# Measurement of RF Interference from a Part No. WB4343WF3SP-1 WIFI/BLT Module Transmitter

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|---|---|
| For | California Eastern Laboratories<br>1253 N. Old Rand Road<br>Wauconda, IL 60084 |
| P.O. Number | 204338 |
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| Test Personnel | Richard King |
| Specification | FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Sections 15.207 and 15.247 for Frequency Hopping Spread Spectrum Intentional Radiators within the band 2400-2483.5MHz<br>Industry Canada RSS-247<br>Industry Canada RSS-GEN |

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TABLE OF CONTENTS


| PARAGRAPH | DESCRIPTION OF CONTENTS | PAGE NO. |
|---|---|---|
| **1.** | INTRODUCTION | 5 |
| 1.1 | Scope of Tests | 5 |
| 1.2 | Purpose | 5 |
| 1.3 | Deviations, Additions and Exclusions | 5 |
| 1.4 | EMC Laboratory Identification | 5 |
| 1.5 | Laboratory Conditions | 5 |
| **2.** | **APPLICABLE DOCUMENTS** | 5 |
| **3.** | **EUT SETUP AND OPERATION** | 6 |
| 3.1 | General Description | 6 |
| 3.1.1 | Power Input | 6 |
| 3.1.2 | Peripheral Equipment | 6 |
| 3.1.3 | Interconnect Cables | 6 |
| 3.1.4 | Grounding | 6 |
| 3.2 | Software | 6 |
| 3.3 | Operational Mode | 6 |
| 3.4 | EUT Modifications | 6 |
| **4.** | **TEST FACILITY AND TEST INSTRUMENTATION** | 6 |
| 4.1 | Shielded Enclosure | 6 |
| 4.2 | Test Instrumentation | 6 |
| 4.3 | Calibration Traceability | 7 |
| 4.4 | Measurement Uncertainty | 7 |
| 4.5 | Transmitter | 7 |
| 4.5.1 | 20dB Bandwidth | 7 |
| 4.5.1.1 | Requirements | 7 |
| 4.5.1.2 | Procedures | 7 |
| 4.5.1.3 | Results | 7 |
| 4.5.2 | Carrier Frequency Separation | 8 |
| 4.5.2.1 | Requirements | 8 |
| 4.5.2.2 | Procedures | 8 |
| 4.5.2.3 | Results | 8 |
| 4.5.3 | Number of Hopping Frequencies | 8 |
| 4.5.3.1 | Requirements | 8 |
| 4.5.3.2 | Procedures | 8 |
| 4.5.3.3 | Results | 8 |
| 4.5.4 | Time of Occupancy | 8 |
| 4.5.4.1 | Requirements | 8 |
| 4.5.4.2 | Procedures | 9 |
| 4.5.4.3 | Results | 9 |
| 4.5.5 | Peak Output Power | 9 |
| 4.5.5.1 | Requirements | 9 |
| 4.5.5.2 | Procedures | 9 |
| 4.5.5.3 | Results | 9 |
| 4.5.6 | Duty Cycle Factor Measurements | 9 |
| 4.5.6.1 | Procedures | 9 |
| 4.5.6.2 | Results | 10 |
| 4.5.7 | Antenna Conducted Spurious Emissions | 10 |
| 4.5.7.1 | Requirements | 10 |
| 4.5.7.2 | Procedures | 10 |


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4.5.7.3 Results ..... 10
4.5.8 Radiated Spurious Emissions Measurements ..... 10
4.5.8.1 Requirements ..... 10
4.5.8.2 Procedures ..... 10
4.5.8.3 Results ..... 11
4.5.9 Band Edge Compliance ..... 12
4.5.9.1 Requirements ..... 12
4.5.9.2 Procedures ..... 12
4.5.9.2.1 Low Band Edge ..... 12
4.5.9.2.2 High Band Edge ..... 12
4.5.9.3 Results ..... 13
**5. CONCLUSIONS** ..... 13
**6. CERTIFICATION** ..... 13
**7. ENDORSEMENT DISCLAIMER** ..... 13
**8. EQUIPMENT LIST** ..... 14
**Table 8-1 Equipment List** ..... 14

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## REVISION HISTORY

| Revision | Date | Description |
|---|---|---|
| — | 07/07/2016 | Initial release |
| | | |

**Measurement of RF Emissions from a Part No. WB4343WF3SP-1 Transmitter**

# 1. INTRODUCTION

## 1.1 Scope of Tests

This document represents the results of the series of radio interference measurements performed on a California Eastern Laboratories WIFI/BLT Module, Part No. WB4343WF3SP-1, no serial numbers assigned, transmitter (hereinafter referred to as the EUT). The EUT is a frequency hopping spread spectrum transmitter. The transmitter was designed to transmit and receive in 2400-2483.5 MHz band using an integral antenna. The EUT was manufactured and submitted for testing by California Eastern Laboratories located in Wauconda, IL.

## 1.2 Purpose

The test series was performed to determine if the EUT meets the conducted RF emission requirements, radiated RF emissions requirements, and additional provisions of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Sections 15.207 and 15.249 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 RF emission requirements, radiated RF emissions requirements of Industry Canada Radio Standards Specification RSS-Gen Section 8.8 and Industry Canada Radio Standards Specification RSS-247 for Transmitters.

Testing was performed in accordance with ANSI C63.4-2014 and ANSI C63.10-2013.

## 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 American Association for Laboratory Accreditation (A2LA), A2LA Lab Code: 1786-01.

## 1.5 Laboratory Conditions

The temperature at the time of the test was 25.5C and the relative humidity was 49%.

# 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 C, dated 1 October 2015
- ANSI C63.4-2014, "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”
- ANSI C63.10-2013, "American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices”
- FCC Public Notice, DA 00-705, "Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems", Released March 30, 2000
- Industry Canada RSS-247, Issue 1, May 2015, “Spectrum Management and Telecommunications Radio Standards Specification, Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs), and License-Exempt Local Area Network (LE-LAN) Devices”
- Industry Canada RSS-GEN, Issue 4, November 2014, “Spectrum Management and

Telecommunications Radio Standards Specification, General Requirements for Compliance of Radio Apparatus"

# 3. EUT SETUP AND OPERATION

## 3.1 General Description

The EUT is a WIFI/BLT Module, Part No. WB4343WF3SP-1. A block diagram of the EUT setup is shown as Figure 1 and Figure 2.

### 3.1.1 Power Input

The EUT obtained 3.6VDC power to the SMA power connector on the board. The EUT had no external power cable. The 3.6VDC was supplied to the board through two 6-foot long leads.

### 3.1.2 Peripheral Equipment

No peripheral equipment was submitted with the EUT.

### 3.1.3 Interconnect Cables

No interconnect cables were submitted with the EUT.

### 3.1.4 Grounding

Since the EUT was powered with 3.6VDC, it was ungrounded during the tests.

## 3.2 Software

For all tests the EUT had Firmware Version BCM4343A1_001_002_009_0018_0028_Generic_UART_37_4MHz_wlbga_ref_hcd loaded onto the device to provide correct load characteristics.

## 3.3 Operational Mode

For all tests the EUT was placed on an 80cm high non-conductive stand when investigating frequencies between 30MHz and 1GHz. For all tests the EUT was placed on a 150cm high non-conductive stand when investigating frequencies above 1GHz.The EUT as energized.

The unit was programmed to operate in one of the following modes:

- Transmit at 2402MHz
- Transmit at 2440MHHz
- Transmit at 2480MHHz
- Frequency Hopping

## 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 C63.4-2014 for site attenuation.

## 4.2 Test Instrumentation

The test instrumentation and auxiliary equipment used during the tests are listed in Table 8-1.

Conducted and radiated emission tests were performed with an EMI receiver utilizes the bandwidths and detectors specified by the FCC and IC.

## 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 |

## 4.5 Transmitter

### 4.5.1 20dB Bandwidth

#### 4.5.1.1 Requirements

Per section 15.247(a)(1), Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5MHz band may have hopping channel carrier frequencies that are separated by 25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater, provided the systems operate within an output power no greater than 125mW.

#### 4.5.1.2 Procedures

The antenna port of the EUT was connected to the spectrum analyzer through 40dB of attenuation.

With the hopping function disabled, the EUT was allowed to transmit continuously. The frequency hopping channel was set separately to low, middle, and high hopping channels. The resolution bandwidth (RBW) was set to ≥ 1% of the 20 dB BW. The span was set to approximately 2 to 3 times the 20 dB bandwidth.

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.

#### 4.5.1.3 Results

The plots on pages 20 through 22 show that the maximum 20 dB bandwidth was 1.12MHz. The 99% bandwidth was measured to be 985.77kHz.

### 4.5.2 Carrier Frequency Separation

#### 4.5.2.1 Requirements

Per section 15.247 (a)(1), frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater.

Per section 15.247(a)(1), alternatively, frequency hopping systems operating in the 2400-2483.5MHz band may have hopping channel carrier frequencies that are separated by 25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater, provided the systems operate within an output power no greater than 125mW (21dBm).

#### 4.5.2.2 Procedures

The antenna port of the EUT was connected to the spectrum analyzer through 40dB of attenuation. With the hopping function enabled, the EUT was allowed to transmit continuously.

The resolution bandwidth (RBW) was set to > to 1% of the span. The peak detector and 'Max-Hold' function were engaged. The span was set wide enough to capture the peaks of at least two adjacent channels.
When the trace had stabilized after multiple scans, the marker-delta function was used to determine the separation between the peaks of the adjacent channels. The analyzer's display was plotted using a 'screen dump' utility.

#### 4.5.2.3 Results

Page 23 shows the carrier frequency separation. As can be seen from this plot, the carrier frequency separation is 985.6kHz which is greater than the 2/3 of the 20dB bandwidth of the hopping channel (747.8kHz).

### 4.5.3 Number of Hopping Frequencies

#### 4.5.3.1 Requirements

Per 15.247(b)(1), frequency hopping systems operating in the 2400- 2483.5MHz band that employ at least 75 non-overlapping hopping channels must have a maximum peak conducted output power that does not exceed 1W (30dBm).

#### 4.5.3.2 Procedures

The antenna port of the EUT was connected to the spectrum analyzer through 40dB of attenuation. With the hopping function enabled, the EUT was allowed to transmit continuously.

The resolution bandwidth (RBW) was set to ≥ to 1% of the span. The peak detector and 'Max-Hold' function were engaged. The span was set wide enough to capture the entire frequency band of operation.

The EUT’s signal was allowed to stabilize after multiple scans. The number of hopping frequencies was counted. The analyzer's display was plotted using a 'screen dump' utility.

#### 4.5.3.3 Results

Page 24 shows the number of hopping frequencies. As can be seen from this plot, the number of hopping frequencies is 79 which is equal to (or greater than) 75 which is the minimum number of required hopping frequencies for systems operating in the 2400-2483.5MHz band that have a maximum peak conducted output power that does not exceed 1W (30dBm).

### 4.5.4 Time of Occupancy

#### 4.5.4.1 Requirements

Per section 15.247(a)(1)(iii), for frequency hopping systems operating in the 2400-2483.5MHz band, the average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

#### 4.5.4.2 Procedures

The antenna port of the EUT was connected to the spectrum analyzer through 40dB of attenuation. With the hopping function enabled, the EUT was allowed to transmit continuously.

The resolution bandwidth (RBW) was set to 1 MHz. The peak detector and 'Max-Hold' function were engaged. With the span set to 0Hz, the sweep time was adjusted to capture a single event in order to measure the dwell time per hop. The analyzer's display was plotted using a 'screen dump' utility. Then, the sweep time was expanded to 0.4 seconds multiplied by the number of hopping channels employed. In this case the 0.4 seconds multiplied by 79 hopping channels equaled a sweep time expanded to 31.6 seconds.

#### 4.5.4.3 Results

Pages 25 and 26 show the plots for the time of occupancy (dwell time). As can be seen from the plots, the time of occupancy can be determined by 2.88mS multiplied by 94 pulses in 31.6 seconds. This calculated value is equal to 0.27 seconds which is less than the 0.40 seconds maximum allowed.

### 4.5.5 Peak Output Power

#### 4.5.5.1 Requirements

Per section 15.247(b)(1), for frequency hopping systems operating in the 2400-2483.5MHz band and employing at least 75 non-overlapping hopping channels, the maximum peak output conducted power shall not be greater than 1W (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). If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below 30dBm by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

#### 4.5.5.2 Procedures

The antenna port of the EUT was connected to the spectrum analyzer through 40dB of attenuation. With the hopping function disabled, the EUT was allowed to transmit continuously. The frequency hopping channel was set separately to low, middle, and high hopping channels. The resolution bandwidth (RBW) was set to greater than the 20dB bandwidth. The span was set to approximately 5 times the 20 dB bandwidth. The 'Max-Hold' function was engaged. The maximum meter reading was recorded. The peak power output was calculated for the low, middle and high hopping frequencies.

#### 4.5.5.3 Results

The results are presented on pages 27 and 30. The maximum peak conducted output power from the transmitter was 0.007W (8.8 dBm) which is below the 1 Watt limit. The maximum EIRP measured from the transmitter was 11.4 dBm or 0.013 W which is below the 4 Watt limit.

### 4.5.6 Duty Cycle Factor Measurements

#### 4.5.6.1 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 1msec/div (adjust this for what you need). 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 10msec/div. This shows if the word is longer than 100msec or shorter than 100msec. If the word period is less than 100msec, the display is set to show at least one word. The on-time and off-time are then measured. The on-time is total time signal level exceeds the 4th division. Off-time is time under for the word period. The duty cycle is then computed as the (On-time/ word period) where the word period = (On-time + Off-time).

#### 4.5.6.2 Results

The plots of the duty cycle are shown on data page 21.

### 4.5.7 Antenna Conducted Spurious Emissions

#### 4.5.7.1 Requirements

Per section 15.247(c), 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.

#### 4.5.7.2 Procedures

The antenna port of the EUT was connected to the spectrum analyzer through 40dB of attenuation. The frequency hopping function was disabled. 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 25GHz were observed and plotted separately with the EUT transmitting at low, middle and high hopping frequencies.

#### 4.5.7.3 Results

The results of the antenna conducted emissions levels were plotted. These plots are presented on pages 32 through 43. These plots show that the spurious emissions were at least 20 dB below the level of the fundamental.

### 4.5.8 Radiated Spurious Emissions Measurements

#### 4.5.8.1 Requirements

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 |

#### 4.5.8.2 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 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.

1) 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. The EUT was placed on an 80cm high non-conductive stand. 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. The EUT was placed on a 1.5 meter high non-conductive stand. 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, for all radiated emissions measurements above 1GHz, the resolution bandwidth was set to 1MHz. The analyzer was set to linear mode with a 10Hz video bandwidth in order to simulate an average detector. An average reading was taken.

If the dwell time per channel of the hopping signal is less than 100msec, then the reading obtained with the 10 Hz video bandwidth may be further adjusted by a “duty cycle correction factor”, derived from 20*log(dwell time/100msec). These readings must be no greater than the limits specified in 15.209(a).

#### 4.5.8.3 Results

Preliminary radiated emissions plots with the EUT transmitting at Low Frequency, Middle Frequency, and High Frequency are shown on pages 44 through 67. Final radiated emissions data are presented on data pages 69 through 74. As can be seen from the data, all emissions measured from the EUT were within the specification limits.

Photographs of the test configuration which yielded the highest, or worst case, radiated emission levels are

shown on Figures 3 through 6.

### 4.5.9 Band Edge Compliance

#### 4.5.9.1 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).

#### 4.5.9.2 Procedures

##### 4.5.9.2.1 Low Band Edge

1) The antenna port of the EUT was connected to the spectrum analyzer through 40dB of attenuation.
2) The EUT was set to transmit continuously at the channel closest to the low band-edge hopping function disabled.
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) ≥ 1% of the span.
    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.

4) Step 3) was repeated with the frequency hopping function enabled.

##### 4.5.9.2.2 High Band Edge

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.
8) Steps 1 through 7 were repeated with the hopping enabled.

#### 4.5.9.3 Results

Pages 75 through 80 show the band-edge compliance results. As can be seen from these plots, the conducted emissions at the low end band edge are within the 20 dB down limits. The radiated emissions at the high end band edge are within the general limits.

## 5. CONCLUSIONS

It was determined that the California Eastern Laboratories WIFI/BLT Module, Part No. WB4343WF3SP-1 frequency hopping spread spectrum transmitter, no serial numbers assigned, 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 and Subpart C, Sections 15.207 and 15.247 for Intentional Radiators Operating within the 2400-2483.5 MHz, band, when tested per ANSI C63.4-2014.

It was also determined that the California Eastern Laboratories WIFI/BLT Module, Part No. WB4343WF3SP-1 frequency hopping spread spectrum transmitter, no serial numbers assigned, did fully meet the conducted and radiated RF emission requirements of the Industry Canada Radio Standards Specification, RSS-Gen, Section 8.8 and Section 7.1.2 for receivers and the Industry Canada Radio Standards Specification RSS-Gen Section 8.8 and Radio Standards Specification RSS-247 for transmitters, when tested per ANSI C63.4-2014.

## 6. 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.

## 7. ENDORSEMENT DISCLAIMER

This report must not be used to claim product certification, approval, or endorsement by A2LA, NIST or any agency of the Federal Government.

# 8. EQUIPMENT LIST

## Table 8-1 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 | 3/2/2016 | 3/2/2017 |
| APW11 | PREAMPLIFIER | PMI | PE2-35-120-5R0-10-12-SFF | PL11685/1241 | 1GHZ-20GHZ | 4/18/2016 | 4/18/2017 |
| CDX8 | COMPUTER | ELITE | WORKSTATION | | | N/A | |
| CDY0 | WORKSTATION | ELITE | WORKSTATION | | WINDOWS 7 | N/A | |
| CDY3 | LAB COMPUTER | ELITE | WORKSTATION | | WINDOWS 7 | N/A | |
| GRD0 | SIGNAL GENERATOR | HEWLETT PACKARD | E4432B | US38080222 | 250KHZ-3.0GHZ | 9/1/2015 | 9/1/2016 |
| MDA9 | MULTIMETER | FLUKE CORPORATION | 26 III | 77311274 | I;VDC;VAC;R | 9/10/2015 | 9/10/2016 |
| MPW0 | POWER METER | KEYSIGHT | 8990B | MY51000388 | | 2/5/2016 | 2/5/2017 |
| MWPA | WIDEBAND POWER SENSOR | KEYSIGHT | N1923A | MY56080002 | 50MHZ-18GHZ | 2/17/2016 | 2/17/2017 |
| NHG0 | STANDARD GAIN HORN ANTENNA | NARDA | 638 | --- | 18-26.5GHZ | NOTE 1 | |
| NTA2 | BILOG ANTENNA | TESEQ | 6112D | 28040 | 25-1000MHz | 10/27/2015 | 10/27/2016 |
| NTA3 | BILOG ANTENNA | TESEQ | 6112D | 32853 | 25-1000MHz | 3/23/2016 | 3/23/2017 |
| NWQ1 | DOUBLE RIDGED WAVEGUIDE ANTENNA | ETS-LINDGREN | 3117 | 66655 | 1GHZ-18GHZ | 4/4/2016 | 4/4/2018 |
| NWQ2 | DOUBLE RIDGED WAVEGUIDE ANTENNA | ETS LINDGREN | 3117 | 66659 | 1GHZ-18GHZ | 3/2/2016 | 3/2/2018 |
| PHA0 | MAGNETIC FIELD PROBE | ELECTRO-METRICS | EM-6882 | 134 | 22-230MHZ | NOTE 1 | |
| RAKG | RF SECTION | HEWLETT PACKARD | 85462A | 3549A00284 | 0.009-6500MHZ | 2/22/2016 | 2/22/2017 |
| RAKI | RF SECTION | HEWLETT PACKARD | 85462A | 3411A00181 | 0.009-6500MHZ | 3/4/2016 | 3/4/2017 |
| RAKJ | RF FILTER SECTION | HEWLETT PACKARD | 85460A | 3330A00154 | --- | 3/4/2016 | 3/4/2017 |
| RBA1 | EMI TEST RECEIVER | ROHDE & SCHWARZ | ESIB26 | 100146 | 20HZ-26.5GHZ | 2/12/2016 | 2/12/2017 |
| RBB0 | EMI TEST RECEIVER 20HZ TO 40 GHZ. | ROHDE & SCHWARZ | ESIB40 | 100250 | 20 HZ TO 40GHZ | 2/16/2016 | 2/16/2017 |
| RBD1 | EMI TEST RECEIVER | ROHDE & SCHWARZ | ESU40 | 100009 | 20Hz-40GHz | 2/10/2016 | 2/10/2017 |
| RBE1 | EMI TEST RECEIVER | ROHDE & SCHWARZ | ESU26 | 100096 | 20Hz-26GHz | 2/25/2016 | 2/25/2017 |
| SDL3 | POWER SUPPLY | HEWLETT PACKARD | 3425A | 254 | 0-20VDC; 0-10A | NOTE 1 | |
| SES0 | 24VDC POWER SUPPLY | P-TRANS | FS-32024-1M | 001 | 18-27VDC | NOTE 1 | |
| SES1 | 24VDC POWER SUPPLY | P TRANS | FS-32024-1M | 002 | 18-27VDC | NOTE 1 | |
| SHA0 | DC POWER SUPPLY | HEWLETT PACKARD | 6642A | MY40000116 | 0-20V/0-10A | NOTE 1 | |
| SHB0 | DC POWER SUPPLY | HEWLETT PACKARD | 6644A | MY40000115 | 0-60V/0-3.5A | NOTE 1 | |
| T2S3 | 20DB 25W ATTENUATOR | WEINSCHEL | 46-20-34 | BV3544 | DC-18GHZ | 8/7/2015 | 8/7/2016 |
| T2SG | 20DB 25W ATTENUATOR | WEINSCHEL | 46-20-34 | CD5016 | DC-18GHZ | 1/5/2016 | 1/5/2018 |
| WQB0 | RE_8546A | | | | | | |
| WQC0 | HF_8546A | | | | | | |
| XLQU | 5W, 50 OHM TERMINATION | JFW INDUSTRIES | 50T-052 | --- | DC-2GHZ | 7/8/2015 | 7/8/2016 |
| 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 | 9/22/2015 | 9/22/2016 |

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

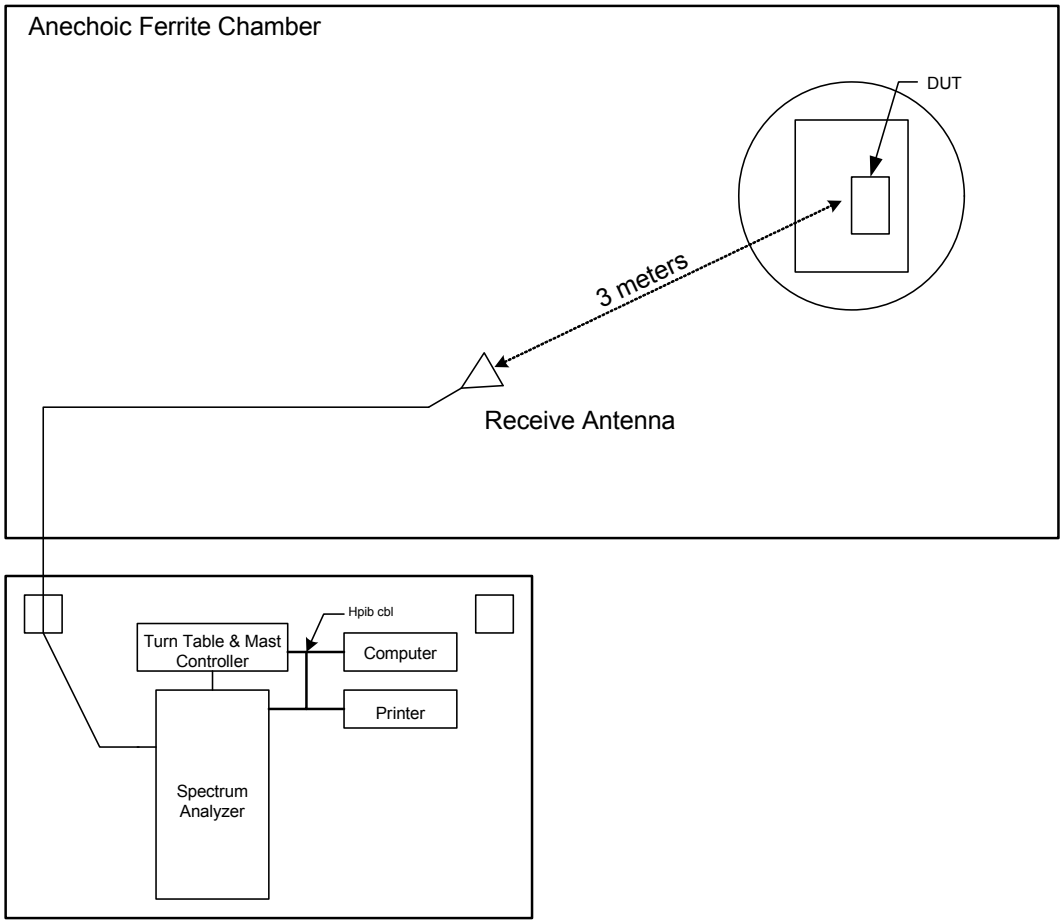



FIGURE 1 BLOCKDIAGRAM OF TEST SETUP

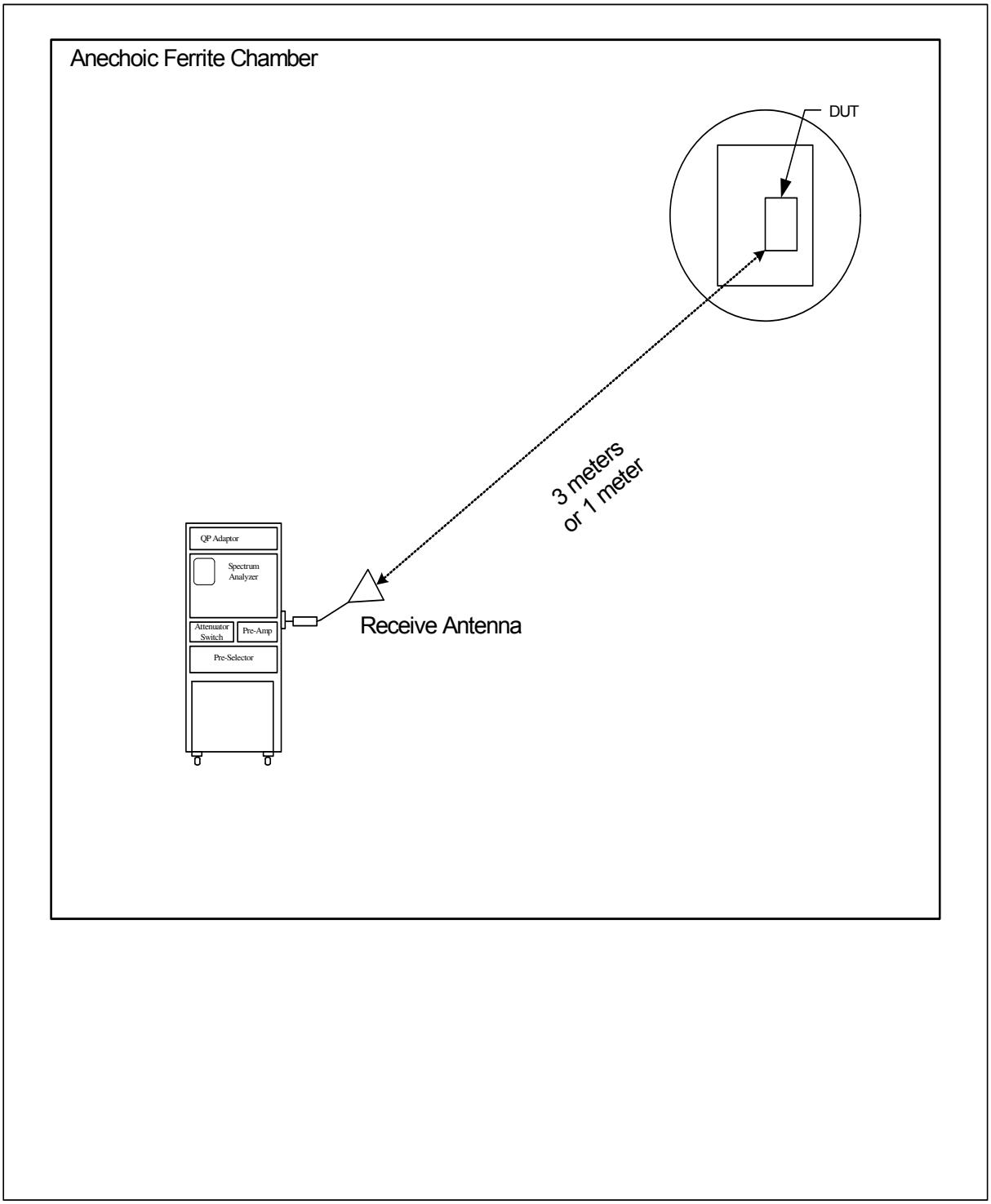



Figure 2: BLOCK DIAGRAM OF TEST SETUP FOR RADIATED EMISSIONS ABOVE 18GHZ

Figure 3

Test Setup for Radiated Emissions – 30MHz to 1GHz, Horizontal Polarization

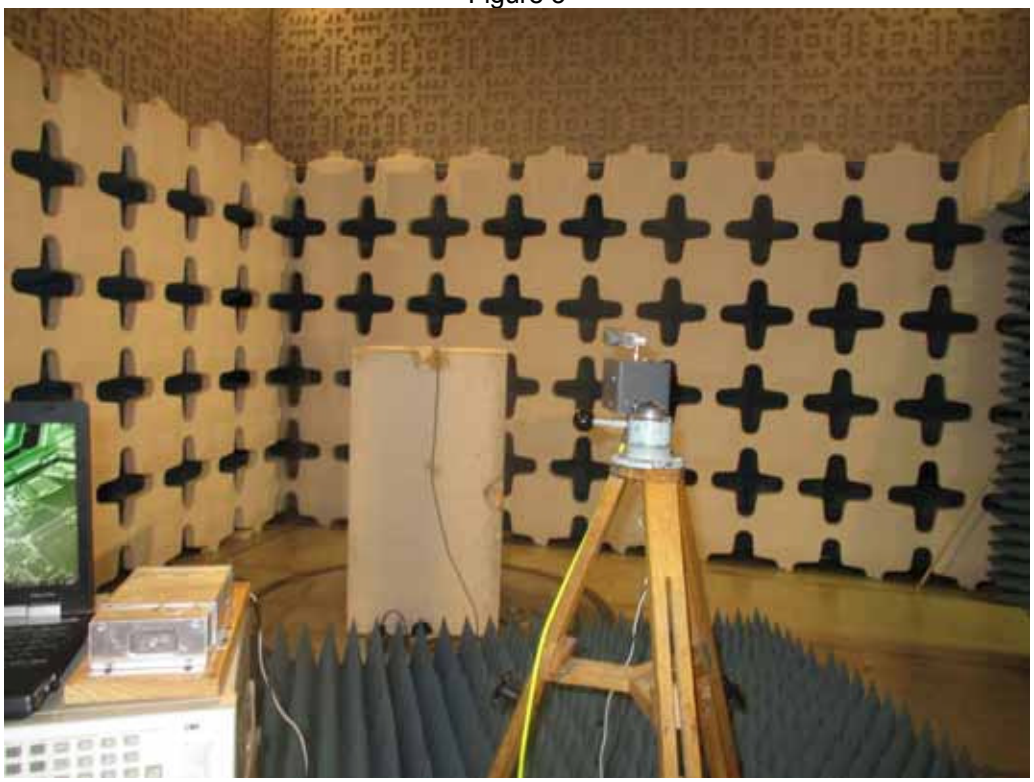
Test Setup for Radiated Emissions – 30MHz to 18GHz, Vertical Polarization

Figure 4

Test Setup for Radiated Emissions – 2GHz to 18GHz, Horizontal Polarization

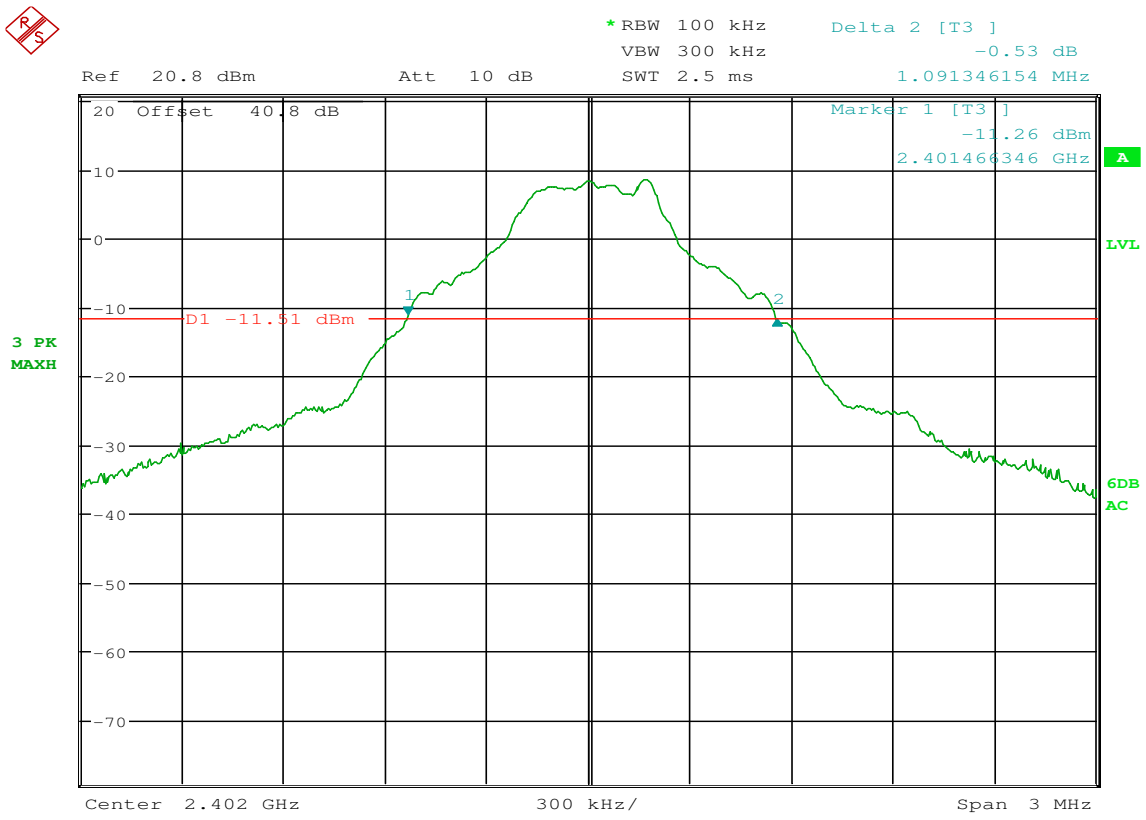
Test Setup for Radiated Emissions – 2GHz to 18GHz, Vertical Polarization

Figure 5



Test Setup for Radiated Emissions – 18GHz to 25GHz, Horizontal Polarization

Test Setup for Radiated Emissions – 18GHz to 25GHz, Vertical Polarization

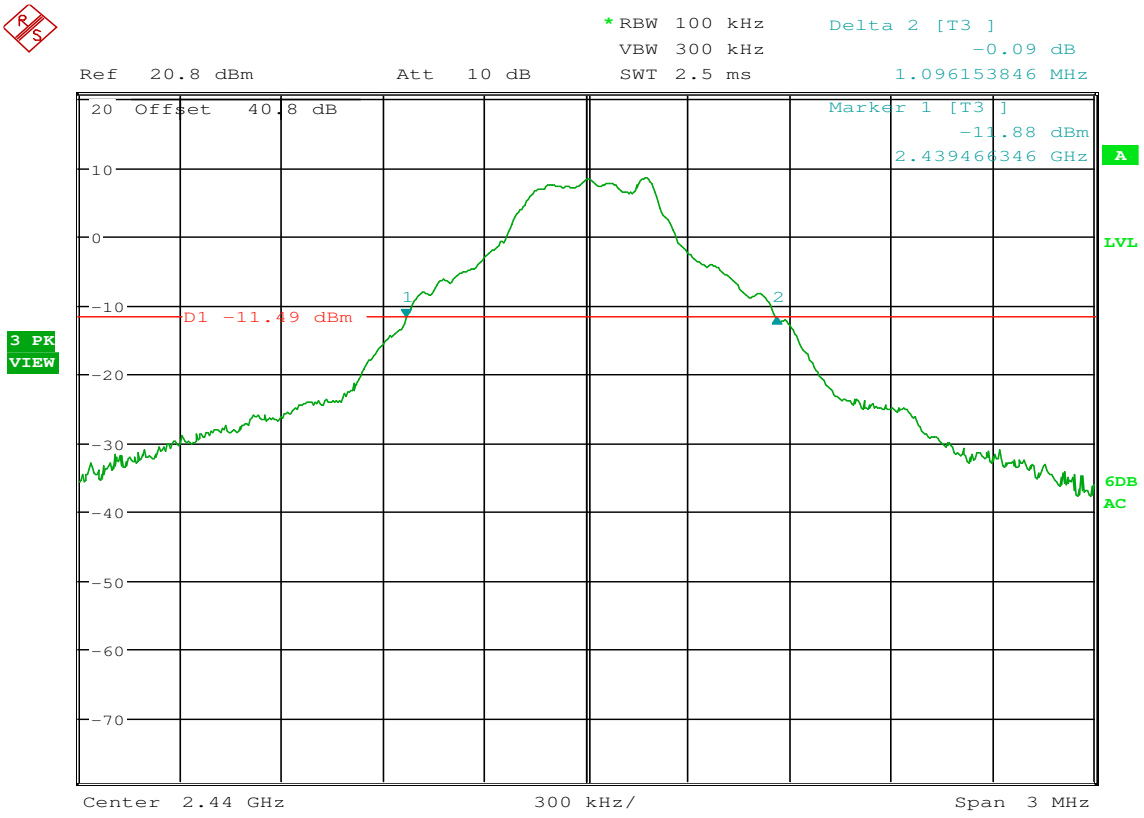



Date: 1.JUN.2016 09:29:49

**FCC 15.247 20 dB Bandwidth**

MANUFACTURER : California Eastern Laboratories
MODEL NUMBER : WB4343WF3SP-1
TEST MODE : Tx @ 2402MHz
: PEAK detector
NOTES : 20 dB bandwidth
NOTES : Bluetooth Classic
NOTES :

NOTES

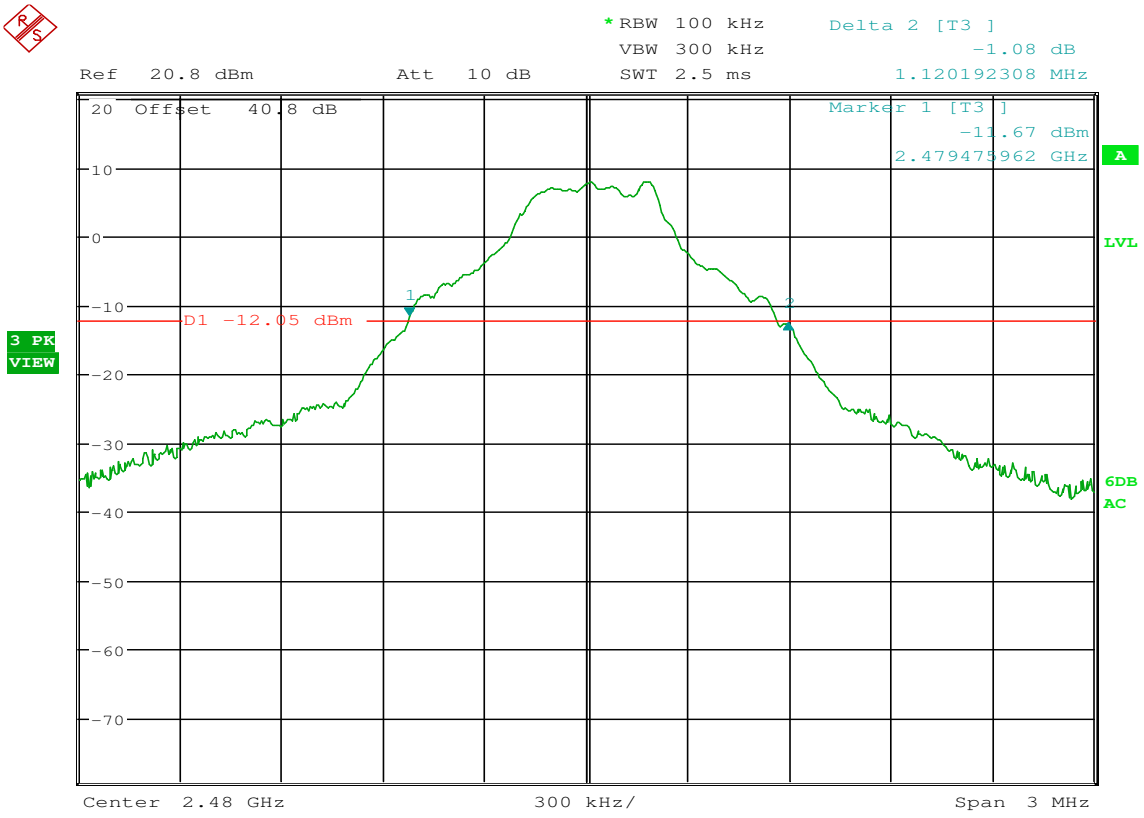



Date: 1.JUN.2016 09:33:46

**FCC 15.247 20 dB Bandwidth**

MANUFACTURER : California Eastern Laboratories
MODEL NUMBER : WB4343WF3SP-1
TEST MODE : Tx @ 2440MHz
: PEAK detector
NOTES : 20 dB bandwidth
NOTES : Bluetooth Classic
NOTES :

NOTES

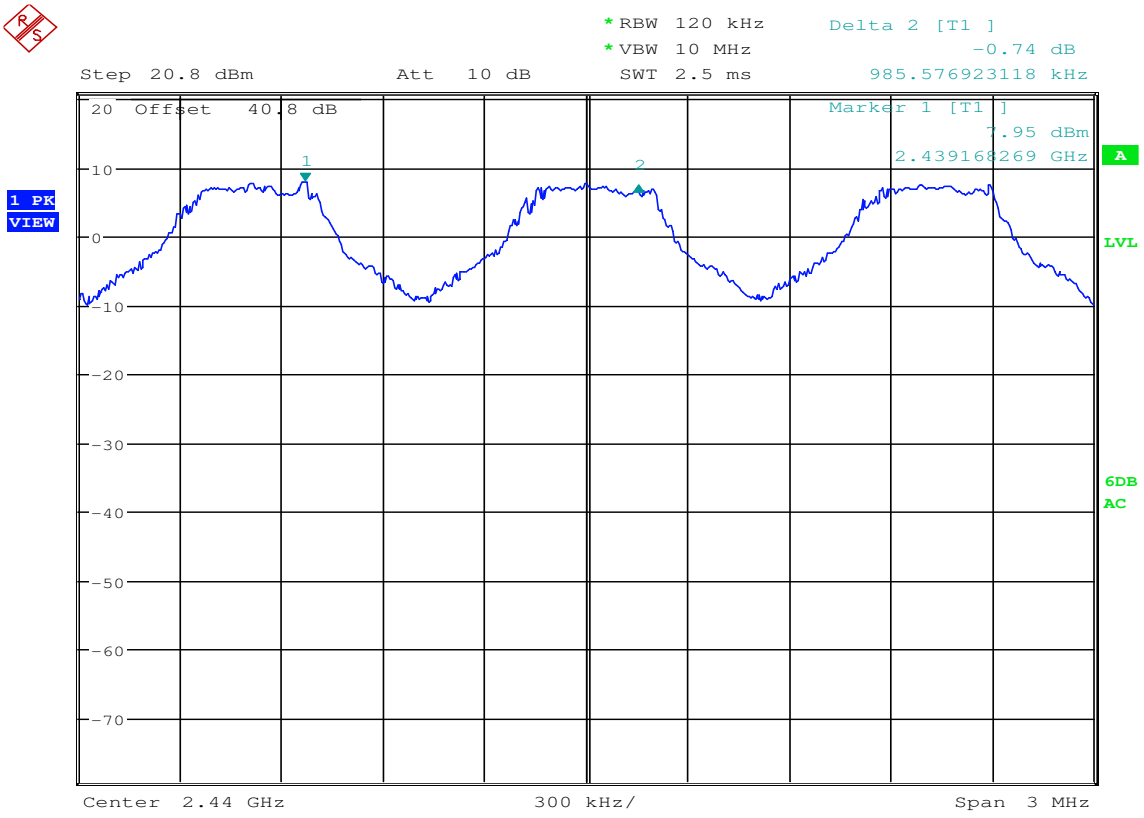



Date: 1.JUN.2016 09:37:08

**FCC 15.247 20 dB Bandwidth**

MANUFACTURER : California Eastern Laboratories
MODEL NUMBER : WB4343WF3SP-1
TEST MODE : Tx @ 2480MHz
: PEAK detector
NOTES : 20 dB bandwidth
NOTES : Bluetooth Classic
NOTES :

NOTES

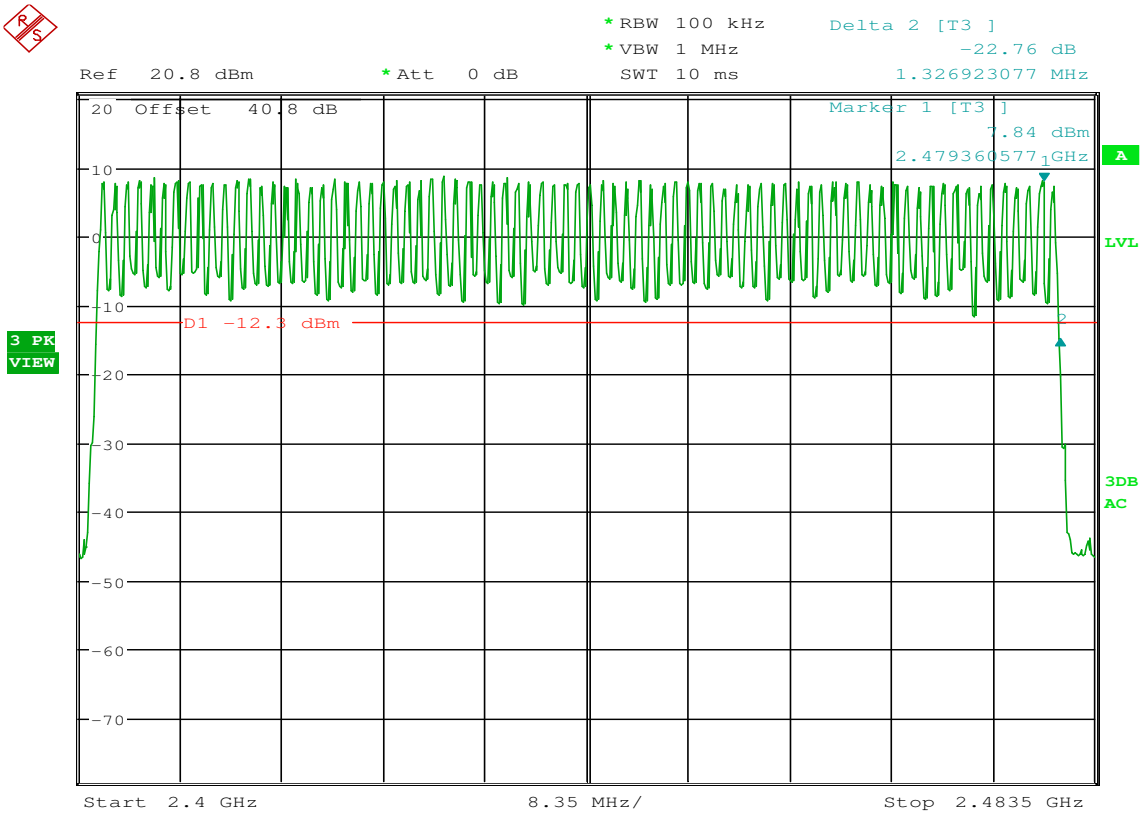



Date: 2.JUN.2016 11:03:41

**FCC 15.247 Carrier Frequency Separation**

| | | |
|---|---|---|
| MANUFACTURER | : | California Eastern Laboratories |
| MODEL NUMBER | : | WB4343WF3SP-1 |
| TEST MODE | : | Frequency Hopping |
| | : | PEAK DETECTOR |
| NOTES | : | |
| NOTES | : | Bluetooth Classic |
| NOTES | : | |

NOTES

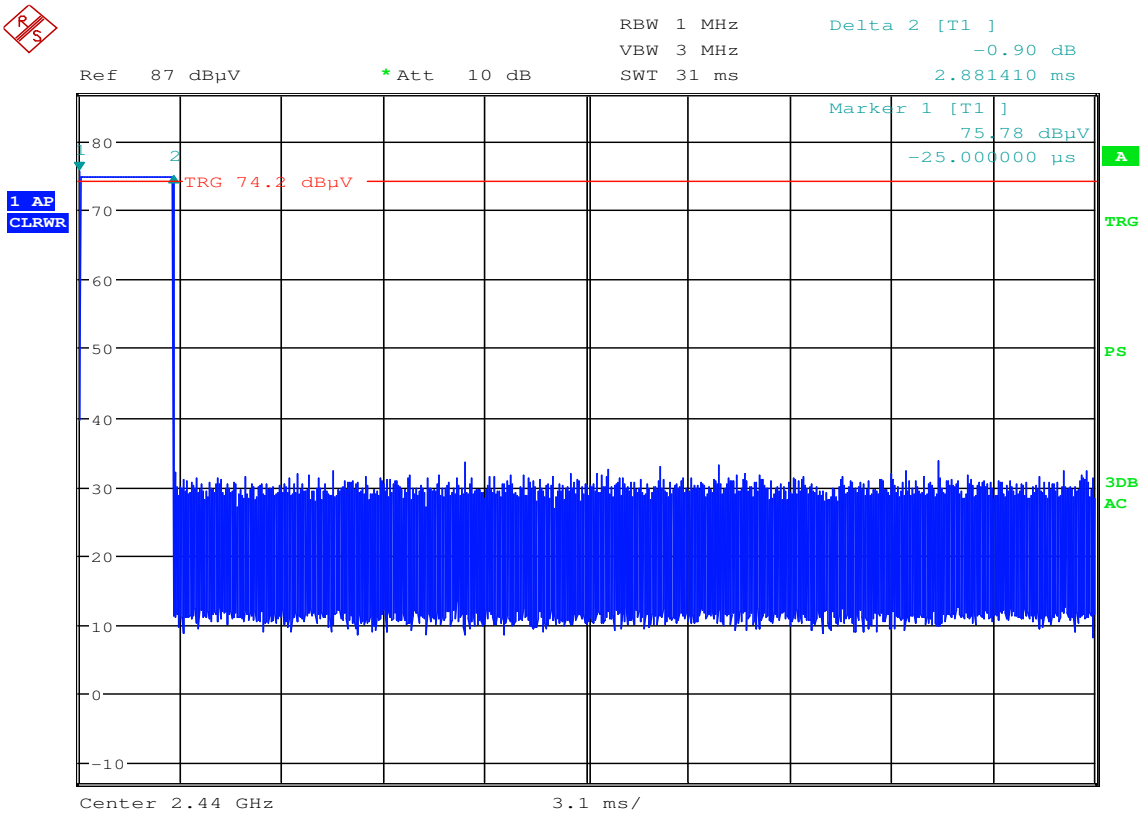



Date: 1.JUN.2016 13:30:57

**FCC 15.247 Frequency Hopping**

| | | |
|---|---|---|
| MANUFACTURER | : | California Eastern Laboratories |
| MODEL NUMBER | : | WB4343WF3SP-1 |
| TEST MODE | : | Hopping Mode |
| | : | PEAK DETECTOR |
| NOTES | : | 20 dB bandwidth |
| NOTES | : | Bluetooth Classic |
| NOTES | : | 79 Hopping Frequencies |

NOTES

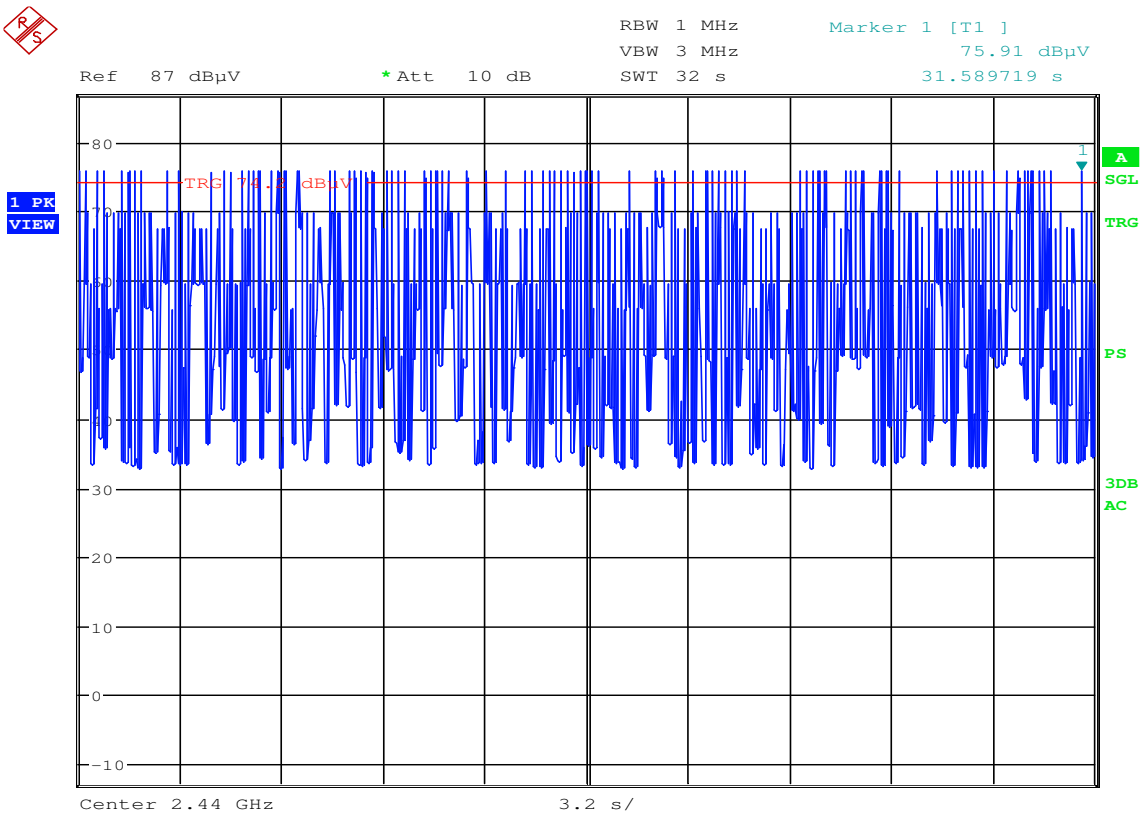



Date: 27.JUN.2016 11:20:53

**FCC 15.247 Time of Occupancy**

| | |
|---|---|
| MANUFACTURER | : California Eastern Laboratories |
| MODEL NUMBER | : WB4343WF3SP-1 |
| TEST MODE | : Tx @ 2440MHz |
| | : PEAK detector |
| NOTES | : Bluetooth Classic |
| NOTES | : Pulse width = 2.88mS |
| NOTES | : Number of pulses in 32 S = 94 |

NOTES

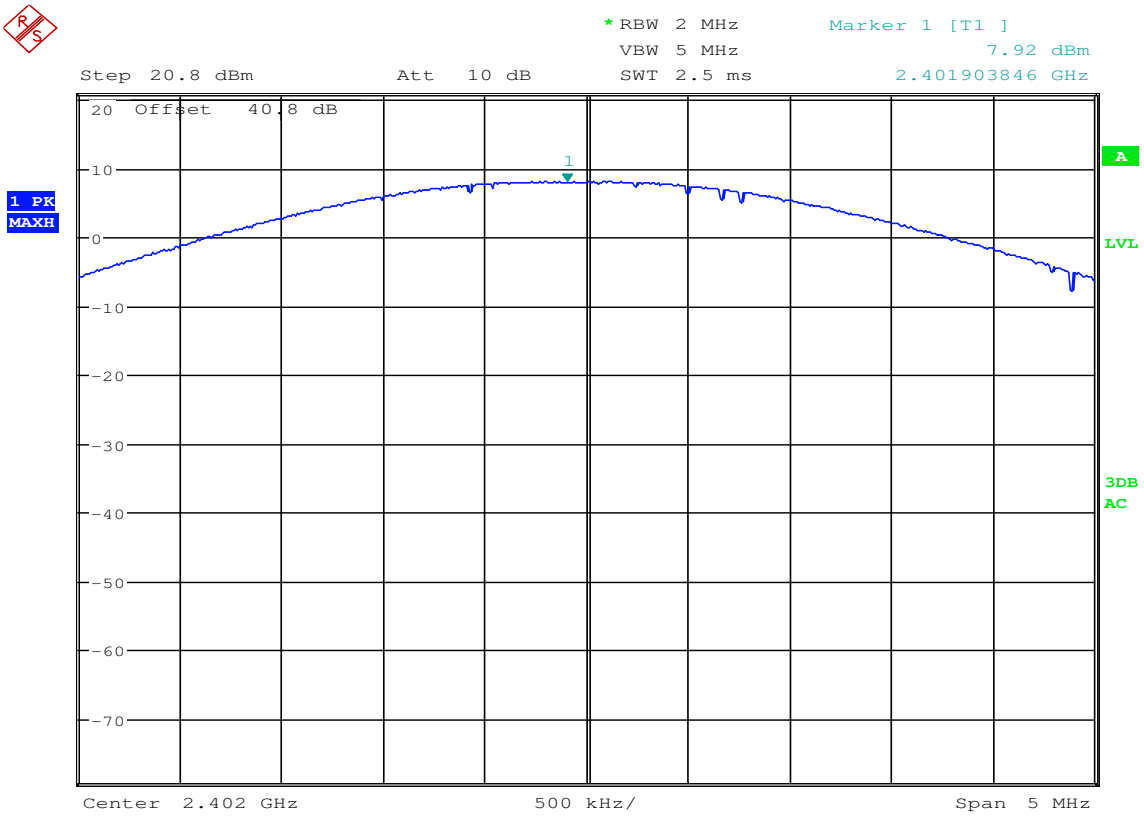



Date: 27.JUN.2016 11:16:22

**FCC 15.247 Time of Occupancy**

| | |
|---|---|
| MANUFACTURER | : California Eastern Laboratories |
| MODEL NUMBER | : WB4343WF3SP-1 |
| TEST MODE | : Tx @ 2440MHz |
| | : PEAK detector |
| NOTES | : Bluetooth Classic |
| NOTES | : Pulse width = 2.88mS |
| NOTES | : Number of pulses in 32s = 94 |

NOTES

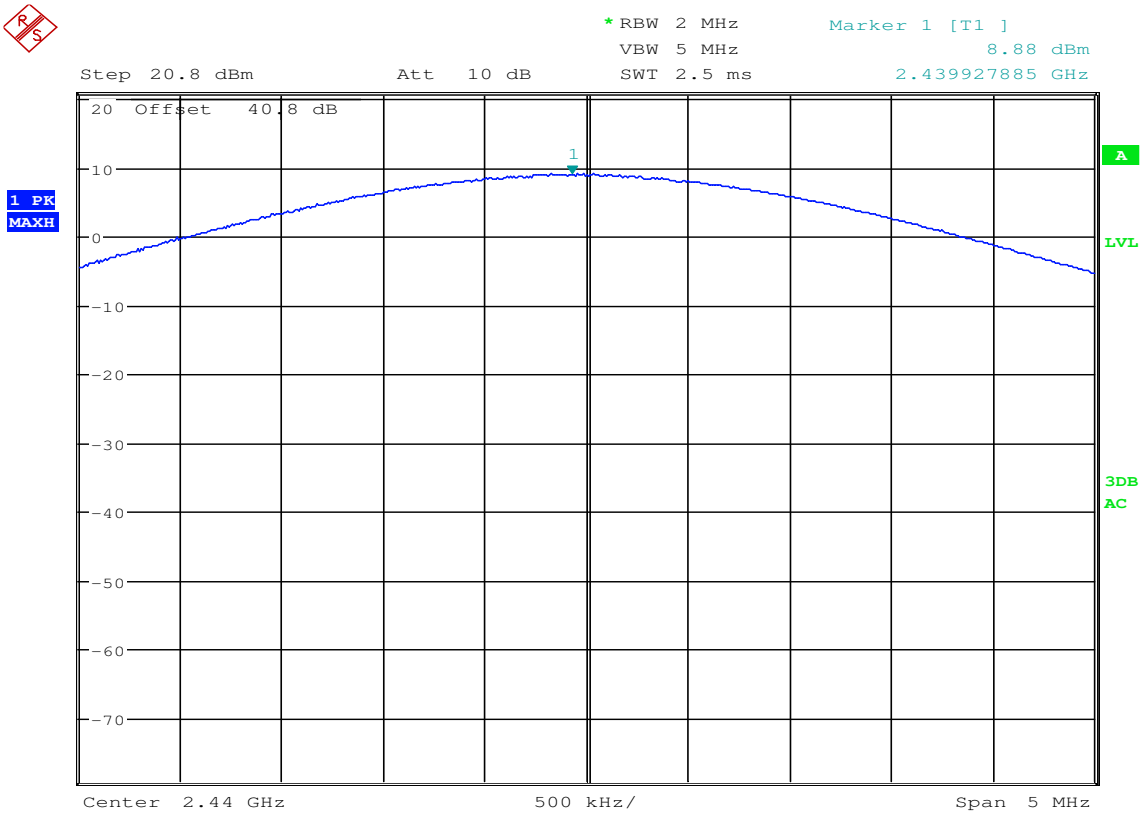



Date: 2.JUN.2016 08:27:30

**FCC 15.247 Output Power**

| | |
|---|---|
| MANUFACTURER | : California Eastern Laboratories |
| MODEL NUMBER | : WB4343WF3SP-1 |
| TEST MODE | : Tx @ 2402MHz |
| | : PEAK detector |
| NOTES | : Output Power |
| NOTES | : Bluetooth Classic |
| NOTES | : |

NOTES

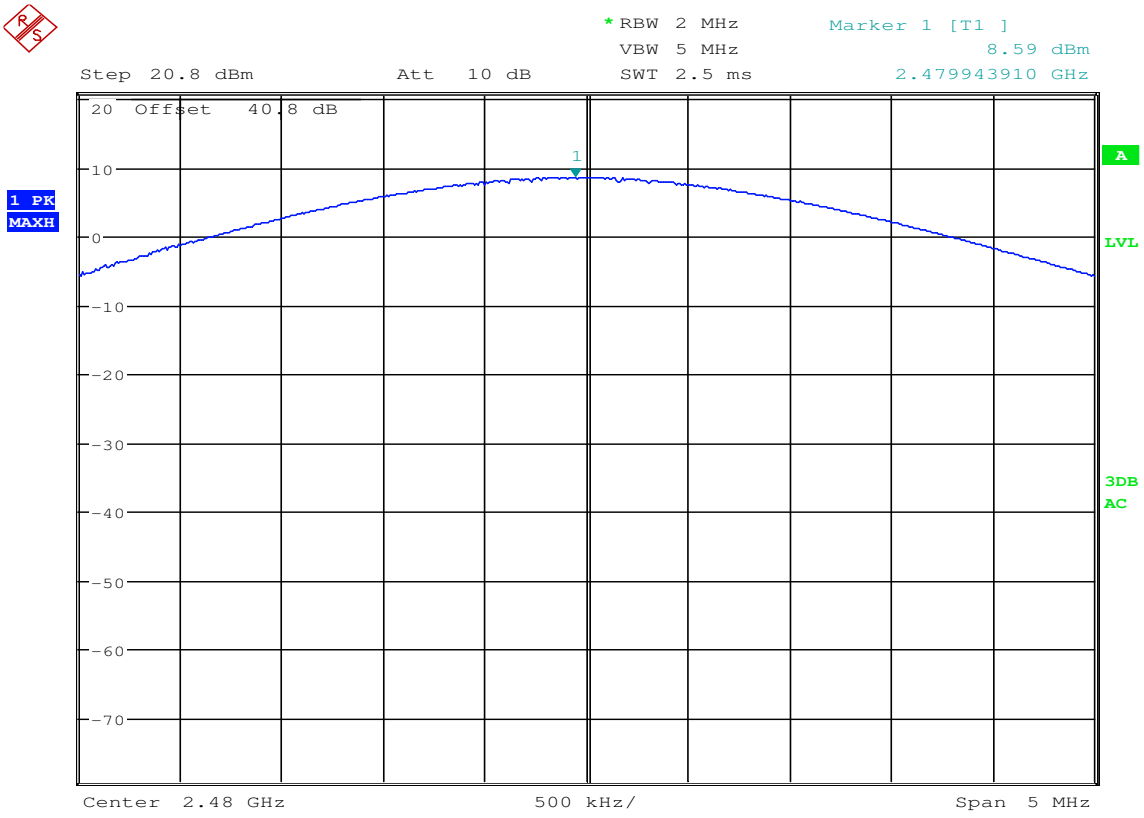



Date: 2.JUN.2016 08:42:01

**FCC 15.247 Output Power**

| | |
|---|---|
| MANUFACTURER | : California Eastern Laboratories |
| MODEL NUMBER | : WB4343WF3SP-1 |
| TEST MODE | : Tx @ 2440MHz |
| | : PEAK detector |
| NOTES | : Output Power |
| NOTES | : Bluetooth Classic |
| NOTES | : |

NOTES




Date: 2.JUN.2016 08:44:17

**FCC 15.247 Output Power**

| | |
|---|---|
| MANUFACTURER | : California Eastern Laboratories |
| MODEL NUMBER | : WB4343WF3SP-1 |
| TEST MODE | : Tx @ 2480MHz |
| | : PEAK detector |
| NOTES | : Output Power |
| NOTES | : Bluetooth Classic |
| NOTES | : |

NOTES

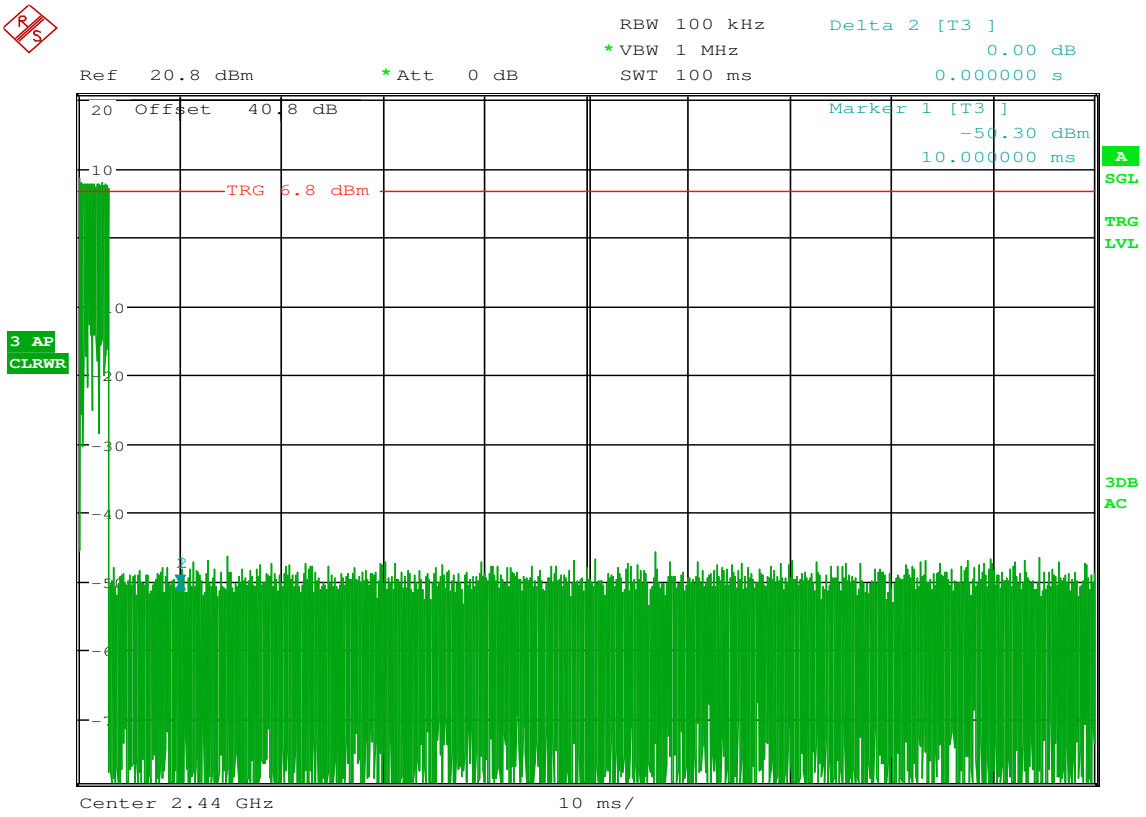
Manufacturer : California Eastern Laboratories
Model Number : WIFI/BLT Module
Specification : FCC-15.247 Effective Isotropic Radiated Power (EIRP)
Date : June 6, 2016
Notes : Test Distance is 3 meters

| Freq (MHz) | Ant Pol | Meter Reading (dBuV) | Matched SIG. GEN. (dBm) | Equivalent Ant Gain (dB) | Cable Loss (dB) | EIRP Total (dBm) | Limit dBm |
|---|---|---|---|---|---|---|---|
| 2402.00 | H | 68.5 | 6.5 | 5.7 | 2.7 | 9.4 | 36.0 |
| 2402.00 | V | 60.2 | -1.5 | 5.7 | 2.7 | 1.4 | 36.0 |
| 2440.00 | H | 70.3 | 8.4 | 5.8 | 2.8 | 11.4 | 36.0 |
| 2440.00 | V | 60.8 | -0.9 | 5.8 | 2.8 | 2.2 | 36.0 |
| 2480.00 | H | 69.6 | 7.8 | 5.7 | 2.8 | 10.7 | 36.0 |
| 2480.00 | V | 61.4 | -0.2 | 5.7 | 2.8 | 2.7 | 36.0 |

EIRP (dBm) = Matched Signal Generator (dBm) + Antenna Gain (dB) – Cable Loss (dB)

Checked BY Richard E. King :

Richard E. King

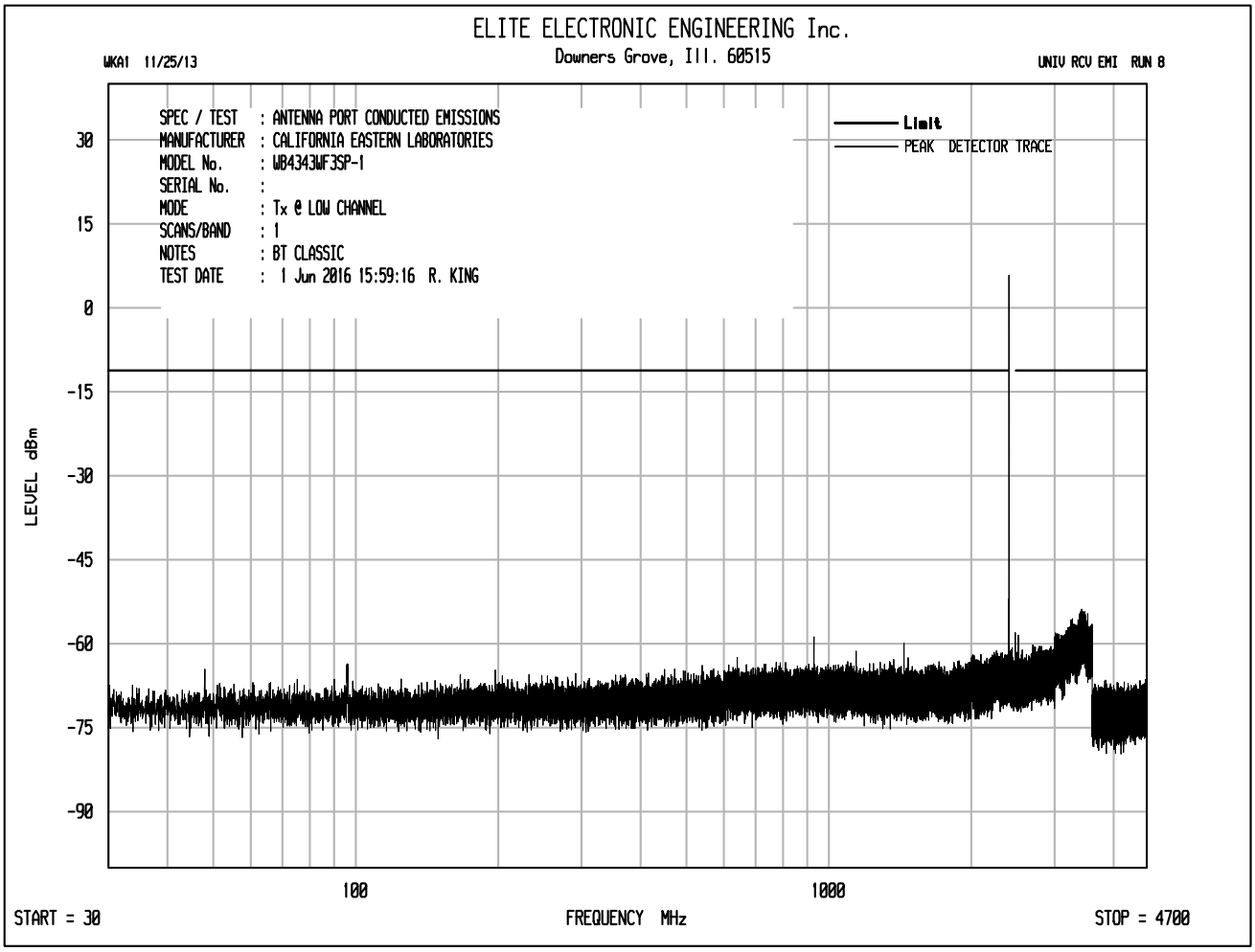


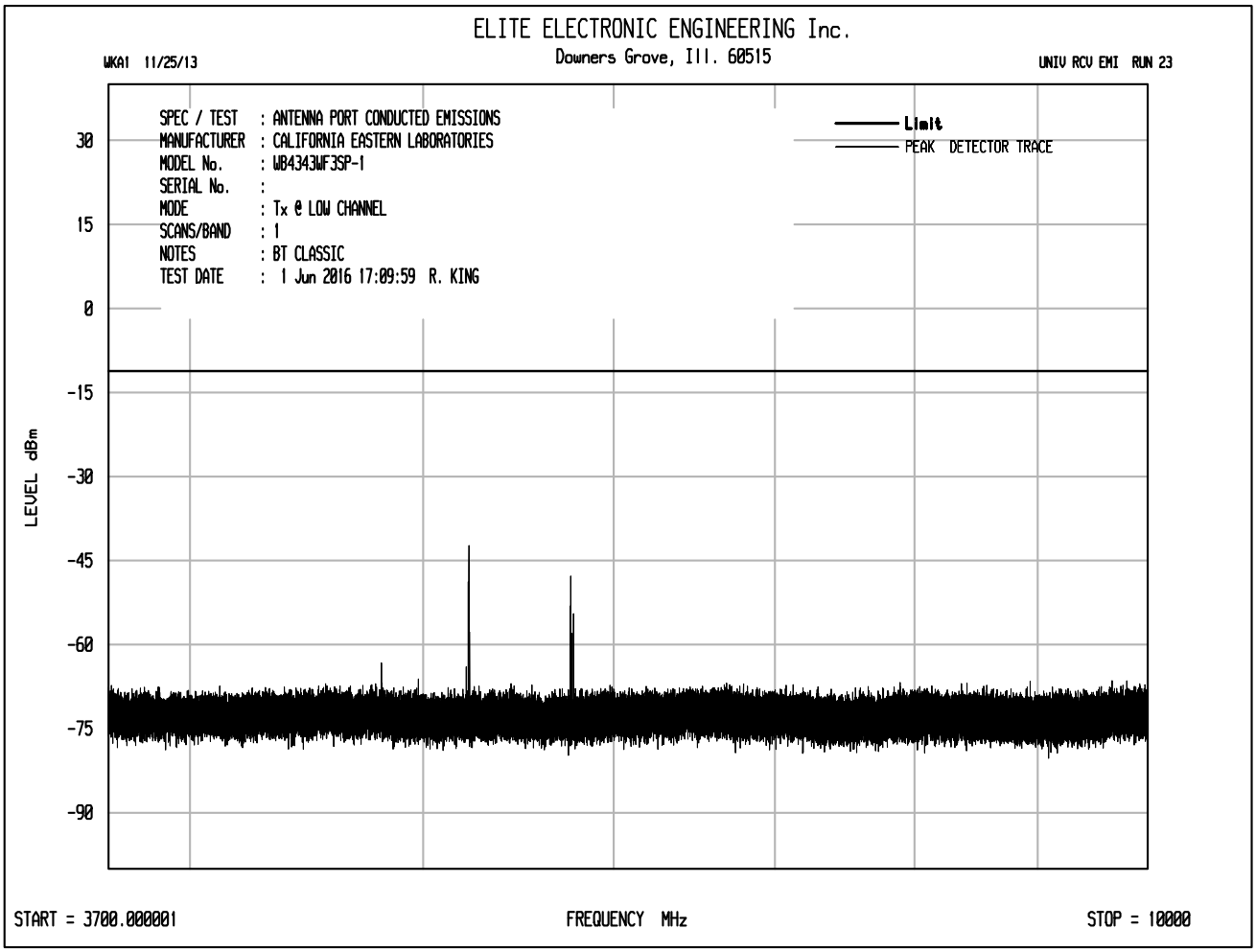

Date: 1.JUN.2016 14:01:58

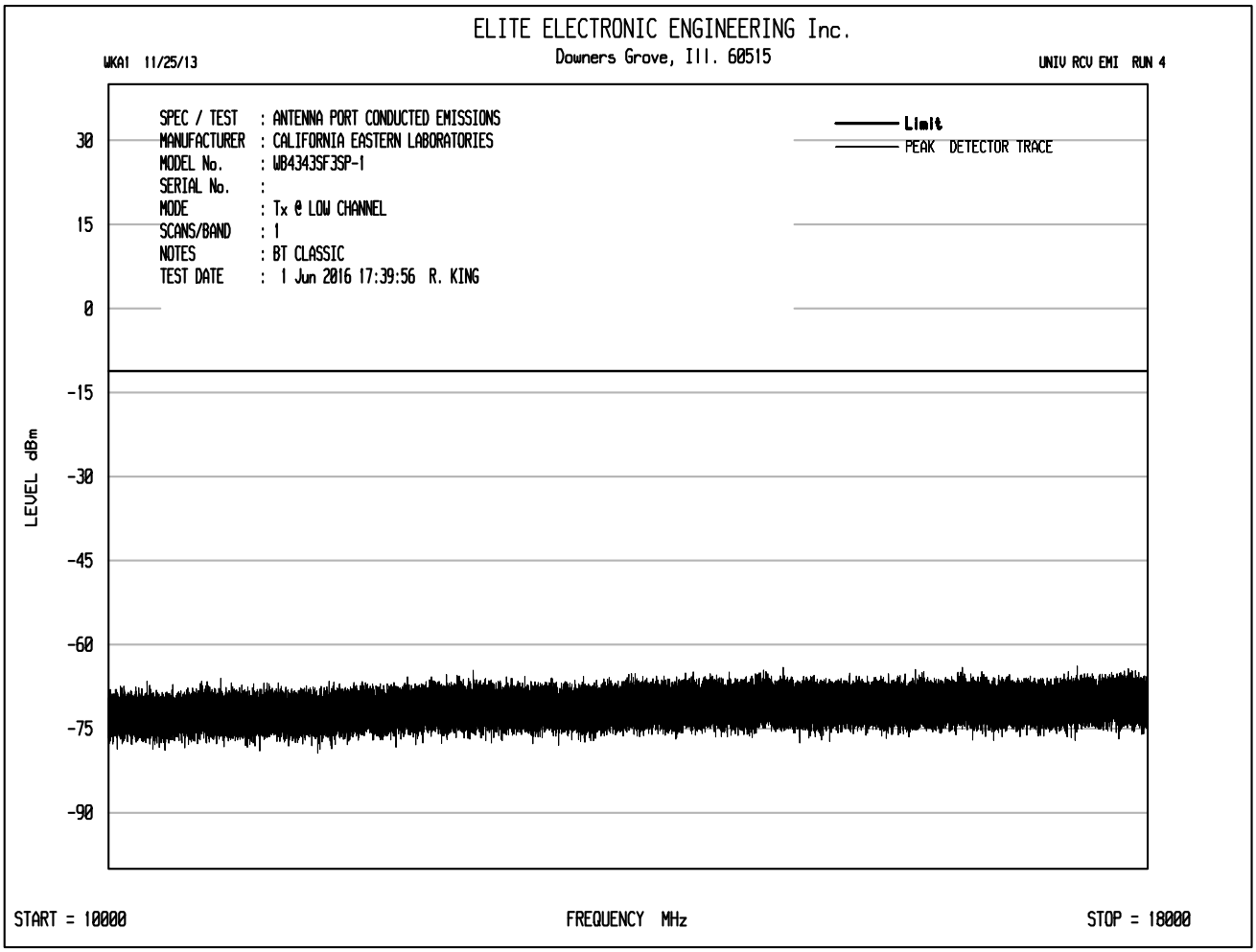
**FCC 15C Duty Cycle**

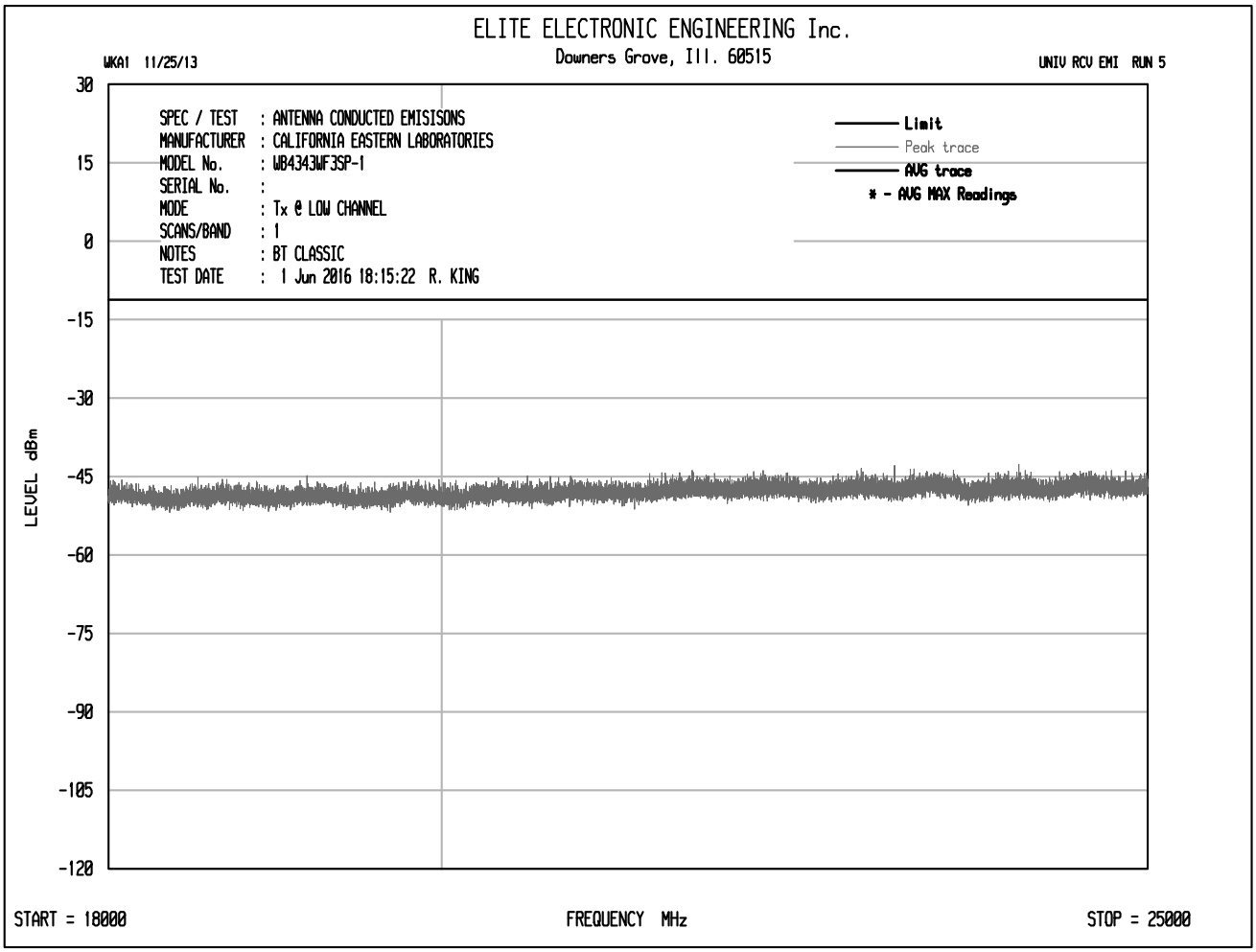
| | | |
|---|---|---|
| MANUFACTURER | : | California Eastern Laboratories |
| MODEL NUMBER | : | WB4343WF3SP-1 |
| TEST MODE | : | Hopping Mode |
| | : | PEAK DETECTOR |
| NOTES | : | Bluetooth Classic |
| NOTES | : | Duty Cycle |
| NOTES | : | Pulse Width = 2.88mS |
| NOTES | : | DC = 20*LOG(On Time/100mS) = 20*Log(2.88mS/100mS) |
| | : | DC = -30.8 dB |

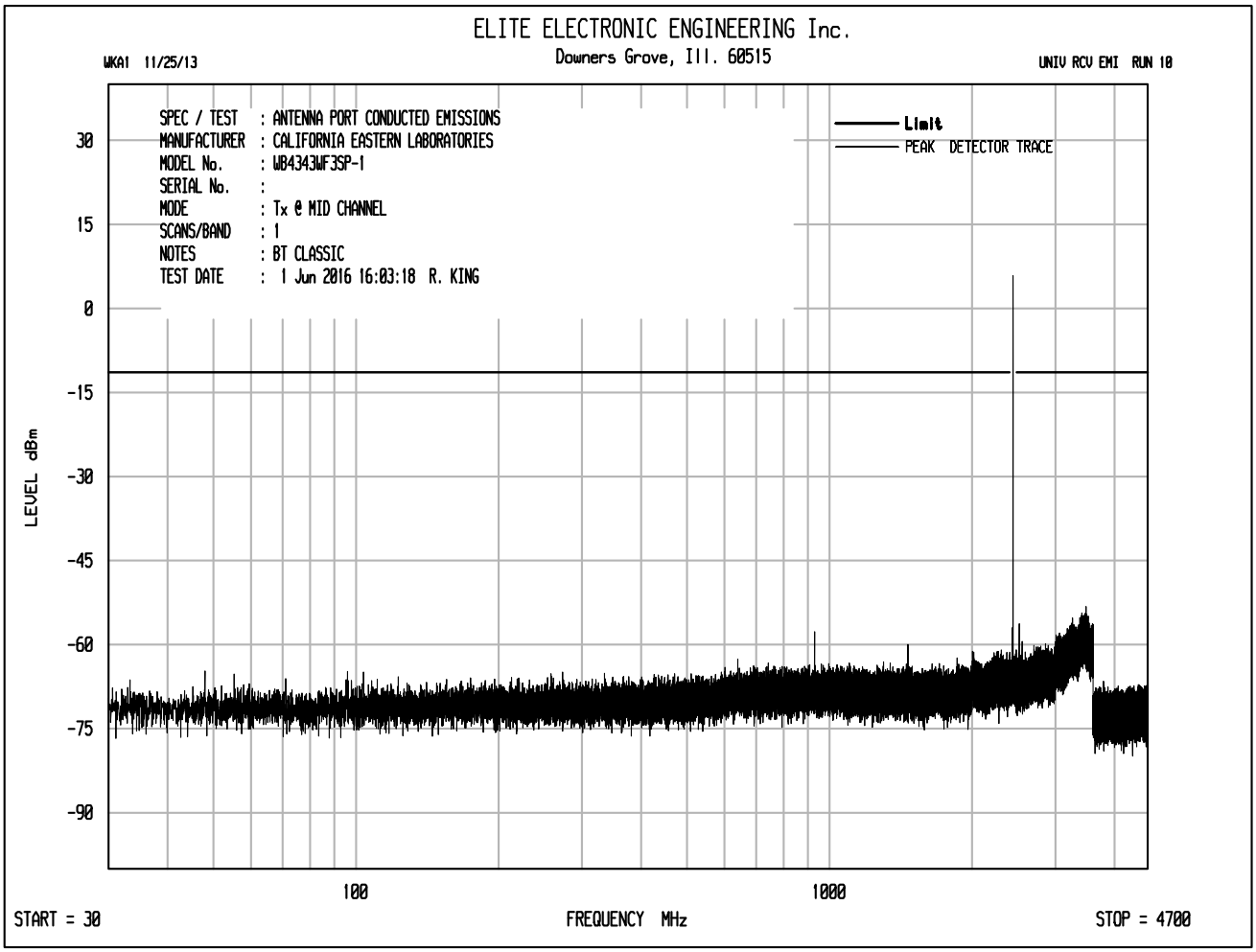
NOTES

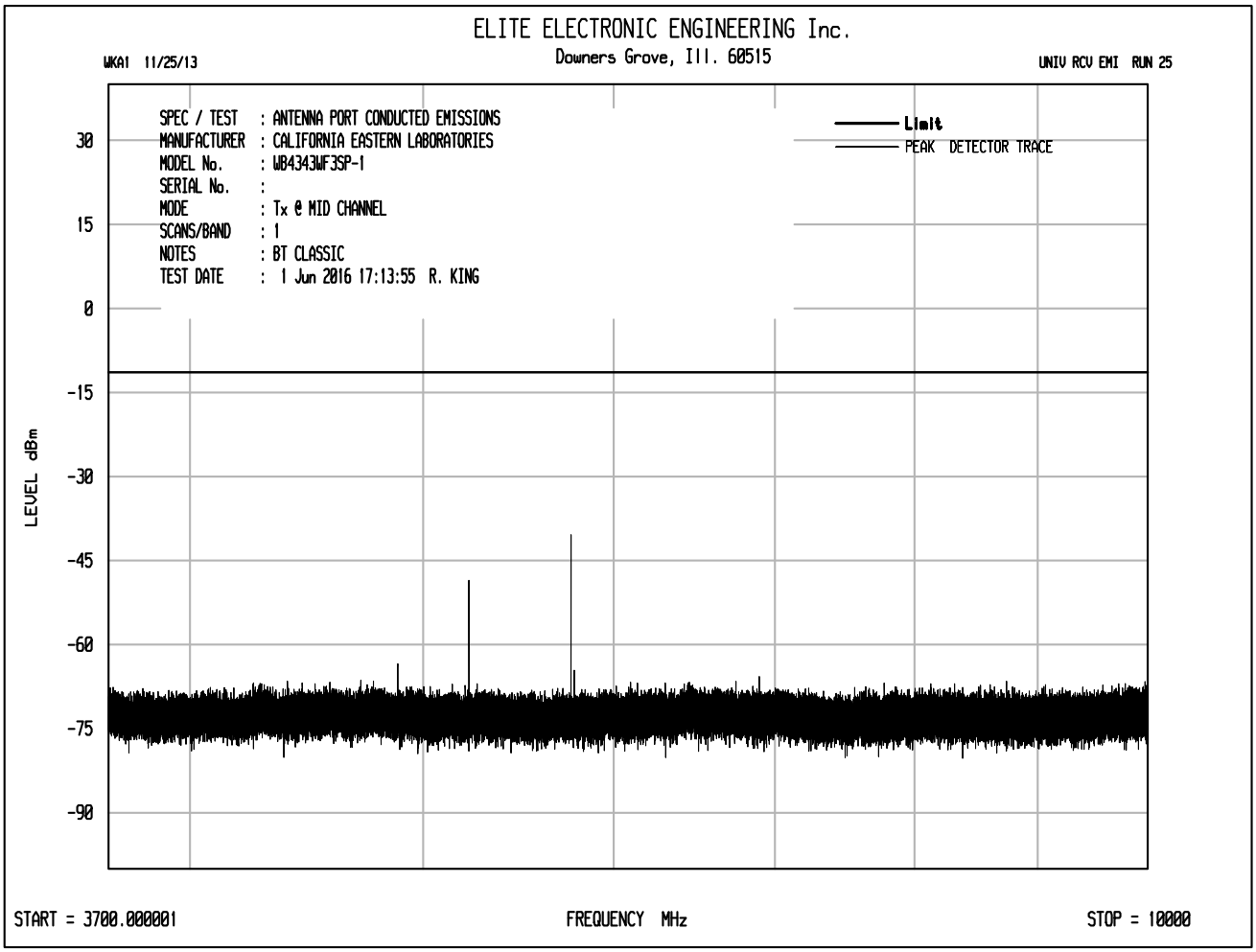

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 8
SPEC / TEST : ANTENNA PORT CONDUCTED EMISSIONS
MANUFACTURER : CALIFORNIA EASTERN LABORATORIES
MODEL No. : WB4343WF3SP-1
SERIAL No. :
MODE : Tx @ LOW CHANNEL
SCANS/BAND : 1
NOTES : BT CLASSIC
TEST DATE : 1 Jun 2016 15:59:16 R. KING
Limit
PEAK DETECTOR TRACE
30
15
0
-15
-30
-45
-60
-75
-90
LEVEL dBm
100
1000
START = 30
FREQUENCY MHz
STOP = 4700

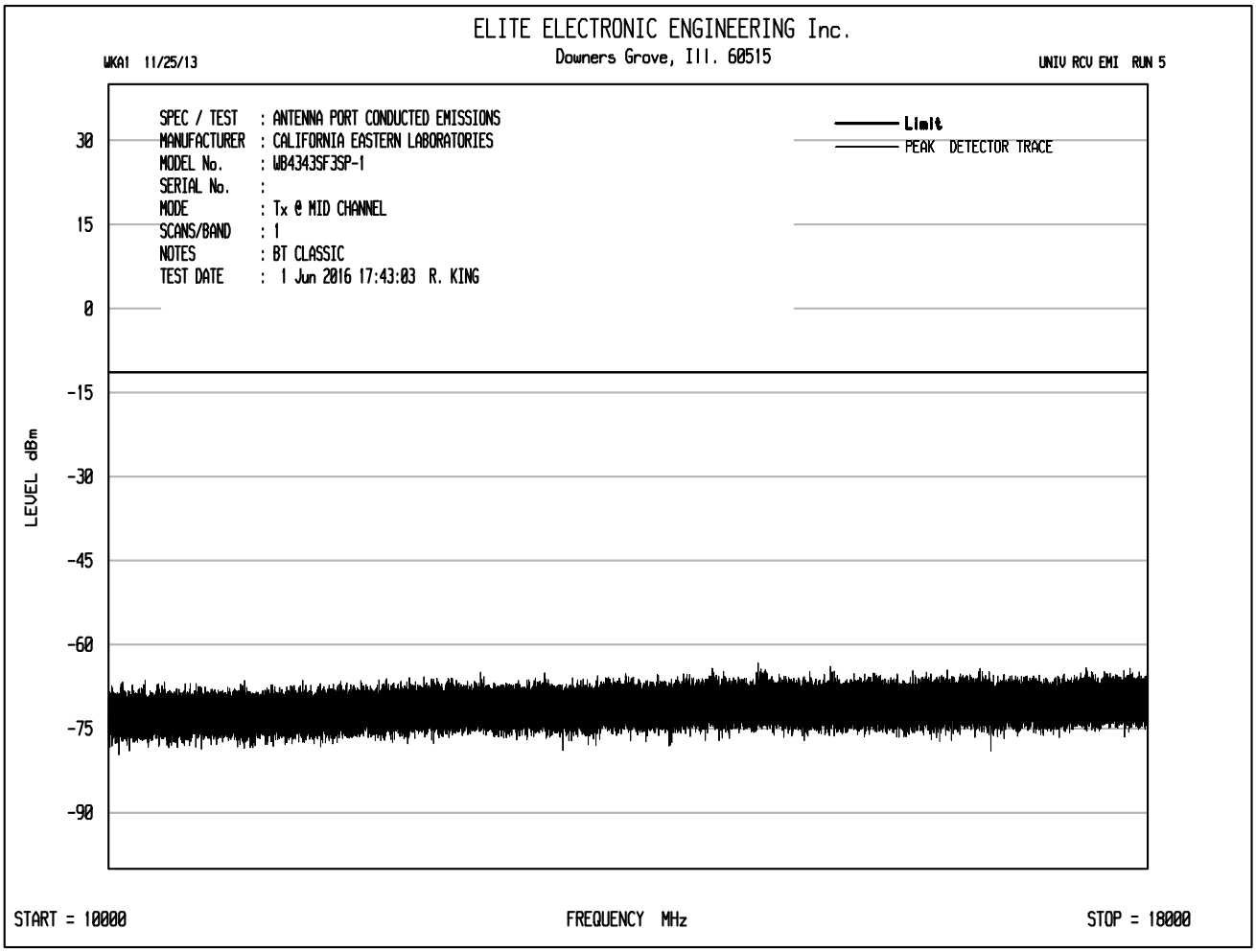

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 23
SPEC / TEST : ANTENNA PORT CONDUCTED EMISSIONS
MANUFACTURER : CALIFORNIA EASTERN LABORATORIES
MODEL No. : WB4343WF3SP-1
SERIAL No. :
MODE : Tx @ LOW CHANNEL
SCANS/BAND : 1
NOTES : BT CLASSIC
TEST DATE : 1 Jun 2016 17:09:59 R. KING
Limit
PEAK DETECTOR TRACE
30
15
0
-15
-30
-45
-60
-75
-90
LEVEL dBm
START = 3700.000001
FREQUENCY MHz
STOP = 10000

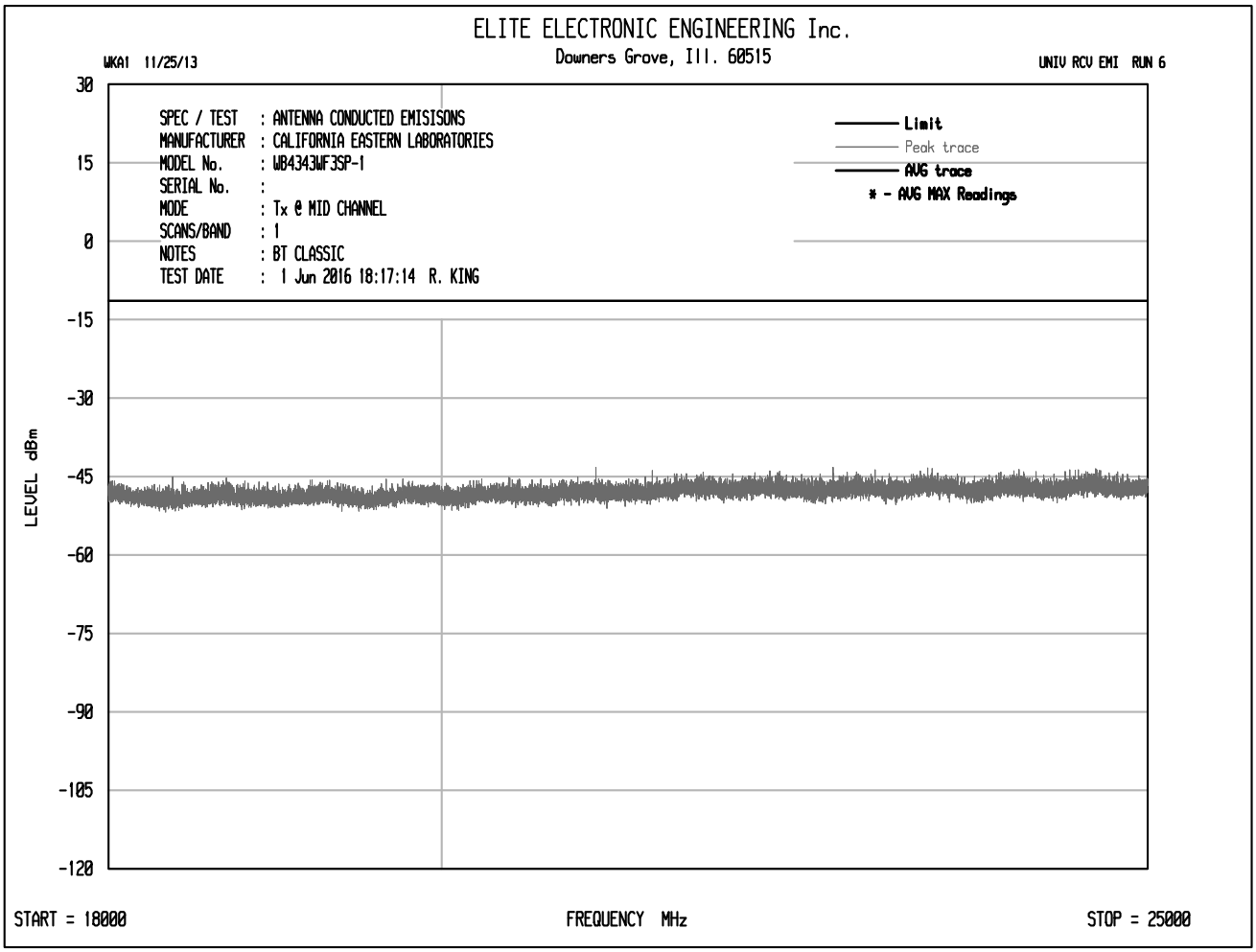

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 4
SPEC / TEST : ANTENNA PORT CONDUCTED EMISSIONS
MANUFACTURER : CALIFORNIA EASTERN LABORATORIES
MODEL No. : WB4343SF3SP-1
SERIAL No. :
MODE : Tx @ LOW CHANNEL
SCANS/BAND : 1
NOTES : BT CLASSIC
TEST DATE : 1 Jun 2016 17:39:56 R. KING
Limit
PEAK DETECTOR TRACE
30
15
0
-15
-30
-45
-60
-75
-90
LEVEL dBm
START = 10000
FREQUENCY MHz
STOP = 18000

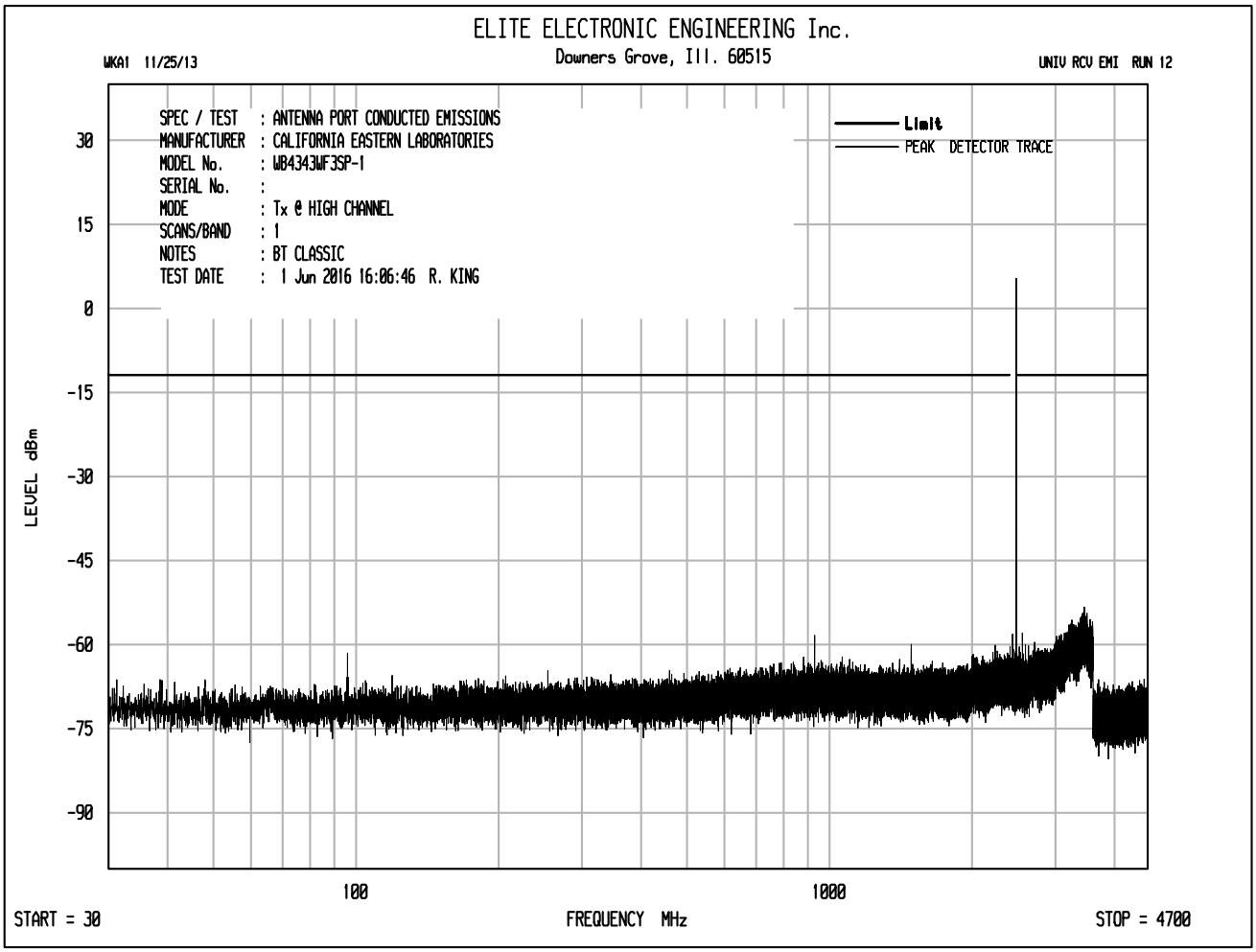

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 5
SPEC / TEST : ANTENNA CONDUCTED EMISISONS
MANUFACTURER : CALIFORNIA EASTERN LABORATORIES
MODEL No. : WB4343WF3SP-1
SERIAL No. :
MODE : Tx @ LOW CHANNEL
SCANS/BAND : 1
NOTES : BT CLASSIC
TEST DATE : 1 Jun 2016 18:15:22 R. KING
Limit
Peak trace
AVG trace
* - AVG MAX Readings
30
15
0
-15
-30
-45
-60
-75
-90
-105
-120
LEVEL dBm
START = 18000
FREQUENCY MHz
STOP = 25000

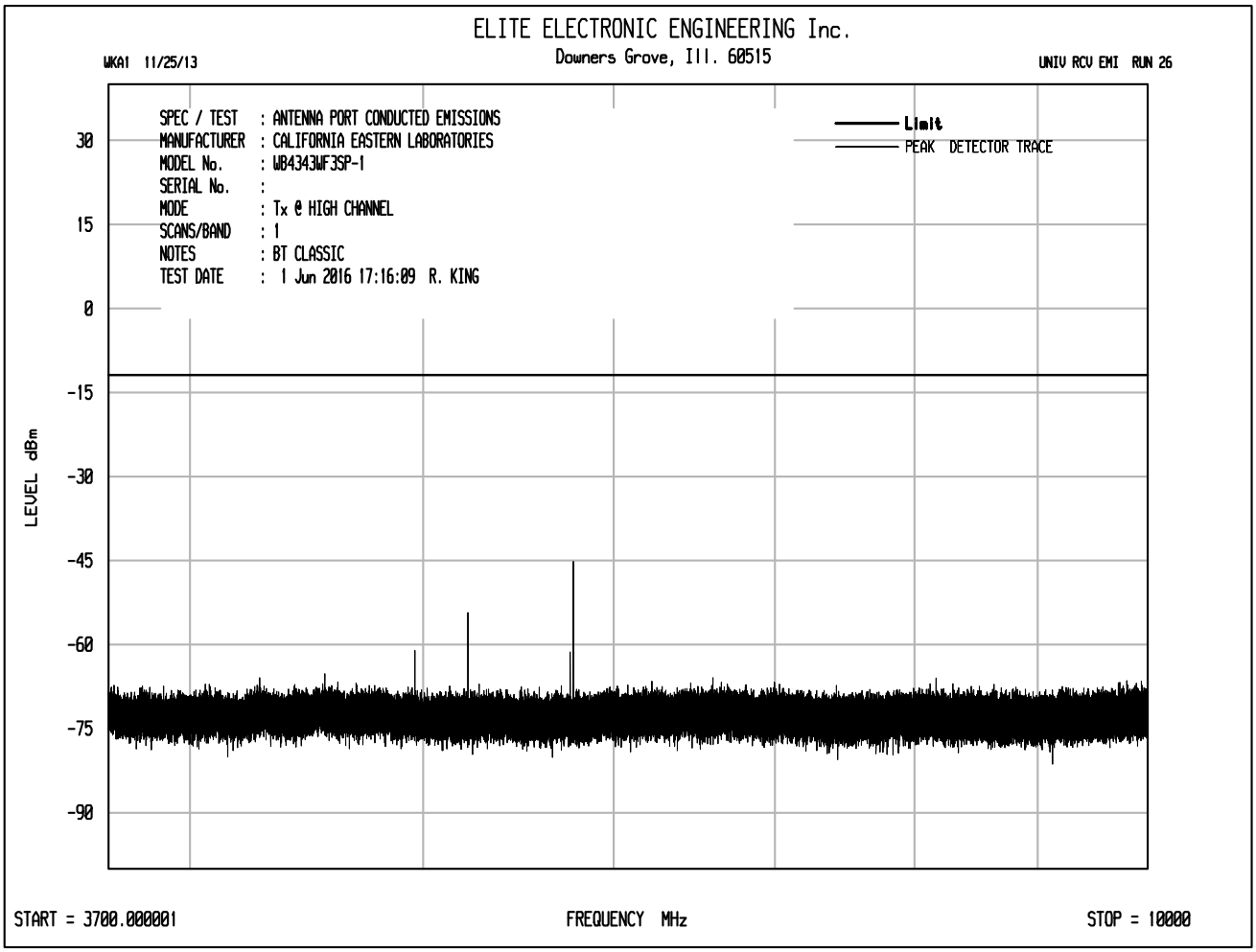

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 10
SPEC / TEST : ANTENNA PORT CONDUCTED EMISSIONS
MANUFACTURER : CALIFORNIA EASTERN LABORATORIES
MODEL No. : WB4343WF3SP-1
SERIAL No. :
MODE : Tx @ MID CHANNEL
SCANS/BAND : 1
NOTES : BT CLASSIC
TEST DATE : 1 Jun 2016 16:03:18 R. KING
Limit
PEAK DETECTOR TRACE
LEVEL dBm
30
15
0
-15
-30
-45
-60
-75
-90
100
1000
START = 30
FREQUENCY MHz
STOP = 4700

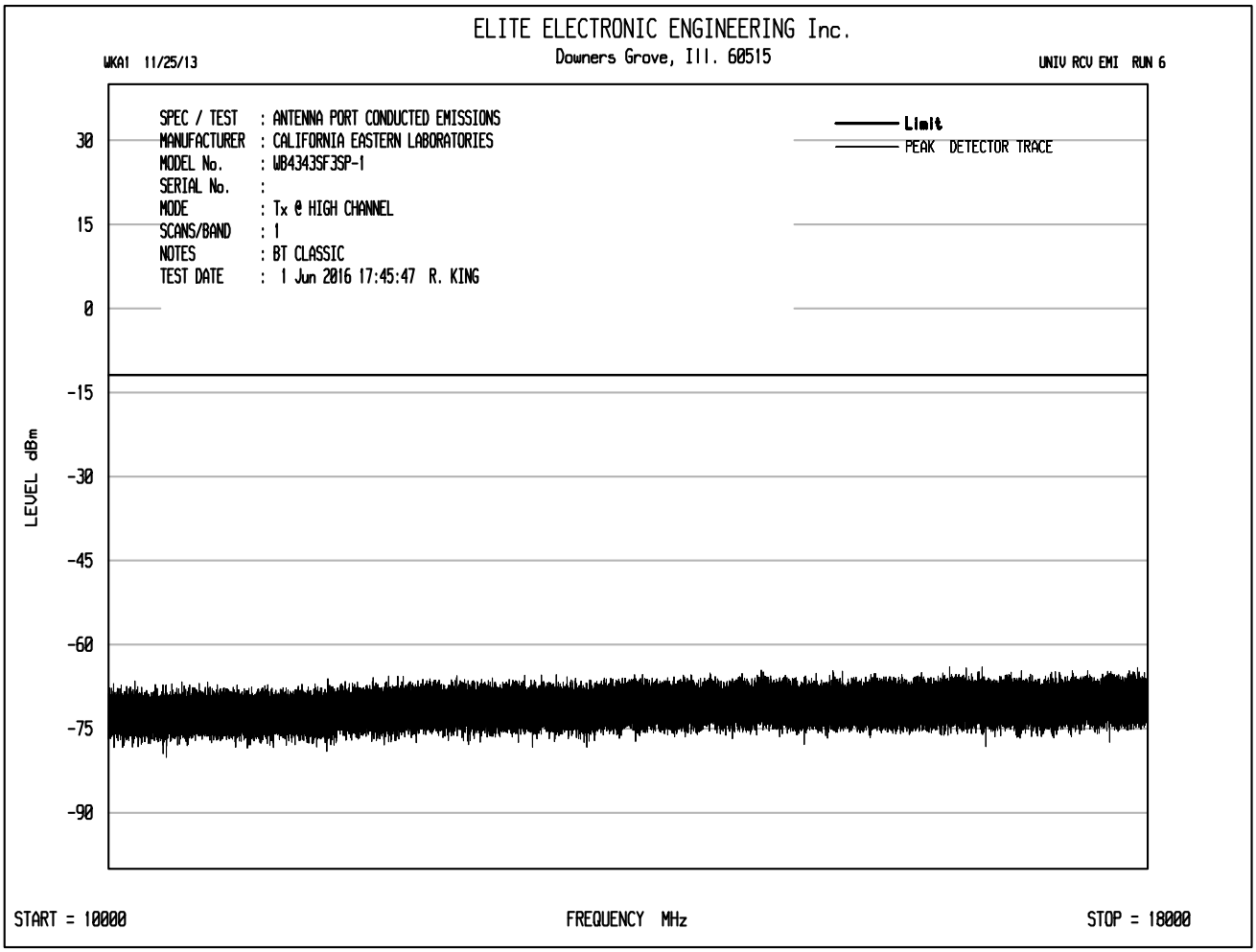

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 25
SPEC / TEST : ANTENNA PORT CONDUCTED EMISSIONS
MANUFACTURER : CALIFORNIA EASTERN LABORATORIES
MODEL No. : WB4343WF3SP-1
SERIAL No. :
MODE : Tx @ MID CHANNEL
SCANS/BAND : 1
NOTES : BT CLASSIC
TEST DATE : 1 Jun 2016 17:13:55 R. KING
Limit
PEAK DETECTOR TRACE
30
15
0
-15
-30
-45
-60
-75
-90
LEVEL dBm
START = 3700.000001
FREQUENCY MHz
STOP = 10000

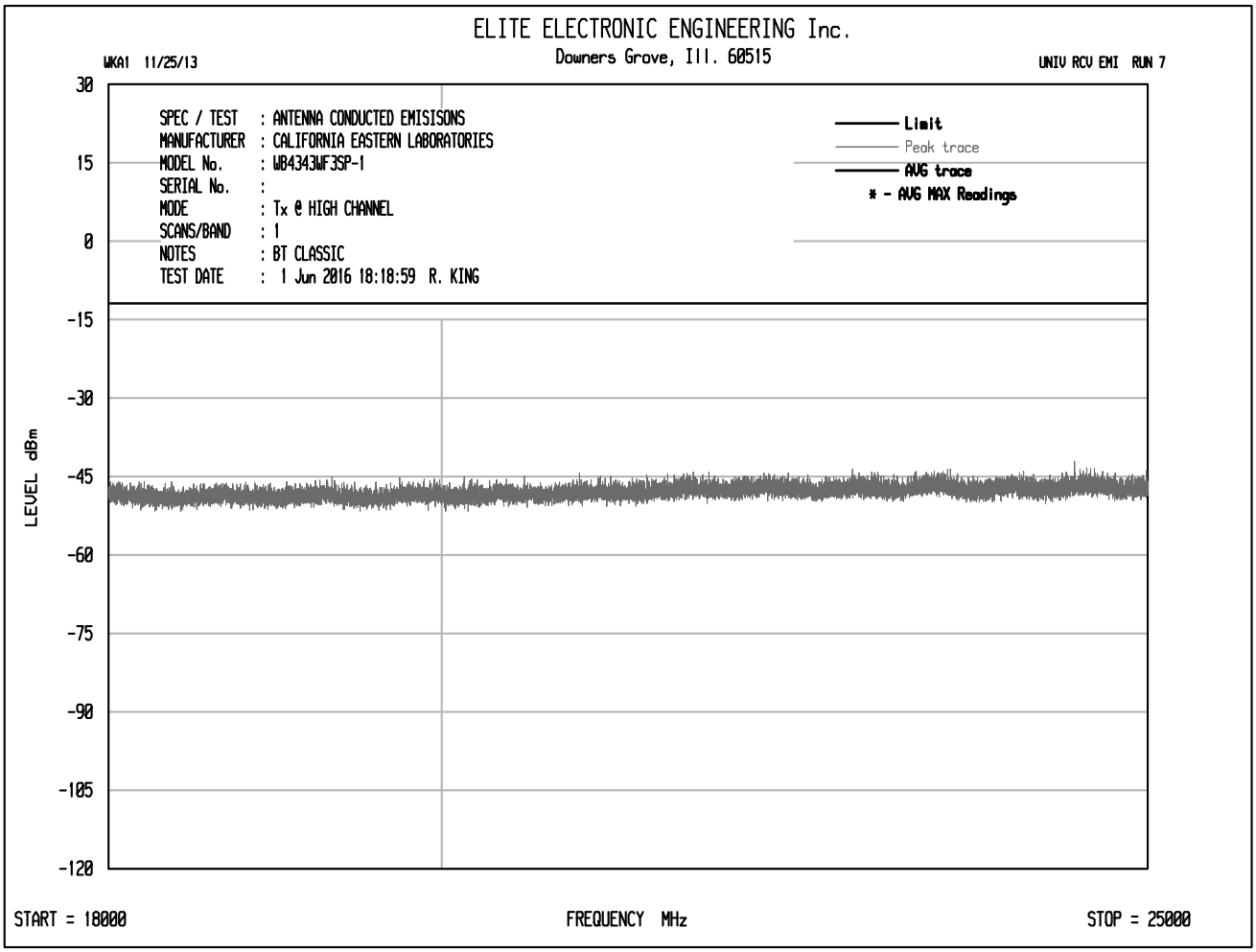

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 5
SPEC / TEST : ANTENNA PORT CONDUCTED EMISSIONS
MANUFACTURER : CALIFORNIA EASTERN LABORATORIES
MODEL No. : WB4343SF3SP-1
SERIAL No. :
MODE : Tx @ MID CHANNEL
SCANS/BAND : 1
NOTES : BT CLASSIC
TEST DATE : 1 Jun 2016 17:43:03 R. KING
Limit
PEAK DETECTOR TRACE
30
15
0
-15
-30
-45
-60
-75
-90
LEVEL dBm
START = 10000
FREQUENCY MHz
STOP = 18000

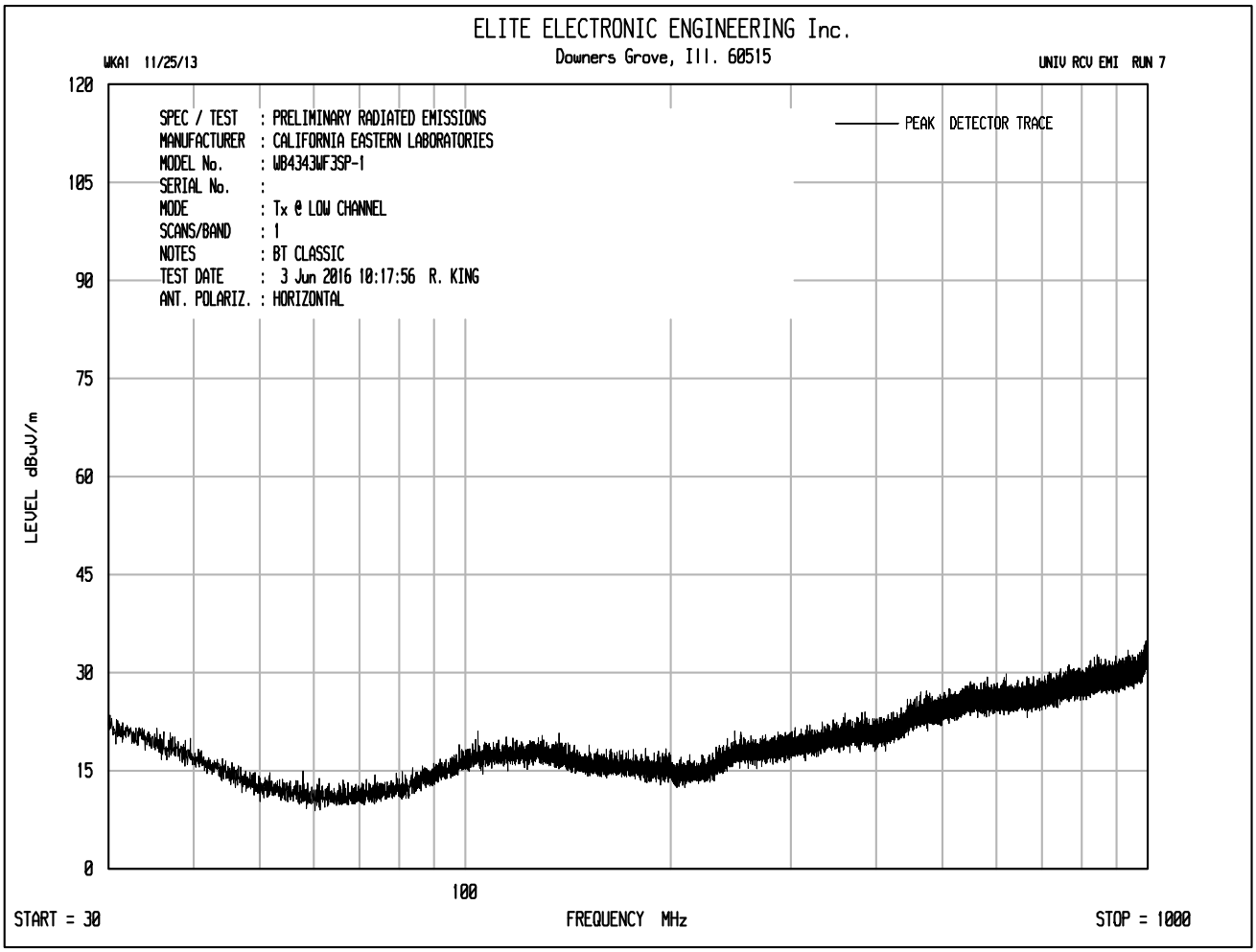

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 6
SPEC / TEST : ANTENNA CONDUCTED EMISISONS
MANUFACTURER : CALIFORNIA EASTERN LABORATORIES
MODEL No. : WB4343WF3SP-1
SERIAL No. :
MODE : Tx @ MID CHANNEL
SCANS/BAND : 1
NOTES : BT CLASSIC
TEST DATE : 1 Jun 2016 18:17:14 R. KING
Limit
Peak trace
AVG trace
* - AVG MAX Readings
30
15
0
-15
-30
-45
-60
-75
-90
-105
-120
LEVEL dBm
START = 18000
FREQUENCY MHz
STOP = 25000

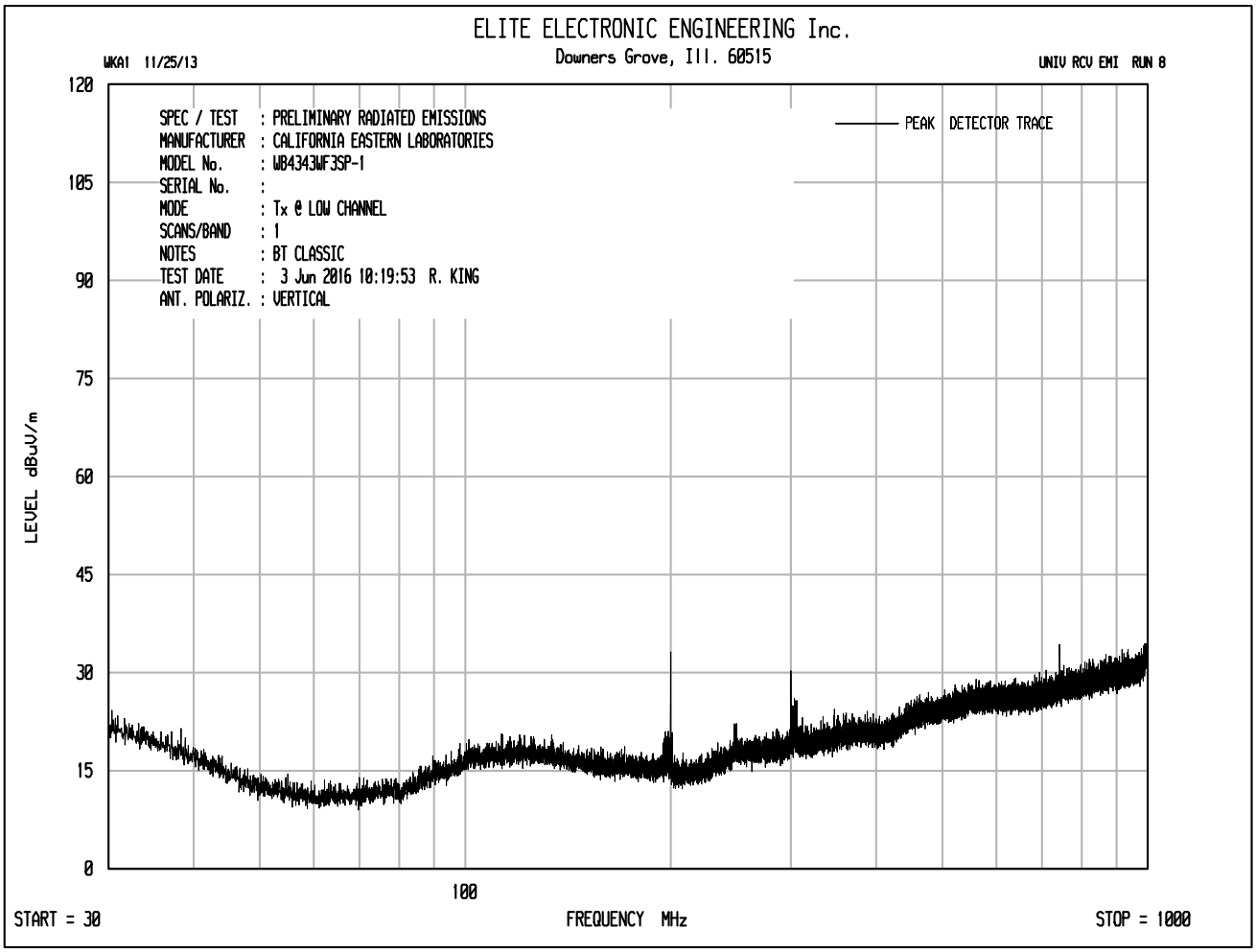

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 12
SPEC / TEST : ANTENNA PORT CONDUCTED EMISSIONS
MANUFACTURER : CALIFORNIA EASTERN LABORATORIES
MODEL No. : WB4343WF3SP-1
SERIAL No. :
MODE : Tx @ HIGH CHANNEL
SCANS/BAND : 1
NOTES : BT CLASSIC
TEST DATE : 1 Jun 2016 16:06:46 R. KING
Limit
PEAK DETECTOR TRACE
30
15
0
-15
-30
-45
-60
-75
-90
LEVEL dBm
100
1000
START = 30
FREQUENCY MHz
STOP = 4700

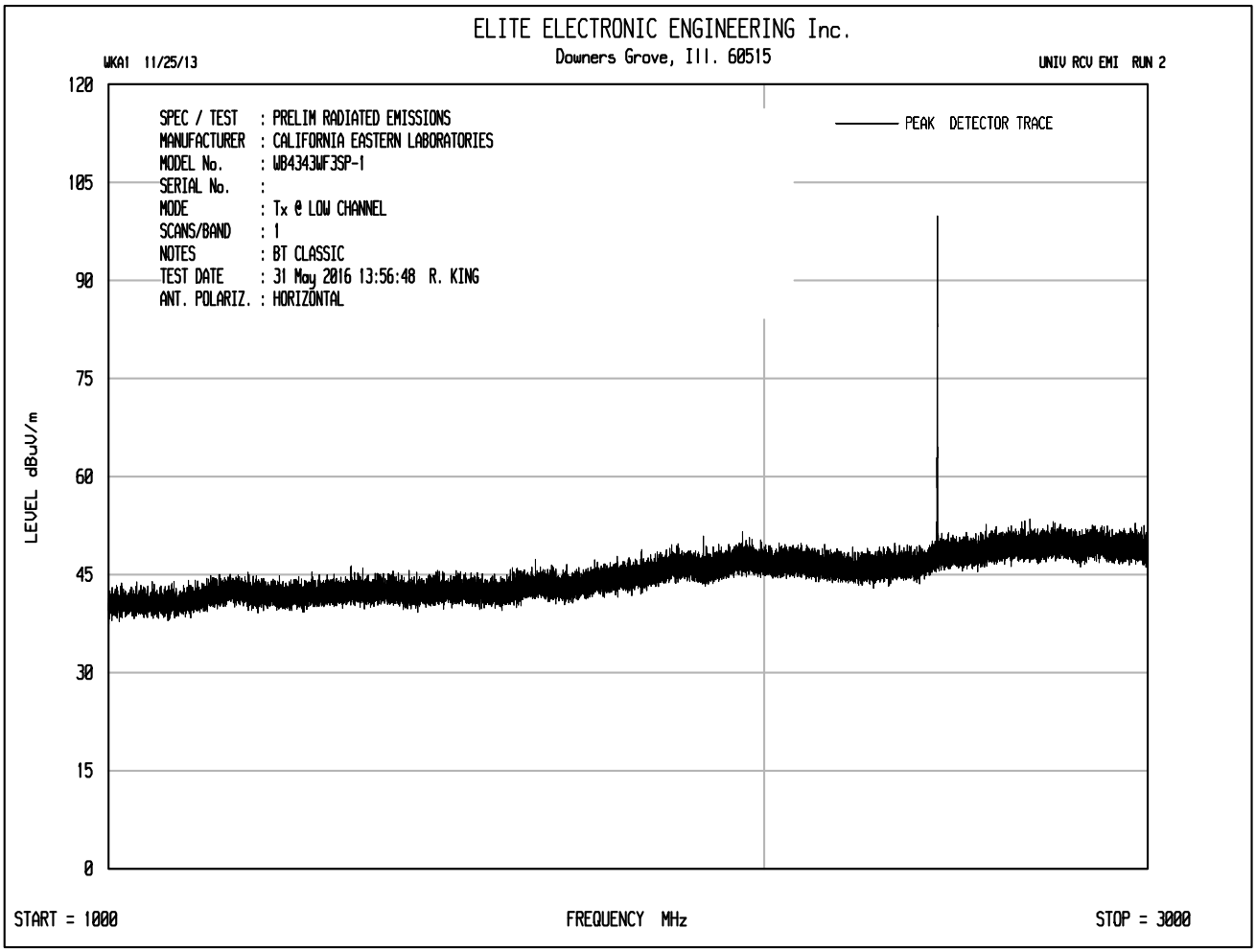

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 26
SPEC / TEST : ANTENNA PORT CONDUCTED EMISSIONS
MANUFACTURER : CALIFORNIA EASTERN LABORATORIES
MODEL No. : WB4343WF3SP-1
SERIAL No. :
MODE : Tx @ HIGH CHANNEL
SCANS/BAND : 1
NOTES : BT CLASSIC
TEST DATE : 1 Jun 2016 17:16:09 R. KING
Limit
PEAK DETECTOR TRACE
30
15
0
-15
-30
-45
-60
-75
-90
LEVEL dBm
START = 3700.000001
FREQUENCY MHz
STOP = 10000

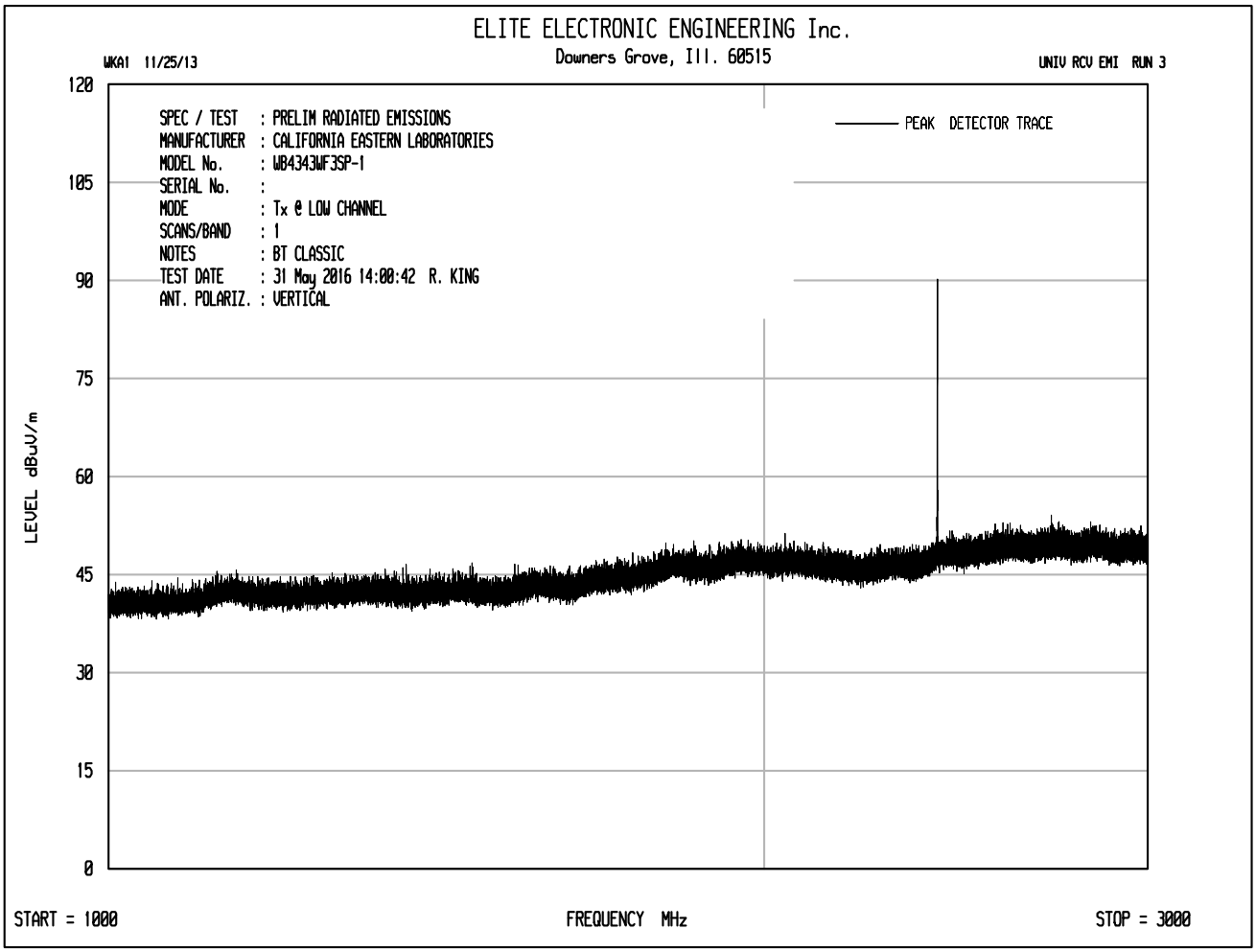

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 6
SPEC / TEST : ANTENNA PORT CONDUCTED EMISSIONS
MANUFACTURER : CALIFORNIA EASTERN LABORATORIES
MODEL No. : WB4343SF3SP-1
SERIAL No. :
MODE : Tx @ HIGH CHANNEL
SCANS/BAND : 1
NOTES : BT CLASSIC
TEST DATE : 1 Jun 2016 17:45:47 R. KING
Limit
PEAK DETECTOR TRACE
30
15
0
-15
-30
-45
-60
-75
-90
LEVEL dBm
START = 10000
FREQUENCY MHz
STOP = 18000

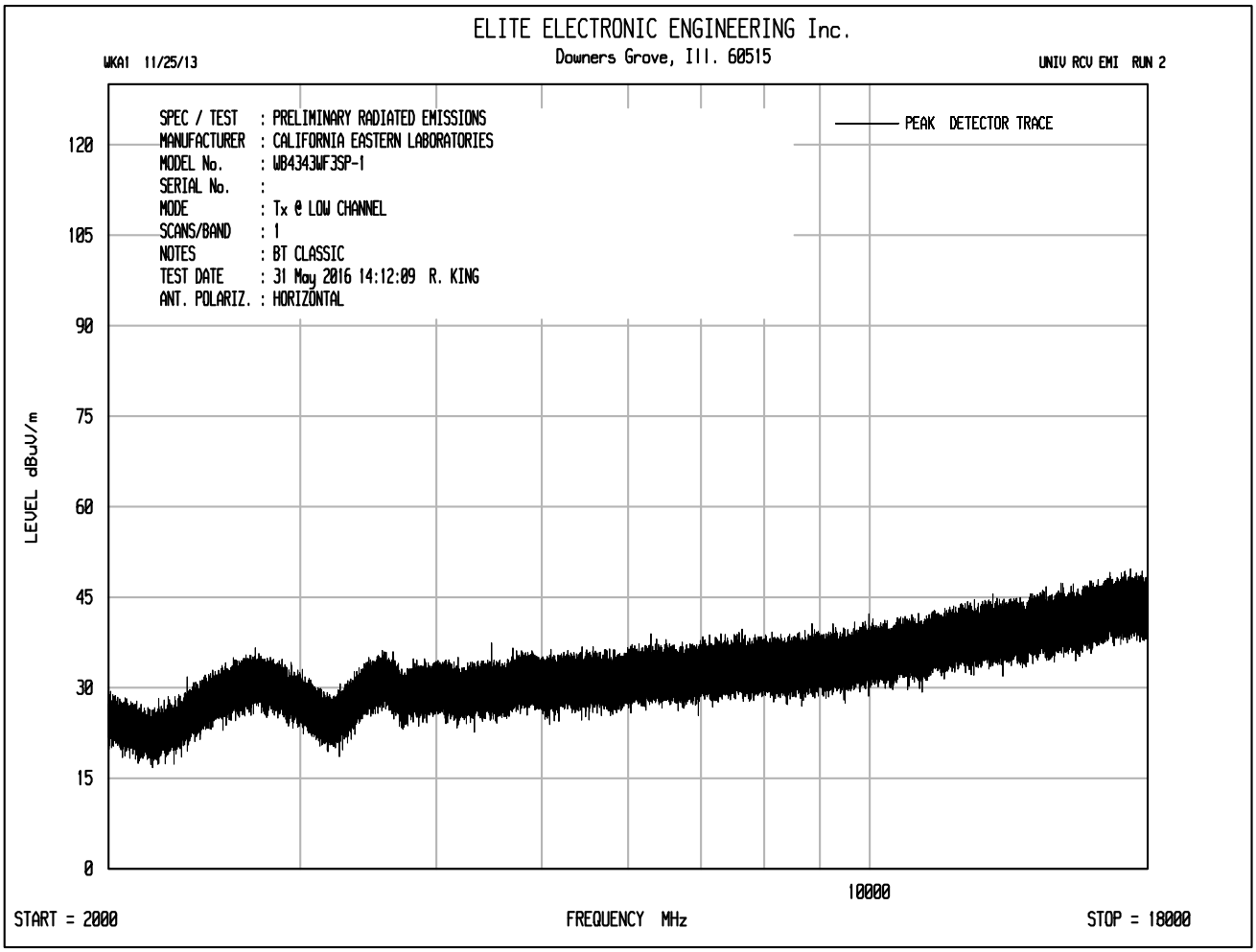

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 7
SPEC / TEST : ANTENNA CONDUCTED EMISISONS
MANUFACTURER : CALIFORNIA EASTERN LABORATORIES
MODEL No. : WB4343WF3SP-1
SERIAL No. :
MODE : Tx @ HIGH CHANNEL
SCANS/BAND : 1
NOTES : BT CLASSIC
TEST DATE : 1 Jun 2016 18:18:59 R. KING
Limit
Peak trace
AVG trace
* - AVG MAX Readings
30
15
0
-15
-30
-45
-60
-75
-90
-105
-120
LEVEL dBm
START = 18000
FREQUENCY MHz
STOP = 25000

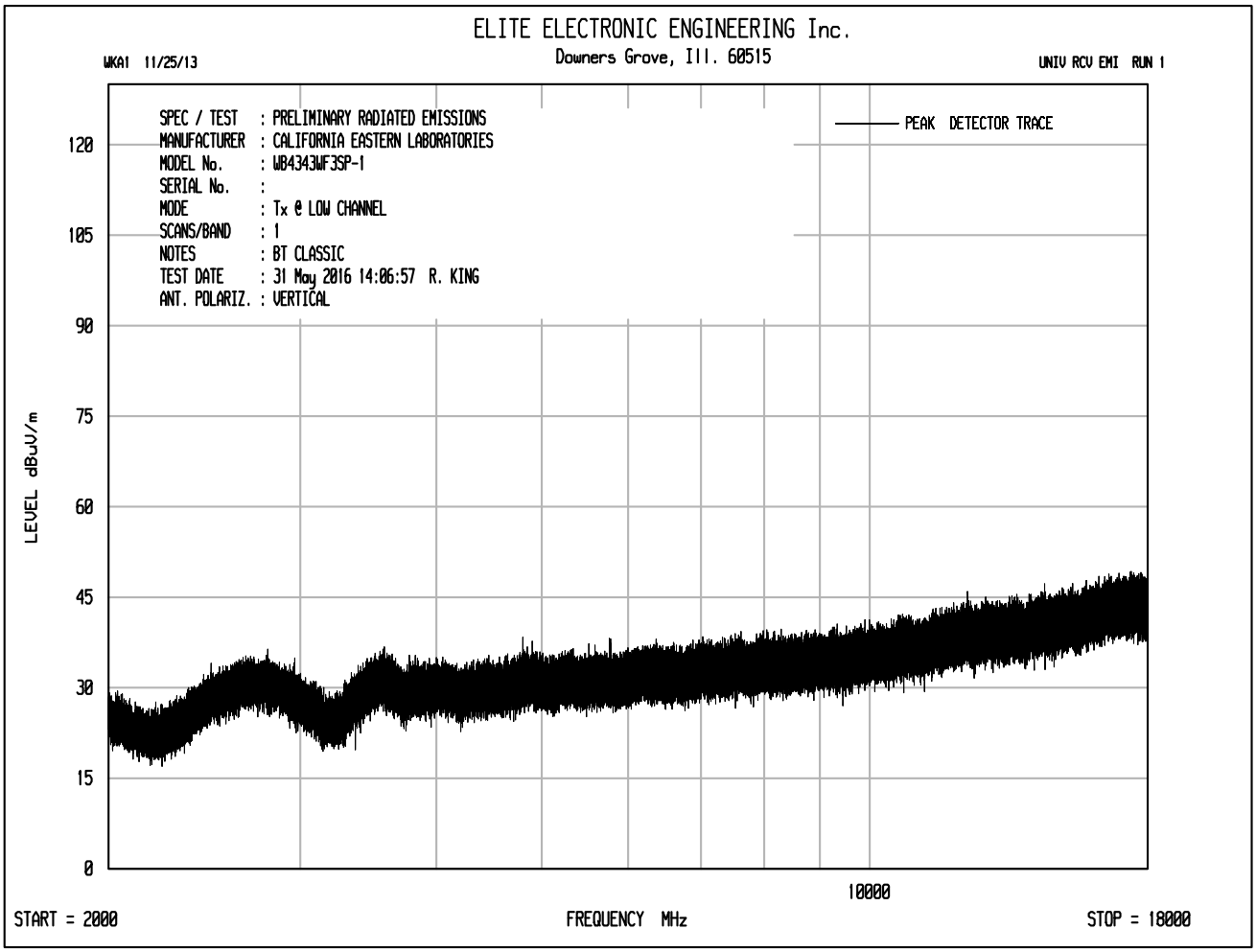

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 7
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : CALIFORNIA EASTERN LABORATORIES
MODEL No. : WB4343WF3SP-1
SERIAL No. :
MODE : Tx @ LOW CHANNEL
SCANS/BAND : 1
NOTES : BT CLASSIC
TEST DATE : 3 Jun 2016 10:17:56 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

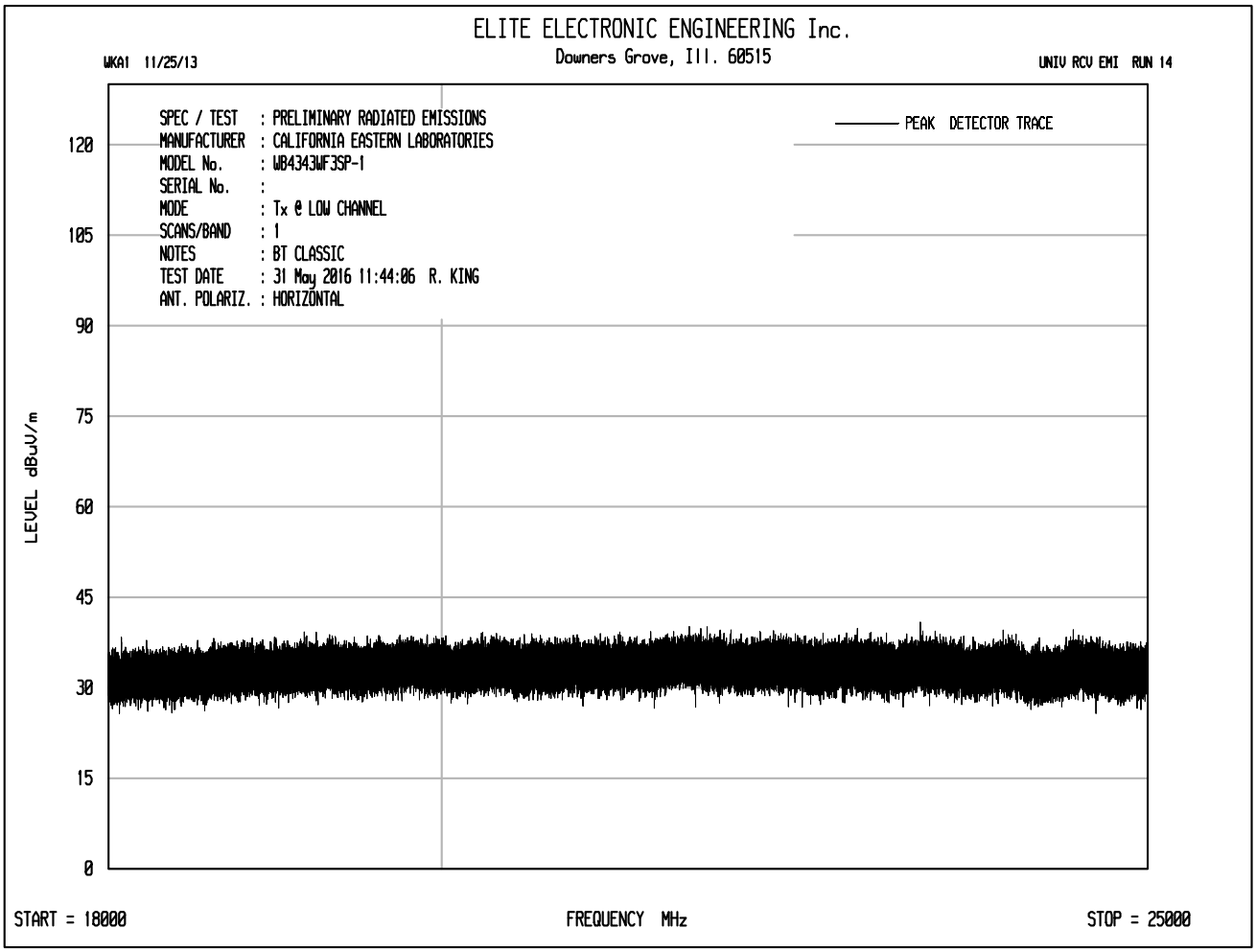

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 8
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : CALIFORNIA EASTERN LABORATORIES
MODEL No. : WB4343WF3SP-1
SERIAL No. :
MODE : Tx @ LOW CHANNEL
SCANS/BAND : 1
NOTES : BT CLASSIC
TEST DATE : 3 Jun 2016 10:19:53 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

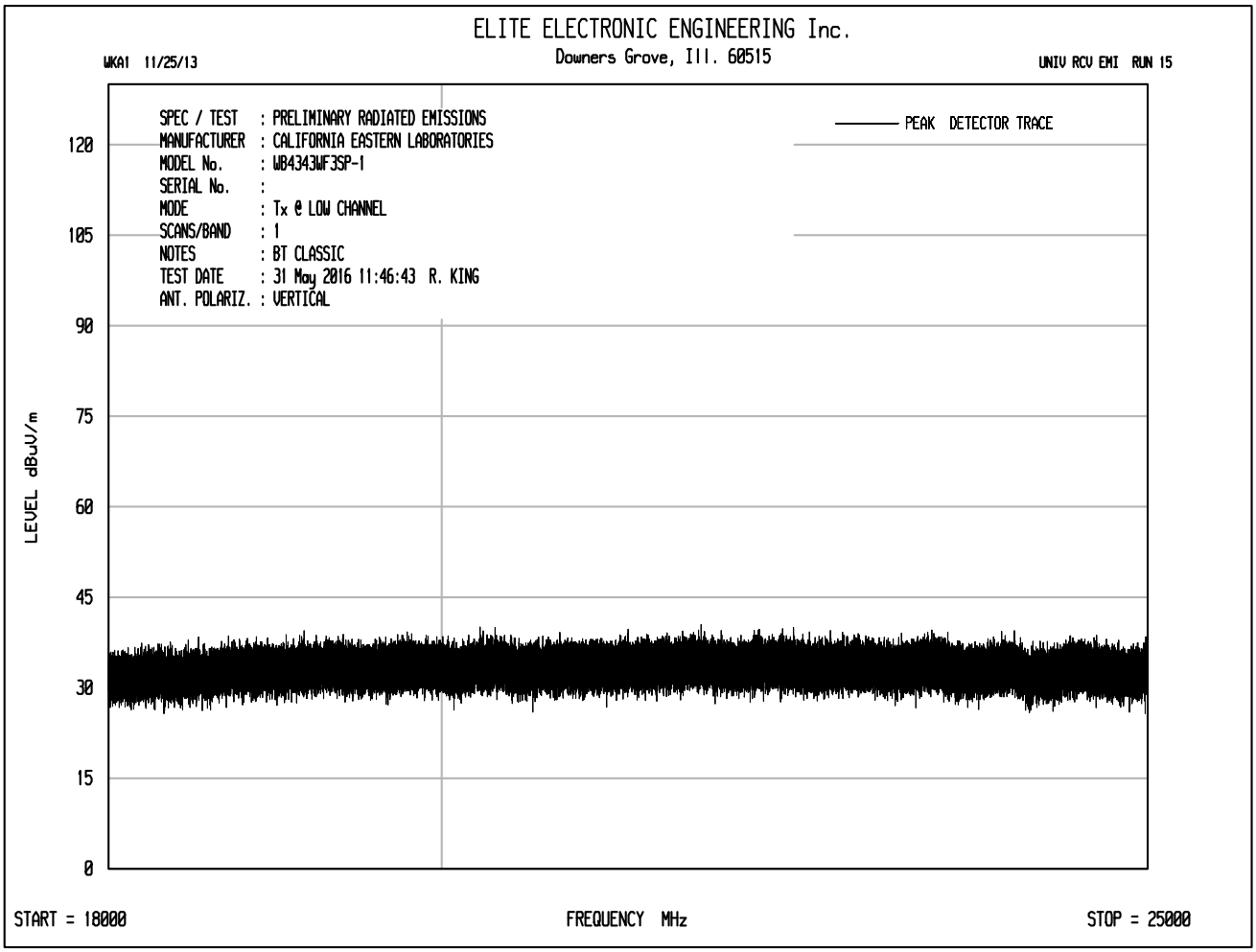

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 2
SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : CALIFORNIA EASTERN LABORATORIES
MODEL No. : WB4343WF3SP-1
SERIAL No. :
MODE : Tx @ LOW CHANNEL
SCANS/BAND : 1
NOTES : BT CLASSIC
TEST DATE : 31 May 2016 13:56:48 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 3000

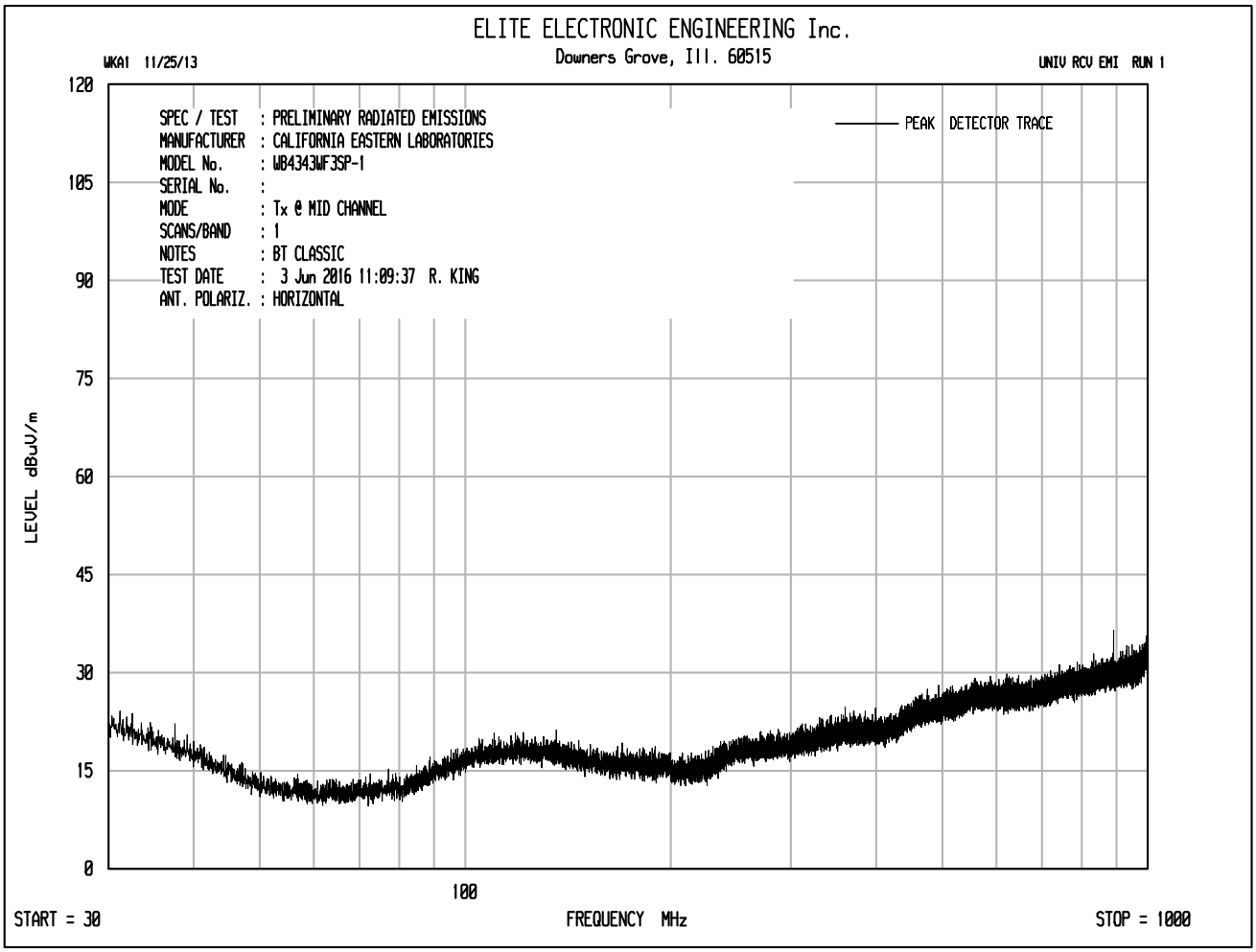

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 3
SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : CALIFORNIA EASTERN LABORATORIES
MODEL No. : WB4343WF3SP-1
SERIAL No. :
MODE : Tx @ LOW CHANNEL
SCANS/BAND : 1
NOTES : BT CLASSIC
TEST DATE : 31 May 2016 14:00:42 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 3000

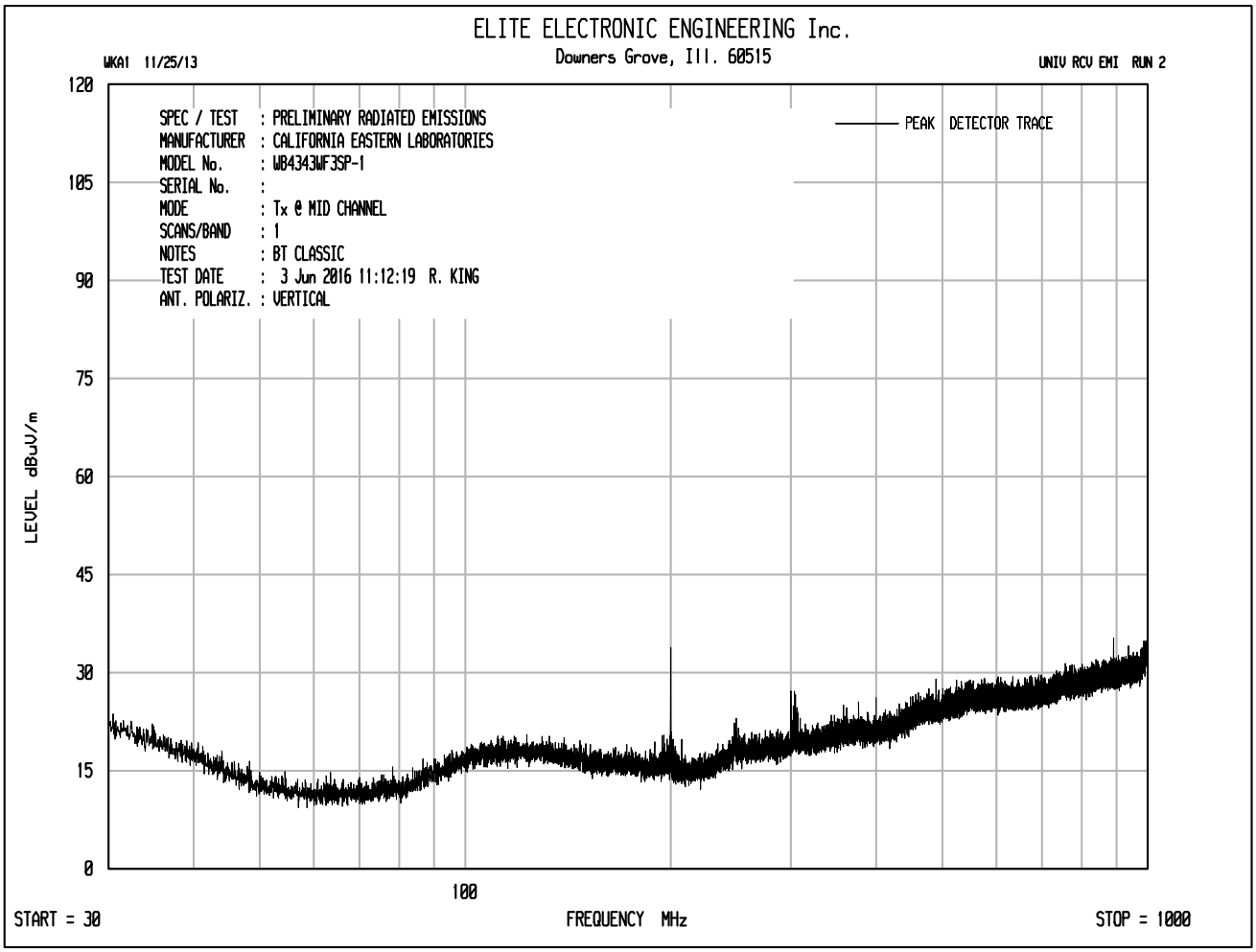

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 2
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : CALIFORNIA EASTERN LABORATORIES
MODEL No. : WB4343WF3SP-1
SERIAL No. :
MODE : Tx @ LOW CHANNEL
SCANS/BAND : 1
NOTES : BT CLASSIC
TEST DATE : 31 May 2016 14:12:09 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
10000
START = 2000
FREQUENCY MHz
STOP = 18000

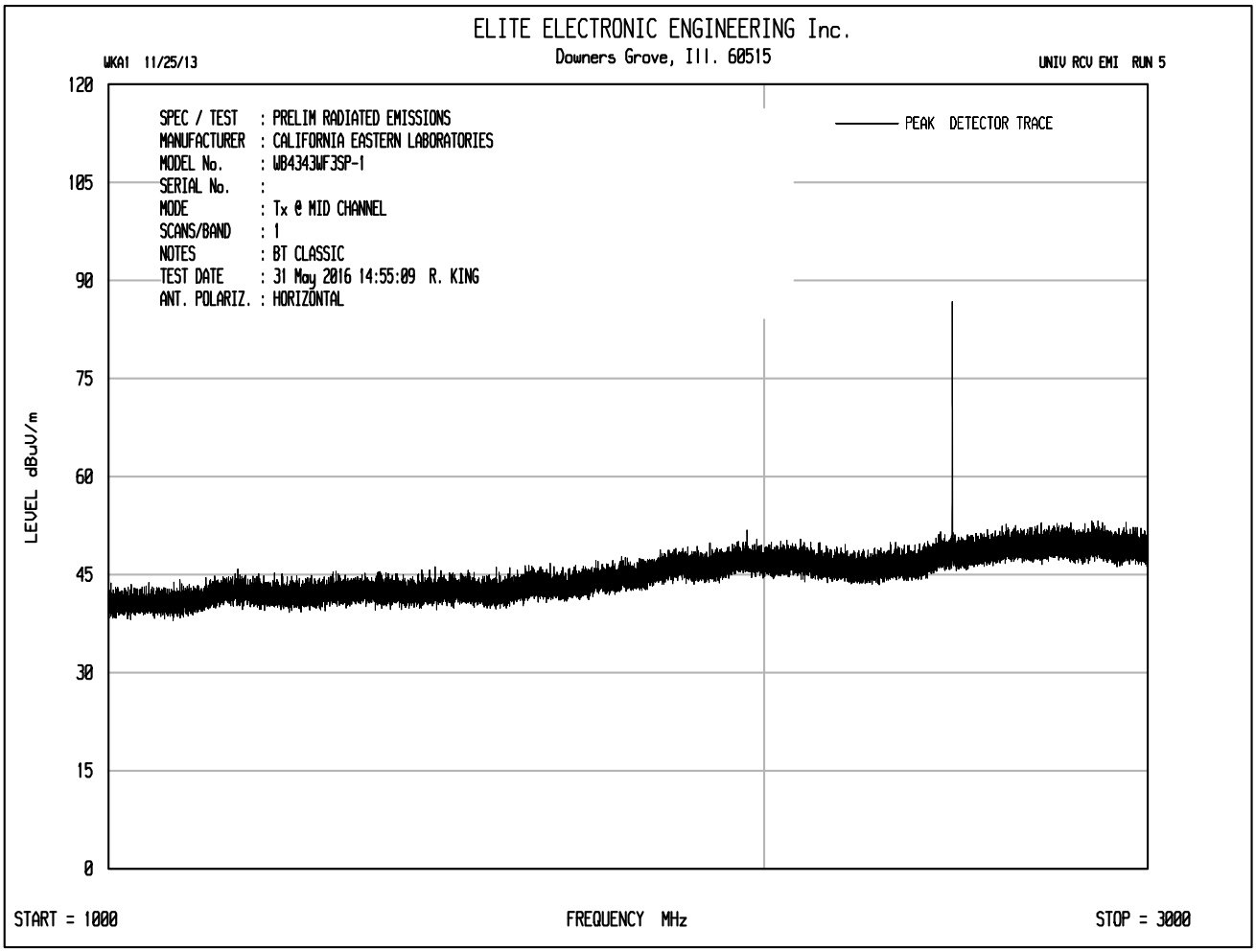

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 1
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : CALIFORNIA EASTERN LABORATORIES
MODEL No. : WB4343WF3SP-1
SERIAL No. :
MODE : Tx @ LOW CHANNEL
SCANS/BAND : 1
NOTES : BT CLASSIC
TEST DATE : 31 May 2016 14:06:57 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
10000
START = 2000
FREQUENCY MHz
STOP = 18000

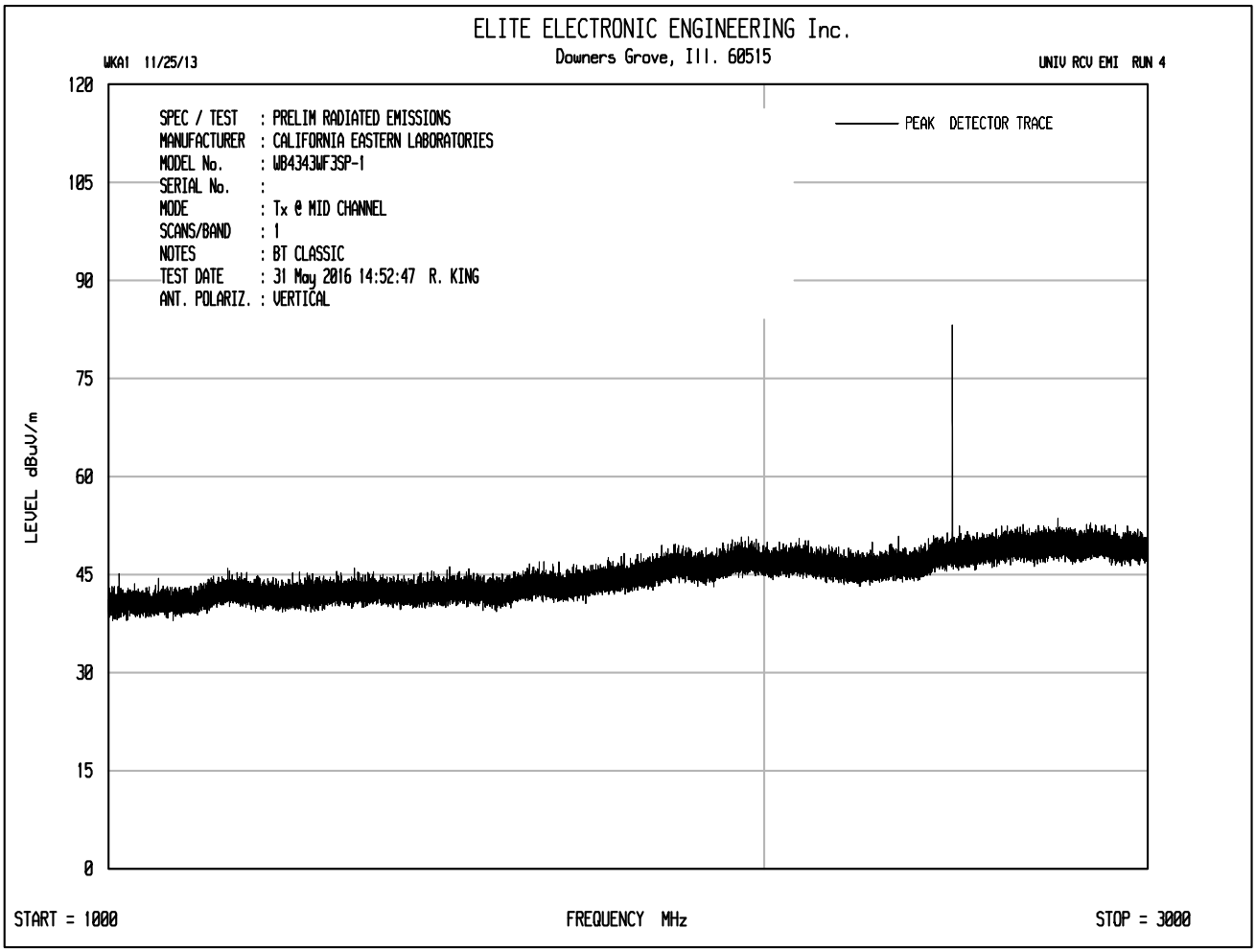

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 14
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : CALIFORNIA EASTERN LABORATORIES
MODEL No. : WB4343WF3SP-1
SERIAL No. :
MODE : Tx @ LOW CHANNEL
SCANS/BAND : 1
NOTES : BT CLASSIC
TEST DATE : 31 May 2016 11:44:06 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 18000
FREQUENCY MHz
STOP = 25000

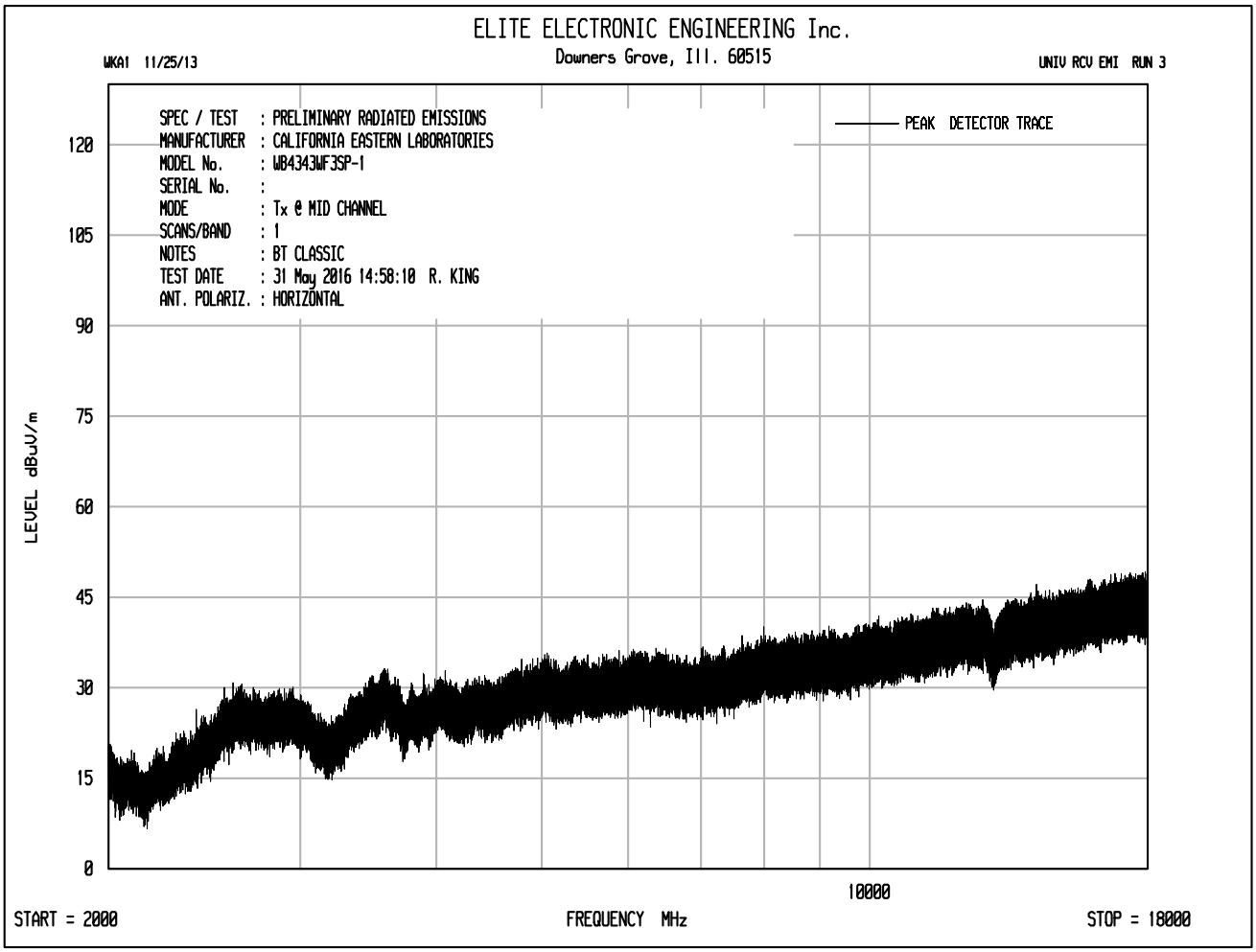

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 15
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : CALIFORNIA EASTERN LABORATORIES
MODEL No. : WB4343WF3SP-1
SERIAL No. :
MODE : Tx @ LOW CHANNEL
SCANS/BAND : 1
NOTES : BT CLASSIC
TEST DATE : 31 May 2016 11:46:43 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 18000
FREQUENCY MHz
STOP = 25000

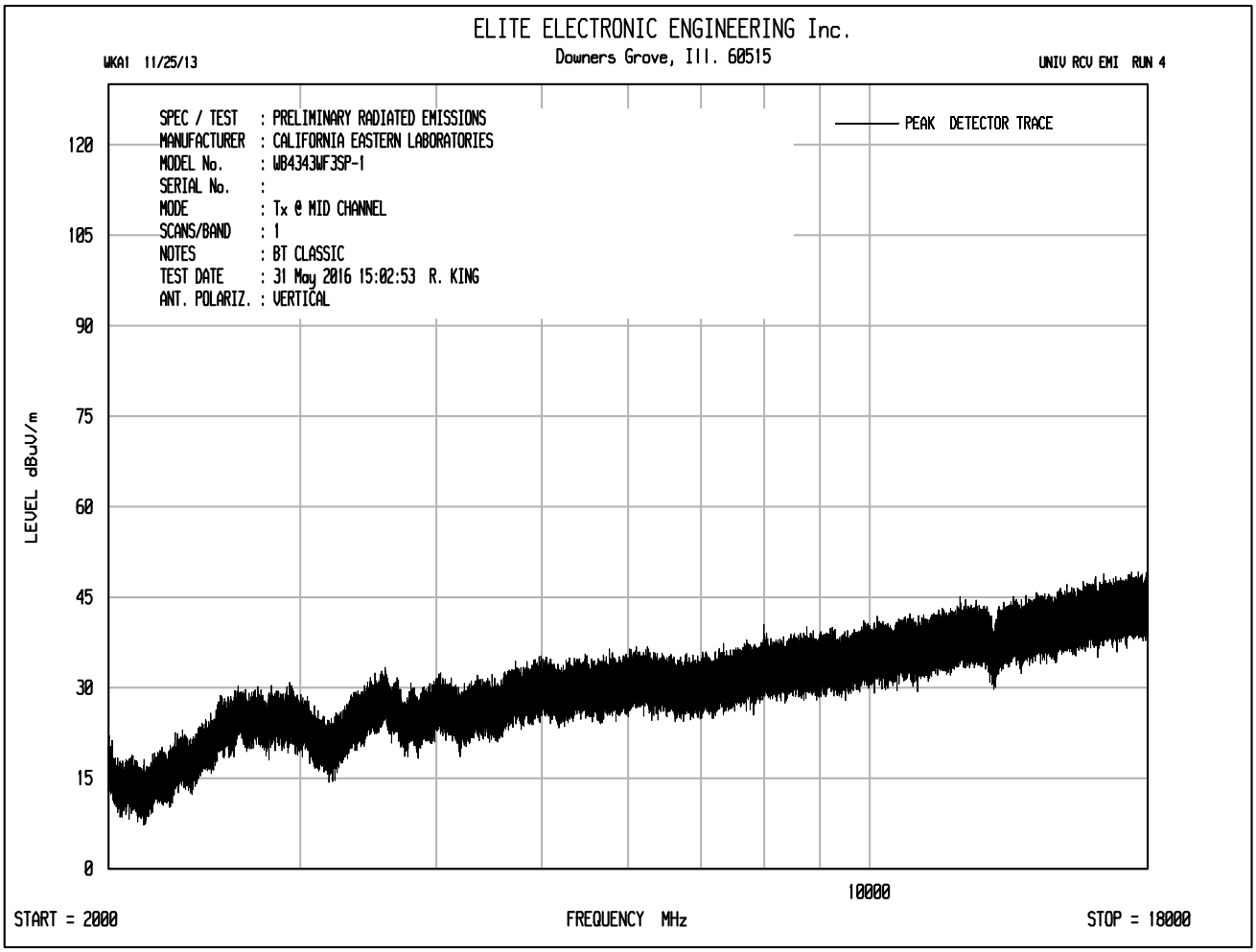

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 1
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : CALIFORNIA EASTERN LABORATORIES
MODEL No. : WB4343WF3SP-1
SERIAL No. :
MODE : Tx @ MID CHANNEL
SCANS/BAND : 1
NOTES : BT CLASSIC
TEST DATE : 3 Jun 2016 11:09:37 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

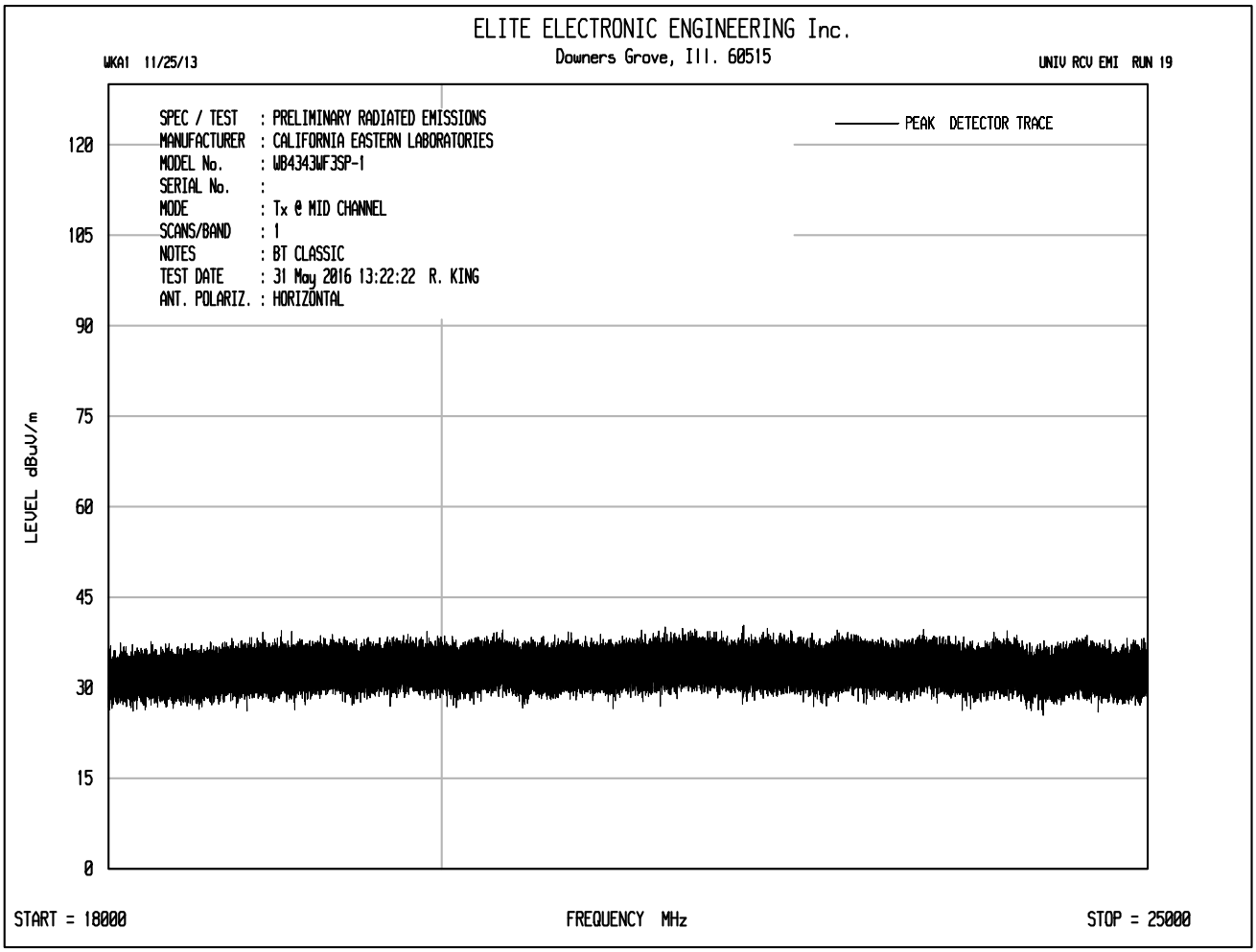

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 2
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : CALIFORNIA EASTERN LABORATORIES
MODEL No. : WB4343WF3SP-1
SERIAL No. :
MODE : Tx @ MID CHANNEL
SCANS/BAND : 1
NOTES : BT CLASSIC
TEST DATE : 3 Jun 2016 11:12:19 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

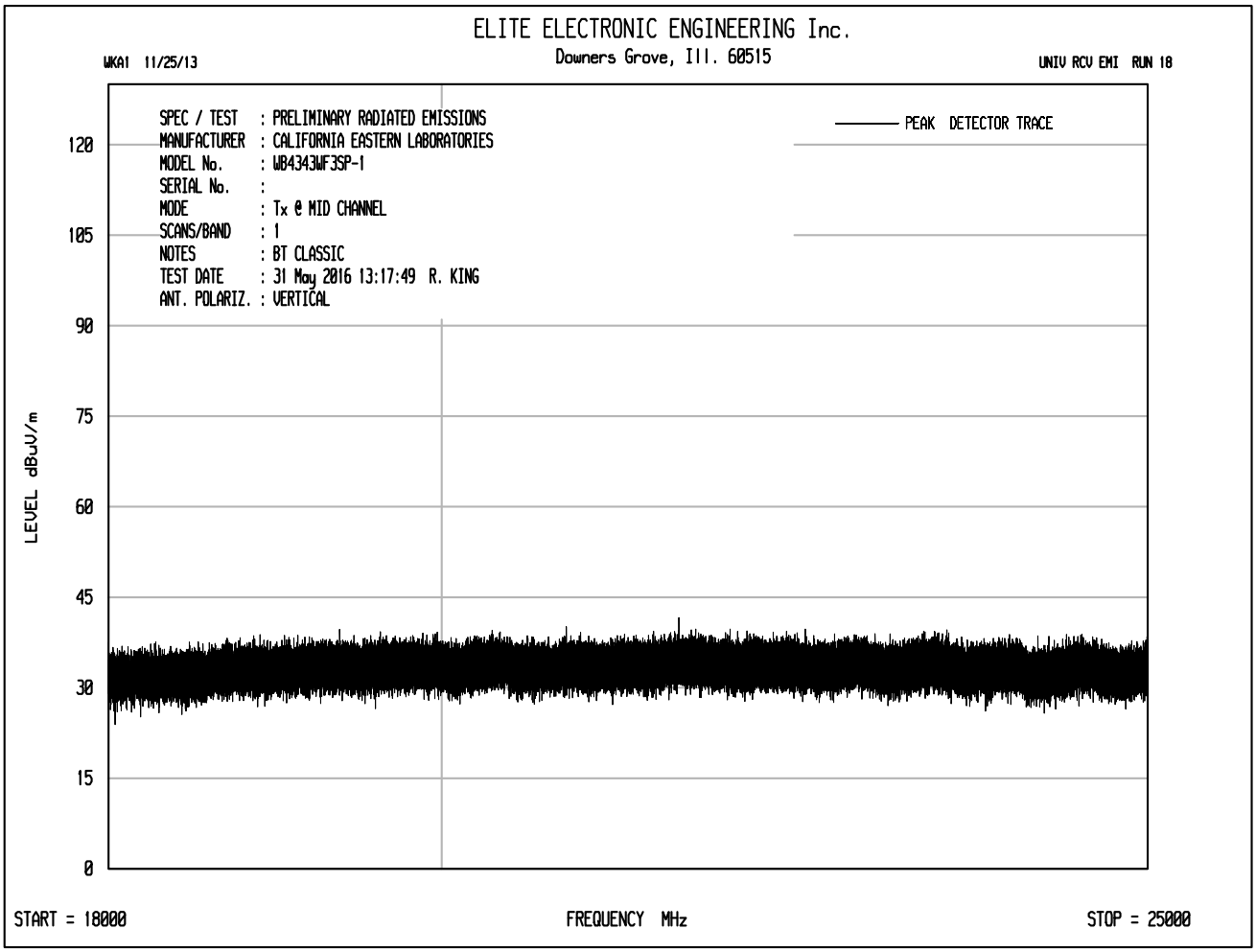

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 5
SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : CALIFORNIA EASTERN LABORATORIES
MODEL No. : WB4343WF3SP-1
SERIAL No. :
MODE : Tx @ MID CHANNEL
SCANS/BAND : 1
NOTES : BT CLASSIC
TEST DATE : 31 May 2016 14:55:09 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 3000

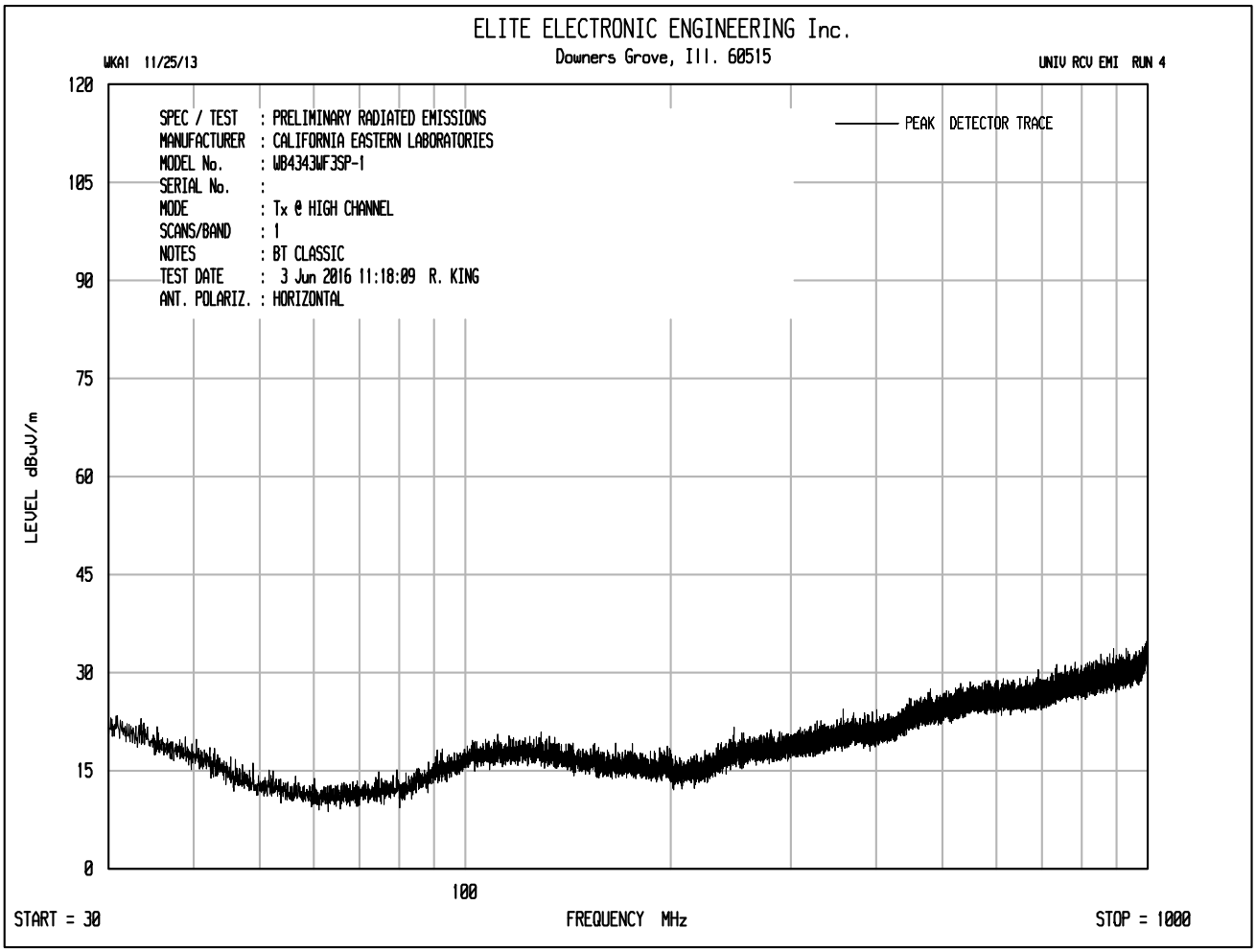

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 4
SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : CALIFORNIA EASTERN LABORATORIES
MODEL No. : WB4343WF3SP-1
SERIAL No. :
MODE : Tx @ MID CHANNEL
SCANS/BAND : 1
NOTES : BT CLASSIC
TEST DATE : 31 May 2016 14:52:47 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 3000

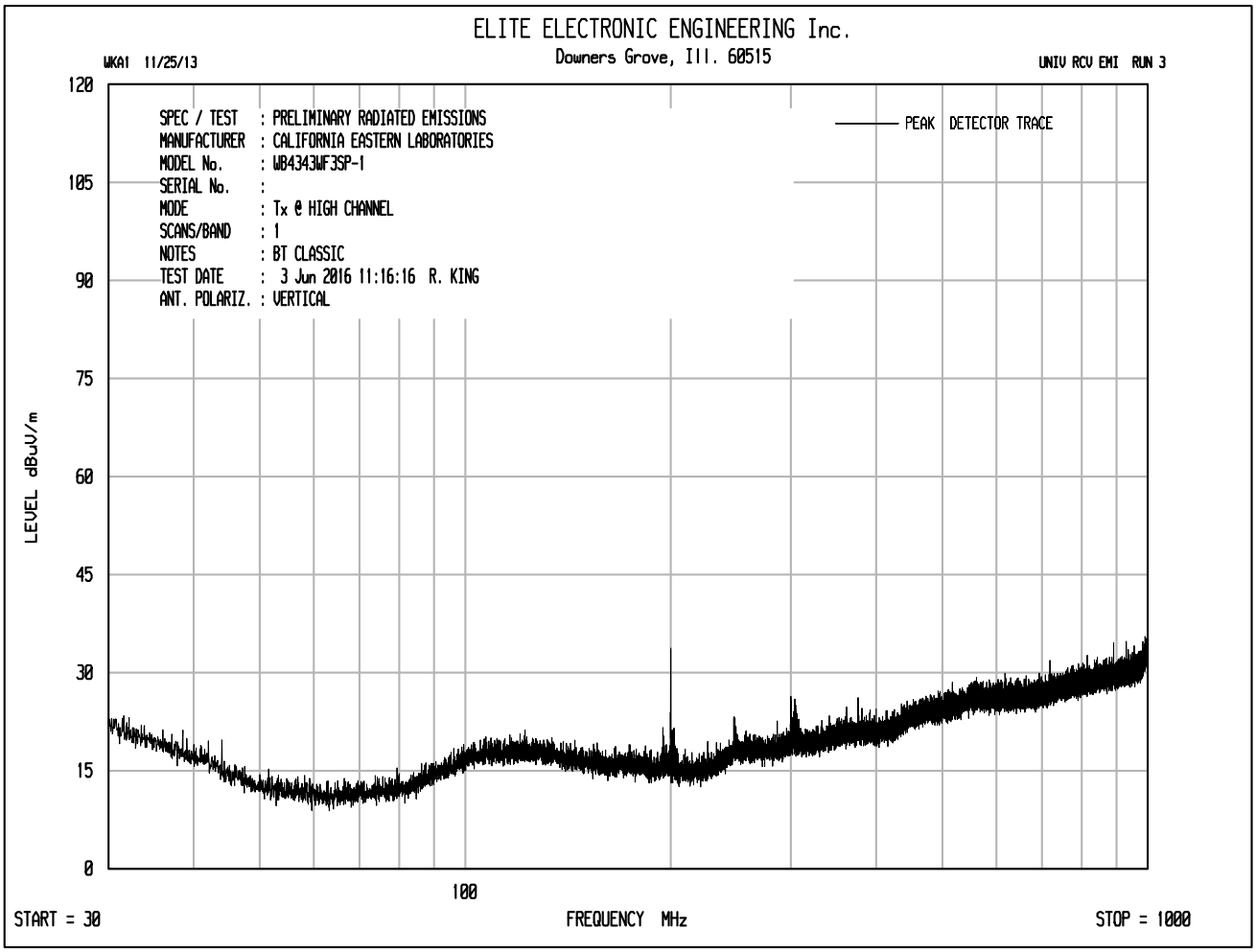

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 3
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : CALIFORNIA EASTERN LABORATORIES
MODEL No. : WB4343WF3SP-1
SERIAL No. :
MODE : Tx @ MID CHANNEL
SCANS/BAND : 1
NOTES : BT CLASSIC
TEST DATE : 31 May 2016 14:58:10 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
10000
START = 2000
FREQUENCY MHz
STOP = 18000

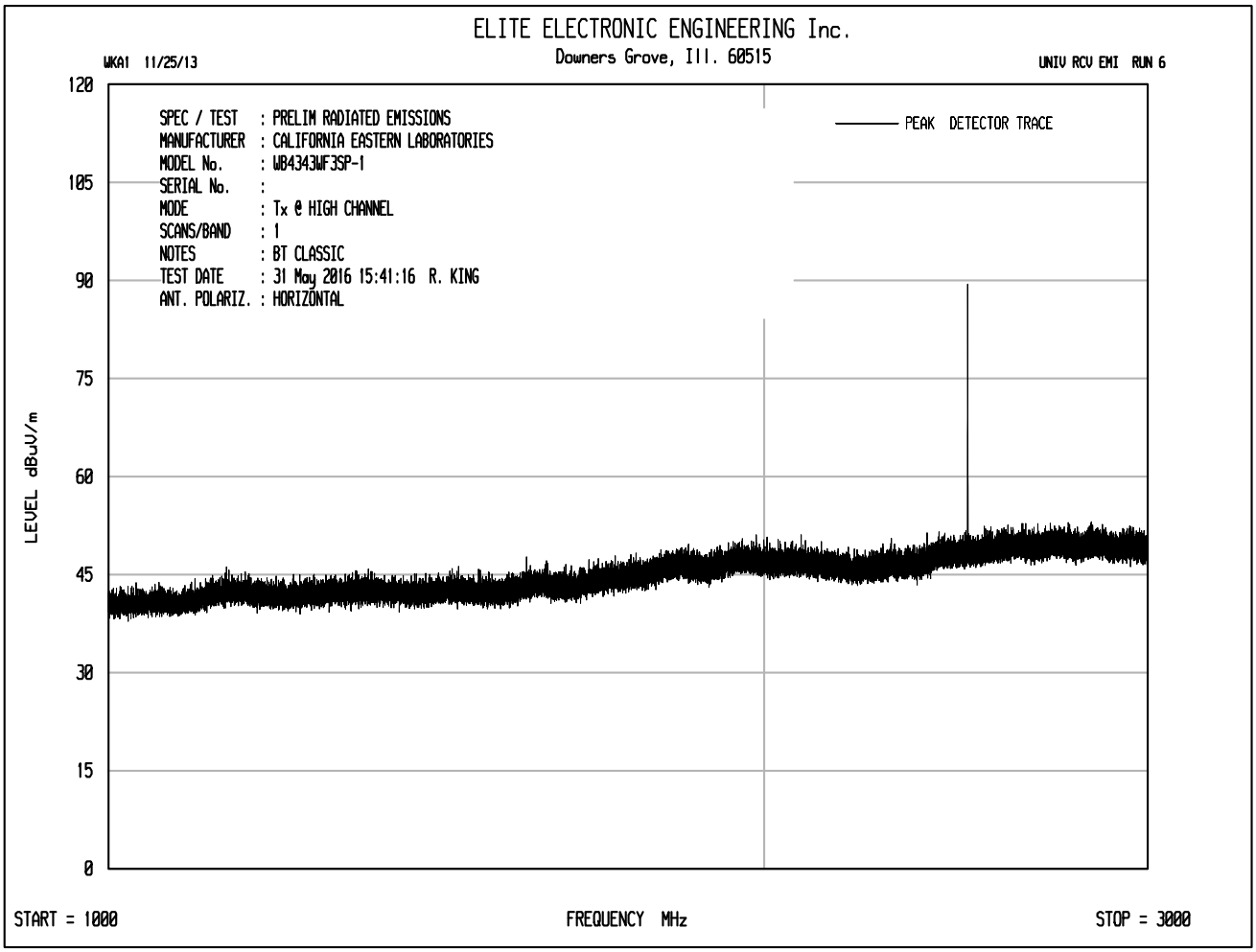

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 4
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : CALIFORNIA EASTERN LABORATORIES
MODEL No. : WB4343WF3SP-1
SERIAL No. :
MODE : Tx @ MID CHANNEL
SCANS/BAND : 1
NOTES : BT CLASSIC
TEST DATE : 31 May 2016 15:02:53 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
10000
START = 2000
FREQUENCY MHz
STOP = 18000

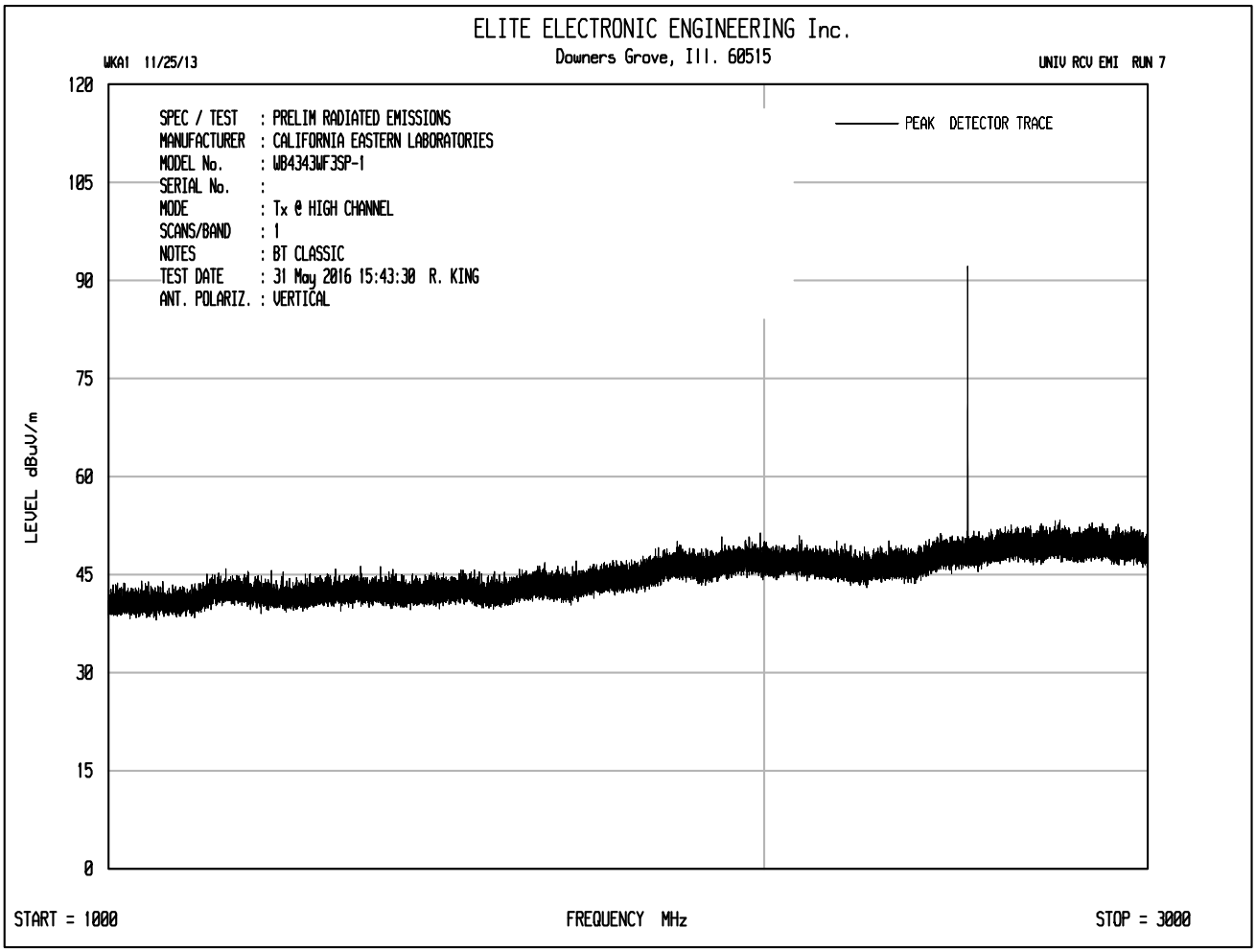

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 19
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : CALIFORNIA EASTERN LABORATORIES
MODEL No. : WB4343WF3SP-1
SERIAL No. :
MODE : Tx @ MID CHANNEL
SCANS/BAND : 1
NOTES : BT CLASSIC
TEST DATE : 31 May 2016 13:22:22 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 18000
FREQUENCY MHz
STOP = 25000

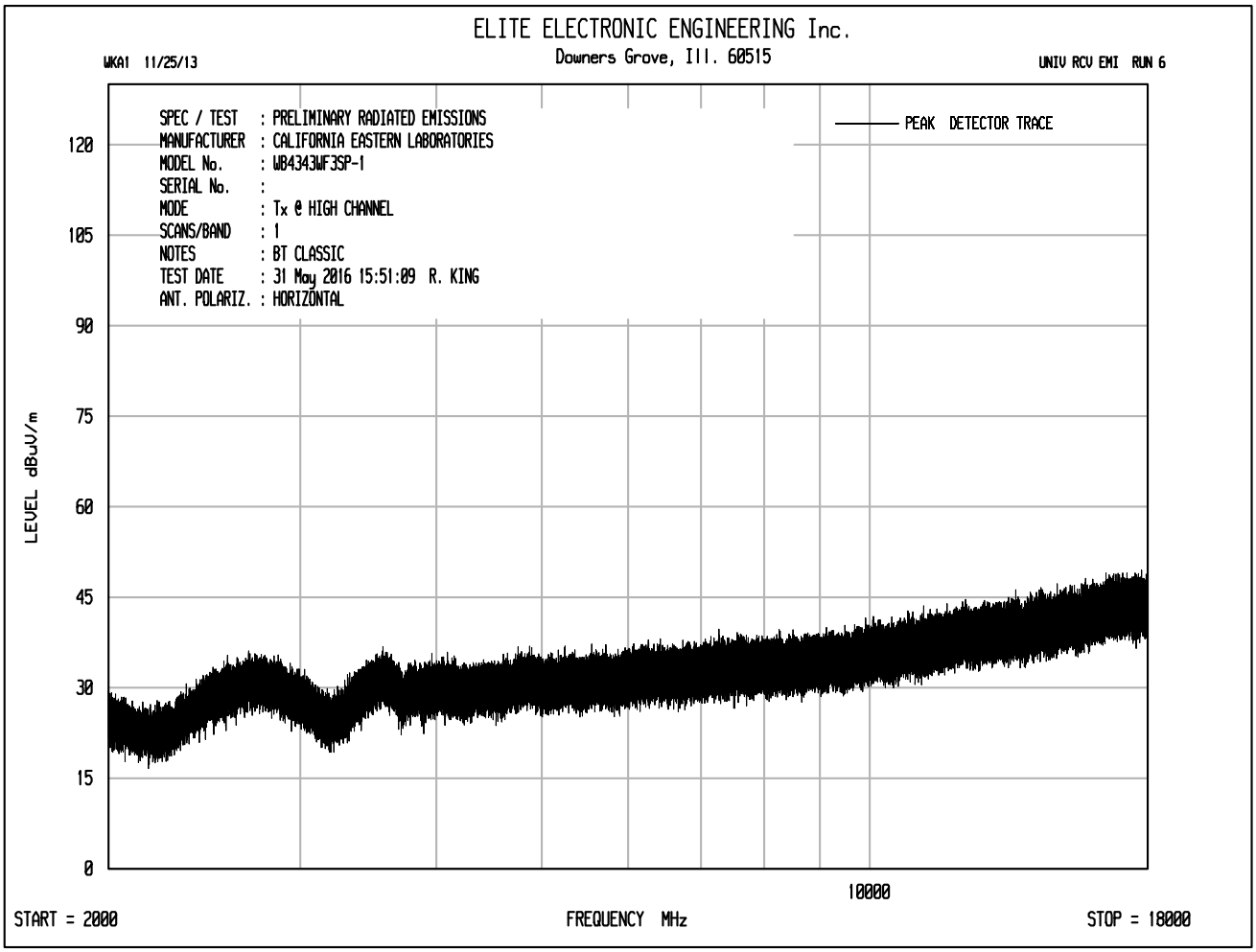

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 18
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : CALIFORNIA EASTERN LABORATORIES
MODEL No. : WB4343WF3SP-1
SERIAL No. :
MODE : Tx @ MID CHANNEL
SCANS/BAND : 1
NOTES : BT CLASSIC
TEST DATE : 31 May 2016 13:17:49 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 18000
FREQUENCY MHz
STOP = 25000

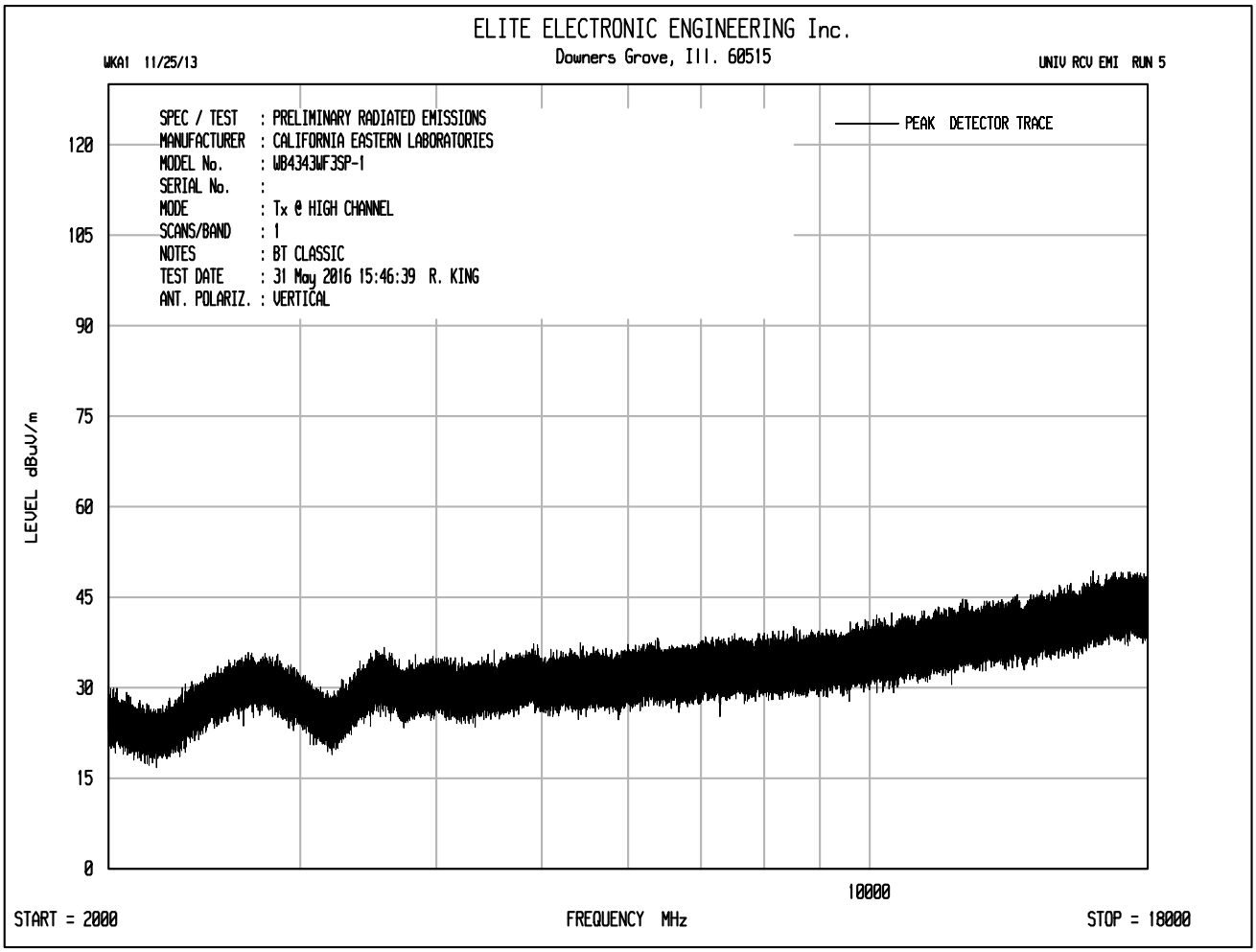

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 4
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : CALIFORNIA EASTERN LABORATORIES
MODEL No. : WB4343WF3SP-1
SERIAL No. :
MODE : Tx @ HIGH CHANNEL
SCANS/BAND : 1
NOTES : BT CLASSIC
TEST DATE : 3 Jun 2016 11:18:09 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

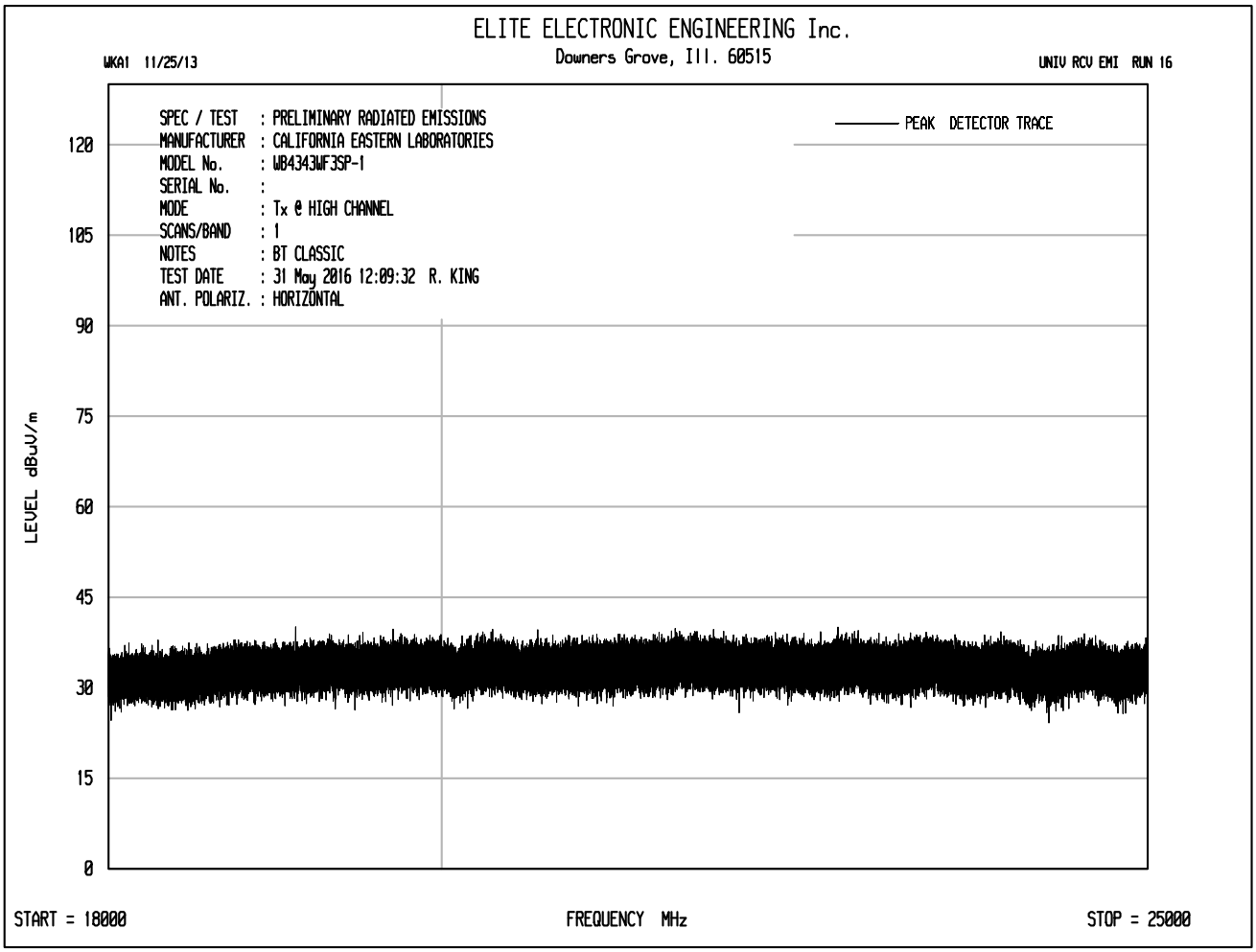

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 3
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : CALIFORNIA EASTERN LABORATORIES
MODEL No. : WB4343WF3SP-1
SERIAL No. :
MODE : Tx @ HIGH CHANNEL
SCANS/BAND : 1
NOTES : BT CLASSIC
TEST DATE : 3 Jun 2016 11:16:16 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
100
START = 30
FREQUENCY MHz
STOP = 1000

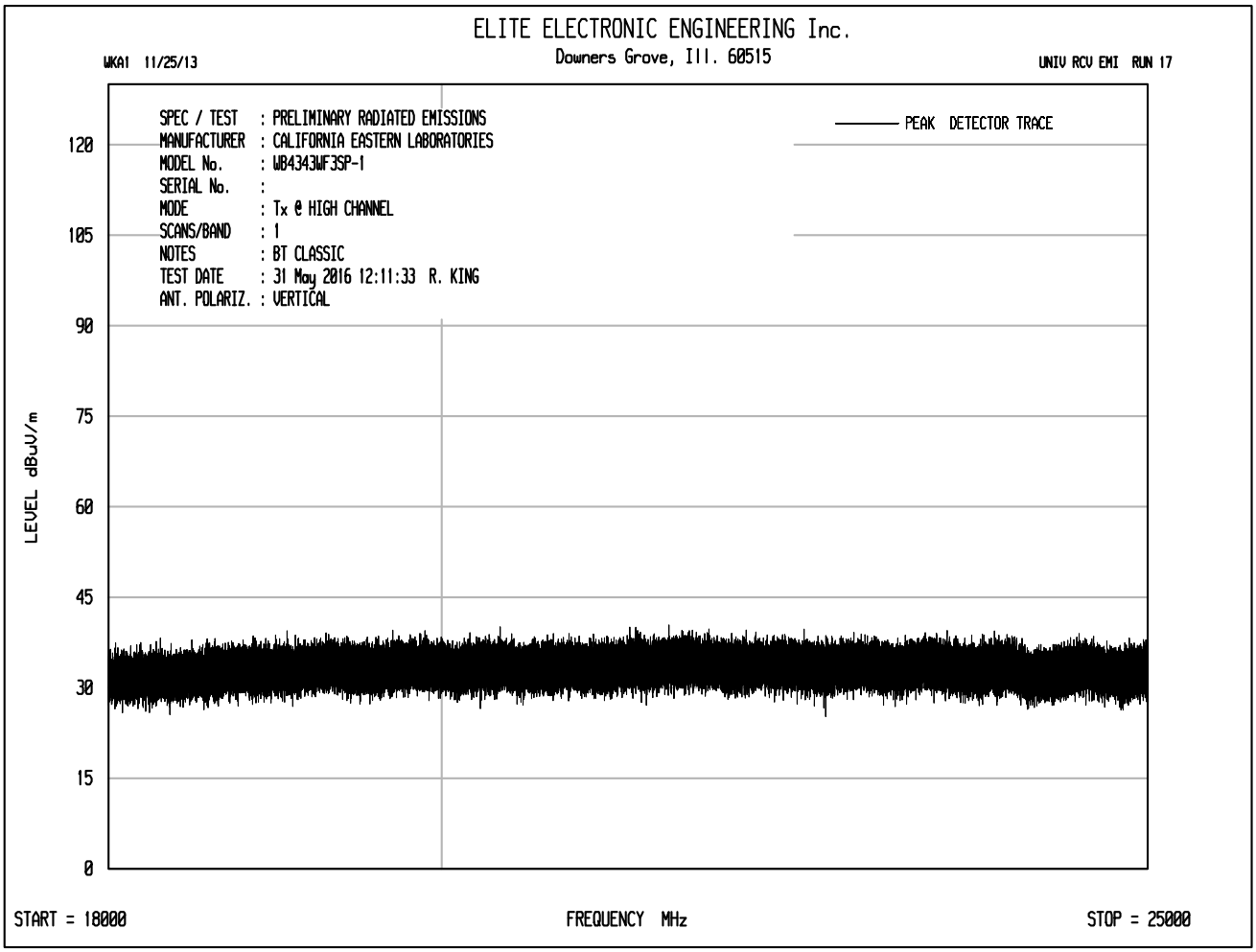

ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 6
SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : CALIFORNIA EASTERN LABORATORIES
MODEL No. : WB4343WF3SP-1
SERIAL No. :
MODE : Tx @ HIGH CHANNEL
SCANS/BAND : 1
NOTES : BT CLASSIC
TEST DATE : 31 May 2016 15:41:16 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 3000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 7
SPEC / TEST : PRELIM RADIATED EMISSIONS
MANUFACTURER : CALIFORNIA EASTERN LABORATORIES
MODEL No. : WB4343WF3SP-1
SERIAL No. :
MODE : Tx @ HIGH CHANNEL
SCANS/BAND : 1
NOTES : BT CLASSIC
TEST DATE : 31 May 2016 15:43:30 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 1000
FREQUENCY MHz
STOP = 3000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 6
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : CALIFORNIA EASTERN LABORATORIES
MODEL No. : WB4343WF3SP-1
SERIAL No. :
MODE : Tx @ HIGH CHANNEL
SCANS/BAND : 1
NOTES : BT CLASSIC
TEST DATE : 31 May 2016 15:51:09 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
10000
START = 2000
FREQUENCY MHz
STOP = 18000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 5
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : CALIFORNIA EASTERN LABORATORIES
MODEL No. : WB4343WF3SP-1
SERIAL No. :
MODE : Tx @ HIGH CHANNEL
SCANS/BAND : 1
NOTES : BT CLASSIC
TEST DATE : 31 May 2016 15:46:39 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
10000
START = 2000
FREQUENCY MHz
STOP = 18000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 16
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : CALIFORNIA EASTERN LABORATORIES
MODEL No. : WB4343WF3SP-1
SERIAL No. :
MODE : Tx @ HIGH CHANNEL
SCANS/BAND : 1
NOTES : BT CLASSIC
TEST DATE : 31 May 2016 12:09:32 R. KING
ANT. POLARIZ. : HORIZONTAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 18000
FREQUENCY MHz
STOP = 25000


ELITE ELECTRONIC ENGINEERING Inc.
Downers Grove, Ill. 60515
WKA1 11/25/13
UNIV RCV EMI RUN 17
SPEC / TEST : PRELIMINARY RADIATED EMISSIONS
MANUFACTURER : CALIFORNIA EASTERN LABORATORIES
MODEL No. : WB4343WF3SP-1
SERIAL No. :
MODE : Tx @ HIGH CHANNEL
SCANS/BAND : 1
NOTES : BT CLASSIC
TEST DATE : 31 May 2016 12:11:33 R. KING
ANT. POLARIZ. : VERTICAL
PEAK DETECTOR TRACE
LEVEL dBuV/m
120
105
90
75
60
45
30
15
0
START = 18000
FREQUENCY MHz
STOP = 25000

ETR No. EEE1601463 854
6A

DATA SHEET TEST NO. 1

RADIATED QP EMISSION MEASUREMENTS in a 3 m SEMI-ANECHOIC ROOM
SPECIFICATION : FCC 15B CLASS B
MANUFACTURER : CALIFORNIA EASTERN LABORATORIES
MODEL NO. : WB4343WF3SP-1
SERIAL NO. :
TEST MODE : Tx @ LOW CHANNEL
NOTES :
TEST DATE : 3 Jun 2016 10:49:01
TEST DISTANCE : 3 m

| FREQUENCY MHz | QP READING dBuV | ANT FAC dB | CBL FAC dB | EXT ATTN dB | DIST FAC dB | TOTAL dBuV/m | QP LIMIT dBuV/m | AZ deg | ANT HT cm | ANT POL |
|---|---|---|---|---|---|---|---|---|---|---|
| 32.41 | -8.3 | 22.7 | .5 | 0.0 | 0.0 | 15.0 | 40.0 | 90 | 340 | H |
| 52.74 | -6.3 | 13.5 | .5 | 0.0 | 0.0 | 7.6 | 40.0 | 45 | 120 | V |
| 88.06 | -7.5 | 14.7 | .5 | 0.0 | 0.0 | 7.7 | 43.5 | 90 | 200 | H |
| 120.64 | -8.0 | 18.3 | .6 | 0.0 | 0.0 | 11.0 | 43.5 | -0 | 200 | H |
| 133.98 | -8.0 | 17.7 | .7 | 0.0 | 0.0 | 10.4 | 43.5 | 135 | 120 | H |
| 142.02 | -8.0 | 17.0 | .8 | 0.0 | 0.0 | 9.8 | 43.5 | 225 | 200 | H |
| 167.77 | -8.1 | 15.9 | .9 | 0.0 | 0.0 | 8.7 | 43.5 | 90 | 200 | H |
| 193.74 | -6.0 | 15.0 | 1.0 | 0.0 | 0.0 | 9.9 | 43.5 | 90 | 200 | V |
| 298.77 | -5.9 | 19.2 | 1.0 | 0.0 | 0.0 | 14.3 | 46.0 | 315 | 120 | V |
| 443.00 | -7.0 | 22.2 | 1.5 | 0.0 | 0.0 | 16.7 | 46.0 | -0 | 200 | H |
| 476.09 | .3 | 23.4 | 1.5 | 0.0 | 0.0 | 25.2 | 46.0 | 180 | 120 | V |
| 677.78 | -7.0 | 25.0 | 1.7 | 0.0 | 0.0 | 19.7 | 46.0 | -0 | 340 | V |
| 774.33 | -6.7 | 25.8 | 1.9 | 0.0 | 0.0 | 21.0 | 46.0 | 225 | 120 | H |
| 869.94 | -5.9 | 26.6 | 2.0 | 0.0 | 0.0 | 22.7 | 46.0 | -0 | 200 | H |
| 951.00 | -5.7 | 27.2 | 2.0 | 0.0 | 0.0 | 23.5 | 46.0 | 270 | 120 | H |

Manufacturer : California Eastern Laboratories
Test Item : WIFI/BLT Module
Model No. : WB4343WF3SP-1
Mode : Tx @ 2402MHz Low Channel
Test Specification : FCC-15.247, RSS-247 Peak Radiated Emissions in Restricted Bands
Date : May 31st through June 6th, 2016
Notes : Peak Detector with 1MHz Resolution Bandwidth

Total (dBuV/m) = Meter Reading + CBL FAC + Ant Fac + Pre Amp.

| Freq. MHz | Ant Pol | Meter Reading (dBuV) | Ambient | CBL Fac (dB) | Ant Fac (dB) | Pre Amp (dB) | Peak Total dBuV/m at 3m | Peak Total uV/m at 3 m | Peak Limit uV/m at 3 m | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|---|
| 4804.00 | H | 48.6 | | 4.8 | 34.2 | -39.3 | 48.3 | 261.3 | 5000.0 | -25.6 |
| 4804.00 | V | 49.3 | | 4.8 | 34.2 | -39.3 | 49.0 | 281.3 | 5000.0 | -25.0 |
| 12010.00 | H | 47.3 | * | 8.0 | 39.1 | -39.2 | 55.2 | 575.6 | 5000.0 | -18.8 |
| 12010.00 | V | 46.6 | * | 8.0 | 39.1 | -39.2 | 54.5 | 531.6 | 5000.0 | -19.5 |
| 19216.00 | H | 41.9 | * | 2.2 | 40.4 | -28.6 | 55.9 | 625.5 | 5000.0 | -18.1 |
| 19216.00 | V | 42.7 | * | 2.2 | 40.4 | -28.6 | 56.8 | 689.0 | 5000.0 | -17.2 |

Checked BY Richard E. King :

Richard E. King

Manufacturer : California Eastern Laboratories
Test Item : WIFI/BLT Module
Model No. : WB4343WF3SP-1
Mode : Tx @ 2402MHz Low Channel
Test Specification : FCC-15.247, RSS-247 Peak Radiated Emissions in Restricted Bands
Date : May 31st through June 6th, 2016
Notes : Average Detector with 1MHz Resolution Bandwidth

Total (dBuV/m) = Meter Reading + CBL FAC + Ant Fac + Pre Amp + Duty Cycle Fac

| Freq. MHz | Ant Pol | Meter Reading (dBuV) | Ambient | CBL Fac (dB) | Ant Fac (dB) | Pre Amp (dB) | Duty Cycle (dB) | Average Total dBuV/m at 3m | Average Total uV/m at 3 m | Average Limit uV/m at 3 m | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4804.00 | H | 37.6 | | 4.8 | 34.2 | -39.3 | -30.8 | 6.5 | 2.1 | 500.0 | -47.5 |
| 4804.00 | V | 38.6 | | 4.8 | 34.2 | -39.3 | -30.8 | 7.5 | 2.4 | 500.0 | -46.5 |
| 12010.00 | H | 33.3 | * | 8.0 | 39.1 | -39.2 | -30.8 | 10.5 | 3.3 | 500.0 | -43.5 |
| 12010.00 | V | 33.3 | * | 8.0 | 39.1 | -39.2 | -30.8 | 10.5 | 3.3 | 500.0 | -43.5 |
| 19216.00 | H | 28.1 | * | 2.2 | 40.4 | -28.6 | -30.8 | 11.3 | 3.7 | 500.0 | -42.6 |
| 19216.00 | V | 28.2 | * | 2.2 | 40.4 | -28.6 | -30.8 | 11.4 | 3.7 | 500.0 | -42.5 |

Checked BY Richard E. King :

Richard E. King

Manufacturer : California Eastern Laboratories
Test Item : WIFI/BLT Module
Model No. : WB4343WF3SP-1
Mode : Tx @ 2440MHz Mid Channel
Test Specification : FCC-15.247, RSS-247 Peak Radiated Emissions in Restricted Bands
Date : May 31st through June 6th, 2016
Notes : Peak Detector with 1MHz Resolution Bandwidth

Total (dBuV/m) = Meter Reading + CBL FAC + Ant Fac + Pre Amp.

| Freq. MHz | Ant Pol | Meter Reading (dBuV) | Ambient | CBL Fac (dB) | Ant Fac (dB) | Pre Amp (dB) | Peak Total dBuV/m at 3m | Peak Total uV/m at 3 m | Peak Limit uV/m at 3 m | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|---|
| 4880.00 | H | 46.7 | | 4.9 | 34.2 | -39.3 | 46.4 | 210.0 | 5000.0 | -27.5 |
| 4880.00 | V | 46.5 | | 4.9 | 34.2 | -39.3 | 46.2 | 204.5 | 5000.0 | -27.8 |
| 7320.00 | H | 45.7 | * | 6.2 | 36.2 | -39.4 | 48.6 | 269.7 | 5000.0 | -25.4 |
| 7320.00 | V | 45.4 | * | 6.2 | 36.2 | -39.4 | 48.3 | 260.3 | 5000.0 | -25.7 |
| 12200.00 | H | 46.8 | * | 8.0 | 39.3 | -39.1 | 55.0 | 562.0 | 5000.0 | -19.0 |
| 12200.00 | V | 46.7 | * | 8.0 | 39.3 | -39.1 | 54.9 | 554.3 | 5000.0 | -19.1 |
| 19520.00 | H | 42.0 | * | 2.2 | 40.4 | -28.5 | 56.1 | 636.2 | 5000.0 | -17.9 |
| 19520.00 | V | 41.8 | * | 2.2 | 40.4 | -28.5 | 55.9 | 620.3 | 5000.0 | -18.1 |

Checked BY Richard E. King :

Richard E. King

Manufacturer : California Eastern Laboratories
Test Item : WIFI/BLT Module
Model No. : WB4343WF3SP-1
Mode : Tx @ 2440MHz Mid Channel
Test Specification : FCC-15.247, RSS-247 Peak Radiated Emissions in Restricted Bands
Date : May 31st through June 6th, 2016
Notes : Average Detector with 1MHz Resolution Bandwidth

Total (dBuV/m) = Meter Reading + CBL FAC + Ant Fac + Pre Amp + Duty Cycle Fac

| Freq. MHz | Ant Pol | Meter Reading (dBuV) | Ambient | CBL Fac (dB) | Ant Fac (dB) | Pre Amp (dB) | Duty Cycle (dB) | Average Total dBuV/m at 3m | Average Total uV/m at 3 m | Average Limit uV/m at 3 m | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4880.00 | H | 35.8 | | 4.9 | 34.2 | -39.3 | -30.4 | 5.1 | 1.8 | 500.0 | -48.8 |
| 4880.00 | V | 35.3 | | 4.9 | 34.2 | -39.3 | -30.4 | 4.7 | 1.7 | 500.0 | -49.3 |
| 7320.00 | H | 32.5 | * | 6.2 | 36.2 | -39.4 | -30.4 | 5.0 | 1.8 | 500.0 | -49.0 |
| 7320.00 | V | 32.4 | * | 6.2 | 36.2 | -39.4 | -30.4 | 4.8 | 1.7 | 500.0 | -49.1 |
| 12200.00 | H | 33.7 | * | 8.0 | 39.3 | -39.1 | -30.4 | 11.4 | 3.7 | 500.0 | -42.5 |
| 12200.00 | V | 33.7 | * | 8.0 | 39.3 | -39.1 | -30.4 | 11.4 | 3.7 | 500.0 | -42.5 |
| 19520.00 | H | 27.9 | * | 2.2 | 40.4 | -28.5 | -30.4 | 11.6 | 3.8 | 500.0 | -42.4 |
| 19520.00 | V | 27.9 | * | 2.2 | 40.4 | -28.5 | -30.4 | 11.6 | 3.8 | 500.0 | -42.3 |

Checked BY Richard E. King :

Richard E. King

Manufacturer : California Eastern Laboratories
Test Item : WIFI/BLT Module
Model No. : WB4343WF3SP-1
Mode : Tx @ 2480MHz High Channel
Test Specification : FCC-15.247, RSS-247 Peak Radiated Emissions in Restricted Bands
Date : May 31st through June 6th, 2016
Notes : Peak Detector with 1MHz Resolution Bandwidth

Total (dBuV/m) = Meter Reading + CBL FAC + Ant Fac + Pre Amp.

| Freq. MHz | Ant Pol | Meter Reading (dBuV) | Ambient | CBL Fac (dB) | Ant Fac (dB) | Pre Amp (dB) | Peak Total dBuV/m at 3m | Peak Total uV/m at 3 m | Peak Limit uV/m at 3 m | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|---|
| 4960.00 | H | 49.0 | | 4.9 | 34.2 | -39.3 | 48.7 | 273.0 | 5000.0 | -25.3 |
| 4960.00 | V | 48.7 | | 4.9 | 34.2 | -39.3 | 48.5 | 264.7 | 5000.0 | -25.5 |
| 7440.00 | H | 46.9 | * | 6.2 | 36.3 | -39.4 | 50.0 | 315.6 | 5000.0 | -24.0 |
| 7440.00 | V | 46.5 | * | 6.2 | 36.3 | -39.4 | 49.5 | 299.3 | 5000.0 | -24.5 |
| 12400.00 | H | 46.9 | * | 8.0 | 39.4 | -39.0 | 55.3 | 580.7 | 5000.0 | -18.7 |
| 12400.00 | V | 47.5 | * | 8.0 | 39.4 | -39.0 | 55.9 | 620.8 | 5000.0 | -18.1 |
| 19840.00 | H | 42.4 | * | 2.2 | 40.4 | -28.2 | 56.9 | 699.3 | 5000.0 | -17.1 |
| 19840.00 | V | 42.3 | * | 2.2 | 40.4 | -28.2 | 56.8 | 688.9 | 5000.0 | -17.2 |
| 22320.00 | H | 43.2 | * | 2.2 | 40.6 | -29.1 | 56.9 | 700.5 | 5000.0 | -17.1 |
| 22320.00 | V | 43.0 | * | 2.2 | 40.6 | -29.1 | 56.8 | 690.1 | 5000.0 | -17.2 |

Checked BY Richard E. King :

Richard E. King

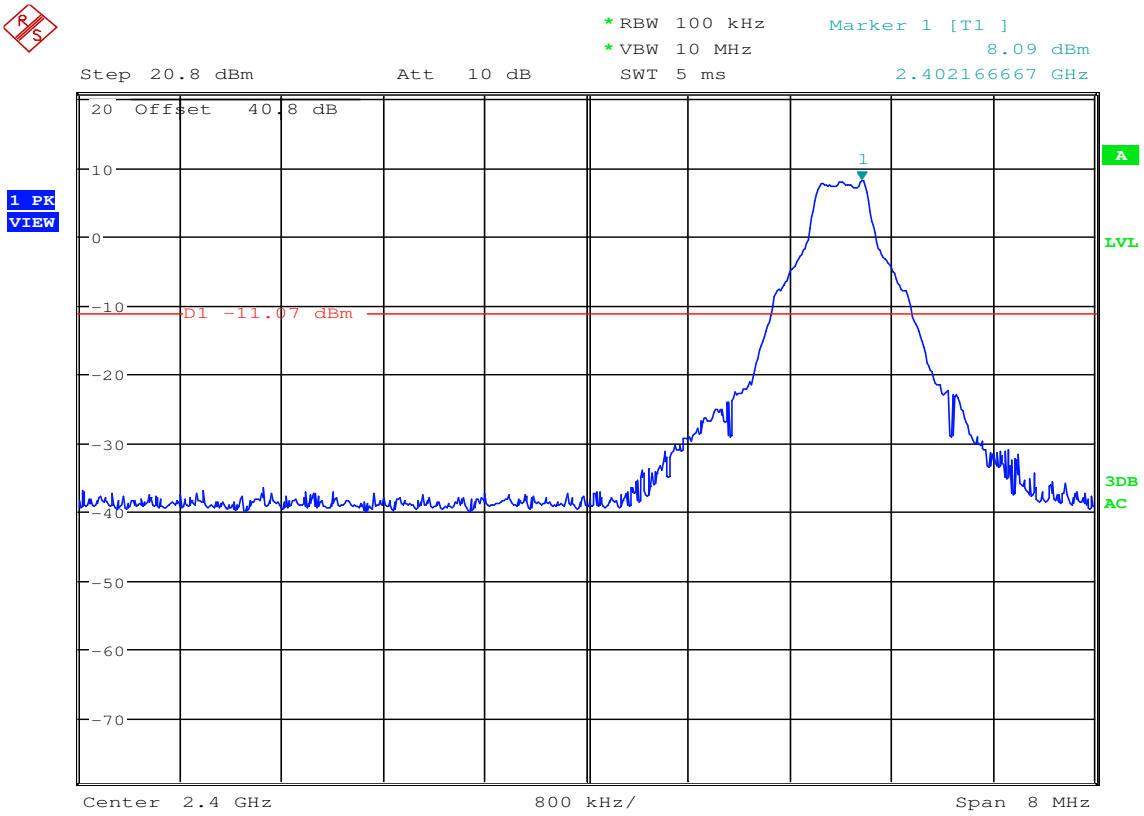
Manufacturer : California Eastern Laboratories
Test Item : WIFI/BLT Module
Model No. : WB4343WF3SP-1
Mode : Tx @ 2480MHz High Channel
Test Specification : FCC-15.247, RSS-247 Peak Radiated Emissions in Restricted Bands
Date : May 31st through June 6th, 2016
Notes : Average Detector with 1MHz Resolution Bandwidth

Total (dBuV/m) = Meter Reading + CBL FAC + Ant Fac + Pre Amp + Duty Cycle Fac

| Freq. MHz | Ant Pol | Meter Reading (dBuV) | Ambient | CBL Fac (dB) | Ant Fac (dB) | Pre Amp (dB) | Duty Cycle (dB) | Average Total dBuV/m at 3m | Average Total uV/m at 3 m | Average Limit uV/m at 3 m | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 4960.00 | H | 38.5 | | 4.9 | 34.2 | -39.3 | -30.4 | 7.9 | 2.5 | 500.0 | -46.1 |
| 4960.00 | V | 36.5 | | 4.9 | 34.2 | -39.3 | -30.4 | 5.9 | 2.0 | 500.0 | -48.1 |
| 7440.00 | H | 33.65 | * | 6.2 | 36.3 | -39.4 | -30.4 | 6.3 | 2.1 | 500.0 | -47.7 |
| 7440.00 | V | 33.7 | * | 6.2 | 36.3 | -39.4 | -30.4 | 6.4 | 2.1 | 500.0 | -47.6 |
| 12400.00 | H | 33.7 | * | 8.0 | 39.4 | -39.0 | -30.4 | 11.6 | 3.8 | 500.0 | -42.3 |
| 12400.00 | V | 33.7 | * | 8.0 | 39.4 | -39.0 | -30.4 | 11.6 | 3.8 | 500.0 | -42.4 |
| 19840.00 | H | 28.2 | * | 2.2 | 40.4 | -28.2 | -30.4 | 12.3 | 4.1 | 500.0 | -41.7 |
| 19840.00 | V | 28.2 | * | 2.2 | 40.4 | -28.2 | -30.4 | 12.3 | 4.1 | 500.0 | -41.7 |
| 22320.00 | H | 29.1 | * | 2.2 | 40.6 | -29.1 | -30.4 | 12.4 | 4.2 | 500.0 | -41.5 |
| 22320.00 | V | 29.2 | * | 2.2 | 40.6 | -29.1 | -30.4 | 12.5 | 4.2 | 500.0 | -41.5 |

Checked BY Richard E. King :

Richard E. King

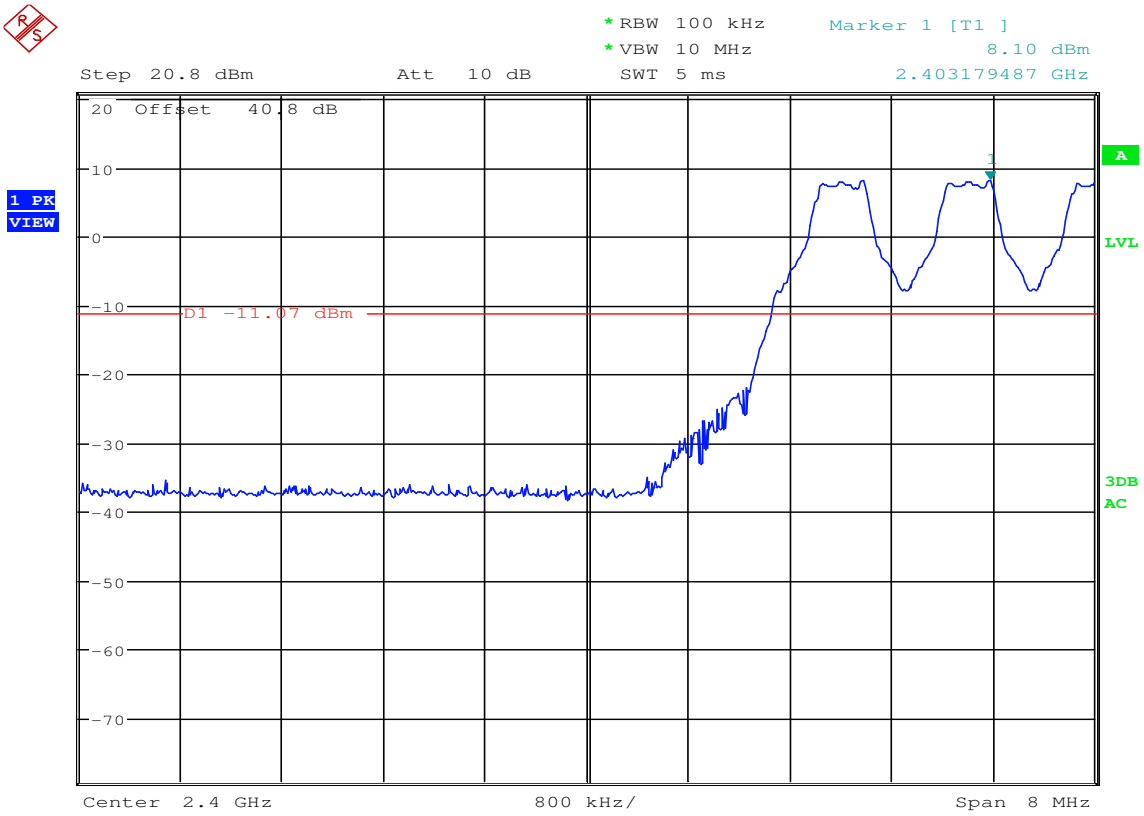



Date: 2.JUN.2016 10:17:57

**FCC 15.247 Band-edge Compliance**

MANUFACTURER : California Eastern Laboratories
MODEL NUMBER : WB4343WF3SP-1
TEST MODE : Tx @ 2480MHz
: PEAK detector
NOTES :
NOTES : Bluetooth Classic
NOTES :

NOTES




Date: 2.JUN.2016 10:35:23

**FCC 15.247 Band-edge Compliance**

MANUFACTURER : California Eastern Laboratories
MODEL NUMBER : WB4343WF3SP-1
TEST MODE : Frequency Hopping
: PEAK detector
NOTES :
NOTES : Bluetooth Classic
NOTES :

NOTES

Manufacturer : California Eastern Laboratories
Test Item : WIFI/BLT Module
Model No. : WB4343WF3SP-1
Mode : Tx @ 2480MHz High Channel
Test Specification : FCC-15.247, RSS-247 Band-edge Compliance
Date : May 31st through June 6th, 2016
Notes : Peak Detector with 1MHz Resolution Bandwidth

Total (dBuV/m) = Meter Reading + CBL FAC + Ant Fac + Pre Amp.

| Freq. MHz | Ant Pol | Meter Reading (dBuV) | Ambient | CBL Fac (dB) | Ant Fac (dB) | Pre Amp (dB) | Peak Total dBuV/m at 3m | Peak Total uV/m at 3 m | Peak Limit uV/m at 3 m | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|---|
| 2483.50 | H | 16.9 | | 3.5 | 32.6 | 0.0 | 53.0 | 446.8 | 5000.0 | -21.0 |
| 2483.50 | V | 13.0 | | 3.5 | 32.6 | 0.0 | 49.1 | 284.2 | 5000.0 | -24.9 |

Checked BY Richard E. King :

Richard E. King

Manufacturer : California Eastern Laboratories
Test Item : WIFI/BLT Module
Model No. : WB4343WF3SP-1
Mode : Tx @ 2480MHz High Channel
Test Specification : FCC-15.247, RSS-247 Band-edge Compliance
Date : May 31st through June 6th, 2016
Notes : Average Measurement with 1MHz Resolution Bandwidth

Total (dBuV/m) = Meter Reading + CBL FAC + Ant Fac + Pre Amp

| Freq. MHz | Ant Pol | Meter Reading (dBuV) | Ambient | CBL Fac (dB) | Ant Fac (dB) | Pre Amp (dB) | Average Total dBuV/m at 3m | Average Total uV/m at 3 m | Average Limit uV/m at 3 m | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|---|
| 2483.50 | H | 8.2 | | 3.5 | 32.6 | 0.0 | 44.3 | 163.5 | 500.0 | -9.7 |
| 2483.50 | V | 8.2 | | 3.5 | 32.6 | 0.0 | 44.2 | 162.8 | 500.0 | -9.7 |

Checked BY Richard E. King :

Richard E. King

Manufacturer : California Eastern Laboratories
Test Item : WIFI/BLT Module
Model No. : WB4343WF3SP-1
Mode : Frequency Hopping
Test Specification : FCC-15.247, RSS-247 Band-edge Compliance
Date : May 31st through June 6th, 2016
Notes : Peak Detector with 1MHz Resolution Bandwidth

Total (dBuV/m) = Meter Reading + CBL FAC + Ant Fac + Pre Amp.

| Freq. MHz | Ant Pol | Meter Reading (dBuV) | Ambient | CBL Fac (dB) | Ant Fac (dB) | Pre Amp (dB) | Peak Total dBuV/m at 3m | Peak Total uV/m at 3 m | Peak Limit uV/m at 3 m | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|---|
| 2483.50 | H | 13.0 | | 3.5 | 32.6 | 0.0 | 49.1 | 284.2 | 5000.0 | -24.9 |
| 2483.50 | V | 13.0 | | 3.5 | 32.6 | 0.0 | 49.1 | 284.2 | 5000.0 | -24.9 |

Checked BY Richard E. King :

Richard E. King

Manufacturer : California Eastern Laboratories
Test Item : WIFI/BLT Module
Model No. : WB4343WF3SP-1
Mode : Frequency Hopping
Test Specification : FCC-15.247, RSS-247 Band-edge Compliance
Date : May 31st through June 6th, 2016
Notes : Average Measurement with 1MHz Resolution Bandwidth

Total (dBuV/m) = Meter Reading + CBL FAC + Ant Fac + Pre Amp

| Freq. MHz | Ant Pol | Meter Reading (dBuV) | Ambient | CBL Fac (dB) | Ant Fac (dB) | Pre Amp (dB) | Average Total dBuV/m at 3m | Average Total uV/m at 3 m | Average Limit uV/m at 3 m | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|---|
| 2483.50 | H | 7.0 | | 3.5 | 32.6 | 0.0 | 43.1 | 142.4 | 500.0 | -10.9 |
| 2483.50 | V | 7.0 | | 3.5 | 32.6 | 0.0 | 43.1 | 142.4 | 500.0 | -10.9 |

Checked BY Richard E. King :

Richard E. King