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Test Report: 90256-1TRFWL

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

Apparatus: EVO641R

FCC ID: KDYEVO641R

In Accordance With: FCC Part 15 Subpart C, 15.207 and 15.209
Intentional Radiators

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

Authorized By: 
Jason Nixon, Telecom Specialist

Date: September 25, 2007

Total Number of Pages: 17

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:	EVO641R
Specification:	FCC Part 15 Subpart C, 15.207 and 15.209
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:

EVO641R

1.2 Samples Submitted for Assessment

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

Sample No.	Description	Serial No.
3	EVO641R Keypad	1F63B09A
	ATC Frost 120VAC to 16VAC Transformer (PN#FTC3716)	None
	EVO192 (MN#EVO192)	1F63B096

The first samples were received on: July 16, 2007

1.3 Theory of Operation

The EVO641R is an alarm system keypad with a card reader. When connected to an EVO control panel, the user can use the keypad to arm, disarm the system, activate an alarm and gives authorized people access to the system by opening doors for example.

The keypad generates an electrical field , which when coupled with the antenna of a card, the card is energized and transmit its code to the reader of the keypad via RF. The keypad, in turns communicates this information to the control panel, which gives or denies access to that user.

1.4 Technical Specifications of the EUT

Manufacturer: Paradox Security Systems

Operating Frequency: 125 kHz

Emission Designator: F1D

Modulation: FSK

Antenna Data: Coil inductor

Antenna Connector: None

Power Source: 12 VDC

Section 2 : Test Conditions

2.1 Specifications

The apparatus was assessed against the following specifications:

FCC Part 15 Subpart C, 15.207 and 15.209
Intentional Radiators

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.
Receiver	Rohde & Schwarz	ESVS-30	FA001437	July 12/08
Spectrum Analyzer	Rohde & Schwarz	FSP	FA001920	Mar. 19/08
Biconical (1) Antenna	EMCO	3109	FA000805	May 05/08
Loop Antenna	EMCO	6502	FA001686	Jul 27/08
Log Periodic Antenna #4	EMCO	3146	FA001455	April 26/08
Receiver/Spectrum Analyzer	Rohde & Schwarz	ESU	FA002043	Oct. 24/07
LISN	Rohde & Schwarz	ENV216	FA002023	Sept. 04/08

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
15.207(a)	Conducted Emissions	Y	PASS
15.209(a)	Radiated Emissions, general requirements	Y	PASS
15.215(c)	20dB Bandwidth	Y	PASS

Notes:

Appendix A : Test Results

Clause 15.207(a) Powerline Conducted Emissions

Frequency of Conducted limit (dB μ V)		
Emission (MHz)	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
* Decreases with the logarithm of the frequency.		

Test Conditions:

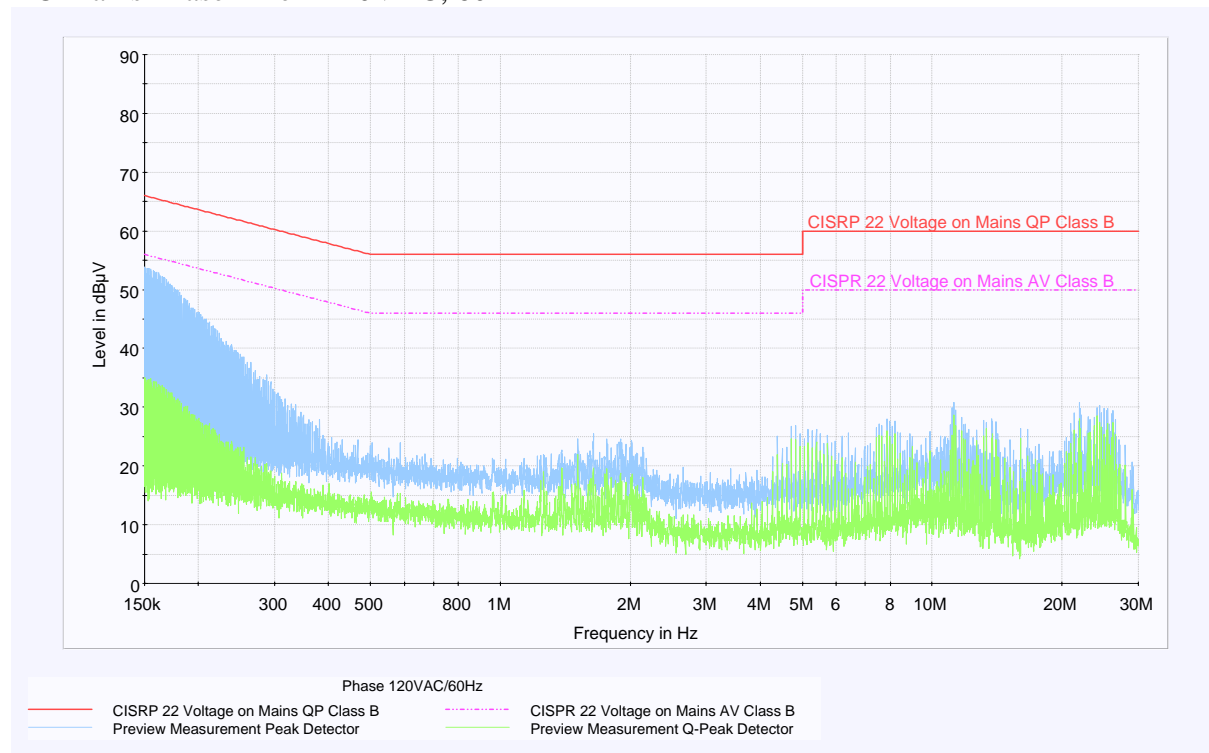
Sample Number:	3	Temperature:	22 °C
Date:	August 2, 2007	Humidity:	40 %
Modification State:	0	Tester:	Heng Lin
		Laboratory:	Ottawa

Test Results: See Attached Plots.

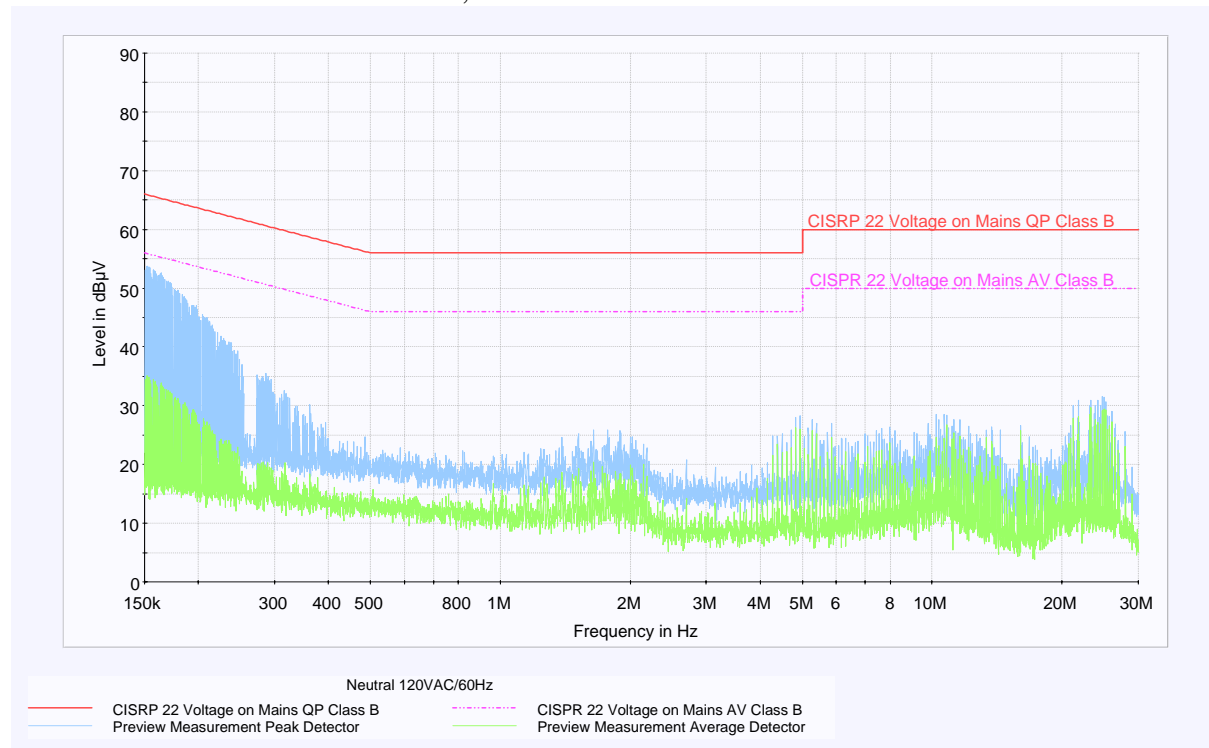
Additional Observations:

All measurements for conducted emissions were performed using a Peak detector, Average detector and Quasi-Peak detector with 9 kHz RBW.

AC Mains Phase Line – 120VAC, 60Hz



AC Mains Neutral Line – 120VAC, 60Hz



Clause 15.209(a) Radiated Emissions, General Limits

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 (microvolts/meter)	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:	3	Temperature:	22 °C
Date:	August 2, 2007	Humidity:	40 %
Modification State:	0	Tester:	Heng Lin
		Laboratory:	Ottawa

Test Results:

See Attached Table for Results

Additional Observations:

The Spectrum was searched from 9 kHz to 1 GHz.

The EUT was measured on three orthogonal axes.

All measurements were performed using a Peak Detector with 200 Hz RBW below 150 kHz, 10 kHz RBW in 0.15 – 30 MHz range and 100 kHz RBW in 30 – 1000 MHz range at a distance of 3 meters.

Field Strength:

Limits were extrapolated from 300m to 3m distance:

E-field:

$$\text{Limit (@ 300m)} = 2400/F = 2400/125 = 19.2 \mu\text{V/m} = 25.7 \text{ dB}\mu\text{V/m}$$

$$\text{Limit (@ 3m)} = \text{Limit (@ 300m)} + 40 \cdot \log_{10}(300/3) = 105.7 \text{ dB}\mu\text{V/m}$$

Measured E-field:

Axis	Frequency (MHz)	ACF-E (dB)	Reading (dBμV)	E-field (dBμV/m)	Limit (dBμV/m)	Margin (dB)
X	0.125	10.6	78.79	89.39	105.7	16.31
Y	0.125	10.6	63.80	74.4	105.7	31.3
Z	0.125	10.6	66.41	77.01	105.7	28.69

Spurious Emission:

Freq. (MHz)	Ant	Pol. V/H	RCVD Signal (dBμV)	Ant. Factor (dB)	Amp. Gain (dB)	Cable Loss (dB)	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)
127.9989	BC1	V	17	12.4	NA	1.2	30.6	43.5	12.9
40.0	BC1	V	16	10.4	NA	0.6	27.0	40	13.0
64.0062	BC1	V	18	7.7	NA	0.9	26.6	40	13.4
48.7	BC1	V	16	9.7	NA	0.7	26.4	40	13.6
159.9989	BC1	V	14.8	13.2	NA	1.3	29.3	43.5	14.2
50.0041	BC1	V	15	9.0	NA	0.7	24.7	40	15.3
111.9982	BC1	V	15.6	11.5	NA	1.1	28.2	43.5	15.3
143.9989	BC1	V	13.5	13.3	NA	1.4	28.2	43.5	15.4
175.9989	BC1	V	13.2	13.6	NA	1.4	28.1	43.5	15.4
174.9989	BC1	V	13	13.5	NA	1.3	27.8	43.5	15.7
Note 1: Antenna Legend: BC = Biconical, BL = Bilog, LP = Log-Periodic, Horn = Horn, ED = EMCO Dipole									

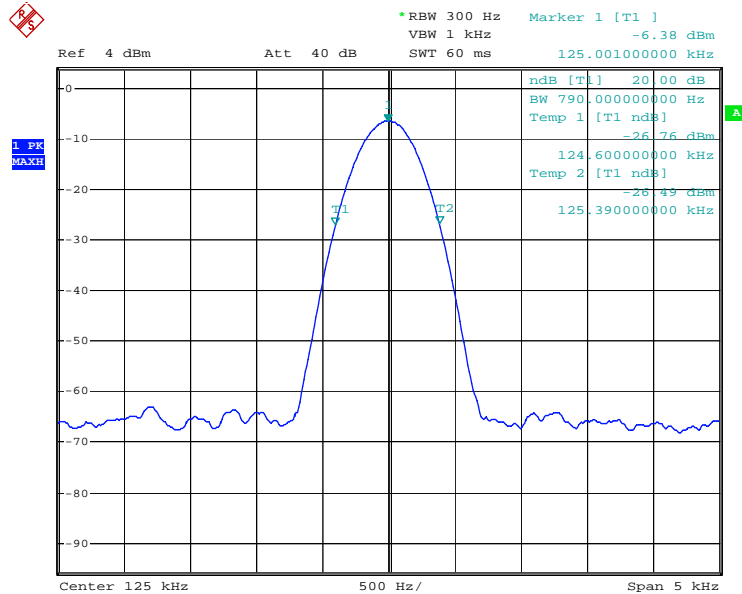
Clause 15.215(c) 20dB Bandwidth

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:	3	Temperature:	25.1 °C
Date:	September 25, 2007	Humidity:	44.5 %
Modification State:	0	Tester:	Heng Lin
		Laboratory:	Ottawa

Test Results: See Attached Plots.

20dB Bandwidth:

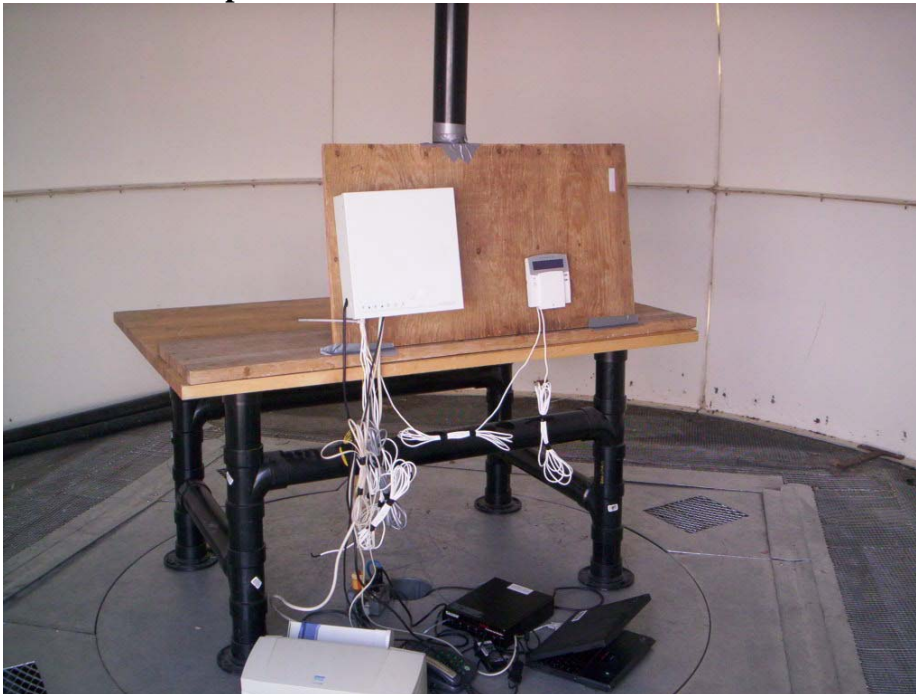
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Appendix B : Setup Photographs

Conducted Emission Setup:

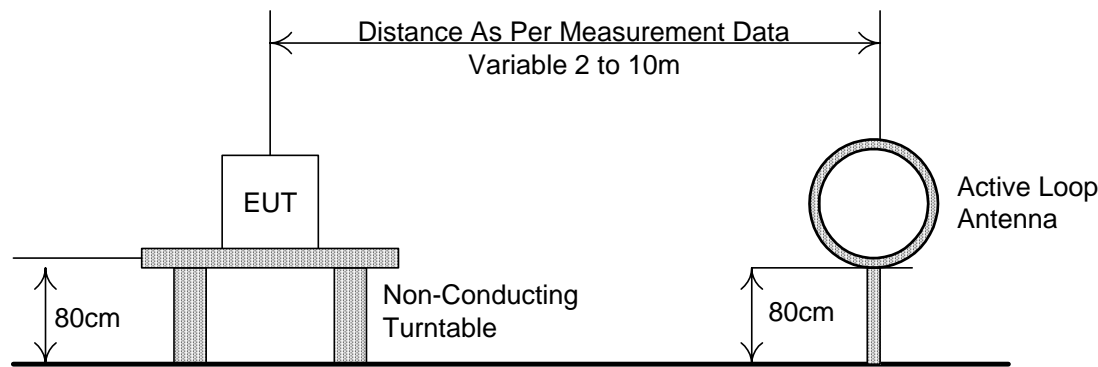


Spurious Emissions Setup:

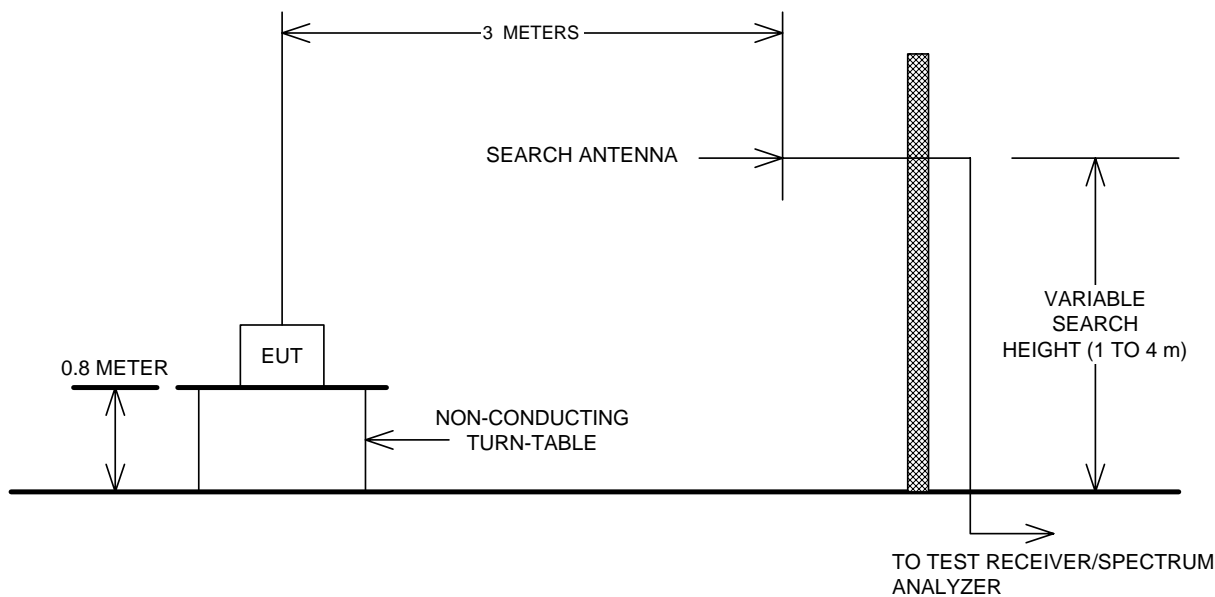


Appendix C : Block Diagram of Test Setups

Test Site For Radiated Emissions Below 30MHz



Test Site For Radiated Emissions Above 30MHz



Conducted Emissions

