

REPORT OF MEASUREMENTS
PART 15C - INTENTIONAL RADIATOR

DEVICE: 15.209 & 15.231 SUPERVISORY LOCK
TRANSMITTER

MODEL: PLATINUM PLUS LOCK

MANUFACTURER: STRATEGIC TECHNOLOGIES, INC.

ADDRESS: BUILDING A, UNIT 102
17802 66TH AVENUE
SURREY BC V3S 7X1

THE DATA CONTAINED IN THIS REPORT WAS
COLLECTED ON 17 DECEMBER 1998 AND COMPILED BY:

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CHIEF EMC ENGINEER

WORK ORDER: 10706

1. GENERAL.....	3
1.1 PURPOSE.....	3
1.2 MANUFACTURER	3
1.3 TEST LOCATION	3
1.4 TEST PERSONNEL.....	3
2. TEST RESULTS SUMMARY	4
3. DESCRIPTION OF EQUIPMENT AND PERIPHERALS	5
3.1 EQUIPMENT UNDER TEST (EUT)	5
3.2 EUT DESCRIPTION AND USAGE.....	5
3.3 EUT PERIPHERALS	5
3.4 DESCRIPTION OF INTERFACE CABLES.....	5
3.5 MODE OF OPERATION DURING TESTS	5
3.6 MODIFICATIONS REQUIRED FOR COMPLIANCE	5
4. ANTENNA REQUIREMENT	6
4.1 REGULATION.....	6
4.2 RESULT.....	6
5. CONDUCTED EMISSIONS TESTS	7
5.1 TEST EQUIPMENT.....	7
5.2 PURPOSE.....	7
5.3 TEST PROCEDURES	7
5.4 TEST RESULTS	7
6. 15.209 EMISSIONS FOR 800 KHZ SIGNAL	8
6.1 REGULATION.....	8
6.2 TEST EQUIPMENT.....	8
6.3 TEST PROCEDURES	9
6.4 TEST RESULTS	9
7. PERIODIC OPERATION EXCEEDING 15.231(A).....	10
7.1 REGULATION.....	10
7.2 TEST EQUIPMENT.....	11
7.3 TEST PROCEDURES	12
7.4 CALCULATION OF FIELD STRENGTH LIMITS	12
7.5 CALCULATION OF AVERAGE CORRECTION FACTOR	12
7.6 RESULT.....	13
8. DURATION OF TRANSMISSION AND MINIMUM SILENT PERIOD FOR 15.231(E)	15
8.1 REGULATION.....	15
8.2 RESULT.....	15
9. 20 DB BANDWIDTH	16
9.1 REGULATION.....	16
9.2 TEST EQUIPMENT.....	16
9.3 CALCULATION OF 20 DB BANDWIDTH AND RESULT	16
10. FREQUENCY TOLERANCE IN THE 40.66 – 40.70 MHZ BAND.....	17
10.1 REGULATION.....	17
10.2 RESULT.....	17
11. MISCELLANEOUS COMMENTS AND NOTES.....	18

1. General

1.1 Purpose

The purpose of this report is to show compliance to the FCC regulations for unlicensed devices operating under sections 15.209 & 15.231 of the Code of Federal Regulations title 47.

1.2 Manufacturer

Company Name: Strategic Technologies, Inc.
Contact: Steve Rosset
Street Address: Building A, Unit 102, 17802 66th Avenue
City/Province: Surrey BC
Country/Postal Code: Canada V3S 7X1
Telephone: 604 576-8658
Fax: 604 576-0436

1.3 Test location

Company: Acme Testing Inc.
Street Address: 2002 Valley Highway
Mailing Address: PO Box 3
City/State/Zip: Acme WA 98220-0003
Laboratory: Test Site 2
Telephone: 888 226-3837
Fax: 360 595-2722
E-mail: acmetest@acmetesting.com
Web: www.acmetesting.com

1.4 Test Personnel

Paul G. Slavens, Chief EMC Engineer

2. Test Results Summary

Summary of Test Results

Requirement	CFR Section	Test Result
Antenna Requirement	15.203	Pass
Radiated Spurs < 15.209	15.205(b)	Pass
Conducted Emissions < 48.0 dBuV	15.207	Pass
Field Strength Limits	15.209	Pass
Field Strength Limits	15.231(e)	Pass
20 dB Bandwidth	15.231(c)	Pass

The signed original of this report, supplied to the client, represents the only “official” copy. Retention of any additional copies (electronic or non-electronic media) is at Acme Testing’s discretion to meet internal requirements only. The client has made the determination that EUT Condition, Characterization, and Mode of Operation are representative of production units, and meet the requirements of the specifications referenced herein.

The measurements contained in this report were made in accordance with the procedure ANSI C63.4 - 1992 and all applicable Public Notices received prior to the date of testing. All emissions from the device were found to be within the limits outlined in this report. Acme Testing assumes responsibility only for the accuracy and completeness of this data as it pertains to the sample tested.

Paul G. Slavens
Chief EMC Engineer

Date of Issuance

3. Description of Equipment and Peripherals

3.1 Equipment Under Test (EUT)

Device:	Transmitter
Model Number:	Platinum Plus Lock
FCC ID:	OEHSTILOCK
Power:	9 V Battery
TX Frequency:	800 kHz, 433.28 MHz & 434.56 MHz
Grounding:	Local
Antenna Distance:	3 m

3.2 EUT description and Usage

The purpose of the Platinum Plus Lock transmitter is to program and reset the transmitter used to monitor personal subjected to “house arrest” through the means of electronic monitoring. The Platinum Plus Lock transmitter resets the personal transmitter with an 800 kHz signal transmitted through a ferrite core. The Platinum Plus Lock transmitter also programs the supervising receiver using either a signal at 43.28 MHz or 434.56 MHz. This signal is radiated directly from the printed circuit board with no antenna and has a extremely short range.

3.3 EUT Peripherals

None, EUT is a stand alone device.

3.4 Description of Interface Cables

None, EUT is a stand alone device

3.5 Mode of Operation During Tests

During testing the EUT was exercised with special software that caused the EUT to constantly transmit.

3.6 Modifications Required for Compliance

1. None.

4. Antenna requirement

4.1 Regulation

15.203 An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of Part 15C. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

4.2 Result

The antenna is a piece of insulated wire permanently soldered to the transmitter's PCB and coiled around a ferrite core. The antenna is internal to the EUT case.

5. Conducted Emissions Tests

Test Requirement: FCC CFR47, Part 15C

Test Procedure: ANSI C63.4:1992

5.1 Test Equipment

Spectrum Analyzer: Hewlett-Packard 8566B, Serial Number 2410A-00168, Calibrated:
31 December 1997, Calibration due Date: 31 December 1998

RF Preselector: Hewlett-Packard 85685A, Serial Number 2648A-00519, Calibrated:
31 December 1997, Calibration due Date: 31 December 1998

Quasi Peak Adapter: Hewlett-Packard 85650A, Serial Number 2043A-00327, Calibrated:
31 December 1997, Calibration due Date: 31 December 1998

Line Impedance Stabilization Network: EMCO 3825/2, Serial Number 9002-1601, Calibrated:
27 August 1997, Calibration due Date: 31 December 1998

5.2 Purpose

The purpose of this test is to evaluate the level of conducted noise the EUT imposes on the AC mains.

5.3 Test Procedures

For tabletop equipment, the EUT is placed on a 1 meter by 1.5 meters wide and 0.8 meter high nonconductive table that is placed above the groundplane. Floor standing equipment is placed directly on the groundplane. Any supplemental grounding mechanisms are connected, if appropriate. The EUT is connected to its associated peripherals, with any excess I/O cabling bundled to approximately 1 meter. The EUT is connected to a dedicated LISN and all peripherals are connected to a second separate LISN circuit. The LISNs are bonded to the groundplane.

Preview tests are performed to determine the “worst case” mode of operation. With the EUT operating in “worst case” mode, final conducted measurements are taken. Conducted measurements are made on each current carrying conductor with respect to ground.

Conducted Emissions Test Characteristics

Frequency range	0.45 MHz - 30.0 MHz
Test instrumentation resolution bandwidth	9 kHz
Lines Tested	Line 1/Line 2

5.4 Test Results

Not applicable the EUT is DC powered.

6. 15.209 Emissions for 800 kHz Signal

6.1 Regulation

Section 15.209 Radiated emission limits, general requirements.

(a) 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

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

6.2 Test Equipment

Spectrum Analyzer: Hewlett-Packard 8566B, Serial Number 2410A-00168, Calibrated:
31 December 1997, Calibration due Date: 31 December 1998

RF Preselector: Hewlett-Packard 85685, Serial Number 2648A-00519, Calibrated:
31 December 1997, Calibration due Date: 31 December 1998

Quasi Peak Adapter: Hewlett-Packard 85650A, Serial Number 2043A-00327, Calibrated: 31
December 1997, Calibration due Date: 31 December 1998

Magnetic Loop Antenna: EMCO 602, Serial Number 2016, Calibrated:
31 December 1997, Calibration due Date: 31 December 1998

EUT Turntable Position Controller: EMCO 1061-3M 9003-1441, No Calibration Required

Antenna Mast: EMCO 1051 9002-1457, No Calibration Required

6.3 Test Procedures

For tabletop equipment, the EUT is placed on a 1 meter by 1.5 meters wide and 0.8 meter high nonconductive table that sits on a flush mounted metal turntable

Radiated Emissions Test Characteristics

Frequency range	0.5 MHz –30 MHz
Test distance	10 m
Test instrumentation resolution bandwidth	120 kHz (0.5 MHz –30 MHz)
Receive antenna scan height	1 m - 4 m

6.4 Test Results

PRODUCT EMISSIONS 15.209 BANDS

No	EMISSION	SPEC LIMIT	MEASUREMENTS			POL	SITE	
	FREQUENCY MHz		ABS	dLIM dB	MODE		HGT cm	AZM deg
1	0.800	39.0	29.6	-9.4	PK	N/A	111	297

7. Periodic Operation Exceeding 15.231(a)

7.1 Regulation

15.231(e) Intentional radiators may operate at a periodic rate exceeding that specified in paragraph (a) and may be employed for any type of operation, including operation prohibited in paragraph (a), provided the intentional radiator complies with the provisions of paragraphs (b) through (d) of this Section, except the field strength table in paragraph (b) is replaced by the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental (microvolts/meter)	Field Strength of Spurious Emission (microvolts/meter)
40.66 - 40.70	1,000	100
70 - 130	500	50
130 - 174	500 to 1,500 **	50 to 150 **
174 - 260	1,500	150
260 - 470	1,500 to 5,000 **	150 to 500 **
Above 470	5,000	500

** linear interpolations

[Where F is the frequency in MHz, the formulas for calculating the maximum permitted fundamental field strengths are as follows: for the band 130-174 MHz, $\mu\text{V/m}$ at 3 meters = $22.72727(F) - 2454.545$; for the band 260-470 MHz, $\mu\text{V/m}$ at 3 meters = $16.6667(F) - 2833.3333$. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.]

7.2 Test Equipment

Spectrum Analyzer: Hewlett-Packard 8566B, Serial Number 2410A-00168, Calibrated:
31 December 1997, Calibration due Date: 31 December 1998

RF Preselector: Hewlett-Packard 85685, Serial Number 2648A-00519, Calibrated:
31 December 1997, Calibration due Date: 31 December 1998

Quasi Peak Adapter: Hewlett-Packard 85650A, Serial Number 2043A-00327, Calibrated:
31 December 1997, Calibration due Date: 31 December 1998

Line Impedance Stabilization Network: Rhode & Schwarz ESH2-Z5, Calibrated: 4 June 1997,
Calibration due Date: 31 December 1998

Broadband Biconical Antenna (20 MHz to 200 MHz): EMCO 3110, Serial Number 1115,
Calibrated: 27 July 1997, Calibration due Date: 31 December 1998

Broadband Log Periodic Antenna (200 MHz to 1000 MHz): EMCO 3146, Serial Number 2853,
Calibrated: 27 July 1997, Calibration due Date: 31 December 1998

EUT Turntable Position Controller: EMCO 1061-3M 9003-1441, No Calibration Required

Antenna Mast: EMCO 1051 9002-1457, No Calibration Required

2 GHz to 10 GHz Low Noise Preamplifier: Milliwave 593-2898, Serial Number 2494, Calibrated:
19 June 1997, Calibration due Date: 31 December 1998

Double Ridge Guide Horn Antenna: EMCO 3115, Serial Number 5534, Calibrated: 21 July 1998,
Calibration due Date: 21 November 1999

7.3 Test Procedures

For tabletop equipment, the EUT is placed on a 1 meter by 1.5 meters wide and 0.8 meter high nonconductive table that sits on a flush mounted metal turntable. Floor standing equipment is placed directly on the flush mounted metal turntable. The EUT is connected to its associated peripherals with any excess I/O cabling bundled to approximately 1 meter.

Preview tests are performed to determine the “worst case” mode of operation. With the EUT operating in “worst case” mode, emissions from the unit are maximized by adjusting the polarization and height of the receive antenna and rotating the EUT on the turntable. Manipulating the system cables also maximizes EUT emissions.

Radiated Emissions Test Characteristics

Frequency range	30 MHz - 5000 MHz
Test distance	3 m
Test instrumentation resolution bandwidth	120 kHz (30 MHz - 1000 MHz) 1 MHz (1000 MHz - 5000 MHz)
Receive antenna scan height	1 m - 4 m
Receive antenna polarization	Vertical/Horizontal

7.4 Calculation of Field Strength Limits

Fundamental field strength limits for the band 260-470 MHz, uV/m at 3 meters = $16.6667(F) - 2833.3333$. = $16.6667 \times 433.28 - 2833.33 = 4,388 \text{ uV} = 72.8 \text{ dBuV/m}$

The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level = 52.8 dBuV/m

7.5 Calculation of Average Correction Factor

The average correction factor is computed by analyzing the “worst case” on time in **any** 100 mSec time period and using the formula:

Correction Factor (dB) = $20 \times \log (\text{worst case on time}/100 \text{ mSec})$.

Analysis of the system transmitter worst case on time in any 100 mSec time period is an on time of 6.0 mSec. Therefore the correction factor is $20 \times \log (6.0/100) = -24.4 \text{ dB}$.

The maximum correction factor to be applied is 20 dB per section 15.35 of the FCC rules.

7.6 Result

PRODUCT EMISSIONS
AVERAGE* DATA
15.231 BANDS
CHANNEL A

No	EMISSION	SPEC LIMIT	MEASUREMENTS			POL	SITE	
	FREQUENCY MHz		ABS	dLIM dB	MODE		HGT cm	AZM deg
1	216.659	52.8	1.8	-51.0	AVG	V	100	360
2	433.343	72.8	16.5	-56.3	AVG	V	125	310
3	866.749	52.8	20.3	-32.5	AVG	V	157	061
4	1733.45	52.8	27.8	-25.0	AVG	V	100	360

* From calculation of section 6.5 (i.e. Peak Data – 20 dB)

PRODUCT EMISSIONS
PEAK DATA
15.205 BANDS
CHANNEL A

No	EMISSION	SPEC LIMIT	MEASUREMENTS			POL	SITE	
	FREQUENCY MHz		ABS	dLIM dB	MODE		HGT cm	AZM deg
1	1300.04	54.0	39.4	-14.6	PK	V	111	246

PRODUCT EMISSIONS
AVERAGE* DATA
 15.231 BANDS
 CHANNEL B

No	EMISSION	SPEC LIMIT	MEASUREMENTS			POL	SITE	
	FREQUENCY MHz		ABS	dLIM dB	MODE		HGT cm	AZM deg
1	217.307	52.8	1.0	-35.4	AVG	V	151	001
2	434.635	72.8	18.7	-3.4	AVG	V	107	000
3	869.316	52.8	19.5	-26.5	AVG	V	107	151
4	1738.65	52.8	21.0	-23.9	AVG	V	107	001

* From calculation of section 6.5 (i.e. Peak Data – 20 dB)

PRODUCT EMISSIONS
PEAK DATA
 15.205 BANDS
 CHANNEL B

No	EMISSION	SPEC LIMIT	MEASUREMENTS			POL	SITE	
	FREQUENCY MHz		ABS	dLIM dB	MODE		HGT cm	AZM deg
1	1303.95	54.0	41.0	-13.0	PK	V	107	360

8. Duration of Transmission and Minimum Silent Period for 15.231(e)

8.1 Regulation

15.231(e) In addition, devices operated under the provisions of this paragraph shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

8.2 Result

The transmit time is 6 milliseconds.

The silent period between transmissions is 12 seconds.

9. 20 dB bandwidth

9.1 Regulation

15.231(c) 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.

9.2 Test Equipment

Spectrum Analyzer: Hewlett-Packard 8566B, Serial Number 2410A-00168, Calibrated:
31 December 1997, Calibration due Date: 31 December 1998

RF Preselector: Hewlett-Packard 85685, Serial Number 2648A-00519, Calibrated:
31 December 1997, Calibration due Date: 31 December 1998

Quasi Peak Adapter: Hewlett-Packard 85650A, Serial Number 2043A-00327, Calibrated:
31 December 1997, Calibration due Date: 31 December 1998

Broadband Biconical Antenna (20 MHz to 200 MHz): EMCO 3110, Serial Number 1115,
Calibrated: 27 July 1997, Calibration due Date: 31 December 1998

Broadband Log Periodic Antenna (200 MHz to 1000 MHz): EMCO 3146, Serial Number 2853,
Calibrated: 27 July 1997, Calibration due Date: 31 December 1998

9.3 Calculation of 20 dB Bandwidth and Result

The 20 dB bandwidth limit = 2.16 MHz

The Measured 20 dB bandwidth is 260 kHz

10. Frequency Tolerance in the 40.66 – 40.70 MHz Band

10.1 Regulation

15.231(d) For devices operating within the frequency band 40.66 - 40.70 MHz, the bandwidth of the emission shall be confined within the band edges and the frequency tolerance of the carrier shall be $\pm 0.01\%$. This frequency tolerance shall be maintained for a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

10.2 Result

Not applicable the EUT does not transmit in this band.

11. Miscellaneous Comments and Notes

1. None.