



Test Report: 6W69730.4

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

Apparatus: MG-5000

FCC ID: KDYMG5000

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: 21

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-5000
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.

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Section 1 : Equipment Under Test

1.1 Product Identification

The Equipment Under Test was identified as follows:

MG-5000 Alarm Control Panel

1.2 Samples Submitted for Assessment

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

Sample No.	Description	Serial No.
2	MG5000 alarm control panel	M50000011E
3	MG32LED Keypad	None
6	Class II transformer M/N: UB1640W	None

The first samples were received on: June 30, 2006

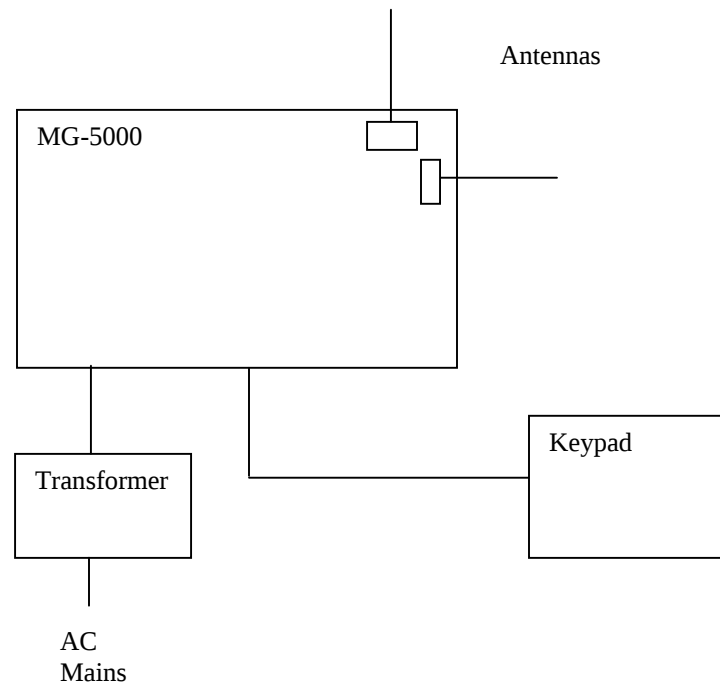
1.3 Theory of Operation

The apparatus is a security alarm control panel. It is able to transmit and receive status from wireless zones.

1.4 Technical Specifications of the EUT

Manufacturer:	Paradox Security Systems
Operating Frequency:	Tx: 433.92MHz Rx LO: 423.22MHz
Emission Designator:	L1D
Modulation:	Pulse Width Modulated, 600usec pulse time, 200usec start (high), 200usec data ('1' is high) and 200usec stop (low)
Antenna Connection:	Wire Screw terminal with Solid core Wire
Power Source:	120VAC

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
LISN	EMCO	4825/2	FA001545	Jan. 30/07
Receiver	Rohde & Schwarz	ESHS 10	FA001918	Feb. 17/07
International Power Supply	California Inst.	1001WP	FA000995	Jan. 11/07
Transient Limiter	Hewlett-Packard	1194 7A	FA000975	May 18/07

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	PASS
15.207(a)	Powerline Conducted Emissions	Y	PASS
15.209(a)	Radiated Emissions within Restricted Bands	Y	PASS
15.231(a)(1)	Manually operated transmitter	N	PASS
15.231(a)(2)	Automatically activated transmitter	Y	
15.231(a)(3)	Periodic transmissions at regular predetermined intervals	N	
15.231(a)(4)	Radiators used in cases of emergency	N	PASS
15.231(a)(5)	Set-up information for security systems	N	
15.231(b)	Radiated Emissions	Y	
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 15.207(a) Powerline Conducted Emissions

Frequency of Conducted limit (dBmV)		
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:

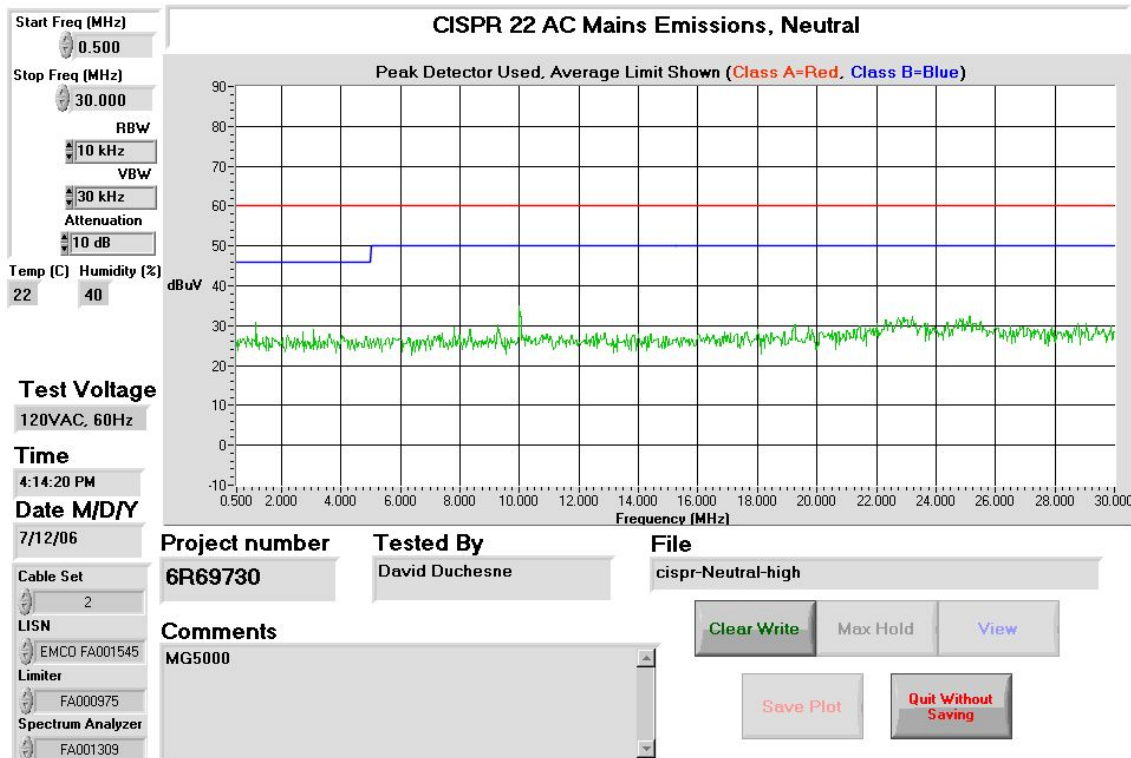
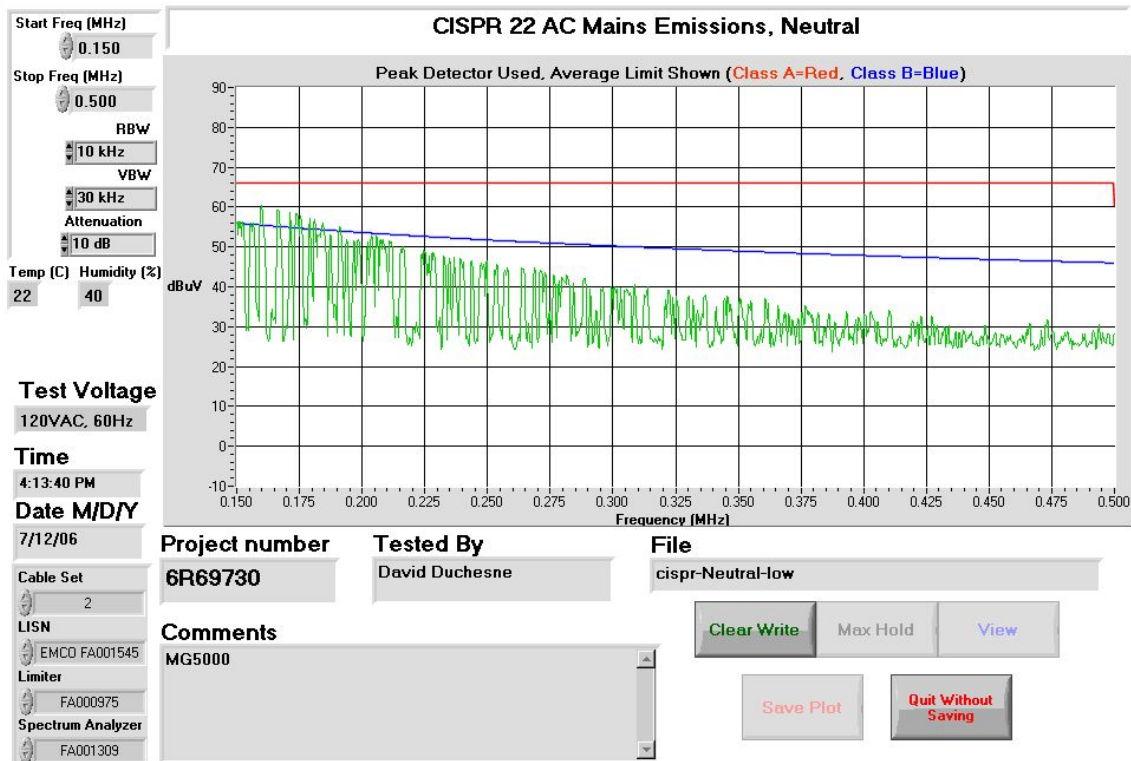
Sample Number:	2	Temperature:	22
Date:	July 12, 2006	Humidity:	50
Modification State:	0	Tester:	David Duchesne
		Laboratory:	Shielded Room

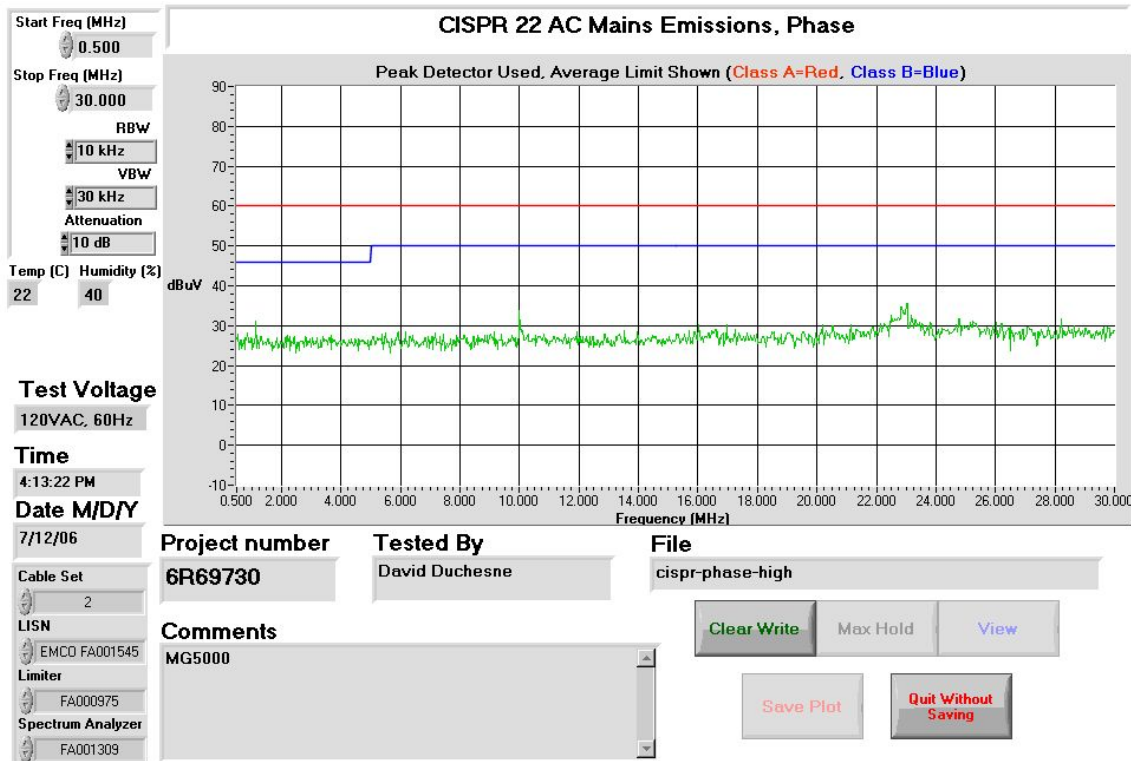
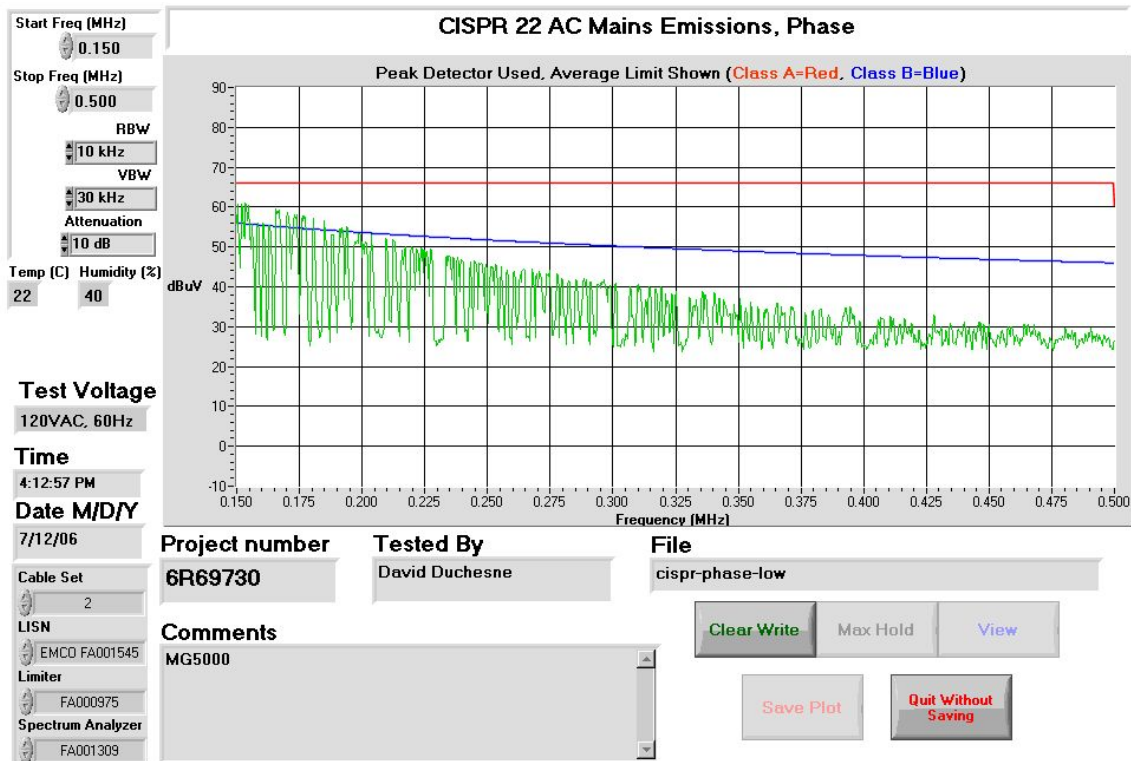
Test Results: See Attached Plots and Table.

Additional Observations:

All plots were taken using a Peak detector corrected with the LISN, Cable and transient limiter losses and compared to the Average limit.

Conductor		Frequency (MHz)	Detector	Emission Level (dBuV)	LISN Loss (dB)	Cable Loss (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)
1	Neutral	0.1500	Quasi Peak	49.7	0.00	0.00	49.70	66.0	16.3
			Average	19.1	0.00	0.00	19.10	56.0	36.9
2	Neutral	0.1754	Quasi Peak	46.4	0.00	0.14	46.54	64.7	18.2
			Average	16.0	0.00	0.14	16.14	54.7	38.6
3	Neutral	0.2240	Quasi Peak	38.9	0.00	0.20	39.10	62.7	23.6
			Average	9.2	0.00	0.20	9.40	52.7	43.3
4	Phase	0.1500	Quasi Peak	49.5	0.00	0.00	49.50	66.0	16.5
			Average	19.0	0.00	0.00	19.00	56.0	37.0
5	Phase	0.1754	Quasi Peak	45.5	0.00	0.14	45.64	64.7	19.1
			Average	15.6	0.00	0.14	15.74	54.7	39.0
6	Phase	0.2240	Quasi Peak	38.2	0.00	0.20	38.40	62.7	24.3
			Average	8.8	0.00	0.20	9.00	52.7	43.7





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 (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:	2	Temperature:	21
Date:	September 6, 2006	Humidity:	83
Modification State:	1	Tester:	Jason Nioxn
		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.

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 (dBμV)	Limit (dBμV)	Margin (dB)	Detector
1301.7600	Horn1	V	55.4	25.1	49.1	-15.1	3.4	19.7	54.0	34.3	Avg
1301.7600	Horn1	H	51.9	25.1	49.1	-15.1	3.4	16.2	54.0	37.8	Avg
1301.7600	Horn1	V	55.4	25.1	49.1	N/A	3.4	34.8	74.0	39.2	Peak
1301.7600	Horn1	H	51.9	25.1	49.1	N/A	3.4	31.3	74.0	42.7	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:

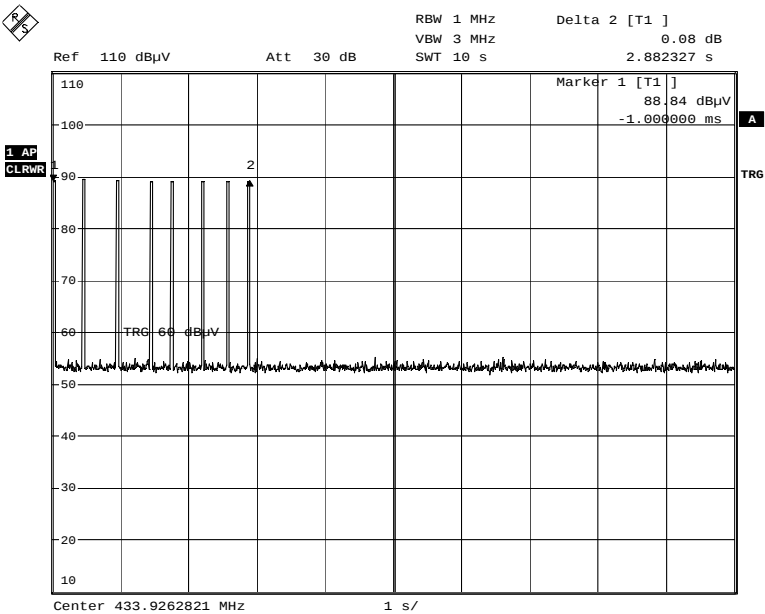
- (1) A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.
- (2) A transmitter activated automatically shall cease transmission within 5 seconds after activation.
- (3) Periodic transmissions at regular 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:	2	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:	2	Temperature:	21
Date:	September 6, 2006	Humidity:	83
Modification State:	1	Tester:	Jason Nioxn
		Laboratory:	OATS

Test Results:

See Attached Table for Results

Additional Observations:

The Spectrum was searched from 30MHz to 5GHz.

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.

The AC mains was varied by +/-15% and there was no change in the field strength.

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	LP2	V	73.5	16.6	N/A	-15.1	3.1	78.1	80.8	2.7
433.9200	LP2	H	65.3	17.2	N/A	-15.1	3.1	70.5	80.8	10.3
867.8400	LP2	V	22.6	22.7	N/A	-15.1	4.3	34.5	60.8	26.3
867.8400	LP2	H	18.8	23.5	N/A	-15.1	4.3	31.5	60.8	29.3
1735.6800	Horn1	V	54.6	27.2	49.0	-15.1	4.0	21.8	60.8	39.0
1735.6800	Horn1	H	52.5	27.3	49.0	-15.1	4.0	19.8	60.8	41.0
2169.6000	Horn1	V	63.0	28.7	58.6	-15.1	4.7	22.7	60.8	38.1
2169.6000	Horn1	H	63.5	28.7	58.6	-15.1	4.7	23.3	60.8	37.5

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

Duty Cycle:

Header = 800usec

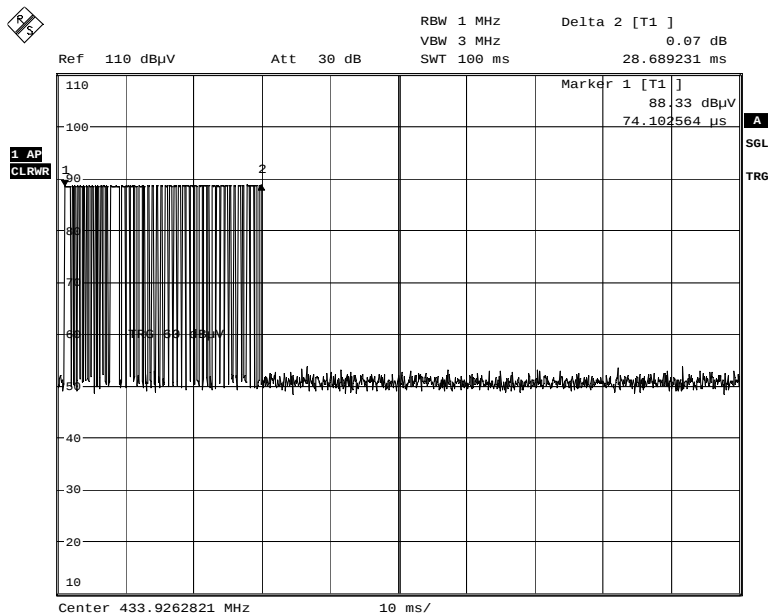
12bit preamble @ 50% duty cycle = 2.4msec

Firewall dummy bit = 200usec

Sync header = 1200usec

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

Tx End bit = 200usec

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


On-time in 100msec

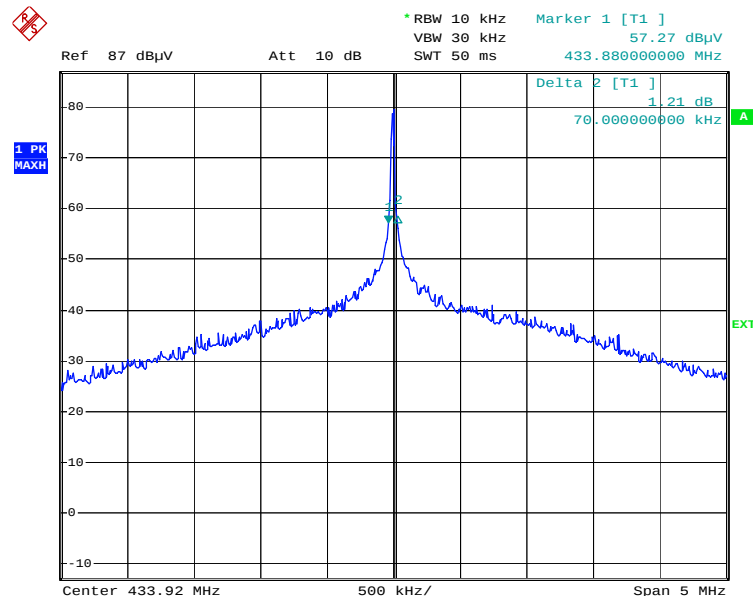
Date: 16.AUG.2006 10:24:42

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:	2	Temperature:	24
Date:	September 8, 2006	Humidity:	50
Modification State:	1	Tester:	Jason Nixon
		Laboratory:	Wireless

Test Results:**20dB Bandwidth:**

20dB Bandwidth

Date: 8.SEP.2006 17:26:42

Appendix B : Setup Photographs

Conducted Emissions Setup:

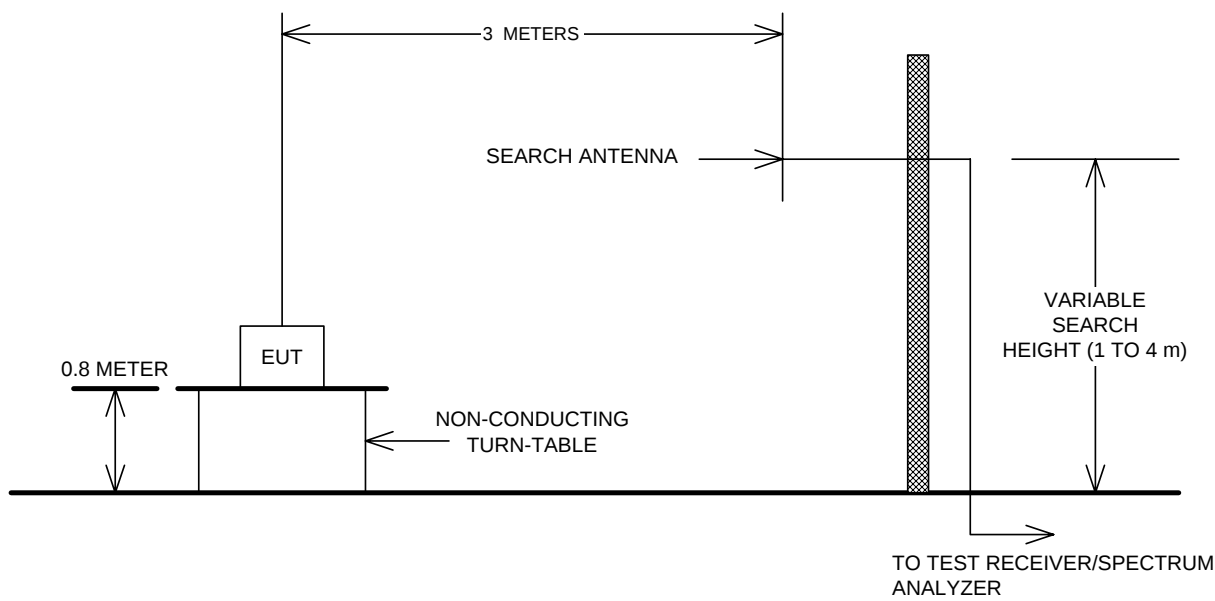


Spurious Emissions Setup:



Appendix C : Block Diagram of Test Setups

Test Site For Radiated Emissions



Conducted Emissions

