

ELITE ELECTRONIC ENGINEERING INCORPORATED
1516 CENTRE CIRCLE
DOWNERS GROVE, ILLINOIS 60515-1082

ELITE PROJECT: 30906

DATE TESTED: April 17-18, 2002

TEST PERSONNEL: Richard E. King


TEST SPECIFICATION: FCC "Code of Federal Regulations" Title 47
Part 15, Subpart C, Sections 15.207 & 15.209

ENGINEERING TEST REPORT NO. 30906-01
MEASUREMENT OF RF INTERFERENCE FROM
A TWO (2) CARD READER TRANSMITTERS
MODELS AY-Q12 AND AY-Q14

FOR: Rosslare Enterprises Ltd.
Flat 12,9/F Wing Fat Industrial Bldg.
12 Wang Tai Road
Kowloon Bay, Hong Kong

PURCHASE ORDER NO.: P020650-00

Report By: 
Richard E. King

Approved By: 
Raymond J. Klouda
Registered Professional
Engineer of Illinois - 44894

ENGINEERING TEST REPORT NO. 30906-01

ADMINISTRATIVE DATA AND SUMMARY OF TESTS

DESCRIPTION OF TEST ITEM: Card Reader Transmitters

MODEL NO: AY-Q12 and AY-Q14

SERIAL NO: Sample #3

MANUFACTURER: Rosslare Enterprises Ltd.

APPLICABLE SPECIFICATIONS: FCC "Code of Federal Regulations"
Title 47, Part 15, Subpart C

QUANTITY OF ITEMS TESTED: One (1)

TEST PERFORMED BY: ELITE ELECTRONIC ENGINEERING INCORPORATED
Radio Interference Consultants
Downers Grove, Illinois 60515

DATE RECEIVED: April 16, 2002

DATE TESTED: April 17-18, 2002

PERSONNEL (OPERATORS, OBSERVERS, AND CO-ORDINATORS):

CUSTOMER: No Rosslare Enterprises Ltd. personnel were present.

ELITE ELECTRONIC: Richard E. King

ELITE JOB NO.: 30906

ABSTRACT: The model AY-Q12 and model AY-Q14 Card Reader Transmitters, do meet the conducted and radiated emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Sections 15.207 & 15.209 for Intentional Radiators, when tested per ANSI C63.4-1992.

The conducted emissions level closest to the limit (worst case) occurred at 19.96 MHz. The emissions level at this frequency was 7.5dB within the limit. See data page 20 for more detailed results.

The radiated emissions level closest to the limit (worst case) occurred at 125.0kHz. The emissions level at this frequency was 81.3dB within the limit. See data page 26 for more details.

THIS REPORT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT THE WRITTEN APPROVAL OF ELITE ELECTRONIC ENGINEERING INCORPORATED.

TABLE OF CONTENTS

PARAGRAPH	DESCRIPTION OF CONTENTS	PAGE NO.
1.0	INTRODUCTION	4
1.1	DESCRIPTION OF TEST ITEM	4
1.2	PURPOSE	4
1.3	DEVIATIONS, ADDITIONS AND EXCLUSIONS	4
1.4	APPLICABLE DOCUMENTS	4
1.5	SUBCONTRACTOR IDENTIFICATION	5
1.6	LABORATORY CONDITIONS	5
2.0	TEST ITEM SETUP AND OPERATION	5
2.1	POWER INPUT	5
2.2	GROUNDING	5
3.0	TEST EQUIPMENT	6
3.1	TEST EQUIPMENT LIST	6
3.2	CALIBRATION TRACEABILITY	6
3.3	MEASUREMENT UNCERTAINTY	6
4.0	REQUIREMENTS, PROCEDURES AND RESULTS	7
4.1	POWERLINE CONDUCTED EMISSIONS	7
4.1.1	REQUIREMENTS	7
4.1.2	PROCEDURES	7
4.1.3	RESULTS	7
4.3	RADIATED MEASUREMENTS	8
4.3.1	REQUIREMENTS	8
4.3.2.1	PRELIMINARY RADIATED MEASUREMENTS	8
4.3.2.2	FINAL RADIATED MEASUREMENTS	9
4.3.3	RESULTS	10
5.0	CONCLUSION	10
6.0	CERTIFICATION	10
7.0	ENDORSEMENT DISCLAIMER	11
	TABLE I - EQUIPMENT LIST	12

TOTAL NUMBER OF PAGES IN THIS DOCUMENT,
(INCLUDING DATA SHEETS): 27

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ENGINEERING TEST REPORT NO. 30906-01
MEASUREMENT OF RF INTERFERENCE FROM
A MODEL AY-Q12 CARD READER TRANSMITTER

1.0 INTRODUCTION:

1.1 DESCRIPTION OF TEST ITEM: This document presents the results of a series of radio interference measurements performed on two Card Reader Transmitters, serial numbers Sample #1 and Sample #3, (hereinafter referred to as the test items). The test items were designed to transmit at approximately 125kHz using an internal antenna. The tests were performed for Rosslare Enterprises Ltd. of Hong Kong, China.

1.2 PURPOSE: The test series was performed to determine if the test item meets the conducted and radiated RF emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Sections for Intentional Radiators. Testing was performed in accordance with ANSI C63.4-1992.

1.3 DEVIATIONS, ADDITIONS AND EXCLUSIONS: There were no deviations, additions to, or exclusions from the test specification during this test series.

1.4 APPLICABLE DOCUMENTS: The following documents of the exact issue designated form part of this document to the extent specified herein:

- Federal Communications Commission "Code of Federal Regulations", Title 47, Part 15, Subpart C, dated 1 October 2000
- ANSI C63.4-1992, "American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 Ghz"

1.5 SUBCONTRACTOR IDENTIFICATION: This series of tests was performed by Elite Electronic Engineering Incorporated of Downers Grove, Illinois. The laboratory is accredited by the National

Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP). NVLAP Lab Code: 100278-0.

1.6 LABORATORY CONDITIONS: The temperature at the time of the test was 22°C and the relative humidity was 55%.

2.0 TEST ITEM SETUP AND OPERATION:

A block diagram of the test item setup is included as Figure 1.

2.1 POWER INPUT: The test item obtained 13VDC power via a 4 wire, 1.5 foot long, unshielded power cord. The 13VDC was supplied from a Kantech Systems, Inc. model KT200 Access Controller. The Access Controller received 24VAC, 60Hz power from the secondary of a ATC Frost model FTC7524Q Class 2 transformer via a 2 wire, 3.0 foot long, unshielded power cable. The primary of the transformer was connected to the 120VAC, 60Hz power.

The high and low leads were connected through a line impedance stabilization network (LISN) which was located on the copper ground plane. The network complies with the requirements of Paragraph 4.1.2 of ANSI C63.4-1992.

2.2 GROUNDING: Since only two wires were used to provide the input power, the test item was ungrounded during the tests.

2.5 OPERATIONAL MODE: For all tests the test item was energized and was placed on a 80cm high non-conductive stand.

For all tests, the test item was set to transmit continuously by placing a magnetic card near the reader. Transmission was verified by observation of an LED which changed colors momentarily whenever the transmitter was enabled. The transmitting mechanism automatically deactivated when the card was taken away from the reader. The tests were performed with the test item transmitting at 125kHz.

3.0 TEST EQUIPMENT:

3.1 TEST EQUIPMENT LIST: A list of the test equipment used can be found on Table I. All equipment was calibrated per the instruction manuals supplied by the manufacturer.

Conducted emission tests were performed with a spectrum analyzer in conjunction with a quasi-peak adapter.

The fundamental, harmonics and spurious radiated emissions were measured with a spectrum analyzer. These measurements were taken with the resolution bandwidth of the measuring instrument adjusted to 100Hz below 150kHz and 10kHz from 150kHz to 30MHz.

3.2 CALIBRATION TRACEABILITY: Test equipment is maintained and calibrated on a regular basis. All calibrations are traceable to the National Institute of Standards and Technology (NIST).

3.3 MEASUREMENT UNCERTAINTY: All measurements are an estimate of their true value. The measurement uncertainty characterizes, with a specified confidence level, the spread of values which may be possible for a given measurement system.

The measurement uncertainty budgets were based on guidelines in "ISO Guide to the Expression of Uncertainty in Measurements" and NAMAS NIS81 "The Treatment of Uncertainty in EMC Measurements".

The measurement uncertainty for these tests is presented below:

Conducted Emission Measurements:

Combined Standard Uncertainty	1.07	-1.07
Expanded Uncertainty (95% confidence)	2.1	-2.1

Radiated Emission Measurements:

Combined Standard Uncertainty	2.26	-2.18
Expanded Uncertainty (95% confidence)	4.5	-4.4

4.0 REQUIREMENTS, PROCEDURES AND RESULTS:**4.1 POWERLINE CONDUCTED EMISSIONS:**

4.1.1 REQUIREMENTS: All radio frequency voltages on the

power lines of an intentional radiator shall be below 250uV (quasi-peak) over the frequency range from 0.45MHz to 30MHz. It is also to be noted that if emitted levels in the peak detector function do not exceed the above limits, the test item does meet the intent of these requirements.

4.1.2 PROCEDURES: The interference on each power lead was measured by connecting the measuring equipment to the appropriate meter terminal of the LISN. The meter terminal of the LISN not under test was terminated with 50 ohms. Measurements were first made over the entire frequency range from 450kHz through 30MHz with a peak detector and the results were automatically plotted. The data thus obtained was then searched by the computer for the highest levels. Quasi-peak measurements were automatically performed at the frequencies selected from the highest peak measurements, and the results printed.

4.1.3 RESULTS: The plots of the peak preliminary conducted voltage levels on each power line are presented on data pages 16 through 19. The conducted limit for intentional radiators is shown as a reference. The final quasi-peak results are presented on data pages 20 through 23.

For model AY-Q12 the emissions level closest to the limit (worst case) occurred at 19.96MHz. The emissions level at this frequency was 7.5dB within the limit. For model AY-Q14 the emissions level closest to the limit (worst case) occurred at 19.7MHz. The emissions level at this frequency was 7.6dB within the limit. Photographs of the test configuration which yielded the highest, or worst case, conducted emission levels are shown on Figure 3.

4.3 RADIATED MEASUREMENTS:

4.3.1 REQUIREMENTS: The test item must comply with the requirements of FCC "Code of Federal Regulations Title 47", Part 15, Subpart C, Section 15.209.

Paragraph 15.209 has the following radiated emission limits:

Frequency MHz	Field Strength uV/m	Measurement Distance (m)
0.009-0.49	2400/f (kHz)	300
0.49-1.705	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

4.3.2.1 PRELIMINARY RADIATED MEASUREMENTS: All preliminary tests were performed in a 32ft. x 20ft. x 18ft. test chamber.

The shielded enclosure prevents emissions from other sources, such as radio and TV stations from interfering with the measurements. All powerlines and signal lines entering the enclosure pass through filters on the enclosure wall. The powerline filters prevent extraneous signals from entering the enclosure on these leads.

The broadband measuring antenna was positioned at a 1 meter distance from the test item. The entire frequency range from 10kHz to 30MHz was investigated using a peak detector and automatically plotted. The frequencies where significant emission levels were noted were then remeasured at an open area test site.

4.3.2.2 FINAL RADIATED MEASUREMENTS: Final open field measurements were manually performed at Elite's open field test site located in Downers Grove, Illinois. The open field test site is located in a clear area and is equipped with a 1/4-inch wire mesh ground plane. The facility complies with the test site criteria in ANSI C63.4-1992 and Section 2.948 of the FCC Rules.

Measurements were performed at a test distance of 3 meters using a peak detector.

Since the test distance was reduced from either 300 or 30 meters to 3 meters, a correction factor was applied to the measurements. Radiation at 125kHz was measured at several distances and the levels plotted. A straight line was drawn through these points and the slope (which is the propagation loss constant) was calculated. Measurements and calculations are shown in Figure 2. The factors to correct levels at 3 meters to levels at 300 or 30 meters are shown on the data page.

The final open field emission tests were performed over the frequency range of 120kHz to 1500kHz. Between 120kHz and 1500kHz, a loop antenna was used as the pick-up device.

All significant broadband and narrowband signals were measured and recorded.

To ensure that maximum emission levels were measured, the following steps were taken:

- 1) Measurements were made using a peak detector and a loop antenna.
- 2) To ensure that maximum, or worst case, emission levels were measured, the following steps were taken:
 - (a) The test item was rotated so that all of its sides were exposed to the receiving antenna.
 - (b) Since the measuring antenna is linearly polarized, both horizontal and vertical field components were measured.
 - (c) The measuring antenna was raised and lowered from 1 to 3 meters for each antenna polarization to maximize the readings.

4.3.3 RESULTS: The preliminary plots, with the test item transmitting at 125kHz, are presented on data page 24 and 25. The plot is presented for a reference only, and are not used as official data.

The final open area radiated levels, with the test item transmitting at 125kHz, is presented on data pages 26 and 27. As can be seen from the data, all emissions measured from the test item were within the specification limits. For model AY-Q12 the emissions level closet to the limit (worst case) occurred at 125.0kHz. The emissions level at this frequency was 81.3dB within the limit. See data page 26 for details. For model AY-Q14 the emissions level closet to the limit (worst case) occurred at 125.0kHz. The emissions level at this frequency was 78.1dB within the limit. See data page 27 for details. Photographs of the test configuration which yielded the highest, or worst case, radiated emission levels are shown on Figure 4.

5.0 CONCLUSION:

It was found that the Rosslare Enterprises Ltd. model AY-Q12 and AY-Q14 Card Reader Transmitters, do meet the conducted and radiated emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Sections 15.207 & 15.209 for Intentional Radiators, when tested per ANSI C63.4-1992.

6.0 CERTIFICATION:

Elite Electronic Engineering Incorporated certifies that the information contained in this report was obtained under conditions which meet or exceed those specified in the test specification.

The data presented in this test report pertains only to the test item at the test date. Any electrical or mechanical modification made to the test item subsequent to the specified test date will serve to invalidate the data and void this certification.

7.0 ENDORSEMENT DISCLAIMER:

This report must not be used to claim product endorsement by NVLAP or any agency of the US Government.

ENGINEERING TEST REPORT NO. 30906-01

TABLE 1: TEST EQUIPMENT LIST

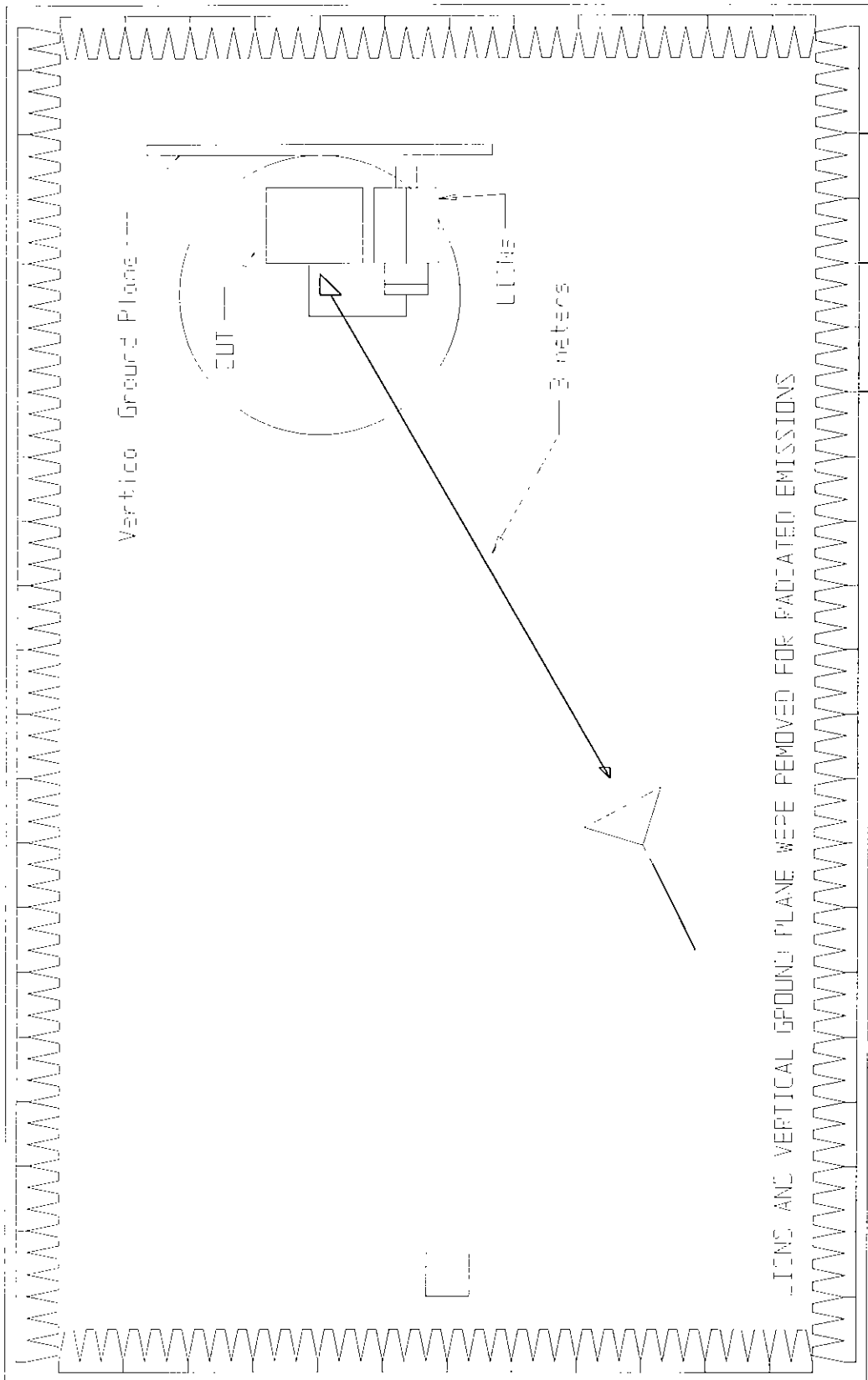
ELITE ELECTRONIC ENG. INC.

Page: 1

Eq ID	Equipment Description	Manufacturer	Model No.	Serial No.	Frequency Range	Cal Date	Cal Inv	Due Date
Equipment Type: ACCESSORIES, MISCELLANEOUS								
XLJA	5W, 50 OHM TERMINATION	JFW INDUSTRIES	50T-052	11	DC-2GHZ	06/12/01	12	06/12/02
XZG0	ATTENUATOR/SWITCH DRIVER	HEWLETT PACKARD	11713A	3439A02724	---		N/A	
Equipment Type: AMPLIFIERS								
APK0	PRE-AMPLIFIER	HEWLETT PACKARD	8449B	3008A00662	1-26.5GHZ	02/22/02	12	02/22/03
Equipment Type: ANTENNAS								
NLS1	24" ACTIVE LOOP ANTENNA	EMCO	6502	8903-2329	0.01-30MHZ	01/16/02	12	01/16/03
Equipment Type: CONTROLLERS								
CDD2	COMPUTER	HEWLETT PACKARD	D4171A#ABA	US61654645	---		N/A	
Equipment Type: PROBES; CLAMP-ON & LISNS								
PLL9	50UH LISN 462D	ELITE	462D/70A	010	0.01-400MHZ	02/27/02	12	02/27/03
PLLA	50UH LISN 462D	ELITE	462D/70A	011	0.01-400MHZ	02/27/02	12	02/27/03
Equipment Type: PRINTERS AND PLOTTERS								
HRE7	LASER JET 6P	HEWLETT PACKARD	C3980A	USCD109509	---		N/A	
Equipment Type: RECEIVERS								
RAC1	SPECTRUM ANALYZER	HEWLETT PACKARD	85660B	3407A08369	100HZ-22GHZ	01/18/02	12	01/18/03
RACB	RF PRESELECTOR	HEWLETT PACKARD	85685A	3506A01491	20HZ-2GHZ	01/18/02	12	01/18/03
RAF3	QUASIPeAK ADAPTER	HEWLETT PACKARD	85650A	3303A01775	0.01-1000MHZ	01/18/02	12	01/18/03

Cal. Interval: Listed in Months I/O: Initial Only N/A: Not Applicable

Note 1: For the purpose of this test, the equipment was calibrated over the specified frequency range, pulse rate, or modulation prior to the test or monitored by a calibrated instrument.



ETC 30905-C1

TEST SETUP DRAWING RADIATED EMISSIONS

--- ICNS AND VERTICAL GROUND PLANE WERE REMOVED FOR RADIATED EMISSIONS

Figure 1



FIGURE 2

PROPAGATION LOSS MEASUREMENTS AND CALCULATIONS FOR ROSSLARE
MODEL AY-Q SERIES CARD READERS

TEST DISTANCE (meters)	METER READING (dBuV)
3	53.5
4	46.8
5	41.2
6	37.0

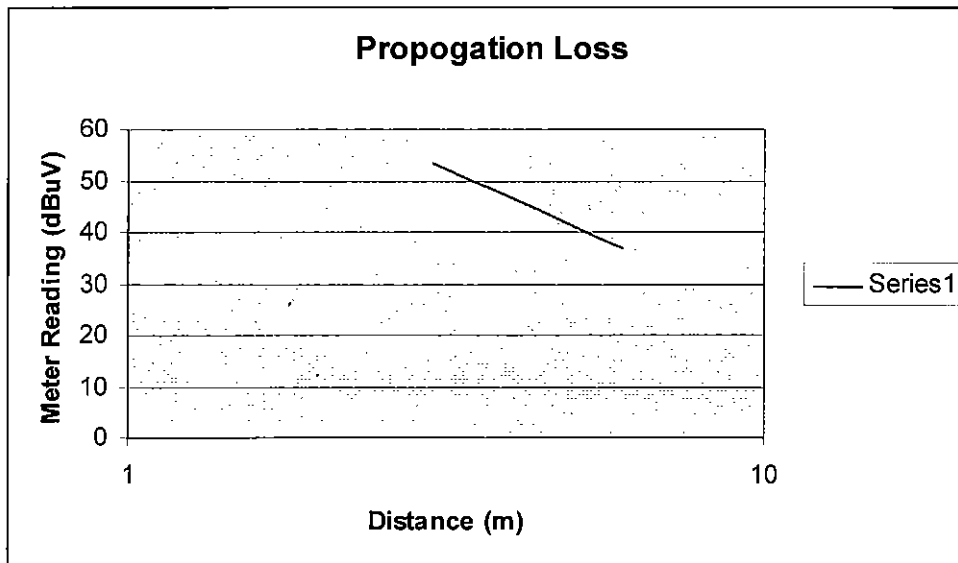
$$\text{PROPAGATION LOSS} = 20 * \text{LOG} (D_m/D_l)^N$$

WHERE : D_m = DISTANCE OF MEASUREMENT
: D_l = LIMIT DISTANCE
: N = SLOPE OF THE LINE

SOLVING FOR N:

$$N = (dBV_2 - dBV_1) / (20 * \text{LOG}(D_2/D_1))$$
$$N = (37.0 - 53.5) / (20 * \text{LOG}(6/3))$$
$$N = -2.75$$

PLACING THE SLOPE (N) INTO THE PROPAGATION LOSS EQUATION GIVES YOU:
PROPAGATION LOSS OF 110.0dB AT 300 METER TEST DISTANCE
PROPAGATION LOSS OF 55.0dB AT 30 METER TEST DISTANCE

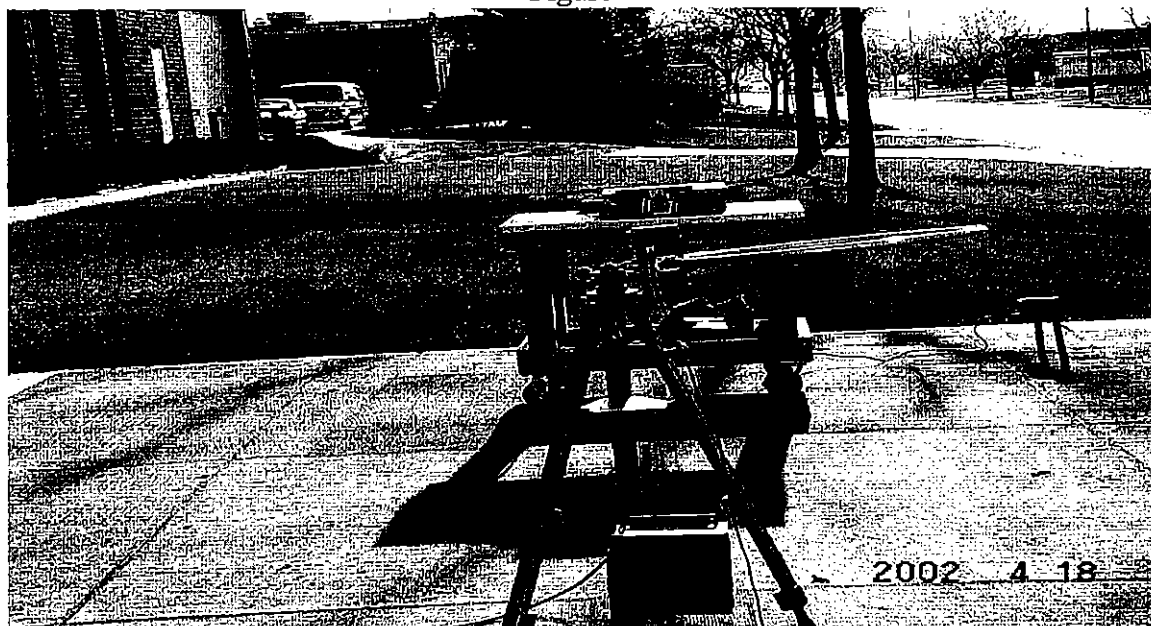


ETR 30906-01
Figure 3

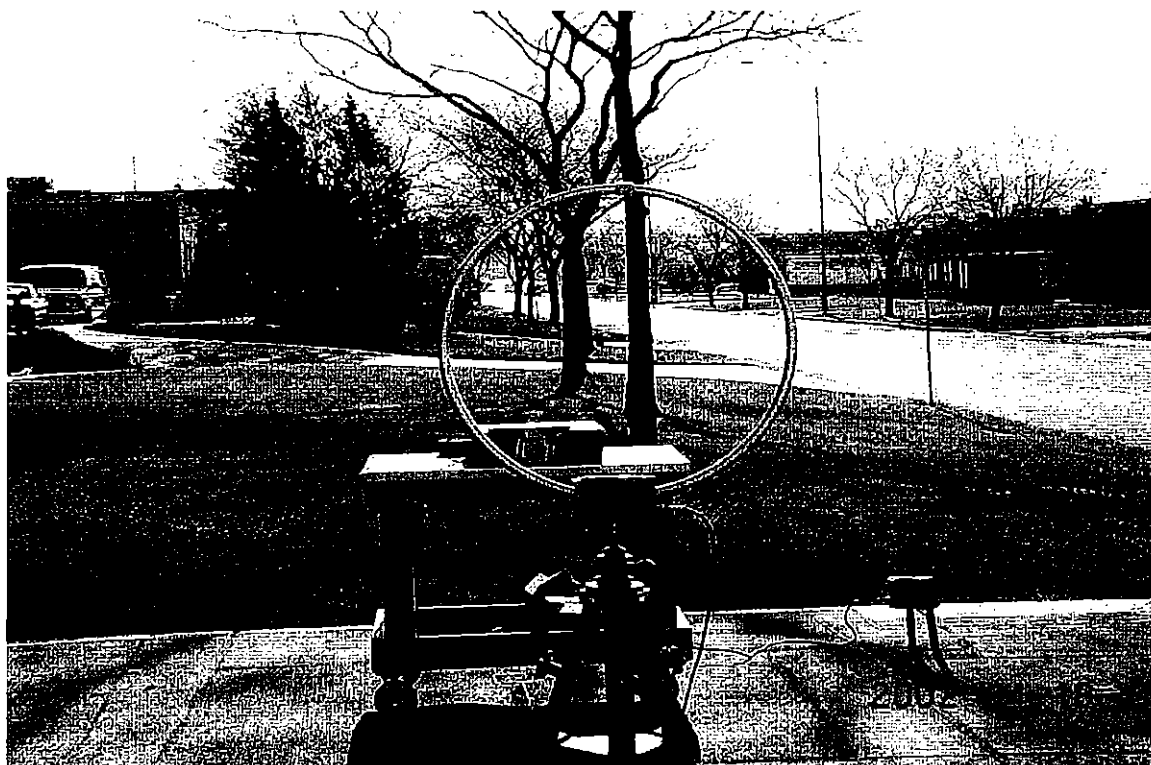


Conducted Emissions Test Setup

ETR 30906-01
Figure 4



Radiated Emissions Worst Case Horizontal Polarization



Radiated Emissions Worst Case Vertical Polarization

ELITE ELECTRONIC ENGINEERING Co.

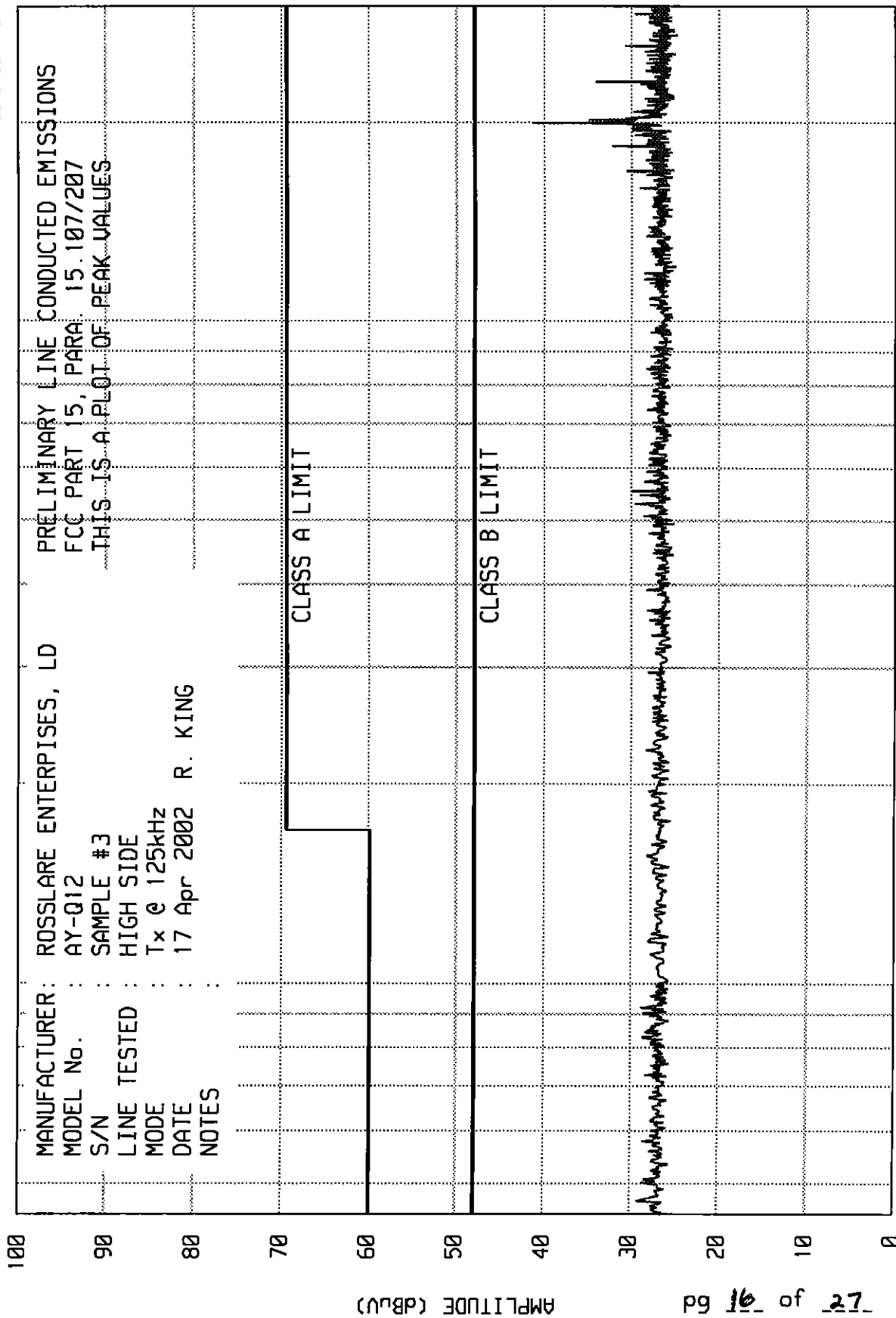
Downers Grove, Ill. 60515

FCC15 CE RUN 1

WEA0 02/22/01

MANUFACTURER: ROSSLARE ENTERPRISES, LD
 MODEL No. : AY-Q12
 S/N : SAMPLE #3
 LINE TESTED : HIGH SIDE
 MODE : Tx @ 125kHz
 DATE : 17 Apr 2002 R. KING
 NOTES :

PRELIMINARY LINE CONDUCTED EMISSIONS
 FCC PART 15, PARA. 15.107/207
 THIS IS A PLOT OF PEAK VALUES



STOP = 30

FREQUENCY - MHZ

START = .45

17 27 16 6d

ELITE ELECTRONIC ENGINEERING Co.

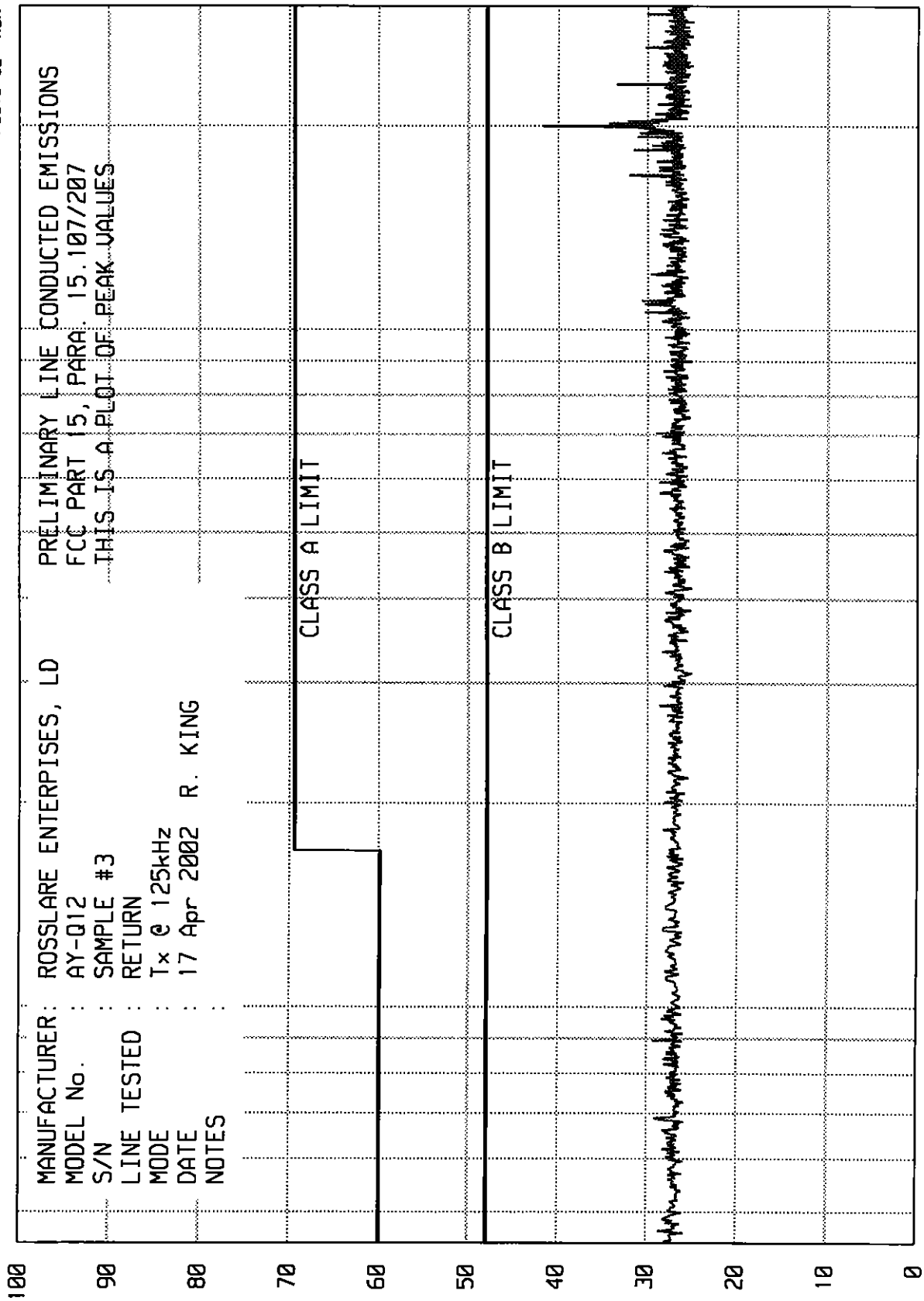
Downers Grove, Ill. 60515

FCC15 CE RUN 2

WEA0 02/22/01

MANUFACTURER: ROSSLARE ENTERPRISES, LD
 MODEL No. AY-Q12
 S/N SAMPLE #3
 LINE TESTED RETURN
 MODE Tx @ 125kHz
 DATE 17 Apr 2002 R. KING
 NOTES

PRELIMINARY LINE CONDUCTED EMISSIONS
 FCC PART 15, PARA. 15.107/207
 THIS IS A PLOT OF PEAK VALUES



START = .45

10

FREQUENCY - MHz

STOP = 30

72 of 6d

ELITE ELECTRONIC ENGINEERING Co.

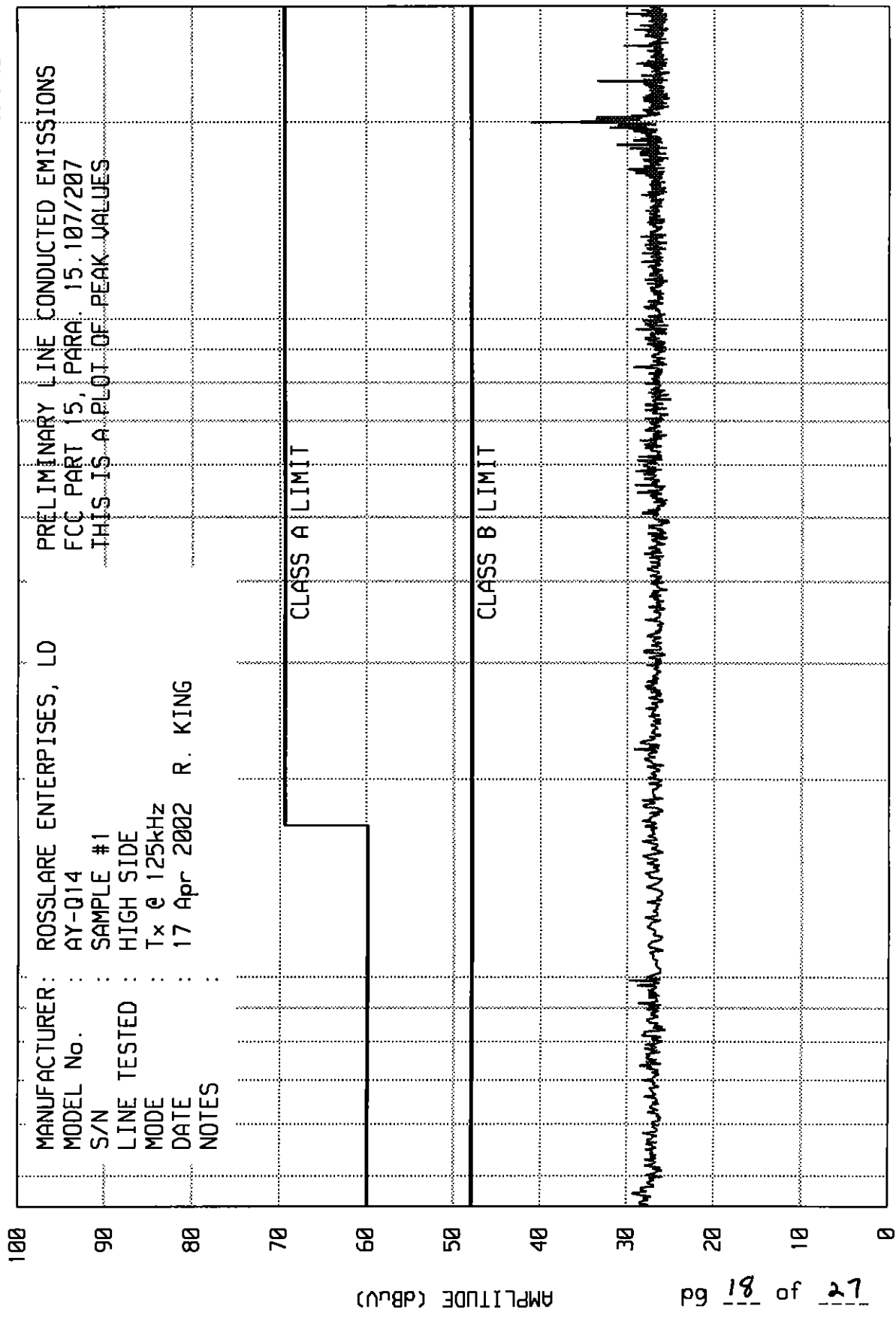
Downers Grove, Ill. 60515

FCC15 CE RUN 4

UEA0 02/22/01

MANUFACTURER: ROSSLARE ENTERPRISES, LD
 MODEL No. : AY-Q14
 S/N : SAMPLE #1
 LINE TESTED : HIGH SIDE
 MODE : Tx @ 125kHz
 DATE : 17 Apr 2002 R. KING
 NOTES :

PRELIMINARY LINE CONDUCTED EMISSIONS
 FCC PART 15, PARA. 15.107/207
 THIS IS A PLOT OF PEAK VALUES



AMPLITUDE (dBV)

pg 18 of 27

START = .45

FREQUENCY - MHZ

10

STOP = 30

ELITE ELECTRONIC ENGINEERING Co.

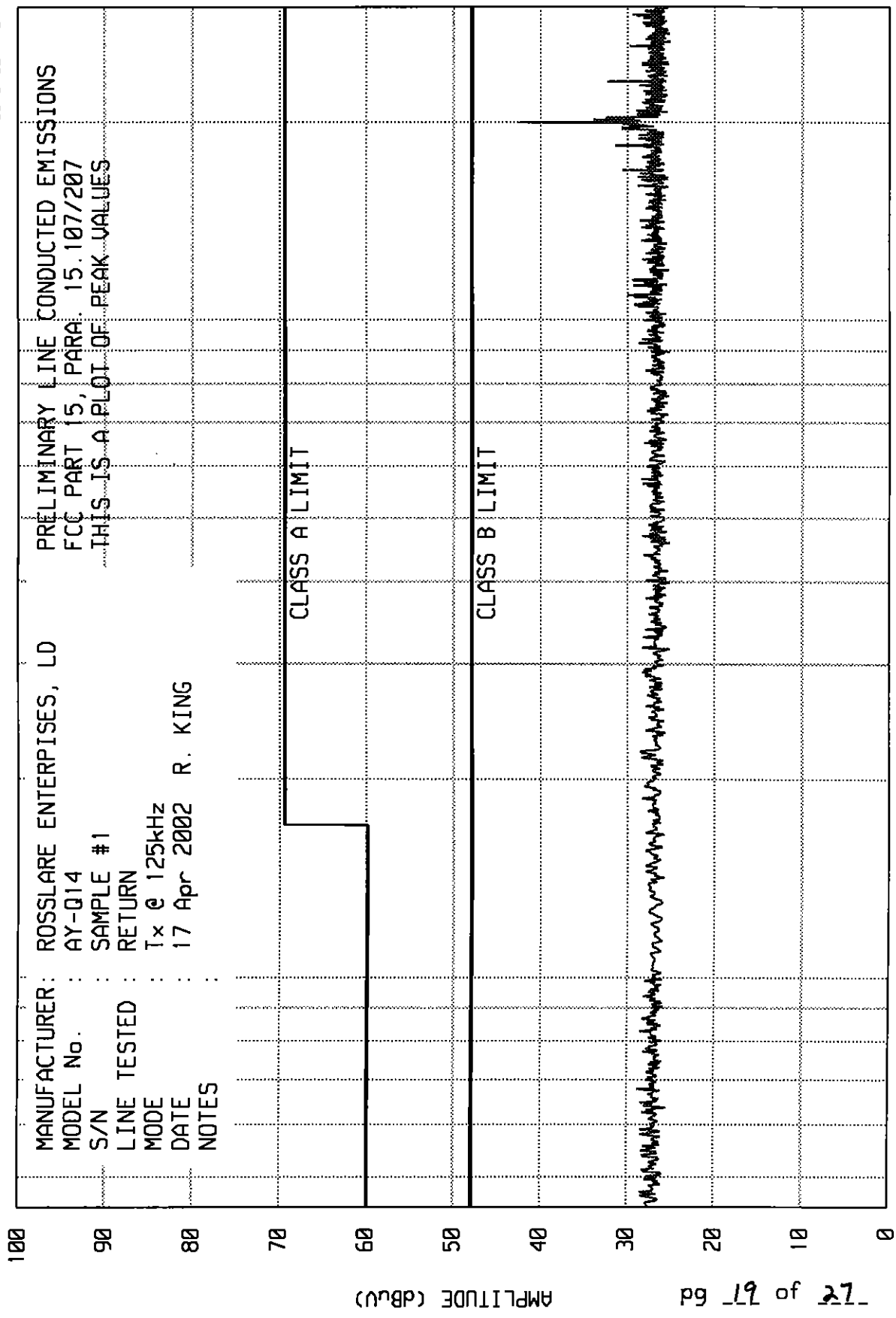
Downers Grove, Ill. 60515

FCC15 CE RUN 3

WEA0 02/22/01

MANUFACTURER: ROSSLARE ENTERPRISES, LD
 MODEL No. : AY-Q14
 S/N : SAMPLE #1
 LINE TESTED : RETURN
 MODE : Tx @ 125kHz
 DATE : 17 Apr 2002 R. KING
 NOTES :

PRELIMINARY LINE CONDUCTED EMISSIONS
 FCC PART 15, PARA. 15.107/207
 THIS IS A PLOT OF PEAK VALUES



START = .45 FREQUENCY - MHZ STOP = 30

12 of 17 6d

MANUFACTURER : ROSSLARE ENTERPISES, LD
MODEL : AY-Q12
S/N : SAMPLE #3
SPECIFICATION : FCC DIGITAL EQUIPMENT, CLASS B
TEST : LINE CONDUCTED EMISSIONS
LINE TESTED : HIGH SIDE
MODE : Tx @ 125kHz
DATE : 17 Apr 2002
NOTES :
RECEIVER : HP 8566 w/ HP85650A QP ADAPTOR
VALUES MEASURED WITH QP DETECTOR USING 9kHz BANDWIDTH

FREQUENCY MHz	METER RDG. uV	LIMIT uV
.461	18.9	250
.717	18.9	250
.910	18.9	250
1.543	18.9	250
2.234	18.9	250
2.936	19.1	250
3.882	19.1	250
4.280	19.1	250
4.733	18.9	250
5.501	19.4	250
6.035	18.9	250
8.431	19.1	250
8.807	19.1	250
11.548	18.9	250
11.798	18.9	250
13.453	19.4	250
15.903	19.4	250
16.897	29.5	250
19.969	95.2	250
20.170	40.5	250
23.042	37.6	250
23.928	18.9	250
26.112	28.0	250
26.638	19.1	250
29.186	27.6	250

MANUFACTURER : ROSSLARE ENTERPISES, LD
MODEL : AY-Q12
S/N : SAMPLE #3
SPECIFICATION : FCC DIGITAL EQUIPMENT, CLASS B
TEST : LINE CONDUCTED EMISSIONS
LINE TESTED : RETURN
MODE : Tx @ 125kHz
DATE : 17 Apr 2002
NOTES :
RECEIVER : HP 8566 w/ HP85650A QP ADAPTOR
VALUES MEASURED WITH QP DETECTOR USING 9kHz BANDWIDTH

FREQUENCY MHz	METER RDG. uV	LIMIT uV
.457	18.9	250
.679	19.1	250
.703	19.1	250
.885	18.9	250
1.289	19.1	250
1.810	19.4	250
2.760	19.1	250
3.305	18.9	250
4.355	19.1	250
5.906	19.1	250
6.995	18.9	250
8.479	18.9	250
8.659	19.4	250
10.994	19.4	250
12.028	18.9	250
13.826	21.9	250
16.333	19.1	250
16.898	30.0	250
19.969	92.3	250
20.169	39.5	250
23.042	36.4	250
24.575	20.9	250
26.114	27.6	250
27.523	19.1	250
29.184	25.8	250

MANUFACTURER : ROSSLARE ENTERPISES, LD
MODEL : AY-Q14
S/N : SAMPLE #1
SPECIFICATION : FCC DIGITAL EQUIPMENT, CLASS B
TEST : LINE CONDUCTED EMISSIONS
LINE TESTED : RETURN
MODE : Tx @ 125kHz
DATE : 17 Apr 2002
NOTES :
RECEIVER : HP 8566 w/ HP85650A QP ADAPTOR
VALUES MEASURED WITH QP DETECTOR USING 9kHz BANDWIDTH

FREQUENCY MHz	METER RDG. uV	LIMIT uV
.464	19.1	250
.667	19.1	250
.819	19.4	250
1.439	18.9	250
2.188	19.1	250
2.906	18.9	250
3.134	19.1	250
4.655	19.1	250
5.693	19.1	250
6.471	18.9	250
8.351	19.1	250
9.187	19.1	250
10.863	19.4	250
13.163	18.9	250
14.153	19.1	250
16.001	19.9	250
16.897	29.5	250
19.969	89.8	250
20.169	38.6	250
23.041	35.4	250
24.575	20.4	250
26.113	27.1	250
28.177	18.9	250
29.185	25.8	250

CHECKED BY: Richard E. King
R. KING

MANUFACTURER : ROSSLARE ENTERPISES, LD
MODEL : AY-Q14
S/N : SAMPLE #1
SPECIFICATION : FCC DIGITAL EQUIPMENT, CLASS B
TEST : LINE CONDUCTED EMISSIONS
LINE TESTED : HIGH SIDE
MODE : Tx @ 125kHz
DATE : 17 Apr 2002
NOTES :
RECEIVER : HP 8566 w/ HP85650A QP ADAPTOR
VALUES MEASURED WITH QP DETECTOR USING 9kHz BANDWIDTH

FREQUENCY MHz	METER RDG. uV	LIMIT uV
.460	19.1	250
.724	19.1	250
.979	19.1	250
1.598	18.9	250
2.203	19.1	250
2.545	19.1	250
3.081	19.1	250
4.361	18.9	250
4.418	18.9	250
5.546	19.1	250
6.059	19.1	250
8.411	18.9	250
9.603	19.1	250
9.743	19.1	250
10.393	19.1	250
12.188	19.1	250
13.315	19.1	250
15.413	19.1	250
16.896	29.1	250
19.970	93.6	250
20.169	39.2	250
23.041	37.0	250
23.041	37.0	250
24.468	19.1	250
26.113	28.0	250
27.603	18.9	250
29.185	27.3	250

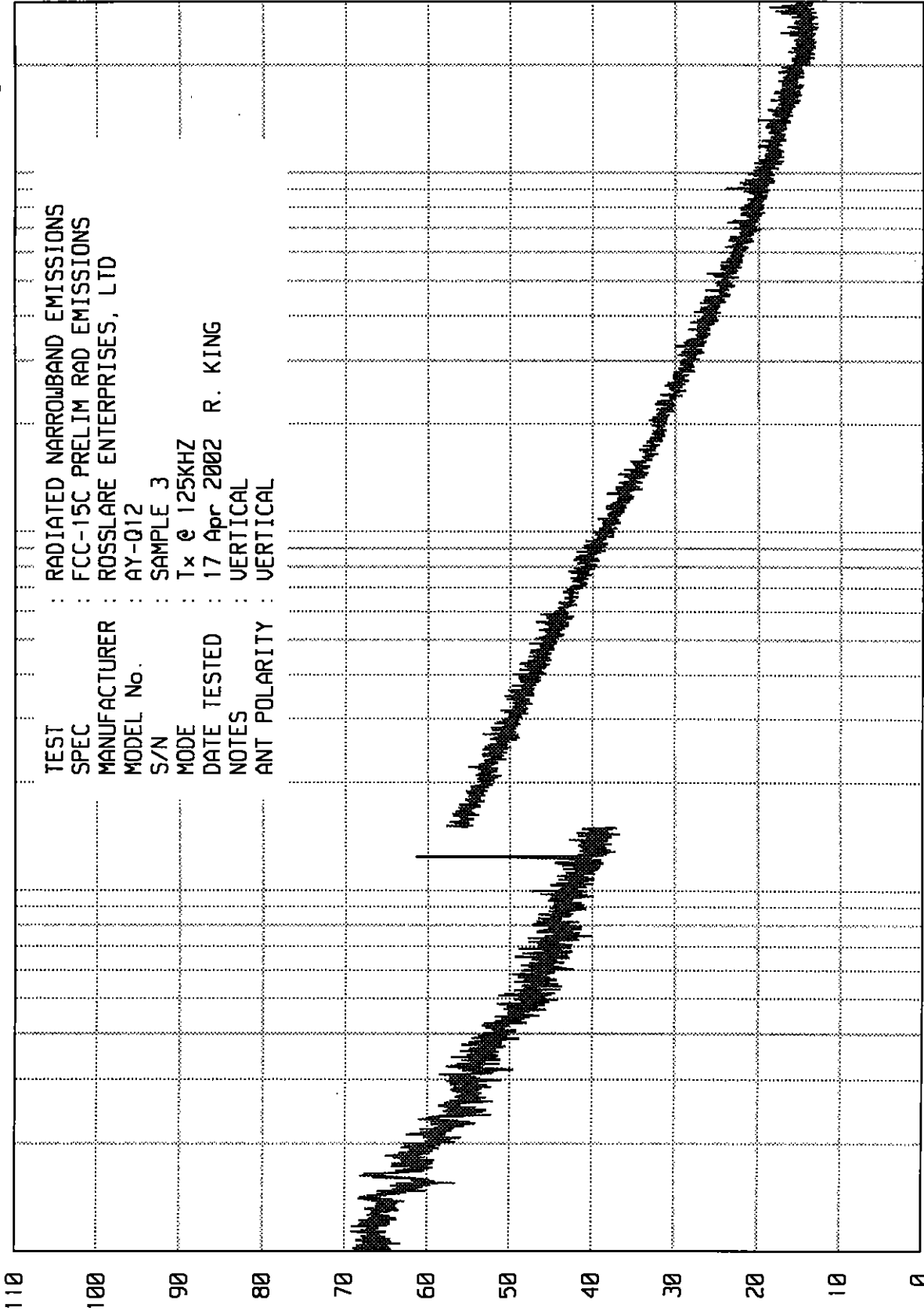
ELITE ELECTRONIC ENGINEERING Co.

Downers Grove, Ill. 60515

UNTV_EM RUN RUN 1

WJKA0 11/26/01

TEST : RADIATED NARROWBAND EMISSIONS
 SPEC : FCC-15C PRELIM RAD EMISSIONS
 MANUFACTURER : ROSSLARE ENTERPRISES, LTD
 MODEL No. : AY-012
 S/N : SAMPLE 3
 MODE : Tx @ 125KHZ
 DATE TESTED : 17 Apr 2002 R. KING
 NOTES : VERTICAL
 ANT POLARITY : VERTICAL



RADIATED NARROWBAND EMISSIONS - dBu/m

START = .01

FREQUENCY - MHz

STOP = 30

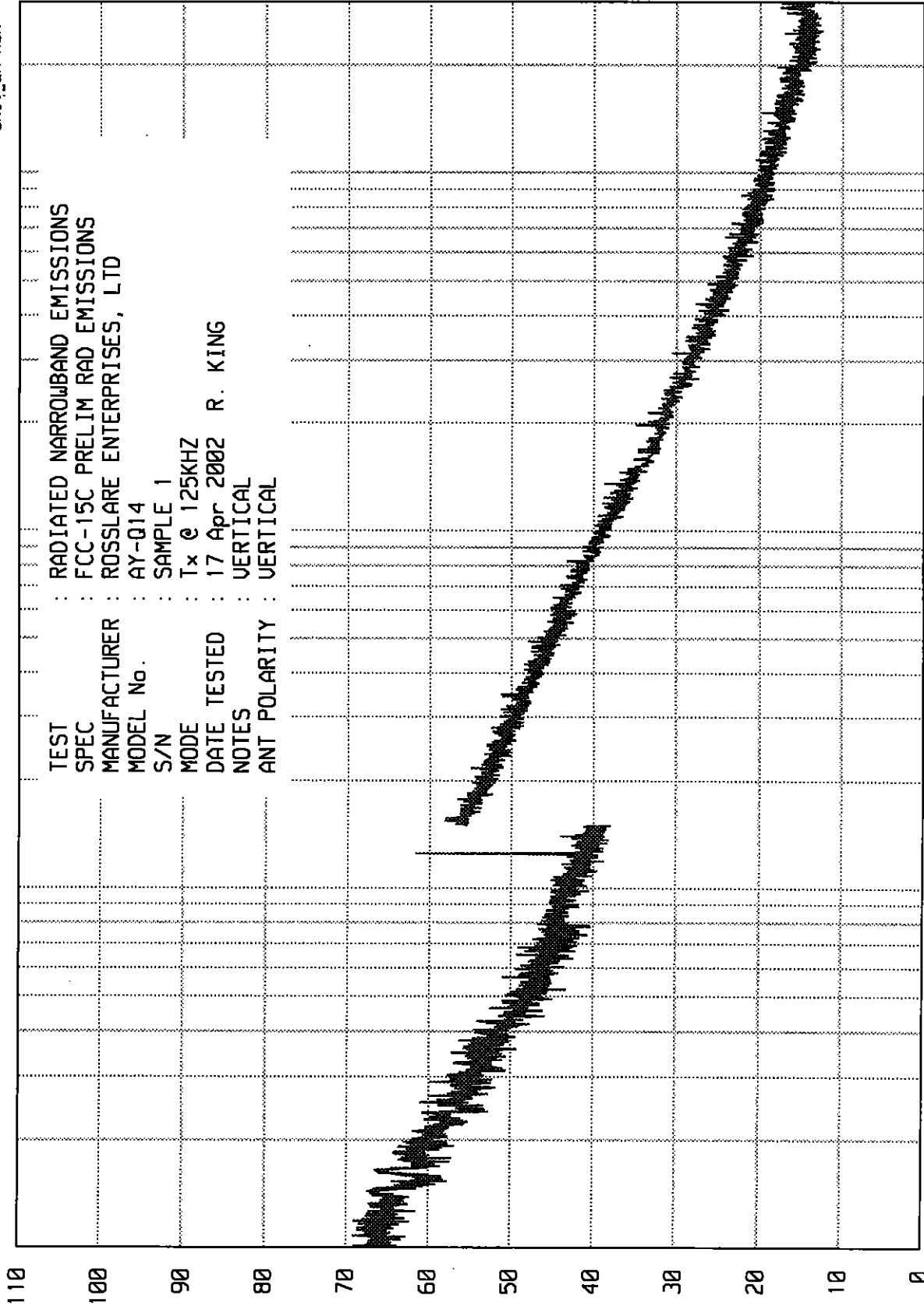
ELITE ELECTRONIC ENGINEERING Co.

Downers Grove, Ill. 60515

UNTV_EM RUN 1

11/26/01

TEST : RADIATED NARROWBAND EMISSIONS
 SPEC : FCC-15C PRELIM RAD EMISSIONS
 MANUFACTURER : ROSSLARE ENTERPRISES, LTD
 MODEL No. : AY-Q14
 S/N : SAMPLE 1
 MODE : Tx @ 125KHZ
 DATE TESTED : 17 Apr 2002 R. KING
 NOTES : VERTICAL
 ANT POLARITY : VERTICAL



STOP = 30

FREQUENCY - MHz

START = .01



ETR 30906-01
DATA SHEET

RADIATED EMISSION MEASUREMENTS

SPECIFICATION : FCC-15C (15.209)
 MANUFACTURER : ROSSLARE ENTERPRISES, LTD.
 MODEL NO. : AY-Q12
 SERIAL NO. : SAMPLE #3
 NOTES :
 TEST DATE : 18 April 2002
 TEST DISTANCE : 3m

FREQUENCY (kHz)	ANT POL	MTR RDG dBuV	ANT FAC dB	DIST CORR dB	TOTAL dBuV/m	TOTAL uV/m	LIMIT uV/m
125.0	H	44.0	10.3	110.0	-55.7	0.0016	19.2
125.0	V	51.6	10.3	110.0	-48.1	0.0039	19.2
250.0	H	40.7 AMB	10.2	110.0	-59.1	0.0011	9.6
250.0	V	26.3 AMB	10.2	110.0	-73.5	0.0002	9.6
375.0	H	35.5 AMB	10.2	110.0	-64.3	0.0006	6.4
375.0	V	22.0 AMB	10.2	110.0	-77.8	0.0001	6.4
500.0	H	35.0 AMB	10.2	55.0	-9.8	0.3236	48.0
500.0	V	17.7 AMB	10.2	55.0	-27.1	0.0442	48.0
625.0	H	35.6 AMB	10.3	55.0	-9.1	0.3508	38.4
625.0	V	40.1 AMB	10.3	55.0	-4.6	0.5888	38.4
750.0	H	24.7 AMB	10.3	55.0	-20.0	0.1000	32.0
750.0	V	39.4 AMB	10.3	55.0	-5.3	0.5433	32.0
875.0	H	24.3 AMB	10.4	55.0	-20.3	0.0966	27.4
875.0	V	18.4 AMB	10.4	55.0	-26.2	0.0490	27.4
1000.0	H	53.9 AMB	10.4	55.0	9.3	2.9174	24.0
1000.0	V	52.3 AMB	10.4	55.0	7.7	2.4266	24.0
1125.0	H	21.8 AMB	10.4	55.0	-22.8	0.0724	21.3
1125.0	V	33.0 AMB	10.4	55.0	-11.6	0.2630	21.3
1250.0	H	18.9 AMB	10.5	55.0	-25.6	0.0525	19.2
1250.0	V	26.6 AMB	10.5	55.0	-17.9	0.1274	19.2

H - HORIZONTAL
V - VERTICAL

AMB - AMBIENT

CHECKED BY: Richard E. Kinney



ETR 30906-D1
DATA SHEET

RADIATED EMISSION MEASUREMENTS

SPECIFICATION : FCC-15C (15.209)
MANUFACTURER : ROSSLARE ENTERPRISES, LTD.
MODEL NO. : AY-Q14
SERIAL NO. : SAMPLE #1
NOTES :
TEST DATE : 18 April 2002
TEST DISTANCE : 3m

FREQUENCY (kHz)	ANT POL	MTR RDG dBuV	ANT FAC dB	DIST CORR dB	TOTAL dBuV/m	TOTAL uV/m	LIMIT uV/m
125.0	H	47.2	10.3	110.0	-52.5	0.0024	19.2
125.0	V	53.5	10.3	110.0	-46.2	0.0049	19.2
250.0	H	47.5 AMB	10.2	110.0	-52.3	0.0024	9.6
250.0	V	42.2 AMB	10.2	110.0	-57.6	0.0013	9.6
375.0	H	45.2 AMB	10.2	110.0	-54.6	0.0019	6.4
375.0	V	41.2 AMB	10.2	110.0	-58.6	0.0012	6.4
500.0	H	38.3 AMB	10.2	55.0	-6.5	0.4732	48.0
500.0	V	35.9 AMB	10.2	55.0	-8.9	0.3589	48.0
625.0	H	51.1 AMB	10.3	55.0	6.4	2.0893	38.4
625.0	V	35.5 AMB	10.3	55.0	-9.2	0.3467	38.4
750.0	H	27.3 AMB	10.3	55.0	-17.4	0.1349	32.0
750.0	V	57.5 AMB	10.3	55.0	12.8	4.3652	32.0
875.0	H	43.0 AMB	10.4	55.0	-1.6	0.8318	27.4
875.0	V	68.5 AMB	10.4	55.0	23.9	15.6675	27.4
1000.0	H	45.2 AMB	10.4	55.0	0.6	1.0715	24.0
1000.0	V	56.7 AMB	10.4	55.0	12.1	4.0272	24.0
1125.0	H	53.3 AMB	10.4	55.0	8.7	2.7227	21.3
1125.0	V	58.3 AMB	10.4	55.0	13.7	4.8417	21.3
1250.0	H	47.7 AMB	10.5	55.0	3.2	1.4454	19.2
1250.0	V	32.6 AMB	10.5	55.0	-11.9	0.2541	19.2

H - HORIZONTAL
V - VERTICAL

AMB - AMBIENT

CHECKED BY: Richard E. King