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Test Report:	91666-1TRFWL
Applicant:	Digital Security Controls, a Division of Tyco Safety Products Canada Ltd. 3301 Langstaff Road Concord, ON L4K4L2 Canada
Apparatus:	WS4916NA
FCC ID:	F5307WS4916
In Accordance With:	FCC Part 15 Subpart C, 15.231 Periodic operation in the band 40.66-40.70MHz and above 70 MHz.
Tested By:	Nemko Canada Inc. 303 River Road Ottawa, Ontario K1V 1H2
Authorized By:	Jason Nixon, Telecom Specialist
Date:	September 20, 2007
Total Number of Pages:	18

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: WS4916NA

Specification: FCC Part 15 Subpart C, 15.231

Compliance Status: Complies

Exclusions: None

Non-compliances: None

Report Release History: Original Release

Author: Heng Lin EMC / Wireless 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.

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Section 1 : Equipment Under Test

1.1 Product Identification

The Equipment Under Test was identified as follows:

WS4916NA

1.2 Samples Submitted for Assessment

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

Sample No.	Description	Serial No.
2	Wireless Smoke Detector WS4916NA	None
3	Wireless Smoke Detector WS4916NA	None
4	Wireless Smoke Detector WS4916NA	None

The first samples were received on: September 05, 2007

1.3 Technical Specifications of the EUT

Operating Frequency: 433.92 MHz

Emission Designator: K1D

Modulation: ASK

Antenna Type: PCB integrated

Power Source: 6 VDC (2 x 3VDC Lithium Batteries)

Section 2 : Test Conditions

2.1 Specifications

The apparatus was assessed against the following specifications:

FCC Part 15 Subpart C, 15.231
Periodic operation in the band 40.66-40.70 MHz and above 70 MHz.

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.
Receiver	Rohde & Schwarz	ESVS-30	FA001447	July 23/08
Spectrum Analyzer	Rohde & Schwarz	FSP	FA001920	March 19/08
Log Periodic Antenna #1	EMCO	LPA-25	FA000477	Sept. 12/07
Horn Antenna #1	EMCO	3115	FA000649	Feb. 26/08
1.0 – 2.0 GHz Amplifier	JCA	12-400	FA001498	Aug. 21/08
2.0 – 4.0 GHz Amplifier	JCA	24-600	FA001496	Aug. 21/08
4.0 – 8.0 GHz Amplifier	JCA	48-600	FA001497	Aug. 21/08

COU – Calibrate on Use
NCR – No Calibration Required

Section 3 : Observations

3.1 Modifications Performed During Assessment

No modifications were performed during assessment.

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 source	N	
15.207(a)	Powerline Conducted Emissions	N	
15.209(a)	Radiated Emissions within Restricted Bands	Y	PASS
15.231(a)(1)	Manually operated transmitter	N	
15.231(a)(2)	Automatically activated transmitter	Y	PASS
15.231(a)(3)	Periodic transmissions at regular predetermined intervals	Y	PASS
15.231(a)(4)	Radiators used in cases of emergency	Y	PASS
15.231(a)(5)	Set-up information for security systems	N	
15.231(b)	Radiated Emissions	Y	PASS
15.231(c)	20dB Bandwidth	Y	PASS
15.231(d)	Devices operating within the frequency band 40.66-40.70 MHz	N	
15.231(e)	Radiated emissions for Periodic radiators	N	

Notes:

Appendix A : Test Results

Clause 15.231(a) Conditions for intentional radiators to comply with periodic operation

The provisions of this section are restricted to periodic operation within the band 40.66-40.70 MHz and above 70 MHz. Except as shown in paragraph (e) of this section, the intentional radiator is restricted to the transmission of a control signal such as those used with alarm systems, door openers, remote switches, etc. Continuous transmissions, voice, video and the radio control of toys are not permitted. Data is permitted to be sent with a control signal. The following conditions shall be met to comply with the provisions for this periodic operation:

(1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

(2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.

(3) Periodic transmissions at regular predetermined intervals are not permitted. However, polling or supervision transmissions, including data, to determine system integrity of transmitters used in security or safety applications are allowed if the total duration of transmissions does not exceed more than two seconds per hour for each transmitter. There is no limit on the number of individual transmissions, provided the total transmission time does not exceed two seconds per hour.

(4) Intentional radiators, which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition.

(5) Transmission of set-up information for security systems may exceed the transmission duration limits in paragraphs (a)(1) and (a)(2) of this section, provided such transmissions are under the control of a professional installer and do not exceed ten seconds after a manually operated switch is released or a transmitter is activated automatically. Such set-up information may include data.

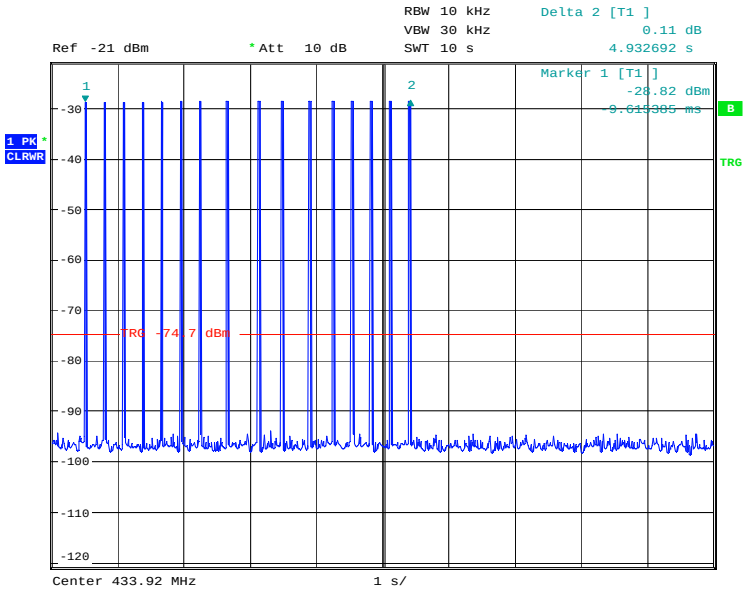
Test Conditions:

Sample Number:	2	**Temperature (°C):**	24.8 °C
Date:	September 07, 2007	**Humidity (%):**	44.6 %
Modification State:	0	**Tester:**	Heng Lin
		Laboratory:	Ottawa

Test Results:

(1) The EUT is not manually operated.

(2) The EUT are activated automatically. The duration of transmission is 4.93 seconds.



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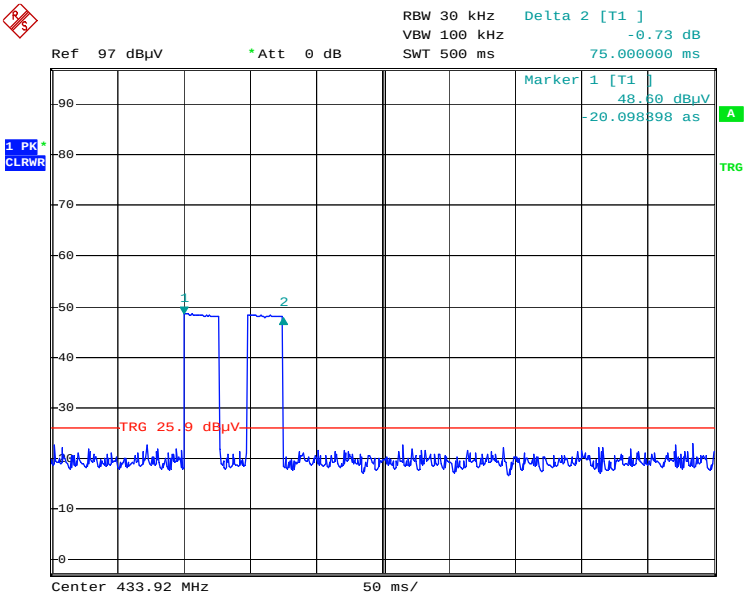
(3) The apparatus transmits a supervisory signal at intervals of 64 minutes and the duration is 75msec.



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(4) When activated by an alarm the transmitter follows the same pattern of transmission as seen in (2)

(5) The EUT does not transmit setup information.

Clause 15.231(b) Radiated Emissions

In addition to the provisions of 15.205, the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental (microvolts/meter)	Field Strength of Spurious Emissions (microvolts/meter)
40.66-40.70	2,250	225
70-130	1,250	125
130-174	1,250 to 3,750	125 to 375
174-260	3,750	375
260-470	3,750 to 12,500	375 to 1,250
Above 470	12,500	1,250

Test Conditions:

Sample Number:	2, 4	**Temperature (°C):**	24.6 °C
Date:	September 10, 2007	**Humidity (%):**	44.8 %
Modification State:	0	**Tester:**	Heng Lin
		Laboratory:	Ottawa

Test Results:

See Attached Table for Results

Additional Observations:

The Spectrum was searched from 30MHz to the 10th Harmonic.

The EUT was measured on three orthogonal axes.

The test was performed with fresh new batteries.

All measurements were performed using a Peak Detector with 100kHz RBW/VBW below 1 GHz and a 1 MHz RBW/VBW above 1 GHz at a distance of 3 meters.

Average Results

Freq. (MHz)	Ant	Pol. V/H	RCVD Signal (dBµV)	Ant. Factor (dB)	Amp. Gain (dB)	Duty Cycle Corr. (dB)	Cable Loss (dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
433.9200	LP1	V	70.3	16.3	N/A	-15.6	2.1	73.1	80.8	7.7
433.9200	LP1	H	76.6	16.9	N/A	-15.6	2.1	80.0	80.8	0.8
867.8400	LP1	V	33.6	22.7	N/A	-15.6	3.0	43.6	60.8	17.2
867.8400	LP1	H	31.8	23.3	N/A	-15.6	3.0	42.5	60.8	18.3
1301.7500	Horn1	V	53.3	25.0	47.3	-15.6	3.9	19.3	54.0	34.7
1301.7500	Horn1	H	51.1	25.0	47.3	-15.6	3.9	17.1	54.0	36.9
1735.7500	Horn1	V	47.8	27.2	46.9	-15.6	4.5	17.0	54.0	37.0
1735.7500	Horn1	H	48.0	27.3	46.9	-15.6	4.5	17.2	54.0	36.8

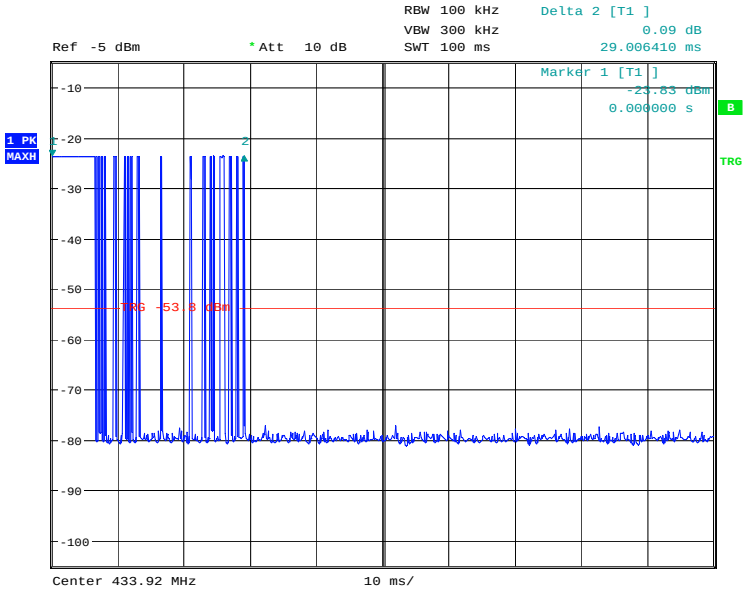
Note 1: Antenna Legend: BC = Biconical, BL = Bilog, LP = Log-Periodic, Horn = Horn, ED = EMCO Dipole

Peak Results

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)
433.9200	LP1	V	70.3	16.3	N/A	2.1	88.7	100.8	12.1
433.9200	LP1	H	76.6	16.9	N/A	2.1	95.5	100.8	5.3
867.8400	LP1	V	33.6	22.7	N/A	3.0	59.2	80.8	21.6
867.8400	LP1	H	31.8	23.3	N/A	3.0	58.1	80.8	22.7
1301.7500	Horn1	V	53.3	25.0	47.3	3.9	34.9	74.0	39.1
1301.7500	Horn1	H	51.1	25.0	47.3	3.9	32.7	74.0	41.3
1735.7500	Horn1	V	47.8	27.2	46.9	4.5	32.6	74.0	41.4
1735.7500	Horn1	H	48.0	27.3	46.9	4.5	32.8	74.0	41.2

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

Duty Cycle:



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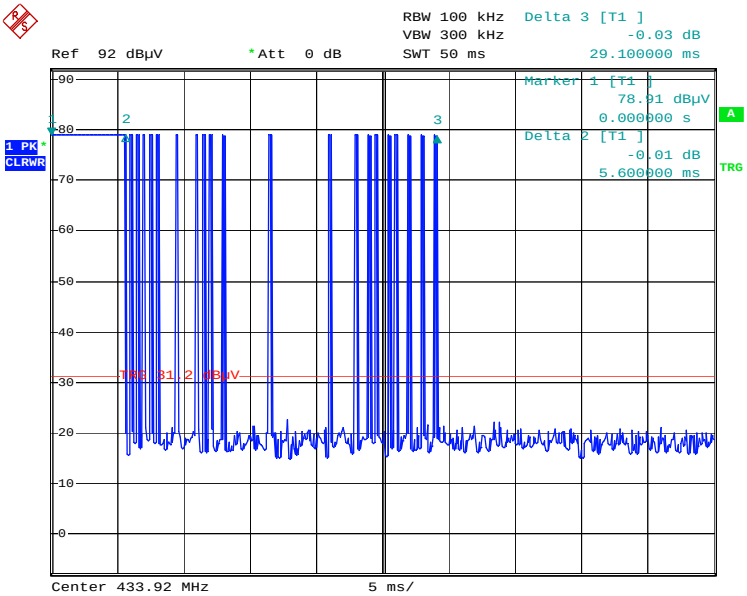

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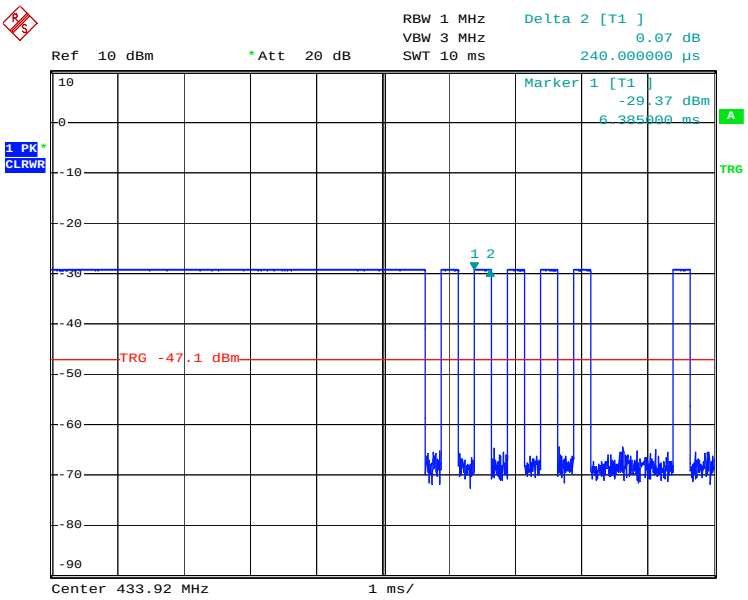

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Header Pulse = 5.6msec
Sync Pulses = 4 x 0.25msec = 1msec
Data Pulses = 40 x 0.25msec = 10msec

Duty Cycle: **= ((**header pulse + sync pulses + data pulses)/100msec) %
= ((5.6msec + 1msec + 10msec)/100msec) %
= 16.6%

Duty cycle Correction Factor = 20 log (16.6%) = -15.6 dB

Clause 15.231(c) 20dB Bandwidth

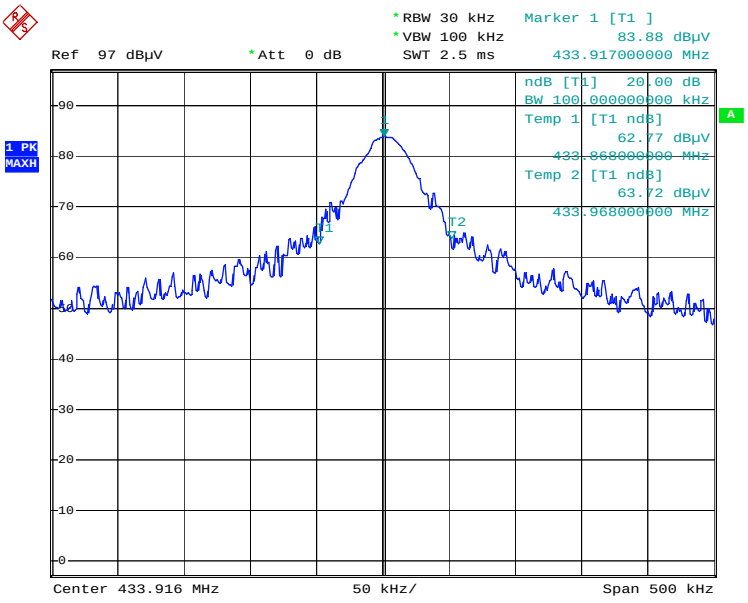
The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

Test Conditions:

Sample Number:	2	**Temperature (°C):**	24.2 °C
Date:	September 11, 2007	**Humidity (%):**	44.5 %
Modification State:	0	**Tester:**	Heng Lin
		Laboratory:	Ottawa

Test Results:

20dB Bandwidth:



Limit: = 433.92 MHz x 0.25% = 1.08 MHz

Appendix B : Setup Photographs

Spurious Emissions Setup:

Appendix C : Block Diagram of Test Setups

Test Site For Radiated Emissions