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

For : TRL Technologies
Elgin, IL

P.O. No. : 780-0000001828
Date Received : March 1st., 2004
Date Tested : March 1st. through March 8th., 2004
Test Personnel : Richard E. King EMC Engineer
Specification : FCC "Code of Federal Regulations" Title 47 Part 22

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

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

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 25th. through March 3rd., 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 a single channel Mobile Repeater that operates in the 800MHz Cellular bands, 835MHz to 849MHz and 869MHz to 894MHz. The test item has a rated gain of 50dB.

1.2 PURPOSE: The test series was performed to determine if the test item meets the technical requirements of the FCC Part 22 for 800MHz 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 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 four 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 all tests, one test frequency was used for each frequency band. For the uplink frequency band all tests were performed at 836.5MHz. For the downlink frequency band all tests were performed at 881.5MHz.

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

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

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	15	0.032	0.032
CDMA	15	15	0.032	0.032
GSM	15	15	0.032	0.032
TDMA	15	15	0.032	0.032

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 configured to measure the output for the uplink path.

(a) The input signal was set to 836.5MHz.
(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.
(f) The test item was configured for the downlink path. The input signal was set to 881.5MHz. and steps (b) through (e) were repeated.

4.1.3 RESULTS: The output power measurements are presented on data page 12. The power outputs achieved for the downlink path and the uplink path were 0.032 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 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 EIRP requirement cannot be directly applied to the test item.

4.2 OCCUPIED BANDWIDTH MEASUREMENTS:

4.2.1 REQUIREMENTS: For AMPS and TDMA modulations, in accordance with

paragraph 22.917(d), the mean power of any emission shall be attenuated below the unmodulated carrier power (P) in accordance with the following schedule:

(1) On any frequency removed from the carrier frequency by more than 20 kHz but not more than 45kHz: at least 26 dB.
(2) On any frequency removed from the carrier frequency by more than 45 kHz but not more than 90kHz: at least 45 dB.
(3) On any frequency removed from the carrier frequency by more than 90 kHz; up to the first multiple of the carrier frequency: at least 60 dB or 43 + 10 log P dB, whichever is the lesser attenuation.

For CDMA modulation, in accordance with paragraph 10.5.1.3 of the TIA/EIA/IS-98-A specification, the mean power of any emission shall be attenuated below the unmodulated carrier power (P) in accordance with the following schedule:

(1) For offset frequencies greater than 900kHz from the CDMA Channel center frequency: At least 42dB
(2) For offset frequencies greater than 1.98MHz from the CDMA Channel center frequency: At least 54dB

For GSM modulation, there is not an emissions specification. To determine compliance the output signal must represent the input signal.

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

(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 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 836.5MHz.
(f) The modulation was changed to GSM and steps (c) and (d) were repeated separately with the input signal set to 836.5MHz. 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 836.5MHz. The bandwidth of the spectrum analyzer was set to 300Hz.
(f) The input signal was set to 881.5MHz. and steps (a) through (g) were repeated.

4.2.3 RESULTS: The plots of the occupied bandwidth measured with the AMPS, CDMA, GSM and TDMA modulation of the carrier are presented on data pages 13 through 36.

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 22.917(e), on any frequency twice or more than twice the fundamental frequency, the spurious emissions 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, CDMA, GSM, TDMA).

(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 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 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.
(g) The modulation was changed to CDMA and steps (c) through (e) were repeated separately with the input signal set to 836.5MHz.
(h) The modulation was changed to GSM and steps (c) through (e) were repeated separately with the input signal set to 836.5MHz.
(i) The modulation was changed to TDMA and steps (c) through (e) were repeated separately with the input signal set to 836.5MHz.
(j) The input signal was set to 881.5MHz. The input signal level was adjusted to provide the rated level at the test item output. Steps (b) through (i) were repeated.

4.3.3 RESULTS: The plots of the antenna conducted output measurements are presented on data pages 37 through 60. 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 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

4.4.2 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 2.2 (AMPS, CDMA, GSM, TDMA).

(a) The preliminary measurements were performed with the test item operating with an input signal (uplink) at 836.5MHz, with AMPS 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.

(b) The modulation was changed to CDMA and step (a) was repeated separately with the input signal (uplink) set to 836.5MHz.

(c) The modulation was changed to GSM and step (a) was repeated separately with the input signal (uplink) set to 836.5MHz.

(d) The modulation was changed to TDMA and step (a) was repeated separately with the input signal (uplink) set to 836.5MHz.

(e) Steps (a) through (d) were repeated separately with the input signal (downlink) set to 881.5MHz.

4.4.3 RESULTS: The preliminary plots are presented on data pages 61 through 76. 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. Final radiated emissions data are presented on data pages 77 through 84.

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 22.

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

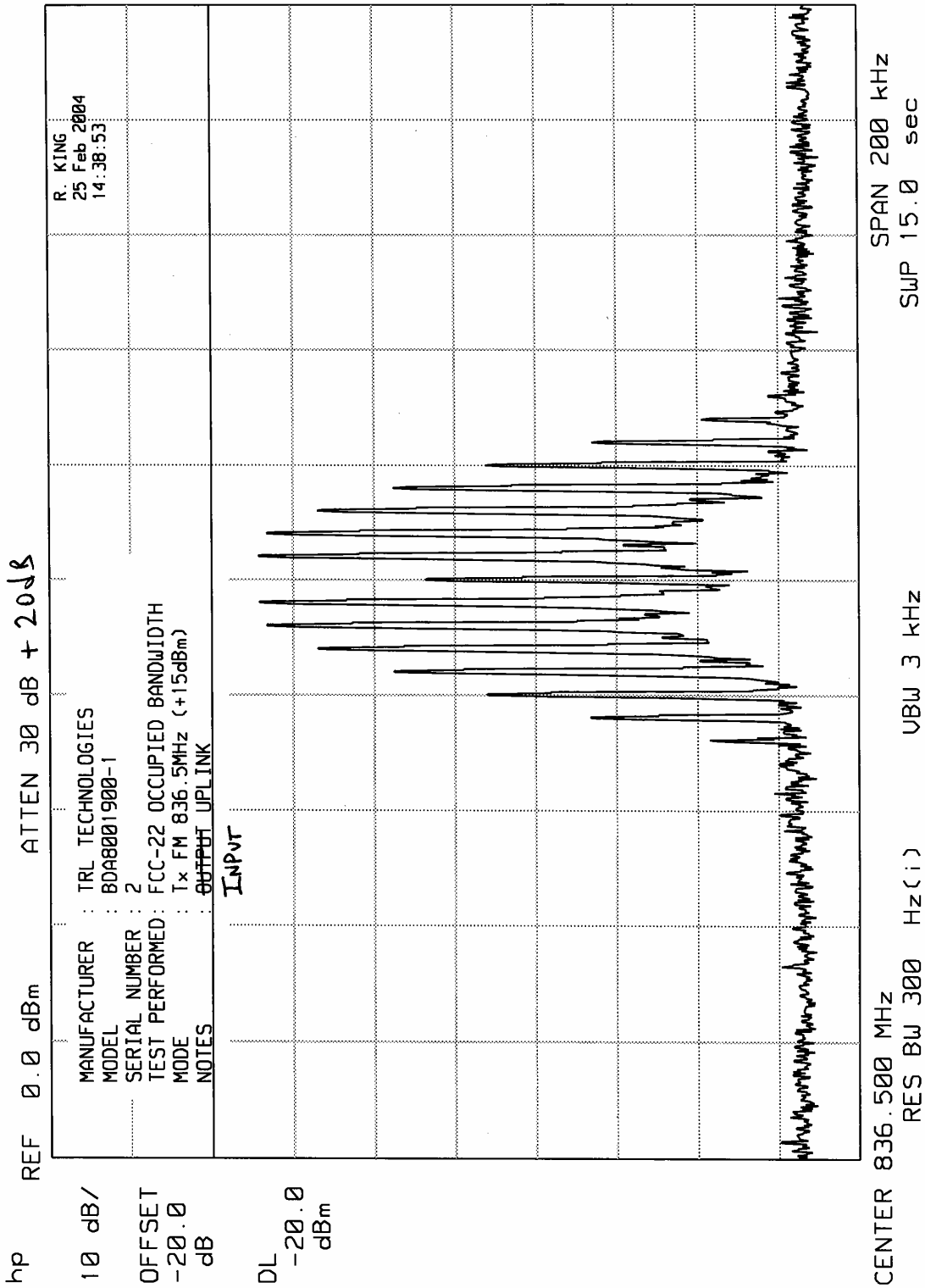
Eq ID	Equipment Description	Manufacturer	Model No.	Serial No.	Frequency Range	Cal Date	Cal Inv	Due Date
Equipment Type: ACCESSORIES, MISCELLANEOUS								
XLJA	5W, 50 OHM TERMINATION	JFW INDUSTRIES	50T-052	11	DC-2GHZ	05/27/03	12	05/27/04
XZG3	ATTENUATOR/SWITCH DRIVER	HEWLETT PACKARD	11713A	2421A03059	---		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	

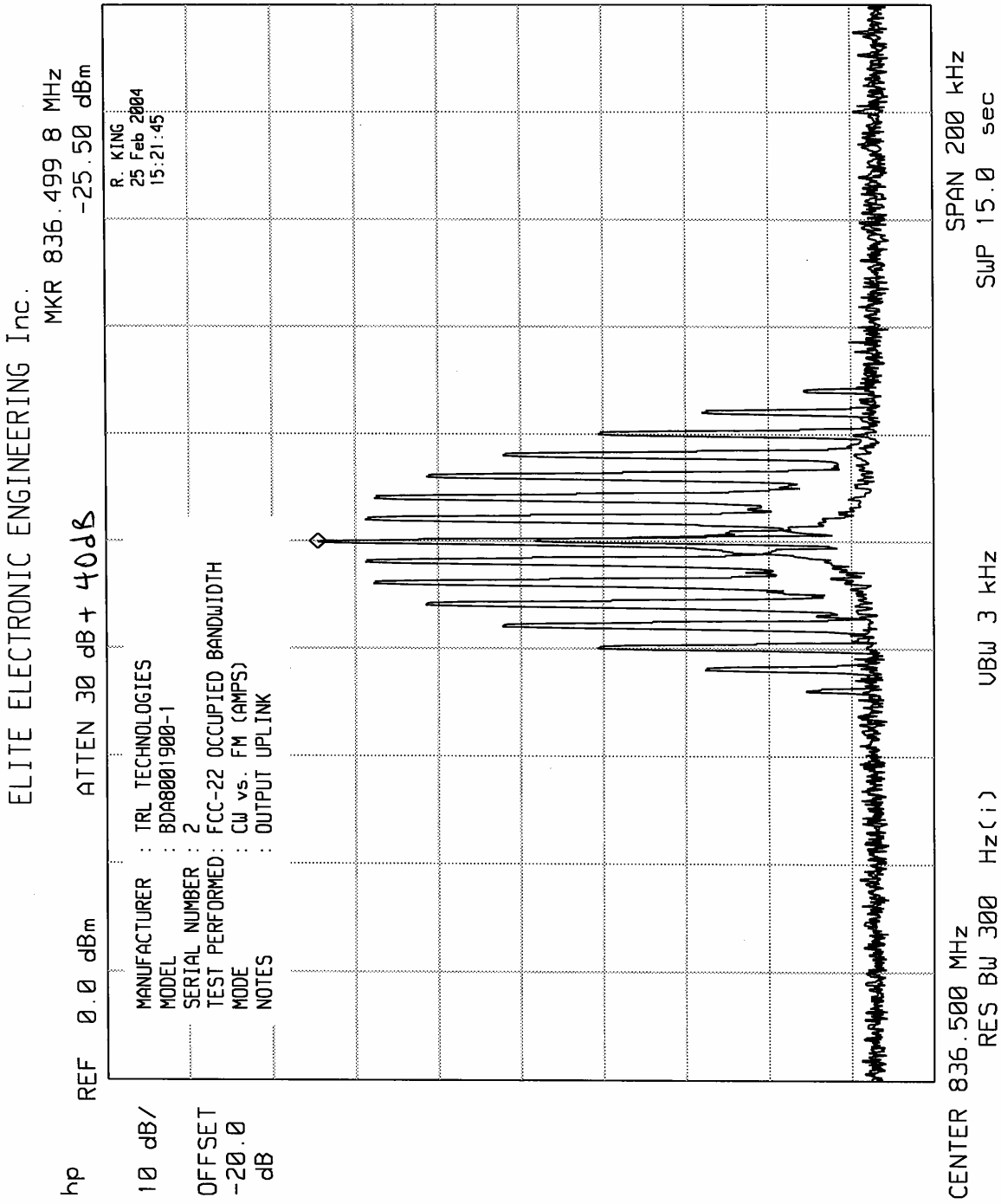
Cal. Interval: Listed in Months I/O: Initial Only N/A: Not Applicable
Note 1: For the purpose of this test, the equipment was calibrated over the specified frequency range, pulse rate, or modulation prior to the test or monitored by a calibrated instrument.

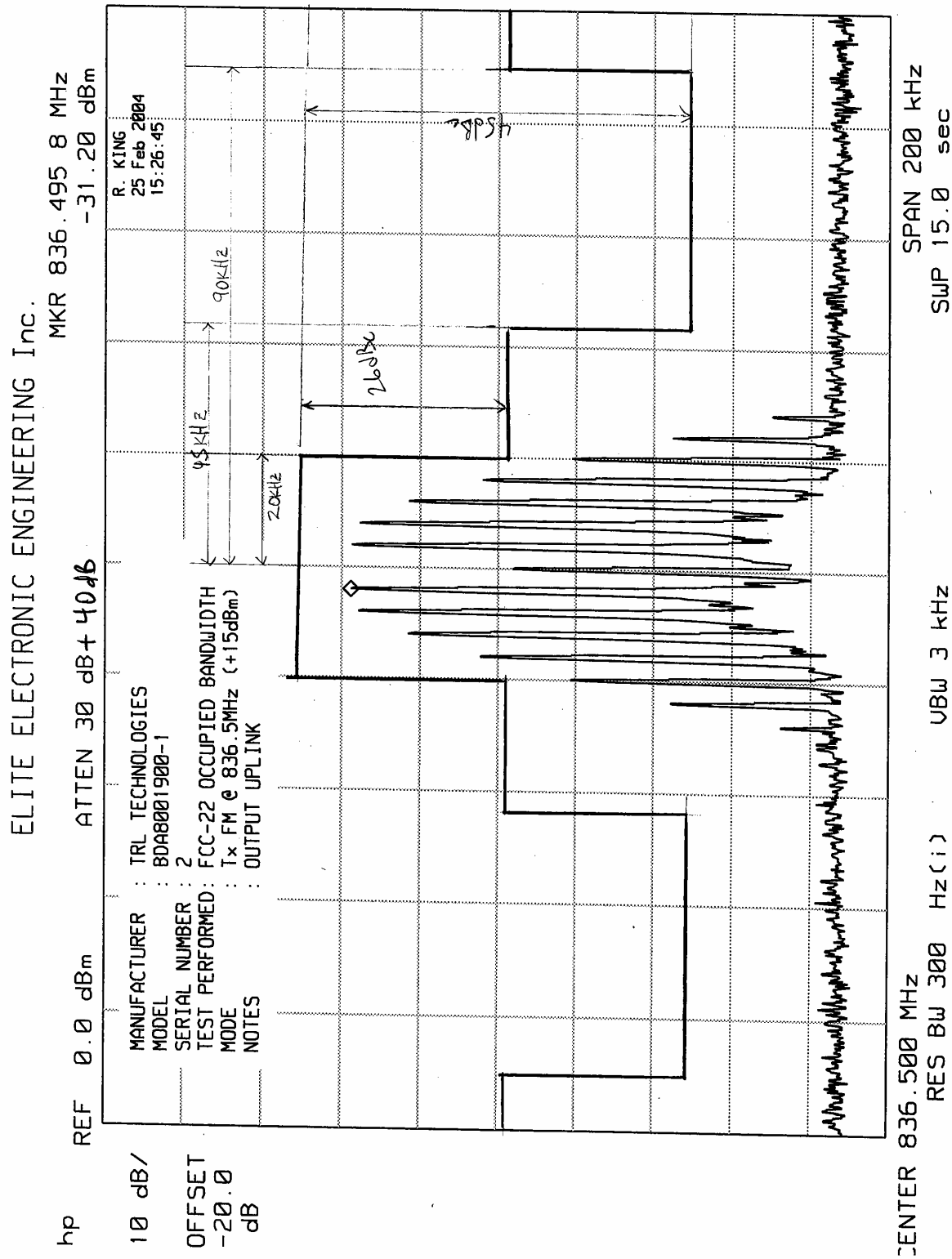
MANUFACTURER : TRL Technologies Inc.
MODEL : BDA8001900-1
S/N : 2
SPECIFICATION : FCC- 22 RF Power Output
DATE : February 25, 2004
NOTES : All modulations
:

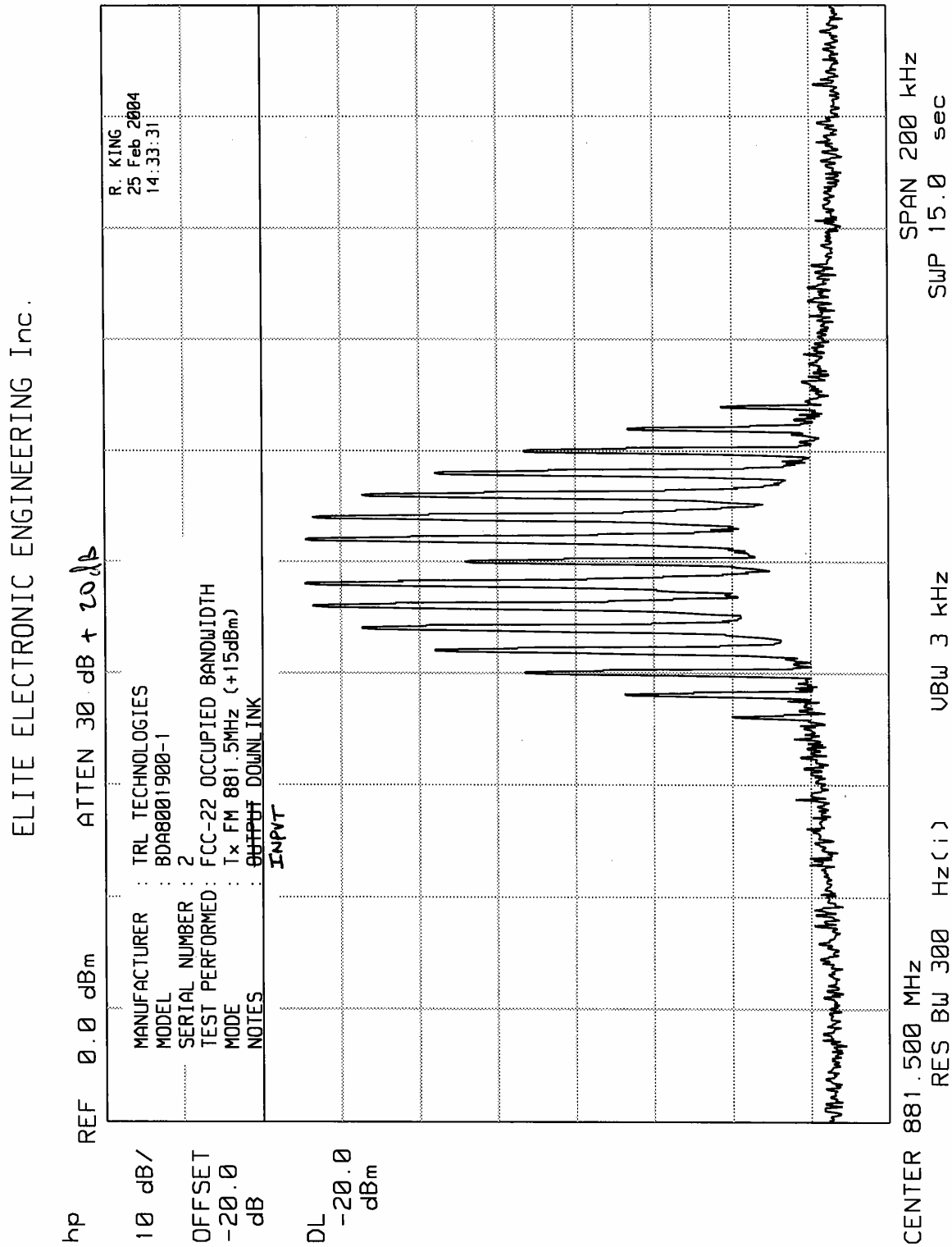
Frequency MHz	Modulation	Rated Power dBm	Rated Power Watts
836.5	AMPS	15	0.032
836.5	CDMA	15	0.032
836.5	GSM	15	0.032
836.5	TDMA	15	0.032
881.5	AMPS	15	0.032
881.5	CDMA	15	0.032
881.5	GSM	15	0.032
881.5	TDMA	15	0.032

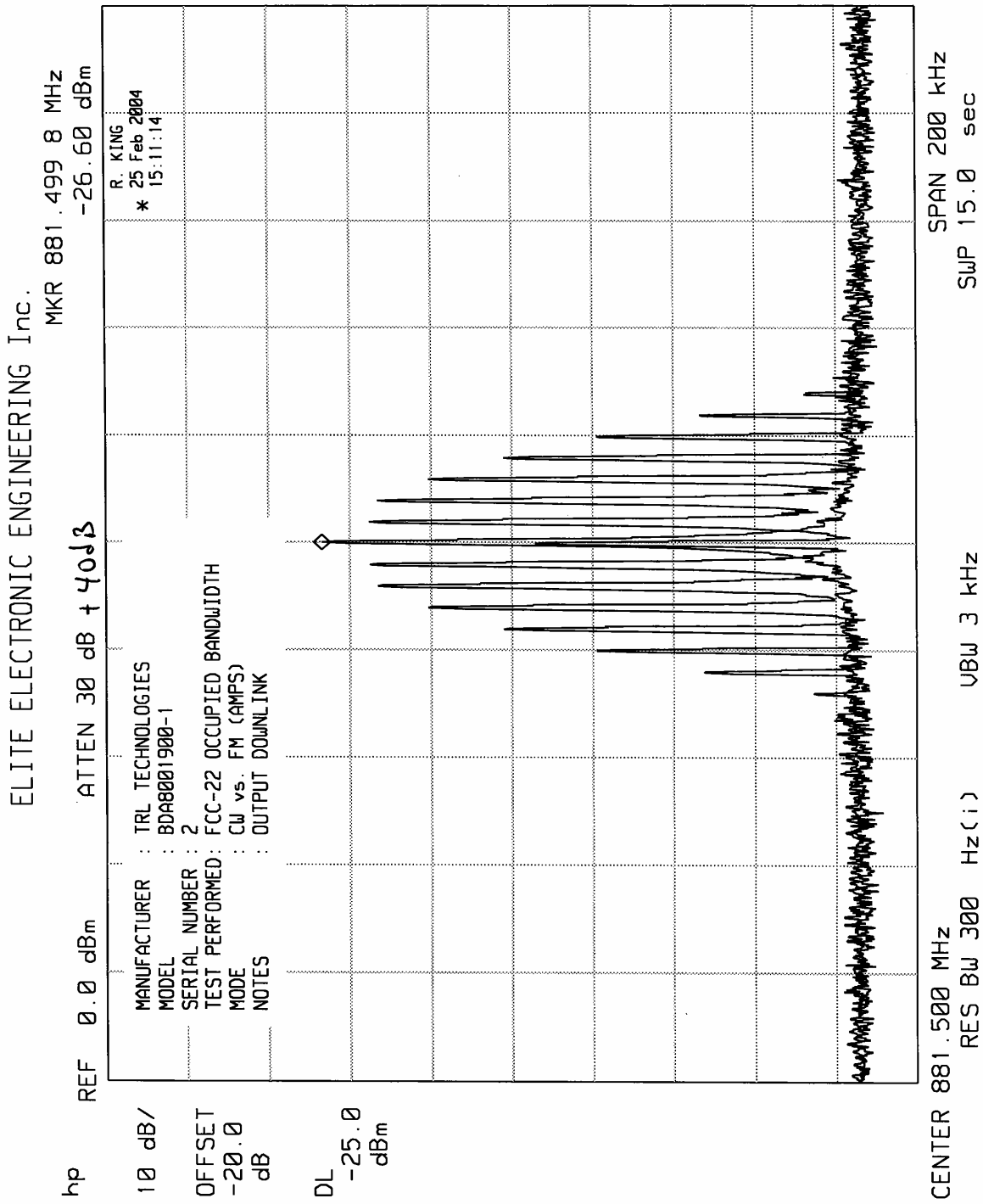
CHECKED BY: Richard E. King
Richard E. King

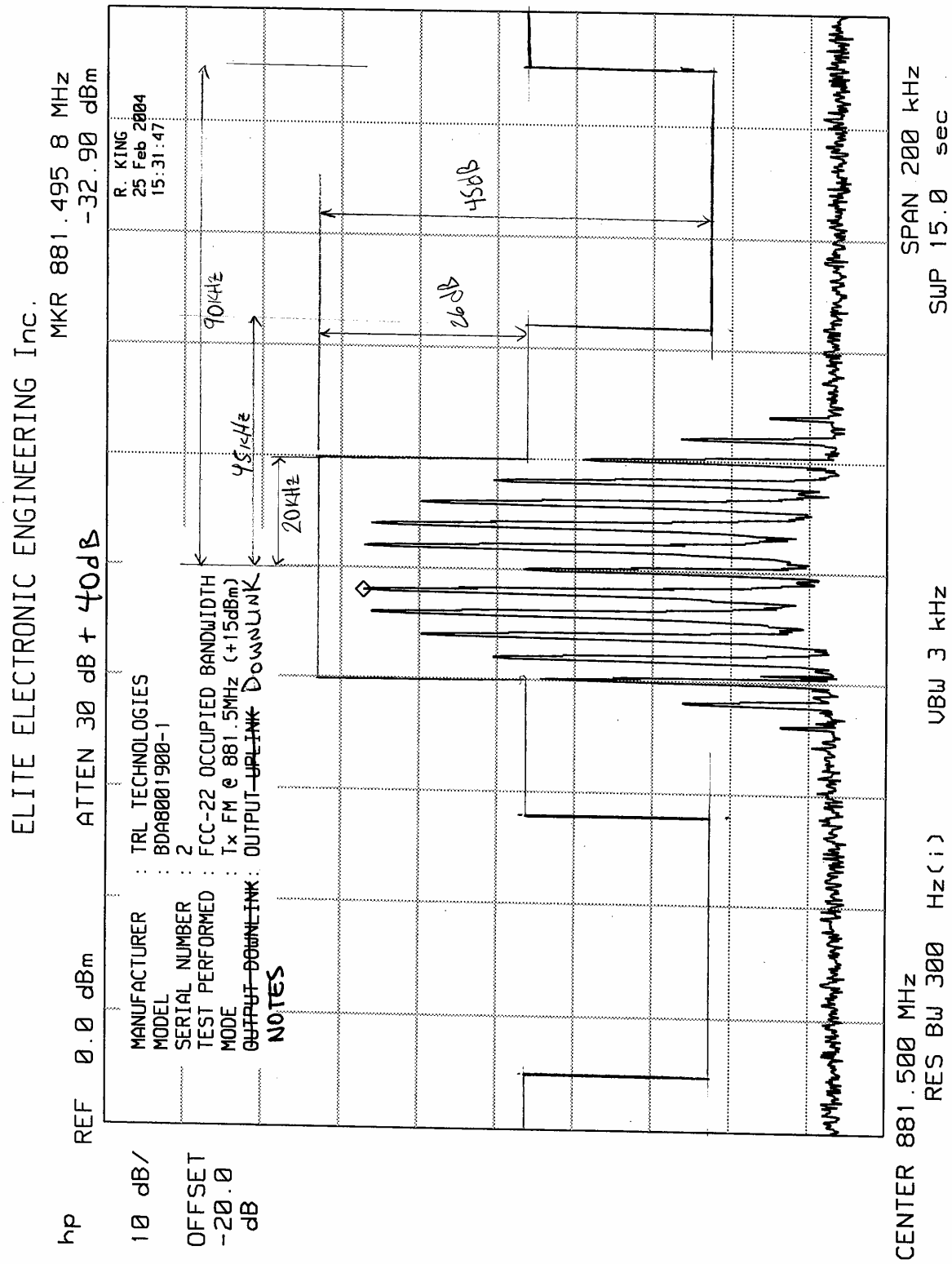

hp
ELITE ELECTRONIC ENGINEERING Inc.
REF 0.0 dBm
ATTEN 30 dB + 20dB
10 dB/
OFFSET
-20.0
dB
DL
-20.0
dBm
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED: FCC-22 OCCUPIED BANDWIDTH
MODE : Tx FM 836.5MHz (+15dBm)
NOTES : ~~OUTPUT~~ UPLINK
INPUT
R. KING
25 Feb 2004
14:38:53
CENTER 836.500 MHz
RES BW 300 Hz(i)
VBW 3 kHz
SWP 15.0 sec
SPAN 200 kHz

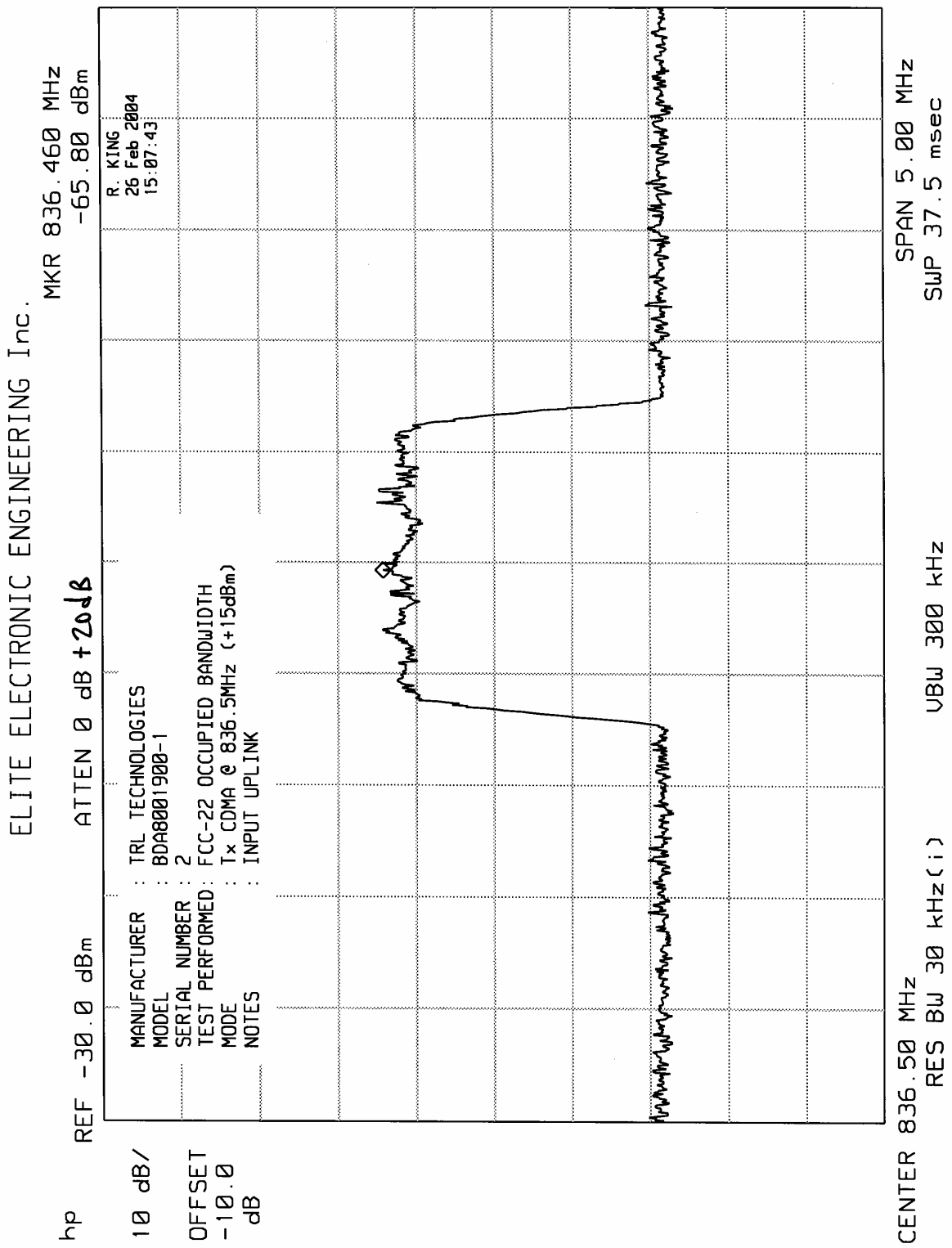

hp
10 dB/
OFFSET
-20.0
dB
REF 0.0 dBm
ATTEN 30 dB + 40dB
ELITE ELECTRONIC ENGINEERING Inc.
MKR 836.499 8 MHz
-25.50 dBm
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA0001900-1
SERIAL NUMBER : 2
TEST PERFORMED: FCC-22 OCCUPIED BANDWIDTH
MODE : CW vs. FM (AMPS)
NOTES : OUTPUT UPLINK
R. KING
25 Feb 2004
15:21:45
CENTER 836.500 MHz
RES BW 300 Hz(i)
VBW 3 kHz
SPAN 200 kHz
SWP 15.0 sec

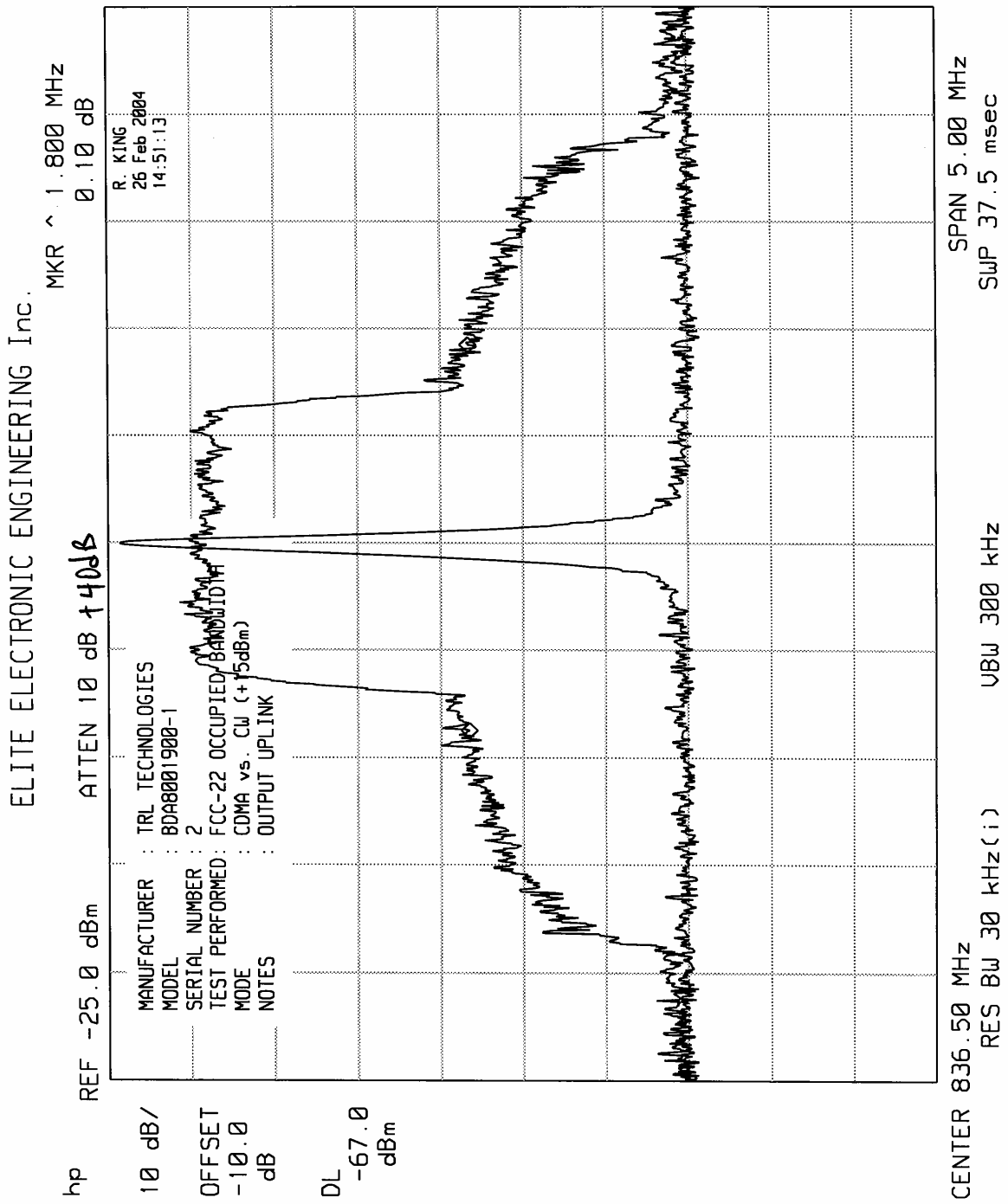

ELITE ELECTRONIC ENGINEERING Inc.
MKR 836.495 8 MHz
-31.20 dBm
ATTEN 30 dB+40dB
REF 0.0 dBm
hp
10 dB/
OFFSET
-20.0
dB
R. KING
25 Feb 2004
15:26:45
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED: FCC-22 OCCUPIED BANDWIDTH
MODE : Tx FM @ 836.5MHz (+15dBm)
NOTES : OUTPUT UPLINK
45KHz
90KHz
20KHz
26dBc
45dBc
CENTER 836.500 MHz
RES BW 300 Hz(i)
VBW 3 kHz
SPAN 200 kHz
SWP 15.0 sec

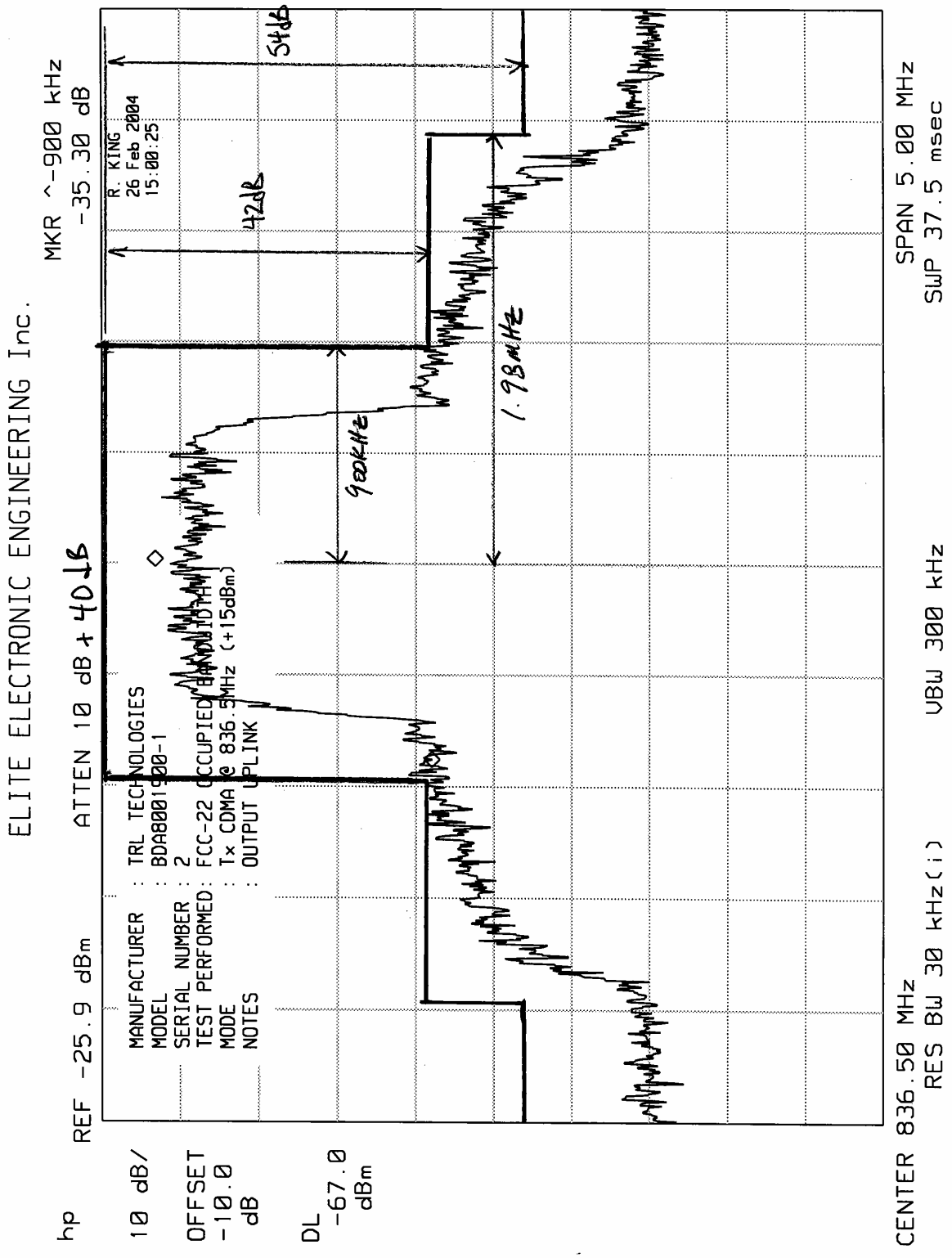

hp
ELITE ELECTRONIC ENGINEERING Inc.
REF 0.0 dBm
ATTEN 30 dB + 20dB
10 dB/
OFFSET
-20.0
dB
DL
-20.0
dBm
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED: FCC-22 OCCUPIED BANDWIDTH
MODE : Tx FM 881.5MHz (+15dBm)
NOTES : ~~OUTPUT~~ DOWNLINK
INPUT
R. KING
25 Feb 2004
14:33:31
CENTER 881.500 MHz
RES BW 300 Hz(i)
VBW 3 kHz
SPAN 200 kHz
SWP 15.0 sec

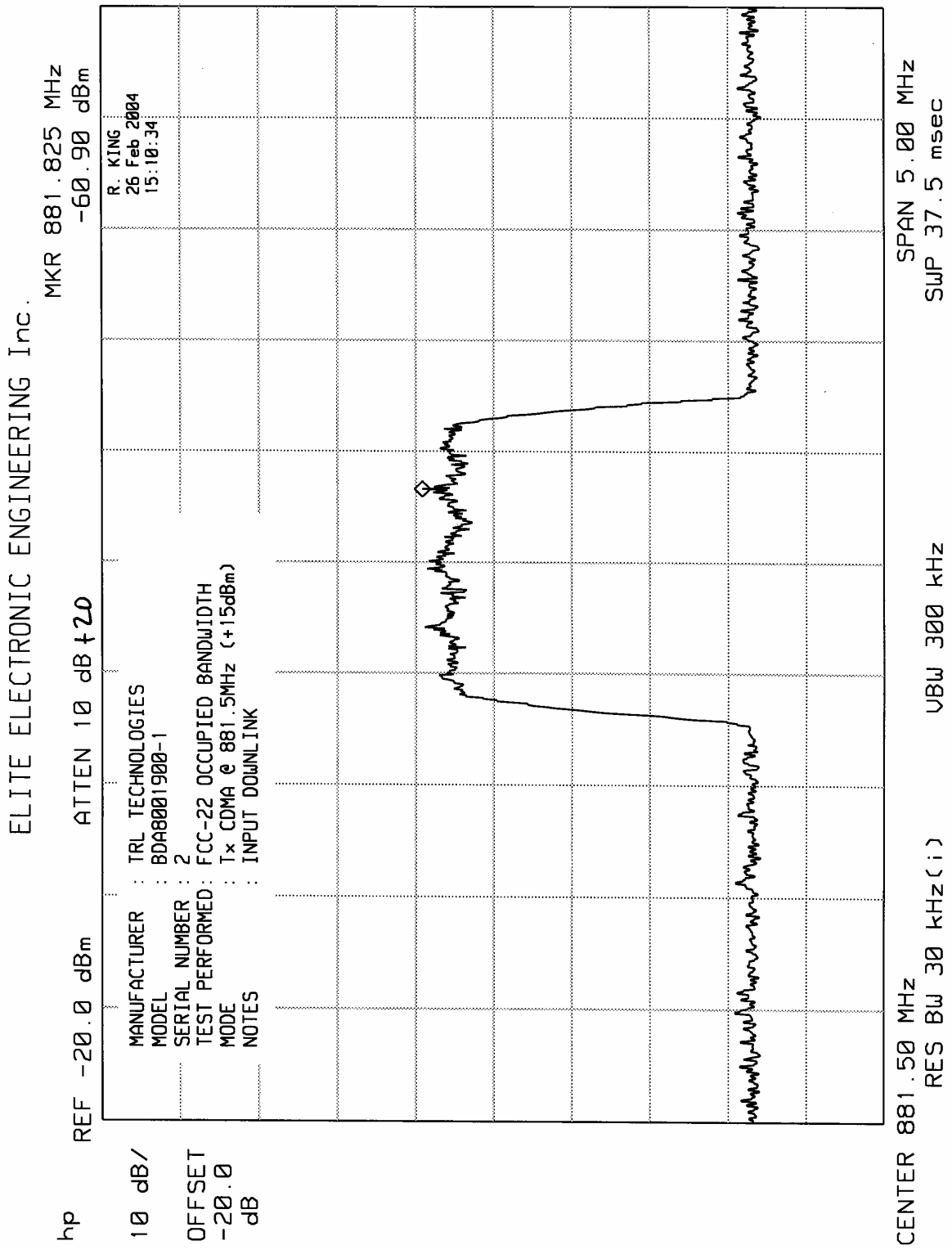

hp
REF 0.0 dBm
ATTEN 30 dB + 40dB
ELITE ELECTRONIC ENGINEERING Inc.
MKR 881.499 8 MHz
-26.60 dBm
10 dB/
OFFSET
-20.0
dB
DL
-25.0
dBm
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED: FCC-22 OCCUPIED BANDWIDTH
MODE : CW vs. FM (AMPS)
NOTES : OUTPUT DOWNLINK
R. KING
* 25 Feb 2004
15:11:14
CENTER 881.500 MHz
RES BW 300 Hz(i)
VBW 3 kHz
SPAN 200 kHz
SWP 15.0 sec

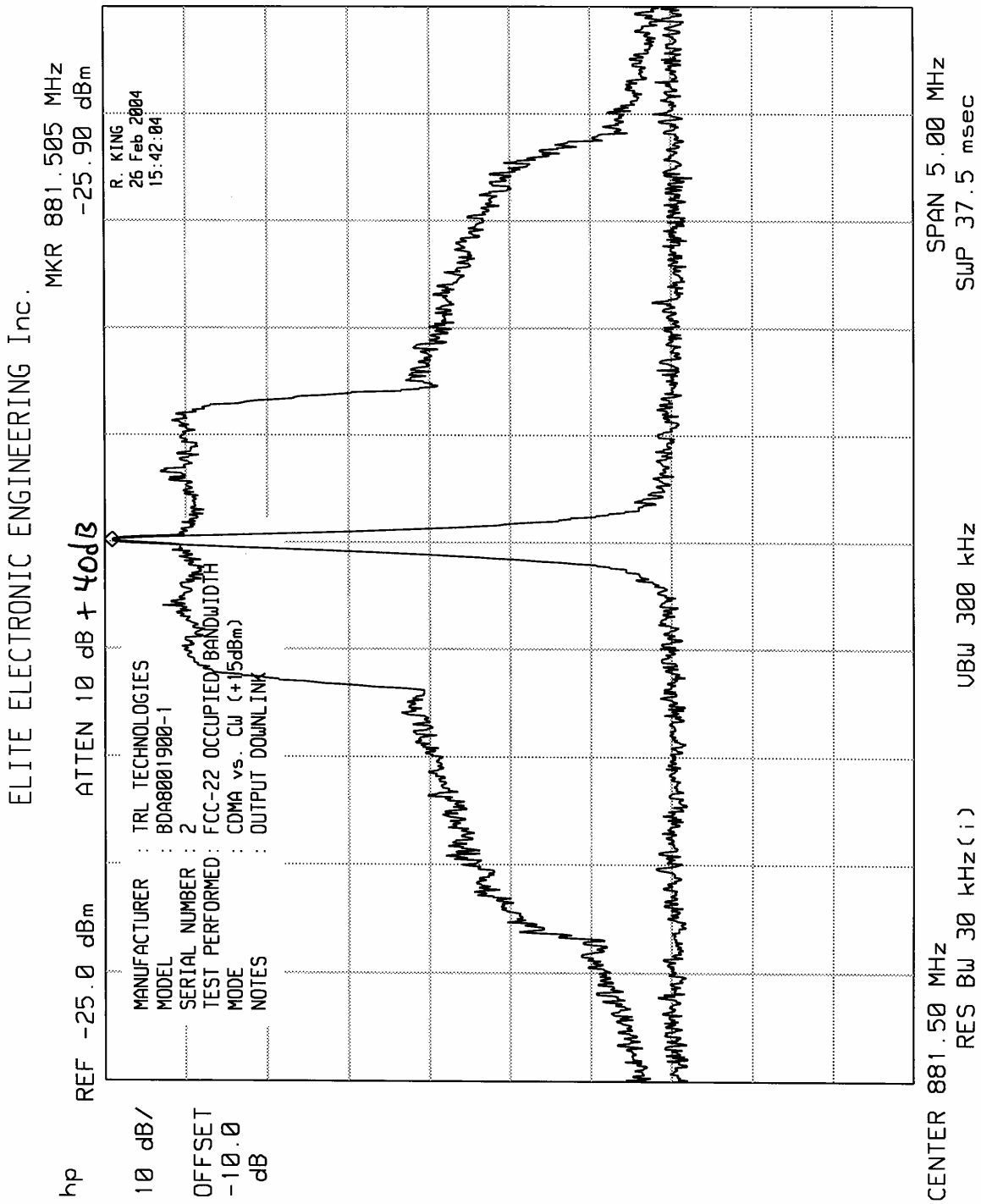

hp
REF 0.0 dBm
ATTEN 30 dB + 40dB
ELITE ELECTRONIC ENGINEERING Inc.
MKR 881.495 8 MHz
-32.90 dBm
10 dB/
OFFSET
-20.0
dB
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED : FCC-22 OCCUPIED BANDWIDTH
MODE : Tx FM @ 881.5MHz (+15dBm)
~~OUTPUT DOWN LINK~~ : OUTPUT ~~UPLINK~~ DOWNLINK
NOTES
R. KING
25 Feb 2004
15:31:47
90KHz
45KHz
20KHz
45dB
26dB
SPAN 200 kHz
SWP 15.0 sec
VBW 3 kHz
CENTER 881.500 MHz
RES BW 300 Hz(i)

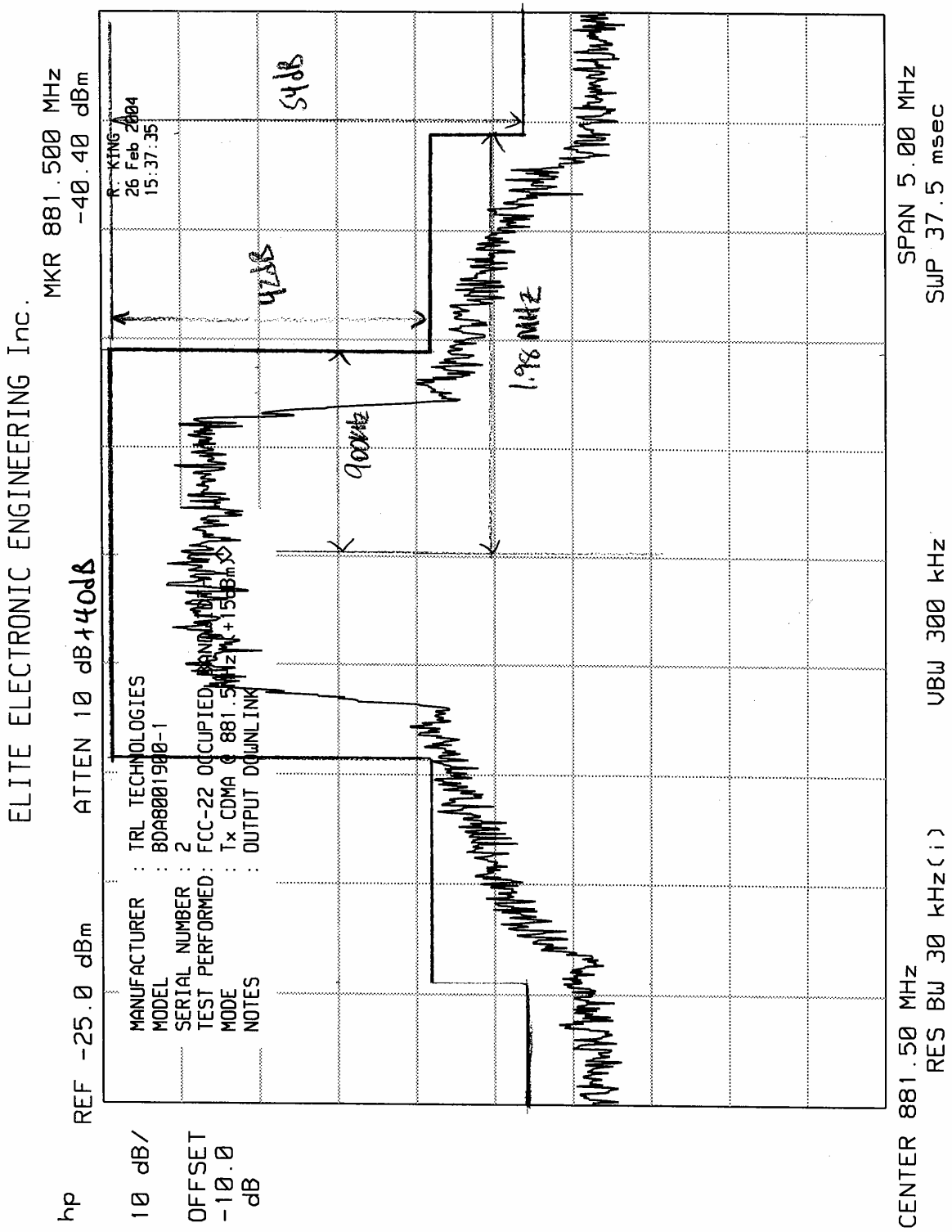

hp
REF -30.0 dBm
ATTEN 0 dB +20dB
ELITE ELECTRONIC ENGINEERING Inc.
MKR 836.460 MHz
-65.80 dBm
10 dB/
OFFSET
-10.0
dB
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED: FCC-22 OCCUPIED BANDWIDTH
MODE : Tx CDMA @ 836.5MHz (+15dBm)
NOTES : INPUT UPLINK
R. KING
26 Feb 2004
15:07:43
CENTER 836.50 MHz
RES BW 30 kHz(i)
VBW 300 kHz
SPAN 5.00 MHz
SWP 37.5 msec

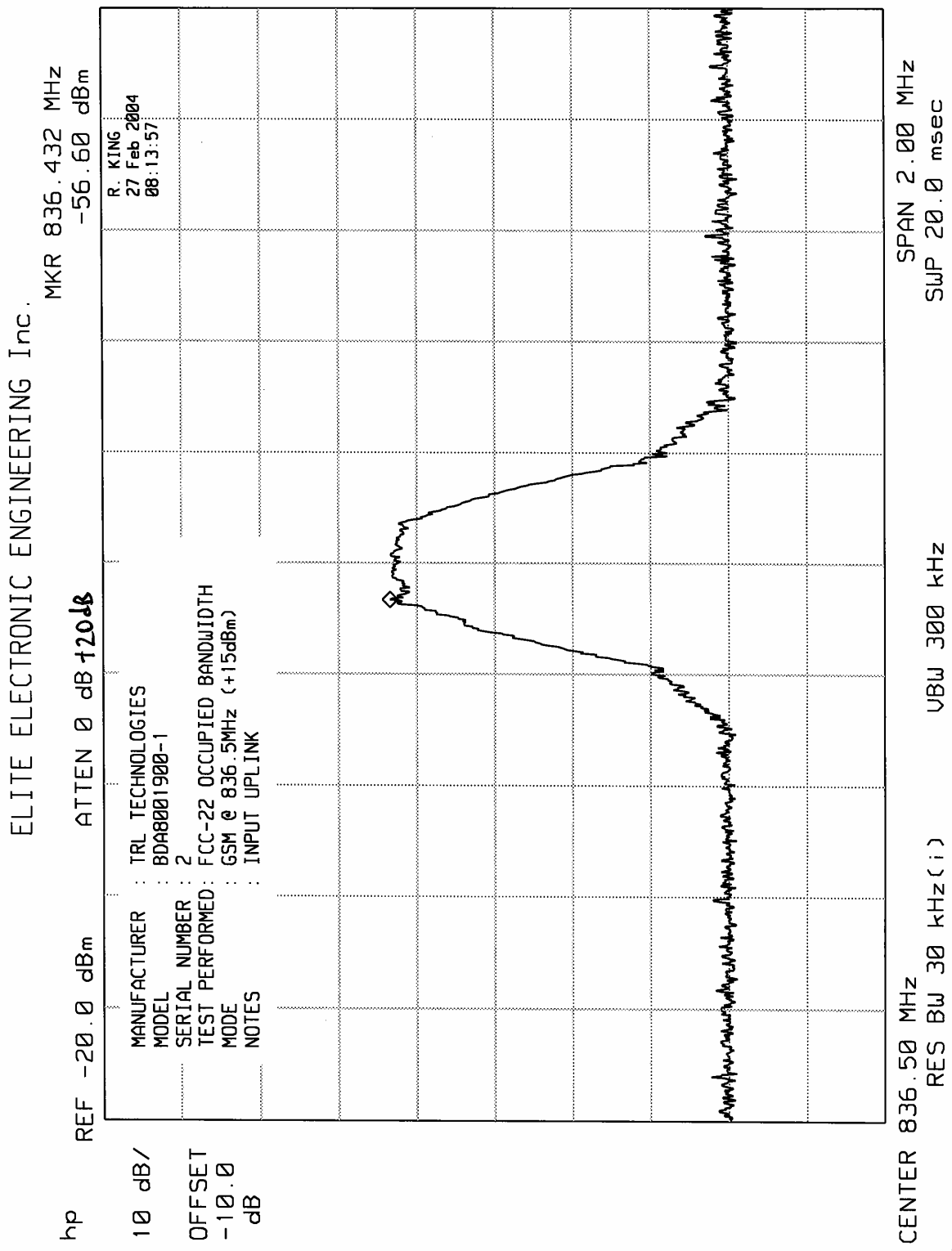

hp
ELITE ELECTRONIC ENGINEERING Inc.
REF -25.0 dBm
ATTEN 10 dB +40dB
MKR ^ 1.800 MHz
0.10 dB
10 dB/
OFFSET
-10.0
dB
DL
-67.0
dBm
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED : FCC-22 OCCUPIED BANDWIDTH
MODE : CDMA vs. CW (+15dBm)
NOTES : OUTPUT UPLINK
R. KING
26 Feb 2004
14:51:13
CENTER 836.50 MHz
RES BW 30 kHz(i)
VBW 300 kHz
SPAN 5.00 MHz
SWP 37.5 msec

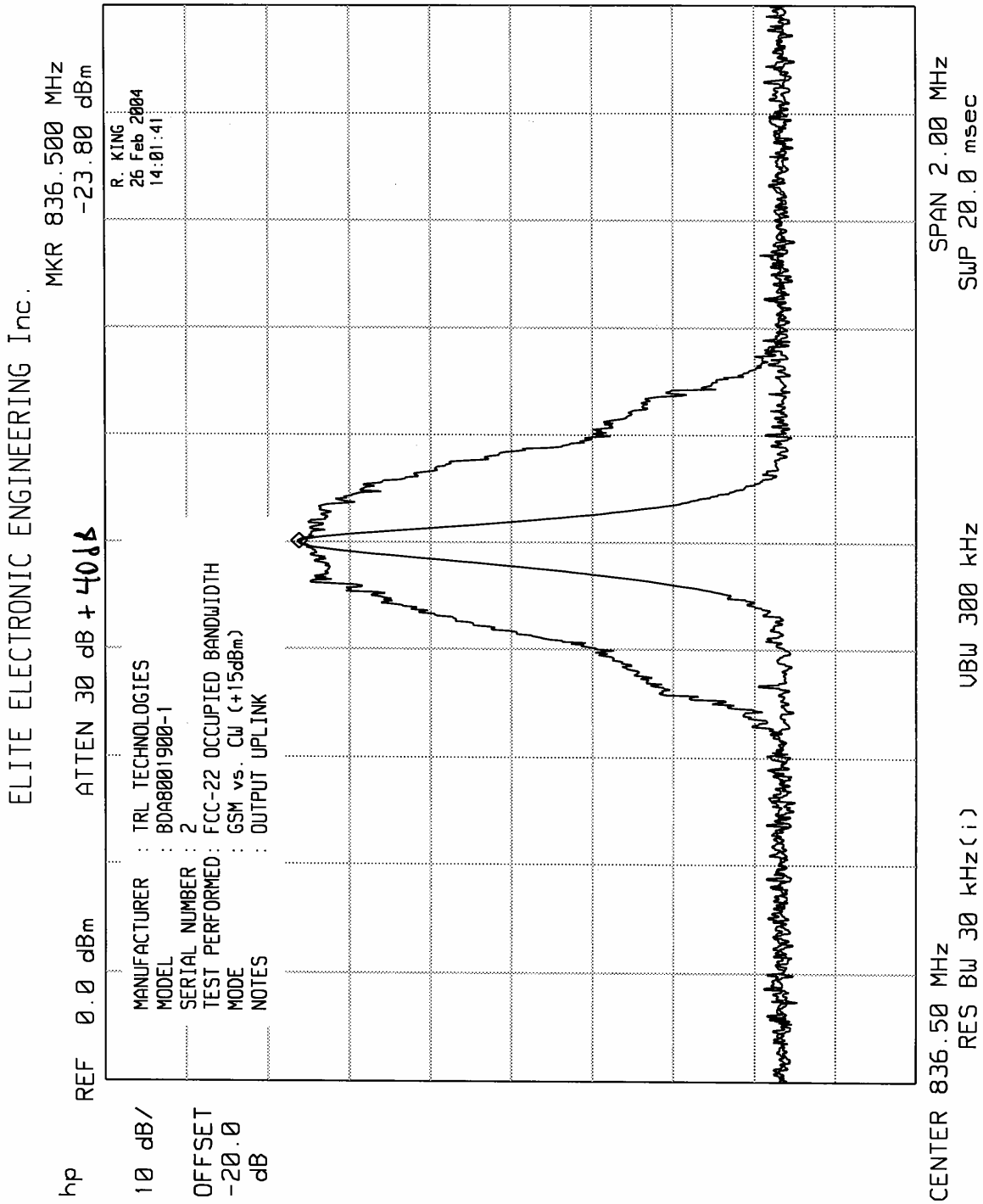

ELITE ELECTRONIC ENGINEERING Inc.
hp
REF -25.9 dBm
ATTEN 10 dB + 40 dB
MKR ^-900 kHz
-35.30 dB
10 dB/
OFFSET
-10.0
dB
DL
-67.0
dBm
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED: FCC-22 OCCUPIED BANDWIDTH
MODE : Tx CDMA @ 836.5MHz (+15dBm)
NOTES : OUTPUT UPLINK
R. KING
26 Feb 2004
15:00:25
54dB
42dB
900kHz
1.98MHz
CENTER 836.50 MHz
RES BW 30 kHz(i)
VBW 300 kHz
SPAN 5.00 MHz
SWP 37.5 msec

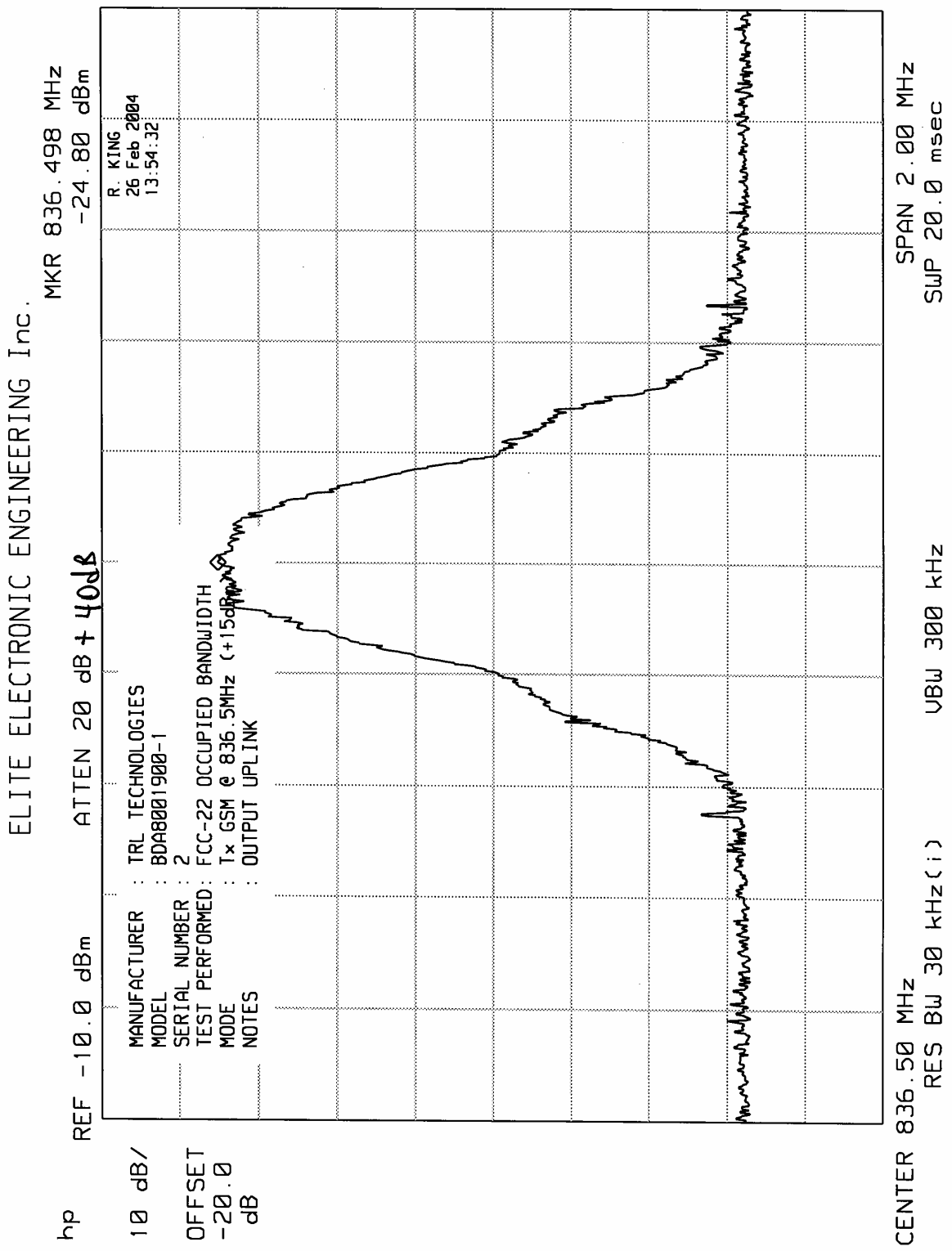

hp
10 dB/
OFFSET
-20.0
dB
REF -20.0 dBm
ATTEN 10 dB +20
ELITE ELECTRONIC ENGINEERING Inc.
MKR 881.825 MHz
-60.90 dBm
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED : FCC-22 OCCUPIED BANDWIDTH
MODE : Tx CDMA @ 881.5MHz (+15dBm)
NOTES : INPUT DOWNLINK
R. KING
26 Feb 2004
15:10:34
CENTER 881.50 MHz
RES BW 30 kHz(i)
VBW 300 kHz
SPAN 5.00 MHz
SWP 37.5 msec

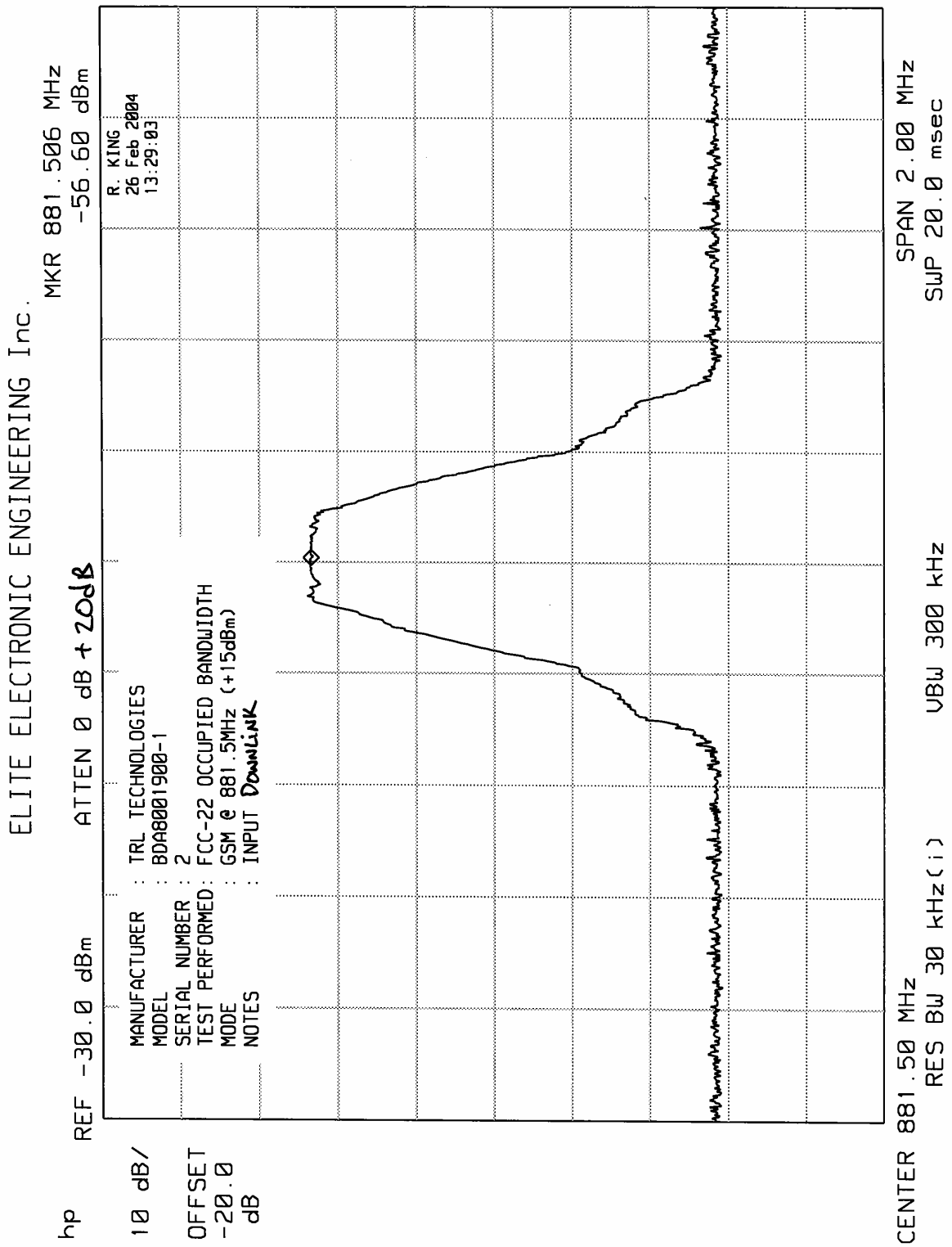

hp
REF -25.0 dBm
10 dB/
OFFSET
-10.0
dB
ELITE ELECTRONIC ENGINEERING Inc.
ATTEN 10 dB + 40dB
MKR 881.505 MHz
-25.90 dBm
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED : FCC-22 OCCUPIED BANDWIDTH
MODE : CDMA vs. CW (+15dBm)
NOTES : OUTPUT DOWNLINK
R. KING
26 Feb 2004
15:42:04
CENTER 881.50 MHz
RES BW 30 kHz(i)
VBW 300 kHz
SPAN 5.00 MHz
SWP 37.5 msec

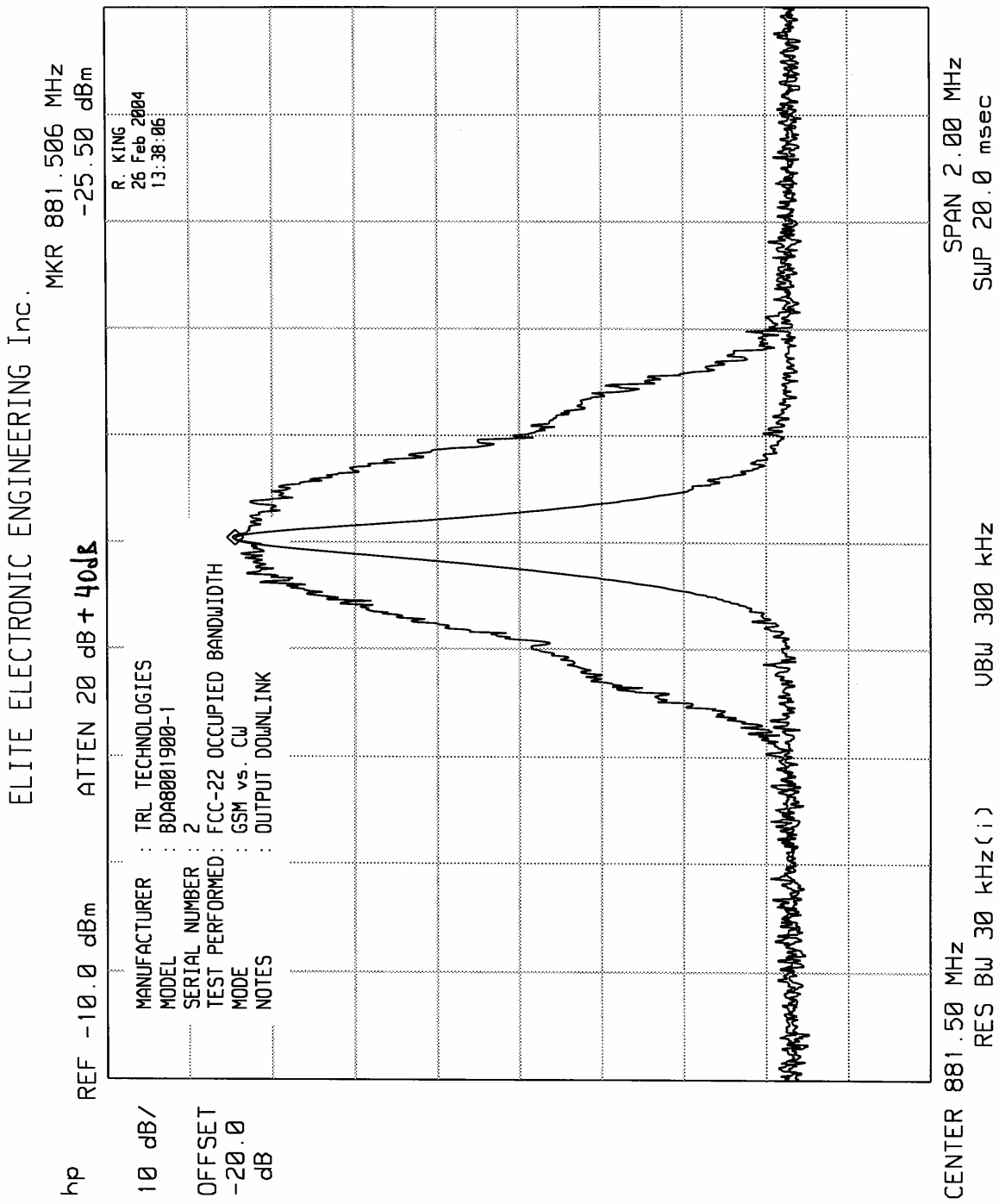

hp
ELITE ELECTRONIC ENGINEERING Inc.
REF -25.0 dBm
ATTEN 10 dB 40dB
MKR 881.500 MHz
-40.40 dBm
10 dB/
OFFSET
-10.0
dB
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED: FCC-22 OCCUPIED BANDWIDTH
MODE : Tx CDMA @ 881.5MHz +15dBm
NOTES : OUTPUT DOWNLINK
R: KING
26 Feb 2004
15:37:35
42dB
54dB
900kHz
1.98 MHz
CENTER 881.50 MHz
RES BW 30 kHz(i)
VBW 300 kHz
SPAN 5.00 MHz
SWP 37.5 msec

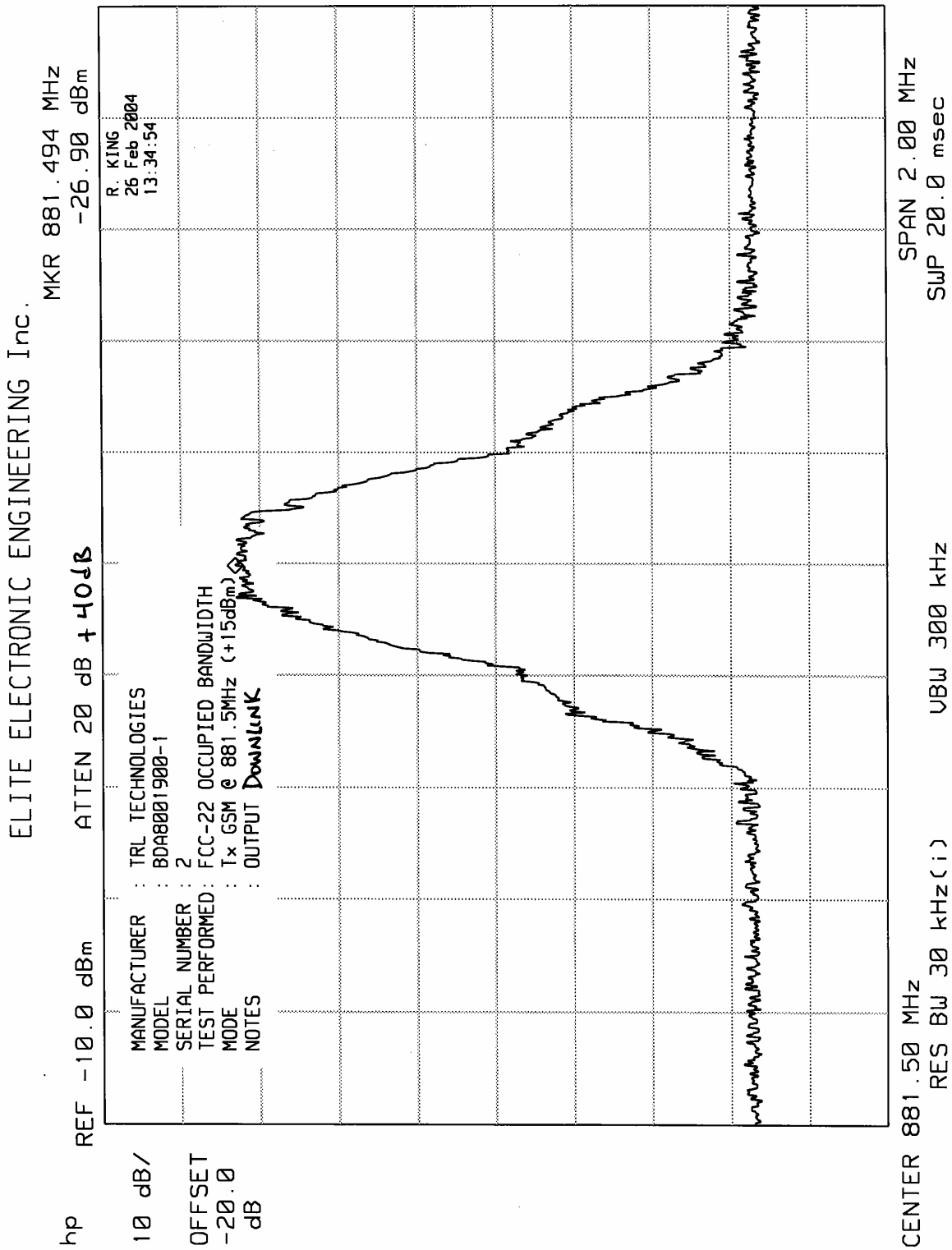

hp
10 dB/
OFFSET
-10.0
dB
REF -20.0 dBm
ATTEN 0 dB +20dB
ELITE ELECTRONIC ENGINEERING Inc.
MKR 836.432 MHz
-56.60 dBm
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED: FCC-22 OCCUPIED BANDWIDTH
MODE : GSM @ 836.5MHz (+15dBm)
NOTES : INPUT UPLINK
R. KING
27 Feb 2004
08:13:57
CENTER 836.50 MHz
RES BW 30 kHz(i)
VBW 300 kHz
SPAN 2.00 MHz
SWP 20.0 msec

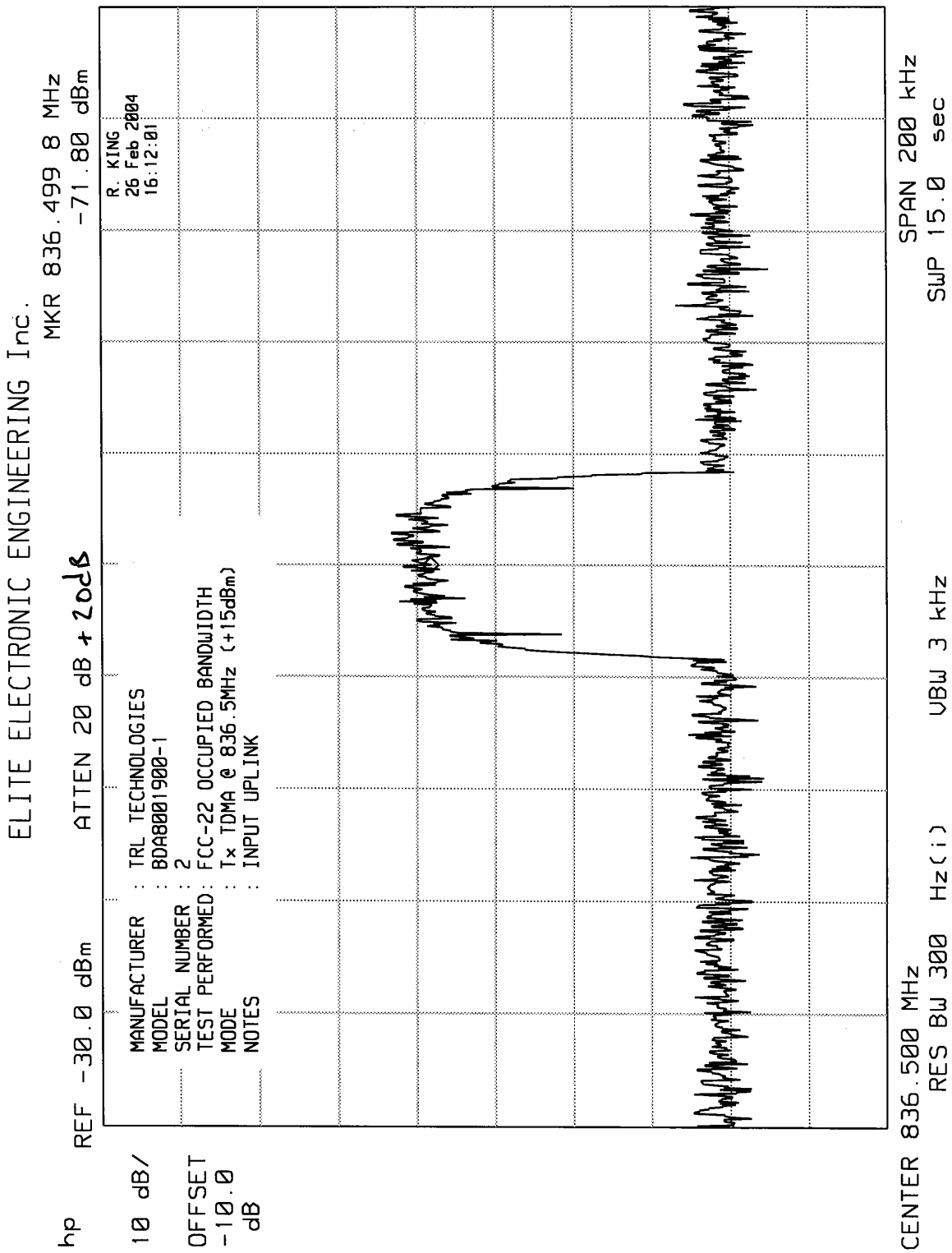

hp
REF 0.0 dBm
ATTEN 30 dB + 40dB
ELITE ELECTRONIC ENGINEERING Inc.
MKR 836.500 MHz
-23.80 dBm
10 dB/
OFFSET
-20.0
dB
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED: FCC-22 OCCUPIED BANDWIDTH
MODE : GSM vs. CW (+15dBm)
NOTES : OUTPUT UPLINK
R. KING
26 Feb 2004
14:01:41
CENTER 836.50 MHz
RES BW 30 kHz(i)
VBW 300 kHz
SPAN 2.00 MHz
SWP 20.0 msec

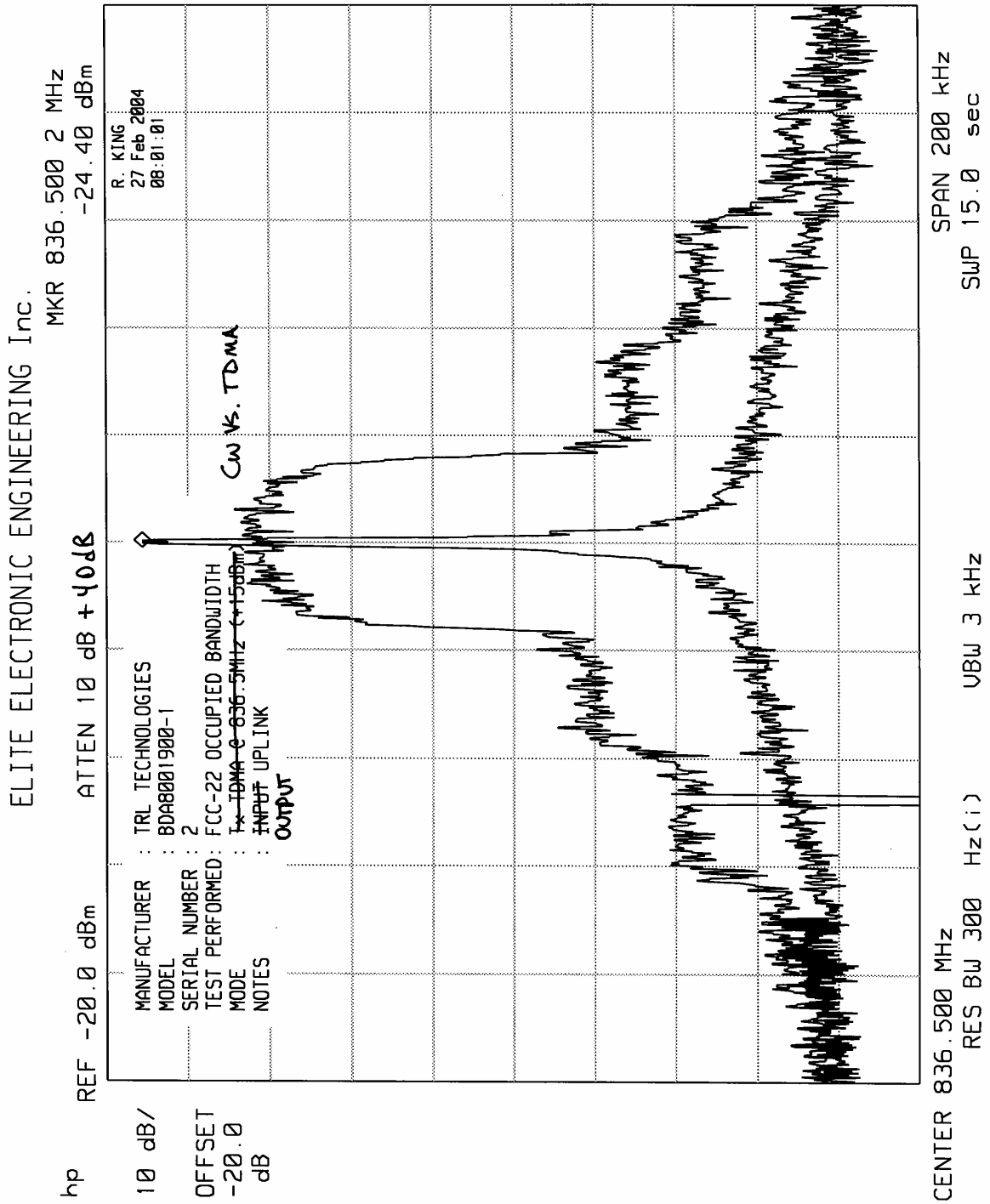

hp
REF -10.0 dBm
ATTEN 20 dB + 40dB
ELITE ELECTRONIC ENGINEERING Inc.
MKR 836.498 MHz
-24.80 dBm
10 dB/
OFFSET
-20.0
dB
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED: FCC-22 OCCUPIED BANDWIDTH
MODE : Tx GSM @ 836.5MHz (+15dBm)
NOTES : OUTPUT UPLINK
R. KING
26 Feb 2004
13:54:32
CENTER 836.50 MHz
RES BW 30 kHz(i)
VBW 300 kHz
SPAN 2.00 MHz
SWP 20.0 msec

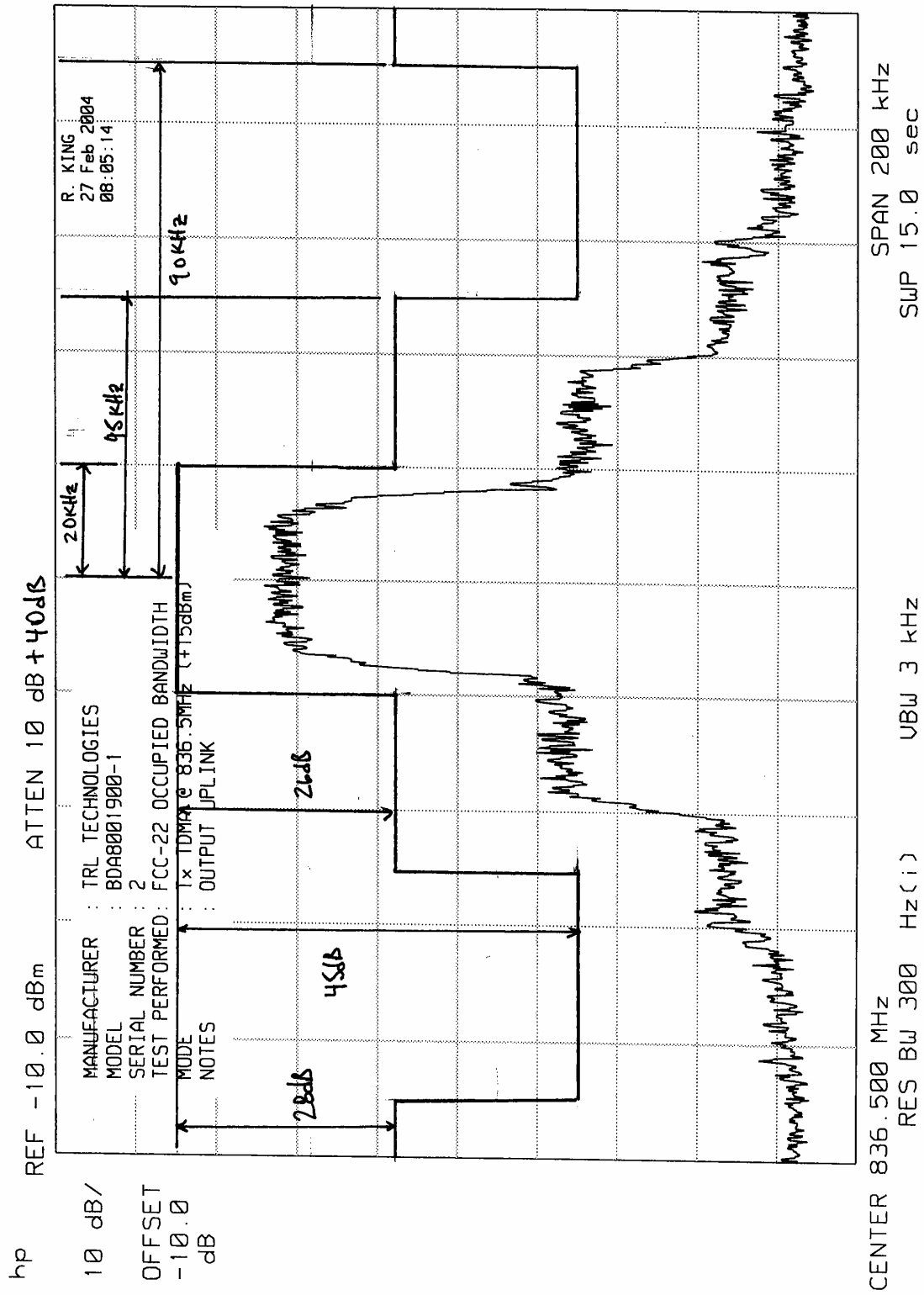

hp
ELITE ELECTRONIC ENGINEERING Inc.
MKR 881.506 MHz
-56.60 dBm
R. KING
26 Feb 2004
13:29:03
REF -30.0 dBm
ATTEN 0 dB + 20dB
10 dB/
OFFSET
-20.0
dB
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED: FCC-22 OCCUPIED BANDWIDTH
MODE : GSM @ 881.5MHz (+15dBm)
NOTES : INPUT Downlink
SPAN 2.00 MHz
SWP 20.0 msec
CENTER 881.50 MHz
RES BW 30 kHz(i)
VBW 300 kHz

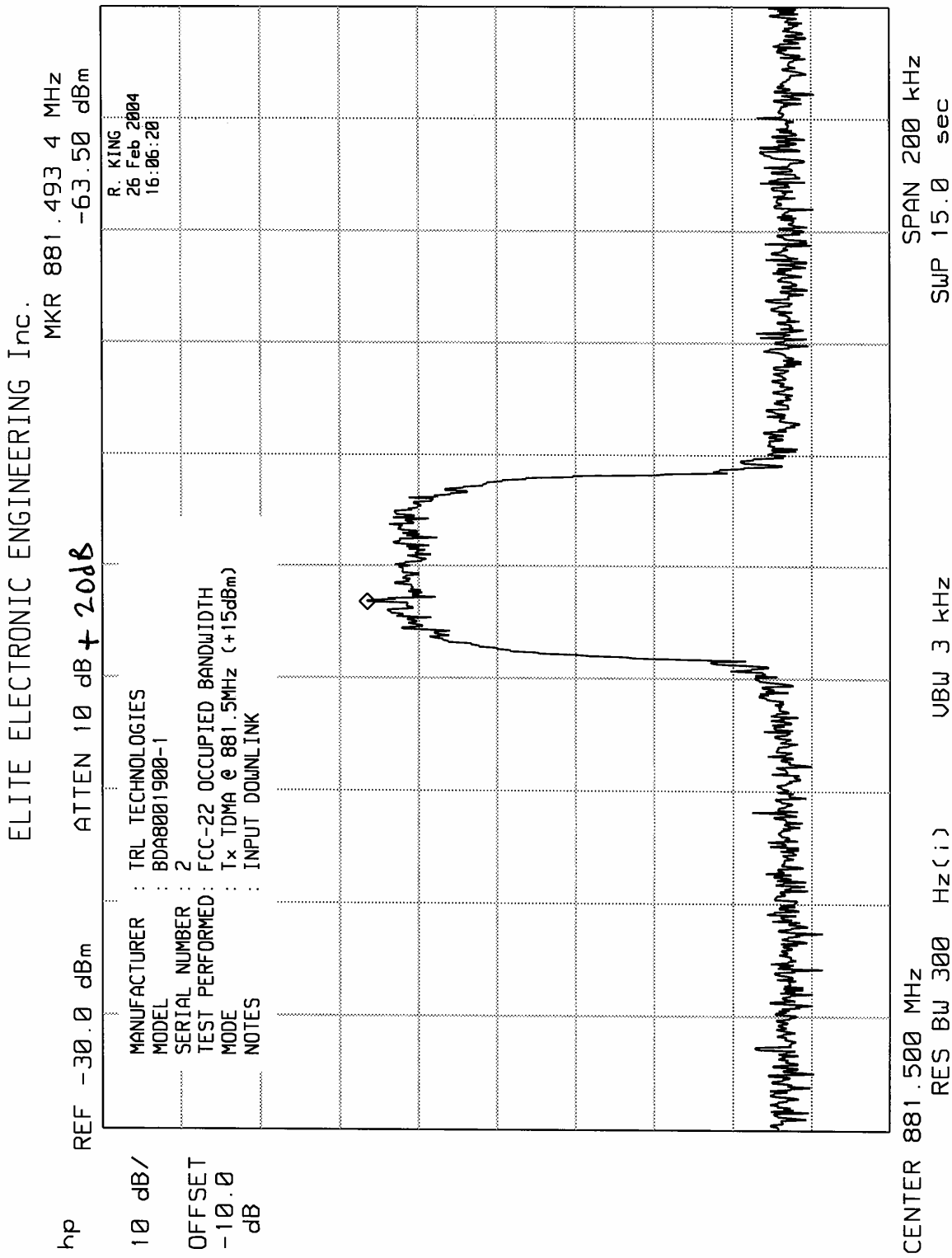

hp
10 dB/
OFFSET
-20.0
dB
REF -10.0 dBm
ATTEN 20 dB + 40dB
ELITE ELECTRONIC ENGINEERING Inc.
MKR 881.506 MHz
-25.50 dBm
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED: FCC-22 OCCUPIED BANDWIDTH
MODE : GSM vs. CW
NOTES : OUTPUT DOWNLINK
R. KING
26 Feb 2004
13:38:06
CENTER 881.50 MHz
RES BW 30 kHz(i)
VBW 300 kHz
SPAN 2.00 MHz
SWP 20.0 msec

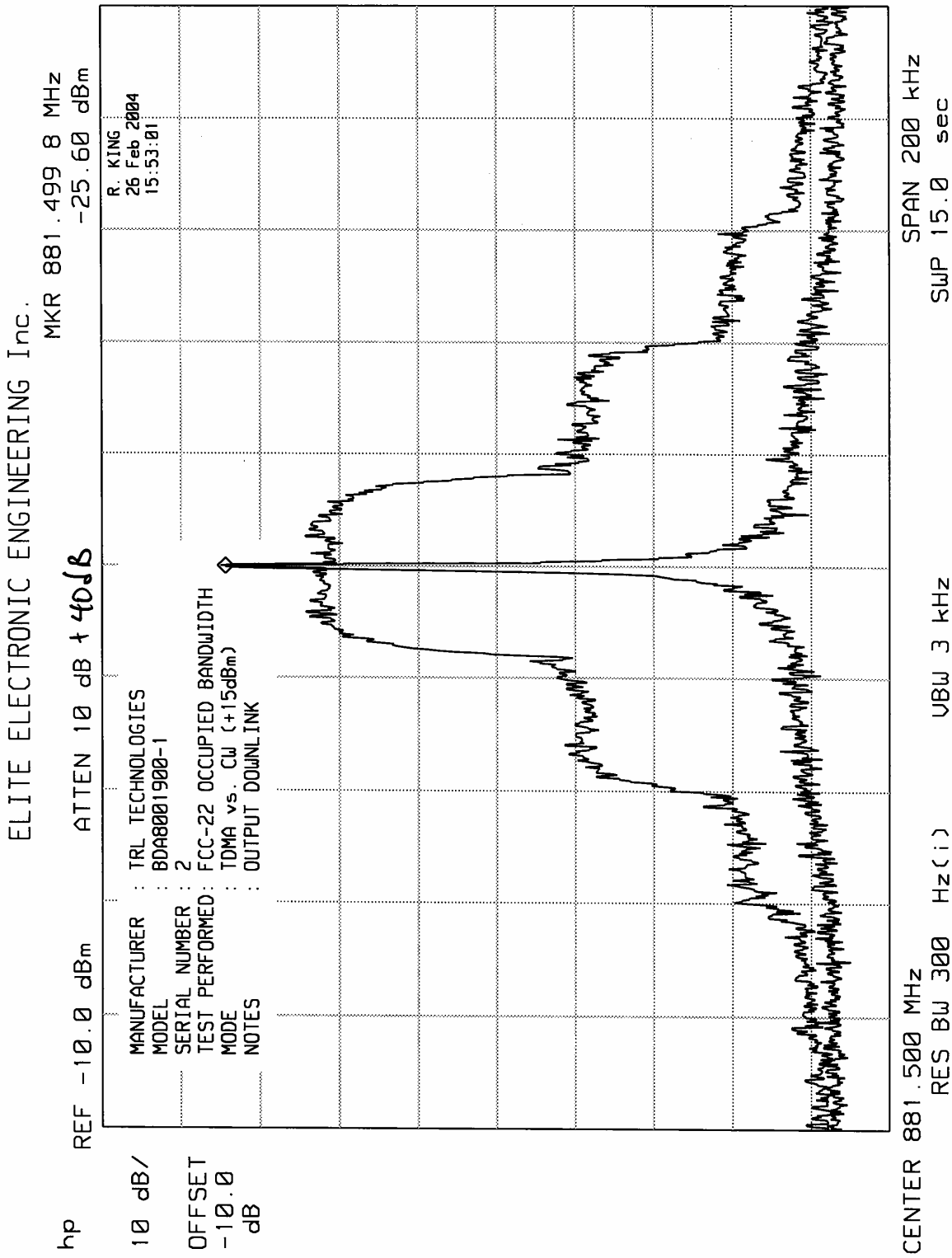

hp
ELITE ELECTRONIC ENGINEERING Inc.
REF -10.0 dBm
ATTEN 20 dB +40dB
MKR 881.494 MHz
-26.90 dBm
10 dB/
OFFSET
-20.0
dB
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED: FCC-22 OCCUPIED BANDWIDTH
MODE : Tx GSM @ 881.5MHz (+15dBm)
NOTES : OUTPUT DOWNLINK
R. KING
26 Feb 2004
13:34:54
CENTER 881.50 MHz
RES BW 30 kHz(i)
VBW 300 kHz
SPAN 2.00 MHz
SWP 20.0 msec

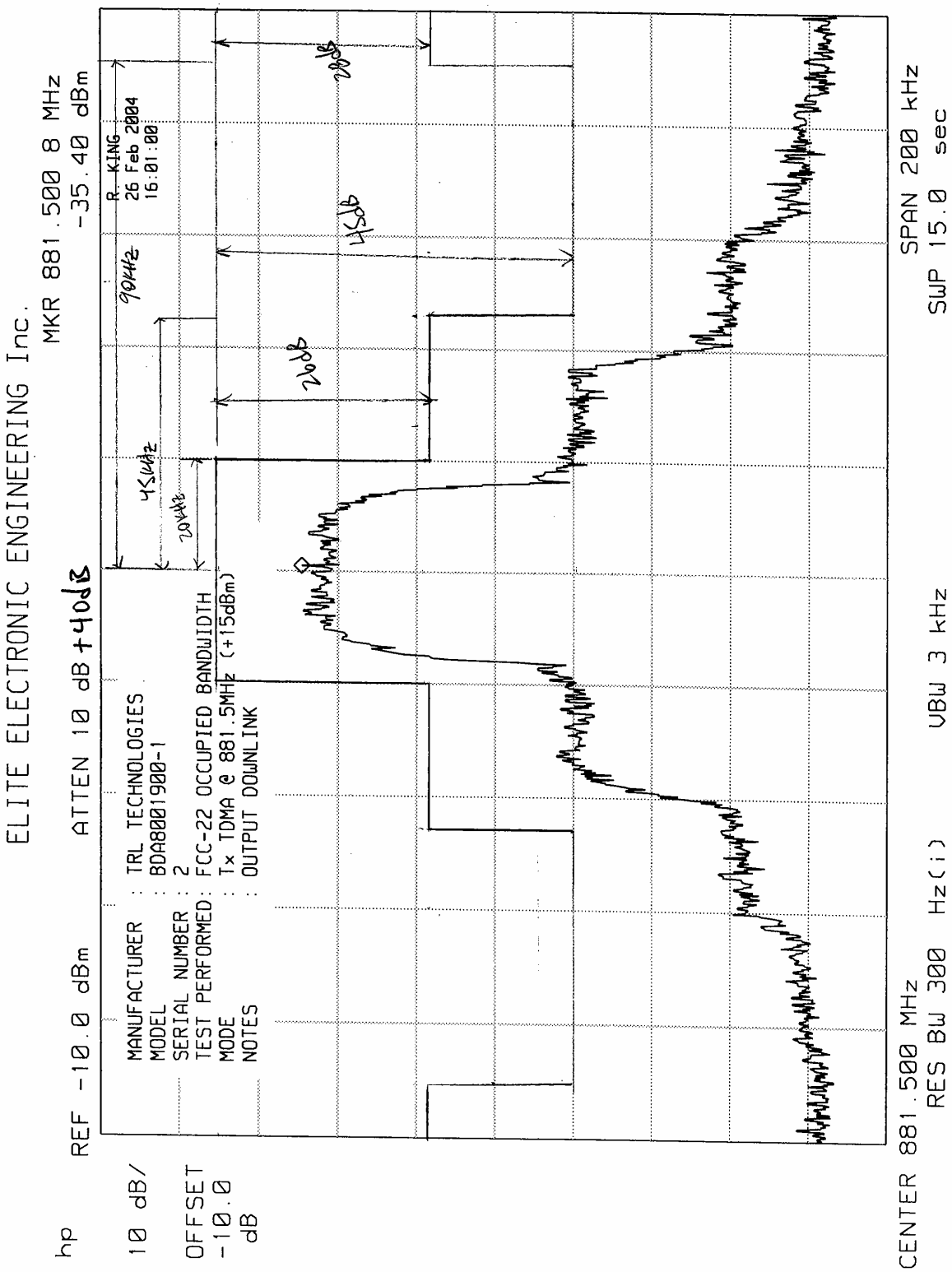

hp
REF -30.0 dBm
ATTEN 20 dB + 20dB
ELITE ELECTRONIC ENGINEERING Inc.
MKR 836.499 8 MHz
-71.80 dBm
10 dB/
OFFSET
-10.0
dB
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED: FCC-22 OCCUPIED BANDWIDTH
MODE : Tx TDMA @ 836.5MHz (+15dBm)
NOTES : INPUT UPLINK
R. KING
26 Feb 2004
16:12:01
CENTER 836.500 MHz
RES BW 300 Hz(i)
VBW 3 kHz
SWP 15.0 sec
SPAN 200 kHz

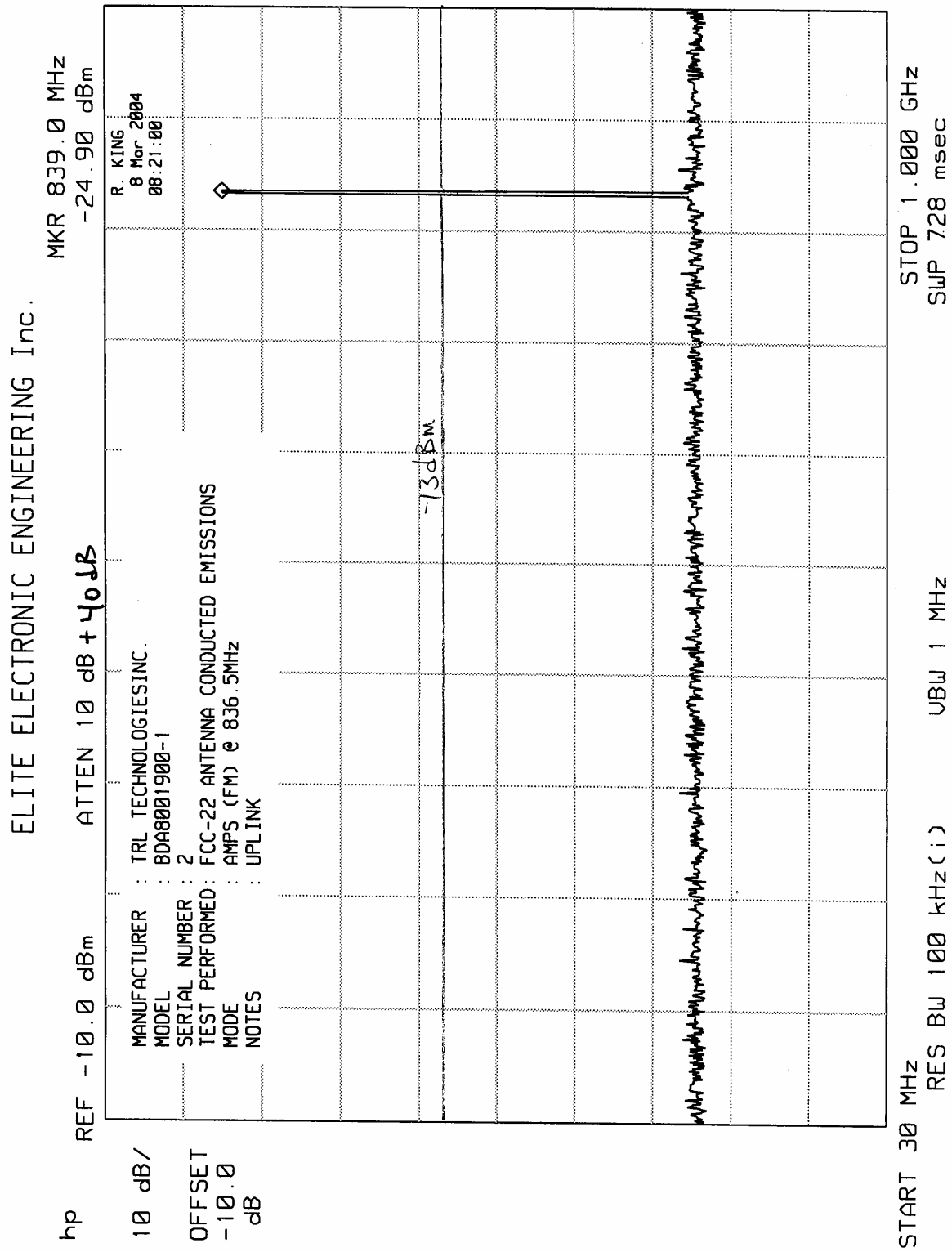

hp
REF -20.0 dBm
ATTEN 10 dB +40dB
ELITE ELECTRONIC ENGINEERING Inc.
MKR 836.500 2 MHz
-24.40 dBm
10 dB/
OFFSET
-20.0
dB
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED: FCC-22 OCCUPIED BANDWIDTH
MODE : ~~Tx TDMA @ 836.5MHz (+15dBm)~~
NOTES : ~~INPUT~~ UPLINK
OUTPUT
CW vs. TDMA
R. KING
27 Feb 2004
08:01:01
CENTER 836.500 MHz
RES BW 300 Hz(i)
VBW 3 kHz
SWP 15.0 sec
SPAN 200 kHz

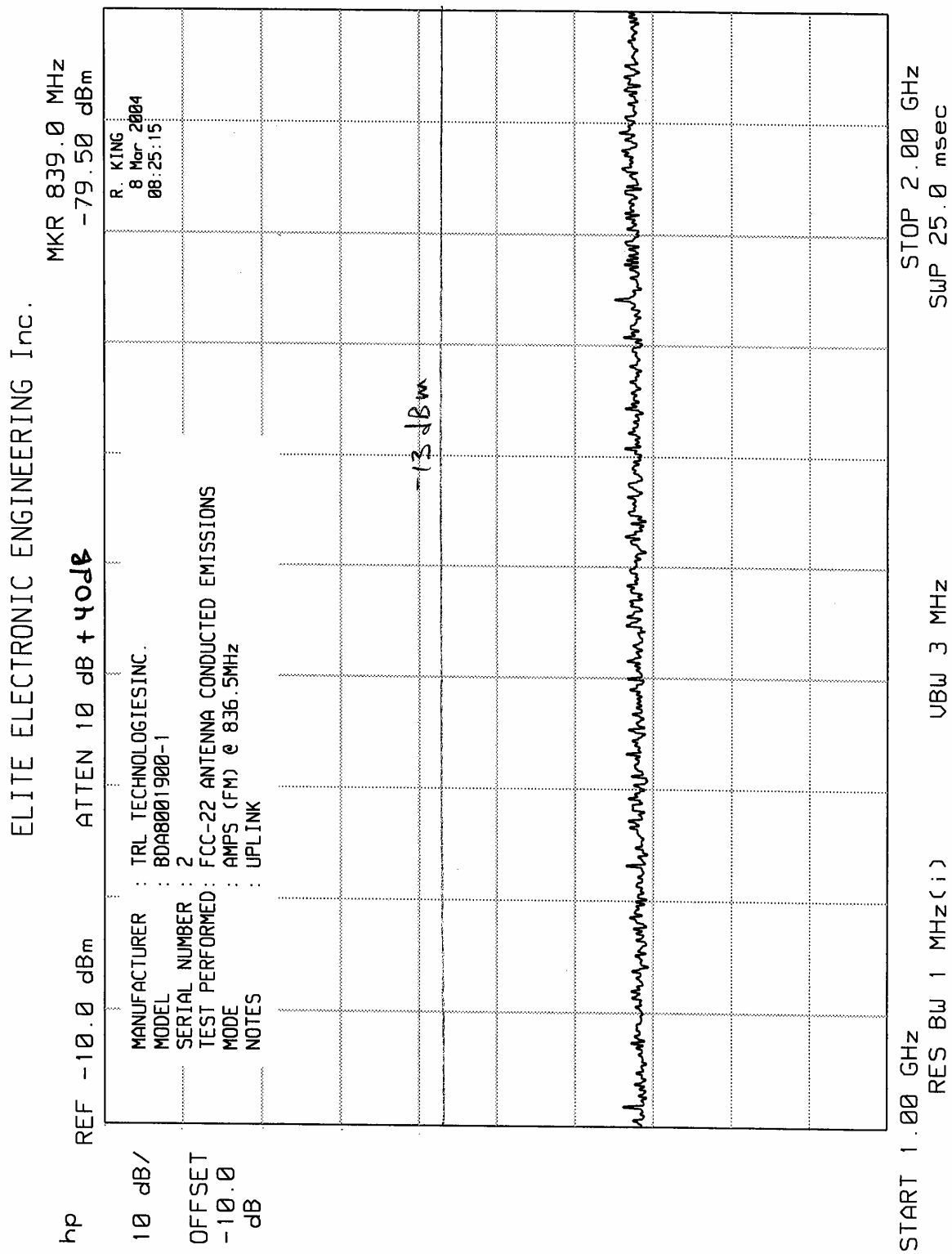

hp
10 dB/
OFFSET
-10.0
dB
REF -10.0 dBm
ATTEN 10 dB +40dB
ELITE ELECTRONIC ENGINEERING Inc.
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED: FCC-22 OCCUPIED BANDWIDTH
MODE : 1x TDMA @ 836.5MHz (+15dBm)
NOTES : OUTPUT UPLINK
R. KING
27 Feb 2004
08:05:14
20KHz
45KHz
90KHz
28dB
45dB
26dB
CENTER 836.500 MHz
RES BW 300 Hz(i)
VBW 3 kHz
SPAN 200 kHz
SWP 15.0 sec

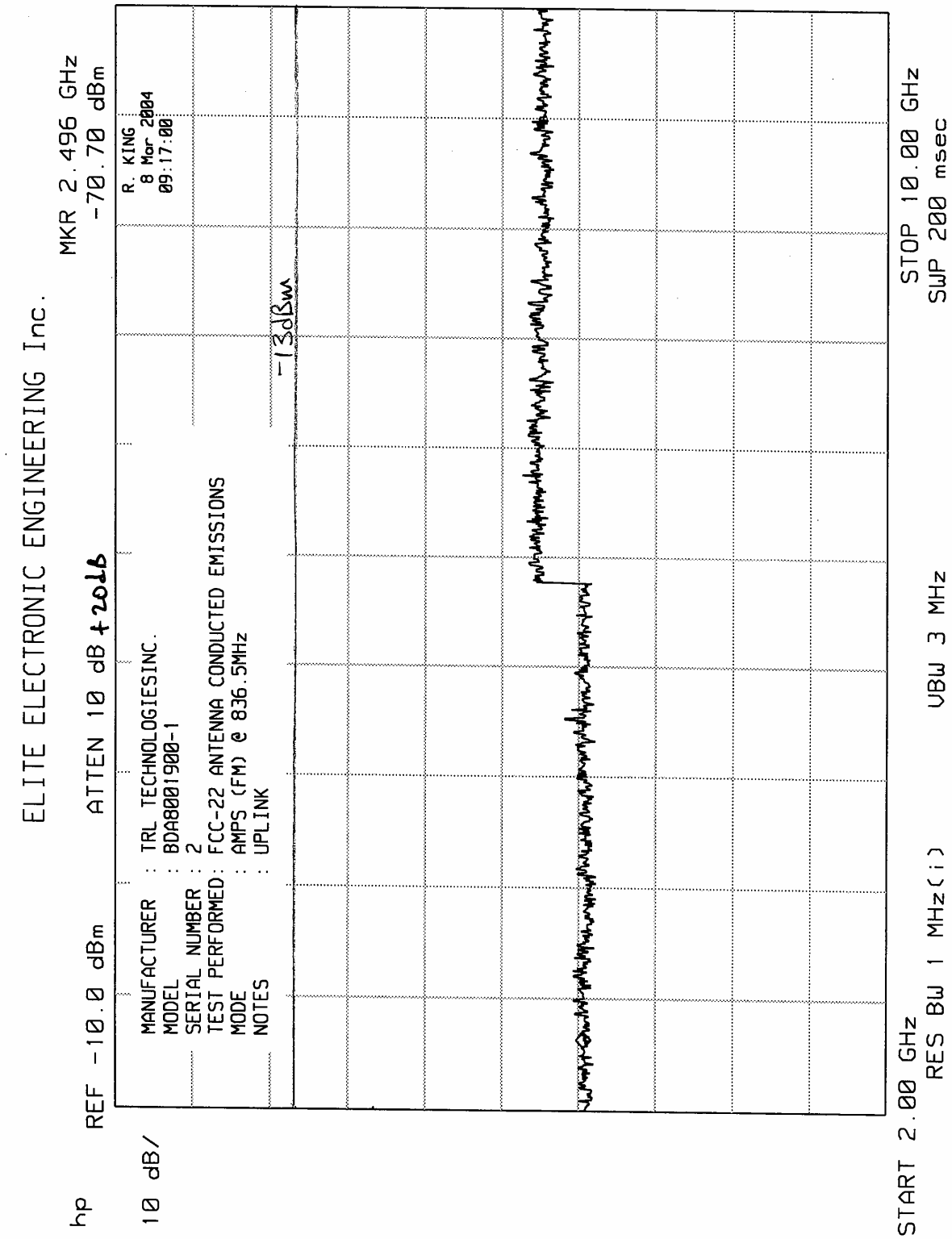

hp
REF -30.0 dBm
ATTEN 10 dB + 20dB
ELITE ELECTRONIC ENGINEERING Inc.
MKR 881.493 4 MHz
-63.50 dBm
10 dB/
OFFSET
-10.0
dB
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED: FCC-22 OCCUPIED BANDWIDTH
MODE : Tx TDMA @ 881.5MHz (+15dBm)
NOTES : INPUT DOWNLINK
R. KING
26 Feb 2004
16:06:20
CENTER 881.500 MHz
RES BW 300 Hz(i)
VBW 3 kHz
SWP 15.0 sec
SPAN 200 kHz

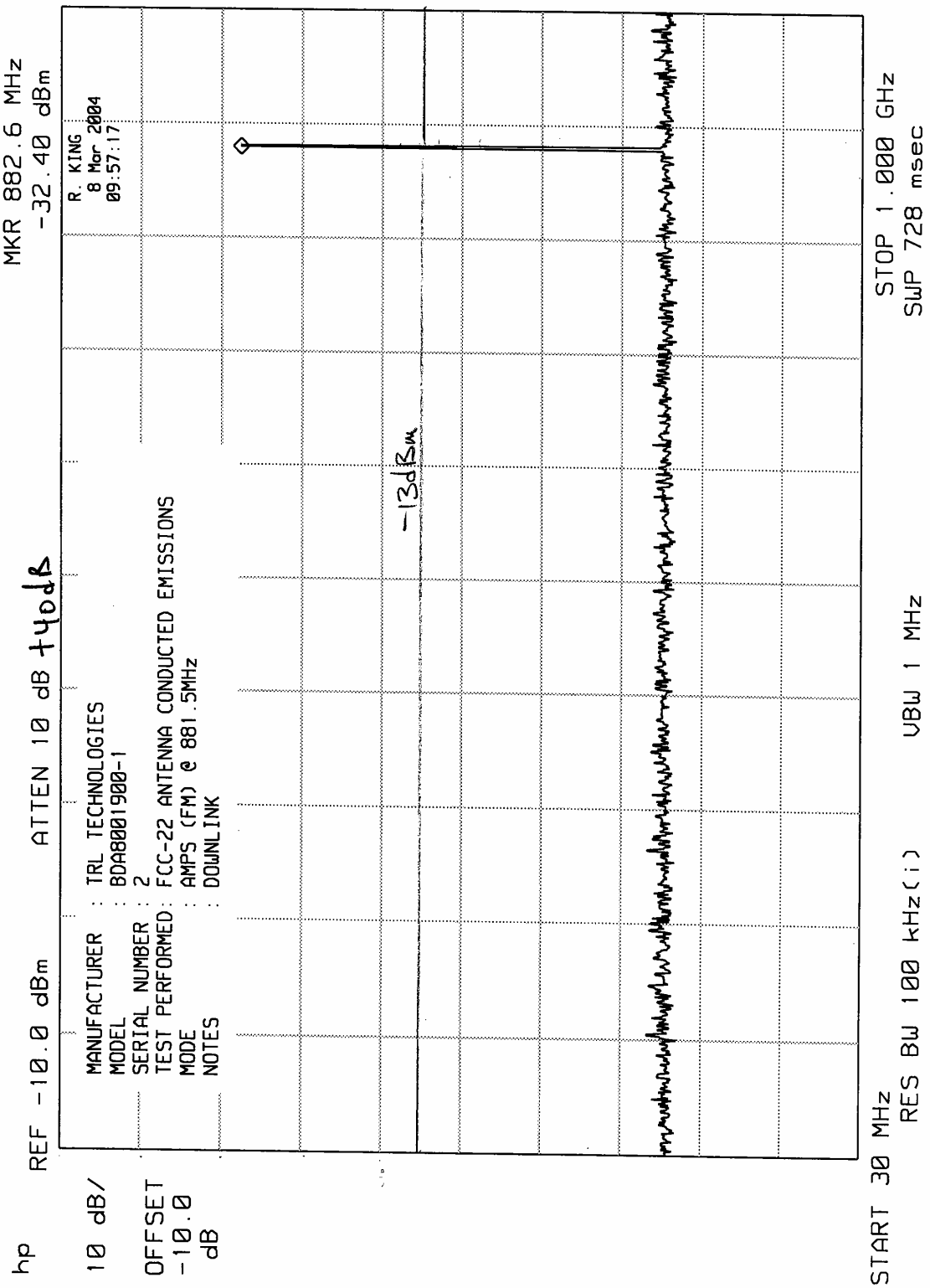

hp
REF -10.0 dBm
ATTEN 10 dB + 40dB
ELITE ELECTRONIC ENGINEERING Inc.
MKR 881.499 8 MHz
-25.60 dBm
10 dB/
OFFSET
-10.0
dB
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED: FCC-22 OCCUPIED BANDWIDTH
MODE : TDMA vs. CW (+15dBm)
NOTES : OUTPUT DOWNLINK
R. KING
26 Feb 2004
15:53:01
CENTER 881.500 MHz
RES BW 300 Hz(i)
VBW 3 kHz
SPAN 200 kHz
SWP 15.0 sec

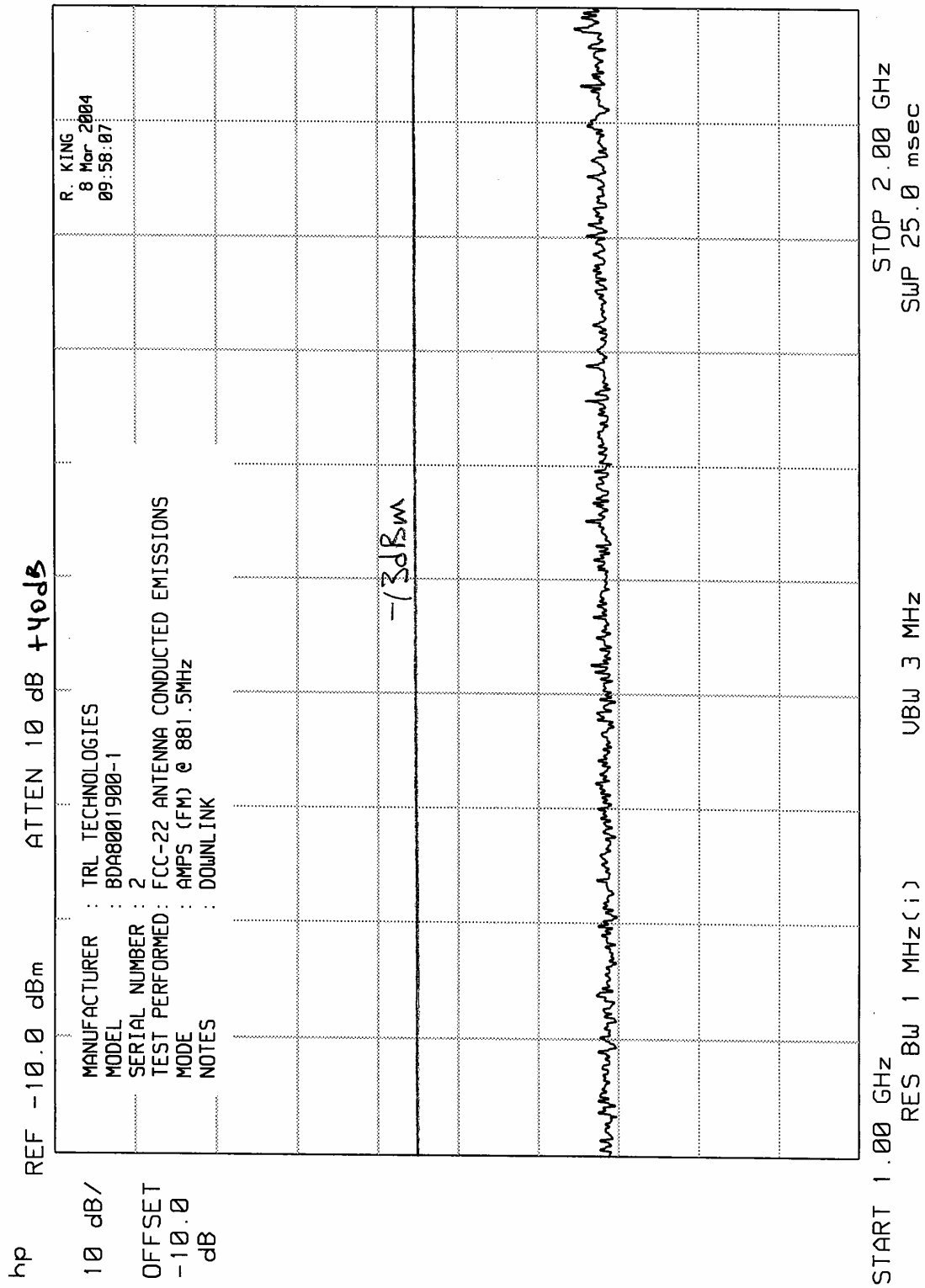

ELITE ELECTRONIC ENGINEERING Inc.
MKR 881.500 8 MHz
-35.40 dBm
R. KING
26 Feb 2004
16:01:00
REF -10.0 dBm
ATTEN 10 dB +40dB
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED: FCC-22 OCCUPIED BANDWIDTH
MODE : Tx TDMA @ 881.5MHz (+15dBm)
NOTES : OUTPUT DOWNLINK
hp
10 dB/
OFFSET
-10.0
dB
CENTER 881.500 MHz
RES BW 300 Hz(i)
VBW 3 kHz
SPAN 200 kHz
SWP 15.0 sec
90kHz
45kHz
20kHz
26dB
45dB
28dB

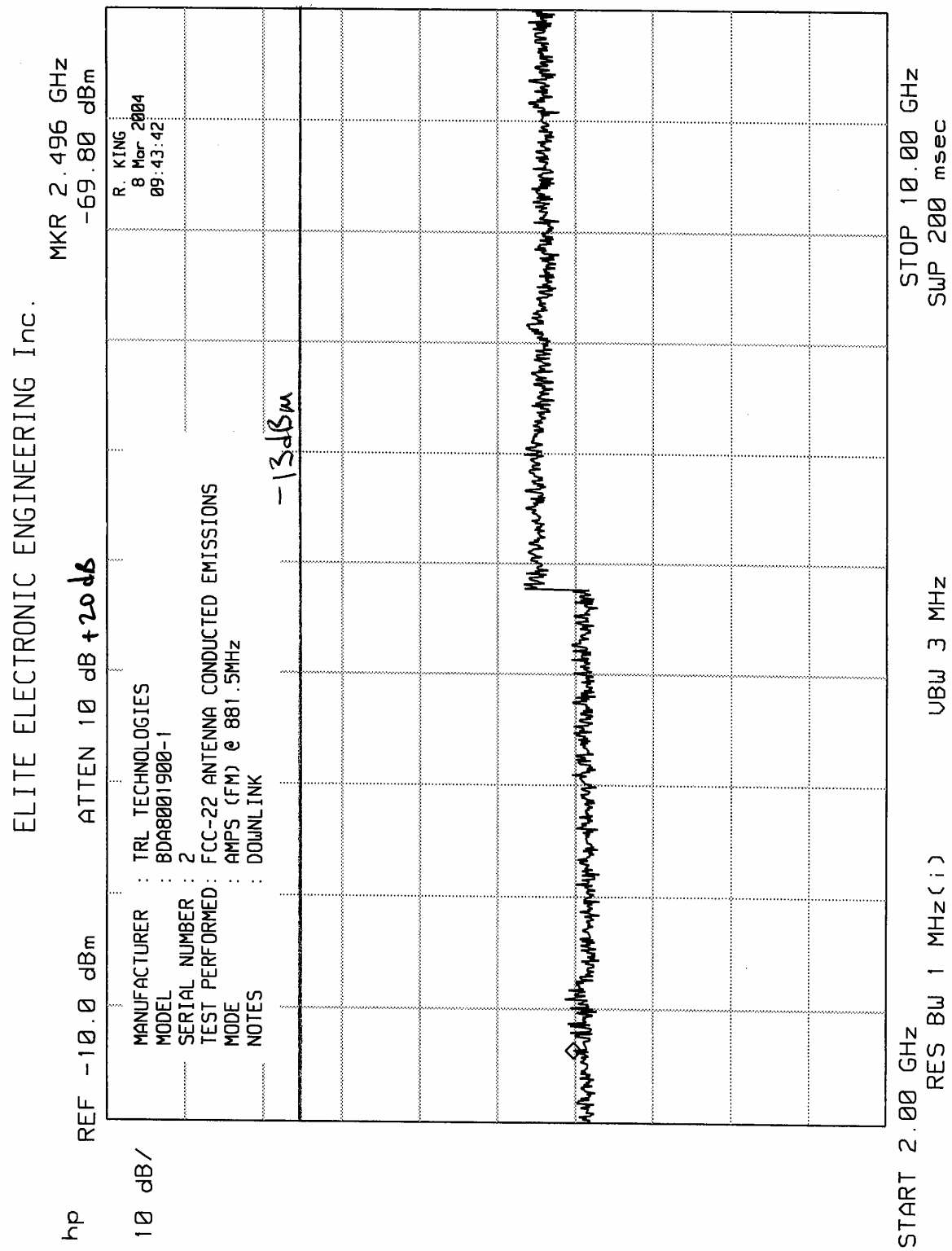

hp
10 dB/
OFFSET
-10.0
dB
REF -10.0 dBm
ATTEN 10 dB +40dB
ELITE ELECTRONIC ENGINEERING Inc.
MKR 839.0 MHz
-24.90 dBm
MANUFACTURER : TRL TECHNOLOGIESINC.
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED: FCC-22 ANTENNA CONDUCTED EMISSIONS
MODE : AMPS (FM) @ 836.5MHz
NOTES : UPLINK
R. KING
8 Mar 2004
08:21:00
-13dBm
START 30 MHz
RES BW 100 kHz(i)
VBW 1 MHz
STOP 1.000 GHz
SWP 728 msec


hp
REF -10.0 dBm
ATTEN 10 dB +40dB
ELITE ELECTRONIC ENGINEERING Inc.
MKR 839.0 MHz
-79.50 dBm
10 dB/
OFFSET
-10.0
dB
MANUFACTURER : TRL TECHNOLOGIESINC.
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED: FCC-22 ANTENNA CONDUCTED EMISSIONS
MODE : AMPS (FM) @ 836.5MHz
NOTES : UPLINK
R. KING
8 Mar 2004
08:25:15
-13 dBm
START 1.00 GHz
RES BW 1 MHz(i)
VBW 3 MHz
STOP 2.00 GHz
SWP 25.0 msec


hp
10 dB/
REF -10.0 dBm
ATTEN 10 dB +20dB
ELITE ELECTRONIC ENGINEERING Inc.
MKR 2.496 GHz
-70.70 dBm
MANUFACTURER : TRL TECHNOLOGIESINC.
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED: FCC-22 ANTENNA CONDUCTED EMISSIONS
MODE : AMPS (FM) @ 836.5MHz
NOTES : UPLINK
R. KING
8 Mar 2004
09:17:00
-13dBm
START 2.00 GHz
RES BW 1 MHz(i)
VBW 3 MHz
STOP 10.00 GHz
SWP 200 msec


hp
10 dB/
OFFSET
-10.0
dB
REF -10.0 dBm
ATTEN 10 dB +40dB
ELITE ELECTRONIC ENGINEERING Inc.
MKR 882.6 MHz
-32.40 dBm
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED: FCC-22 ANTENNA CONDUCTED EMISSIONS
MODE : AMPS (FM) @ 881.5MHz
NOTES : DOWNLINK
R. KING
8 Mar 2004
09:57:17
-13dBm
START 30 MHz
RES BW 100 kHz(i)
VBW 1 MHz
STOP 1.000 GHz
SWP 728 msec


hp
10 dB/
OFFSET
-10.0
dB
REF -10.0 dBm
ELITE ELECTRONIC ENGINEERING Inc.
ATTEN 10 dB +40dB
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED: FCC-22 ANTENNA CONDUCTED EMISSIONS
MODE : AMPS (FM) @ 881.5MHz
NOTES : DOWNLINK
R. KING
8 Mar 2004
09:58:07
-13dBm
START 1.00 GHz
RES BW 1 MHz(i)
VBW 3 MHz
STOP 2.00 GHz
SWP 25.0 msec


hp
10 dB/
REF -10.0 dBm
ATTEN 10 dB +20 dB
ELITE ELECTRONIC ENGINEERING Inc.
MKR 2.496 GHz
-69.80 dBm
MANUFACTURER : TRL TECHNOLOGIES
MODEL : BDA8001900-1
SERIAL NUMBER : 2
TEST PERFORMED: FCC-22 ANTENNA CONDUCTED EMISSIONS
MODE : AMPS (FM) @ 881.5MHz
NOTES : DOWNLINK
R. KING
8 Mar 2004
09:43:42
-13dBm
START 2.00 GHz
RES BW 1 MHz(i)
VBW 3 MHz
STOP 10.00 GHz
SWP 200 msec