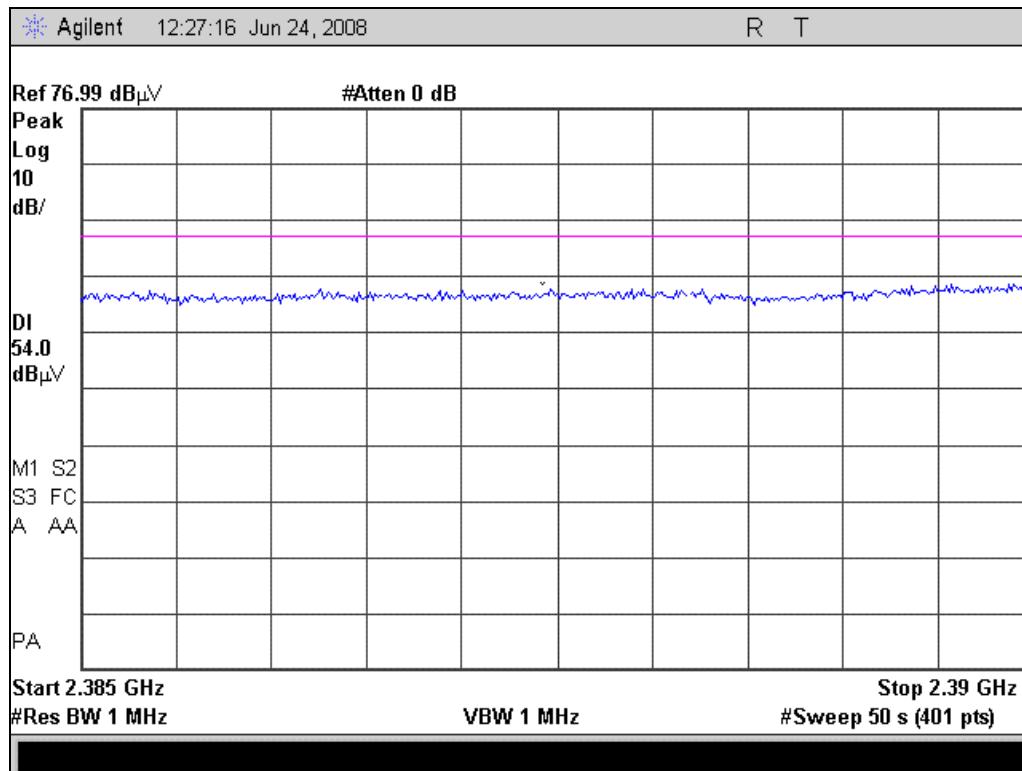
Band Edge 2400 MHz (Zigbee)



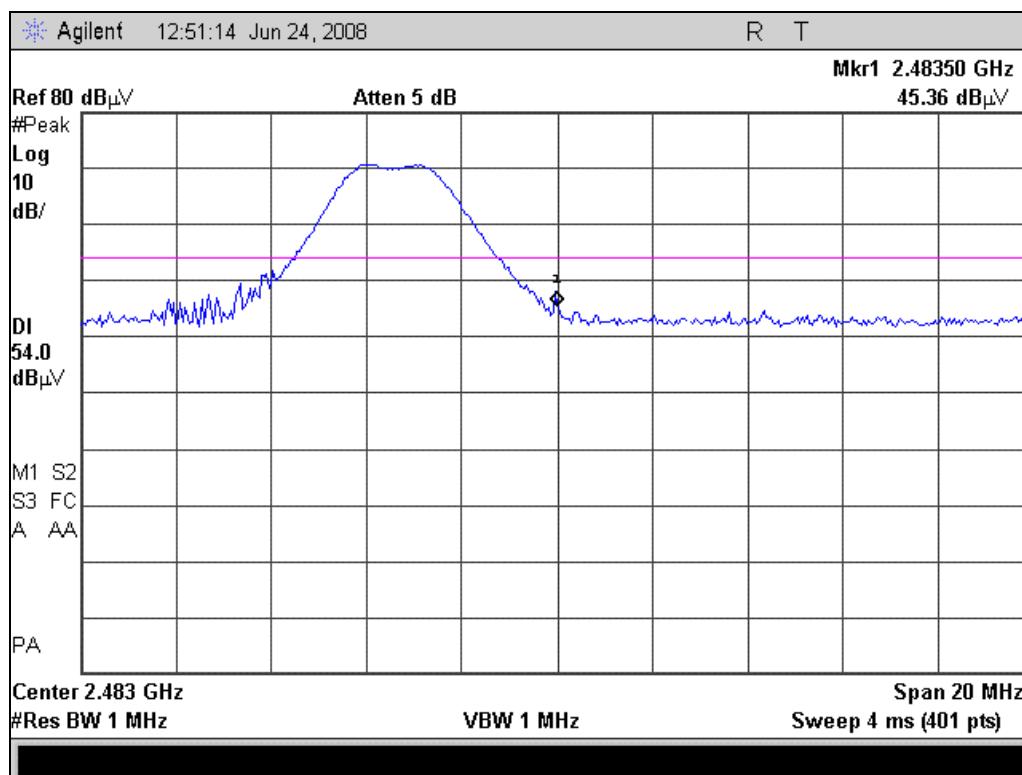
Band Edge 2483.5 MHz (Zigbee)



Restricted Band 2390 MHz (Zigbee)



Restricted Band 2483.5 MHz (Zigbee)



For both transmitters the peak spurious emissions were below the average limits therefore no additional testing is required.

Name of Test: 99% Occupied Bandwidth
Specification: RSS 210 Industry Canada Only
Test Equipment Utilized i00329 **Test Date:** 6/24/08

Test Procedure

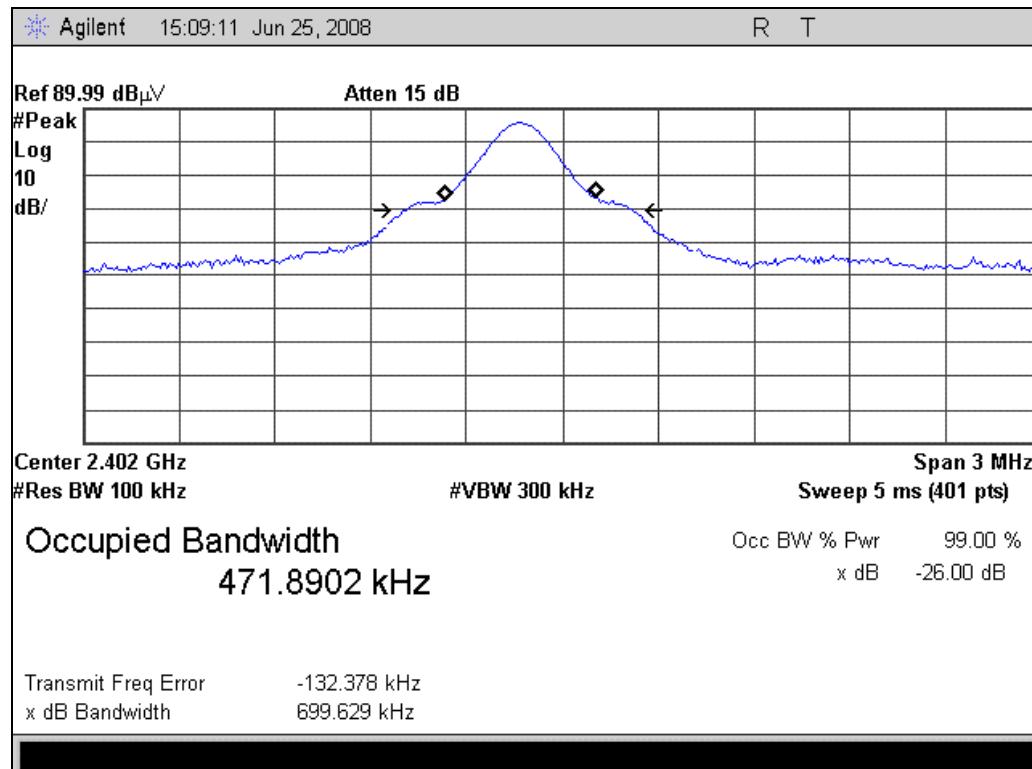
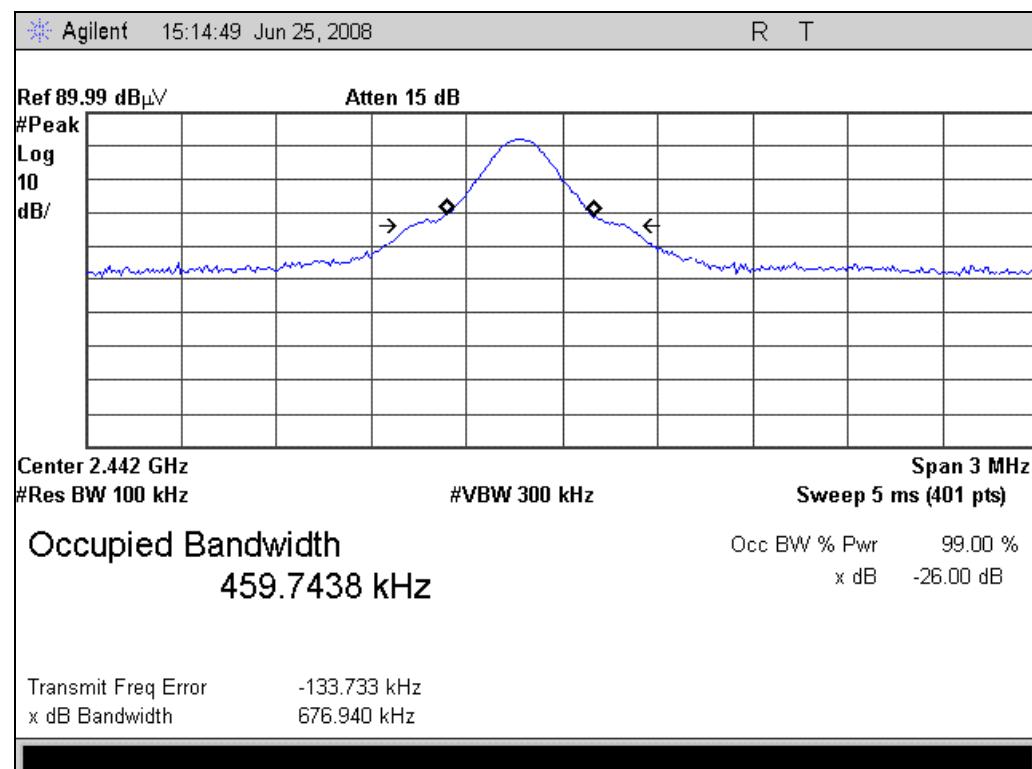
The UUT was tested on an Open Area Test Site (OATS) at a distance of 3 meters from the receiving antenna. A spectrum analyzer was used to verify that the UUT met the Occupied Bandwidth.

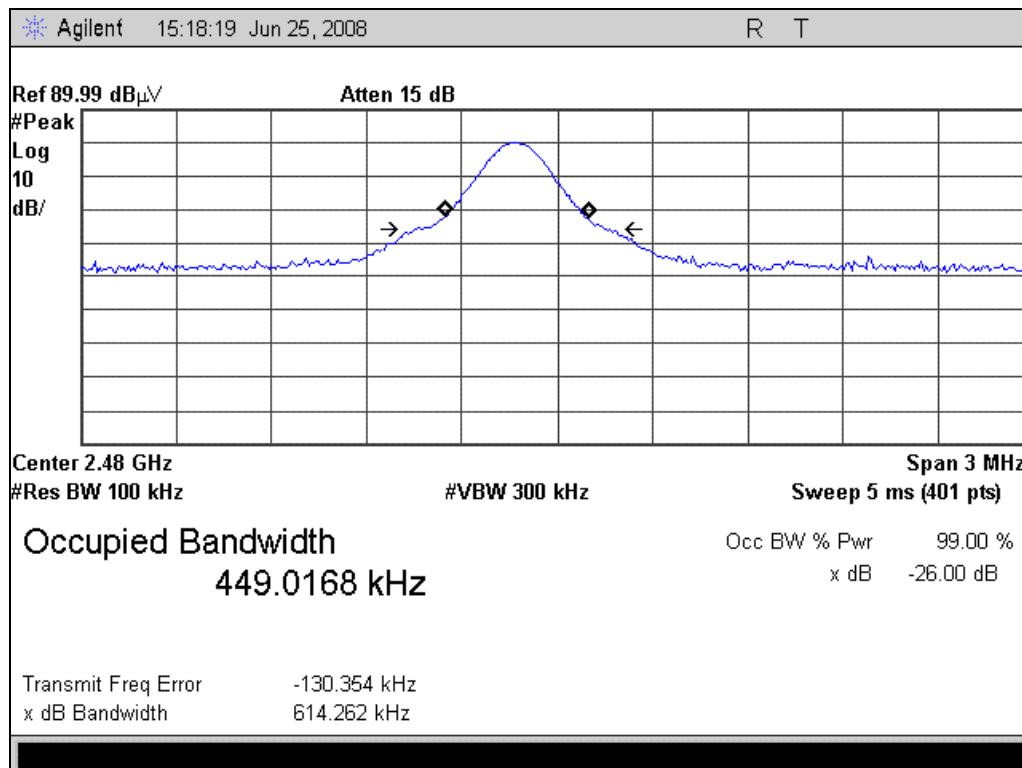
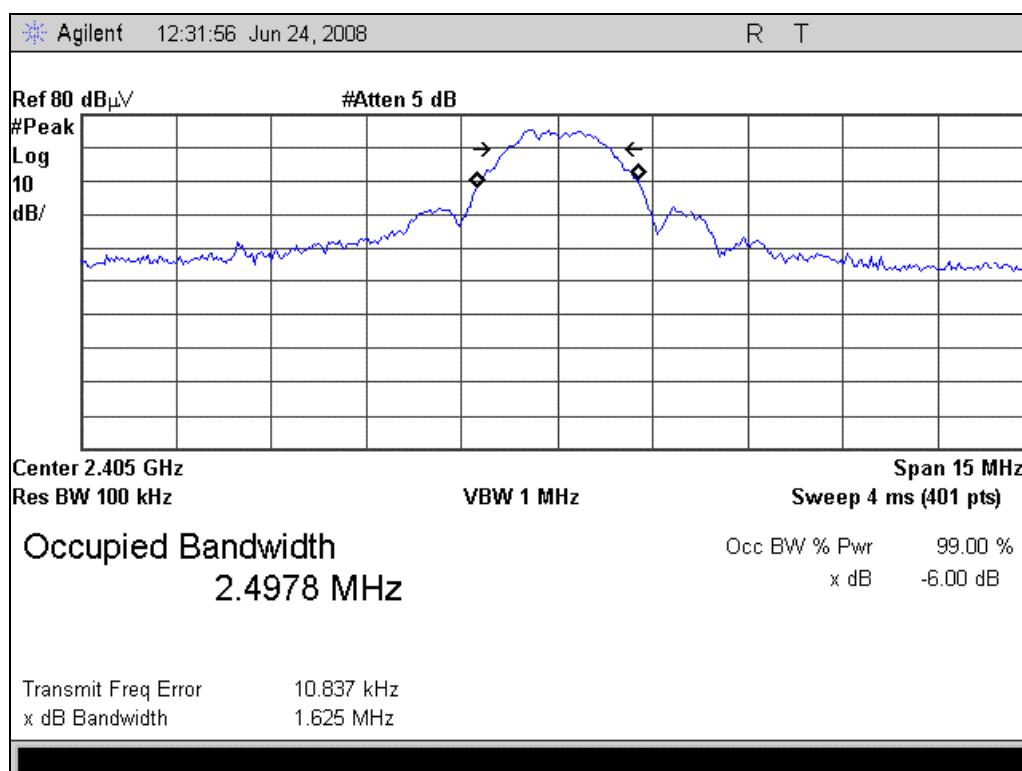
Occupied Bandwidth Summary (Bluetooth)

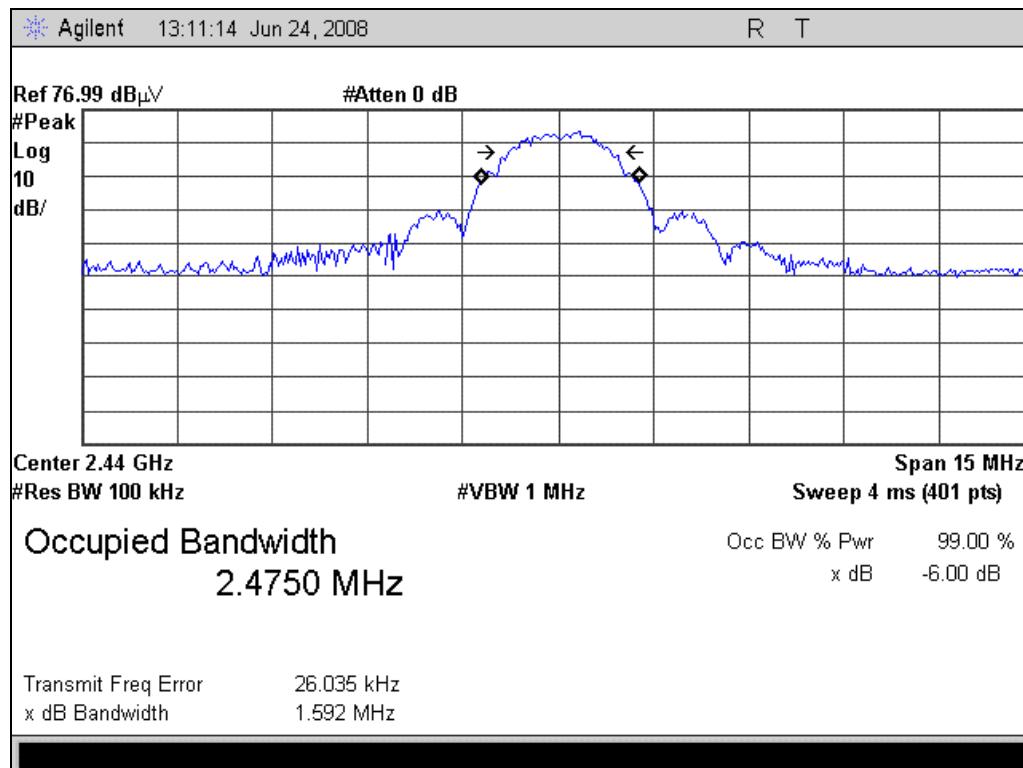
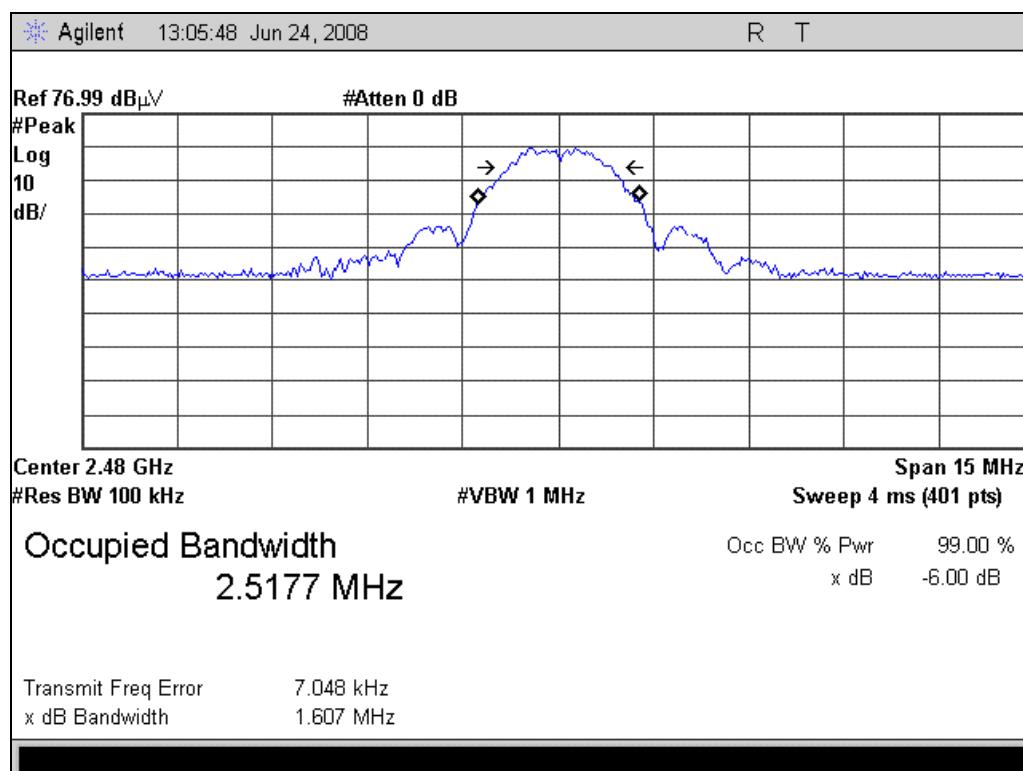
Frequency MHz	Recorded Measurement	Result
2402	471.8902 kHz	Pass
2442	455.7438 kHz	Pass
2480	449.0168kHz	Pass

Occupied Bandwidth Summary (Zigbee)

Frequency MHz	Recorded Measurement	Result
2405	2.4987 MHz	Pass
2440	2.4570 MHz	Pass
2482	2.5177 MHz	Pass

99% Bandwidth 2402 MHz (Bluetooth)

99% Bandwidth 2442 MHz (Bluetooth)


99% Bandwidth 2480 MHz (Bluetooth)

99% Bandwidth 2402 MHz (Zigbee)


99% Bandwidth 2442 MHz (Zigbee)

99% Bandwidth 2480 MHz (Zigbee)


Test Equipment Utilized

Description	MFG	Model Number	FTL Asset Number	Last Cal Date	Cal Due Date
Horn Antenna	EMCO	3115	i00103	9/5/06	9/5/08
Spectrum Analyzer	HP	E4407B	i00331	10/23/07	10/23/08

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