

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

ELITE PROJECT: 30862                      DATES TESTED: April 1 through 3, 2002

TEST PERSONNEL: Richard E. King

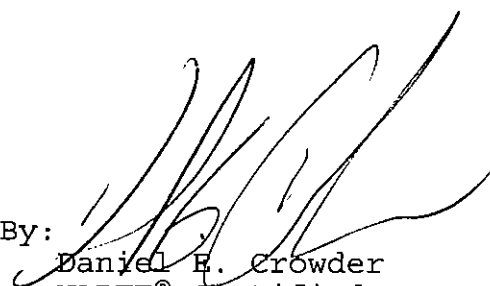
TEST SPECIFICATION: Federal Communication Commission (FCC) Part 22

ENGINEERING TEST REPORT NO. 30862-02  
MEASUREMENT OF RF INTERFERENCE FROM  
A MODEL SYN8486A  
SINGLE CARRIER DUAL BAND RF LINEAR COMPENSATOR

FOR: TRL Technologies  
Elgin, IL

PURCHASE ORDER NO: 780-0000000764

Report By:




Daniel E. Crowder  
NARTE® Certified -  
ATL-0152-E

Witnessed By:

Heip Lam  
TRL Technologies

Approved By:



Craig W. Fanning  
NARTE® Certified -  
ATL-0188-E; EMC-000296-NT

ENGINEERING TEST REPORT NO. 30862-02

ADMINISTRATIVE DATA AND SUMMARY OF TESTS

**DESCRIPTION OF TEST ITEM:** Single Carrier Dual Band RF Linear  
Compensator

**MODEL NO:** SYN8486A

**SERIAL NO:** 136135

**MANUFACTURER:** TRL Technologies

**APPLICABLE SPECIFICATIONS:** FCC Part 22

**QUANTITY OF ITEMS TESTED:** One (1)

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

**DATE RECEIVED:** April 1, 2002

**DATES TESTED:** April 1 through 3, 2002

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

**CUSTOMER:** Heip Lam of TRL Technologies was present.

**ELITE ELECTRONIC:** Richard E. King; Daniel E. Crowder

**ELITE JOB NO.:** 28604

**ABSTRACT:** The model SYN8486A Single Carrier Dual Band RF Linear  
Compensator complies with the technical requirements in FCC Part 22.  
See test results and data pages for more details.

ENGINEERING TEST REPORT NO. 30862-02

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TOTAL NUMBER OF PAGES IN THIS DOCUMENT,  
(INCLUDING DATA SHEETS): 29

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

MEASUREMENT OF RF INTERFERENCE FROM

A MODEL SYN8486A

SINGLE CARRIER DUAL BAND RF LINEAR COMPENSATOR

**1.0 INTRODUCTION:**

**1.1 DESCRIPTION OF TEST ITEM:** During the period of April 1 through 3, 2002, a series of radio interference measurements were performed on a model SYN8486A Single Carrier Dual Band RF Linear Compensator, serial number 136135, (hereinafter referred to as the test item). The tests were performed for TRL Technologies of Elgin, IL.

The test item is a single carrier RF linear compensator that operates in the Cellular bands, 869MHz to 894MHz and 835MHz to 849MHz. The test item has a rated gain of 10dB.

**1.2 PURPOSE:** The test series was performed to determine if the test item meets a class II permissive change to the technical requirements of the FCC Part 22 for Dual Band Cellular Radio.

**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 22, dated 1 October 1998
- Federal Communications Commission "Code of Federal Regulations", Title 47, Part 2, dated 1 October 1998
- 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 25%.

**2.0 TEST ITEM SETUP AND OPERATION:**

**2.1 POWER INPUT:** The test item obtained 12VDC from a Tektronix PS280 DC Power Supply through two, 1/2 meter long, unshielded leads.

**2.2 GROUNDING:** Since the test item was powered with 12VDC from a DC power supply, it was ungrounded during the tests.

**2.3 PERIPHERAL EQUIPMENT:**The following peripheral equipment was submitted with the test item:

<u>ITEM</u>	<u>DESCRIPTION</u>
HP Signal Generator	M/N E4432B, S/N VS38440973
Ophir Amplifier	M/N GRF5064, S/N 1006
HP Power Meter	M/N 437B, S/N 3110A05097

The output of the signal generator was routed through the amplifier. The output of the amplifier was connected to the test item through a 1/2 meter long coaxial cable. The power meter was connected to the test item through a 1 meter long coaxial cable.

**2.4 MODULATION:** The test signal was modulated with a representative digital type of modulation: GSM. The input signals were supplied from an HP M/N E4432B Signal Generator.

All tests were performed with GSM modulated input signals.

**2.5 FREQUENCY SELECTION:** One test frequency was selected for each frequency band. The specified channel spacings for each modulation are shown below:

<u>Modulation</u>	<u>Channel Spacing</u>
GSM	300kHz

The specific test frequencies are designated as follows:

<u>Band</u>	<u>Frequency (MHz)</u>
Uplink	836.5

**2.6 RF POWER OUTPUT:**The input levels were adjusted to reach the rated output levels shown below:

<u>Modulation</u>	<u>Rated Power (dBm)</u>	<u>Rated Power (Watts)</u>
GSM	27	0.5

**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.

**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).

**4.0 REQUIREMENTS, PROCEDURES AND RESULTS:**

**4.1 RF POWER OUTPUT MEASUREMENTS:**

**4.1.1 REQUIREMENTS:** In accordance with paragraph 22.913, the effective radiated power (ERP) level is allowed up to 7 watts for mobile transmitters.

**4.1.2 PROCEDURES:** The test item was adjusted for the rated

gain. The test item was operated to measure the output for the uplink path.

(a) The input signal was set to 836.5MHz.

(b) The input signal was GSM modulated.

(c) The HP 437B Power Meter was connected to the output of the test item and the output of the test item was monitored.

(d) The amplitude of the input signal was adjusted until the rated output level was measured. The output power level was measured and recorded.

**4.1.3 RESULTS:** The output power measurements are presented on data page 15. The power outputs achieved for the uplink path were 0.5 watts (GSM Modulation). The remainder of the tests were performed at these power levels. The power output complies with the FCC requirements.

The ERP limit does not apply to the power output alone, but the combination of the power output and the antenna. Compliance to the power output will be based on the system configuration. Therefore, the ERP requirement cannot be directly applied to the test item.

#### **4.2 OCCUPIED BANDWIDTH MEASUREMENTS:**

**4.2.1 REQUIREMENTS:** In accordance to Section 2.1049(i); transmitters designed for other types of modulation - when modulated by an appropriate signal of sufficient amplitude to be representative of the type of service in which used. A description of the input signal should be supplied.

**4.2.2 PROCEDURES:** The test was performed using each of the modulation types listed in paragraph 2.2 (GSM).

(a) The input signal was set to 836.5MHz. The input signal level

was adjusted to provide the rated level at the test item output. The reference level was recorded.

(b) The input signal was modulated.

(c) A spectrum analyzer was connected to the output of the test item. With a bandwidth of the spectrum analyzer set to 30kHz, the output of the test item was measured and recorded.

(d) The input signal from the signal generator was measured with the spectrum analyzer and recorded over the same frequency range.

**4.2.3 RESULTS:** The plots of the occupied bandwidth measured with the GSM modulation of the carrier are presented on data pages 16 through 18.

As can be seen from the data, the test item output met the occupied bandwidth requirements. The emissions measured at the test item output were similar to the emissions measured from the input signals.

#### **4.3 SPURIOUS EMISSIONS AT ANTENNA TERMINAL:**

**4.3.1 REQUIREMENTS:** This test determines whether the test item produces excessive spurious emissions.

In accordance with paragraph 22.917(e), on any frequency twice or more than twice the fundamental frequency, the spurious emissions and intermodulation products shall be attenuated below the unmodulated carrier power (P) by at least  $43 + 10 \log(P)$  dB. This requirement translates to a field strength limit of -13dBm (ERP). The peak power of the emissions shall be measured from 30MHz up to the 10th harmonic of the fundamental frequency.

**4.3.2 PROCEDURES:** In general, this test will measure spurious emissions at the antenna terminals. The test was performed

using each of the modulation types listed in paragraph 2.2 (AMPS, TDMA, CDMA).

(a) The input signal was set to 836.5MHz. The input signal level was adjusted to provide the rated level at the test item output.

(b) The input signal was modulated.

(c) A spectrum analyzer was connected to the output of the test item. The frequency span was adjusted to cover 30 MHz up to 1 GHz. With a bandwidth of the spectrum analyzer set to 100 kHz, the output of the test item was measured and recorded.

(d) The frequency span was adjusted to cover 1 GHz up to 2 GHz. With a bandwidth of the spectrum analyzer set to 1 MHz, the output of the test item was measured and recorded.

(e) The frequency span was adjusted to cover 2 GHz up to 10 GHz. With a bandwidth of the spectrum analyzer set to 1 MHz, the output of the test item was measured and recorded. This range covers up through the 10th harmonic.

(f) Steps (c) through (e) were repeated on the input signal from the signal generator.

**4.3.3 RESULTS:** The plots of the antenna conducted output measurements are presented on data pages 19 through 24. As can be seen from the data, the test item did not produce spurious emissions in excess of the -13 dBm limit.

#### **4.4 FIELD STRENGTH OF SPURIOUS EMISSIONS:**

##### **4.4.1 PRELIMINARY RADIATED MEASUREMENTS:**

**4.4.1.1 REQUIREMENTS:** Because emission levels in the open field may be masked by interference from sources other than the test item, preliminary radiated measurements are first performed in the low ambient environment of a shielded enclosure. The radiated

emissions from the test item were first measured using peak detection. This data was then automatically plotted. The frequencies with significant emission levels were measured in the open field.

**4.4.1.2 PROCEDURES:** All preliminary tests were performed in a 32ft. x 20ft. x 18ft. hybrid ferrite-tile/anechoic absorber lined test chamber. The walls and ceiling of the shielded chamber are lined with ferrite tiles. Anechoic absorber material is installed over the ferrite tile. The floor of the chamber is used as the ground plane. The chamber complies with ANSI C63.4 1992 for site attenuation.

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 test was performed using each of the modulation types listed in paragraph 2.2 (GSM).

(a) The preliminary measurements were performed with the test item operating with an input signal (uplink) at 836.5MHz, with GSM modulation. The broadband measuring antenna was positioned at a 3 meter distance from the test item. The frequency range from 30MHz to 10GHz was investigated. The readings were taken with a peak detector function and recorded.

**4.4.1.3 RESULTS:** The preliminary plots are presented on data pages 25 through 28. Factors for the antenna and distance correction were added to the data before it was plotted.

This data is only presented for a reference, and is not used as official data. All significant radiated emissions were subsequently

official data. All significant radiated emissions were subsequently measured at an open field test site.

**4.4.2 FINAL RADIATED EMISSIONS:**

**4.4.2.1 REQUIREMENTS:** In accordance with paragraph 22.917(e), on any frequency twice or more than twice the fundamental frequency, the emissions shall be attenuated below the unmodulated carrier power (P) by at least  $43 + 10 \log(P)$  dB. This requirement translates to a limit of -13dBm. The peak power of the emissions shall be measured from 30MHz up to the 10th harmonic of the fundamental frequency.

**4.4.2.2 PROCEDURES:** Final open field measurements were performed in a 32ft. x 20ft. x 18ft. hybrid ferrite-tile/anechoic absorber lined test chamber. The walls and ceiling of the shielded chamber are lined with ferrite tiles. Anechoic absorber material is installed over the ferrite tile. The floor of the chamber is used as the ground plane. The chamber complies with ANSI C63.4 1992 for site attenuation.

The final open field emission test procedure is as follows:

- a) The test item was placed on a 0.8 meter high non-conductive stand at a 3 meter test distance from the receive antenna.
- b) The antenna output was terminated in 50 ohms for the tests.
- c) A double ridged waveguide antenna was placed on an adjustable height antenna mast 3 meters from the test item for emission measurements.
- d) Detected emissions were maximized at each frequency by rotating the test item and adjusting the receive antenna height and polarization.
- e) The maximum meter reading was recorded. Measurement BW was 1 MHz and Video of 3MHz. Peak reading were recorded. No averaging methods or corrections were applied.
- f) Measurements were performed with the input signal modulated with GSM.

used during the preliminary measurements.

The equivalent power into a dipole antenna was determined from the field intensity levels measured at 3 meters using the substitution method. To determine the emission power another tuned dipole antenna or double ridged waveguide antenna was set in place of test item and connected to a calibrated signal generator. The output of the signal generator was adjusted to match the received level at the spectrum analyzer. The signal level was recorded. The reading was corrected to compensate for cable loss, as required, and when the ridged waveguide antenna was used increased by the difference in gain between the dipole and the waveguide antenna.

**4.4.2.3 RESULTS OF OPEN FIELD RADIATED TEST**The final open field radiated levels are presented on data page 29. The radiated emissions were measured through the 10th harmonic. All emissions measured from the test item were within the specification limits.

**4.5 FREQUENCY STABILITY:**

**4.5.1 REQUIREMENTS:** This requirement does not apply to a Single Carrier Dual Band RF Linear Compensator.

**5.0 CONCLUSION:**

It was found that the TRL Technologies model SYN8486A Single Carrier Dual Band RF Linear Compensator, complies with the RF Power Output, the Occupied Bandwidth, the Spurious Emissions at Antenna Terminal and the Field Strength of Spurious Emissions requirements of the FCC Part 22 and 2.

**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.

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 as operated by TRL Technologies personnel. 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.

TABLE I: 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								
XZG2	ATTENUATOR/SWITCH DRIVER	HEWLETT PACKARD	11713A	2223A01751	---		N/A	
Equipment Type: AMPLIFIERS								
APK2	PREAMPLIFIER	AGILENT TECHNOL	8449B	3008A01595	1-26.5GHZ	05/07/01	12	05/07/02
Equipment Type: ANTENNAS								
NTA0	BILOG ANTENNA	CHASE EMC LTD.	BILOG CBL611	2057	0.03-2GHZ	05/09/01	12	05/09/02
NW10	RIDGED WAVE GUIDE	AEL	H1498	153	2-18GHZ	09/18/01	12	09/18/02
NW11	RIDGED WAVE GUIDE	AEL	H1498	154	2-18GHZ	09/18/01	12	09/18/02
Equipment Type: ATTENUATORS								
T2D0	20DB, 25W ATTENUATOR (DCC-	WEINSCHEL	46-20-43	AV5813	DC-18GHZ	01/14/02	12	01/14/03
T2D9	20DB, 25W ATTENUATOR	WEINSCHEL	46-20-34	BH5445	DC-18GHZ	11/29/01	12	11/29/02
Equipment Type: CONTROLLERS								
CDD2	COMPUTER	HEWLETT PACKARD	D4171A#ABA	US61654645	---		N/A	
CDG5	COMPUTER	HEWLETT PACKARD	D7949T	US9160519	---		N/A	
Equipment Type: PRINTERS AND PLOTTERS								
HRE1	LASER JET 5P	HEWLETT PACKARD	C3150A	USHB061052	---		N/A	
HRG0	LASERJET 2100XI	HEWLETT PACKARD	C4170A	USCD047806	---		N/A	
Equipment Type: RECEIVERS								
RAC0	SPECTRUM ANALYZER	HEWLETT PACKARD	85660B	2449A01117	100HZ-22GHZ	02/20/02	12	02/20/03
RACA	RF PRESELECTOR	HEWLETT PACKARD	85685A	2926A00980	20HZ-2GHZ	02/21/02	12	02/21/03
RAF1	QUASISPEAK ADAPTER	HEWLETT PACKARD	85650A	2043A00271	0.01-1000MHZ	02/21/02	12	02/21/03
Equipment Type: SIGNAL GENERATORS								
GBN5	SIGNAL GENERATOR	ROHDE & SCHWARZ	SMY 02	DE13542	0.009-2008MHZ	03/28/02	12	03/28/03
GDJ0	SYNTHESIZED GENERATOR	HEWLETT PACKARD	8672A	2221A02477	2-18GHZ	02/19/02	12	02/19/03

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.



ETR 30862-02  
DATA SHEET

MANUFACTURER : TRL TECHNOLOGIES  
MODEL : SYN8486A  
S/N : NONE ASSIGNED  
SPECIFICATION : FCC-22 RF POWER OUTPUT  
DATE : APRIL 2, 2002

FREQUENCY (MHz)	POWER READING	
	dBm	WATTS
836.5 GSM Modulation	27	0.5

CHECKED BY:

  
Daniel E. Crowder

15 of 29

ELITE ELECTRONIC ENGINEERING CO

MKR 836.502 MHz  
-15.10 dBm

hp

REF 7.0 dBm

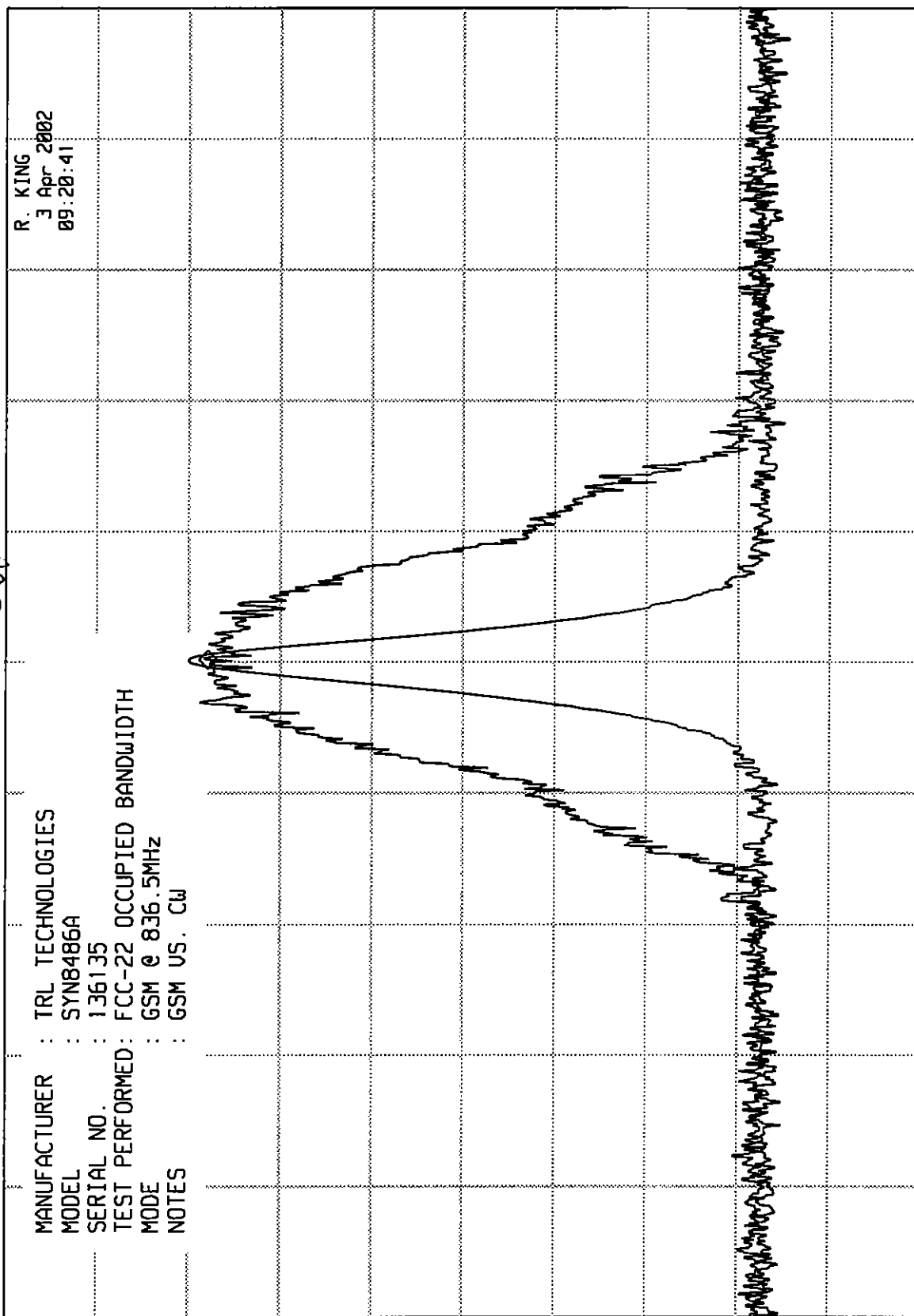
ATTEN 20 dB + 40 dB Ext

10 dB/

MANUFACTURER : TRL TECHNOLOGIES  
MODEL : SYN8486A  
SERIAL NO. : 136135  
TEST PERFORMED : FCC-22 OCCUPIED BANDWIDTH  
MODE : GSM @ 836.5MHz  
NOTES : GSM US. CW

R. KING  
3 Apr 2002  
09:20:41

DL -33.0 dBm



CENTER 836.50 MHz

RES BW 30 kHz(i)

VBW 300 kHz

SPAN 2.00 MHz

SWP 20.0 msec

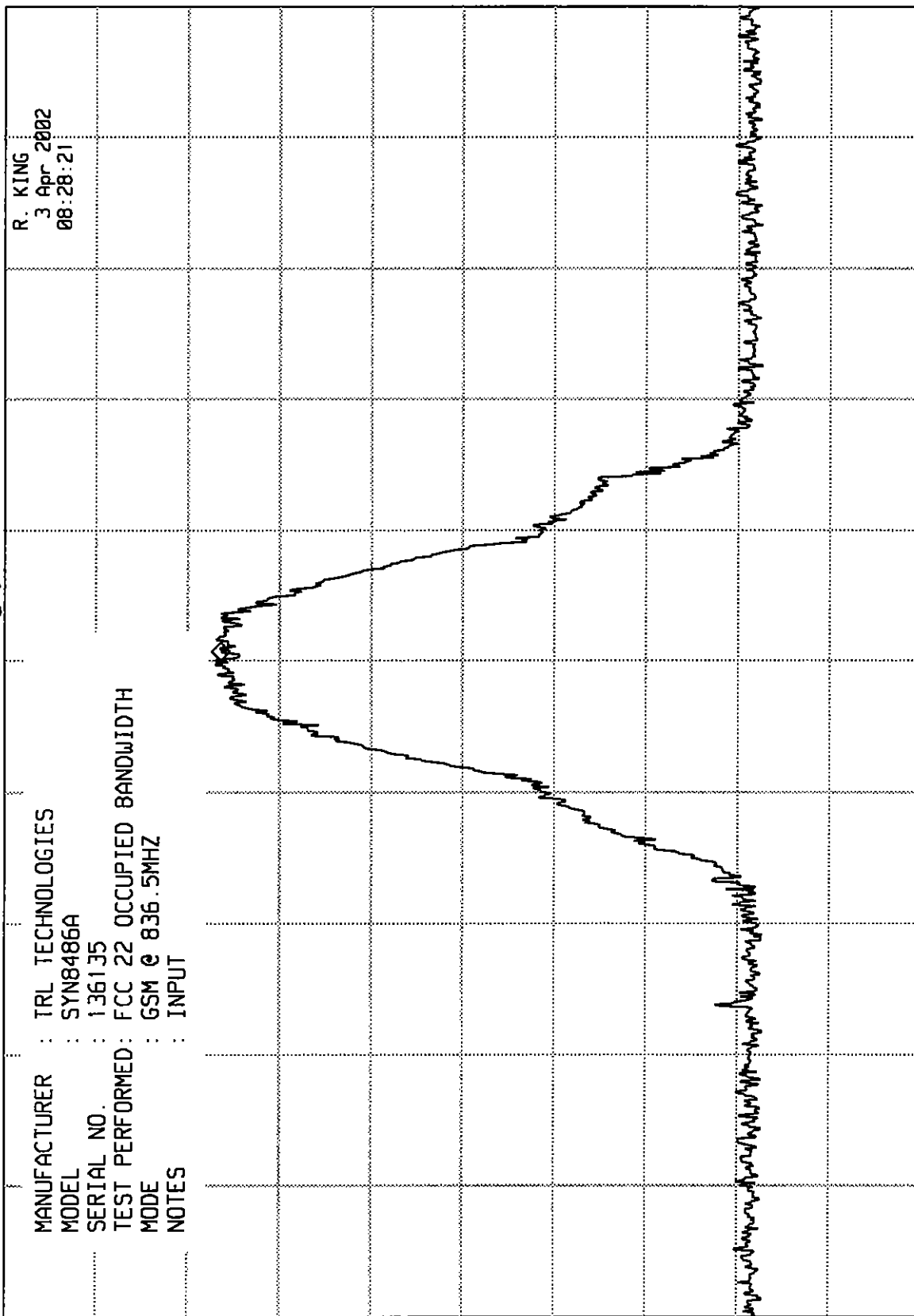
ELITE ELECTRONIC ENGINEERING CO

MKR 836.512 MHz  
-16.60 dBm

REF 7.0 dBm  
ATTEN 20 dB +40dB EXP.

hp

10 dB/



SPAN 2.00 MHz  
SWP 20.0 msec

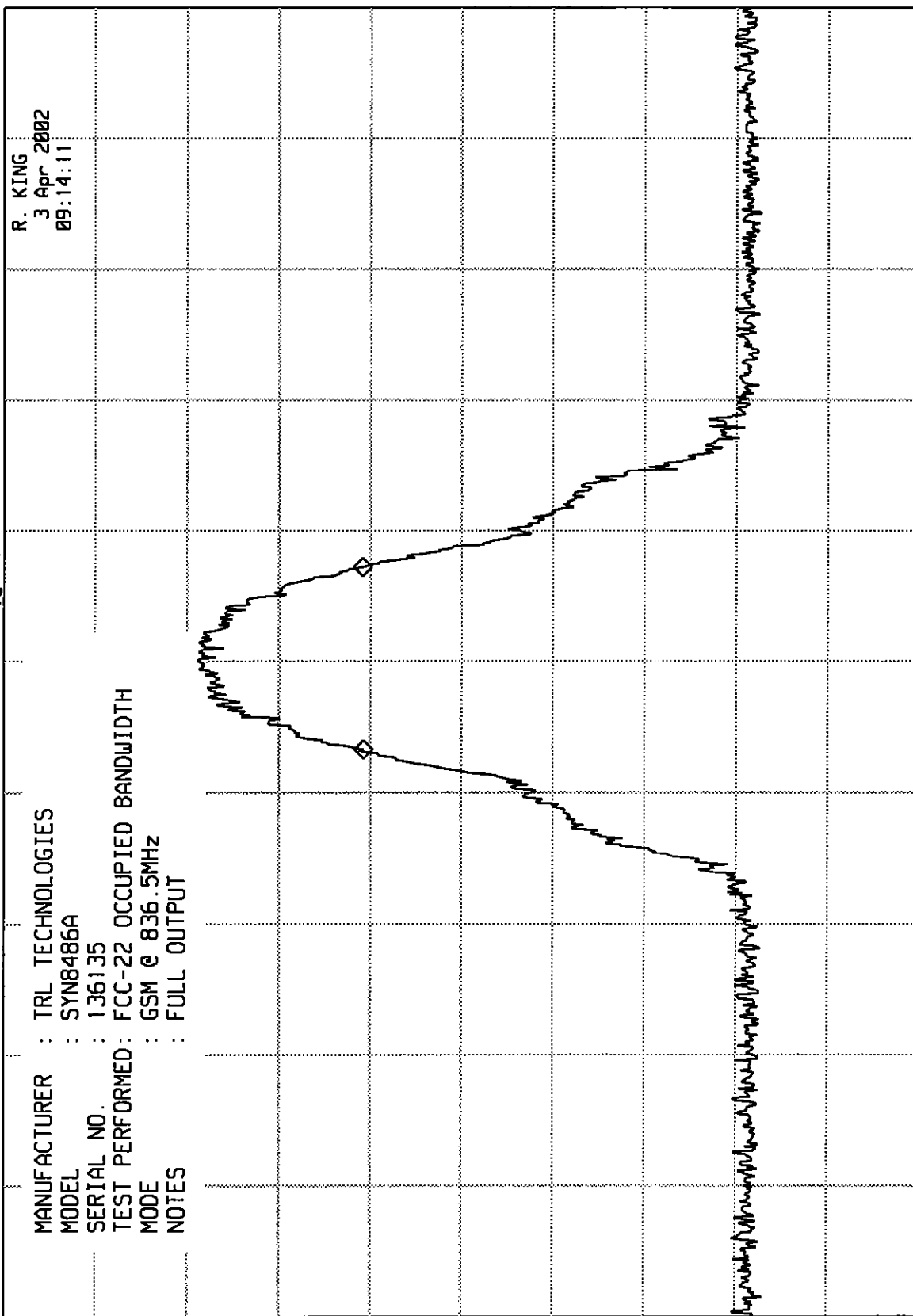
VBW 300 kHz

CENTER 836.50 MHz  
RES BW 30 kHz (i)

ELITE ELECTRONIC ENGINEERING CO

MKR ^ 278 kHz  
0.10 dB

REF 7.0 dBm  
ATTEN 20 dB + 40 dB Ext



hp

10 dB/

DL -33.0 dBm

CENTER 836.50 MHz  
RES BW 30 kHz (i)  
SPAN 2.00 MHz  
SWP 20.0 msec  
VBW 300 kHz

ELITE ELECTRONIC ENGINEERING CO

MKR 841.9 MHz  
-16.70 dBm

hp

REF 7.0 dBm

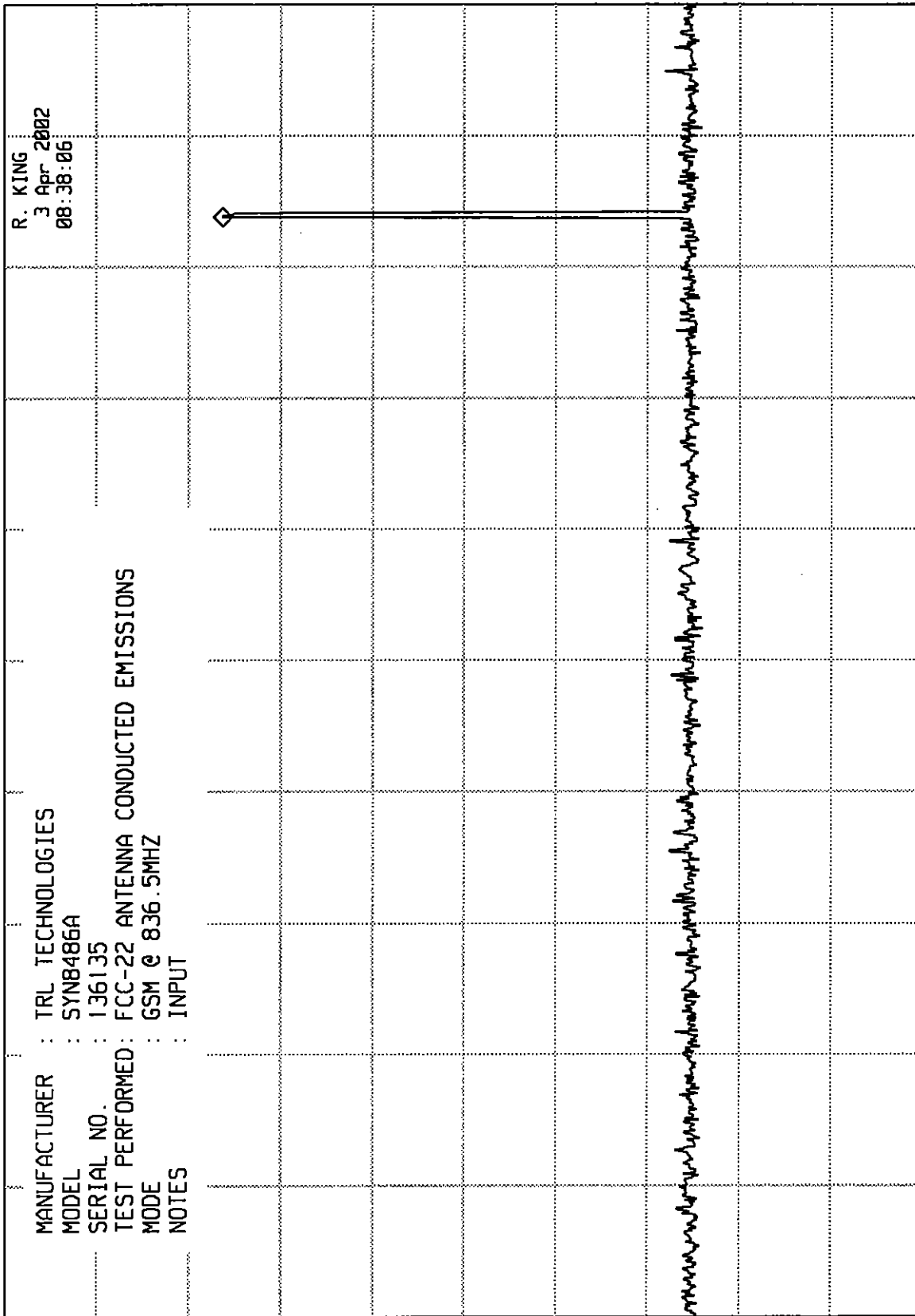
ATTEN 20 dB + 40 dB of ATTEN

10 dB/

MANUFACTURER : TRL TECHNOLOGIES  
MODEL : SYN8486A  
SERIAL NO. : 136135  
TEST PERFORMED: FCC-22 ANTENNA CONDUCTED EMISSIONS  
MODE : GSM @ 836.5MHZ  
NOTES : INPUT

R. KING  
3 Apr 2002  
08:38:06

DL -53.0  
dBm



STOP 1.000 GHz  
SWP 728 msec

VBW 300 kHz

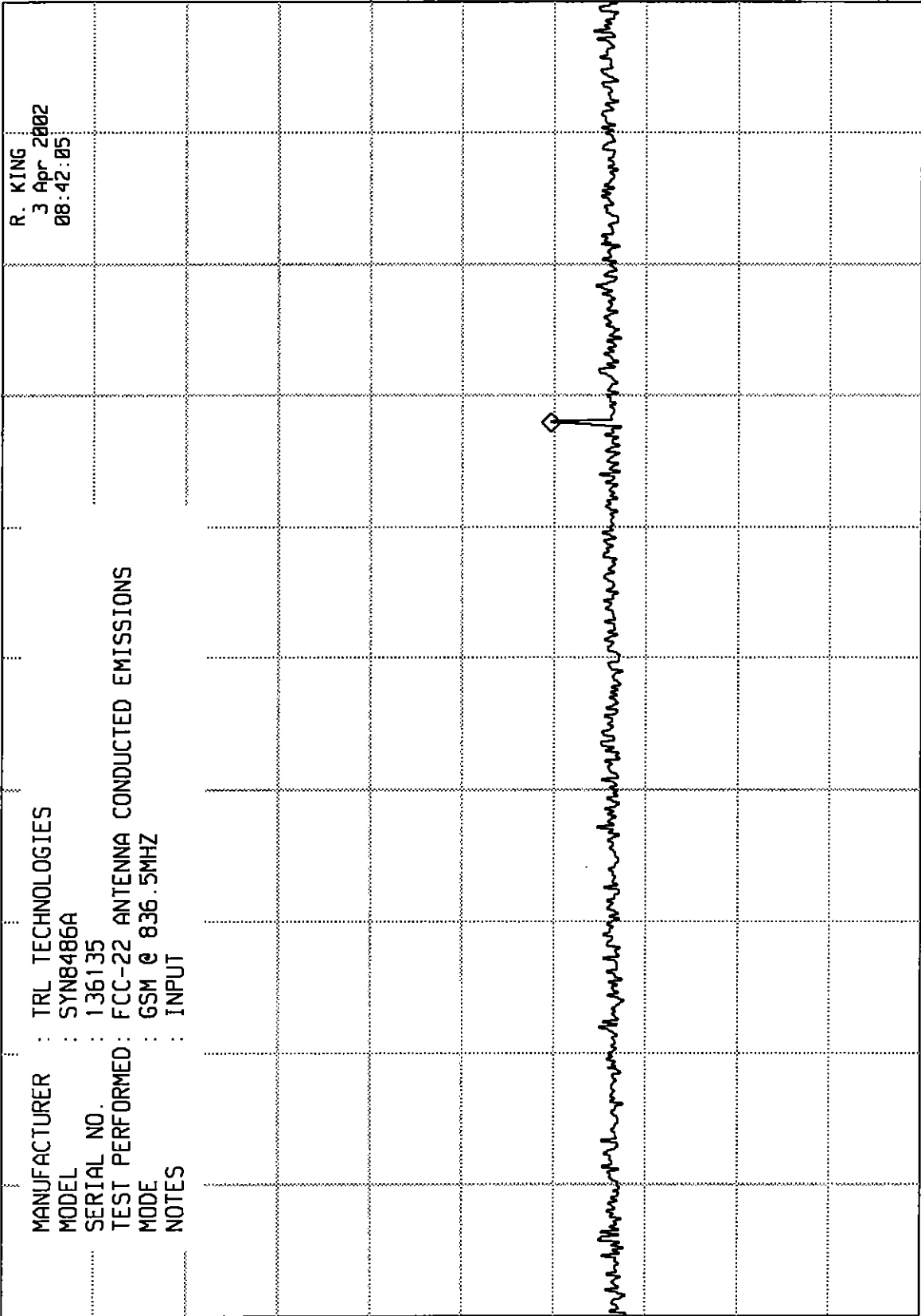
RES BW 100 kHz (i)

START 30 MHz

ELITE ELECTRONIC ENGINEERING CO

MKR 1.678 GHz  
-52.70 dBm

REF 7.0 dBm      ATTN 20 dB +40 dB EXT



hp 10 dB/

DL -53.0 dBm

START 1.00 GHz      RES BW 1 MHz(i)      STOP 2.00 GHz  
VBW 3 MHz      SWP 25.0 msec

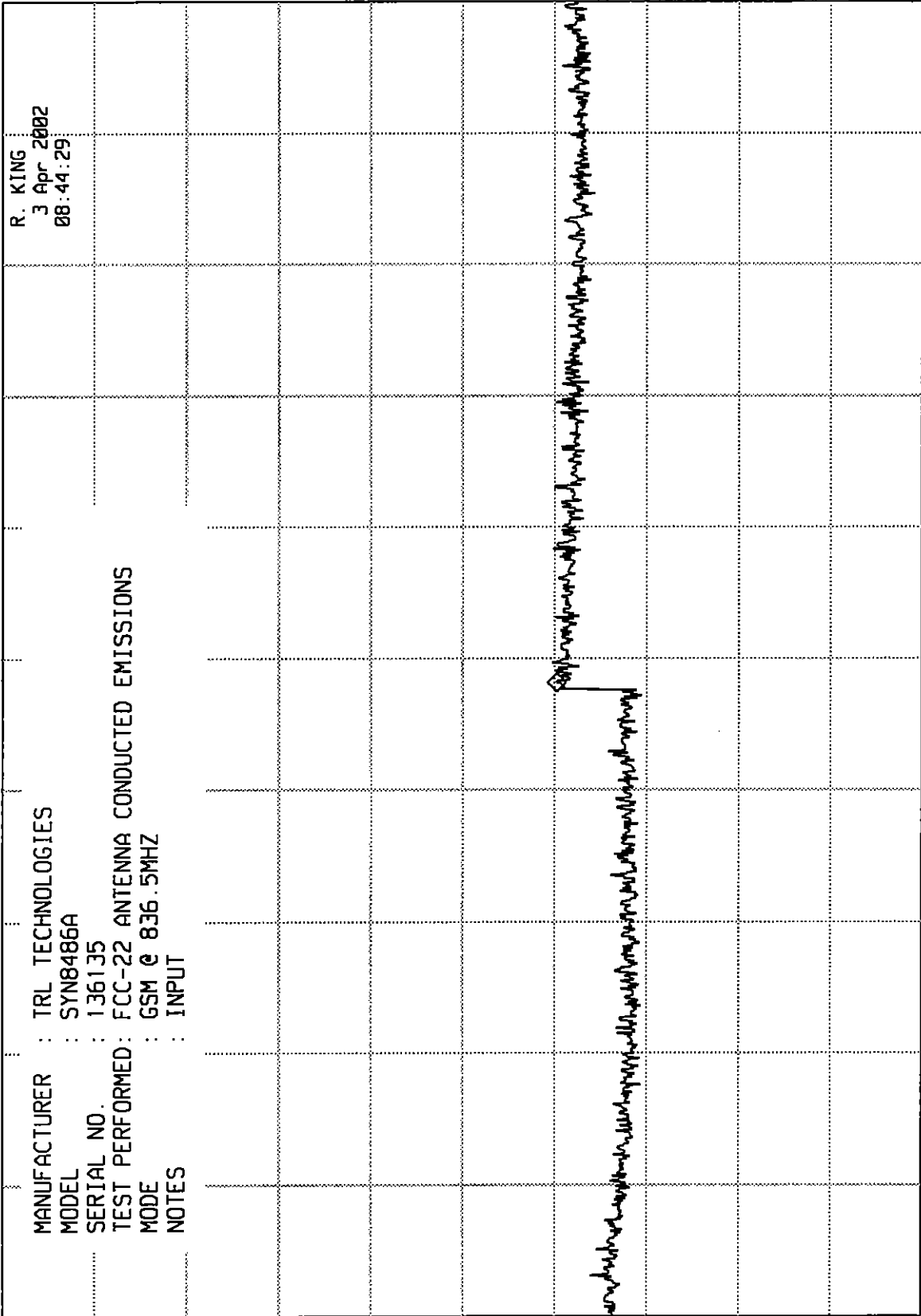
ELITE ELECTRONIC ENGINEERING CO

MKR 5.848 GHz  
-53.30 dBm

REF 7.0 dBm ATTEN 20 dB + 20 dB EXT

hp

10 dB/



STOP 10.00 GHz  
SWP 200 msec

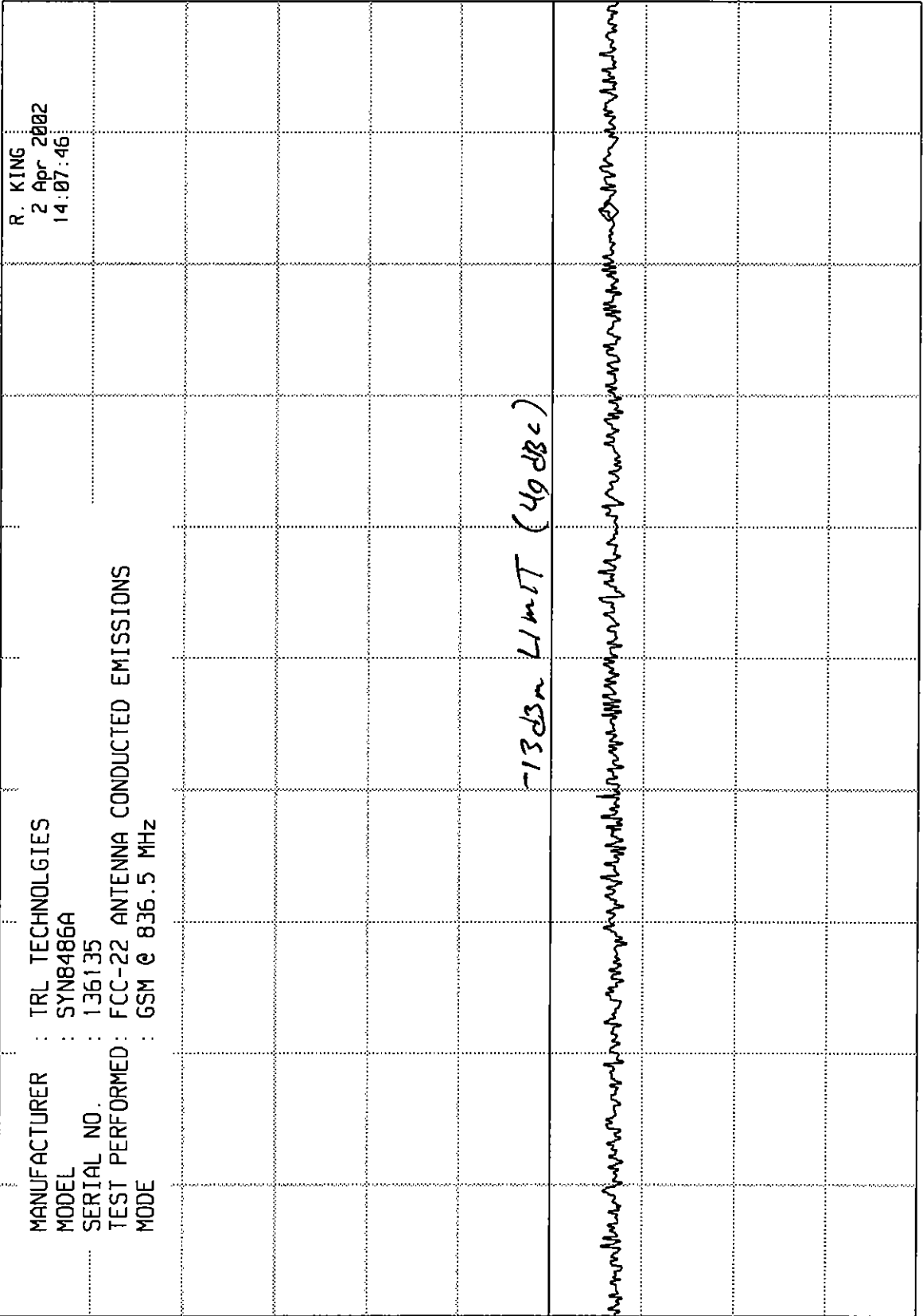
VBW 3 MHz

START 2.00 GHz  
RES BW 1 MHz (i)

ELITE ELECTRONIC ENGINEERING CO

MKR 1.839 GHz  
-59.10 dBm

REF 7.0 dBm      ATTEN 20 dB + 40 dB EXT



hp

10 dB/

DL -53.0 dBm

MANUFACTURER : TRL TECHNOLOGIES  
 MODEL : SYN8486A  
 SERIAL NO. : 136135  
 TEST PERFORMED : FCC-22 ANTENNA CONDUCTED EMISSIONS  
 MODE : GSM @ 836.5 MHz

R. KING  
2 Apr 2002  
14:07:46

-13dBm Limit (49 dBc)

START 1.00 GHz      RES BW 1 MHz(i)      UBW 3 MHz      STOP 2.00 GHz  
 SWP 25.0 msec

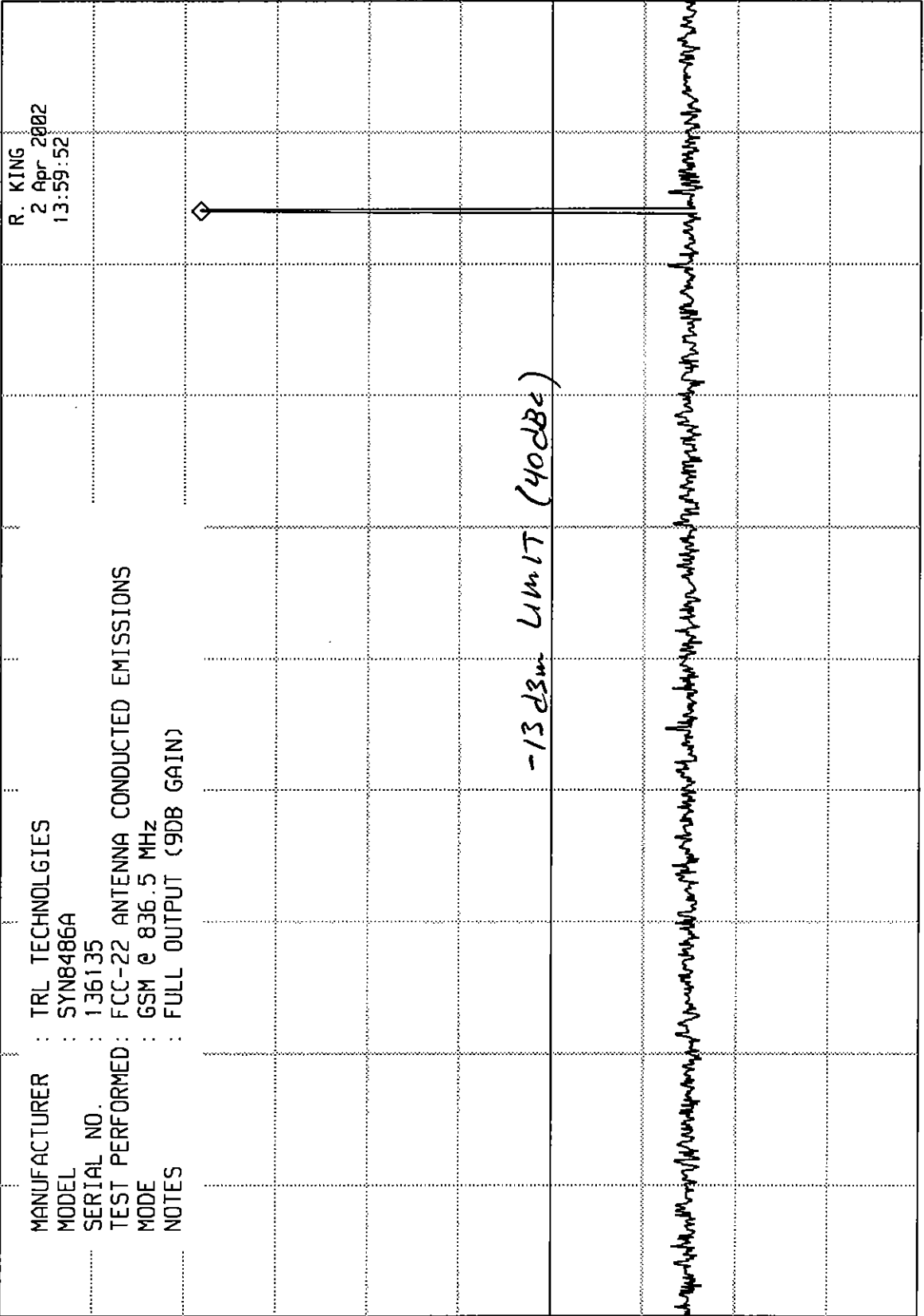
ELITE ELECTRONIC ENGINEERING CO

MKR 843.8 MHz  
-14.70 dBm

REF 7.0 dBm      ATTEN 20 dB + 40 dB Ext

hp

10 dB/



DL -53.0 dBm

START 30 MHz      RES BW 100 kHz (i)      UBW 300 kHz      STOP 1.000 GHz  
SWP 728 msec

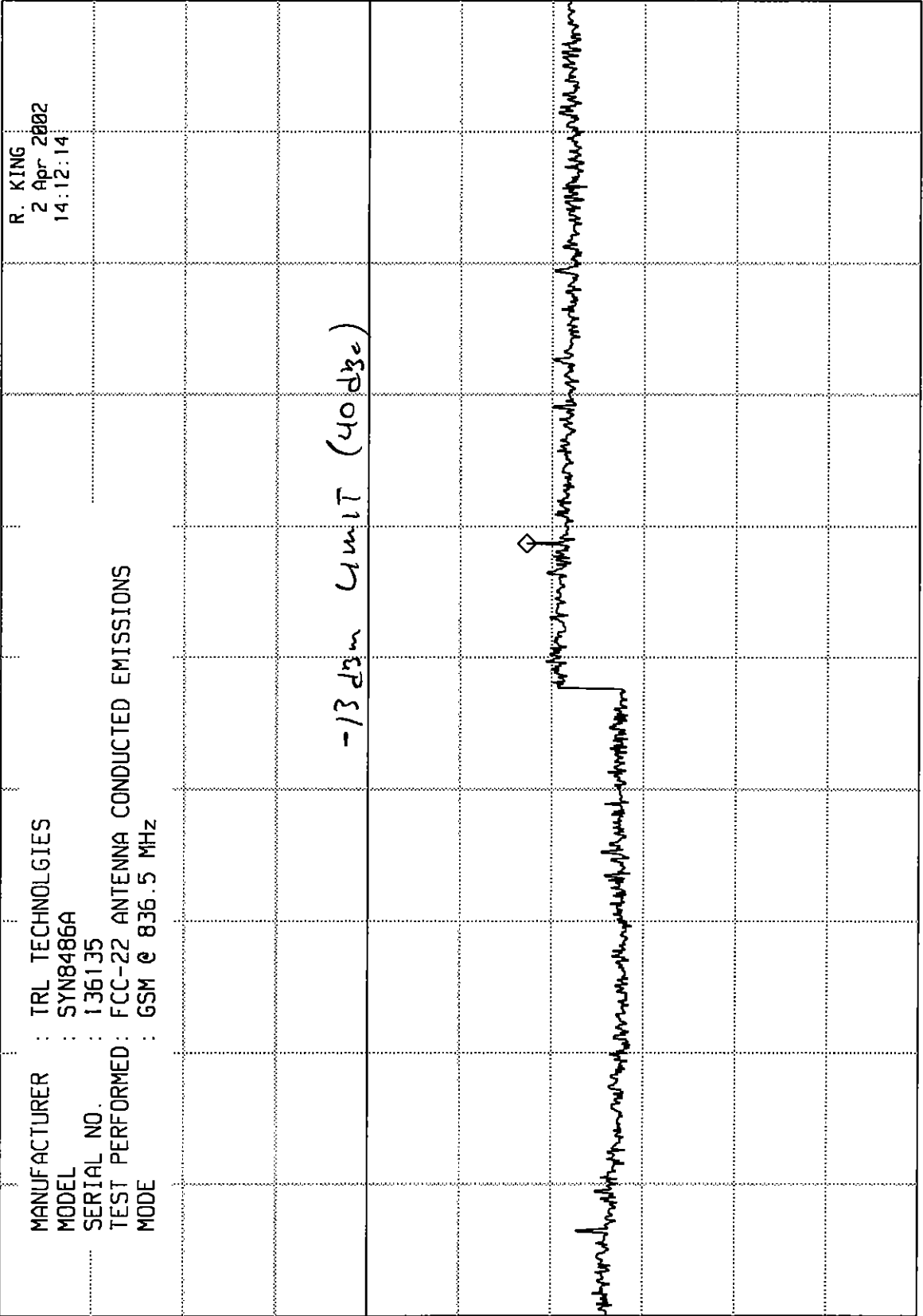
ELITE ELECTRONIC ENGINEERING CO

MKR 6.688 GHz  
-50.30 dBm

REF 7.0 dBm      ATTEN 20 dB + 20 dB Ext

hp

10 dB/



DL -33.0 dBm

START 2.00 GHz      RES BW 1 MHz (i)      VBW 3 MHz      STOP 10.00 GHz  
 SWP 200 msec

ELITE ELECTRONIC ENGINEERING Co.

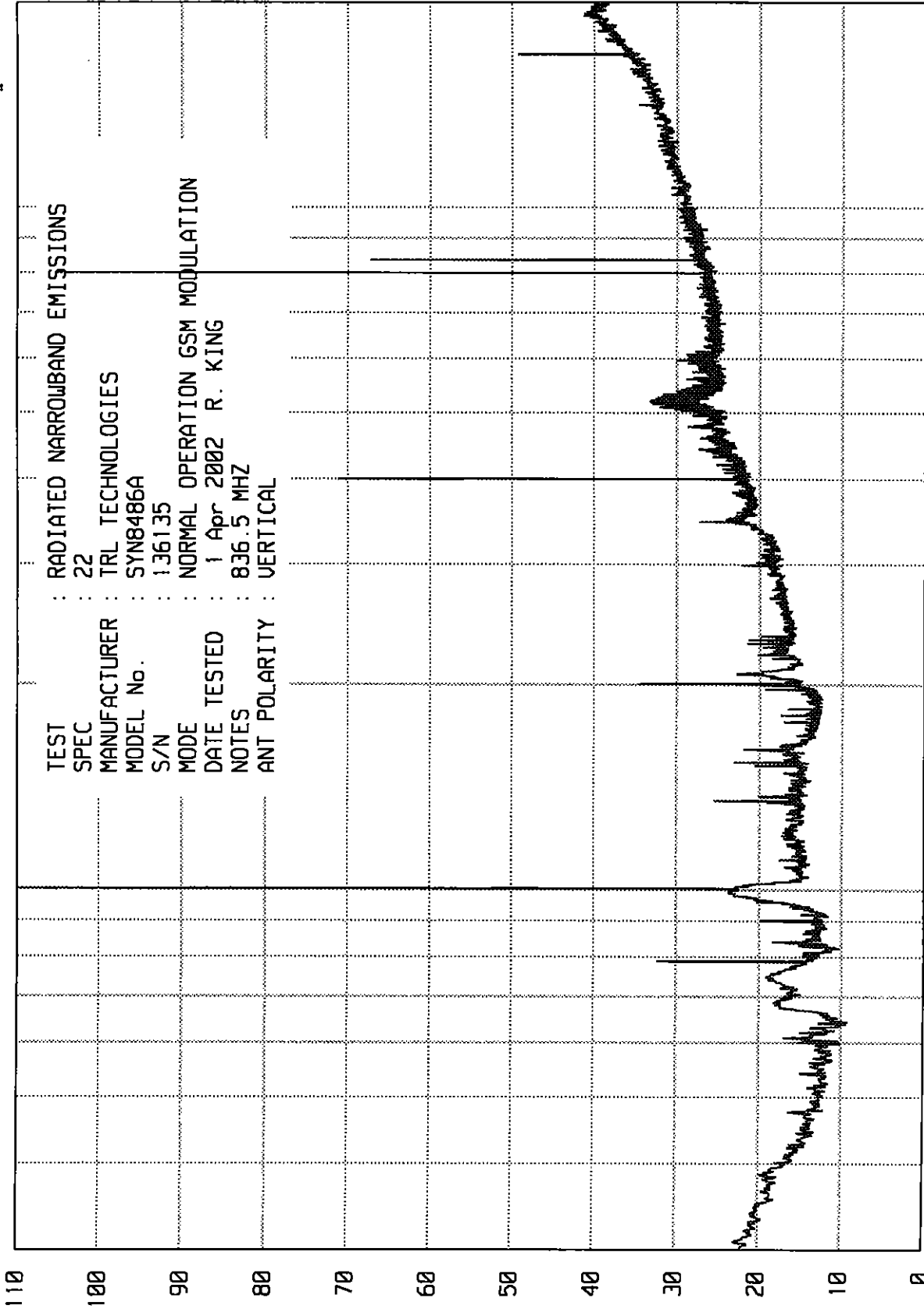
Downers Grove, Ill. 60515

UNIV\_EM RUN RUN 1

UKAB 11/26/01

EE

TEST : RADIATED NARROWBAND EMISSIONS  
 SPEC : 22  
 MANUFACTURER : TRL TECHNOLOGIES  
 MODEL No. : SYN8486A  
 S/N : 136135  
 MODE : NORMAL OPERATION GSM MODULATION  
 DATE TESTED : 1 Apr 2002 R. KING  
 NOTES : 836.5 MHZ  
 ANT POLARITY : VERTICAL



RADIATED NARROWBAND EMISSIONS - dBu/m

START = 30

FREQUENCY - MHz

100

1000

STOP = 2000

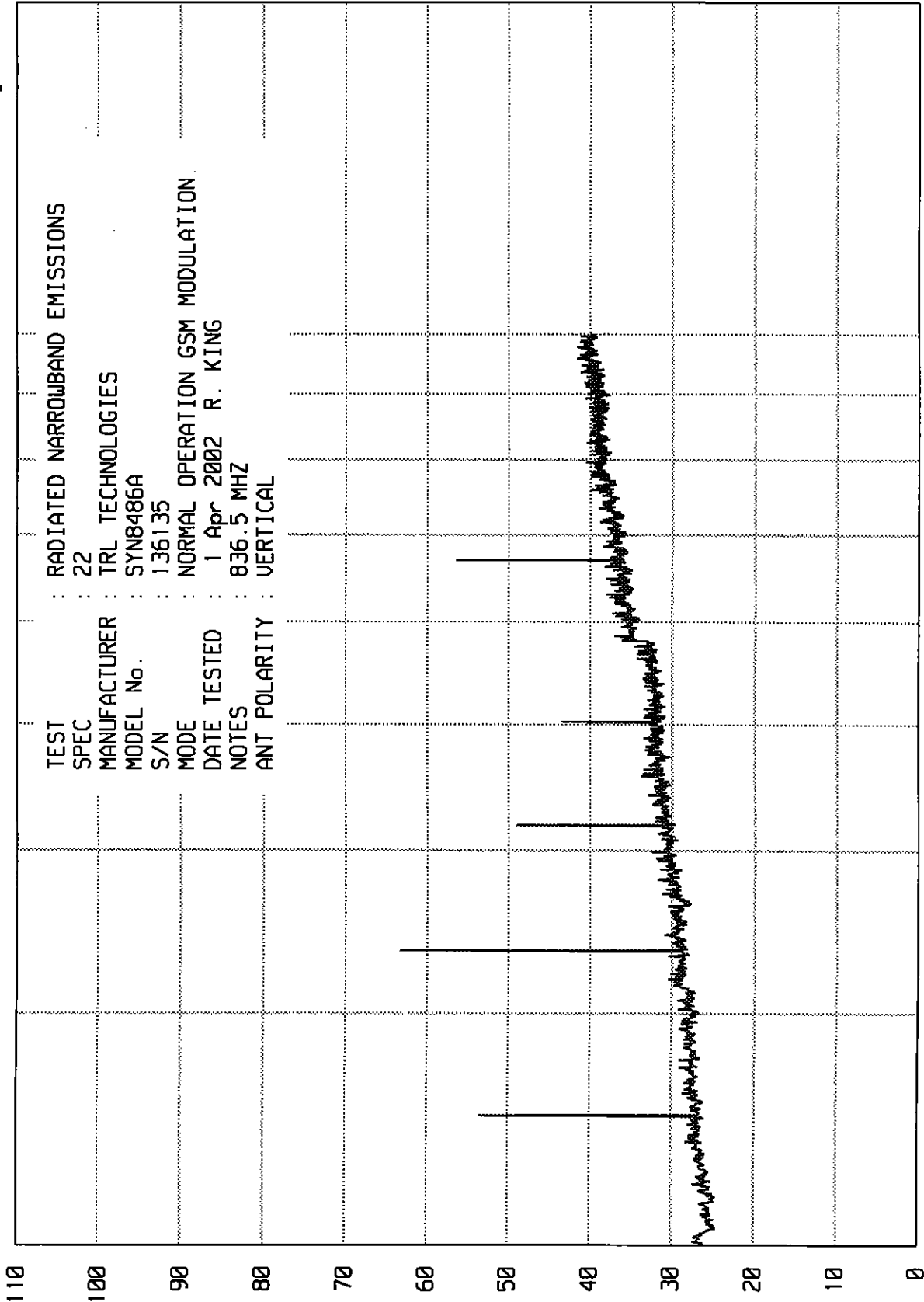
ELITE ELECTRONIC ENGINEERING Co.

Downers Grove, Ill. 60515

UNTV\_EM RUN RUN 5

UKA0 11/26/01

EE



TEST : RADIATED NARROWBAND EMISSIONS  
 SPEC : 22  
 MANUFACTURER : TRL TECHNOLOGIES  
 MODEL No. : SYN8486A  
 S/N : 136135  
 MODE : NORMAL OPERATION GSM MODULATION  
 DATE TESTED : 1 Apr 2002 R. KING  
 NOTES : 836.5 MHZ  
 ANT POLARITY : VERTICAL

RADIATED NARROWBAND EMISSIONS - dBu/m

START = 2000

FREQUENCY - MHZ

10000

STOP = 18000

ELITE ELECTRONIC ENGINEERING Co.

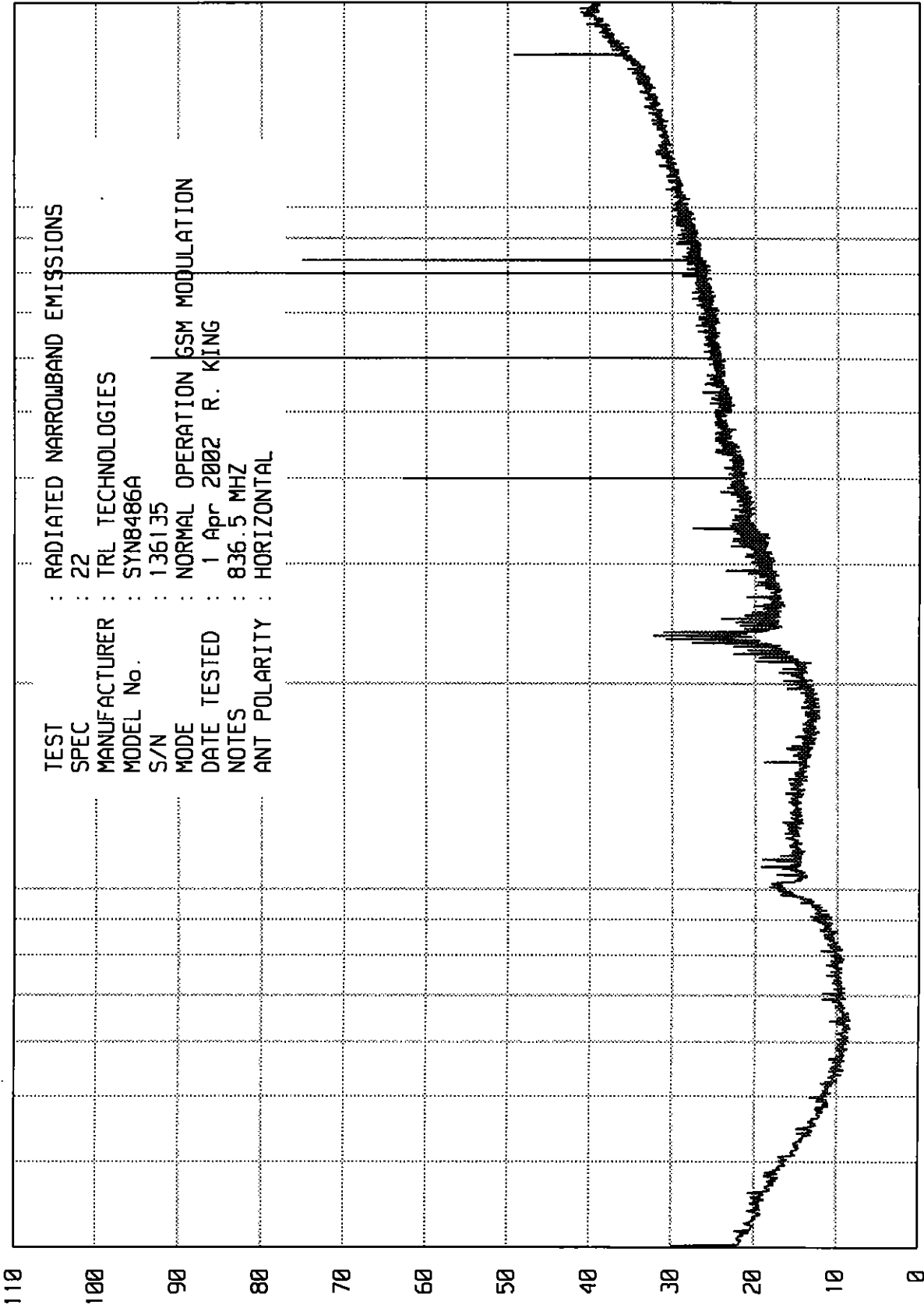
Downers Grove, Ill. 60515

UNIV\_EM RUN RUN 1

WJKA0 11/26/01

EE

TEST : RADIATED NARROWBAND EMISSIONS  
 SPEC : 22  
 MANUFACTURER : TRL TECHNOLOGIES  
 MODEL No. : SYN8486A  
 S/N : 136135  
 MODE : NORMAL OPERATION GSM MODULATION  
 DATE TESTED : 1 Apr 2002 R. KING  
 NOTES : 836.5 MHZ  
 ANT POLARITY : HORIZONTAL



RADIATED NARROWBAND EMISSIONS - dBu/m

START = 30

FREQUENCY - MHz

100

1000

STOP = 2000

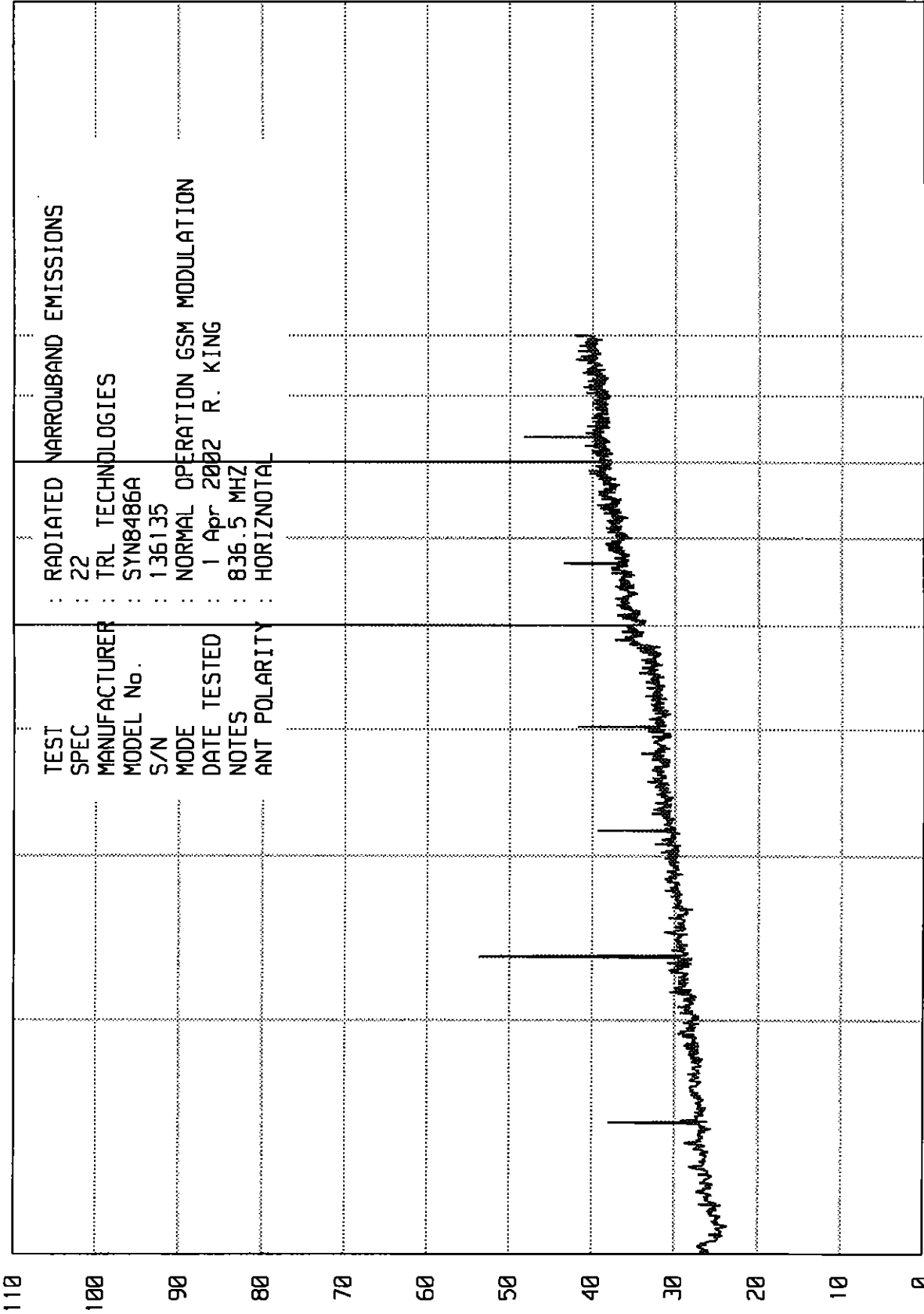
ELITE ELECTRONIC ENGINEERING Co.

Downers Grove, Ill. 60515

UNTV\_EM RUN RUN 5

UKAB 11/26/01

EE



TEST : RADIATED NARROWBAND EMISSIONS  
 SPEC : 22  
 MANUFACTURER : TRL TECHNOLOGIES  
 MODEL No. : SYN8486A  
 S/N : 136135  
 MODE : NORMAL OPERATION GSM MODULATION  
 DATE TESTED : 1 Apr 2002 R. KING  
 NOTES : 836.5 MHZ  
 ANT POLARITY : HORIZONTAL

STOP = 18000

10000

FREQUENCY - MHz

START = 2000



ETR 30862-02  
DATA SHEET

MANUFACTURER : TRL TECHNOLOGIES  
MODEL : SYN8486A  
S/N : NONE ASSIGNED  
SPECIFICATION : FCC-22 OPEN FIELD SPURIOUS RADIATED EMISSIONS  
DATE : APRIL 1, 2002  
NOTES : GSM @ 836.5MHz, FULL OUTPUT  
: TEST DISTANCE IS 3 METERS

FREQ. (MHz)	ANT POL	MTR RDG (dBuV)	MATCHED SIGNAL dBm	ANT GAIN dB	CABLE FAC dB	ERP TOTAL dBm	ATTN dB	MIN ATTN dB
1673.0	H	65.2	-38.4	0.9	3.6	-41.1	68.1	40
1673.0	V	66.8	-38.3	0.9	3.6	-41.0	68.0	40
2509.5	H	63.6	-36.0	4.5	4.3	-35.8	62.8	40
2509.5	V	64.9	-36.0	4.5	4.3	-35.8	62.8	40
3346.0	H	70.2	-26.5	6.3	5.7	-25.9	52.9	40
3346.0	V	74.3	-23.0	6.3	5.7	-22.4	49.4	40
4182.5	H	50.5	-46.5	5.2	6.3	-47.6	74.6	40
4182.5	V	58.9	-37.5	5.2	6.3	-38.6	65.6	40
5019.0	H	51.4	-44.0	6.9	6.9	-44.0	71.0	40
5019.0	V	58.5	-33.5	6.9	6.9	-33.5	60.5	40
5855.5	H	47.3	-45.5	7.0	7.5	-46.0	73.0	40
5855.5	V	50.3	-45.0	7.0	7.5	-45.5	72.5	40
6692.0	H	52.7	-37.5	7.1	8.1	-38.5	65.5	40
6692.0	V	55.3	-33.5	7.1	8.1	-34.5	61.5	40
7528.5	H	41.0	-57.5	7.3	8.1	-58.3	85.3	40
7528.5	V	44.2	-48.0	7.3	8.1	-48.8	75.8	40
8365.0	H	50.0	-37.5	7.8	9.0	-38.7	65.7	40
8365.0	V	48.5	-41.5	7.9	9.0	-42.6	69.6	40

CHECKED BY:

  
Daniel E. Crowder

29.629