Atlas Compliance & Engineering, Inc.
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Atlas Compliance & Engineering, Inc.

FCC
Test Report

FCC CFR 47 Part 15.209 COMPLIANCE

RETH (USA), INC.
20257 Paseo Del Prado
Walnut, CA 91789 USA

Product:
Proximity Access Control System
Model:
PROMI

Test Report Number: 0012PROMI_subc
Date of Report: March 22, 2000

ACCREDITED

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Scope of Accreditation

American Association for Laboratory Accreditation

SCOPE OF ACCREDITATION TO ISO/IEC GUIDE 25-1990 AND EN 45001

ATLAS COMPLIANCE & ENGINEERING, INC.
726 Hidden Valley Road / 675 Sycamore Drive
Royal Oaks, CA 95076 / Milpitas, CA 95035
Bruce K. Smith Phone: 831 761 2223

ELECTRICAL (EMC)

Valid to: December 31, 2001 Certificate Number: 1007-01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following electromagnetic compatibility tests:

Tests:	Standard(s):
Milpitas Facility	
Emissions (Conducted)	CFR 47, FCC Parts 15 (using ANSI C63.4) & 18 (using FCC MP-5); AS/NZS 3548; CISPR 22 (1993, 1997); CISPR 11; EN 55011; EN 55013; EN 55014-1; EN 55015; EN 55022; EN 55103-1; EN 50081-1; EN 50081-2; ICES 001 & 003 (Issue 3); C108.8-M1983; C108.6-M91; CNS 13438; VCCI
Immunity	EN 55014-2; EN 55020; EN 55024; EN 55103-2; EN 50082-1; EN 50082-2
Electrostatic Discharge (ESD)	EN 61000-4-2
Radiated Immunity	EN 61000-4-3
Electrical Fast Transient/Burst	EN 61000-4-4
Surge Immunity (Power Lines Only)	EN 61000-4-5
Conducted Immunity	EN 61000-4-6
Voltage Dips, Short Interruptions, and Line Voltage Variations	EN 61000-4-11
Current Harmonics	EN 61000-3-2
Voltage Fluctuations & Flicker	EN 61000-3-3
Safety	UL 1950; EN 60950; IEC 60950
Royal Oaks Facility	
Emissions	CFR 47 Part 15 B & C (using ANSI C63.4)& 18 (using FCC MP-5); CISPR 22 (1993, 1997); CISPR 11; C108.8-M1983; C108.6-M91; ICES 001 & 003 (Issue 3); AS/NZS 3548; EN 55011; EN 55013; EN 55014-1; EN 55015; EN 55022; EN 55103-1; EN 50081-1; EN 50081-2; CNS 13438; VCCI V-1, V-2, V-3, V-4 (1999)
Safety	UL 1950; EN 60950; IEC 60950

On materials and products related to the following:
Industrial, Scientific, and Medical (ISM) Equipment; Information Technology Equipment (ITE); Household Appliances; Electric Tools and Similar Apparatus; Radio Frequency Devices; Digital Apparatus; Broadcast Receivers and Associated Equipment; Electrical Lighting and Similar Equipment; Professional Audio, Video, Audio-Visual and Entertainment Lighting Control Apparatus; and Electrical/Electronic Equipment.

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General Information

Test Report Number:	0012PROMI_subc
Date Product Tested:	March 6, 2000
Date of Report:	March 22, 2000
Applicant:	RETH (USA), INC. 20257 Paseo Del Prado Walnut, CA 91789 USA
Contact Person	Kevin Chen
Equipment Tested:	Proximity Access Control System
Trade Name:	PROMI-xxx
Model:	PROMI
Purpose Of Test:	To demonstrate the compliance of the Proximity Access Control System, PROMI, with the requirements of FCC CFR 47 Part 15 Rules and Regulations to the limits of Subpart C 15.209 using the procedure stated in ANSI C63.4-1992.
Frequency Range Investigated:	9 kHz to 1000 MHz
Test Site Locations:	OATS Atlas Compliance & Engineering, Inc. 726 Hidden Valley Road Watsonville, California 95076
Test Personnel:	Bruce Smith EMC Engineer

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Test Equipment

The following list contains the test equipment that was utilized in making the measurements in this report.

Description _ Model	Serial	Manufacturer	Calibrated	Calibration Due
BiLog Antenna _ CBL6141	4034	Chase Electronics Ltd.	10/7/99	10/7/00
Active Loop Antenna _ 6502	9108-2669	EMCO	3/28/99	3/28/00
EMI Test Receiver 9 kHz - 2500 MHz _ ESPC	DE14459	Rohde & Schwarz	12/6/99	12/6/00
Temperature and humidity probe _ RH-20F	200-97-082591	Omega Engineering	3/27/99	3/27/00

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Test Configuration

Customer:	RETH (USA), INC.
Test Date:	March 6, 2000
Specification:	FCC CRF 47 Part 15.209 Limits, ANSI C63.4-1992 Methods

EUT Description / Note:

The EUT, PROMI, a Proximity Access Control System, was tested connected to a DC power supply.

EUT Support Program

The PROMI reader was constantly operating waiting for a valid access card.

EUT Modifications for Compliance

There were no modifications performed on the EUT. The test results state the emission levels of the EUT in the condition as it was received on February 29, 2000.

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EUT Support Devices

Table 1 - Support Equipment Used For Test

Model:	Description:	S/N	FCC ID#
LPT-7202-FM	Lambda, DC Power Supply	B00362	N/A

I/O Ports and Cables

Table 2 - EUT Port Termination's

I/O Port	Cable Type	Length	Connector	Termination
Not Applicable				

Table 3 - Host Port Termination's

I/O Port	Cable Type	Length	Connector	Termination
Not Applicable				

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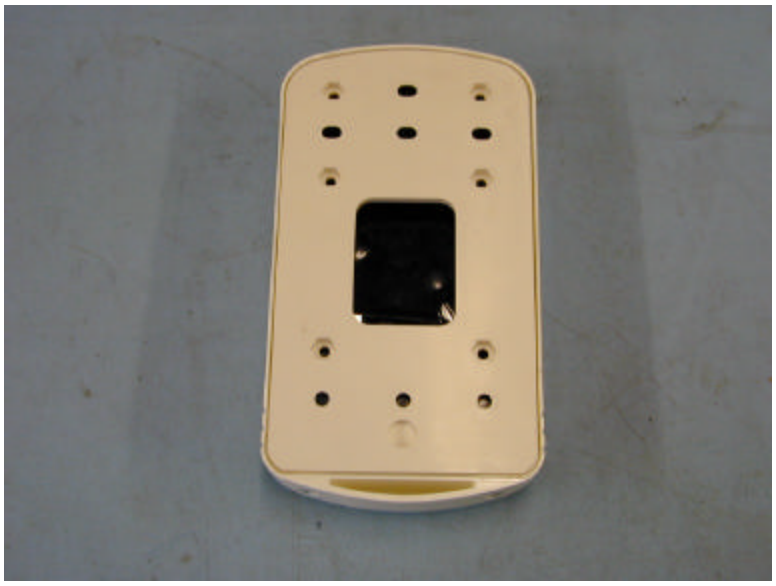
Equipment Under Test

The photographs below show the condition of the EUT for test.



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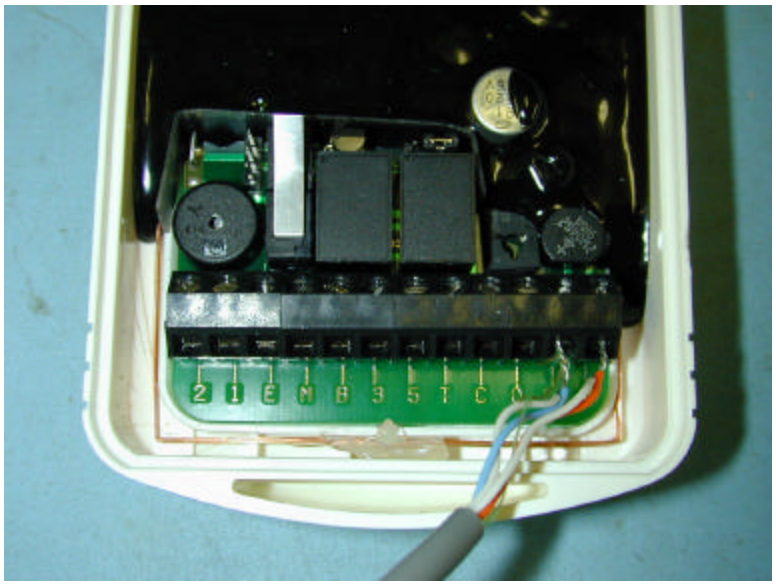

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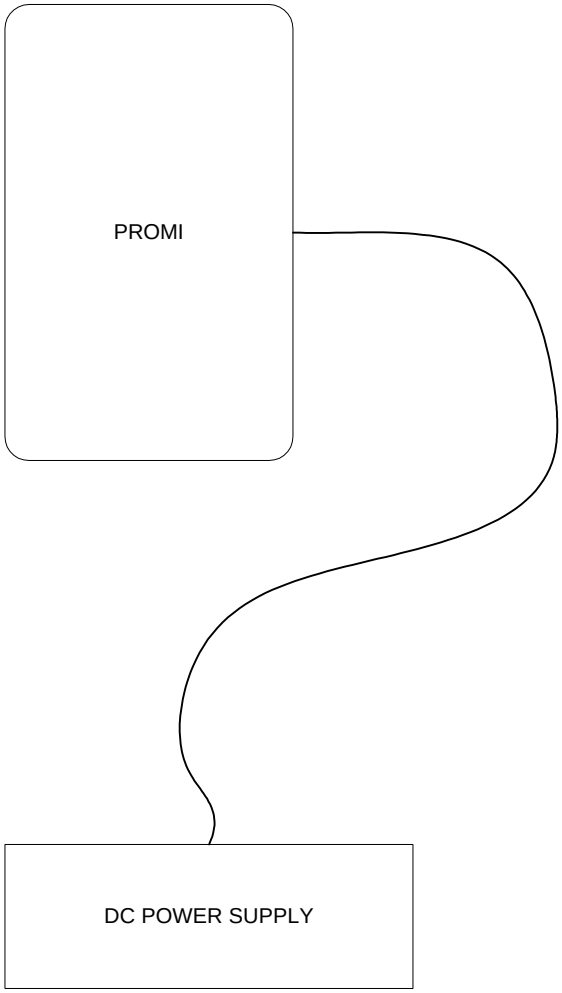
Equipment Block Diagram

Following is the block diagram of the test setup. Refer to TEST CONFIGURATION pages for port connections and information.

Figure 1 - Test Setup Diagram



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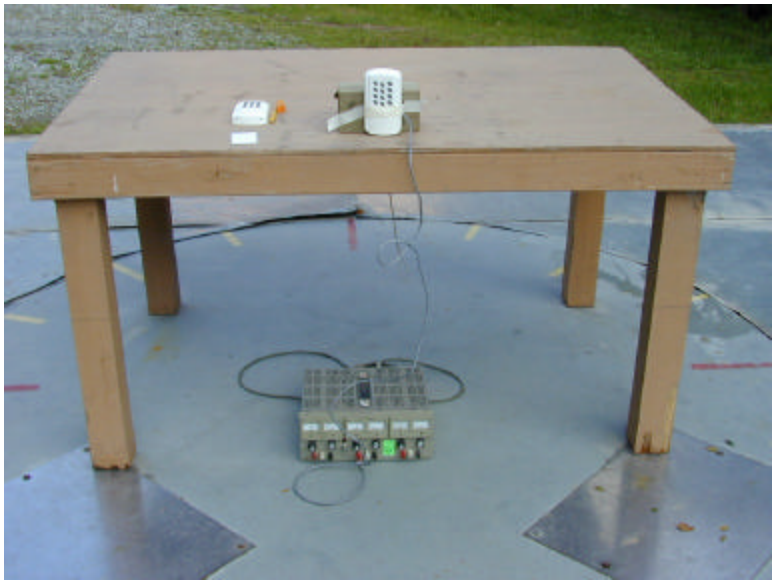
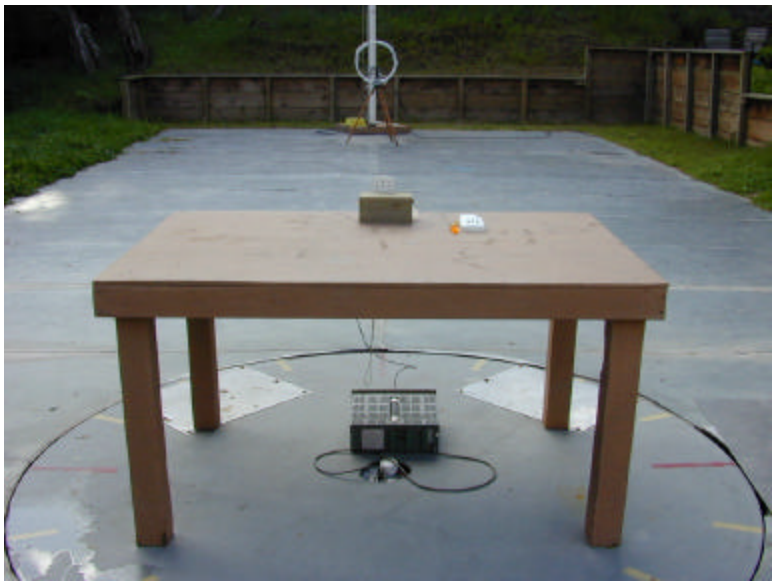
Test Setup (Radiated Emissions)

The photographs below show worst case setup for radiated emission testing.





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Test Methods for Emissions

The test procedure stated in ANSI C63.4-1992 was used to collect the test data. The radiated emission data of the EUT was taken with the Rohde & Schwarz EMI Test Receiver. Incorporating the application of correction factors programmed into the Test Receiver and verified for distance, antenna, cable loss, and amplifier gain, the data was reduced as shown in the Sample Calculations. These correction factors are available upon request. The corrected data was then compared to the emission limits to determine compliance.

During radiated emission testing, the EUT was placed on a nonconductive rotating table 0.8 meter above the conductive grid. The nonconductive table dimensions were 1 meter deep by 1.5 meters wide at 0.8 meter high. The EUT is centered laterally on the tabletop with its rear flush with the rear of the table.

For radiated emissions testing, scans in the frequency range of 9 kHz to 1000 MHz were made. Each frequency between 9 kHz and 150 kHz was measured at a bandwidth of 200 Hz, between 150 kHz and 30 MHz was measured at a bandwidth of 10 kHz and between 30 MHz and 1000 MHz was measured at a bandwidth of 120 kHz. Measurements were made employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz and 110-490 kHz, which employed an average detector. All readings within 10 dB of the limits were recorded, and those emissions were then measured using the appropriate detector and bandwidth for a 2-second measurement time.

Measurements were made at distance of 10 meters and pursuant to section 15.31-(f) (2) the measurement results were extrapolated to the specified distance by using the square of an inverse linear distance extrapolation factor of 40dB/decade.

Temperature and Humidity

The ambient temperature of the actual EUT was within the range of 10° to 40° C (50° to 104° F) unless the particular equipment requirements specify testing over a different temperature range. The humidity levels were within the range of 10% to 90% relative humidity unless the EUT operating requirements call for a different level.

Sample Calculations

An example of how the EMI Test Receiver reading is converted using correction factors is given for the emissions recorded in Table 5. These correction factors are programmed into the EMI Test Receiver and verified. For radiated emissions in dBµV/m, the EMI Test Receiver reading in dBµV is corrected by using the following formula:

Meter Reading (dBµV)
+ Antenna Factor (dB)
+ Cable Loss (dB)
= Corrected Reading (dBµV/m)

This reading is then compared to the applicable specification limits and the difference will determine compliance.

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FCC Part 15 Subpart C 15.209 Limits

Table 4 - Radiated Emission Limits, General Requirements

Frequency MHz	Field Strength µV/m	Measurement Distance Meters
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30	30	30
30 – 88	100	3
88 – 216	150	3
216 – 960	200	3
Above 960	500	3

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closest point of any part of the device or system.
3. The level of any unwanted emissions from an intentional radiator operating under these general provisions shall not exceed the level of the fundamental emission.
4. The emission limits shown are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

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Report of Measurements Radiated Data

The following table reports the results of the radiated measurements for the Proximity Access Control System, PROMI.

Table 5 - Radiated Emission Level at 10 meter distance

Fundamental Frequency kHz	Level dBµV	Detector	Limit dBµV	Margin dB	Antenna
128.0	66.81	AV	84.54	17.73	Loop

Unwanted Frequency kHz	Level dBµV	Detector	Limit dBµV	Margin dB	Antenna
256.0	42.42	AV	66.81	24.39	Loop
384.0	40.61	AV	66.81	26.20	Loop
512.0	42.23	QP	66.81	24.58	Loop
640.0	52.74	QP	66.81	14.07	Loop
768.0	62.96	QP	66.81	3.85	Loop
896.0	36.40	QP	66.81	30.41	Loop
1024.0	37.08	QP	66.81	29.73	Loop
1152.0	36.09	QP	66.81	30.72	Loop
1280.0	41.18	QP	66.81	25.63	Loop

Test Method: ANSI C63.4-1992
Spec Limit: FCC 15.209
No other emissions were observed.

Note: AV = Average
QP = Quasi Peak

COMMENTS: System continuously running. Ambient temperature 62°F and relative humidity of 55%. Test distance of 10 meters, limits are extrapolated at 40 dB/decade (see 15.31 (f)(2)). The limit of any unwanted emission shall not exceed the level of the fundamental emission (see 15.209 (f)).

Calculation of limit at 128kHz:
Limit in microvolts/meter
2400/128=18.75µV/m at 300 meters
Convert to dbµV
20 Log 18.75µV/m = 25.46dBµV/m at 300 meters
Take the Log of the ratio of the distance between 300 and 10
Log 300/10 = 1.477
Multiply this distance ratio with the extrapolation factor
1.477*40dB/decade = 59.08 factor for 10 meter distance
Add this factor to the limit of 25.46dBµV/m
25.46+59.08=84.54dBµV/m at 10 meters

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COMPLIANCE VERIFICATION REPORT

TEST CERTIFICATE

APPLICANT:	RETH (USA), INC. 20257 Paseo Del Prado Walnut, CA 91789 USA
Trade Name:	Proximity Access Control System
Model:	PROMI

I HEREBY CERTIFY THAT:

The measurements shown in this report were made in accordance with the procedures indicated and that the energy emitted by this equipment, as received, was found to be within the FCC Part 15 Subpart C section 15.209 for Radiated emissions. Additionally, it should be noted that the results in this report apply only to the items tested, as identified herein.

I FURTHER CERTIFY THAT:

On the basis of the measurements taken at the test site, the equipment tested is capable of operation in compliance with the requirements set forth in FCC CFR 47 Part 15.209 Rules and Regulations.

On this Date: March 22, 2000

Bruce Smith
Atlas Compliance & Engineering, Inc.

_____
Printed Name

_____
Signature
RETH (USA), INC. Representative

ACCREDITED