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Transmitter Certification

of

FCC ID: RK41012
Model: DC 7000 wireless

to

Federal Communications Commission

Rule Part 15.209

Date of report: October 4, 2005; Amended November 16, 2005

On the Behalf of the Applicant:

Acroprint Time Recorder Company

At the Request of:

Acroprint Time Recorder Company
5640 Departure Drive
Raleigh, NC 27616

Attention of:

Mark Lackey
mlackey@acroprint.com
800-334-7190 ext. 138; Fax 919-872-3778

Supervised by:

David E. Lee, Quality Assurance Manager

List Of Exhibits
(FCC **Certification** (Transmitters) - Revised 9/28/98)

Applicant: Acroprint Time Recorder Company

FCC ID: RK41012

By Applicant:

1. Letter Of Authorization
2. Identification Drawings
 - Label
 - Location of Label
 - Compliance Statement
 - Location of Compliance Statement
3. Documentation: 2.1033(B)
 - (3) User Manual
 - (4) Operational Description
 - (5) Block Diagram
 - (5) Schematic Diagram
 - (7) Photographs
 - Parts List
 - Active Devices

By M.F.A. Inc.

- A. Testimonial & Statement of Certification

The Applicant has been cautioned as to the following:

15.21 Information to User.

The users manual or instruction manual for an intentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

15.27(a) Special Accessories.

Equipment marketed to a consumer must be capable of complying with the necessary regulations in the configuration in which the equipment is marketed. Where special accessories, such as shielded cables and/or special connectors are required to enable an unintentional or intentional radiator to comply with the emission limits in this part, the equipment must be marketed with, i.e. shipped and sold with, those special accessories. However, in lieu of shipping or packaging the special accessories with the unintentional or intentional radiator, the responsible party may employ other methods of ensuring that the special accessories are provided to the consumer, without additional charge.

Information detailing any alternative method used to supply the special accessories for a grant of equipment authorization or retained in the verification records, as appropriate. The party responsible for the equipment, as detailed in § 2.909 of this chapter, shall ensure that these special accessories are provided with the equipment. The instruction manual for such devices shall include appropriate instructions on the first page of text concerned with the installation of the device that these special accessories must be used with the device. It is the responsibility of the user to use the needed special accessories supplied with the equipment.

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Required information per ISO/IEC Guide 25-1990, paragraph 13.2:

a) **Test Report**

b) Laboratory: M. Flom Associates, Inc.
(FCC: 31040/SIT) 3356 N. San Marcos Place, Suite 107
(Canada: IC 2044) Chandler, AZ 85225

c) Report Number: d05a0019

d) Client: Acroprint Time Recorder Company
5640 Departure Drive
Raleigh, NC 27616

e) Identification: FCC ID: RK41012
Model DC 7000
Description: Entry Control Badge Reader

f) EUT Condition: Not required unless specified in individual tests.

g) Report Date: October 4, 2005
EUT Received: June 20, 2005

h, j, k): As indicated in individual tests.

i) Sampling method: No sampling procedure used.

l) Uncertainty: In accordance with MFA internal quality manual.

m) Supervised by:



David E. Lee, Quality Assurance Manager

n) Results: The results presented in this report relate only to the item tested.

o) Reproduction: This report must not be reproduced, except in full, without written permission from this laboratory.

Sub-part
2.1033(b):

Test And Measurement Data

All tests and measurement data shown were performed in accordance with FCC Rules and Regulations, Volume II; Part 2, Sub-part J, Sections 2.1031, 2.1033, 2.1035, 2.1041, 2.1043, 2.1045, and the following individual Parts:

X	15.209	Radiated emission limits; general requirements
	15.211	Tunnel radio systems
	15.213	Cable locating equipment
	15.214	Cordless telephones
	15.217	Operation in the band 160-190 kHz
	15.219	Operation in the band 510-1705 kHz
	15.221	Operation in the band 525-1705 kHz (leaky coax)
	15.223	Operation in the band 1.705-10 MHz
	15.225	Operation in the band 13.553-13.567 MHz
	15.227	Operation in the band 26-27.28 MHz (remote control)
	15.229	Operation in the band 40.66-40.70 MHz
	15.231	Periodic operation in the band 40.66-40.70 MHz and above 70 MHz
	15.233	Operation within the bands 43.71-44.49, 46.60-46.98 MHz 48.75-49.51 MHz and 49.66-50.0 MHz
	15.235	Operation within the band 49.82-49.90 MHz
	15.237	Operation within the bands 72.0-73.0 MHz, 74.6-74.8 MHz and 75.2-76.0 MHz (auditory assistance)
	15.239	Operation in band 88-108 MHz
	15.241	Operation in the band 174-216 MHz (biomedical)
	15.243	Operation in the band 890-940 MHz (materials)
	15.245	Operation within the bands 902-928 MHz, 2435-2465 MHz, 5785-5815 MHz, 10500-10550 MHz, and 24075-24175 MHz (filed disturbance sensors)
	15.247	Operation within bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz (spread spectrum)
	15.249	Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz, and 24.0- 24.25 GHz
	15.251	Operation within the bands 2.9-3.26 GHz, 3.267-3.332 GHz, 3.339-3.3458 GHz, and 3.358- 3.6 GHz (vehicle identification systems)
	15.321	Specific requirements for asynchronous devices operating in the 1910-1920 MHz and 2390- 2400 MHz bands (Unlicensed PCS)
	15.323	Specific requirements for isochronous devices operating in the 1920-1930 MHz sub-band (Unlicensed PCS)

Standard Test Conditions and Engineering Practices

Except as noted herein, the following conditions and procedures were observed during the testing:

In accordance with ANSI C 63.4-1992/2003, section 6.1.9, and unless otherwise indicated in the specific measurement results, the ambient temperature of the actual EUT was maintained within the range of 10° to 40°C (50° to 104 °F) unless the particular equipment requirements specify testing over a different temperature range. Also, unless otherwise indicated, the humidity levels were in the range of 10% to 90% relative humidity.

Prior to testing, the EUT was tuned up in accordance with the manufacturer's alignment procedures. All external gain controls were maintained at the position of maximum and/or optimum gain throughout the testing.

Measurement results, unless otherwise noted, are worst-case measurements.



A2LA

"A2LA has accredited M. Flom Associates, Inc. Chandler, AZ for technical competence in the field of Electrical Testing. The accreditation covers the specific tests and types of tests listed on the agreed scope of accreditation. This laboratory meets the requirements of ISO/IEC 17025 - 1999 'General Requirements for the Competence of Testing and Calibration Laboratories' and any additional program requirements in the identified field of testing."

Certificate Number: **2152-01**

Expository Statement

Applicant: Acroprint Time Recorder Company

FCC ID: RK41012

The applicant has designed a device that can be sold in several different formats. Some of the formats are purely passive requiring only 47CFR15.107 / 109 testing, a Declaration of Conformance, and the appropriate label.

In that form the EUT may contain a Finger Print Reader / Magnetic Stripe Reader / Barcode Reader Wand / LAN Connector either singly or in combination

This report shows the tests conducted on a unit fitted with the above options and a Proximity Badge Reader. The Badge Reader is an intentional radiator under 47CFR15.209 Field Disturbance Sensor and is available in two forms, the ISO Reader and the HID Reader. Both these devices occupy the same area of the motherboard and are mutually exclusive. The circuitry for the ISO is populated on the motherboard when used; the HID reader is on a separate header board that sits over the unpopulated ISO Reader area. The same loop antenna is used with either of the installed readers.

A variant of the basic device contains a wireless LAN module, which has its own FCC ID (RTTAB-WLNB). When this device is fitted the manufacturer will place the appropriate label on the Badge Reader signifying that the unit contains the specific module.

The test report documents the worst-case combinations of the equipment under test.

List of General Information Required for Certification

In Accordance with FCC Rules and Regulations,
Volume II, Part 2 and to 15.209

Sub-part 2.1033

(c)(1): **Name and Address of Applicant:**

Acroprint Time Recorder Company
5640 Departure Drive
Raleigh, NC 27616

Manufacturer:

Applicant

(c)(2): **FCC ID:** RK41012

Model Number: DC7000

(c)(3): **Instruction Manual(s):**

Please See Attached Exhibits

(c)(4): **Type Of Emission:** Field Disturbance

(c)(5): **FREQUENCY RANGE:** 125kHz

(c)(6): **Power Rating:** 11.0 uv/m @ 300m
☐ Switchable ☐ Variable ☒ N/A

(c)(7): **Maximum Power Rating:** 19.2 uv/m @ 300m

15.203: **Antenna Requirement:**

- ☒ The antenna is permanently attached to the EUT
- ☐ The antenna uses a unique coupling
- ☐ The EUT must be professionally installed
- ☐ The antenna requirement does not apply

Subpart 2.1033 (continued)

(c)(8): Voltages & currents in all elements in final RF stage, including final transistor or solid-state device:

Collector Current, A	=	30mA (max), 10uA (standby)
Collector Voltage, Vdc	=	3.5
Supply Voltage, Vdc	=	6.0

(c)(9): **Tune-Up Procedure:**

Please see attached exhibits

(c)(10): **Circuit Diagram/Circuit Description:**

Including description of circuitry & devices provided for determining and stabilizing frequency, for suppression of spurious radiation, for limiting modulation and limiting power.

Please see attached exhibits

(c)(11): **Label Information:**

Please see attached exhibits

(c)(12): **Photographs:**

Please see attached exhibits

(c)(13): **Digital Modulation Description:**

 Attached Exhibits
 x N/A

(c)(14): **Test and Measurement Data:**

Follows

Name of Test: Field Strength of Spurious Radiation

Specification: 47 CFR 2.1053(a)

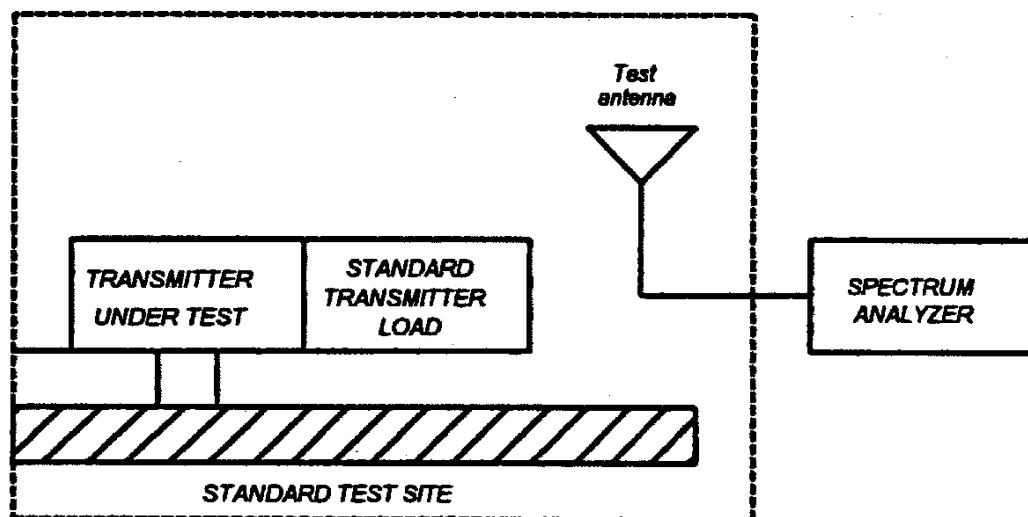
Guide: ANSI/TIA/EIA-603-1992/2001, Paragraph 1.2.12 and Table 16, 47 CFR 22.917

Measurement Procedure

1.2.12.1 Definition: Radiated spurious emissions are emissions from the equipment when transmitting into a non-radiating load on a frequency or frequencies which are outside an occupied band sufficient to ensure transmission of information of required quality for the class of communications desired.

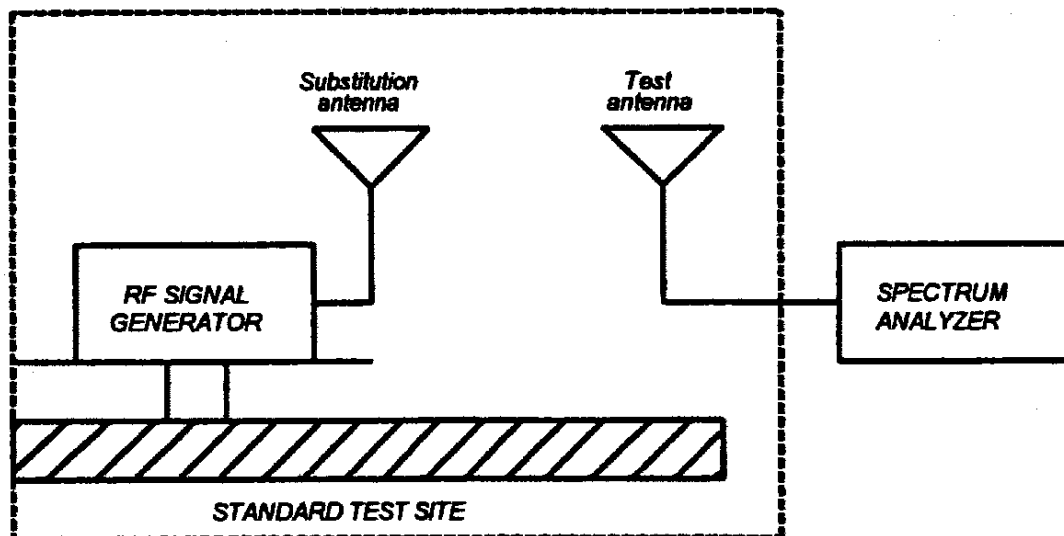
1.2.12.2 Method of Measurement

- A) Connect the equipment as illustrated
- B) Adjust the spectrum analyzer for the following settings:
 - 1) Resolution Bandwidth 100 kHz (<1 GHz), 1 MHz (> 1GHz).
 - 2) Video Bandwidth = 3 times Resolution Bandwidth, or 30 kHz (22.917)
 - 3) Sweep Speed ≤ 2000 Hz/second
 - 4) Detector Mode = Mean or Average Power
- C) Place the transmitter to be tested on the turntable in the standard test site. The transmitter is transmitting into a non-radiating load which is placed on the turntable. The RF cable to this load should be of minimum length.



Name of Test: Field Strength of Spurious Radiation (Cont.)

- D) For each spurious measurement the test antenna should be adjusted to the correct length for the frequency involved. This length may be determined from a calibration ruler supplied with the equipment. Measurements shall be made from the lowest radio frequency generated in the equipment to the tenth harmonic of the carrier, except for the region close to the carrier equal to \pm the test bandwidth (see section 1.3.4.4).
- E) For each spurious frequency, raise and lower the test antenna from 1 m to 4 m to obtain a maximum reading on the spectrum analyzer with the test antenna at horizontal polarity. Repeat this procedure to obtain the highest possible reading. Record this maximum reading.
- F) Repeat step E) for each spurious frequency with the test antenna polarized vertically.



- G) Reconnect the equipment as illustrated.
- H) Keep the spectrum analyzer adjusted as in step B).
- I) Remove the transmitter and replace it with a substitution antenna (the antenna should be half-wavelength for each frequency involved). The center of the substitution antenna should be approximately at the same location as the center of the transmitter. At lower frequencies, where the substitution antenna is very long, this will be impossible to achieve when the antenna is polarized vertically. In such case the lower end of the antenna should be 0.3 m above the ground.

Name of Test: Field Strength of Spurious Radiation (Cont.)

- J) Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a non-radiating cable. With the antennas at both ends horizontally polarized and with the signal generator tuned to a particular spurious frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.
- K) Repeat step J) with both antennas vertically polarized for each spurious frequency.
- L) Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps J) and K) by the power loss in the cable between the generator and the antenna and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna.
- M) The levels recorded in step L) are absolute levels of radiated spurious emissions in dBm. The radiated spurious emissions in dB can be calculated by the following:

$$\text{Radiated spurious emissions dB} = 10\log_{10}(\text{TX power in watts}/0.001) - \text{the levels in step I)}$$

NOTE: It is permissible that other antennas provided can be referenced to a dipole.

Test Equipment:

Asset	Description	s/n	Cycle	Last Cal
(as applicable)				
Transducer				
X i00079	Singer 94593-1 Loop	0219	24 mo.	Jun-05
X i00088	EMCO 3109-B 25MHz-300MHz	2336	24 mo.	Sep-03
	i00065 EMCO 3301-B Active Monopole	2635	24 mo.	Sep-03
X i00089	Apriel 2001 200MHz-1GHz	001500	24 mo.	Sep-03
X i00103	EMCO 3115 1GHz-18GHz	9208-3925	24 mo.	Jan-04
Amplifier				
i00028	HP 8449A	2749A00121	12 mo.	May-05
Spectrum Analyzer				
X i00029	HP 8563E	3213A00104	12 mo.	May-05
X i00033	HP 85462A	3625A00357	12 mo.	Sep-05
	i00048 HP 8566B	2511AD1467	12 mo.	Jun-05

Radiated Setup



Measurement Results

47 CFR 15.209 Radiated Limits

Frequency of Emission, MHz	Field Strength, $\mu\text{V/m}$	Distance m
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30.0 - 88.0	100	3
88.0 - 216.0	150	3
216.0 - 960	200	3
Above 960.0	500	3

Limit: $2400/125 = 19.2\text{mV/m}$ @ 300m

g05a0007: 2005-Oct-13 Thu 10:18:00
State: 2:High Power

Ambient Temperature: $28^{\circ}\text{C} \pm 3^{\circ}\text{C}$

Frequency Tuned, MHz	Frequency Emission, MHz	Meter, dBuV		CF, dB	$\mu\text{V/m}$ @ 300m
0.125000	0.125008	3.60	P	17.68	11.00
0.125000	0.250000	-7.50	P	16.75	
0.125000	0.375000	-6.55	P	15.70	
0.125000	0.500000	-5.77	P	14.68	
0.125000	0.650000	-2.77	P	12.75	
0.125000	0.775000	-5.40	P	12.74	<3.00
0.125000	0.900000	-13.90	P	12.77	
0.125000	1.025000	-4.90	P	5.84	
0.125000	1.150000	-9.77	P	5.15	
0.125000	1.250000	-9.27	P	4.50	



Performed By:

Fred Chastain, Test Technician

47 CFR 15.109(a) Class A Radiated Limits

Frequency of Emission, MHz	Field Strength, $\mu\text{V/m}$ @ 10m	Field Strength, $\mu\text{V/m}$ @ 3m
30 - 88	90	284
88 - 216	150	474
216 - 960	210	664
Above 960	300	949

g05a0008: 2005-Oct-13 Thu 10:38:00
State: 2:High Power

Ambient Temperature: $30^{\circ}\text{C} \pm 3^{\circ}\text{C}$

Emissions, Hz	Level, dBuV	Scf, dB	Calc, dBuV	Calc, uV	Limit dist, m	Margin, dB
150.000000	18.00	12.50	30.50	33.50	3	-19.5
200.002000	25.33	10.20	35.53	59.77	3	-14.5
214.850000	18.27	11.24	29.51	29.89	3	-20.5
232.205166	12.50	12.31	24.81	17.40	3	-32.2
235.154166	17.17	12.48	29.65	30.37	3	-27.4
250.000666	32.33	13.35	45.68	192.31	3	-11.3
250.003667	22.50	13.35	35.85	62.02	3	-21.2
300.003500	22.17	16.50	38.67	85.80	3	-18.3
350.003667	24.17	17.91	42.08	127.06	3	-14.9
400.003667	17.50	19.20	36.70	68.39	3	-20.3
450.003667	14.33	19.83	34.16	51.05	3	-22.8
550.004167	14.83	21.35	36.18	64.42	3	-20.8
650.005750	21.10	23.22	44.32	164.44	3	-12.7



Performed By:

Fred Chastain, Test Technician

Name of Test: A/C Powerline Conducted Emissions

Specification: FCC: 47 CFR 15.207

Guide: IEEE Standard 213

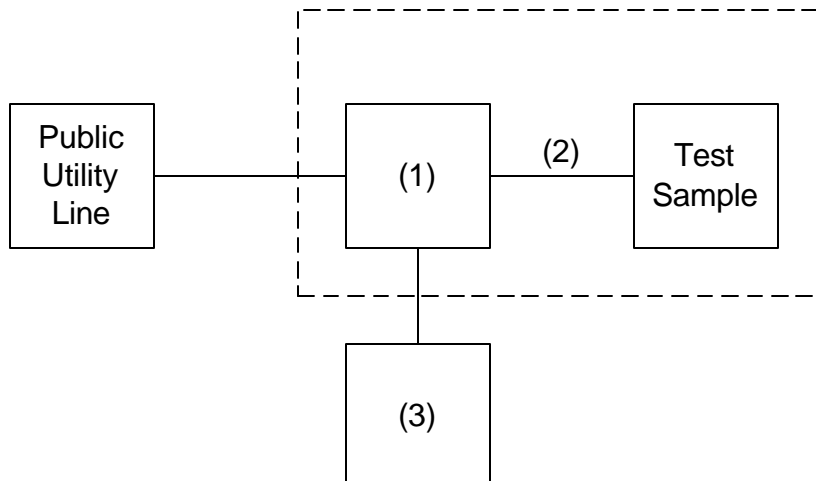
Test Conditions: S. T. & H.

Test Equipment: As per attached page

Measurement Procedure

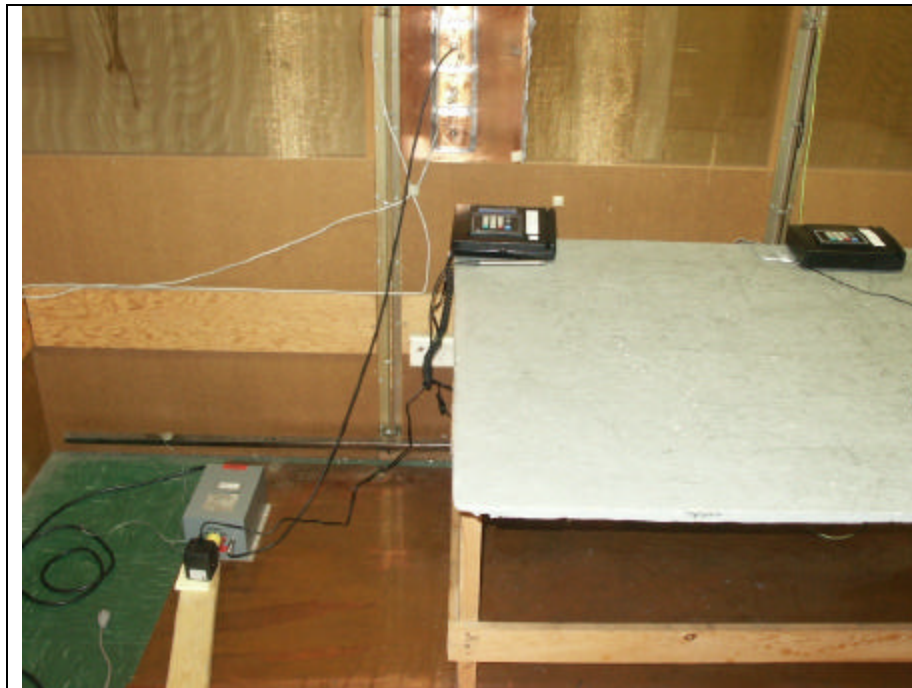
1. A test sample was connected to the Public Utility lines through a LISN (50 μ H).
2. A reference level of 250 μ V was set on the Spectrum Analyzer. The spectrum was searched over the range of 150 kHz to 30 MHz.
3. All other emissions were 20 dB or more below limit.
4. ☐ The test sample used a charger.
☒ The test sample does not use a charger.
5. Measurement Results: Attached.

AC Powerline Conducted Measurements



Asset	Description	s/n	Cycle	Last Cal
(1)	Line Impedance Stabilization Network			
X i00244	Fischer 50-20-2-01	2047	NCR	
(2)	Screen Room			
X i00170	Lindgren LG170	4999	NCR	
(3)	Spectrum Analyzer			
X i00033	HP 85462A	3625A00357	12 mo.	Sep-05
i00048	HP 8566B	2511AD1467	12 mo.	Jun-05

Conducted Setup



Name of Test: A/C Powerline Conducted Emissions

15.107(b) Class A Conducted Limits

Frequency of Emission, MHz	μ V	dBuV
0.150 - 1.705	1000	60
1.705 - 30.0	3000	70

g0560288: 2005-Jun-21 Tue 14:43:00

State: 0: Line Side

Frequency Emission, MHz	Level, dBuV	C.F., dB	μ V	Margin, dB
0.160500	48.38	1.23	302.34	-16.1
0.262900	43.96	0.73	171.59	-18.1
0.346900	42.65	0.60	145.38	-17.1
0.579000	35.54	0.58	63.97	-19.9
1.033000	25.11	0.51	19.10	-30.4
1.558000	25.09	0.50	19.03	-30.4
1.813000	24.86	0.51	18.56	-30.6
4.180000	35.30	0.67	62.88	-20.0
4.700000	36.31	0.70	70.88	-19.0
17.060000	21.24	1.49	13.69	-37.3
19.950000	22.34	1.96	16.41	-35.7
21.490000	21.78	1.79	15.08	-36.4
28.540000	20.67	1.93	13.49	-37.4

g0560289: 2005-Jun-21 Tue 15:04:00

State: 0: Neutral Side

Frequency Emission, MHz	Level, dBuV	C.F., dB	μ V	Margin, dB
0.158800	53.95	1.29	578.10	-10.5
0.259400	49.95	0.76	343.16	-12.2
0.367000	46.46	0.60	225.42	-12.7
0.500000	38.40	0.59	89.02	-17.0
3.374000	35.04	0.62	60.67	-20.3
4.419000	36.19	0.69	69.82	-19.1
16.550000	19.97	1.43	11.75	-38.6
23.150000	18.57	1.66	10.27	-39.8
28.600000	23.13	1.93	17.91	-34.9
29.650000	25.19	1.99	22.86	-32.8



Performed By:
END OF TEST REPORT

Fred Chastain, Test Technician

**Testimonial
and
Statement of Certification**

This is to Certify:

1. **That** the application was prepared either by, or under the direct supervision of, the undersigned.
2. **That** the technical data supplied with the application was taken under my direction and supervision.
3. **That** the data was obtained on representative units, randomly selected.
4. **That**, to the best of my knowledge and belief, the facts set forth in the application and accompanying technical data are true and correct.



Certifying Engineer:

David E. Lee, Quality Assurance Manager