



[www.nemko.com](http://www.nemko.com)



**Test Report:** 84286-1TRFWL


**Applicant:** 1K Solutions  
11 Geneva Street  
Ottawa, Ontario  
K1Y 3N5

**Apparatus:** Valve Control Unit

**FCC ID:** VCLVCU1KS20000000

**In Accordance With:** FCC Part 15 Subpart C, 15.249  
Operation in the 902-928MHz, 2400 - 2483.5 MHz,  
5725-5850MHz and 24.0-24.25 GHz

**Tested By:** Nemko Canada Inc.  
303 River Road  
Ottawa, Ontario  
K1V 1H2

**Authorized By:**   
Jin Xu, Wireless Specialist

**Date:** June 27, 2007

**Total Number of Pages:** 14

## Report Summary

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15, Subpart C. Radiated tests were conducted in accordance with ANSI C63.4-2003. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC.

The assessment summary is as follows:

<b>Apparatus Assessed:</b>	Valve Control Unit
<b>Specification:</b>	FCC Part 15 Subpart C, 15.249
<b>Compliance Status:</b>	Complies
<b>Exclusions:</b>	None
<b>Non-compliances:</b>	None
<b>Report Release History:</b>	Original Release

Author: Jason Nixon, Telecom Specialist

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025.

Nemko Canada Inc. authorizes the applicant to reproduce this report provided it is reproduced in its entirety and for use by the company's employees only.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Nemko Canada Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

---

## TABLE OF CONTENTS

<b>Report Summary .....</b>	<b>2</b>
<b>Section 1 : Equipment Under Test.....</b>	<b>4</b>
1.1 Product Identification .....	4
1.2 Samples Submitted for Assessment.....	4
1.3 Theory of Operation .....	4
1.4 Technical Specifications of the EUT .....	5
1.5 Block Diagram of the EUT.....	5
<b>Section 2 : Test Conditions.....</b>	<b>6</b>
2.1 Specifications .....	6
2.2 Deviations From Laboratory Test Procedures .....	6
2.3 Test Environment .....	6
2.4 Test Equipment.....	6
<b>Section 3 : Observations .....</b>	<b>7</b>
3.1 Modifications Performed During Assessment .....	7
3.2 Record Of Technical Judgements .....	7
3.3 EUT Parameters Affecting Compliance .....	7
3.4 Test Deleted.....	7
3.5 Additional Observations .....	7
<b>Section 4 : Results Summary .....</b>	<b>8</b>
4.1 FCC Part 15 Subpart C : Test Results .....	9
<b>Appendix A : Test Results.....</b>	<b>10</b>
Clause 15.215(c) 20dB Bandwidth.....	10
Clause 15.249(a) Radiated emissions not in Restricted Bands .....	11
<b>Appendix B : Setup Photographs .....</b>	<b>13</b>
<b>Appendix C : Block Diagram of Test Setups.....</b>	<b>14</b>

## **Section 1 : Equipment Under Test**

### **1.1 Product Identification**

The Equipment Under Test was identified as follows:

Valve Control unit

### **1.2 Samples Submitted for Assessment**

The following samples of the apparatus have been submitted for type assessment:

<b>Sample No.</b>	<b>Description</b>	<b>Serial No.</b>
11	Valve Control Unit	None

The first samples were received on: March 30, 2007

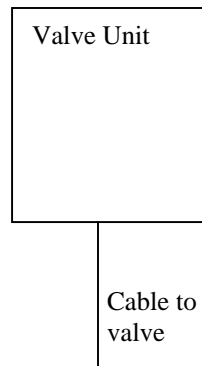
### **1.3 Theory of Operation**

The EUT is used to control valves of a sprinkler system.

## 1.4 Technical Specifications of the EUT

<b>Operating Frequency:</b>	915MHz Fixed
<b>Emission Designator</b>	F1D
<b>Modulation:</b>	FSK
<b>Antenna Data:</b>	Integral
<b>Power Source:</b>	4 x “C” batteries

## 1.5 Block Diagram of the EUT



## Section 2 : Test Conditions

### 2.1 Specifications

The apparatus was assessed against the following specifications:

FCC Part 15 Subpart C, 15.249

Operation in the 902-928MHz, 2400 - 2483.5 MHz, 5725-5850MHz  
and 24.0-24.25 GHz bands

### 2.2 Deviations From Laboratory Test Procedures

No deviations were made from laboratory test procedures.

### 2.3 Test Environment

All tests were performed under the following environmental conditions:

Temperature range : 15 – 30 °C  
Humidity range : 20 - 75 %  
Pressure range : 86 - 106 kPa  
Power supply range : +/- 5% of rated voltages

### 2.4 Test Equipment

Equipment	Manufacturer	Model No.	Asset/Serial No.	Next Cal.
Spectrum Analyzer	Rohde & Schwarz	FSP	FA001920	Mar 19/08
Receiver	Rohde & Schwarz	ESVS-30	FA001445	July 14/07
Biconical (2) Antenna	EMCO	3109	FA000904	Sept. 12/07
Log Periodic Antenna #1	EMCO	LPA-25	FA000477	Sept. 12/07
Horn Antenna #2	EMCO	3115	FA000825	Jan. 30/08
1.0 – 2.0 GHz Amplifier	JCA	12-400	FA001498	Aug. 02/07
2.0 – 4.0 GHz Amplifier	JCA	24-600	FA001496	Aug. 02/07
4.0 – 8.0 GHz Amplifier	JCA	48-600	FA001497	Aug. 02/07
5.0 – 18.0 GHz Amplifier	NARDA	DWT-186N23U40	FA001409	COU

COU – Calibrate on Use

NCR – No Calibration Required

## **Section 3 : Observations**

### **3.1 Modifications Performed During Assessment**

The following modification was performed during this assessment:

#### **3.1.1 Modification state 1**

As originally submitted the apparatus was found to be non-compliant with the fundamental field strength requirements of 15.249(a). The voltage was reduced to 2.8VDC and the output of the transceiver chip was changed to 0dBm. Following this modification the apparatus was found to be fully compliant.

### **3.2 Record Of Technical Judgements**

No technical judgements were made during the assessment.

### **3.3 EUT Parameters Affecting Compliance**

The user of the apparatus could not alter parameters that would affect compliance.

### **3.4 Test Deleted**

No Tests were deleted from this assessment.

### **3.5 Additional Observations**

There were no additional observations made during this assessment.

## **Section 4 : Results Summary**

This section contains the following:

FCC Part 15 Subpart C : Test Results

The column headed 'Required' indicates whether the associated clauses were invoked for the apparatus under test. The following abbreviations are used:

- N      No : not applicable / not relevant.
- Y      Yes : Mandatory i.e. the apparatus shall conform to these tests.
- N/T    Not Tested, mandatory but not assessed. (See section 3.4 Test deleted)

The results contained in this section are representative of the operation of the apparatus as originally submitted.



#### 4.1 FCC Part 15 Subpart C : Test Results

Part 15	Test Description	Required	Result
15.31(e)	Variation of power supply	N	
15.207(a)	Powerline Conducted Emissions	N	
15.209(a)	Radiated Emissions within Restricted Bands	Y	PASS
15.215(c)	20dB Bandwidth	Y	PASS
15.249(a)	Radiated emissions not in Restricted Bands	Y	PASS
15.249(b)	Fixed Point-to-Point operation in the 24.0-24.25 GHz Band	N	
15.249(d)	Spurious emissions (except Harmonics)	Y	PASS

Notes:

## Appendix A : Test Results

### Clause 15.215(c) 20dB Bandwidth

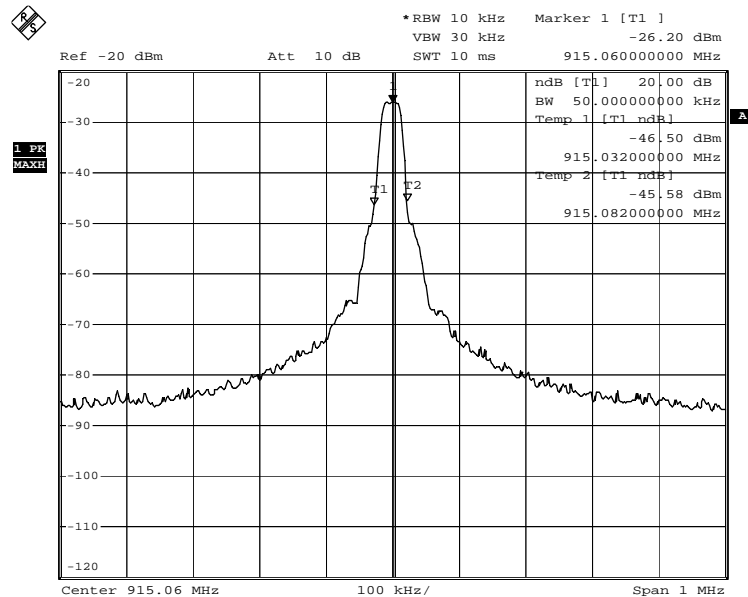
Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

### Test Conditions:

<b>Sample Number:</b>	11	<b>Temperature (°C):</b>	21
<b>Date:</b>	May 2, 2007	<b>Humidity (%):</b>	18
<b>Modification State:</b>	1	<b>Tester:</b>	Jason Nixon
		<b>Laboratory:</b>	Wireless

**Test Results:** See Attached Plots.

### 20dB Bandwidth:



20dB Bandwidth

Date: 2.MAY.2007 09:12:54

**Clause 15.249(a) Radiated emissions not in Restricted Bands**

Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

**Test Conditions:**

<b>Sample Number:</b>	11	<b>Temperature (°C):</b>	12
<b>Date:</b>	May 1, 2007	<b>Humidity (%):</b>	41
<b>Modification State:</b>	1	<b>Tester:</b>	Jason Nixon
		<b>Laboratory:</b>	OATS

**Test Results:** See attached Table

**Additional Observations:**

The Spectrum was searched from 30MHz to 10GHz.

The EUT was measured with fresh new batteries.

All measurements were performed at 3m.

Freq. (MHz)	Ant	Pol. V/H	RCVD Signal (dBμV)	Ant. Factor (dB)	Amp. Gain (dB)	Cable Loss (dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
915.0000	LP1	V	64.7	23.0	N/A	3.2	90.9	94.0	3.1	Q-Peak
915.0000	LP1	H	66.1	23.7	N/A	3.2	93.0	94.0	1.0	Q-Peak
1830.0000	Horn2	V	62.8	27.5	49.1	4.6	45.9	54.0	8.1	Peak
1830.0000	Horn2	H	65.5	27.4	49.1	4.6	48.5	54.0	5.5	Peak

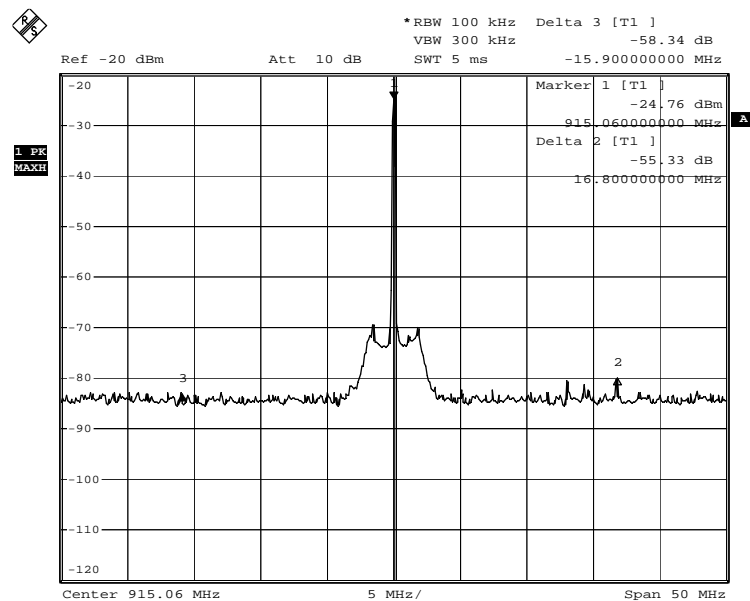
Note 1: Antenna Legend: BC = Biconical, BL = Bilog, LP = Log-Periodic, Horn = Horn, ED = EMCO Dipole

**Clause 15.249(d) Spurious emissions (except Harmonics)**

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

**Test Conditions:**

Sample Number:	11	Temperature (°C):	21
Date:	May 2, 2007	Humidity (%):	18
Modification State:	1	Tester:	Jason Nixon
		Laboratory:	Wireless

**Test Results:**

Bandedges

Date: 2.MAY.2007 09:15:31

## **Appendix B : Setup Photographs**

### **Spurious Emissions Setup:**



## Appendix C : Block Diagram of Test Setups

### Test Site For Radiated Emissions

