www.nemko.com

Test Report:	84286-2TRFWL
Applicant:	1K Solutions 11 Geneva Street Ottawa, Ontario K1Y 3N5
Apparatus:	Contoller Unit
FCC ID:	VCLCU1KS20000000
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:

Apparatus Assessed: Contoller Unit

Specification: FCC Part 15 Subpart C, 15.249

Compliance Status: Complies

Exclusions: None

Non-compliances: None

Report Release History: 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.

TABLE OF CONTENTS

Section 1 : Equipment Under Test

1.1 Product Identification

The Equipment Under Test was identified as follows:

Controller Unit

1.2 Samples Submitted for Assessment

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

Sample No.	Description	Serial No.
12	Controller	None

The first samples were received on: March 30, 2007

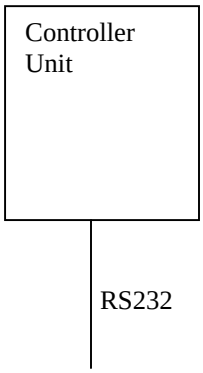
1.3 Theory of Operation

The EUT is used to control valve units for an automated sprinkler system.

1.4 Technical Specifications of the EUT

Operating Frequency:	915MHz Fixed
Emission Designator	F1D
Modulation:	FSK
Antenna Data:	Integral
Power Source:	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 ^{o}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 PCB design was change to include a PCB antenna, 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

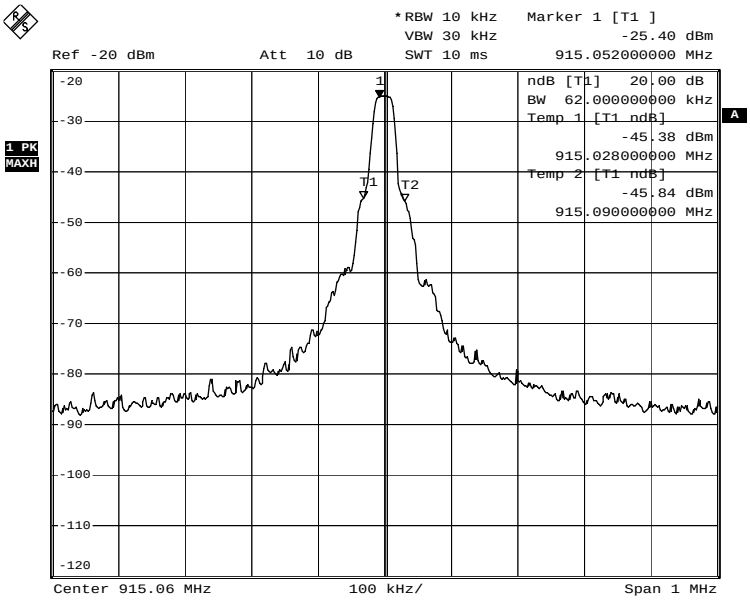
Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific 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:

Sample Number:	12	**Temperature (°C):**	21
Date:	May 2, 2007	**Humidity (%):**	18
Modification State:	1	**Tester:**	Jason Nixon
		Laboratory:	Wireless

Test Results: See Attached Plots.

20dB Bandwidth:



20dB Bandwidth

Date: 2.MAY.2007 09:22:07

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:

Sample Number:	12	**Temperature (°C):**	12
Date:	May 1, 2007	**Humidity (%):**	41
Modification State:	1	**Tester:**	Jason Nixon
		Laboratory:	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	66.4	23.0	N/A	3.2	92.6	94.0	1.4	Q-Peak
915.0000	LP1	H	67.0	23.7	N/A	3.2	93.9	94.0	0.1	Q-Peak
1830.0000	Horn2	V	55.4	27.5	49.1	4.6	38.5	54.0	15.5	Peak
1830.0000	Horn2	H	54.4	27.4	49.1	4.6	37.4	54.0	16.6	Peak

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

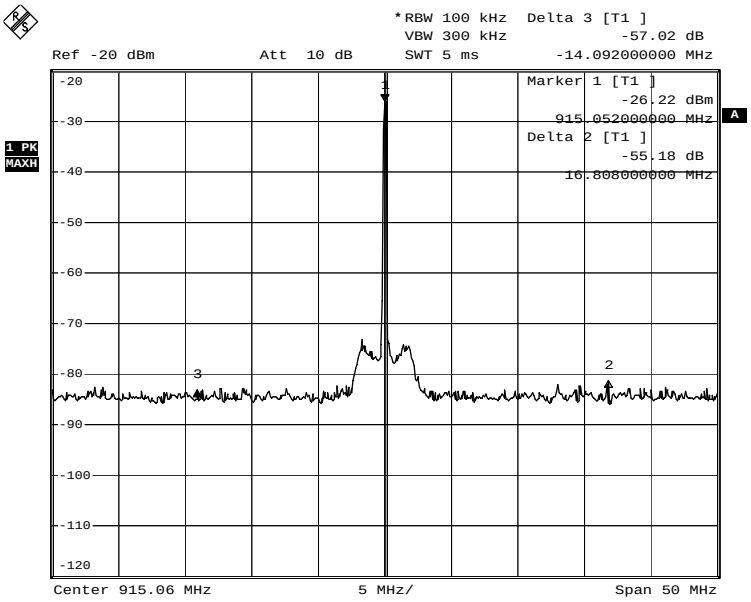
Clause 15.249(d) Spurious emissions (except Harmonics)

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

Test Results:



Bandedges

Date: 2.MAY.2007 09:23:37

Appendix B : Setup Photographs

Spurious Emissions Setup:

Appendix C : Block Diagram of Test Setups

Test Site For Radiated Emissions