
FCC ID: M74T1200

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PTI PROJECT: 99-026

Submitted to:

**Federal Communications Commission
Equipment Authorization Division,
Application Processing Branch**

7435 Oakland Mills Road
Columbia, MD 21048

September 1998

**FCC Type Certification Test Report
of an Intentional Radiator**

LONG RANGE SYSTEMS INCORPORATED

**T1200 Wait Reducer
Pager Transmitter
(Transmitter Portion)**

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Certificate of Compliance

Manufacturer: Long Range Systems Incorporated
Model: T1200 Wait Reducer Pager Transmitter
Serial #: Not Available
FCC ID: M74T1200
PTI Project: 99-026
Test Dates: June 12 through 15, September 21, 1998

I, Jeffrey A. Lenk, for Professional Testing (EMI), Inc., being familiar with the FCC rules and test procedures have reviewed the test setup, measurement data and this report. I believe them to be true and accurate. The **Long Range Systems T1200 Wait Reducer Pager Transmitter** was tested and found to be in compliance with FCC Part 15 for Intentional Radiators.

Jeffrey A. Lenk
President

1.0 Equipment Under Test (EUT) Description

The **Long Range Systems T1200 Wait Reducer Pager Transmitter** is a handheld device used for transmitting paging calls to small (belt worn) battery powered pagers. This device is intended for use by restaurants to inform patrons that their table is ready. Only one **T1200** is used in each system configuration. The **T1200** is battery powered, but can also be operated from an AC to DC power adapter.

To call a pager, the operator inputs the pager code into the **T1200** from the front panel then presses the CALL button. The code is then transmitted to the pager. The **T1200** is in 'sleep mode' most of the time and is only active when the front panel keys are pressed and the code is transmitted. After the code has been transmitted, the unit goes back into sleep mode automatically. Specific test requirements used for Type Certification of the **T1200 Wait Reducer** include the following:

47 CFR 15.231(a)	Operational Frequency and Use
47 CFR 15.231(a)(1)	Deactivation Time
47 CFR 15.231(c)	Occupied Bandwidth
47 CFR 15.231(b)	Peak Output Power
47 CFR 15.231(b)	Out-of-Band Emissions and
& 47 CFR 15.205	Restricted Bands of Operation
47 CFR 15.207	Conducted Emissions
47 CFR 15.203	Antenna Requirement

The system tested consisted of the following components:

EUT

<u>Manufacturer & Model</u>	<u>Serial #</u>	<u>FCC ID #</u>	<u>Description</u>
Long Range Systems Inc. T1200 Wait Reducer	N/P	M74T1200	Pager Transmitter
Condor Model DV-1215A-1	N/P	N/P	AC to DC Power Supply

1.1 Equipment Under Test (EUT) Operation

For all tests except §15.231(a)(1) and §15.231(d), the **Long Range Systems T1200 Wait Reducer Pager Transmitter** was put into a test mode which transmitted a 'worst case' test message (page) continuously. For the deactivation test (15.231(a)(1)), the EUT was operated in a normal fashion using a standard page message.

2.0 Operational Frequency Measurement and EUT Use Evaluation

Measurements were made on the **Long Range Systems T1200 Wait Reducer Pager Transmitter** to verify compliance with the operational frequency requirements of § 15.231(a).

2.1 Test Procedure

Radiated Emissions measurements were made at the Professional Testing "Open Field" Site 3, located in Marble Falls, Texas to determine the radio noise radiated from the EUT. A "Description of Measurement Facilities" has been submitted to the FCC and approved pursuant to Section 2.948 of CFR 47 of the FCC rules.

2.2 Test Criteria

Section 15.231(a) states that items subject to application based on this section shall operate within 40.66 to 40.77 MHz and above 70 MHz. Use of the signals transmitted under this part shall be restricted to transmission of short range control signals (garage door openers, alarm systems, etc.). Radio control of toys is not permitted.

2.3 Test Results

The **Long Range Systems T1200 Wait Reducer Pager Transmitter** operates at a nominal center frequency of 448 MHz. No other center frequency options are available. The measured center frequency for the sample under test was 447.971 MHz. A plot of the intended transmit signal of the **T1200** is included as part of the Occupied Bandwidth data. The intended application for this device is a transmitter for short range pagers. The transmission signal sends an identity code which results in a visual and vibrational response from the pagers used with the system.

The operational frequency of the T1200 is within the band specified by §15.231. The end use of this device is a controller meeting the restrictions of §15.231(a). The **Long Range Systems T1200 Wait Reducer Pager Transmitter** meets the requirements of §15.231 regarding operational frequency and application.

3.0 Deactivation Measurements

Measurements were made on the **Long Range Systems T1200 Wait Reducer Pager Transmitter** to verify compliance with the deactivation requirements of § 15.231(a)(1).

3.1 Test Procedure

Radiated Emissions measurements were made at in a controller laboratory environment at Professional Testing's Round Rock test facility. A passive electric field probe was placed within 1 foot of the EUT. The emission from the EUT was measured with a spectrum analyzer tuned to the center frequency of the **T1200** and placed in 'zero span' (receiver) mode. The EUT was operated in the normal transmit mode of operation. This involved transmitting a call to a pager programmed into the EUT and measuring the transmit duration of the **T1200**. The spectrum analyzer was set in single sweep mode with the trigger set to the normal transmit level.

3.2 Test Criteria

Section 15.231(a)(1) states that a manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

3.3 Test Results

The **Long Range Systems T1200 Wait Reducer Pager Transmitter** transmitted a single code burst immediately upon pressing the OPEN/ENTER key following entry of a valid pager code. Several code combinations were tested to determine if a significant difference in transmit duration existed between the codes. No significant difference was found between code sets.

The maximum transmit code duration was 22 milliseconds. The EUT ceased transmitting immediately after transmission of the pager code and went back into 'SLEEP' mode within 3 seconds after transmission. A plot of the worst case transmission period for the T1200 is shown in Appendix A.

The **Long Range Systems T1200 Wait Reducer Pager Transmitter** meets the requirements of §15.231 regarding deactivation time.

4.0 Occupied Bandwidth Measurements

Measurements were made on the **Long Range Systems T1200 Wait Reducer Pager Transmitter** to verify compliance with the bandwidth requirements of § 15.231(c).

4.1 Test Procedure

Radiated Emissions measurements were made at the Professional Testing "Open Field" Site 3, located in Marble Falls, Texas to determine the radio noise radiated from the EUT. A "Description of Measurement Facilities" has been submitted to the FCC and approved pursuant to Section 2.948 of CFR 47 of the FCC rules.

4.2 Test Criteria

Section 15.231(c) states that the bandwidth of emission shall be no greater than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. Bandwidth is determined at points 20 dB below the modulation carrier.

Based on an operating frequency of 448 MHz, the maximum permissible bandwidth of the T1200 is:

$$448 \text{ MHz} * 0.0025 = 1.12 \text{ MHz}$$

4.3 Test Results

Test data for occupied bandwidth testing of the **Long Range Systems T1200 Wait Reducer Pager Transmitter** is located in Appendix B. Several different code combinations were tested to determine possible impact of the code on occupied bandwidth. No change in occupied bandwidth was observed versus pager code.

The measured 20 dB bandwidth of the T1200 was 1.2 kHz, which is significantly below the maximum bandwidth limit. The **Long Range Systems T1200 Wait Reducer Pager Transmitter** meets the occupied bandwidth requirements of Section 15.231(c).

5.0 Peak Output Power

Measurements were made on the **Long Range Systems T1200 Wait Reducer Pager Transmitter** to verify compliance with the peak output power requirements of § 15.231(b).

5.1 Test Procedure

Radiated Emissions measurements were made at the Professional Testing "Open Field" Site 3, located in Marble Falls, Texas to determine the radio noise radiated from the EUT. A "Description of Measurement Facilities" has been submitted to the FCC and approved pursuant to Section 2.948 of CFR 47 of the FCC rules. Measurement of the fundamental of the T1200 were made for the EUT in horizontal and vertical positions for both polarizations of the measurement antenna.

5.2 Test Criteria

Section 15.231(b) requires that the fundamental emission levels for items certified under this part meet the following criteria:

<u>Frequency (MHz)</u>	<u>Maximum Fundamental Level (μV/m)</u>
40.66 to 40.70	2,250
70 to 130	1,250
130 to 174	1,250 to 3,750 (1)
174 to 260	3,750
260 to 470	3,750 to 12,500 (1)
Above 470	12,500

(1) Linear interpolations

The tighter level shall apply at the band edges. Levels are referenced to a test distance of 3 meters. In addition to this table, the fundamental emission of the EUT must also meet the requirements of Section 15.205. For this system, the maximum transmit level is interpolated between 260 to 470 to provide the maximum transmit level for the fundamental using the following procedure (extracted from the July 1998 update of 47 CFR Part 15):

[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 = $56.81818(F) - 6136.3636$; for the band 260-470 MHz, $\mu\text{V/m}$ at 3 meters = $41.6667(F) - 7083.3333$. The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level.]

For a signal at 448 MHz, the maximum level of the fundamental is calculated below:

$$\text{Limit } (\mu\text{V/m}) = 41.6667(448) - 7083.3333 = 11,583.34 \mu\text{V/m} = 81.27 \text{ dB dB}\mu\text{V/m}$$

5.3 Test Results

The **Long Range Systems T1200 Wait Reducer Pager Transmitter** has a maximum fundamental emission of 79.8 dBμV/m. This was measured with the EUT in the horizontal polarization and the measurement antenna in the horizontal polarization. This signal level is below the limit derived in the preceeding paragraph.

Data for this test is contained in Appendix C. The **Long Range Systems T1200 Wait Reducer Pager Transmitter** met the §15.231(b) maximum fundamental signal strength requirement.

6.0 Out-of-Band and Restricted Band Emissions Measurements

Measurements were made on the **Long Range Systems T1200 Wait Reducer Pager Transmitter** to verify compliance with the out-of-band emission requirements of §15.231(b). Measurements were performed for the radiated out-of-band emissions.

6.1 Test Procedure

Radiated Emissions measurements were made at the Professional Testing "Open Field" Site 3, located in Marble Falls, Texas to determine the radio noise radiated from the EUT. A "Description of Measurement Facilities" has been submitted to the FCC and approved pursuant to Section 2.948 of CFR 47 of the FCC rules.

6.2 Test Criteria

Section 15.231(b) requires that the spurious emission levels for items certified under this part meet the following criteria:

<u>Frequency (MHz)</u>	<u>Maximum Spurious Emission Level (μV/m)</u>
40.66 to 40.70	225
70 to 130	125
130 to 174	125 to 375 (1)
174 to 260	375
260 to 470	375 to 1250 (1)
Above 470	1250

(1) Linear interpolations

The tighter level shall apply at the band edges. Levels are referenced to a test distance of 3 meters. In addition to this table, spurious emissions of the EUT must also meet the requirements of Section 15.205.

For this system, the maximum spurious emission level is 20 dB below the maximum allowed fundamental signal level. Based on the level calculated in Section 5.2, the maximum spurious emission level is:

$$\text{Maximum Spur Level} = 81.27 \text{ dB}\mu\text{V/m} - 20 \text{ dB} = 61.27 \text{ dB}\mu\text{V/m}$$

6.3 Test Results

A Hewlett Packard 8566B Spectrum Analyzer utilizing an IF/video bandwidth of 100 kHz/300 kHz was used to record the output signals. Testing was performed over the frequency range 30 MHz to 4.48 GHz. Quasi-peak detection was used for most of the testing below 1 GHz with peak detection used above 1 GHz. Average detection was used for all measurements involving compliance with §15.205.

The data sheets for out-of-band emissions is contained in Appendix E of this report. All measured spurious emissions were less than 61.27 dB μ V/m; therefore, the **Long Range Systems T1200 Wait Reducer Pager Transmitter** met the §15.231(b) radiated emission requirements. In addition, in the restricted bands defined by §15.205, the emissions detected during this test were also below this limit.

7.0 Conducted Emissions Measurements

Conducted emissions measurements were made to determine the line-to-ground radio noise from the **Long Range Systems T1200 Wait Reducer Pager Transmitter** external power supply power-input terminals which connect to the public utility lines.

7.1 Test Procedure

The tests were performed in a 12' X 16' RayProof modular shielded room. The measurements were taken using Schwarzbeck 8127 Line Impedance Stabilization Network (LISN). A Hewlett Packard Spectrum Analyzer in association with a Quasi-Peak Adapter were used to record the conducted emissions. The Quasi-Peak Adapter utilizes a measurement bandwidth of 9 kHz.

The power cord length in excess of the distance between the EUT and LISN was wrapped in a "figure eight" pattern using tie wraps to establish the correct power cable length.

7.2 Test Criteria

The §15.207 conducted emission limits are given below:

Frequency (MHz)	Maximum RF Line Voltage	
	(μ V)	(dB μ V)
0.45 to 30.0	250	48

7.3 Test Results

The **Long Range Systems T1200 Wait Reducer Pager Transmitter** operates at a frequency of 448 MHz. The T1200 was placed in a continuous page test mode for conducted emission testing.

Conducted test data is contained in Appendix e of this report. The **Long Range Systems T1200 Wait Reducer Pager Transmitter** met the §15.207 conducted emission requirements.

8.0 Antenna Requirement

An analysis of the **Long Range Systems T1200 Wait Reducer Pager Transmitter** was performed to determine compliance with Section 15.203 of the Rules. This section requires specific handling and control of antennas used for devices subject to regulation under the Intentional Radiator portions of Part 15.

8.1 Evaluation Procedure

The structure and application of the **Long Range Systems T1200 Wait Reducer Pager Transmitter** were analyzed with respect to the rules. The antenna for this unit is a three inch monopole on top of the unit. The antenna is soldered onto the main board and is not accessible by the user and an auxiliary antenna port is not present.

8.2 Evaluation Criteria

Section 15.203 of the rules states that the subject device must meet at least one of the following criteria:

- (a) Antenna be permanently attached to the unit.
- (b) Antenna must use a unique type of connector to attach to the EUT.
- (c) Unit must be professionally installed. Installer shall be responsible for verifying that the correct antenna is employed with the unit.

8.3 Evaluation Results

The **Long Range Systems T1200 Wait Reducer Pager Transmitter** meets the criteria of this rule by virtue of having an antenna permanently attached to the unit. The EUT is therefore compliant with §15.203.

9.0 Form 731 Information

The following information is provided for inclusion in the FCC Form 731 for the **Long Range Systems T1200 Wait Reducer Pager Transmitter**.

9.1 Emission Designator

This portion of the report details the derivation of the emission designator for this product based on §2.201 of the Rules

Bandwidth:

The **T1200** has a measured occupied bandwidth of 1.97 kHz. This measurement is described in Section 4.0 of this report.

Emission Designator::

The RF output signals of the **T1200** are dual sideband AM modulation of the 448 MHz RF carrier signal. Based on this information, the emission designator for this product is:

Symbol Position	Parameter	Description	Resulting Symbol
1	Type of Modulation	Amplitude	A
2	Nature of Symbol(s) Modulating the Carrier	Digital Data only, no submodulation	1
3	Type of Information Being Transmitted	Data transmission, telemetry, or telecommand	D

This analysis results in an overall emission designator of A1D1K97.

9.2 Output Power

The rated output power of the **T1200** is calculated based on the following formula found in Industry Canada NIR-E document:

$$\text{Power (ERP)} = (E * r) / (30)^{1/2}$$

Where:

E = radiated electric field level in V/m

r = distance from the EUT to the measurement antenna

The method used in this application to calculate ERP goes through the following steps:

- (a) Determine the peak level in dB μ V/m
- (b) Translate this level to μ V/m using the following formula

$$\mu\text{V/m} = 10^{((\text{dB}\mu\text{V/m})/20)}$$

- (c) Translate this level to V/m by dividing by 1×10^6
- (d) Calculate ERP based on the formula at the beginning of this section for a test distance of X meters.

For the T1200, the rated output power in watts is calculated as follows:

$$\text{Maximum Radiated Fundamental Level} = 79.8 \text{ dB}\mu\text{V/m} = 9.77 \text{ mV/m}$$

Test Distance = 3 meters

$$\text{ERP} = (9.77 \times 10^{-3} * 3) / (30)^{1/2} = 0.00535 \text{ watts}$$

9.3 Main Processor Chip

The main processor chip of the **T1200** is a Zilog Z86E31.

10.0 List of Test Equipment

A list of the test equipment utilized to perform the conducted and radiated emission measurements is given below. The date of calibration is given for each.

<u>Device</u>	<u>Description</u>	<u>Date Last Calibrated</u>	<u>Calibration Due</u>
HP 8566B	Spectrum Analyzer	09/22/97	09/22/98
HP 85650A	Quasi Peak Adapter	09/22/97	09/22/98
MITEQ AFS4-00101800-40-10P-N	Broadband Pre-Amp	05/22/98	05/22/99
Schwarzbeck 8127 LISN	LISN	03/05/98	03/05/99
HP 8591E	Spectrum Analyzer	04/29/98	04/29/98
EMCO 3115	Double Ridged Horn Antenna	05/22/98	05/22/99
EMCO 3108	Biconical Antenna	07/22/97	07/22/98
EMCO 3146	Log Periodic Antenna	07/22/97	07/22/98
HP 8447	Broadband Pre-Amp	06/10/98	06/10/99

Appendix A

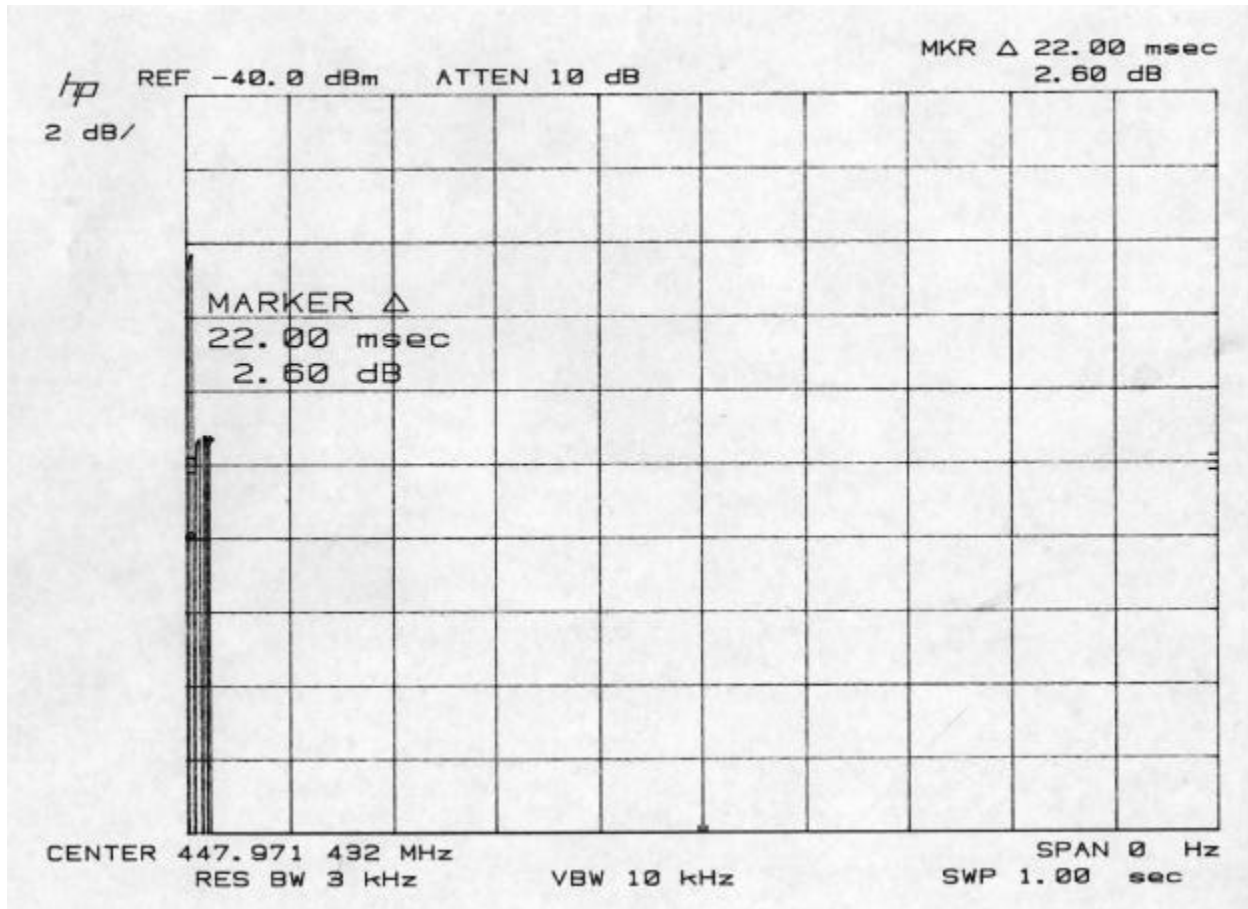
Deactivation Time Test Data

Deactivation Time Data Sheet

Long Range Systems Inc.
T1200 Wait Reducer

SERIAL #: Not Available
 DATE: September 21, 1998

PROJECT #: 99-026



COMMENT #1: Pager Test Code: 1, 2, 3

COMMENT #2: Code Duration = 22 milliseconds

COMMENT #3: Deactivation < 3 seconds

TEST ENGINEER: _____ APPROVED BY: _____
 John O'Brien Jeffery Lenk

Appendix B

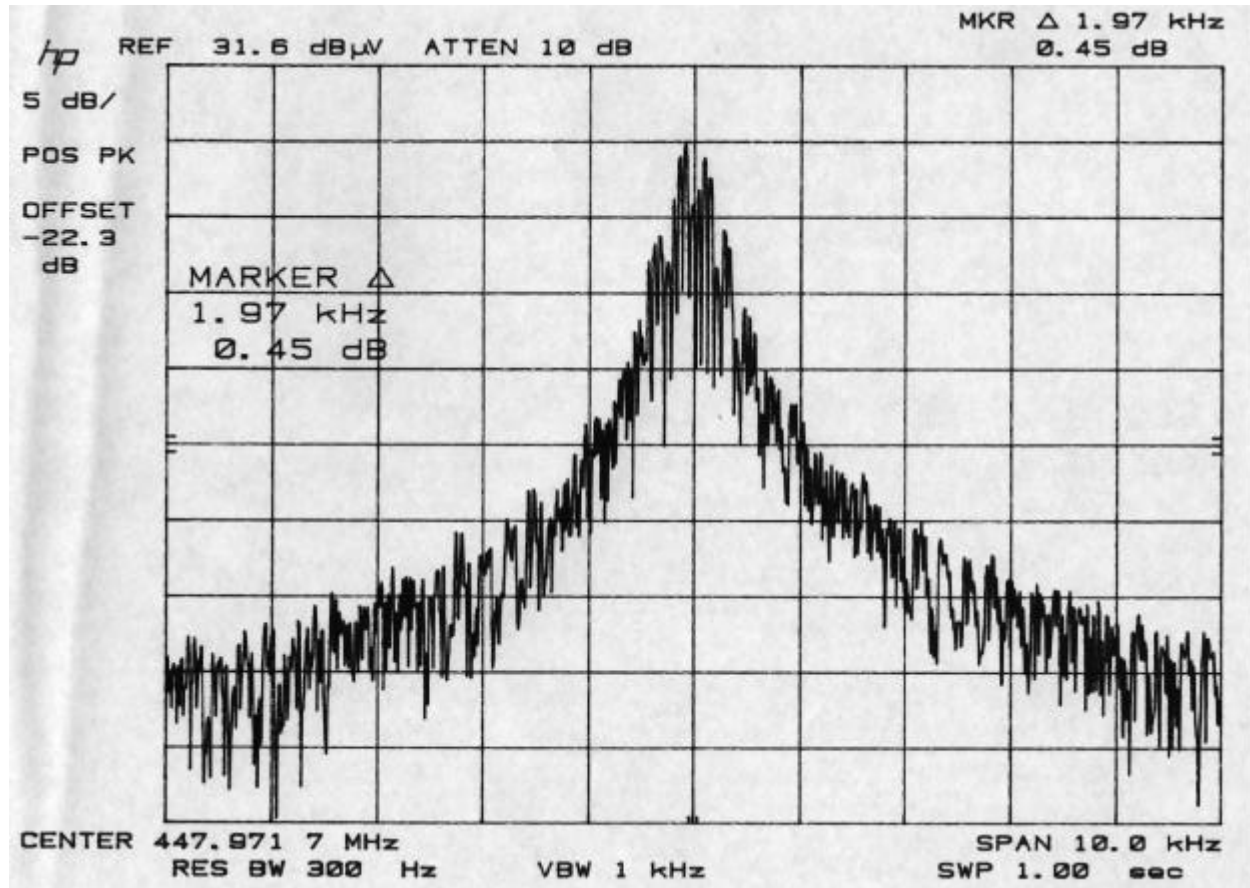
Occupied Bandwidth Test Data

Occupied Bandwidth Data Sheet

**Long Range Systems Inc.
T1200 Wait Reducer**

SERIAL #: Not Available
DATE: June 12, 1998

PROJECT #: 99-026



COMMENT #1: Pager Code: 1, 2, 3 in continuous repetitive transmit mode

COMMENT #2: 20dB Bandwidth = 1.97 kHz

TEST ENGINEER: _____ APPROVED BY: _____
John O'Brien Jeffery Lenk

Appendix C

Peak Output Power Test Data

Radiated Emissions Data Sheet**Long Range Systems Inc.
T1200 Wait Reducer**

SERIAL #: Not Available
 DATE: July 12, 1998
 PROJECT #: 99-026

MEASUREMENT DISTANCE (m): 1
 ANTENNA POLARIZATION: Vertical
 DETECTOR FUNCTION: Peak

Freq. (MHz)	EUT Orient. (V/H)	Antenna Orient. (V/H)	Recorded Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
447.9	V	V	56.5	18.1	4.8	79.4	81.2	-1.8
447.9	V	H	47.8	18.1	4.8	70.7	81.2	-10.5
447.9	H	V	48.0	18.1	4.8	70.9	81.2	-10.3
447.9	H	H	56.9	18.1	4.8	79.8	81.2	-1.4

$$\text{Corrected Level} = \text{Recorded Level} + \text{Antenna Factor} + \text{Cable Loss}$$

COMMENT #1: EUT in constant page mode. Used 1, 2, 3 test message.

COMMENT #2: Antenna height optimized to 1 meter EUT-Vertical tests and 3 meters for EUT-Horizontal tests.

COMMENT #3: Orientation 301 degrees worst case for all configurations

TEST ENGINEER: _____ APPROVED BY: _____
 John O'Brien Jeffery Lenk

Appendix D

Out-of-Band and Restricted Band Radiated Emission Test Data

Radiated Out-of-Band Emissions Data Sheet**Long Range Systems Inc.
T1200 Wait Reducer**

SERIAL #: Not Available
 DATE: June 12, 1998
 PROJECT #: 99-026

MEASUREMENT DISTANCE (m): 1
 ANTENNA POLARIZATION: Vertical
 DETECTOR FUNCTION: See Text

Freq. (MHz)	EUT Dir. (Deg.)	Antenna Elevation Meters	Recorded Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
612.0	319.0	3.0	2.5	20.3	7.1	29.9	46.0	-16.1
816.0	319.0	3.0	-2.7	22.7	5.8	25.8	61.2	-35.4
1344.0	215.0	1.0	0.8	23.5	2.4	26.7	53.9	-27.2
1792.0	0.0	1.0	6.5	24.3	2.8	33.6	61.2	-27.6
2240.0	0.0	1.0	7.4	26.3	3.2	36.9	53.9	-17.0
2688.0	215.0	1.0	15.6	28.5	3.2	47.3	53.9	-6.6
3136.0	0.0	1.0	4.8	31.4	3.8	40.0	61.2	-21.2
3584.0	0.0	1.0	0.4	31.7	3.8	35.9	61.2	-25.3
4032.0	0.0	1.0	1.3	32.4	4.2	37.9	53.9	-16.0
4480.0	0.0	1.0	0.8	32.4	5.5	38.7	61.2	-22.5

Corrected Level = Recorded Level + Antenna Factor + Cable Loss

COMMENT #1: EUT in Horizontal polarization

COMMENT #2: Test message 1, 2, 3 running in continuous transmit mode

TEST ENGINEER: _____ APPROVED BY: _____
 John O'Brien Jeffery Lenk

Radiated Out-of-Band Emissions Data Sheet

Long Range Systems Inc.
T1200 Wait Reducer

SERIAL #: Not Available
 DATE: June 12, 1998
 PROJECT #: 99-026

MEASUREMENT DISTANCE (m): 1
 ANTENNA POLARIZATION: Horizontal
 DETECTOR FUNCTION: See Text

Freq. (MHz)	EUT Dir. (Deg.)	Antenna Elevation Meters	Recorded Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
612.0	301.0	1.0	-2.1	20.3	7.1	25.3	46.0	-20.7
816.0	301.0	1.0	-2.2	22.7	5.8	26.3	61.2	-34.9
1344.0	0.0	1.0	-2.2	23.5	2.4	23.7	53.9	-30.2
1792.0	0.0	1.0	-1.8	24.3	2.8	25.3	61.2	-35.9
2240.0	0.0	1.0	-1.9	26.3	3.2	27.6	53.9	-26.3
2688.0	0.0	1.0	-0.7	28.5	3.2	31.0	53.9	-22.9
3136.0	0.0	1.0	-1.8	31.4	3.8	33.4	61.2	-27.8
3584.0	0.0	1.0	-2.8	31.7	3.8	32.7	61.2	-28.5
4032.0	0.0	1.0	-1.9	32.4	4.2	34.7	53.9	-19.2
4480.0	0.0	1.0	-2.0	32.4	5.5	35.9	61.2	-25.3

Corrected Level = Recorded Level + Antenna Factor + Cable Loss

COMMENT #1: EUT in Horizontal polarization

COMMENT #2: Test message 1, 2, 3 running in continuous transmit mode

TEST ENGINEER: _____ APPROVED BY: _____
 John O'Brien Jeffery Lenk

Appendix E

Conducted Emissions Test Data

FCC Part 15.207 Conducted Data Sheet**Long Range Systems Inc.
T1200 Wait Reducer**

SERIAL #: Not Available

DATE: June 15, 1998

DETECTOR FUNCTION: Quasi-Peak

LINE MEASURED: Neutral

PROJECT #: 99-026

Frequency Measured (MHz)	Recorded Level (dBuV)	Cable Loss (dB)	LISN Factor (dB)	Corrected Level (dBuV)	Limit Quasi-Peak (dBuV)	Margin (dB)
0.50	21.8	0.1	1.1	23.0	48.0	-25.0
0.731	15.7	0.1	1.1	16.9	48.0	-31.1
1.00	11.2	0.2	1.1	12.5	48.0	-35.5
4.00	19.0	0.3	1.3	20.6	48.0	-27.4
10.70	12.9	0.6	1.6	15.1	48.0	-32.9
241.00	21.3	0.9	2.5	24.7	48.0	-23.3

COMMENT #1: 120VAC/60Hz; Transmit mode

COMMENT #2:

TEST ENGINEER: _____ **APPROVED BY:** _____
 John O'Brien Jeffery Lenk

FCC Part 15.207 Conducted Data Sheet**Long Range Systems Inc.
T1200 Wait Reducer**

SERIAL #: Not Available

DATE: June 15, 1998

DETECTOR FUNCTION: Quasi-Peak

LINE MEASURED: Phase

PROJECT #: 99-026

Frequency Measured (MHz)	Recorded Level (dBuV)	Cable Loss (dB)	LISN Factor (dB)	Corrected Level (dBuV)	Limit Quasi-Peak (dBuV)	Margin (dB)
0.50	28.1	0.1	1.1	29.3	48.0	-18.7
0.731	22.1	0.1	1.1	23.3	48.0	-24.7
1.00	11.7	0.2	1.1	13.0	48.0	-35.0
4.00	20.5	0.3	1.3	22.1	48.0	-25.9
10.70	13.3	0.6	1.6	15.5	48.0	-32.5
241.00	25.5	0.9	2.5	28.9	48.0	-19.1

COMMENT #1: 120VAC/60Hz; Transmit mode

COMMENT #2:

TEST ENGINEER: _____ **APPROVED BY:** _____
 John O'Brien Jeffery Lenk