



Measurement of RF Emissions from a Model No. B1010SP0 Wireless Transmitter

For	California Eastern Labs 1253 N. Old Rand Road Wauconda, IL 60084
P.O. Number	199215
Date Tested	April 22-24, 2015
Test Personnel	Rick King
Test Specification	FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Section 15.247 for Digital Modulation Intentional Radiators Operating within the band 2400-2483.5MHz
	Industry Canada RSS-GEN Industry Canada RSS-210

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REVISION HISTORY

Revision	Date	Description
—	18 May 2015	Initial release
A	19 May 2015	Changed Paragraph 3.2 to read 2480 MHz in place of 2482 MHz

Measurement of RF Emissions from a Wireless Transmitter, Model No. B1010SP0 Transmitter

1. INTRODUCTION

1.1. Scope of Tests

This report represents the results of the series of radio interference measurements performed on a California Eastern Labs Wireless Transmitter, Model No. B1010SP0, no serial number was assigned, transmitter (hereinafter referred to as the EUT). The EUT is a digital modulation spread spectrum transmitter. The transmitter was designed to transmit in the 2400-2483.5 MHz band using an integral antenna. The EUT was manufactured and submitted for testing by California Eastern Labs located in Wauconda, IL.

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 C, Sections 15.207 and 15.247 for Intentional Radiators. The test series was also performed to determine if the EUT meets the conducted RF emission requirements of the Industry Canada Radio Standards Specification, RSS-Gen, Section 7.2.4 and the radiated RF emission requirements of the Industry Canada Radio Standards Specification, RSS-210, Annex 8 for transmitters. Testing was performed in accordance with ANSI C63.4-2009 and ANSI C63.4-2014.

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 Certificate Number: 1786.01.

1.5. Laboratory Conditions

The temperature at the time of the test was 23.5°C and the relative humidity was 26%.

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, Subpart C, dated 1 October 2014
- 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"
- 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"
- Federal Communications Commission Office of Engineering and Technology Laboratory Division Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under Section 15.247, June 5, 2014

- Industry Canada Radio Standards Specification, RSS-Gen, "General Requirements and Information for the Certification of Radiocommunication Equipment", Issue 4, November 2014
- Industry Canada Radio Standards Specification, RSS-210, "Low-power License-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment", Issue 8, December 2010

3. EUT SETUP AND OPERATION

3.1. General Description

The EUT is a California Eastern Labs, Wireless Transmitter, Model No. B1010SP0. A block diagram of the EUT setup is shown as Figure 1.

3.1.1.Power Input

The EUT obtained 3.3V DC power through an SMA connector. The EUT received DC power from a DC power supply. The EUT was connected to a DC power supply through lowpass powerline filters on the wall of the shielded enclosure. Each primary lead was connected through a line impedance stabilization network (LISN) which was located on the ground plane. The network complies with the requirements of Paragraph 4.3 of ANSI C63.4-2009 and ANSI C63.4-2014.

3.1.2.Peripheral Equipment

No peripheral equipment is required for the EUT to operate normally therefore no peripheral equipment was used.

3.1.3.Signal Input/Output Leads

No signal input/output leads are required for the EUT to operate normally therefore no signal input/output leads were used.

3.1.4.Grounding

Since the EUT was powered with 3.3VDC through a DC supply, it was ungrounded during the tests.

3.2. Operational Mode

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

- Transmit at 2402MHz
- Transmit at 2440MHz
- Transmit at 2480MHz

3.3. EUT Modifications

No modifications were required for compliance to the FCC 15.247 you tested to requirements.

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 and 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 9-1.

Conducted and radiated emission measurements were performed with a spectrum analyzer. This receiver allows measurements with the bandwidths and detector functions specified by the FCC. The receiver bandwidth was 120kHz for the 30MHz to 1000MHz radiated emissions data and 1MHz for the 1000MHz to 5000MHz radiated emissions data.

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	1.07	-1.07
Expanded Uncertainty (95% confidence)	2.1	-2.1

Radiated Emissions Measurements		
Combined Standard Uncertainty	2.26	-2.18
Expanded Uncertainty (95% confidence)	4.5	-4.4

5. TEST PROCEDURES

5.1. Powerline Conducted Emissions

5.1.1. Requirements

Per the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Per 15.207(a) and Industry Canada RSS-Gen section 7.2.4, all radio frequency voltages on the power lines of a transmitter shall be below the values shown below when using a quasi-peak or average detector:

Frequency MHz	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 – 0.5	66 decreasing with logarithm of frequency to 56	56 decreasing with logarithm of frequency to 46
0.5 - 5	56	46
5 - 30	60	50

Note 1: The lower limit shall apply at the transition frequencies.

Note 2: If the levels measured using the QP detector meet both the QP and the Average limits, the EUT is considered to have met both requirements and measurements do not need to be performed using the Average detector.

5.1.2.Procedures

The interference on each power lead of the EUT was measured by connecting the measuring equipment to the appropriate meter terminal of the Line Impedance Stabilization Network (LISN). The meter terminal of the LISN not under test was terminated with 50 ohms.

- a) The EUT was operated in the Transmit at mid channel mode.
- b) Measurements were first made on the +3.3VDC line.
- c) The frequency range from 150 kHz to 30 MHz was broken up into smaller frequency sub-bands.
- d) Conducted emissions measurements were taken on the first frequency sub-band using a peak detector.
- e) The data thus obtained was then searched by the computer for the highest levels. Any emissions levels that were within 10dB of the average limit were then measured again using both a quasi-peak detector and an average detector. (If no peak readings were within 10dB of the average limit, quasi-peak and average readings were taken on the highest emissions levels measured during the peak detector scan.)
- f) Steps (d) and (e) were repeated for the remainder of the frequency sub-bands until the entire frequency range from 150kHz to 30MHz was investigated. The peak trace was automatically plotted. The plot also shows quasi-peak and average readings that were taken on discrete frequencies. A table showing the quasi-peak and average readings was also generated. This tabular data compares the quasi-peak and average conducted emissions to the applicable conducted emissions limits.
- g) Steps (c) through (f) were repeated on the 3.3VDC return line.

5.1.3.Results

The plots and tabular results of the peak, quasi-peak, and average conducted voltage levels acquired from each input power line with the EUT operated in the transmit at mid channel mode are shown on pages 20 through 23. All power line conducted emissions measured from the EUT were within the specification limits.

Photographs of the test configuration which yielded the highest or worst case, conducted emission levels are shown on Figure 2.

5.2. 6dB Bandwidth

5.2.1.Requirement

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

5.2.2.Procedures

The output of the EUT was connected to the spectrum analyzer through 40dB 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.

5.2.3.Results

The plots on pages 24 through 26 show that the minimum 6 dB bandwidth was 681.3kHz which is greater than

minimum allowable 6dB bandwidth requirement of 500kHz for systems using digital modulation techniques. The 99% bandwidth was measured to be 1.02MHz.

5.3. Peak Output Power

5.3.1. 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). 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).

5.3.2. Procedures

The output of the EUT was connected to the spectrum analyzer through 40dB of attenuation. The EUT was set to transmit separately at the low, middle, and high channels. The resolution bandwidth (RBW) was set to greater than the 6dB 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 channels.

The EUT was placed on the non-conductive stand and set to transmit. A dipole antenna (double ridged waveguide antenna for all measurements above 1GHz) was placed at a test distance of 3 meters from the EUT. The resolution bandwidth (RBW) of the spectrum analyzer was set to greater than the 6dB bandwidth. The EUT was maximized for worst case emissions (or maximum output power) at the measuring antenna. The maximum meter reading was recorded. The peak power output was measured for the low, middle and high channels.

The equivalent power was determined from the field intensity levels measured at 3 meters using the substitution method. To determine the emission power, a second dipole antenna (double ridged waveguide antenna for all measurements above 1GHz) was then set in place of the EUT and connected to a calibrated signal generator. The output of the signal generator was adjusted to match the received level at the spectrum analyzer. The signal level was recorded. The reading was then corrected to compensate for cable loss (and antenna gain for all measurements above 1GHz), as required. The peak power output was calculated for low, middle, and high hopping frequencies.

5.3.3. Results

The results are presented on pages 27 and 29. The maximum peak conducted output power from the transmitter was 0.007W (8.69 dBm) which is below the 1 Watt limit.

The results are presented on pages 30. The maximum EIRP measured from the transmitter was 9.4 dBm or 0.009 W which is below the 4 Watt limit.

5.4. Radiated Spurious Emissions Measurements

5.4.1. Requirements

Per section 15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated emissions measurement. Attenuation below the general limits specified in §15.209(a) is not required. In addition, 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).

5.4.2. Procedures

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 harmonics not in the restricted bands, the following procedure was used:
 - a) The field strength of the fundamental was 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 100 kHz was used on the spectrum analyzer.
 - b) The field strengths of all of the harmonics not in the restricted band were then 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 100 kHz was used on the spectrum analyzer.
 - c) To ensure that maximum or worst case emission levels at the fundamental and harmonics were measured, the following steps were taken when measuring the fundamental emissions and the spurious emissions:
 - 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 axes to ensure the maximum readings were recorded for the EUT.
 - d) All harmonics not in the restricted bands must be at least 20 dB below levels measured at the fundamental. However, attenuation below the general limits specified in §15.209(a) is not required.
- 2) 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 axes 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.

5.4.3.Results

Preliminary radiated emissions plots with the EUT transmitting at 2402MHz, 2440MHz, and 2480MHz are shown on pages 31 through 54. Final radiated emissions data are presented on data pages 55 through 63.

Photographs of the test configuration which yielded the highest, or worst case, radiated emission levels are shown on Figures 3 and 4.

5.5. Band Edge Compliance

5.5.1.Requirement

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.

5.5.2.Procedures

5.4.2.1 Low Band Edge

- 1) The EUT was setup inside the test chamber on a non-conductive stand.
- 2) A broadband measuring antenna was placed at a test distance of 3 meters from the EUT.
- 3) The EUT was set to transmit continuously at the channel closest to the low band-edge.
- 4) The EUT was maximized for worst case emissions at the measuring antenna. The maximum meter reading was recorded.
- 5) To determine the bandedge 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) $\geq$ 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.

5.4.2.2 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.

5.5.3.Results

Pages 64 through 66 show the radiated band-edge compliance results. As can be seen from these plots, the radiated 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.

5.6. Power Spectral Density

5.6.1.Requirements

Per section 15.247(d), 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.

5.6.2.Procedures

- 1) The output of the EUT was connected to the spectrum analyzer through 40dB of attenuation.
- 2) The EUT was set to transmit at a mid-channel.
- 3) To determine the power spectral density, the following spectrum analyzer settings were used:
 - a. Center frequency = transmit frequency
 - b. Resolution bandwidth (RBW) greater than the 20dB bandwidth.
 - c. Sweep time = auto
 - d. The peak detector and 'Max-Hold' function was engaged. The analyzer was allowed to scan until the envelope of the transmitter bandwidth was defined.
 - e. The analyzer's display was plotted using a 'screen dump' utility.
- 4) This reading corresponds to the peak EIRP measured for the mid channel.
- 5) Turn on Display Line 1 and place it at the peak of the measured level. Turn on Display Line 2 and place it at the corresponding +8dBm level (e.g. if the peak output power is +18dBm then the +8dBm level will be 10dB down from the radiated level and if the peak output power is +6dBm then the +8dBm level will be 2dB above the radiated level.)
- 6) The EUT was then placed in the normal operation mode (for DTS devices)
- 7) To determine the power spectral density, the following spectrum analyzer settings were used:
 - a. Center frequency = transmit frequency
 - b. Span = 1.5 times the channel bandwidth
 - c. Resolution bandwidth (RBW) $\geq 3\text{kHz}$
 - d. Video bandwidth (VBW) $\geq 3 \times \text{RBW}$
 - e. Sweep time = auto couple
 - f. The analyzer was allowed to scan until the envelope of the transmitter bandwidth was defined. The peak detector and 'Max-Hold' function was engaged.
 - g. The analyzer's display was plotted using a 'screen dump' utility.
 - h. If the measured value exceeds the +8dBm limit, reduce the RBW (no less than 3kHz) and repeat step 7.

5.6.3.Results

Pages 67 through 69 show the power spectral density results. As can be seen from the plots, the peak power density is less than 8dBm in a 30kHz band during any time interval of continuous transmission.

6. OTHER TEST CONDITIONS

6.1. Test Personnel and Witnesses

All tests were performed by qualified personnel from Elite Electronic Engineering Incorporated. The test series was witnessed by California Eastern Labs personnel.



6.2. Disposition of the EUT

The EUT and all associated equipment were returned to California Eastern Labs upon completion of the tests.

7. CONCLUSIONS

It was determined that the California Eastern Labs Wireless Transmitter, Model No. B1010SP0, digital modulation transmitter, did fully meet the conducted and radiated emission requirements of the FCC "Code of Federal Regulations" Title 47, Part 15, Subpart C, Sections 15.207 and 15.247 for Intentional Radiators Operating within the 2400-2483.5 MHz band, when tested per ANSI C63.4-2009.

It was also determined that the California Eastern Labs Wireless Transmitter, Model No. B1010SP0, digital modulation transmitter, did fully meet the conducted and radiated RF emission requirements of the Industry Canada Radio Standards Specification, RSS-Gen Section 7.2.4 and RSS-210 Annex 8, for transmitters, when tested per ANSI C63.4-2014.

8. 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.

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

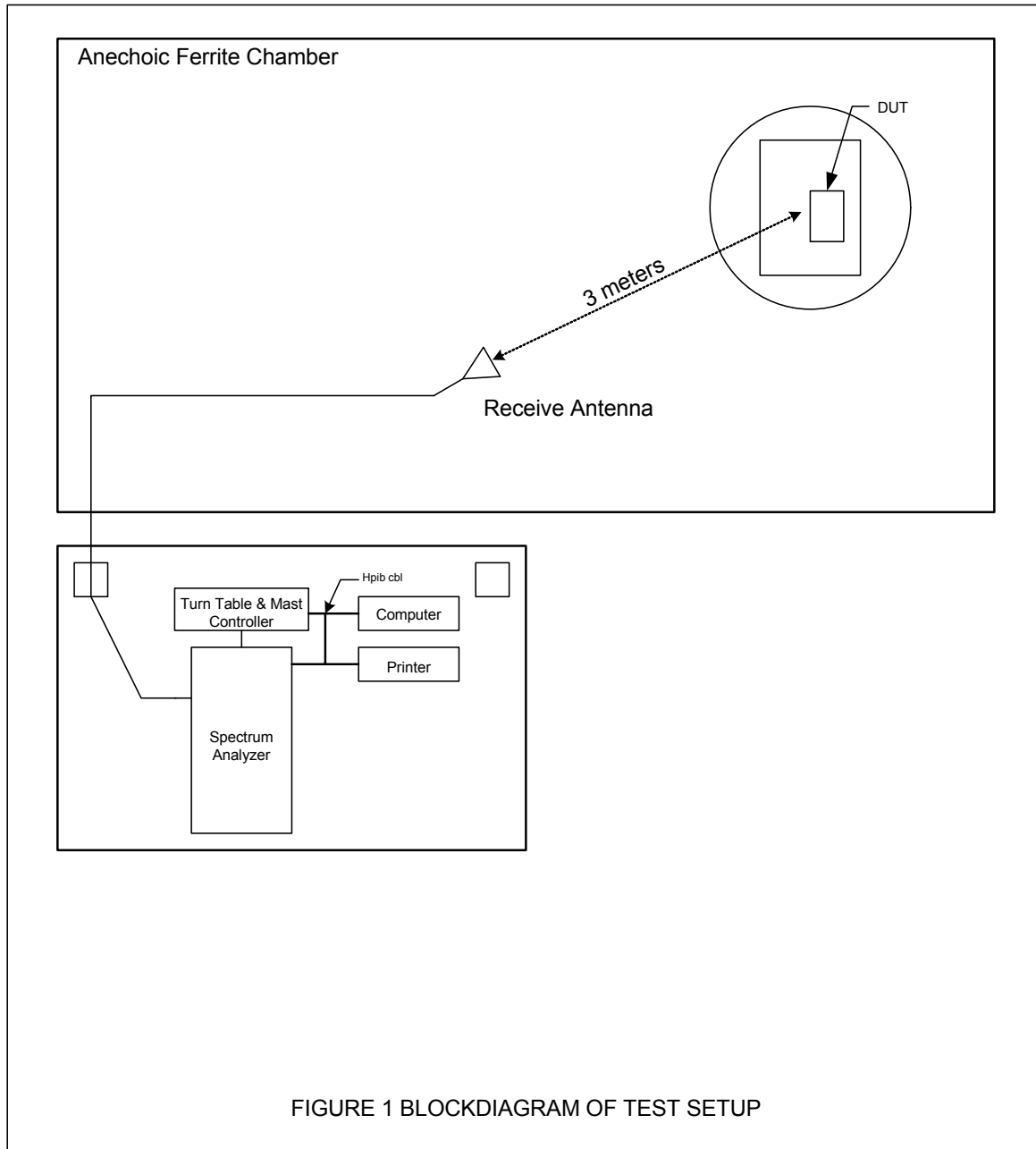
Table 9-1 Equipment List

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	2/17/2015	2/17/2016
APW3	PREAMPLIFIER	PLANAR ELECTRONICS	PE2-35-120-5R0-10-12	PL2924	1GHZ-20GHZ	11/3/2014	11/3/2015
CDU3	LAPTOP COMPUTER						
CDX8	COMPUTER	ELITE	WORKSTATION			N/A	
NHG1	STANDARD GAIN HORN ANTENNA	NARDA	638	---	18-26.5GHZ	NOTE 1	
NWQ2	DOUBLE RIDGED WAVEGUIDE ANTENNA	ETS LINDGREN	3117	66659	1GHZ-18GHZ	2/9/2014	2/9/2016
PLF2	CISPR16 50UH LISN	ELITE	CISPR16/70A	002	.15-30MHz	6/5/2014	6/5/2015
PLF4	CISPR16 50UH LISN	ELITE	CISPR16/70A	003	.15-30MHz	6/5/2014	6/5/2015
RBA0	EMI TEST RECEIVER	ROHDE & SCHWARZ	ESIB26	100145	20HZ-26.5GHZ	3/3/2015	3/3/2016
SMAQ	DC POWER SUPPLY	VOLTEQ	HY3020EX	11885471	30VDC/20A	NOTE 1	
T1EG	10DB 25W ATTENUATOR	WEINSCHL	46-10-34	CD3551	DC-18GHZ	6/10/2014	6/10/2015
T2DA	20DB, 25W ATTENUATOR	WEINSCHL	46-20-34	BH5446	DC-18GHZ	7/22/2014	7/22/2015
T2SD	20DB 25W ATTENUATOR	WEINSCHL	46-20-34	CD5016	DC-18GHZ	10/15/2014	10/15/2015
VBR8	CISPR EN FCC CE VOLTAGE.exe						
WKA1	SOFTWARE, UNIVERSAL RCV EMI	ELITE	UNIV_RCV_EMI	1	---	I/O	
WQB0	RE_8546A						
XLQA	5W, 50 OHM TERMINATION	JFW INDUSTRIES	50T-052	---	DC-2GHZ	7/22/2014	7/22/2015
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	9/19/2014	9/19/2015

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.



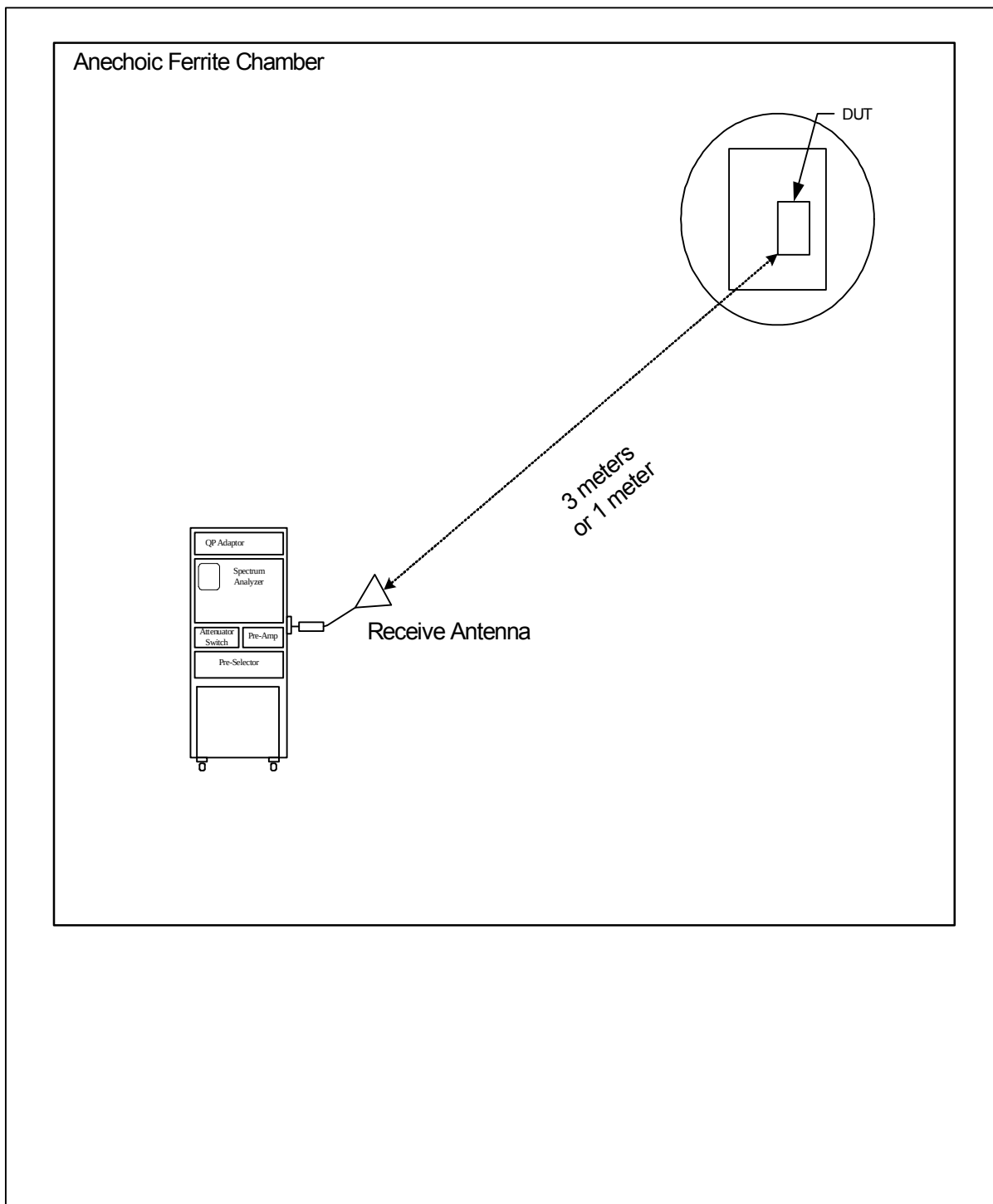
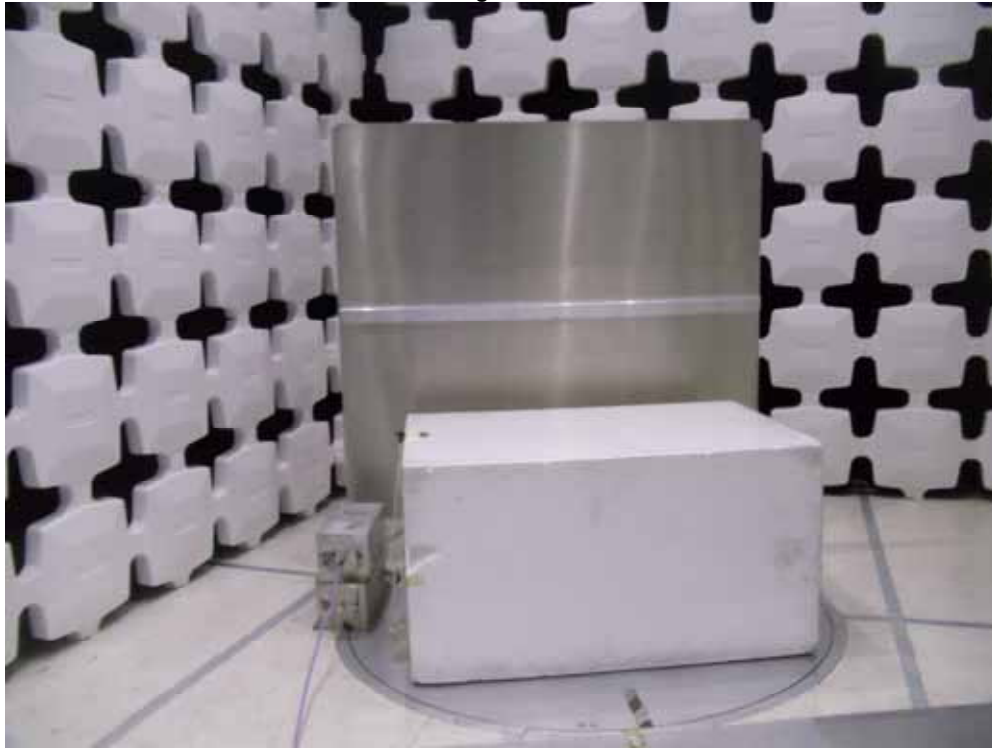
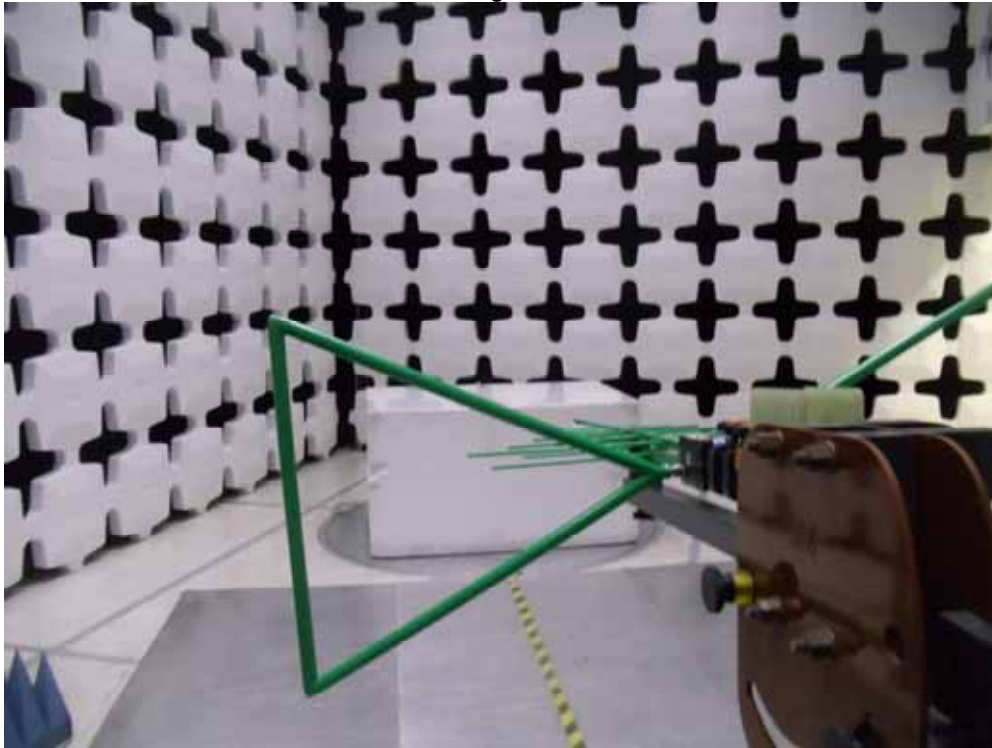


Figure 2



Test Setup for Conducted Emissions

Figure 3

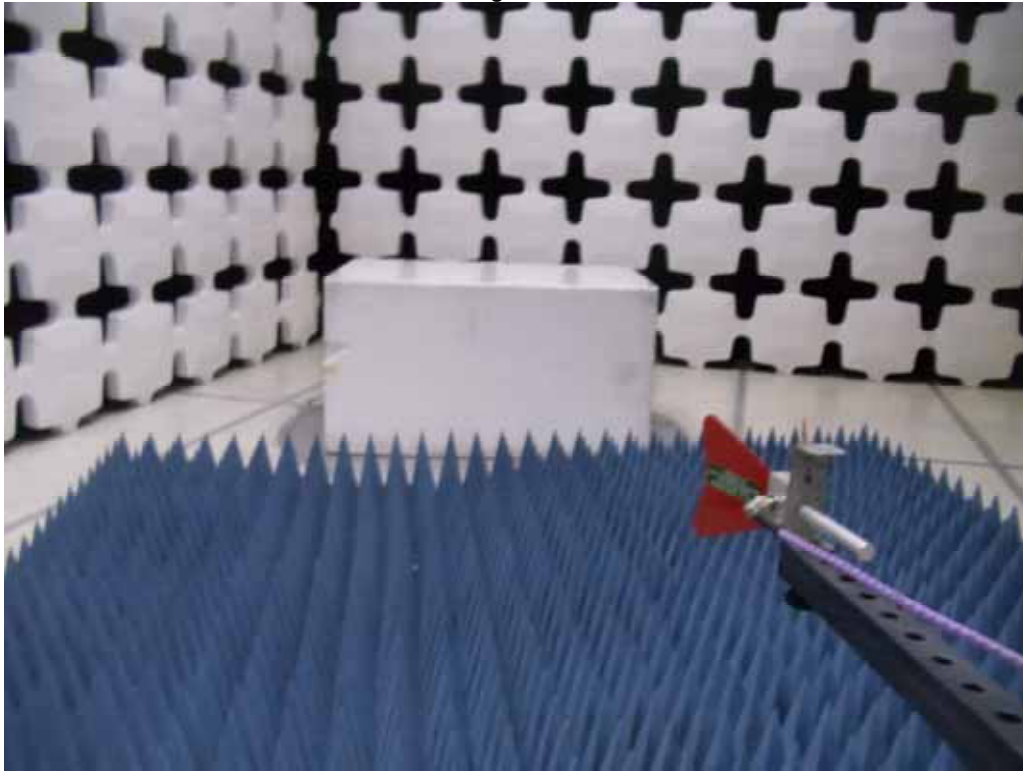


Test Setup for Radiated Emissions, 30MHz to 1GHz – Horizontal Polarization



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

Figure 4



Test Setup for Radiated Emissions, 1GHz to 18GHz – Horizontal Polarization



Test Setup for Radiated Emissions, 1GHz to 18GHz – Vertical Polarization



FCC Part 15 Subpart B Conducted Emissions Test

Significant Emissions Data

VBR8 03/04/2015

Manufacturer : CALIFORNIA EASTERN LABS
Model : B1010SP0
Serial Number :
DUT Mode : Tx @ MID CHANNEL
Line Tested : L1
Scan Step Time [ms] : 30
Meas. Threshold [dB] : -10
Notes :
Test Engineer : R. King
Limit : Class B
Test Date : Apr 24, 2015 12:52:08 PM
Data Filter : Up to 80 maximum levels detected with 6 dB level excursion threshold over 10 dB margin below limit

Freq MHz	Quasi-peak Level dBμV	Quasi-peak Limit dBμV	Excessive Quasi-peak Emissions	Average Level dBμV	Average Limit dBμV	Excessive Average Emissions
0.164	19.8	65.3		14.4	55.3	
0.338	14.8	59.3		9.2	49.3	
0.509	9.0	56.0		4.2	46.0	
1.002	9.9	56.0		5.5	46.0	
1.624	6.8	56.0		1.6	46.0	
2.844	6.2	56.0		2.7	46.0	
4.000	42.5	56.0		38.6	46.0	
8.002	28.5	60.0		26.7	50.0	
16.002	23.6	60.0		20.1	50.0	
19.999	21.6	60.0		18.7	50.0	

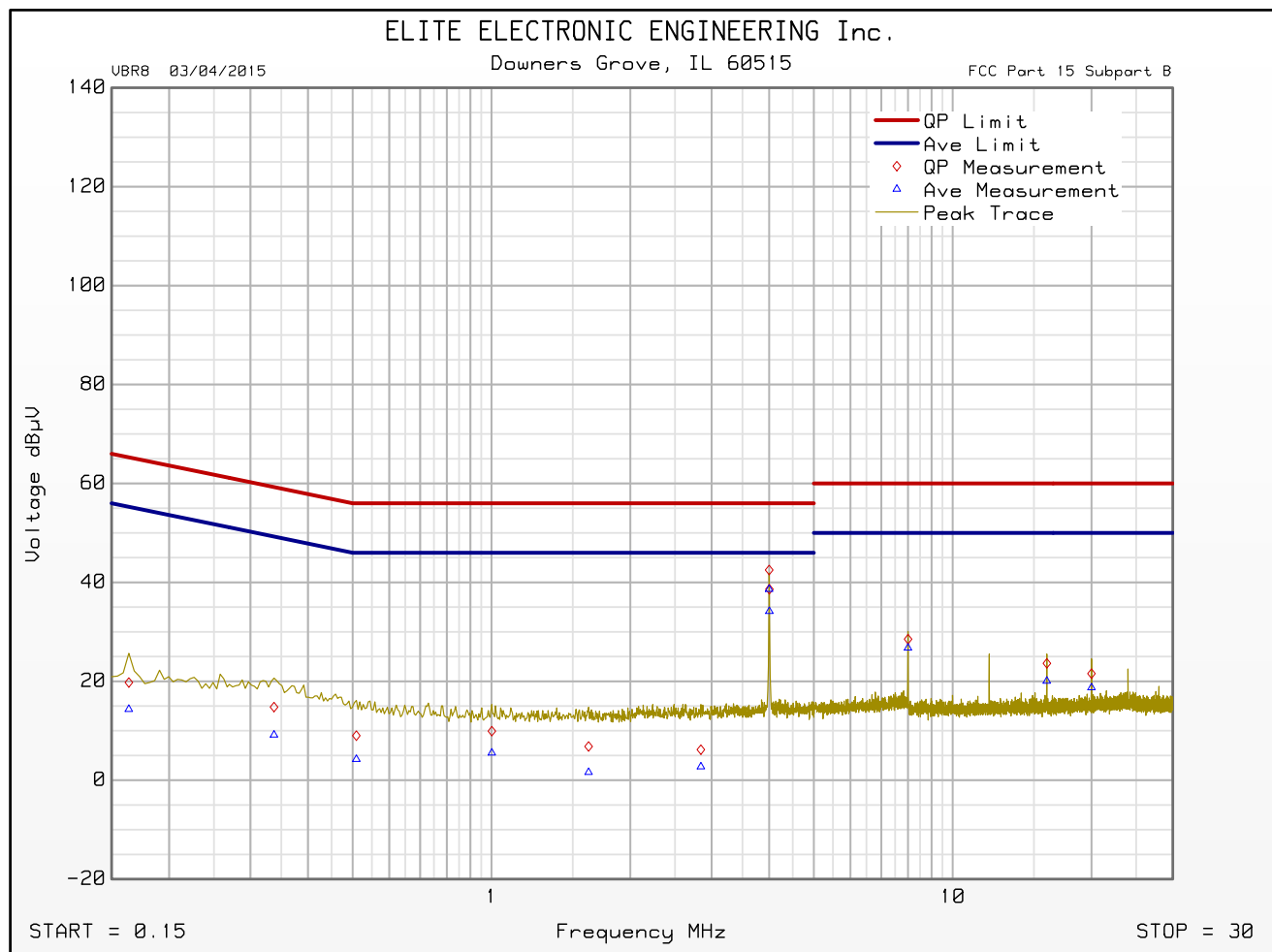


FCC Part 15 Subpart B Conducted Emissions Test

Cumulative Data

VBR8 03/04/2015

Manufacturer : CALIFORNIA EASTERN LABS
Model : B1010SP0
Serial Number :
DUT Mode : Tx @ MID CHANNEL
Line Tested : L1
Scan Step Time [ms] : 30
Meas. Threshold [dB] : -10
Notes :
Test Engineer : R. King
Limit : Class B
Test Date : Apr 24, 2015 12:52:08 PM



Emissions Meet QP Limit
Emissions Meet Ave Limit



FCC Part 15 Subpart B Conducted Emissions Test

Significant Emissions Data

VBR8 03/04/2015

Manufacturer : CALIFORNIA EASTERN LABS
Model : B1010SP0
Serial Number :
DUT Mode : Tx @ MID CHANNEL
Line Tested : L2
Scan Step Time [ms] : 30
Meas. Threshold [dB] : -10
Notes :
Test Engineer : R. King
Limit : Class B
Test Date : Apr 24, 2015 12:46:24 PM
Data Filter : Up to 80 maximum levels detected with 6 dB level excursion threshold over 10 dB margin below limit

Freq MHz	Quasi-peak Level dBμV	Quasi-peak Limit dBμV	Excessive Quasi-peak Emissions	Average Level dBμV	Average Limit dBμV	Excessive Average Emissions
0.254	14.8	61.6		9.2	51.6	
0.432	11.1	57.2		5.8	47.2	
0.572	7.4	56.0		3.3	46.0	
1.002	10.3	56.0		5.9	46.0	
1.822	5.5	56.0		1.9	46.0	
2.142	6.2	56.0		2.3	46.0	
4.000	42.5	56.0		38.6	46.0	
8.002	28.4	60.0		26.6	50.0	
16.002	23.8	60.0		20.4	50.0	
19.999	21.7	60.0		19.0	50.0	

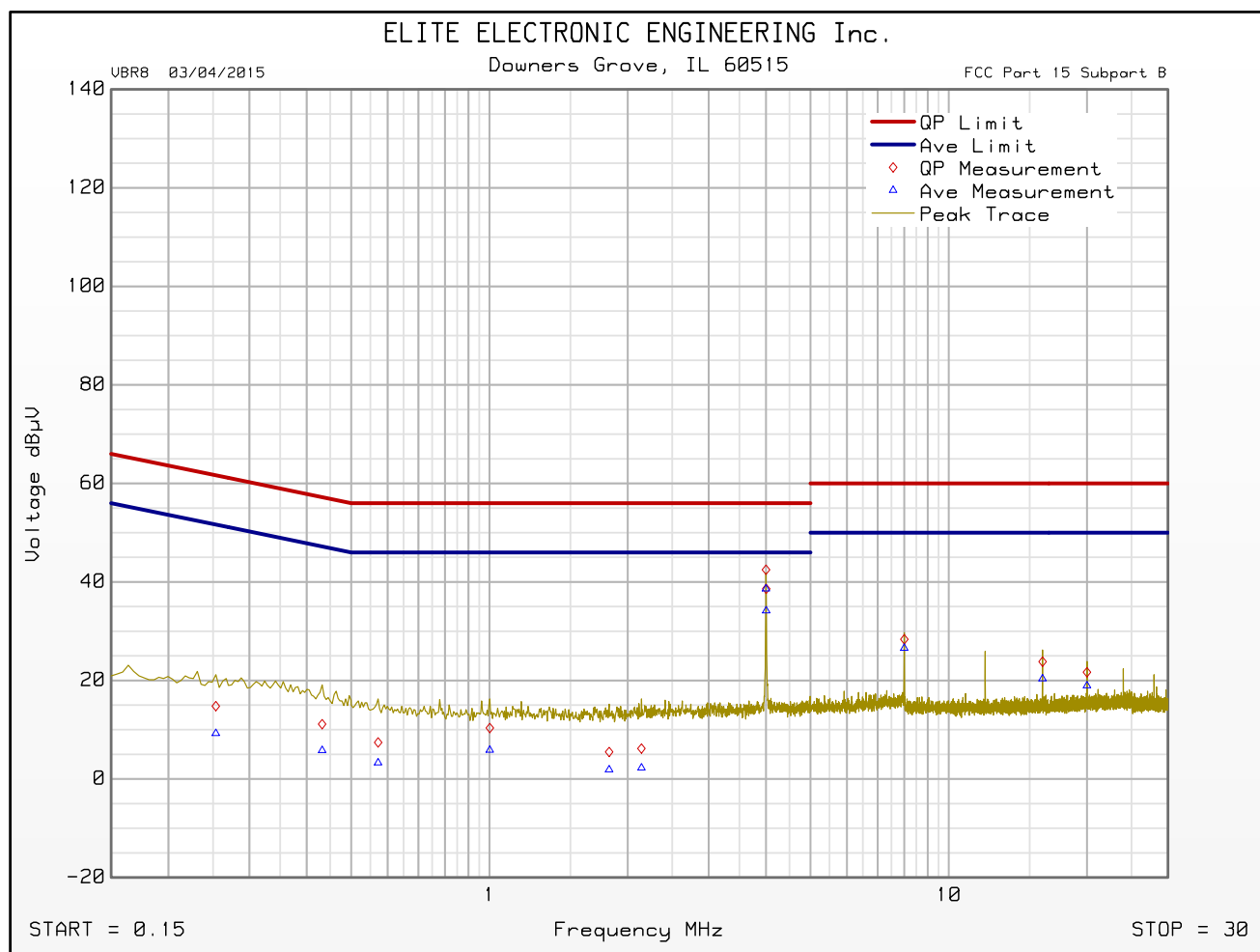


FCC Part 15 Subpart B Conducted Emissions Test

Cumulative Data

VBR8 03/04/2015

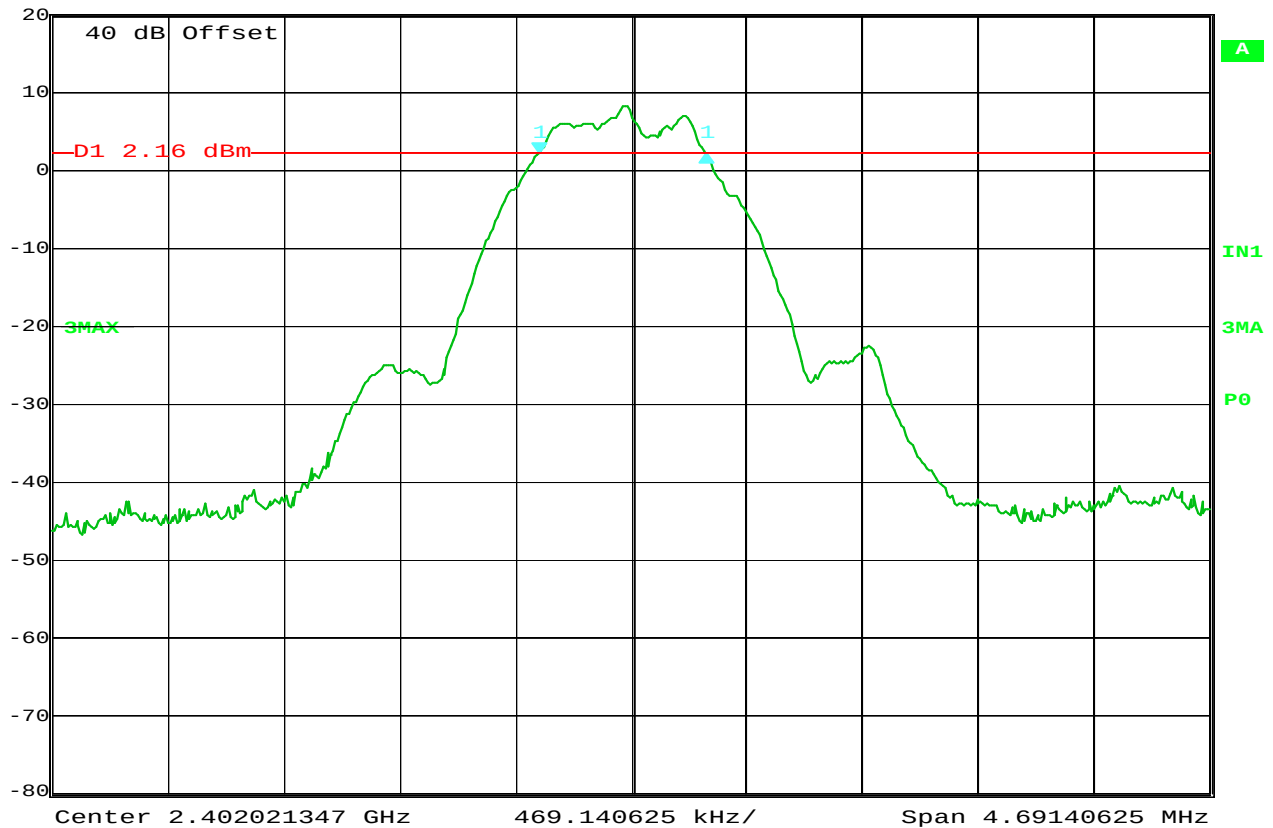
Manufacturer : CALIFORNIA EASTERN LABS
Model : B1010SP0
Serial Number :
DUT Mode : Tx @ MID CHANNEL
Line Tested : L2
Scan Step Time [ms] : 30
Meas. Threshold [dB] : -10
Notes :
Test Engineer : R. King
Limit : Class B
Test Date : Apr 24, 2015 12:46:24 PM



Emissions Meet QP Limit
Emissions Meet Ave Limit



Delta 1 [T3] RBW 100 kHz RF Att 0 dB
Ref Lvl 0.16 dB VBW 1 MHz
20 dBm 676.91633266 kHz SWT 5 ms Unit dBm



Date: 24.APR.2015 09:02:30

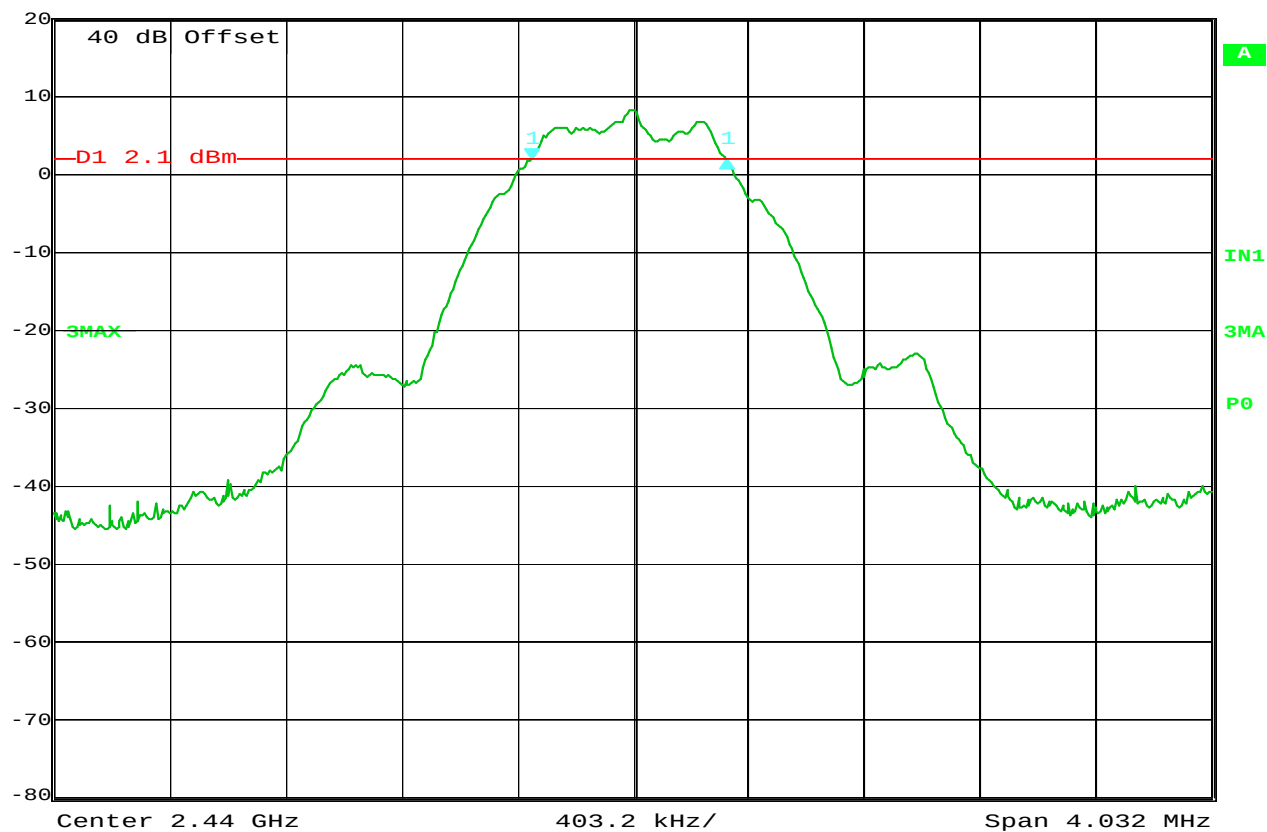
FCC Part 15.247 and IC RSS-210 DTS Bandwidth

MANUFACTURER : California Eastern Labs
MODEL NUMBER : B1010SP0
SERIAL NUMBER :
TEST MODE : Tx @ 2402MHz
EQUIPMENT USED : RBA0, T2DA, T2SD, SMAQ
NOTES : DTS BDW = 676.9kHz

NOTES



Delta 1 [T3] RBW 100 kHz RF Att 0 dB
Ref Lvl 0.23 dB VBW 1 MHz
20 dBm 679.74348698 kHz SWT 7.5 ms Unit dBm



Date: 24.APR.2015 09:19:53

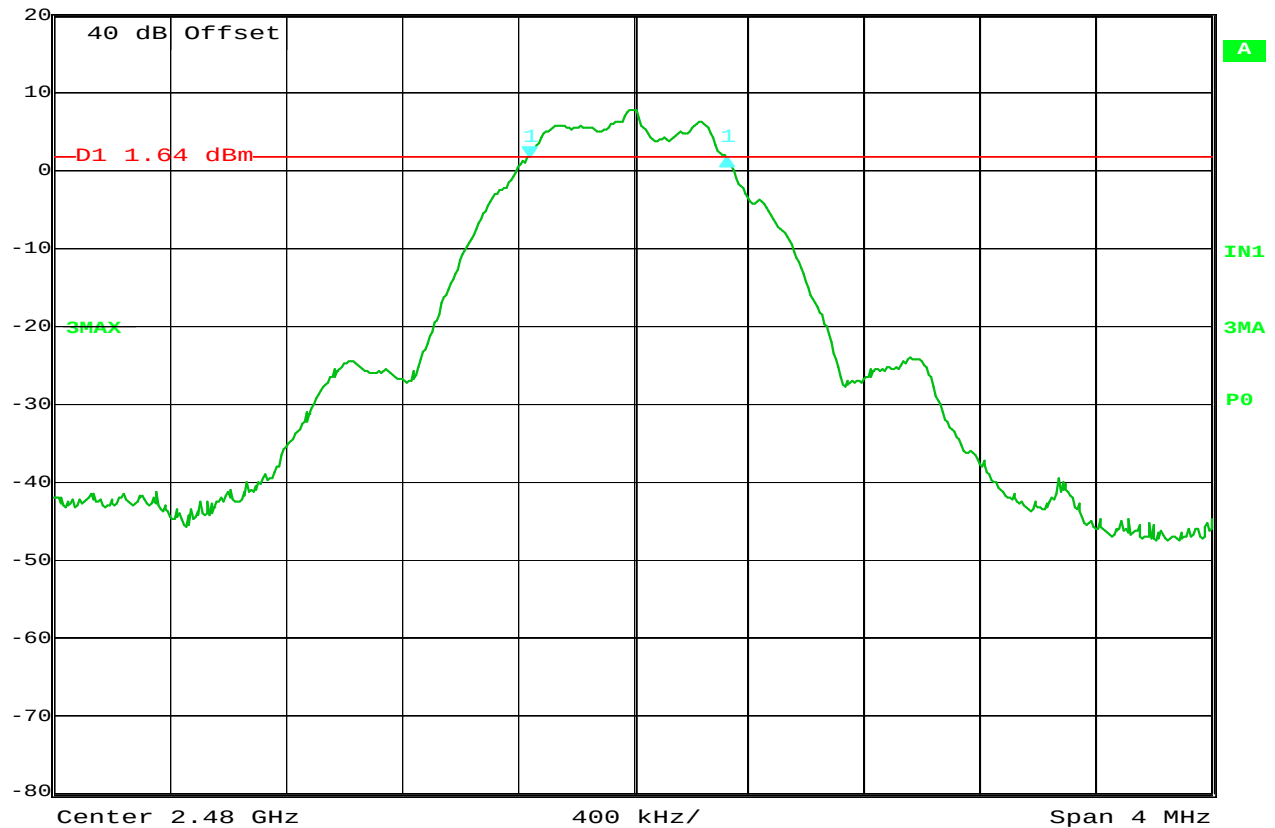
FCC Part 15.247 and IC RSS-210 DTS Bandwidth

MANUFACTURER : California Eastern Labs
MODEL NUMBER : B1010SP0
SERIAL NUMBER :
TEST MODE : Tx @ 2440MHz
EQUIPMENT USED : RBA0, T2DA, T2SD, SMAQ
NOTES : DTS BW = 679.7kHz

NOTES



Delta 1 [T3] RBW 100 kHz RF Att 0 dB
Ref Lvl -0.17 dB VBW 1 MHz
20 dBm 681.36272545 kHz SWT 7.5 ms Unit dBm



Date: 24.APR.2015 09:31:54

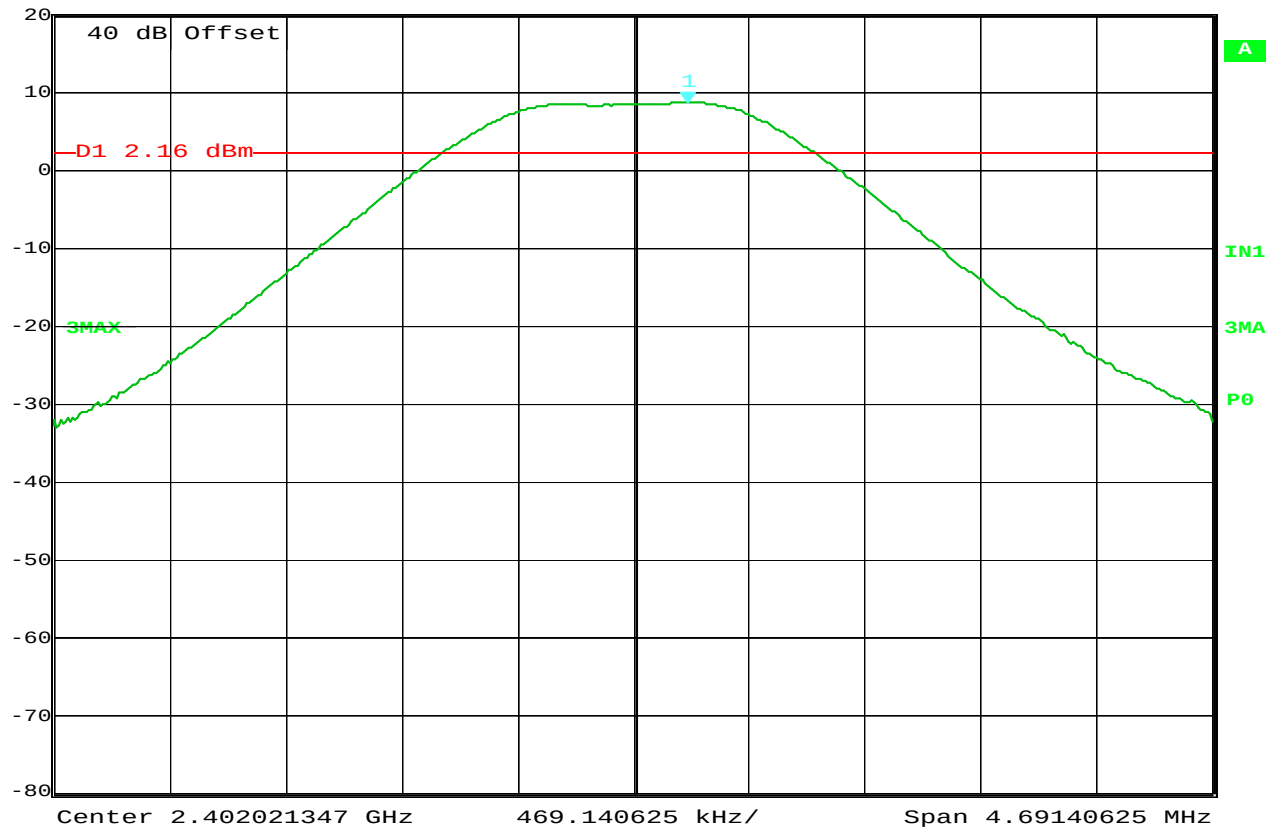
FCC Part 15.247 and IC RSS-210 DTS Bandwidth

MANUFACTURER : California Eastern Labs
MODEL NUMBER : B1010SP0
SERIAL NUMBER :
TEST MODE : Tx @ 2480MHz
EQUIPMENT USED : RBA0, T2DA, T2SD, SMAQ
NOTES : DTS BW = 681.3kHz

NOTES



Marker 1 [T3] RBW 1 MHz RF Att 0 dB
8.69 dBm VBW 10 MHz
2.40224229 GHz SWT 5 ms Unit dBm



Date: 24.APR.2015 09:04:49

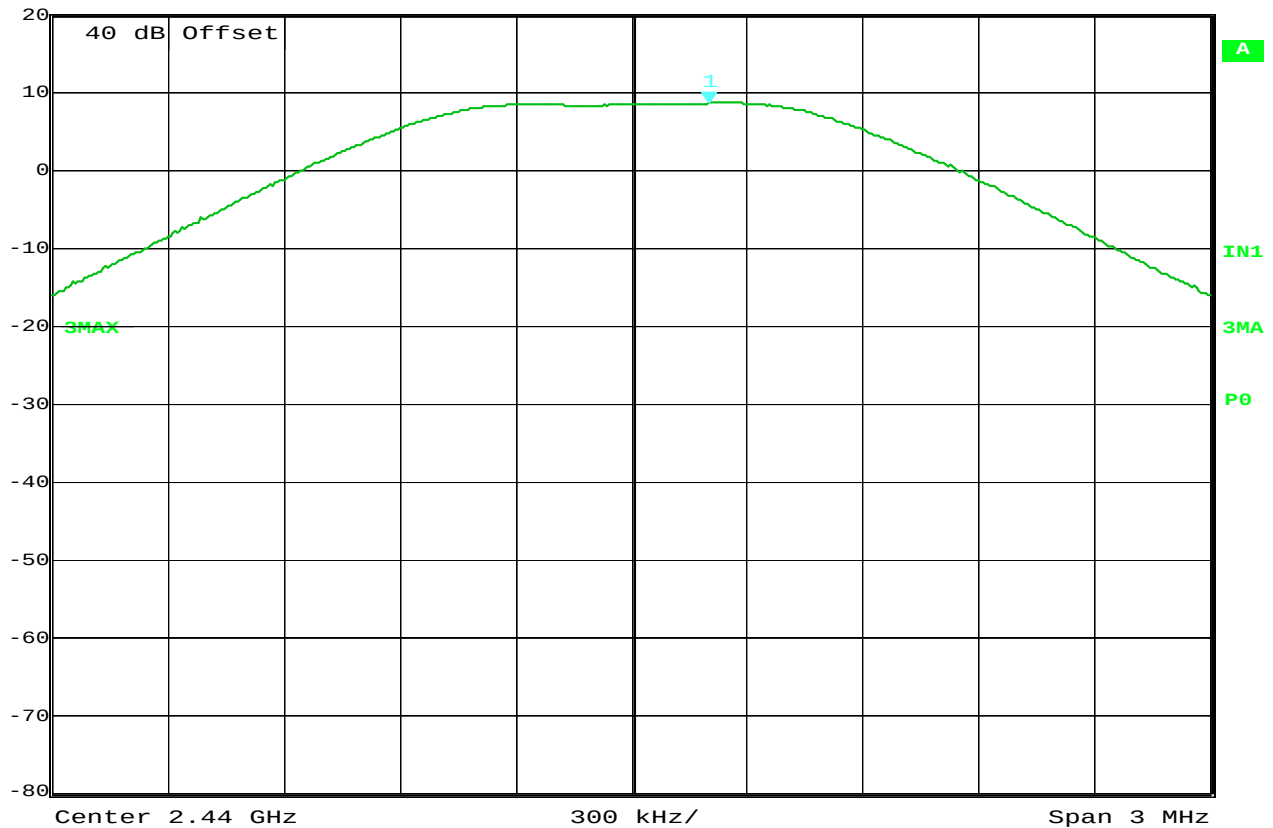
FCC Part 15.247 and IC RSS-210 Output Power

MANUFACTURER : California Eastern Labs
MODEL NUMBER : B1010SP0
SERIAL NUMBER :
TEST MODE : Tx @ 2402MHz
TEST PARAMETERS :
EQUIPMENT USED : RBA0, T2DA, T2SD, SMAQ
NOTES : 8.68 dBm

NOTES



Marker 1 [T3] RBW 1 MHz RF Att 0 dB
8.55 dBm VBW 10 MHz
2.44020140 GHz SWT 7.5 ms Unit dBm



Date: 24.APR.2015 09:22:35

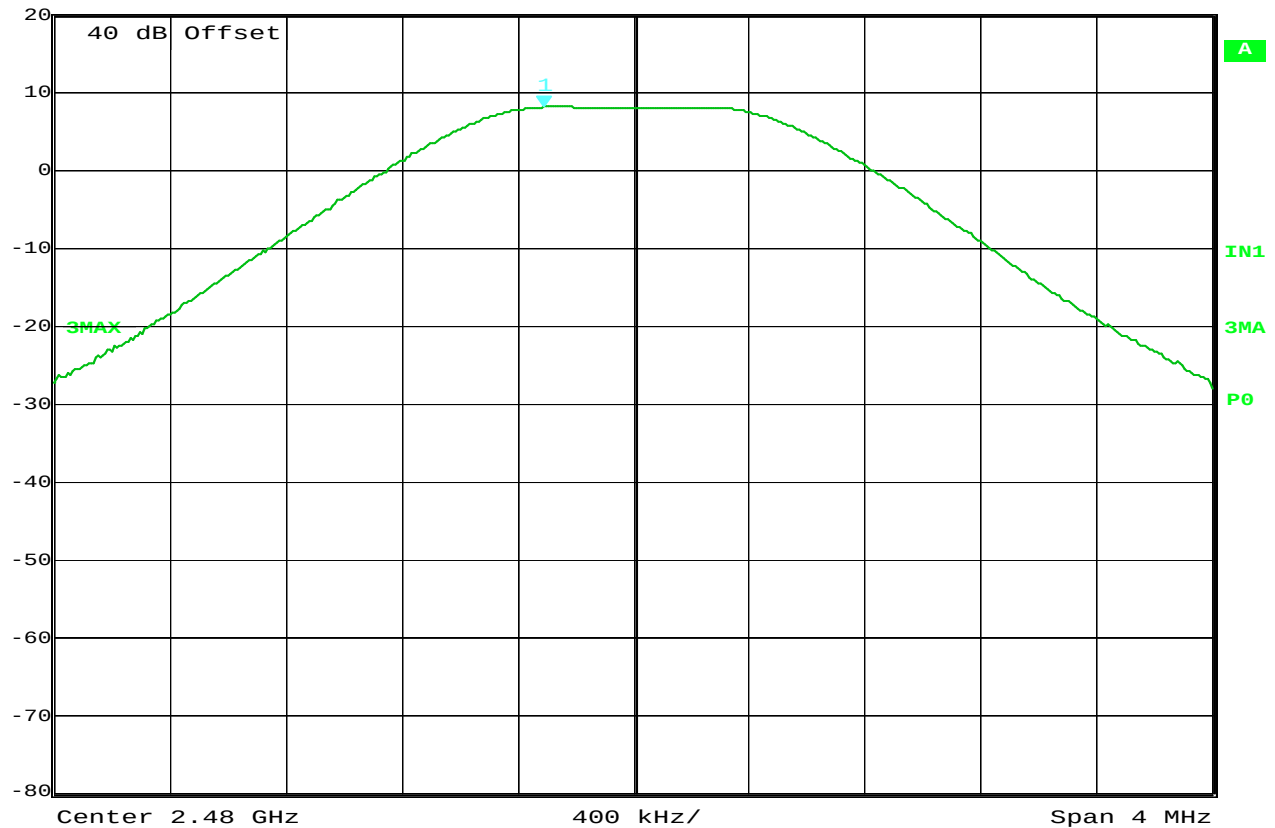
FCC Part 15.247 and IC RSS-210 Output Power

MANUFACTURER : California Eastern Labs
MODEL NUMBER : B1010SP0
SERIAL NUMBER :
TEST MODE : Tx @ 2440MHz
TEST PARAMETERS :
EQUIPMENT USED : RBA0, T2DA, T2SD, SMAQ
NOTES : Output Power = 8.55 dBm

NOTES



Marker 1 [T3] RBW 1 MHz RF Att 0 dB
Ref Lvl 8.06 dBm VBW 10 MHz
20 dBm 2.47969138 GHz SWT 7.5 ms Unit dBm



Date: 24.APR.2015 09:40:33

FCC Part 15.247 and IC RSS-210 Output Power

MANUFACTURER : California Eastern Labs
MODEL NUMBER : B1010SP0
SERIAL NUMBER :
TEST MODE : Tx @ 2480MHz
TEST PARAMETERS :
EQUIPMENT USED : RBA0, T2DA, T2SD, SMAQ
NOTES : Output Power = 8.06 dBm

NOTES



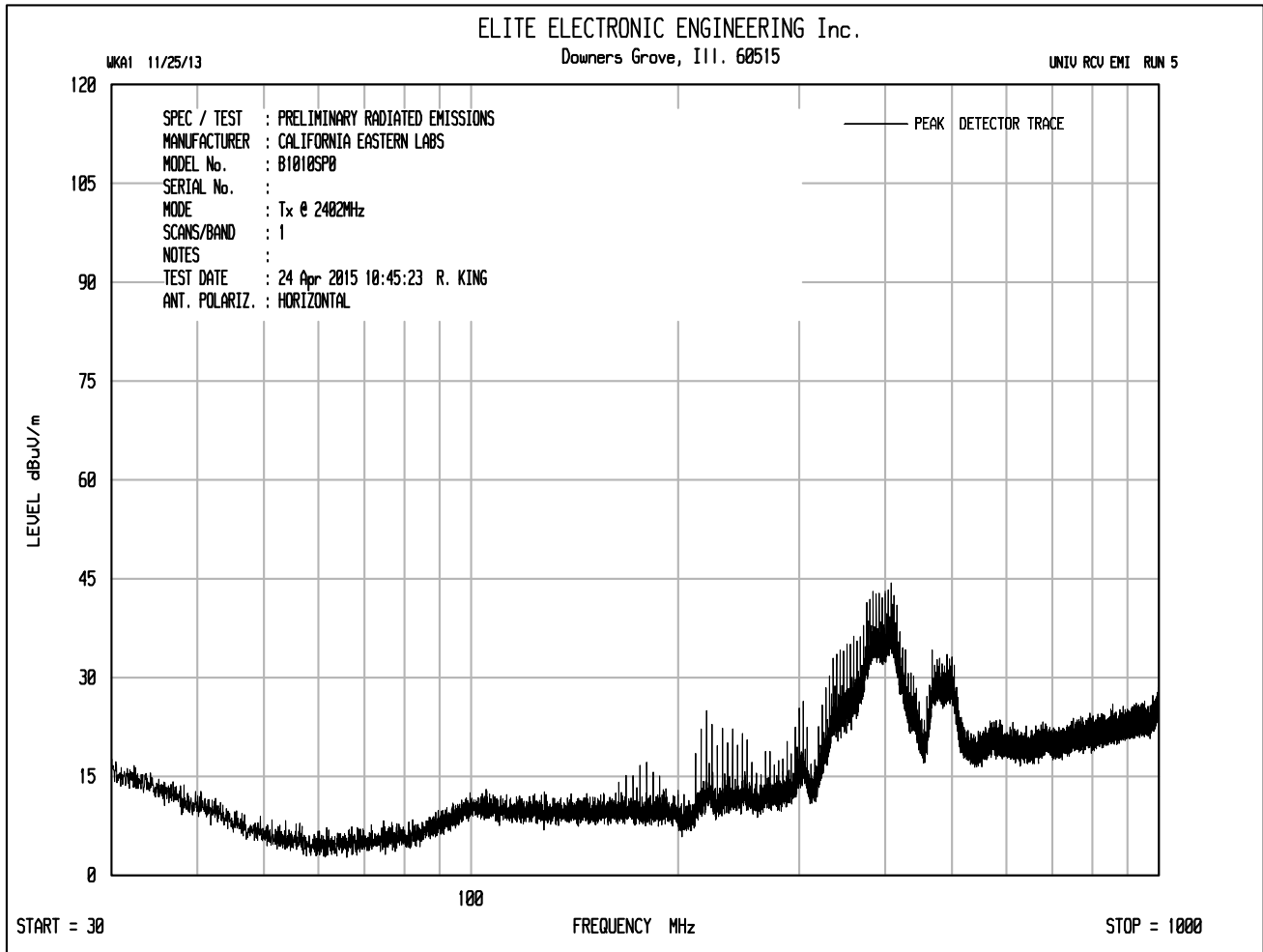
MANUFACTURER : California Eastern Labs
MODEL NUMBER : B1010SP0
TEST MODE : Transmit
TEST DATE : April 24, 2015
TEST PARAMETERS : Effective Isotropic Radiated Power (EIRP)
NOTES :

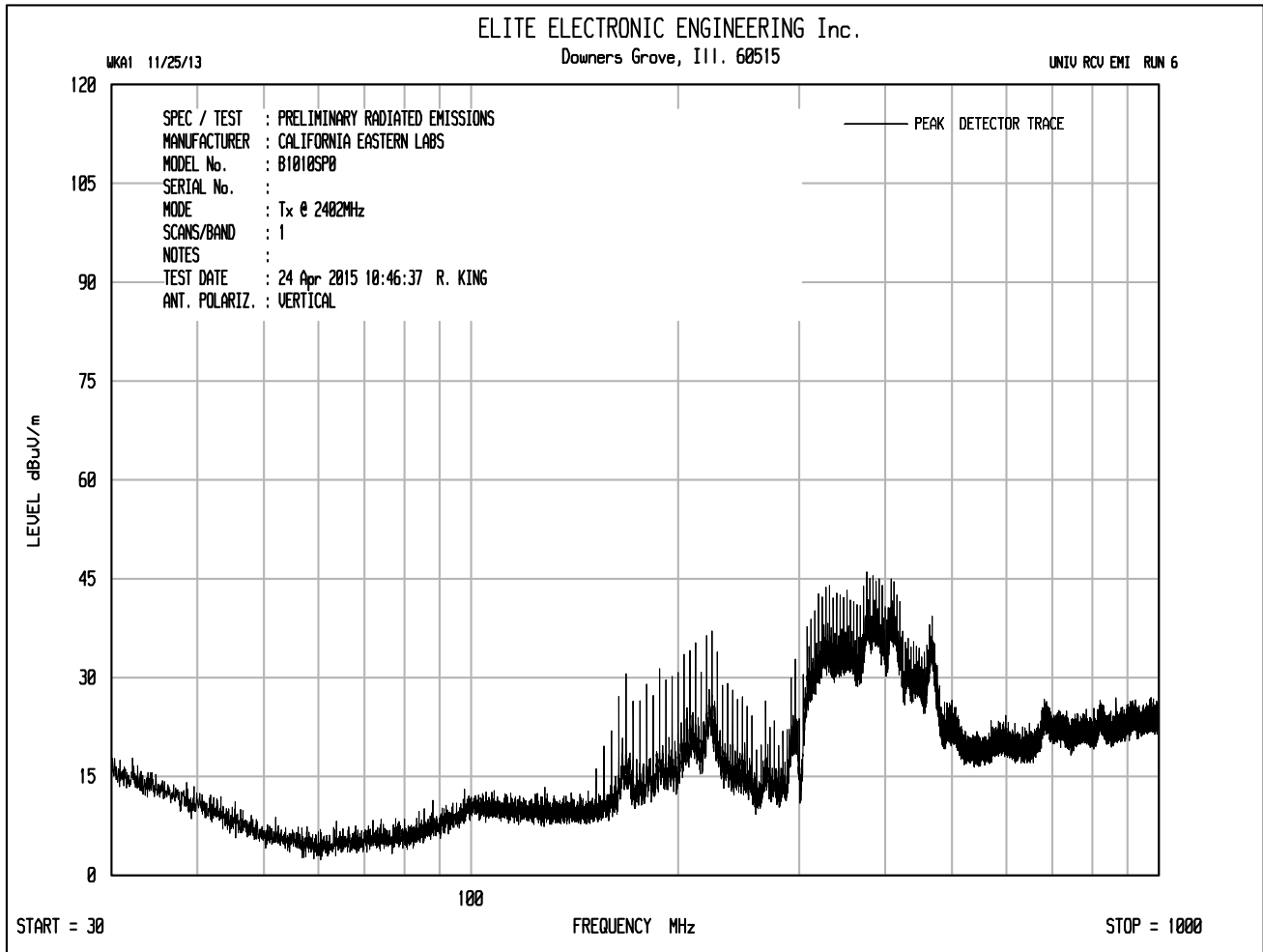
Freq. (MHz)	Ant Pol	Meter Reading (dBuV)	Matched Sig. Gen. Reading (dBm)	Equivalent Antenna Gain (dB)	Cable Loss (dB)	EIRP (dBm)	Limit (dBm)
2402.00	H	69.6	6.4	5.7	2.7	9.4	36.0
2402.00	V	68.1	4.3	5.7	2.7	7.3	36.0
2440.00	H	68.9	6.0	5.8	2.8	9.0	36.0
2440.00	V	67.4	4.1	5.8	2.8	7.1	36.0
2480.00	H	69.9	6.4	5.7	2.8	9.3	36.0
2480.00	V	66.2	3.5	5.7	2.8	6.4	36.0

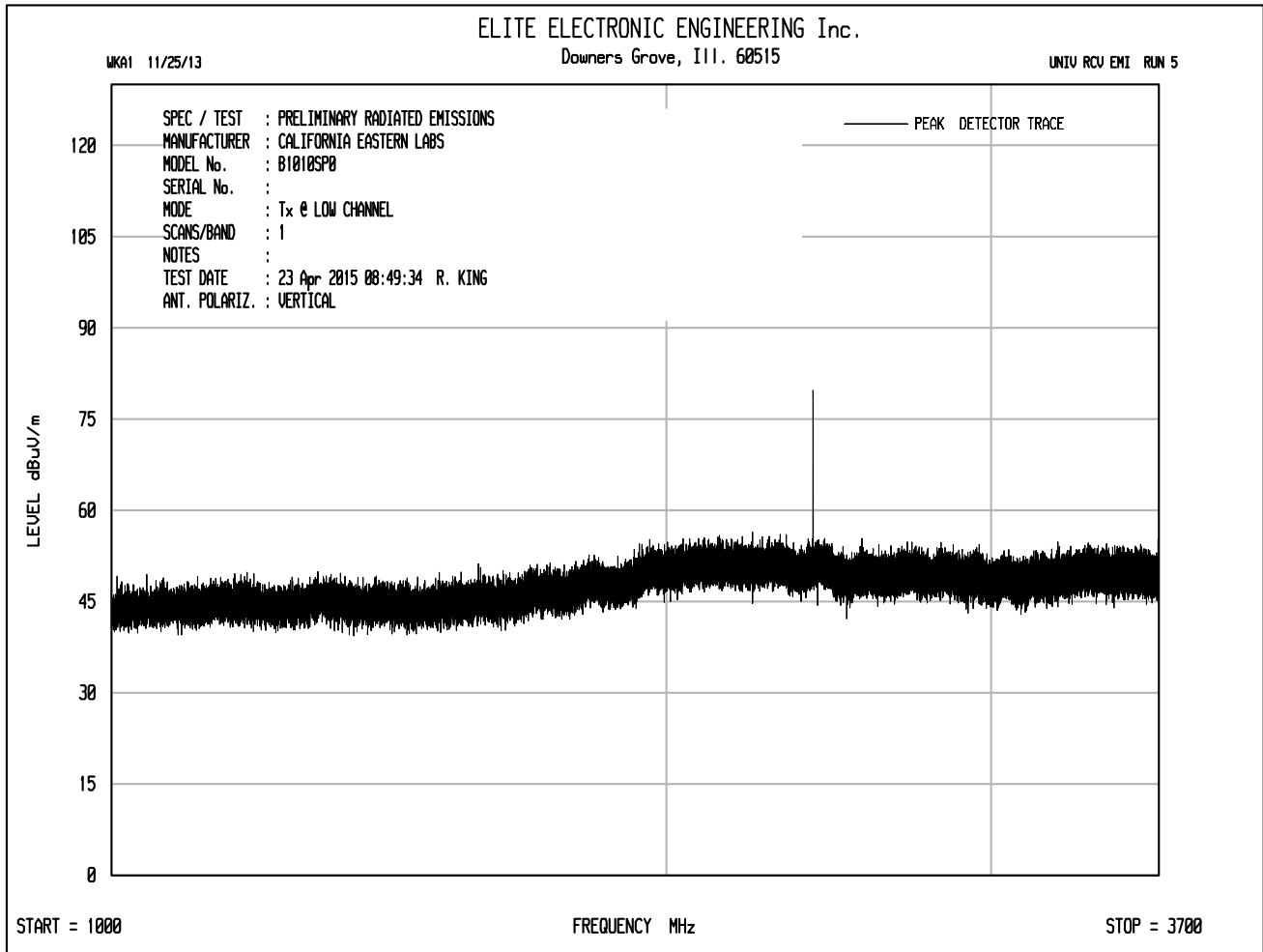
EIRP = Match Signal Reading + Antenna Gain

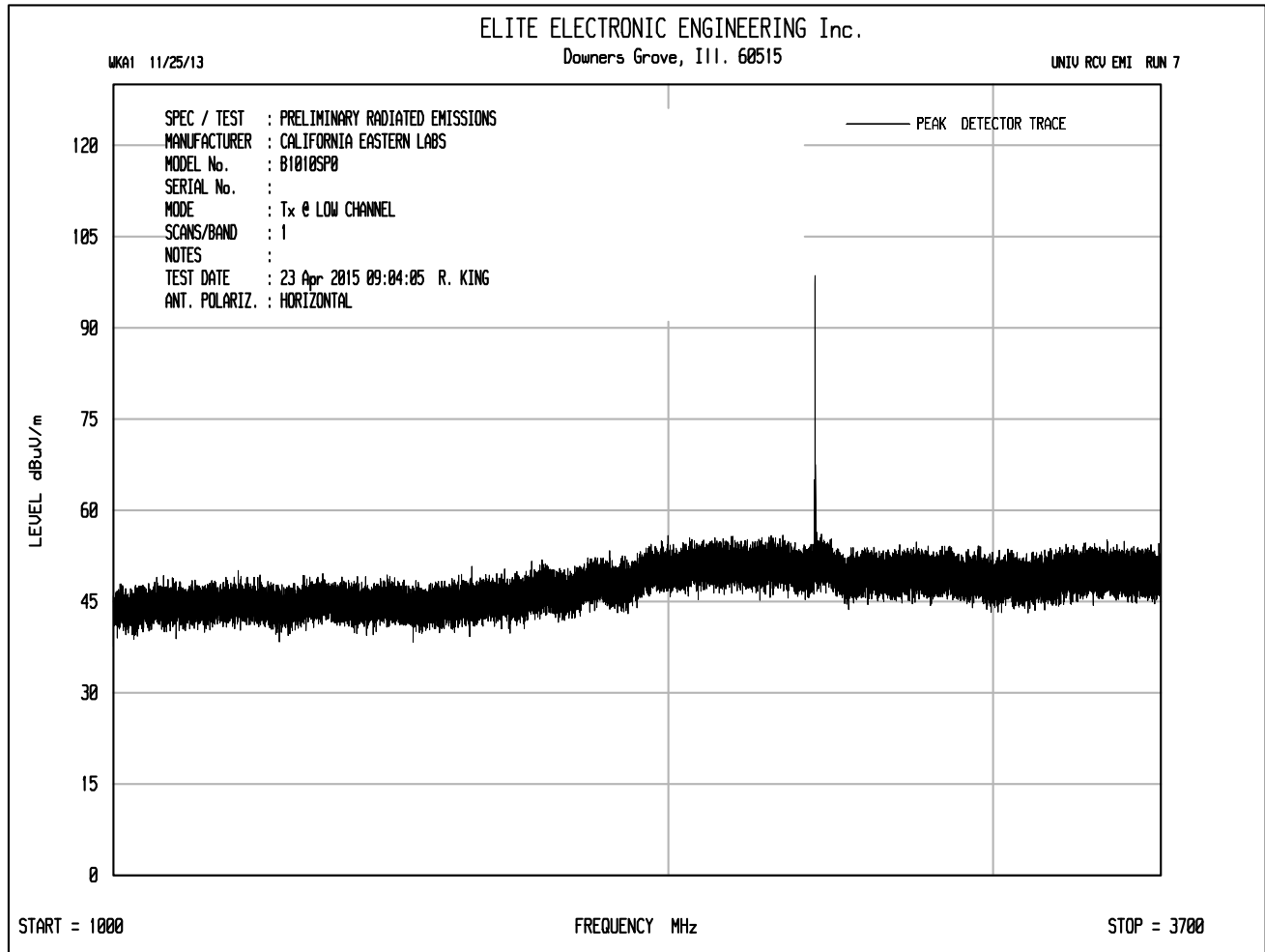
Checked BY RICHARD E. KING :

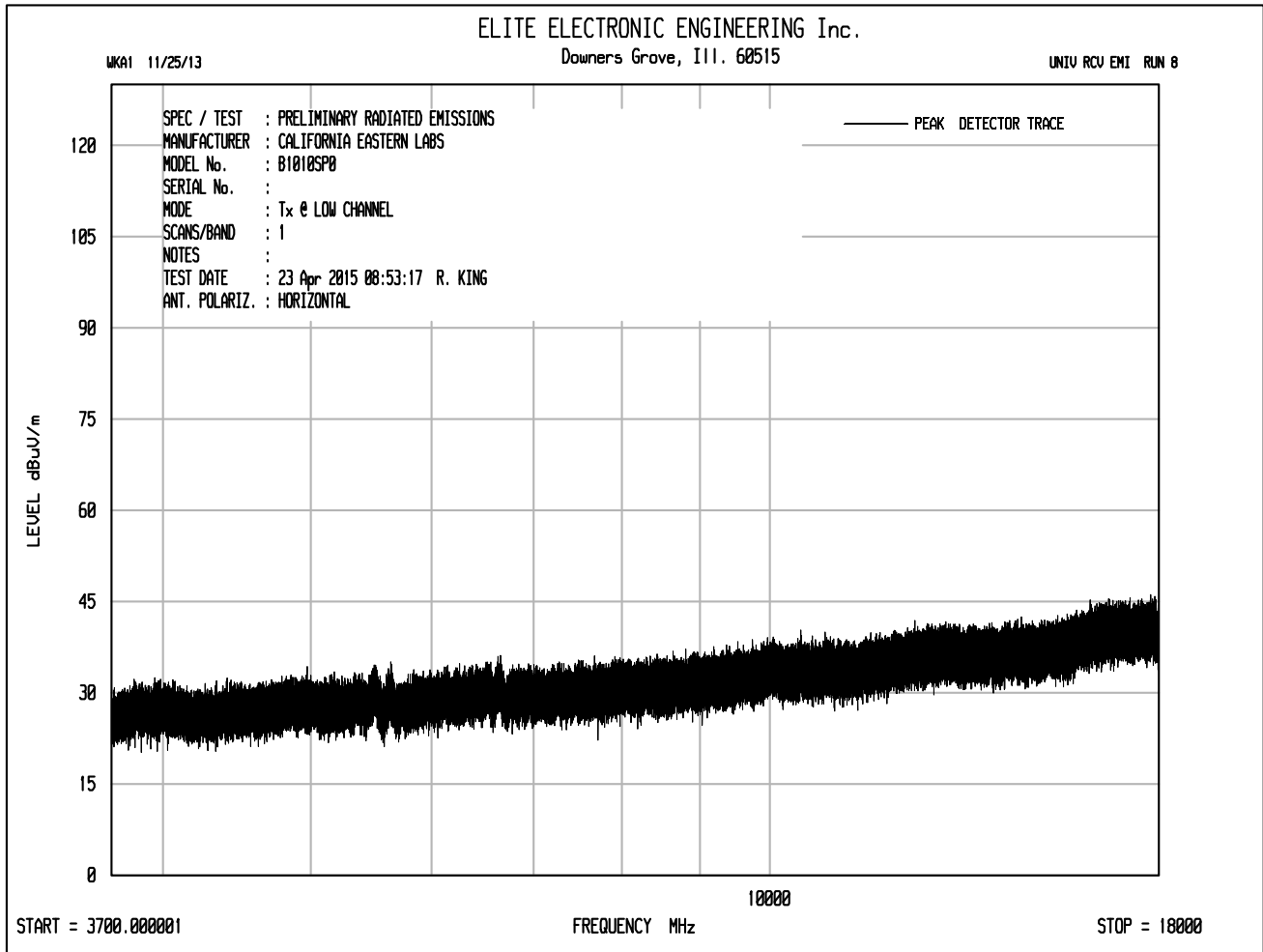
Richard E. King

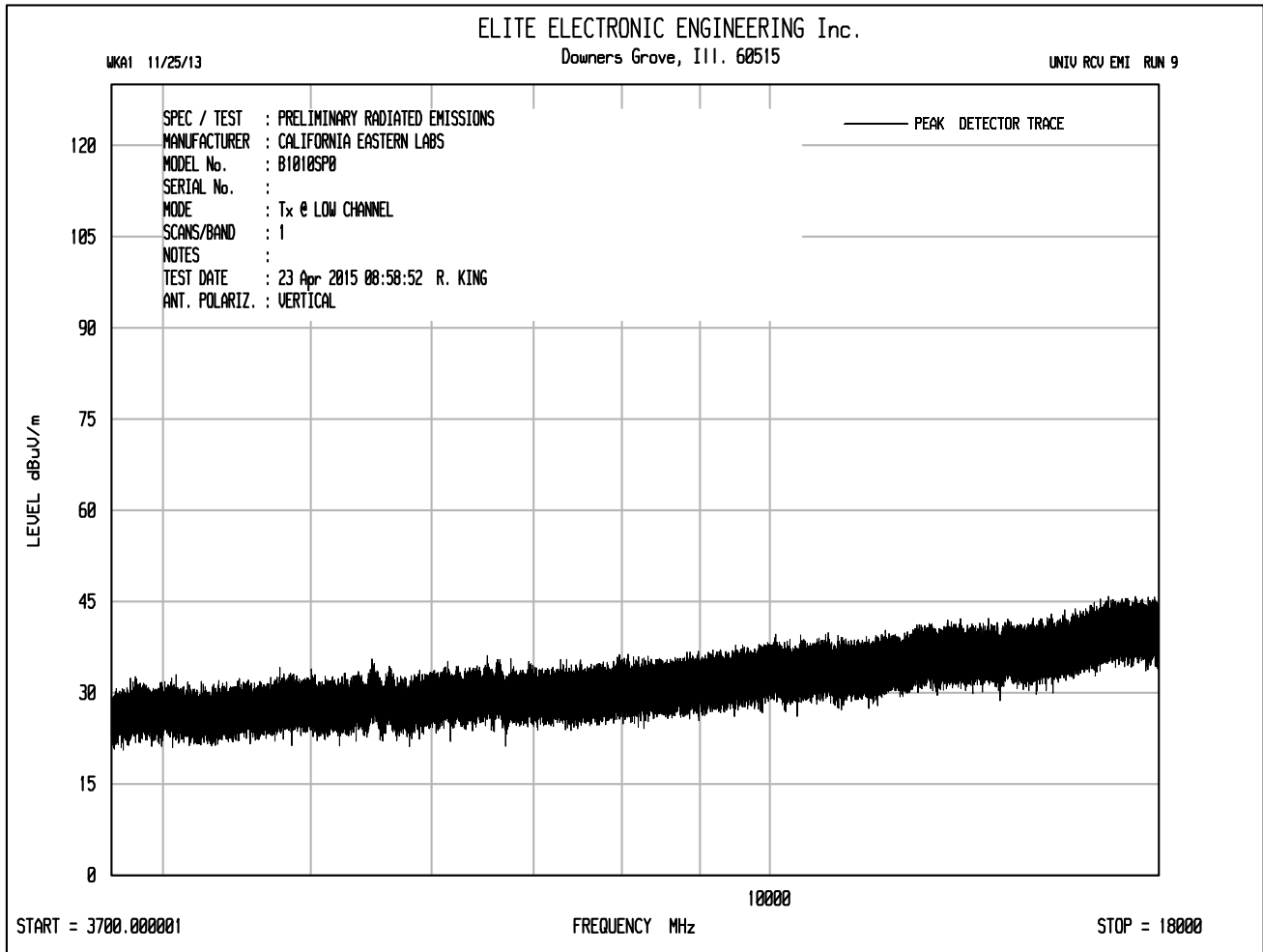


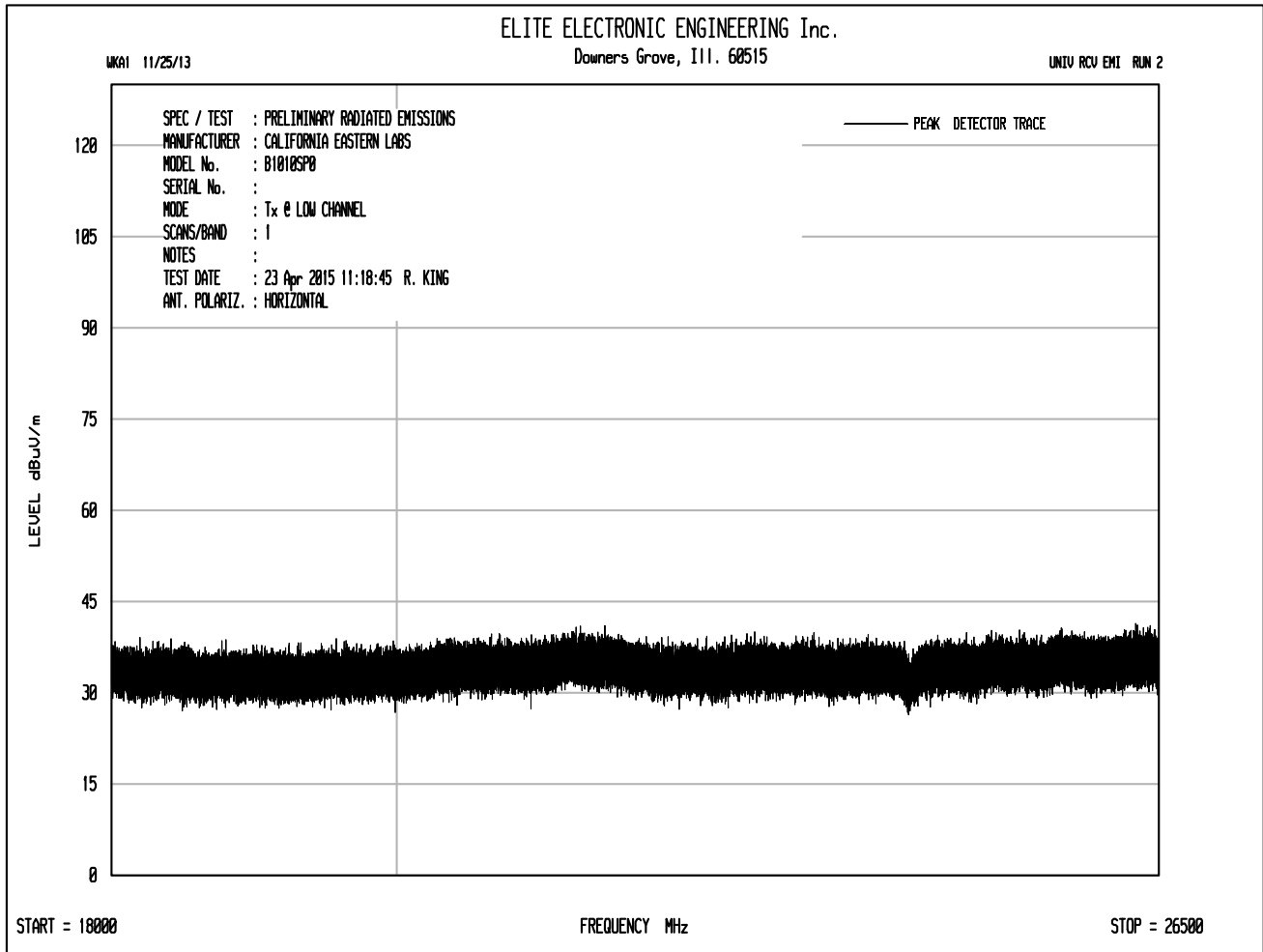


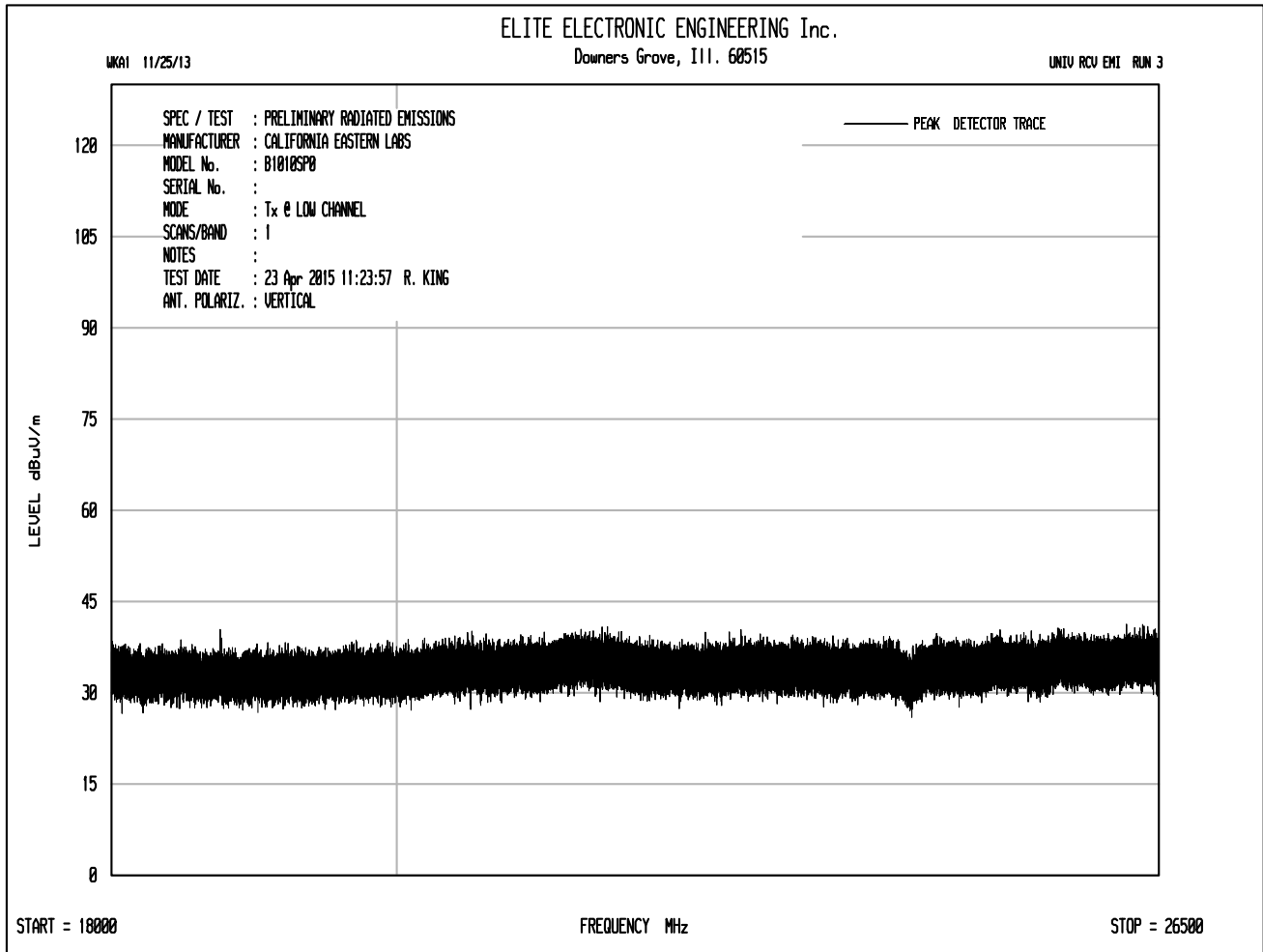


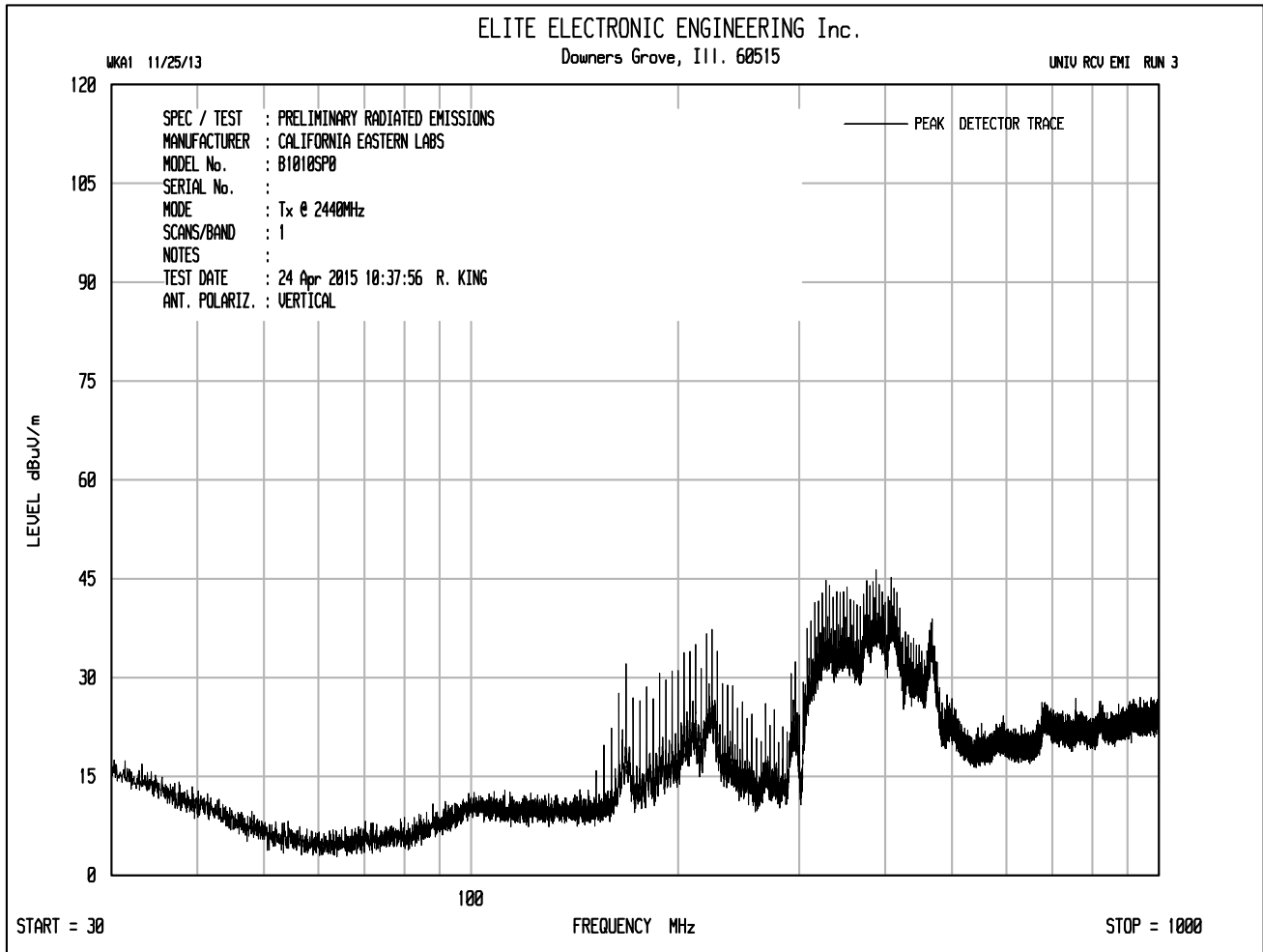


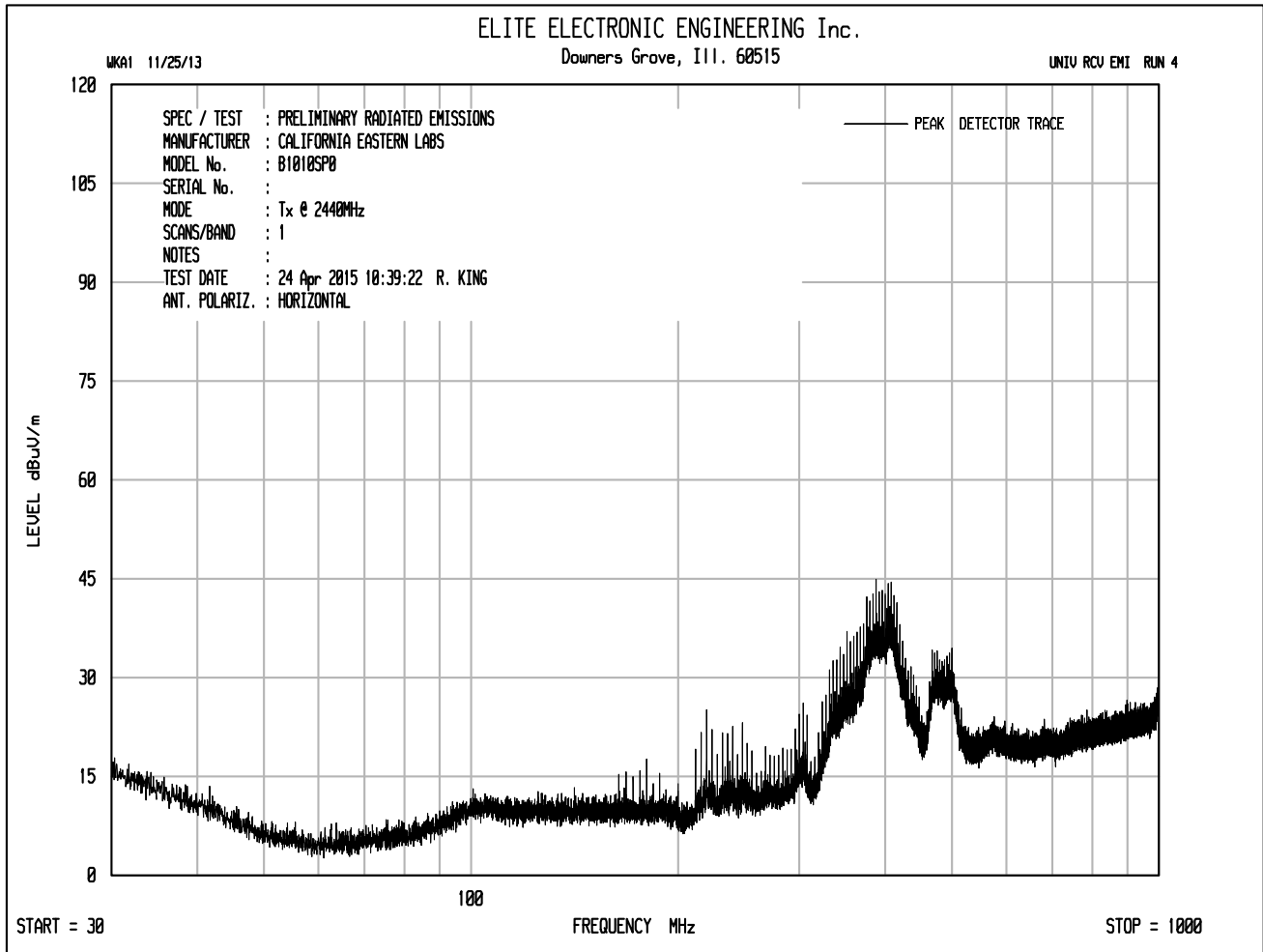


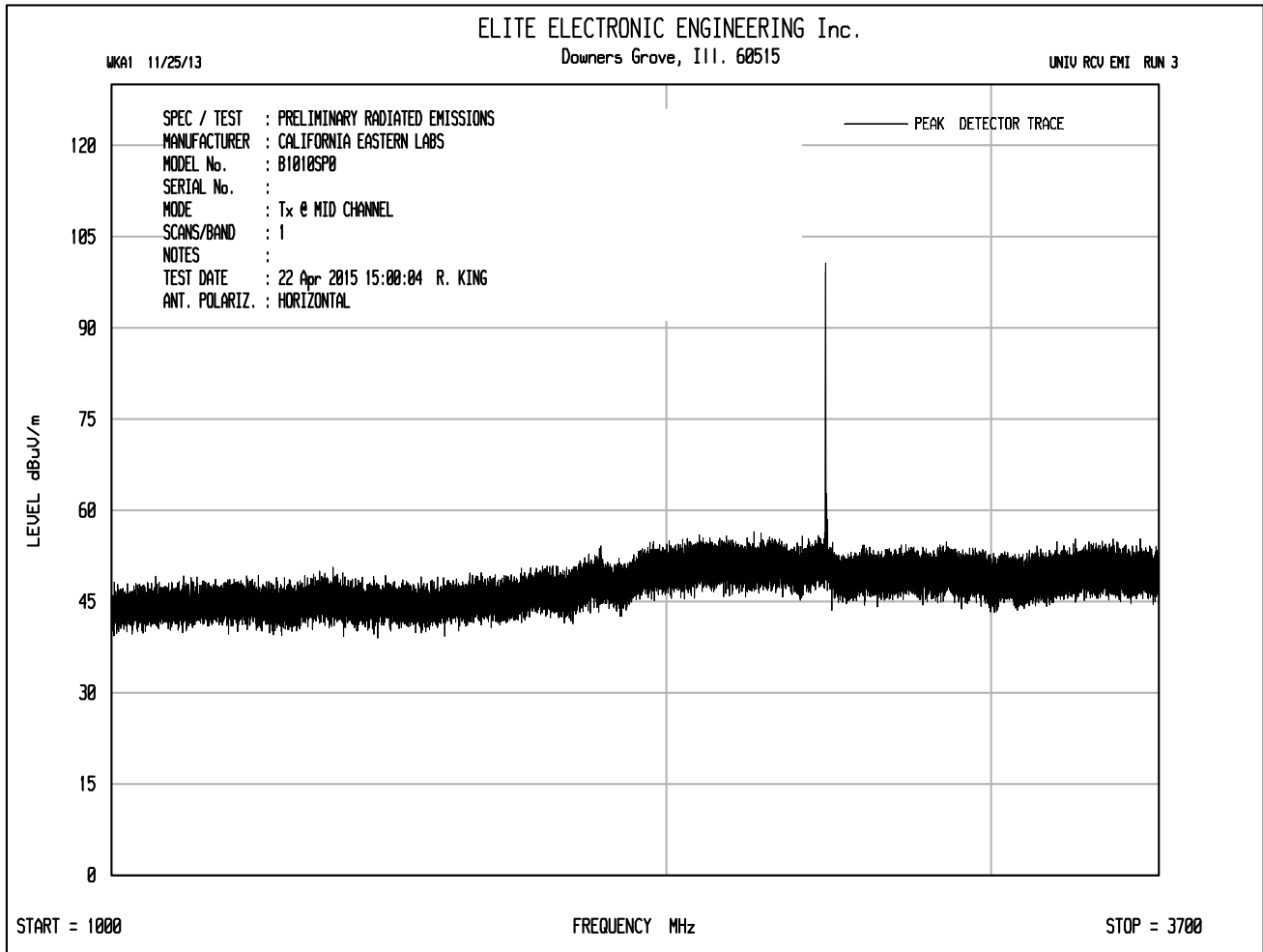


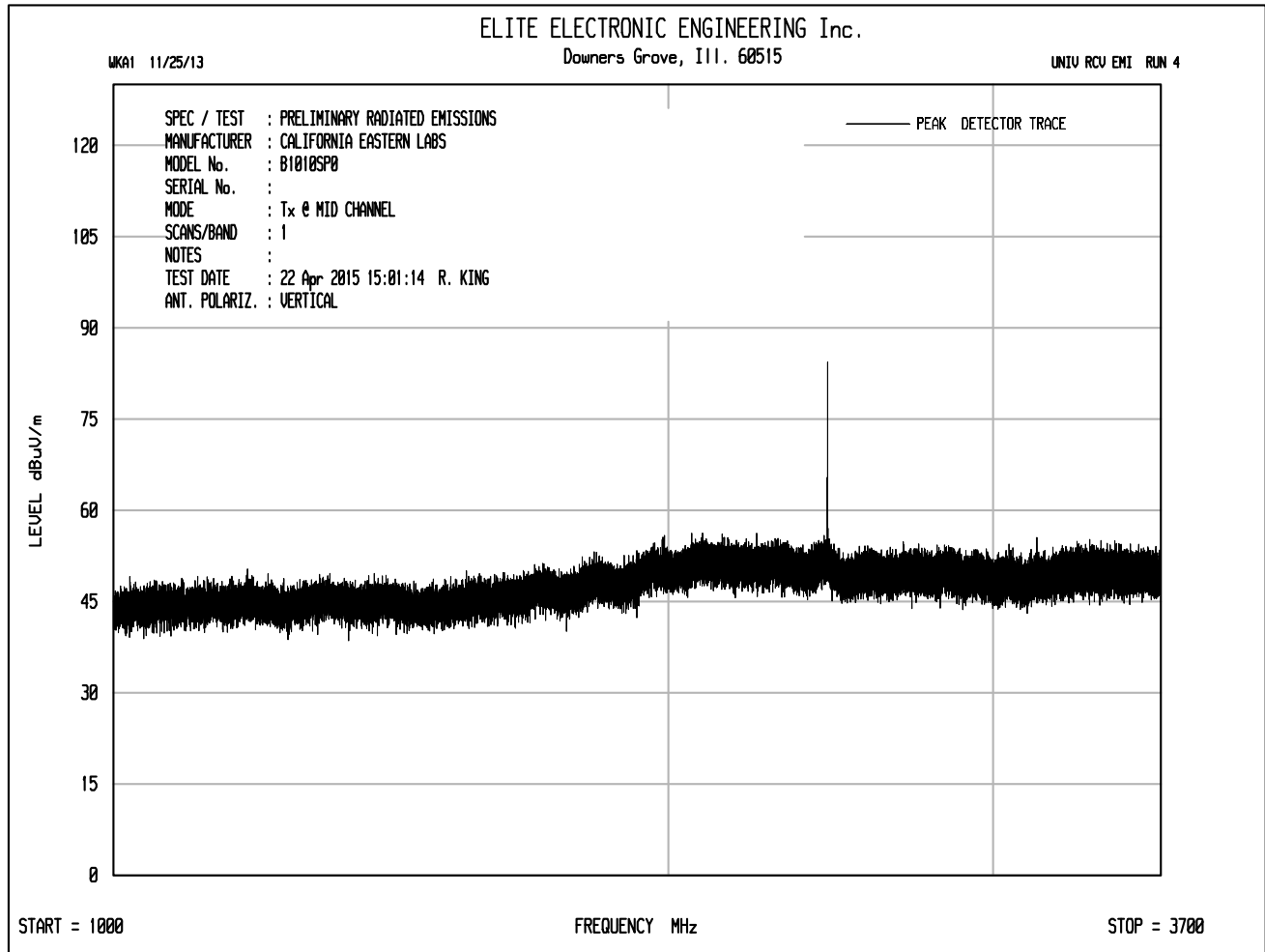


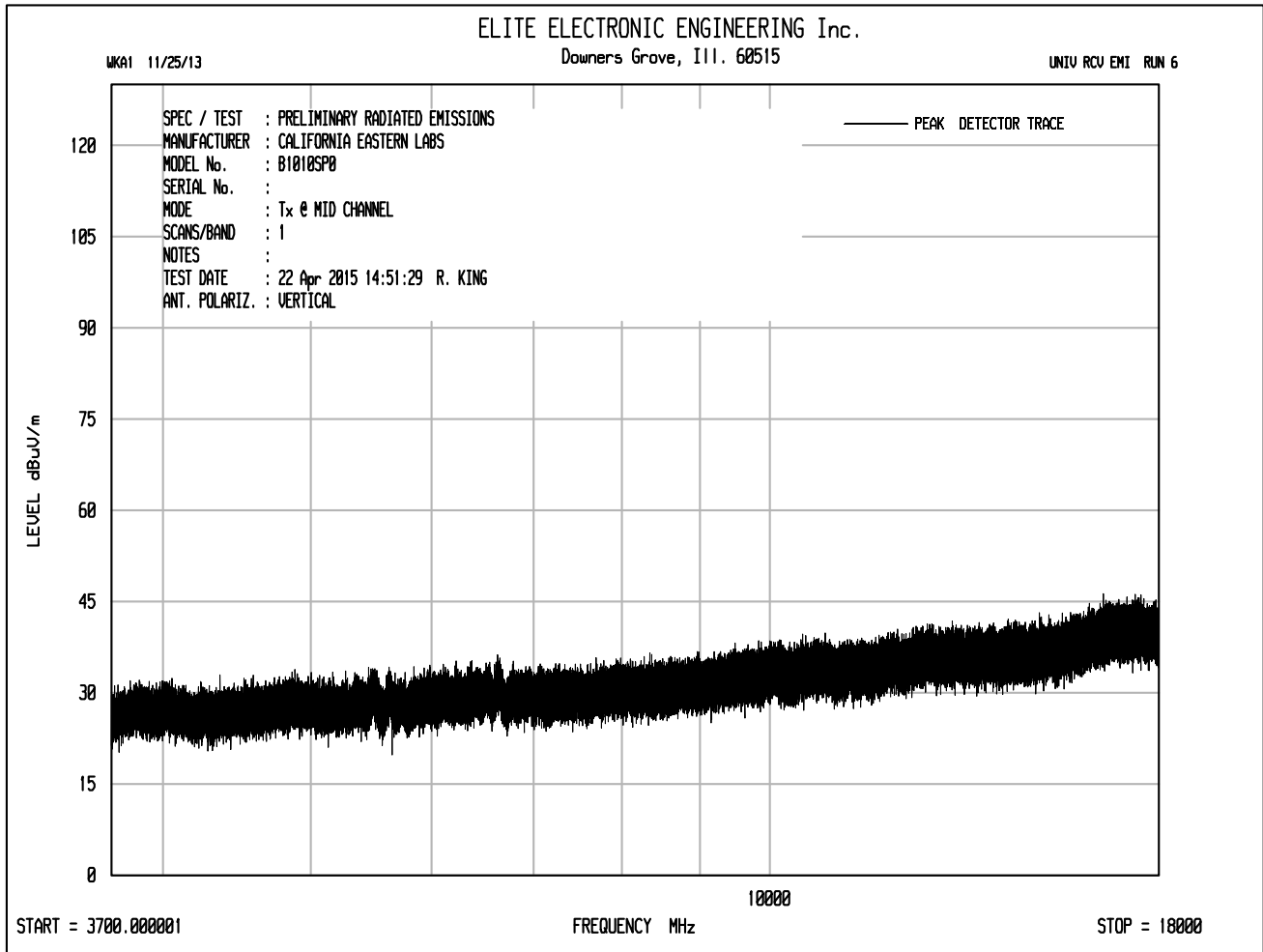


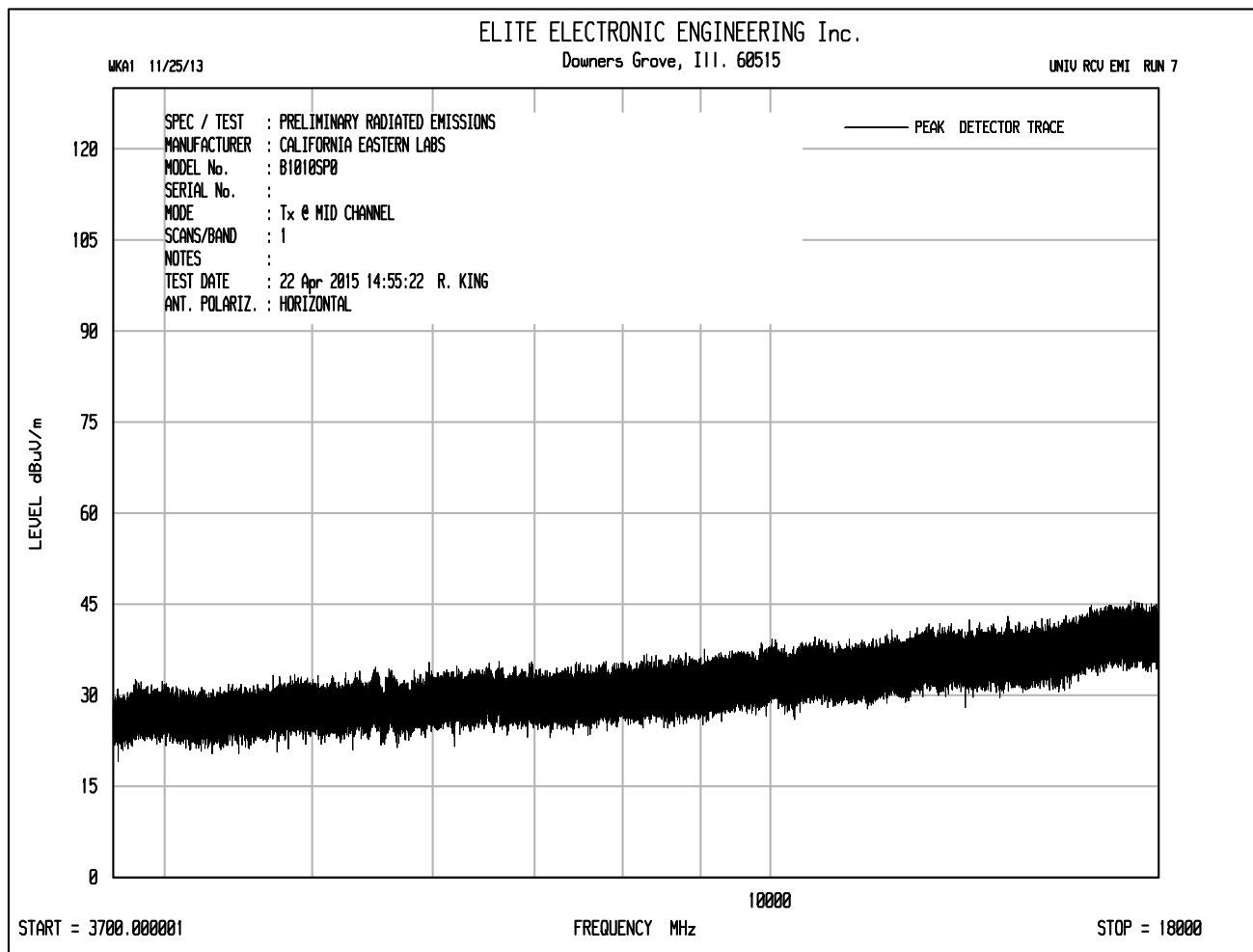


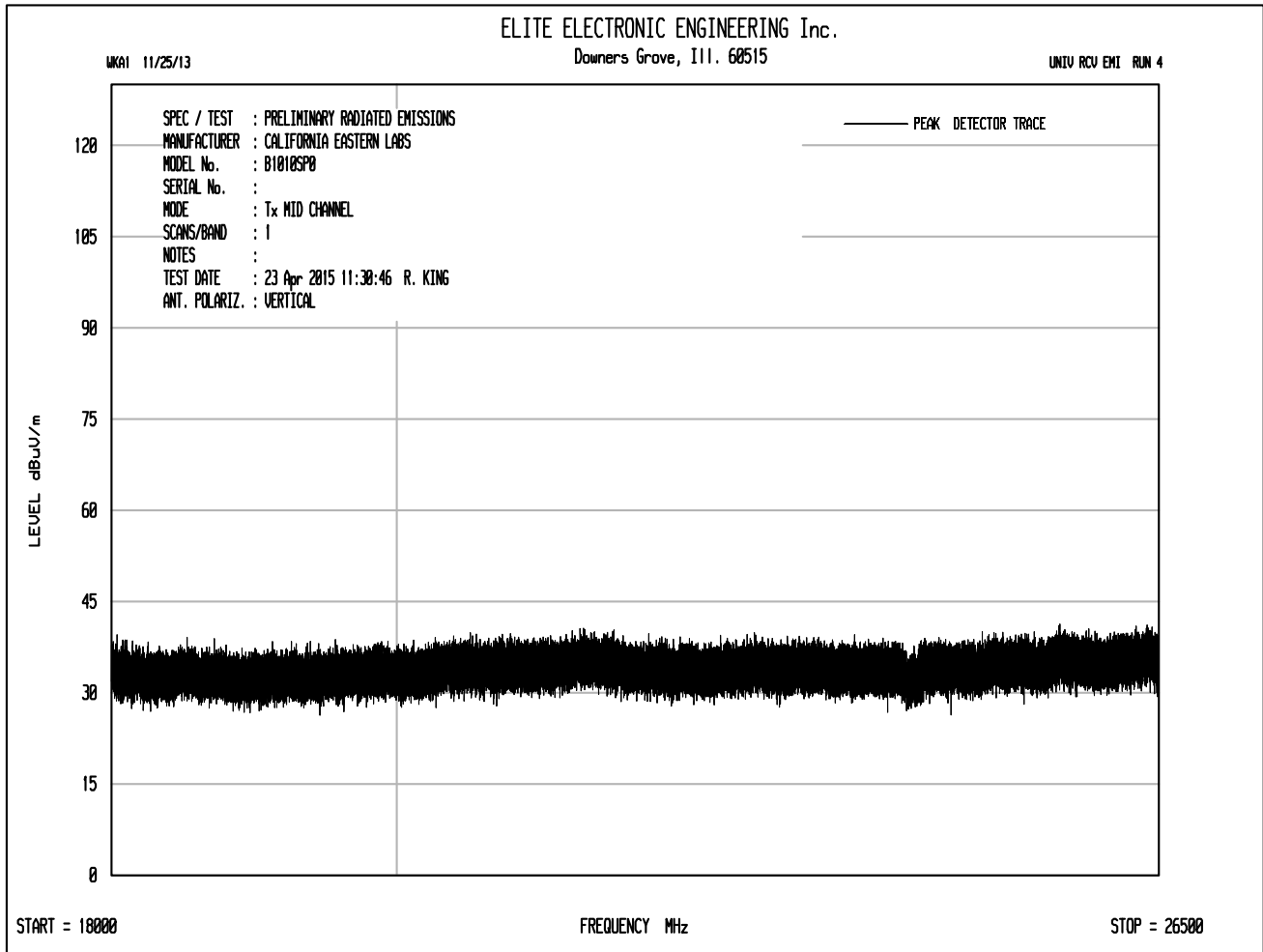


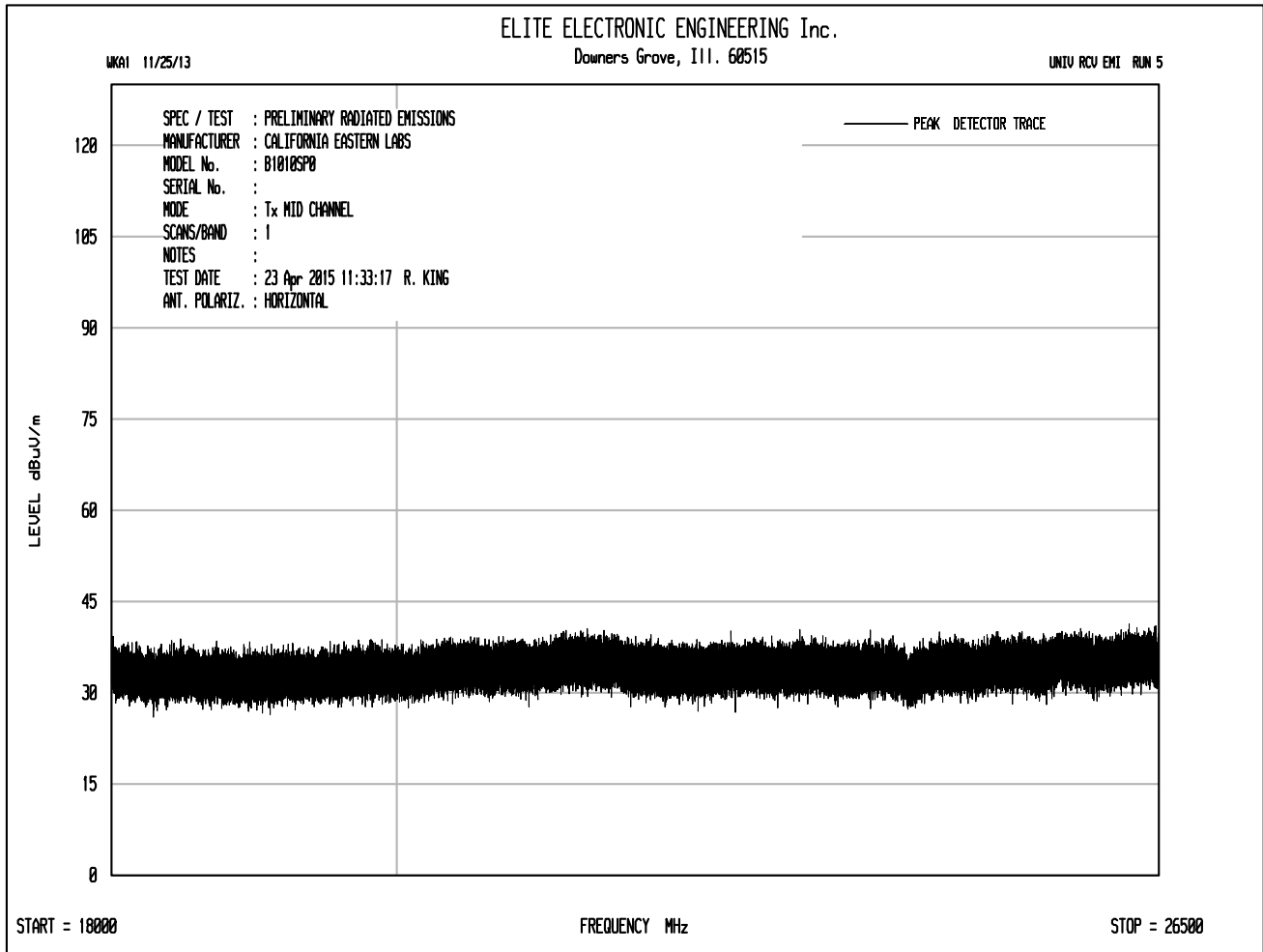


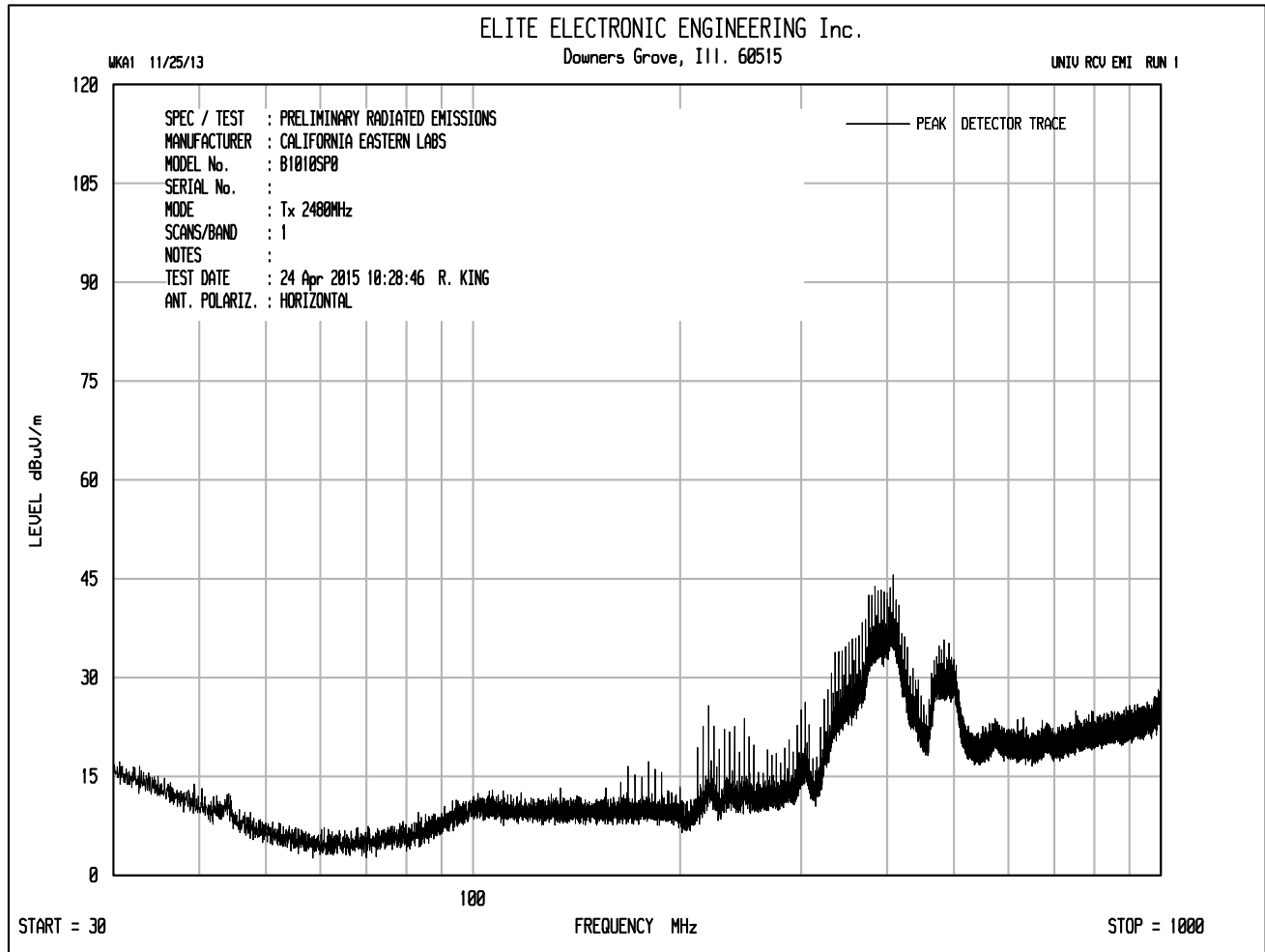


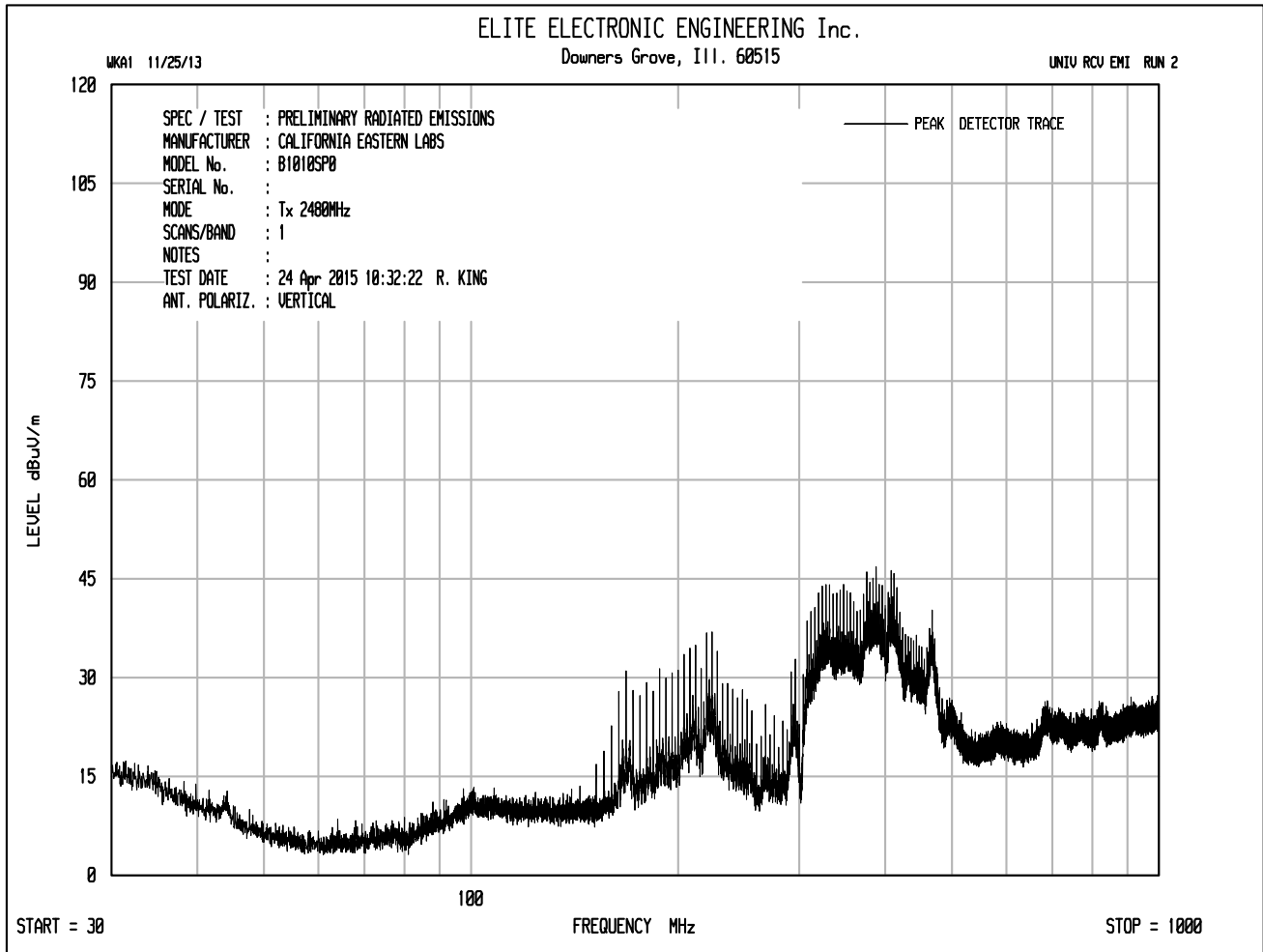


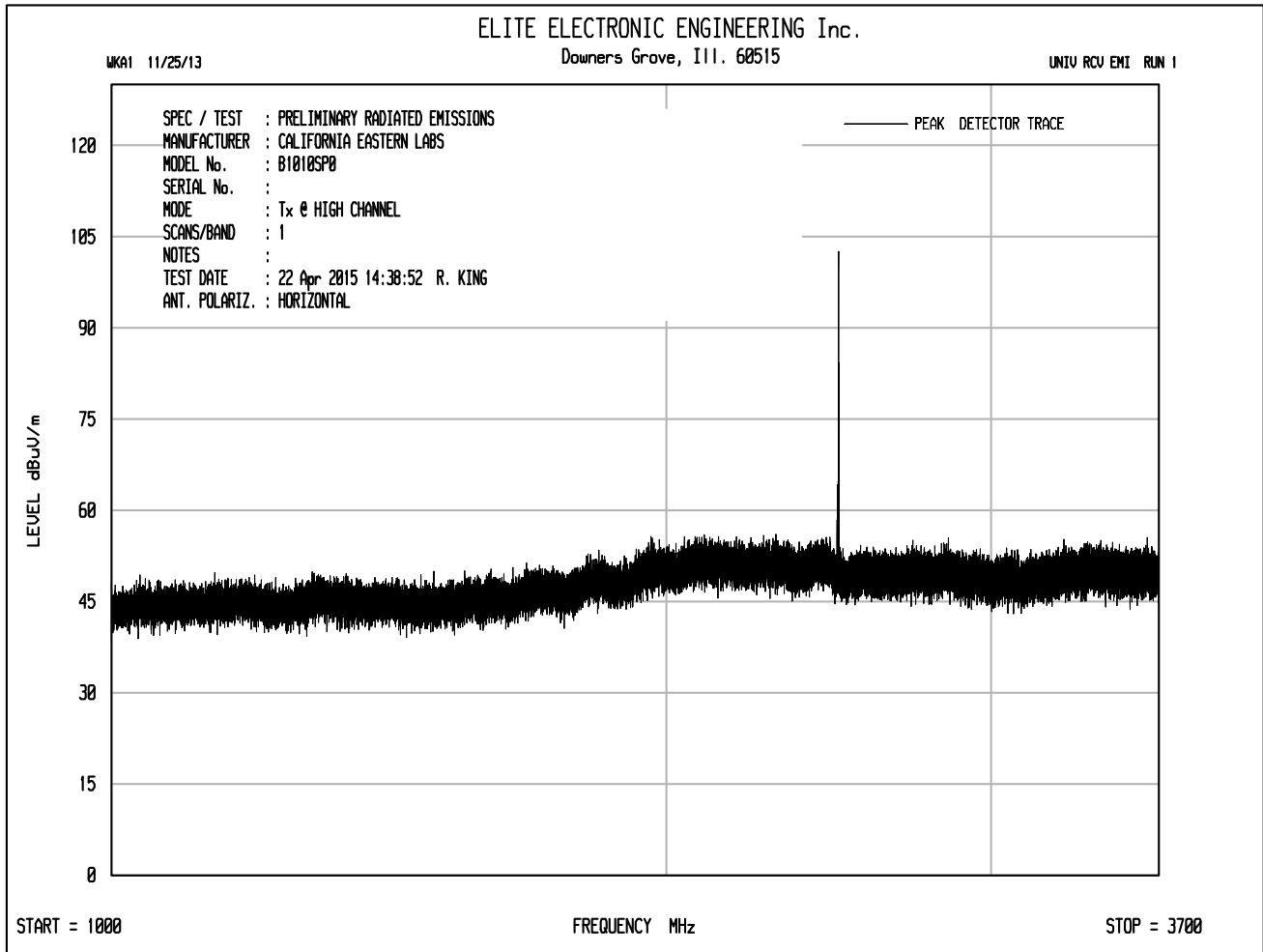


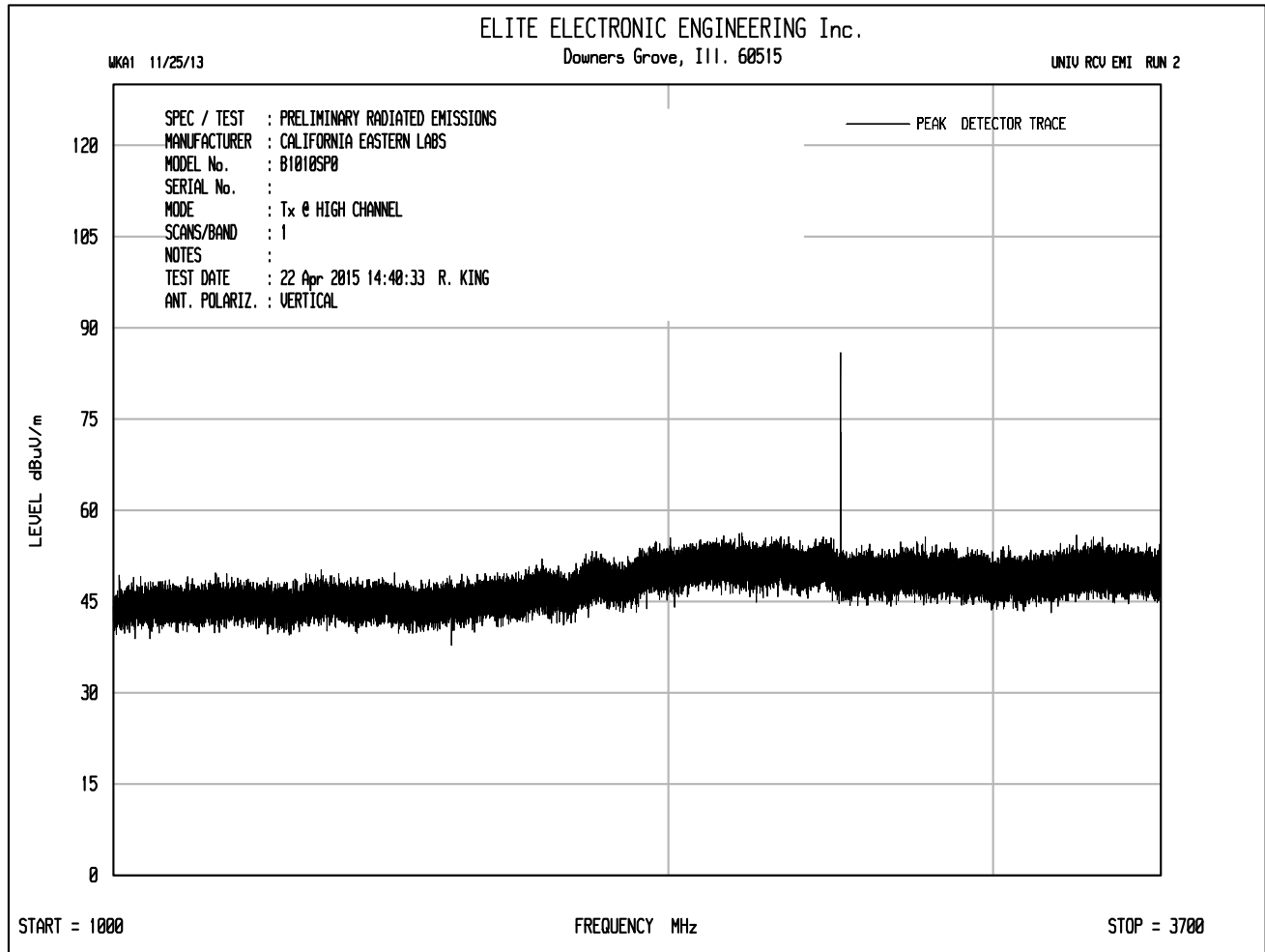


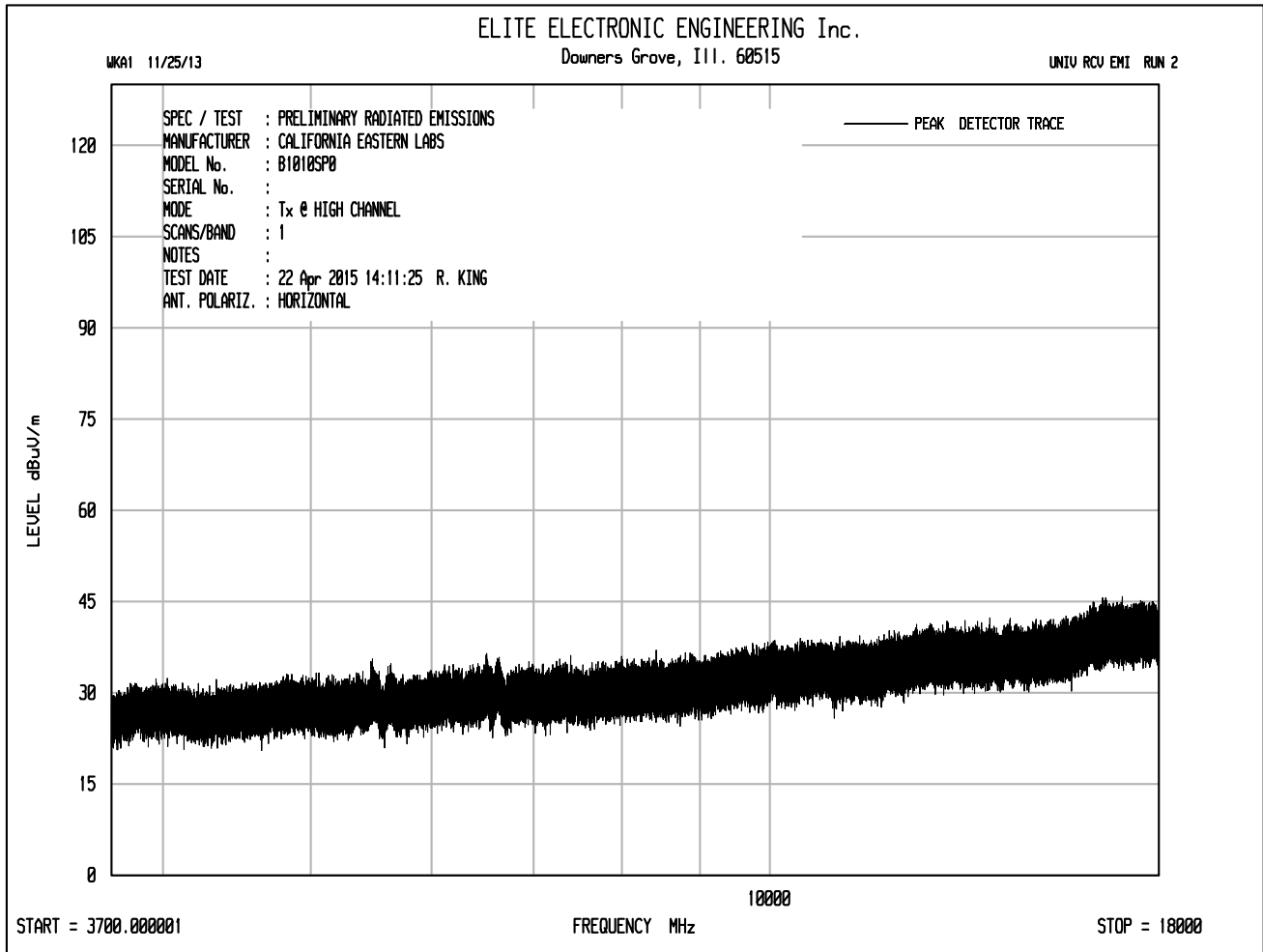


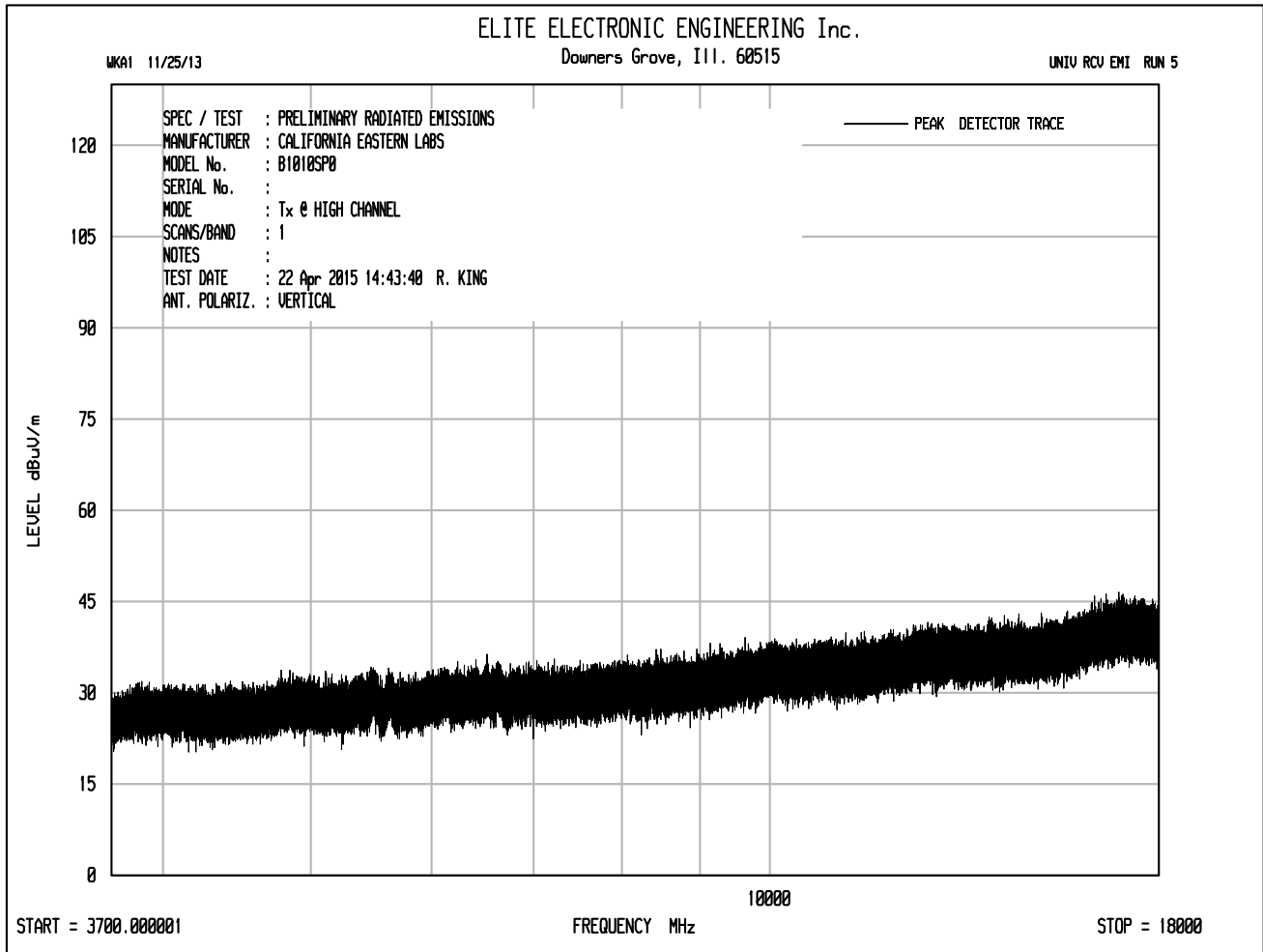


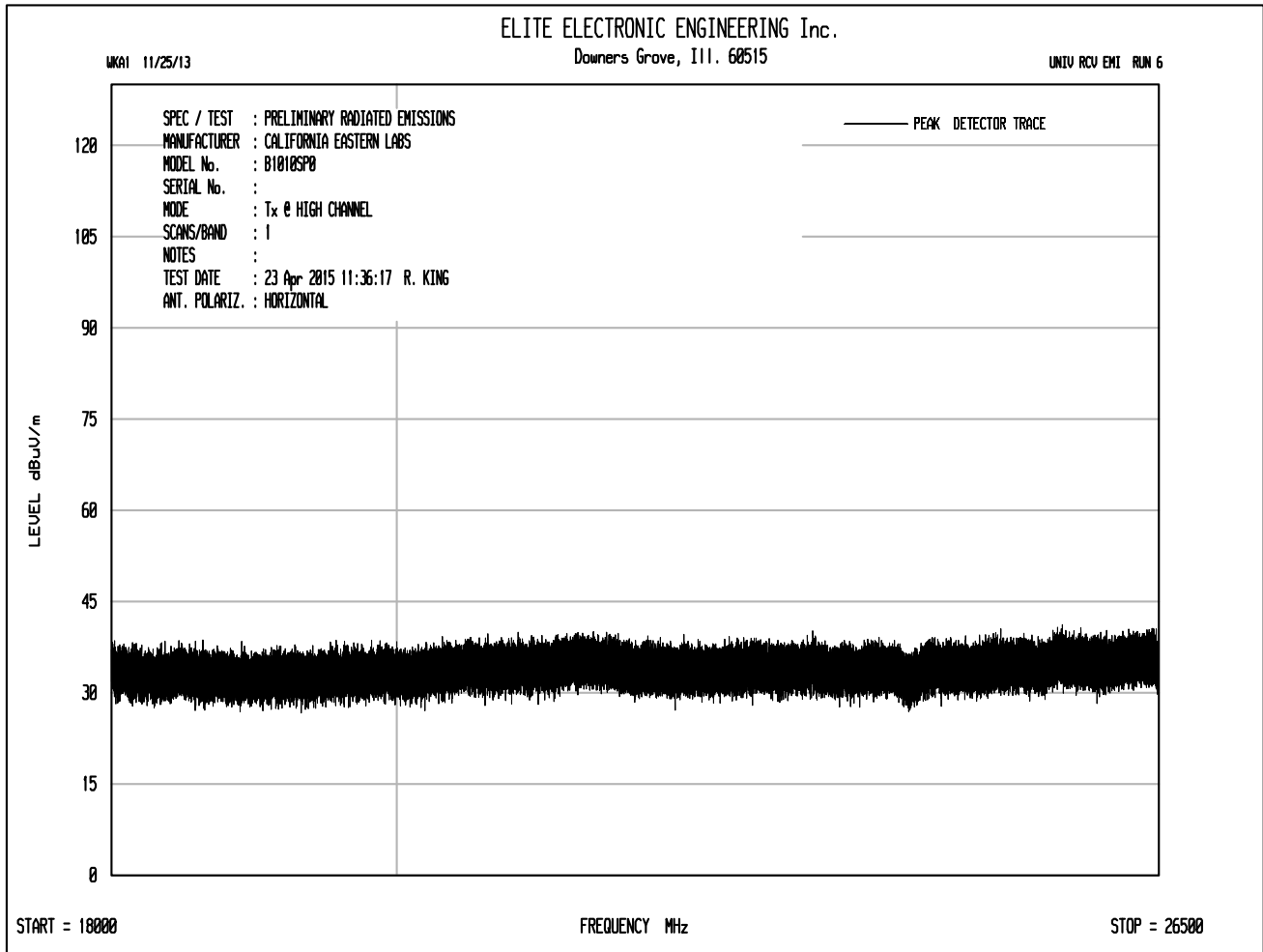


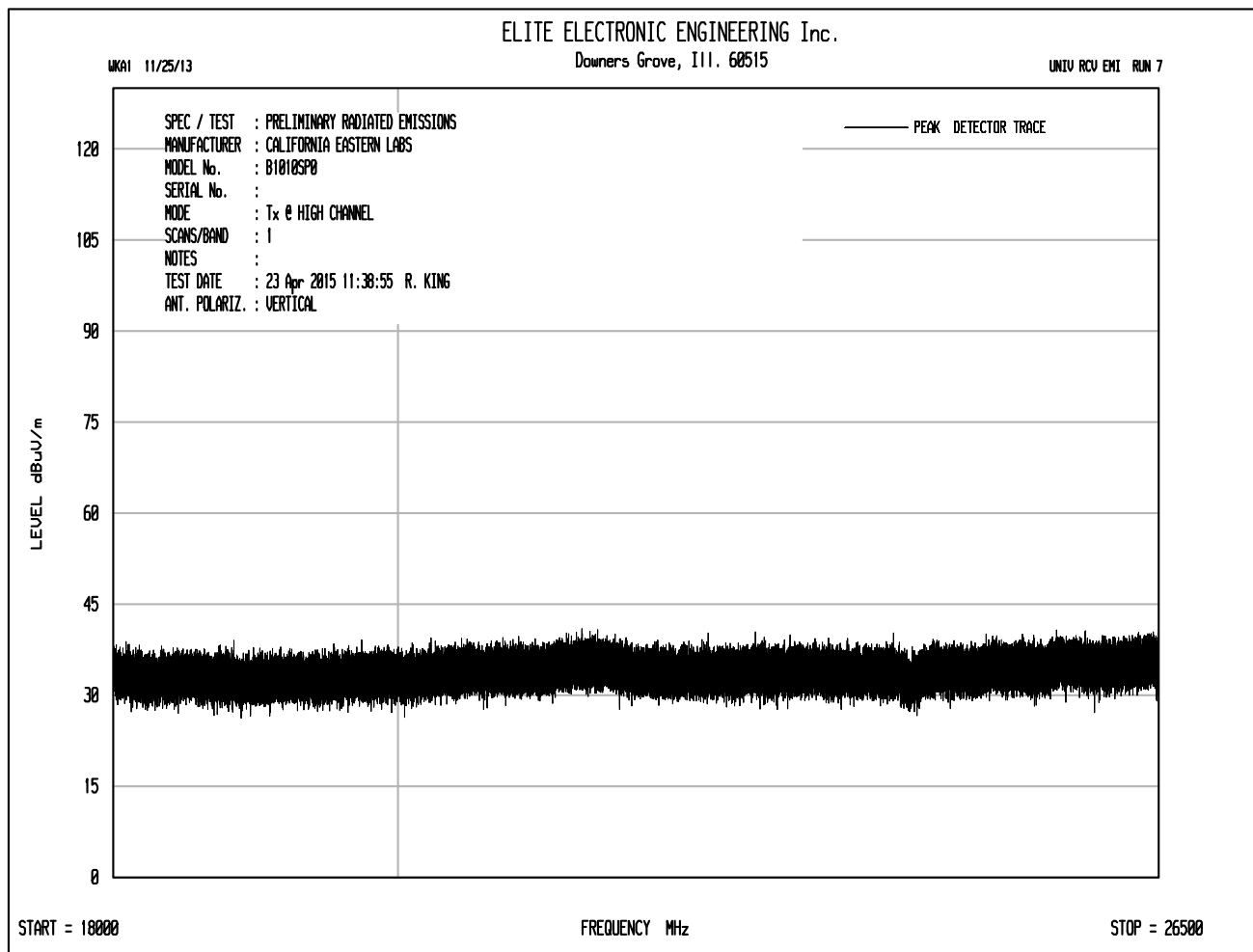














MANUFACTURER : California Eastern Labs
MODEL NO. : B1010SP0
TEST SPECIFICATION : FCC Part 15, Subpart C, Section 15.247, Radiated Emissions
DATE : April 24, 2015
MODE : Transmit @ 2402MHz
TEST DISTANCE : 3 meters
NOTES : Peak Detector
: Total = Meter Reading + Cable Fac + Antenna Factor + Preamp Gain

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)
2402.00	H	69.6		2.6	32.1		104.4	165898.5		
2402.00	V	68.1		2.6	32.1		102.9	139265.1		
4804.00	H	49.7		3.7	34.8	-40.2	48.0	250.0	5000.0	-26.0
4804.00	V	46.3		3.7	34.8	-40.2	44.6	170.0	5000.0	-29.4
7206.00	H	35.5	*	4.6	35.7	-40.1	35.8	61.4	16589.8	-48.6
7206.00	V	38.6		4.6	35.7	-40.1	38.8	87.5	16589.8	-45.6
9608.00	H	36.6	*	5.2	36.7	-39.6	38.9	88.0	16589.8	-45.5
9608.00	V	36.8	*	5.2	36.7	-39.6	39.1	90.0	16589.8	-45.3
12010.00	H	46.2	*	6.1	38.8	-39.7	51.4	371.8	5000.0	-22.6
12010.00	V	46.4	*	6.1	38.8	-39.7	51.6	380.0	5000.0	-22.4
14412.00	H	36.0	*	6.6	39.8	-40.0	42.4	132.3	16589.8	-42.0
14412.00	V	36.2	*	6.6	39.8	-40.0	42.6	134.4	16589.8	-41.8
16814.00	H	36.0	*	7.2	41.6	-38.9	45.8	195.3	16589.8	-38.6
16814.00	V	36.3	*	7.2	41.6	-38.9	46.1	202.4	16589.8	-38.3
19216.00	H	32.5	*	1.4	40.4	-28.6	45.7	192.2	5000.0	-28.3
19216.00	V	32.5	*	1.4	40.4	-28.6	45.7	192.9	5000.0	-28.3
21618.00	H	24.5	*	1.4	40.6	-28.7	37.8	77.8	16589.8	-46.6
21618.00	V	24.5	*	1.4	40.6	-28.7	37.8	77.7	16589.8	-46.6
24020.00	H	24.4	*	1.4	40.6	-30.0	36.4	66.0	16589.8	-48.0
24020.00	V	24.4	*	1.4	40.6	-30.0	36.4	66.0	16589.8	-48.0

Checked BY RICHARD E. King :Richard E. King



MANUFACTURER : California Eastern Labs
MODEL NO. : B1010SP0
TEST SPECIFICATION : FCC Part 15, Subpart C, Section 15.247, Radiated Emissions
DATE : April 24, 2015
MODE : Transmit @ 2402MHz
TEST DISTANCE : 3 meters
NOTES : Average Readings in Restricted Bands
: Total = Meter Reading + Cable Fac + Antenna Factor + Preamp Gain

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	37.7		3.7	34.8	-40.2	0.0	36.0	63.1	500.0	-18.0
4804.00	V	33.6		3.7	34.8	-40.2	0.0	31.9	39.4	500.0	-22.1
12010.00	H	32.6	*	6.1	38.8	-39.7	0.0	37.8	77.7	500.0	-16.2
12010.00	V	32.6	*	6.1	38.8	-39.7	0.0	37.8	78.0	500.0	-16.1
19216.00	H	20.7	*	1.4	40.4	-28.6	0.0	33.9	49.7	500.0	-20.1
19216.00	V	20.7	*	1.4	40.4	-28.6	0.0	33.9	49.7	500.0	-20.1

Checked BY RICHARD E. KING :

Richard E. King



MANUFACTURER : California Eastern Labs
MODEL NO. : B1010SP0
TEST SPECIFICATION : FCC Part 15, Subpart C, Section 15.247, Radiated Emissions
DATE : April 24, 2015
MODE : Transmit @ 2440MHz
TEST DISTANCE : 3 meters
NOTES : Peak Detector
: Total = Meter Reading + Cable Fac + Antenna Factor + Preamp Gain

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)
2440.00	H	68.9		2.6	32.2		103.7	152812.5		
2440.00	V	67.4		2.6	32.2		102.2	129020.5		
4880.00	H	50.2		3.7	34.8	-40.3	48.4	262.7	5000.0	-25.6
4880.00	V	47.0		3.7	34.8	-40.3	45.2	182.8	5000.0	-28.7
7320.00	H	46.1	*	4.7	35.6	-40.1	46.3	207.0	5000.0	-27.7
7320.00	V	44.6	*	4.7	35.6	-40.1	44.8	173.2	5000.0	-29.2
9760.00	H	34.5	*	5.2	36.9	-39.6	37.1	71.6	15281.2	-46.6
9760.00	V	34.5	*	5.2	36.9	-39.6	37.1	71.6	15281.2	-46.6
12200.00	H	44.7	*	6.1	39.0	-39.6	50.2	322.2	5000.0	-23.8
12200.00	V	45.1	*	6.1	39.0	-39.6	50.6	337.4	5000.0	-23.4
14640.00	H	34.8	*	6.7	39.9	-40.2	41.2	114.3	15281.2	-42.5
14640.00	V	34.8	*	6.7	39.9	-40.2	41.2	114.7	15281.2	-42.5
17080.00	H	35.8	*	7.3	41.5	-38.8	45.8	194.1	15281.2	-37.9
17080.00	V	34.9	*	7.3	41.5	-38.8	44.9	175.0	15281.2	-38.8
19520.00	H	32.5	*	1.4	40.4	-28.5	45.7	193.6	5000.0	-28.2
19520.00	V	32.5	*	1.4	40.4	-28.5	45.8	194.3	5000.0	-28.2
21960.00	H	24.5	*	1.4	40.6	-29.2	37.3	73.3	15281.2	-46.4
21960.00	V	24.5	*	1.4	40.6	-29.2	37.3	73.2	15281.2	-46.4
24400.00	H	24.4	*	1.4	40.6	-30.2	36.2	64.2	15281.2	-47.5
24400.00	V	24.4	*	1.4	40.6	-30.2	36.2	64.2	15281.2	-47.5

Checked BY RICHARD E. King :Richard E. King



MANUFACTURER : California Eastern Labs
MODEL NO. : B1010SP0
TEST SPECIFICATION : FCC Part 15, Subpart C, Section 15.247, Radiated Emissions
DATE : April 24, 2015
MODE : Transmit @ 2440MHz
TEST DISTANCE : 3 meters
NOTES : Average Readings in Restricted Bands
: Total = Meter Reading + Cable Fac + Antenna Factor + Preamp Gain

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	39.9		3.7	34.8	-40.3	0.0	38.1	80.2	500.0	-15.9
4880.00	V	34.6		3.7	34.8	-40.3	0.0	32.8	43.5	500.0	-21.2
7320.00	H	32.2	*	4.7	35.6	-40.1	0.0	32.4	41.7	500.0	-21.6
7320.00	V	32.1	*	4.7	35.6	-40.1	0.0	32.3	41.4	500.0	-21.6
12200.00	H	31.7	*	6.1	39.0	-39.6	0.0	37.1	71.8	500.0	-16.9
12200.00	V	31.7	*	6.1	39.0	-39.6	0.0	37.1	71.6	500.0	-16.9
19520.00	H	20.7	*	1.4	40.4	-28.5	0.0	34.0	50.1	500.0	-20.0
19520.00	V	20.7	*	1.4	40.4	-28.5	0.0	34.0	50.1	500.0	-20.0

Checked BY RICHARD E. King :

Richard E. King



MANUFACTURER : California Eastern Labs
MODEL NO. : B1010SP0
TEST SPECIFICATION : FCC Part 15, Subpart C, Section 15.247, Radiated Emissions
DATE : April 24, 2015
MODE : Transmit @ 2480MHz
TEST DISTANCE : 3 meters
NOTES : Peak Detector
: Total = Meter Reading + Cable Fac + Antenna Factor + Preamp Gain

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)
2480.00	H	69.9		2.7	32.4		104.9	175007.5		
2480.00	V	66.2		2.7	32.4		101.3	115493.2		
4960.00	H	47.2		3.7	34.7	-40.3	45.4	185.2	5000.0	-28.6
4960.00	V	45.8	*	3.7	34.7	-40.3	43.9	157.3	5000.0	-30.0
7440.00	H	45.6	*	4.7	35.6	-40.0	45.8	195.8	5000.0	-28.1
7440.00	V	45.6	*	4.7	35.6	-40.0	45.8	195.8	5000.0	-28.1
9920.00	H	34.8	*	5.3	36.9	-39.5	37.4	74.1	17500.7	-47.5
9920.00	V	36.4	*	5.3	36.9	-39.5	39.0	89.6	17500.7	-45.8
12400.00	H	46.6	*	6.1	39.1	-39.5	52.3	410.1	5000.0	-21.7
12400.00	V	45.6	*	6.1	39.1	-39.5	51.2	364.2	5000.0	-22.8
14880.00	H	34.9	*	6.8	39.8	-40.4	41.2	114.2	17500.7	-43.7
14880.00	V	36.1	*	6.8	39.8	-40.4	42.3	130.3	17500.7	-42.6
17360.00	H	36.1	*	7.4	41.7	-39.1	46.0	199.4	17500.7	-38.9
17360.00	V	36.8	*	7.4	41.7	-39.1	46.7	216.3	17500.7	-38.2
19840.00	H	32.5	*	1.4	40.4	-28.2	46.1	202.0	5000.0	-27.9
19840.00	V	32.5	*	1.4	40.4	-28.2	46.1	202.7	5000.0	-27.8
22320.00	H	34.5	*	1.4	40.6	-29.1	47.4	234.8	5000.0	-26.6
22320.00	V	34.5	*	1.4	40.6	-29.1	47.4	234.8	5000.0	-26.6
24800.00	H	24.4	*	1.4	40.6	-30.9	35.4	59.1	17500.7	-49.4
24800.00	V	24.4	*	1.4	40.6	-30.9	35.4	59.1	17500.7	-49.4

Checked BY RICHARD E. King :Richard E. King

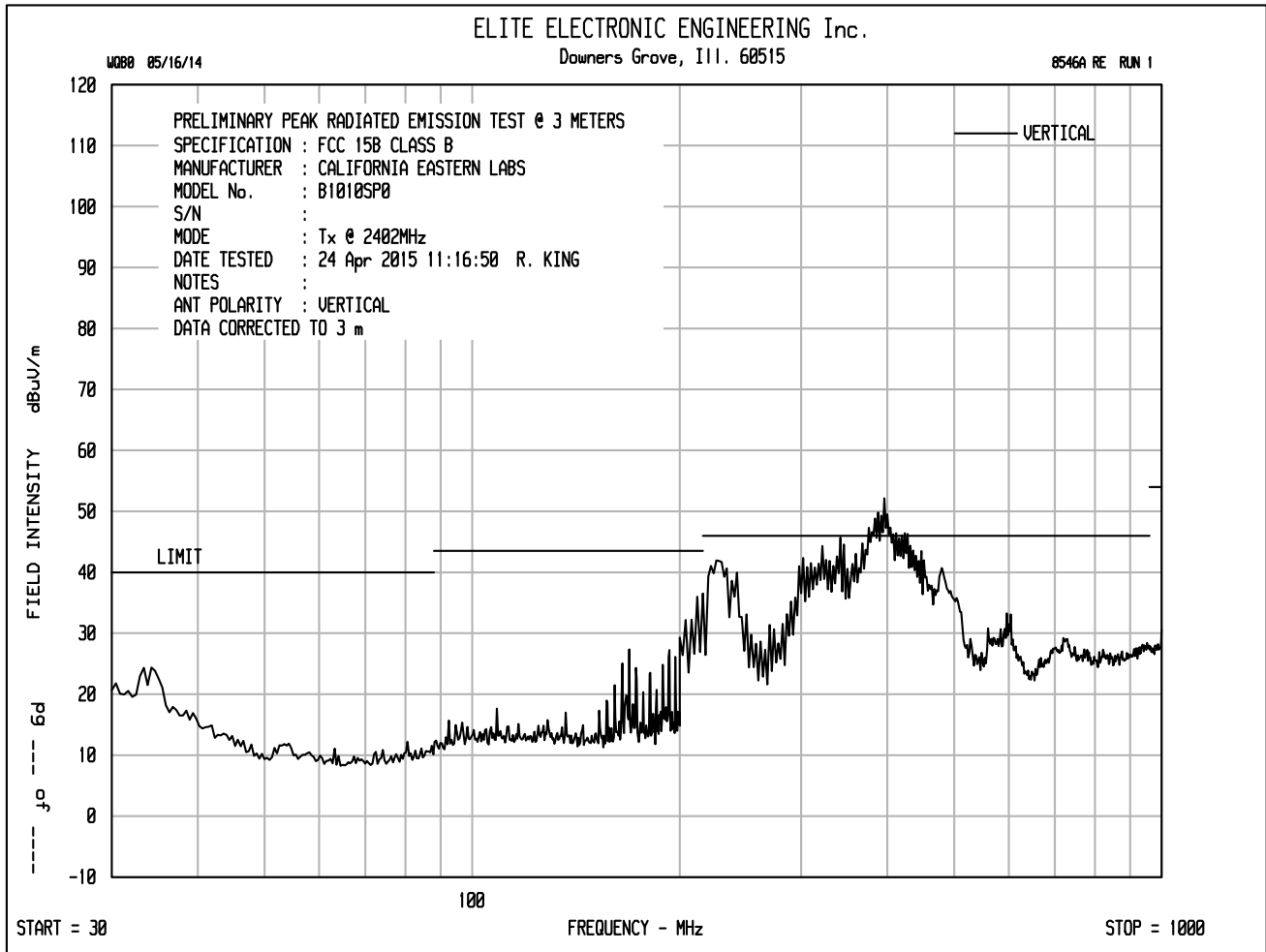


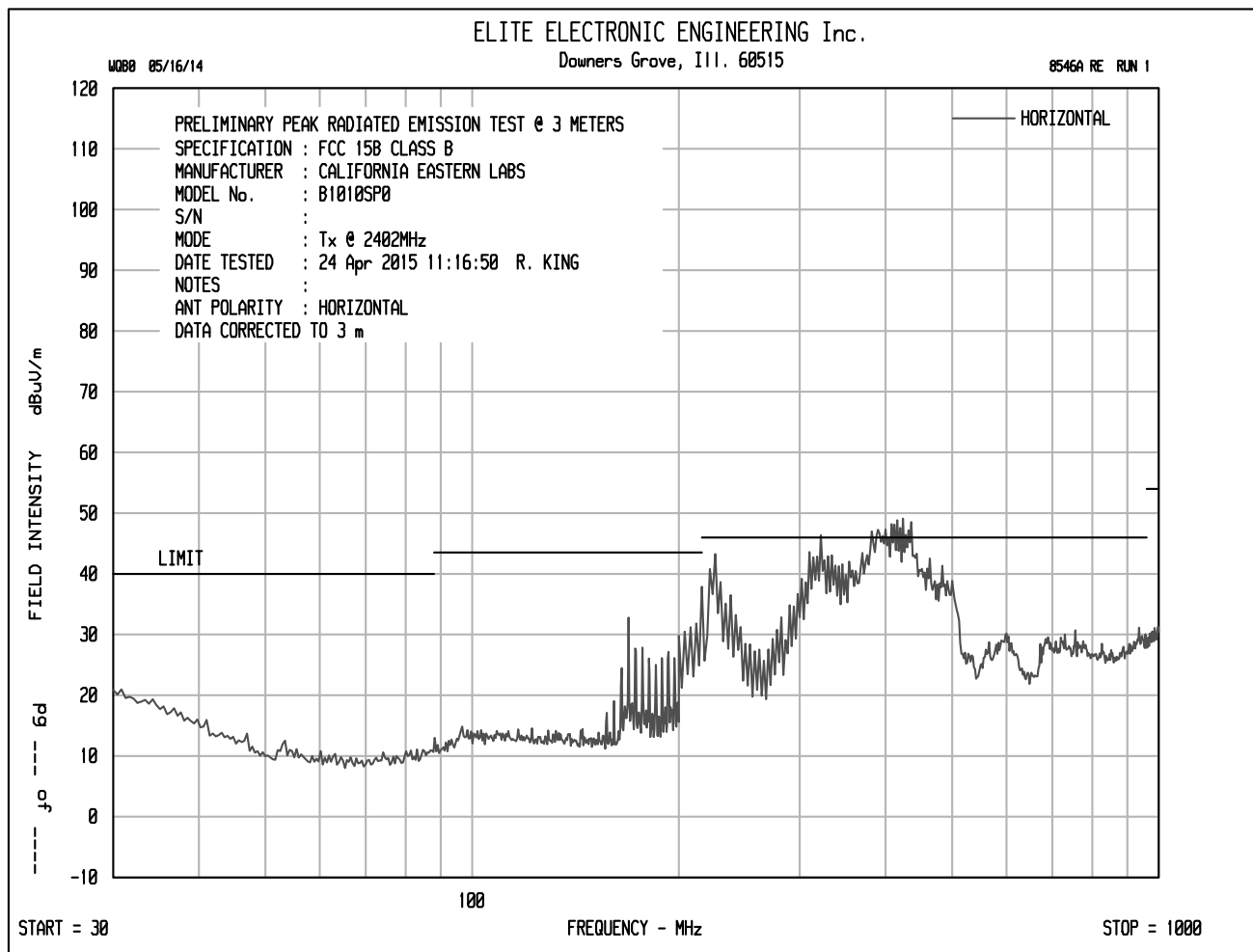
MANUFACTURER : California Eastern Labs
MODEL NO. : B1010SP0
TEST SPECIFICATION : FCC Part 15, Subpart C, Section 15.247, Radiated Emissions
DATE : April 24, 2015
MODE : Transmit @ 2480MHz
TEST DISTANCE : 3 meters
NOTES : Average Readings in Restricted Bands
: Total = Meter Reading + Cable Fac + Antenna Factor + Preamp Gain

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	35.3		3.7	34.7	-40.3	0.0	33.5	47.2	500.0	-20.5
4960.00	V	32.1	*	3.7	34.7	-40.3	0.0	30.3	32.8	500.0	-23.7
7440.00	H	31.78	*	4.7	35.6	-40.0	0.0	32.1	40.1	500.0	-21.9
7440.00	V	31.7	*	4.7	35.6	-40.0	0.0	32.0	39.6	500.0	-22.0
12400.00	H	32.2	*	6.1	39.1	-39.5	0.0	37.8	78.0	500.0	-16.1
12400.00	V	31.9	*	6.1	39.1	-39.5	0.0	37.6	75.5	500.0	-16.4
19840.00	H	20.7	*	1.4	40.4	-28.2	0.0	34.4	52.2	500.0	-19.6
19840.00	V	20.7	*	1.4	40.4	-28.2	0.0	34.4	52.2	500.0	-19.6
22320.00	H	20.6	*	1.4	40.6	-29.1	0.0	33.5	47.4	500.0	-20.5
22320.00	V	20.6	*	1.4	40.6	-29.1	0.0	33.5	47.4	500.0	-20.5

Checked BY RICHARD E. King :

Richard E. King





ETR No.
DATA SHEET8546A
TEST NO. 1

RADIATED QP EMISSION MEASUREMENTS in a 3 m SEMI-ANECHOIC ROOM

SPECIFICATION : FCC 15B CLASS B

MANUFACTURER : CALIFORNIA EASTERN LABS

MODEL NO. : B1010SP0

SERIAL NO. :

TEST MODE : Tx @ 2402MHz

NOTES :

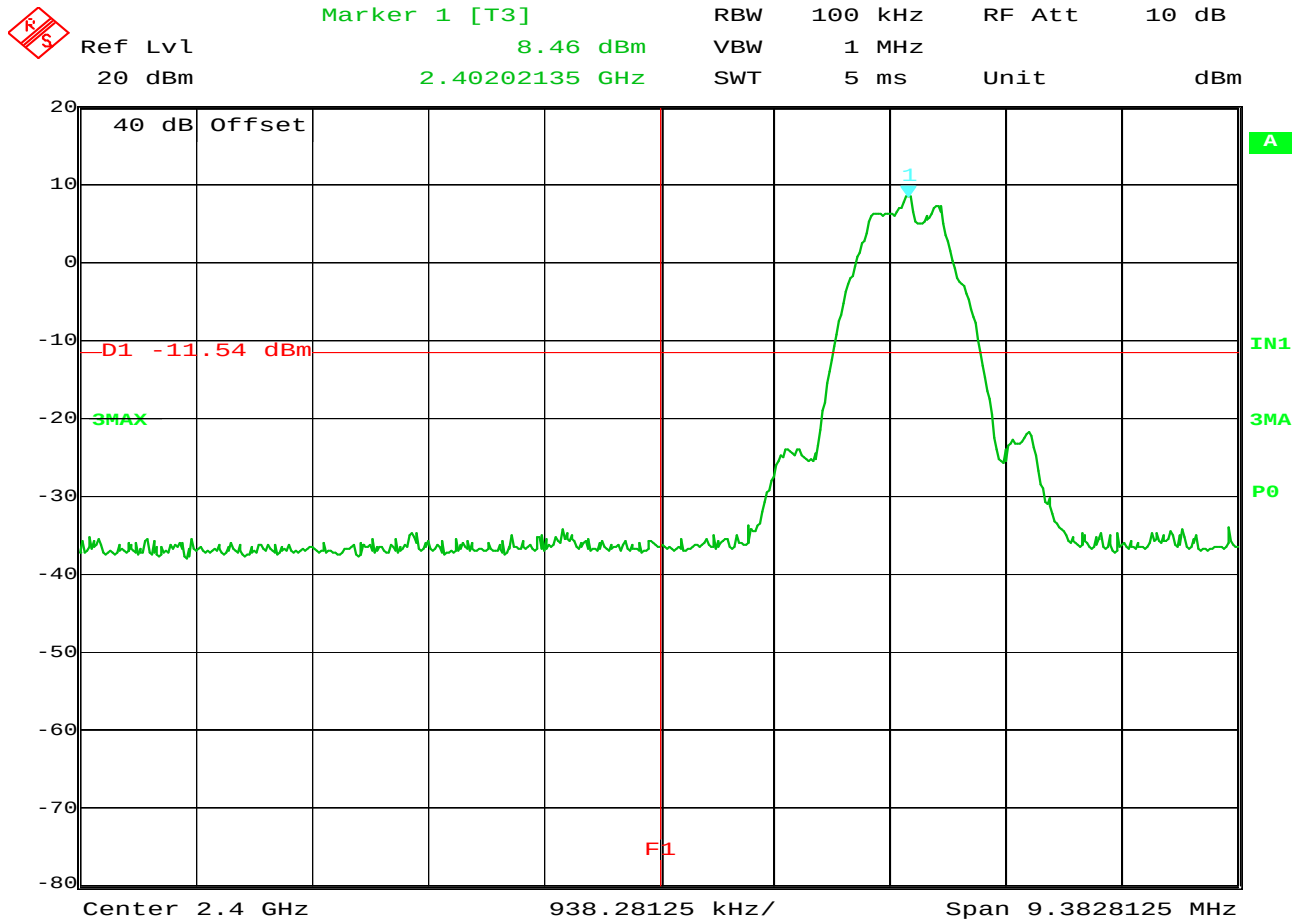
TEST DATE : 24 Apr 2015 11:16:50

TEST DISTANCE : 3 m

FREQUENCY	QP	ANT	CBL	EXT	DIST	TOTAL	QP	AZ	ANT	
MHz	READING	FAC	FAC	ATTN	FAC	dBuV/m	LIMIT	deg	HT	ANT
	dBuV	dB	dB	dB	dB		dBuV/m		cm	POL
34.82	-1.5	15.4	.4	0.0	0.0	14.3	40.0	180	120	V
52.00	-3.8	7.6	.4	0.0	0.0	4.3	40.0	180	120	H
80.01	.3	7.0	.4	0.0	0.0	7.7	40.0	180	120	V
108.01	3.3	10.9	.4	0.0	0.0	14.6	43.5	90	120	V
136.01	.3	10.3	.5	0.0	0.0	11.2	43.5	180	120	V
164.02	17.8	9.9	.7	0.0	0.0	28.3	43.5	315	120	V
168.02	20.6	9.8	.7	0.0	0.0	31.1	43.5	225	340	H
220.01	30.3	10.3	.8	0.0	0.0	41.3	46.0	225	200	H
320.01	30.0	13.6	.9	0.0	0.0	44.4	46.0	225	340	H
396.01	32.2	15.3	1.1	0.0	0.0	48.6	46.0	PASS 90	200	V*
480.01	23.6	16.8	1.1	0.0	0.0	41.5	46.0	135	200	H
595.97	8.3	18.5	1.1	0.0	0.0	28.0	46.0	135	120	V
760.40	3.5	19.4	1.5	0.0	0.0	24.4	46.0	270	120	H
829.76	-3.6	20.2	1.5	0.0	0.0	18.1	46.0	270	120	H
933.97	1.1	21.0	1.5	0.0	0.0	23.7	46.0	135	200	H

* - 396.1MHz is not in a restricted band and only has to be 20dBc from the fundamental of 104.4dBuV/m.

Checked BY RICHARD E. King :Richard E. King



Date: 24.APR.2015 08:47:57

FCC Part 15.247 and IC RSS-210 Bandedge Compliance

MANUFACTURER : California Eastern Labs
MODEL NUMBER : B1010SP0
SERIAL NUMBER :
TEST MODE : Tx @ 2402MHz
TEST PARAMETERS :
EQUIPMENT USED : RBA0, T2DA, T2SD, SMAQ
NOTES :

NOTES



MANUFACTURER : California Eastern Labs
MODEL NO. : B1010SP0
TEST SPECIFICATION : FCC Part 15, Subpart C, Section 15.247, Bandedge Compliance
DATE : April 24, 2015
MODE : Transmit @ 2480MHz
TEST DISTANCE : 3 meters
NOTES : Peak Detector
: Total = Meter Reading + Cable Fac + Antenna Factor + Preamp Gain

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	24.8		2.7	32.6	0.0	60.0	1004.4	5000.0	-13.9
2483.50	V	24.6		2.7	32.6	0.0	59.9	989.5	5000.0	-14.1

Checked BY RICHARD E. KING :

Richard E. King



MANUFACTURER : California Eastern Labs
MODEL NO. : B1010SP0
TEST SPECIFICATION : FCC Part 15, Subpart C, Section 15.247, Bandedge Compliance
DATE : April 24, 2015
MODE : Transmit @ 2480MHz
TEST DISTANCE : 3 meters
NOTES : Average Readings in Restricted Bands
: Total = Meter Reading + Cable Fac + Antenna Factor + Preamp Gain

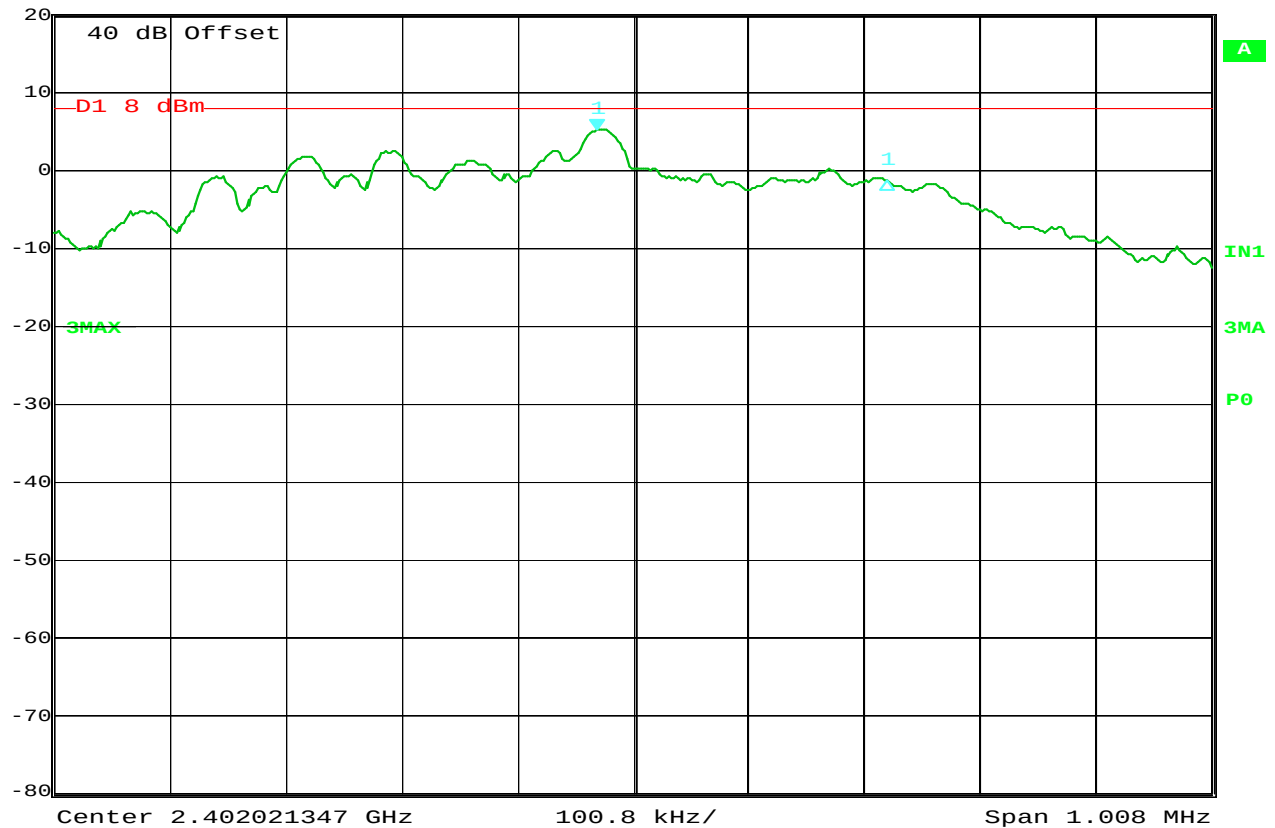
Freq. MHz	Ant Pol	Meter Reading (dBuV)	Ambient	CBL Fac (dB)	Ant Fac (dB)	Pre Amp (dB)	Duty Cycle (dB)	Average Total dBuV/m at 3m	Average Total uV/m at 3 m	Average Limit uV/m at 3 m	Margin (dB)
2483.50	H	11.8		2.7	32.6	0	0	47.14	227.5097	500	-6.8
2483.50	V	13.4		2.7	32.6	0	0	48.7	272.2701	500	-5.2

Checked BY RICHARD E. King :

Richard E. King



Marker 1 [T3] RBW 30 kHz RF Att 0 dB
5.17 dBm VBW 300 kHz
2.40199004 GHz SWT 7.5 ms Unit dBm



Date: 24.APR.2015 09:14:08

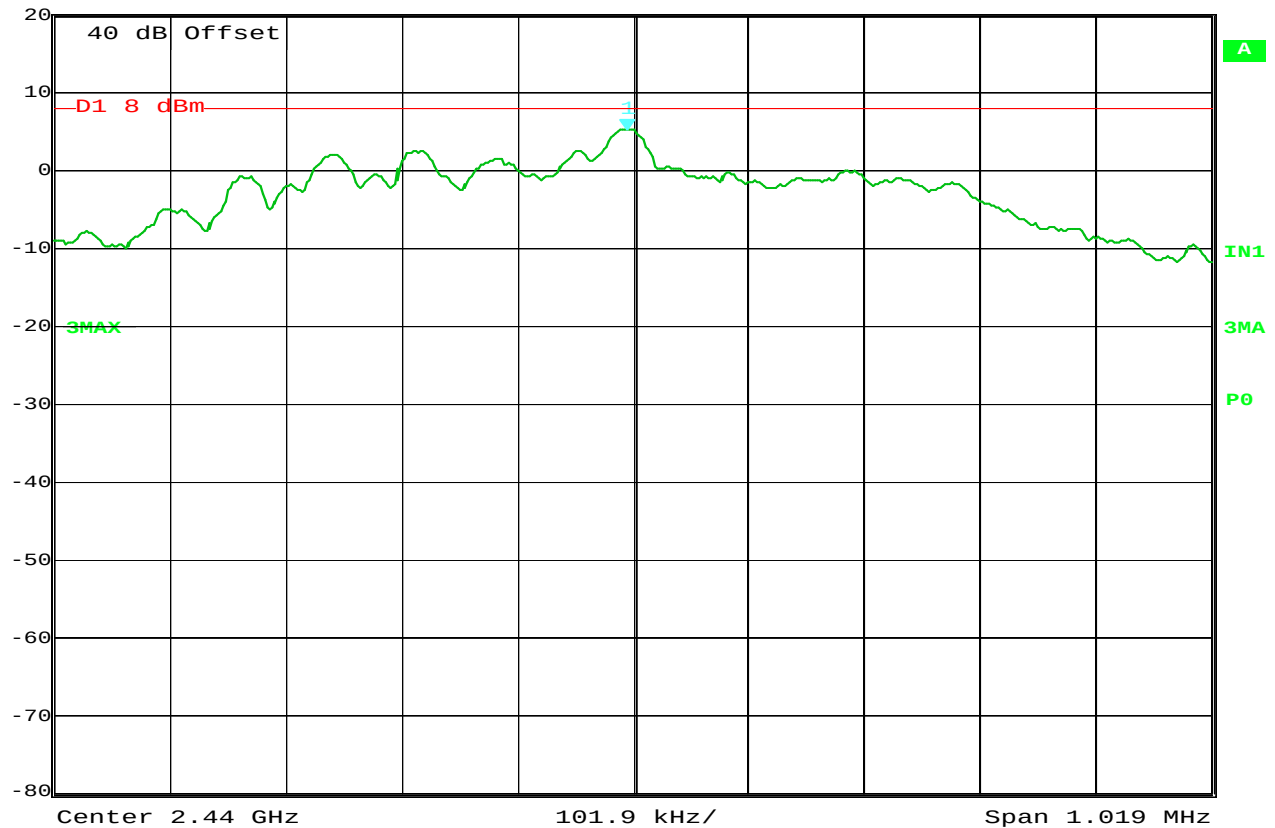
FCC Part 15.247 and IC RSS-210 Power Spectral Density

MANUFACTURER : California Eastern Labs
MODEL NUMBER : B1010SP0
SERIAL NUMBER :
TEST MODE : Tx @ 2402MHz
TEST PARAMETERS :
EQUIPMENT USED : RBA0, T2DA, T2SD, SMAQ
NOTES : Power Spectral Density = 5.17 dBm

NOTES



Marker 1 [T3] RBW 30 kHz RF Att 0 dB
Ref Lvl 5.23 dBm VBW 300 kHz
20 dBm 2.43999489 GHz SWT 7.5 ms Unit dBm



Date: 24.APR.2015 09:24:48

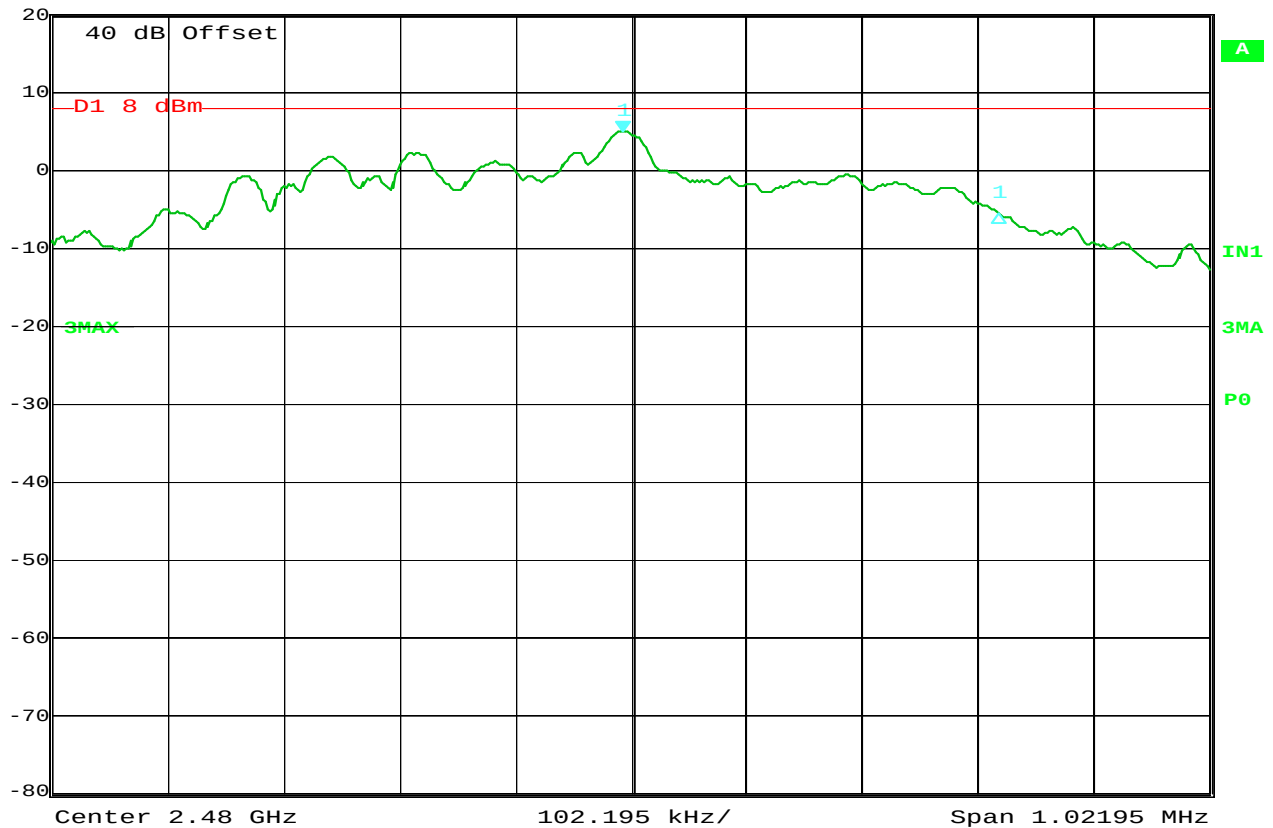
FCC Part 15.247 and IC RSS-210 Power Spectral Density

MANUFACTURER : California Eastern Labs
MODEL NUMBER : B1010SP0
SERIAL NUMBER :
TEST MODE : Tx @ 2440MHz
TEST PARAMETERS :
EQUIPMENT USED : RBA0, T2DA, T2SD, SMAQ
NOTES : Power Spectral Density = 5.23 dBm

NOTES



Marker 1 [T3] RBW 30 kHz RF Att 0 dB
4.93 dBm VBW 300 kHz
2.47999283 GHz SWT 7.5 ms Unit dBm



Date: 24.APR.2015 09:39:10

FCC Part 15.247 and IC RSS-210 Power Spectral Density

MANUFACTURER : California Eastern Labs
MODEL NUMBER : B1010SP0
SERIAL NUMBER :
TEST MODE : Tx @ 2480MHz
TEST PARAMETERS :
EQUIPMENT USED : RBA0, T2DA, T2SD, SMAQ
NOTES : Power Spectral Density = 4.98dBm

NOTES