



Test Report: 6W69730.6


Applicant: Paradox Security Systems
780 Industrial Blvd
Ste-Eustache, Quebec
J7R 5V3

Apparatus: MG-DCTXP2

FCC ID: KDYMGDCTXP2

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: 
Jin Xu, Wireless Specialist

Date: September 28, 2006

Total Number of Pages: 19

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:	MG-DCTXP2
Specification:	FCC Part 15 Subpart C, 15.231
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.

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

Report Summary	2
Section 1 : Equipment Under Test	4
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
Section 2 : Test Conditions	6
2.1 Specifications	6
2.2 Deviations From Laboratory Test Procedures	6
2.3 Test Environment	6
2.4 Test Equipment.....	6
Section 3 : Observations	7
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
Section 4 : Results Summary	8
4.1 FCC Part 15 Subpart C : Test Results	9
Appendix A : Test Results	10
Clause 15.209(a) Radiated Emissions within Restricted Bands	10
Clause 15.231(a) Conditions for intentional radiators to comply with periodic operation	11
Clause 15.231(b) Radiated Emissions	13
Clause 15.231(c) 20dB Bandwidth.....	16
Appendix B : Setup Photographs	17
Appendix C : Block Diagram of Test Setups	19

Section 1 : Equipment Under Test

1.1 Product Identification

The Equipment Under Test was identified as follows:

MG-DCTXP2

1.2 Samples Submitted for Assessment

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

Sample No.	Description	Serial No.
4	MG-DCTXP2 door contact	None

The first samples were received on: June 30, 2006

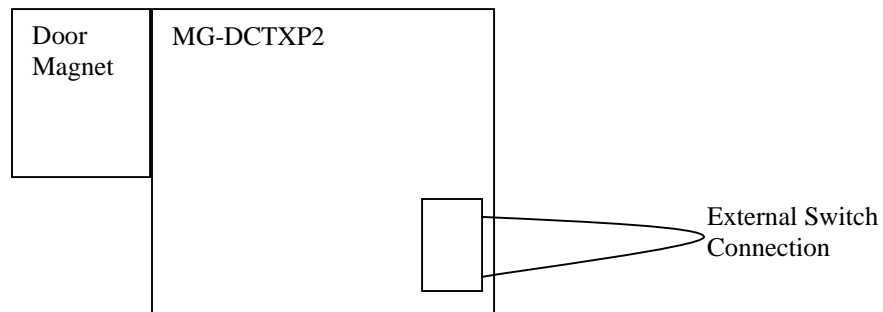
1.3 Theory of Operation

The apparatus is used as a Door contact for a security system. The apparatus has a reed switch, which is used to detect if the door is opened, and an external switch connector, which can be connected to any type of switch to detect alarms.

1.4 Technical Specifications of the EUT

Manufacturer:	Paradox Security Systems
Operating Frequency:	433.92MHz
Emission Designator:	L1D
Modulation:	Pulse Width Modulated, 600usec pulse time, 200usec start (high), 200usec data ('1' is high) and 200usec stop (low)
Antenna Data:	Integral
Power Source:	2x 'AA' 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, 15.231

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 °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	FSU	FA001877	May 10/07
Spectrum Analyzer	Hewlett-Packard	8566B	FA001309	May 16/07
Spectrum Analyzer Display	Hewlett-Packard	85662A	FA001309	May 16/07
Horn Antenna #1	EMCO	3115	FA000649	Jan. 12/07
Log Periodic Antenna #2	EMCO	3148	FA001355	May 16/07
Biconical (1) Antenna	EMCO	3109	FA000805	May 03/07
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

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 1

As originally submitted the apparatus was found to be non-compliant to the radiated emissions requirements. A 56kohm resistor was added from pin 5 of IC TH72012 to ground. 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 in its final modified state.

4.1 FCC Part 15 Subpart C : Test Results

Part 15	Test Description	Required	Result
15.31(e)	Variation of Power source	Y (1)	PASS
15.207(a)	Powerline Conducted Emissions	N	
15.209(a)	Radiated Emissions within Restricted Bands	Y	PASS
15.231(a)(1)	Manually operated transmitter	Y	PASS
15.231(a)(2)	Automatically activated transmitter	N	
15.231(a)(3)	Periodic transmissions at regular predetermined intervals	N	
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:

- (1) The EUT was battery operated and tested using fresh new batteries.

Appendix A : Test Results

Clause 15.209(a) Radiated Emissions within Restricted Bands

Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvoltsmeter) (kHz)	Measurement Distance (meters)
0.009-0.490	2400/F (kHz)	300
0.490-1.705	24000/F (kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Conditions:

Sample Number:	4	Temperature:	26
Date:	September 8, 2006	Humidity:	52
Modification State:	1	Tester:	Jason Nixon
		Laboratory:	OATS

Test Results:

See Attached Table for Results

Additional Observations:

The Spectrum was searched from 30MHz to 5GHz.

These results apply to emissions found in the Restricted bands defined in FCC Part 15 Subpart C, 15.205.

The EUT was measured on three orthogonal axis.

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

Freq. (MHz)	Ant	Pol. V/H	RCVD Signal (dBμV)	Ant. Factor (dB)	Amp. Gain (dB)	Duty Cycle Corr. (dB)	Cable Loss (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1301.7600	Horn1	V	55.7	25.1	49.1	-15.1	3.4	20.0	54.0	34.0	Avg
1301.7600	Horn1	H	55.4	25.1	49.1	-15.1	3.4	19.8	54.0	34.2	Avg
1301.7600	Horn1	V	55.7	25.1	49.1	N/A	3.4	35.1	74.0	38.9	Peak
1301.7600	Horn1	H	55.4	25.1	49.1	N/A	3.4	34.9	74.0	39.1	Peak

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

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:

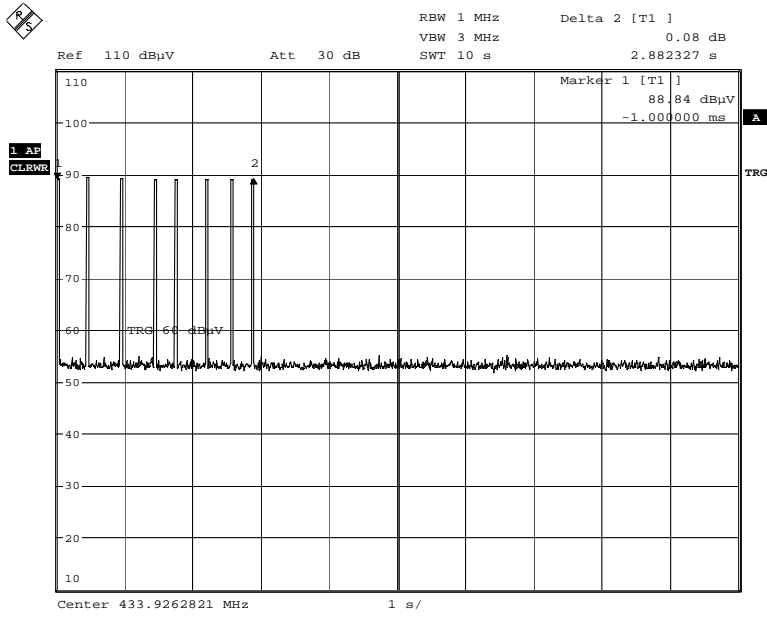
- (1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.
- (2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.
- (3) Periodic transmissions at regular 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:	4	Temperature:	26
Date:	August 16, 2006	Humidity:	38
Modification State:	0	Tester:	Jason Nixon
		Laboratory:	Wireless

Test Results:

- (1) The apparatus is not manually triggered.
- (2) See attached plot for transmission time of 1 event.
- (3) The apparatus is not a periodic transmitter.
- (4) The apparatus only transmits a single event for each alarm detected.
- (5) The setup information does not exceed the transmit duration.



Alarm Time
Date: 16.AUG.2006 10:28:08

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:	4	Temperature:	26
Date:	September 8, 2006	Humidity:	52
Modification State:	1	Tester:	Jason Nixon
		Laboratory:	OATS

Test Results:

See Attached Table for Results

Additional Observations:

The Spectrum was searched from 30MHz to 5GHz.

The EUT was measured on three orthogonal axis.

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

Only emissions within 20dB below the limit have been reported.

Freq. (MHz)	Ant	Pol. V/H	RCVD Signal (dBμV)	Ant. Factor (dB)	Amp. Gain (dB)	Duty Cycle Corr. (dB)	Cable Loss (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)
433.9200 (x)	LP2	V	61.2	16.6	N/A	-15.1	3.1	65.8	80.8	15.0
433.9200 (y)	LP2	V	54.5	16.6	N/A	-15.1	3.1	59.1	80.8	21.7
433.9200 (z)	LP2	V	46.8	16.6	N/A	-15.1	3.1	51.4	80.8	29.4
433.9200 (x)	LP2	H	53.7	17.2	N/A	-15.1	3.1	58.9	80.8	21.9
433.9200 (y)	LP2	H	62.3	17.2	N/A	-15.1	3.1	67.5	80.8	13.3
433.9200 (z)	LP2	H	60.3	17.2	N/A	-15.1	3.1	65.5	80.8	15.3

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

Duty Cycle:

Header = 800usec

12bit preamble @ 50% duty cycle = 2.4msec

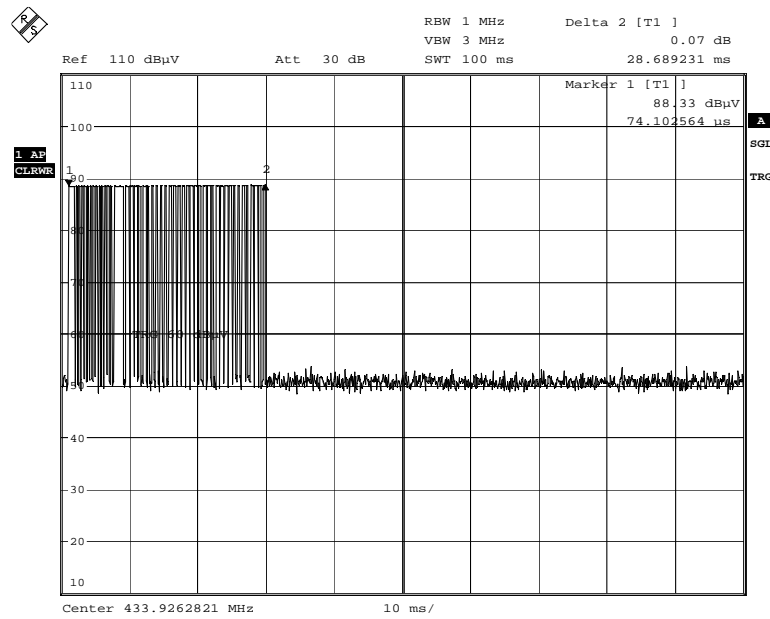
Firewall dummy bit = 200usec

Sync header = 1200usec

32 bit of data, all '1's = 12.8msec

Tx End bit = 200usec

Duty cycle correction = $20\log((0.8 + 2.4 + 0.2 + 1.2 + 12.8 + 0.2)/100) = -15.1\text{dB}$



On-time in 100msec

Date: 16.AUG.2006 10:24:42

Clause 15.231(c) 20dB Bandwidth

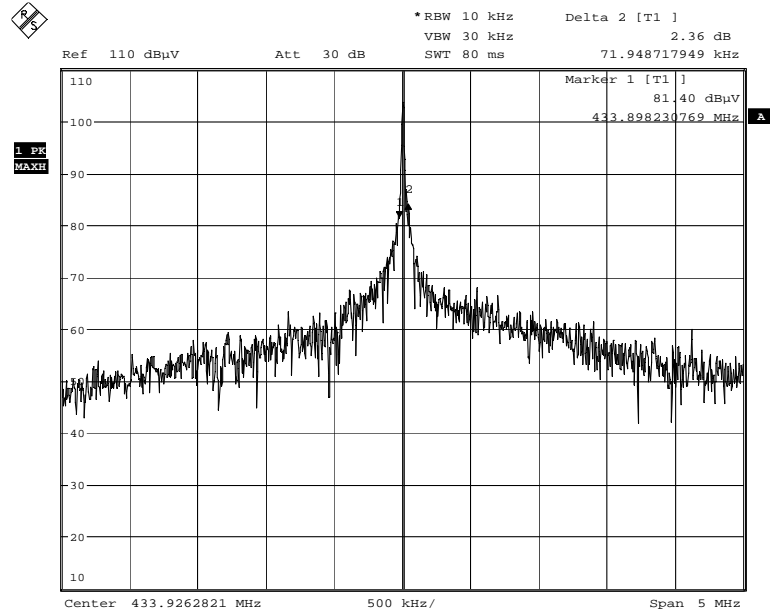
The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated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

Test Conditions:

Sample Number:	4	Temperature:	26
Date:	August 16, 2006	Humidity:	38
Modification State:	0	Tester:	Jason Nixon
		Laboratory:	Wireless

Test Results:

20dB Bandwidth:



20dB Bandwidth
Date: 16.AUG.2006 10:29:54

Appendix B : Setup Photographs

Spurious Emissions Setup:





Appendix C : Block Diagram of Test Setups

Test Site For Radiated Emissions

