Measurement of RF Interference from an WLg-ABOARD/N/CAT WiFi Access Point and Bridge Transceiver

For	Caterpillar Underground Mining Building P, 2-8 Hopkinson St Burnie, Tasmania 7320 AUSTRALIA
P.O. Number	4600250214
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Specification	- FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Sections 15.207 and 15.247 for Digital Modulation Intentional Radiators Operating within the band 2400-2483.5MHz - FCC "Code of Federal Regulations" Title 47, Part15, Subpart 15B, Section 15.107 and 15.109 for Receivers - Industry Canada RSS-210 - Industry Canada RSS-GEN
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REVISION HISTORY

Revision	Date	Description
—	05/30/2014	Initial release

Measurement of RF Emissions from a WiFi Access Point and Bridge (Transceiver), Part No. WLg-ABOARD/N/CAT

1. INTRODUCTION

1.1 Scope of Tests

This document represents the results of the series of radio interference measurements performed on a Caterpillar Underground Mining WiFi Access Point and Bridge, Part No. WLg-ABOARD/N/CAT, transceiver (hereinafter referred to as the EUT). The EUT is a digital modulation transceiver. The transceiver was designed to transmit and receive in the 2400-2483.5 MHz band using the following antennas:

802.11 standard	Single or Dual Antenna (Main or Diversity)	FCC Rule Part	Frequency Range MHz	Data Rates Mb/sec	Antenna on Main Port	Antenna on Aux Port
802.11b	Main	FCC Part 15, Subpart B, Section 247 (DTS)	2412 – 2462	1, 2, 5.5, 11	PacSat OMN2405B (5dBi gain) with 41cm of coaxial cable	50 ohms (Mini-Circuits KARN-50+)
802.11b	Diversity	FCC Part 15, Subpart B, Section 247 (DTS)	2412 – 2462	1, 2, 5.5, 11	RFI Model No. DAS-M1 (3.3dBi gain) with 41cm of coaxial cable	RFI Model No. DAS-M1 (3.3dBi gain) with 41cm of coaxial cable
802.11g	Main	FCC Part 15, Subpart B, Section 247 (DTS)	2412 – 2462	6, 9, 12, 18, 24, 36, 48, 54	PacSat OMN2405B (5dBi gain) with 41cm of coaxial cable	50 ohms (Mini-Circuits KARN-50+)
802.11g	Diversity	FCC Part 15, Subpart B, Section 247 (DTS)	2412 – 2462	6, 9, 12, 18, 24, 36, 48, 54	RFI Model No. DAS-M1 (3.3dBi gain) with 41cm of coaxial cable	RFI Model No. DAS-M1 (3.3dBi gain) with 41cm of coaxial cable

The EUT was manufactured and submitted for testing by Caterpillar Underground Mining located in Burnie, Tasmania, AUSTRALIA.

1.2 Purpose

The test series was performed to determine if the EUT meets the conducted and radiated RF emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart B, Sections 15.107 and 15.109, for receivers, Subpart C, Sections 15.207 and 15.247 for Intentional Radiators operating within the 2400-2483.5 MHz band.

The test series was also performed to determine if the EUT meets the conducted and radiated RF emission requirements of the Industry Canada Radio Standards Specification, RSS-Gen, Section 7.2.4 and Section 6.1 for receivers, Industry Canada Radio Standards Specification RSS-Gen Section 7.2.4 and RSS-210 Annex 8, for Transmitters operating within the 2400-2483.5 MHz band.

Testing was performed in accordance with ANSI C63.4-2009.

1.3 Deviations, Additions and Exclusions

There were no deviations, additions to, or exclusions from the test specification during this test series.

1.4 EMC Laboratory 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.

1.5 Laboratory Conditions

The temperature at the time of the test was 23C and the relative humidity was 18%.

2. APPLICABLE DOCUMENTS

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

- Federal Communications Commission "Code of Federal Regulations", Title 47, Part 15, Subparts B C, dated 1 October 2013
- ANSI C63.4-2009, "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"
- Federal Communications Commission Office of Engineering Technology Laboratory Division, Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247, April 9, 2013
- Federal Communications Commission Office of Engineering Technology Laboratory Division, Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E
- Industry Canada RSS-210, Issue 8,December 2010, “Spectrum Management and Telecommunications Radio Standards Specification, Low-power License-exempt radio communication devices (All Frequency Bands): Category I Equipment”
- Industry Canada RSS-GEN, Issue 3, December 2010, “Spectrum Management and Telecommunications Radio Standards Specification, General Requirements and Information for the Certification of radio communication equipment”

3. EUT SETUP AND OPERATION

3.1 General Description

The EUT is a WiFi Access Point and Bridge, Part No. WLg-ABOARD/N/CAT. A block diagram of the EUT setup is shown as Figure 1 and Figure 2.

3.1.1 Power Input

The EUT can operate on an input voltage of 9 to 72VDC. For testing purposes, the EUT was powered with 27VDC via 2 wires of the input power harness (CAT part number 434-1525).

3.1.2 Peripheral Equipment

The following peripheral equipment was submitted with the EUT:

Item	Description
Laptop computer	HP EliteBook 8470p used to program the DUT.

In addition see §1.1 of this document for a description of the antennas and 50 ohm terminations used during testing.

3.1.3 Interconnect Cables

The following interconnect cables were submitted with the EUT:

Item	Description
LAN cable	Woodhead Connectivity/Brad Harrison P/N: BG20623, used to connect LAN Port 1 to the laptop computer

3.1.4 Grounding

The EUT was not grounded during the tests.

3.2 Software

For all tests the EUT had Firmware Version E2080.CA.1.WLG-AP-BRIDGE-SWITCH_V2_V3_V5.42.0.bin loaded onto the device.

3.3 Operational Mode

For all tests the EUT and all peripheral equipment were placed on an 80cm high non-conductive stand. The EUT and all peripheral equipment were energized. The unit was programmed to operate in one of the following modes:

802.11b
- -Transmit at 2412MHz, 1Mb/sec
- -Transmit at 2412MHz, 2Mb/sec
- -Transmit at 2412MHz, 5.5Mb/sec
- -Transmit at 2412MHz, 11Mb/sec

- -Transmit at 2437MHz, 1Mb/sec
- -Transmit at 2437MHz, 2Mb/sec
- -Transmit at 2437MHz, 5.5Mb/sec
- -Transmit at 2437MHz, 11Mb/sec

- -Transmit at 2462MHz, 1Mb/sec
- -Transmit at 2462MHz, 2Mb/sec
- -Transmit at 2462MHz, 5.5Mb/sec
- -Transmit at 2462MHz, 11Mb/sec

802.11g
- -Transmit at 2412MHz, 6Mb/sec
- -Transmit at 2412MHz, 9Mb/sec
- -Transmit at 2412MHz, 12Mb/sec
- -Transmit at 2412MHz, 18Mb/sec
- -Transmit at 2412MHz, 24Mb/sec
- -Transmit at 2412MHz, 36Mb/sec
- -Transmit at 2412MHz, 48Mb/sec
- -Transmit at 2412MHz, 54Mb/sec

- -Transmit at 2437MHz, 6Mb/sec
- -Transmit at 2437MHz, 9Mb/sec
- -Transmit at 2437MHz, 12Mb/sec
- -Transmit at 2437MHz, 18Mb/sec
- -Transmit at 2437MHz, 24Mb/sec
- -Transmit at 2437MHz, 36Mb/sec
- -Transmit at 2437MHz, 48Mb/sec
- -Transmit at 2437MHz, 54Mb/sec

- -Transmit at 2462MHz, 6Mb/sec
- -Transmit at 2462MHz, 9Mb/sec
- -Transmit at 2462MHz, 12Mb/sec
- -Transmit at 2462MHz, 18Mb/sec
- -Transmit at 2462MHz, 24Mb/sec
- -Transmit at 2462MHz, 36Mb/sec
- -Transmit at 2462MHz, 48Mb/sec
- -Transmit at 2462MHz, 54Mb/sec

3.4 EUT Modifications

No modifications were required for compliance.

4. TEST FACILITY AND TEST INSTRUMENTATION

4.1 Shielded Enclosure

All tests were performed in a 32ft. x 20ft. x 18ft. hybrid ferrite-tile/anechoic absorber lined test chamber. With the exception of the floor, the reflective surfaces of the shielded chamber are lined with ferrite tiles on the walls and ceiling. 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 C63.4-2009 for site attenuation.

4.2 Test Instrumentation

The test instrumentation and auxiliary equipment used during the tests are listed in Table 9-1. All equipment was calibrated per the instruction manuals supplied by the manufacturer.

Conducted emission tests were performed with a spectrum analyzer in conjunction with a quasi-peak adapter. Radiated emissions were performed with a spectrum analyzer. This receiver allows measurements with the bandwidths specified by the FCC and with the quasi-peak and average detector functions. The spectrum analyzer bandwidth was 120kHz for the 30MHz to 1000MHz radiated emissions data and 1MHz for radiated emissions data above 1000MHz.

4.3 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).

4.4 Measurement Uncertainty

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

The measurement uncertainty for these tests is presented below:

Conducted Emissions Measurements		
Combined Standard Uncertainty	1.06	-1.06
Expanded Uncertainty (95% confidence)	2.12	-2.12

Radiated Emissions Measurements		
Combined Standard Uncertainty	2.09	-2.09
Expanded Uncertainty (95% confidence)	4.19	-4.19

5. TEST PROCEDURES

5.1 Receiver

5.1.1 Requirements

Per the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart B, Section 15.101(b), receivers operating above 960MHz are exempt from complying with the technical provisions of part 15.

Per Industry Canada Regulatory Standards Notice – Changes to RSS-Gen, February 2, 2012, Section 2.2.3, only radio communication receivers operating in stand-alone mode within the band 30-960 MHz and scanner receivers are subject to Industry Canada requirements. All other receivers are excluded from any Industry Canada

certification, testing, labelling and reporting requirements. Since the DUT operates above 960MHz, no testing is required on the receiver portion of the DUT.

5.2 Transmitter

5.2.1 FCC 15C, §15.247 (DTS)

5.2.1.1 Powerline Conducted Emissions

5.2.1.1.1 Requirements

Since the DUT is normally powered by the battery of the vehicle in which it is installed, no powerline conducted emissions tests were performed.

5.2.1.2 6dB Bandwidth

5.2.1.2.1 Requirements

Per 15.247(a)(2),the minimum 6dB bandwidth shall be at least 500kHz for all systems using digital modulation techniques.

5.2.1.2.2 Procedures

The output of the EUT was connected to the spectrum analyzer through 50dB of attenuation.

The EUT was allowed to transmit continuously. The transmit channel was set separately to low, middle, and high channels. The resolution bandwidth (RBW) was set to 100kHz and the span was set to greater than the RBW.

The 'Max-Hold' function was engaged. The analyzer was allowed to scan until the envelope of the transmitter bandwidth was defined. The analyzer's display was plotted using a 'screen dump' utility.

5.2.1.2.3 Results

Pages 22 through 57 show the 6dB bandwidth for the EUT transmitting in the 2.4GHz band using 802.11b and 802.11g modes. The minimum 6 dB bandwidth was 9.98MHz which is greater than minimum allowable 6dB bandwidth requirement of 500kHz for systems using digital modulation techniques. The 99% bandwidth was measured to be 16.6MHz.

5.2.1.3 Peak Output Power - Conducted

5.2.1.3.1 Requirements

Per section 15.247(b)(3), for systems using digital modulation the maximum peak output conducted power shall not be greater than 1.0W (30dBm).

5.2.1.3.2 Procedures

The output of the EUT was connected to the spectrum analyzer through 50dB of attenuation. The spectrum analyzer was setup as specified in the Federal Communications Commission Office of Engineering Technology Laboratory Division, Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247, April 9, 2013, paragraph 9.1.2 for Integrated Band Power Measurements. The peak power output was measured for the low, middle and high channels.

5.2.1.3.3 Results

The maximum peak conducted output power results with the EUT transmitting in the 2.4GHz band using 802.11b and 802.11g modes are shown in tabular form on pages 58 and 59. The screen captures from the spectrum analyzer used to measure the output power for each mode are shown on pages 60 through 95. The maximum

peak conducted output power from the DUT was 24.27dBm (267.3mW) which is below the 30dBm (1 W) limit.

5.2.1.4 Peak Output Power – Radiated

5.2.1.4.1 Requirements

Per section 15.247(b)(3), for systems using digital modulation the maximum peak output conducted power shall not be greater than 1.0W (30dBm). Per section 15.247(b)(4), this limit is based on the use of antennas with directional gains that do not exceed 6dBi. Since the limit allows for a 6dBi antenna gain, the maximum EIRP can be increased by 6dB to 4 Watt (36dBm).

5.2.1.4.2 Procedures

The maximum peak effective radiated power (EIRP) was calculated by adding the nominal gain (dBi) of each antenna used by the EUT to the maximum peak conducted output power (dBm) of the EUT.

5.2.1.4.3 Results

The maximum peak effective radiated power (EIRP) results with the EUT transmitting in the 2.4GHz band using 802.11b and 802.11g modes are shown in tabular form on pages 96 through 99. The maximum EIRP from the DUT was calculated to be 29.27dBm (845.3mW) which is below the 36dBm (4 W) limit.

5.2.1.5 Duty Cycle Factor Measurements

5.2.1.5.1 Procedures

The duty cycle factor is used to convert peak detected readings to average readings. This factor is computed from the time domain trace of the pulse modulation signal.

With the transmitter set up to transmit for maximum pulse density, the time domain trace is displayed on the spectrum analyzer. This trace is obtained by tuning center frequency to the transmitter frequency and then setting a zero span width with a sweep rate adjusted to capture a single pulse. The amplitude settings are adjusted so that the on/off transitions clear the 4th division from the bottom of the display. The markers are set at the beginning and end of the “on-time”. The trace is recorded.

Next the spectrum analyzer center frequency is set to the transmitter frequency with a zero span width and a sweep rate of 10msec/div. The maximum on-time is then calculated by multiplying the number of pulses that occur in a 100msec period by the length of each pulse. The duty cycle is then computed as the (On-time/ 100msec).

5.2.1.5.2 Results

The plots of the duty cycle are shown on data pages 100 through 103. The duty cycle correction factor for 802.11a mode was calculated to be -52.4dB. The duty cycle correction factor for 802.11b mode was calculated to be -29.15dB. The duty cycle correction factor for 802.11g mode was calculated to be -51.93dB.

5.2.1.6 Antenna Conducted Spurious Emissions

5.2.1.6.1 Requirements

Per section 15.247(d), the spurious emissions in any 100 kHz BW outside the frequency band must be at least 20dB below the highest 100 kHz BW level measured within the band.

5.2.1.6.2 Procedures

The output of the EUT was connected to the spectrum analyzer through 40dB of attenuation. The resolution bandwidth (RBW) was set to 100kHz. The peak detector and 'Max-Hold' function were engaged. The emissions in the frequency range from 30MHz to 26GHz were observed and plotted separately with the EUT transmitting at low, middle and high channels of the 2.4GHz band. The emissions in the frequency range from 30MHz 40GHz were observed and plotted separately with the EUT transmitting at low, middle and high channels of the 5GHz band.

5.2.1.6.3 Results

The antenna conducted emissions results with the EUT transmitting in the 2.4GHz band using 802.11b and 802.11g modes are shown on pages 104 through 175. These plots show that the spurious emissions were at least 20 dB below the level of the fundamental.

5.2.1.7 Radiated Spurious Emissions Measurements

5.2.1.7.1 Requirements

Per 15.247(d), radiated emissions which fall in the restricted bands, as defined in §15.205(a), must comply with the radiated emission limits specified in §15.209(a).

Paragraph 15.209(a) has the following radiated emission limits:

Frequency MHz	Field Strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	3
30.0-88.0	100	3
88.0-216.0	150	3
216.0-960.0	200	3
Above 960	500	3

5.2.1.7.2 Procedures

Radiated measurements were performed in a 32ft. x 20ft. x 14ft. high shielded enclosure. 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.

Preliminary radiated emissions tests were performed to determine the emission characteristics of the EUT. For the preliminary test, a broadband measuring antenna was positioned at a 3 meter distance from the EUT. The entire frequency range from 30MHz to 25GHz (the test was extended out to 40GHz for the 802.11a mode) was investigated using a peak detector function.

The final open field emission tests were then manually performed over the frequency range of 30MHz to 25GHz.

For all emissions in the restricted bands, the following procedure was used:

a) The field strengths of all emissions below 1 GHz were measured using a bi-log antenna. The bi-log antenna was positioned at a 3 meter distance from the EUT. A peak detector with a resolution bandwidth of 100 kHz was used on the spectrum analyzer.

b) The field strengths of all emissions above 1 GHz were measured using a double-ridged waveguide antenna. The waveguide antenna was positioned at a 3 meter distance from the EUT. A peak detector with a resolution bandwidth of 1 MHz was used on the spectrum analyzer.

c) To ensure that maximum or worst case emission levels were measured, the following steps were taken when taking all measurements:

   i) The EUT was rotated so that all of its sides were exposed to the receiving antenna.

   ii) Since the measuring antenna is linearly polarized, both horizontal and vertical field components were measured.

   iii) The measuring antenna was raised and lowered for each antenna polarization to maximize the

readings.

iv) In instances where it was necessary to use a shortened cable between the measuring antenna and the spectrum analyzer. The measuring antenna was not raised or lowered to ensure maximized readings, instead the EUT was rotated through all axis to ensure the maximum readings were recorded for the EUT.

d) For all radiated emissions measurements below 1 GHz, if the peak reading is below the limits listed in 15.209(a), no further measurements are required. If however, the peak readings exceed the limits listed in 15.209(a), then the emissions are remeasured using a quasi-peak detector.

e) For all radiated emissions measurements above 1 GHz, the peak readings must comply with the 15.35(b) limits. 15.35(b) states that when average radiated emissions measurements are specified, there also is a limit on the peak level of the radiated emissions. The limit on the peak radio frequency emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test. Therefore, all peak readings above 1 GHz must be no greater than 20 dB above the limits specified in 15.209(a).

f) Next, all peak radiated emissions measurements above 1GHz were converted to average readings by adding the duty cycle correction factor to the peak readings. The duty cycle correction factor was derived from 20*log(dwell time/100msec). These readings must be no greater than the limits specified in 15.209(a).

5.2.1.7.3 Results

Preliminary radiated emissions plots with the EUT transmitting in the 2.4GHz band using 802.11b and 802.11g modes are shown on pages 176 through 271. Final radiated emissions data with the EUT transmitting in the 2.4GHz band using 802.11b and 802.11g modes are shown on pages 272 through 299. As can be seen from the data, all emissions measured from the EUT were within the specification limits. The emissions level closet to the limit (worst case) occurred at 37.9MHz. The emissions level at this frequency was 0.2dB within the limit. Photographs of the test configuration which yielded the highest, or worst case, radiated emission levels are shown on Figure 3 through Figure 12.

5.2.1.8 Band Edge Compliance

5.2.1.8.1 Requirements

Per section 15.247(d), the emissions at the band-edges must be at least 20dB below the highest level measured within the band but attenuation below the general limits listed in 15.209(a) is not required. In addition, the radiated emissions which fall in the restricted band beginning at 2483.5 MHz must meet the general limits of 15.209(a).

5.2.1.8.2 Procedures

5.2.1.8.2.1 Low Band Edge (2400MHz)

1) The output of the EUT was connected to the spectrum analyzer through 50dB of attenuation.
2) The EUT was set to transmit continuously at the channel closest to the low band-edge.
3) To determine the band edge compliance, the following spectrum analyzer settings were used:

   a. Center frequency = low band-edge frequency.
   b. Span = Wide enough to capture the peak level of the emission operating on the channel closest to the band-edge, as well as any modulation products which fall outside of the authorized band of operation.
   c. Resolution bandwidth (RBW) = 100kHz.
   d. The 'Max-Hold' function was engaged. The analyzer was allowed to scan until the envelope of the transmitter bandwidth was defined.
   e. The marker was set on the peak of the in-band emissions. A display line was placed 20dB down from the peak of the in-band emissions. All emissions which fall outside of the authorized band of operation must be below the 20dB down display line. (All emissions to the left of the center frequency (band-edge) must be below the display line.)

f. The analyzer's display was plotted using a 'screen dump' utility.

5.2.1.8.2.2 High Band Edge (2483.5MHz)

1) The EUT was set to transmit continuously at the channel closest to the high band-edge.
2) A double ridged waveguide was placed 3 meters away from the EUT. The antenna was connected to the input of a spectrum analyzer.
3) The center frequency of the analyzer was set to the high band edge (2483.5MHz)
4) The resolution bandwidth was set to 1MHz.
5) To ensure that the maximum or worst case emission level was measured, the following steps were taken:

   a. The EUT was rotated so that all of its sides were exposed to the receiving antenna.
   b. Since the measuring antenna is linearly polarized, both horizontal and vertical field components were measured.
   c. The measuring antenna was raised and lowered from 1 to 4 meters for each antenna polarization to maximize the readings.

6) The highest measured peak reading was recorded.
7) The highest measured average reading was recorded.

5.2.1.9 Results

Low band edge (2400MHz) compliance results with the EUT transmitting in the 2.4GHz band using 802.11b and 802.11g modes are shown on pages 300 through 311. As can be seen from these plots, the conducted emissions at the low end band edge are within the 20 dB down limits.

High band edge (2483.5MHz) compliance results with the EUT transmitting in the 2.4GHz band using 802.11b and 802.11g modes are shown on pages 312 through 319. As can be seen from the data, the radiated emissions at the high end band edge meet the general limits of 15.209(a).

5.2.1.10 Maximum Peak Conducted Power Spectral Density

5.2.1.10.1 Requirement

Per section 15.247(e), the peak power spectral density from the intentional radiator shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

5.2.1.10.2 Procedures

The output of the EUT was connected to the spectrum analyzer through 50dB of attenuation. The EUT was allowed to transmit continuously. The transmit channel was set separately to low, middle, and high channels. To determine the power spectral density, the following spectrum analyzer settings were used:

a. Set analyzer center frequency to DTS channel center frequency.
b. Set the span to 1.5 times the DTS bandwidth.
c. Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
d. Set the VBW ≥ 3 x RBW.
e. Detector = peak.
f. Sweep time = auto couple.
g. Trace mode = max hold.
h. Allow trace to fully stabilize.
i. Use the peak marker function to determine the maximum amplitude level within the RBW.
j. If the measured value exceeds the +8dBm limit, reduce the RBW (no less than 3kHz) and repeat.

5.2.1.10.3 Results

Maximum peak conducted power spectral density results with the EUT transmitting in the 2.4GHz band using 802.11b and 802.11g modes are shown on pages 320 through 355. As can be seen from these plots, the maximum peak conducted power spectral density measurements were below the +8dBm limit.

6. CONCLUSIONS

It was determined that the Caterpillar Underground Mining WiFi Access Point and Bridge, Part No. WLg-ABOARD/N/CAT transceiver, did fully meet the conducted and radiated emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart B, Sections 15.107 and 15.109 for receivers, Subpart C, Sections 15.207 and 15.247 for intentional radiators utilizing digital modulation operating within the 2400-2483.5 MHz band when tested per ANSI C63.4-2009.

It was also determined that the Caterpillar Underground Mining WiFi Access Point and Bridge, Part No. WLg-ABOARD/N/CAT transceiver, did fully meet the conducted and radiated RF emission requirements of the Industry Canada Radio Standards Specification, RSS-Gen, Section 7.2.4 and Section 6.1 for receivers and the Industry Canada Radio Standards Specification RSS-Gen Section 7.2.4 and RSS-210 Annex 8 for transmitters utilizing digital modulation operating within the 2400-2483.5 MHz band when tested per ANSI C63.4-2009.

7. 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 specifications.

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

8. ENDORSEMENT DISCLAIMER

This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the Federal Government.

9. EQUIPMENT LIST

Table 9-1 Equipment List

Eq ID	Equipment Description	Manufacturer	Model No.	Serial No.	Frequency Range	Cal Date	Due Date
APW0	PREAMPLIFIER	PLANAR ELECTRONICS	PE2-30-20G20R6G	PL2926/0646	20GHZ-26.5GHZ	3/11/2014	3/11/2015
APW3	PREAMPLIFIER	PLANAR ELECTRONICS	PE2-35-120-5R0-10-12	PL2924	1GHZ-20GHZ	10/8/2013	10/8/2014
APW4	PREAMPLIFIER	PLANAR	PE2-36-2D540G-5R0-10	PL3043/0651	26.5GHZ-40GHZ		
CDX4	COMPUTER	ELITE CUSTOM	WINDOW 7 PRO			NOTE 1	
CDX7	COMPUTER	ELITE	WORKSTATION			N/A	
CDX8	COMPUTER	ELITE	WORKSTATION			N/A	
ECA0	TEMPERATURE CHAMBER	BLUE M	POM-146A-1	P14-4383	-40 TO 160	NOTE 1	
ECAB	PRODUCT SAVER	WATLOW	97A1	016561	-40 TO 100 C	NOTE 1	
MTE3	TEMPERATURE CHART RECORDER	HONEYWELL	DR45AT-1100	0717Y77407200004	---	10/8/2013	10/8/2014
NHG1	STANDARD GAIN HORN ANTENNA	NARDA	638	---	18-26.5GHZ	NOTE 1	
NHH0	STANDARD GAIN HORN ANTENNA	NARDA	V637	---	26.5-40GHZ	NOTE 1	
NTA3	BILOG ANTENNA	TESEQ	6112D	28040	25-1000MHz	2/19/2014	2/19/2015
NWQ2	DOUBLE RIDGED WAVEGUIDE ANTENNA	ETS LINDGREN	3117	66659	1GHZ-18GHZ	3/20/2014	3/20/2015
RBA0	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB26	100145	20HZ-26.5GHZ	3/7/2014	3/7/2015
RBB0	EMI TEST RECEIVER 20HZ TO 40 GHZ.	ROHDE & SCHWARZ	ESIB40	100250	20 HZ TO 40GHZ	3/11/2014	3/11/2015
RBE1	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESU26	100096	20Hz-26GHz	2/28/2014	2/28/2015
SMAR	DC POWER SUPPLY	VOLTEQ	HY3020EX	11885493	30VDC/20A	NOTE 1	
T1ED	10DB 25W ATTENUATOR	WEINSCHEL	46-10-34	BN2320	DC-18GHZ	1/6/2014	1/6/2015
T2DS	20DB, 25W ATTENUATOR	WEINSCHEL	46-20-34	BS0916	DC-18GHZ	8/5/2013	8/5/2014
T2S6	20DB 25W ATTENUATOR	WEINSCHEL	46-20-34	BV3539	DC-18GHZ	11/11/2013	11/11/2014
WQC0	HF_8546A						
XOA2	WAVE-TO-COAX ADAPTER	HEWLETT PACKARD	R281B	01138	26.5-65GHZ	NOTE 1	
XOB2	ADAPTER	HEWLETT PACKARD	K281C,012	09407	18-26.5GHZ	NOTE 1	
XPR0	HIGH PASS FILTER	K&L MICROWAVE	11SH10-4800/X20000	001	4.8-20GHZ	9/12/2013	9/12/2014

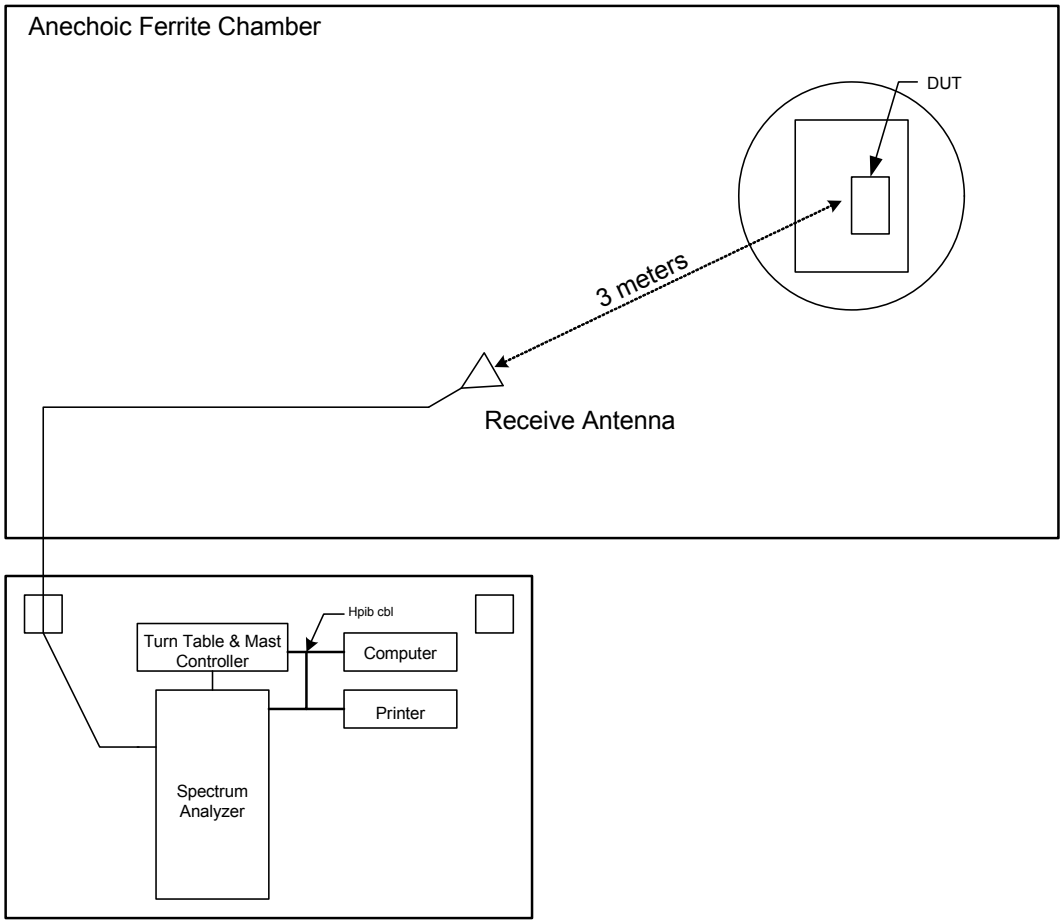


FIGURE 1 BLOCKDIAGRAM OF TEST SETUP

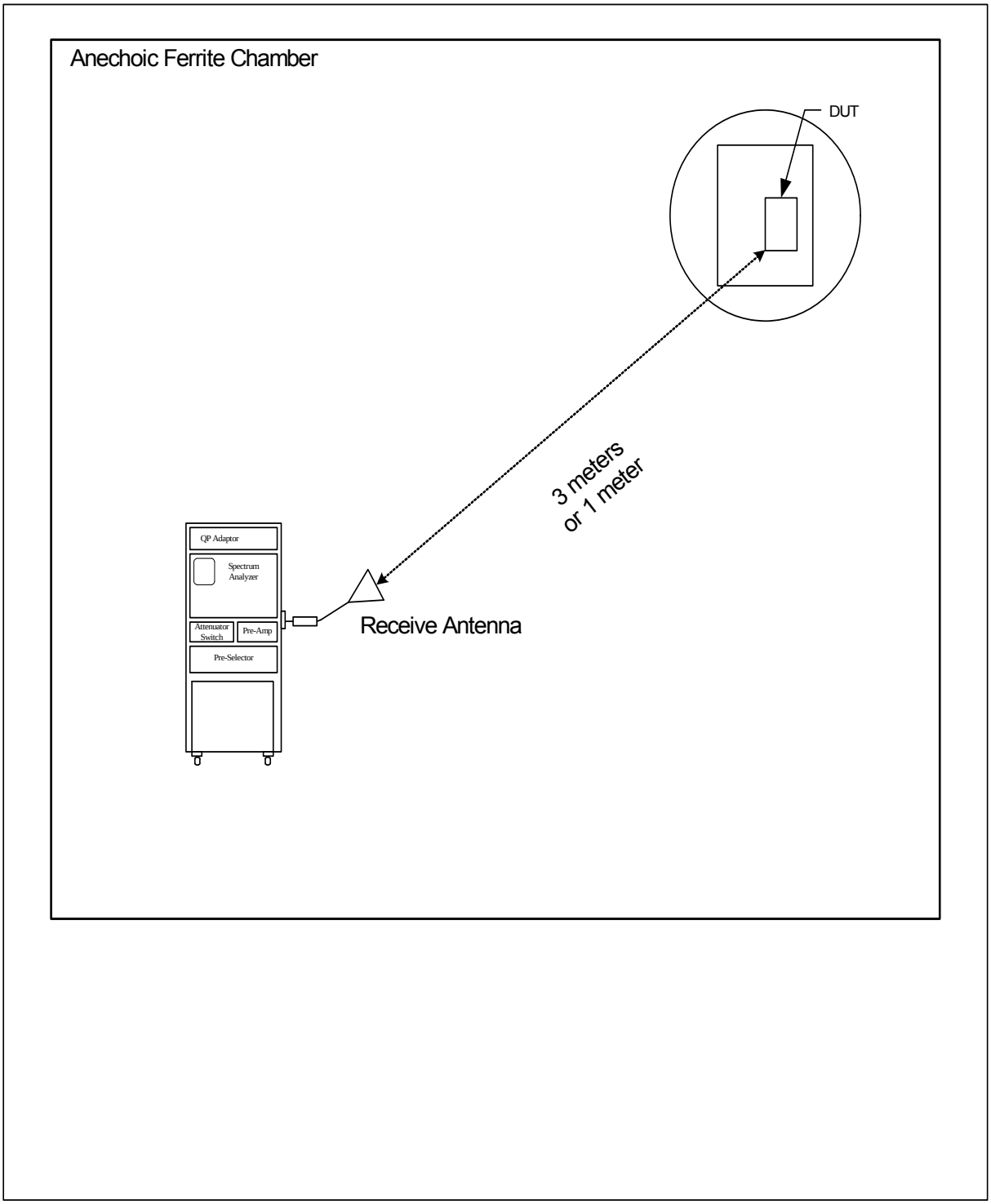
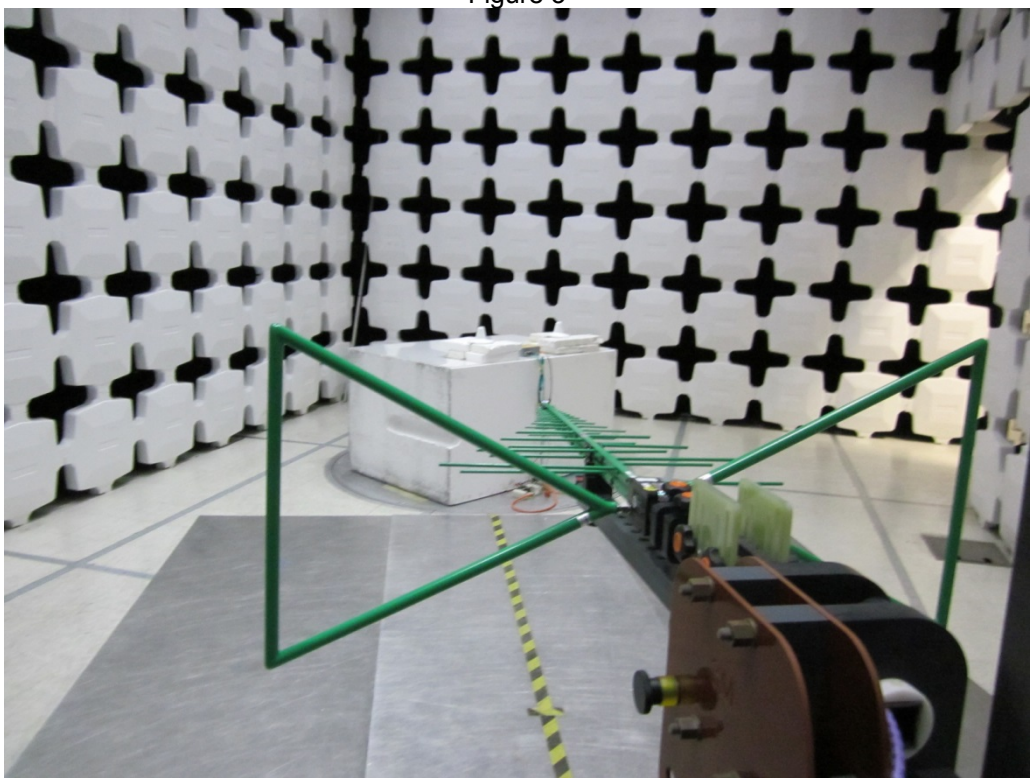
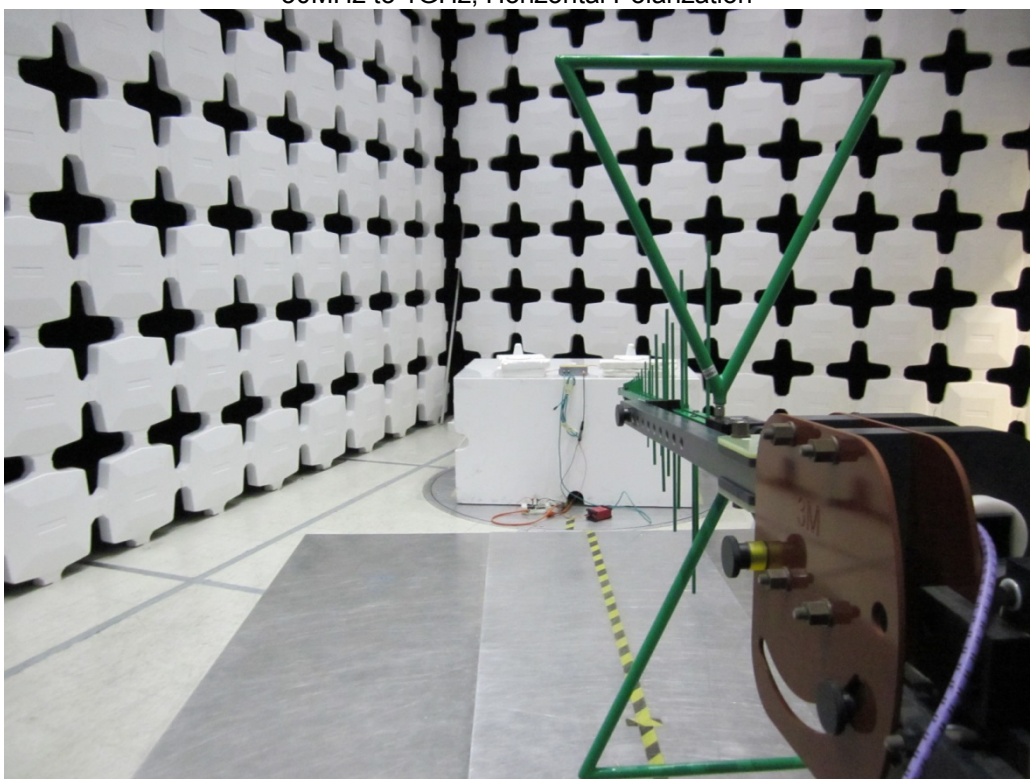


Figure 2: BLOCK DIAGRAM OF TEST SETUP FOR RADIATED EMISSIONS ABOVE 18GHZ

Figure 3

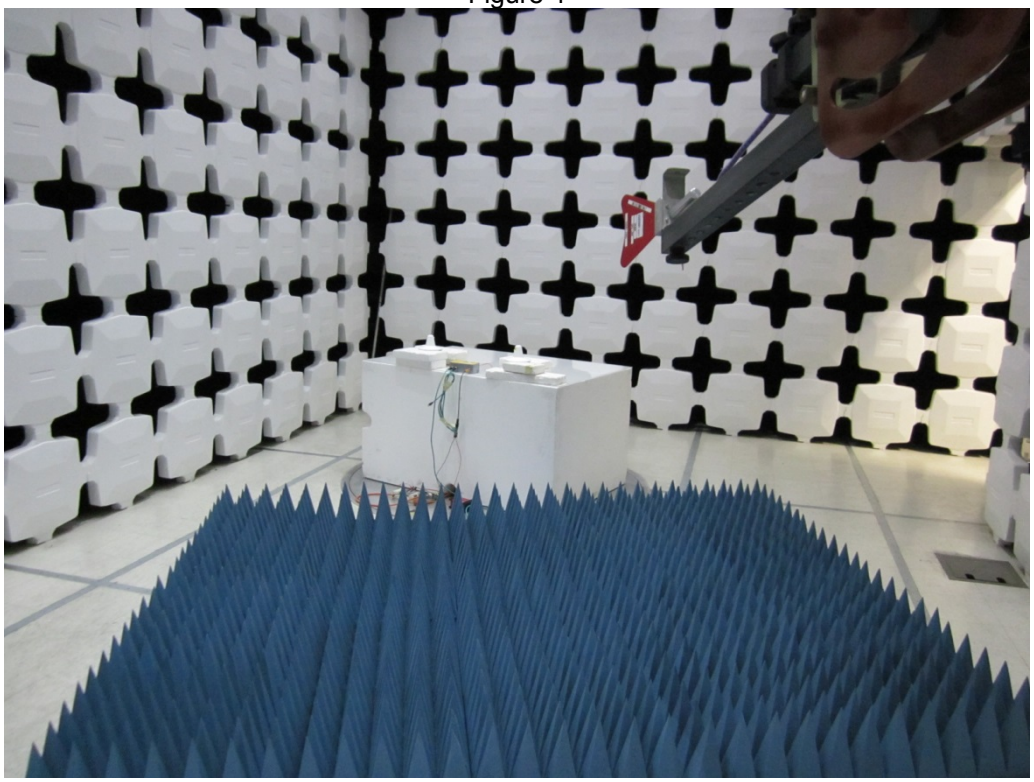


Test Setup for Radiated Emissions, 802.11b and 802.11g Diversity Modes, – 30MHz to 1GHz, Horizontal Polarization

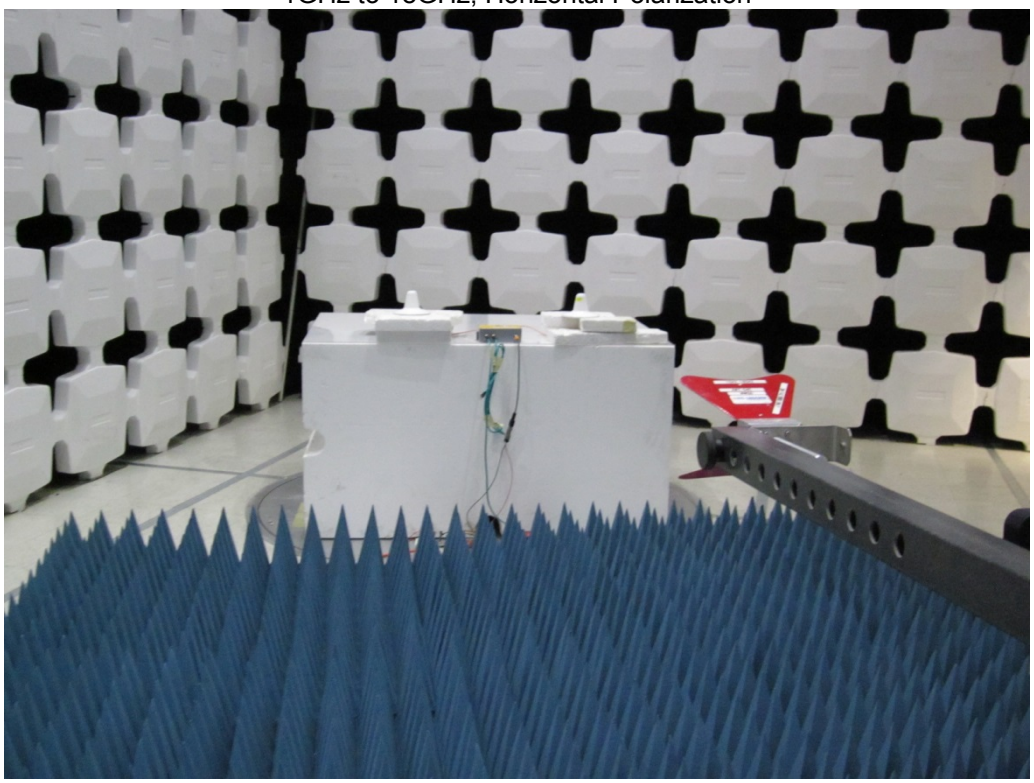


Test Setup for Radiated Emissions, 802.11b and 802.11g Diversity Modes, – 30MHz to 1GHz, Vertical Polarization

Figure 4

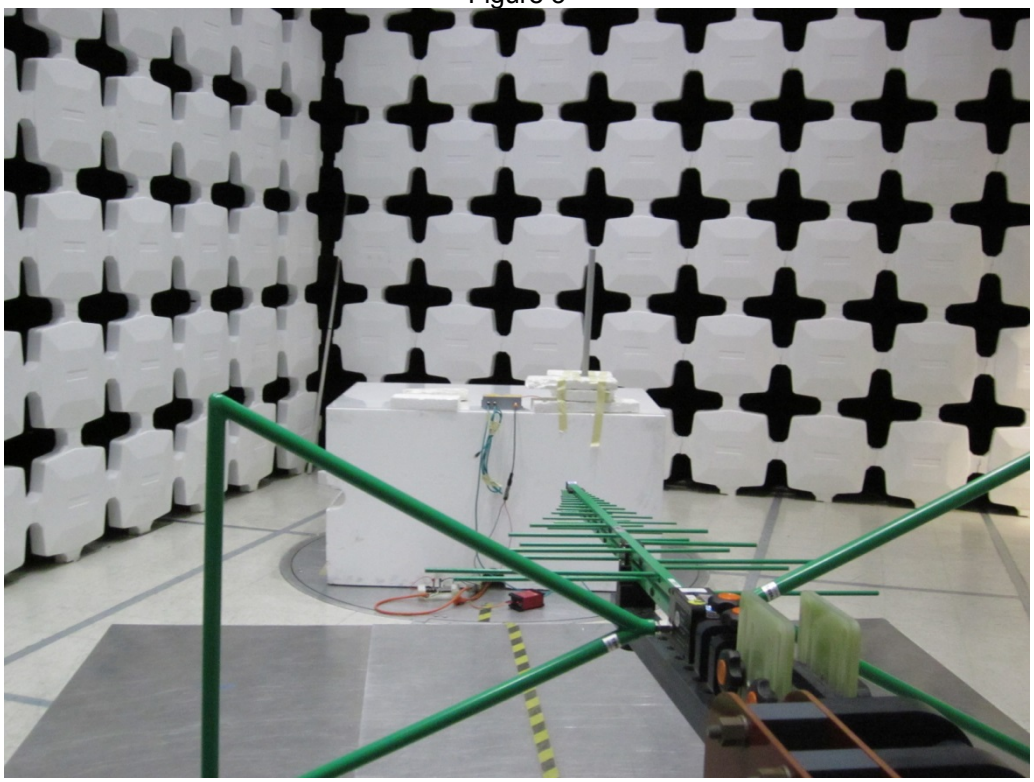


Test Setup for Radiated Emissions, 802.11b and 802.11g Diversity Modes, – 1GHz to 18GHz, Horizontal Polarization

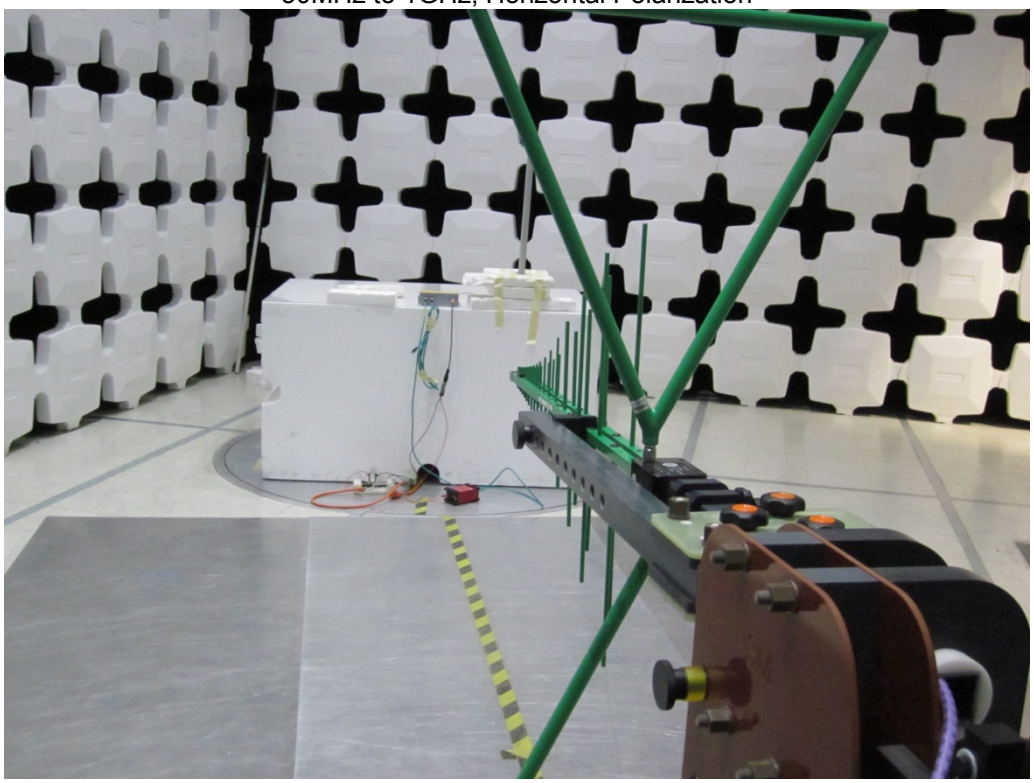


Test Setup for Radiated Emissions, 802.11b and 802.11g Diversity Modes, – 1GHz to 18GHz, Vertical Polarization

Figure 5

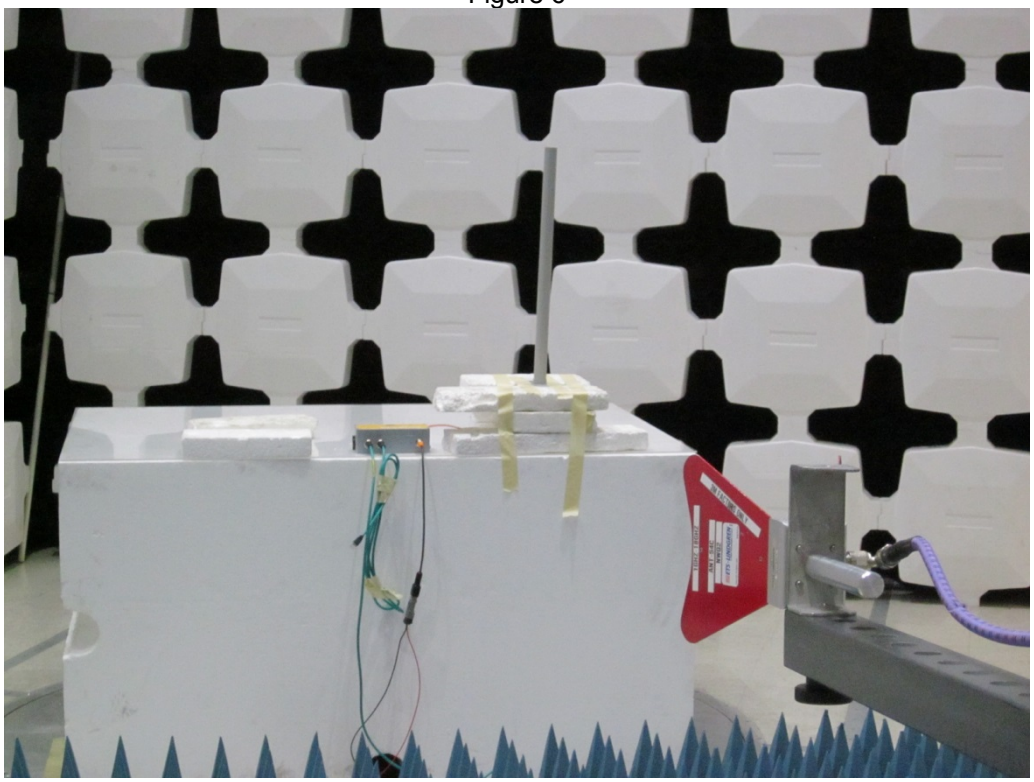


Test Setup for Radiated Emissions, 802.11b and 802.11g Main Modes, –
30MHz to 1GHz, Horizontal Polarization

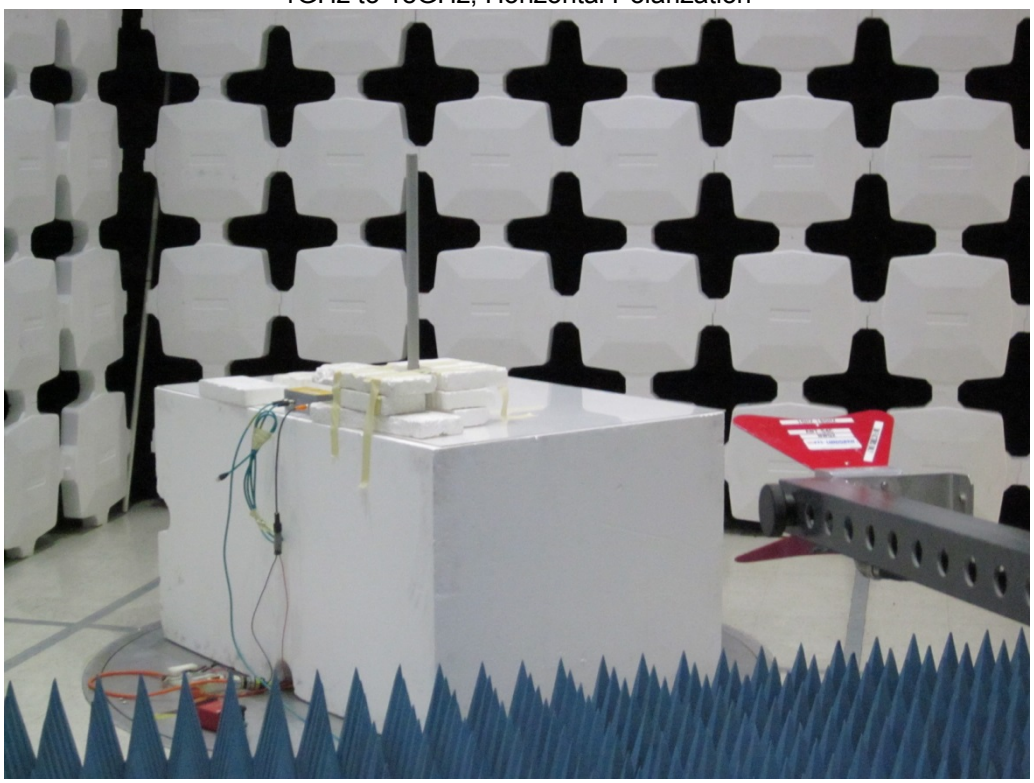


Test Setup for Radiated Emissions, 802.11b and 802.11g Main Modes, –
30MHz to 1GHz, Vertical Polarization

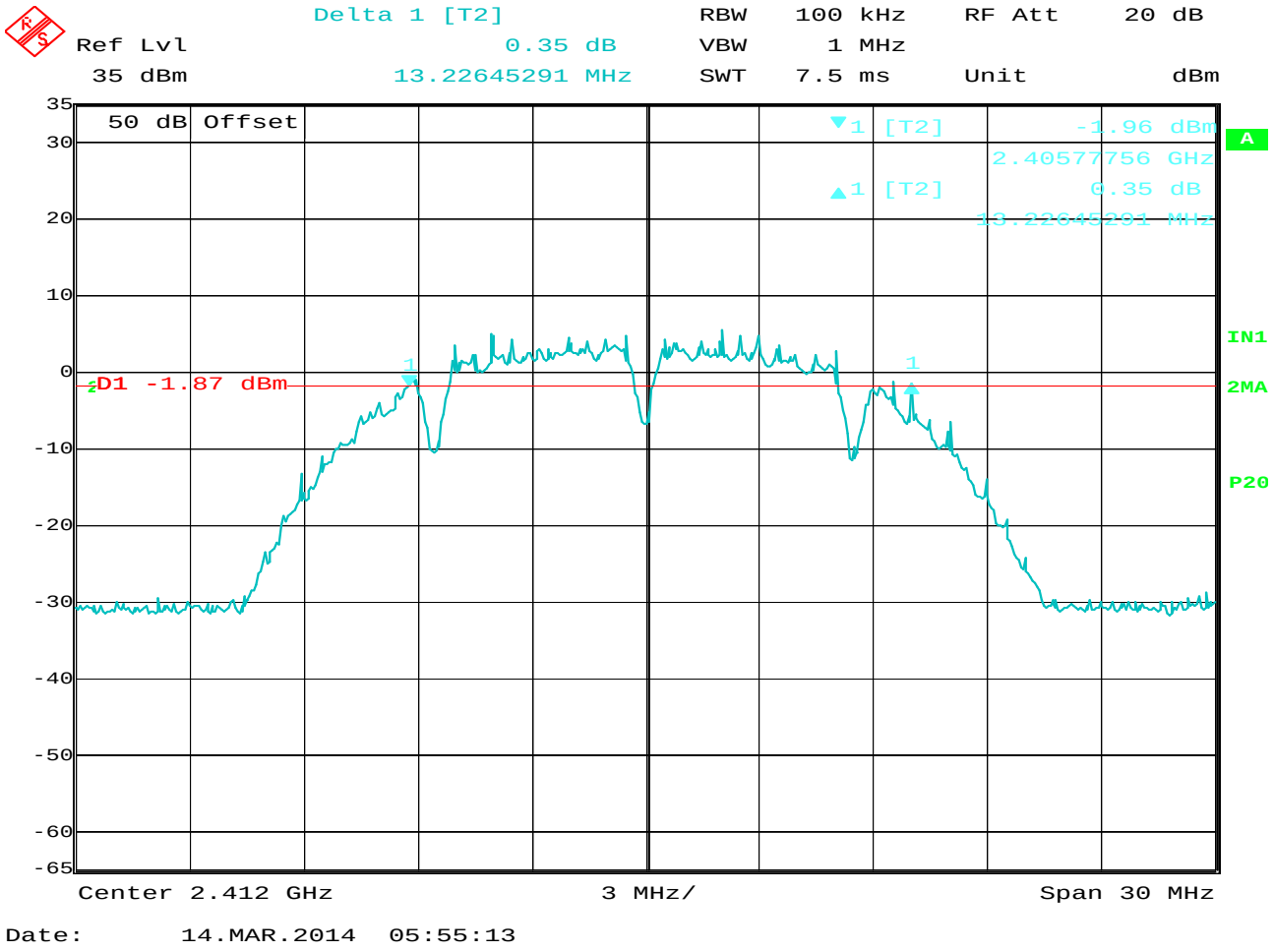
Figure 6



Test Setup for Radiated Emissions, 802.11b and 802.11g Main Modes, –
1GHz to 18GHz, Horizontal Polarization



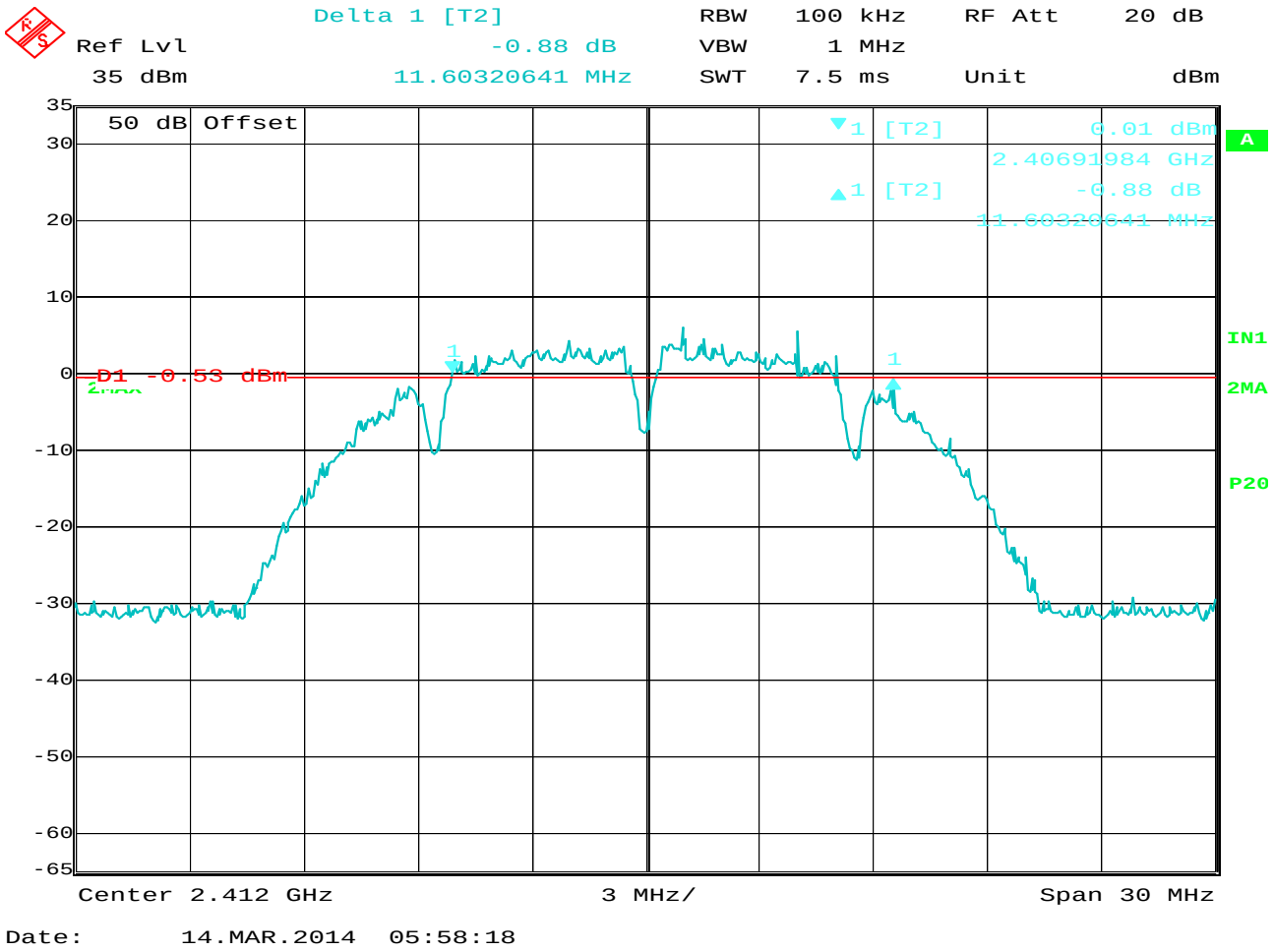
Test Setup for Radiated Emissions, 802.11b and 802.11g Main Modes, –
1GHz to 18GHz, Vertical Polarization



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at LOW Channel
PROTOCOL	:	802.11 b
DATA RATE	:	1MB/s
NOTES	:	

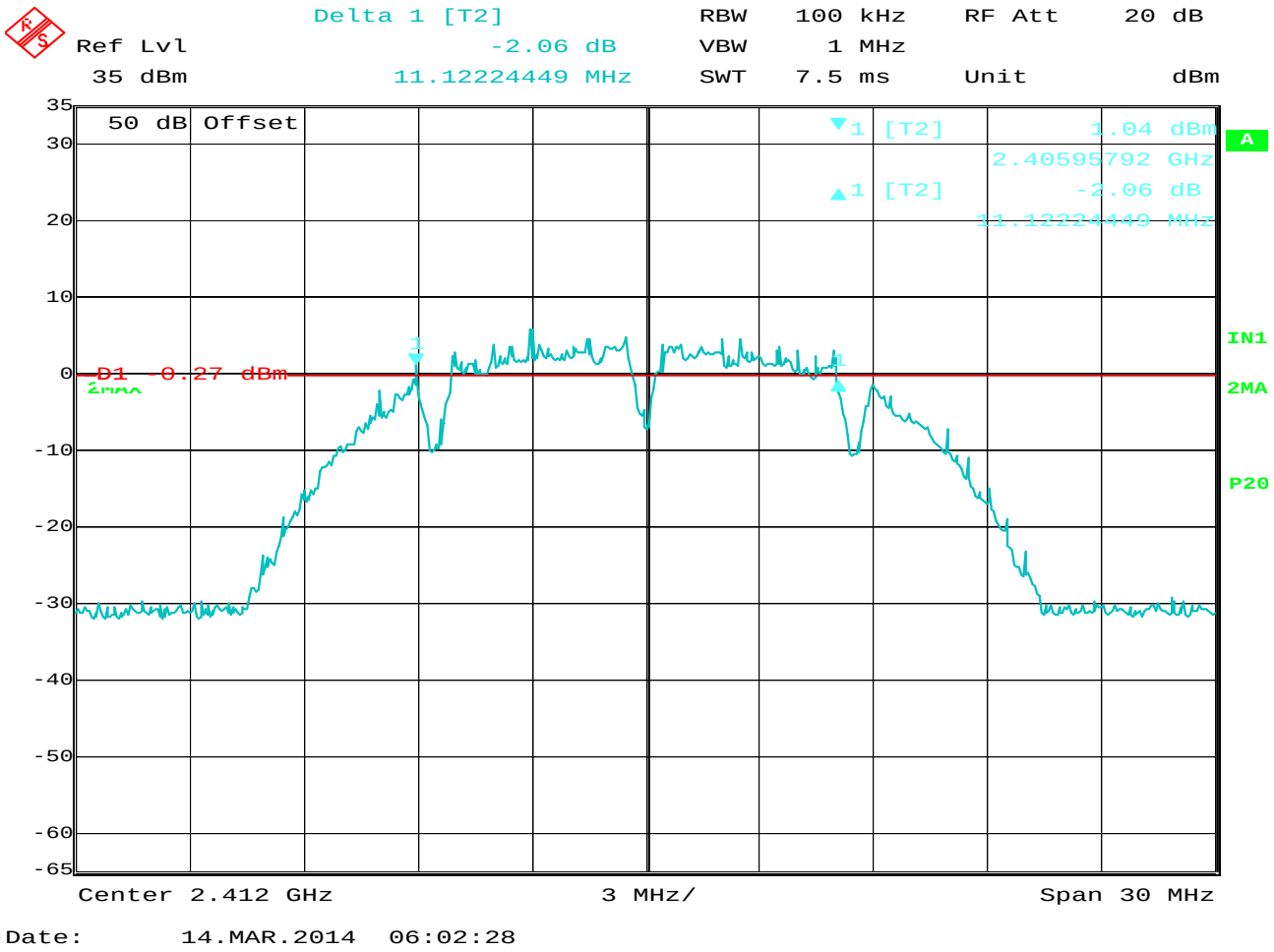
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at LOW Channel
PROTOCOL	:	802.11 b
DATA RATE	:	2MB/s
NOTES	:	

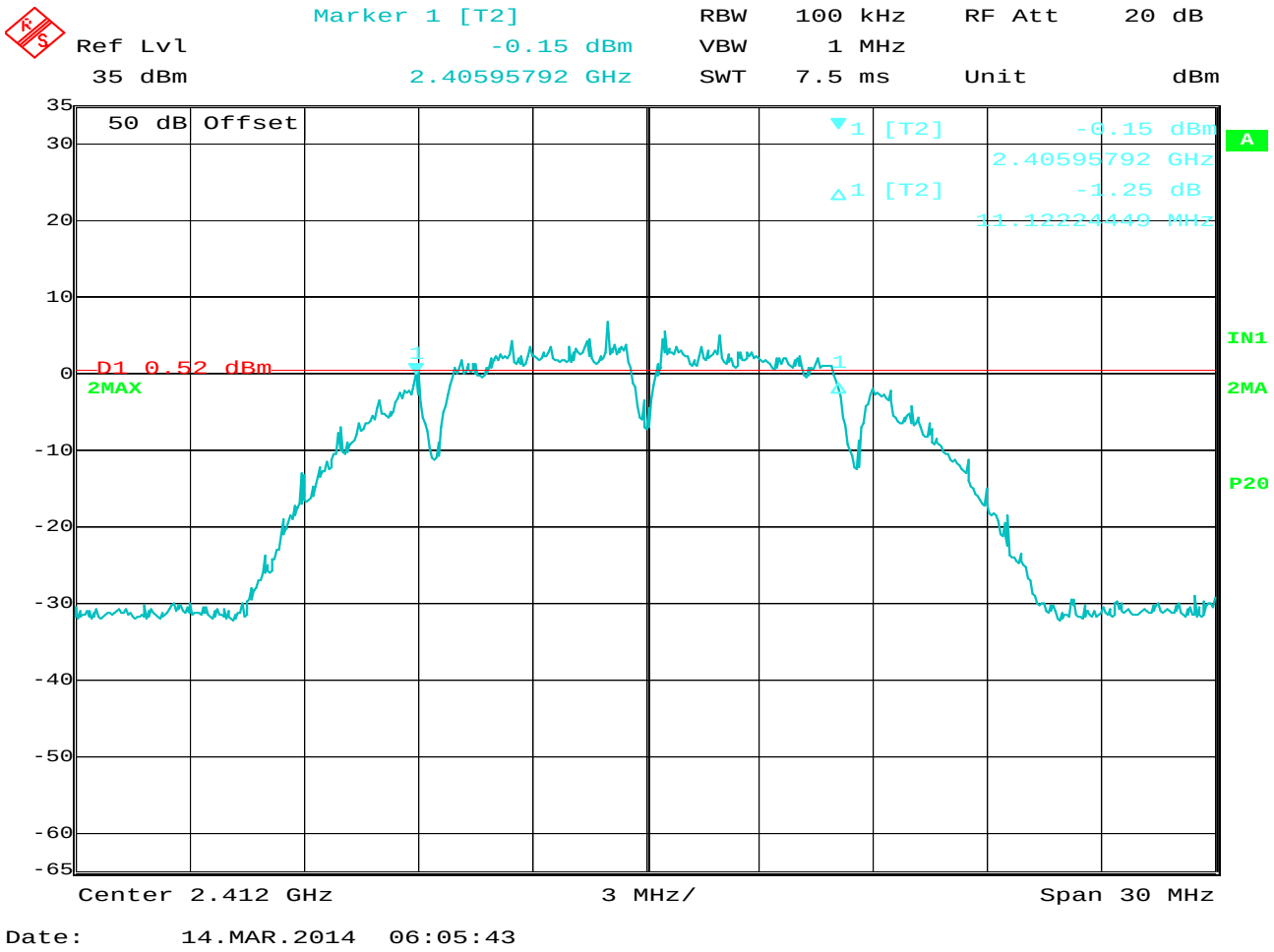
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at LOW Channel
PROTOCOL	:	802.11 b
DATA RATE	:	5.5MB/s
NOTES	:	

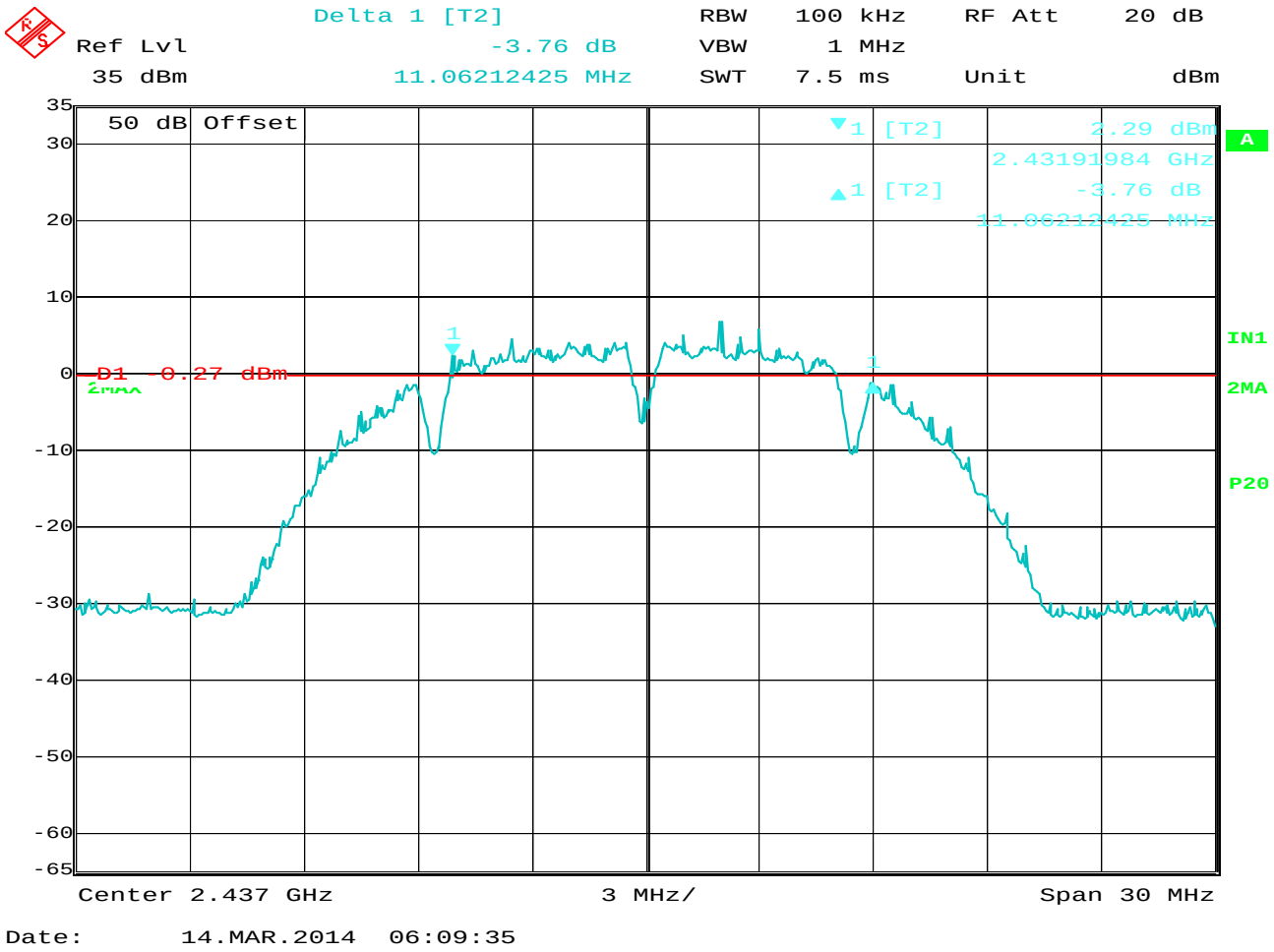
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at LOW Channel
PROTOCOL	:	802.11 b
DATA RATE	:	11MB/s
NOTES	:	

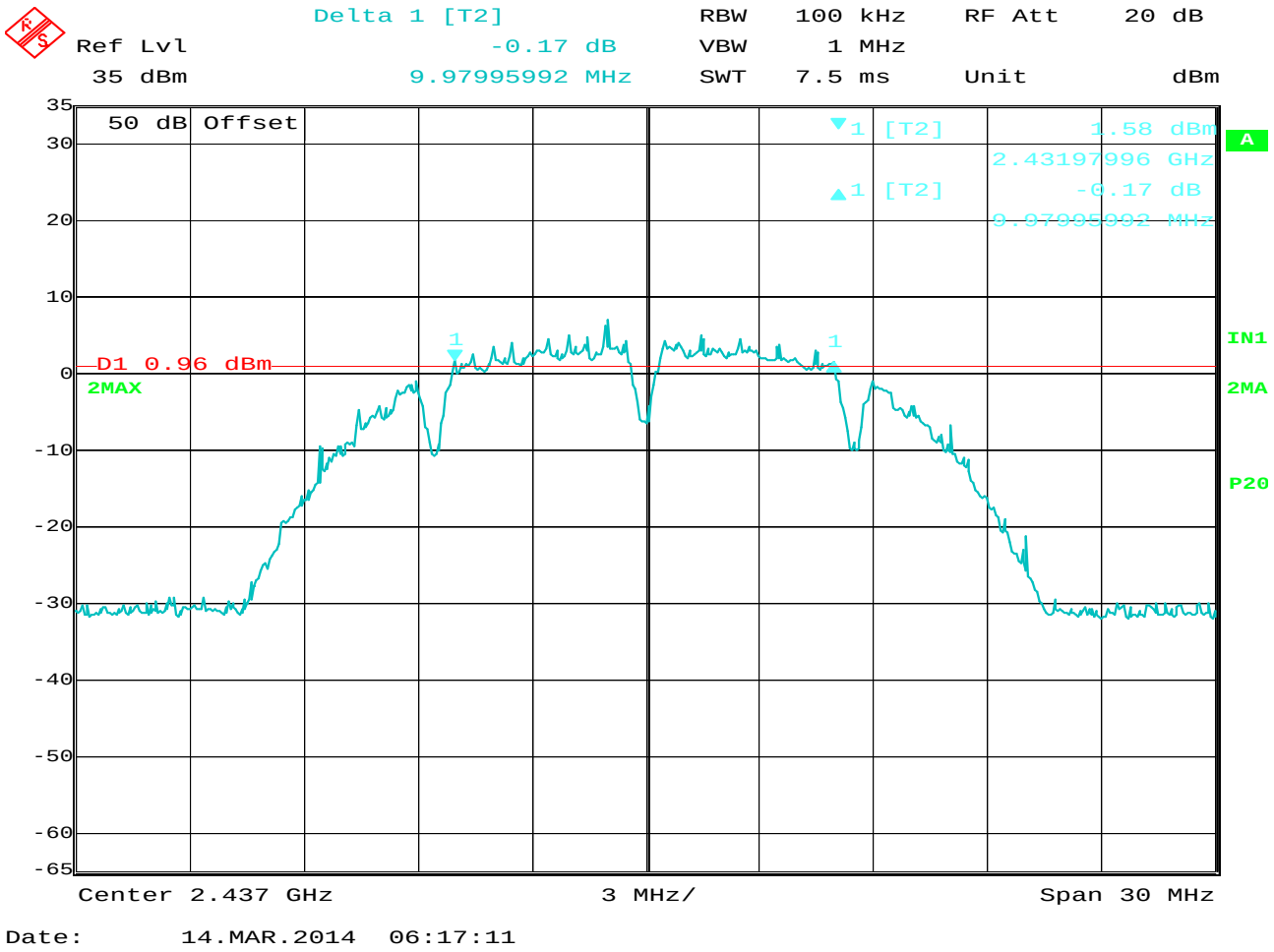
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at MID Channel
PROTOCOL	:	802.11 b
DATA RATE	:	1MB/s
NOTES	:	

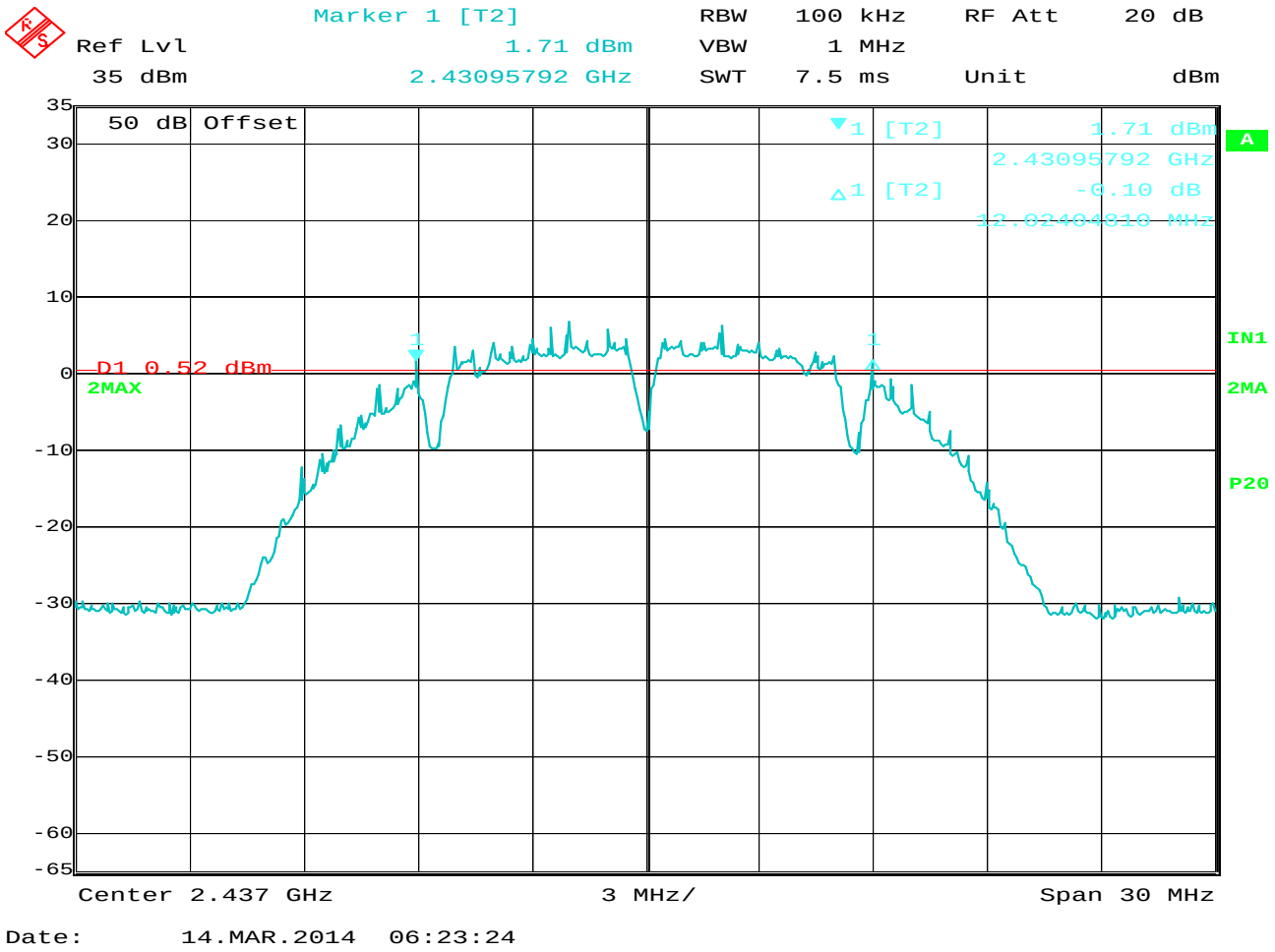
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at MID Channel
PROTOCOL	:	802.11 b
DATA RATE	:	2MB/s
NOTES	:	

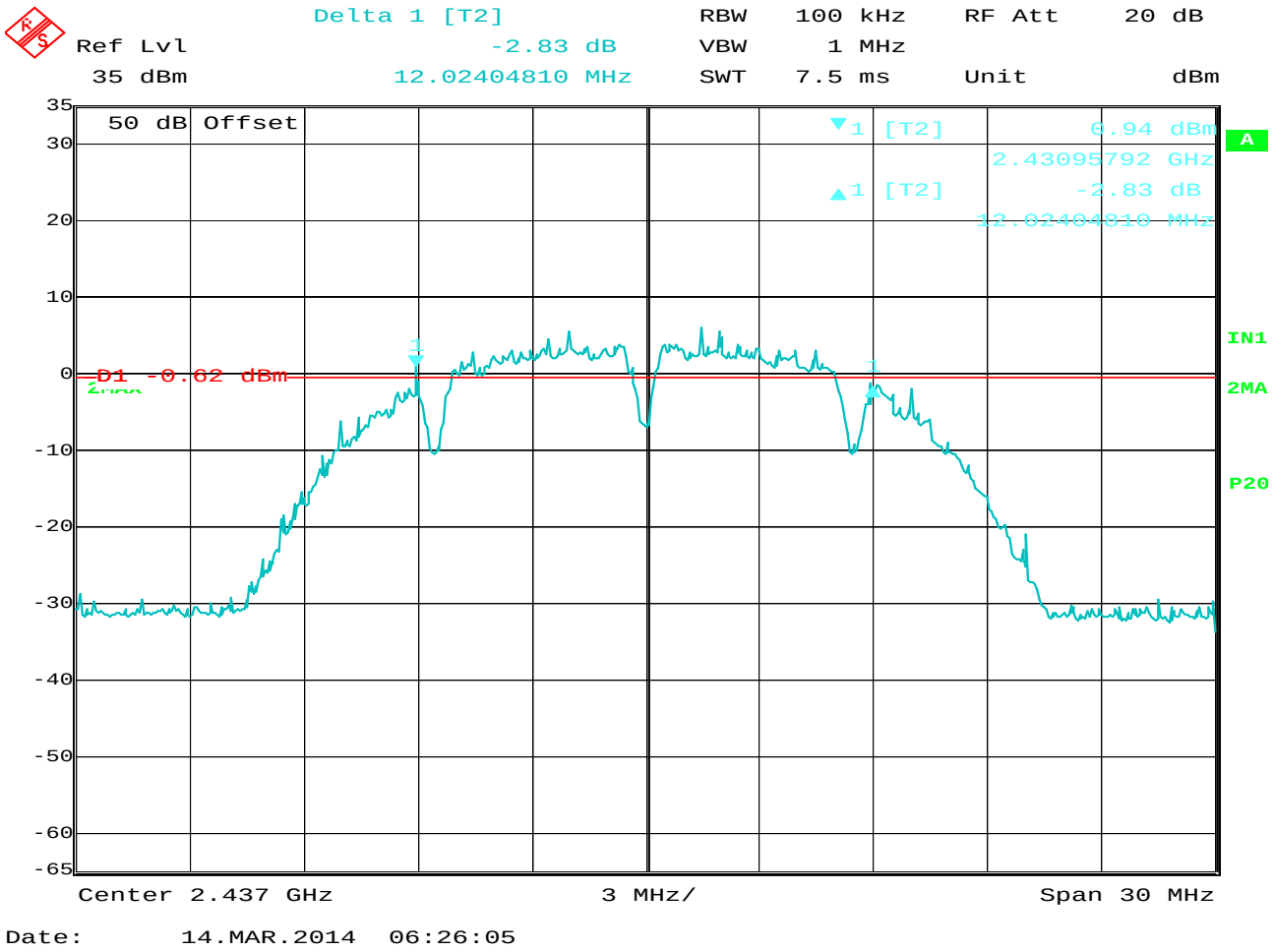
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at MID Channel
PROTOCOL	:	802.11 b
DATA RATE	:	5.5MB/s
NOTES	:	

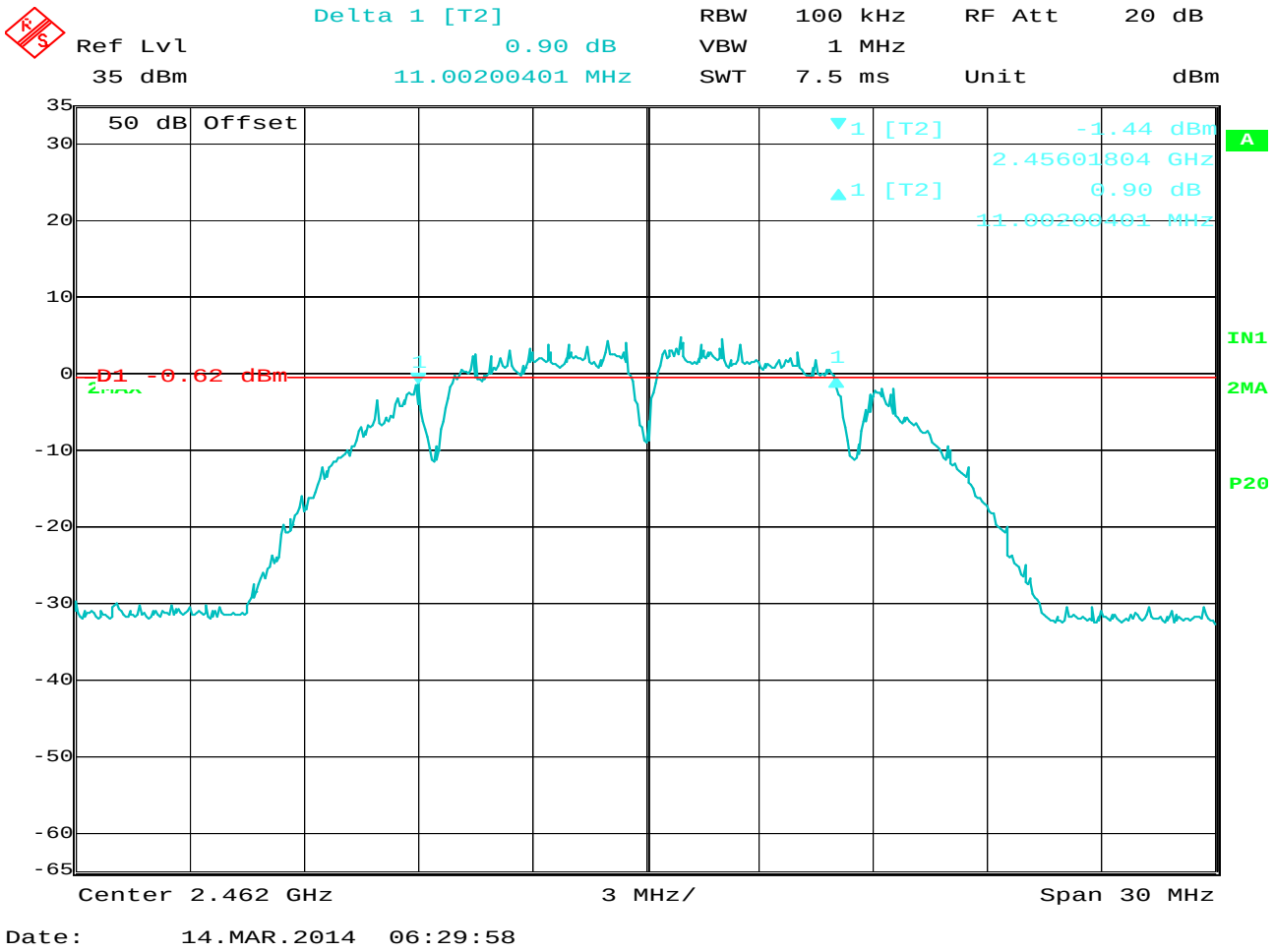
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at MID Channel
PROTOCOL	:	802.11 b
DATA RATE	:	11MB/s
NOTES	:	

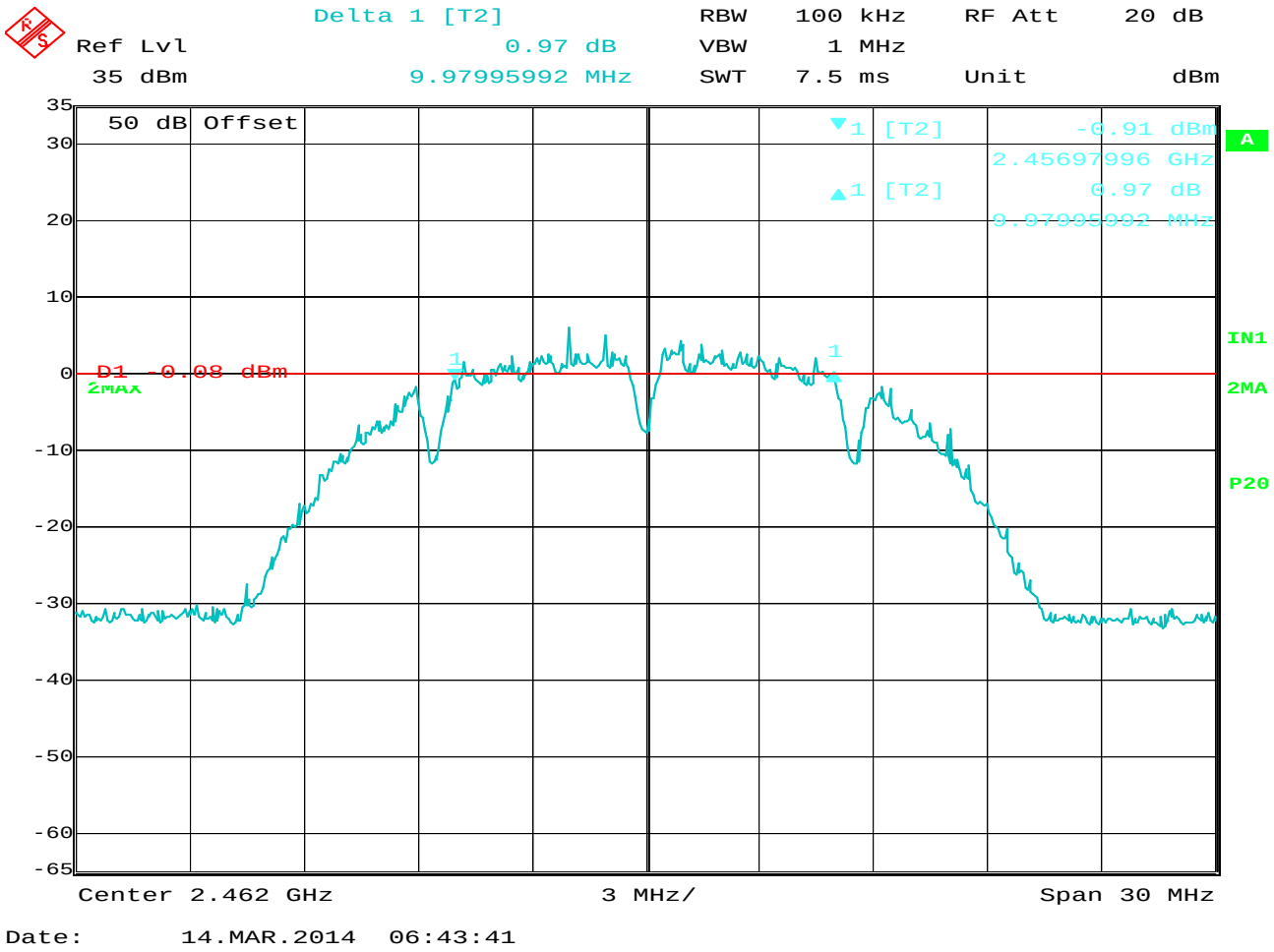
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at HIGH Channel
PROTOCOL	:	802.11 b
DATA RATE	:	1MB/s
NOTES	:	

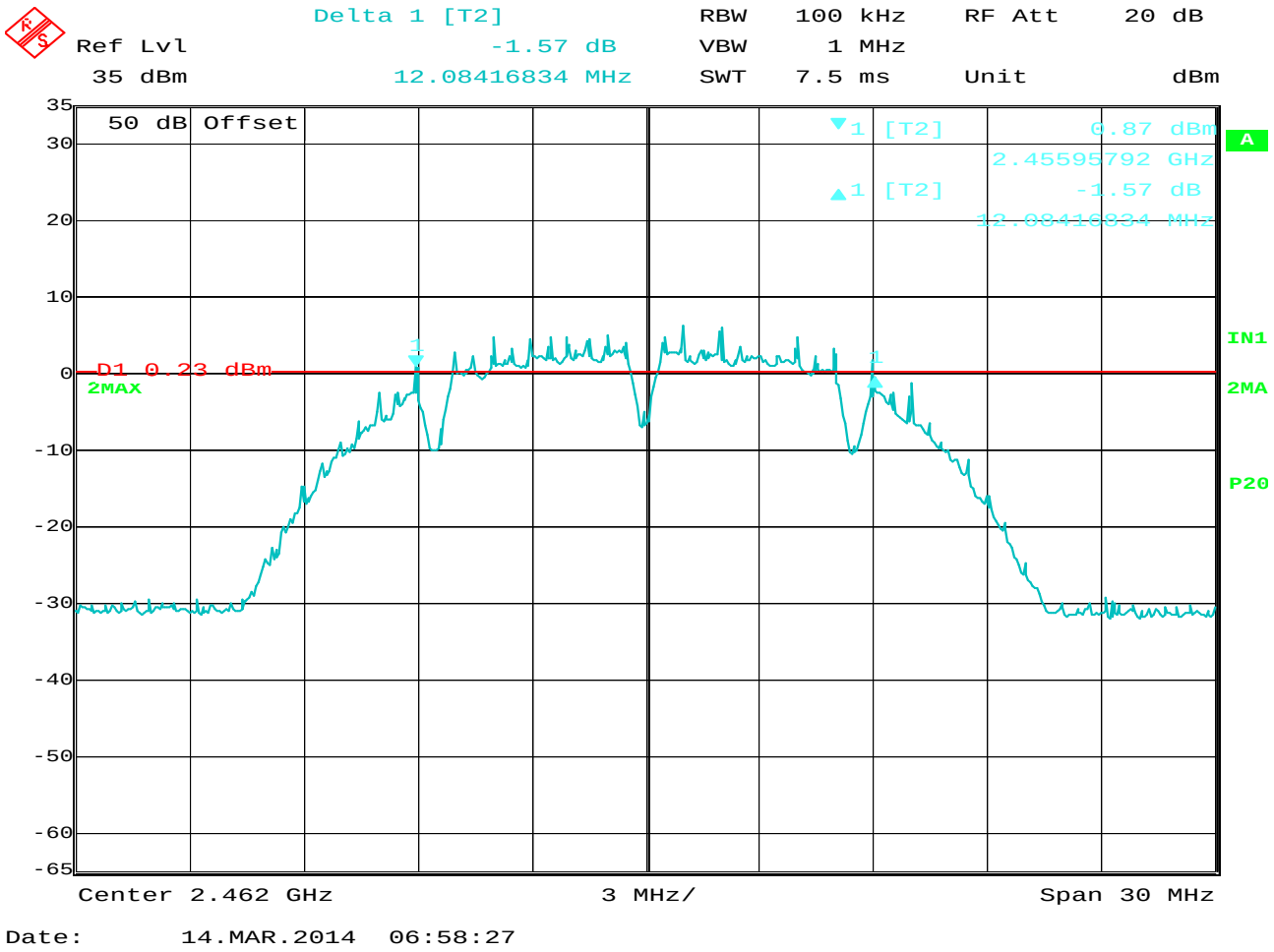
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at HIGH Channel
PROTOCOL	:	802.11 b
DATA RATE	:	2MB/s
NOTES	:	

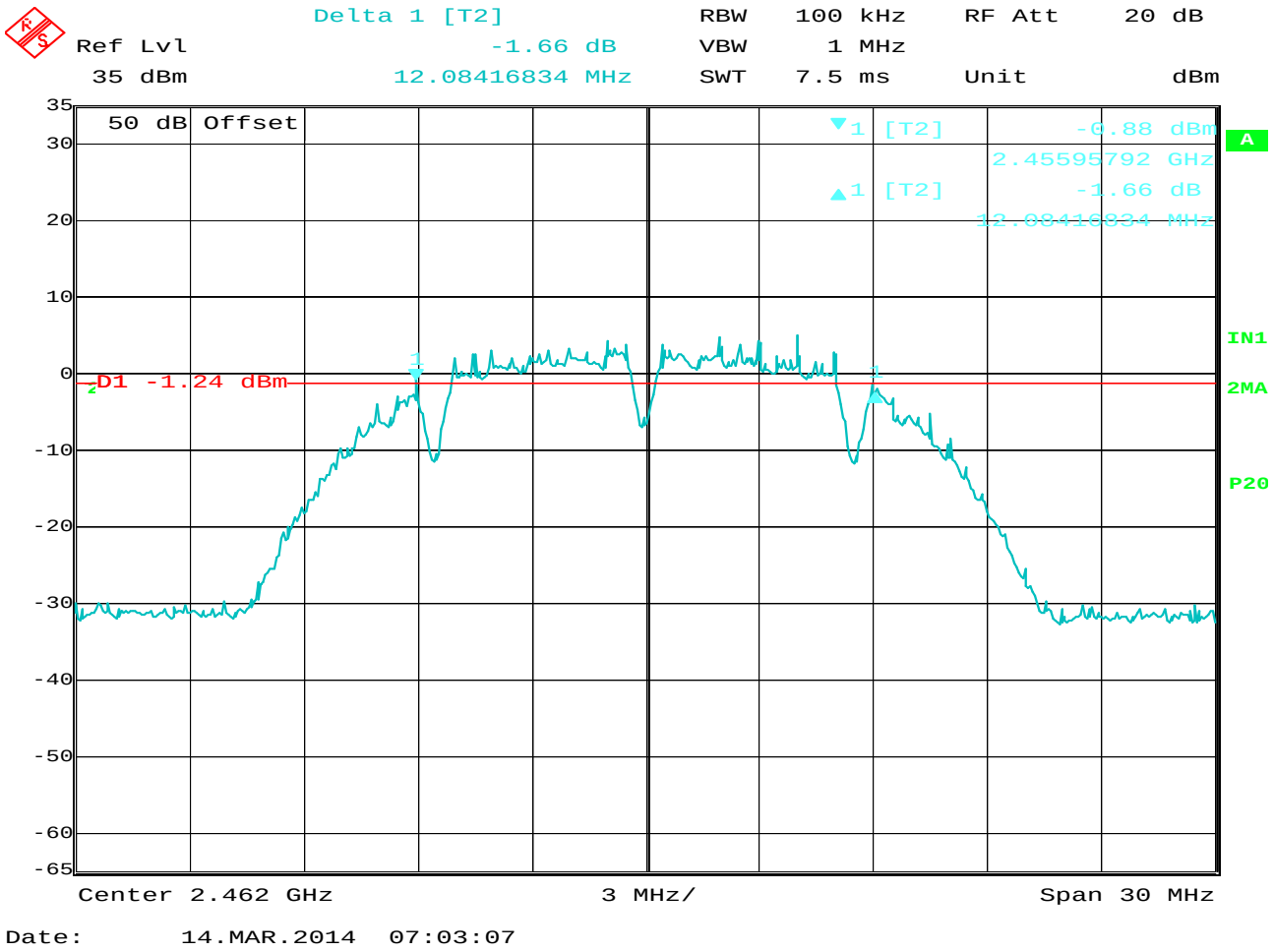
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at HIGH Channel
PROTOCOL	:	802.11 b
DATA RATE	:	5.5MB/s
NOTES	:	

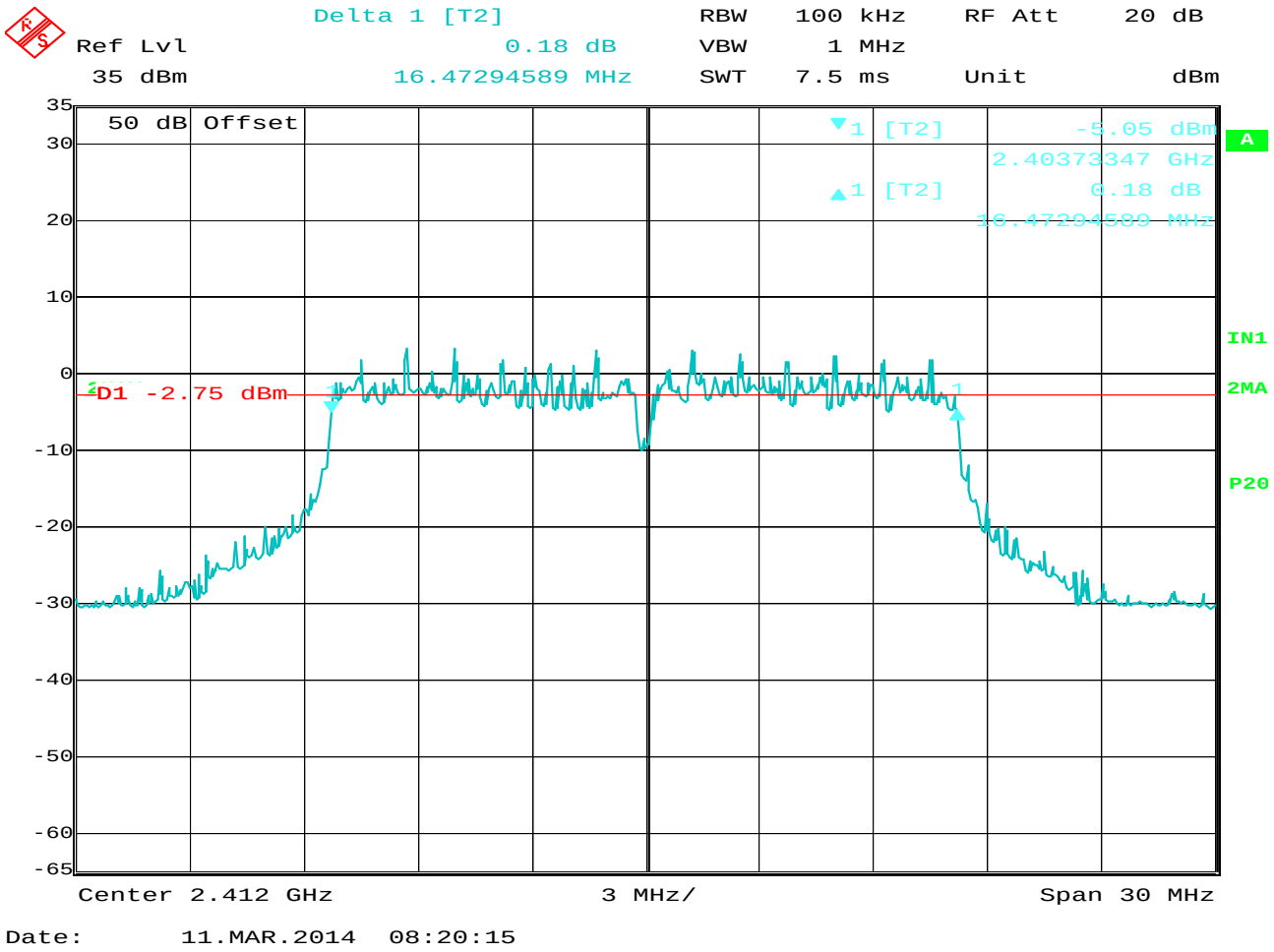
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at HIGH Channel
PROTOCOL	:	802.11 b
DATA RATE	:	11MB/s
NOTES	:	

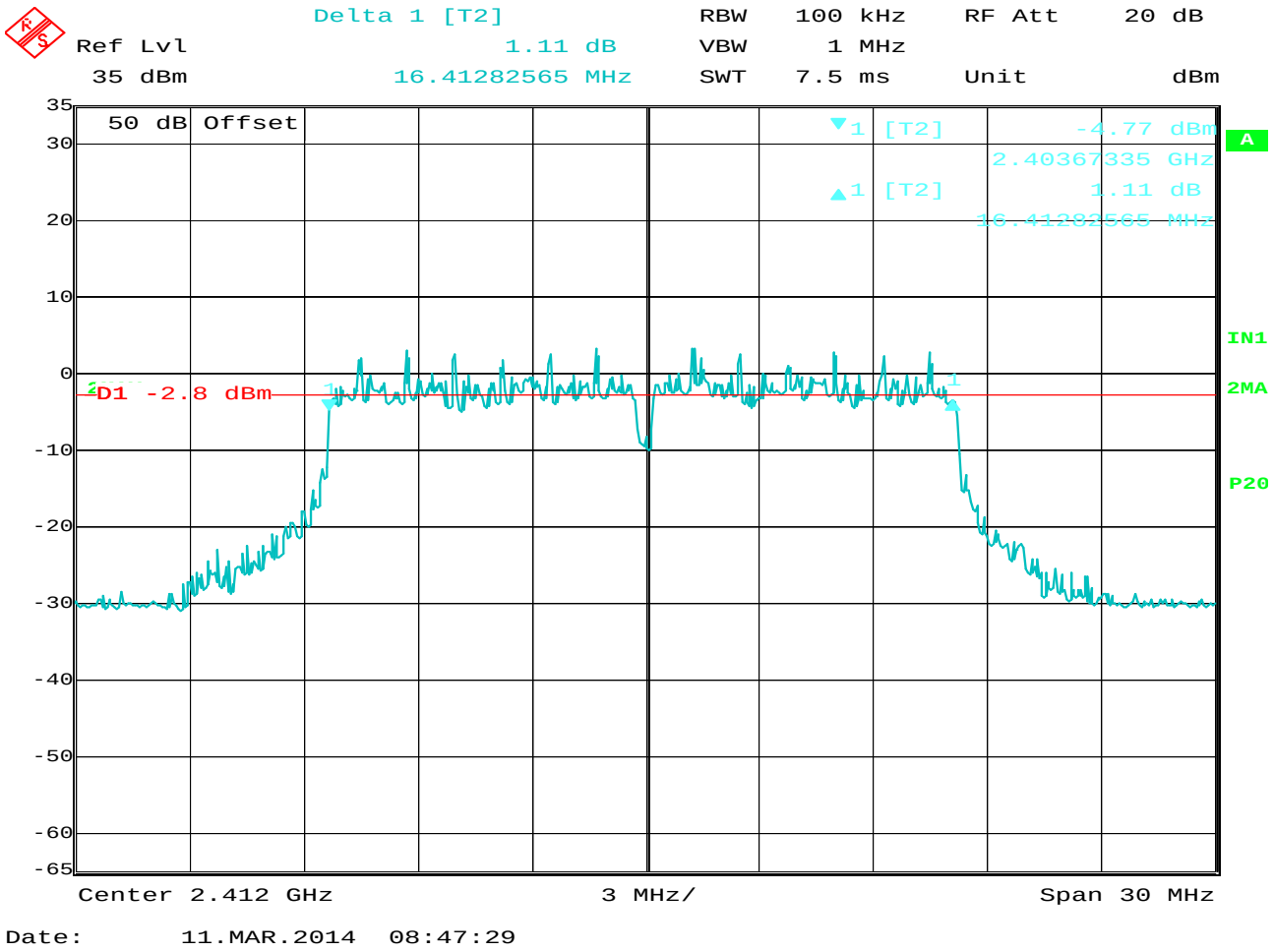
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at LOW Channel
DATA RATE	:	6MB/s
NOTES	:	

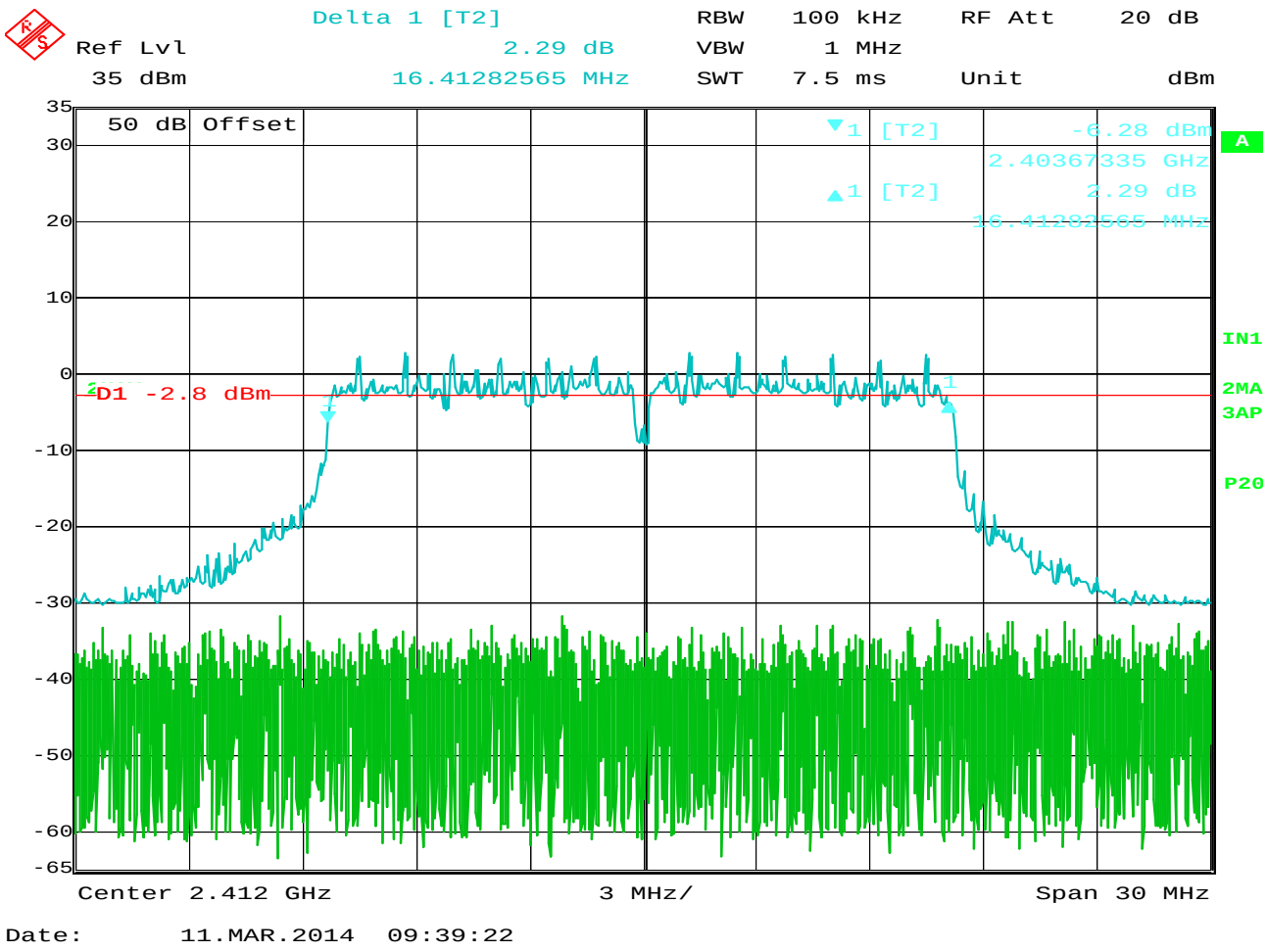
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at LOW Channel
DATA RATE	:	9MB/s
NOTES	:	

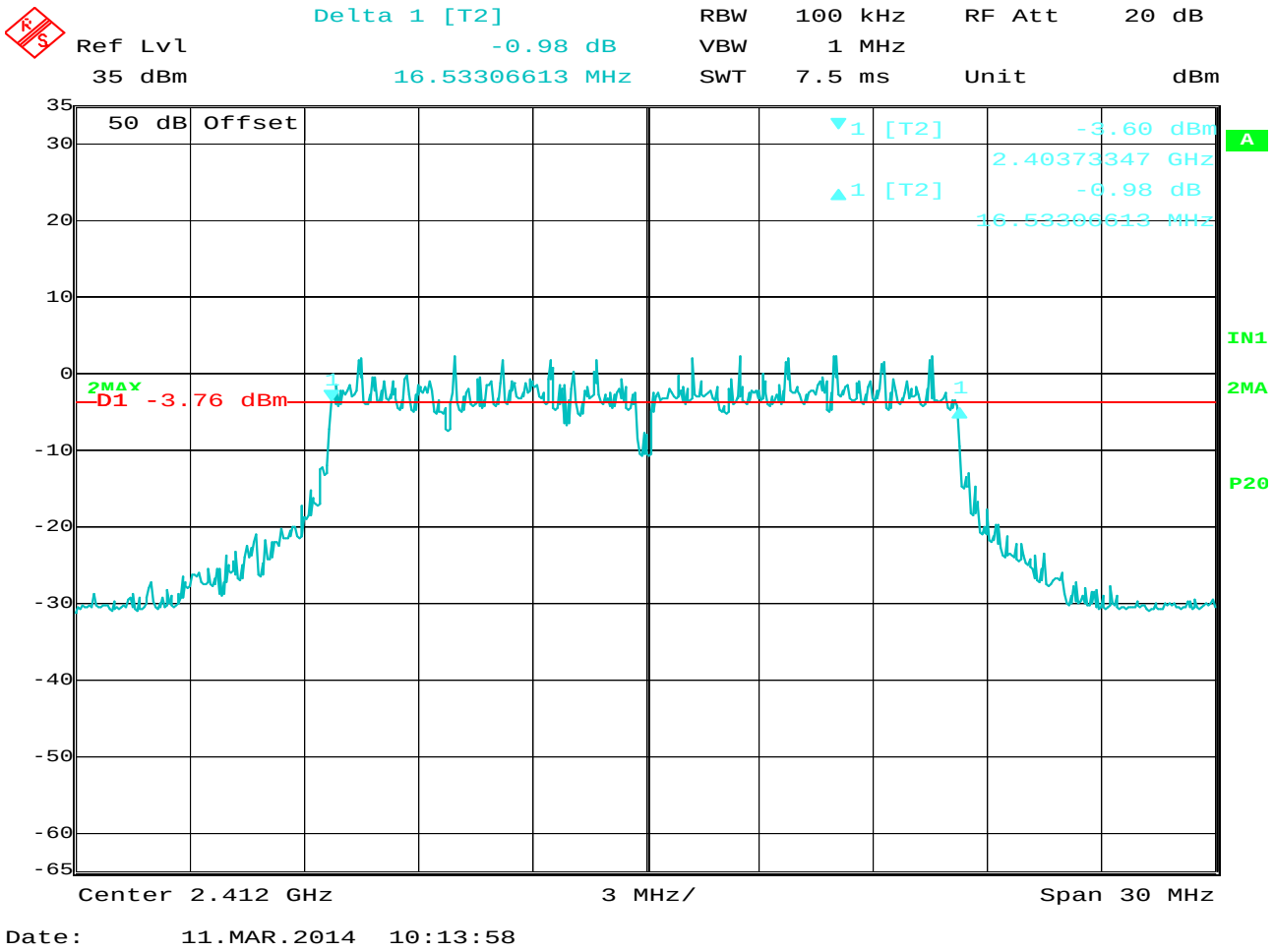
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at LOW Channel
DATA RATE	:	12MB/s
NOTES	:	

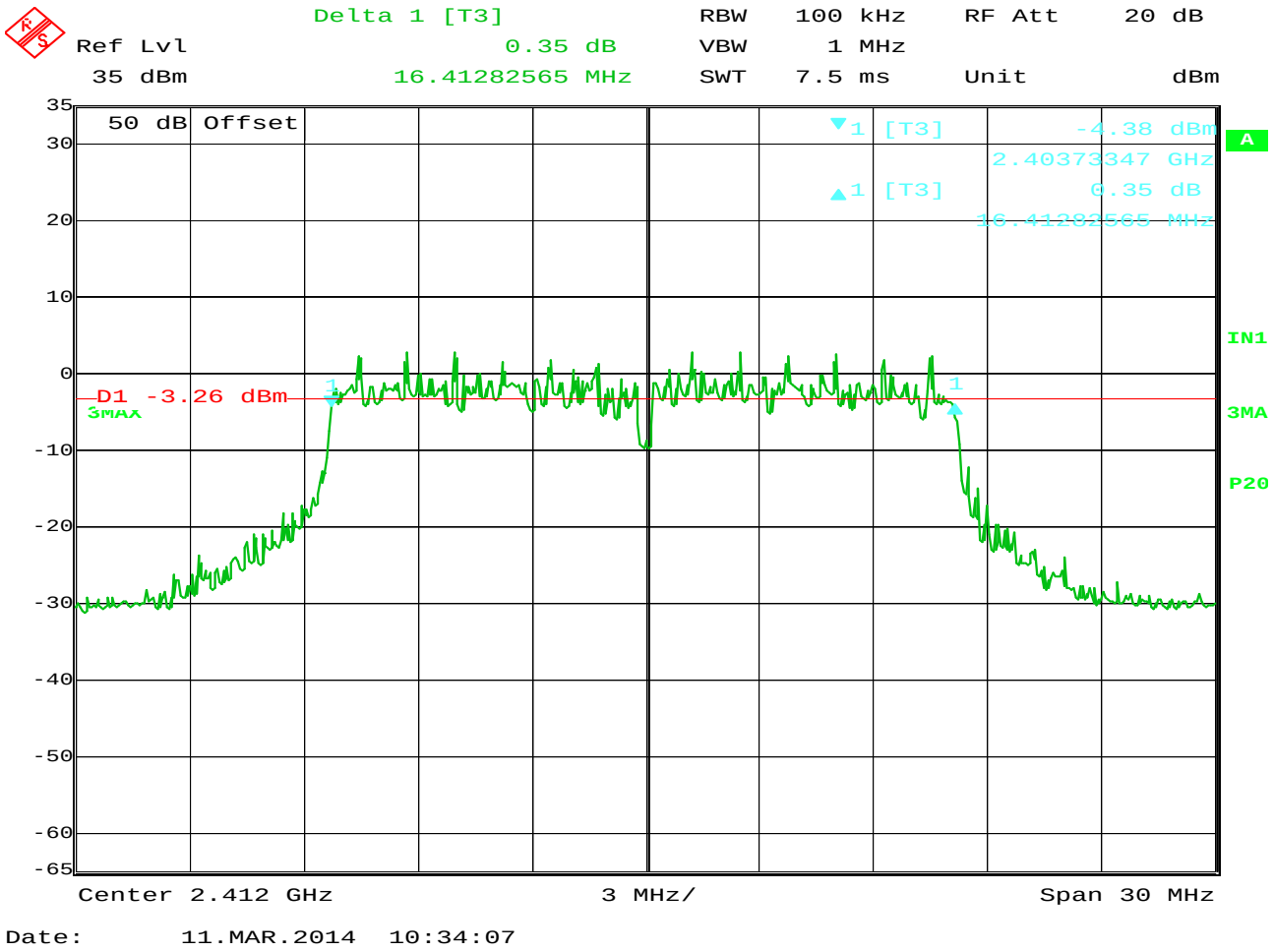
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at LOW Channel
DATA RATE	:	18MB/s
NOTES	:	

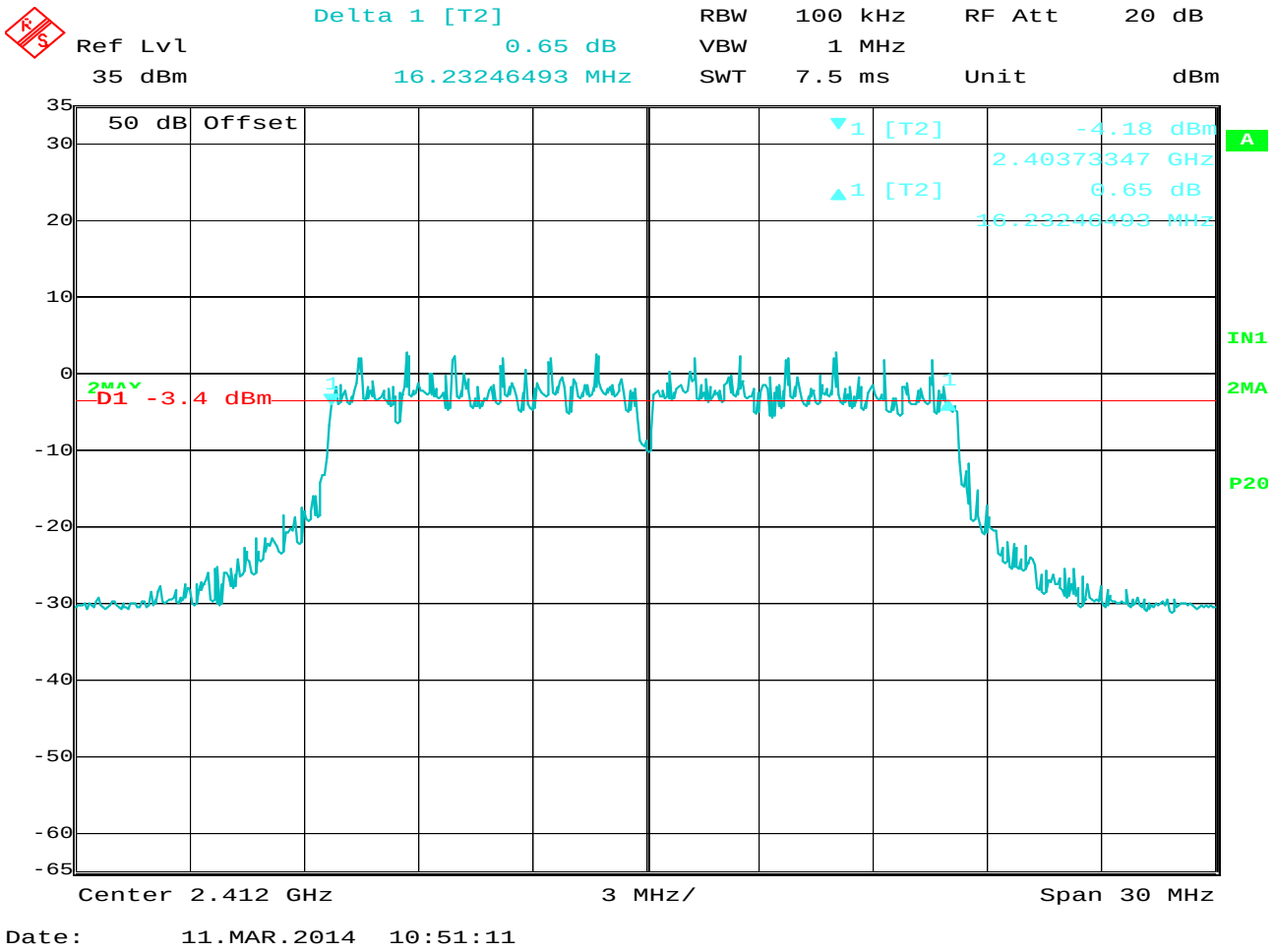
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at LOW Channel
DATA RATE	:	24MB/s
NOTES	:	

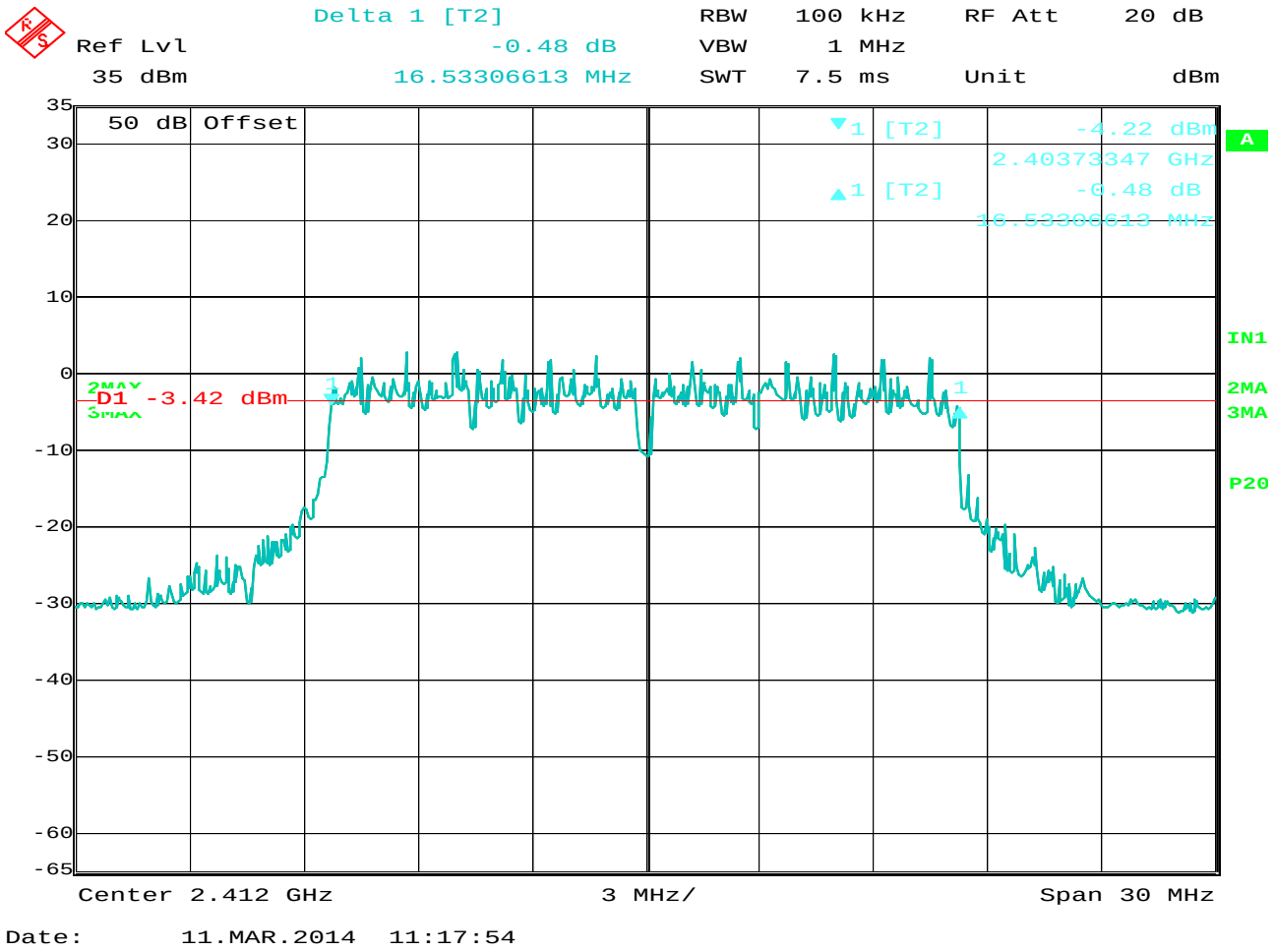
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at LOW Channel
DATA RATE	:	36MB/s
NOTES	:	

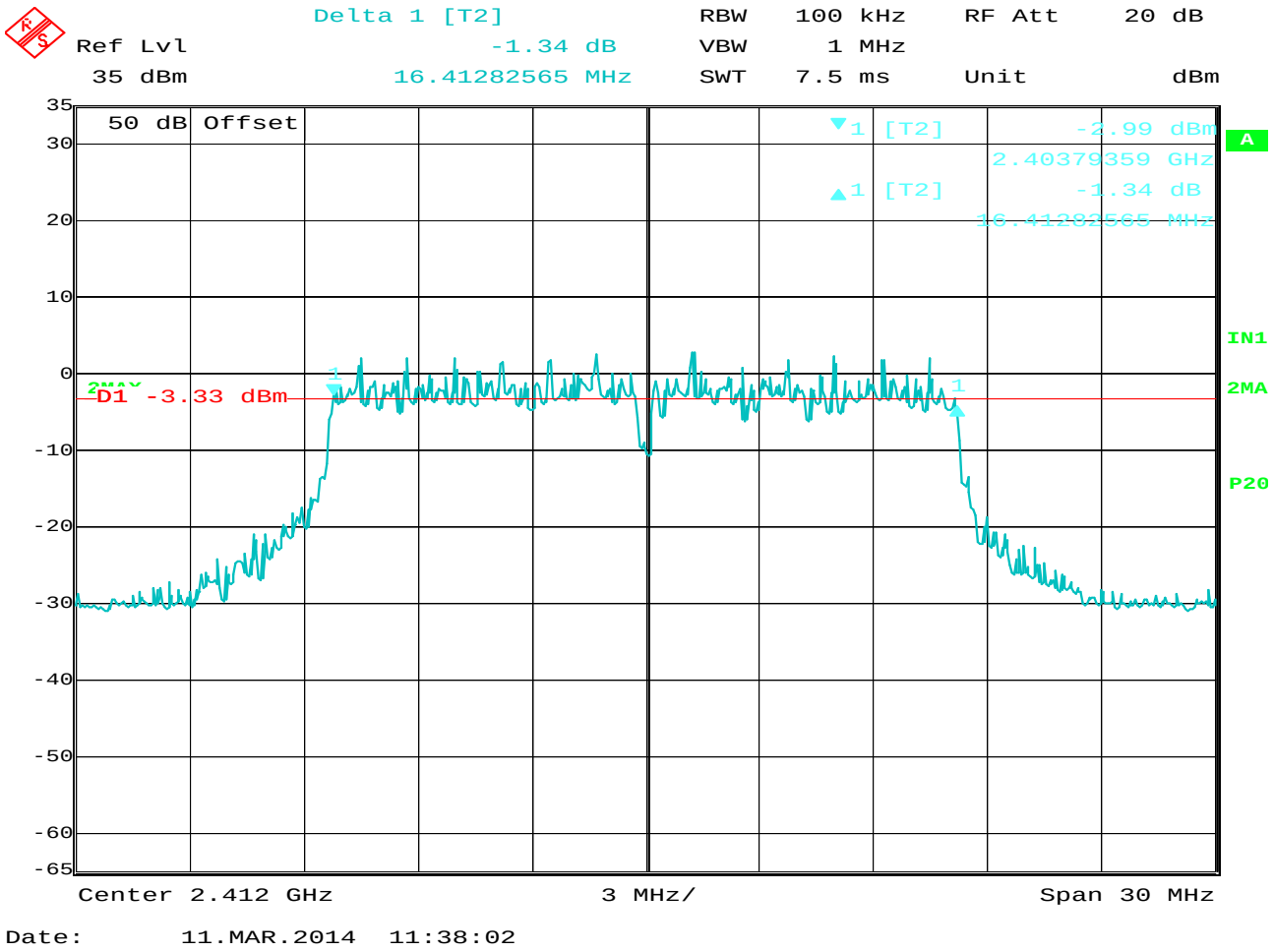
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at LOW Channel
DATA RATE	:	48MB/s
NOTES	:	

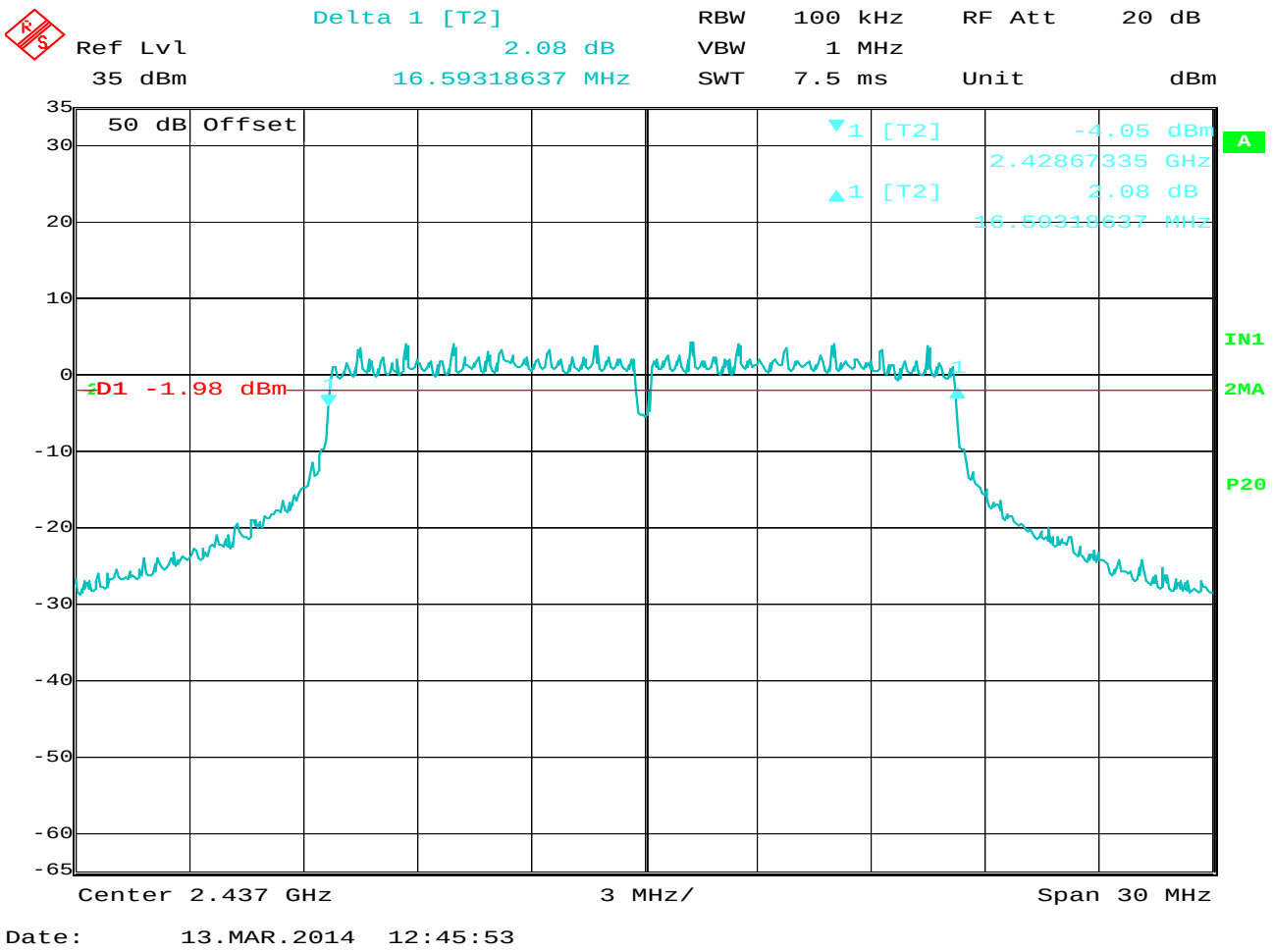
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at LOW Channel
DATA RATE	:	54MB/s
NOTES	:	

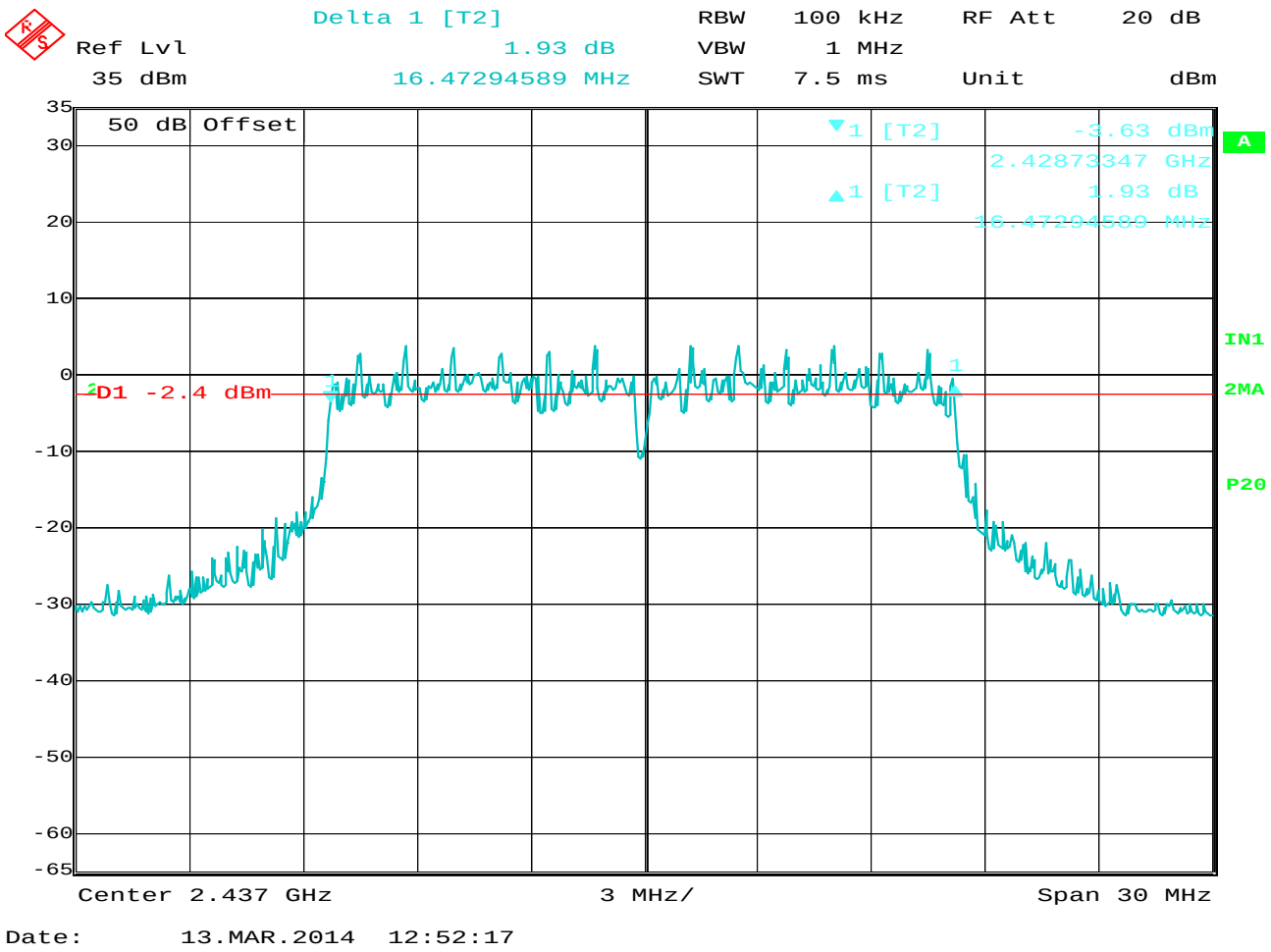
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at MID Channel
PROTOCOL	:	802.11 g
DATA RATE	:	6MB/s
NOTES	:	

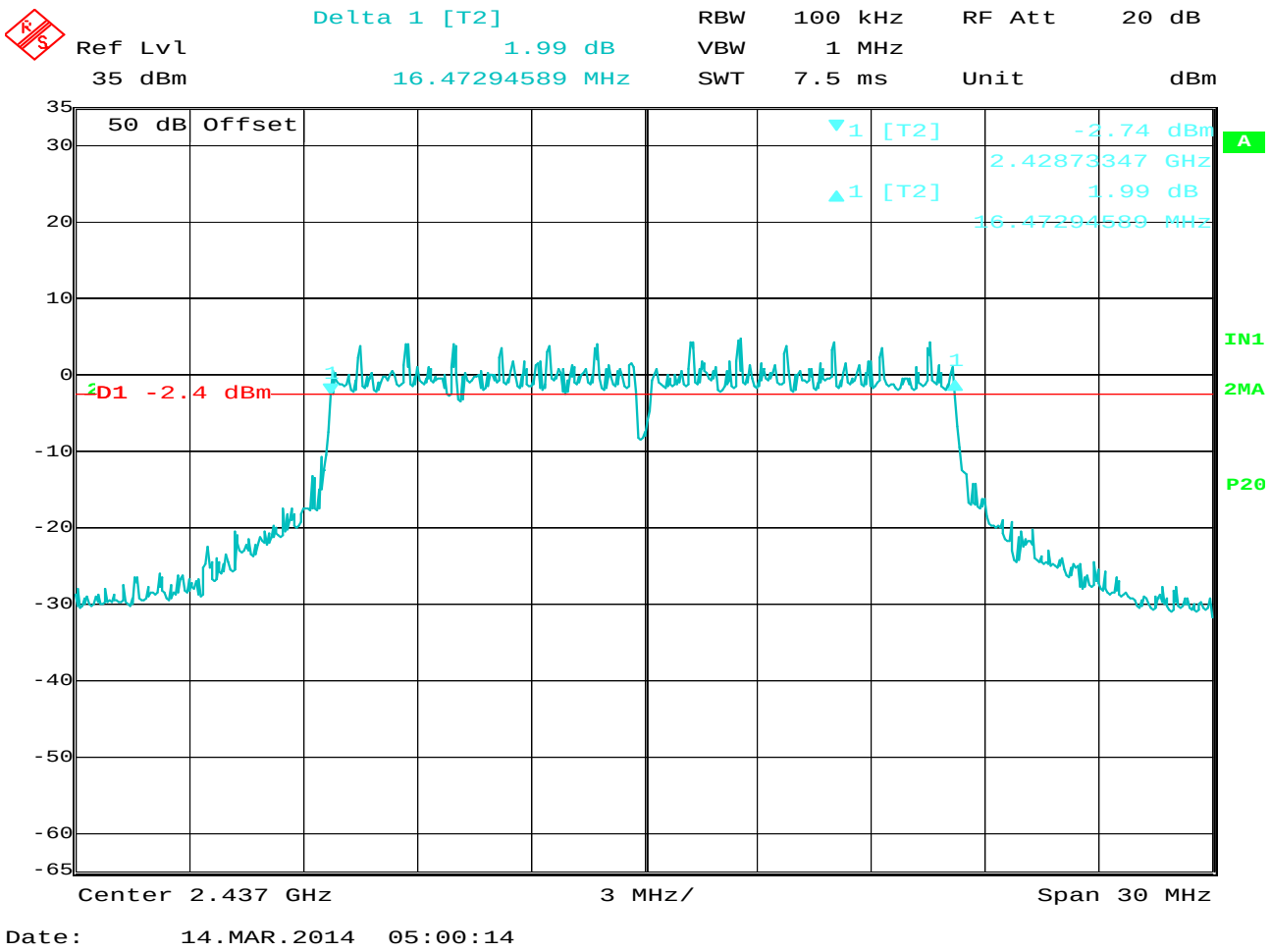
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at MID Channel
PROTOCOL	:	802.11 g
DATA RATE	:	9MB/s
NOTES	:	

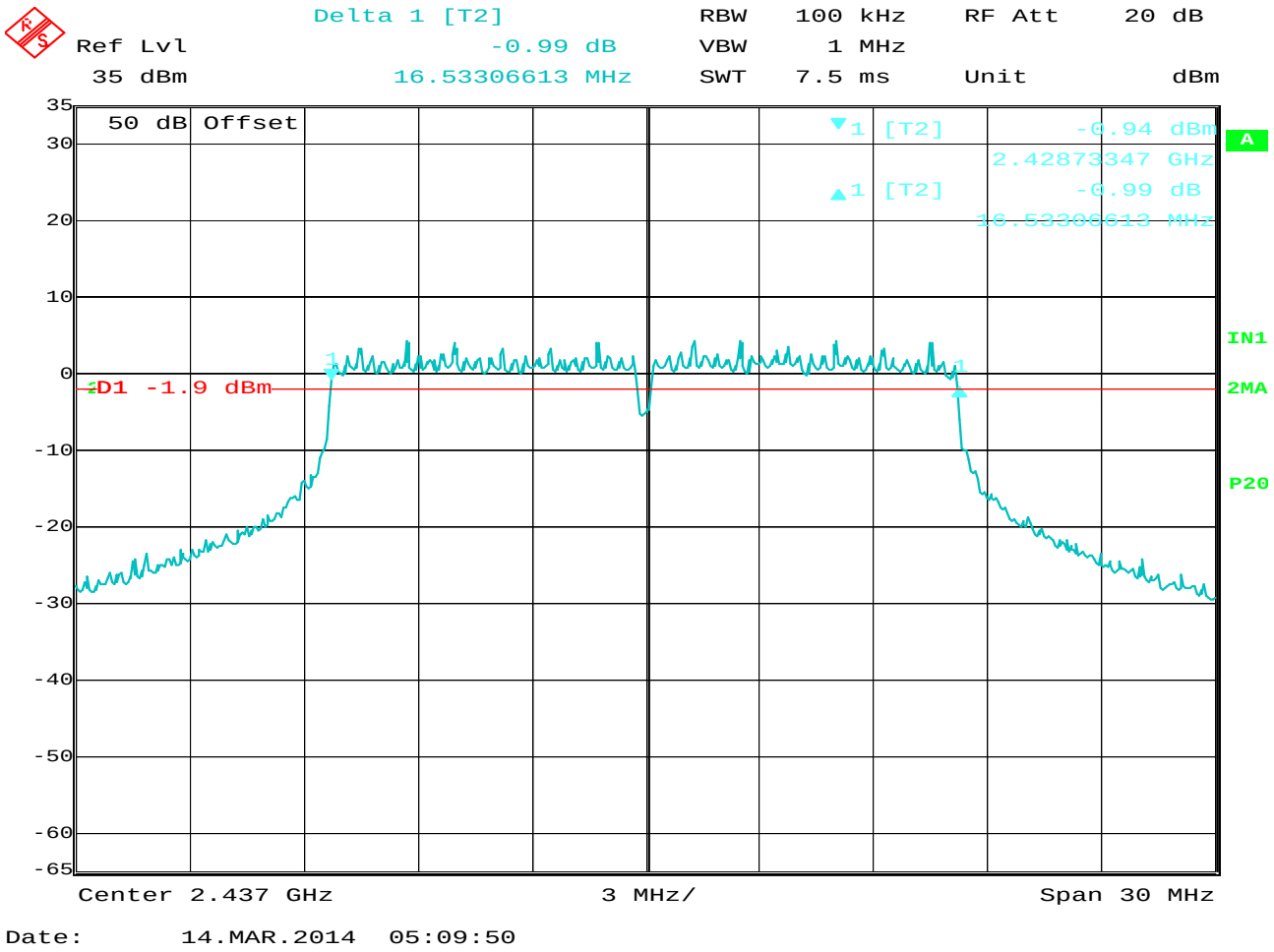
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at MID Channel
PROTOCOL	:	802.11 g
DATA RATE	:	12MB/s
NOTES	:	

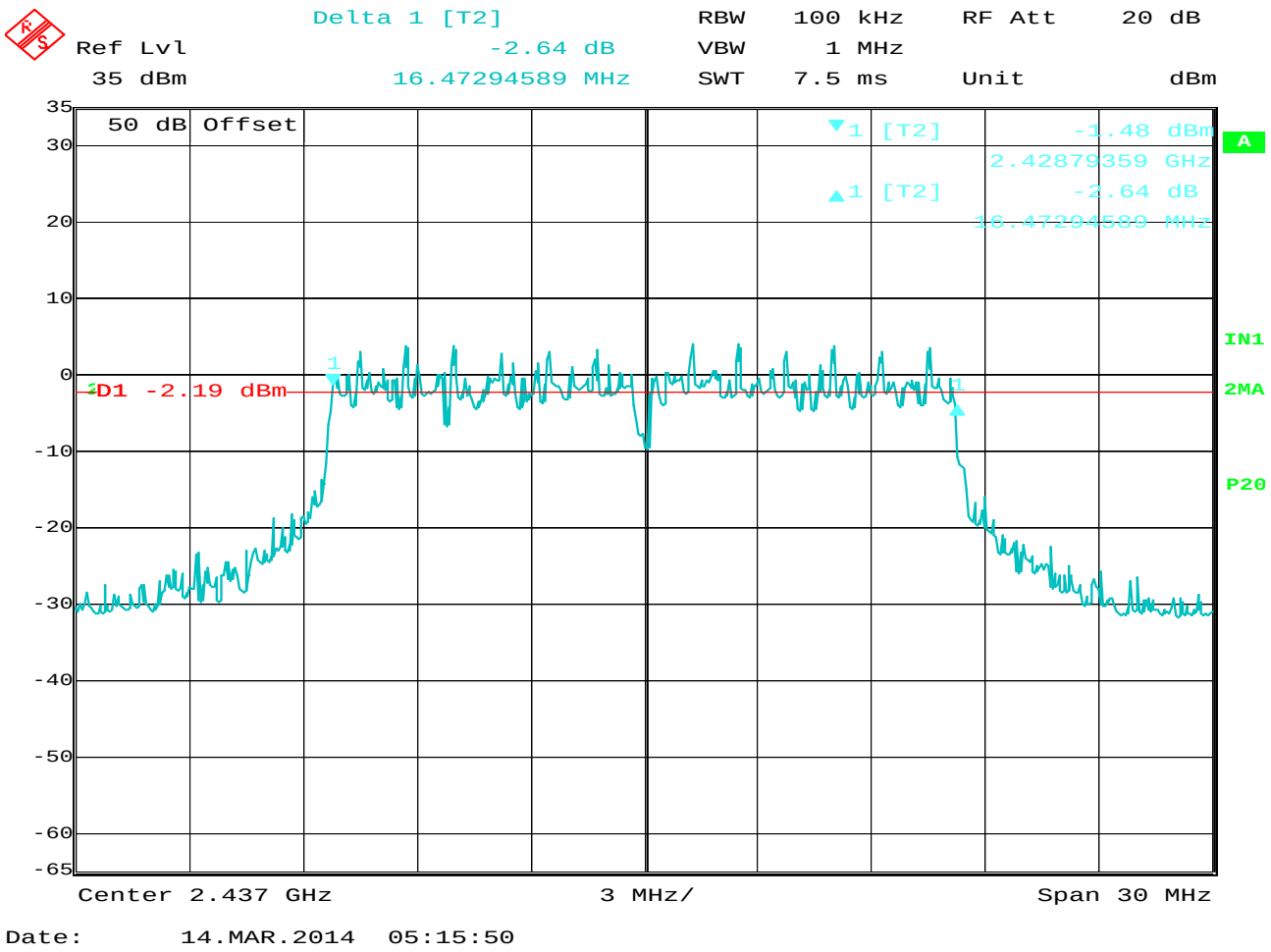
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at MID Channel
PROTOCOL	:	802.11 g
DATA RATE	:	18MB/s
NOTES	:	

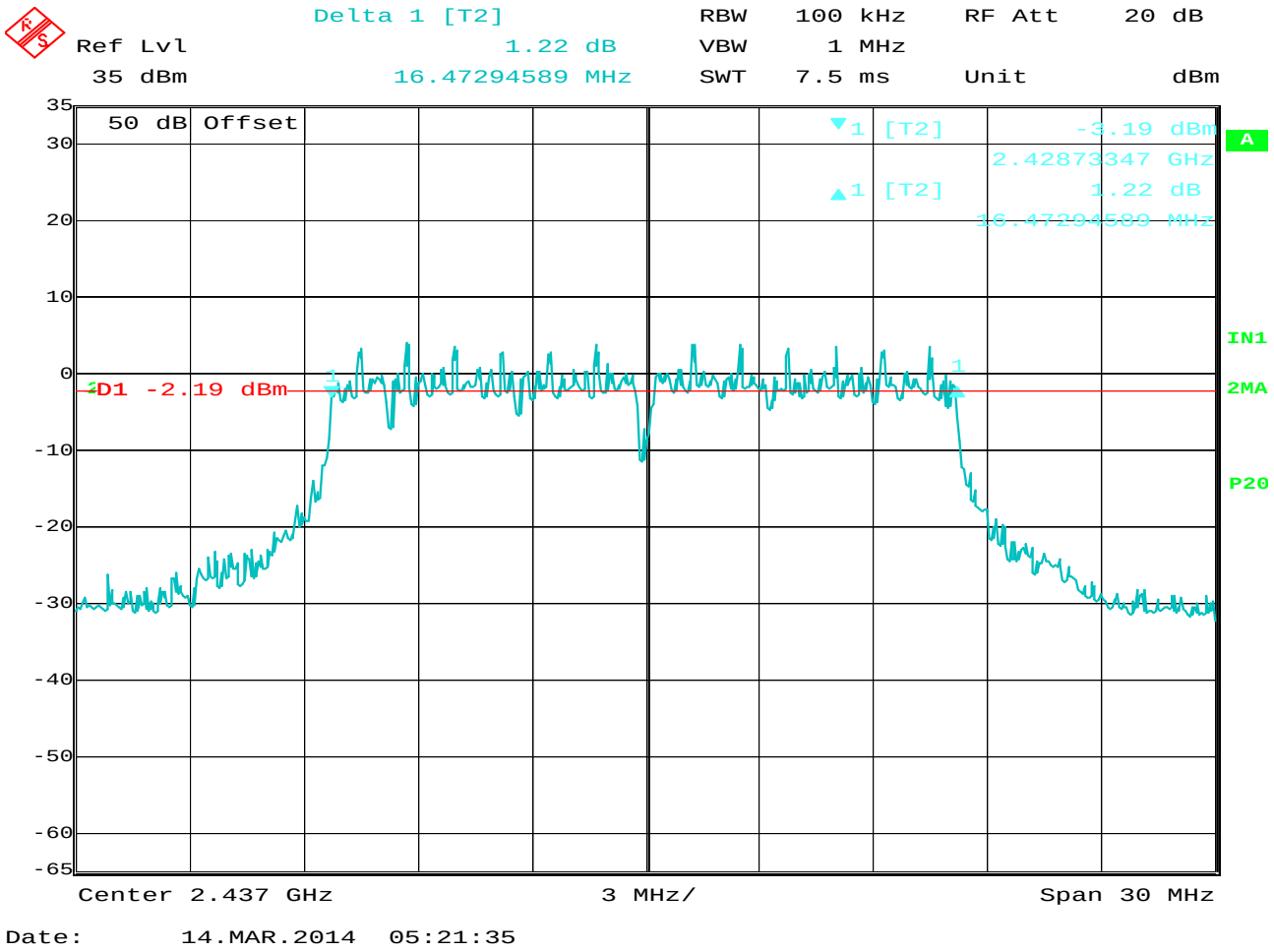
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at MID Channel
PROTOCOL	:	802.11 g
DATA RATE	:	24MB/s
NOTES	:	

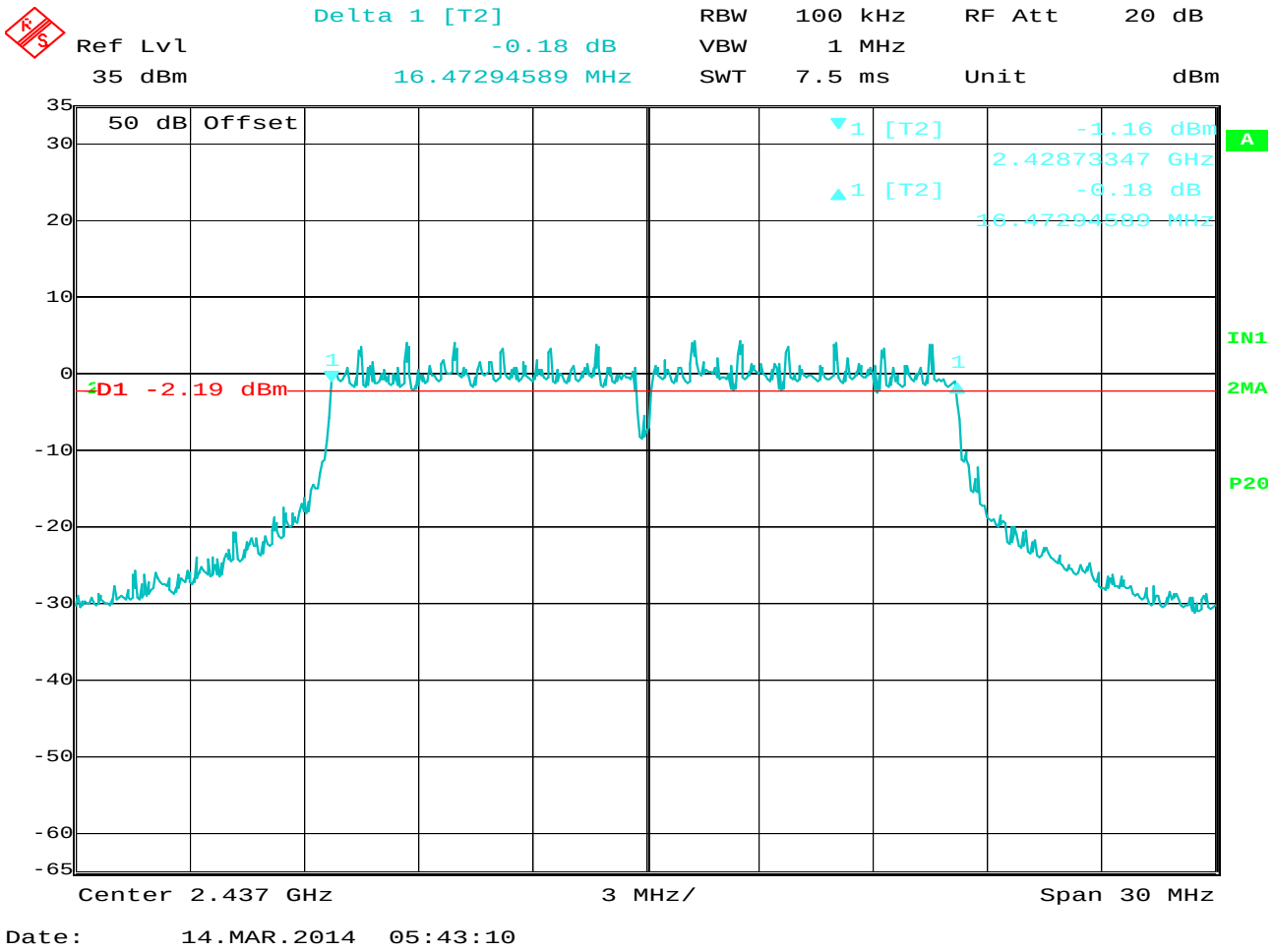
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at MID Channel
PROTOCOL	:	802.11 g
DATA RATE	:	36MB/s
NOTES	:	

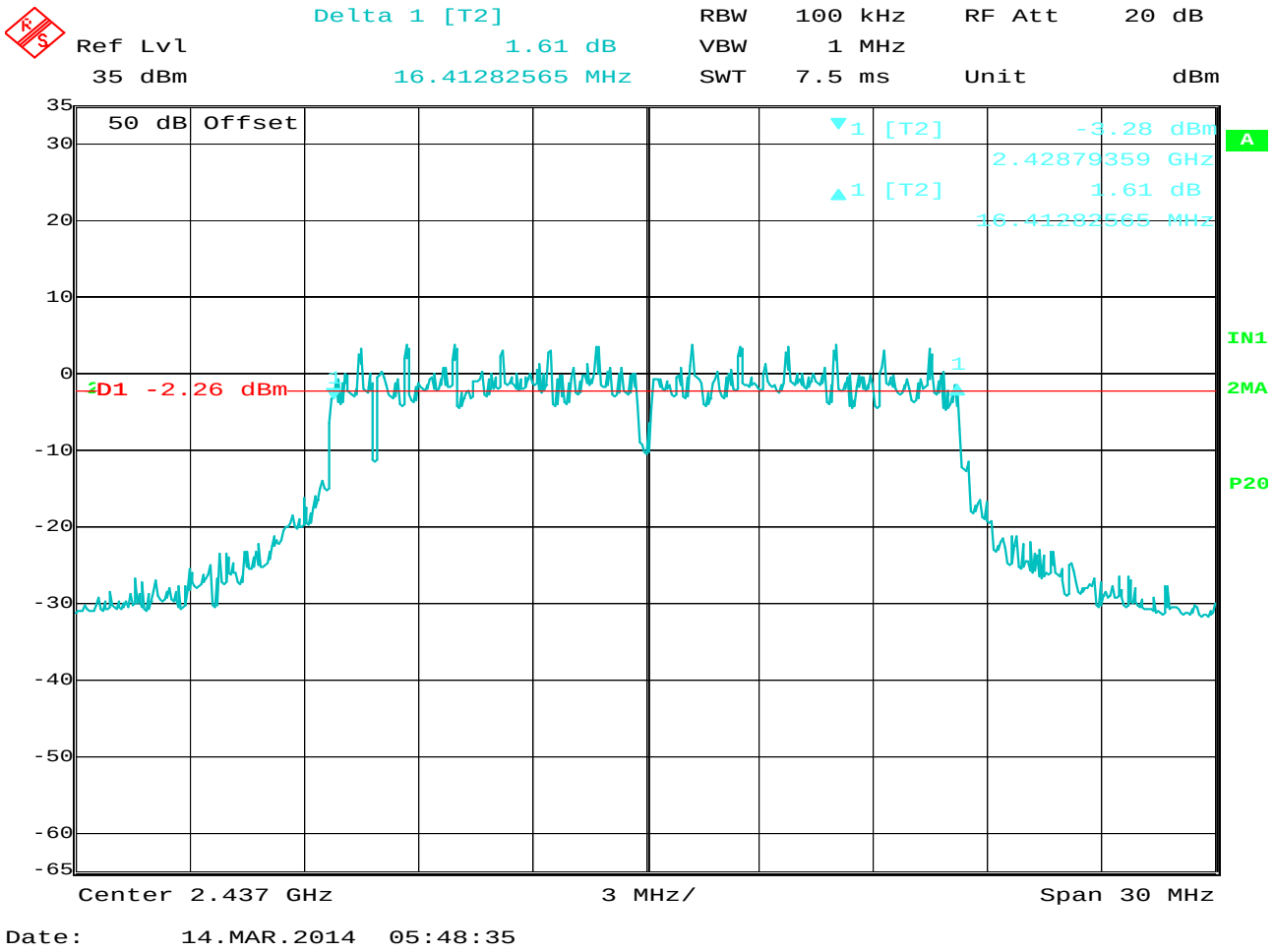
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at MID Channel
PROTOCOL	:	802.11 g
DATA RATE	:	48MB/s
NOTES	:	

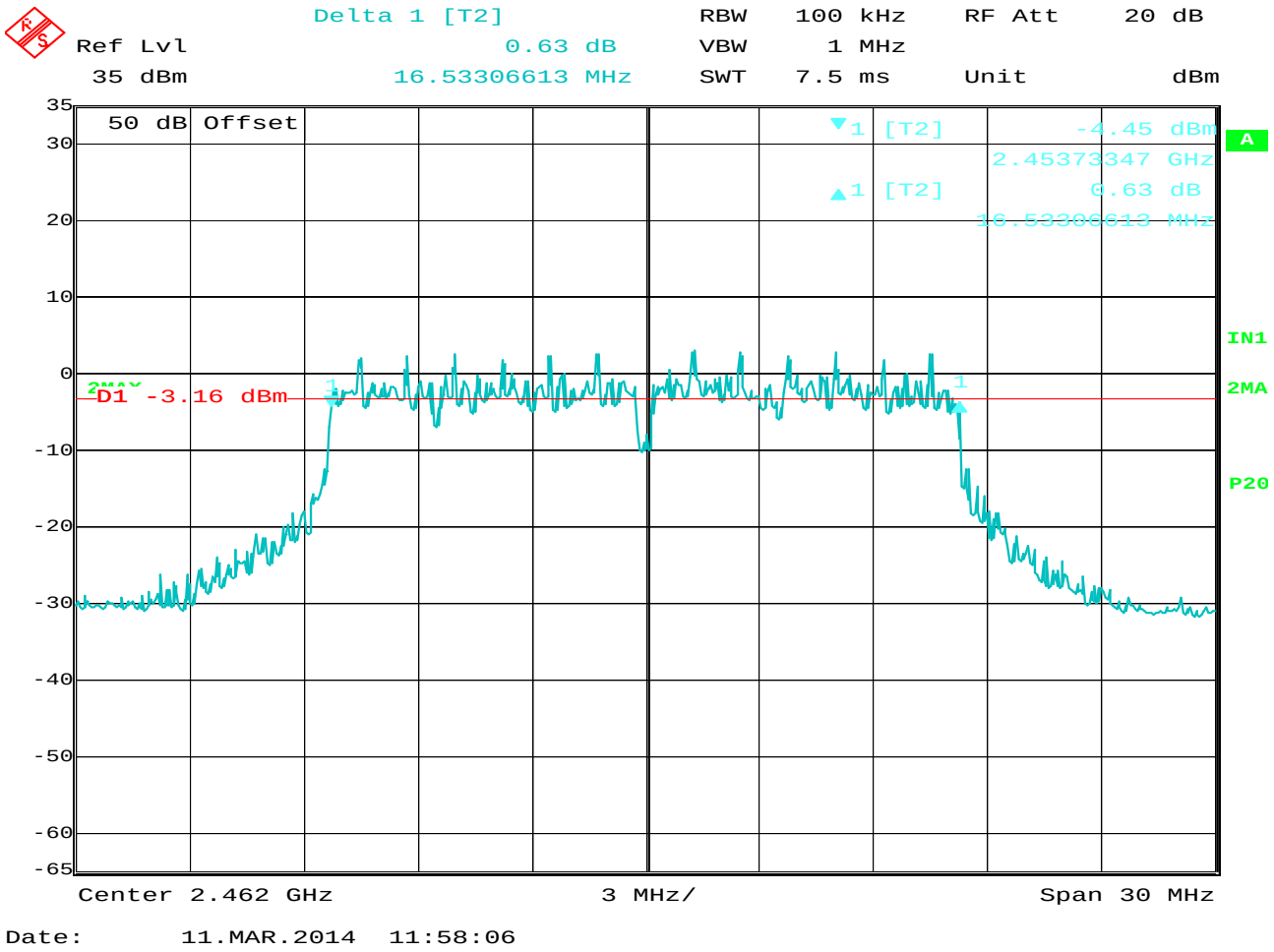
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at MID Channel
PROTOCOL	:	802.11 g
DATA RATE	:	54MB/s
NOTES	:	

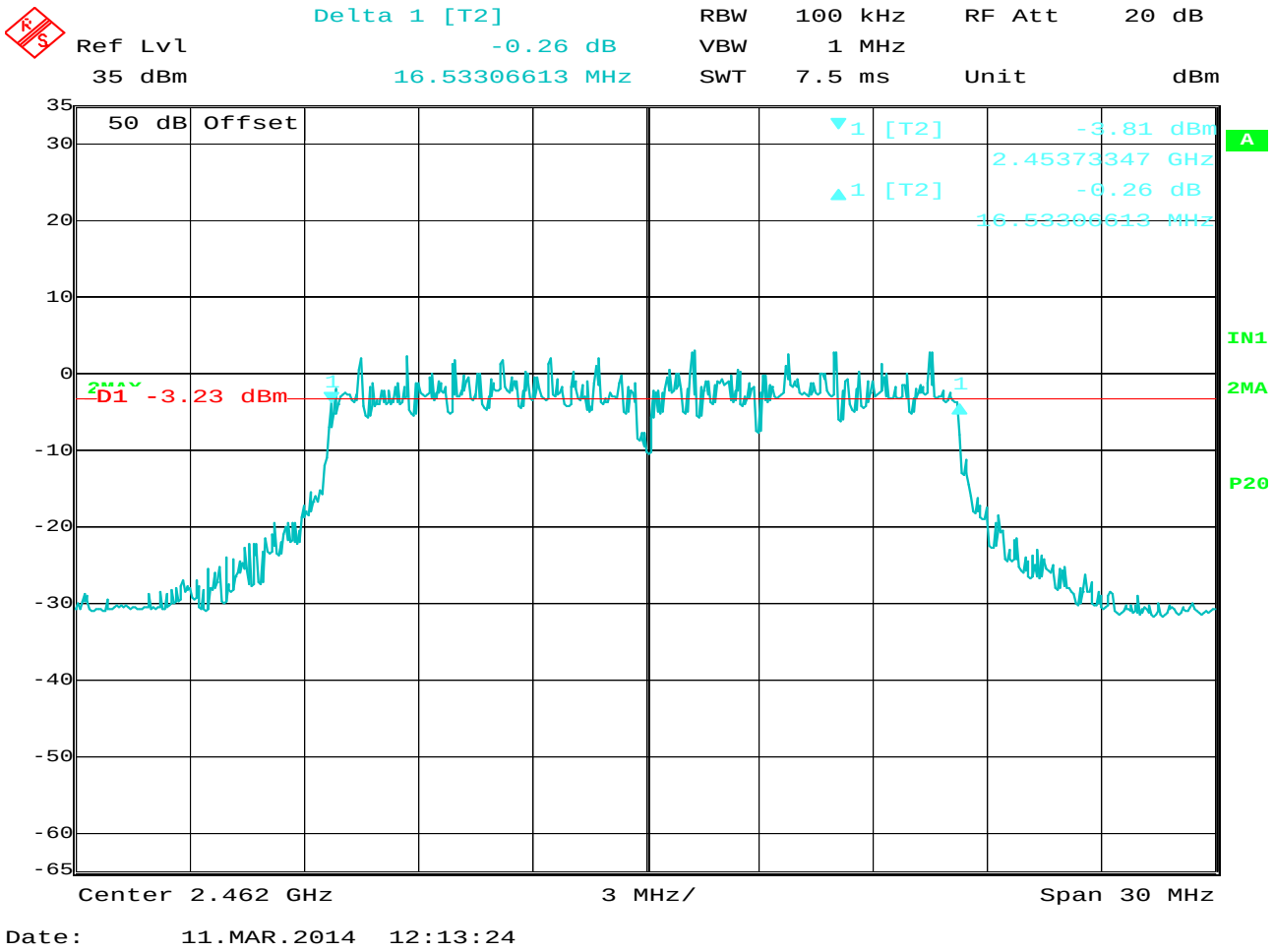
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at HIGH Channel
PROTOCOL	:	802.11 g
DATA RATE	:	6MB/s
NOTES	:	

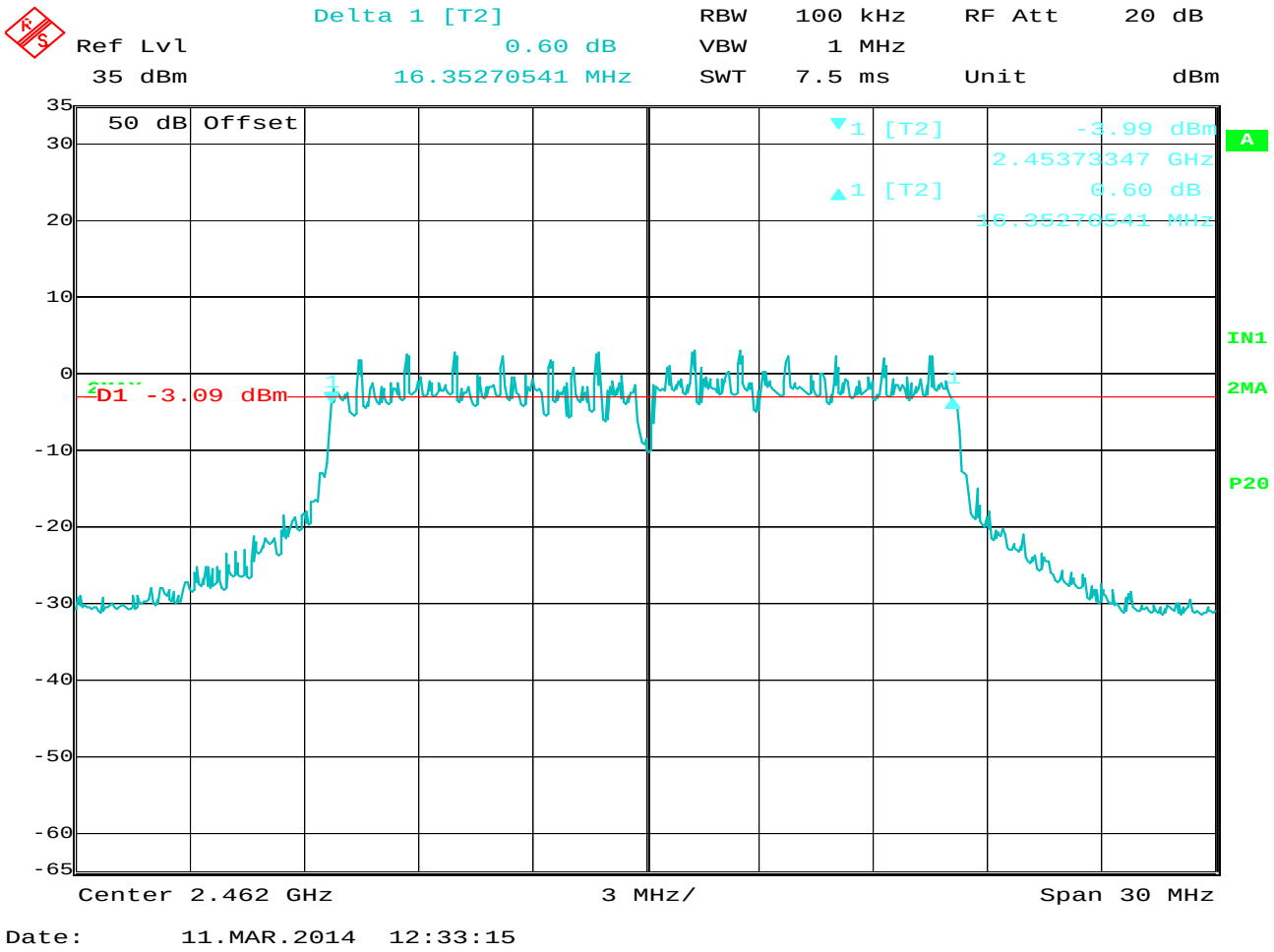
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at HIGH Channel
PROTOCOL	:	802.11 g
DATA RATE	:	9MB/s
NOTES	:	

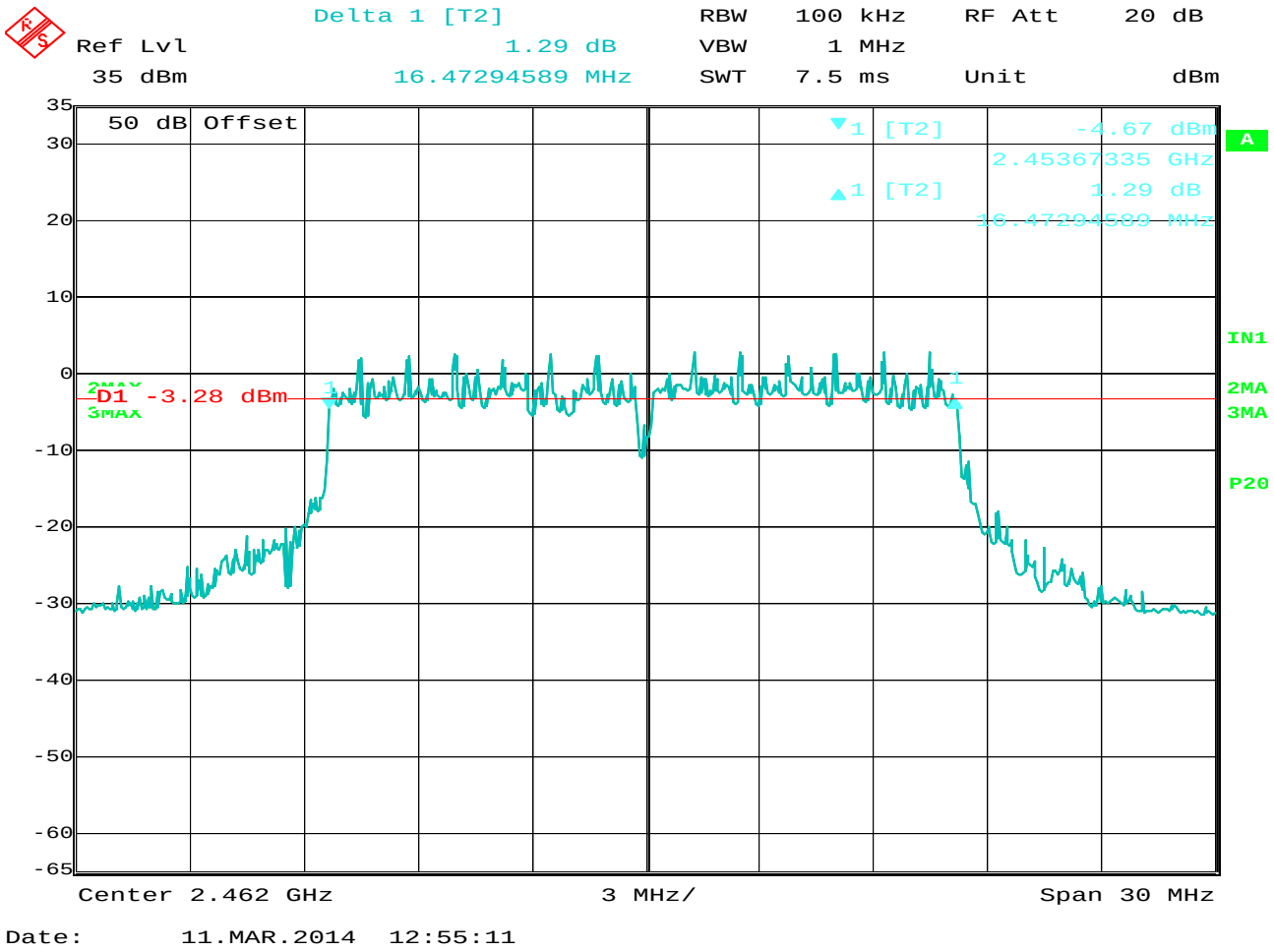
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at HIGH Channel
PROTOCOL	:	802.11 g
DATA RATE	:	12MB/s
NOTES	:	

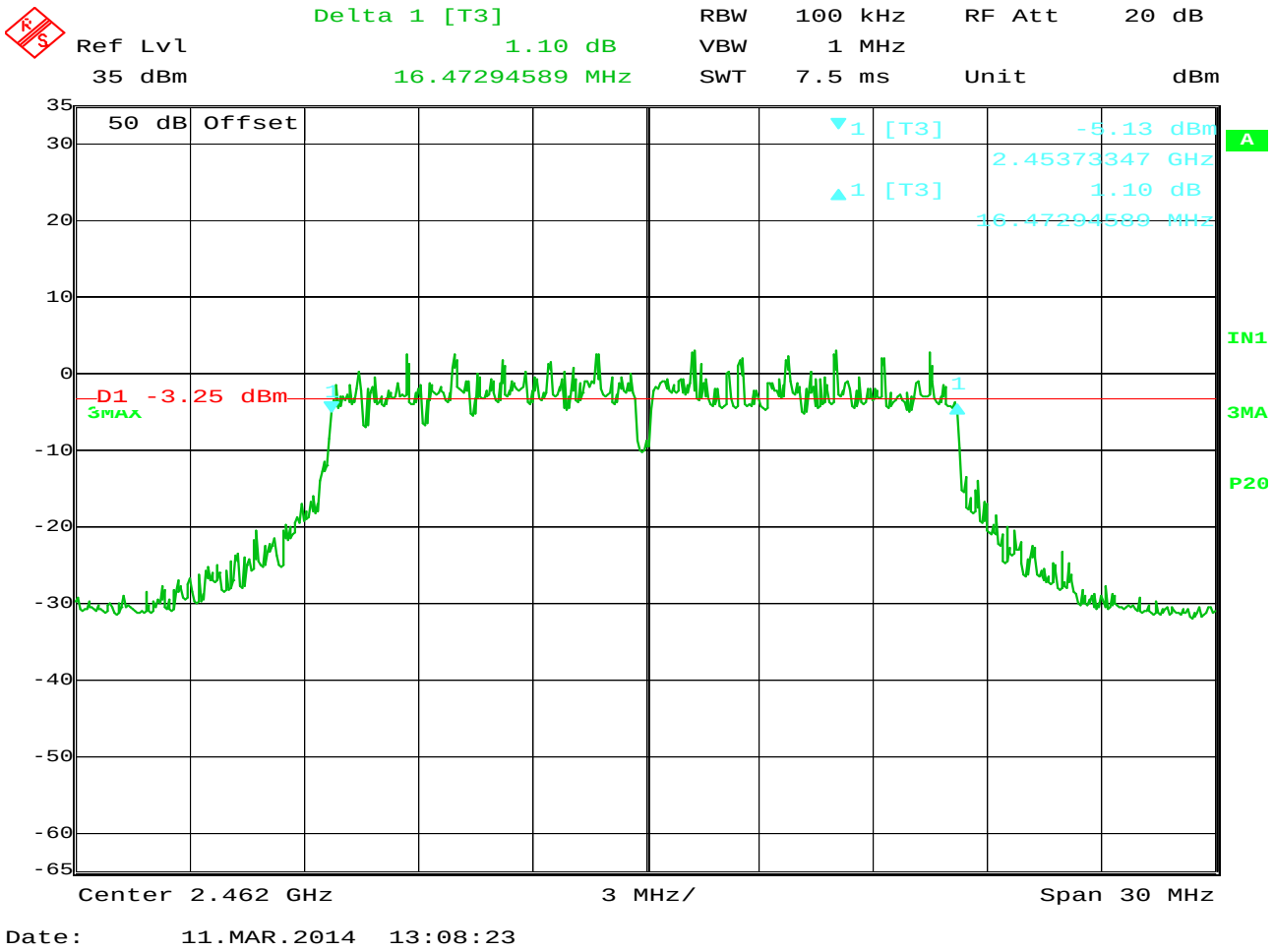
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at HIGH Channel
PROTOCOL	:	802.11 g
DATA RATE	:	18MB/s
NOTES	:	

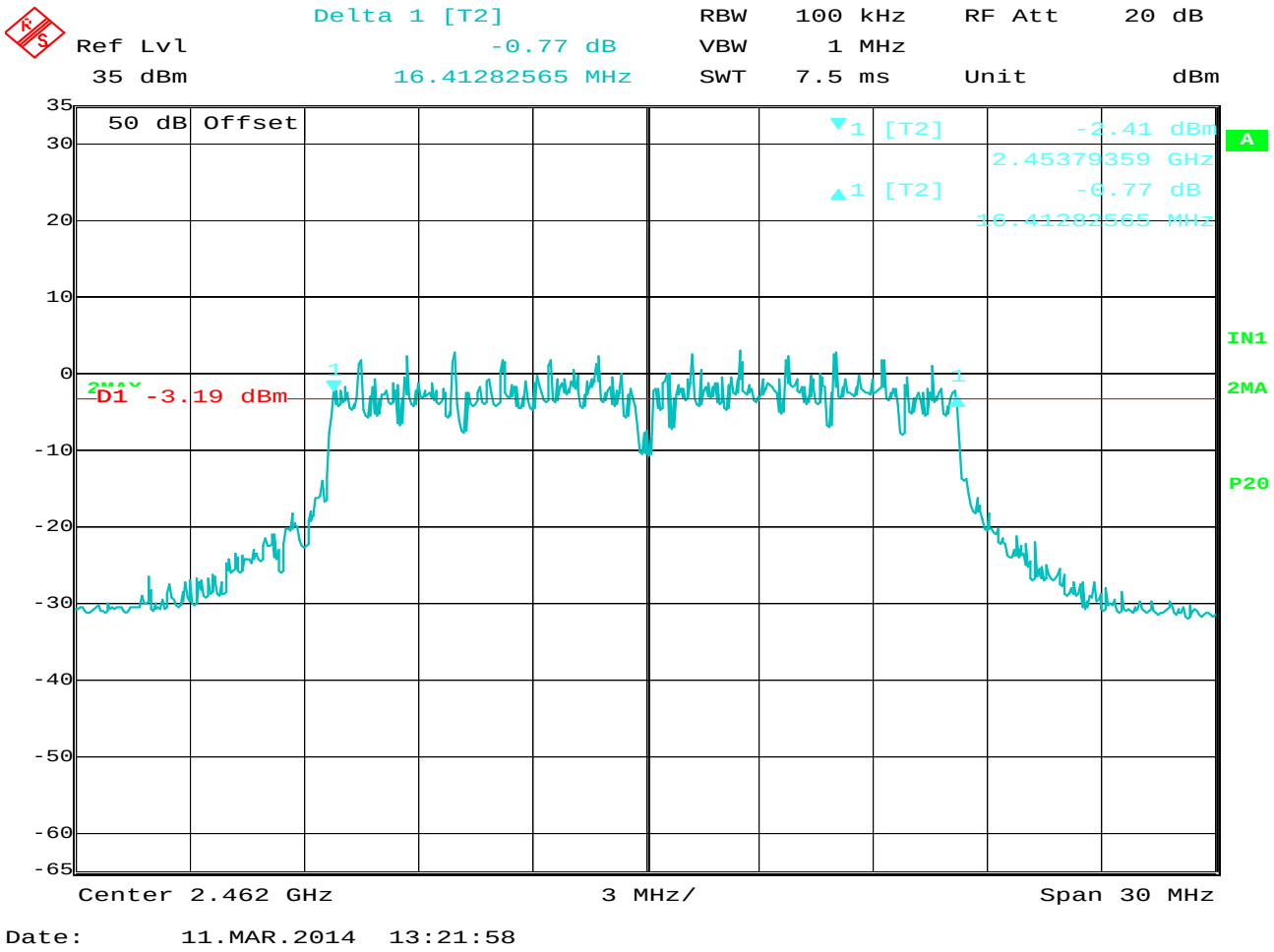
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at HIGH Channel
PROTOCOL	:	802.11 g
DATA RATE	:	24MB/s
NOTES	:	

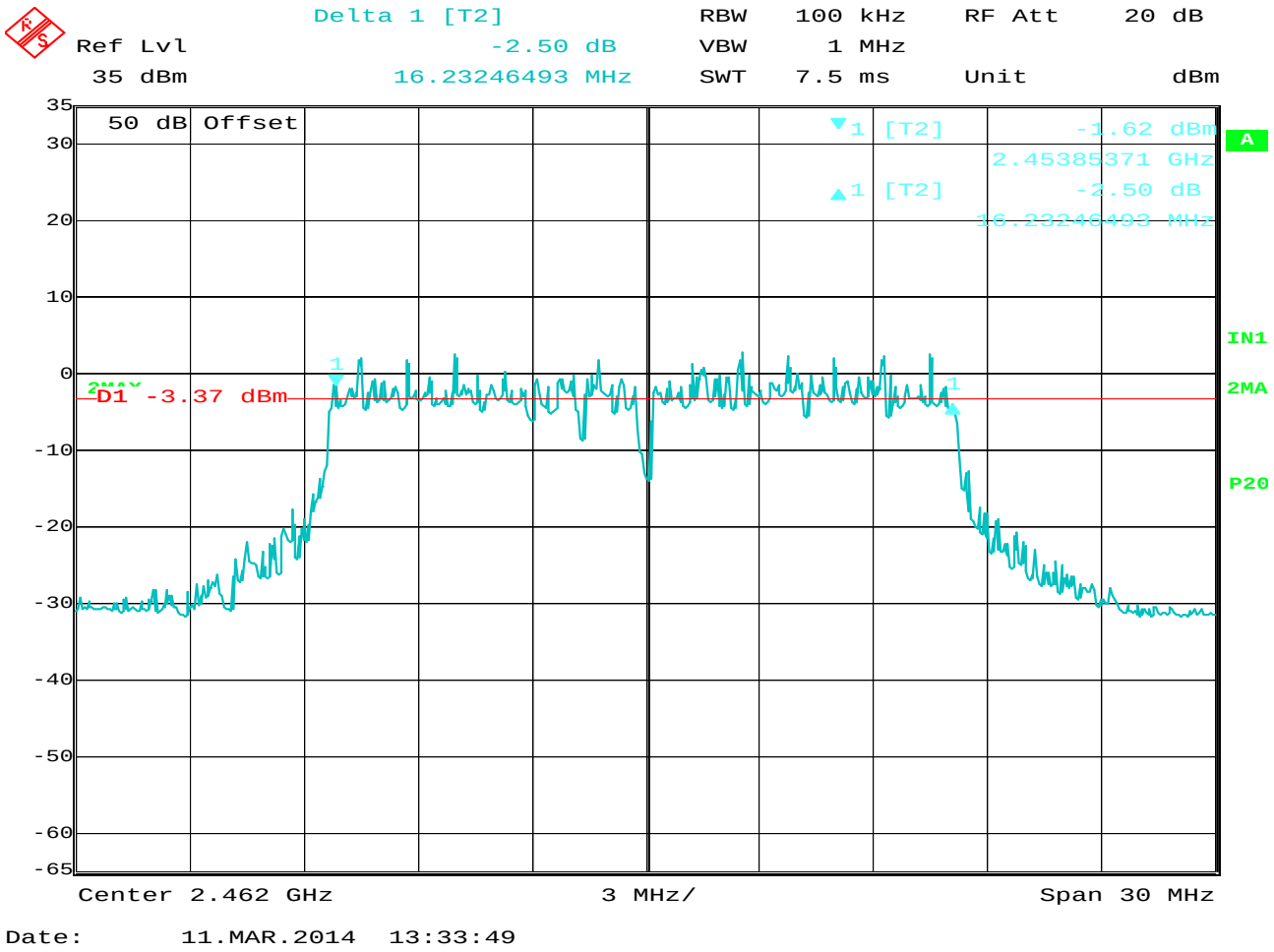
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at HIGH Channel
PROTOCOL	:	802.11 g
DATA RATE	:	36MB/s
NOTES	:	

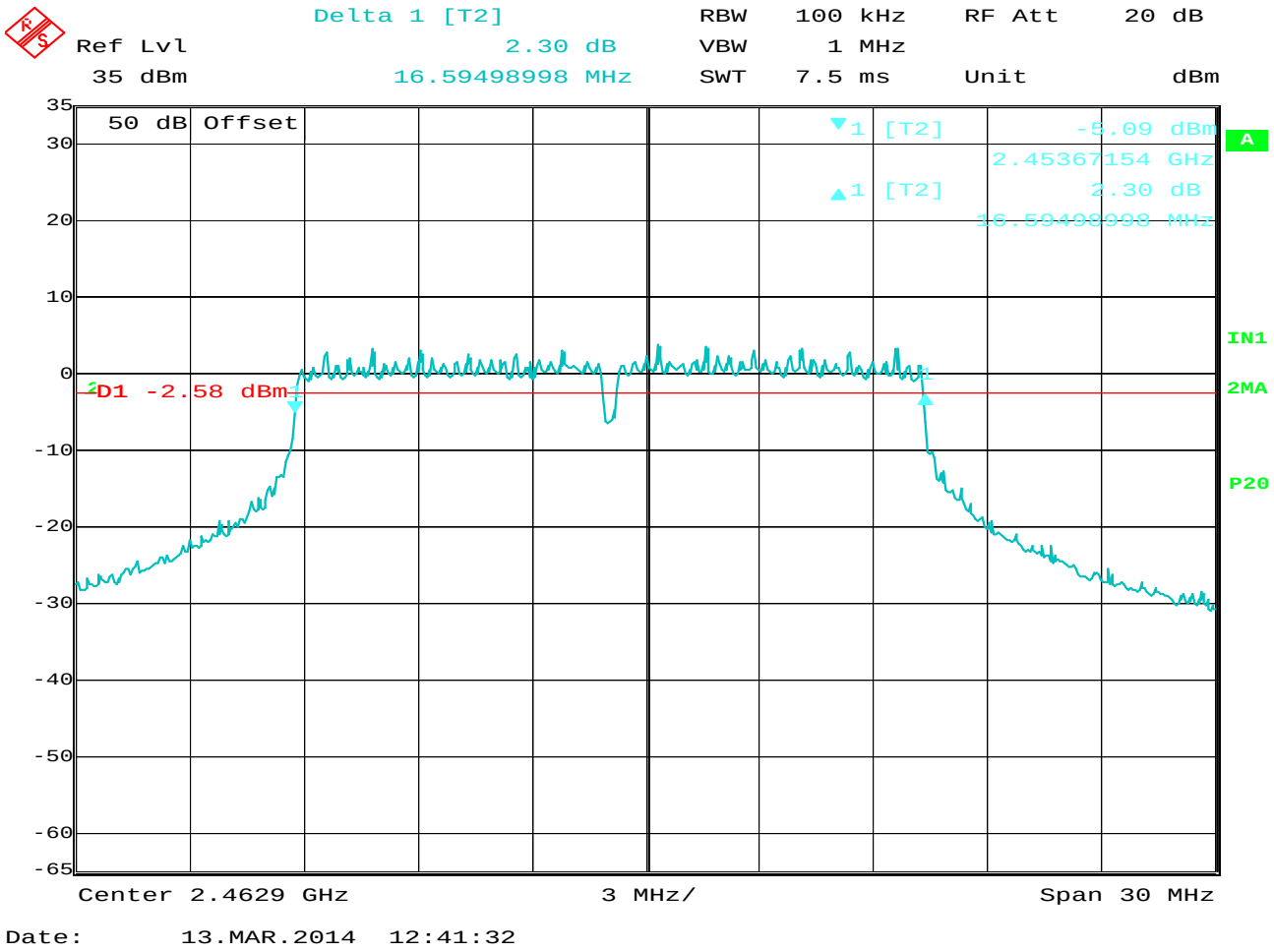
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at HIGH Channel
PROTOCOL	:	802.11 g
DATA RATE	:	48MB/s
NOTES	:	

NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at HIGH Channel
PROTOCOL	:	802.11 g
DATA RATE	:	54MB/s
NOTES	:	

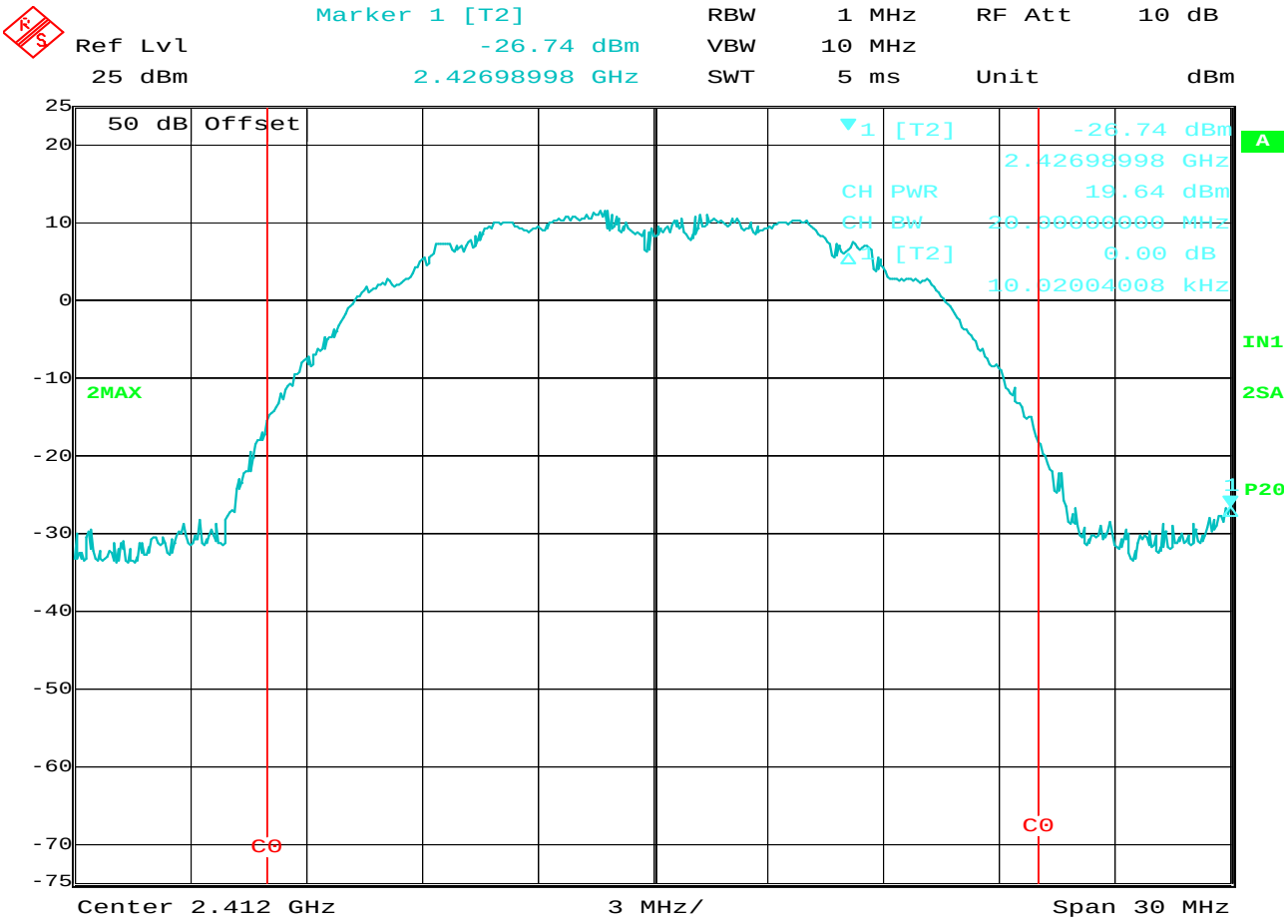
NOTES

MANUFACTURER : Caterpillar Underground Mining
MODEL NUMBER : WLg-ABOARD/N/CAT
SERIAL NUMBER : 13059009
TEST PERFORMED : Maximum Peak Conducted Output Power
TEST DATE : March 14, 2014
TEST MODE : See below
PROTOCOL : See below
DATA RATE : See below
NOTES : Integrated Band Power Measurements of paragraph 9.1.2 Federal Communications
: Commission Office of Engineering Technology Laboratory Division, Guidance for
: Performing Compliance Measurements on Digital Transmission Systems (DTS)
: Operating Under §15.247, April 9, 2013 used

Frequency MHz	802.11 Standard	Data Rate (Mb/sec)	Maximum Peak Conducted Output Power (dBm)	Maximum Peak Conducted Output Power Limit (dBm)
2412	b	1	19.64	30.00
		2	19.97	30.00
		5.5	19.68	30.00
		11	20.05	30.00
2437	b	1	20.18	30.00
		2	20.00	30.00
		5.5	20.20	30.00
		11	20.32	30.00
2462	b	1	19.37	30.00
		2	19.26	30.00
		5.5	19.01	30.00
		11	19.27	30.00

MANUFACTURER : Caterpillar Underground Mining
MODEL NUMBER : WLg-ABOARD/N/CAT
SERIAL NUMBER : 13059009
TEST PERFORMED : Maximum Peak Conducted Output Power
TEST DATE : March 14, 2014
TEST MODE : See below
PROTOCOL : See below
DATA RATE : See below
NOTES : Integrated Band Power Measurements of paragraph 9.1.2 Federal Communications
: Commission Office of Engineering Technology Laboratory Division, Guidance for
: Performing Compliance Measurements on Digital Transmission Systems (DTS)
: Operating Under §15.247, April 9, 2013 used

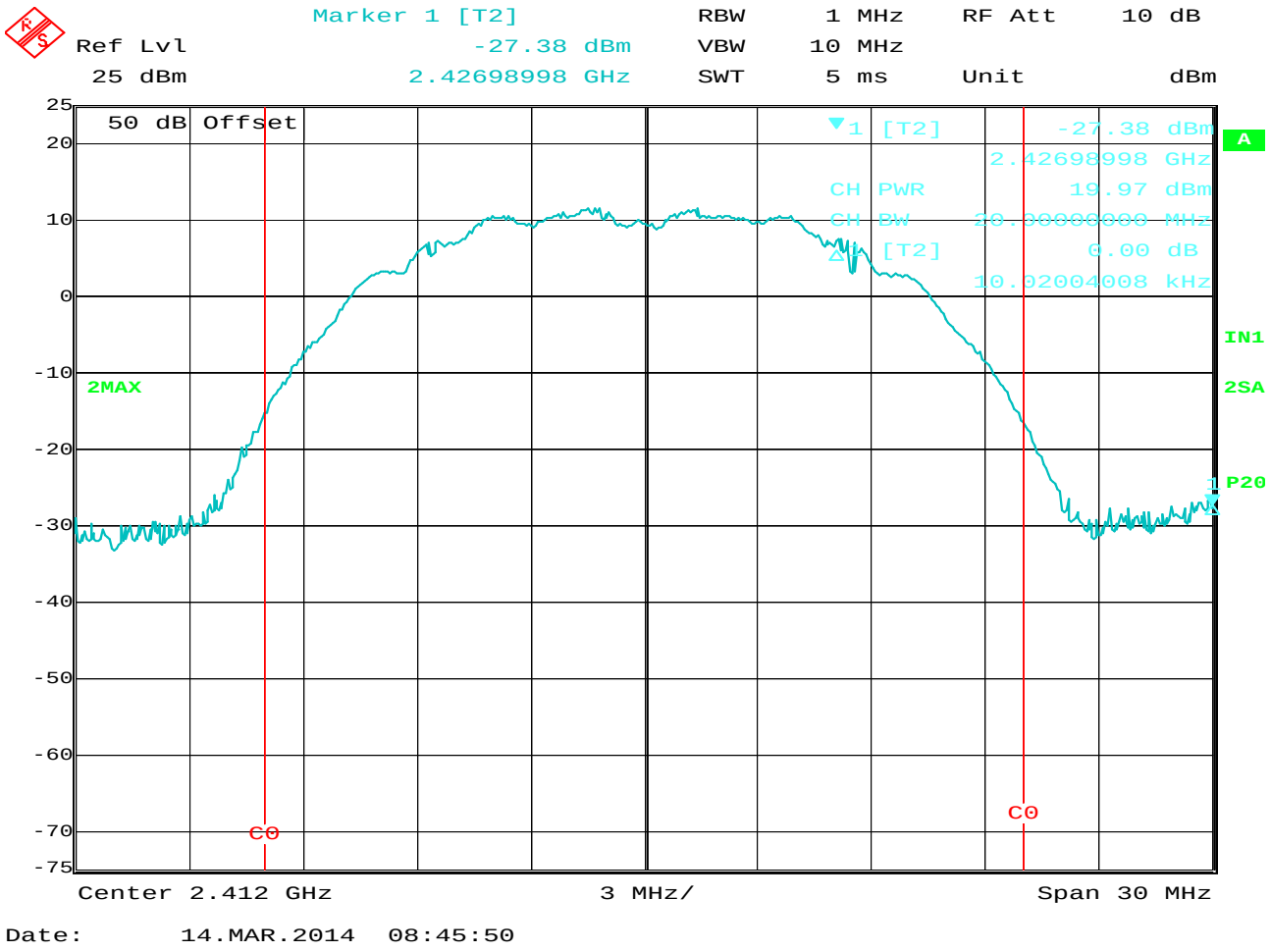
Frequency MHz	802.11 Standard	Data Rate (Mb/sec)	Maximum Peak Conducted Output Power (dBm)	Maximum Peak Conducted Output Power Limit (dBm)
2412	g	6	21.57	30.00
		9	22.73	30.00
		12	22.65	30.00
		18	19.51	30.00
		24	23.28	30.00
		36	22.87	30.00
		48	23.08	30.00
		54	23.18	30.00
2437	g	6	24.27	30.00
		9	23.84	30.00
		12	24.05	30.00
		18	24.07	30.00
		24	23.78	30.00
		36	23.79	30.00
		48	24.15	30.00
		54	23.80	30.00
2462	g	6	23.35	30.00
		9	23.18	30.00
		12	23.24	30.00
		18	23.25	30.00
		24	23.09	30.00
		36	22.87	30.00
		48	22.89	30.00
		54	23.04	30.00



FCC 15.247 Maximum Peak Conducted Output Power

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at LOW Channel
PROTOCOL	:	802.11 b
DATA RATE	:	1MB/s
NOTES	:	

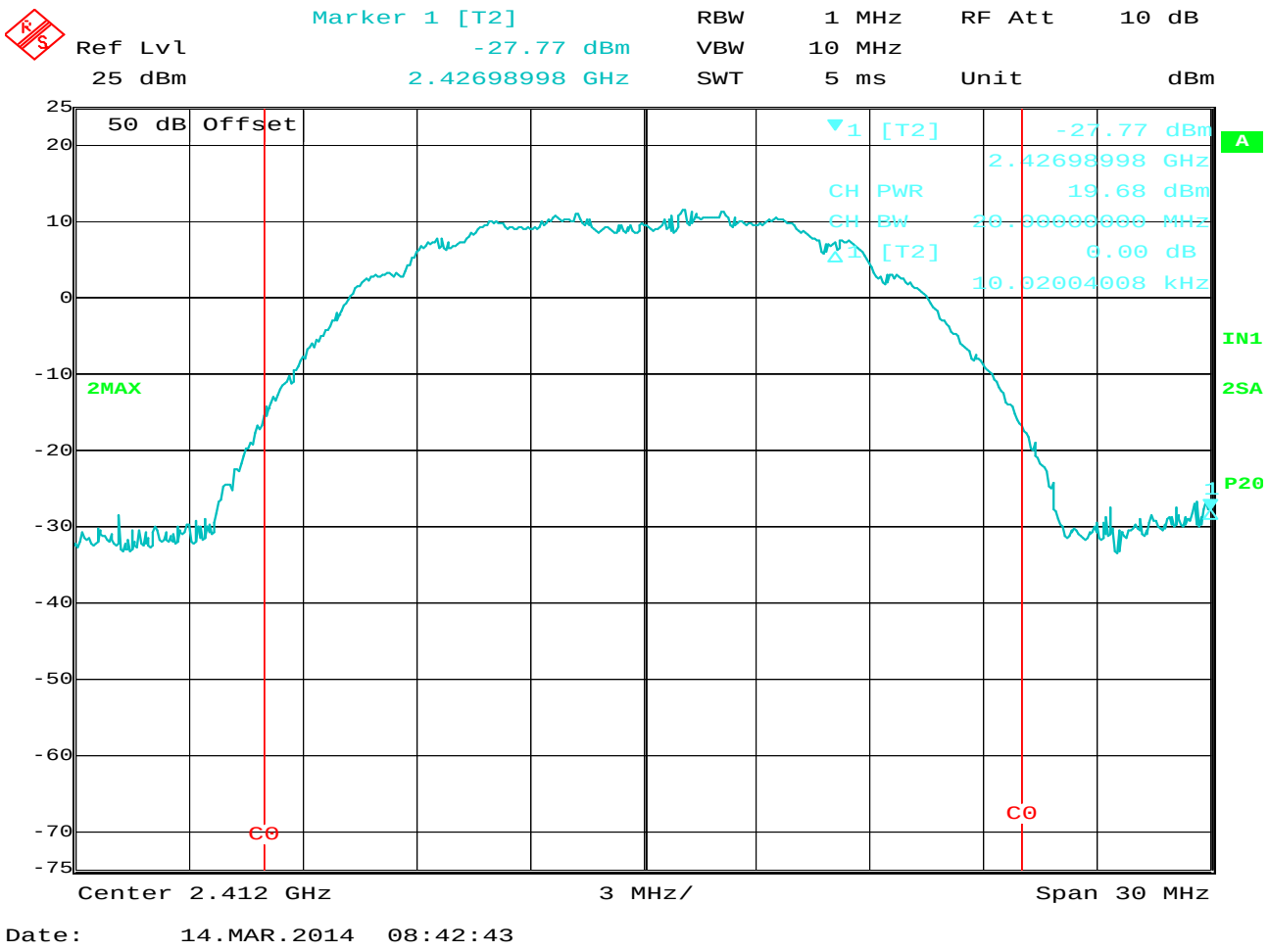
NOTES



FCC 15.247 Maximum Peak Conducted Output Power

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at LOW Channel
PROTOCOL	:	802.11 b
DATA RATE	:	2MB/s
NOTES	:	

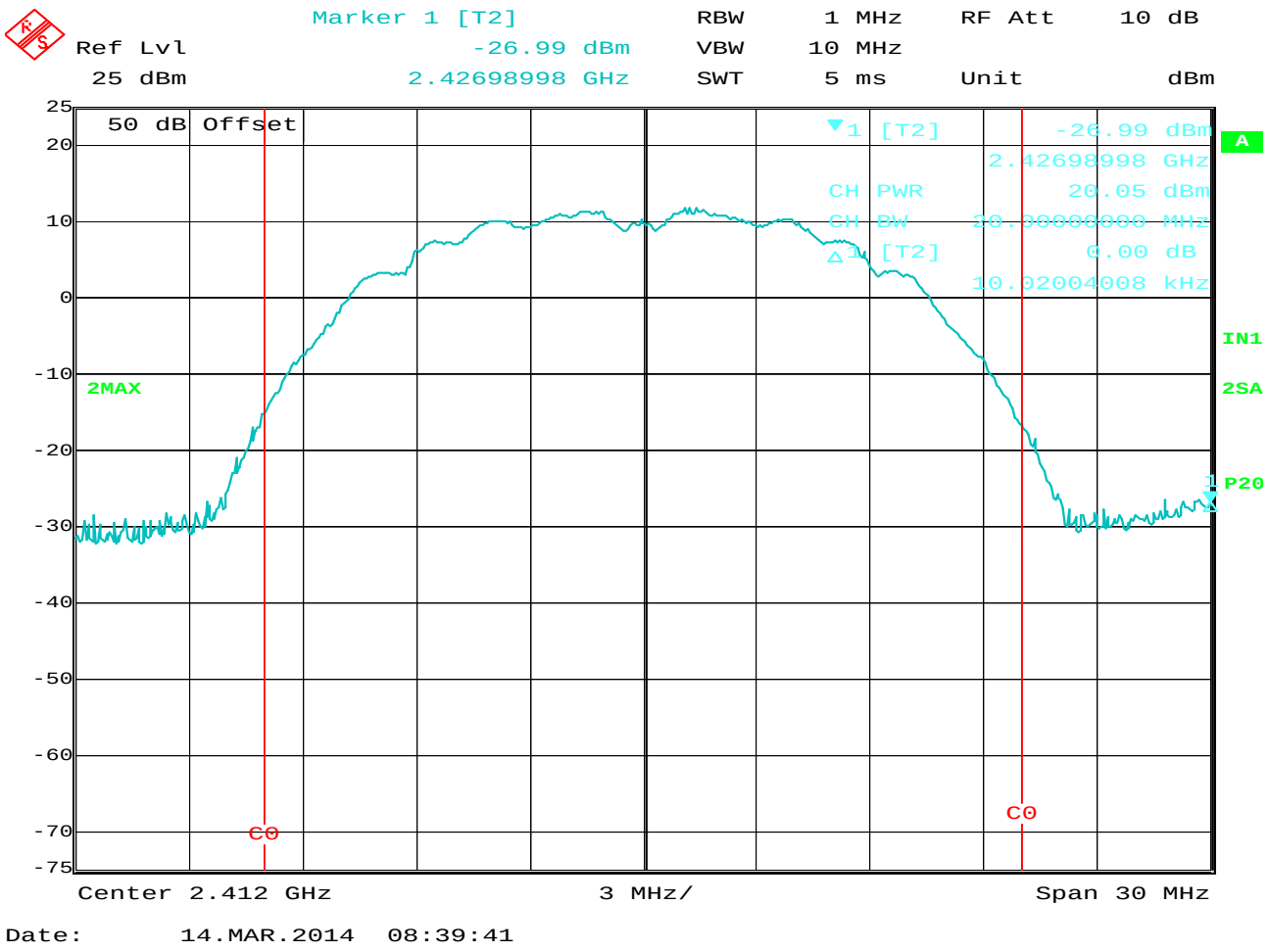
NOTES



FCC 15.247 Maximum Peak Conducted Output Power

MANUFACTURER	: Caterpillar Underground Mining
MODEL NUMBER	: WLg-ABOARD/N/CAT
SERIAL NUMBER	: 13059009
TEST MODE	: Tx at LOW Channel
PROTOCOL	: 802.11 b
DATA RATE	: 5.5MB/s
NOTES	:

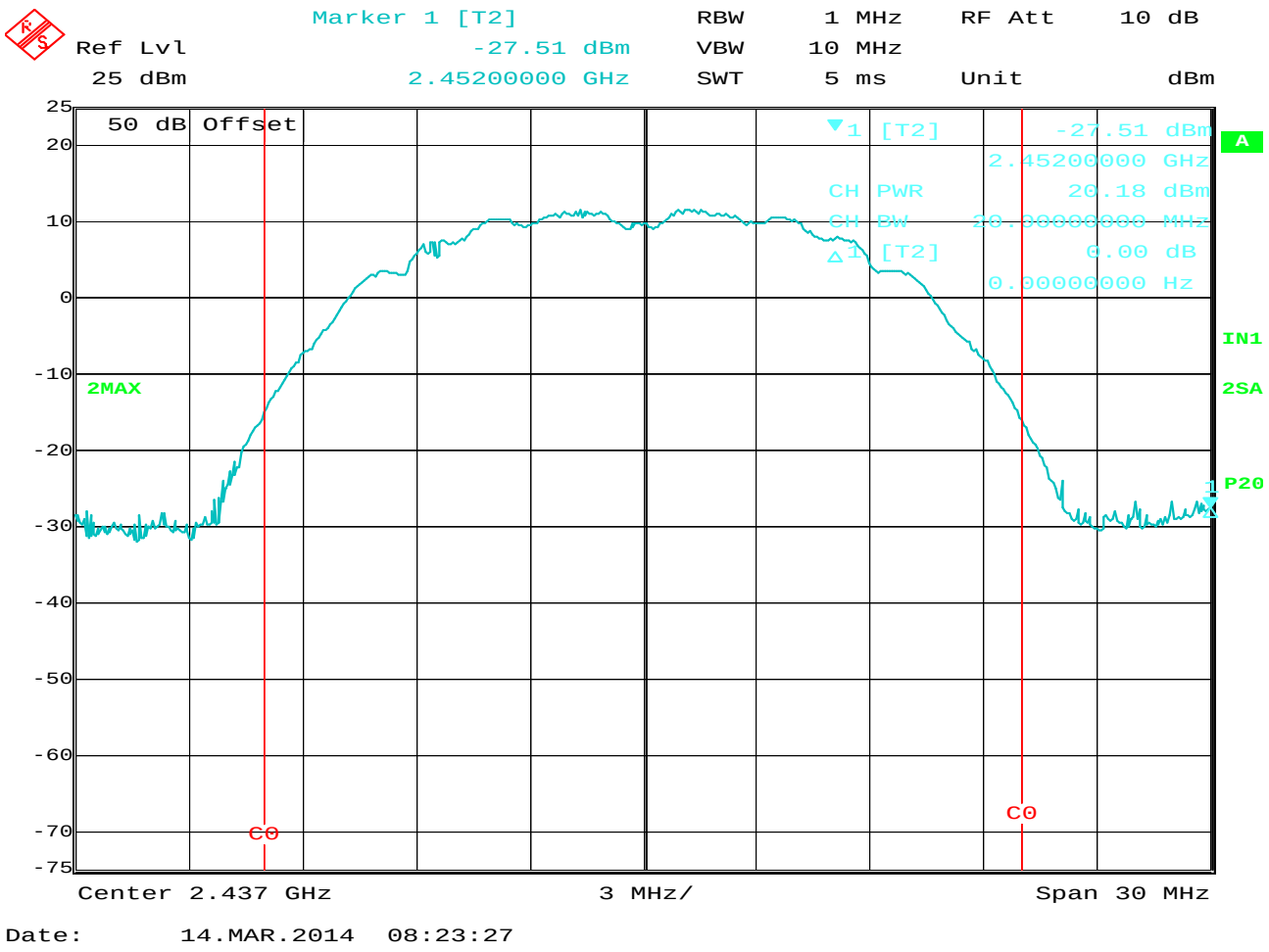
NOTES



FCC 15.247 Maximum Peak Conducted Output Power

MANUFACTURER	: Caterpillar Underground Mining
MODEL NUMBER	: WLg-ABOARD/N/CAT
SERIAL NUMBER	: 13059009
TEST MODE	: Tx at LOW Channel
PROTOCOL	: 802.11 b
DATA RATE	: 11MB/s
NOTES	:

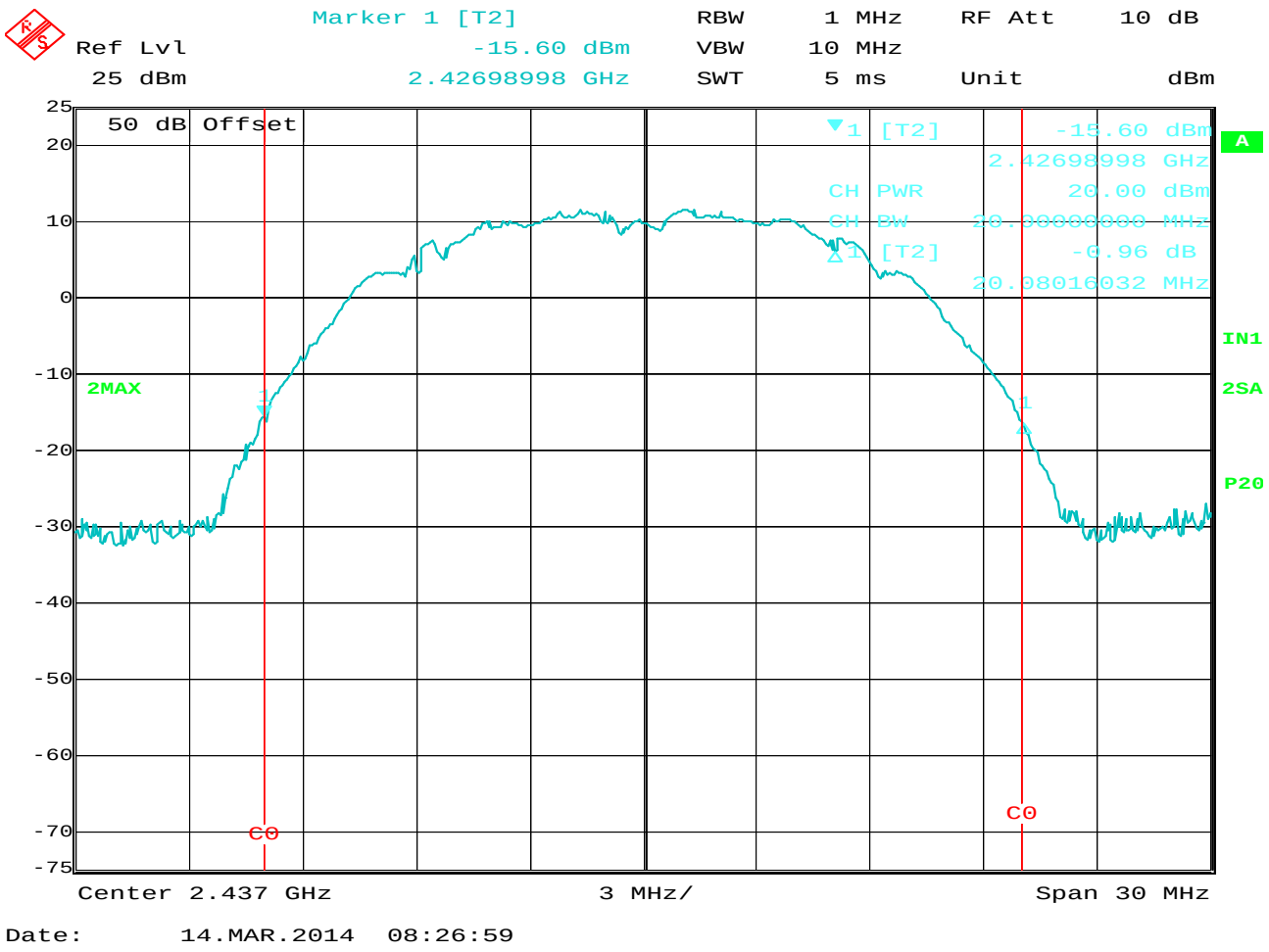
NOTES



FCC 15.247 Maximum Peak Conducted Output Power

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at MID Channel
PROTOCOL	:	802.11 b
DATA RATE	:	1MB/s
NOTES	:	

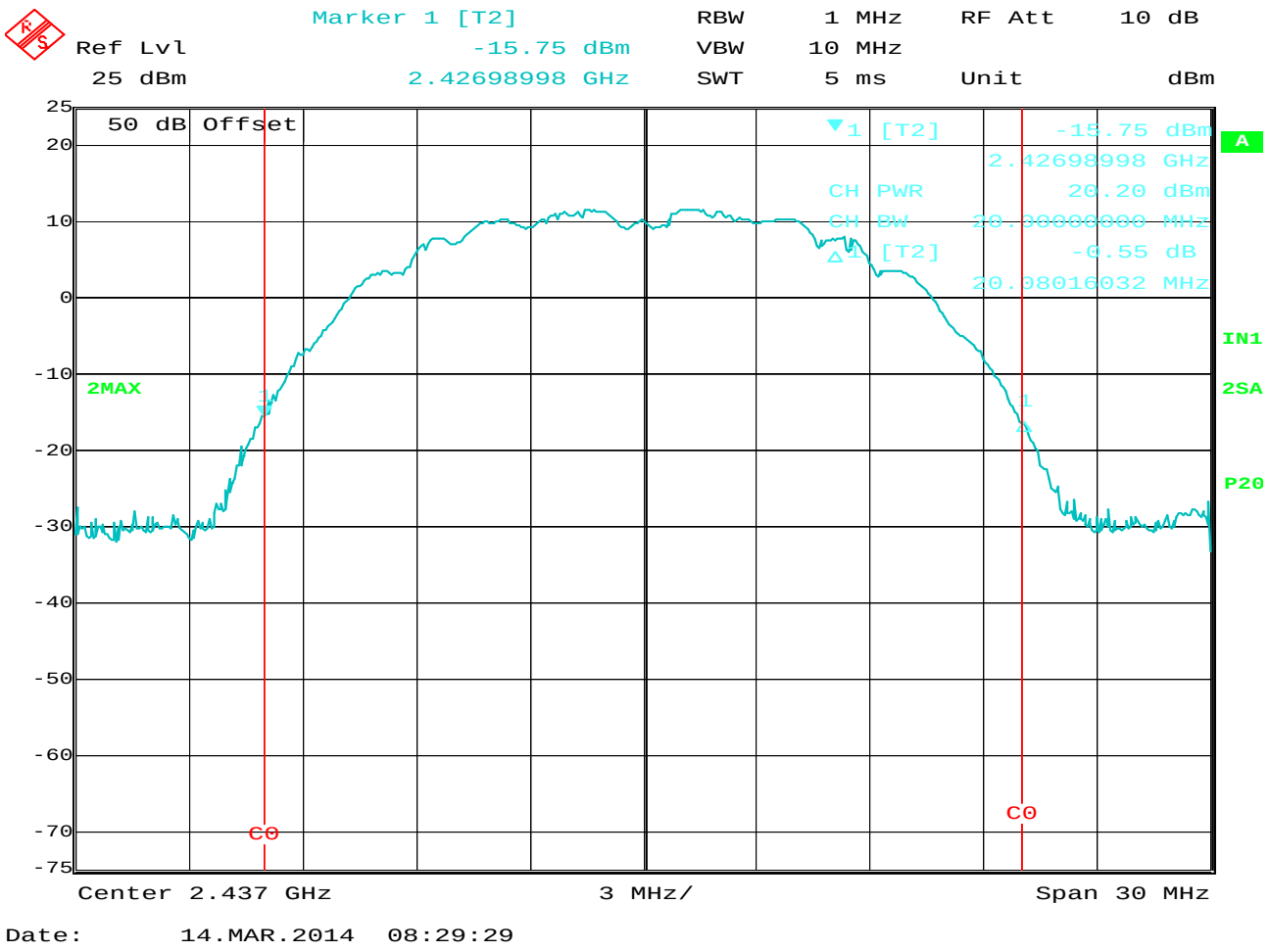
NOTES



FCC 15.247 Maximum Peak Conducted Output Power

MANUFACTURER	: Caterpillar Underground Mining
MODEL NUMBER	: WLg-ABOARD/N/CAT
SERIAL NUMBER	: 13059009
TEST MODE	: Tx at MID Channel
PROTOCOL	: 802.11 b
DATA RATE	: 2MB/s
NOTES	:

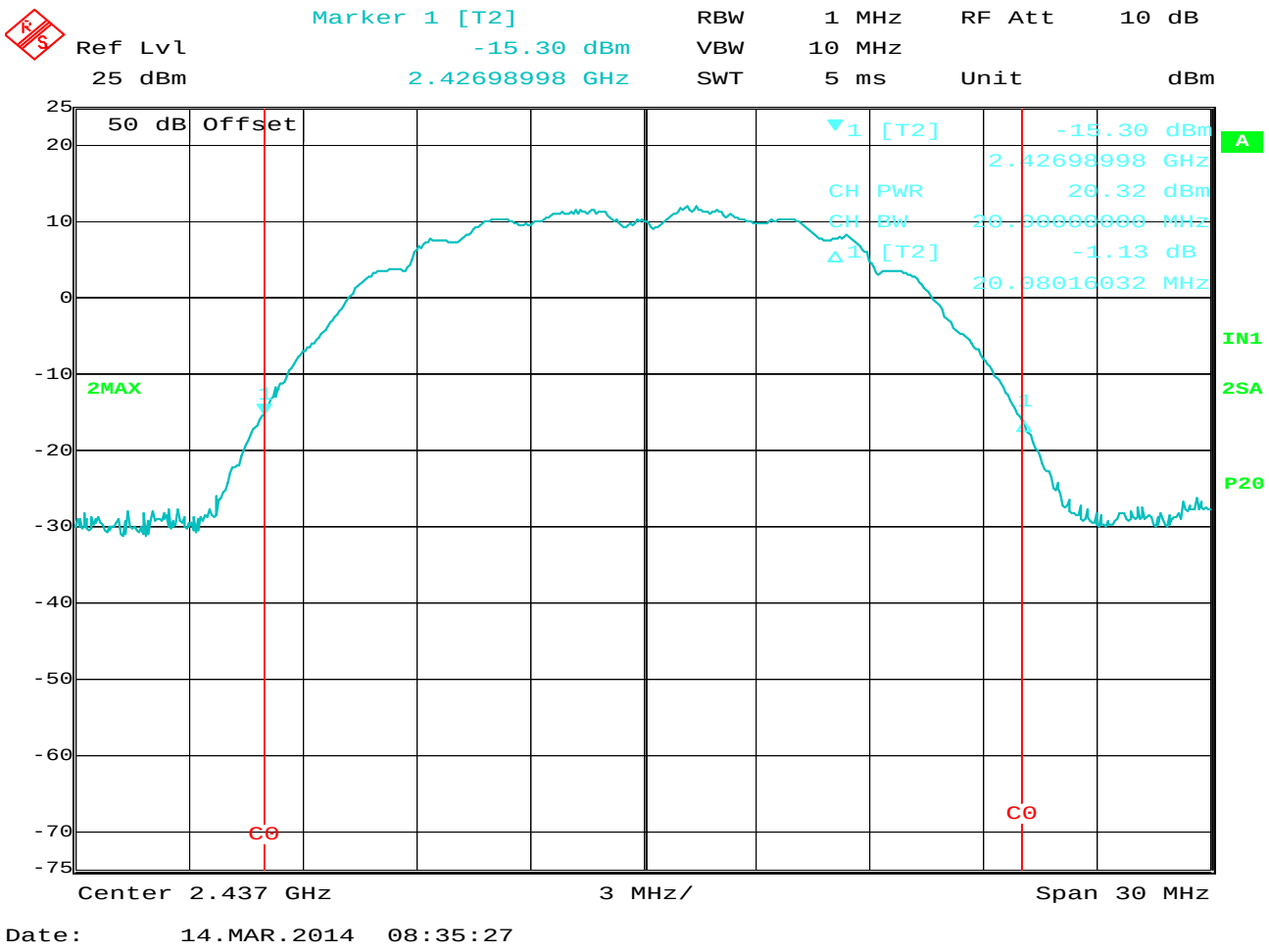
NOTES



FCC 15.247 Maximum Peak Conducted Output Power

MANUFACTURER	: Caterpillar Underground Mining
MODEL NUMBER	: WLg-ABOARD/N/CAT
SERIAL NUMBER	: 13059009
TEST MODE	: Tx at MID Channel
PROTOCOL	: 802.11 b
DATA RATE	: 5.5MB/s
NOTES	:

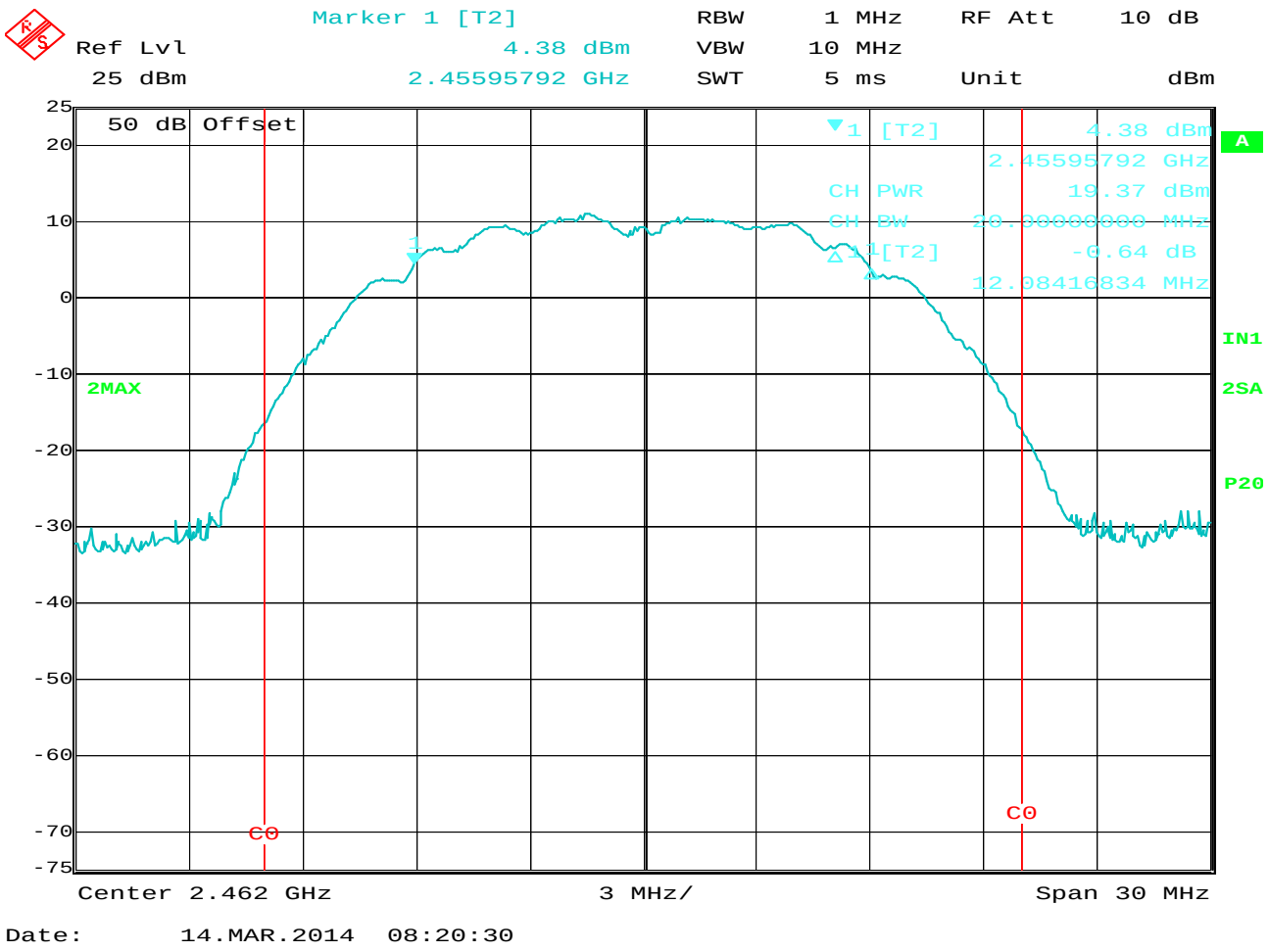
NOTES



FCC 15.247 Maximum Peak Conducted Output Power

MANUFACTURER	: Caterpillar Underground Mining
MODEL NUMBER	: WLg-ABOARD/N/CAT
SERIAL NUMBER	: 13059009
TEST MODE	: Tx at MID Channel
PROTOCOL	: 802.11 b
DATA RATE	: 11MB/s
NOTES	:

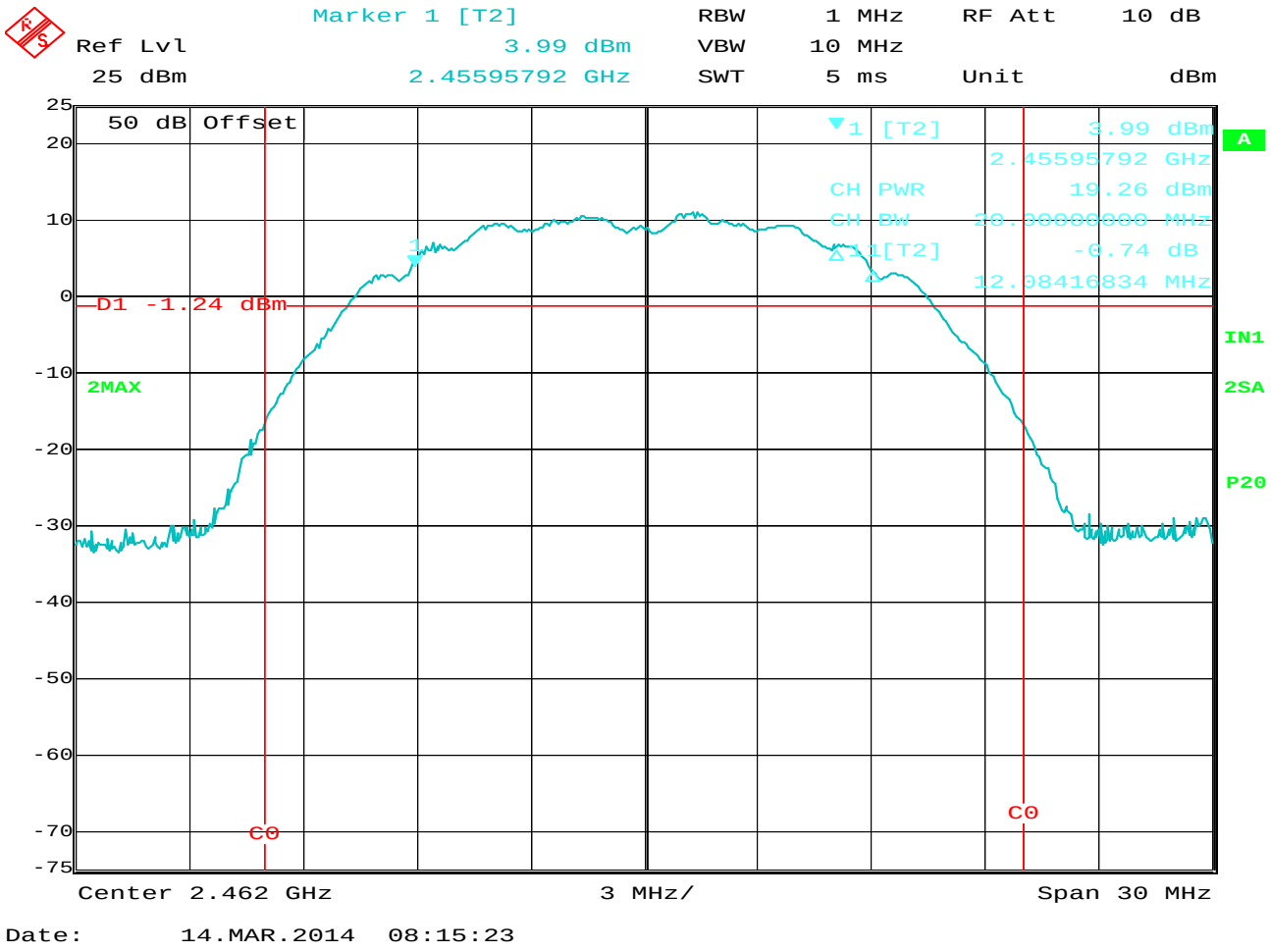
NOTES



FCC 15.247 Maximum Peak Conducted Output Power

MANUFACTURER	: Caterpillar Underground Mining
MODEL NUMBER	: WLg-ABOARD/N/CAT
SERIAL NUMBER	: 13059009
TEST MODE	: Tx at HIGH Channel
PROTOCOL	: 802.11 b
DATA RATE	: 1MB/s
NOTES	:

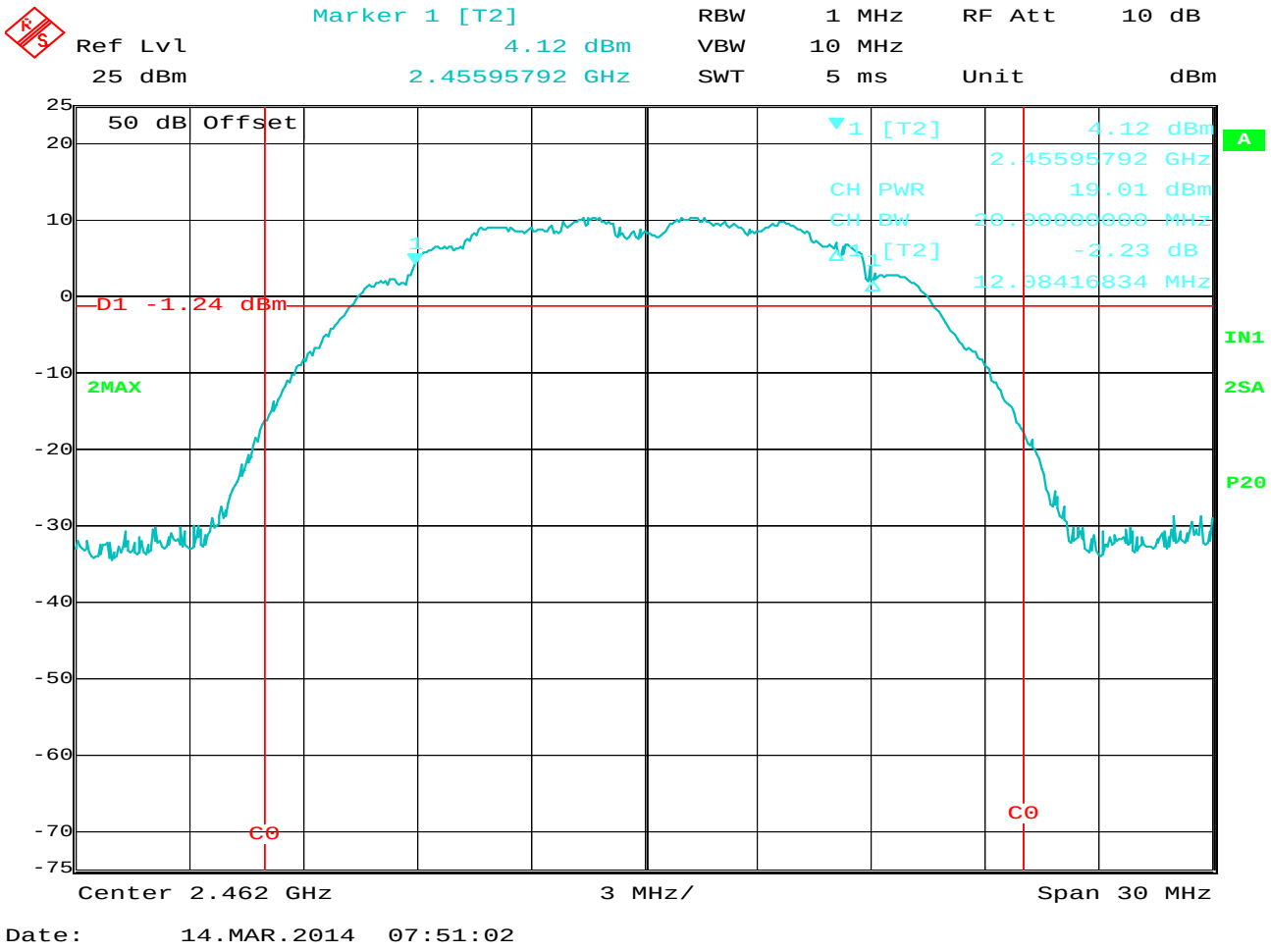
NOTES



FCC 15.247 Maximum Peak Conducted Output Power

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at HIGH Channel
PROTOCOL	:	802.11 b
DATA RATE	:	2MB/s
NOTES	:	

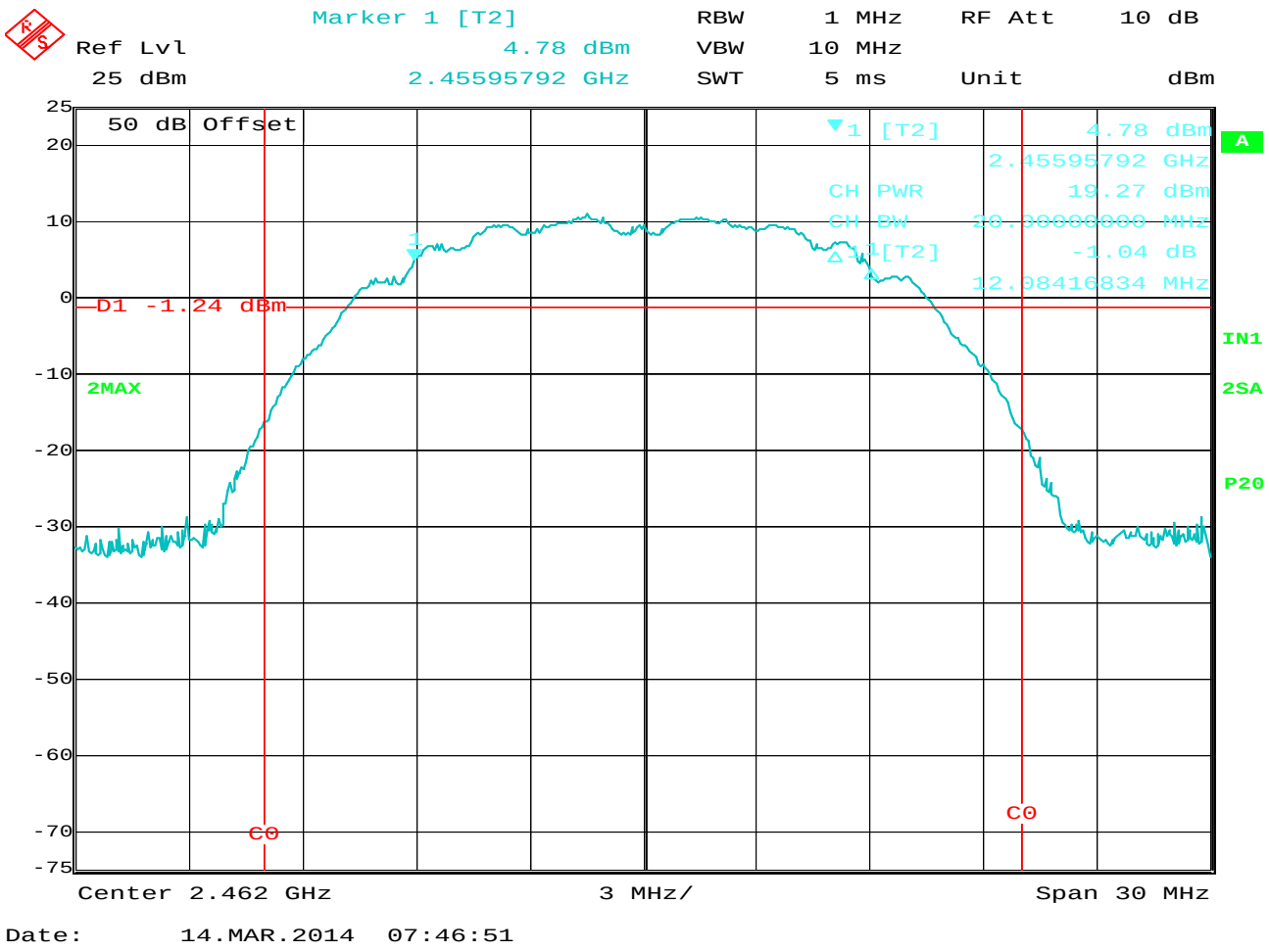
NOTES



FCC 15.247 Maximum Peak Conducted Output Power

MANUFACTURER	: Caterpillar Underground Mining
MODEL NUMBER	: WLg-ABOARD/N/CAT
SERIAL NUMBER	: 13059009
TEST MODE	: Tx at HIGH Channel
PROTOCOL	: 802.11 b
DATA RATE	: 5.5MB/s
NOTES	:

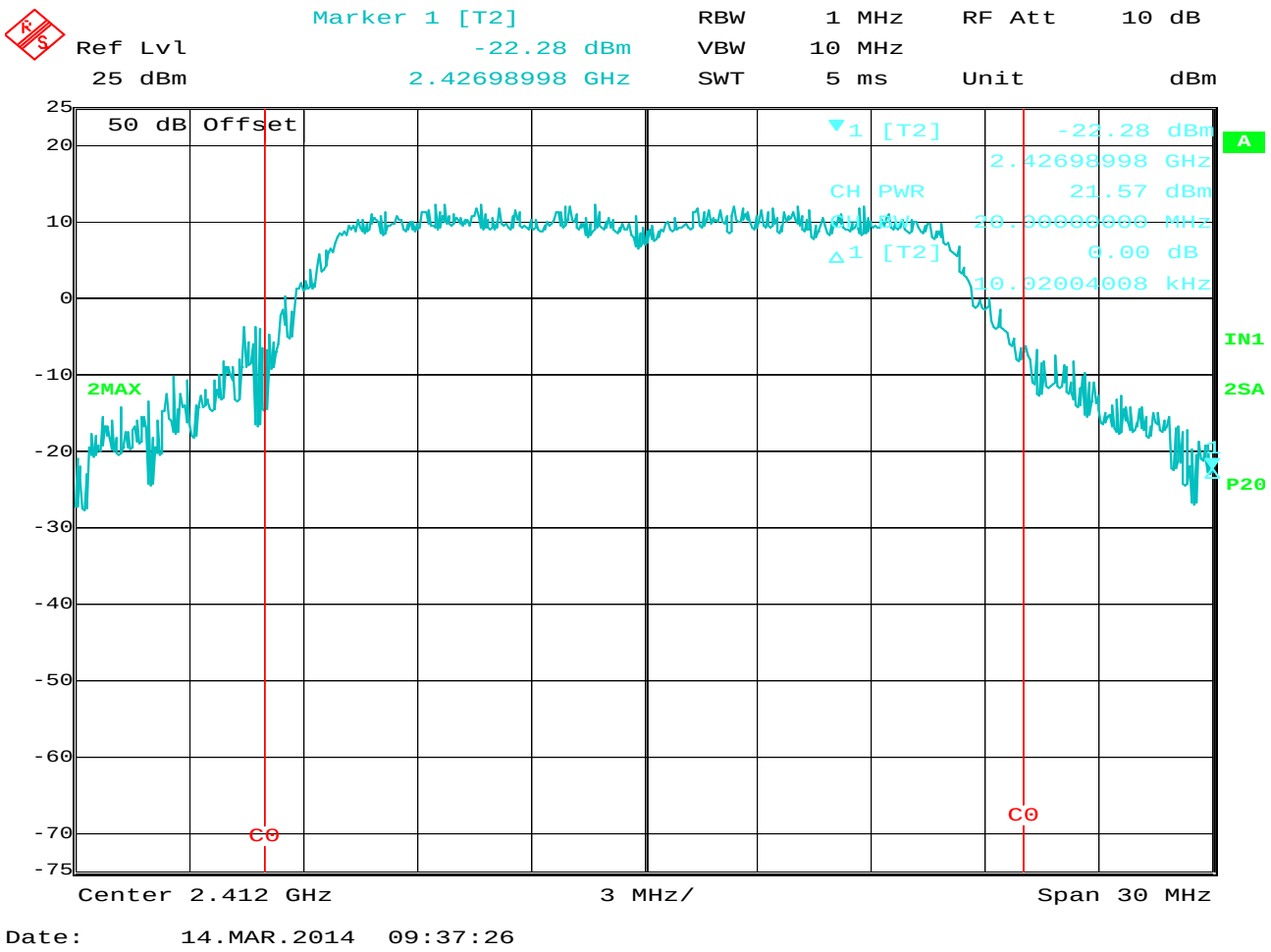
NOTES



FCC 15.247 Maximum Peak Conducted Output Power

MANUFACTURER	: Caterpillar Underground Mining
MODEL NUMBER	: WLg-ABOARD/N/CAT
SERIAL NUMBER	: 13059009
TEST MODE	: Tx at HIGH Channel
PROTOCOL	: 802.11 b
DATA RATE	: 11MB/s
NOTES	:

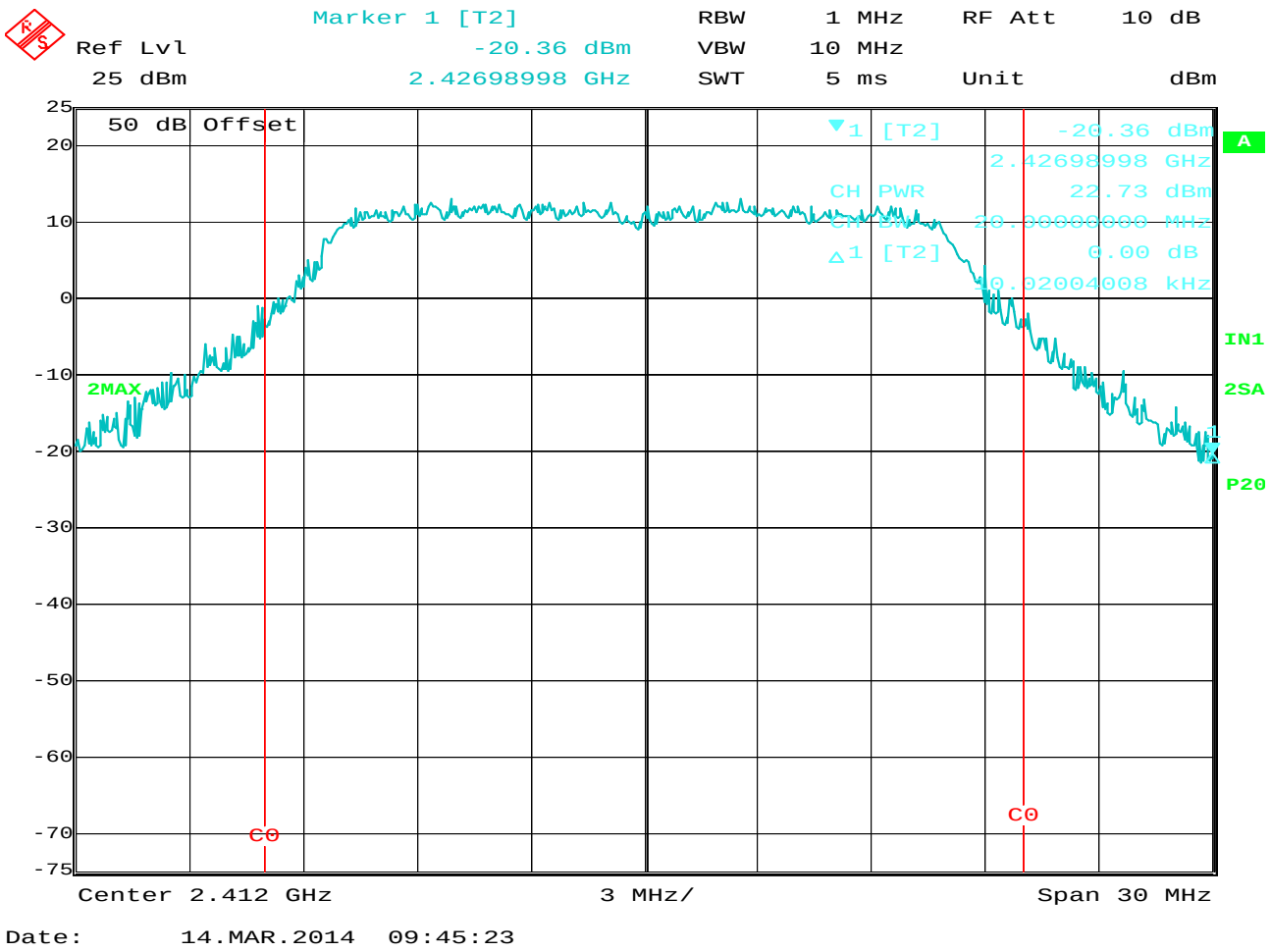
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at LOW Channel
PROTOCOL	:	802.11 g
DATA RATE	:	6MB/s
NOTES	:	

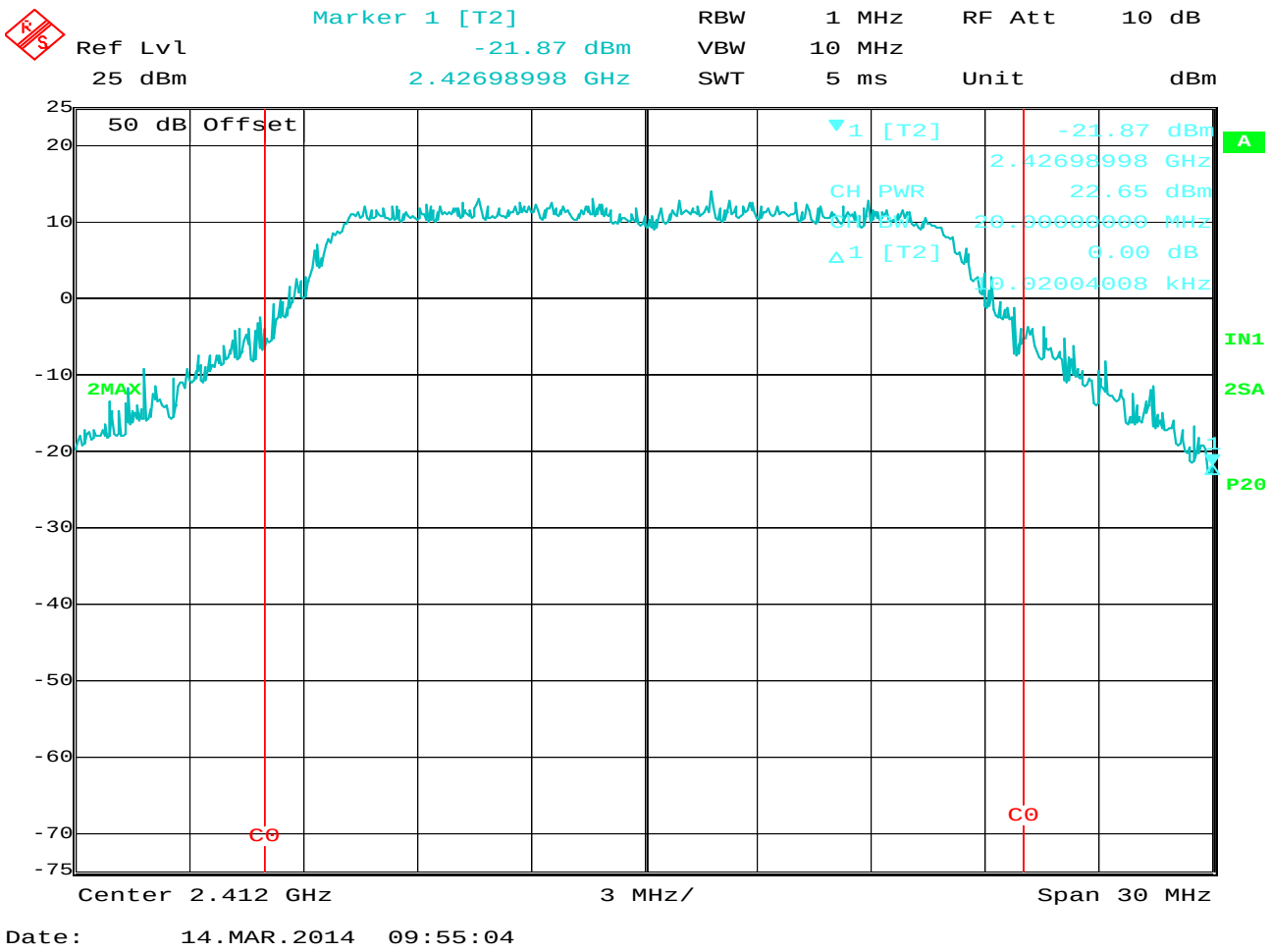
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at LOW Channel
PROTOCOL	:	802.11 g
DATA RATE	:	9MB/s
NOTES	:	

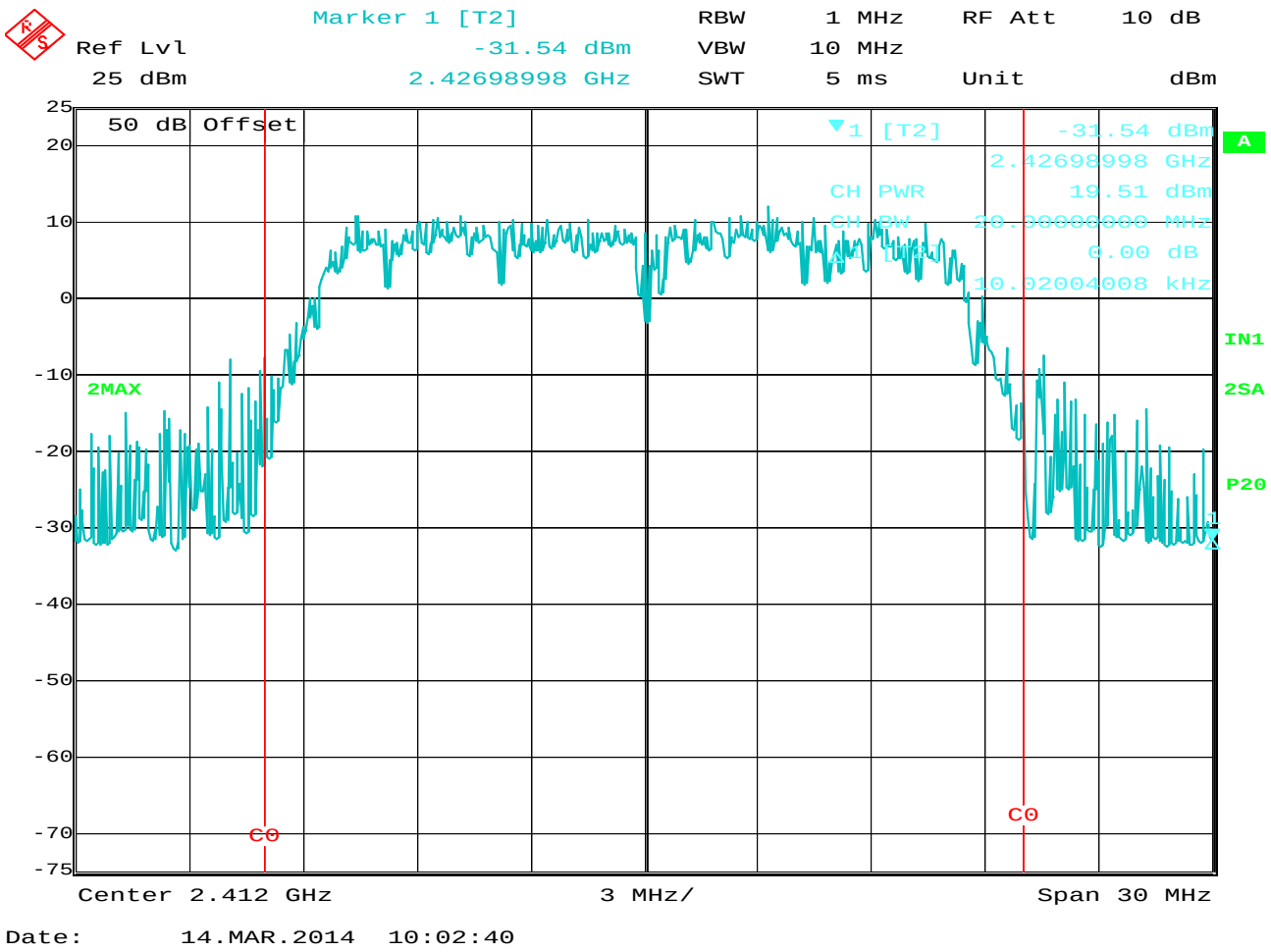
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at LOW Channel
PROTOCOL	:	802.11 g
DATA RATE	:	12MB/s
NOTES	:	

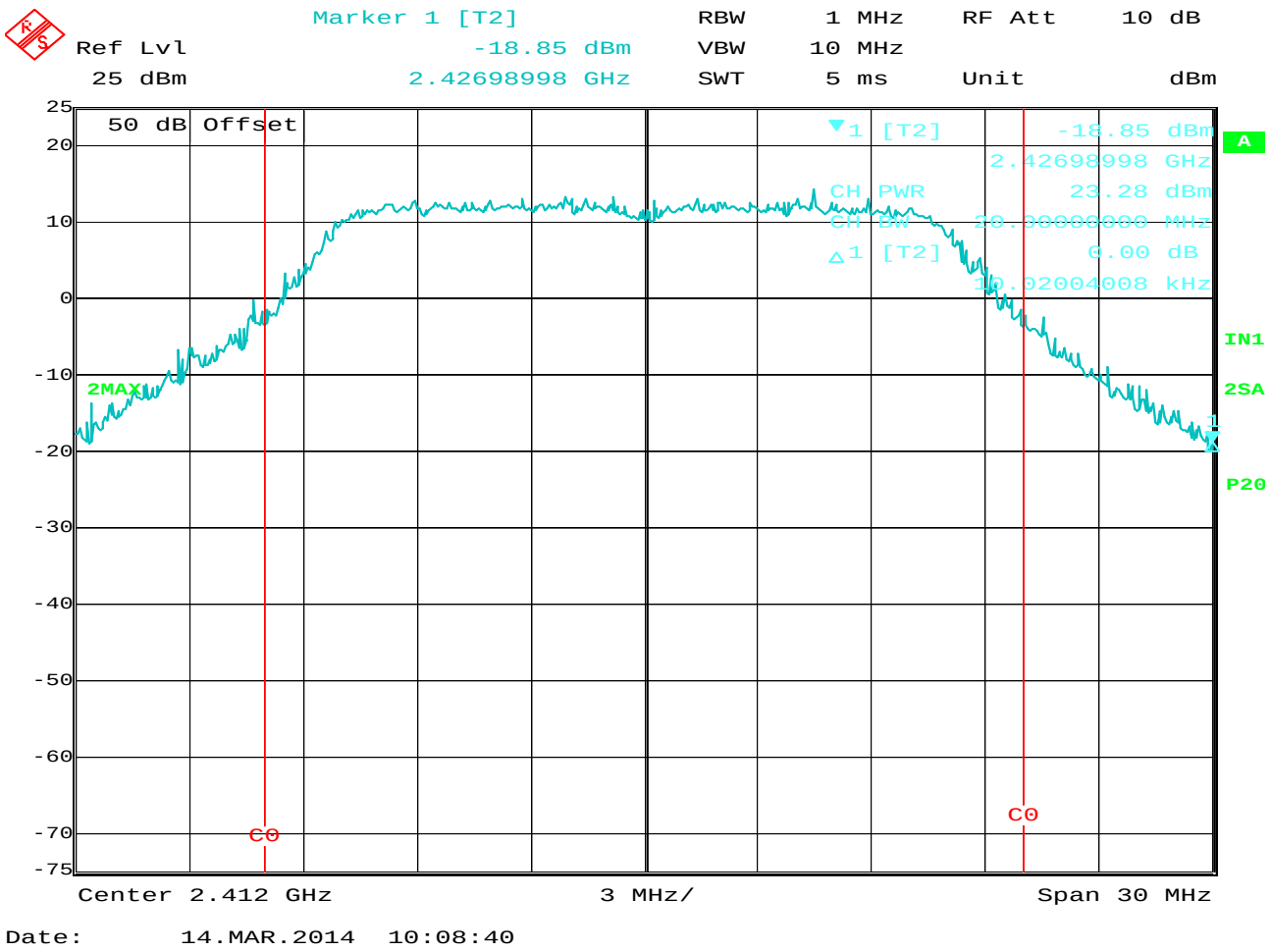
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at LOW Channel
PROTOCOL	:	802.11 g
DATA RATE	:	18MB/s
NOTES	:	

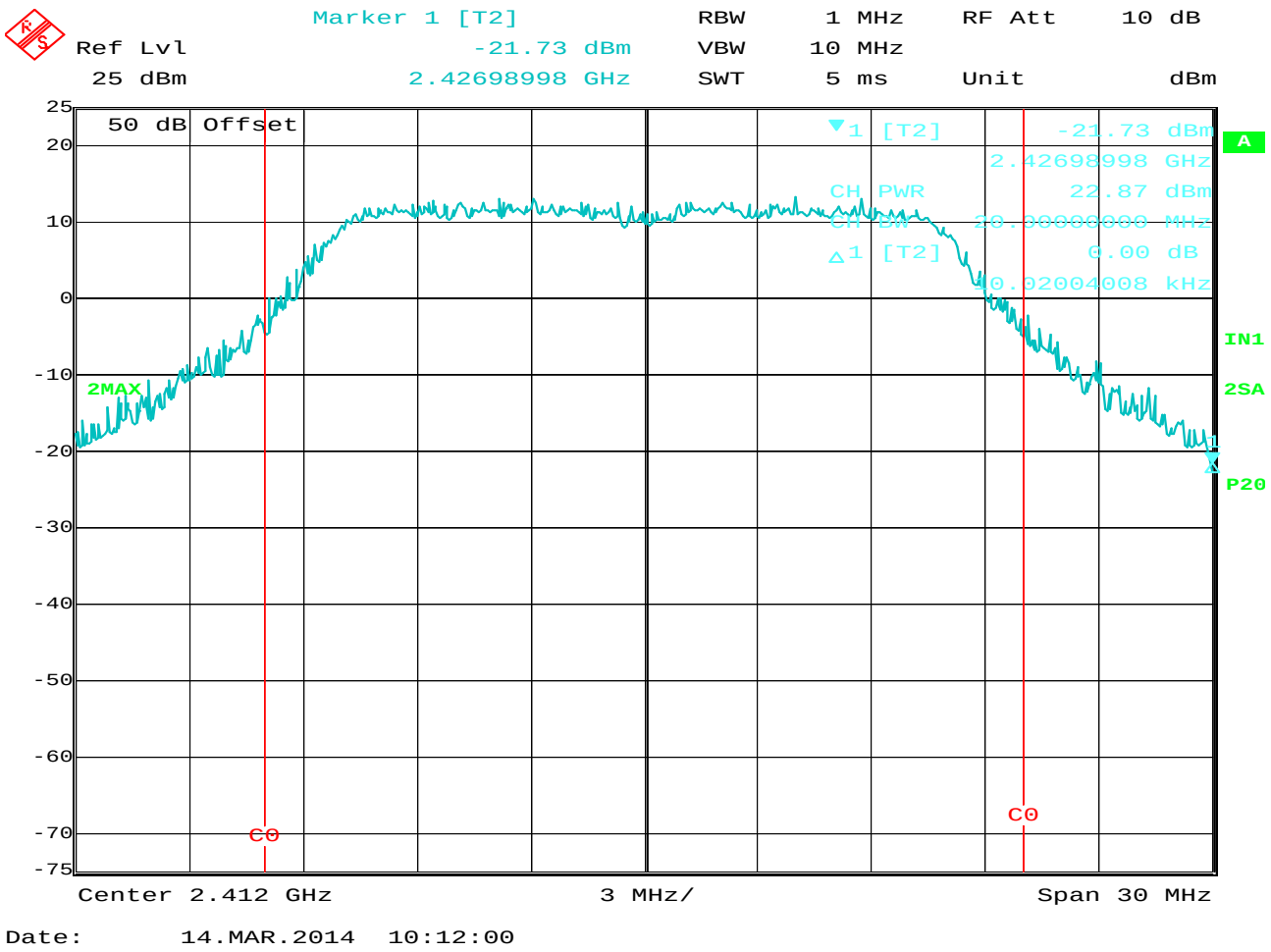
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at LOW Channel
PROTOCOL	:	802.11 g
DATA RATE	:	24MB/s
NOTES	:	

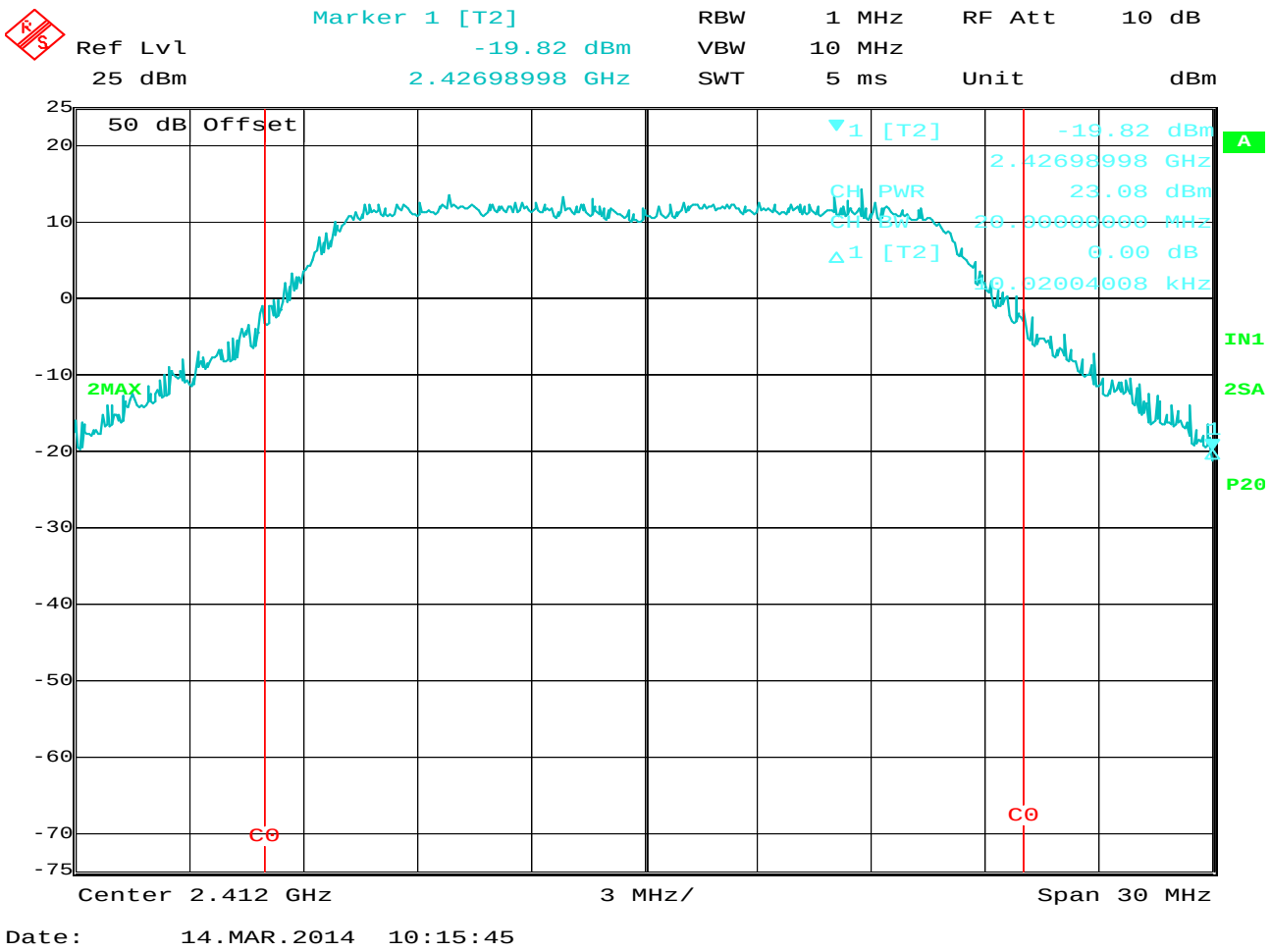
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at LOW Channel
PROTOCOL	:	802.11 g
DATA RATE	:	36MB/s
NOTES	:	

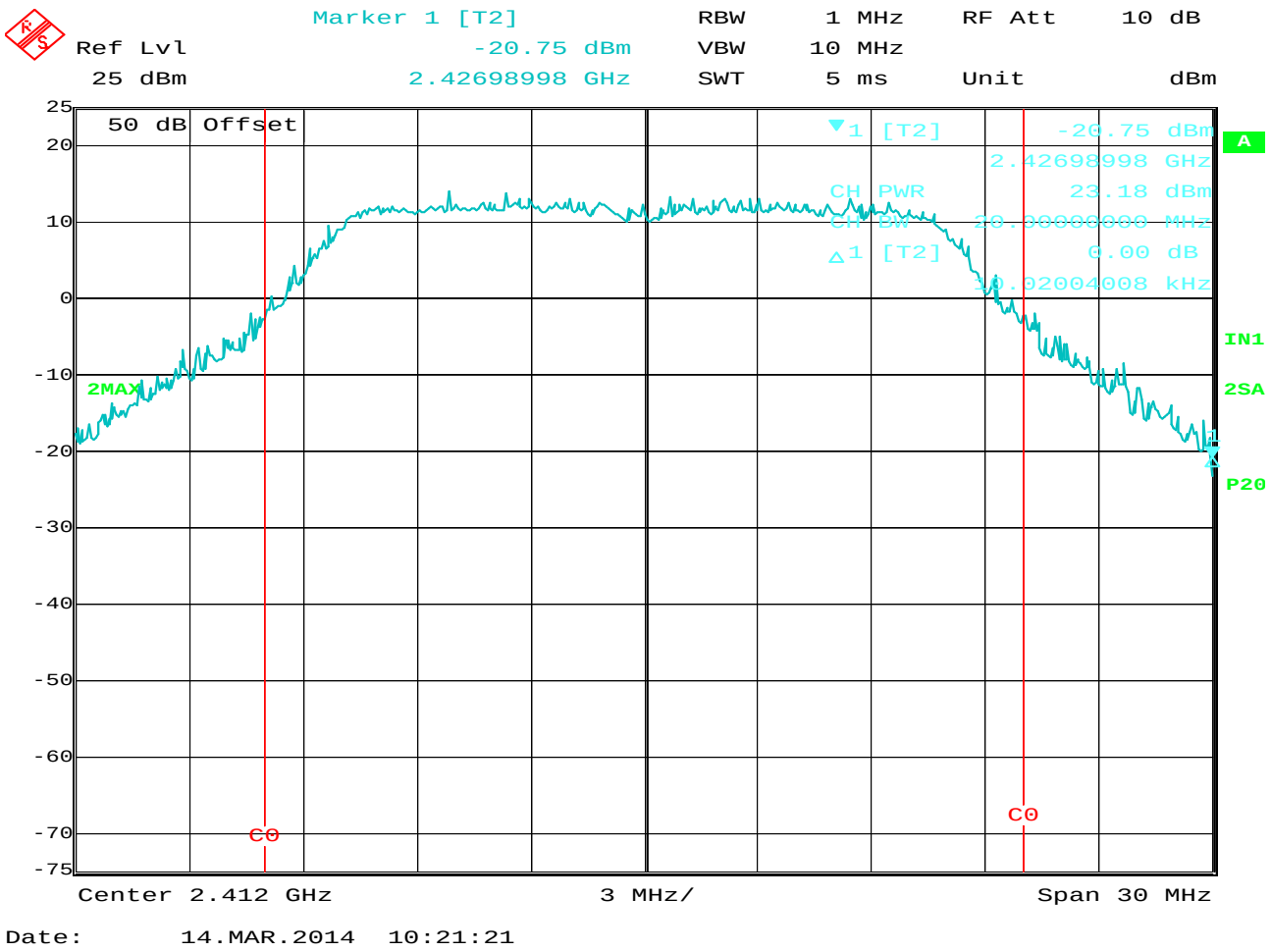
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at LOW Channel
PROTOCOL	:	802.11 g
DATA RATE	:	48MB/s
NOTES	:	

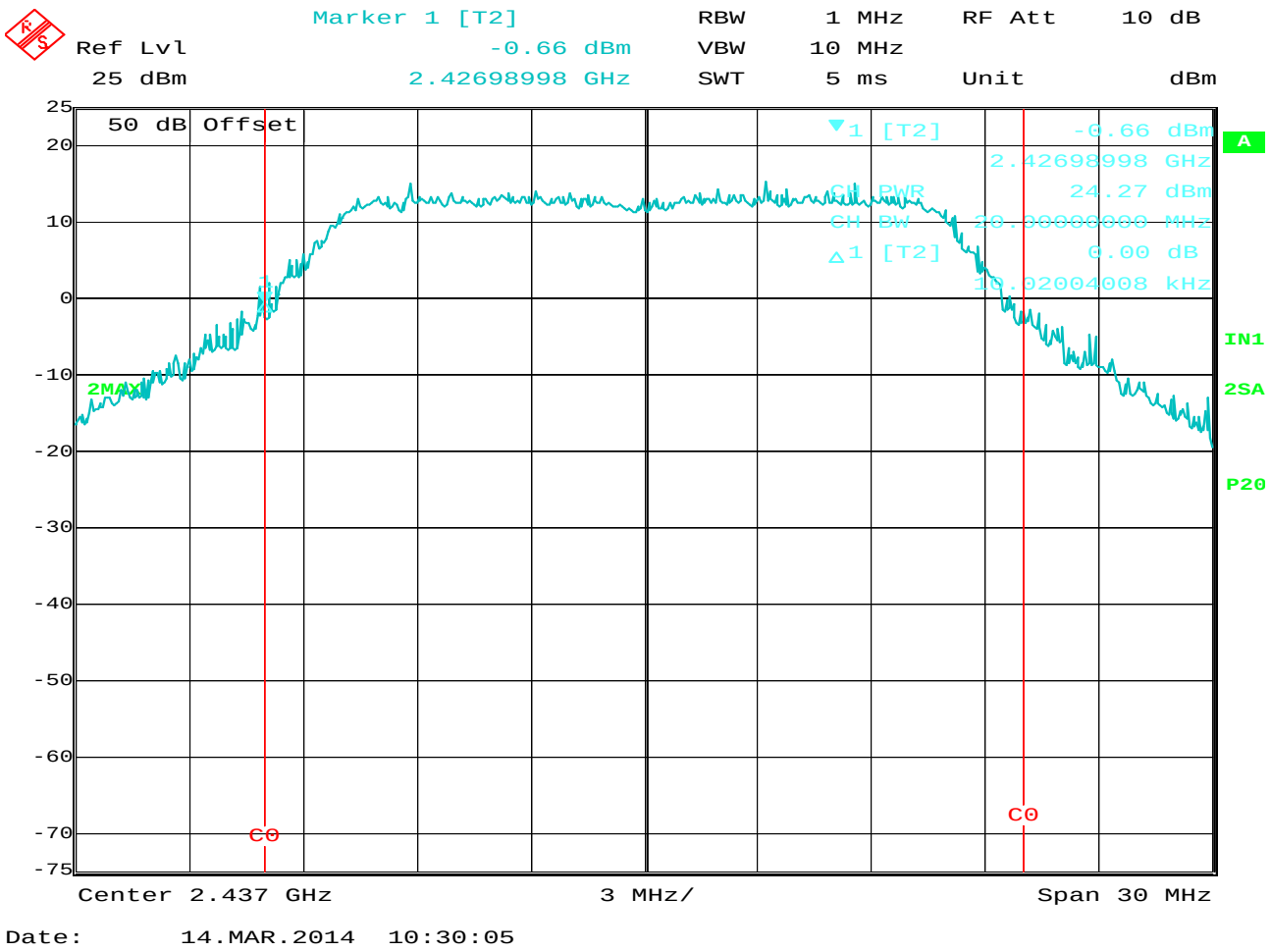
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at LOW Channel
PROTOCOL	:	802.11 g
DATA RATE	:	54MB/s
NOTES	:	

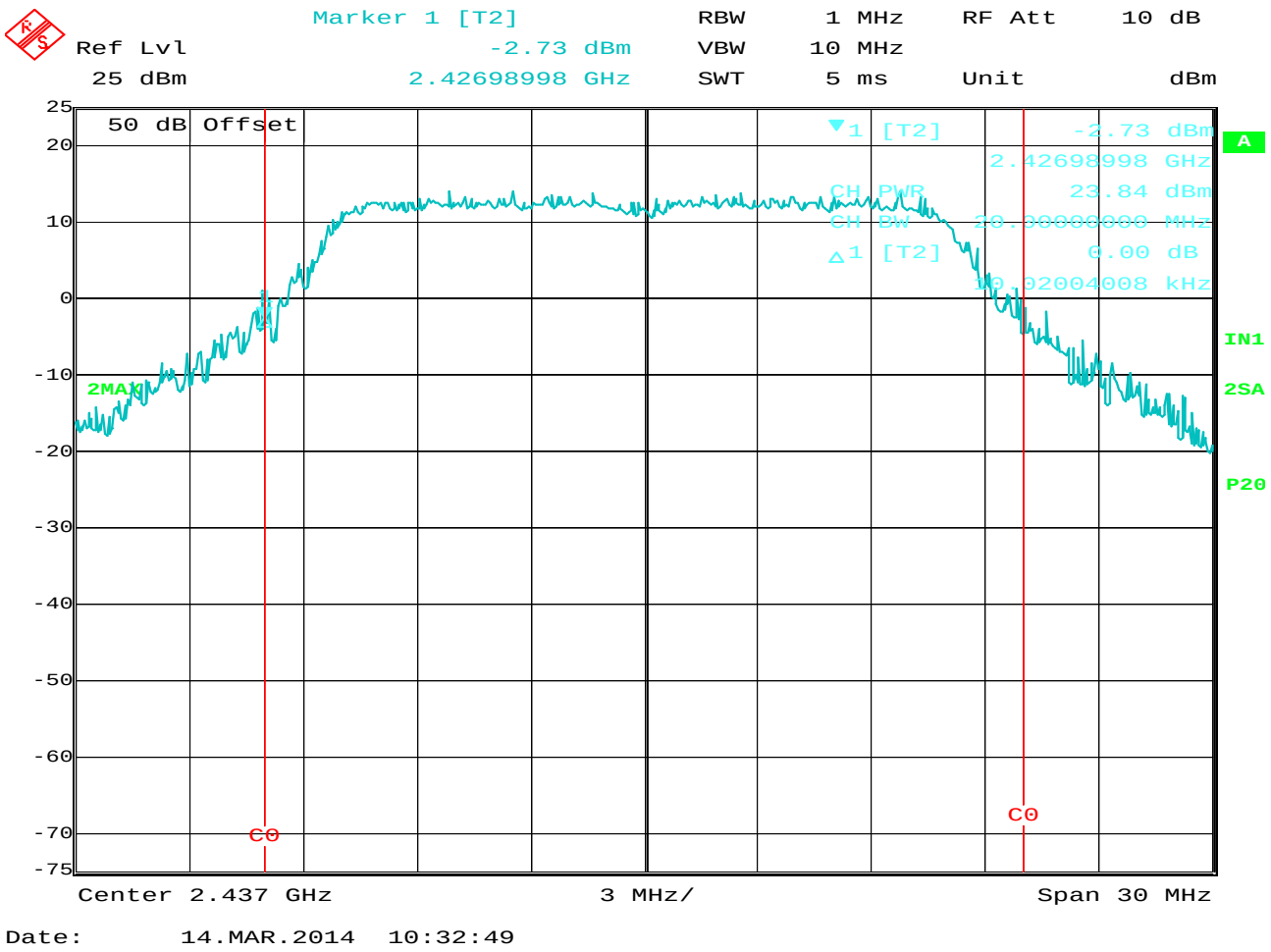
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at MID Channel
PROTOCOL	:	802.11 g
DATA RATE	:	6MB/s
NOTES	:	

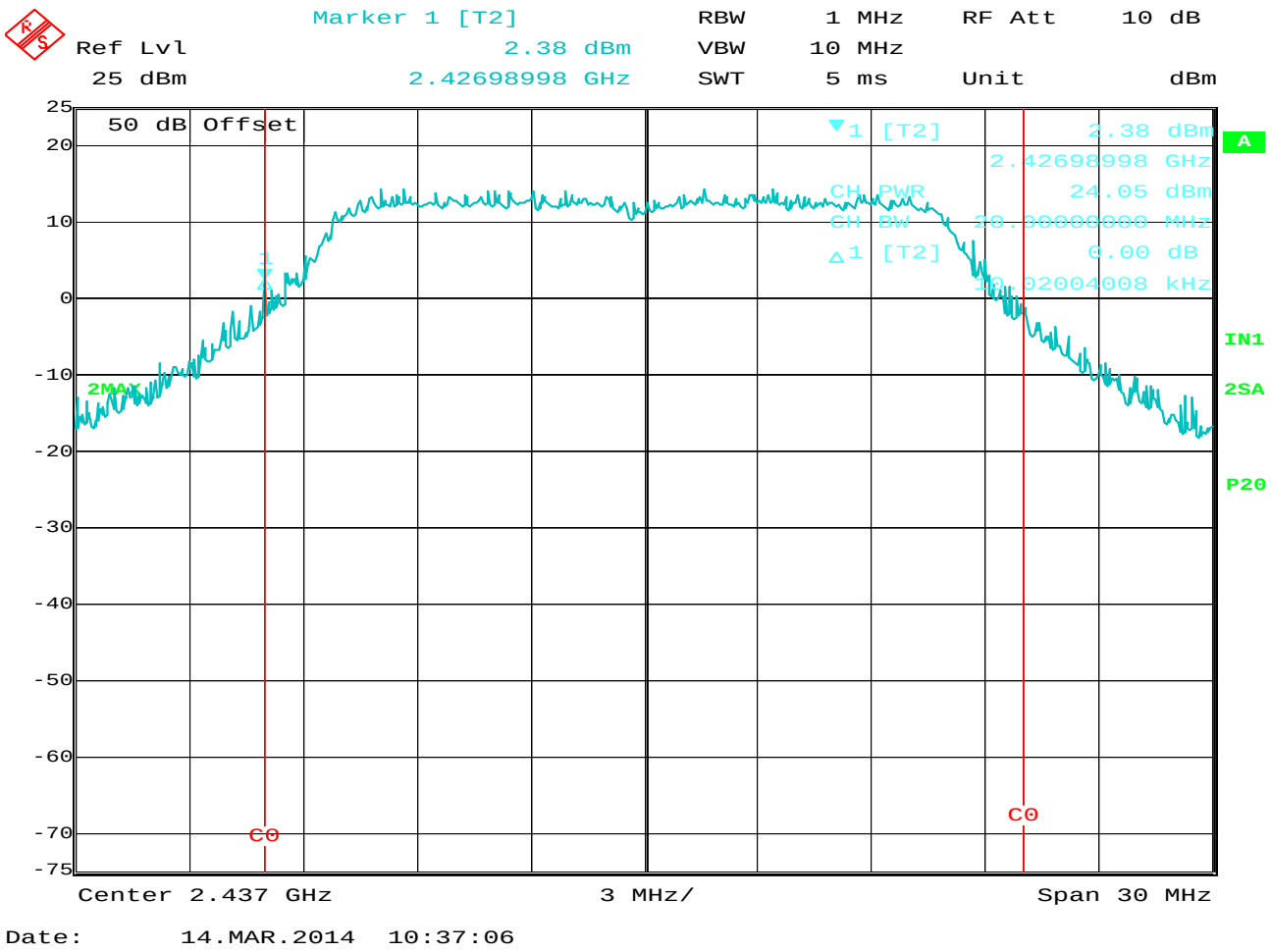
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at MID Channel
PROTOCOL	:	802.11 g
DATA RATE	:	9MB/s
NOTES	:	

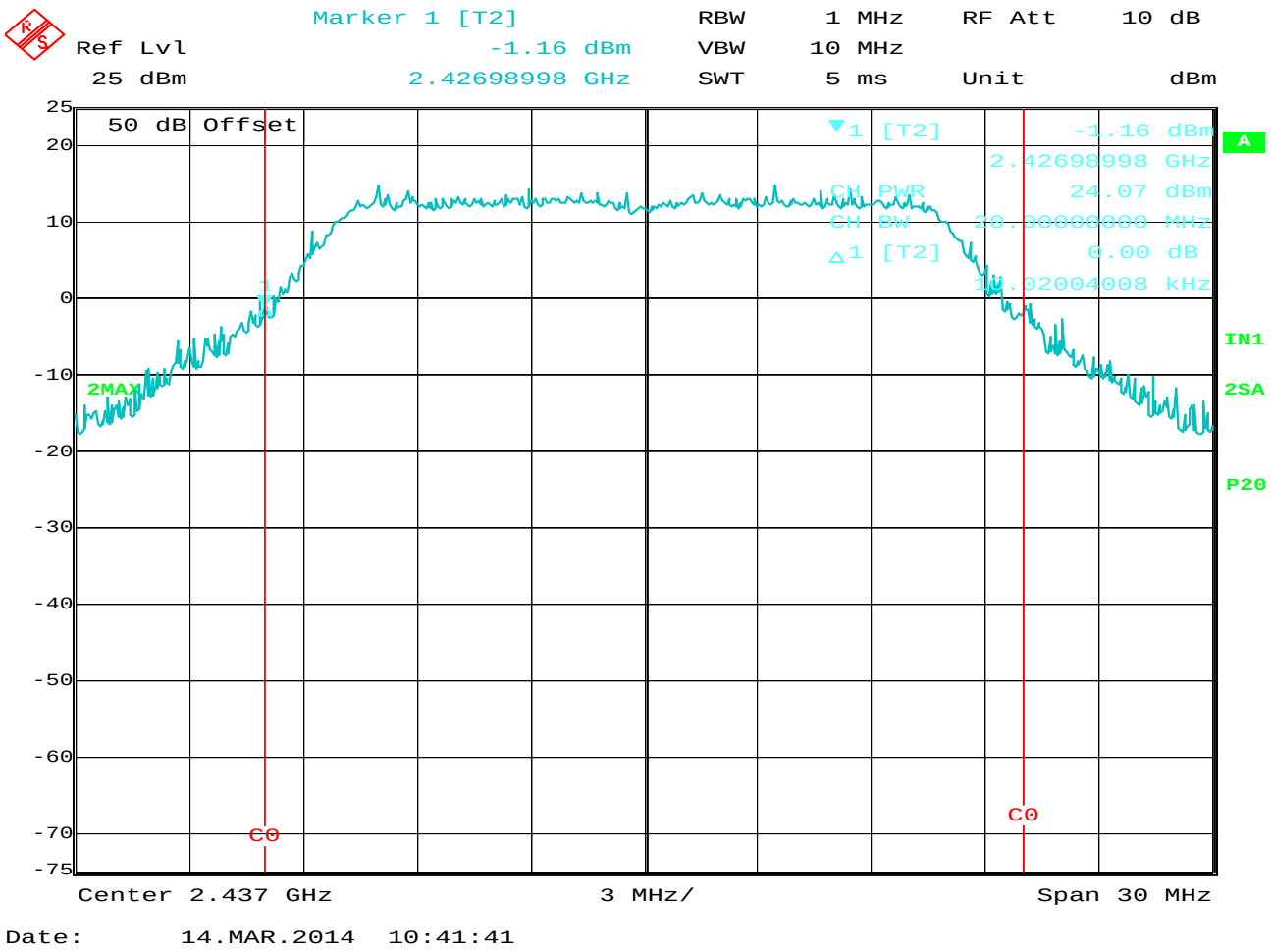
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at MID Channel
PROTOCOL	:	802.11 g
DATA RATE	:	12MB/s
NOTES	:	

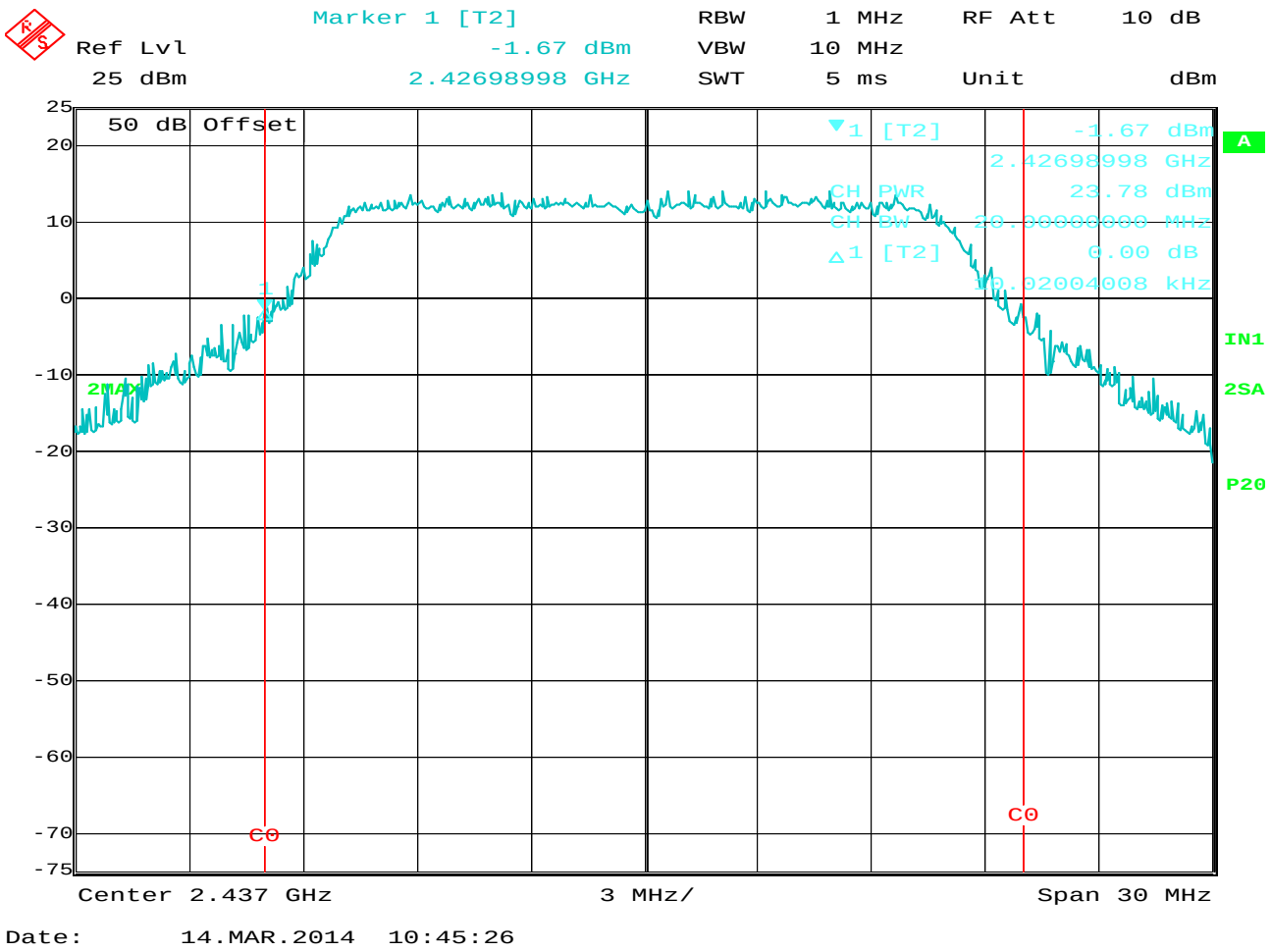
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at MID Channel
PROTOCOL	:	802.11 g
DATA RATE	:	18MB/s
NOTES	:	

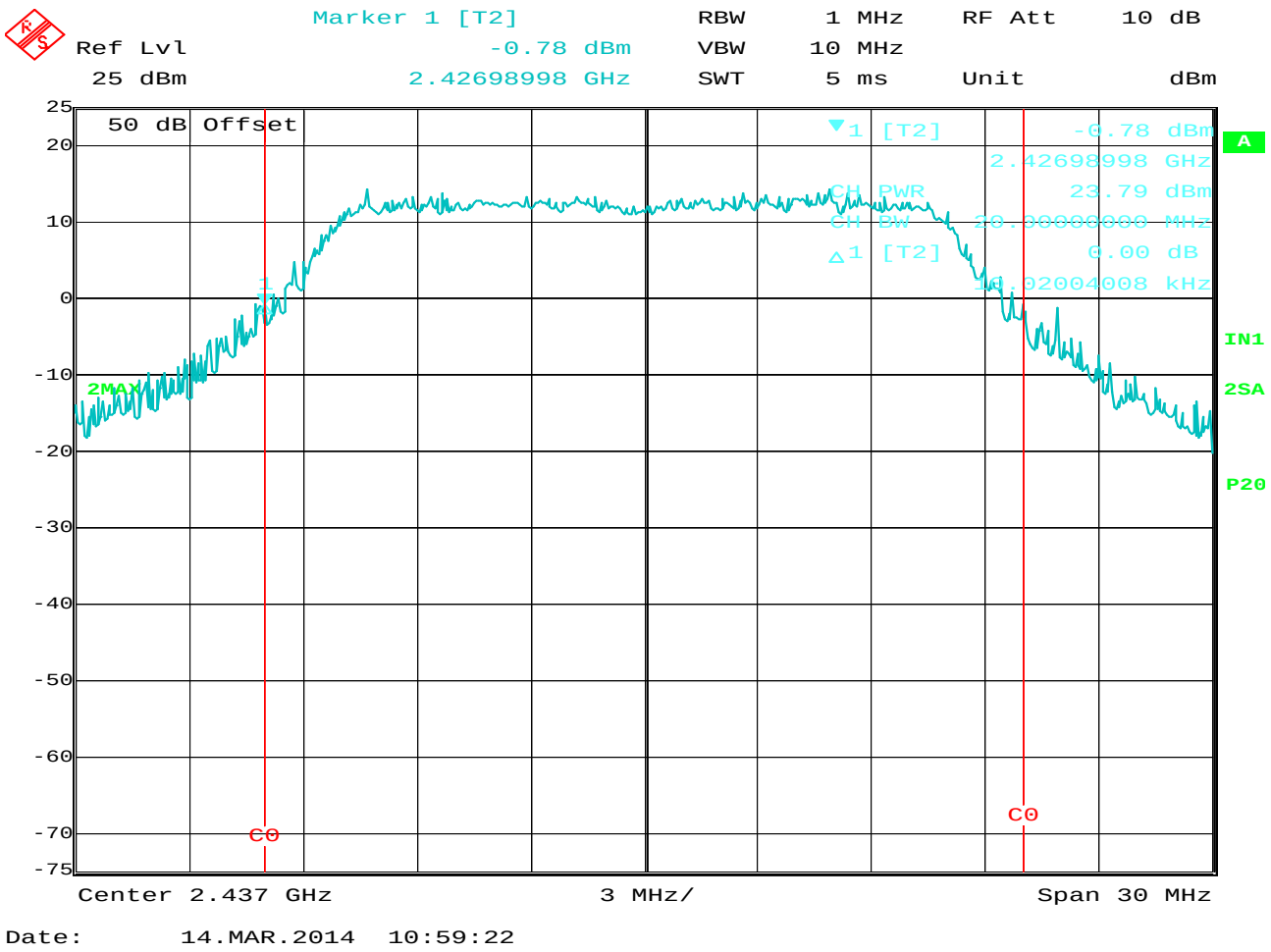
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at MID Channel
PROTOCOL	:	802.11 g
DATA RATE	:	24MB/s
NOTES	:	

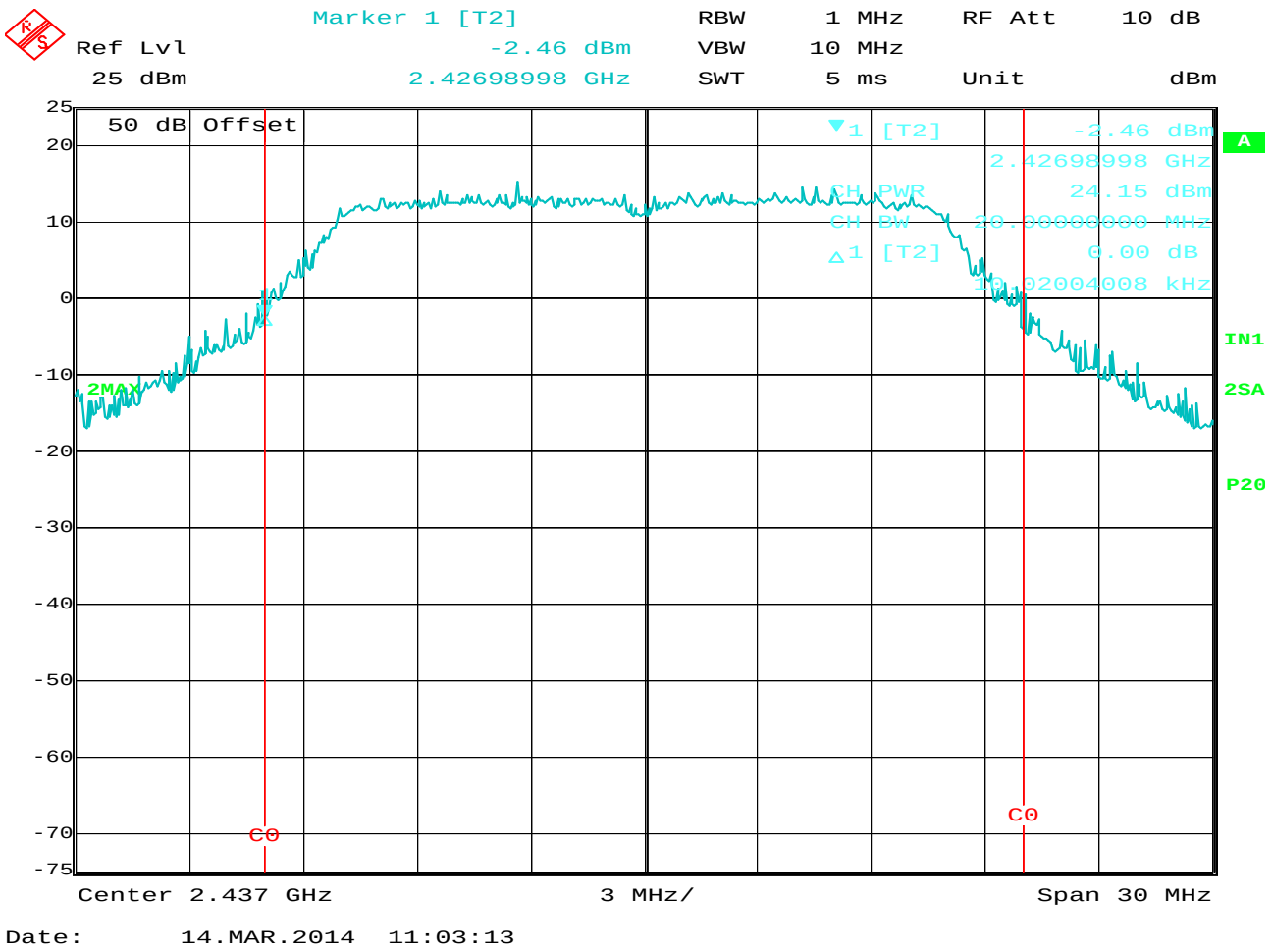
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at MID Channel
PROTOCOL	:	802.11 g
DATA RATE	:	36MB/s
NOTES	:	

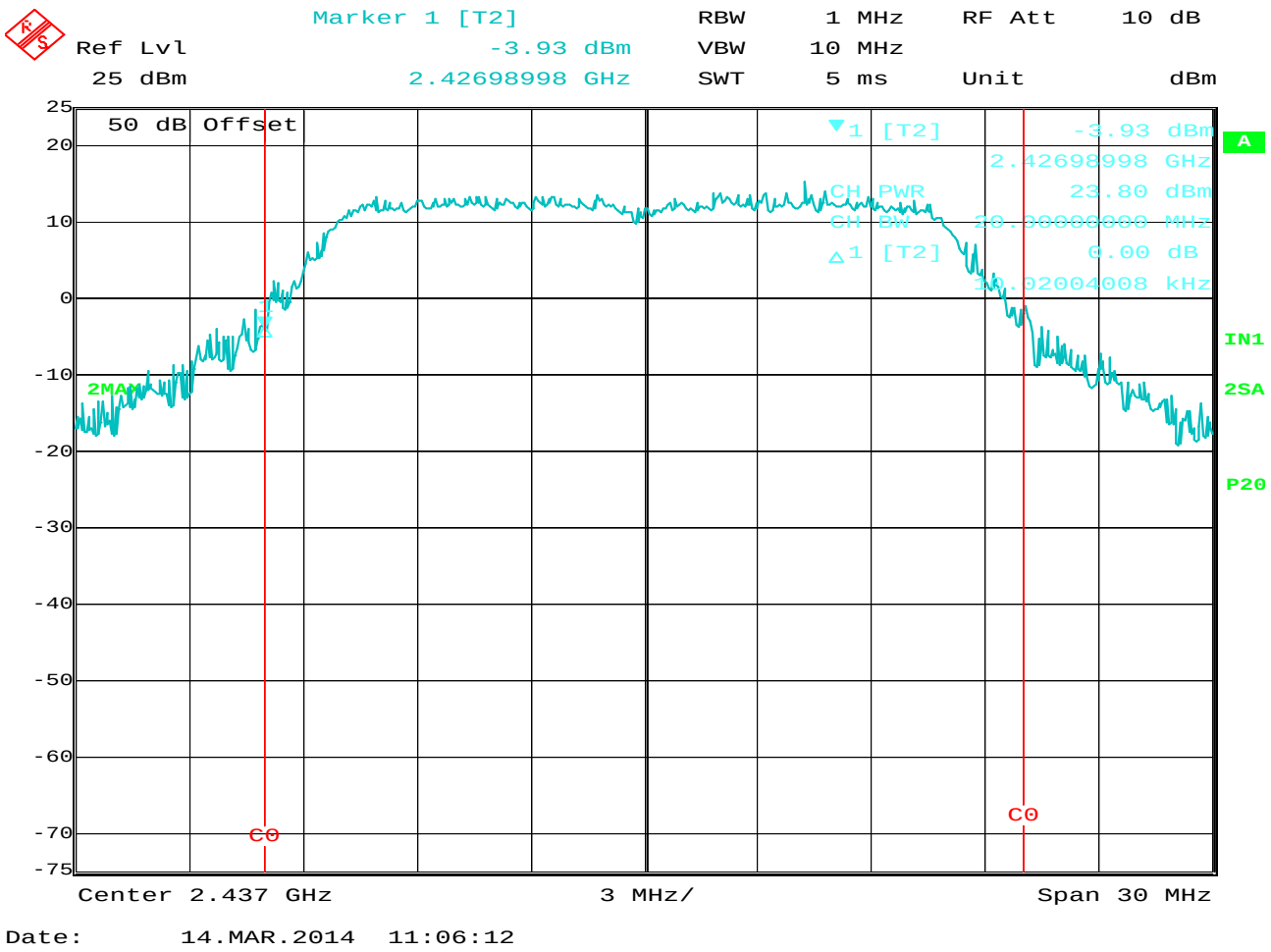
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at MID Channel
PROTOCOL	:	802.11 g
DATA RATE	:	48MB/s
NOTES	:	

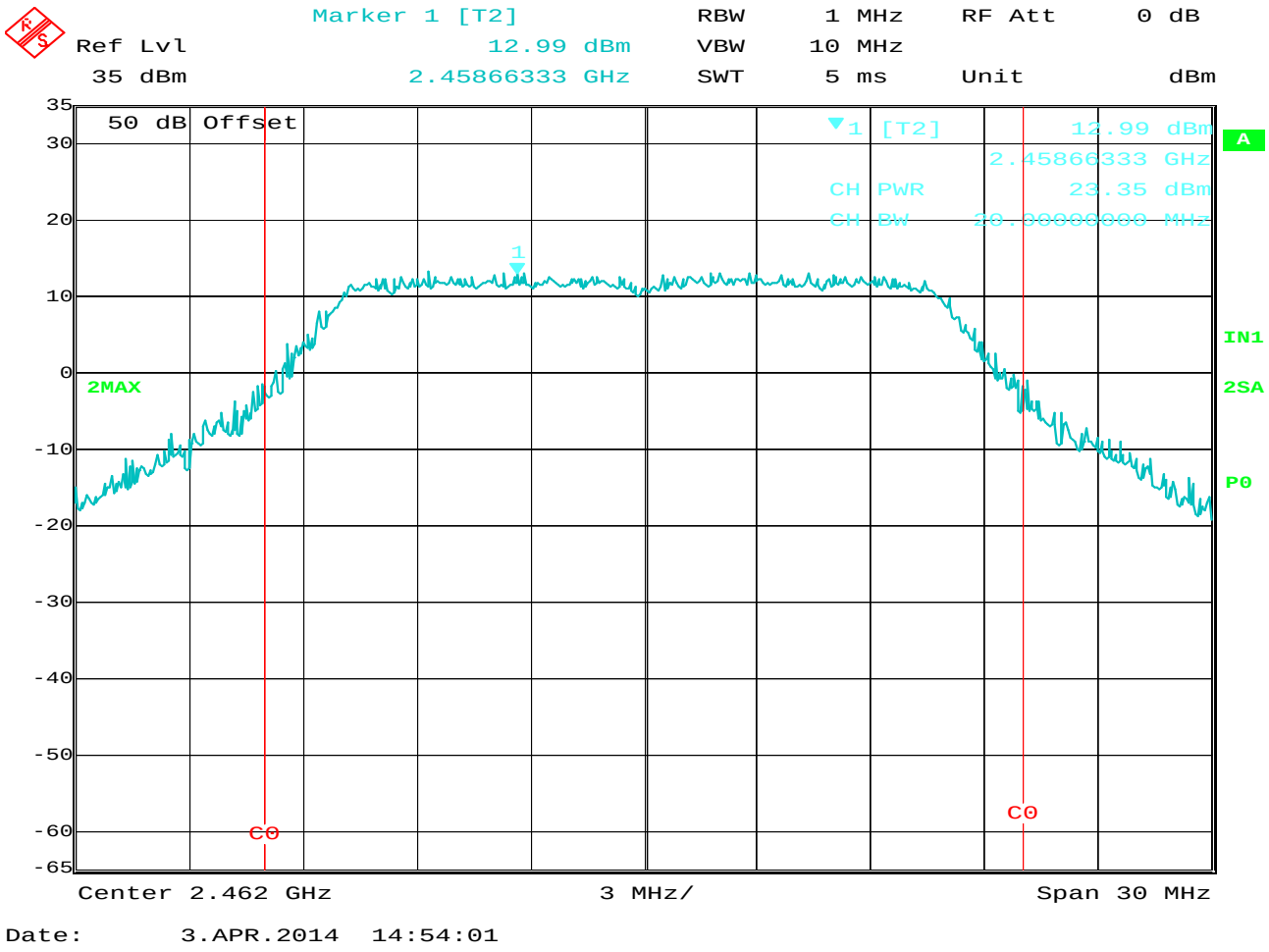
NOTES



FCC 15.247 DTS Bandwidth

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at MID Channel
PROTOCOL	:	802.11 g
DATA RATE	:	54MB/s
NOTES	:	

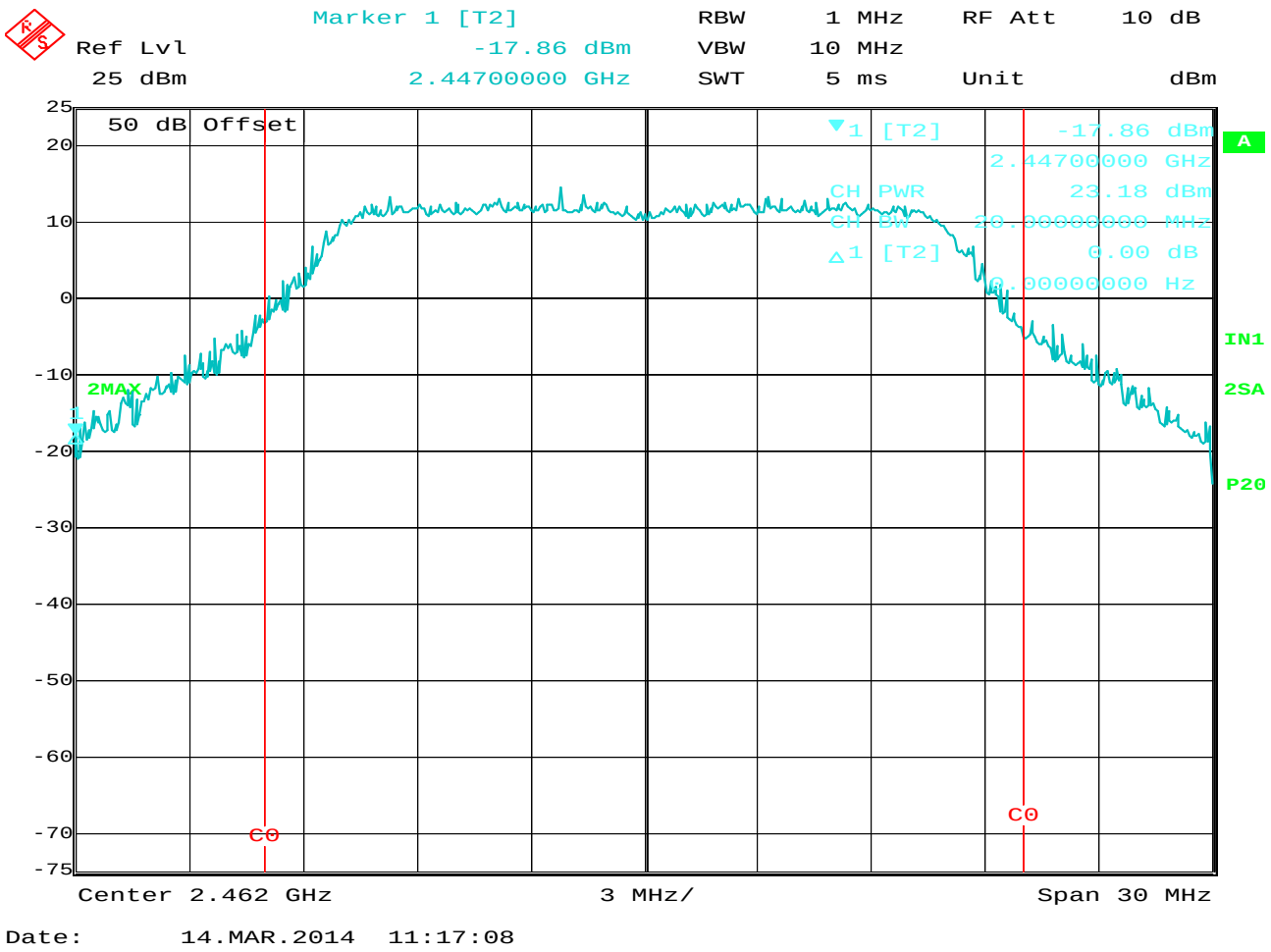
NOTES



FCC 15.247 Maximum Peak Conducted Output Power

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at HIGH Channel
PROTOCOL	:	802.11 g
DATA RATE	:	6MB/s
NOTES	:	

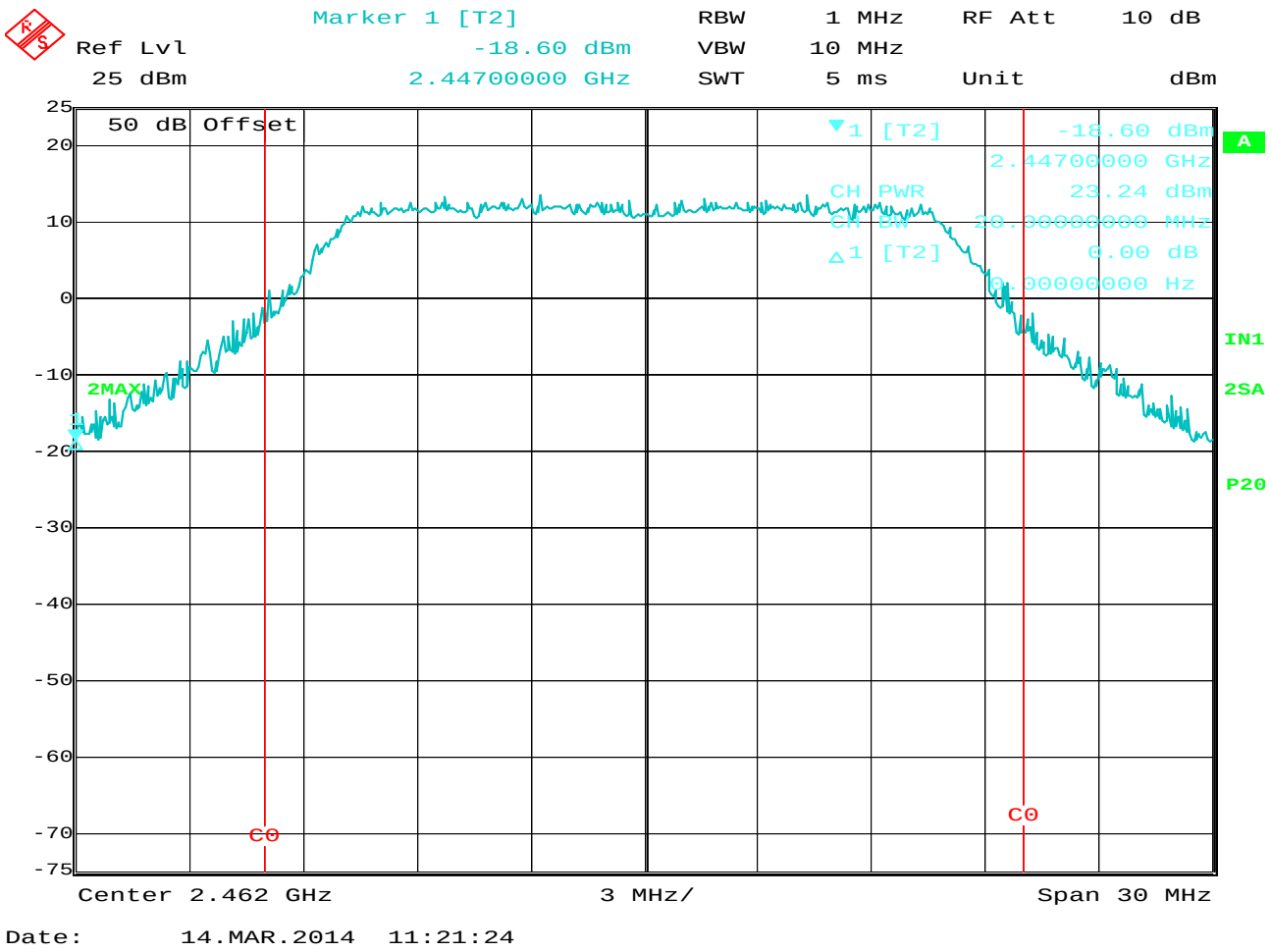
NOTES



FCC 15.247 Maximum Peak Conducted Output Power

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at HIGH Channel
PROTOCOL	:	802.11 g
DATA RATE	:	9MB/s
NOTES	:	

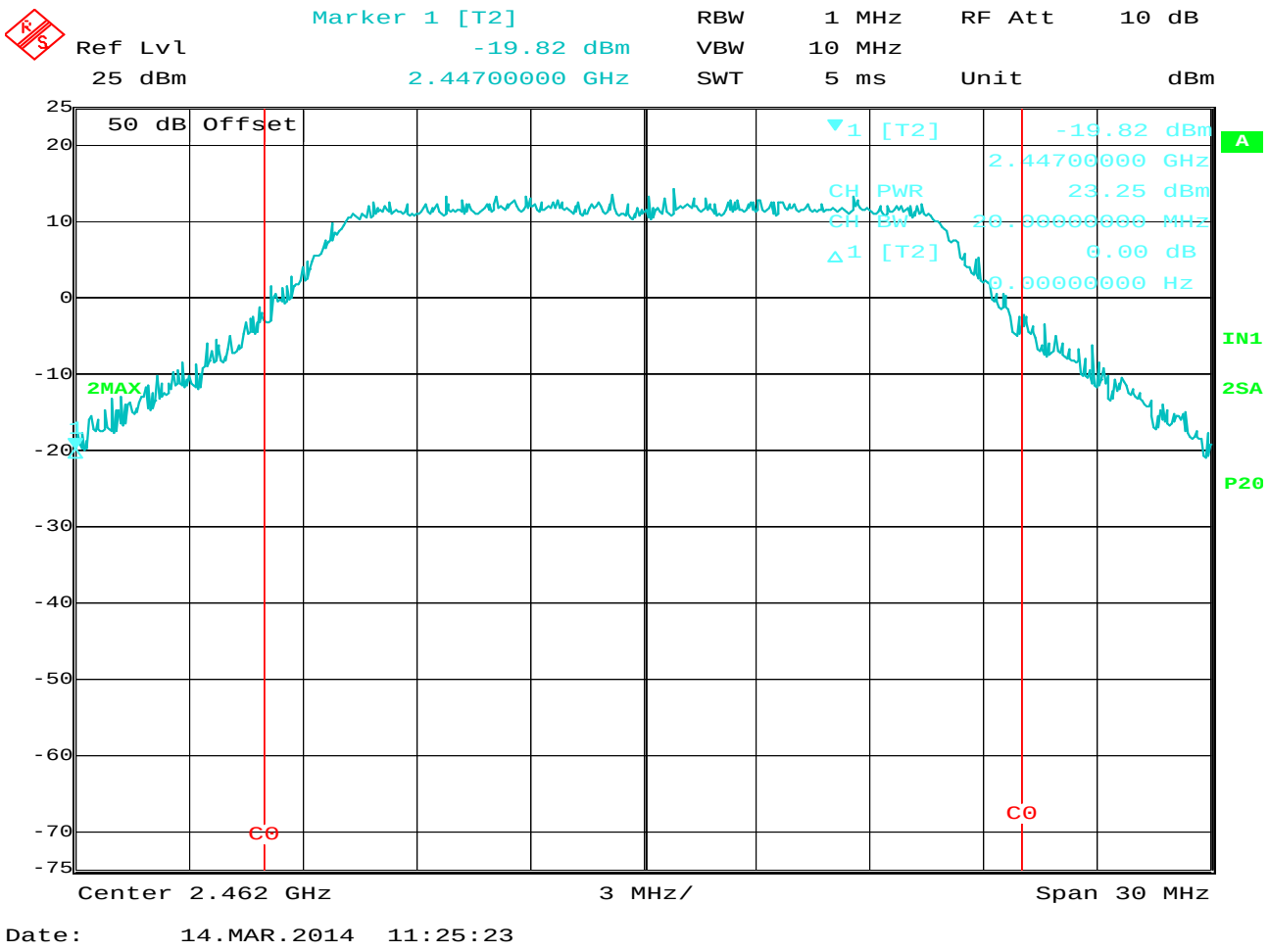
NOTES



FCC 15.247 Maximum Peak Conducted Output Power

MANUFACTURER	: Caterpillar Underground Mining
MODEL NUMBER	: WLg-ABOARD/N/CAT
SERIAL NUMBER	: 13059009
TEST MODE	: Tx at HIGH Channel
PROTOCOL	: 802.11 g
DATA RATE	: 12MB/s
NOTES	:

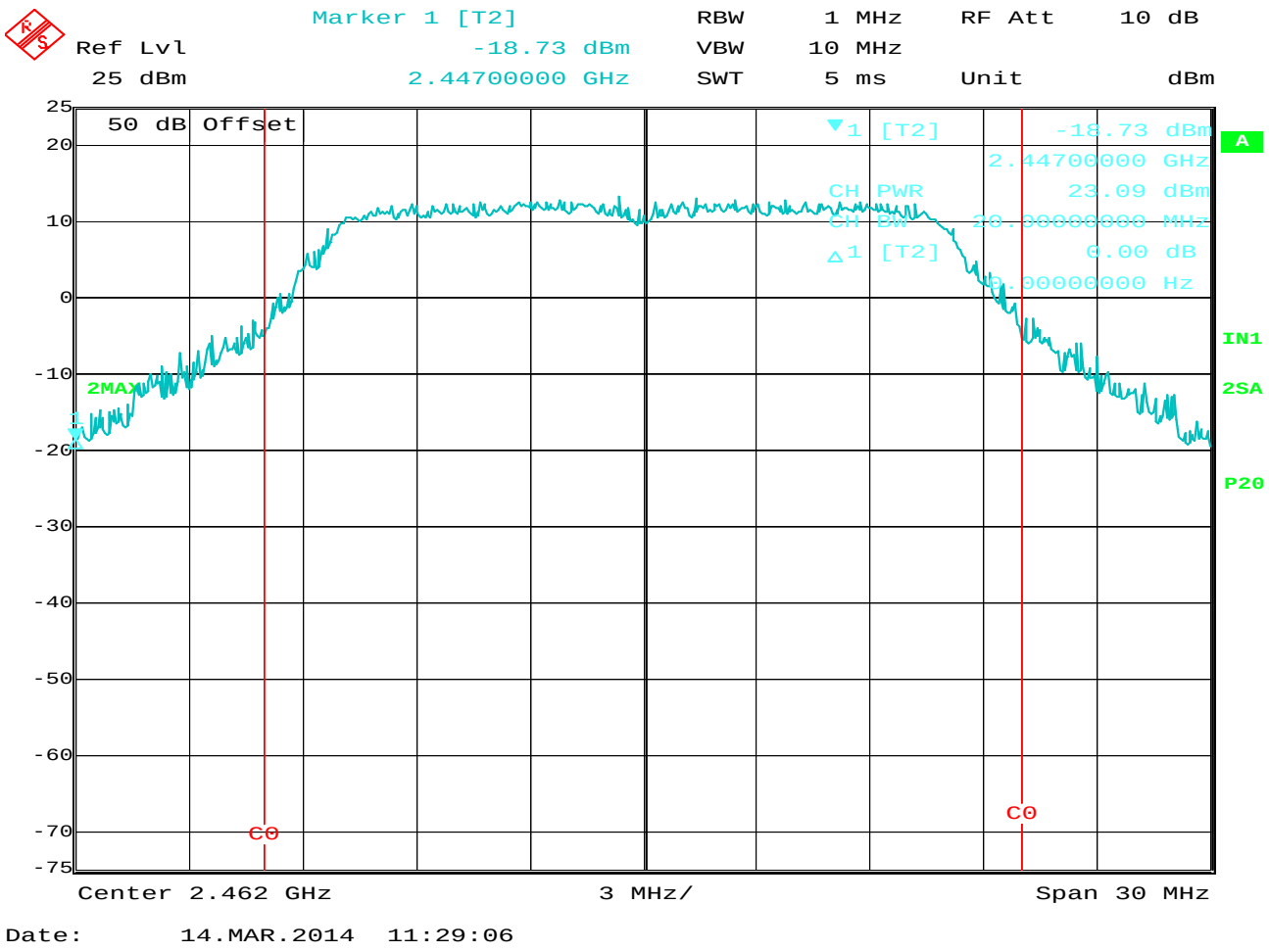
NOTES



FCC 15.247 Maximum Peak Conducted Output Power

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at HIGH Channel
PROTOCOL	:	802.11 g
DATA RATE	:	18MB/s
NOTES	:	

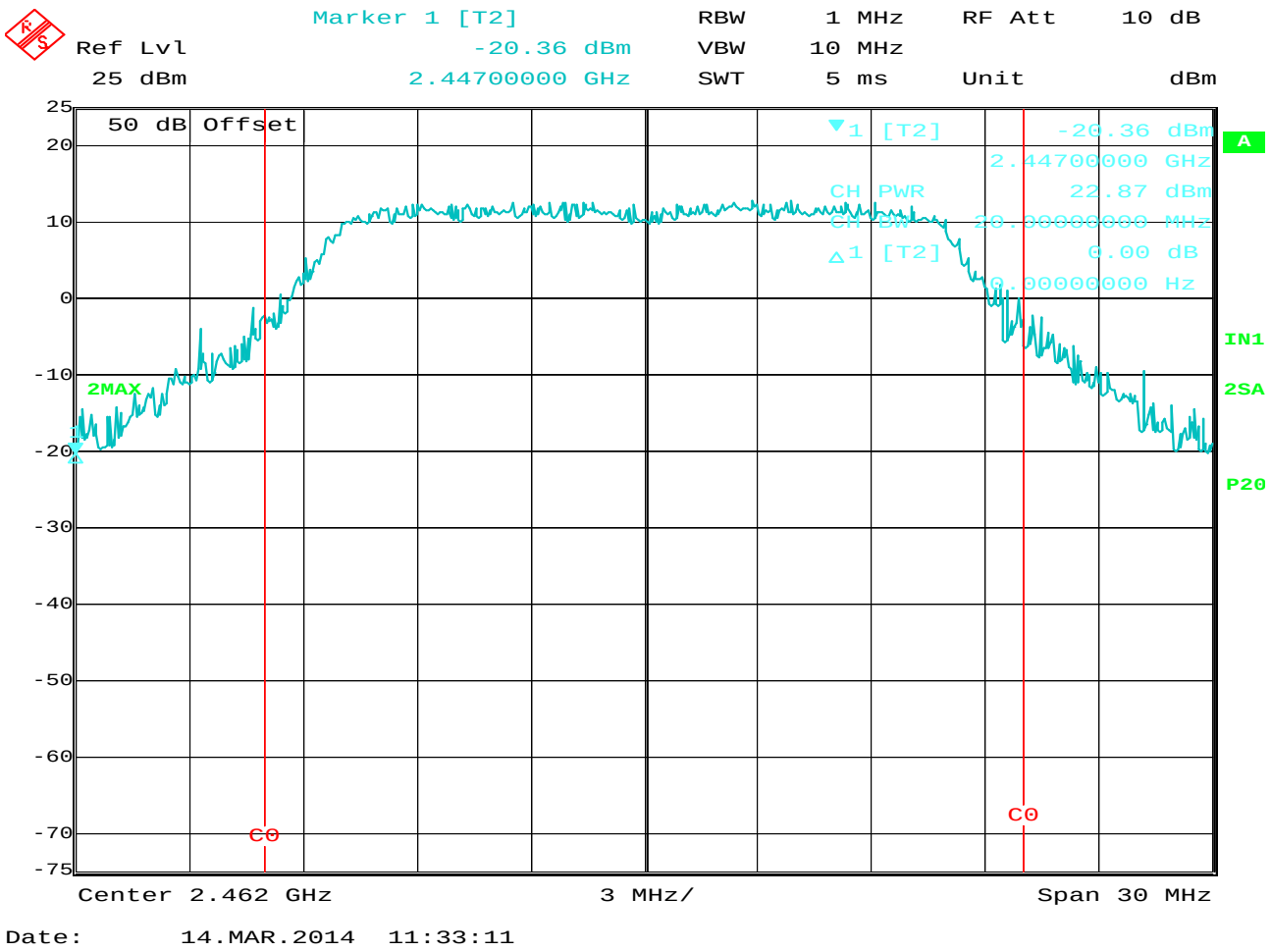
NOTES



FCC 15.247 Maximum Peak Conducted Output Power

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at HIGH Channel
PROTOCOL	:	802.11 g
DATA RATE	:	24MB/s
NOTES	:	

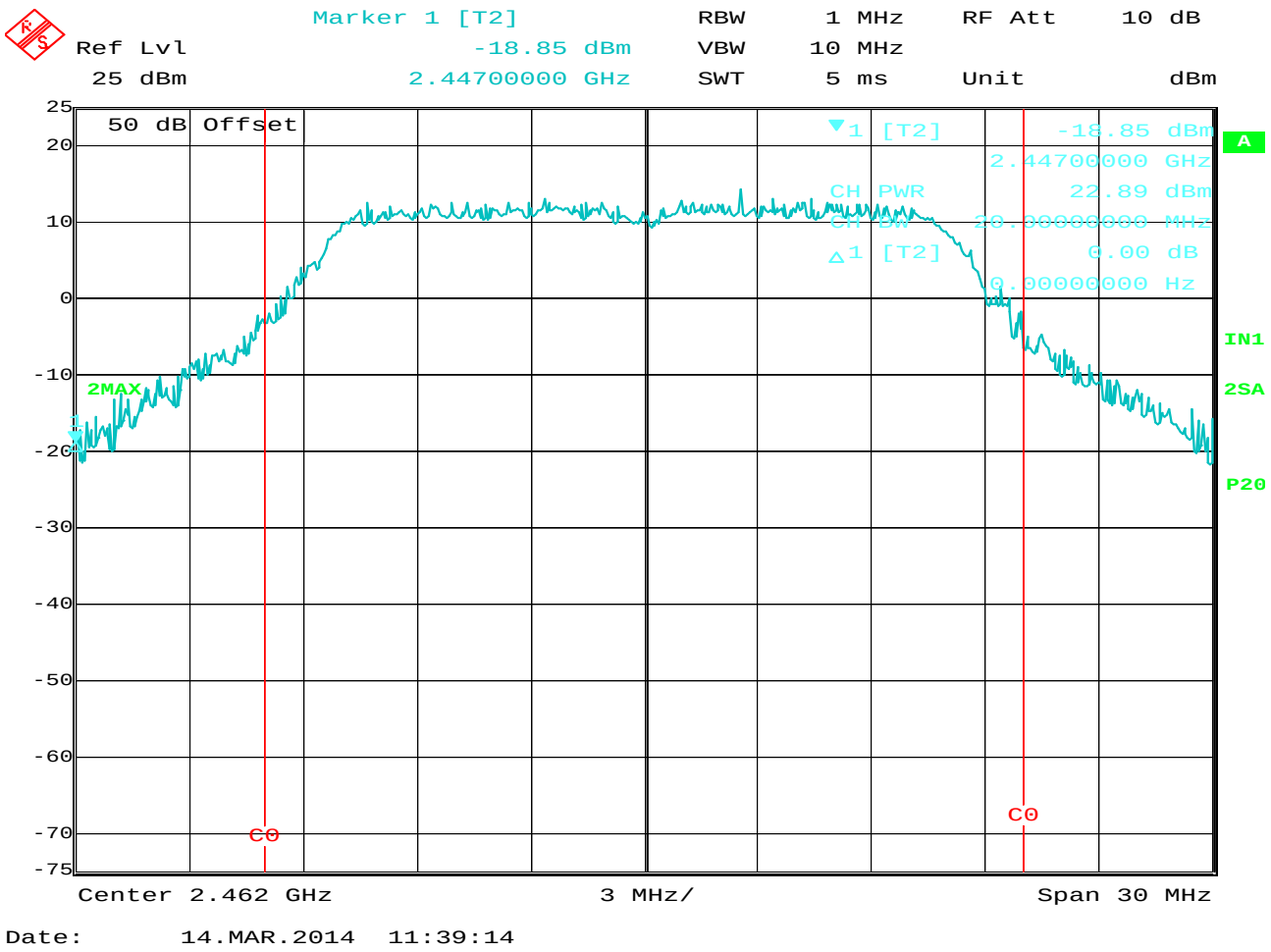
NOTES



FCC 15.247 Maximum Peak Conducted Output Power

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13059009
TEST MODE	:	Tx at HIGH Channel
PROTOCOL	:	802.11 g
DATA RATE	:	36MB/s
NOTES	:	

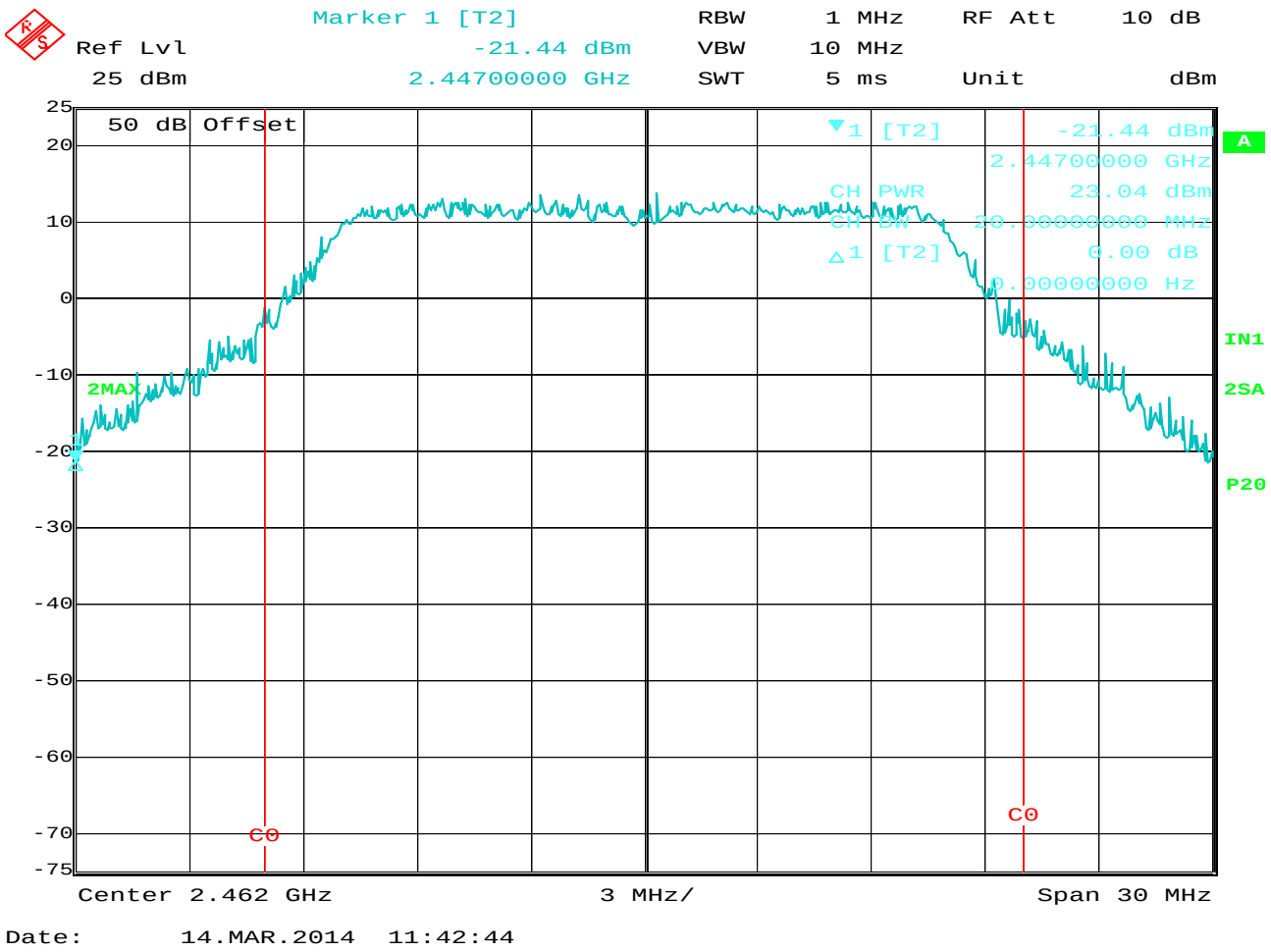
NOTES



FCC 15.247 Maximum Peak Conducted Output Power

MANUFACTURER	: Caterpillar Underground Mining
MODEL NUMBER	: WLg-ABOARD/N/CAT
SERIAL NUMBER	: 13059009
TEST MODE	: Tx at HIGH Channel
PROTOCOL	: 802.11 g
DATA RATE	: 48MB/s
NOTES	:

NOTES



FCC 15.247 Maximum Peak Conducted Output Power

MANUFACTURER	: Caterpillar Underground Mining
MODEL NUMBER	: WLg-ABOARD/N/CAT
SERIAL NUMBER	: 13059009
TEST MODE	: Tx at HIGH Channel
PROTOCOL	: 802.11 g
DATA RATE	: 54MB/s
NOTES	:

NOTES

MANUFACTURER : Caterpillar Underground Mining
MODEL NUMBER : WLg-ABOARD/N/CAT
SERIAL NUMBER : 13059009
TEST PERFORMED : Maximum Peak Conducted Output Power
TEST DATE : March 14, 2014
TEST MODE : See below
PROTOCOL : See below
DATA RATE : See below
NOTES : Main Mode, with PacSat OMN2405B antenna (5dBi gain) antenna on Main Antenna
: Port

Frequency MHz	802.11 Standard	Data Rate (Mb/sec)	Maximum Peak Conducted Output Power (dBm)	Antenna Gain (dBi)	Maximum Peak EIRP (dBm)	Maximum Peak EIRP Limit (dBm)
2412	b	1	19.64	5.0	24.64	36.00
		2	19.97	5.0	24.97	36.00
		5.5	19.68	5.0	24.68	36.00
		11	20.05	5.0	25.05	36.00
2437	b	1	20.18	5.0	25.18	36.00
		2	20.00	5.0	25.00	36.00
		5.5	20.20	5.0	25.20	36.00
		11	20.32	5.0	25.32	36.00
2462	b	1	19.37	5.0	24.37	36.00
		2	19.26	5.0	24.26	36.00
		5.5	19.01	5.0	24.01	36.00
		11	19.27	5.0	24.27	36.00

Maximum Peak EIRP (dBm) = Maximum Peak Conducted Output Power (dBm) + Antenna Gain (dBi)

MANUFACTURER : Caterpillar Underground Mining
MODEL NUMBER : WLg-ABOARD/N/CAT
SERIAL NUMBER : 13059009
TEST PERFORMED : Maximum Peak Conducted Output Power
TEST DATE : March 14, 2014
TEST MODE : See below
PROTOCOL : See below
DATA RATE : See below
NOTES : Main Mode, with PacSat OMN2405B antenna (5dBi gain) antenna on Main Antenna
: Port

Frequency MHz	802.11 Standard	Data Rate (Mb/sec)	Maximum Peak Conducted Output Power (dBm)	Antenna Gain (dBi)	Maximum Peak EIRP (dBm)	Maximum Peak EIRP Limit (dBm)
2412	g	6	21.57	5.0	26.57	36.00
		9	22.73	5.0	27.73	36.00
		12	22.65	5.0	27.65	36.00
		18	19.51	5.0	24.51	36.00
		24	23.28	5.0	28.28	36.00
		36	22.87	5.0	27.87	36.00
		48	23.08	5.0	28.08	36.00
		54	23.18	5.0	28.18	36.00
2437	g	6	24.27	5.0	29.27	36.00
		9	23.84	5.0	28.84	36.00
		12	24.05	5.0	29.05	36.00
		18	24.07	5.0	29.07	36.00
		24	23.78	5.0	28.78	36.00
		36	23.79	5.0	28.79	36.00
		48	24.15	5.0	29.15	36.00
		54	23.80	5.0	28.80	36.00
2462	g	6	23.35	5.0	28.35	36.00
		9	23.18	5.0	28.18	36.00
		12	23.24	5.0	28.24	36.00
		18	23.25	5.0	28.25	36.00
		24	23.09	5.0	28.09	36.00
		36	22.87	5.0	27.87	36.00
		48	22.89	5.0	27.89	36.00
		54	23.04	5.0	28.04	36.00

Maximum Peak EIRP (dBm) = Maximum Peak Conducted Output Power (dBm) + Antenna Gain (dBi)

MANUFACTURER : Caterpillar Underground Mining
MODEL NUMBER : WLg-ABOARD/N/CAT
SERIAL NUMBER : 13059009
TEST PERFORMED : Maximum Peak Conducted Output Power
TEST DATE : March 14, 2014
TEST MODE : See below
PROTOCOL : See below
DATA RATE : See below
NOTES : Diversity Mode, with RFI Model No. DAS-M1 (3.3dBi gain) antenna on Main Antenna
: Port and Auxiliary Port

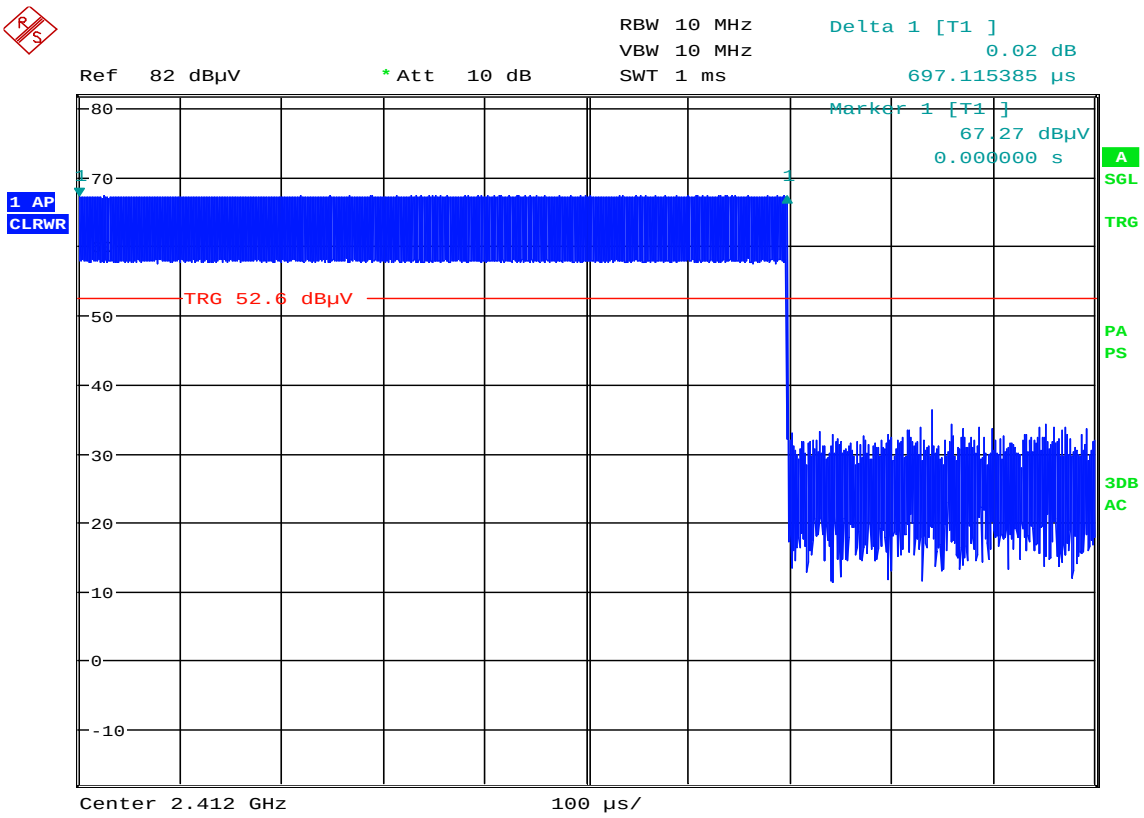
Frequency MHz	802.11 Standard	Data Rate (Mb/sec)	Maximum Peak Conducted Output Power (dBm)	Antenna Gain (dBi)	Maximum Peak EIRP (dBm)	Maximum Peak EIRP Limit (dBm)
2412	b	1	19.64	3.3	22.94	36
		2	19.97	3.3	23.27	36
		5.5	19.68	3.3	22.98	36
		11	20.05	3.3	23.35	36
2437	b	1	20.18	3.3	23.48	36
		2	20.00	3.3	23.30	36
		5.5	20.20	3.3	23.50	36
		11	20.32	3.3	23.62	36
2462	b	1	19.37	3.3	22.67	36
		2	19.26	3.3	22.56	36
		5.5	19.01	3.3	22.31	36
		11	19.27	3.3	22.57	36

Maximum Peak EIRP (dBm) = Maximum Peak Conducted Output Power (dBm) + Antenna Gain (dBi)

MANUFACTURER : Caterpillar Underground Mining
MODEL NUMBER : WLg-ABOARD/N/CAT
SERIAL NUMBER : 13059009
TEST PERFORMED : Maximum Peak Conducted Output Power
TEST DATE : March 14, 2014
TEST MODE : See below
PROTOCOL : See below
DATA RATE : See below
NOTES : Diversity Mode, with RFI Model No. DAS-M1 (3.3dBi gain) antenna on Main Antenna
: Port and Auxiliary Port

Frequency MHz	802.11 Standard	Data Rate (Mb/sec)	Maximum Peak Conducted Output Power (dBm)	Antenna Gain (dBi)	Maximum Peak EIRP (dBm)	Maximum Peak EIRP Limit (dBm)
2412	g	6	21.57	3.3	24.87	36.00
		9	22.73	3.3	26.03	36.00
		12	22.65	3.3	25.95	36.00
		18	19.51	3.3	22.81	36.00
		24	23.28	3.3	26.58	36.00
		36	22.87	3.3	26.17	36.00
		48	23.08	3.3	26.38	36.00
		54	23.18	3.3	26.48	36.00
2437	g	6	24.27	3.3	27.57	36.00
		9	23.84	3.3	27.14	36.00
		12	24.05	3.3	27.35	36.00
		18	24.07	3.3	27.37	36.00
		24	23.78	3.3	27.08	36.00
		36	23.79	3.3	27.09	36.00
		48	24.15	3.3	27.45	36.00
		54	23.80	3.3	27.10	36.00
2462	g	6	23.35	3.3	26.65	36.00
		9	23.18	3.3	26.48	36.00
		12	23.24	3.3	26.54	36.00
		18	23.25	3.3	26.55	36.00
		24	23.09	3.3	26.39	36.00
		36	22.87	3.3	26.17	36.00
		48	22.89	3.3	26.19	36.00
		54	23.04	3.3	26.34	36.00

Maximum Peak EIRP (dBm) = Maximum Peak Conducted Output Power (dBm) + Antenna Gain (dBi)

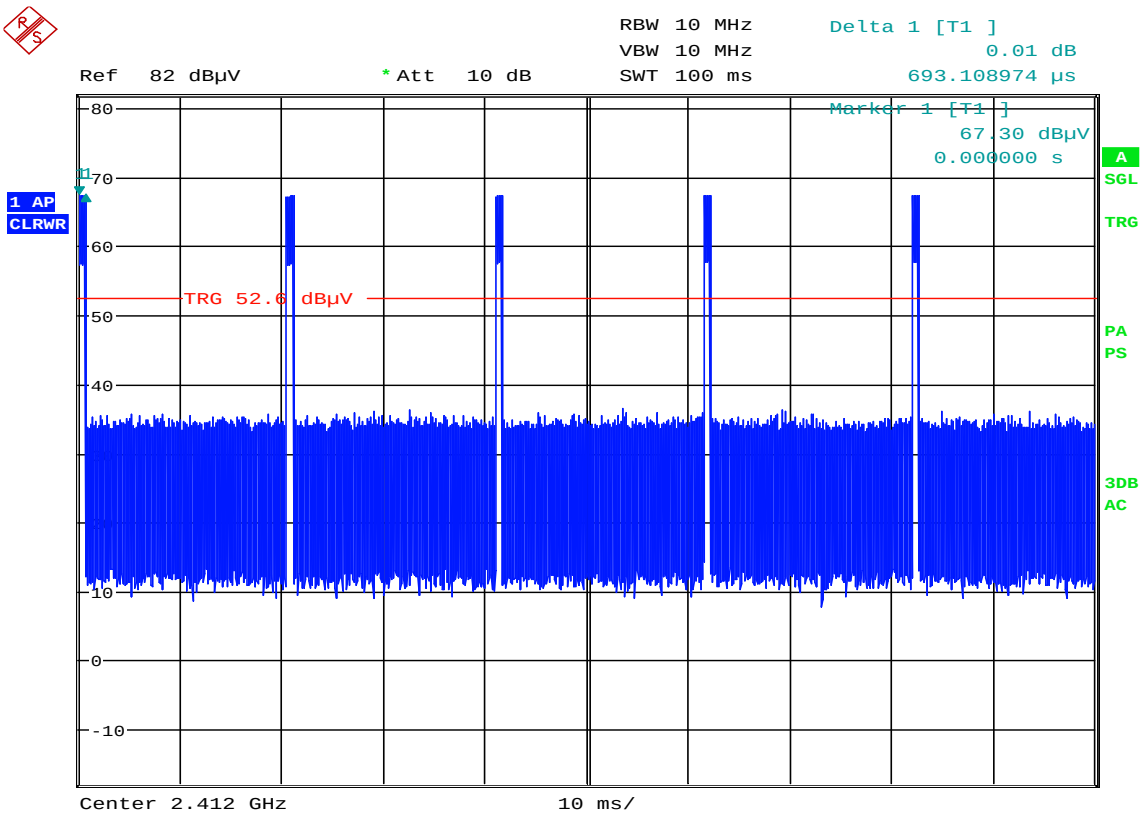


Date: 12.MAR.2014 10:38:23

DUTY CYCLE FACTOR

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13056001
TEST MODE	:	Tx @ 2412MHz (802.11b, 11 Mb/sec, Ch.1, DIVERSITY)
TEST PARAMETERS	:	PULSE IS 697.12usec
NOTES	:	TESTED WITH 2 EACH DAS-M1 ANTENNAS
EQUIPMENT USED	:	RBE1, NWQ2

NOTES

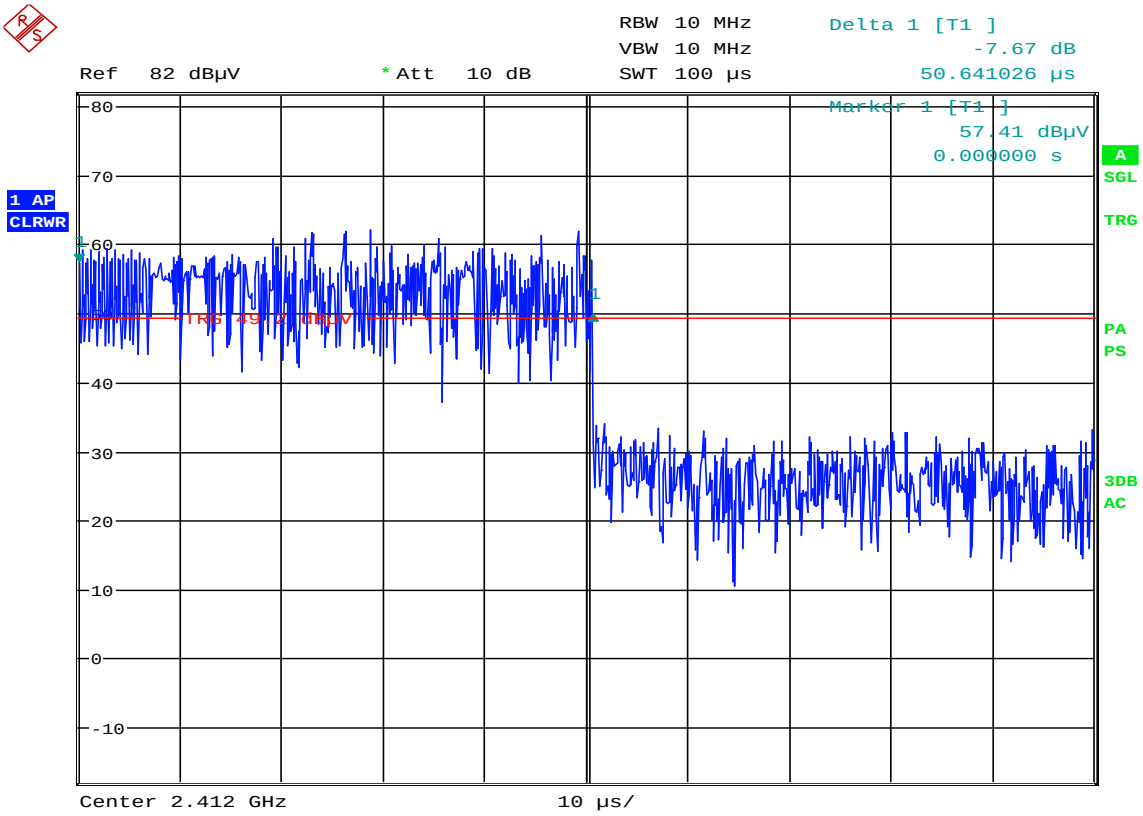


Date: 12.MAR.2014 10:35:32

DUTY CYCLE FACTOR

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13056001
TEST MODE	:	Tx @ 2412MHz (802.11b, 11 Mb/sec, Ch.1, DIVERSITY)
TEST PARAMETERS	:	duty cycle = 20 x log ((no. of pulses)x(pulse width)/100msec)
	:	duty cycle = 20 x log (5 x 697.12usec/100msec)
	:	duty cycle = -29.15dB
NOTES	:	TESTED WITH 2 EACH DAS-M1 ANTENNAS
EQUIPMENT USED	:	RBE1, NWQ2

NOTES

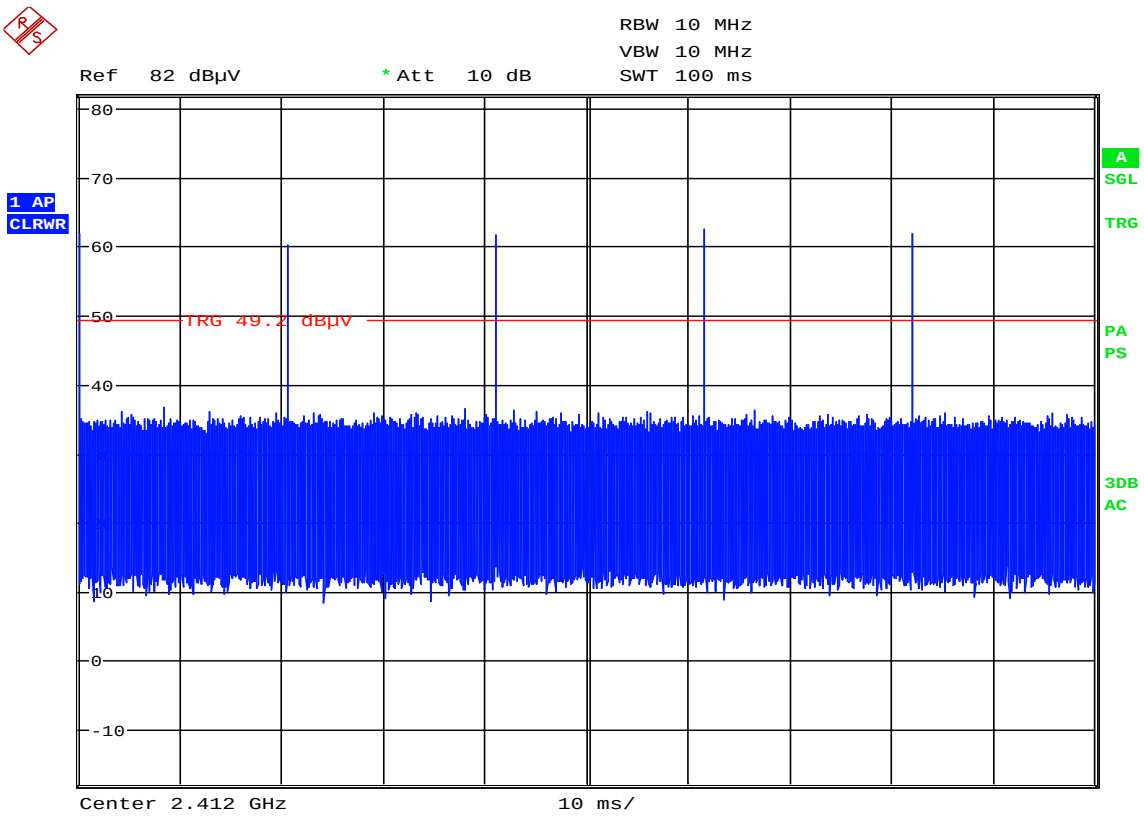


Date: 12.MAR.2014 12:08:23

DUTY CYCLE FACTOR

MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13056001
TEST MODE	:	Tx @ 2412MHz (802.11g, 54 Mb/sec, Ch.1, DIVERSITY)
TEST PARAMETERS	:	PULSE IS 50.64usec
NOTES	:	TESTED WITH 2 EACH DAS-M1 ANTENNAS
EQUIPMENT USED	:	RBE1, NWQ2

NOTES

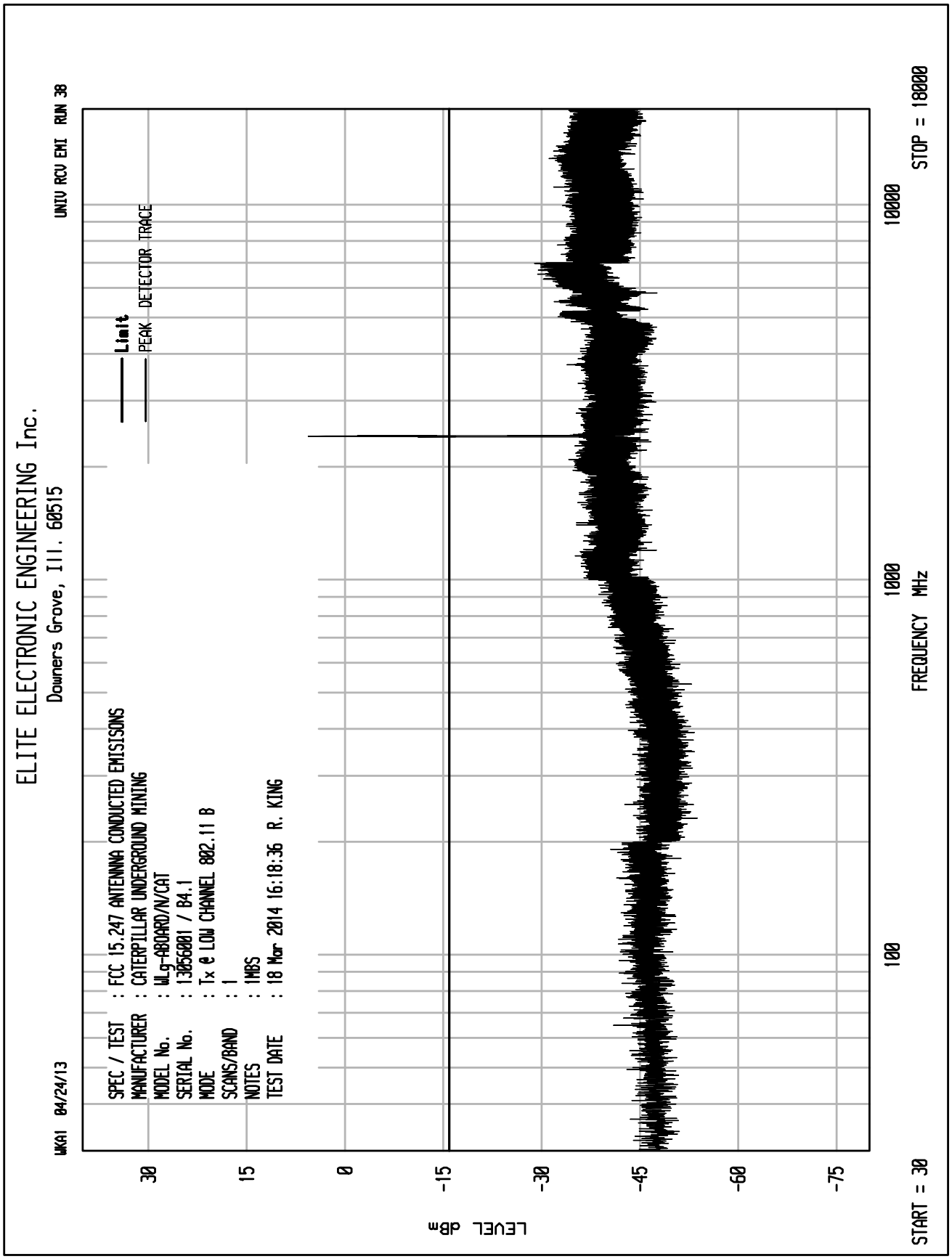


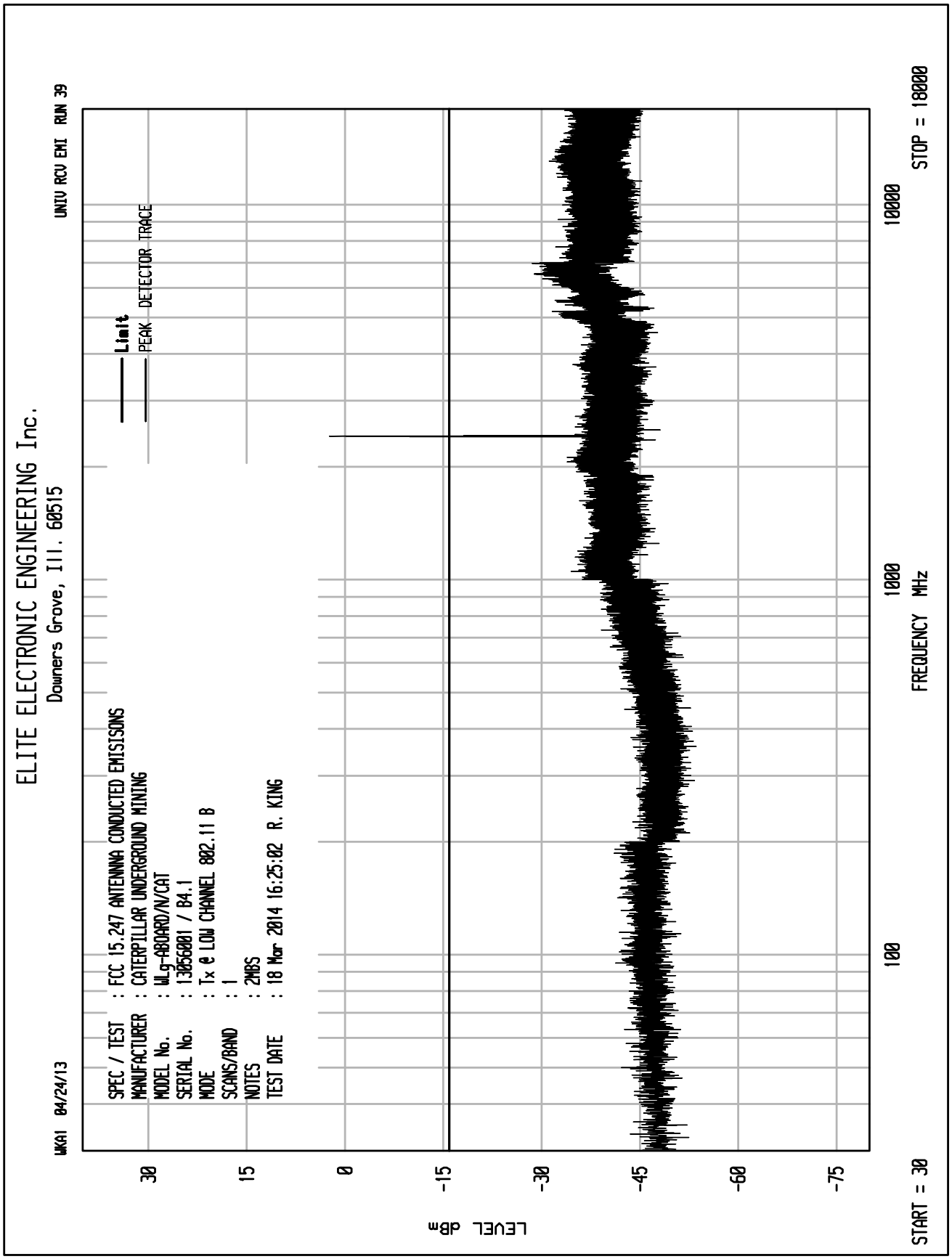
Date: 12.MAR.2014 12:10:19

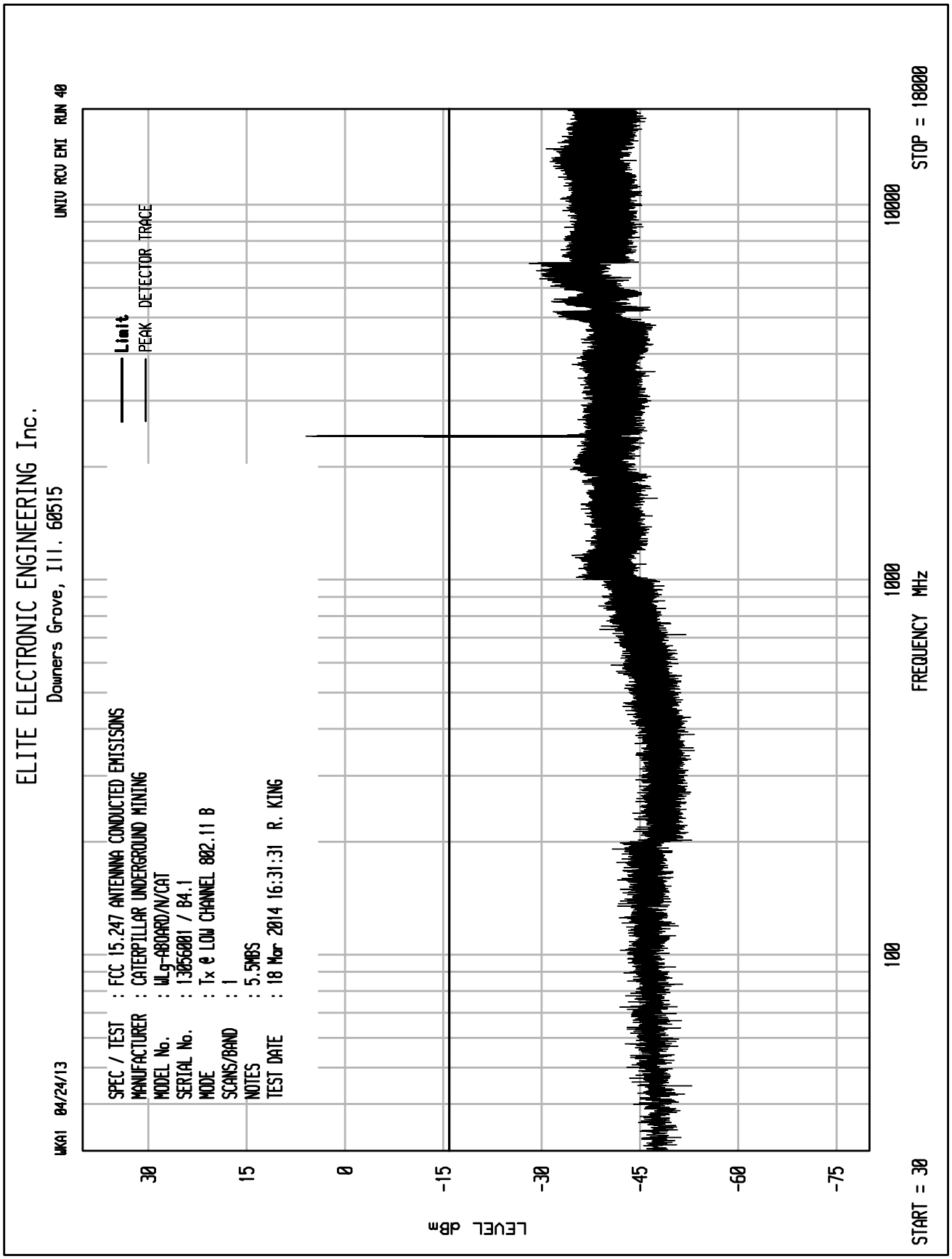
DUTY CYCLE FACTOR

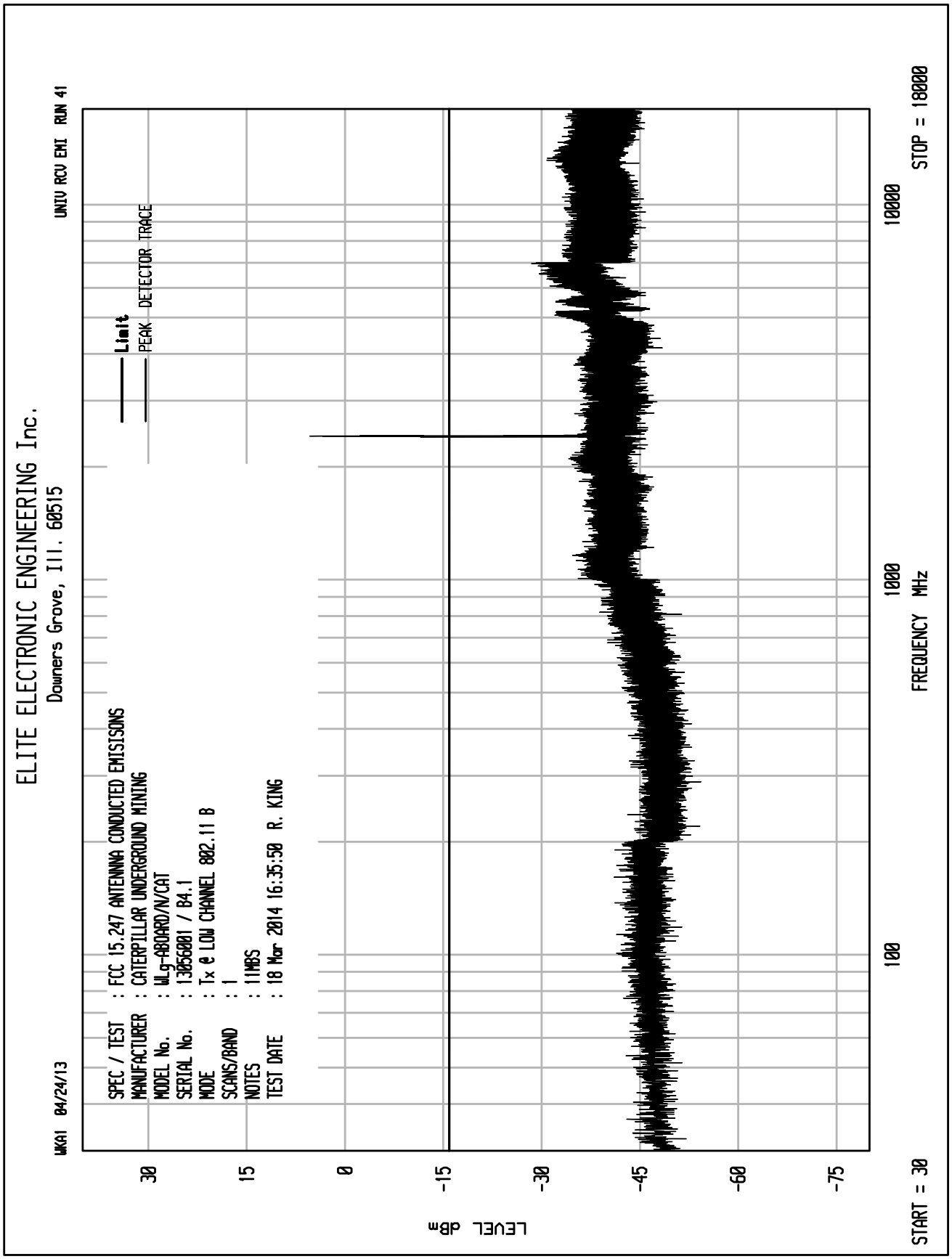
MANUFACTURER	:	Caterpillar Underground Mining
MODEL NUMBER	:	WLg-ABOARD/N/CAT
SERIAL NUMBER	:	13056001
TEST MODE	:	Tx @ 2412MHz (802.11g, 54 Mb/sec, Ch.1, DIVERSITY)
TEST PARAMETERS	:	duty cycle = 20 x log ((no. of pulses)x(pulse width)/100msec)
	:	duty cycle = 20 x log (5 x 50.64usec/100msec)
	:	duty cycle = -51.93dB
NOTES	:	TESTED WITH 2 EACH DAS-M1 ANTENNAS
EQUIPMENT USED	:	RBE1, NWQ2

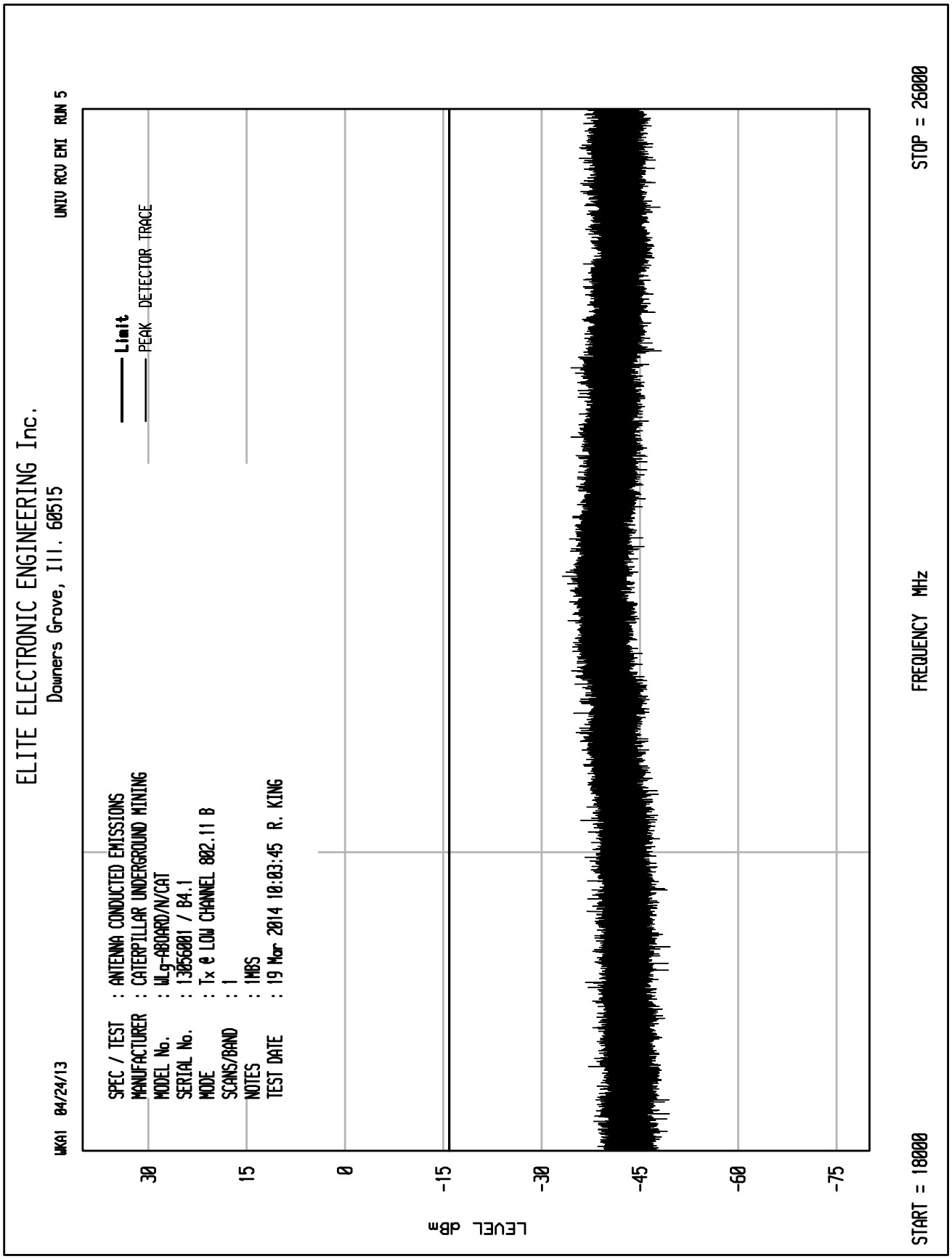
NOTES

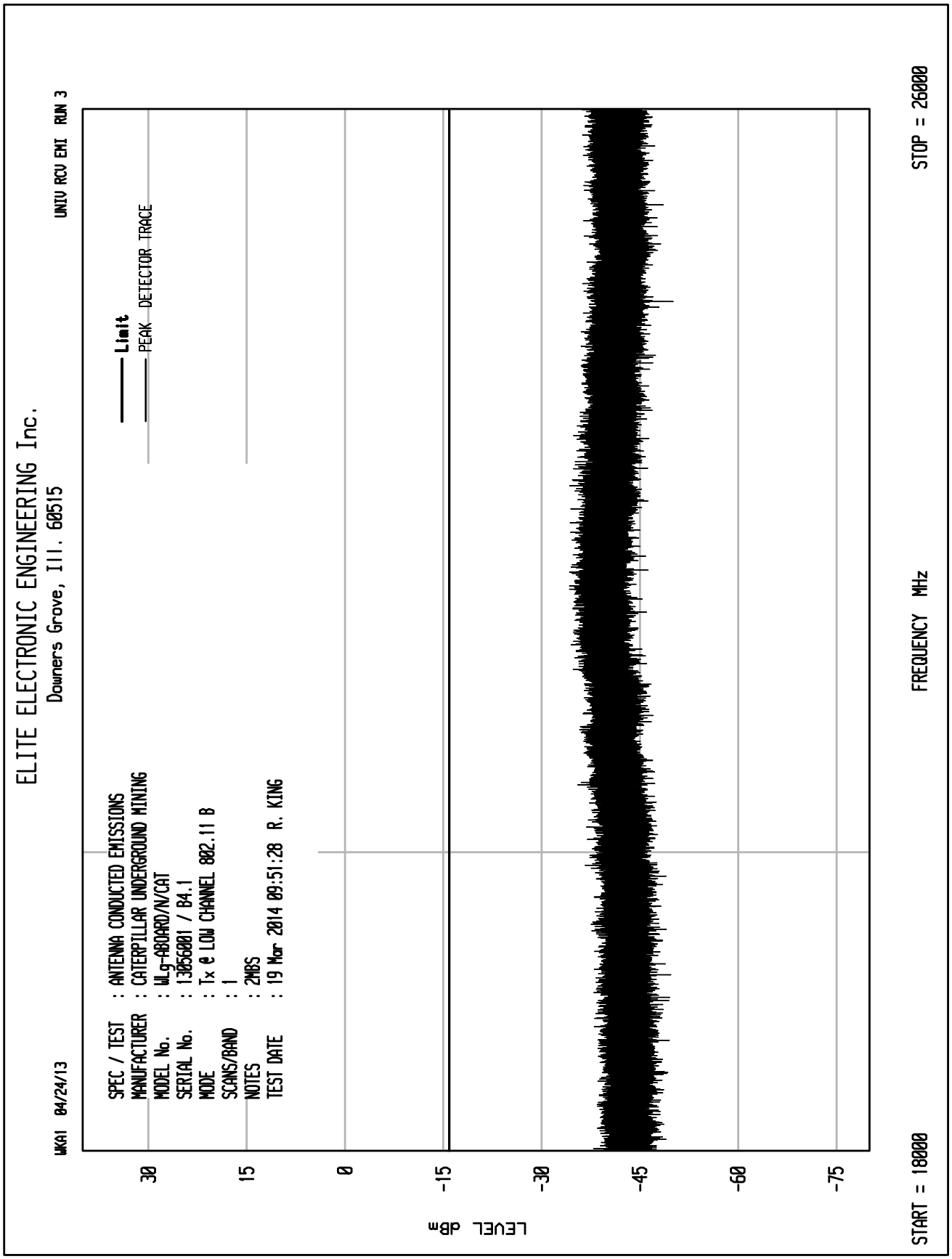

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 38
WKAI 04/24/13
SPEC / TEST : FCC 15.247 ANTENNNA CONDUCTED EMISIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : ULg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ LOW CHANNEL 802.11 B
SCANS/BAND : 1
NOTES : 1MBS
TEST DATE : 18 Mar 2014 16:18:36 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 30
100
1000
10000
STOP = 18000
FREQUENCY MHz

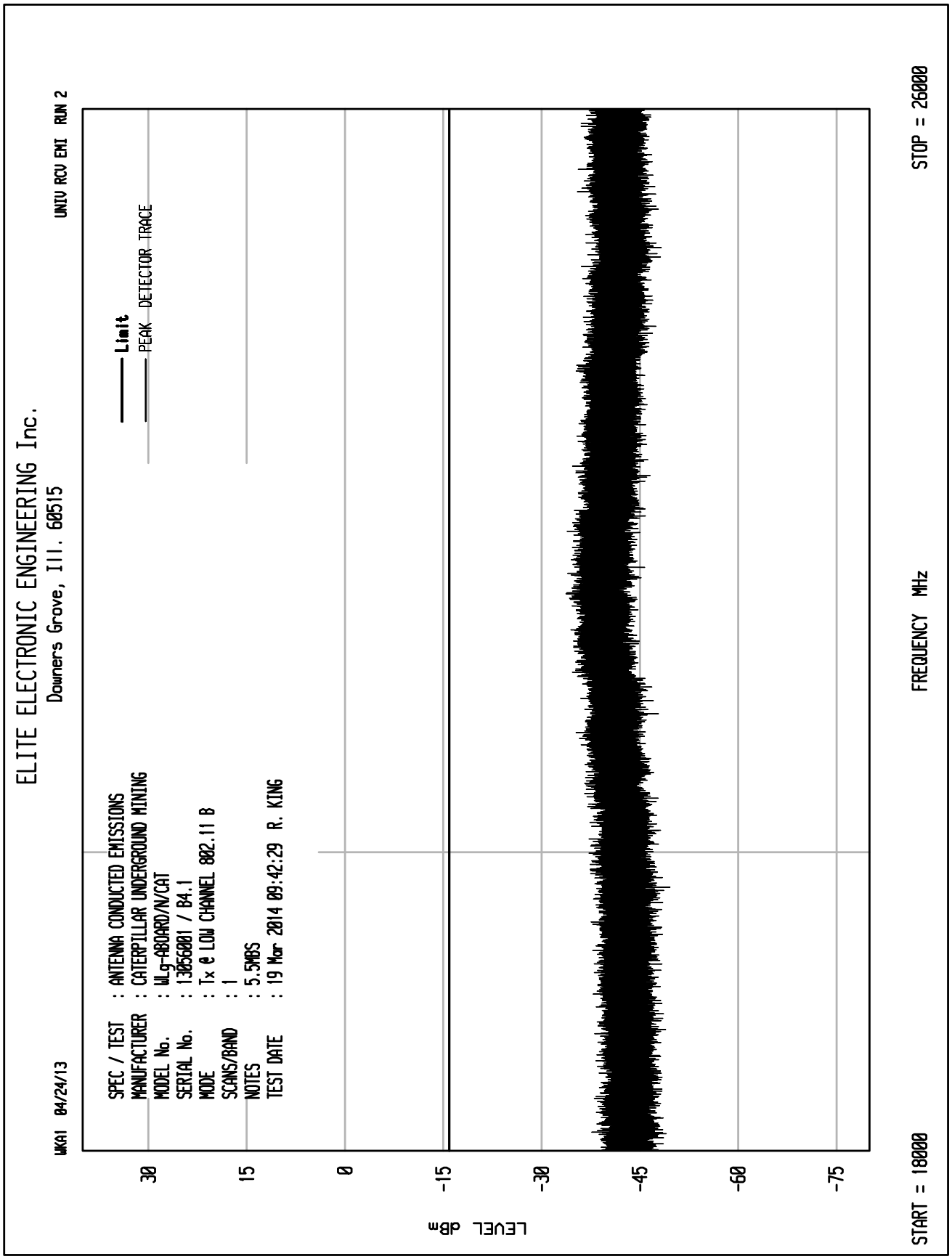

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 39
WKAI 04/24/13
SPEC / TEST : FCC 15.247 ANTENNNA CONDUCTED EMISIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : ULg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ LOW CHANNEL 802.11 B
SCANS/BAND : 1
NOTES : 2MBS
TEST DATE : 18 Mar 2014 16:25:02 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 30
100
1000
10000
STOP = 18000
FREQUENCY MHz

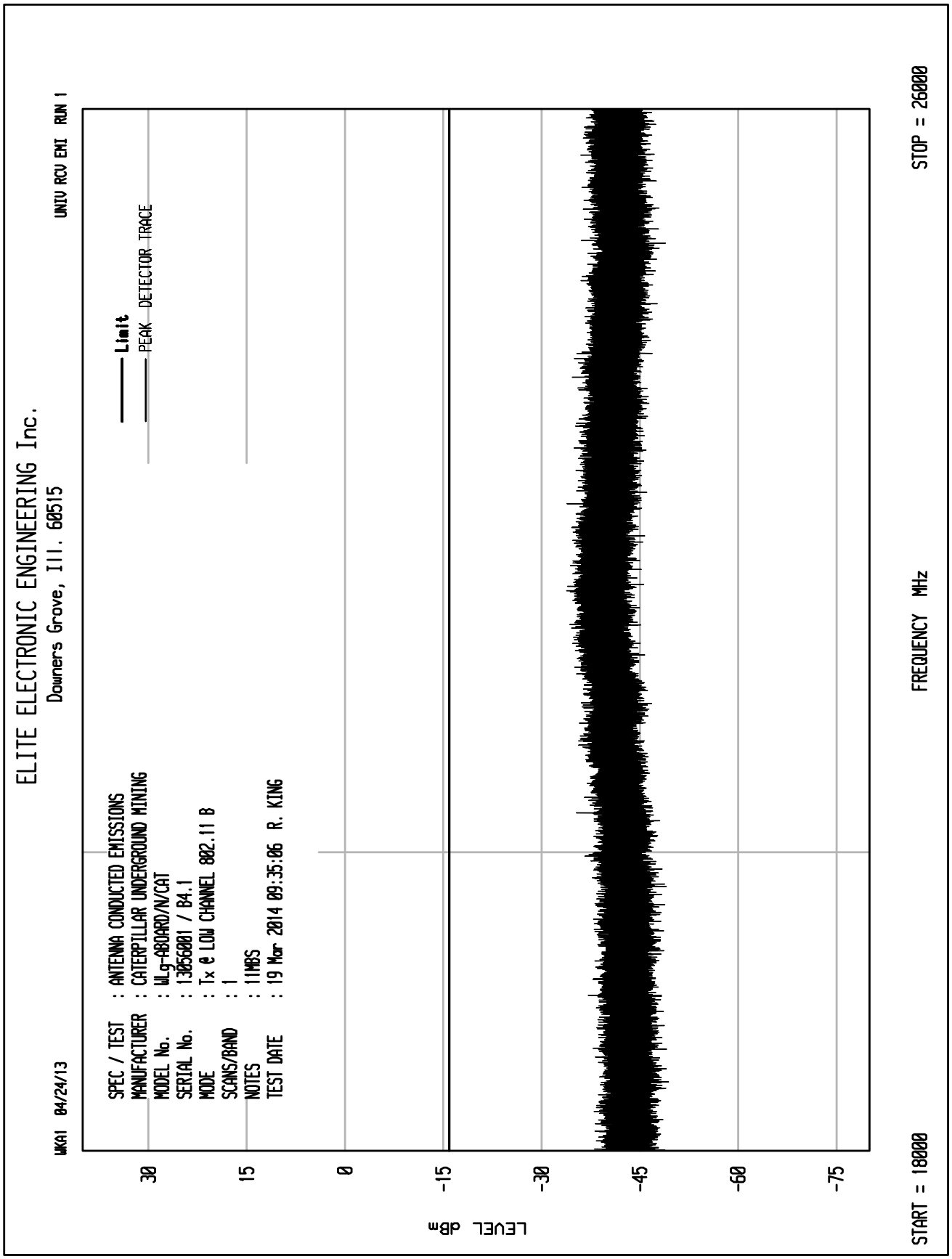

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 40
WKAI 04/24/13
SPEC / TEST : FCC 15.247 ANTENNNA CONDUCTED EMISIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : ULg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ LOW CHANNEL 802.11 B
SCANS/BAND : 1
NOTES : 5.5MBS
TEST DATE : 18 Mar 2014 16:31:31 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 30
100
1000
10000
STOP = 18000
FREQUENCY MHz

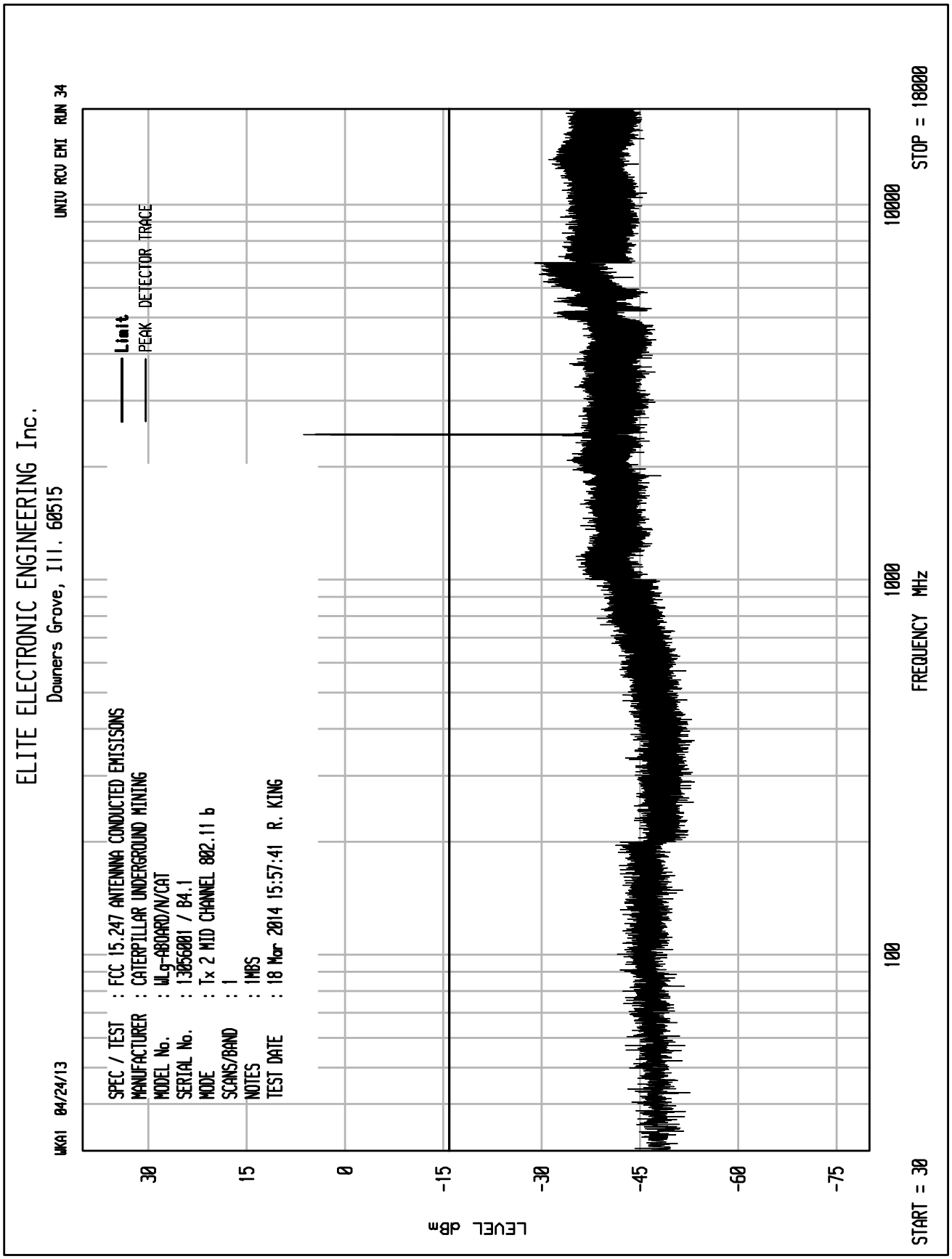

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 41
WKAI 04/24/13
SPEC / TEST : FCC 15.247 ANTENNNA CONDUCTED EMISIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : ULg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ LOW CHANNEL 802.11 B
SCANS/BAND : 1
NOTES : 11MBS
TEST DATE : 18 Mar 2014 16:35:50 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 30
100
1000
10000
STOP = 18000
FREQUENCY MHz

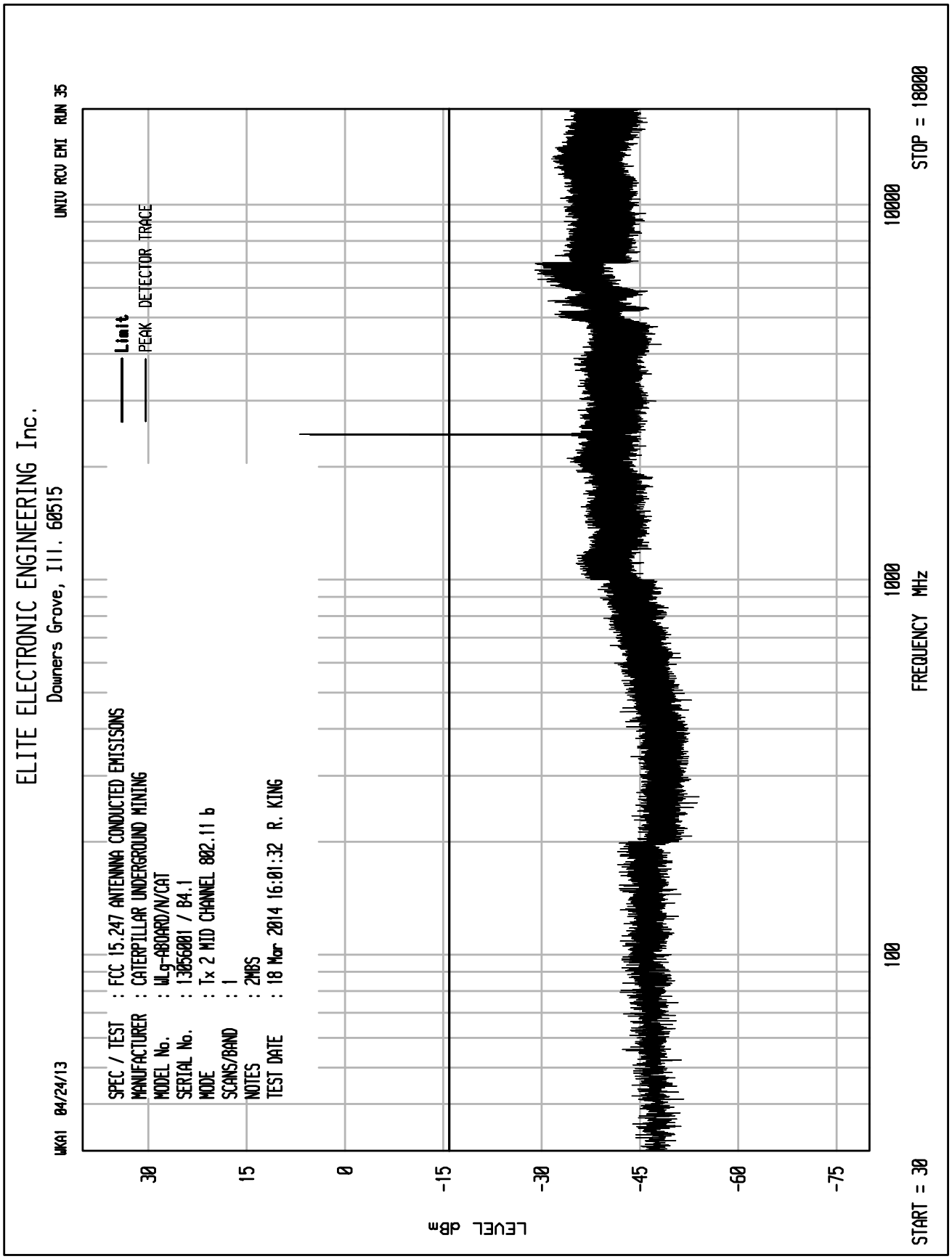

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 5
WKAI 04/24/13
SPEC / TEST : ANTENNA CONDUCTED EMISSIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : WLg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ LOW CHANNEL 802.11 B
SCANS/BAND : 1
NOTES : 1MBS
TEST DATE : 19 Mar 2014 10:03:45 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 18000
FREQUENCY MHz
STOP = 26000

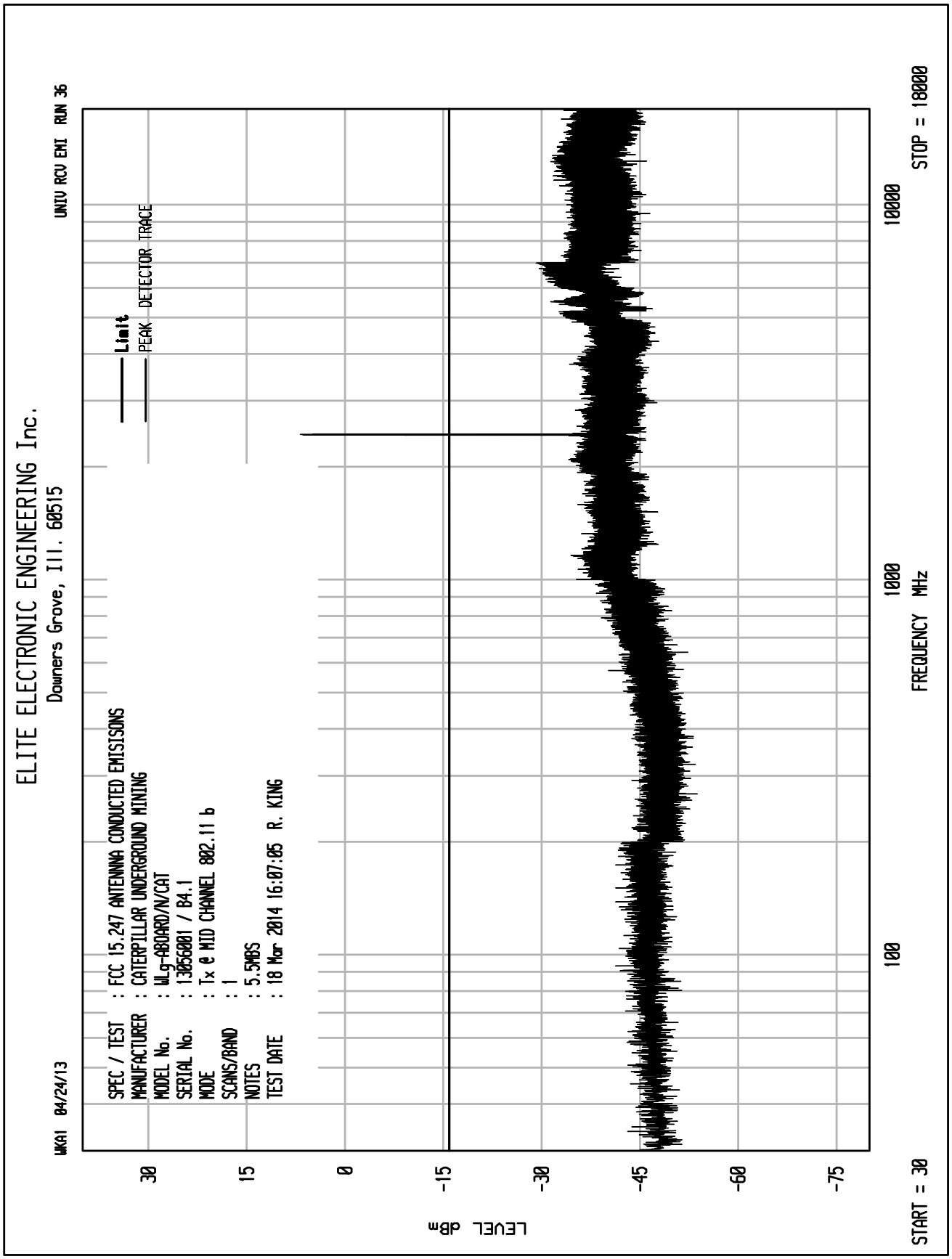

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 3
WKAI 04/24/13
SPEC / TEST : ANTENNA CONDUCTED EMISSIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : ULg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ LOW CHANNEL 802.11 B
SCANS/BAND : 1
NOTES : 2MBS
TEST DATE : 19 Mar 2014 09:51:28 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 18000
FREQUENCY MHz
STOP = 26000

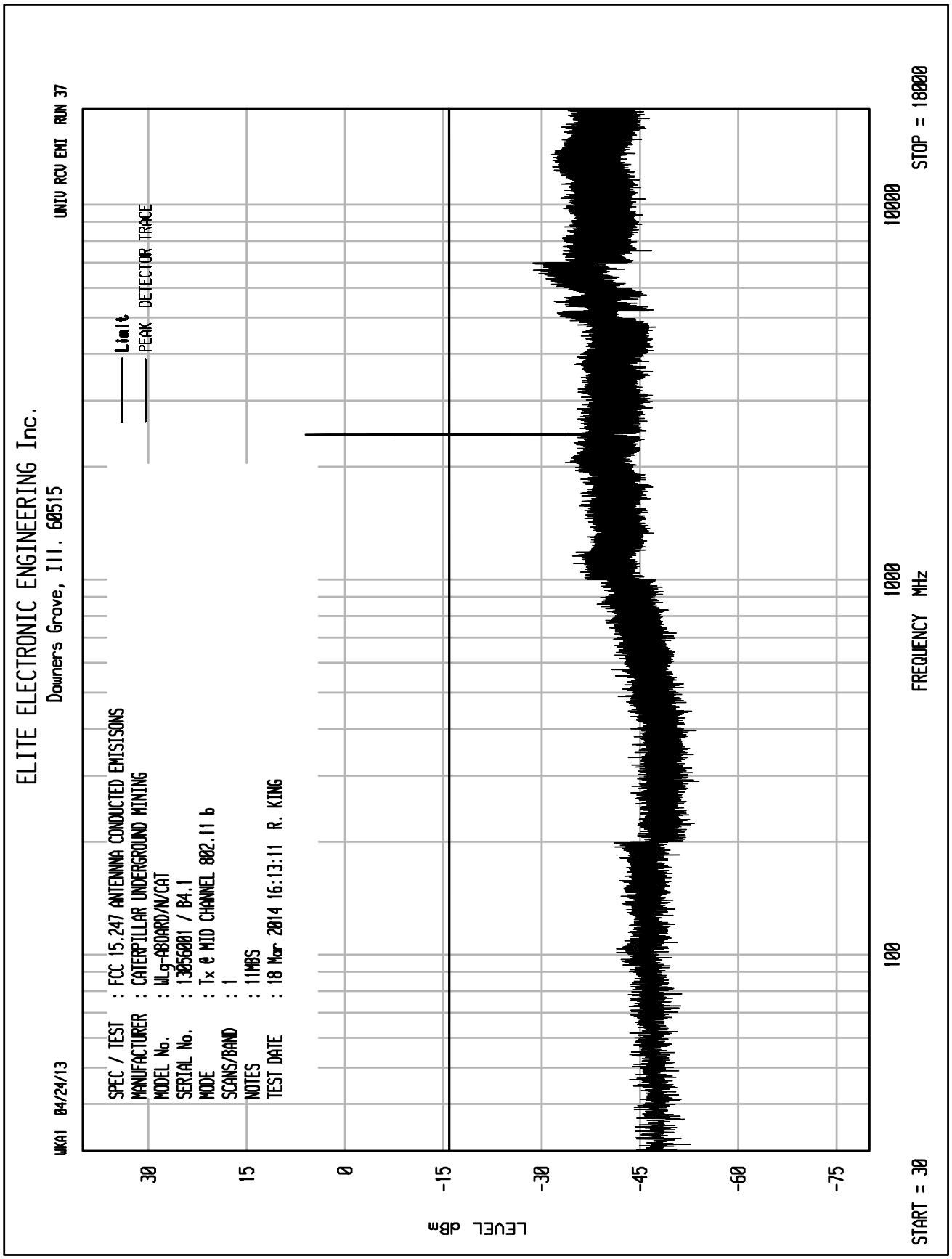

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 2
WKAI 04/24/13
SPEC / TEST : ANTENNA CONDUCTED EMISSIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : WLg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ LOW CHANNEL 802.11 B
SCANS/BAND : 1
NOTES : 5.5MBS
TEST DATE : 19 Mar 2014 09:42:29 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 18000
FREQUENCY MHz
STOP = 26000

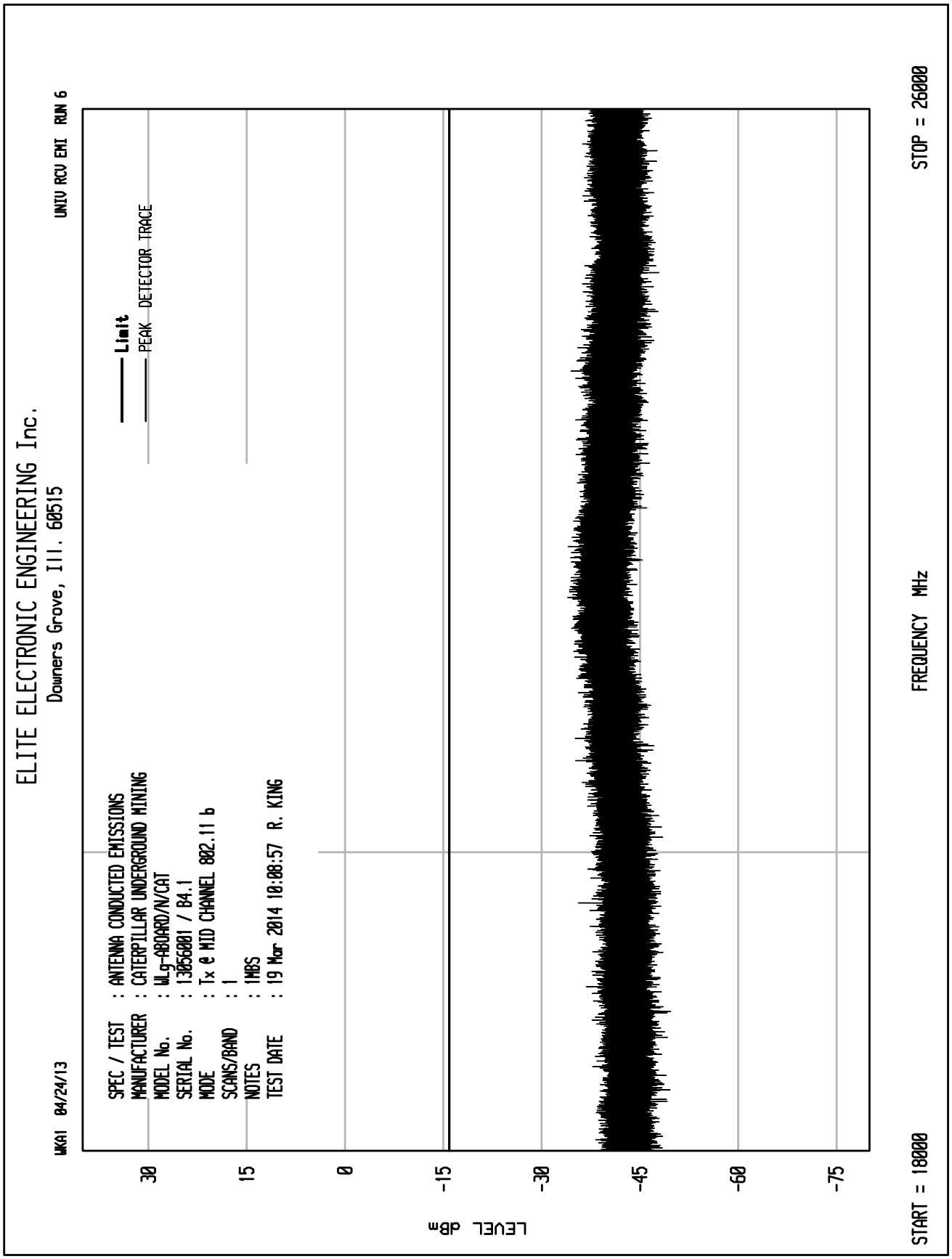

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 1
WKAI 04/24/13
SPEC / TEST : ANTENNA CONDUCTED EMISSIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : ULg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ LOW CHANNEL 802.11 B
SCANS/BAND : 1
NOTES : 11MBS
TEST DATE : 19 Mar 2014 09:35:06 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 18000
FREQUENCY MHz
STOP = 26000

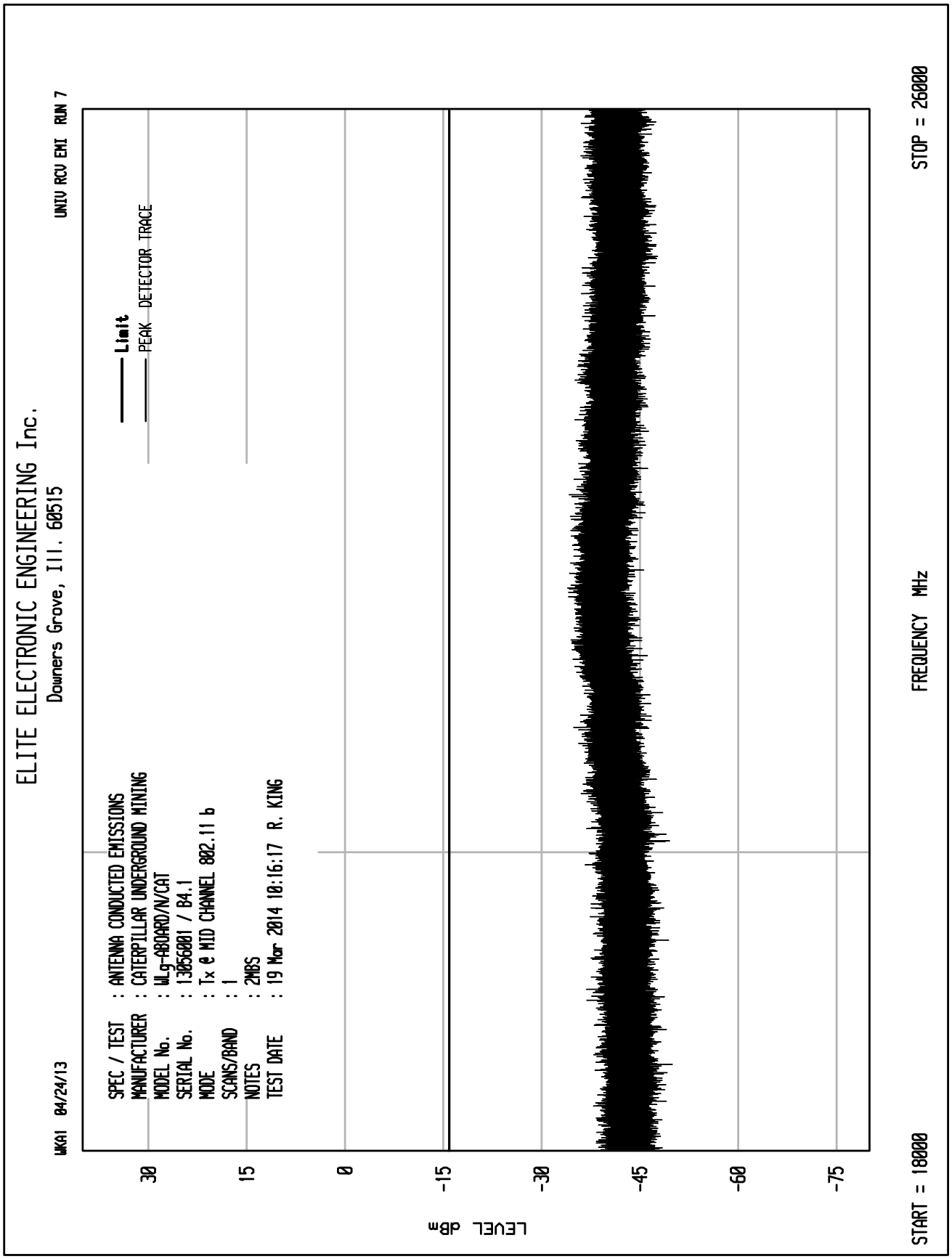

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 34
WKAI 04/24/13
SPEC / TEST : FCC 15.247 ANTENNNA CONDUCTED EMISIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : ULg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx 2 MID CHANNEL 802.11 b
SCANS/BAND : 1
NOTES : 1MBS
TEST DATE : 18 Mar 2014 15:57:41 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 30
100
1000
10000
STOP = 18000
FREQUENCY MHz

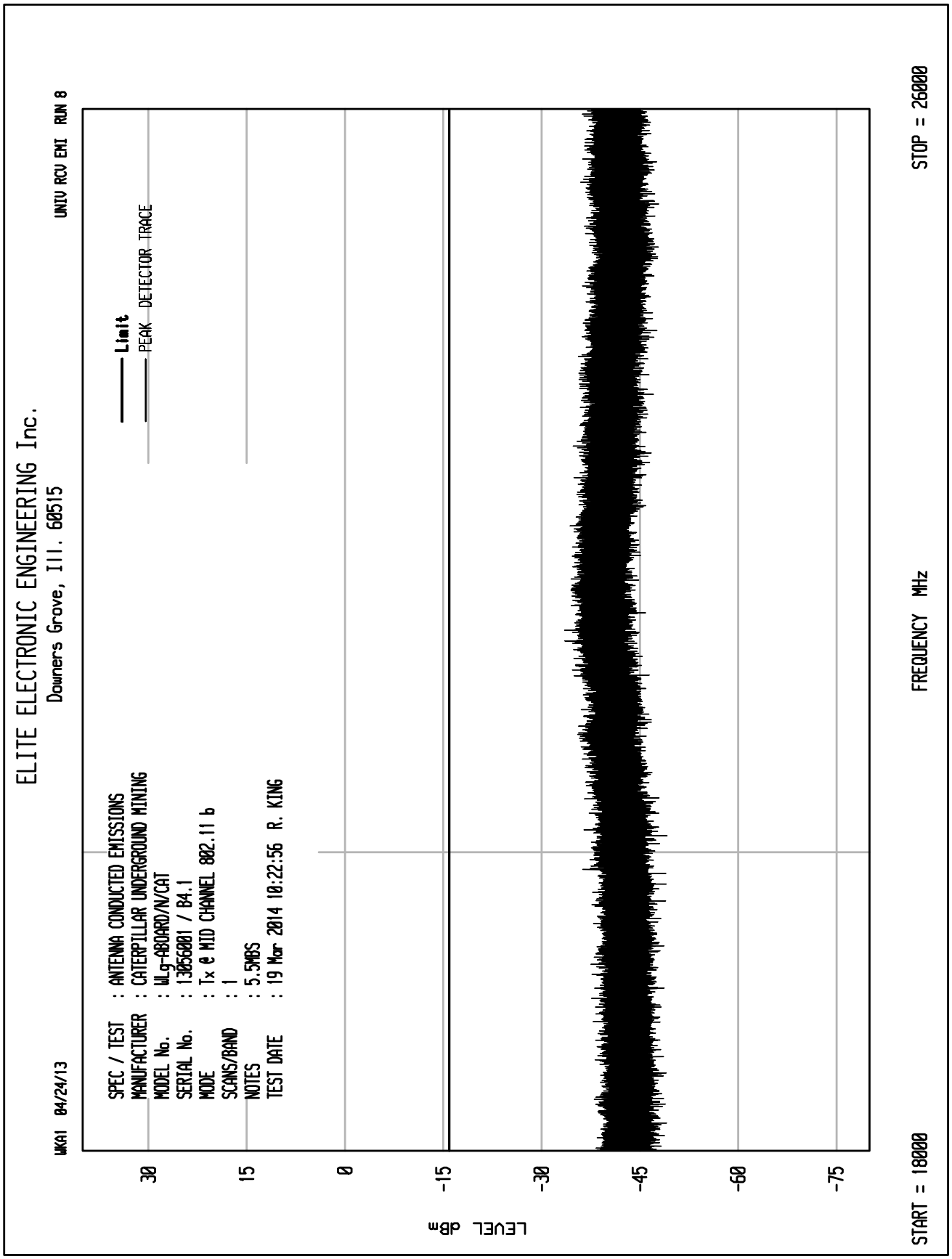

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 35
WKAI 04/24/13
SPEC / TEST : FCC 15.247 ANTENNNA CONDUCTED EMISIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : ULg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx 2 MID CHANNEL 802.11 b
SCANS/BAND : 1
NOTES : 2MBS
TEST DATE : 18 Mar 2014 16:01:32 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 30
100
1000
10000
STOP = 18000
FREQUENCY MHz

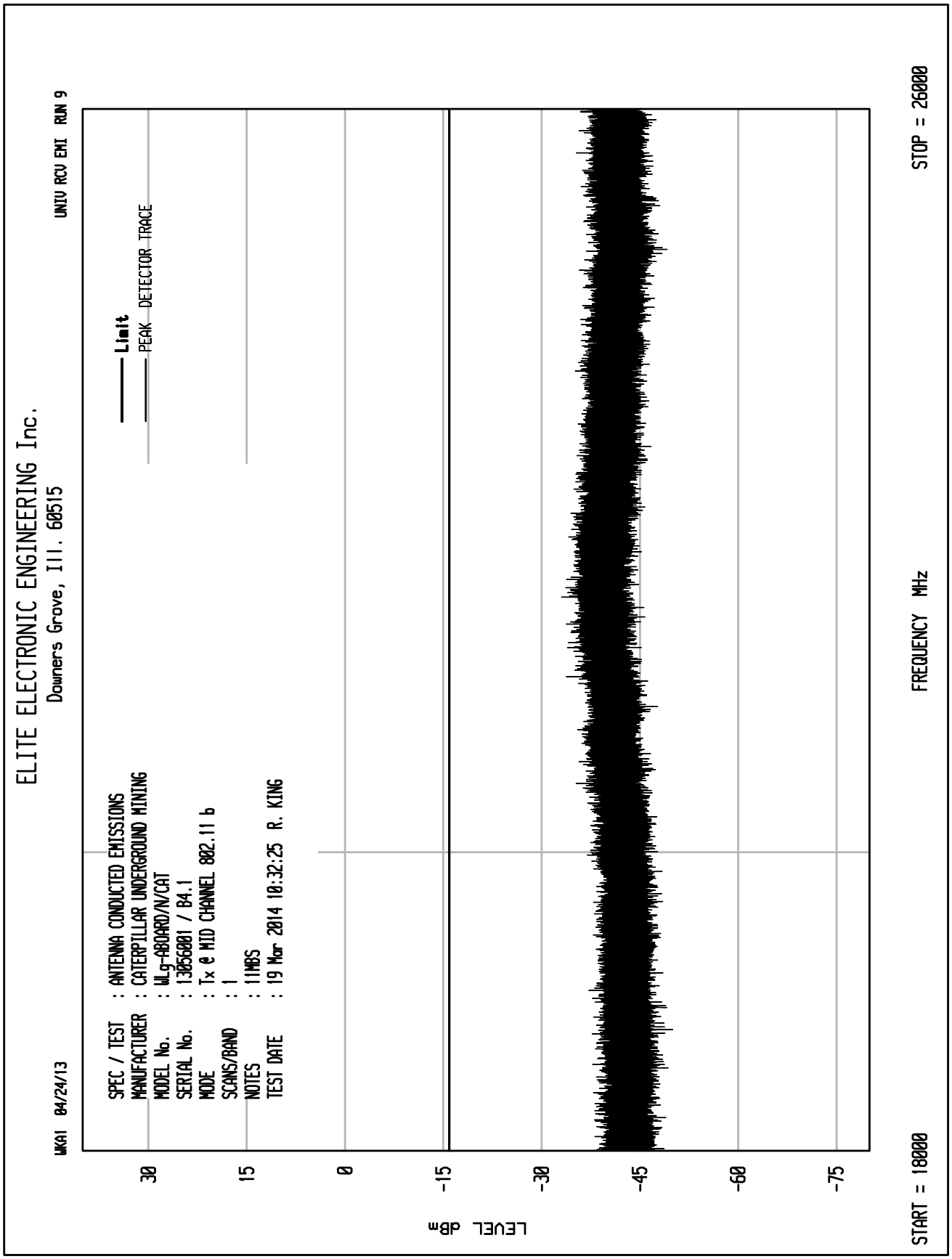

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 36
WKAI 04/24/13
SPEC / TEST : FCC 15.247 ANTENNNA CONDUCTED EMISIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : ULg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ MID CHANNEL 802.11 b
SCANS/BAND : 1
NOTES : 5.5MBS
TEST DATE : 18 Mar 2014 16:07:05 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 30
100
1000
10000
STOP = 18000
FREQUENCY MHz

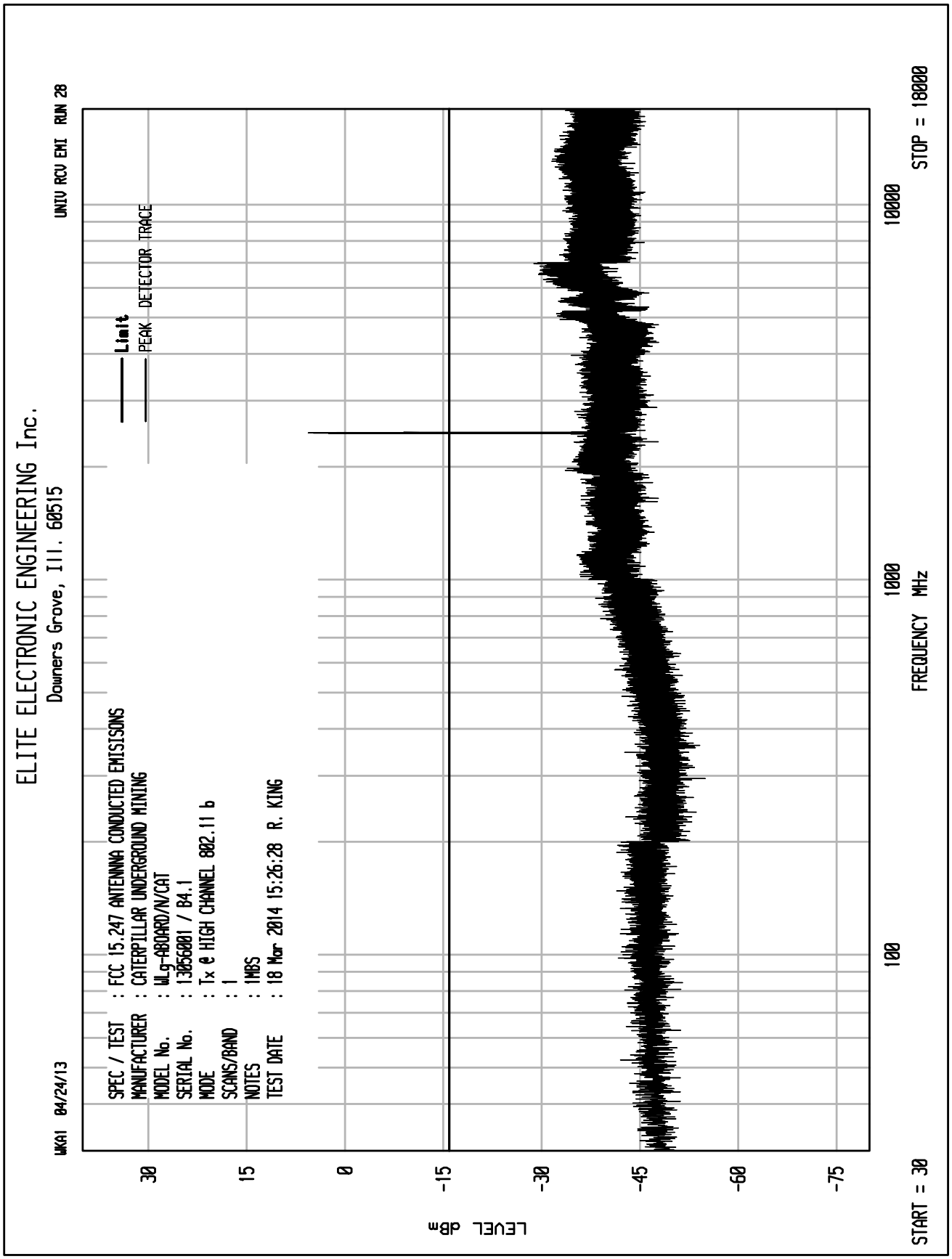

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 37
WKAI 04/24/13
SPEC / TEST : FCC 15.247 ANTENNNA CONDUCTED EMISIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : ULg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ MID CHANNEL 802.11 b
SCANS/BAND : 1
NOTES : 11MBS
TEST DATE : 18 Mar 2014 16:13:11 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 30
100
1000
10000
STOP = 18000
FREQUENCY MHz

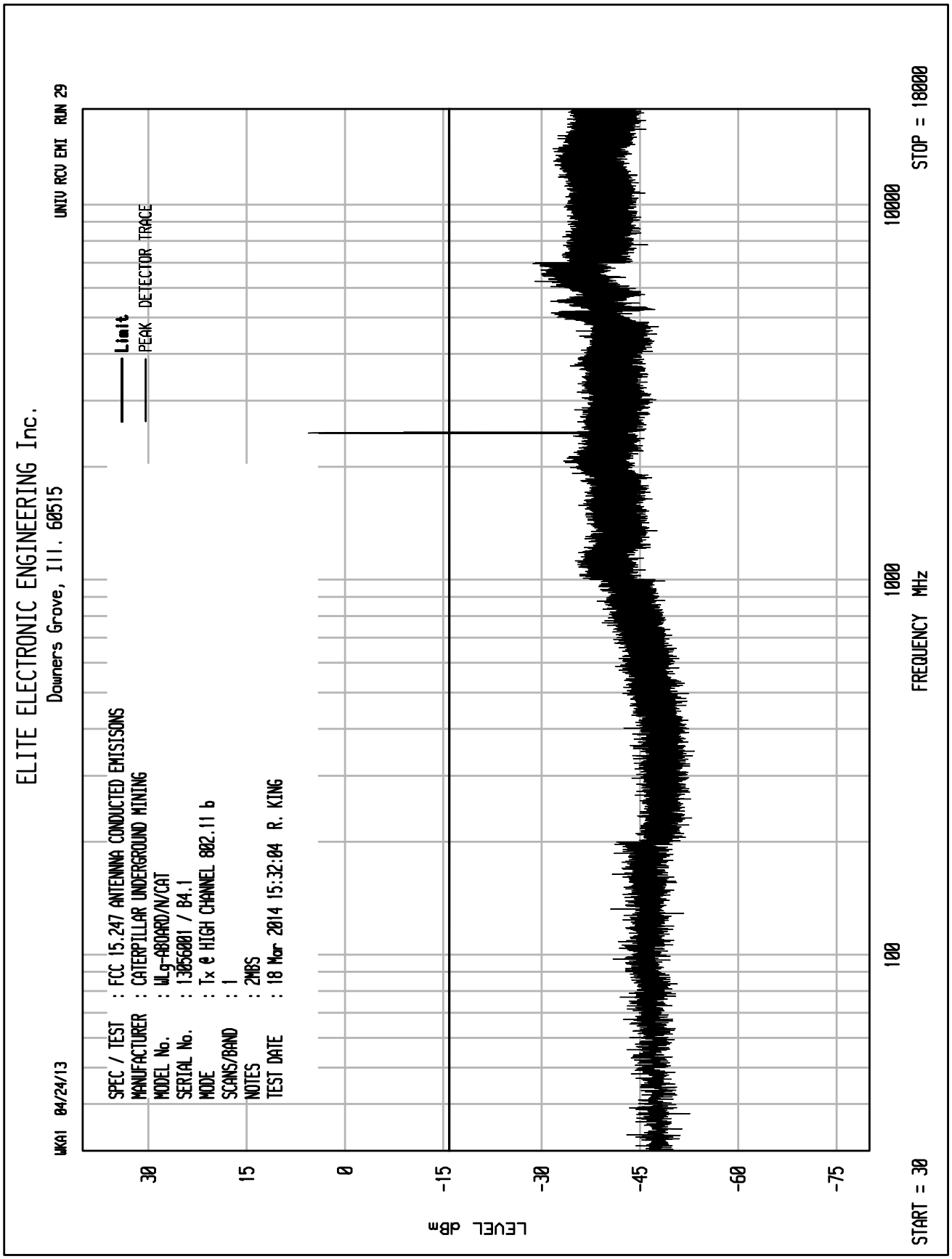

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 6
WKAI 04/24/13
SPEC / TEST : ANTENNA CONDUCTED EMISSIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : ULg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ MID CHANNEL 802.11 b
SCANS/BAND : 1
NOTES : 1MBS
TEST DATE : 19 Mar 2014 10:08:57 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 18000
FREQUENCY MHz
STOP = 26000

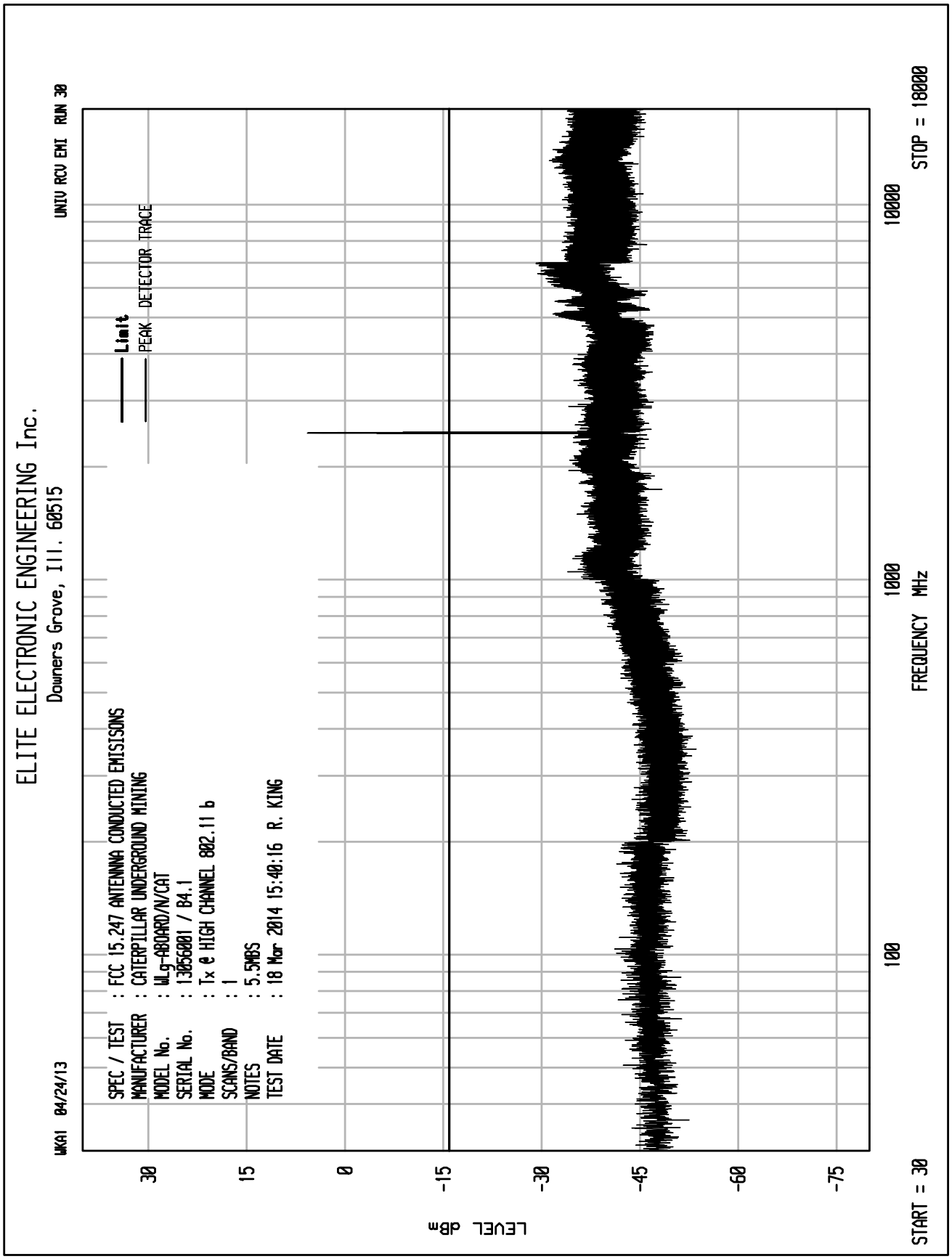

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 7
WKAI 04/24/13
SPEC / TEST : ANTENNA CONDUCTED EMISSIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : ULg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ MID CHANNEL 802.11 b
SCANS/BAND : 1
NOTES : 2MBS
TEST DATE : 19 Mar 2014 10:16:17 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 18000
FREQUENCY MHz
STOP = 26000

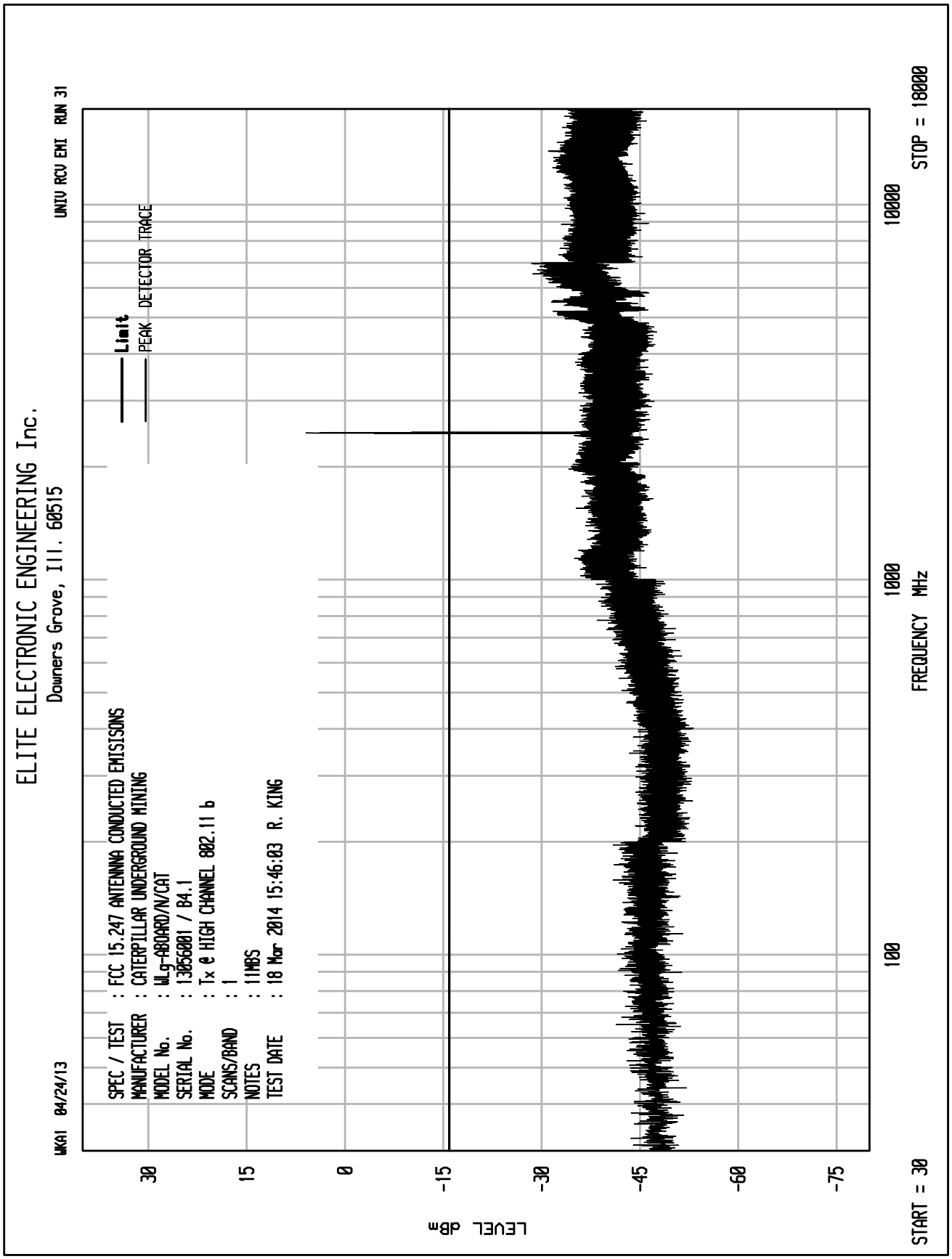

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 8
WKAI 04/24/13
SPEC / TEST : ANTENNA CONDUCTED EMISSIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : ULg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ MID CHANNEL 802.11 b
SCANS/BAND : 1
NOTES : 5.5MBS
TEST DATE : 19 Mar 2014 10:22:56 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 18000
FREQUENCY MHz
STOP = 26000

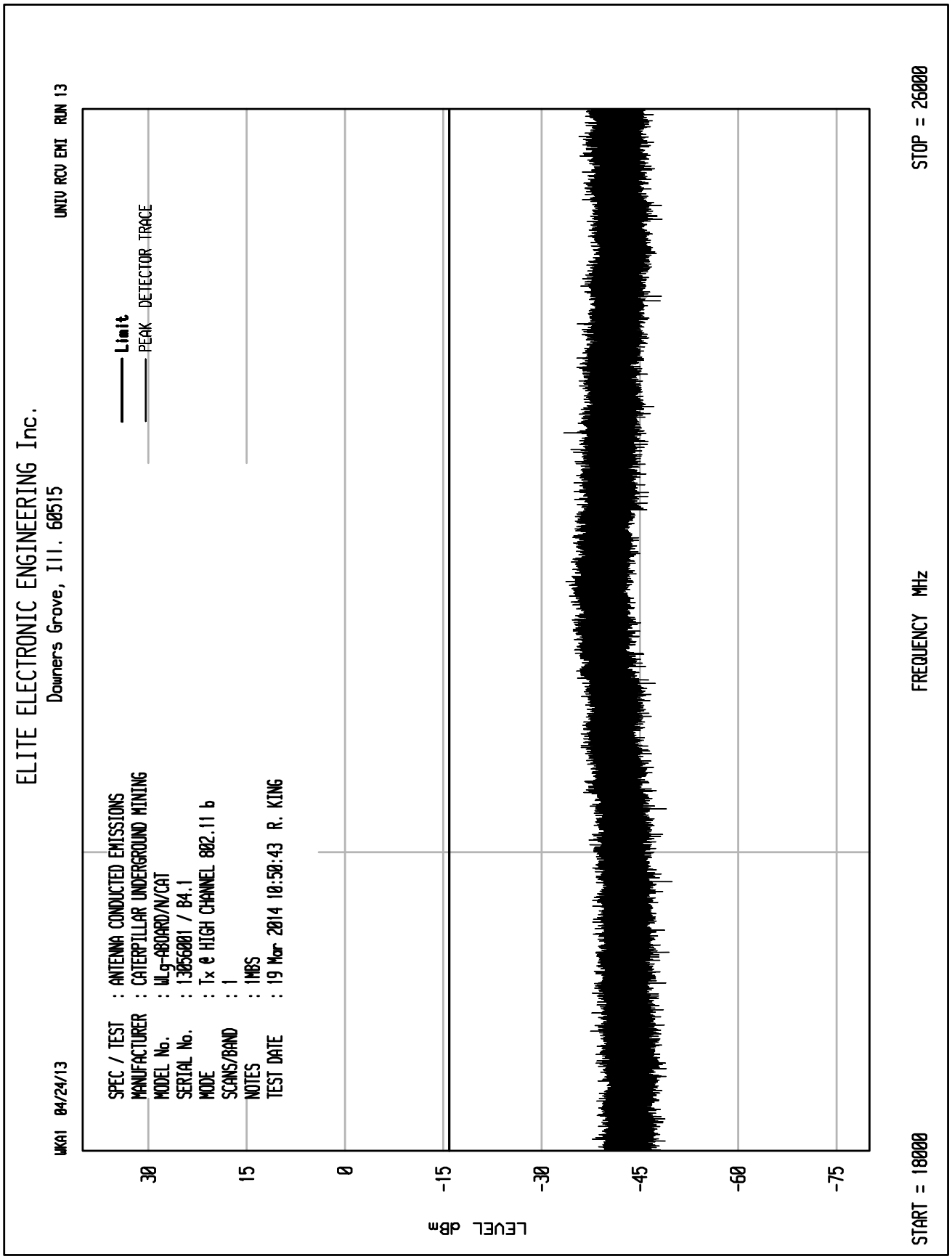

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 9
WKAI 04/24/13
SPEC / TEST : ANTENNA CONDUCTED EMISSIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : ULg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ MID CHANNEL 802.11 b
SCANS/BAND : 1
NOTES : 11MBS
TEST DATE : 19 Mar 2014 10:32:25 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 18000
FREQUENCY MHz
STOP = 26000

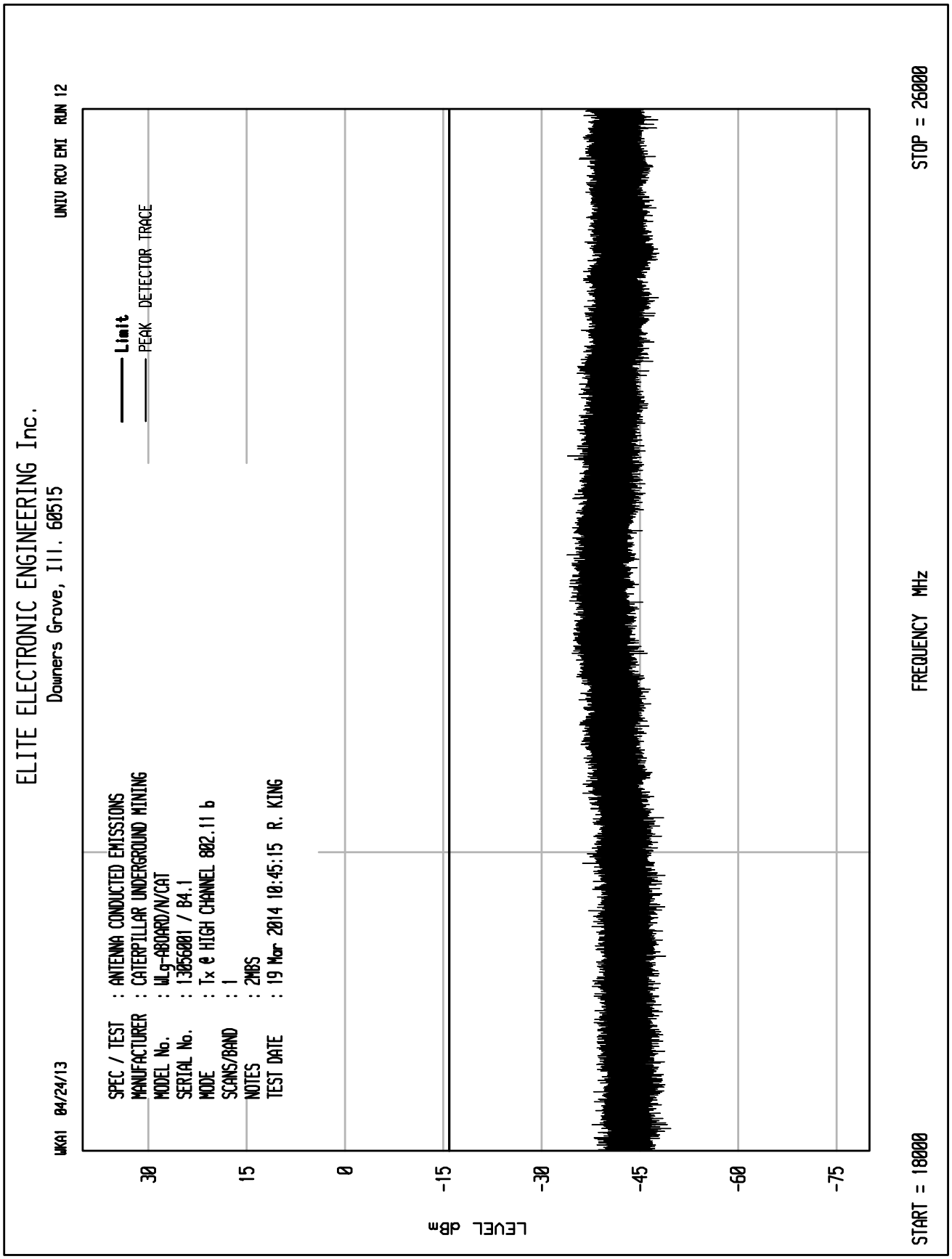

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 28
WKAI 04/24/13
SPEC / TEST : FCC 15.247 ANTENNNA CONDUCTED EMISIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : ULg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ HIGH CHANNEL 802.11 b
SCANS/BAND : 1
NOTES : 1MBS
TEST DATE : 18 Mar 2014 15:26:28 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 30
100
1000
10000
STOP = 18000
FREQUENCY MHz

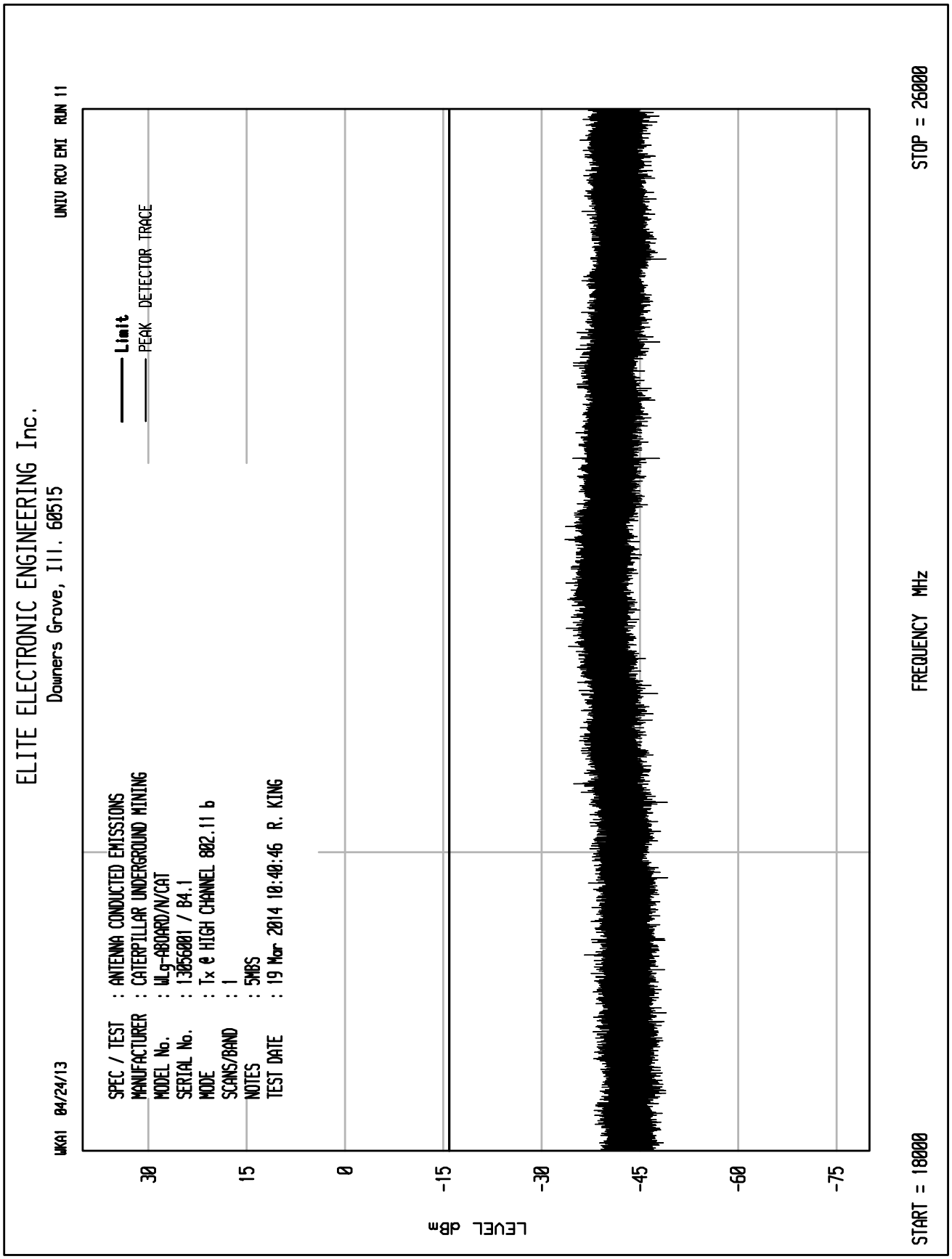

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 29
WKAI 04/24/13
SPEC / TEST : FCC 15.247 ANTENNNA CONDUCTED EMISIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : ULg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ HIGH CHANNEL 802.11 b
SCANS/BAND : 1
NOTES : 2MBS
TEST DATE : 18 Mar 2014 15:32:04 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 30
100
1000
10000
STOP = 18000
FREQUENCY MHz

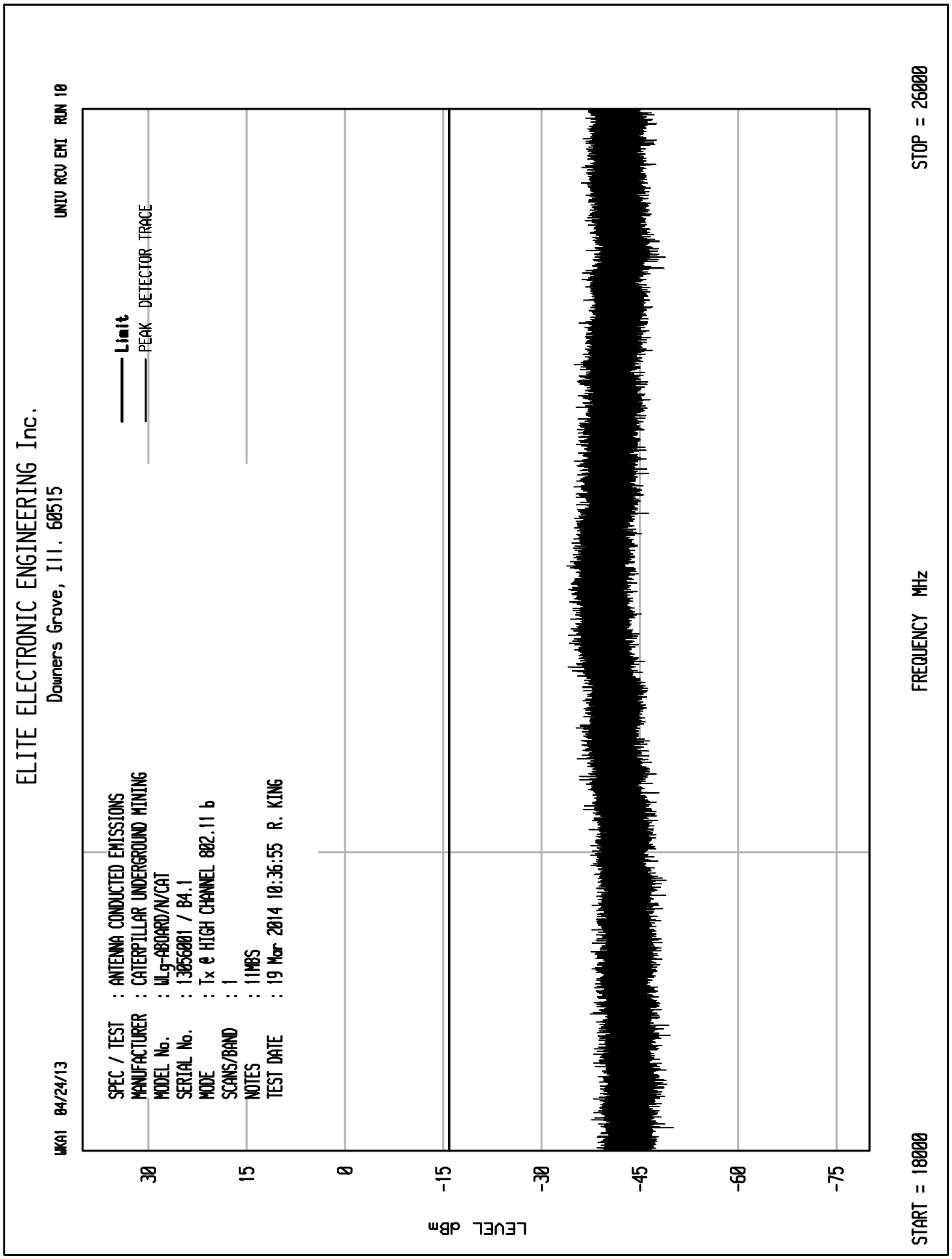

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 30
WKAI 04/24/13
SPEC / TEST : FCC 15.247 ANTENNNA CONDUCTED EMISIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : ULg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ HIGH CHANNEL 802.11 b
SCANS/BAND : 1
NOTES : 5.5MBS
TEST DATE : 18 Mar 2014 15:40:16 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 30
100
1000
10000
STOP = 18000
FREQUENCY MHz

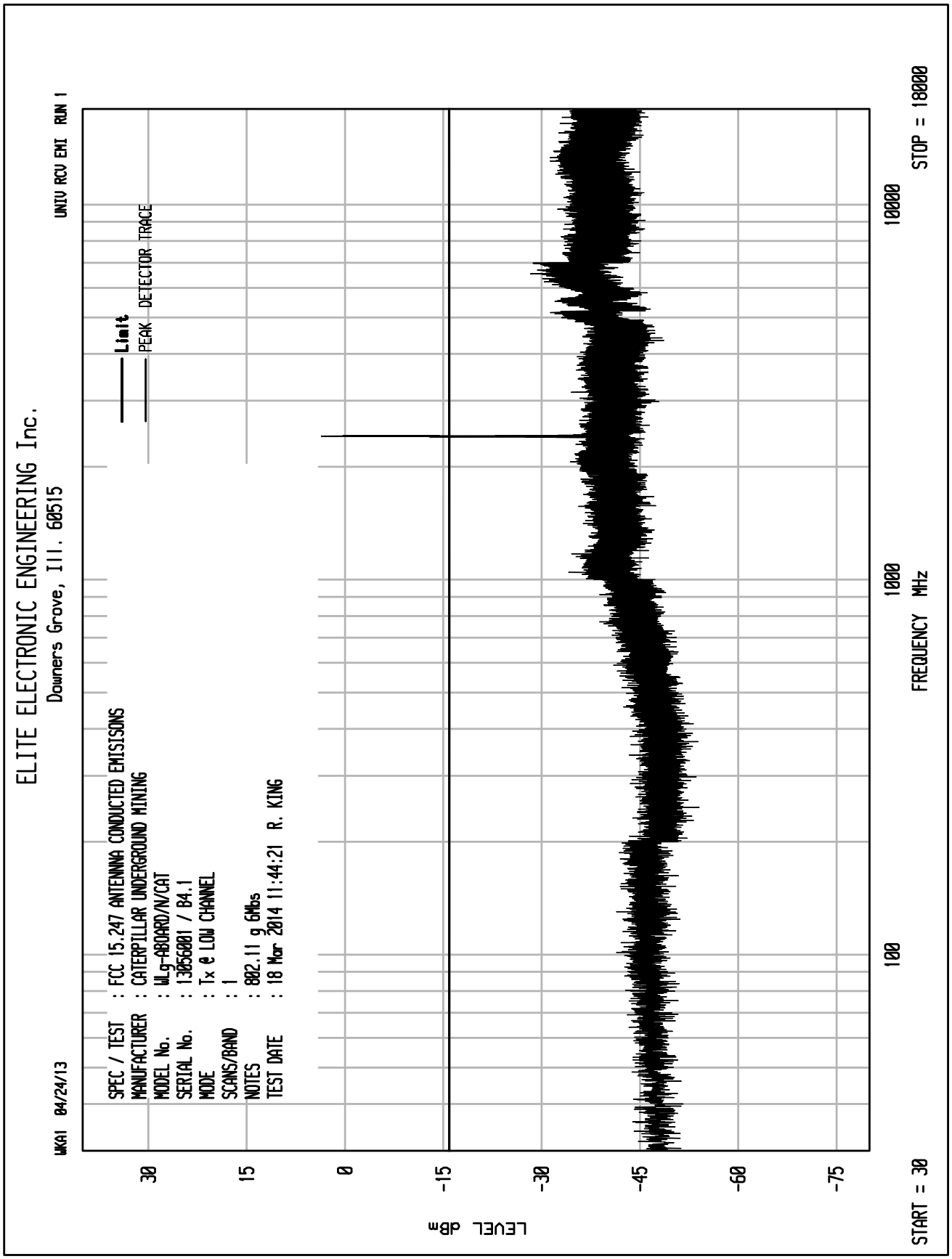

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 31
WKAI 04/24/13
SPEC / TEST : FCC 15.247 ANTENNNA CONDUCTED EMISIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : ULg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ HIGH CHANNEL 802.11 b
SCANS/BAND : 1
NOTES : 11MBS
TEST DATE : 18 Mar 2014 15:46:03 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 30
100
1000
10000
STOP = 18000
FREQUENCY MHz

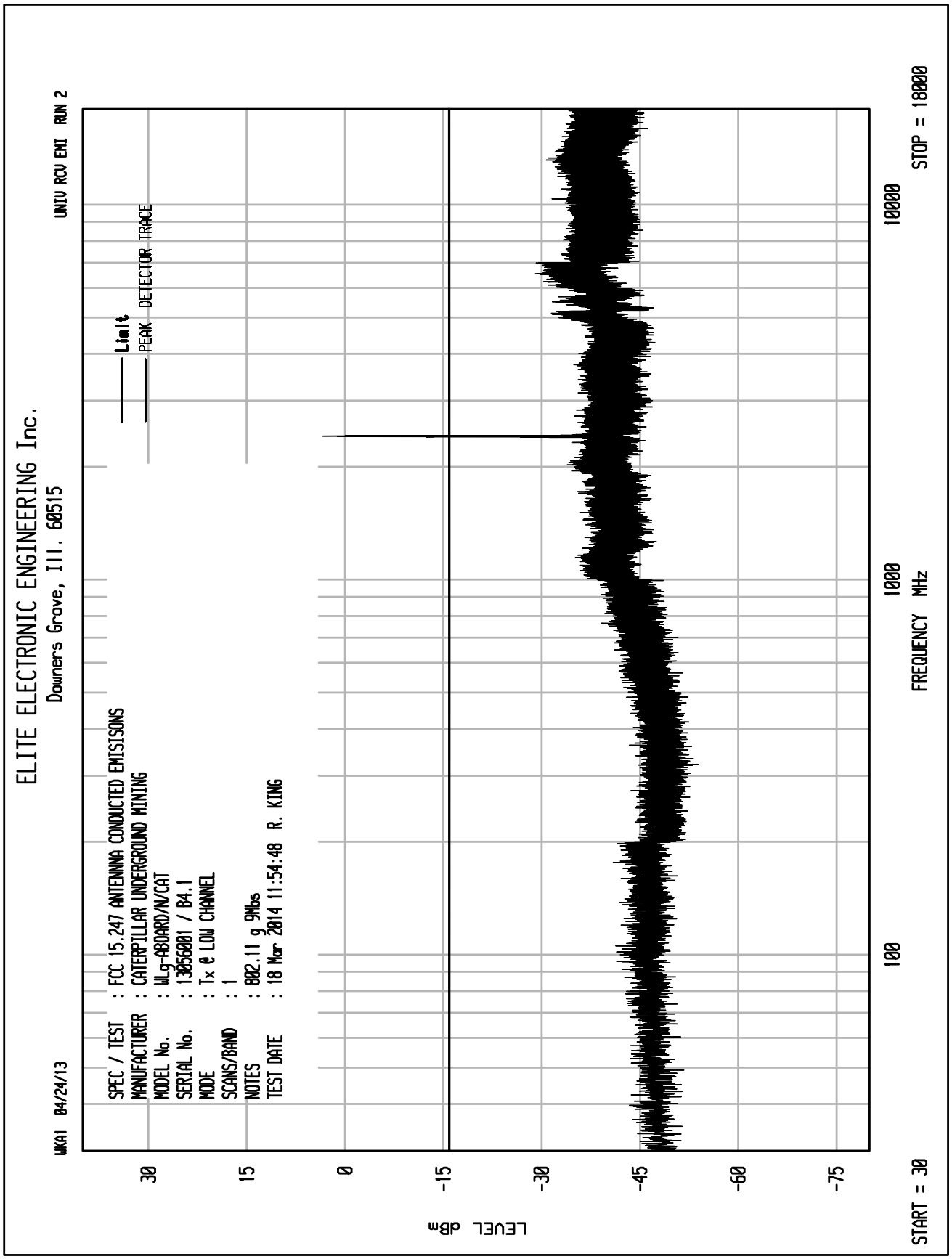

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 13
WKAI 04/24/13
SPEC / TEST : ANTENNA CONDUCTED EMISSIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : ULg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ HIGH CHANNEL 802.11 b
SCANS/BAND : 1
NOTES : 1MBS
TEST DATE : 19 Mar 2014 10:50:43 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 18000
FREQUENCY MHz
STOP = 26000

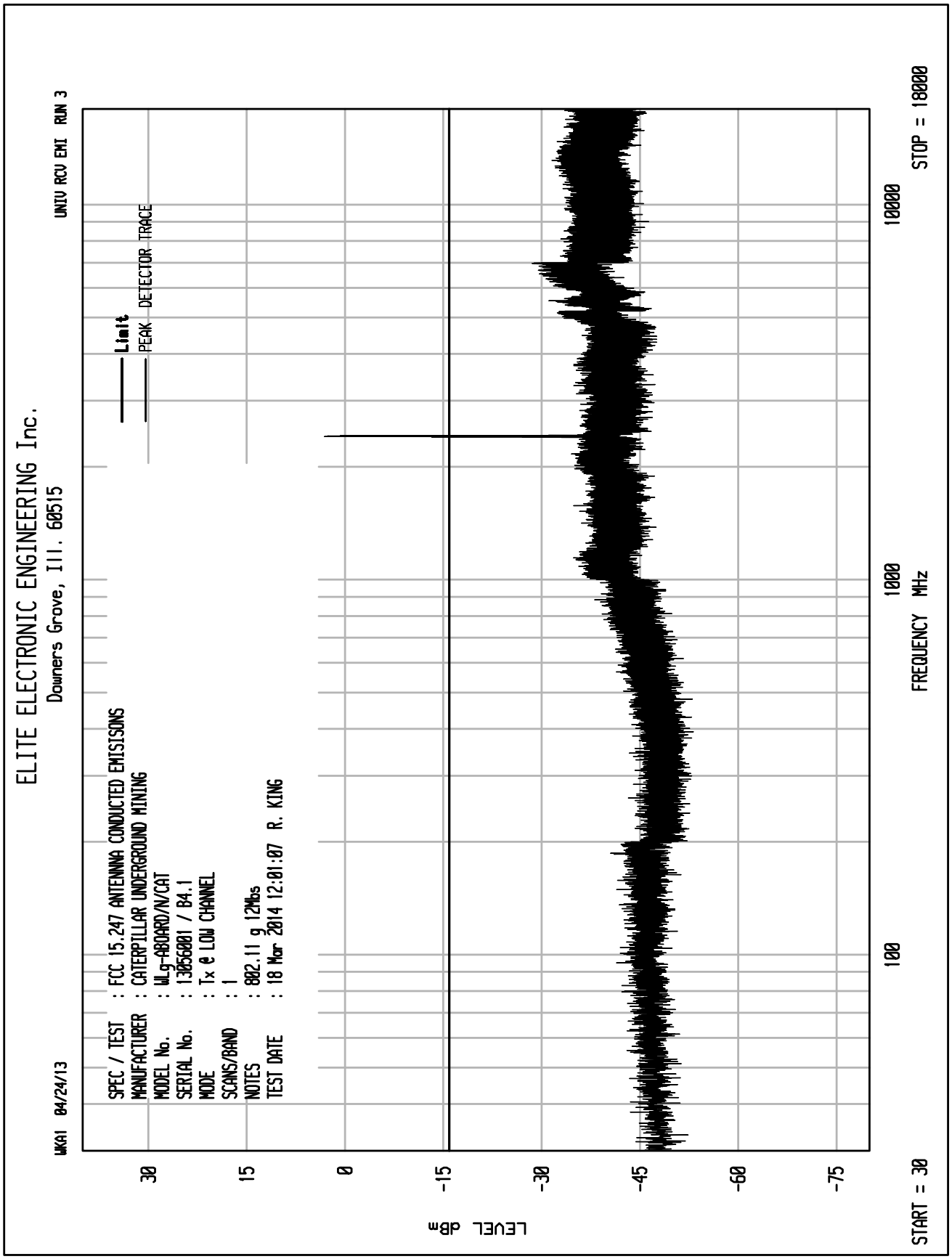

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 12
WKAI 04/24/13
SPEC / TEST : ANTENNA CONDUCTED EMISSIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : ULg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ HIGH CHANNEL 802.11 b
SCANS/BAND : 1
NOTES : 2MBS
TEST DATE : 19 Mar 2014 10:45:15 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 18000
FREQUENCY MHz
STOP = 26000

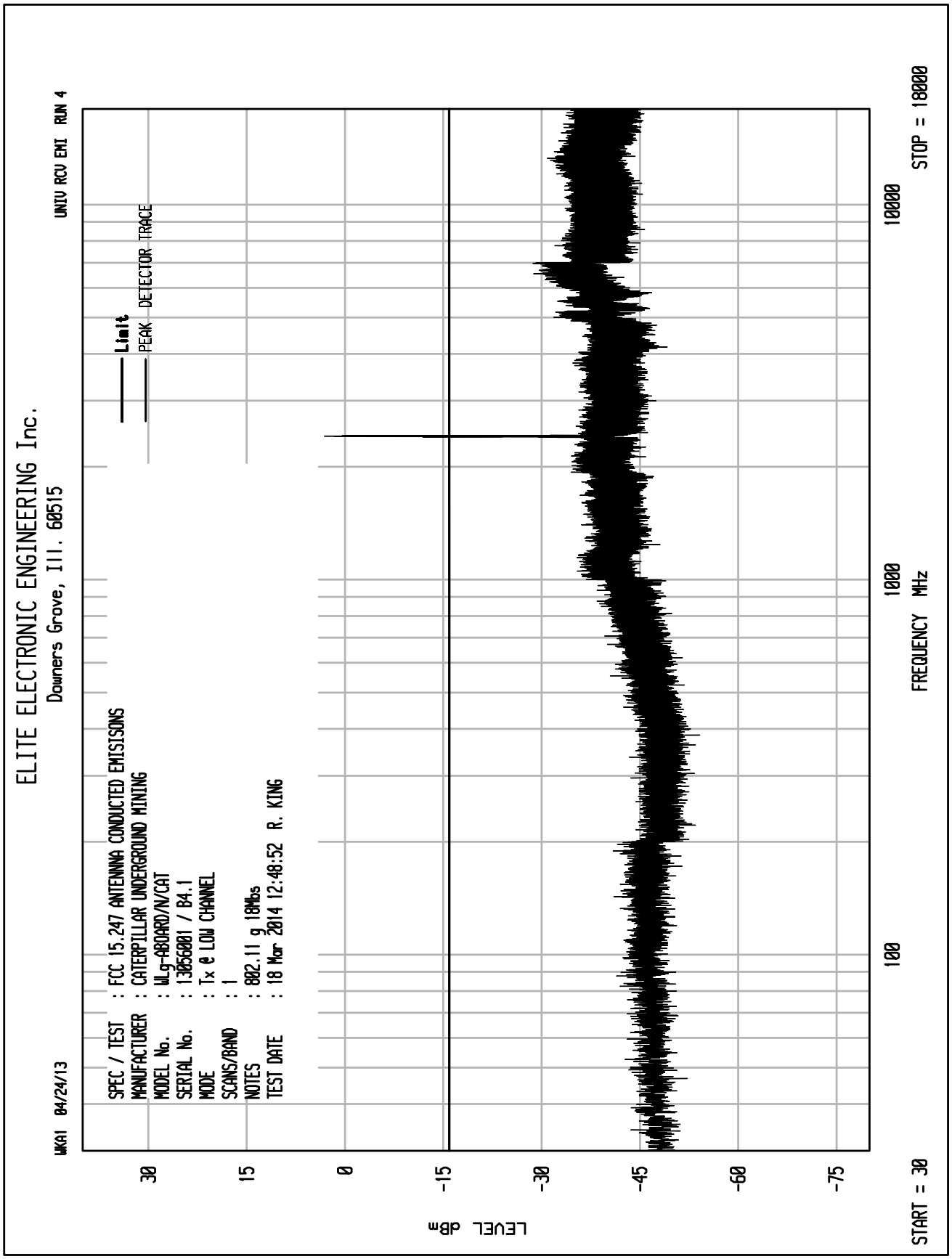

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 11
WKAI 04/24/13
SPEC / TEST : ANTENNA CONDUCTED EMISSIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : WLg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ HIGH CHANNEL 802.11 b
SCANS/BAND : 1
NOTES : SWBS
TEST DATE : 19 Mar 2014 10:40:46 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 18000
FREQUENCY MHz
STOP = 26000

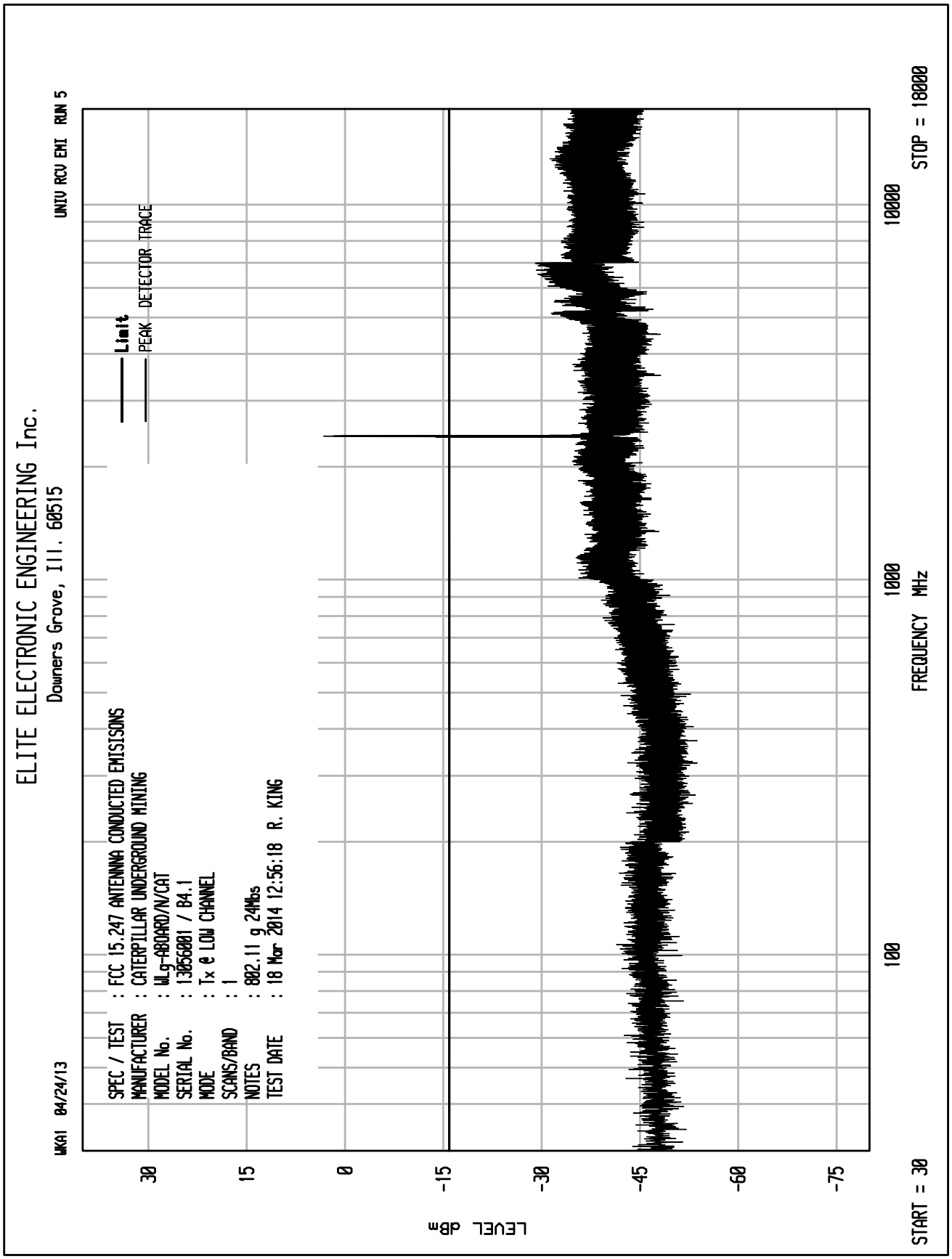

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 10
WKAI 04/24/13
SPEC / TEST : ANTENNA CONDUCTED EMISSIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : ULg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ HIGH CHANNEL 802.11 b
SCANS/BAND : 1
NOTES : 11MBS
TEST DATE : 19 Mar 2014 10:36:55 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 18000
FREQUENCY MHz
STOP = 26000

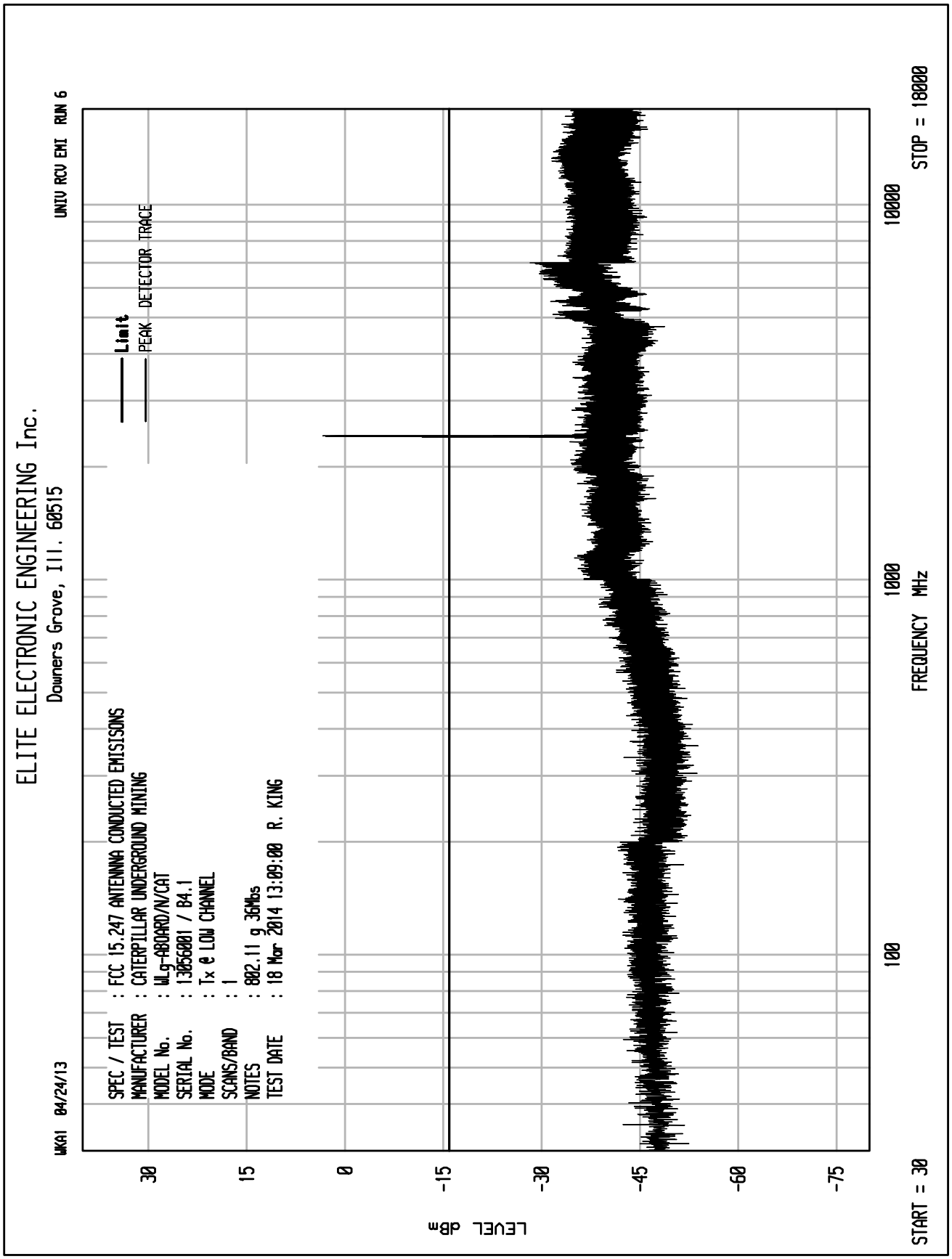

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 1
WKAI 04/24/13
SPEC / TEST : FCC 15.247 ANTENNNA CONDUCTED EMISIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : ULg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ LOW CHANNEL
SCANS/BAND : 1
NOTES : 802.11 g 6Mbs
TEST DATE : 18 Mar 2014 11:44:21 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 30
100
1000
10000
STOP = 18000
FREQUENCY MHz

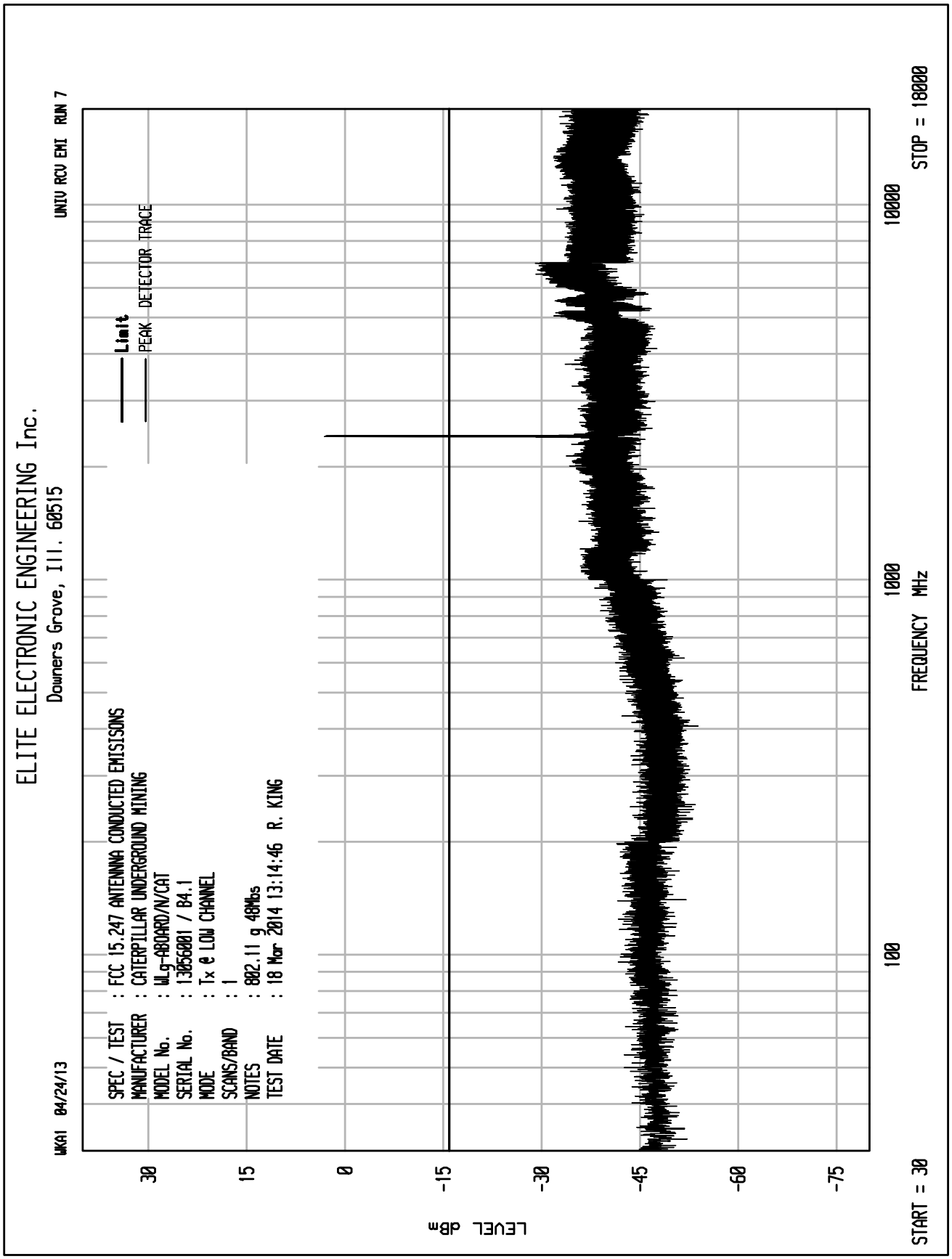

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 2
WKAI 04/24/13
SPEC / TEST : FCC 15.247 ANTENNNA CONDUCTED EMISISONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : WLg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ LOW CHANNEL
SCANS/BAND : 1
NOTES : 802.11 g 9Mbs
TEST DATE : 18 Mar 2014 11:54:48 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 30
100
1000
10000
STOP = 18000
FREQUENCY MHz

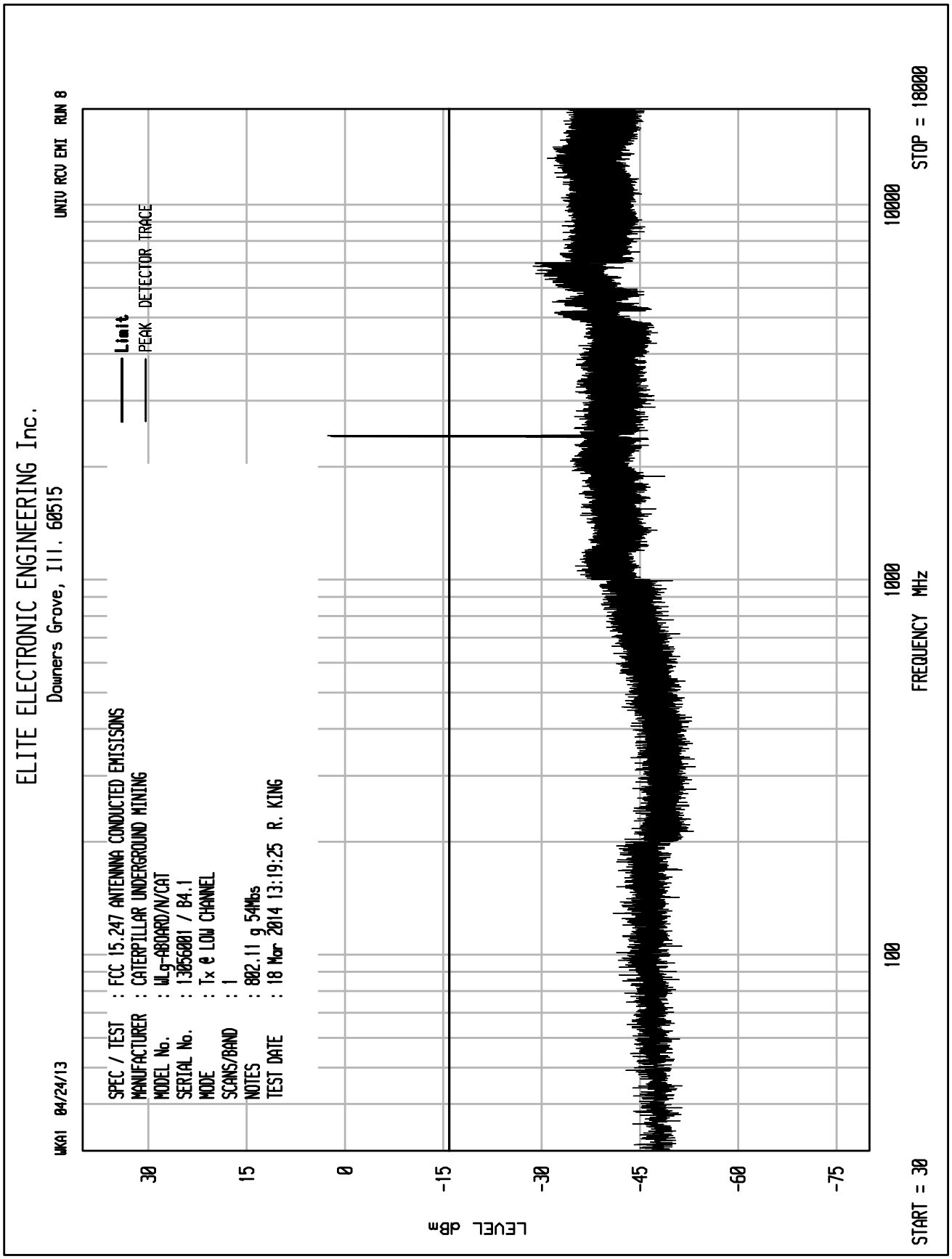

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 3
WKAI 04/24/13
SPEC / TEST : FCC 15.247 ANTENNNA CONDUCTED EMISIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : WLg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ LOW CHANNEL
SCANS/BAND : 1
NOTES : 802.11 g 12Mbs
TEST DATE : 18 Mar 2014 12:01:07 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 30
100
1000
10000
STOP = 18000
FREQUENCY MHz

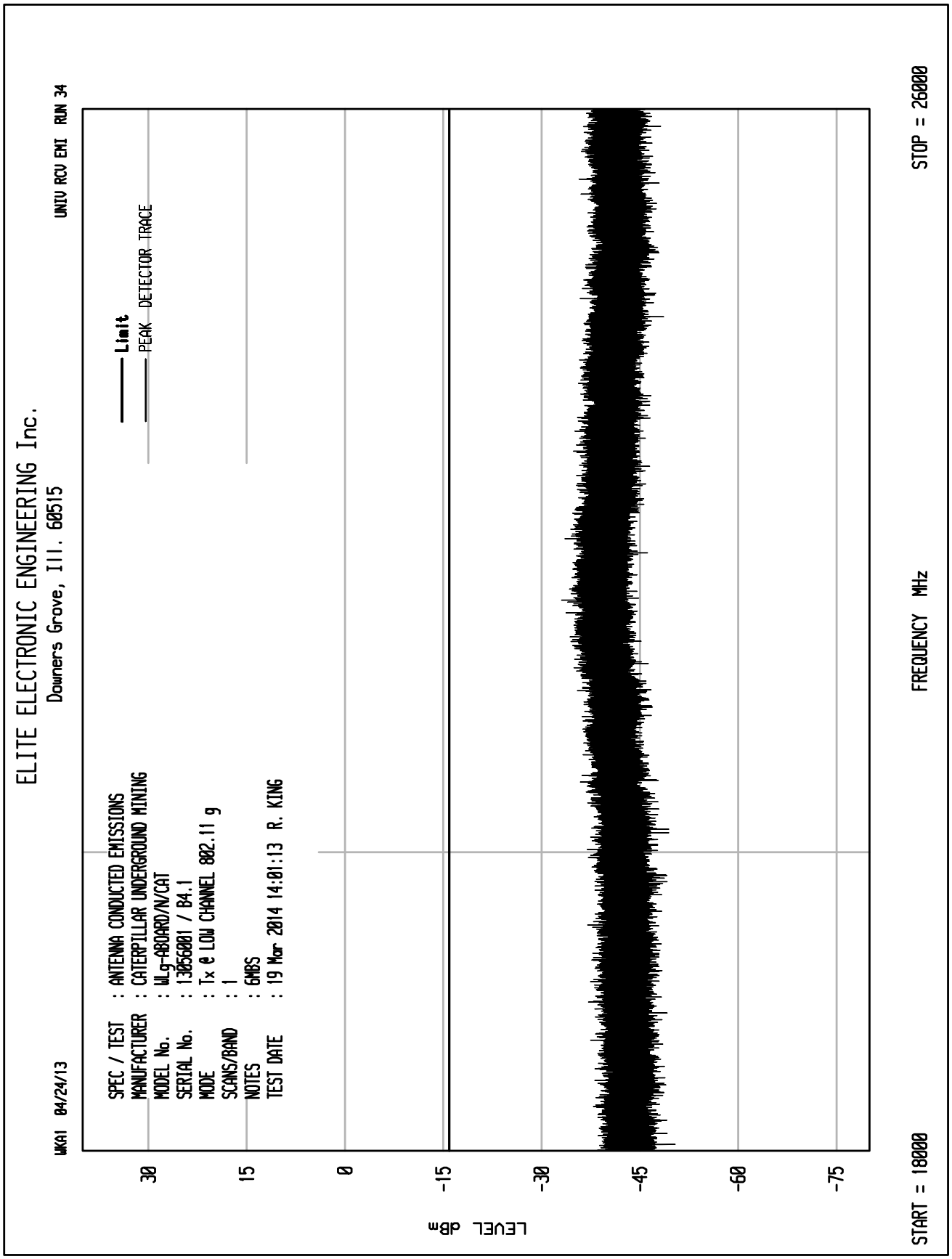

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 4
WKAI 04/24/13
SPEC / TEST : FCC 15.247 ANTENNNA CONDUCTED EMISIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : ULg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ LOW CHANNEL
SCANS/BAND : 1
NOTES : 802.11 g 18Mbs
TEST DATE : 18 Mar 2014 12:48:52 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 30
100
1000
10000
STOP = 18000
FREQUENCY MHz

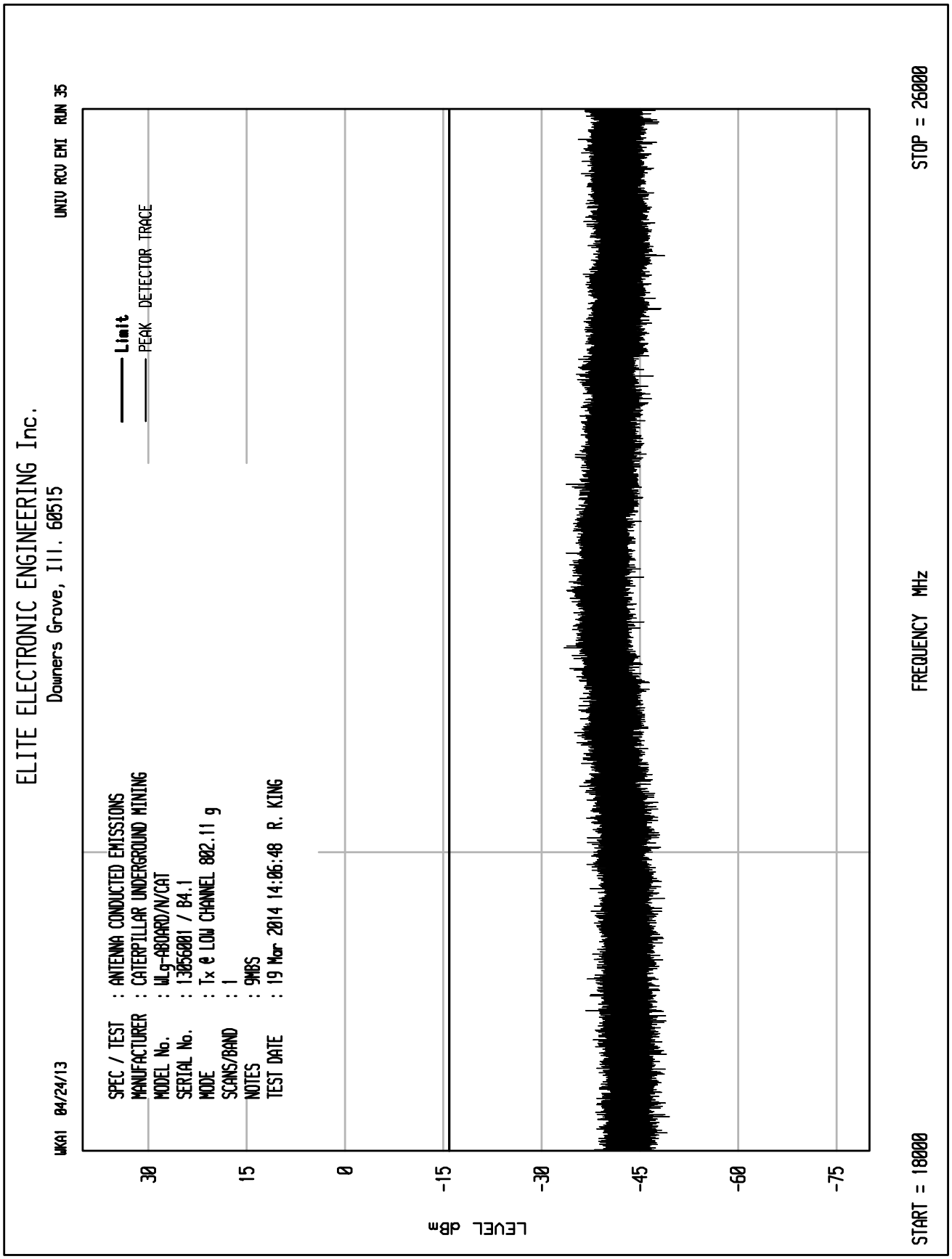

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 5
WKAI 04/24/13
SPEC / TEST : FCC 15.247 ANTENNNA CONDUCTED EMISIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : WLg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ LOW CHANNEL
SCANS/BAND : 1
NOTES : 802.11 g 24Mbs
TEST DATE : 18 Mar 2014 12:56:18 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 30
100
1000
10000
STOP = 18000
FREQUENCY MHz

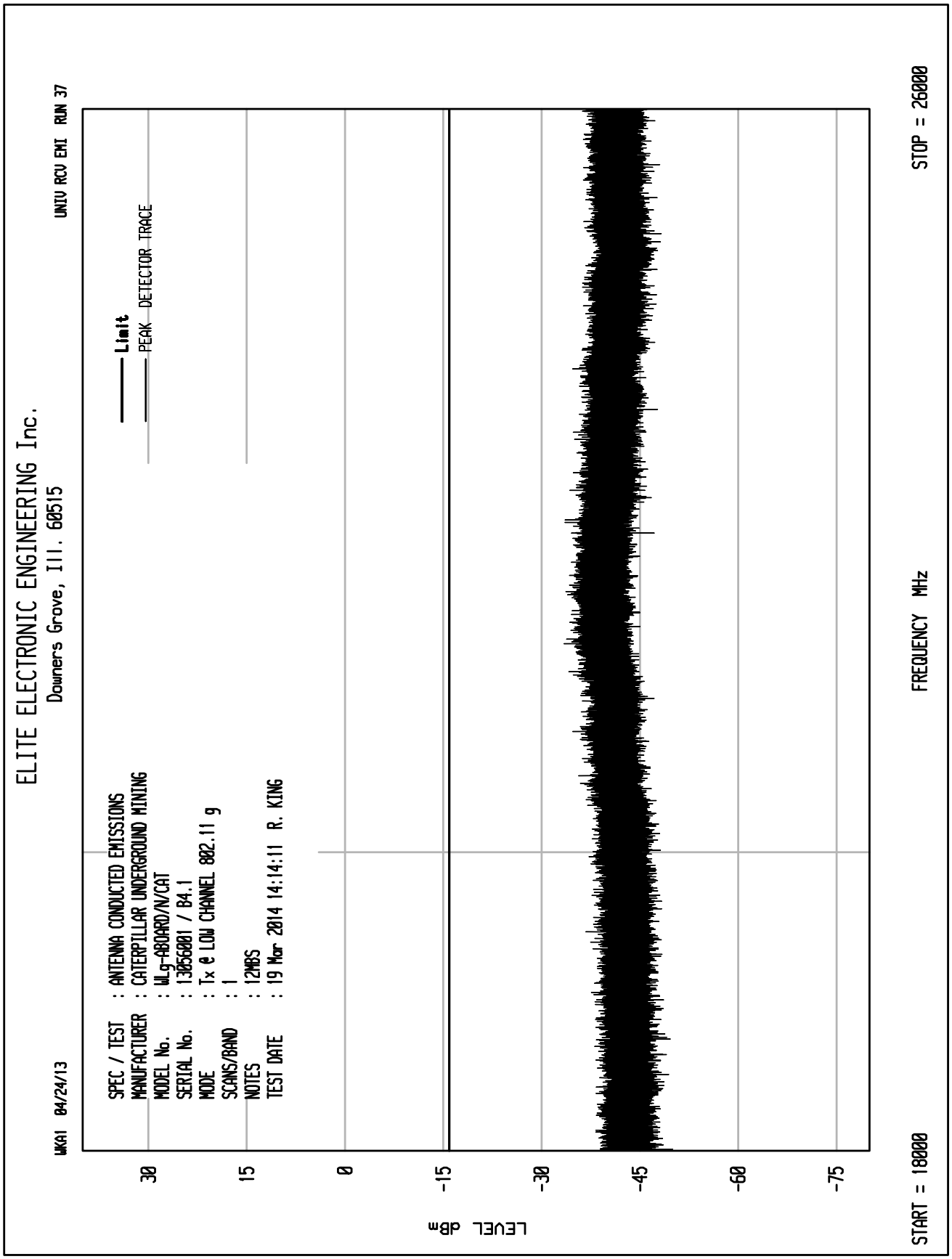

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 6
WKAI 04/24/13
SPEC / TEST : FCC 15.247 ANTENNNA CONDUCTED EMISIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : WLg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ LOW CHANNEL
SCANS/BAND : 1
NOTES : 802.11 g 36Mbs
TEST DATE : 18 Mar 2014 13:09:00 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 30
100
1000
10000
STOP = 18000
FREQUENCY MHz

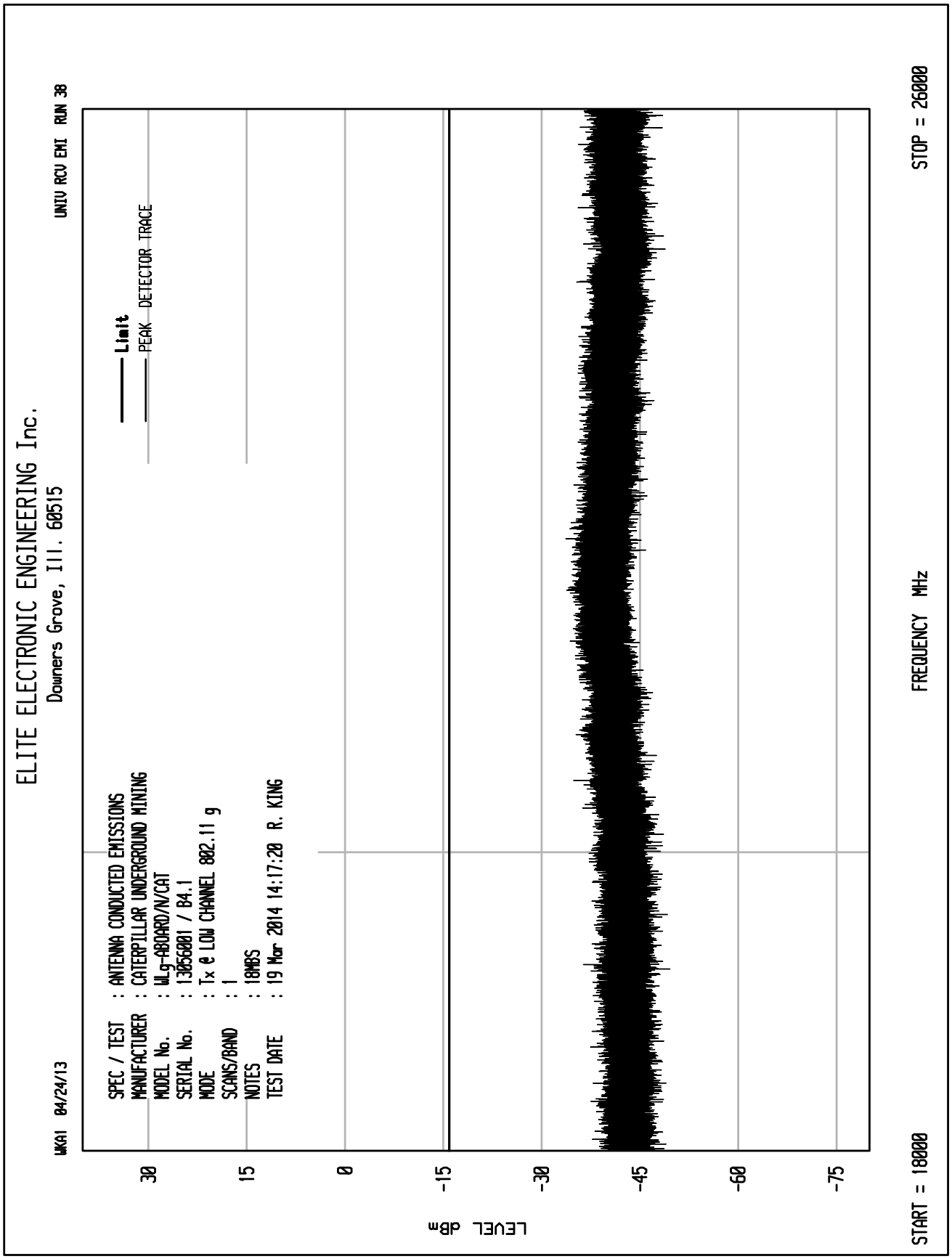

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 7
WKAI 04/24/13
SPEC / TEST : FCC 15.247 ANTENNNA CONDUCTED EMISIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : WLg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ LOW CHANNEL
SCANS/BAND : 1
NOTES : 802.11 g 48Mbs
TEST DATE : 18 Mar 2014 13:14:46 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 30
100
1000
10000
STOP = 18000
FREQUENCY MHz

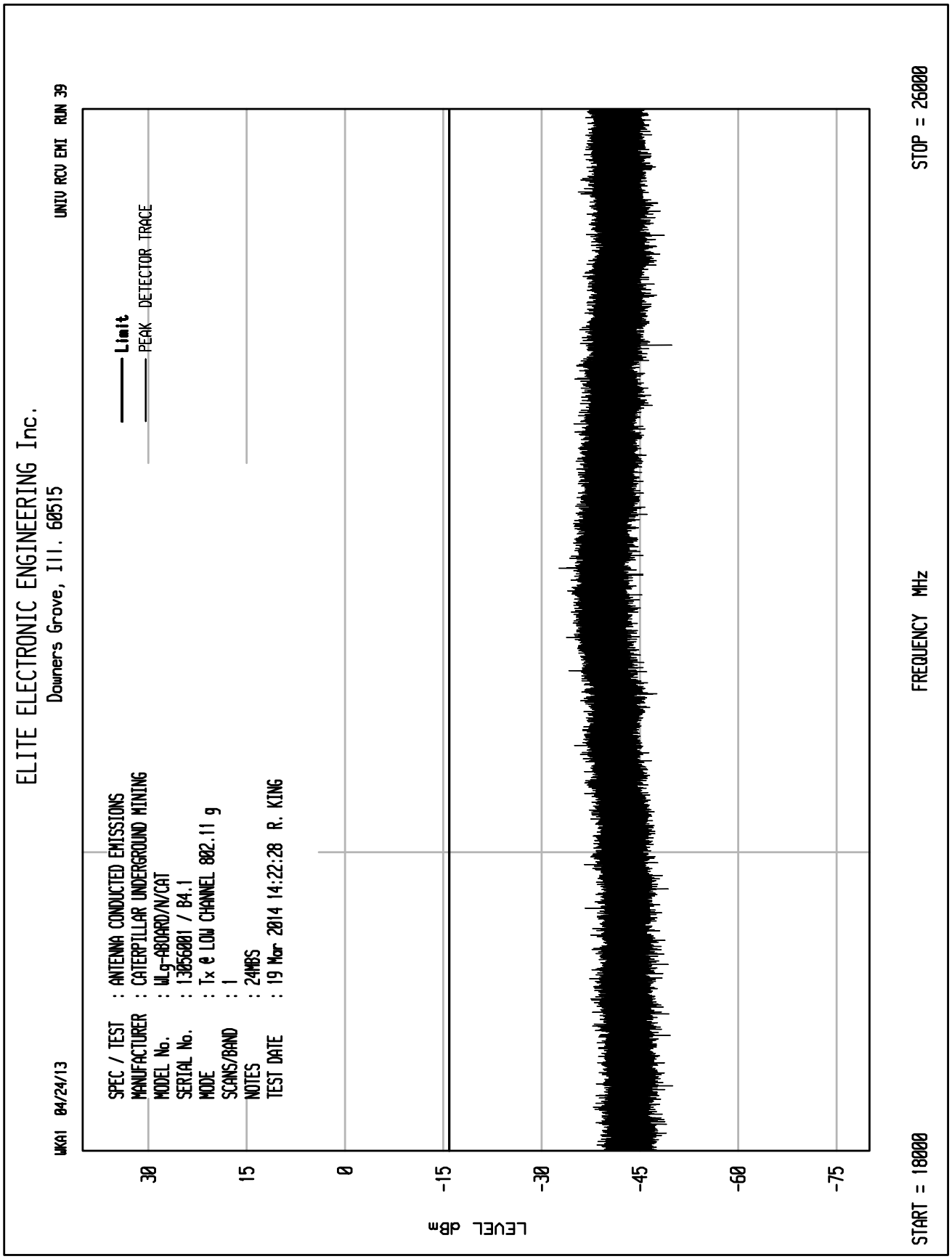

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 8
WKAI 04/24/13
SPEC / TEST : FCC 15.247 ANTENNNA CONDUCTED EMISIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : WLg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ LOW CHANNEL
SCANS/BAND : 1
NOTES : 802.11 g 54Mbs
TEST DATE : 18 Mar 2014 13:19:25 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 30
100
1000
10000
STOP = 18000
FREQUENCY MHz

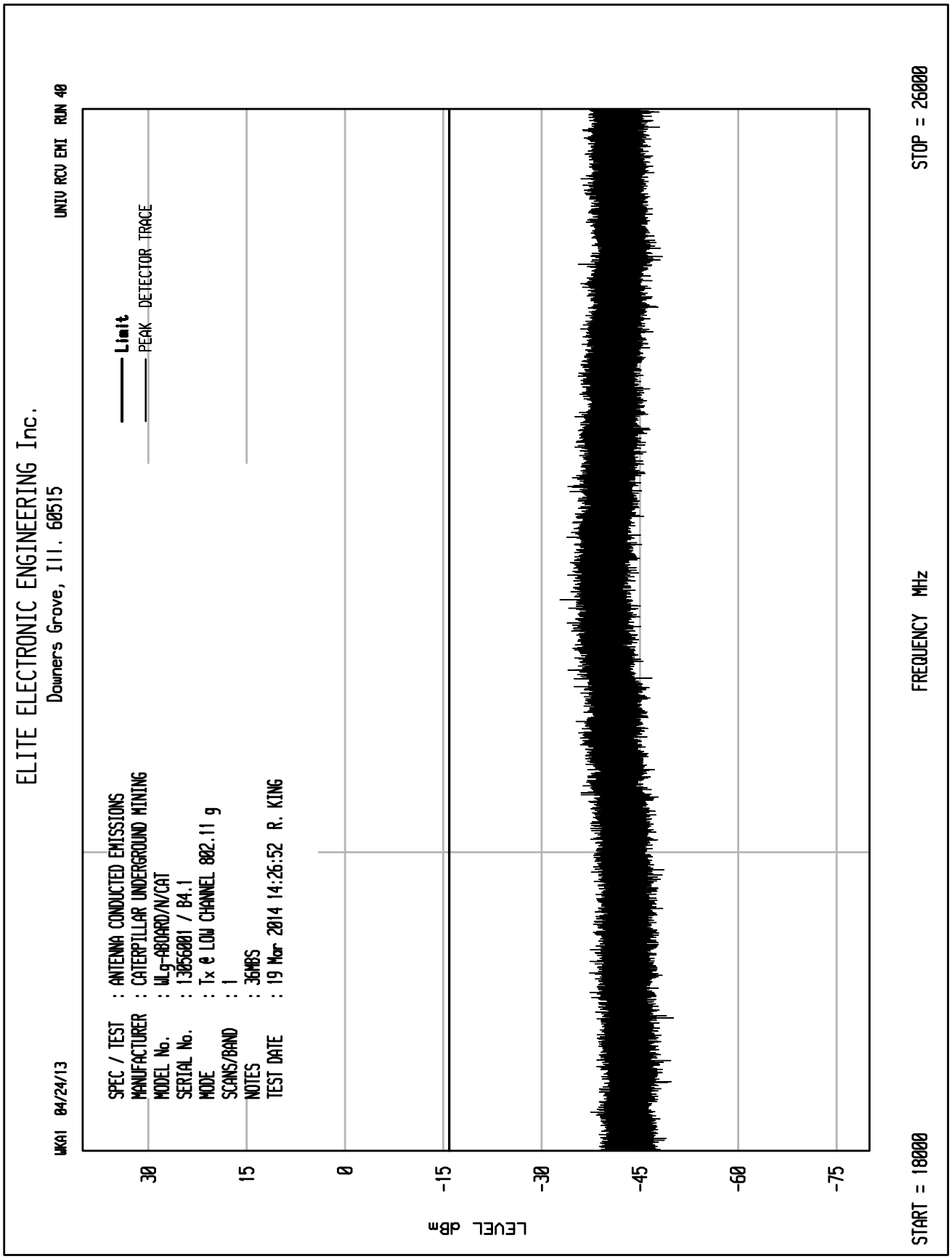

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 34
WKAI 04/24/13
SPEC / TEST : ANTENNA CONDUCTED EMISSIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : WLg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ LOW CHANNEL 802.11 g
SCANS/BAND : 1
NOTES : 6MBS
TEST DATE : 19 Mar 2014 14:01:13 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 18000
FREQUENCY MHz
STOP = 26000

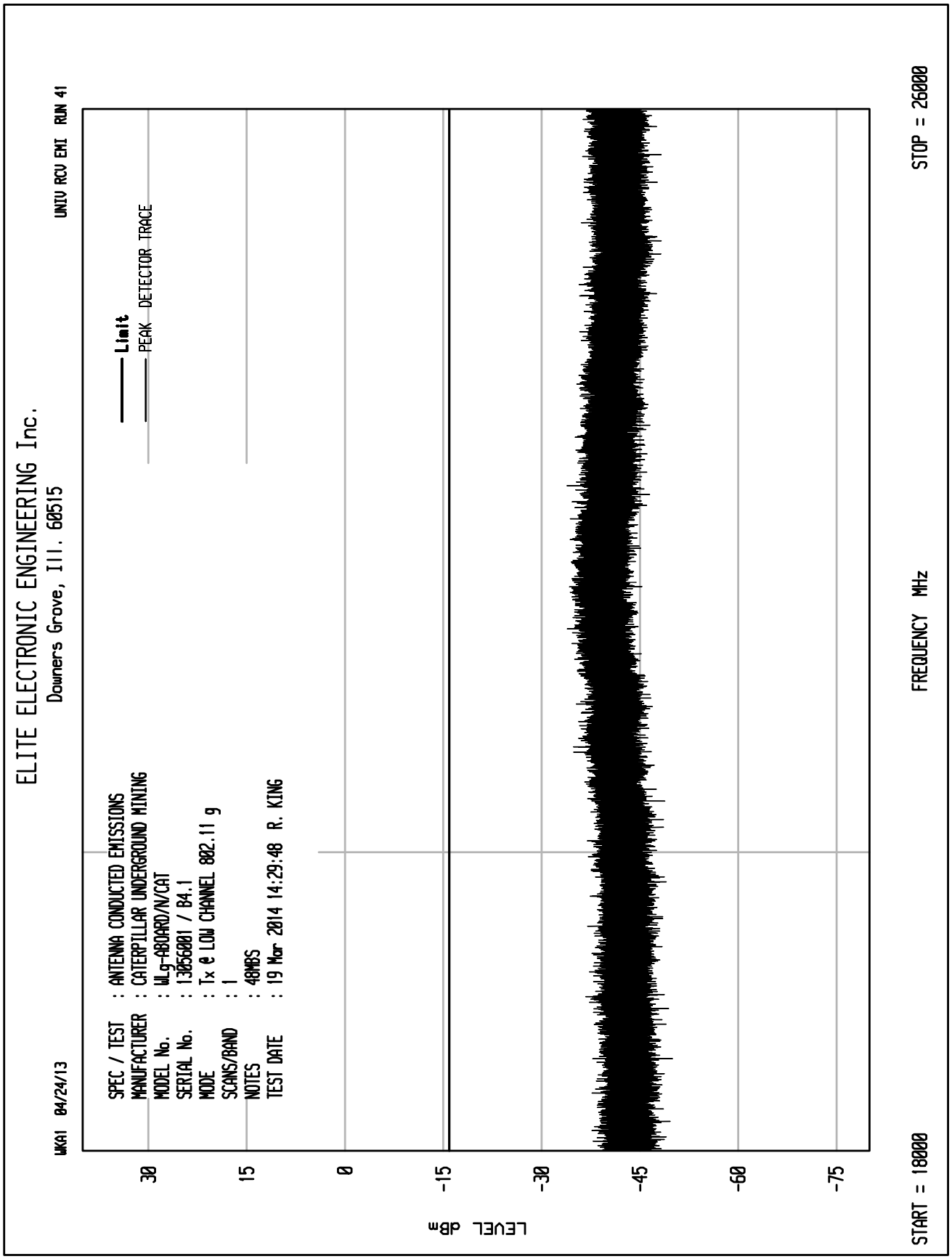

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 35
WKAI 04/24/13
SPEC / TEST : ANTENNA CONDUCTED EMISSIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : WLg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ LOW CHANNEL 802.11 g
SCANS/BAND : 1
NOTES : 9MBS
TEST DATE : 19 Mar 2014 14:06:48 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 18000
FREQUENCY MHz
STOP = 26000

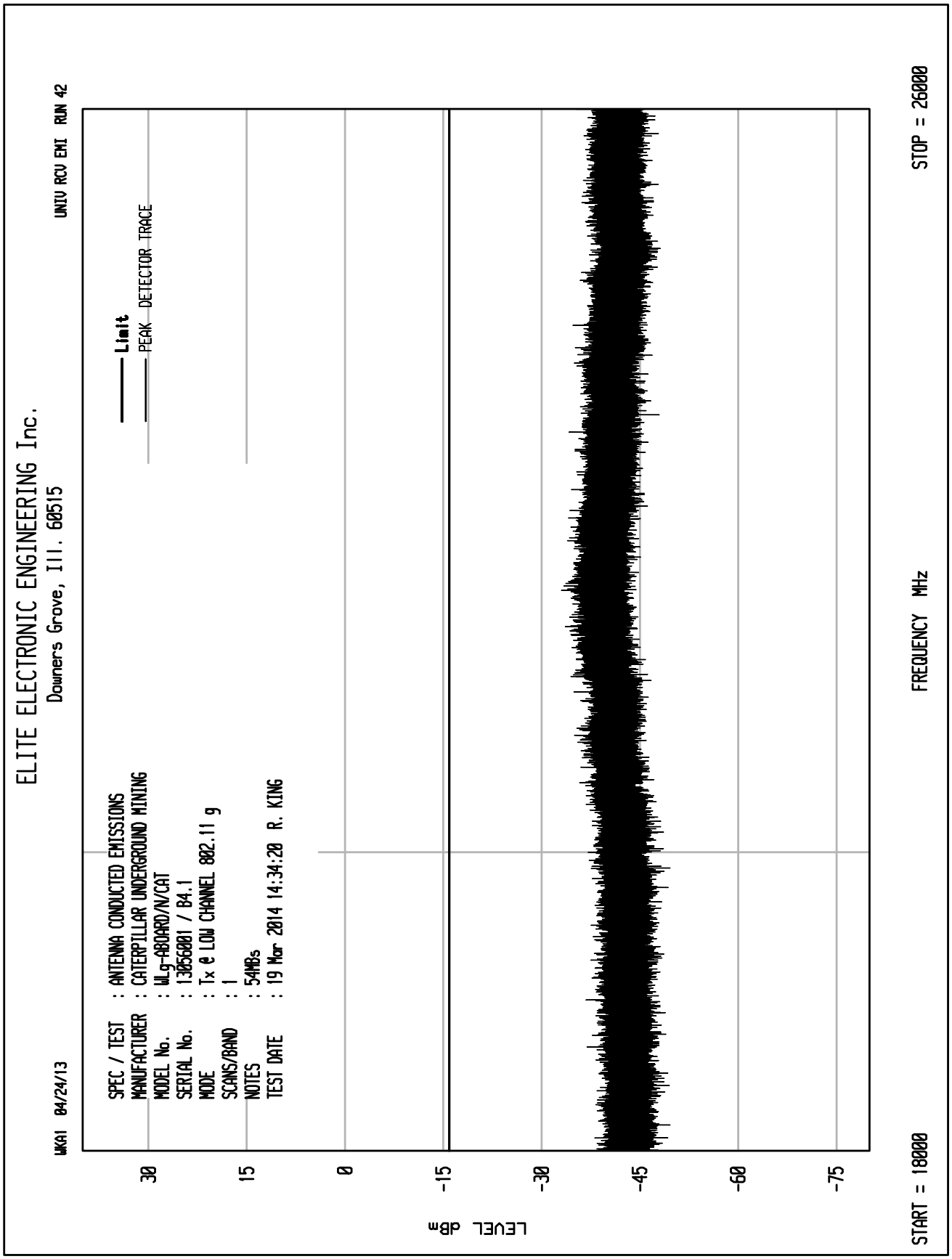

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 37
WKAI 04/24/13
SPEC / TEST : ANTENNA CONDUCTED EMISSIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : WLg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ LOW CHANNEL 802.11 g
SCANS/BAND : 1
NOTES : 12MBS
TEST DATE : 19 Mar 2014 14:14:11 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 18000
FREQUENCY MHz
STOP = 26000

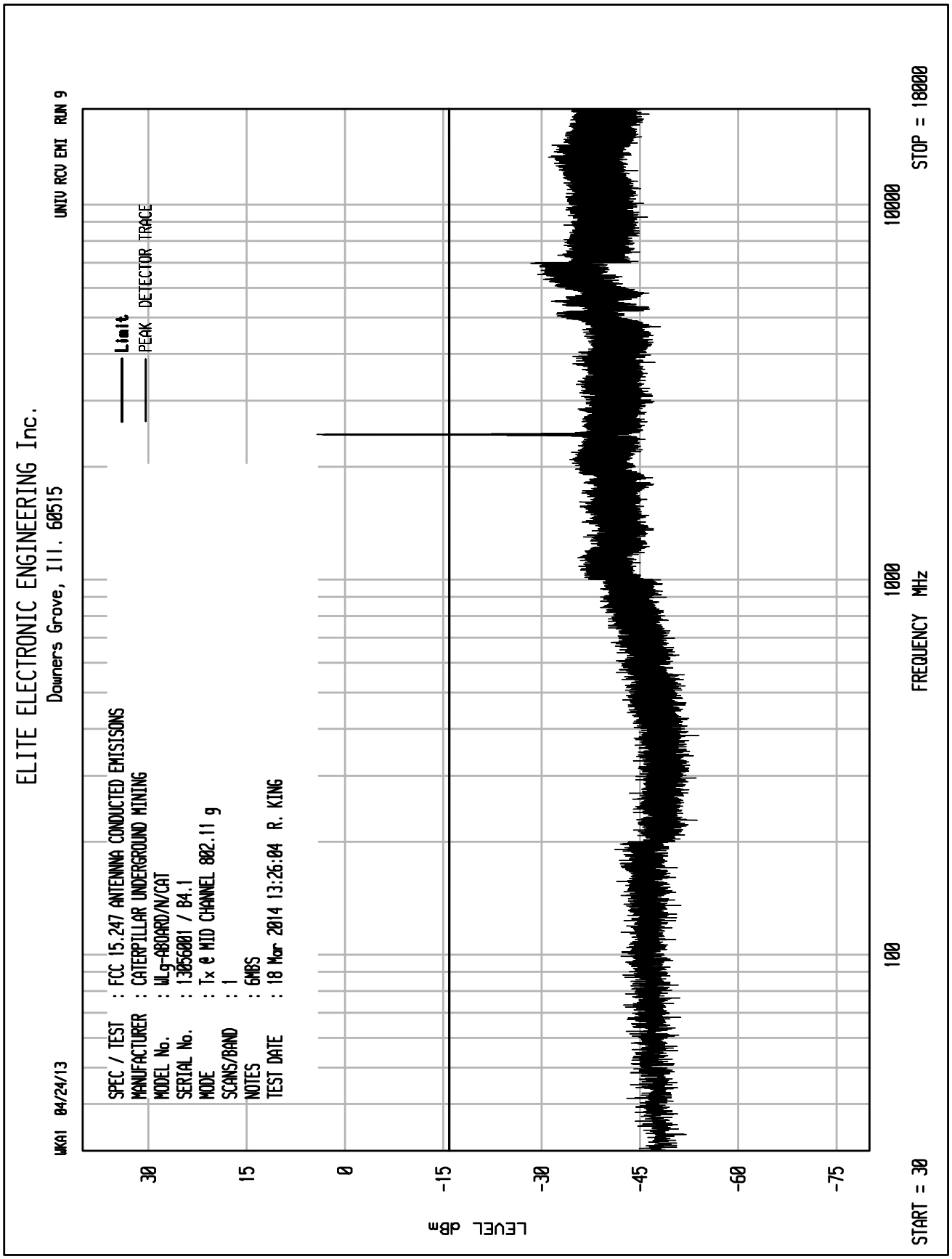

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 38
WKAI 04/24/13
SPEC / TEST : ANTENNA CONDUCTED EMISSIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : WLg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ LOW CHANNEL 802.11 g
SCANS/BAND : 1
NOTES : 18MBS
TEST DATE : 19 Mar 2014 14:17:20 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 18000
FREQUENCY MHz
STOP = 26000

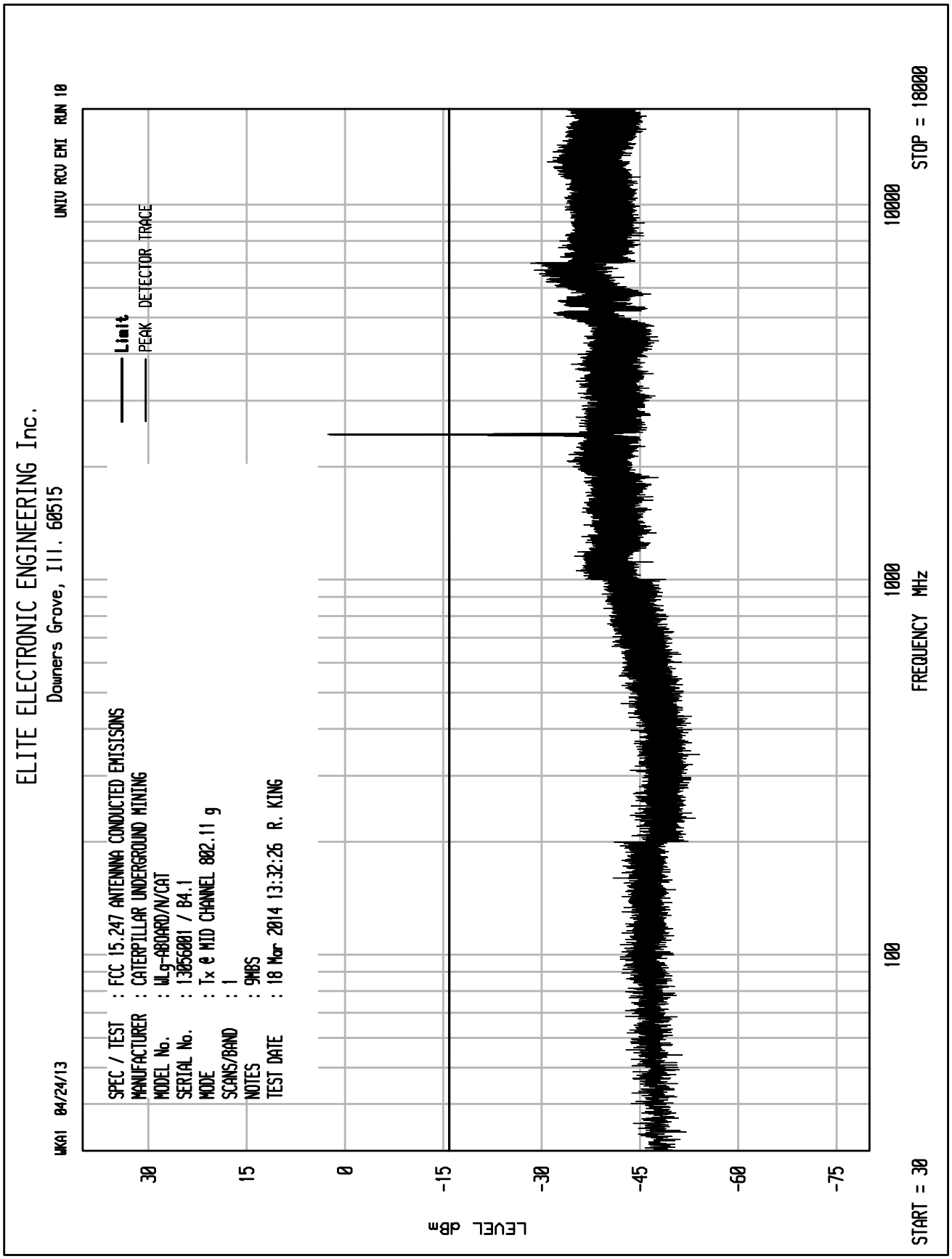

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 39
WKAI 04/24/13
SPEC / TEST : ANTENNA CONDUCTED EMISSIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : WLg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ LOW CHANNEL 802.11 g
SCANS/BAND : 1
NOTES : 24MBS
TEST DATE : 19 Mar 2014 14:22:28 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 18000
FREQUENCY MHz
STOP = 26000

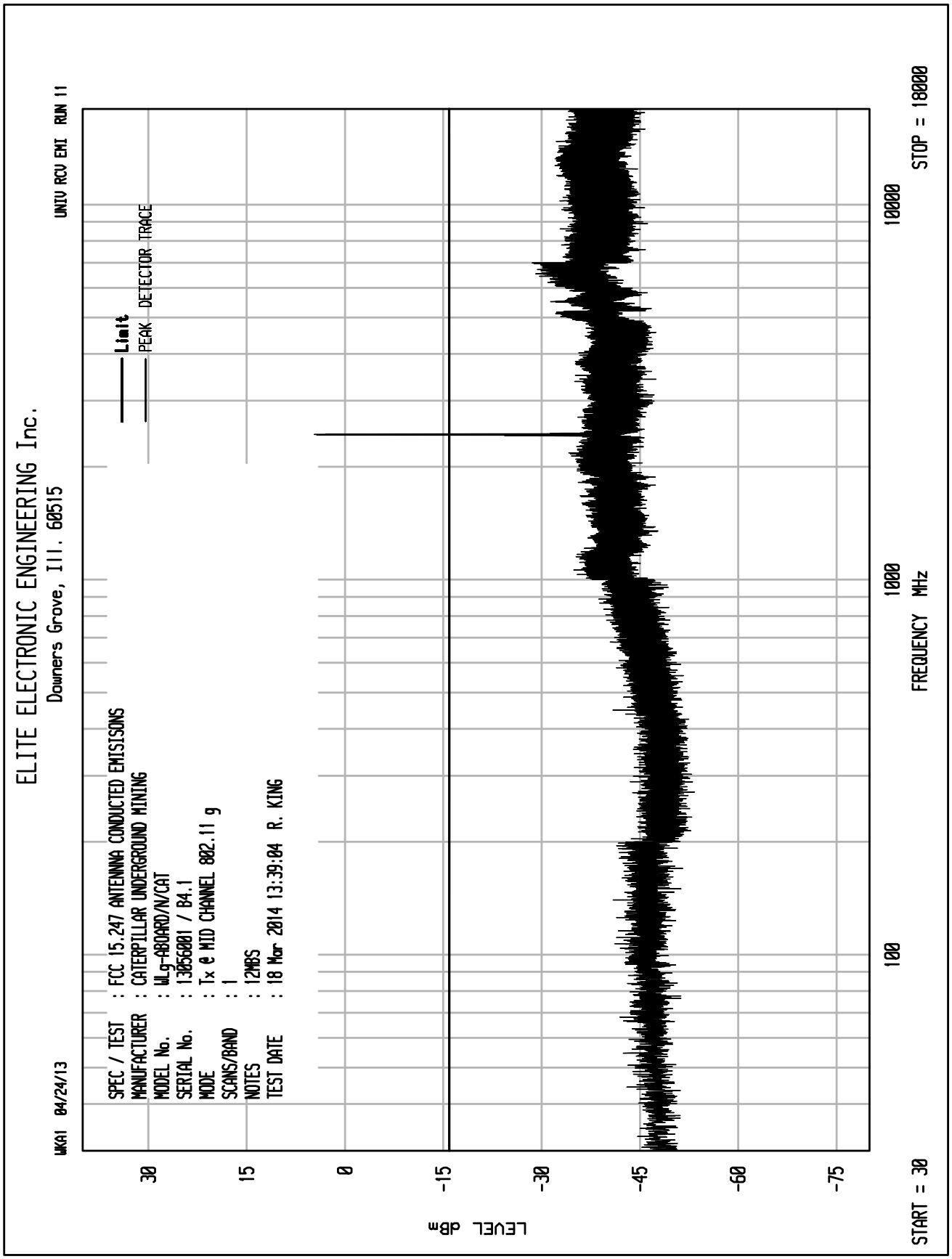

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 40
WKAI 04/24/13
SPEC / TEST : ANTENNA CONDUCTED EMISSIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : WLg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ LOW CHANNEL 802.11 g
SCANS/BAND : 1
NOTES : 36MBS
TEST DATE : 19 Mar 2014 14:26:52 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 18000
FREQUENCY MHz
STOP = 26000

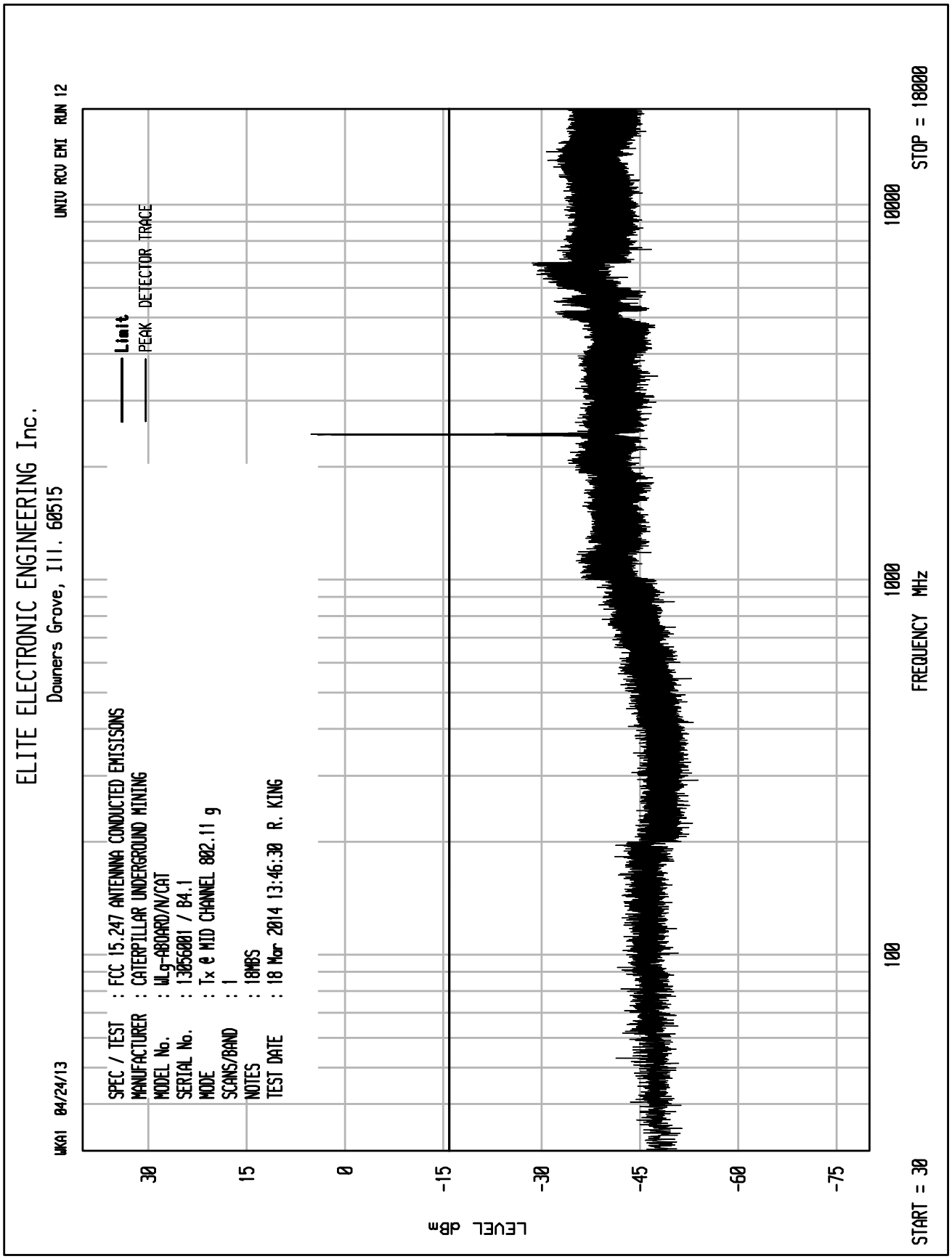

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 41
WKAI 04/24/13
SPEC / TEST : ANTENNA CONDUCTED EMISSIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : WLg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ LOW CHANNEL 802.11 g
SCANS/BAND : 1
NOTES : 40MBS
TEST DATE : 19 Mar 2014 14:29:48 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 18000
FREQUENCY MHz
STOP = 26000

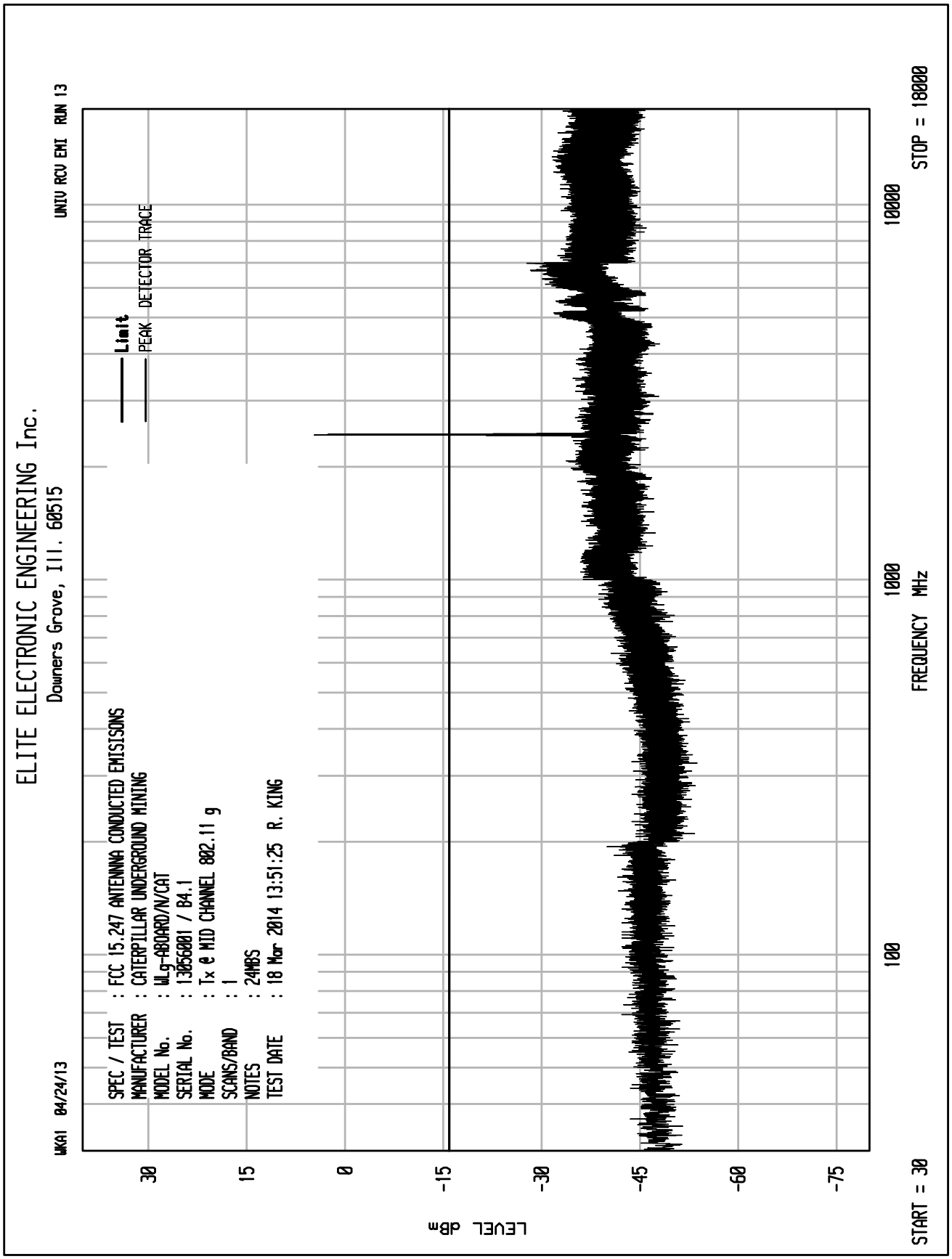

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 42
WKAI 04/24/13
SPEC / TEST : ANTENNA CONDUCTED EMISSIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : WLg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ LOW CHANNEL 802.11 g
SCANS/BAND : 1
NOTES : 54MBs
TEST DATE : 19 Mar 2014 14:34:20 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 18000
FREQUENCY MHz
STOP = 26000

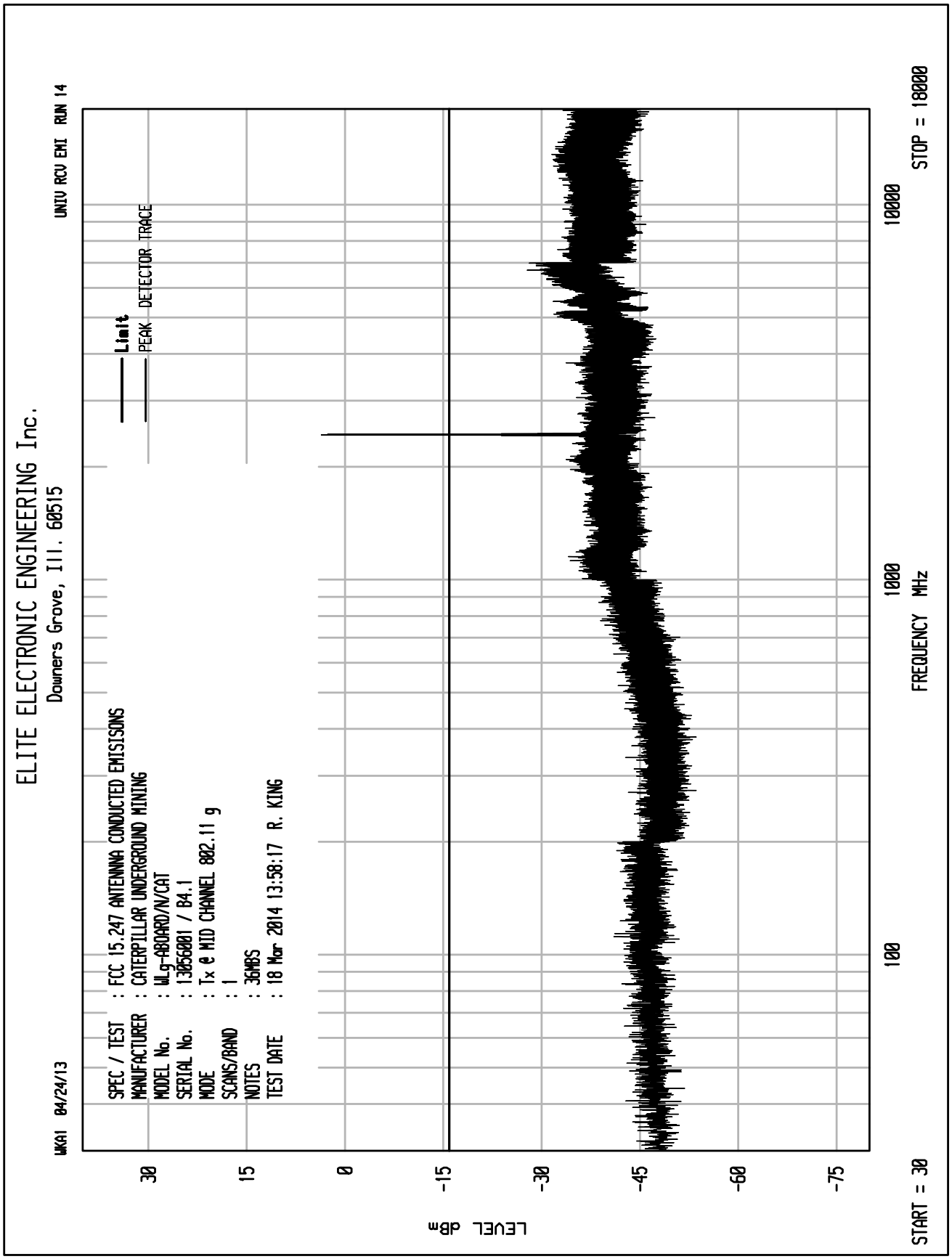

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 9
WKAI 04/24/13
SPEC / TEST : FCC 15.247 ANTENNNA CONDUCTED EMISIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : ULg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ MID CHANNEL 802.11 g
SCANS/BAND : 1
NOTES : 6MBS
TEST DATE : 18 Mar 2014 13:26:04 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 30
100
1000
10000
STOP = 18000
FREQUENCY MHz

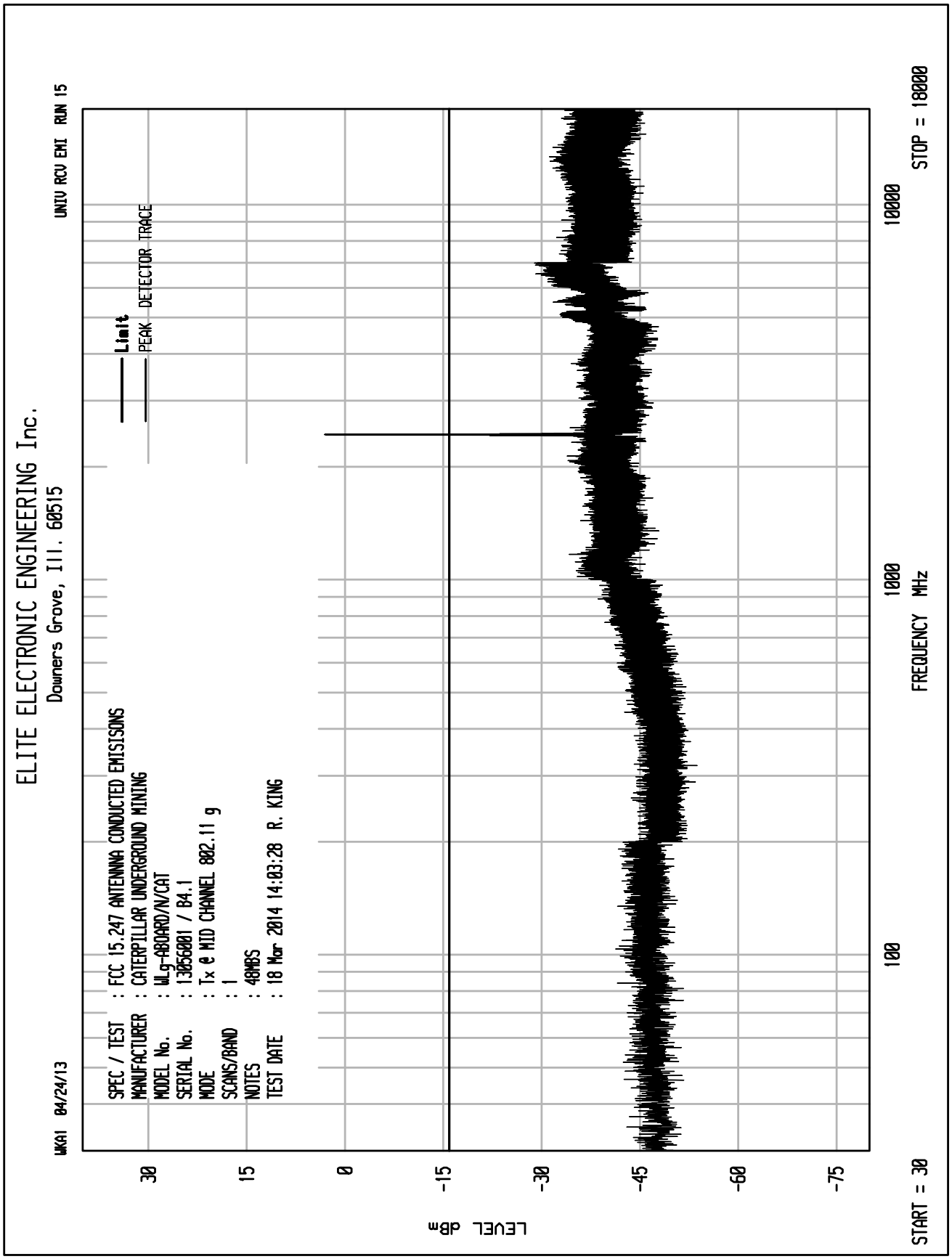

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 10
WKAI 04/24/13
SPEC / TEST : FCC 15.247 ANTENNNA CONDUCTED EMISIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : WLg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ MID CHANNEL 802.11 g
SCANS/BAND : 1
NOTES : 9MBS
TEST DATE : 18 Mar 2014 13:32:26 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 30
100
1000
10000
STOP = 18000
FREQUENCY MHz


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 11
WKAI 04/24/13
SPEC / TEST : FCC 15.247 ANTENNNA CONDUCTED EMISIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : WLg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ MID CHANNEL 802.11 g
SCANS/BAND : 1
NOTES : 12MBS
TEST DATE : 18 Mar 2014 13:39:04 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 30
100
1000
10000
STOP = 18000
FREQUENCY MHz


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 12
WKAI 04/24/13
SPEC / TEST : FCC 15.247 ANTENNNA CONDUCTED EMISIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : WLg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ MID CHANNEL 802.11 g
SCANS/BAND : 1
NOTES : 10HBS
TEST DATE : 18 Mar 2014 13:46:30 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 30
100
1000
10000
STOP = 18000
FREQUENCY MHz


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 13
WKAI 04/24/13
SPEC / TEST : FCC 15.247 ANTENNNA CONDUCTED EMISIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : ULg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ MID CHANNEL 802.11 g
SCANS/BAND : 1
NOTES : 24MBS
TEST DATE : 18 Mar 2014 13:51:25 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 30
100
1000
10000
STOP = 18000
FREQUENCY MHz


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 14
WKAI 04/24/13
SPEC / TEST : FCC 15.247 ANTENNNA CONDUCTED EMISIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : ULg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ MID CHANNEL 802.11 g
SCANS/BAND : 1
NOTES : 36MBS
TEST DATE : 18 Mar 2014 13:58:17 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 30
100
1000
10000
STOP = 18000
FREQUENCY MHz


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
UNIV RCV EMI RUN 15
WKAI 04/24/13
SPEC / TEST : FCC 15.247 ANTENNNA CONDUCTED EMISIONS
MANUFACTURER : CATERPILLAR UNDERGROUND MINING
MODEL No. : ULg-ABOARD/N/CAT
SERIAL No. : 13056001 / B4.1
MODE : Tx @ MID CHANNEL 802.11 g
SCANS/BAND : 1
NOTES : 40MBS
TEST DATE : 18 Mar 2014 14:03:28 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
START = 30
100
1000
10000
STOP = 18000
FREQUENCY MHz