# Global EMC Inc. Labs

# MPE Evaluation

As per

# Industry Canada Safety Code 6

# &

# FCC Part 15 Subpart C: 2007 15.247i

# FCC Part 1, Section 1.1310 Table 1 (B)

On the

# Viconics VWG-APP Wireless module


Ashwani Malhotra
Global EMC Inc.
180 Brodie Dr, Unit 2
Richmond Hill, ON L4B 3K8
Canada
Ph: (905) 883-3919


Testing produced for

See Appendix A for full customer & EUT details.

LAB REGISTRATION #6844A-1

FCC REGISTRATION #612361

ACCREDITED TESTING LABORATORY CERTIFICATE #2565.01

# Table of Contents

# Report Scope

This report addresses the EMC verification testing and test results of the Viconics Wireless Radio Module (VWG-APP), herein referred to as EUT (Equipment Under Test) performed at Global EMC Labs.

The EUT was evaluated for compliance against the following standards:
IC Safety Code 6 & FCC Part 1, Section 1.1310 Table 1 (B)

Test procedures, results, justifications, and engineering considerations, if any, follow later in this report.The results contained in this report relate only to the item(s) tested.
This report does not imply product endorsement by A2LA or any other accreditation agency, any government, or Global EMC Inc.

Opinions/interpretations expressed in this report, if any, are outside the scope of Global EMC Inc accreditation. Any opinions expressed do not necessarily reflect the opinions of Global EMC Inc, unless otherwise stated.

| | |
|---|---|
| Client | Viconics |
| Product | VWG-APP |
| Standard(s) | RSS 210 Issue 6:2005 / FCC Part 15 Subpart C 15:2006 |

# Summary

The results contained in this report relate only to the item(s) tested.

| | |
|---|---|
| EUT FCC Certification #, FCC ID: | V95-VWG-APP |
| EUT Industry Canada Certification #, IC: | 7591A-VWG-APP |
| EUT Passed all tests performed. | Yes (see test results summary) |
| Tests conducted by | Ashwani Malhotra |

| | |
|---|---|
| Client | Viconics |
| Product | VWG-APP |
| Standard(s) | RSS 210 Issue 6:2005 / FCC Part 15 Subpart C 15:2006 |

## *Test Results Summary*

| Standard/Method | Description | Class/Limit | Result |
|---|---|---|---|
| FCC 15.247(i)<br>IC Safety code 6 | Maximum Permissible Exposure | > 20 cm separation. | Pass<br>See justification and calculations |
| **Overall Result** | | | **PASS** |

All tests were performed by Ashwani Malhotra

If the product as tested or otherwise complies with the specification, the EUT is deemed to comply with the requirement and is deemed a 'PASS' grade. If not 'FAIL' grade will be issued. Note that 'PASS' / 'FAIL' grade is independent of any measurement uncertainties. A 'PASS' / 'FAIL' grade within measurement uncertainty is marked with a '*'.

## *Justifications, Descriptions, or Deviations*

The following justifications for tests not performed or deviations from the above listed specifications apply:

For maximum permissible exposure, this device operates at less than 1 Watt at 2400 – 2480.0 MHz and is designed to operate greater than 20 cm from personnel during normal operation. No testing is required, however worst case calculated exposure compliance follows later in this report.

## *Applicable Standards, Specifications and Methods*

| | |
|---|---|
| ANSI C63.4:2003 | - Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz |
| CFR 47 FCC 15 | - Code of Federal Regulations – Radio Frequency Devices |
| CISPR 22:1997 | - Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement |
| ICES-003:2004 | - Digital Apparatus - Spectrum Management and Telecommunications Policy Interference-Causing Equipment Standard |
| ISO 17025:2005 | - General Requirements for the competence of testing and calibration laboratories |
| RSS 210:2005 | - Issue 6: Spectrum Management and Telecommunications Policy. Radio Standards Specification Low Power Licence-Exempt Radiocommunication Devices |
| IC Safety Code 6 | - Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3 KHZ to 300 GHZ |

## *Sample calculation(s)*

Margin = limit – (received signal + antenna factor + cable loss – pre-amp gain)
Margin = 50.5dBuV/m – (50dBuV + 10dB + 2.5dB – 20dB)
Margin = 8.5 dB

## *Document Revision Status*

Revision 1 – May 27, 2009 – Initial report release.
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# Definitions and Acronyms

The following definitions and acronyms are applicable in this report.
See also ANSI C63.14.

**AE** – Auxiallary Equipment.

**BW –** Bandwidth. Unless otherwise stated, this is refers to the 6 dB bandwidth.

**EMC** – Electro-Magnetic Compatibility

**EMI** – Electro-Magnetic Immunity

**EUT** – Equipment Under Test

**ITE –** Information Technology Equipment with a primary function(s) of entry, storage, display, retrieval, transmission, processing, switching, or control, of data.

**LISN** – Line impedance stabilization network

**NCR** – No Calibration Required

**RF** – Radio Frequency

# Testing Facility

Testing for EMC on the EUT was carried out at Global EMC labs in Toronto, Ontario, Canada. The testing lab consists of a 3m semi-anechoic chamber calibrated to be able to allow measurements on an EUT with a maximum width or length of up to 2m and height up to 3m. The chamber is equipped with a turn table that is capable of testing devices up to 3300lb in weight. This facility is capable of testing products that are rated for 120 Vac and 240Vac single phase, or 208 Vac 3 phase input. DC capability is also available. The chamber is equipped with an antenna mast that controls polarization and height from the control room adjoining the shielded chamber. Radiated emissions measurements are performed using a Bilog, and Horn antenna where applicable. Conducted emissions, unless otherwise stated, are performed using a LISN.

## *Calibrations and Accreditations*

The measurement site used is registered with Federal Communications Commission (FCC) and Industry Canada (IC). This site is calibrated for Normalized Site Attenuation (NSA) using test procedures outlined in ANSI C63.4 “Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz”. The semi-anechoic chamber is lined with ferrite tiles and absorption cones to minimize any undesired reflections. All measuring equipment is calibrated on an annual or bi-annual basis as listed for each respective test.

## *Testing Environmental Conditions and Dates*

Following were the environmental conditions in the facility during time of testing –

| Date | Test | Init. | Temperature (ºC) | Humidity (%) | Pressure (kPa) |
|---|---|---|---|---|---|
| May 3 – 8, 2009 | All | AM | 21-24ºC | 35-46% | 100.1 - 102.3kPa |

# Detailed Test Results Section

# *Maximum Permissible Exposure*

## Purpose

The purpose of this test is to ensure that the RF energy intentionally transmitted, in terms of power density emitted from the EUT at a stated operating distance does not exceed the limits listed below as defined in the applicable test standard, as calculated based upon readings obtained during testing. This helps protect human exposure to excessive RF fields.

## Limit(s) and Method

The limits, as defined in FCC 15.247(i) and FCC 1.1310 Table 1 (B) limits for general public exposure was applied. The limit for the frequency range of 1.5 GHz to 100 GHz was applied. This is a limit of 1.0 mW/ $cm^2$. The distance used for calculations was 20cm, as this is the minimum distance an operator will be from the EUT during normal operation, as stated by the manufacturer.

## Results

The EUT passed the requirements. The worst case calculated power density was 0.005355 $mW/cm^2$; this is significantly under the 1.0 $mW/cm^2$ requirement.

## Calculations

Method 1 (conducted power)

$P_d = (P_t * G) / (4 * pi * R^2)$
Where Pt = 11.3 or 13.5 mW as per Peak power conducted output
Where G = 3 dBi, or numerically 2
Where R = 20 cm

$P_d = (13.5\ mW * 2) / (4 * pi * 20cm^2)$
$P_d = 26.91\ mW / 5026\ cm^2$
$P_d = 0.005355\ mW/cm^2$

# Appendix A – EUT Summary

## General EUT Description

| Client | |
|---|---|
| **Organization** | Viconics |
| **Contact** | Paolo Primiani |
| **Phone** | 1-800-563-5660 |
| **Email** | paolo@viconics.com |
| **EUT Details** | |
| **EUT Model number** | VWG-APP |
| **Equipment Category** | Thermostat control equipment. |
| **Basic EUT Functionality** | Viconics Wireless Gateway (VWG-APP) and associated thermostats with wireless mesh network adapter, has been specifically designed to target the automation-less retrofit market equipped with stand-alone electromechanical or electronic controls. The Viconics wireless product line provides significant reduction in installed costs through the elimination of additional field communication wiring, allowing you to reuse the existing equipment-to-controller wiring infrastructure. |
| **Input Voltage and Frequency** | DC powered |
| **Connectors available on EUT** | None |
| **Peripherals Required for Test** | RS-232 connection to test board and laptop to control channel and output power. |
| **Release type** | Final |
| **Intentional Radiator Frequency** | 2400 – 2483.5 MHz |
| **I/O cable description** | EUT has an antenna extender cable which is approximately 5 feet in length. |

# Appendix B – EUT and Test Setup Photographs

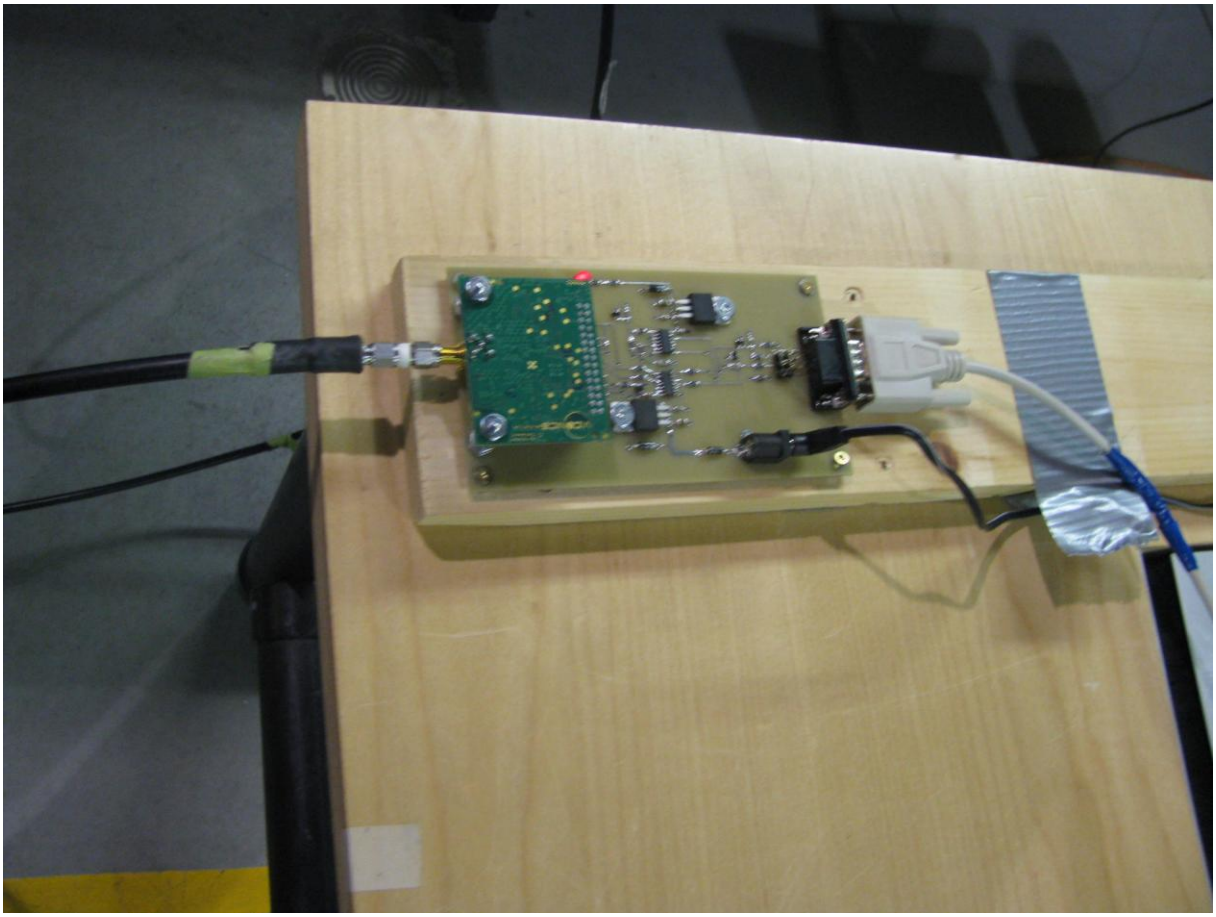

Figure 1 – EUT