Measurement of RF Emissions from an Mobile Repeater, Model No. BDA8001900-1

For : TRL Technologies
Elgin, IL

P.O. No. : 780-0000001828
Date Received : February 25th., 2004
Date Tested : February 25th.. through March 8th., 2004
Test Personnel : Richard E. King EMC Engineer
Specification : FCC "Code of Federal Regulations" Title 47 Part 24

Test Report By :
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TRL Technologies

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TABLE OF CONTENTS

Measurement of RF Emissions from a Model No. BDA8001900-1, Mobile Repeater

1.0 INTRODUCTION:

1.1 DESCRIPTION OF TEST ITEM: During the period of February 25 through March 8, 2004, a series of radio interference measurements were performed on a model BDA8001900-1 Mobile Repeater Serial Number 2, (hereinafter referred to as the test item). The tests were performed for TRL Technologies of Elgin, IL.

The test item is an Mobile Repeater that operates in the PCS bands, 1930 through 1990 and 1850 through 1910. The test item has a rated gain of 50dB for the PCS band.

The test item is designed to operate in the following frequency blocks in the PCS band:

Block	Downlink Frequency (MHz)	Uplink Frequency (MHz)
A	1930-1945	1850-1865
D	1945-1950	1865-1870
B	1950-1965	1870-1885
E	1965-1970	1885-1890
F	1970-1975	1890-1895
C	1975-1990	1895-1910

1.2 PURPOSE: The test series was performed to determine if the test item meets the technical requirements of the FCC Part 24 for broadband PCS.

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 24, dated 1 October 2002

- Federal Communications Commission "Code of Federal Regulations", Title 47, Part 2, dated 1 October 2002

- ANSI C63.4-2001, "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 21%.

2.0 TEST ITEM SETUP AND OPERATION:

2.1 POWER INPUT: The test item obtained 5VDC from an SMP Technology, Inc. AC Adaptor, M/N: SBU 205-SF5C, S/N: 305-000673, through two, 1.8 meter long unshielded leads.

2.2 GROUNDING: The test item was ungrounded during the tests.

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

ITEM	DESCRIPTION
HP Signal Generator	M/N E4432B, S/N VS39440973

The output of the signal generator was connected to the test item through a 1 meter long coaxial cable. **2.4 MODULATION:** The test signal was modulated with three different representative types of modulations: (1) Amps (FM) 30kHz modulation, (2) Digital I/Q modulation - CDMA 1.23 MHz, and (3) Digital modulation - GSM 300kHz. (4) Digital I/Q modulation - TDMA 30kHz. The input signals were supplied from an HP M/N E4432B Signal Generator.

The RF Power Output, the Occupied Bandwidth, the Spurious Emissions at Antenna Terminal, and the Field Strength of Spurious Emissions tests were performed with AMPS, CDMA, GSM, and TDMA modulated input signals.

2.5 FREQUENCY SELECTION: For the RF Power Output test, the Occupied Bandwidth test, and the Spurious Emissions at Antenna Terminal test, two test frequencies for both uplink and downlink, one at the low edge of Block A and one at the high edge of Block C, were selected. The frequencies were one channel spacing from the low or high edge of the frequency range edge.

For the Field Strength of Spurious Emissions test, three test frequencies for both uplink and downlink,

one near the middle of block A, one near the middle of block B, and one near the middle of block C, were selected.

The specified channel spacing used for each modulation type is shown below:

Modulation	Channel Spacing
AMPS	30kHz
CDMA	1.23MHz
GSM	300kHz
TDMA	30kHz

The specific test frequencies are designated as follows:

Modulation Type	Low Edge Frequency MHz	High Edge Frequency MHz	Low Frequency MHz	Middle Frequency MHz	High Frequency MHz
Downlink RF Power Output test, Occupied Bandwidth test, Spurious Emissions at Antenna Terminal test					
AMPS	1930.03	1989.97			
CDMA	1931.23	1988.77			
GSM	1930.3	1989.7			
TDMA	1930.03	1989.97			
Downlink, Field Strength of Spurious Emissions test					
AMPS			1935	1955	1985
CDMA			1935	1955	1985
GSM			1935	1955	1985
TDMA			1935	1955	1985
Uplink RF Power Output test, Occupied Bandwidth test, Spurious Emissions at Antenna Terminal test					
AMPS	1850.03	1909.97			
CDMA	1851.23	1908.77			
GSM	1850.3	1909.7			
TDMA	1850.03	1909.97			
Uplink, Field Strength of Spurious Emissions test					
AMPS			1855	1875	1905
CDMA			1855	1875	1905
GSM			1855	1875	1905
TDMA			1855	1875	1905

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

Modulation	Rated Power dBm		Rated Power Watts	
	Uplink	Downlink	Uplink	Downlink
AMPS	15	10	0.032	0.010
CDMA	15	10	0.032	0.010
GSM	15	10	0.032	0.010
TDMA	15	10	0.032	0.010

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 24.323, mobile/portable stations are limited to 2 Watts e.i.r.p. peak power and the equipment must employ means to limit the power of the minimum necessary for successful communications.

4.1.2 PROCEDURES: The test item was adjusted for the rated gain. The test item was configured to measure the output for the downlink path.

(a) The input signal was set to 1930.03MHz.

(b) The input signal was AMPS modulated.

(c) The spectrum analyzer 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 achieved. The output power level was measured and recorded. The input signal level was also recorded.

(e) Steps (b) through (d) were repeated separately for each frequency and modulation listed in paragraph 2.5 above.

4.1.3 RESULTS: The output power measurements are presented on data pages 15 and 16. The power outputs measured for the uplink path were 0.032 watts for all frequencies and modulations listed in paragraph 2.5 above. The power outputs measured for the downlink path were 0.010 watts for all frequencies and modulations listed in paragraph 2.5 above. The remainder of the tests were performed at these power levels. The power output complies with the FCC requirements.

The EIRP 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 EIRP requirement cannot be directly applied to the test item.

4.2 OCCUPIED BANDWIDTH MEASUREMENTS:

4.2.1 REQUIREMENTS: In accordance with Paragraph 24.238(a), on any frequency outside the authorized frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log(P)dB. For a rated power level of 0.032 watts uplink and 0.010 watts downlink, the emissions outside of the emission bandwidth shall be attenuated at least 28dB uplink and 23dB downlink below the transmitter power.

In the 1MHz bands immediately outside and adjacent to the frequency range a resolution of at least one percent of the emission bandwidth shall be used. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency where the emissions are 28dB down for uplink frequencies and 23dB down for downlink frequencies.

4.2.2 PROCEDURES: The test was performed using each of the modulation types listed in paragraph 2.5 (AMPS, CDMA, GSM, TDMA).

(a) The input signal was set separately to 1850.03MHz, 1909.97MHz, 1930.03MHz and 1989.97MHz. 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 AMPS modulated.
(c) A spectrum analyzer was connected to the output of the test item. With a bandwidth of the spectrum analyzer set to 300 Hz, 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.
(e) The modulation was changed to CDMA and steps (c) and (d) were repeated separately with the input signal set to 1851.23MHz, 1908.77MHz, 1931.23MHz, and 1988.77MHz. The bandwidth of the spectrum analyzer was set to 30kHz.
(f) The modulation was changed to GSM and steps (c) and (d) were repeated separately with the input signal set to 1850.3MHz, 1909.7MHz, 1930.3MHz, and 1989.7MHz. The bandwidth of the spectrum analyzer was set to 30kHz.
(g) The modulation was changed to TDMA and steps (c) and (d) were repeated separately with the input signal set to 1850.03MHz, 1909.97MHz, 1930.03MHz and 1989.97MHz. The bandwidth of the spectrum analyzer was set to 300Hz.

4.2.3 RESULTS: The plots of the occupied bandwidth measured with all modulations listed above in paragraph 2.4 are presented on data pages 17 through 64. The limits, shown on the plots, are referenced to the power measured from the unmodulated carrier.

As can be seen from the data, the test item output met the occupied bandwidth requirements with the AMPS, CDMA, GSM and TDMA modulations of the carrier. The sideband emissions measured at the test item output were similar to the sideband 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 FCC 24.238, the spurious emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log(P)dB. FCC requirements apply only to frequencies outside the authorized frequency block. For the uplink frequencies 0.032W , the spurious emissions shall be attenuated by a minimum of 28dB. This requirement translates to a limit of -13dBm. For the downlink frequencies 0.010W , the spurious emissions shall be attenuated by a minimum of 23dB. This requirement translates to a limit of -13dBm. The peak power of the emissions shall be measured at the antenna terminal 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 2.4 (AMPS, CDMA, GSM, TDMA).

(a) The input signal was set to 1850.03MHz. The input signal level was adjusted to provide the rated level at the test item output.
(b) The input signal was AMPS 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 20 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 with the input signal set to 1909.97MHz. The input signal was AMPS modulated and adjusted to provide the rated level at the test item output.
(g) Steps (c) through (e) were repeated with the input signal set to 1930.03MHz. The input signal was AMPS modulated and adjusted to provide the rated level at the test item output.
(h) Steps (c) through (e) were repeated with the input signal set to 1989.97MHz. The input signal was adjusted to provide the rated level at the test item output.
(i) Steps (c) through (e) were repeated with the input signal set to 1851.23MHz. The input signal was CDMA modulated and adjusted to provide the rated level at the test item output.
(j) Steps (c) through (e) were repeated with the input signal set to 1908.77MHz. The input signal was CDMA modulated and adjusted to provide the rated level at the test item output.
(k) Steps (c) through (e) were repeated with the input signal set to 1931.23MHz. The input signal was CDMA modulated and adjusted to provide the rated level at the test item output.
(l) Steps (c) through (e) were repeated with the input signal set to 1988.77MHz. The input signal was CDMA modulated and adjusted to provide the rated level at the test item output.
(m) Steps (c) through (e) were repeated with the input signal set to 1850.3MHz. The input signal was GSM modulated and adjusted to provide the rated level at the test item output.
(n) Steps (c) through (e) were repeated with the input signal set to 1909.7MHz. The input signal was GSM modulated and adjusted to provide the rated level at the test item output.
(o) Steps (c) through (e) were repeated with the input signal set to 1930.3MHz. The input signal was GSM

modulated and adjusted to provide the rated level at the test item output.

(p) Steps (c) through (e) were repeated with the input signal set to 1989,7MHz. The input signal was GSM modulated and adjusted to provide the rated level at the test item output.

(q) Steps (c) through (e) were repeated with the input signal set to 1850.03MHz. The input signal was TDMA modulated and adjusted to provide the rated level at the test item output.

(r) Steps (c) through (e) were repeated with the input signal set to 1909.97MHz. The input signal was TDMA modulated and adjusted to provide the rated level at the test item output.

(s) Steps (c) through (e) were repeated with the input signal set to 1930.03MHz. The input signal was TDMA modulated and adjusted to provide the rated level at the test item output.

(t) Steps (c) through (e) were repeated with the input signal set to 1989.97MHz. The input signal was TDMA modulated and adjusted to provide the rated level at the test item output.

4.3.3 RESULTS: The plots of the antenna conducted output measurements are presented on data pages 65 through 112. 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

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 2001 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 2.5.

(a) The preliminary measurements were performed with the test item operating separately with an input signal of 1855.0MHz, 1875.0MHz, 1905MHz, 1935MHz, 1955MHz, and 1985MHz with AMPS modulation. The broadband measuring antennas were positioned at a 3 meter distance from the test item. The frequency range from 30MHz to 18GHz was investigated. The readings were taken with a peak detector function and recorded.

(b) Step (a) was repeated with an input signal 1855.0MHz, 1875.0MHz, 1905MHz, 1935MHz, 1955MHz, and 1985MHz and with the modulation changed to CDMA.

(c) Step (a) was repeated with an input signal 1855.0MHz, 1875.0MHz, 1905MHz, 1935MHz, 1955MHz, and 1985MHz and with the modulation changed to GSM.

(d) Step (a) was repeated with an input signal 1855.0MHz, 1875.0MHz, 1905MHz, 1935MHz, 1955MHz, and 1985MHz and with the modulation changed to TDMA.

4.4.1.3 RESULTS: The preliminary plots are presented on data pages 113 through 160. Factors for the antennas and cables 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 measured at an open field test site.

4.4.2 FINAL RADIATED EMISSIONS:

4.4.2.1 REQUIREMENTS: In accordance with paragraph 24.238, on any frequency twice or more than twice the fundamental frequency, the emissions shall be attenuated below the transmitter power (P) by at least 43 + 10 log(P)dB. This requirement translates to a minimum attenuation of 28dB for the uplink frequencies and 23dB for the downlink frequencies. 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 2001 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 of the test item 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 readings were recorded. No averaging methods or corrections were applied.
f) Measurements were performed with the input signal modulated with AMPS, CDMA, GSM and TDMA.
g) Measurements were performed separately at each frequency 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 the 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 pages 161 through 184. The radiated emissions were measured through the 10th harmonic. All emissions measured from the test item were within the specification limits.

5.0 CONCLUSION:

It was found that the TRL Technologies model BDA8001900-1, Serial No. 2, Mobile Repeater, 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 24.

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 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								
XLJA	5W, 50 OHM TERMINATION	JFW INDUSTRIES	50T-052	11	DC-2GHZ	05/27/03	12	05/27/04
XZG3	ATTENUATOR/SWITCH DRIVER	HEWLETT PACKARD	11713A	2421A03059	---		N/A	
Equipment Type: AMPLIFIERS								
APK3	PREAMPLIFIER	AGILENT TECHNOL	8449B	3008A01593	1-26.5GHZ	05/09/03	12	05/09/04
Equipment Type: ANTENNAS								
NTA0	BILOG ANTENNA	CHASE EMC LTD.	BILOG CBL611	2057	0.03-2GHZ	07/03/03	12	07/03/04
NWG0	RIDGED WAVE GUIDE (DCC-MAT	AEL	H1479	104	1-12.4GHZ	11/26/03	12	11/26/04
NWI0	RIDGED WAVE GUIDE	AEL	H1498	153	2-18GHZ	09/05/03	12	09/05/04
NWI1	RIDGED WAVE GUIDE	AEL	H1498	154	2-18GHZ	09/05/03	12	09/05/04
Equipment Type: ATTENUATORS								
T2D9	20DB, 25W ATTENUATOR	WEINSCHEL	46-20-34	BH5445	DC-18HGZ	12/29/03	12	12/29/04
T2DB	20DB, 25W ATTENUATOR	WEINSCHEL	46-20-34	BH5447	DC-18GHZ	12/02/03	12	12/02/04
Equipment Type: CONTROLLERS								
CMA0	MULTI-DEVICE CONTROLLER	EMCO	2090	9701-1213	---		N/A	
Equipment Type: RECEIVERS								
RAC2	SPECTRUM ANALYZER	HEWLETT PACKARD	85660B	3638A08770	100HZ-22GHZ	02/10/04	12	02/10/05
RACD	RF PRESELECTOR	HEWLETT PACKARD	85685A	3010A01205	20HZ-2GHZ	02/11/04	12	02/11/05
RAF4	QUASIPEAK ADAPTER	HEWLETT PACKARD	85650A	2043A00320	0.01-1000MHZ	02/11/04	12	02/11/05
Equipment Type: SIGNAL GENERATORS								
GBX1	SYNTHESIZED SWEEPER	HEWLETT PACKARD	83630A	3420A00857	10MHZ-26.5GHZ		NOTE 1	

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.

MANUFACTURER : TRL Technologies Inc.
MODEL : BDA8001900-1
S/N : 2
SPECIFICATION : FCC- 24 RF Power Output
DATE : February 25, 2004
NOTES : AMPS (FM) & CDMA Modulation
:

Frequency			Rated Power dBm		Rated Power Watts	
Block Edges	Low, Middle, High	Modulation	Uplink	Downlink	Uplink	Downlink
1850.03	---	AMPS	15	---	0.032	---
1909.97	---	AMPS	15	---	0.032	---
---	1855.00	AMPS	15	---	0.032	---
---	1875.00	AMPS	15	---	0.032	---
---	1905.00	AMPS	15	---	0.032	---
1930.03	---	AMPS	---	10	---	0.010
1989.97	---	AMPS	---	10	---	0.010
---	1935.00	AMPS	---	10	---	0.010
---	1955.00	AMPS	---	10	---	0.010
---	1985.00	AMPS	---	10	---	0.010
1851.23	---	CDMA	15	---	0.032	---
1908.77	---	CDMA	15	---	0.032	---
---	1855.00	CDMA	15	---	0.032	---
---	1875.00	CDMA	15	---	0.032	---
---	1905.00	CDMA	15	---	0.032	---
1931.23	---	CDMA	---	10	---	0.010
1988.77	---	CDMA	---	10	---	0.010
---	1935.00	CDMA	---	10	---	0.010
---	1955.00	CDMA	---	10	---	0.010
---	1985.00	CDMA	---	10	---	0.010

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MANUFACTURER : TRL Technologies Inc.
MODEL : BDA8001900-1
S/N : 2
SPECIFICATION : FCC- 24 RF Power Output
DATE : February 25, 2004
NOTES : GSM & TDMA Modulations
:

Frequency			Rated Power dBm		Rated Power Watts	
Block Edges	Low, Middle, High	Modulation	Uplink	Downlink	Uplink	Downlink
1850.30	---	GSM	15	---	0.032	---
1909.70	---	GSM	15	---	0.032	---
---	1855.00	GSM	15	---	0.032	---
---	1875.00	GSM	15	---	0.032	---
---	1905.00	GSM	15	---	0.032	---
1930.30	---	GSM	---	10	---	0.010
1989.70	---	GSM	---	10	---	0.010
---	1935.00	GSM	---	10	---	0.010
---	1955.00	GSM	---	10	---	0.010
---	1985.00	GSM	---	10	---	0.010
1850.03	---	TDMA	15	---	0.032	---
1909.97	---	TDMA	15	---	0.032	---
---	1855.00	TDMA	15	---	0.032	---
---	1875.00	TDMA	15	---	0.032	---
---	1905.00	TDMA	15	---	0.032	---
1930.03	---	TDMA	---	10	---	0.010
1989.97	---	TDMA	---	10	---	0.010
---	1935.00	TDMA	---	10	---	0.010
---	1955.00	TDMA	---	10	---	0.010
---	1985.00	TDMA	---	10	---	0.010

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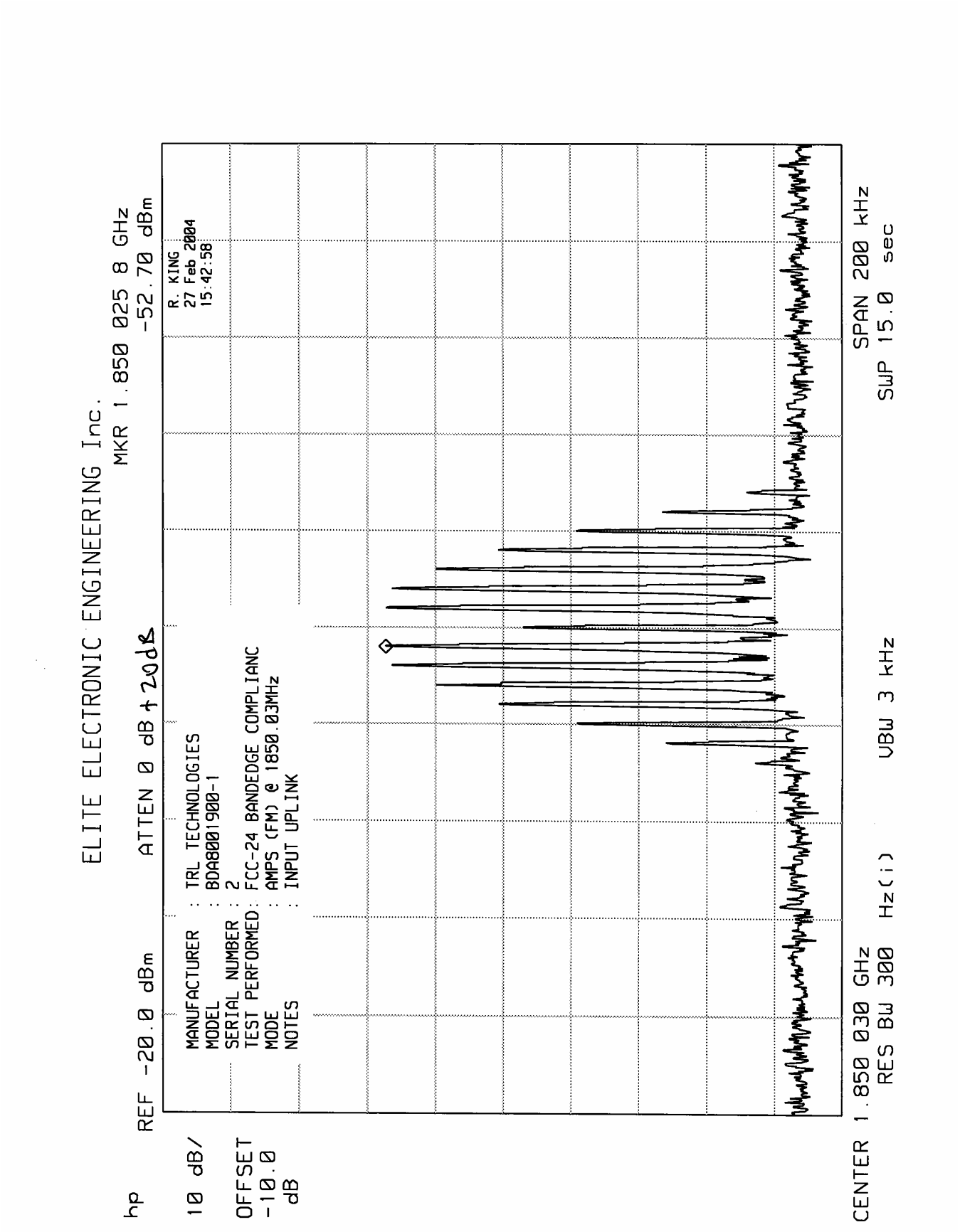
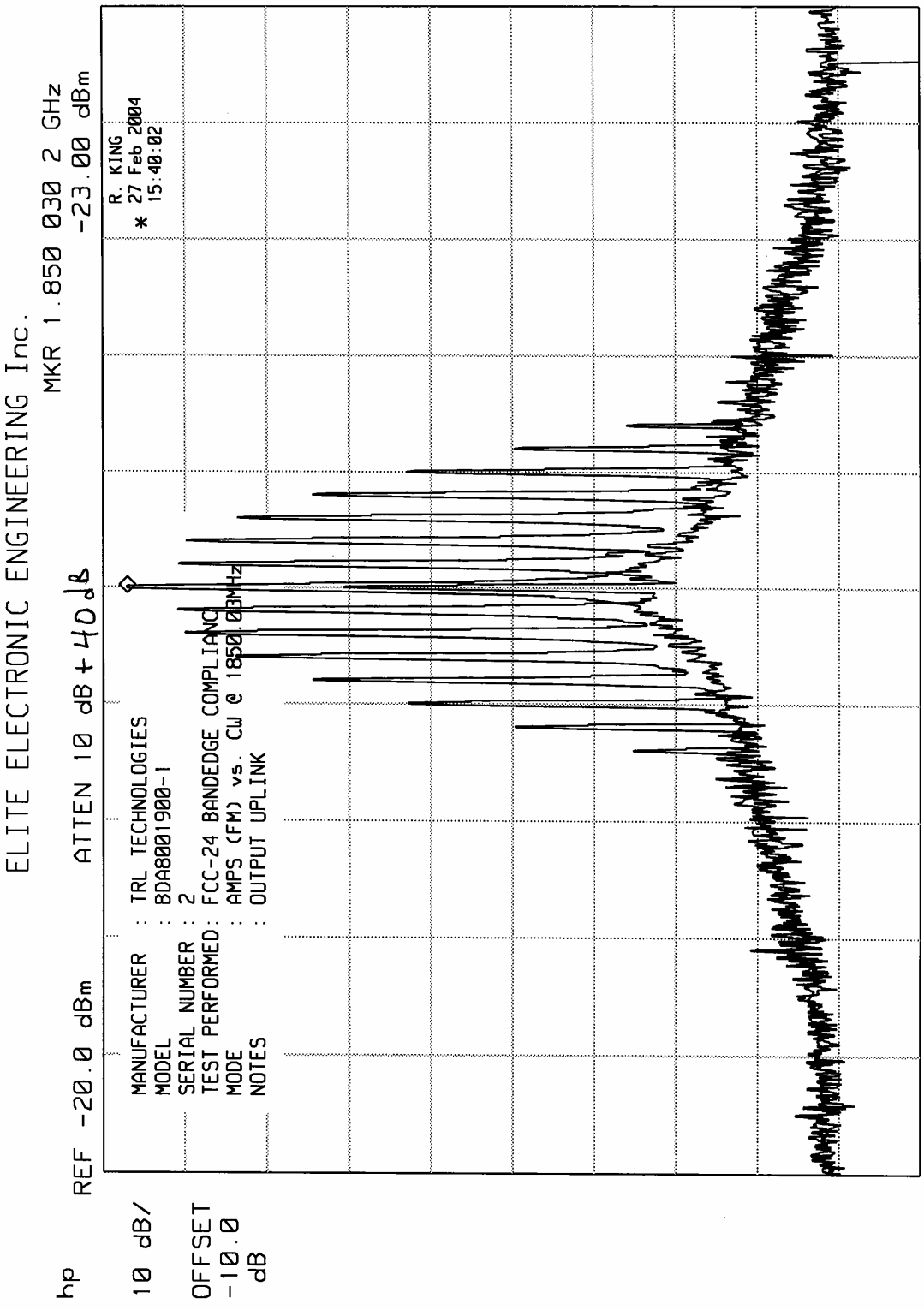
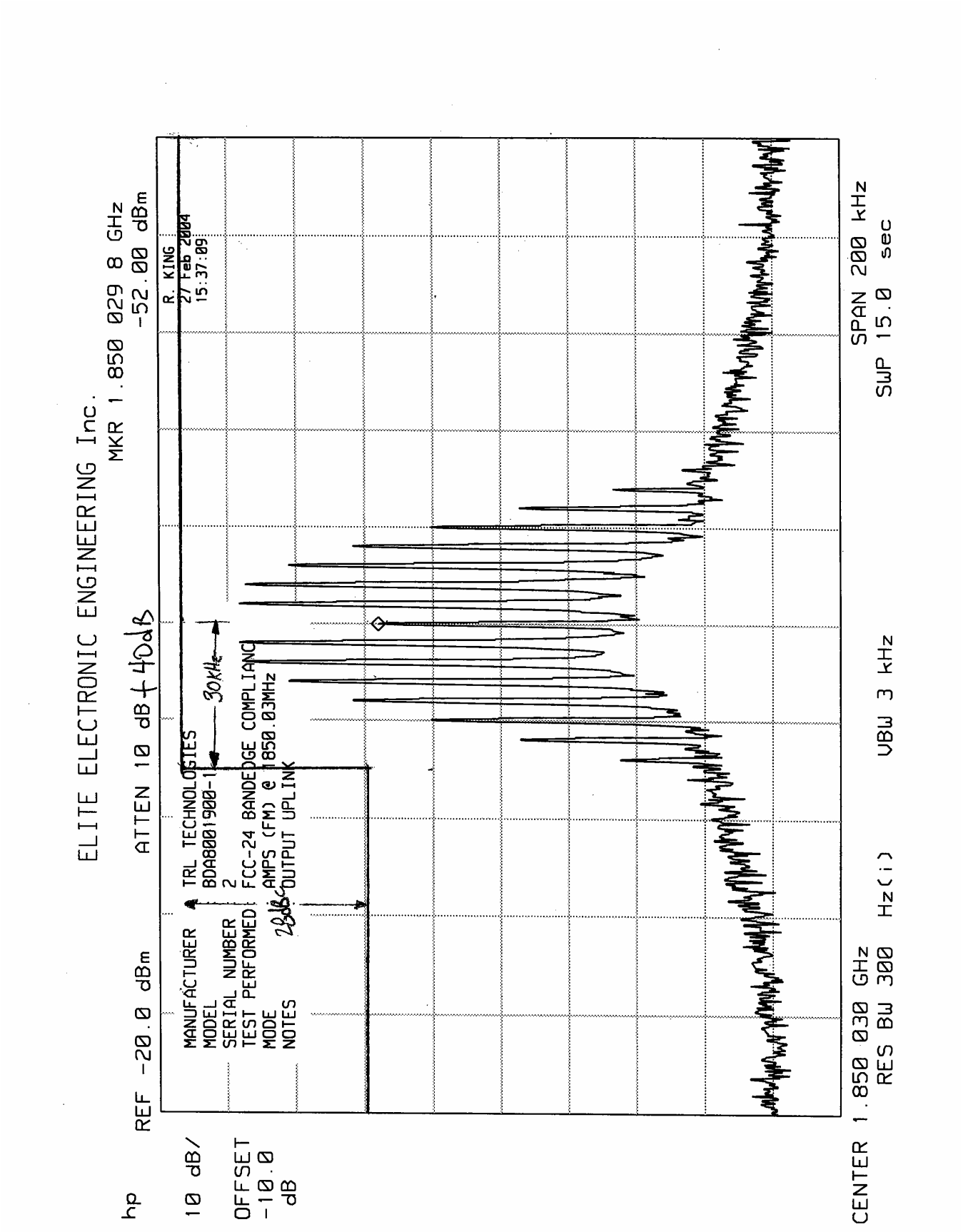
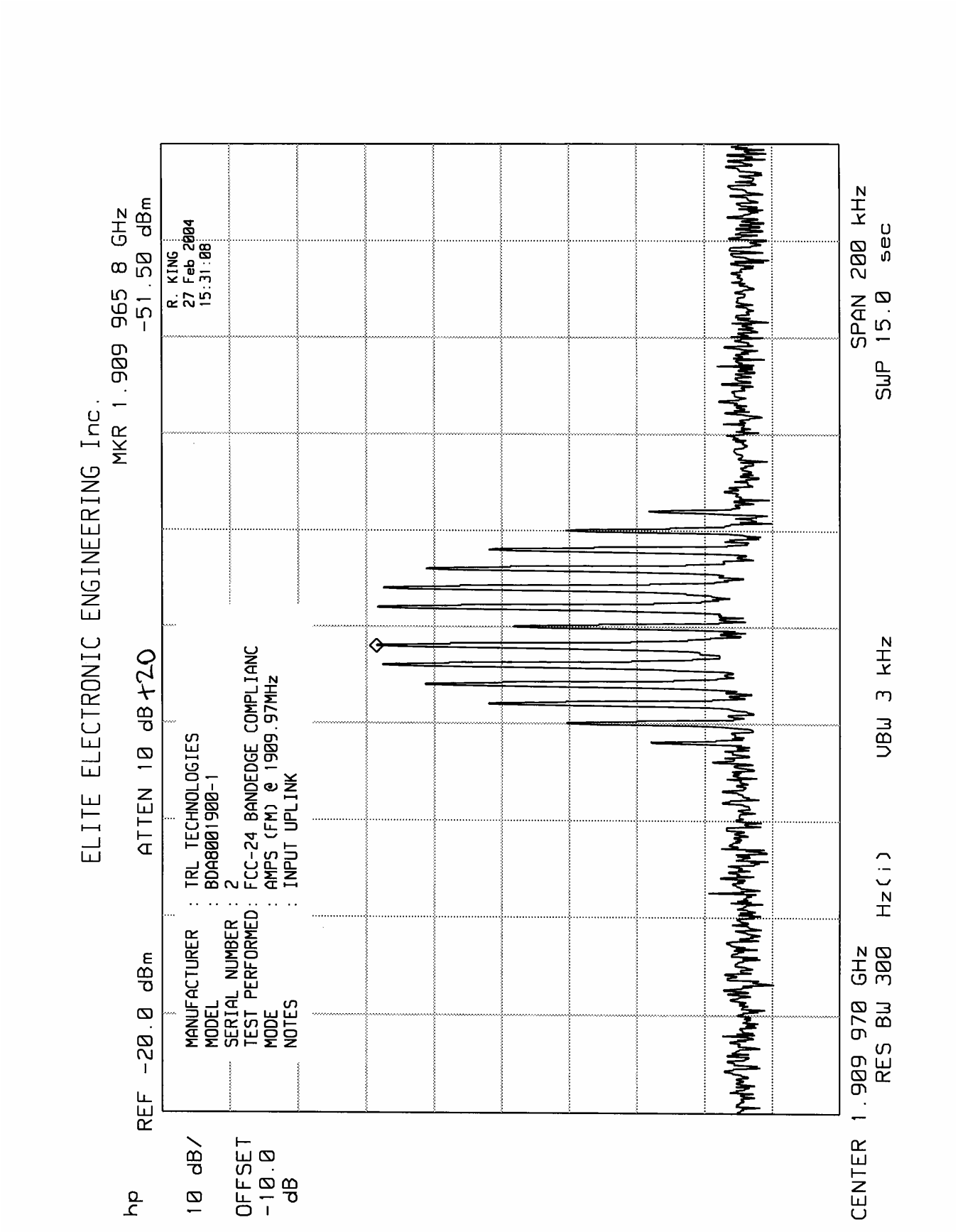
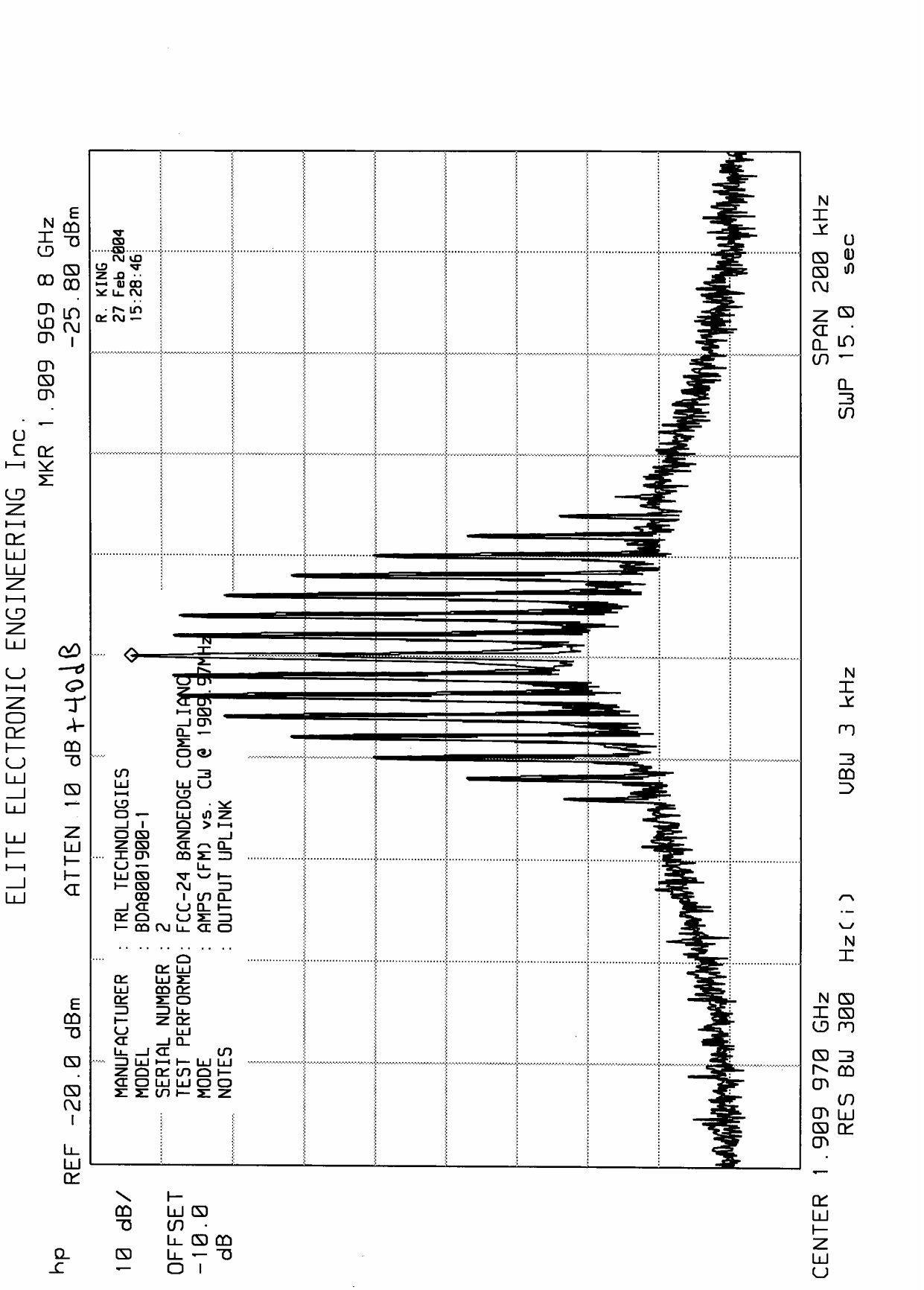
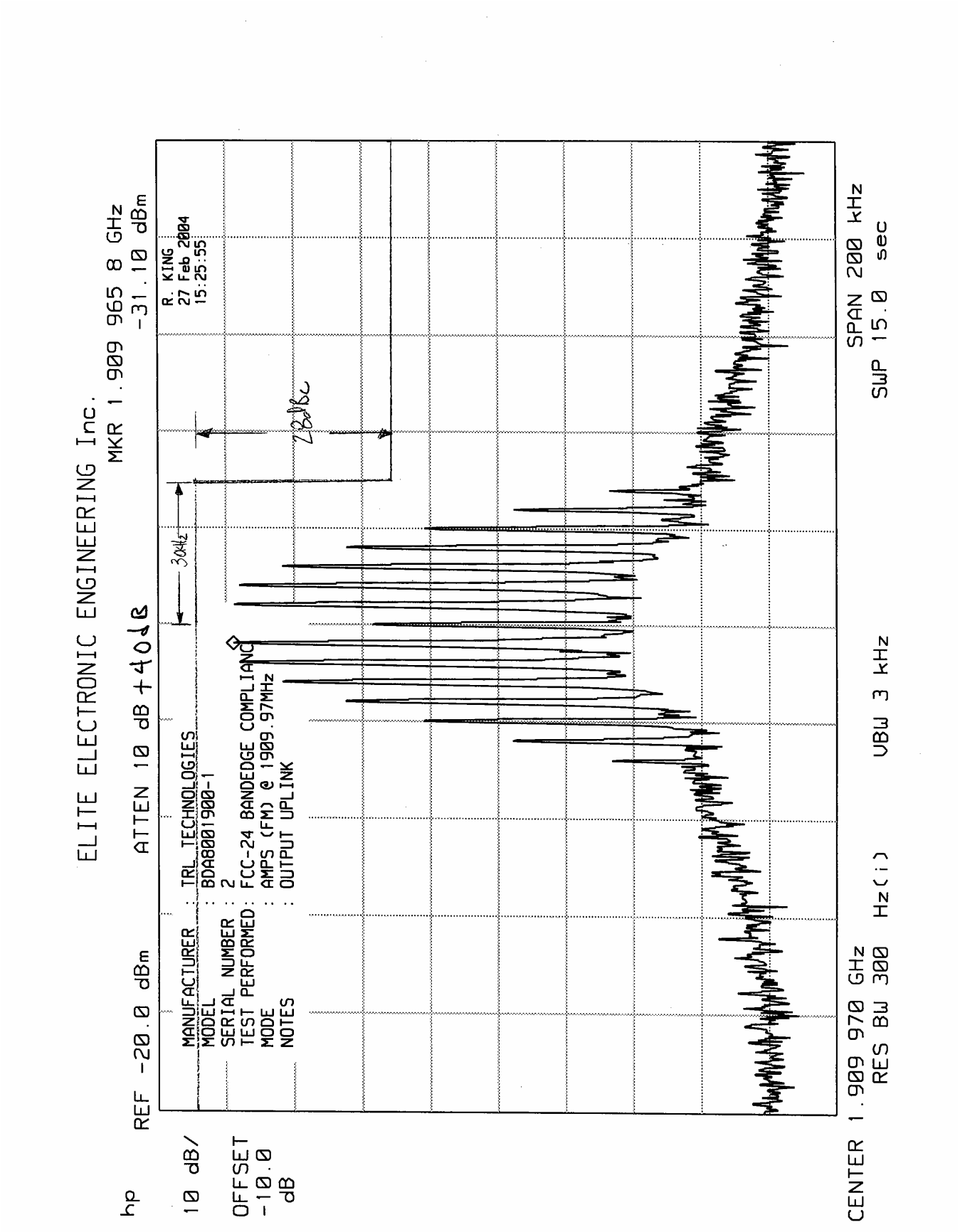

ELITE ELECTRONIC ENGINEERING Inc.
MKR 1.850 025 8 GHz
-52.70 dBm
R. KING
27 Feb 2004
15:42:58
hp
REF -20.0 dBm
ATTEN 0 dB + 20dB
10 dB/
OFFSET
-10.0
dB
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED : FCC-24 BANDEDGE COMPLIANC
MODE : AMPS (FM) @ 1850.03MHz
NOTES : INPUT UPLINK
CENTER 1.850 030 GHz
SPAN 200 kHz
RES BW 300 Hz(i)
VBW 3 kHz
SWP 15.0 sec

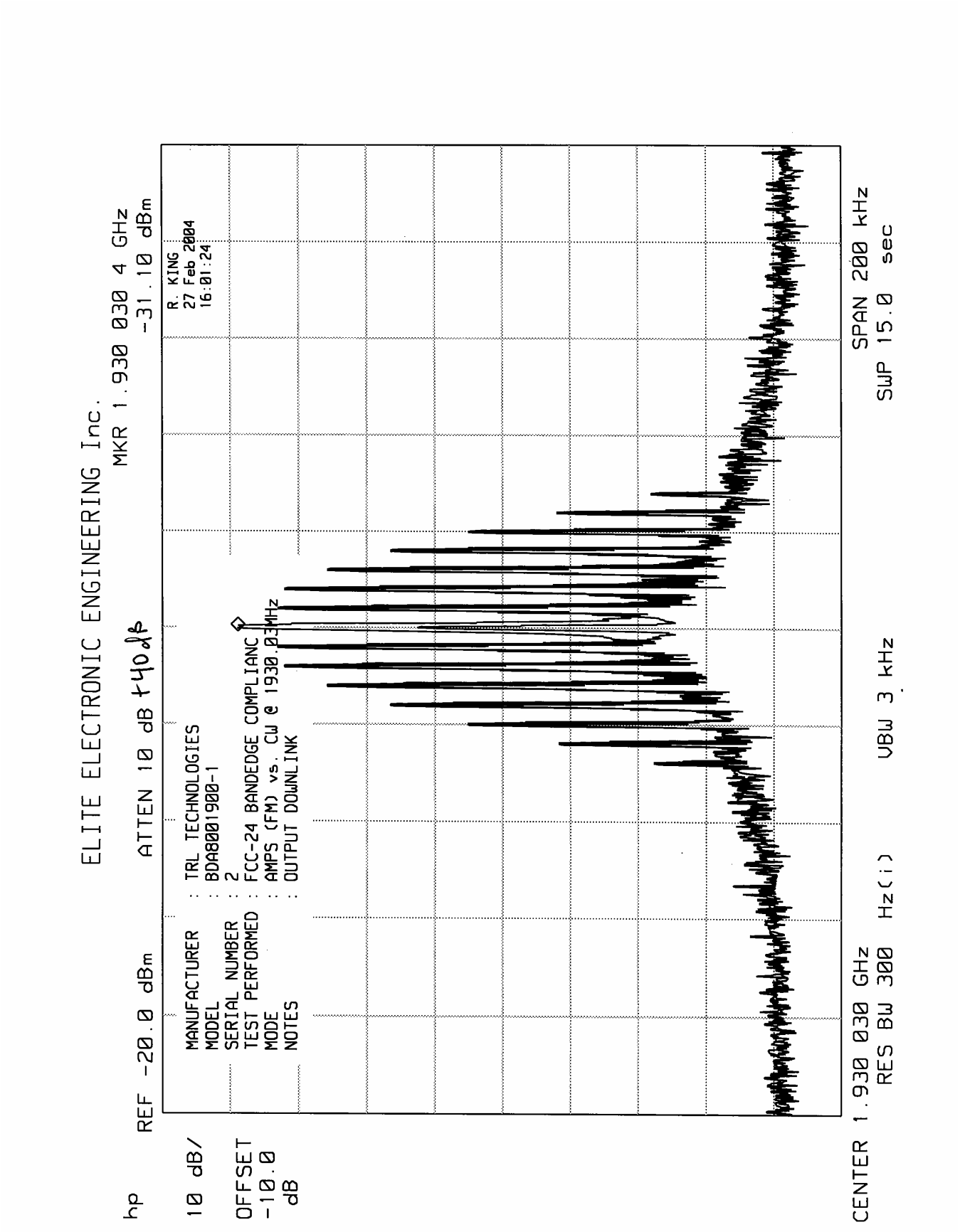

ELITE ELECTRONIC ENGINEERING Inc.
hp
REF -20.0 dBm
ATTEN 10 dB + 40 dB
MKR 1.850 030 2 GHz
-23.00 dBm
10 dB/
OFFSET
-10.0
dB
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED: FCC-24 BANDEDGE COMPLIANCE
MODE : AMPS (FM) vs. CW @ 1850.0MHz
NOTES : OUTPUT UPLINK
R. KING
27 Feb 2004
15:40:02
CENTER 1.850 030 GHz
SPAN 200 kHz
RES BW 300 Hz(i)
VBW 3 kHz
SWP 15.0 sec

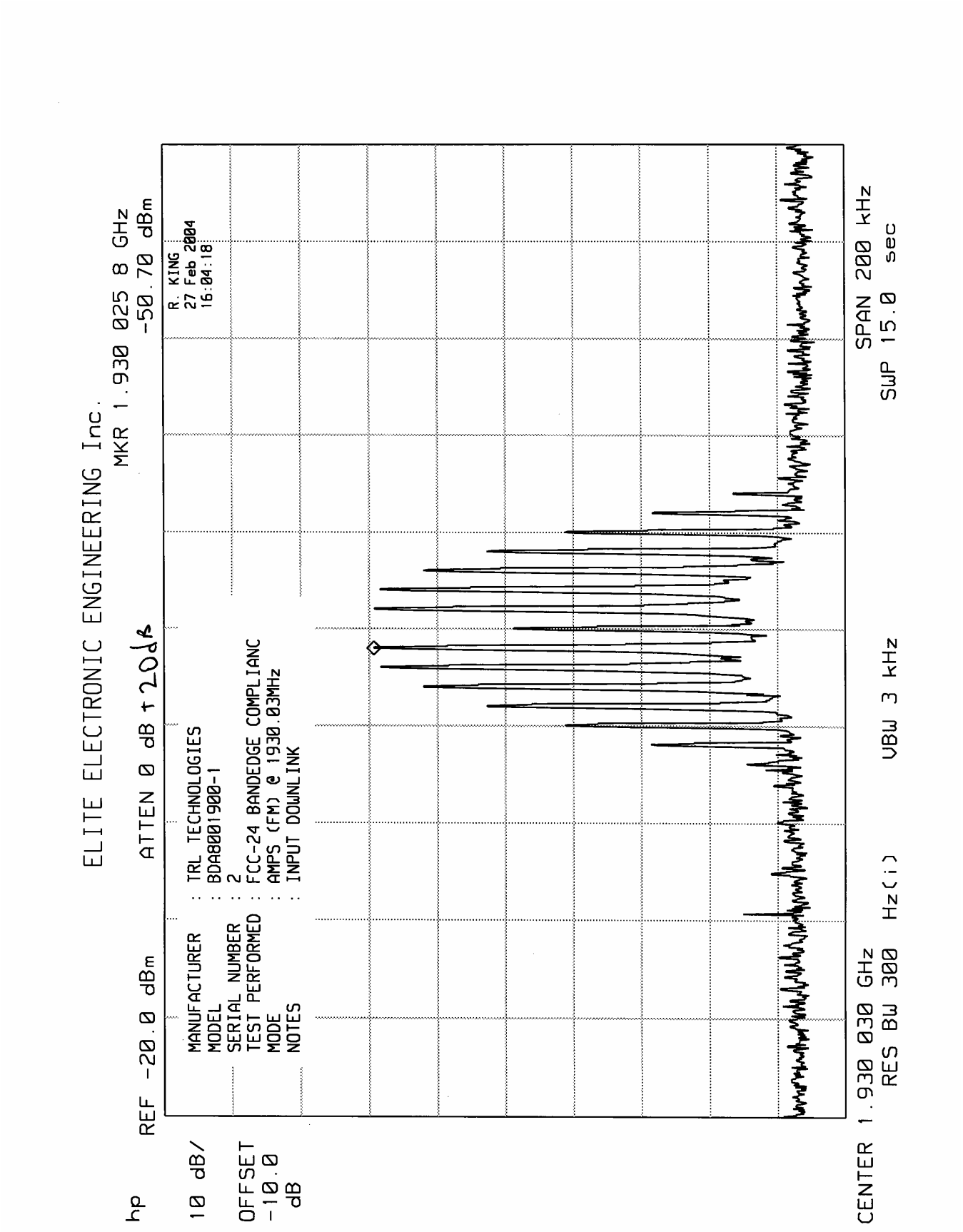

ELITE ELECTRONIC ENGINEERING Inc.
MKR 1.850 029 8 GHz
-52.00 dBm
R. KING
27 Feb 2004
15:37:09
hp
REF -20.0 dBm
ATTEN 10 dB
10 dB/
OFFSET
-10.0
dB
MANUFACTURER TRL TECHNOLOGIES
MODEL BDA8001900-1
SERIAL NUMBER 2
TEST PERFORMED FCC-24 BANDEDGE COMPLIANC
MODE AMPS (FM) @ 1850.03MHz
NOTES OUTPUT UPLINK
30kHz
CENTER 1.850 030 GHz
RES BW 300 Hz(i)
VBW 3 kHz
SPAN 200 kHz
SWP 15.0 sec

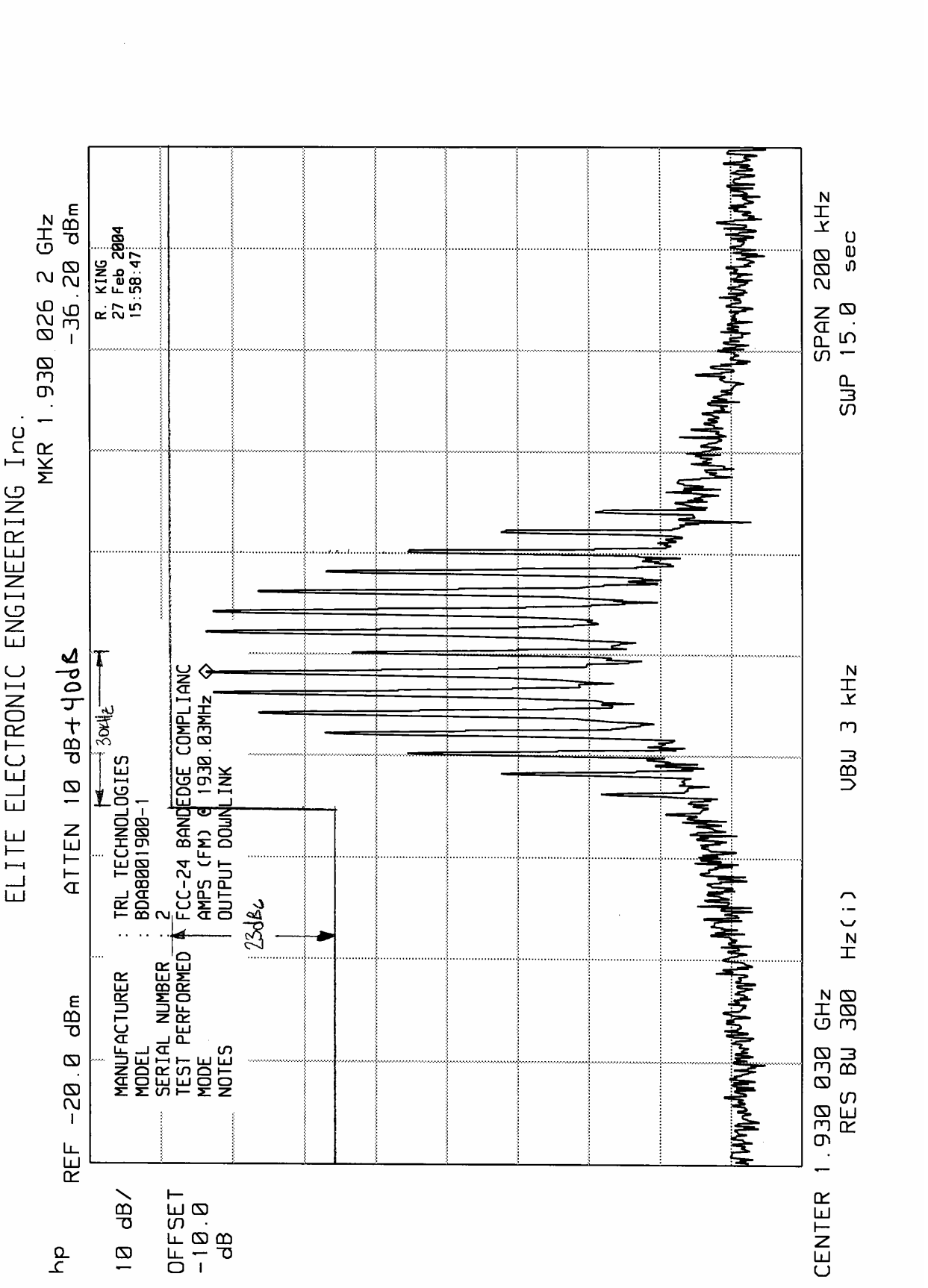

ELITE ELECTRONIC ENGINEERING Inc.
hp
REF -20.0 dBm
ATTEN 10 dB
MKR 1.909 965 8 GHz
-51.50 dBm
10 dB/
OFFSET
-10.0
dB
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED: FCC-24 BANDEDGE COMPLIANC
MODE : AMPS (FM) @ 1909.97MHz
NOTES : INPUT UPLINK
R. KING
27 Feb 2004
15:31:08
CENTER 1.909 970 GHz
SPAN 200 kHz
RES BW 300 Hz(i)
VBW 3 kHz
SWP 15.0 sec

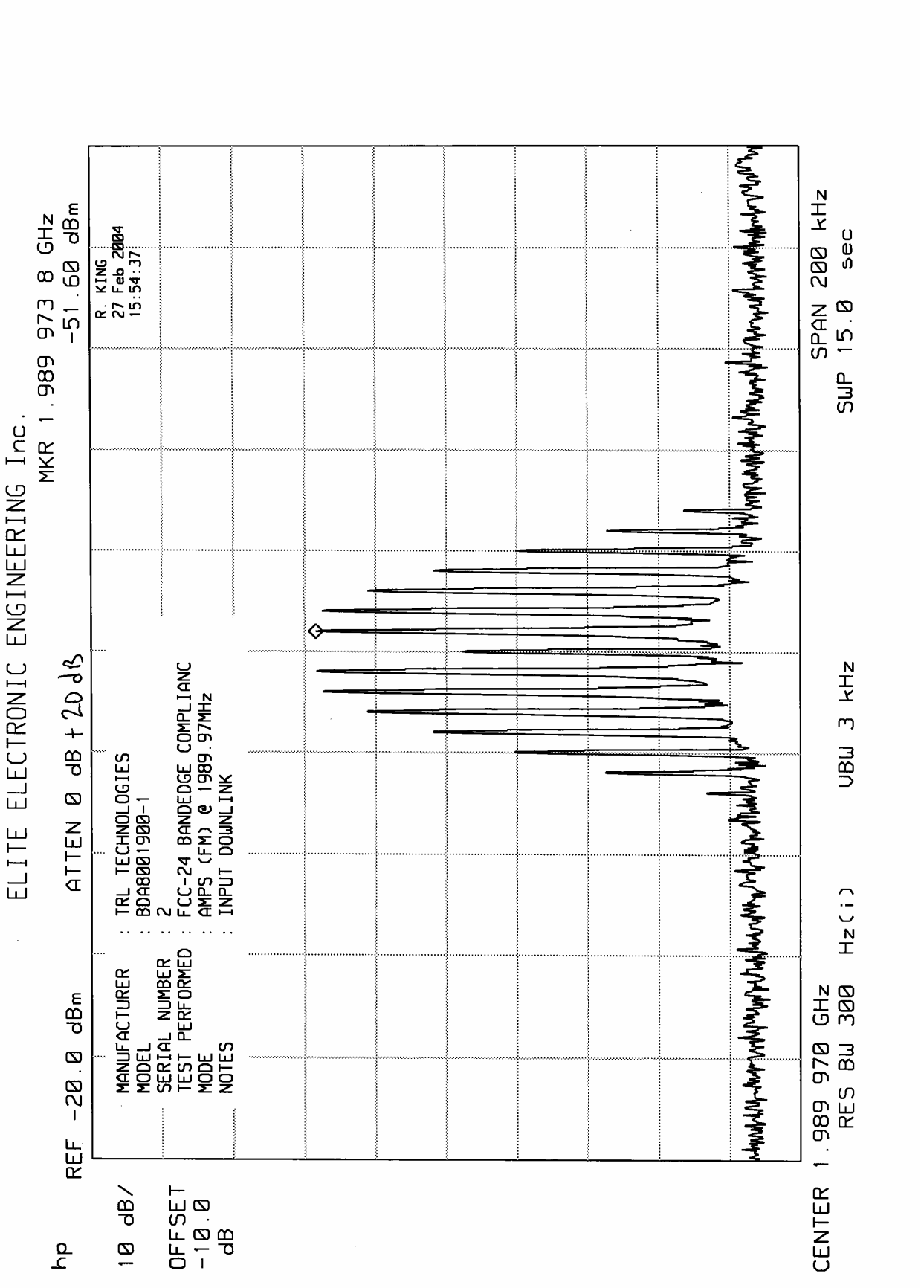

ELITE ELECTRONIC ENGINEERING Inc.
MKR 1.909 969 8 GHz
-25.80 dBm
R. KING
27 Feb 2004
15:28:46
hp
REF -20.0 dBm
ATTEN 10 dB
10 dB/
OFFSET
-10.0
dB
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED : FCC-24 BANDEDGE COMPLIANC
MODE : AMPS (FM) vs. CW @ 1909.97MHz
NOTES : OUTPUT UPLINK
CENTER 1.909 970 GHz
SPAN 200 kHz
RES BW 300 Hz(i)
VBW 3 kHz
SWP 15.0 sec

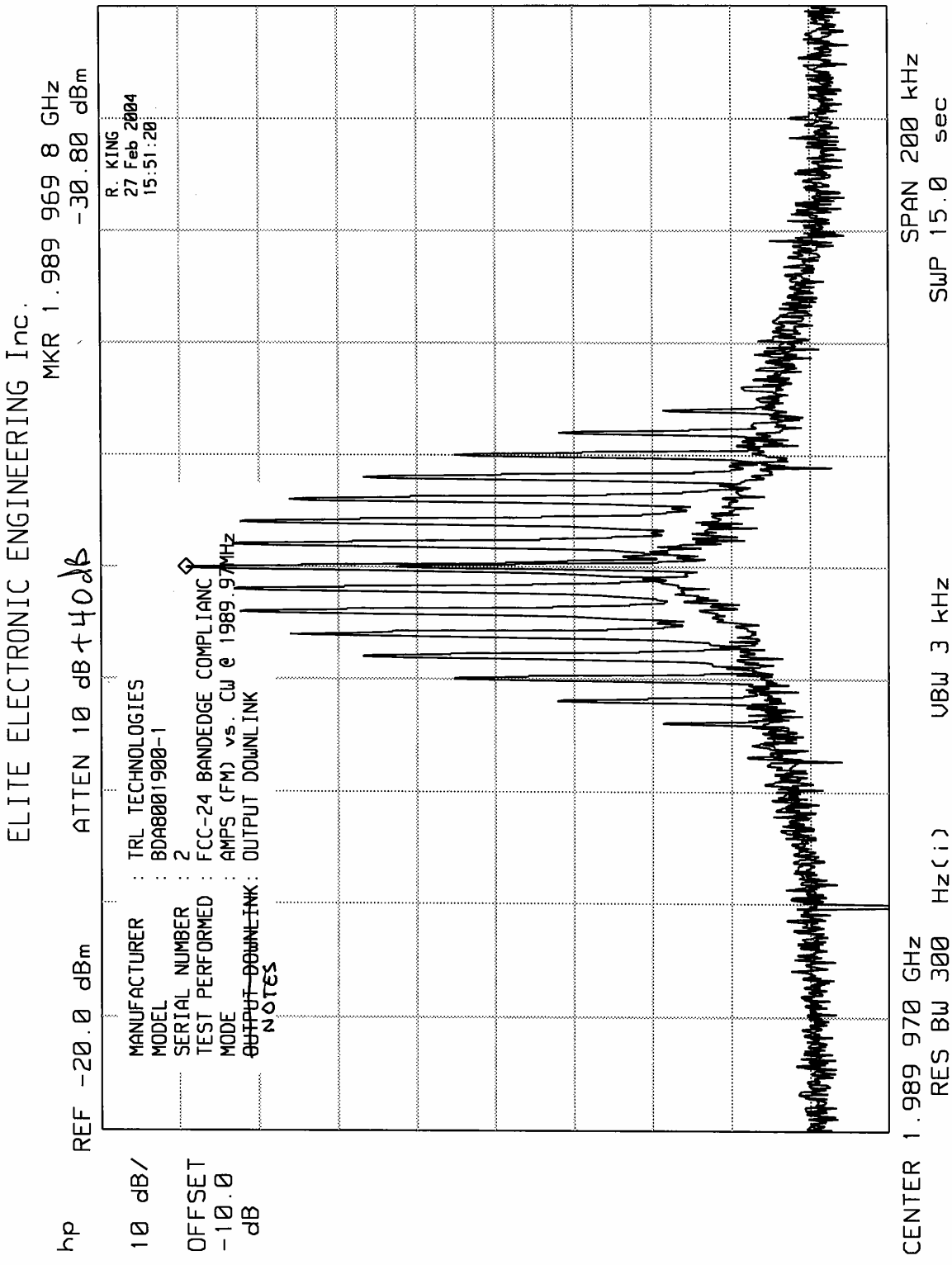

ELITE ELECTRONIC ENGINEERING Inc.
MKR 1.909 965 8 GHz
-31.10 dBm
R. KING
27 Feb 2004
15:25:55
REF -20.0 dBm
ATTEN 10 dB
10 dB/
OFFSET
-10.0
dB
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED: FCC-24 BANDEDGE COMPLIANC
MODE : AMPS (FM) @ 1909.97MHz
NOTES : OUTPUT UPLINK
CENTER 1.909 970 GHz
RES BW 300 Hz(i)
VBW 3 kHz
SPAN 200 kHz
SWP 15.0 sec

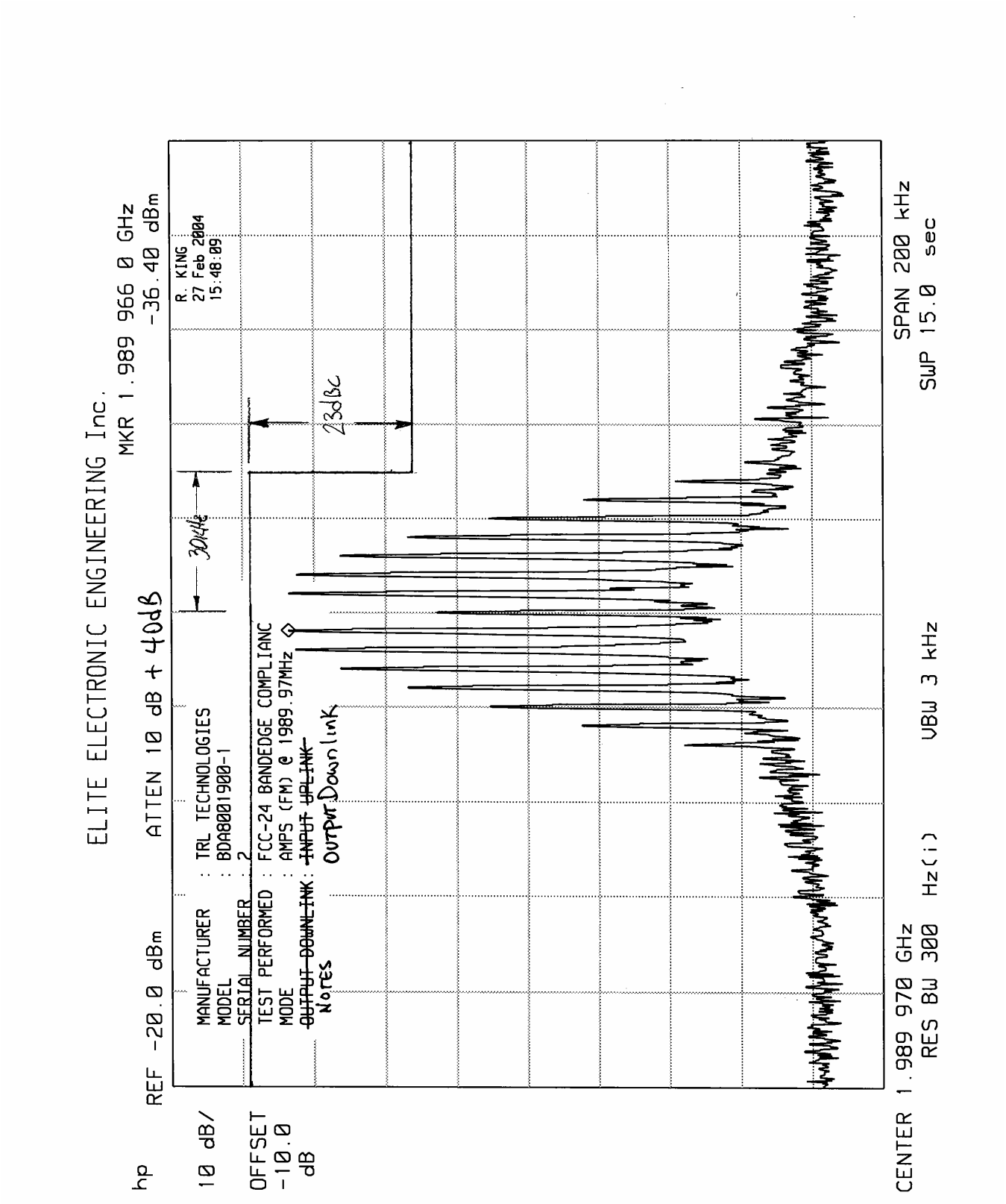

ELITE ELECTRONIC ENGINEERING Inc.
hp
REF -20.0 dBm
ATTEN 10 dB
MKR 1.930 030 4 GHz
-31.10 dBm
10 dB/
OFFSET
-10.0
dB
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED : FCC-24 BANDEDGE COMPLIANC
MODE : AMPS (FM) vs. CW @ 1930.03MHz
NOTES : OUTPUT DOWNLINK
R. KING
27 Feb 2004
16:01:24
CENTER 1.930 030 GHz
RES BW 300 Hz(i)
VBW 3 kHz
SPAN 200 kHz
SWP 15.0 sec

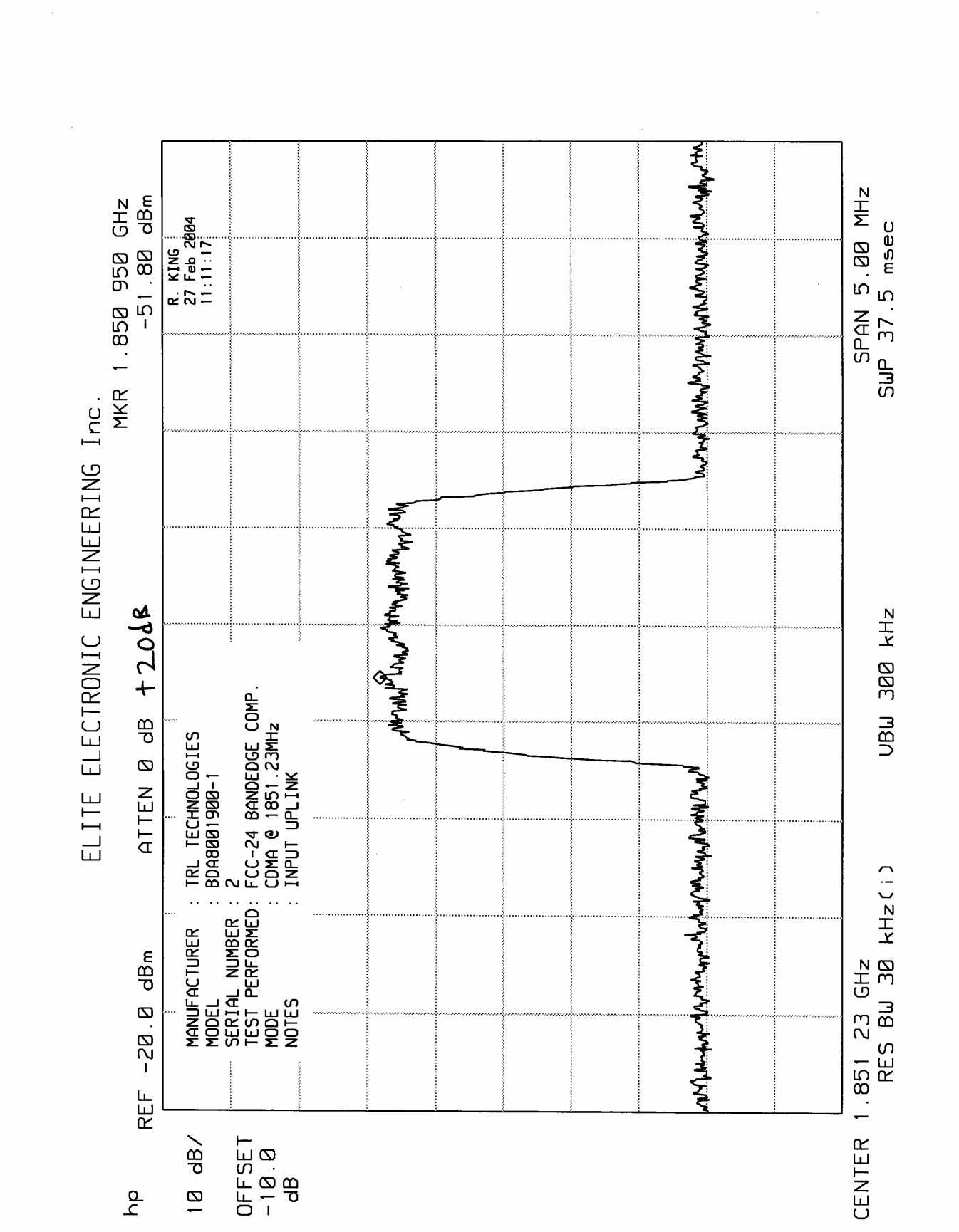

ELITE ELECTRONIC ENGINEERING Inc.
MKR 1.930 025 8 GHz
-50.70 dBm
hp
REF -20.0 dBm
ATTEN 0 dB + 20dB
10 dB/
OFFSET
-10.0
dB
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED : FCC-24 BANDEDGE COMPLIANC
MODE : AMPS (FM) @ 1930.03MHz
NOTES : INPUT DOWNLINK
R. KING
27 Feb 2004
16:04:18
CENTER 1.930 030 GHz
SPAN 200 kHz
RES BW 300 Hz(i)
VBW 3 kHz
SWP 15.0 sec

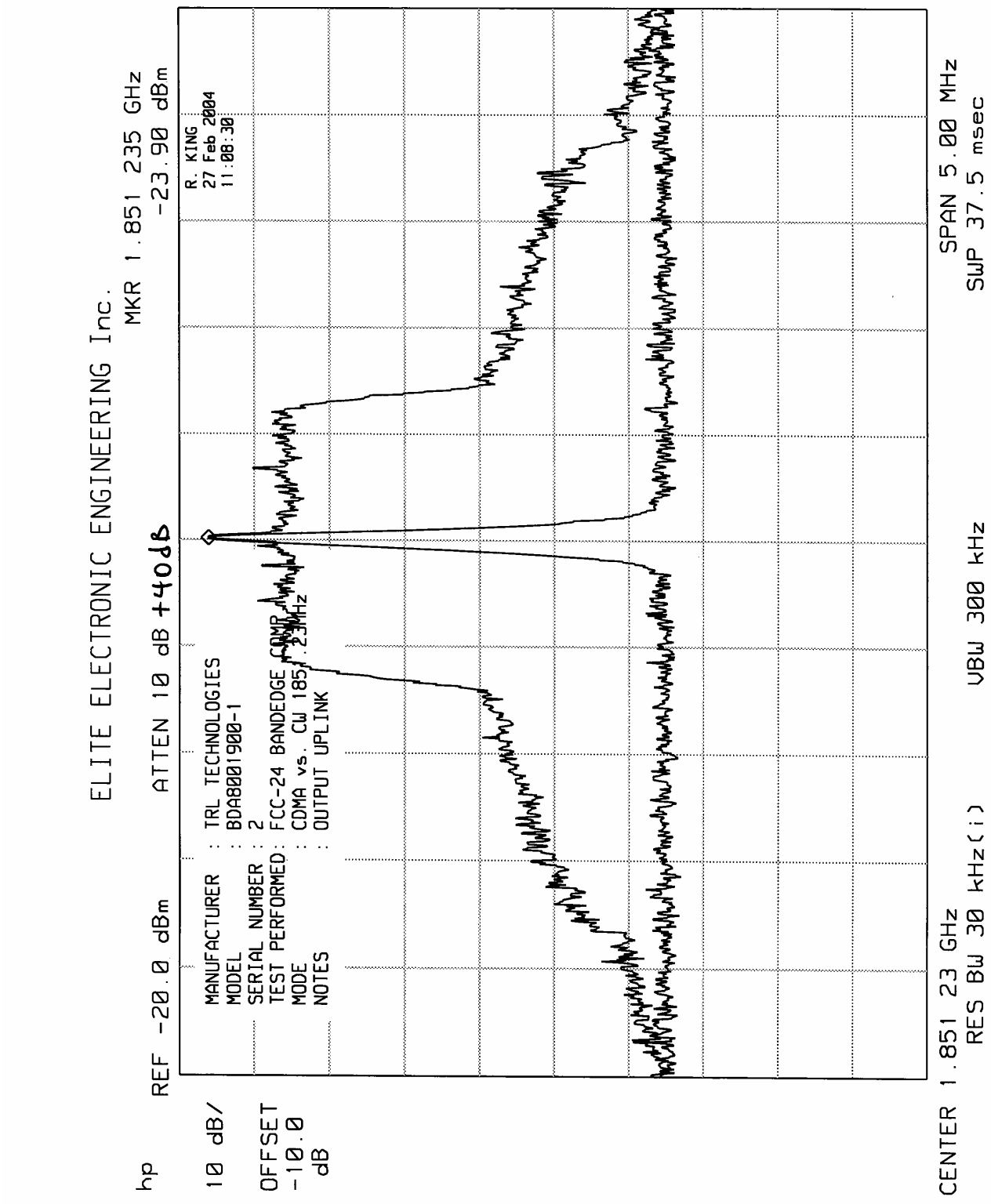

ELITE ELECTRONIC ENGINEERING Inc.
MKR 1.930 026 2 GHz
-36.20 dBm
ATTEN 10 dB+40dB
REF -20.0 dBm
hp
10 dB/
OFFSET
-10.0
dB
R. KING
27 Feb 2004
15:58:47
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED : FCC-24 BANDEDGE COMPLIANC
MODE : AMPS (FM) @ 1930.03MHz
NOTES : OUTPUT DOWNLINK
30kHz
23dBc
CENTER 1.930 030 GHz
RES BW 300 Hz(i)
VBW 3 kHz
SPAN 200 kHz
SWP 15.0 sec

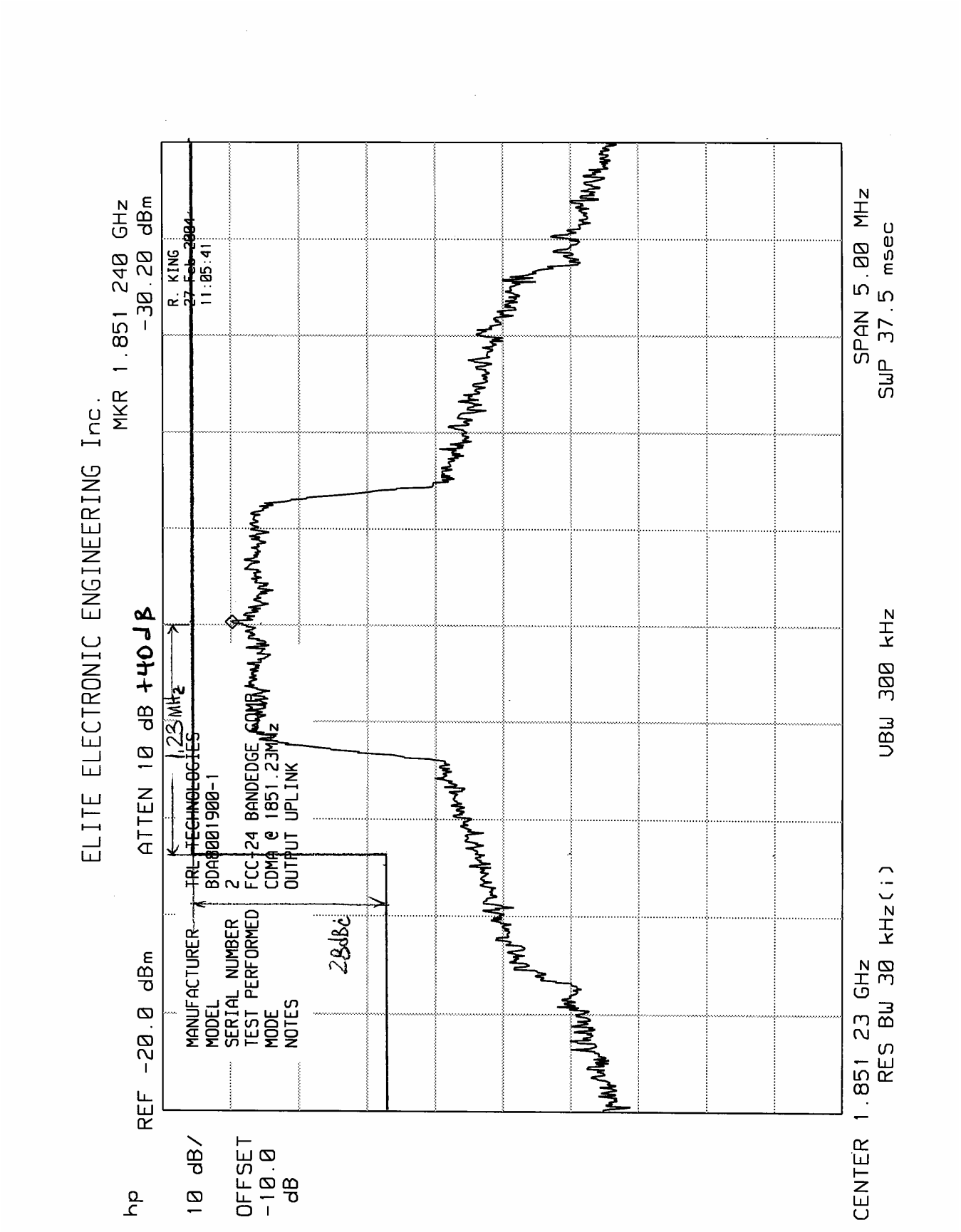

ELITE ELECTRONIC ENGINEERING Inc.
MKR 1.989 973 8 GHz
-51.60 dBm
R. KING
27 Feb 2004
15:54:37
hp
REF -20.0 dBm
ATTEN 0 dB + 20 dB
10 dB/
OFFSET
-10.0
dB
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED : FCC-24 BANDEDGE COMPLIANC
MODE : AMPS (FM) @ 1989.97MHz
NOTES : INPUT DOWNLINK
CENTER 1.989 970 GHz
RES BW 300 Hz(i)
VBW 3 kHz
SPAN 200 kHz
SWP 15.0 sec

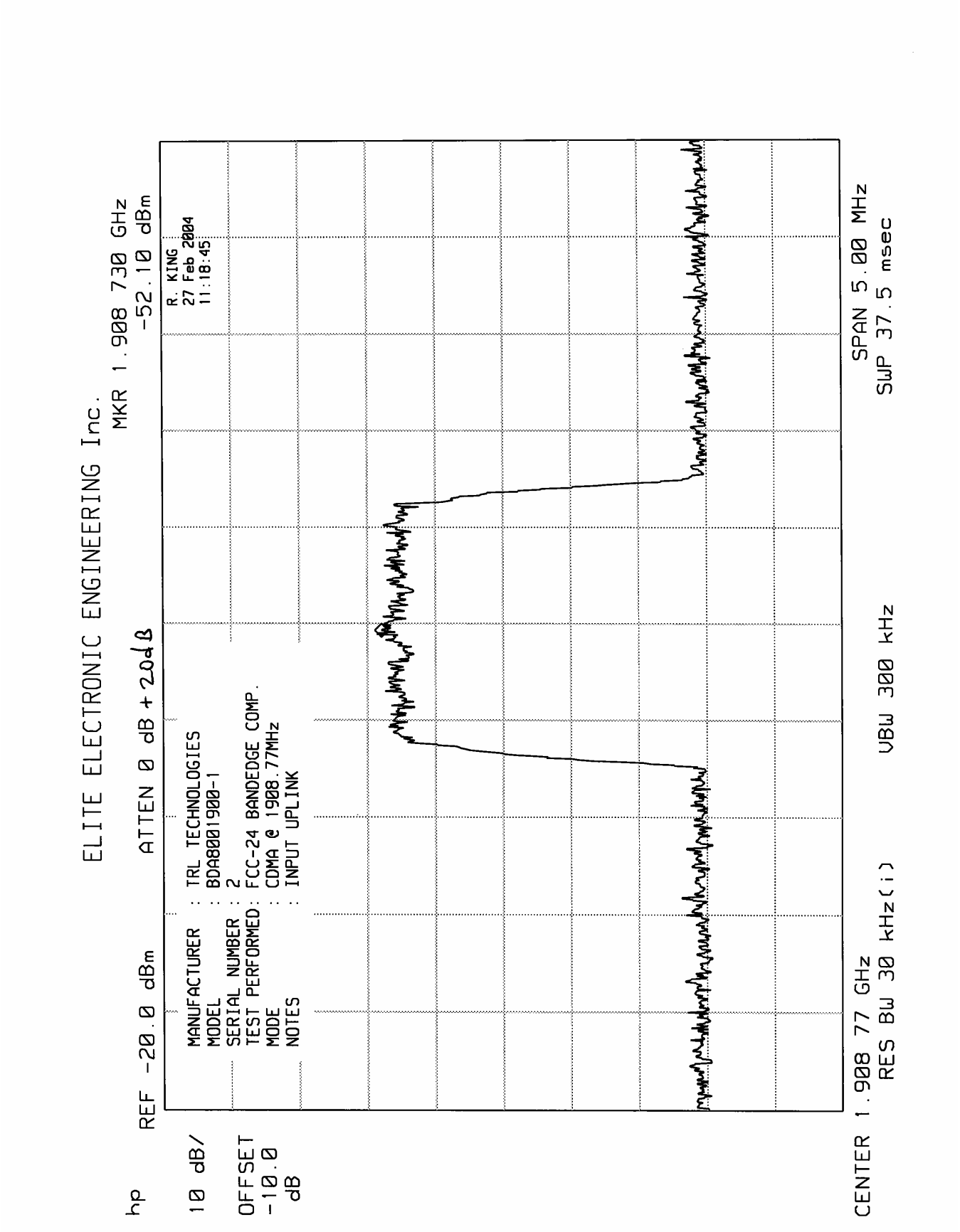

ELITE ELECTRONIC ENGINEERING Inc.
hp
REF -20.0 dBm
ATTEN 10 dB
MKR 1.989 969 8 GHz
-30.80 dBm
10 dB/
OFFSET
-10.0
dB
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED : FCC-24 BANDEDGE COMPLIANC
MODE : AMPS (FM) vs. CW @ 1989.97MHz
OUTPUT DOWNLINK : OUTPUT DOWNLINK
NOTES
R. KING
27 Feb 2004
15:51:20
CENTER 1.989 970 GHz
SPAN 200 kHz
RES BW 300 Hz(i)
VBW 3 kHz
SWP 15.0 sec

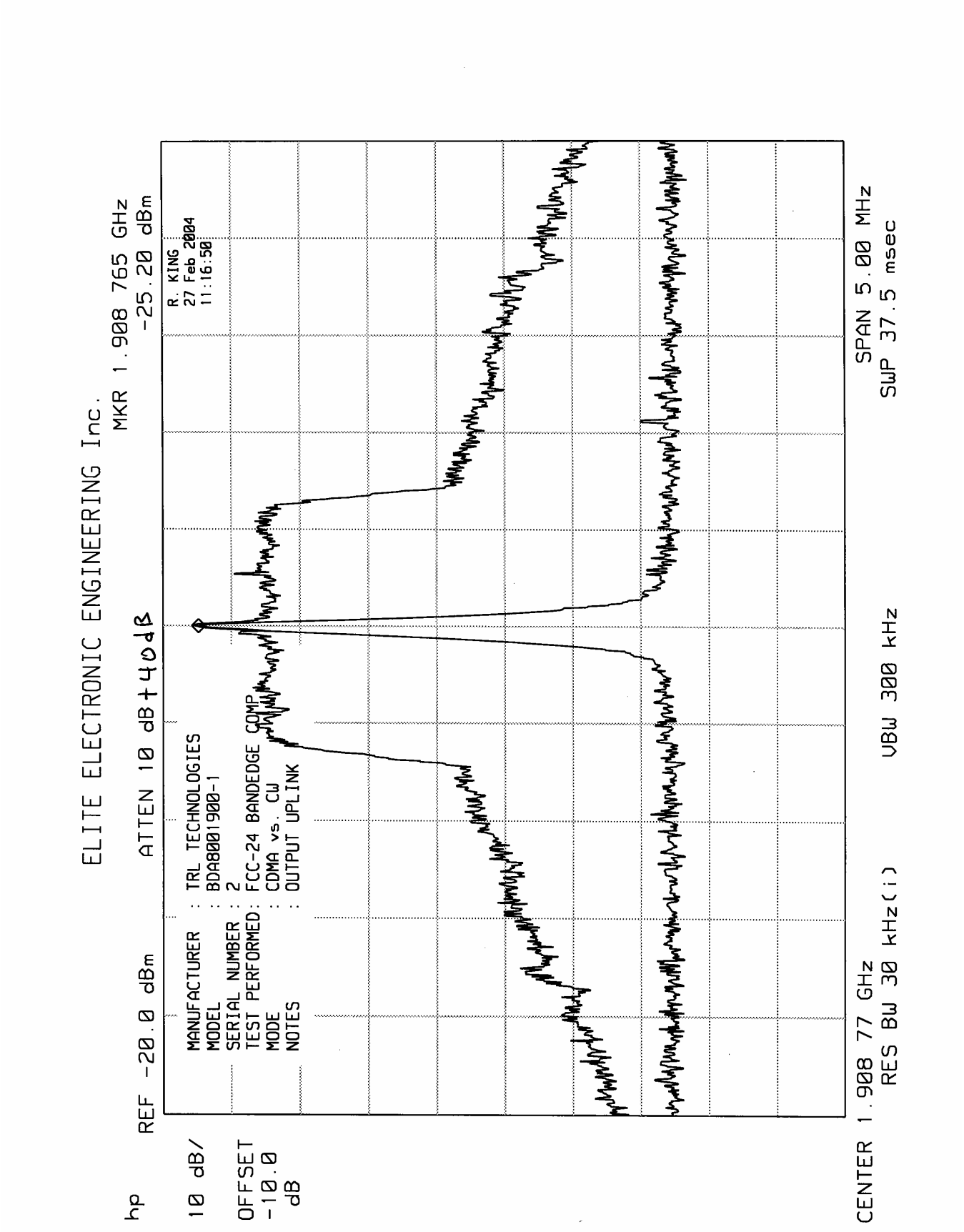

ELITE ELECTRONIC ENGINEERING Inc.
MKR 1.989 966 0 GHz
-36.40 dBm
hp
REF -20.0 dBm
ATTEN 10 dB + 40dB
10 dB/
OFFSET
-10.0
dB
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED : FCC-24 BANDEDGE COMPLIANC
MODE : AMPS (FM) @ 1989.97MHz
~~OUTPUT DOWNLINK~~ ~~INPUT UPLINK~~
Notes
Output Downlink
30kHz
23dBc
R. KING
27 Feb 2004
15:48:09
CENTER 1.989 970 GHz
RES BW 300 Hz(i)
VBW 3 kHz
SPAN 200 kHz
SWP 15.0 sec

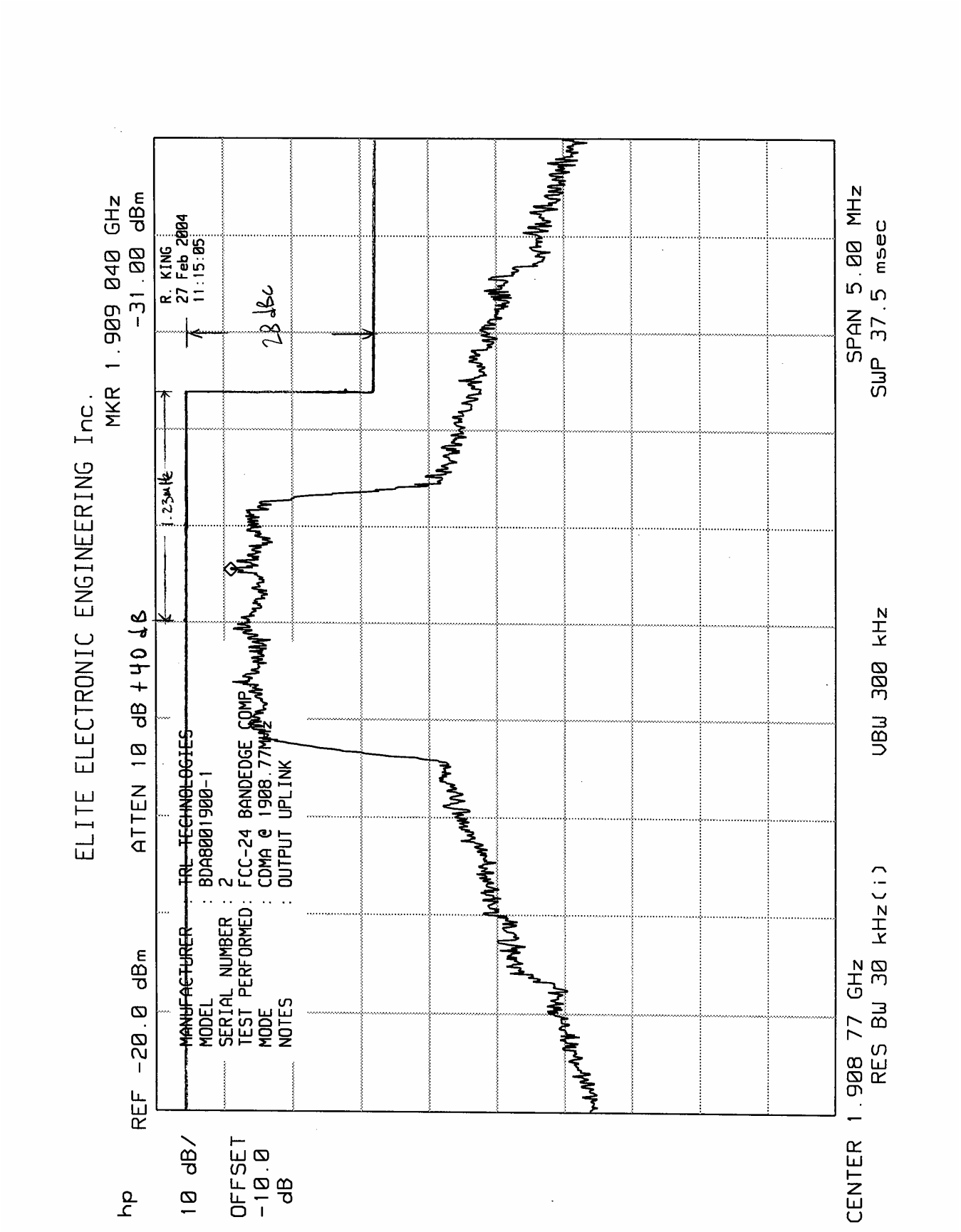

ELITE ELECTRONIC ENGINEERING Inc.
hp
REF -20.0 dBm
ATTEN 0 dB +20dB
MKR 1.850 950 GHz
-51.80 dBm
10 dB/
OFFSET
-10.0
dB
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED : FCC-24 BANDEDGE COMP.
MODE : CDMA @ 1851.23MHz
NOTES : INPUT UPLINK
R. KING
27 Feb 2004
11:11:17
CENTER 1.851 23 GHz
RES BW 30 kHz(i)
VBW 300 kHz
SPAN 5.00 MHz
SWP 37.5 msec

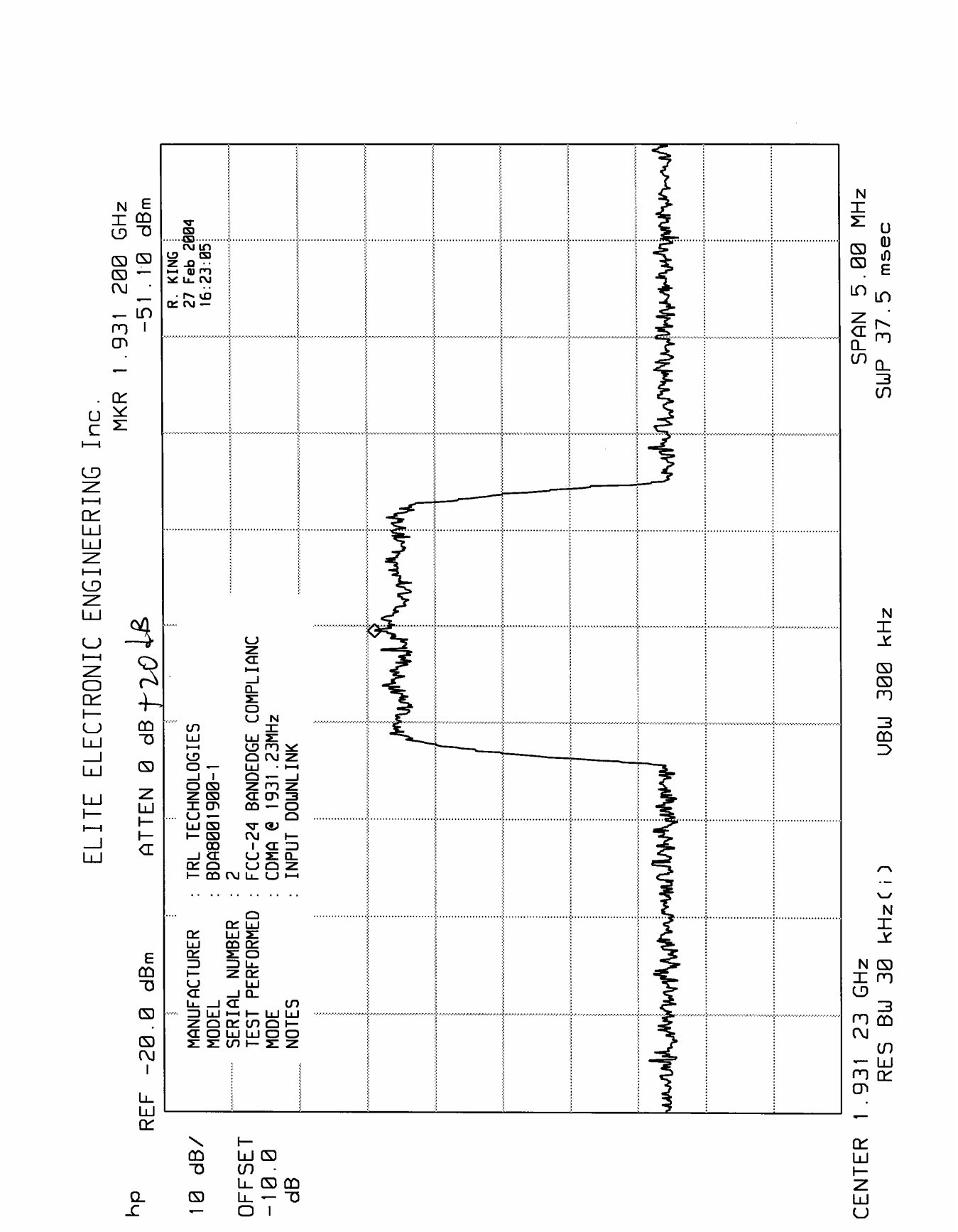

ELITE ELECTRONIC ENGINEERING Inc.
MKR 1.851 235 GHz
-23.90 dBm
hp
REF -20.0 dBm
ATTEN 10 dB +40dB
10 dB/
OFFSET
-10.0
dB
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED : FCC-24 BANDEDGE CDMA
MODE : CDMA vs. CW 185
NOTES : OUTPUT UPLINK
R. KING
27 Feb 2004
11:08:30
CENTER 1.851 23 GHz
RES BW 30 kHz(i)
VBW 300 kHz
SPAN 5.00 MHz
SWP 37.5 msec

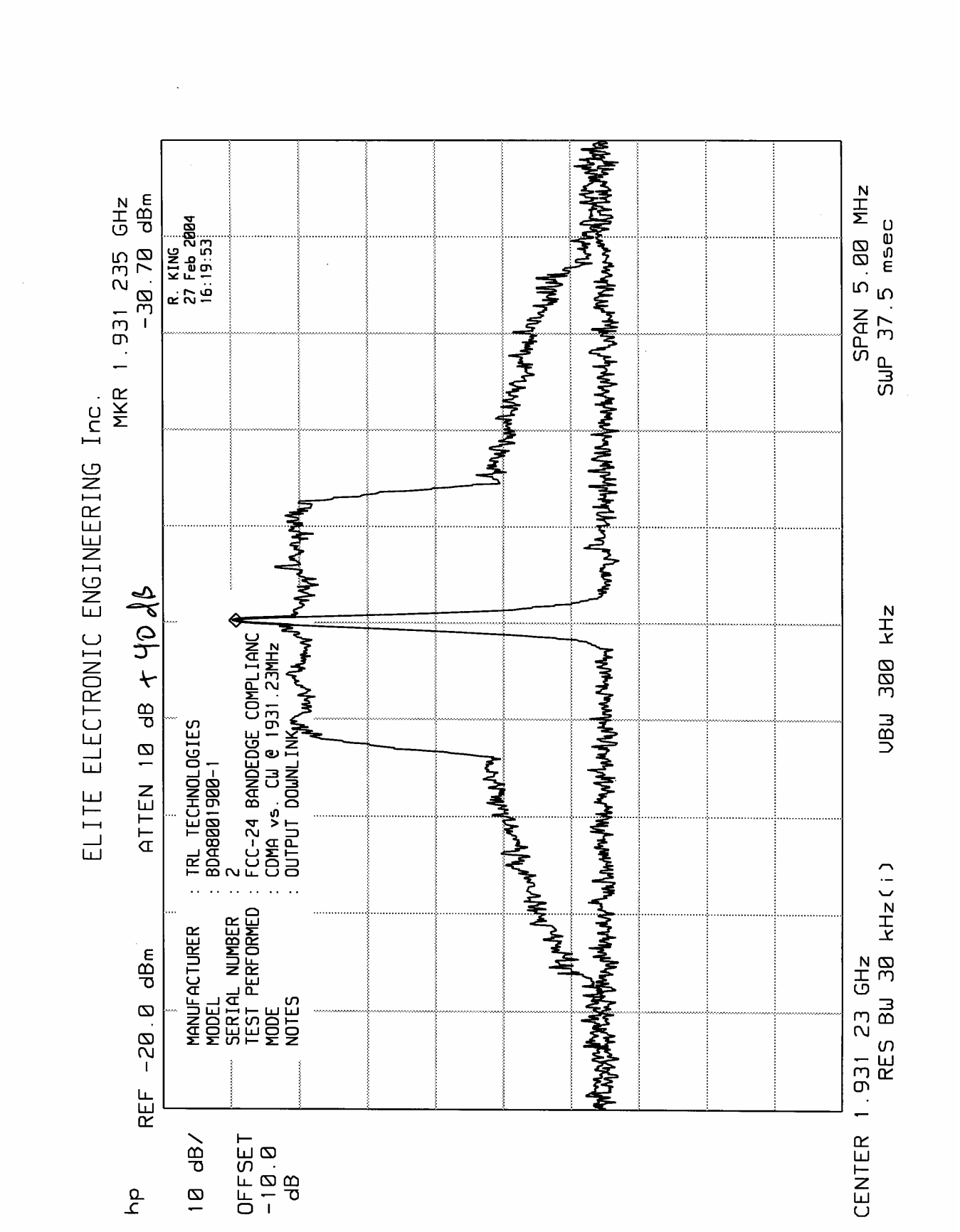

ELITE ELECTRONIC ENGINEERING Inc.
MKR 1.851 240 GHz
-30.20 dBm
R. KING
27 Feb 2004
11:05:41
hp
REF -20.0 dBm
ATTEN 10 dB +40dB
10 dB/
OFFSET
-10.0
dB
MANUFACTURER TRL TECHNOLOGIES
MODEL BDA0001900-1
SERIAL NUMBER 2
TEST PERFORMED FCC-24 BANDEDGE COMB
MODE CDMA @ 1851.23MHz
NOTES OUTPUT UPLINK
1.23MHz
28dBc
CENTER 1.851 23 GHz
RES BW 30 kHz(i)
VBW 300 kHz
SPAN 5.00 MHz
SWP 37.5 msec

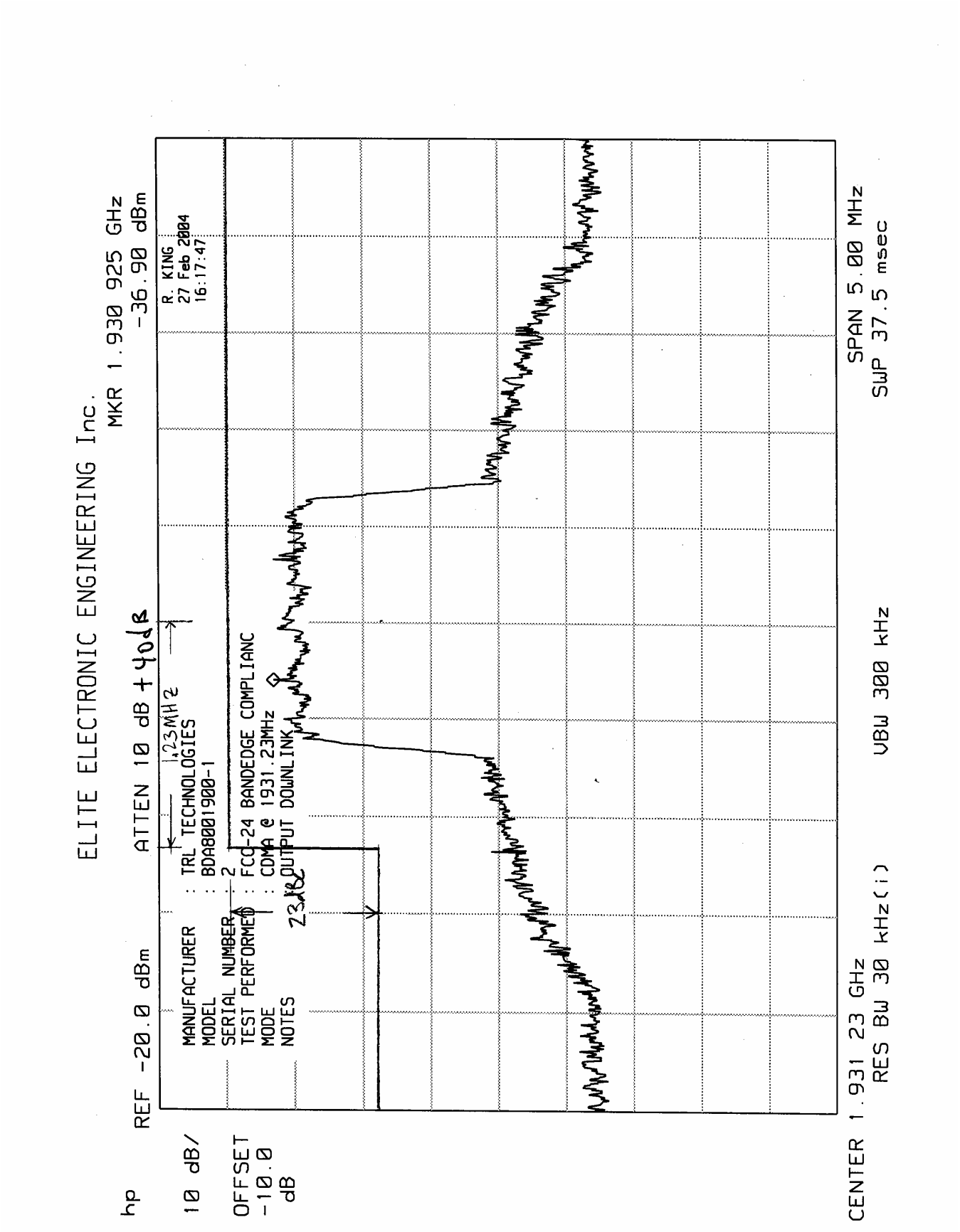

ELITE ELECTRONIC ENGINEERING Inc.
MKR 1.908 730 GHz
-52.10 dBm
R. KING
27 Feb 2004
11:18:45
hp
REF -20.0 dBm
ATTEN 0 dB + 20dB
10 dB/
OFFSET
-10.0
dB
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED : FCC-24 BANDEDGE COMP.
MODE : CDMA @ 1908.77MHz
NOTES : INPUT UPLINK
CENTER 1.908 77 GHz
RES BW 30 kHz(i)
VBW 300 kHz
SPAN 5.00 MHz
SWP 37.5 msec

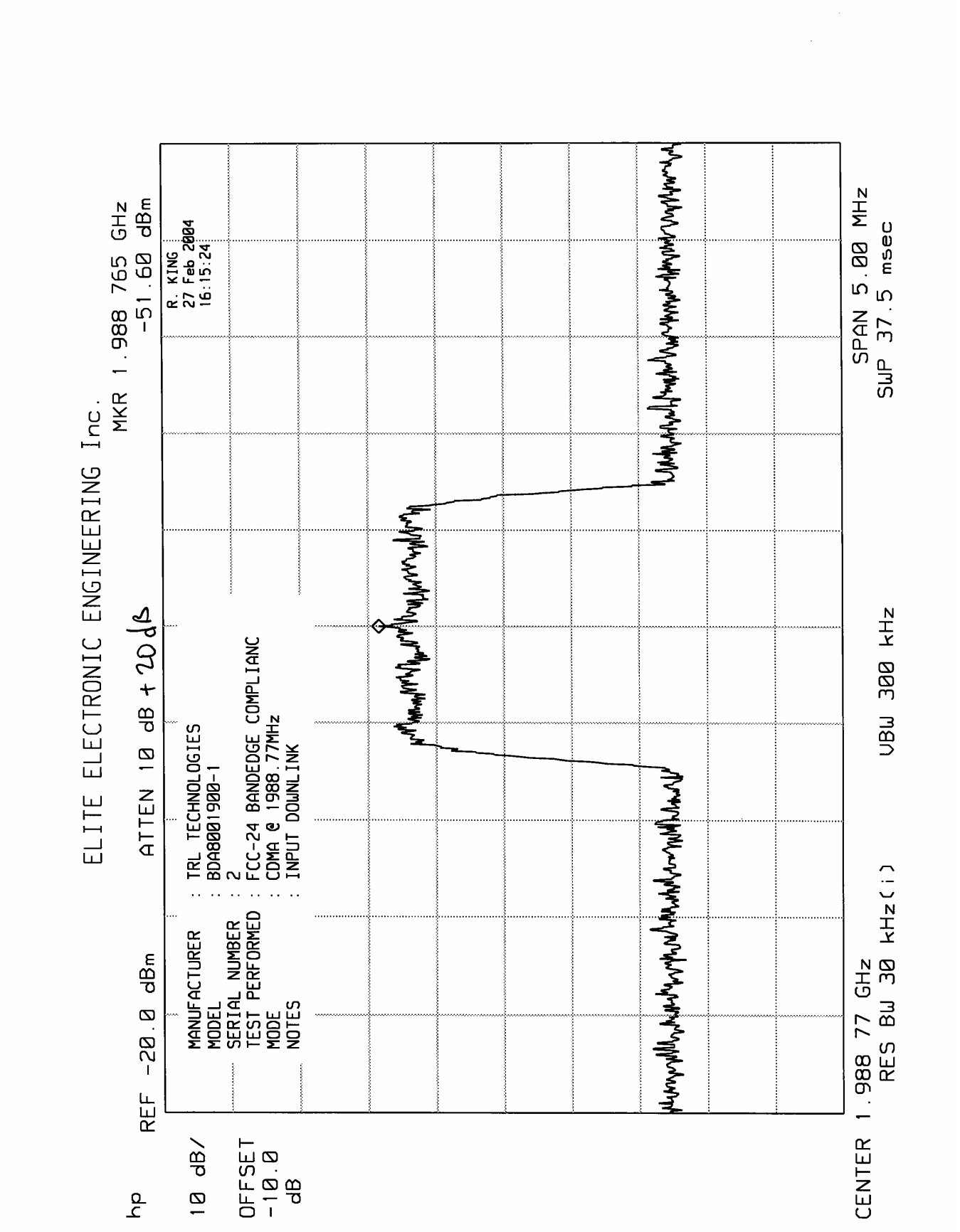

ELITE ELECTRONIC ENGINEERING Inc.
MKR 1.908 765 GHz
-25.20 dBm
R. KING
27 Feb 2004
11:16:50
hp
REF -20.0 dBm
ATTEN 10 dB
+40dB
10 dB/
OFFSET
-10.0
dB
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED : FCC-24 BANDEDGE COMP
MODE : CDMA vs. CW
NOTES : OUTPUT UPLINK
CENTER 1.908 77 GHz
RES BW 30 kHz(i)
VBW 300 kHz
SPAN 5.00 MHz
SWP 37.5 msec


ELITE ELECTRONIC ENGINEERING Inc.
hp
REF -20.0 dBm
ATTEN 10 dB
+40 dB
MKR 1.909 040 GHz
-31.00 dBm
R. KING
27 Feb 2004
11:15:05
1.23mHz
28 dBc
10 dB/
OFFSET
-10.0
dB
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA001900-1
SERIAL NUMBER : 2
TEST PERFORMED: FCC-24 BANDEDGE COMP
MODE : CDMA @ 1908.77MHz
NOTES : OUTPUT UPLINK
CENTER 1.908 77 GHz
RES BW 30 kHz(i)
VBW 300 kHz
SPAN 5.00 MHz
SWP 37.5 msec


ELITE ELECTRONIC ENGINEERING Inc.
MKR 1.931 200 GHz
-51.10 dBm
hp
REF -20.0 dBm
ATTEN 0 dB +20 dB
10 dB/
OFFSET
-10.0
dB
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED : FCC-24 BANDEDGE COMPLIANC
MODE : CDMA @ 1931.23MHz
NOTES : INPUT DOWNLINK
R. KING
27 Feb 2004
16:23:05
CENTER 1.931 23 GHz
SPAN 5.00 MHz
RES BW 30 kHz(i)
VBW 300 kHz
SWP 37.5 msec


ELITE ELECTRONIC ENGINEERING Inc.
hp
REF -20.0 dBm
ATTEN 10 dB
MKR 1.931 235 GHz
-30.70 dBm
10 dB/
OFFSET
-10.0
dB
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED : FCC-24 BANDEDGE COMPLIANC
MODE : CDMA vs. CW @ 1931.23MHz
NOTES : OUTPUT DOWNLINK
R. KING
27 Feb 2004
16:19:53
CENTER 1.931 23 GHz
RES BW 30 kHz(i)
VBW 300 kHz
SPAN 5.00 MHz
SWP 37.5 msec


ELITE ELECTRONIC ENGINEERING Inc.
hp
REF -20.0 dBm
ATTEN 10 dB
MKR 1.930 925 GHz
-36.90 dBm
10 dB/
OFFSET
-10.0
dB
1.23MHz
+40dB
23dB
R. KING
27 Feb 2004
16:17:47
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA01900-1
SERIAL NUMBER : 2
TEST PERFORMED : FCC-24 BANDEDGE COMPLIANC
MODE : CDMA @ 1931.23MHz
NOTES : OUTPUT DOWNLINK
CENTER 1.931 23 GHz
RES BW 30 kHz(i)
VBW 300 kHz
SPAN 5.00 MHz
SWP 37.5 msec


ELITE ELECTRONIC ENGINEERING Inc.
hp
REF -20.0 dBm
ATTEN 10 dB + 20 dB
MKR 1.988 765 GHz
-51.60 dBm
10 dB/
OFFSET
-10.0
dB
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED : FCC-24 BANDEDGE COMPLIANC
MODE : CDMA @ 1988.77MHz
NOTES : INPUT DOWNLINK
R. KING
27 Feb 2004
16:15:24
CENTER 1.988 77 GHz
RES BW 30 kHz(i)
VBW 300 kHz
SPAN 5.00 MHz
SWP 37.5 msec