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Project Number: 08408-10

Prepared for:

Wireless Computing, Inc.  
3703 Peak Lookout  
Austin, Texas 78738

By  
Professional Testing (EMI), Inc.  
1601 FM 1460, Suite B  
Round Rock, Texas 78664

May 2008

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**CERTIFICATION**  
**Electromagnetic Interference Test Report**  
**Wireless Computing, Inc.**  
**RF222 Wireless Keyboard**

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***THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL, WITHOUT THE WRITTEN APPROVAL OF PROFESSIONAL TESTING (EMI), INC.***



# Certificate Of Compliance

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Applicant: Wireless Computing, Inc.

Applicant's Address: 3703 Peak Lookout  
Austin, TX 78738

FCC ID: L7MR170

Project Number: 08408-10

Test Dates: May 1, 2008

I, Jason Anderson, Director of Testing Services for Professional Testing (EMI), Inc., being familiar with the FCC rules and test procedures have reviewed the test setup, measured data and this report. I believe them to be true and accurate.

The **Wireless Computing, Inc., RF222** was tested to and found to be in compliance with FCC Part 15 Subpart C for an Intentional Radiator.

The highest emissions generated by the above equipment are listed below:

	<u>Frequency (MHz)</u>	<u>Level (dB<math>\mu</math>V/m)</u>	<u>Limit (dB<math>\mu</math>V/m)</u>	<u>Margin (dB)</u>
Fundamental	916.5	93.7	94.0	-0.3
Harmonics	1830	40.5	54.0	-13.5
Occupied Bandwidth	344 (kHz)			

Jason Anderson  
Director of Testing Services

This report has been reviewed and accepted by Wireless Computing, Inc.. The undersigned is responsible for ensuring that **Wireless Computing, Inc., RF222** will continue to comply with the FCC rules.

## 1.0 EUT Description

The Wireless Computing RF222 is a Wireless Keyboard. The device transmits in the ISM band at 916.5 MHz. The device employs amplitude shift keying to transmit binary data to the host device.

The system tested consisted of the following:

Manufacturer & Model	FCC Number	Description
Wireless Computing, Inc., RF222	L7MR222	Wireless Keyboard

## 1.1 Applicable Documents

Guidelines	FCC Rule Parts Part 15
Transmitter Characteristics	15.249
Spurious Radiated Power	15.205, 15.209, 15.249
Antenna Requirement	15.203

## 1.2 EUT Operation

The EUT was operated in continuous transmit mode at max power amplitude modulated with a 101010 bit pattern to measure fundamental, harmonics, and spurious radiation.

## 2.0 Electromagnetic Emissions Testing

Measurements were made at the PTI semi-anechoic facility designated Site 45 (FCC 459644, IC 3036A-2) in Austin, Texas. This site is registered with the FCC under Section 2.948 and Industry Canada per RS-212 and is subsequently confirmed by laboratory accreditation (NVLAP). Professional Testing (EMI), Inc. (PTI), follows the guidelines of NIST for all uncertainty calculations, estimates and expressions thereof for EMC testing.

## 2.1 Radiated Emissions Measurements

Radiated emission measurements were made of the Fundamental and Spurious Emission levels for the EUT. Measurements of the occupied bandwidth were also made for the EUT.

Tests of the fundamental for the device were performed to determine the worst case polarization of the devices. The fundamental emissions of the device were measured with the antenna of the device in three orthogonal axes.

### **2.1.1 Test Procedure**

The EUT was placed on a non-conductive table 0.8 meters above the ground plane. The table was centered on a motorized turntable which allows 360 degree rotation. For measurements of the fundamental signal, a measurement antenna was positioned at a distance of 10 meters as measured from the closest point of the EUT. The radiated emissions were maximized by rotating the EUT.

A Spectrum Analyzer with peak detection was used to find the maximums of the radiated emissions during the variability testing. A drawing showing the test setup is given as Figure 2.

### **2.1.2 Test Criteria**

The table below shows FCC radiated limits for an intentional radiator operating under the provisions of part 15.249. The measurement of the harmonics was performed to 10 GHz. The reference distance for each limit is also shown in this table.

Frequency MHz	Test Distance (Meters)	Field Strength (dBuV/m)@Test Distance
30 to 88	3	40.0
88 to 216	3	43.5
216 to 960	3	46.0
960 and above	3	54
Fundamental	3	94
Harmonics	3	54

**Note: Fundamental and Harmonic Limits are expressed in Average field strengths. The spurious limits are expressed in Quasi-Peak.**

### **2.1.3 Test Results**

The radiated test data for the fundamental is included in Appendix A. Peak detection was used during the test for the fundamental and harmonics. Quasi-Peak detection was used for spurious emissions below 1 GHz. The radiated emission test data is included in Appendix A. The radiated emissions generated by the RF222 are below the FCC Part 15.249 limits.

## **3.0 Occupied Bandwidth Measurement**

### **3.1 Test Procedure**

The EUT was placed on a non-conductive table 0.8 meters above the floor. The occupied bandwidth was based on a 20 dB criteria (20 dB down either side of the emission from the peak emission). A drawing showing the test setup is given as Figure 1.

### **3.2 Test Criteria**

According to FCC Part 15.249, the emission must remain in the defined band.

### **3.3 Test Results**

The occupied bandwidth test data is included in Appendix A. The maximum occupied bandwidth for the fundamental frequency 916.5 MHz is 344 kHz. This occupied bandwidth complies with the FCC requirement.

### **4.0 Antenna Requirement**

An analysis of the RF222 was performed to determine compliance with FCC Section 15.203. This section requires specific handling and control of antennas used for devices subject to regulations.

#### **4.1 Evaluation Procedure**

The structure and application of the RF222 was analyzed with respect to the rules. The antenna is an internal antenna, and is not accessible to the user. An auxiliary antenna port is not present.

#### **4.2 Evaluation Criteria**

Section 15.203 of the rules states that the subject device must meet at least one of the following criteria:

- (a) Antenna must be permanently attached to the unit.
- (b) Antenna must use a unique type of connector to attach to the EUT.
- (c) Unit must be professionally installed. Installer shall be responsible for verifying that the correct antenna is employed with the unit.

#### **4.3 Evaluation Results**

The RF222 meets the criteria of this rule by virtue of having an internal antenna inaccessible to the user. The EUT is therefore compliant.

### **5.0 Modifications to Equipment**

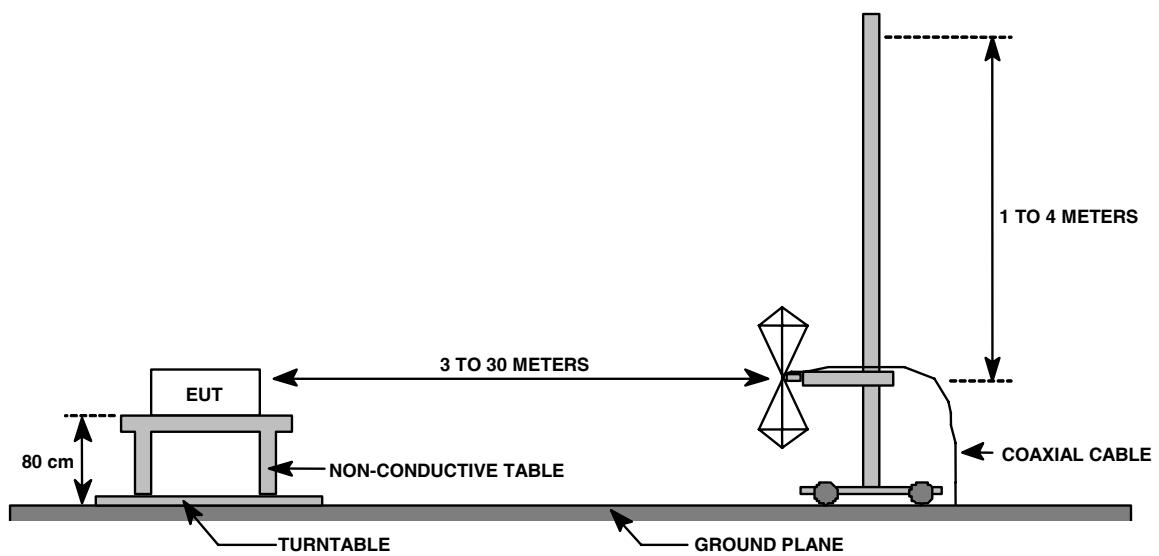
No modifications were made to the EUT.

## 6.0 List of Test Equipment

A list of the test equipment utilized to perform the testing is given below. The date of calibration is given for each.

Asset #	Manufacturer	Model #	Description	Calibration Due
1281	HP	85650A	Quasi-peak Adapter (high band)	June 22, 2008
1273	HP	85662A	Spectrum Analyzer Display (high band)	NCR
84	HP	8566B	Spectrum Analyzer (high band)	March 14, 2009
990	HP	85685A	RF Preselector (high band)	March 18, 2009
239	HP	85650A	Quasi-peak Adapter (low band)	January 22, 2009
1274	HP	85662A	Spectrum Analyzer Display (low band)	NCR
1270	HP	8568B	Spectrum Analyzer (low band)	January 22, 2009
1035	HP	85685A	RF Preselector (low band)	January 22, 2009
1454	HP	8447D	RF Preamplifier	May 8, 2008
1389	Emco	3108	Biconical Antenna	April 16, 2009
1486	Emco	3147	Log Periodic Dipole Araay Antenna	April 16, 2009
C026	none	none	Coaxial Cable (low band)	June 28, 2008
C027	none	none	Coaxial Cable (high band)	June 28, 2008

**FIGURE 1: Radiated Emissions Test Setup**



**APPENDIX A**

**EMISSIONS DATA SHEET**

**Radiated Data Sheet**  
**Fundamental**  
**Wireless Computing, Inc.**  
**RF222**

MEASUREMENT DISTANCE (m): 3

DATE: May 1, 2008

DETECTOR FUNCTION: Peak

PROJECT #: 08408-10

RBW: CISPR 120 kHz

VBW: 1 MHz

**Vertical**

Frequency (MHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
916.5	318	1	57.4	0.0	23.5	3.1	84.0	94	-10.0

**Horizontal**

Frequency (MHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
916.5	228	1	67.1	0.0	23.5	3.1	93.7	94	-0.3

**Radiated Data Sheet**  
**Spurious/Harmonics <1 Ghz**  
**Wireless Computing, Inc.**  
**RF222**

MEASUREMENT DISTANCE (m): 3

DATE: May 1, 2008

DETECTOR FUNCTION: Peak

PROJECT #: 08408-10

RBW: CISPR 120 kHz

VBW: 1 MHz

**Vertical**

Frequency (MHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
100	Noise	Floor	35.1	25.4	9.0	1.0	19.6	43.5	-23.9
200	Noise	Floor	38.7	36.0	10.9	1.9	15.5	43.5	-28.0
300	Noise	Floor	34	36.5	13.9	2.5	13.9	46	-32.1
400	Noise	Floor	32.8	36.6	16.6	3.0	15.8	46	-30.2
500	Noise	Floor	32.3	36.6	18.9	3.4	17.9	46	-28.1
600	Noise	Floor	32.5	36.6	19.7	3.7	19.4	46	-26.6

**Horizontal**

Frequency (MHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
100	Noise	Floor	35.1	25.4	9.0	1.0	19.6	43.5	-23.9
200	Noise	Floor	38.7	36.0	10.9	1.9	15.5	43.5	-28.0
300	Noise	Floor	34	36.5	13.9	2.5	13.9	46	-32.1
400	Noise	Floor	32.8	36.6	16.6	3.0	15.8	46	-30.2
500	Noise	Floor	32.3	36.6	18.9	3.4	17.9	46	-28.1
600	Noise	Floor	32.5	36.6	19.7	3.7	19.4	46	-26.6

**Radiated Data Sheet**  
**Wireless Computing, Inc.**  
**RF222**  
**(Graphical representation only)**

MEASUREMENT DISTANCE (m): 3

DATE: May 1, 2008

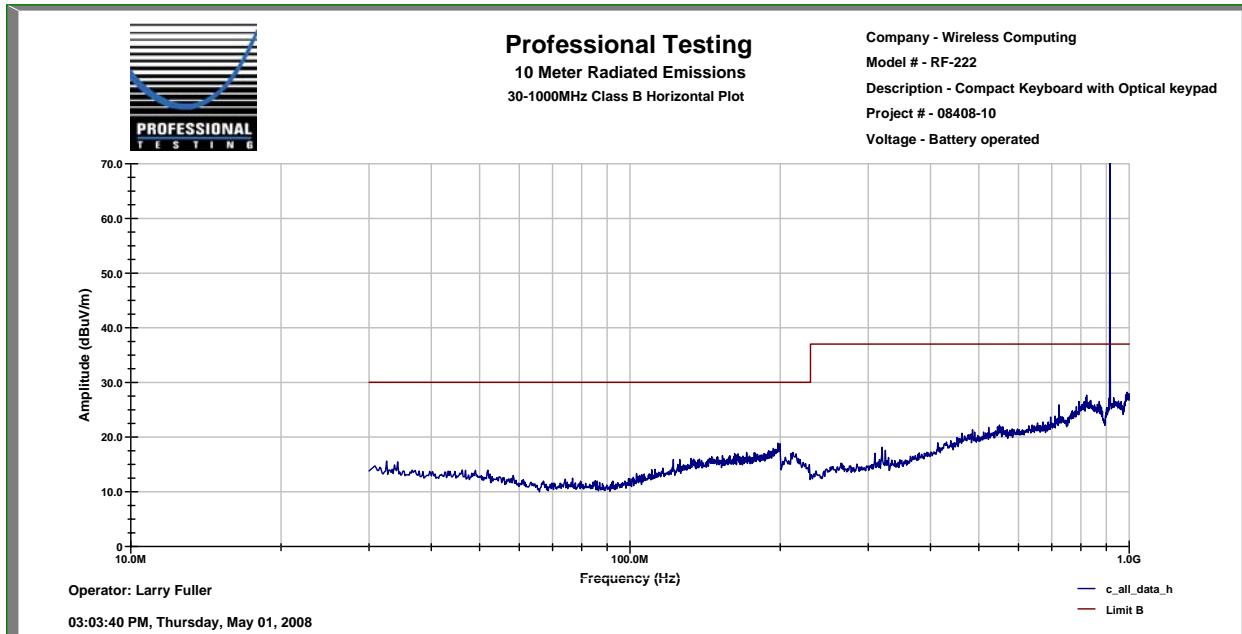
DETECTOR FUNCTION: Peak

PROJECT #: 08408-10

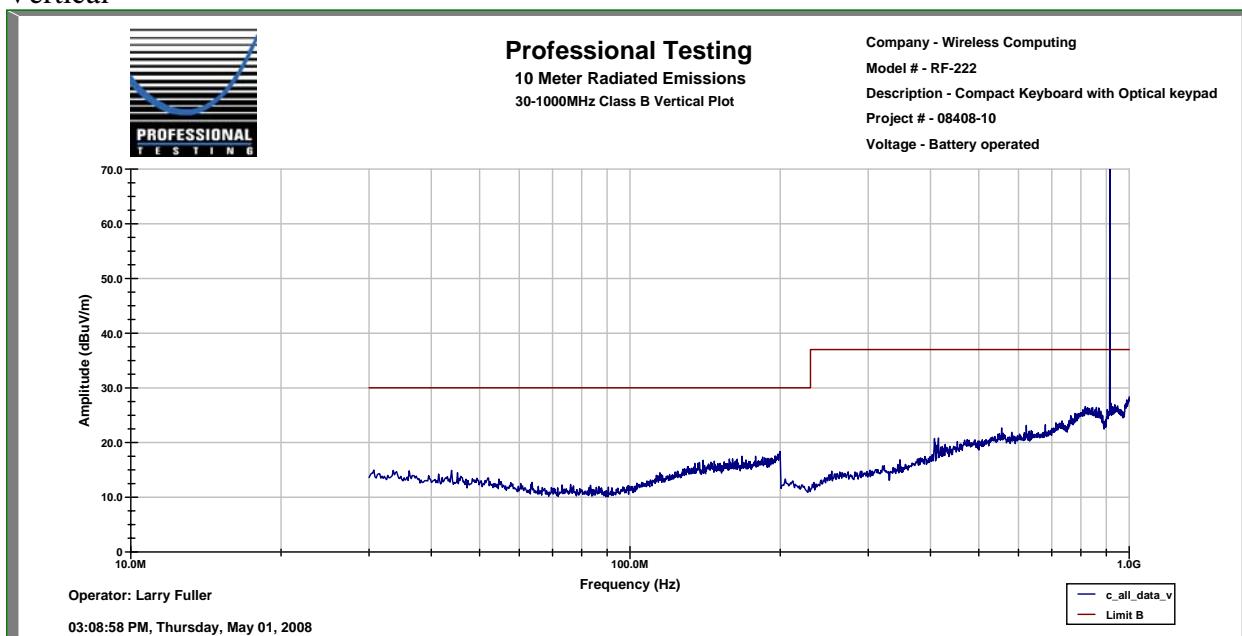
RBW: CISPR 120 kHz

VBW: 1 MHz

Horizontal



Vertical



**Radiated Data Sheet**  
**Spurious/Harmonics >1 GHz**  
**Wireless Computing, Inc.**  
**RF222**

MEASUREMENT DISTANCE (m): 3  
DETECTOR FUNCTION: Peak  
RBW: 1 MHz  
VBW: 1 MHz

DATE: May 1, 2008  
PROJECT #: 08408-10

**Vertical**

Frequency (MHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1832	1	1	66.9	56.9	26.8	3.7	40.5	54	-13.5

**Horizontal**

Frequency (MHz)	EUT Direction (degrees)	Antenna Elevation (Meters)	Recorded Level (dBuV)	Amplifier Gain (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1832	1	1	66.6	56.9	26.8	3.7	40.2	54	-13.8

**Radiated Data Sheet**  
**Wireless Computing, Inc.**  
**RF222**  
**(Graphical representation only)**

MEASUREMENT DISTANCE (m): 3

DATE: May 1, 2008

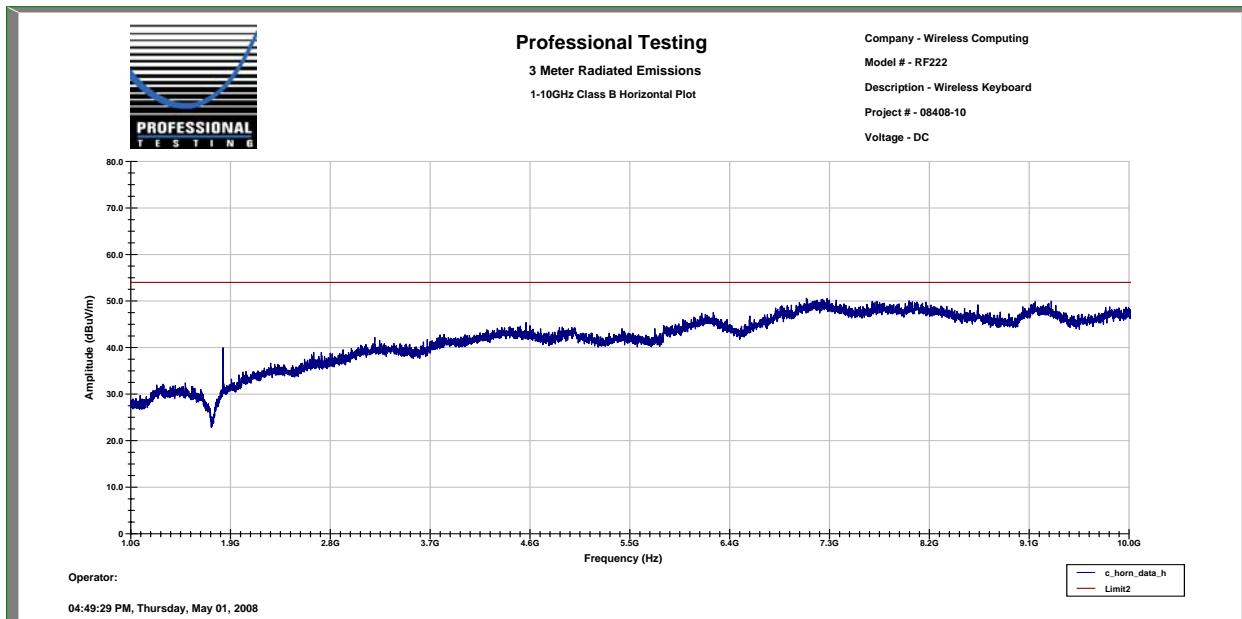
DETECTOR FUNCTION: Peak

PROJECT #: 08408-10

RBW: 1 MHz

VBW: 1 MHz

Horizontal



Vertical



**Occupied Bandwidth Datasheet**  
**Wireless Computing, Inc.**  
**RF222**

Test Date: May 1, 2008

