

MEASUREMENT/TECHNICAL REPORT

Company: Locknetics Security Engineering
Models: CM5100, CM5500, CM5700 and CM993 Series
FCC ID: P2GTBD
November 21, 2001

Description: This is a report to support a request for an original grant of equipment authorization.

Equipment Type: Low Power Communications Device Transmitter (DXX)

Report prepared for: Locknetics Security Engineering
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Introduction

This report is an application for Certification of a Transmitter operating pursuant to Part 15.209 of the FCC Rules, Code of Federal Regulations 47. The model numbers covered by this report are the CM5100, CM5500, CM5700, and CM993 Series. This report is designed to demonstrate the compliance of this device with the requirements outlined in Part 15 of CFR 47 using the methods outlined in Part 2 of CFR 47.

Statement of Conformity

The Locknetics CM5100, CM5500, CM5700, and CM993 Series door locks have been found to conform with the following parts of the 47 CFR as detailed below:

Part 2	Part 15	Comments
	15.15(b)	The product contains no user accessible controls that increase transmission power above allowable levels.
2.925	15.19	The label is shown in the label exhibit.
	15.21	Information to the user is shown in the instruction manual exhibit.
	15.27	No special accessories are required for compliance.
	15.203	The antenna is not accessible to the user and therefore cannot be easily removed. (The antenna and its connector are underneath the keypad assembly which is in turn professionally installed in the door lock enclosure.)
	15.205 15.209	The fundamental is not in a Restricted band and the spurious and harmonic emissions in the Restricted bands comply with the general emission limits of 15.209.
	15.207	The unit is battery powered without the capability of being recharged or operated from the AC mains.

Test Methodology

Radiated emission testing was performed according to the procedures in ANSI C63.4 (1992). The testing was performed at an antenna to EUT distance of 3 or 1 meter(s). The actual test distance used is noted in the test data sheets. The device's performance was investigated to 1GHz. The EUT was powered by four AA batteries. Fresh batteries were used for all testing. Since the device is normally installed in one orientation, the emissions were maximized around the vertical axis and the maximum reading was recorded. The integrated antenna cannot be maximized separately.

All other performance tests were made in accordance with the procedures outlined in Part 15 of CFR 47. The applicable sections provided under Part 15 are provided in the measurement section of this report.

Test Facility

Curtis-Straus LLC

All testing for the range 9kHz–1000MHz was performed at Curtis-Straus (A2LA Certificate Number 1627-01). The open area test site used to collect the radiated data is located at 527 Great Road, Littleton, MA 01460. Site "T" was used.

Test Equipment Used

SPECTRUM ANALYZERS					
x	Analyzer	Model No.	Company	Serial No.	Calibration Due
	ORANGE 9kHz-26.5GHz	E4407B	HP	US39440975	18-MAY-2002

OPEN AREA TEST SITES (OATS)					
x	Site	FCC Code	IC Code	VCCI Code	Calibration Due
	T Texas	93448	IC 2762-T	R-905/ C-480	09-SEP-2002

ANTENNAS					
x	Antenna	Model No.	Company	Serial No.	Calibration Due
	GREEN-WHITE Bilog: 30MHz-2GHz	CBL6112B	Chase	2574	28-JUN-2002
	LARGE LOOP Passive Loop: 20Hz-5MHz	6511	EMCO	9704-1154	06-NOV-2001

PREAMPLIFIERS					
x	Preamplifier	Model No.	Company	Serial No.	Calibration Due
	GREEN 0.01-2000MHz	ZFL-1000-LN	MiniCircuits/ C-S	n/a	24-MAR-2002

Unless otherwise noted the calibration interval is one year. All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

Measurement Results

Operating Frequency

This device operates at 125kHz.

Electric Field Strength Radiation Measurements

Radiated Emissions Table							Curtis-Straus LLC						
Date: 20-Sep-01			Company: Locknetics Security Engineering				Table 1						
Engineer: Evan Gould			EUT Desc: CM993PXK				Work Order: B1011						
Frequency Range: 9kHz-5MHz							Measurement Distance: 1m						
Notes: Fundamental thru tenth harmonic (peak readings taken)							Operating Freq: 125kHz						
Antenna Polarization (0° - 90°)	Frequency (MHz)	Reading (dB μ V)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dB μ V/m)	47 CFR 15.209						
0°	0.1259	64.6	21.9	51.9	0.0	94.6	124.6	-30.0	Pass				
0°	0.2516	30.6	22.0	51.2	0.0	59.8	118.6	-58.8	Pass				
0°	0.3772	27.6	22.1	50.8	0.0	56.3	115.1	-58.8	Pass				
0°	0.5031	14.5	22.1	50.6	0.0	43.0	92.6	-49.6	Pass				
0° (noise floor)	0.6281	25.9	22.1	50.4	0.0	54.2	90.7	-36.5	Pass				
0° (noise floor)	0.754	11.7	22.0	50.3	0.0	40.0	89.1	-49.1	Pass				
0°	0.8793	15.4	22.0	50.1	0.0	43.5	87.8	-44.3	Pass				
0° (noise floor)	1.005	19.5	22.0	50.0	0.0	47.5	86.6	-39.1	Pass				
0° (noise floor)	1.131	19.9	22.0	49.8	0.0	47.7	85.6	-37.9	Pass				
0° (noise floor)	1.256	33.5	22.0	49.6	0.0	61.1	84.7	-23.6	Pass				
Table Result: Pass by -23.6 dB							Worst Freq: 1.256 MHz						
Test Site: "T"			Pre-Amp: Green			Cable: 65 ft RG8A/U			Analyzer: Orange Antenna: Lg Loop				

Radiated Emissions Table							Curtis-Straus LLC						
Date: 20-Sep-01			Company: Locknetics Security Engineering				Table 2						
Engineer: Evan Gould			EUT Desc: CM993PXK				Work Order: B1011						
Frequency Range: 30-1000MHz							Measurement Distance: 3 m						
Notes: Spurious Emissions							EUT Max Freq: 125kHz						
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dB μ V)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dB μ V/m)	FCC Class B						
noise floor	39.322	28.1	24.7	10.0	0.5	13.9	40.0	-26.1	Pass				
noise floor	52.0	34.8	24.7	6.5	0.6	17.2	40.0	-22.8	Pass				
noise floor	58.982	39.2	24.7	5.6	0.6	20.7	40.0	-19.3	Pass				
noise floor	63.2	32.6	24.7	5.8	0.6	14.3	40.0	-25.7	Pass				
noise floor	68.813	35.1	24.7	6.5	0.7	17.6	40.0	-22.4	Pass				
noise floor	74.5	28.8	24.7	7.2	0.7	12.0	40.0	-28.0	Pass				
noise floor	84.7	27.5	24.7	7.6	0.8	11.2	40.0	-28.8	Pass				
Table Result: Pass by -15.5 dB							Worst Freq: 78.463 MHz						
Test Site: "T"			Pre-Amp: Green			Cable: 65 ft RG8A/U			Analyzer: Orange Antenna: Green-White				

Emissions Plots

Fundamental

