# Tripod Data Systems, Inc.

## Cirronet FHSS (2.4GHZ Radio)

**May 17, 2006**

**Report No. TRPO0015.1**

Report Prepared By


www.nwemc.com
1-888-EMI-CERT



EMC Test Report

NORTHWEST EMC

22975 NW Evergreen Parkway
Suite 400
Hillsboro, Oregon 97124

# Certificate of Test

**Issue Date: May 17, 2006**
**Tripod Data Systems, Inc.**
**Model: Cirronet FHSS (2.4GHZ Radio)**

| Emissions | | | | |
|---|---|---|---|---|
| **Test Description** | **Specification** | **Test Method** | **Pass** | **Fail** |
| AC Powerline Conducted Emissions | FCC 15.207 AC Powerline Conducted Emissions:2005-9 | ANSI C63.4:2003 | ☒ | ☐ |
| Conducted Emissions | FCC 15.107 Class B:2005-10 | ANSI C63.4:2003 | ☒ | ☐ |
| Radiated Emissions | FCC 15.109(g) (CISPR 22:1997) Class B:2005-10 | ANSI C63.4:2003 | ☒ | ☐ |
| Spurious Radiated Emissions | FCC 15.247(d) Spurious Radiated Emissions:2005-9 | ANSI C63.4:2003 | ☒ | ☐ |

| **Modifications made to the product** |
|---|
| **See the Modifications section of this report** |

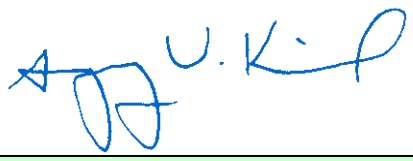
***Test Facility***

The measurement facility used to collect the data is located at:

Northwest EMC, Inc.
22975 NW Evergreen Parkway, Suite 400; Hillsboro, OR 97124
Phone: (503) 844-4066
Fax: 844-3826

This site has been fully described in a report filed with and accepted by the FCC (Federal Communications Commission) and Industry Canada.

**Approved By:**



*Greg Kiemel, Director of Engineering*

***This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government of the United States of America.***

***Product compliance is the responsibility of the client, therefore the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. This Report may only be duplicated in its entirety. The results of this test pertain only to the sample(s) tested, the specific description is noted in each of the individual sections of the test report supporting this certificate of test.***

| Revision Number | Description | Date | Page Number |
|---|---|---|---|
| 00 | None | | |

**FCC:** Accredited by NVLAP for performance of FCC radio, digital, and ISM device testing. Our Open Area Test Sites, certification chambers, and conducted measurement facilities have been fully described in reports filed with the FCC and accepted by the FCC in letters maintained in our files. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by the FCC as a Telecommunications Certification Body (TCB). This allows Northwest EMC to certify transmitters to FCC specifications in accordance with 47 CFR 2.960 and 2.962.

**NVLAP:** Northwest EMC, Inc. is accredited under the United States Department of Commerce, National Institute of Standards and Technology, and National Voluntary Laboratory Accreditation Program for satisfactory compliance with the requirements of ISO/IEC 17025 for Testing Laboratories. The NVLAP accreditation encompasses Electromagnetic Compatibility Testing in accordance with the European Union EMC Directive 89/336/EEC, ANSI C63.4, MIL-STD 461E, DO-160D and SAE J1113. Additionally, Northwest EMC is accredited by NVLAP to perform radio testing in accordance with the European Union R&TTE Directive 1999/5/EEC, the requirements of FCC, and the RSS radio standards for Industry Canada.

NVLAP LAB CODE 200629-0
NVLAP LAB CODE 200630-0
NVLAP LAB CODE 200676-0

**Industry Canada:** Accredited by NVLAP for performance of Industry Canada RSS and ICES testing. Our Open Area Test Sites and certification chambers comply with RSS 212, Issue 1 (Provisional) and have been filed with Industry Canada and accepted. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by NIST and recognized by Industry Canada as a Certification Body (CB) per the APEC Mutual Recognition Arrangement (MRA). This allows Northwest EMC to certify transmitters to Industry Canada technical requirements.

**CAB:** Designated by NIST and validated by the European Commission as a Conformity Assessment Body (CAB) to conduct tests and approve products to the EMC directive and transmitters to the R&TTE directive, as described in the U.S. - EU Mutual Recognition Agreement.

**TÜV Product Service:** Included in TUV Product Service Group's Listing of Recognized Laboratories. It qualifies in connection with the TUV Certification after Recognition of Agent's Testing Program for the product categories and/or standards shown in TUV's current Listing of CARAT Laboratories, available from TUV. A certificate was issued to represent that this laboratory continues to meet TUV's CARAT Program requirements. Certificate No. USA0401C.

**TÜV Rheinland:** Authorized to carryout EMC tests by order and under supervision of TÜV Rheinland. This authorization is based on "Conditions for EMC-Subcontractors" of November 1992.

**NEMKO:** Assessed and accredited by NEMKO (Norwegian testing and certification body) for European emissions and immunity testing. As a result of NEMKO's laboratory assessment, they will accept test results from Northwest EMC, Inc. for product certification (Authorization No. ELA 119).

**Australia/New Zealand:** The National Association of Testing Authorities (NATA), Australia has been appointed by the ACA as an accreditation body to accredit test laboratories and competent bodies for EMC standards. Accredited test reports or assessments by competent bodies must carry the NATA logo. Test reports made by an overseas laboratory that has been accredited for the relevant standards by an overseas accreditation body that has a Mutual Recognition Agreement (MRA) with NATA are also accepted as technical grounds for product conformity. The report should be endorsed with the respective logo of the accreditation body (NVLAP).

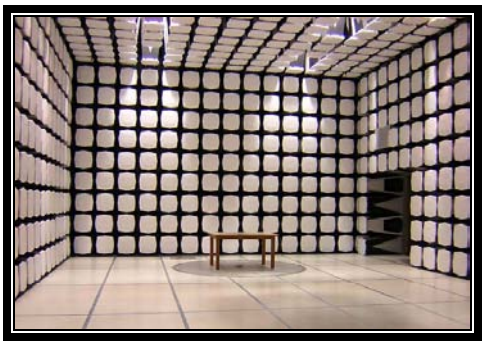
**VCCI:** Accepted as an Associate Member to the VCCI, Acceptance No. 564. Conducted and radiated measurement facilities have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. *(Registration Numbers. - Hillsboro: C-1071, R-1025, and R-2318, Irvine: C-2094 and R-1943, Sultan: R-871, C-1784 and R-1761).*

**BSMI:** Northwest EMC has been designated by NIST and validated by C-Taipei (BSMI) as a CAB to conduct tests as described in the APEC Mutual Recognition Agreement. License No.SL2-IN-E-1017.

**GOST:** Northwest EMC, Inc. has been assessed and accredited by the Russian Certification bodies Certinform VNIINMASH, CERTINFO, SAMTES, and Federal CHEC, to perform EMC and Hygienic testing for Information Technology Products. As a result of their laboratory assessment, they will accept test results from Northwest EMC, Inc. for product certification

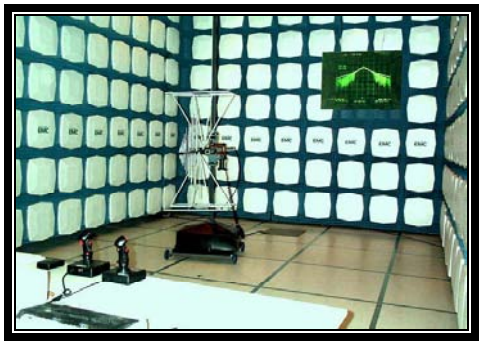
## SCOPE

For details on the Scopes of our Accreditations, please visit:
http://www.nwemc.com/scope.asp

**California – Orange County Facility**
**Labs OC01 – OC13**

41 Tesla Ave. Irvine, CA 92618
(888) 364-2378 Fax: (503) 844-3826



**Oregon – Evergreen Facility**
**Labs EV01 – EV10**

22975 NW Evergreen Pkwy. Suite 400 Hillsboro, OR 97124
(503) 844-4066 Fax: (503) 844-3826

**Washington – Sultan Facility**
**Labs SU01 – SU07**

14128 339th Ave. SE Sultan, WA 98294
(888) 364-2378

| Party Requesting the Test | |
|---|---|
| **Company Name:** | Tripod Data Systems, Inc. |
| **Address:** | 345 SW Avery Ave |
| **City, State, Zip:** | Corvallis, OR 97333 |
| **Test Requested By:** | Bob Grant |
| **Model:** | Cirronet FHSS (2.4GHZ Radio) |
| **First Date of Test:** | April 28, 2006 |
| **Last Date of Test:** | May 08, 2006 |
| **Receipt Date of Samples:** | April 21, 2006 |
| **Equipment Design Stage:** | Production |
| **Equipment Condition:** | No visual damage. |

**Information Provided by the Party Requesting the Test**

| | |
|---|---|
| **Clocks/Oscillators:** | Not provided. |
| **I/O Ports:** | Serial, USB host (unused), USB client, SDIO, Compact flash (2), DC power |

**Functional Description of the EUT (Equipment Under Test):**

The EUT is a proprietary frequency hopping 2.4GHz ISM band radio hosted in the Ranger X series, a Windows Mobile handheld computer and data collector.

**Client Justification for EUT Selection:**

The product is a representative production sample.

**Client Justification for Test Selection:**

These test satisfy the requirements for the FCC.

## CONFIGURATION 1 TRPO0015

| EUT | | | |
|---|---|---|---|
| **Description** | **Manufacturer** | **Model/Part Number** | **Serial Number** |
| EUT - Cirronet radio | Tripod Data Systems, Inc. | Cirronet FHSS (2.4GHZ Radio) | Unknown |

| Peripherals in test setup boundary | | | |
|---|---|---|---|
| **Description** | **Manufacturer** | **Model/Part Number** | **Serial Number** |
| Pocket PC Handheld Data Collector | Tripod Data Systems, Inc. | Ranger X | EMI 2 |
| DC Power Supply | Cincon Electronics Co. | TR30R050 | N/A |

| Cables | | | | | |
|---|---|---|---|---|---|
| **Cable Type** | **Shield** | **Length (m)** | **Ferrite** | **Connection 1** | **Connection 2** |
| DC Leads | No | 1.8 | Yes | Pocket PC Handheld Data Collector | AC Power |
| Serial | Yes | 1.8 | Yes | Pocket PC Handheld Data Collector | Unterminated |
| USB 2 | Yes | 1.8 | Yes | Pocket PC Handheld Data Collector | Unterminated |
| **PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.** | | | | | |

## CONFIGURATION 2 TRPO0015

| EUT | | | |
|---|---|---|---|
| **Description** | **Manufacturer** | **Model/Part Number** | **Serial Number** |
| EUT - Cirronet radio | Tripod Data Systems, Inc. | Cirronet FHSS (2.4GHZ Radio) | Unknown |

| Peripherals in test setup boundary | | | |
|---|---|---|---|
| **Description** | **Manufacturer** | **Model/Part Number** | **Serial Number** |
| EUT - Bluetooth radio | Tripod Data Systems, Inc. | WMBGMR01 | Unknown |
| EUT - 802.11(b/g) radio | Tripod Data Systems, Inc. | WMBGMR01 | Unknown |
| Pocket PC Handheld Data Collector | Tripod Data Systems, Inc. | Ranger X | EMI 2 |
| DC Power Supply | Cincon Electronics Co. | TR30R050 | N/A |

| Remote Equipment Outside of Test Setup Boundary | | | |
|---|---|---|---|
| **Description** | **Manufacturer** | **Model/Part Number** | **Serial Number** |
| Pocket PC Handheld Data Collector | Tripod Data Systems, Inc. | Ranger X | Unknown |
| Pocket PC Handheld Data Collector | Tripod Data Systems, Inc | Ranger X | Unknown |
| Laptop Computer | Dell | Latitude D510 | CN-0N8829-48643-5CJ-1252 |
| GPS | Trimble | Unknown | Unknown |

| Cables | | | | | |
|---|---|---|---|---|---|
| **Cable Type** | **Shield** | **Length (m)** | **Ferrite** | **Connection 1** | **Connection 2** |
| DC Leads | No | 1.8 | Yes | Pocket PC Handheld Data Collector | AC Power |
| Serial | Yes | 1.8 | Yes | Pocket PC Handheld Data Collector | Unterminated |
| USB 1 | Yes | 1.0 | Yes | Pocket PC Handheld Data Collector | Unterminated |
| USB 2 | Yes | 1.8 | Yes | Pocket PC Handheld Data Collector | Unterminated |
| **PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.** | | | | | |

| Equipment modifications | | | | | |
|---|---|---|---|---|---|
| Item | Date | Test | Modification | Note | Disposition of EUT |
| 1 | 4/28/2006 | Spurious Radiated Emissions | Tested as delivered to Test Station. | No EMI suppression devices were added or modified during this test. | EUT remained at Northwest EMC following the test. |
| 2 | 5/1/2006 | Radiated Emissions | Tested as delivered to Test Station. | No EMI suppression devices were added or modified during this test. | EUT remained at Northwest EMC following the test. |
| 3 | 5/8/2006 | AC Power Line Conducted Emissions | Tested as delivered to Test Station. | No EMI suppression devices were added or modified during this test. | EUT remained at Northwest EMC following the test. |
| 4 | 5/8/2006 | Conducted Emissions | Tested as delivered to Test Station. | No EMI suppression devices were added or modified during this test. | Scheduled testing was completed. |

# RADIATED EMISSIONS



Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

## MODES OF OPERATION

Typical operating mode - Radios transmitting and receiving.

## POWER SETTINGS INVESTIGATED

120VAC/60Hz
230VAC/50Hz

## POWER SETTINGS USED FOR FINAL DATA

230VAC/50Hz

## FREQUENCY RANGE INVESTIGATED

| | | | |
|---|---|---|---|
| Start Frequency | 30 MHz | Stop Frequency | 1 GHz |

## SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

## TEST EQUIPMENT

| Description | Manufacturer | Model | ID | Last Cal. | Interval |
|---|---|---|---|---|---|
| Antenna, Biconilog | EMCO | 3142 | AXB | 1/6/2005 | 24 |
| Pre-Amplifier | Miteq | AM-1551 | AOY | 4/5/2006 | 13 |
| Spectrum Analyzer | Agilent | E4443A | AAS | 12/8/2005 | 12 |

## MEASUREMENT BANDWIDTHS

| | Frequency Range (MHz) | Peak Data (kHz) | Quasi-Peak Data (kHz) | Average Data (kHz) |
|---|---|---|---|---|
| | 0.01 - 0.15 | 1.0 | 0.2 | 0.2 |
| | 0.15 - 30.0 | 10.0 | 9.0 | 9.0 |
| | 30.0 - 1000 | 100.0 | 120.0 | 120.0 |
| | Above 1000 | 1000.0 | N/A | 1000.0 |

Measurements were made using the bandwidths and detectors specified. No video filter was used.

## MEASUREMENT UNCERTAINTY

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

## TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, a final radiated emissions test was performed. The frequency range investigated (scanned), is also noted in this report. Radiated emissions measurements were made at the EUT azimuth and antenna height such that the maximum radiated emissions level will be detected. This requires the use of a turntable and an antenna positioner. The preferred method of a continuous azimuth search is utilized for frequency scans of the EUT field strength with both polarities of the measuring antenna. A calibrated, linearly polarized antenna was positioned at the specified distance from the periphery of the EUT.

Tests were made with the antenna positioned in both the horizontal and vertical planes of polarization. The antenna was varied in height above the conducting ground plane to obtain the maximum signal strength. Though specified in the report, the measurement distance shall be 3 meters or 10 meters. At any measurement distance, the antenna height was varied from 1 meter to 4 meters. These height scans apply for both horizontal and vertical polarization, except that for vertical polarization the minimum height of the center of the antenna shall be increased so that the lowest point of the bottom of the antenna clears the ground surface by at least 25 cm.

NORTHWEST EMC

# RADIATED EMISSIONS DATA SHEET

PSA 2006.04.25
EMI 2006.4.26

| | | | | | |
|---|---|---|---|---|---|
| EUT: | Cirronet FHSS (2.4GHz), 802.11(b)/(g), and Bluetooth radios | | | Work Order: | TRPO0015 |
| Serial Number: | EMI 2 | | | Date: | 05/01/06 |
| Customer: | Tripod Data Systems, Inc. | | | Temperature: | 21 |
| Attendees: | None | | | Humidity: | 30% |
| Project: | None | | | Barometric Pres.: | 30.34 |
| Tested by: | Holly Ashkannejhad | Power: | 230VAC/50Hz | Job Site: | EV01 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 15.109(g) (CISPR 22:1997) Class B:2005-10 | ANSI C63.4:2003 |

| TEST PARAMETERS | | | |
|---|---|---|---|
| Antenna Height(s) (m) | 1 - 4 | Test Distance (m) | 10 |

**COMMENTS**

All 3 internal radios active: Cirronet FHSS (2.4GHz), 802.11(b)/(g), and Bluetooth.

**EUT OPERATING MODES**

Typical operating mode - Radios transmitting and receiving.

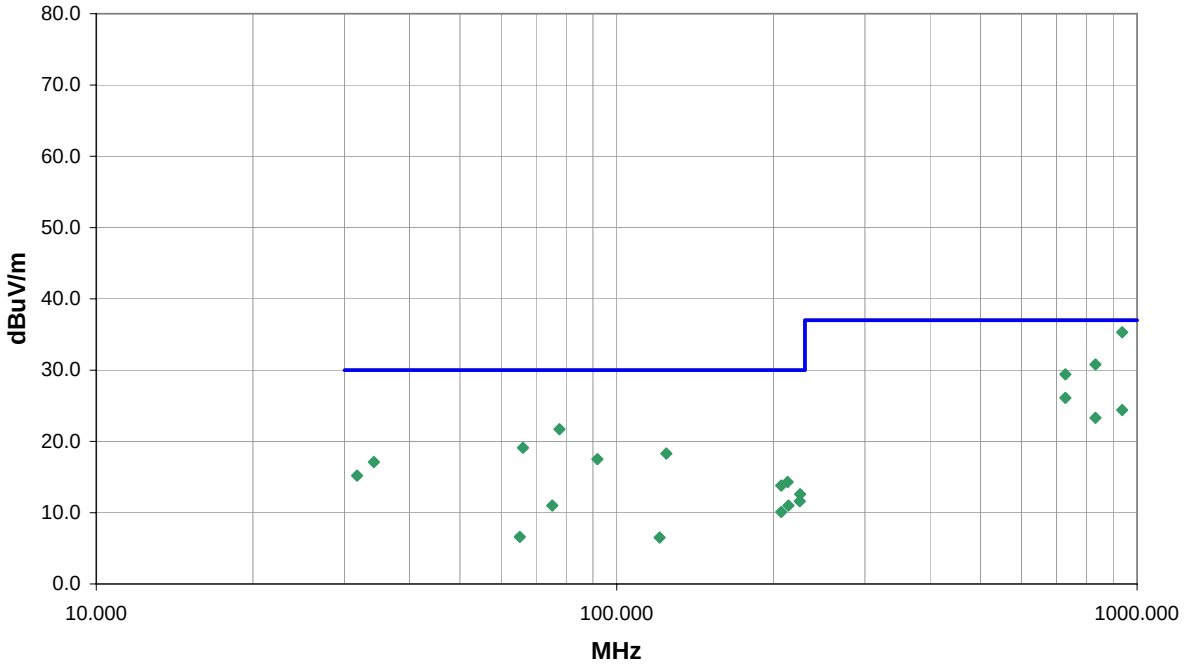
**DEVIATIONS FROM TEST STANDARD**

No deviations.

| | |
|---|---|
| Run # | 1 |
| Configuration # | 2 |
| Results | Pass |

NVLAP Lab Code 200630-0

*Signature* Holly Ashkannejhad




| Freq (MHz) | Amplitude (dBuV) | Factor (dB) | Azimuth (degrees) | Height (meters) | Distance (meters) | External Attenuation (dB) | Polarity | Detector | Distance Adjustment (dB) | Adjusted dBuV/m | Spec. Limit dBuV/m | Compared to Spec. (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 936.062 | 43.9 | -8.6 | 164.0 | 1.0 | 10.0 | 0.0 | H-Bilog | QP | 0.0 | 35.3 | 37.0 | -1.7 |
| 832.059 | 41.3 | -10.5 | 345.0 | 2.0 | 10.0 | 0.0 | V-Bilog | QP | 0.0 | 30.8 | 37.0 | -6.2 |
| 728.052 | 40.1 | -10.7 | 48.0 | 1.0 | 10.0 | 0.0 | H-Bilog | QP | 0.0 | 29.4 | 37.0 | -7.6 |
| 77.626 | 49.2 | -27.5 | 329.0 | 1.0 | 10.0 | 0.0 | V-Bilog | QP | 0.0 | 21.7 | 30.0 | -8.3 |
| 66.070 | 46.1 | -27.0 | 49.0 | 1.9 | 10.0 | 0.0 | V-Bilog | QP | 0.0 | 19.1 | 30.0 | -10.9 |
| 728.055 | 36.8 | -10.7 | 256.0 | 2.2 | 10.0 | 0.0 | V-Bilog | QP | 0.0 | 26.1 | 37.0 | -10.9 |
| 124.579 | 45.2 | -26.9 | 294.0 | 1.0 | 10.0 | 0.0 | V-Bilog | QP | 0.0 | 18.3 | 30.0 | -11.7 |
| 91.830 | 44.7 | -27.2 | 154.0 | 1.0 | 10.0 | 0.0 | V-Bilog | QP | 0.0 | 17.5 | 30.0 | -12.5 |
| 936.064 | 33.0 | -8.6 | 190.0 | 1.0 | 10.0 | 0.0 | V-Bilog | QP | 0.0 | 24.4 | 37.0 | -12.6 |
| 34.150 | 34.6 | -17.5 | 29.0 | 1.0 | 10.0 | 0.0 | V-Bilog | QP | 0.0 | 17.1 | 30.0 | -12.9 |
| 832.063 | 33.8 | -10.5 | 184.0 | 1.5 | 10.0 | 0.0 | H-Bilog | QP | 0.0 | 23.3 | 37.0 | -13.7 |
| 31.701 | 31.5 | -16.3 | 197.0 | 1.0 | 10.0 | 0.0 | H-Bilog | QP | 0.0 | 15.2 | 30.0 | -14.8 |
| 213.140 | 36.9 | -22.6 | 300.0 | 1.0 | 10.0 | 0.0 | V-Bilog | QP | 0.0 | 14.3 | 30.0 | -15.7 |
| 207.139 | 36.7 | -22.9 | 238.0 | 1.0 | 10.0 | 0.0 | V-Bilog | QP | 0.0 | 13.8 | 30.0 | -16.2 |
| 225.154 | 34.6 | -22.0 | 294.0 | 1.4 | 10.0 | 0.0 | V-Bilog | QP | 0.0 | 12.6 | 30.0 | -17.4 |
| 224.882 | 33.7 | -22.1 | 110.0 | 2.8 | 10.0 | 0.0 | H-Bilog | QP | 0.0 | 11.6 | 30.0 | -18.4 |
| 75.200 | 38.5 | -27.5 | 166.0 | 2.9 | 10.0 | 0.0 | H-Bilog | QP | 0.0 | 11.0 | 30.0 | -19.0 |
| 213.778 | 33.6 | -22.6 | 107.0 | 2.8 | 10.0 | 0.0 | H-Bilog | QP | 0.0 | 11.0 | 30.0 | -19.0 |
| 207.141 | 33.0 | -22.9 | 129.0 | 1.0 | 10.0 | 0.0 | H-Bilog | QP | 0.0 | 10.1 | 30.0 | -19.9 |
| 65.128 | 33.5 | -26.9 | 308.0 | 2.6 | 10.0 | 0.0 | H-Bilog | QP | 0.0 | 6.6 | 30.0 | -23.4 |
| 120.917 | 33.4 | -26.9 | 196.0 | 1.0 | 10.0 | 0.0 | H-Bilog | QP | 0.0 | 6.5 | 30.0 | -23.5 |

# CONDUCTED EMISSIONS



Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

## MODES OF OPERATION

Transmitting

Receiving

## POWER SETTINGS INVESTIGATED

120VAC/60Hz

## SAMPLE CALCULATIONS

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

## TEST EQUIPMENT

| Description | Manufacturer | Model | ID | Last Cal. | Interval |
|---|---|---|---|---|---|
| LISN | Solar | 9252-50-R-24-BNC | LIQ | 12/13/2005 | 13 |
| Attenuator | Coaxicom | 66702 2910-20 | RBS | 12/19/2005 | 13 |
| Spectrum Analyzer | Hewlett-Packard | 8568B | AAI | 12/21/2005 | 13 |
| Spectrum Analyzer Display | Hewlett Packard | 85662A | AAID | 12/21/2005 | 13 |
| Quasi-Peak Adapter | Hewlett-Packard | 85650A | AQD | 12/21/2005 | 13 |

## MEASUREMENT BANDWIDTHS

| | Frequency Range (MHz) | Peak Data (kHz) | Quasi-Peak Data (kHz) | Average Data (kHz) |
|---|---|---|---|---|
| | 0.01 - 0.15 | 1.0 | 0.2 | 0.2 |
| | 0.15 - 30.0 | 10.0 | 9.0 | 9.0 |
| | 30.0 - 1000 | 100.0 | 120.0 | 120.0 |
| | Above 1000 | 1000.0 | N/A | 1000.0 |

Measurements were made using the bandwidths and detectors specified. No video filter was used.

## MEASUREMENT UNCERTAINTY

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

## TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, conducted emissions tests were performed. The frequency range investigated (scanned), is also noted in this report. Conducted power line measurements are made, unless otherwise specified, over the frequency range from 150 kHz to 30 MHz to determine the line-to-ground radio-noise voltage that is conducted from the EUT power-input terminals that are directly (or indirectly via separate transformer or power supplies) connected to a public power network. Equipment is tested with power cords that are normally used or that have electrical or shielding characteristics that are the same as those cords normally used. Typically those measurements are made using a LISN (Line Impedance Stabilization Network), the 50 Ω measuring port is terminated by a 50 Ω EMI meter or a 50 Ω resistive load. All 50 Ω measuring ports of the LISN are terminated by 50Ω.

NORTHWEST EMC

# CONDUCTED EMISSIONS DATA SHEET

ACQ-2006.04.25
EMI 2005.9.18

| | | | | | |
|---|---|---|---|---|---|
| EUT: | Cirronet FHSS (2.4GHZ Radio) | | | Work Order: | TRPO0015 |
| Serial Number: | Unknown | | | Date: | 05/08/06 |
| Customer: | Tripod Data Systems, Inc. | | | Temperature: | 25 |
| Attendees: | None | | | Humidity: | 32% |
| Project: | None | | | Barometric Pres.: | 30.15 |
| Tested by: | David Divergigelis | Power: | 120VAC/60Hz | Job Site: | EV07 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 15.107 Class B:2005-10 | ANSI C63.4:2003 |

| TEST PARAMETERS | |
|---|---|
| Cable or Line Tested | N |

**COMMENTS**

Cirronet Radio receiving,

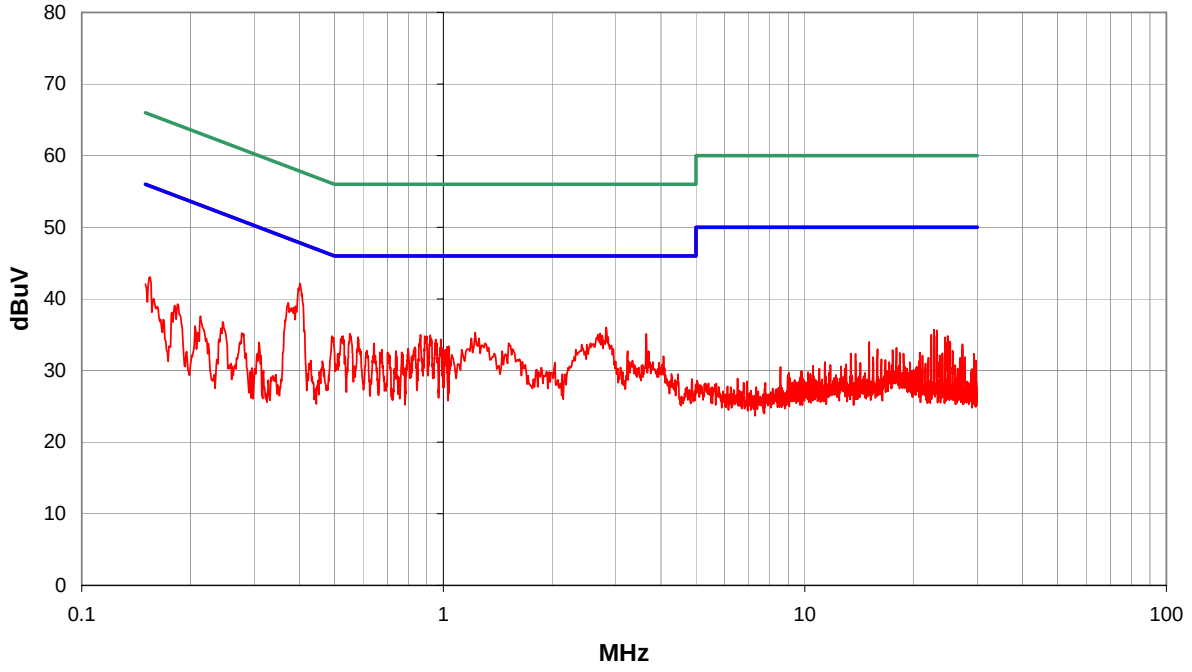
**EUT OPERATING MODES**

mid channel

**DEVIATIONS FROM TEST STANDARD**

No deviations.

| | | | |
|---|---|---|---|
| Run # | 7 | | |
| Configuration # | 1 | | |
| Results | Pass | NVLAP Lab Code 200630-0 | Signature David DiVergigelis |




| Freq (MHz) | Amplitude (dBuV) | | | Transducer (dB) | Cable (dB) | External Attenuation (dB) | | Detector (blank equal peaks [PK] from scan) | | Adjusted dBuV | Spec. Limit dBuV | Compared to Spec. (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.401 | 20.0 | | | 2.2 | 0.0 | 20.0 | | | | 42.2 | 47.8 | -5.7 |
| 0.372 | 17.2 | | | 2.2 | 0.0 | 20.0 | | | | 39.4 | 48.4 | -9.0 |
| 2.816 | 15.5 | | | 0.5 | 0.0 | 20.0 | | | | 36.0 | 46.0 | -10.0 |
| 1.225 | 14.8 | | | 0.5 | 0.0 | 20.0 | | | | 35.3 | 46.0 | -10.7 |
| 2.716 | 14.7 | | | 0.5 | 0.0 | 20.0 | | | | 35.2 | 46.0 | -10.8 |
| 0.551 | 13.4 | | | 1.7 | 0.0 | 20.0 | | | | 35.1 | 46.0 | -10.9 |
| 3.636 | 14.6 | | | 0.5 | 0.0 | 20.0 | | | | 35.1 | 46.0 | -10.9 |
| 0.865 | 14.1 | | | 0.9 | 0.0 | 20.0 | | | | 35.0 | 46.0 | -11.0 |
| 0.919 | 14.2 | | | 0.7 | 0.0 | 20.0 | | | | 34.9 | 46.0 | -11.1 |
| 0.527 | 13.0 | | | 1.8 | 0.0 | 20.0 | | | | 34.8 | 46.0 | -11.2 |
| 0.889 | 14.0 | | | 0.8 | 0.0 | 20.0 | | | | 34.8 | 46.0 | -11.2 |
| 0.492 | 12.9 | | | 1.9 | 0.0 | 20.0 | | | | 34.8 | 46.1 | -11.3 |
| 0.581 | 13.0 | | | 1.7 | 0.0 | 20.0 | | | | 34.7 | 46.0 | -11.3 |
| 1.195 | 14.0 | | | 0.5 | 0.0 | 20.0 | | | | 34.5 | 46.0 | -11.5 |
| 0.984 | 13.8 | | | 0.5 | 0.0 | 20.0 | | | | 34.3 | 46.0 | -11.7 |
| 0.953 | 13.7 | | | 0.6 | 0.0 | 20.0 | | | | 34.3 | 46.0 | -11.7 |
| 1.515 | 13.3 | | | 0.5 | 0.0 | 20.0 | | | | 33.8 | 46.0 | -12.2 |
| 0.643 | 12.3 | | | 1.5 | 0.0 | 20.0 | | | | 33.8 | 46.0 | -12.2 |
| 2.416 | 13.1 | | | 0.5 | 0.0 | 20.0 | | | | 33.6 | 46.0 | -12.4 |

NORTHWEST
**EMC**

# CONDUCTED EMISSIONS DATA SHEET

ACQ-2006.04.25
EMI 2005.9.18

| | | | | | |
|---|---|---|---|---|---|
| **EUT:** | Cirronet FHSS (2.4GHZ Radio) | | | **Work Order:** | TRPO0015 |
| **Serial Number:** | Unknown | | | **Date:** | 05/08/06 |
| **Customer:** | Tripod Data Systems, Inc. | | | **Temperature:** | 25 |
| **Attendees:** | None | | | **Humidity:** | 32% |
| **Project:** | None | | | **Barometric Pres.:** | 30.15 |
| **Tested by:** | David Divergigelis | **Power:** | 120VAC/60Hz | **Job Site:** | EV07 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 15.107 Class B:2005-10 | ANSI C63.4:2003 |

**TEST PARAMETERS**

| | |
|---|---|
| **Cable or Line Tested** | L1 |

**COMMENTS**

Cirronet Radio receiving,

**EUT OPERATING MODES**

mid channel

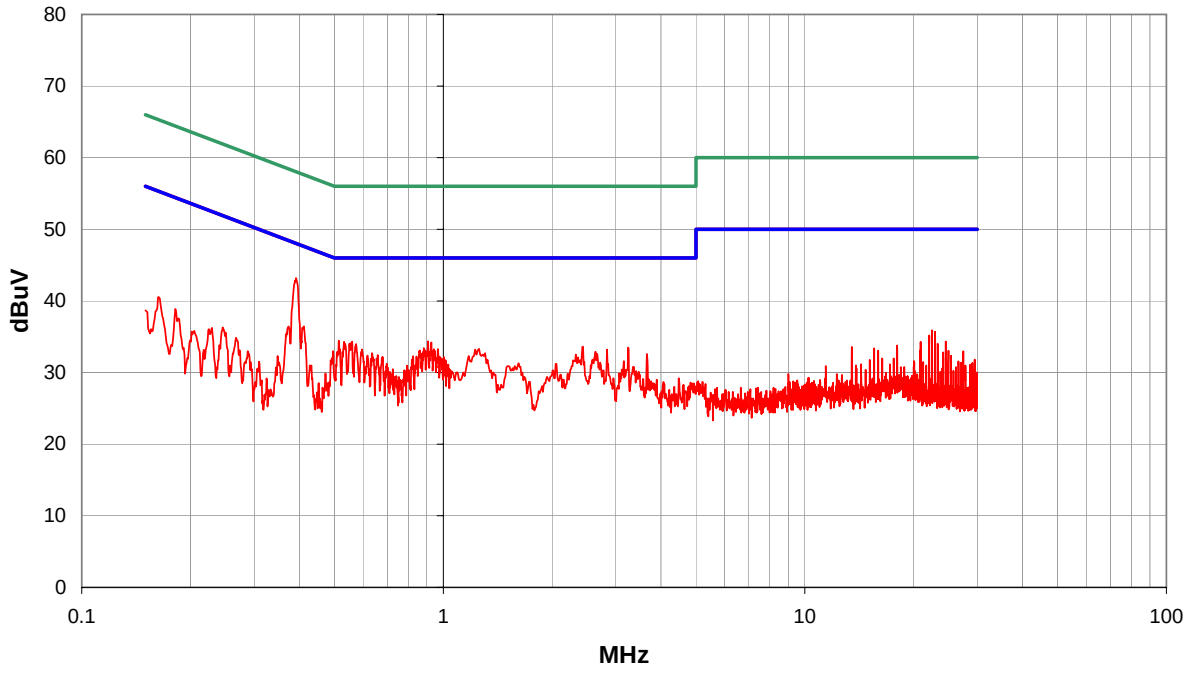
**DEVIATIONS FROM TEST STANDARD**

No deviations.

| | |
|---|---|
| **Run #** | 8 |
| **Configuration #** | 1 |
| **Results** | Pass |

NVLAP Lab Code 200630-0

*Signature* David DiVergigelis




| Freq (MHz) | Amplitude (dBuV) | | | Transducer (dB) | Cable (dB) | External Attenuation (dB) | | Detector (blank equal peaks [PK] from scan) | | Adjusted dBuV | Spec. Limit dBuV | Compared to Spec. (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.391 | 21.0 | | | 2.2 | 0.0 | 20.0 | | | | 43.2 | 48.0 | -4.8 |
| 0.411 | 14.3 | | | 2.1 | 0.0 | 20.0 | | | | 36.4 | 47.6 | -11.2 |
| 0.514 | 12.6 | | | 1.8 | 0.0 | 20.0 | | | | 34.4 | 46.0 | -11.6 |
| 0.907 | 13.6 | | | 0.8 | 0.0 | 20.0 | | | | 34.4 | 46.0 | -11.6 |
| 0.559 | 12.6 | | | 1.7 | 0.0 | 20.0 | | | | 34.3 | 46.0 | -11.7 |
| 0.532 | 12.5 | | | 1.8 | 0.0 | 20.0 | | | | 34.3 | 46.0 | -11.7 |
| 0.927 | 13.5 | | | 0.7 | 0.0 | 20.0 | | | | 34.2 | 46.0 | -11.8 |
| 0.373 | 14.2 | | | 2.2 | 0.0 | 20.0 | | | | 36.4 | 48.4 | -12.0 |
| 0.574 | 12.3 | | | 1.7 | 0.0 | 20.0 | | | | 34.0 | 46.0 | -12.0 |
| 2.426 | 13.1 | | | 0.5 | 0.0 | 20.0 | | | | 33.6 | 46.0 | -12.4 |
| 3.246 | 13.0 | | | 0.5 | 0.0 | 20.0 | | | | 33.5 | 46.0 | -12.5 |
| 0.883 | 12.6 | | | 0.8 | 0.0 | 20.0 | | | | 33.4 | 46.0 | -12.6 |
| 1.255 | 12.8 | | | 0.5 | 0.0 | 20.0 | | | | 33.3 | 46.0 | -12.7 |
| 0.966 | 12.7 | | | 0.6 | 0.0 | 20.0 | | | | 33.3 | 46.0 | -12.7 |
| 0.942 | 12.6 | | | 0.7 | 0.0 | 20.0 | | | | 33.3 | 46.0 | -12.7 |
| 0.596 | 11.6 | | | 1.6 | 0.0 | 20.0 | | | | 33.2 | 46.0 | -12.8 |
| 2.836 | 12.7 | | | 0.5 | 0.0 | 20.0 | | | | 33.2 | 46.0 | -12.8 |
| 0.861 | 12.2 | | | 0.9 | 0.0 | 20.0 | | | | 33.1 | 46.0 | -12.9 |
| 0.496 | 11.1 | | | 1.9 | 0.0 | 20.0 | | | | 33.0 | 46.1 | -13.1 |

NORTHWEST EMC

# CONDUCTED EMISSIONS DATA SHEET

ACQ-2006.04.25
EMI 2005.9.18

| | | | | | |
|---|---|---|---|---|---|
| EUT: | Cirronet FHSS (2.4GHZ Radio) | | | Work Order: | TRPO0015 |
| Serial Number: | Unknown | | | Date: | 05/08/06 |
| Customer: | Tripod Data Systems, Inc. | | | Temperature: | 25 |
| Attendees: | None | | | Humidity: | 32% |
| Project: | None | | | Barometric Pres.: | 30.15 |
| Tested by: | David Divergigelis | Power: | 120VAC/60Hz | Job Site: | EV07 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 15.107 Class B:2005-10 | ANSI C63.4:2003 |

| TEST PARAMETERS | |
|---|---|
| Cable or Line Tested | N |

**COMMENTS**

Cirronet Radio transmitting.

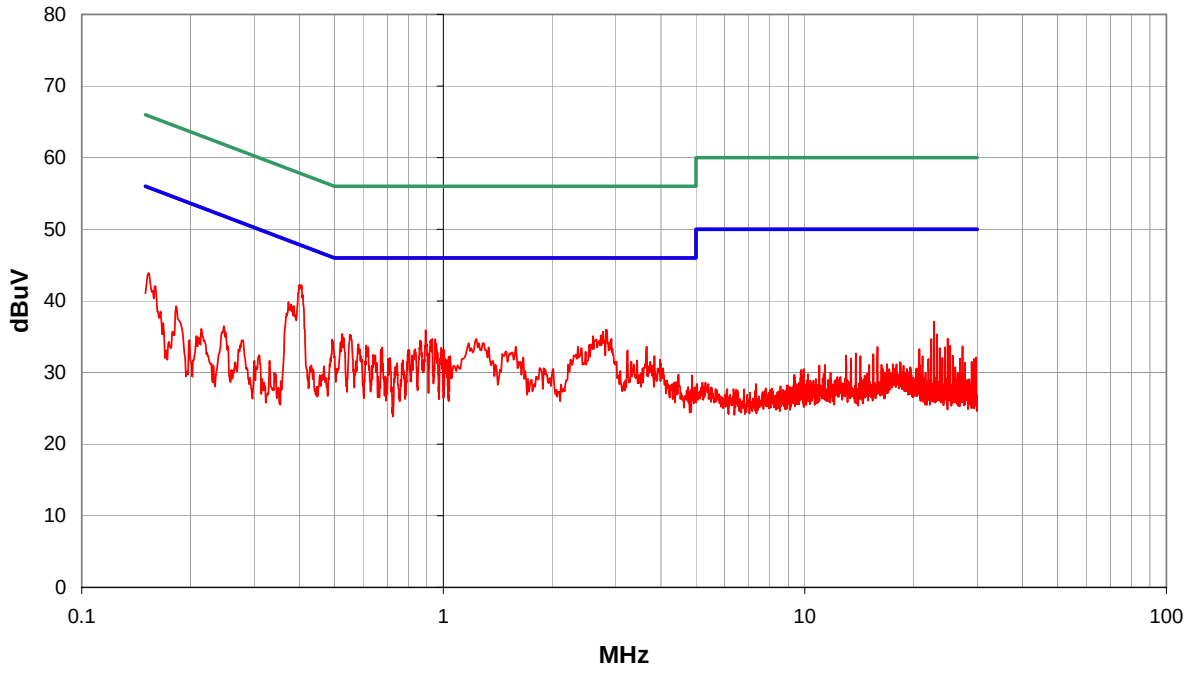
**EUT OPERATING MODES**

mid channel

**DEVIATIONS FROM TEST STANDARD**

No deviations.

| | | | |
|---|---|---|---|
| Run # | 3 | | |
| Configuration # | 1 | | |
| Results | Pass | NVLAP Lab Code 200630-0 | Signature David DiVergigelis |




| Freq (MHz) | Amplitude (dBuV) | | | Transducer (dB) | Cable (dB) | External Attenuation (dB) | | Detector (blank equal peaks [PK] from scan) | | Adjusted dBuV | Spec. Limit dBuV | Compared to Spec. (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.401 | 20.1 | | | 2.2 | 0.0 | 20.0 | | | | 42.3 | 47.8 | -5.6 |
| 0.373 | 17.6 | | | 2.2 | 0.0 | 20.0 | | | | 39.8 | 48.4 | -8.6 |
| 2.816 | 15.5 | | | 0.5 | 0.0 | 20.0 | | | | 36.0 | 46.0 | -10.0 |
| 0.893 | 15.1 | | | 0.8 | 0.0 | 20.0 | | | | 35.9 | 46.0 | -10.1 |
| 2.766 | 15.2 | | | 0.5 | 0.0 | 20.0 | | | | 35.7 | 46.0 | -10.3 |
| 0.525 | 13.6 | | | 1.8 | 0.0 | 20.0 | | | | 35.4 | 46.0 | -10.6 |
| 0.551 | 13.5 | | | 1.7 | 0.0 | 20.0 | | | | 35.2 | 46.0 | -10.8 |
| 1.235 | 14.2 | | | 0.5 | 0.0 | 20.0 | | | | 34.7 | 46.0 | -11.3 |
| 0.931 | 14.0 | | | 0.7 | 0.0 | 20.0 | | | | 34.7 | 46.0 | -11.3 |
| 0.950 | 14.0 | | | 0.6 | 0.0 | 20.0 | | | | 34.6 | 46.0 | -11.4 |
| 0.493 | 12.7 | | | 1.9 | 0.0 | 20.0 | | | | 34.6 | 46.1 | -11.5 |
| 0.864 | 13.6 | | | 0.9 | 0.0 | 20.0 | | | | 34.5 | 46.0 | -11.5 |
| 0.153 | 21.0 | | | 2.9 | 0.0 | 20.0 | | | | 43.9 | 55.9 | -12.0 |
| 0.582 | 12.3 | | | 1.7 | 0.0 | 20.0 | | | | 34.0 | 46.0 | -12.0 |
| 0.612 | 12.2 | | | 1.6 | 0.0 | 20.0 | | | | 33.8 | 46.0 | -12.2 |
| 1.585 | 13.1 | | | 0.5 | 0.0 | 20.0 | | | | 33.6 | 46.0 | -12.4 |
| 2.356 | 13.1 | | | 0.5 | 0.0 | 20.0 | | | | 33.6 | 46.0 | -12.4 |
| 3.646 | 13.1 | | | 0.5 | 0.0 | 20.0 | | | | 33.6 | 46.0 | -12.4 |
| 0.677 | 12.1 | | | 1.4 | 0.0 | 20.0 | | | | 33.5 | 46.0 | -12.5 |

NORTHWEST EMC

# CONDUCTED EMISSIONS DATA SHEET

ACQ-2006.04.25
EMI 2005.9.18

| | | | | | |
|---|---|---|---|---|---|
| EUT: | Cirronet FHSS (2.4GHZ Radio) | | | Work Order: | TRPO0015 |
| Serial Number: | Unknown | | | Date: | 05/08/06 |
| Customer: | Tripod Data Systems, Inc. | | | Temperature: | 25 |
| Attendees: | None | | | Humidity: | 32% |
| Project: | None | | | Barometric Pres.: | 30.15 |
| Tested by: | David Divergigelis | Power: | 120VAC/60Hz | Job Site: | EV07 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 15.107 Class B:2005-10 | ANSI C63.4:2003 |

| TEST PARAMETERS | |
|---|---|
| Cable or Line Tested | L1 |

**COMMENTS**

Cirronet Radio transmitting.

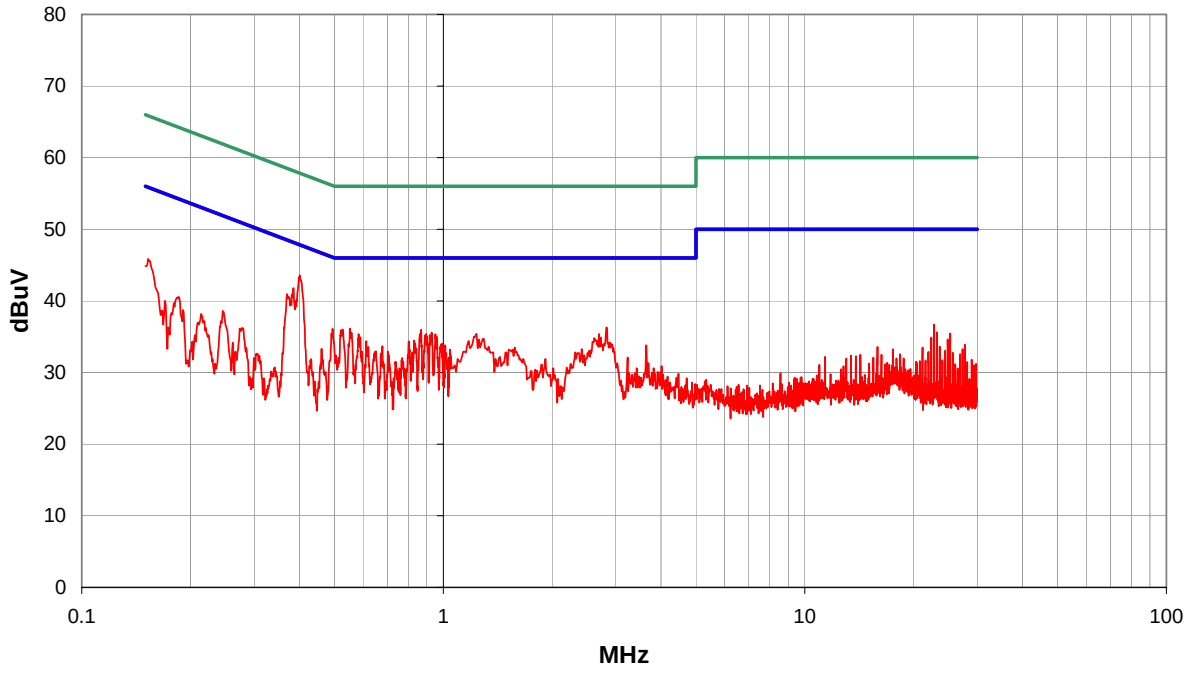
**EUT OPERATING MODES**

mid channel

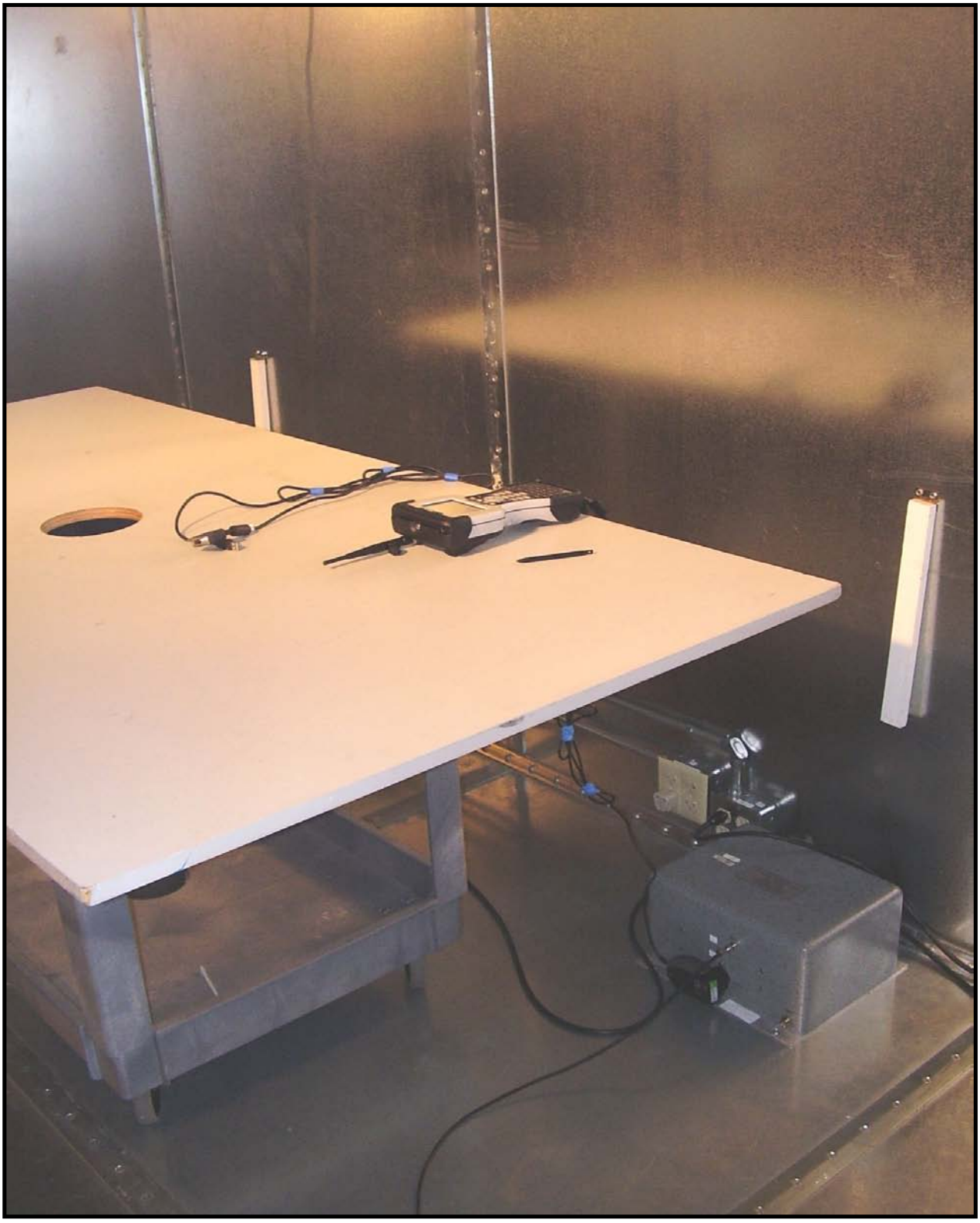
**DEVIATIONS FROM TEST STANDARD**

No deviations.

| | | | |
|---|---|---|---|
| Run # | 4 | | |
| Configuration # | 1 | | |
| Results | Pass | NVLAP Lab Code 200630-0 | Signature David DiVergigelis |




| Freq (MHz) | Amplitude (dBuV) | | | Transducer (dB) | Cable (dB) | External Attenuation (dB) | | Detector (blank equal peaks [PK] from scan) | | Adjusted dBuV | Spec. Limit dBuV | Compared to Spec. (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.401 | 21.4 | | | 2.2 | 0.0 | 20.0 | | | | 43.6 | 47.8 | -4.3 |
| 0.385 | 19.6 | | | 2.2 | 0.0 | 20.0 | | | | 41.8 | 48.2 | -6.4 |
| 2.826 | 15.8 | | | 0.5 | 0.0 | 20.0 | | | | 36.3 | 46.0 | -9.7 |
| 0.552 | 14.4 | | | 1.7 | 0.0 | 20.0 | | | | 36.1 | 46.0 | -9.9 |
| 0.527 | 14.2 | | | 1.8 | 0.0 | 20.0 | | | | 36.0 | 46.0 | -10.0 |
| 0.494 | 14.2 | | | 1.9 | 0.0 | 20.0 | | | | 36.1 | 46.1 | -10.0 |
| 0.153 | 23.0 | | | 2.9 | 0.0 | 20.0 | | | | 45.9 | 55.9 | -10.0 |
| 0.868 | 15.1 | | | 0.9 | 0.0 | 20.0 | | | | 36.0 | 46.0 | -10.0 |
| 0.928 | 14.9 | | | 0.7 | 0.0 | 20.0 | | | | 35.6 | 46.0 | -10.4 |
| 1.235 | 14.9 | | | 0.5 | 0.0 | 20.0 | | | | 35.4 | 46.0 | -10.6 |
| 2.696 | 14.9 | | | 0.5 | 0.0 | 20.0 | | | | 35.4 | 46.0 | -10.6 |
| 0.896 | 14.6 | | | 0.8 | 0.0 | 20.0 | | | | 35.4 | 46.0 | -10.6 |
| 0.583 | 13.7 | | | 1.7 | 0.0 | 20.0 | | | | 35.4 | 46.0 | -10.6 |
| 0.951 | 14.7 | | | 0.6 | 0.0 | 20.0 | | | | 35.3 | 46.0 | -10.7 |
| 0.830 | 13.5 | | | 1.0 | 0.0 | 20.0 | | | | 34.5 | 46.0 | -11.5 |
| 0.613 | 12.8 | | | 1.6 | 0.0 | 20.0 | | | | 34.4 | 46.0 | -11.6 |
| 0.802 | 13.3 | | | 1.0 | 0.0 | 20.0 | | | | 34.3 | 46.0 | -11.7 |
| 0.992 | 13.5 | | | 0.5 | 0.0 | 20.0 | | | | 34.0 | 46.0 | -12.0 |
| 1.012 | 13.3 | | | 0.5 | 0.0 | 20.0 | | | | 33.8 | 46.0 | -12.2 |



# SPURIOUS RADIATED EMISSIONS



Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

| MODES OF OPERATION |
|---|
| Low channel |
| Mid channel |
| High channel |

| POWER SETTINGS INVESTIGATED |
|---|
| 120VAC/60Hz |

**TEST EQUIPMENT**

| Description | Manufacturer | Model | ID | Last Cal. | Interval |
|---|---|---|---|---|---|
| Spectrum Analyzer | Agilent | E4446A | AAT | 4/4/2006 | 12 |
| Antenna, Biconilog | EMCO | 3141 | AXE | 12/28/2005 | 24 |
| Pre-Amplifier | Miteq | AM-1616-1000 | AOL | 1/4/2006 | 13 |
| High Pass Filter | Micro-Tronics | HPM50111 | HFO | 4/4/2006 | 13 |
| Pre-Amplifier | Miteq | AMF-4D-010100-24-10P | APW | 8/2/2005 | 13 |
| Antenna, Horn | EMCO | 3115 | AHC | 8/30/2005 | 12 |
| Pre-Amplifier | Miteq | AMF-4D-005180-24-10P | APC | 2/17/2005 | 16 |
| Antenna, Horn | EMCO | 3160-08 | AHK | NCR | 0 |
| Antenna, Horn | EMCO | 3160-09 | AHG | NCR | 0 |
| Pre-Amplifier | Miteq | JSD4-18002600-26-8P | APU | 3/23/2006 | 13 |

## MEASUREMENT UNCERTAINTY

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

## TEST DESCRIPTION

The highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands to verify compliance. While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and the EUT antenna in three orthogonal axis, and adjusting measurement antenna height and polarization, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.4:2003). A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

NORTHWEST EMC

# SPURIOUS RADIATED EMISSIONS DATA SHEET

PSA 2006.04.25
EMI 2006.4.26

| | | | |
|---|---|---|---|
| EUT: | Cirronet FHSS (2.4GHZ Radio) | Work Order: | TRPO0015 |
| Serial Number: | WIT2410M4-W-114748 | Date: | 04/28/06 |
| Customer: | Tripod Data Systems, Inc. | Temperature: | 25 |
| Attendees: | None | Humidity: | 32% |
| Project: | None | Barometric Pres.: | 30.15 |
| Tested by: | Rod Peloquin | Power: 120VAC/60Hz | Job Site: EV01 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 15.247(d) Spurious Radiated Emissions:2005-9 | ANSI C63.4:2003 |

| TEST PARAMETERS | | | |
|---|---|---|---|
| Antenna Height(s) (m) | 1 - 4 | Test Distance (m) | 3 |

**COMMENTS**

Cirronet Radio

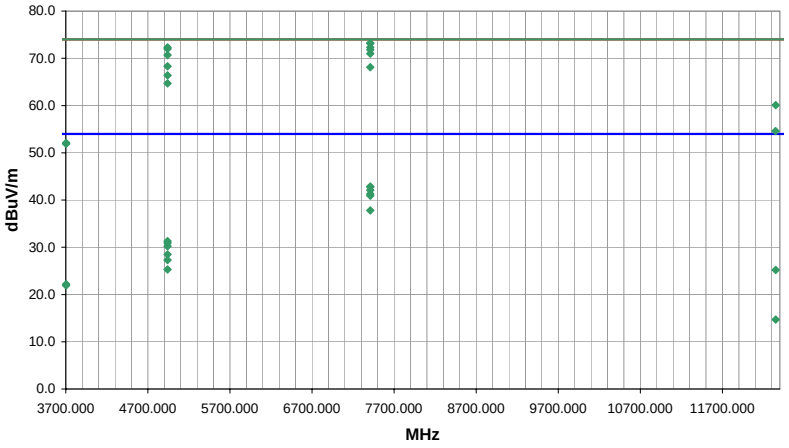
**EUT OPERATING MODES**

High channel

**DEVIATIONS FROM TEST STANDARD**

No deviations.

| | | | |
|---|---|---|---|
| Run # | 2 | | |
| Configuration # | 1 | | |
| Results | Pass | NVLAP Lab Code 200630-0 | Signature |




| Freq (MHz) | Amplitude (dBuV) | Factor (dB) | Azimuth (degrees) | Height (meters) | Duty Cycle Correction Factor | External Attenuation (dB) | Polarity | Detector | Distance Adjustment (dB) | Adjusted dBuV/m | Spec. Limit dBuV/m | Compared to Spec. (dB) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7409.185 | 59.4 | 13.8 | 198.0 | 1.8 | 0.0 | 0.0 | H-Horn | PK | 0.0 | 73.2 | 74.0 | -0.8 | EUT Vertical |
| 7409.305 | 59.4 | 13.8 | 278.0 | 1.6 | 0.0 | 0.0 | V-Horn | PK | 0.0 | 73.2 | 74.0 | -0.8 | EUT on side, Changed antenna assembly, cleaned RF shield |
| 7410.022 | 58.5 | 13.8 | 205.0 | 1.3 | 0.0 | 0.0 | V-Horn | PK | 0.0 | 72.3 | 74.0 | -1.7 | EUT Vertical |
| 4939.794 | 65.6 | 6.7 | 240.0 | 1.3 | 0.0 | 0.0 | H-Horn | PK | 0.0 | 72.3 | 74.0 | -1.7 | EUT on side |
| 4939.877 | 65.3 | 6.7 | 202.0 | 1.2 | 0.0 | 0.0 | V-Horn | PK | 0.0 | 72.0 | 74.0 | -2.0 | EUT Vertical |
| 7409.190 | 58.0 | 13.8 | 95.0 | 1.6 | 0.0 | 0.0 | V-Horn | PK | 0.0 | 71.8 | 74.0 | -2.2 | EUT horizontal |
| 7409.916 | 57.2 | 13.8 | 229.0 | 1.2 | 0.0 | 0.0 | H-Horn | PK | 0.0 | 71.0 | 74.0 | -3.0 | EUT on side |
| 4939.923 | 64.0 | 6.7 | 351.0 | 1.2 | 0.0 | 0.0 | V-Horn | PK | 0.0 | 70.7 | 74.0 | -3.3 | EUT horizontal |
| 4939.897 | 61.6 | 6.7 | 228.0 | 1.8 | 0.0 | 0.0 | V-Horn | PK | 0.0 | 68.3 | 74.0 | -5.7 | EUT on side |
| 7409.896 | 54.3 | 13.8 | 207.0 | 1.1 | 0.0 | 0.0 | H-Horn | PK | 0.0 | 68.1 | 74.0 | -5.9 | EUT horizontal |
| 4939.702 | 59.7 | 6.7 | 185.0 | 1.1 | 0.0 | 0.0 | H-Horn | PK | 0.0 | 66.4 | 74.0 | -7.6 | EUT Vertical |
| 4939.905 | 58.0 | 6.7 | 36.0 | 1.4 | 0.0 | 0.0 | H-Horn | PK | 0.0 | 64.7 | 74.0 | -9.3 | EUT horizontal |
| 7409.619 | 55.5 | 13.8 | 198.0 | 1.8 | 26.5 | 0.0 | H-Horn | AV | 0.0 | 42.8 | 54.0 | -11.2 | EUT Vertical |
| 7409.620 | 55.5 | 13.8 | 278.0 | 1.6 | 26.5 | 0.0 | V-Horn | AV | 0.0 | 42.8 | 54.0 | -11.2 | EUT on side, Changed antenna assembly, cleaned RF shield |
| 7409.654 | 54.8 | 13.8 | 205.0 | 1.3 | 26.5 | 0.0 | V-Horn | AV | 0.0 | 42.1 | 54.0 | -11.9 | EUT Vertical |
| 7409.615 | 54.0 | 13.8 | 95.0 | 1.6 | 26.5 | 0.0 | V-Horn | AV | 0.0 | 41.3 | 54.0 | -12.7 | EUT horizontal |

NORTHWEST EMC

# SPURIOUS RADIATED EMISSIONS DATA SHEET

PSA 2006.04.25
EMI 2006.4.26

| | | | | | |
|---|---|---|---|---|---|
| **EUT:** | Cirronet FHSS (2.4GHZ Radio) | | | **Work Order:** | TRPO0015 |
| **Serial Number:** | WIT2410M4-W-114743 | | | **Date:** | 04/28/06 |
| **Customer:** | Tripod Data Systems, Inc. | | | **Temperature:** | 25 |
| **Attendees:** | None | | | **Humidity:** | 32% |
| **Project:** | None | | | **Barometric Pres.:** | 30.15 |
| **Tested by:** | Rod Peloquin | **Power:** | 120VAC/60Hz | **Job Site:** | EV01 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 15.247(d) Spurious Radiated Emissions:2005-9 | ANSI C63.4:2003 |

**TEST PARAMETERS**

| | | | |
|---|---|---|---|
| **Antenna Height(s) (m)** | 1 - 4 | **Test Distance (m)** | 3 |

**COMMENTS**

Cirronet Radio

**EUT OPERATING MODES**

High channel

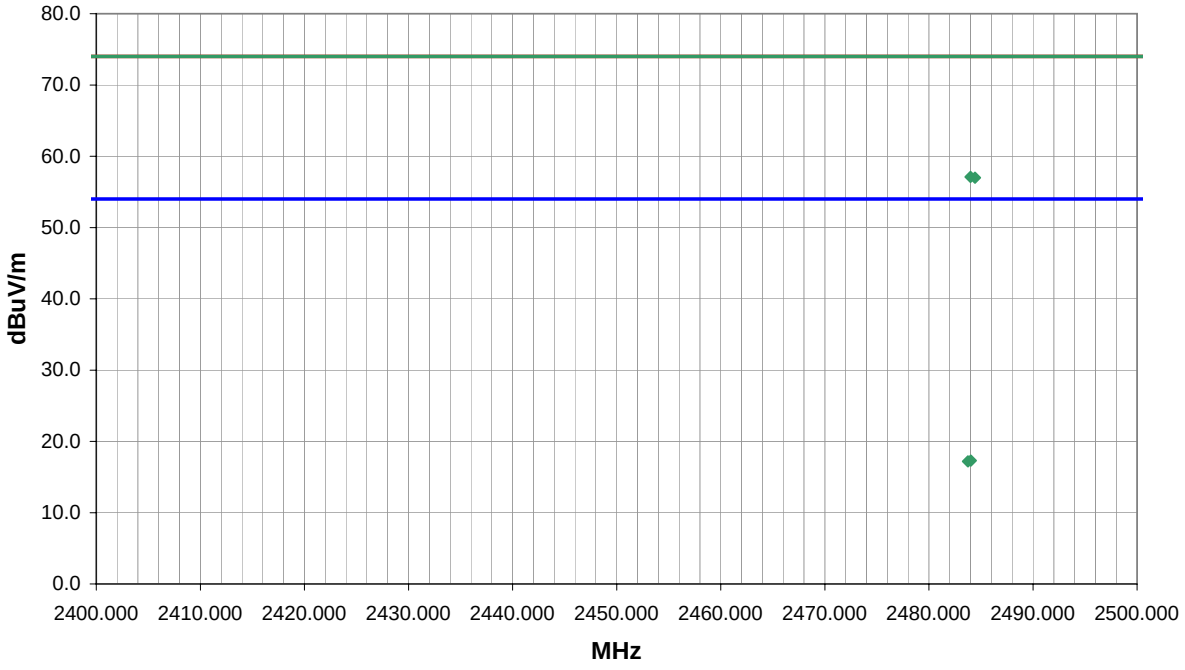
**DEVIATIONS FROM TEST STANDARD**

No deviations.

| | |
|---|---|
| **Run #** | 3 |
| **Configuration #** | 1 |
| **Results** | Pass |

NVLAP Lab Code 200630-0

*Signature*




| Freq (MHz) | Amplitude (dBuV) | Factor (dB) | Azimuth (degrees) | Height (meters) | Duty Cycle Correction Factor | External Attenuation (dB) | Polarity | Detector | Distance Adjustment (dB) | Adjusted dBuV/m | Spec. Limit dBuV/m | Compared to Spec. (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2483.994 | 36.6 | 0.5 | 138.0 | 1.1 | 0.0 | 20.0 | V-Horn | PK | 0.0 | 57.1 | 74.0 | -16.9 |
| 2484.429 | 36.5 | 0.5 | 297.0 | 1.2 | 0.0 | 20.0 | H-Horn | PK | 0.0 | 57.0 | 74.0 | -17.0 |
| 2484.020 | 23.3 | 0.5 | 297.0 | 1.2 | 26.5 | 20.0 | H-Horn | AV | 0.0 | 17.3 | 54.0 | -36.7 |
| 2483.744 | 23.2 | 0.5 | 138.0 | 1.1 | 26.5 | 20.0 | V-Horn | AV | 0.0 | 17.2 | 54.0 | -36.8 |

NORTHWEST EMC

# SPURIOUS RADIATED EMISSIONS DATA SHEET

PSA 2006.04.25
EMI 2006.4.26

| | | | | | |
|---|---|---|---|---|---|
| EUT: | Cirronet FHSS (2.4GHZ Radio) | | | Work Order: | TRPO0015 |
| Serial Number: | WIT2410M4-W-114743 | | | Date: | 04/28/06 |
| Customer: | Tripod Data Systems, Inc. | | | Temperature: | 25 |
| Attendees: | None | | | Humidity: | 32% |
| Project: | None | | | Barometric Pres.: | 30.15 |
| Tested by: | Rod Peloquin | Power: | 120VAC/60Hz | Job Site: | EV01 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 15.247(d) Spurious Radiated Emissions:2005-9 | ANSI C63.4:2003 |

| TEST PARAMETERS | | | |
|---|---|---|---|
| Antenna Height(s) (m) | 1 - 4 | Test Distance (m) | 3 |

**COMMENTS**

Cirronet Radio

**EUT OPERATING MODES**

Mid channel

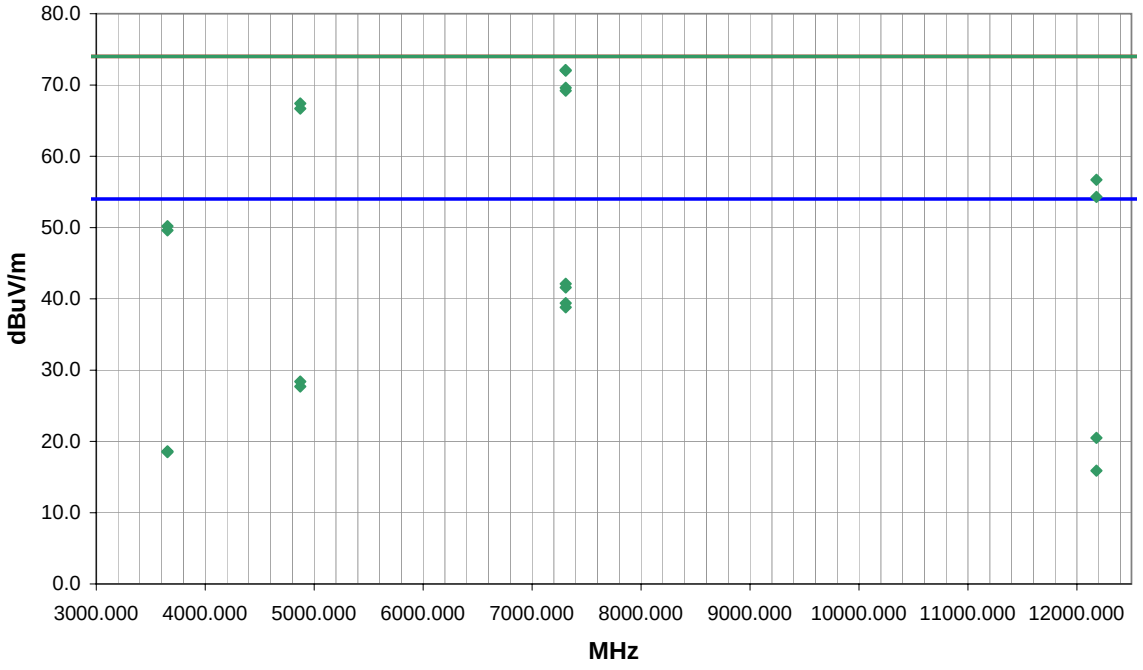
**DEVIATIONS FROM TEST STANDARD**

No deviations.

| | |
|---|---|
| Run # | 4 |
| Configuration # | 1 |
| Results | Pass |

NVLAP Lab Code 200630-0

*Signature*




| Freq (MHz) | Amplitude (dBuV) | Factor (dB) | Azimuth (degrees) | Height (meters) | Duty Cycle Correction Factor | External Attenuation (dB) | Polarity | Detector | Distance Adjustment (dB) | Adjusted dBuV/m | Spec. Limit dBuV/m | Compared to Spec. (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7306.918 | 58.7 | 13.4 | 254.0 | 1.5 | 0.0 | 0.0 | H-Horn | PK | 0.0 | 72.1 | 74.0 | -1.9 |
| 7307.606 | 58.6 | 13.4 | 257.0 | 1.4 | 0.0 | 0.0 | V-Horn | PK | 0.0 | 72.0 | 74.0 | -2.0 |
| 7307.758 | 56.2 | 13.4 | 195.0 | 1.2 | 0.0 | 0.0 | H-Horn | PK | 0.0 | 69.6 | 74.0 | -4.4 |
| 7307.699 | 55.8 | 13.4 | 231.0 | 1.3 | 0.0 | 0.0 | V-Horn | PK | 0.0 | 69.2 | 74.0 | -4.8 |
| 4871.688 | 60.9 | 6.5 | 233.0 | 1.5 | 0.0 | 0.0 | V-Horn | PK | 0.0 | 67.4 | 74.0 | -6.6 |
| 4871.710 | 60.2 | 6.5 | 178.0 | 1.6 | 0.0 | 0.0 | H-Horn | PK | 0.0 | 66.7 | 74.0 | -7.3 |
| 7307.360 | 55.2 | 13.4 | 254.0 | 1.5 | 26.5 | 0.0 | H-Horn | AV | 0.0 | 42.1 | 54.0 | -11.9 |
| 7307.345 | 54.7 | 13.4 | 257.0 | 1.4 | 26.5 | 0.0 | V-Horn | AV | 0.0 | 41.6 | 54.0 | -12.4 |
| 7307.338 | 52.5 | 13.4 | 195.0 | 1.2 | 26.5 | 0.0 | H-Horn | AV | 0.0 | 39.4 | 54.0 | -14.6 |
| 7307.360 | 51.9 | 13.4 | 231.0 | 1.3 | 26.5 | 0.0 | V-Horn | AV | 0.0 | 38.8 | 54.0 | -15.2 |
| 12179.080 | 40.6 | 16.1 | 61.0 | 1.1 | 0.0 | 0.0 | V-Horn | PK | 0.0 | 56.7 | 74.0 | -17.3 |
| 12179.160 | 38.2 | 16.1 | 178.0 | 1.2 | 0.0 | 0.0 | H-Horn | PK | 0.0 | 54.3 | 74.0 | -19.7 |
| 3653.298 | 45.7 | 4.5 | 215.0 | 1.5 | 0.0 | 0.0 | H-Horn | PK | 0.0 | 50.2 | 74.0 | -23.8 |
| 3653.670 | 45.1 | 4.5 | 190.0 | 1.1 | 0.0 | 0.0 | V-Horn | PK | 0.0 | 49.6 | 74.0 | -24.4 |
| 4871.552 | 48.4 | 6.5 | 233.0 | 1.5 | 26.5 | 0.0 | V-Horn | AV | 0.0 | 28.4 | 54.0 | -25.6 |
| 4871.567 | 47.7 | 6.5 | 178.0 | 1.6 | 26.5 | 0.0 | H-Horn | AV | 0.0 | 27.7 | 54.0 | -26.3 |
| 12178.880 | 30.9 | 16.1 | 61.0 | 1.1 | 26.5 | 0.0 | V-Horn | AV | 0.0 | 20.5 | 54.0 | -33.5 |
| 3653.672 | 40.6 | 4.5 | 215.0 | 1.5 | 26.5 | 0.0 | H-Horn | AV | 0.0 | 18.6 | 54.0 | -35.4 |
| 3653.712 | 40.5 | 4.5 | 190.0 | 1.1 | 26.5 | 0.0 | V-Horn | AV | 0.0 | 18.5 | 54.0 | -35.5 |
| 12179.080 | 26.3 | 16.1 | 178.0 | 1.2 | 26.5 | 0.0 | H-Horn | AV | 0.0 | 15.9 | 54.0 | -38.1 |

NORTHWEST EMC

# SPURIOUS RADIATED EMISSIONS DATA SHEET

PSA 2006.04.25
EMI 2006.4.26

| | | | | | |
|---|---|---|---|---|---|
| EUT: | Cirronet FHSS (2.4GHZ Radio) | | | Work Order: | TRPO0015 |
| Serial Number: | WIT2410M4-W-114743 | | | Date: | 04/28/06 |
| Customer: | Tripod Data Systems, Inc. | | | Temperature: | 25 |
| Attendees: | None | | | Humidity: | 32% |
| Project: | None | | | Barometric Pres.: | 30.15 |
| Tested by: | Rod Peloquin | Power: | 120VAC/60Hz | Job Site: | EV01 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 15.247(d) Spurious Radiated Emissions:2005-9 | ANSI C63.4:2003 |

| TEST PARAMETERS | | | |
|---|---|---|---|
| Antenna Height(s) (m) | 1 - 4 | Test Distance (m) | 3 |

**COMMENTS**

Cirronet Radio

**EUT OPERATING MODES**

Low channel

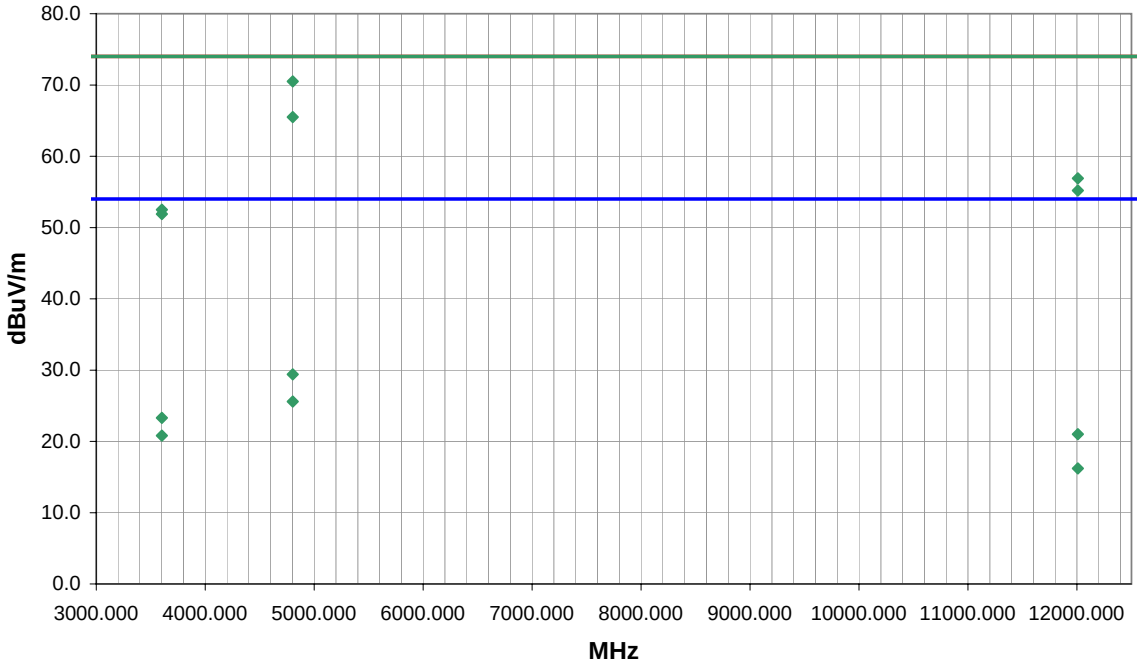
**DEVIATIONS FROM TEST STANDARD**

No deviations.

| | |
|---|---|
| Run # | 5 |
| Configuration # | 1 |
| Results | Pass |

NVLAP Lab Code 200630-0

*Signature*




| Freq (MHz) | Amplitude (dBuV) | Factor (dB) | Azimuth (degrees) | Height (meters) | Duty Cycle Correction Factor | External Attenuation (dB) | Polarity | Detector | Distance Adjustment (dB) | Adjusted dBuV/m | Spec. Limit dBuV/m | Compared to Spec. (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4803.416 | 64.2 | 6.3 | 216.0 | 1.2 | 0.0 | 0.0 | V-Horn | PK | 0.0 | 70.5 | 74.0 | -3.5 |
| 4803.463 | 59.2 | 6.3 | 110.0 | 1.8 | 0.0 | 0.0 | H-Horn | PK | 0.0 | 65.5 | 74.0 | -8.5 |
| 12008.810 | 40.8 | 16.1 | 225.0 | 1.2 | 0.0 | 0.0 | H-Horn | PK | 0.0 | 56.9 | 74.0 | -17.1 |
| 12008.340 | 39.1 | 16.1 | 87.0 | 1.1 | 0.0 | 0.0 | V-Horn | PK | 0.0 | 55.2 | 74.0 | -18.8 |
| 3602.613 | 48.2 | 4.3 | 246.0 | 1.2 | 0.0 | 0.0 | H-Horn | PK | 0.0 | 52.5 | 74.0 | -21.5 |
| 3602.685 | 47.6 | 4.3 | 170.0 | 1.1 | 0.0 | 0.0 | V-Horn | PK | 0.0 | 51.9 | 74.0 | -22.1 |
| 4803.333 | 49.6 | 6.3 | 216.0 | 1.2 | 26.5 | 0.0 | V-Horn | AV | 0.0 | 29.4 | 54.0 | -24.6 |
| 4803.336 | 45.8 | 6.3 | 110.0 | 1.8 | 26.5 | 0.0 | H-Horn | AV | 0.0 | 25.6 | 54.0 | -28.4 |
| 3602.522 | 45.5 | 4.3 | 246.0 | 1.2 | 26.5 | 0.0 | H-Horn | AV | 0.0 | 23.3 | 54.0 | -30.7 |
| 12008.310 | 31.4 | 16.1 | 225.0 | 1.2 | 26.5 | 0.0 | H-Horn | AV | 0.0 | 21.0 | 54.0 | -33.0 |
| 3602.532 | 43.0 | 4.3 | 170.0 | 1.1 | 26.5 | 0.0 | V-Horn | AV | 0.0 | 20.8 | 54.0 | -33.2 |
| 12008.450 | 26.6 | 16.1 | 87.0 | 1.1 | 26.5 | 0.0 | V-Horn | AV | 0.0 | 16.2 | 54.0 | -37.8 |

NORTHWEST EMC

# SPURIOUS RADIATED EMISSIONS DATA SHEET

PSA 2006.04.25
EMI 2006.4.26

| | | | | | |
|---|---|---|---|---|---|
| EUT: | Cirronet FHSS (2.4GHZ Radio) | | | Work Order: | TRPO0015 |
| Serial Number: | WIT2410M4-W-114743 | | | Date: | 04/28/06 |
| Customer: | Tripod Data Systems, Inc. | | | Temperature: | 25 |
| Attendees: | None | | | Humidity: | 32% |
| Project: | None | | | Barometric Pres.: | 30.15 |
| Tested by: | Rod Peloquin | Power: | 120VAC/60Hz | Job Site: | EV01 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 15.247(d) Spurious Radiated Emissions:2005-9 | ANSI C63.4:2003 |

| TEST PARAMETERS | | | |
|---|---|---|---|
| Antenna Height(s) (m) | 1 - 4 | Test Distance (m) | 3 |

**COMMENTS**

Cirronet Radio

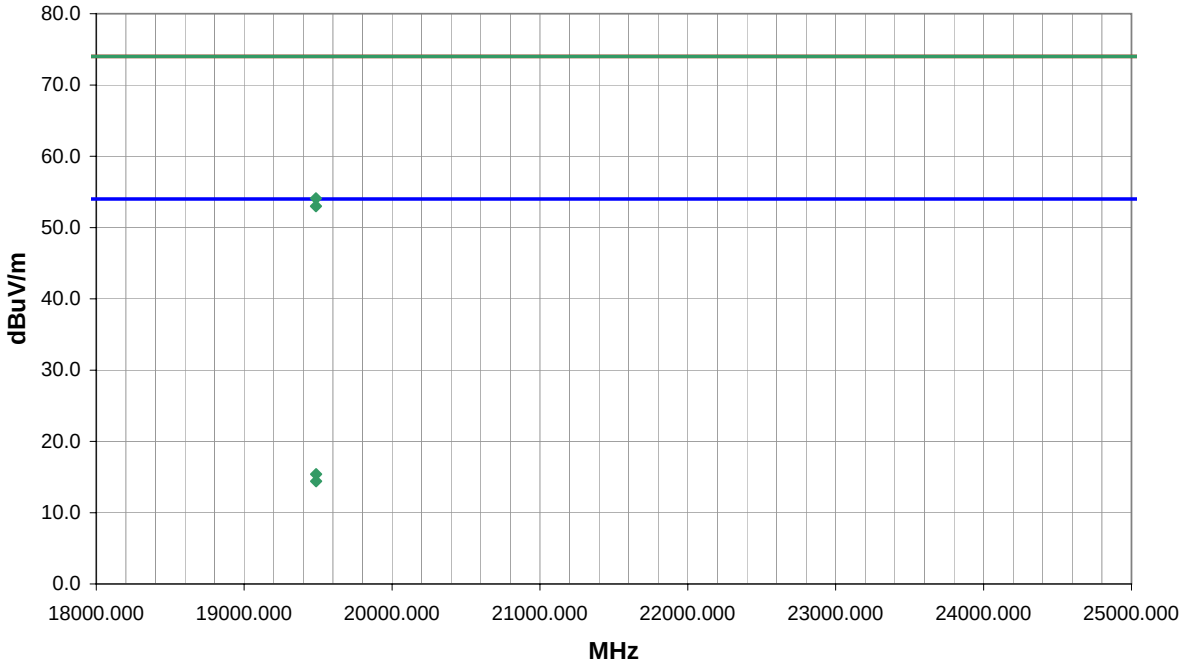
**EUT OPERATING MODES**

mid channel

**DEVIATIONS FROM TEST STANDARD**

No deviations.

| | | | |
|---|---|---|---|
| Run # | 6 | | |
| Configuration # | 1 | | |
| Results | Pass | NVLAP Lab Code 200630-0 | *Signature* |




| Freq (MHz) | Amplitude (dBuV) | Factor (dB) | Azimuth (degrees) | Height (meters) | Duty Cycle Correction Factor | External Attenuation (dB) | Polarity | Detector | Distance Adjustment (dB) | Adjusted dBuV/m | Spec. Limit dBuV/m | Compared to Spec. (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 19485.810 | 43.9 | 10.2 | 103.0 | 1.0 | 0.0 | 0.0 | -High Horr | PK | 0.0 | 54.1 | 74.0 | -19.9 |
| 19485.640 | 42.8 | 10.2 | 219.0 | 1.2 | 0.0 | 0.0 | √-High Horr | PK | 0.0 | 53.0 | 74.0 | -21.0 |
| 19486.200 | 31.7 | 10.2 | 103.0 | 1.0 | 26.5 | 0.0 | -High Horr | AV | 0.0 | 15.4 | 54.0 | -38.6 |
| 19486.200 | 30.7 | 10.2 | 219.0 | 1.2 | 26.5 | 0.0 | √-High Horr | AV | 0.0 | 14.4 | 54.0 | -39.6 |


NORTHWEST EMC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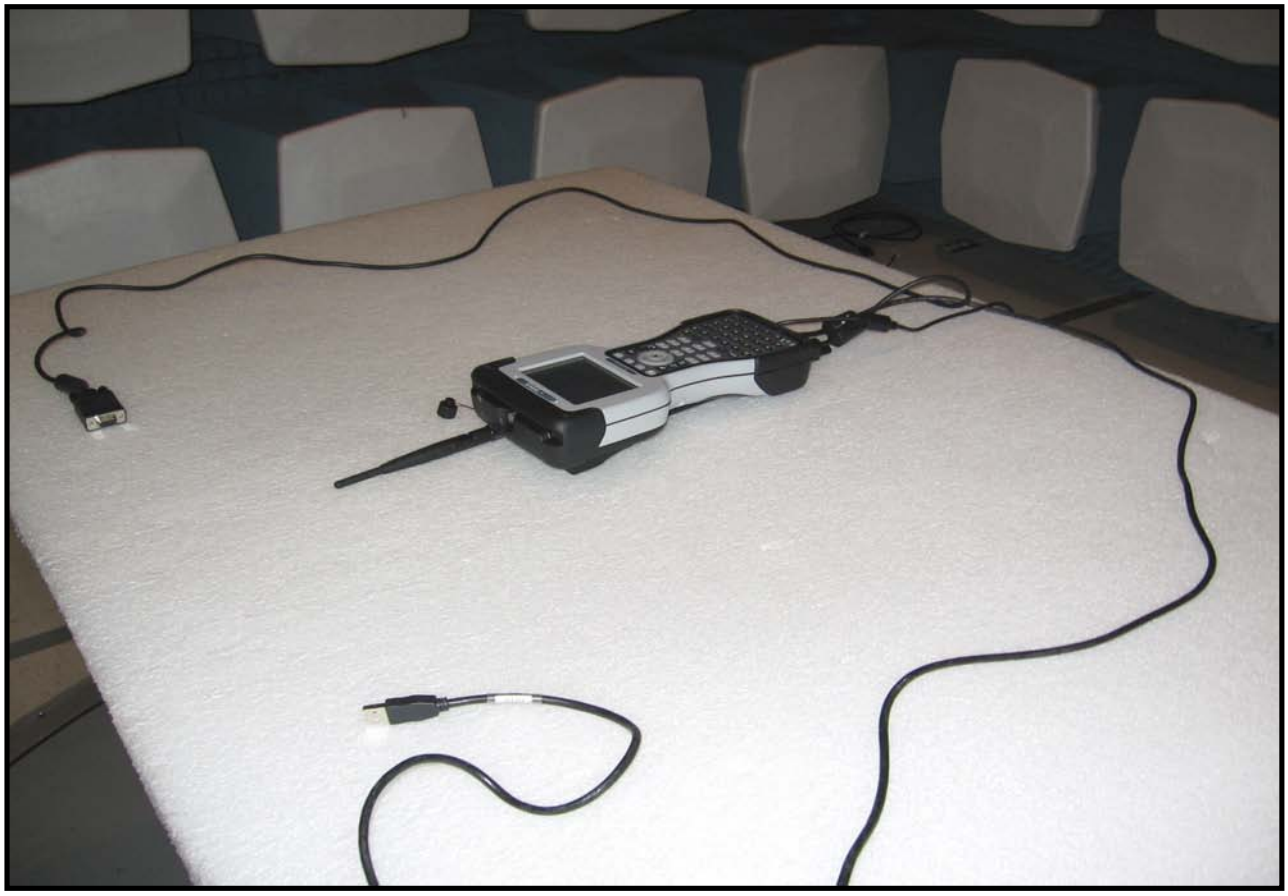
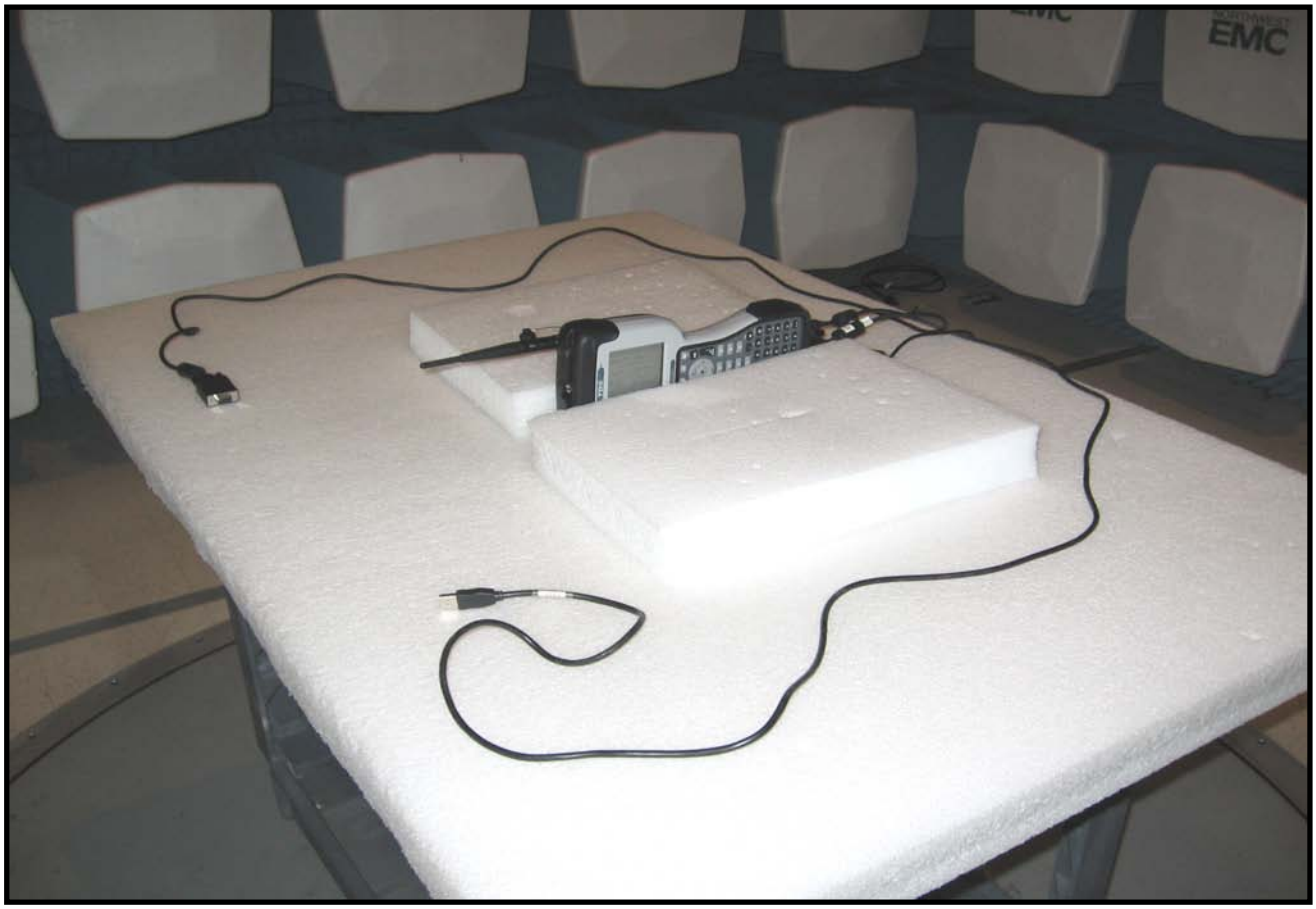
EMC




EMC

# AC POWERLINE CONDUCTED EMISSIONS



Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

| MODES OF OPERATION |
|---|
| Transmitting high channel |
| Transmitting mid channel |
| Transmitting low channel |

| POWER SETTINGS INVESTIGATED |
|---|
| 120VAC/60Hz |

| SAMPLE CALCULATIONS |
|---|
| Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator |

**TEST EQUIPMENT**

| Description | Manufacturer | Model | ID | Last Cal. | Interval |
|---|---|---|---|---|---|
| LISN | Solar | 9252-50-R-24-BNC | LIQ | 12/13/2005 | 13 |
| Attenuator | Coaxicom | 66702 2910-20 | RBS | 12/19/2005 | 13 |
| Spectrum Analyzer | Hewlett-Packard | 8568B | AAI | 12/21/2005 | 13 |
| Spectrum Analyzer Display | Hewlett Packard | 85662A | AAID | 12/21/2005 | 13 |
| Quasi-Peak Adapter | Hewlett-Packard | 85650A | AQD | 12/21/2005 | 13 |

**MEASUREMENT BANDWIDTHS**

| | Frequency Range (MHz) | Peak Data (kHz) | Quasi-Peak Data (kHz) | Average Data (kHz) |
|---|---|---|---|---|
| | 0.01 - 0.15 | 1.0 | 0.2 | 0.2 |
| | 0.15 - 30.0 | 10.0 | 9.0 | 9.0 |
| | 30.0 - 1000 | 100.0 | 120.0 | 120.0 |
| | Above 1000 | 1000.0 | N/A | 1000.0 |
| Measurements were made using the bandwidths and detectors specified. No video filter was used. | | | | |

## MEASUREMENT UNCERTAINTY

Measurement uncertainty is used to reflect the accuracy of the measured result as compared with its "true" or theoretically correct value. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. In the case of transient tests our test equipment has been demonstrated by calibration to provide at least a 95% confidence that it complies with the test specification requirements. The measurement uncertainty for any test is available upon request.

## TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, conducted emissions tests were performed. The frequency range investigated (scanned), is also noted in this report. Conducted power line measurements are made, unless otherwise specified, over the frequency range from 150 kHz to 30 MHz to determine the line-to-ground radio-noise voltage that is conducted from the EUT power-input terminals that are directly (or indirectly via separate transformer or power supplies) connected to a public power network. Equipment is tested with power cords that are normally used or that have electrical or shielding characteristics that are the same as those cords normally used. Typically those measurements are made using a LISN (Line Impedance Stabilization Network), the 50 Ω measuring port is terminated by a 50 Ω EMI meter or a 50 Ω resistive load. All 50 Ω measuring ports of the LISN are terminated by 50Ω.

NORTHWEST EMC

# AC POWERLINE CONDUCTED EMISSIONS

ACQ-2006.04.25
EMI 2005.9.18

| | | | | | |
|---|---|---|---|---|---|
| EUT: | Cirronet FHSS (2.4GHZ Radio) | | | Work Order: | TRPO0015 |
| Serial Number: | Unknown | | | Date: | 05/08/06 |
| Customer: | Tripod Data Systems, Inc. | | | Temperature: | 25 |
| Attendees: | None | | | Humidity: | 32% |
| Project: | None | | | Barometric Pres.: | 30.15 |
| Tested by: | David Divergigelis | Power: | 120VAC/60Hz | Job Site: | EV07 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 15.207 AC Powerline Conducted Emissions: 2005-9 | ANSI C63.4:2003 |

**TEST PARAMETERS**

| | |
|---|---|
| Cable or Line Tested | L1 |

**COMMENTS**

Cirronet Radio transmitting.

**EUT OPERATING MODES**

low channel

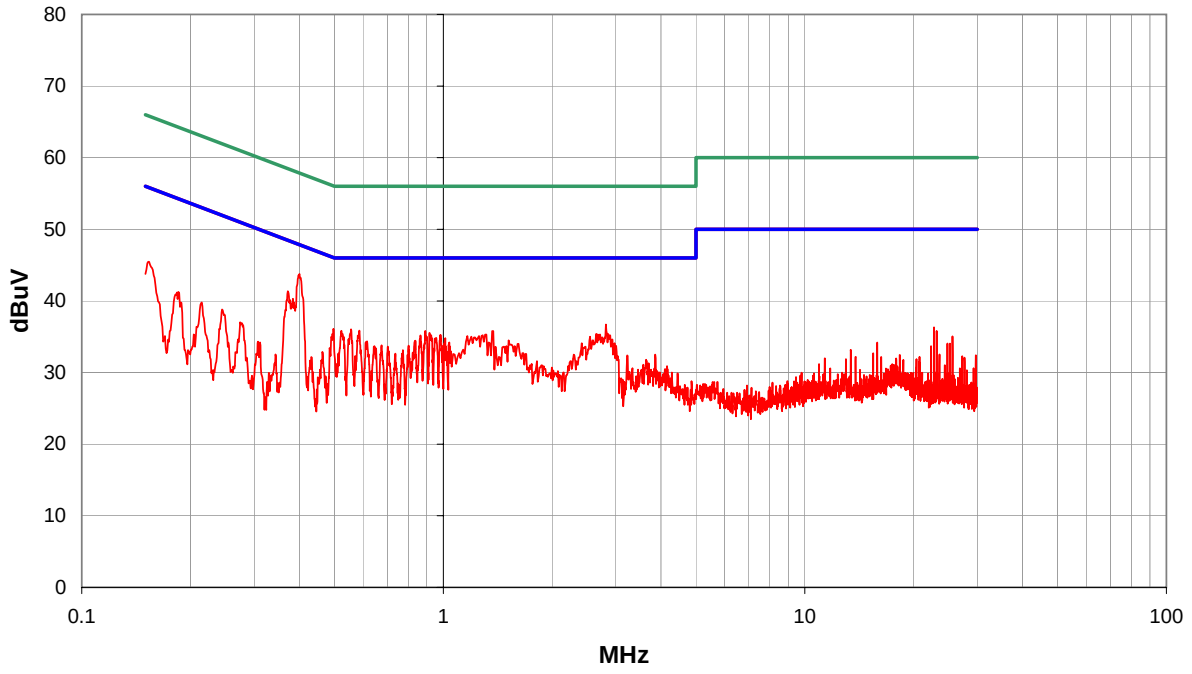
**DEVIATIONS FROM TEST STANDARD**

No deviations.

| | |
|---|---|
| Run # | 1 |
| Configuration # | 1 |
| Results | Pass |

NVLAP Lab Code 200630-0

*Signature* David DiVergigelis




| Freq (MHz) | Amplitude (dBuV) | | | Transducer (dB) | Cable (dB) | External Attenuation (dB) | | Detector (blank equal peaks [PK] from scan) | | Adjusted dBuV | Spec. Limit dBuV | Compared to Spec. (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.400 | 21.6 | | | 2.2 | 0.0 | 20.0 | | | | 43.8 | 47.8 | -4.1 |
| 0.371 | 19.1 | | | 2.2 | 0.0 | 20.0 | | | | 41.3 | 48.5 | -7.1 |
| 2.816 | 16.2 | | | 0.5 | 0.0 | 20.0 | | | | 36.7 | 46.0 | -9.3 |
| 0.497 | 14.2 | | | 1.9 | 0.0 | 20.0 | | | | 36.1 | 46.1 | -10.0 |
| 0.556 | 14.3 | | | 1.7 | 0.0 | 20.0 | | | | 36.0 | 46.0 | -10.0 |
| 0.586 | 14.2 | | | 1.7 | 0.0 | 20.0 | | | | 35.9 | 46.0 | -10.1 |
| 0.523 | 14.0 | | | 1.8 | 0.0 | 20.0 | | | | 35.8 | 46.0 | -10.2 |
| 0.892 | 15.0 | | | 0.8 | 0.0 | 20.0 | | | | 35.8 | 46.0 | -10.2 |
| 1.365 | 15.3 | | | 0.5 | 0.0 | 20.0 | | | | 35.8 | 46.0 | -10.2 |
| 0.153 | 22.6 | | | 2.9 | 0.0 | 20.0 | | | | 45.5 | 55.9 | -10.4 |
| 0.916 | 14.8 | | | 0.7 | 0.0 | 20.0 | | | | 35.5 | 46.0 | -10.5 |
| 1.305 | 14.8 | | | 0.5 | 0.0 | 20.0 | | | | 35.3 | 46.0 | -10.7 |
| 0.982 | 14.7 | | | 0.5 | 0.0 | 20.0 | | | | 35.2 | 46.0 | -10.8 |
| 0.865 | 14.3 | | | 0.9 | 0.0 | 20.0 | | | | 35.2 | 46.0 | -10.8 |
| 0.955 | 14.2 | | | 0.6 | 0.0 | 20.0 | | | | 34.8 | 46.0 | -11.2 |
| 1.012 | 14.3 | | | 0.5 | 0.0 | 20.0 | | | | 34.8 | 46.0 | -11.2 |
| 1.515 | 14.0 | | | 0.5 | 0.0 | 20.0 | | | | 34.5 | 46.0 | -11.5 |
| 0.837 | 13.5 | | | 1.0 | 0.0 | 20.0 | | | | 34.5 | 46.0 | -11.5 |
| 0.615 | 12.8 | | | 1.6 | 0.0 | 20.0 | | | | 34.4 | 46.0 | -11.6 |

NORTHWEST
**EMC**

# AC POWERLINE CONDUCTED EMISSIONS

ACQ-2006.04.25
EMI 2005.9.18

| | | | | | |
|---|---|---|---|---|---|
| **EUT:** | Cirronet FHSS (2.4GHZ Radio) | | | **Work Order:** | TRPO0015 |
| **Serial Number:** | Unknown | | | **Date:** | 05/08/06 |
| **Customer:** | Tripod Data Systems, Inc. | | | **Temperature:** | 25 |
| **Attendees:** | None | | | **Humidity:** | 32% |
| **Project:** | None | | | **Barometric Pres.:** | 30.15 |
| **Tested by:** | David Divergigelis | **Power:** | 120VAC/60Hz | **Job Site:** | EV07 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 15.207 AC Powerline Conducted Emissions: 2005-9 | ANSI C63.4:2003 |

**TEST PARAMETERS**

| | |
|---|---|
| **Cable or Line Tested** | N |

**COMMENTS**

Cirronet Radio transmitting.

**EUT OPERATING MODES**

low channel

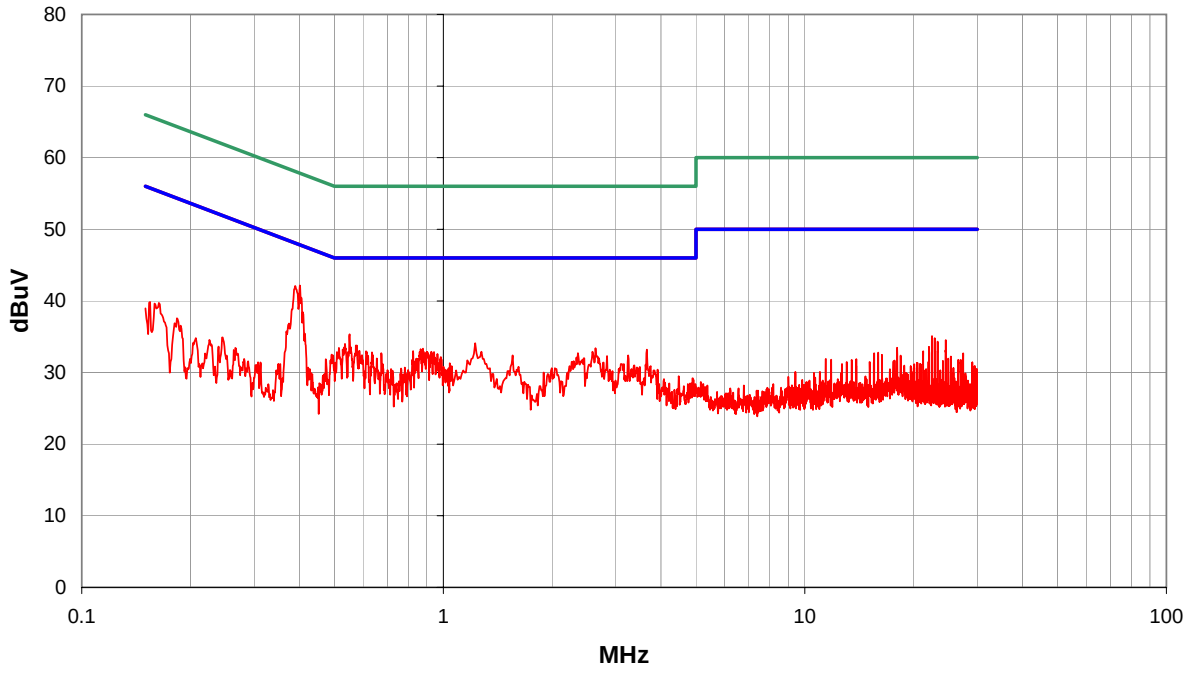
**DEVIATIONS FROM TEST STANDARD**

No deviations.

| | |
|---|---|
| **Run #** | 2 |
| **Configuration #** | 1 |
| **Results** | Pass |

NVLAP Lab Code 200630-0

*Signature* David DiVergigelis




| Freq (MHz) | Amplitude (dBuV) | | | Transducer (dB) | Cable (dB) | External Attenuation (dB) | | Detector (blank equal peaks [PK] from scan) | | Adjusted dBuV | Spec. Limit dBuV | Compared to Spec. (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.401 | 20.0 | | | 2.2 | 0.0 | 20.0 | | | | 42.2 | 47.8 | -5.7 |
| 0.389 | 19.9 | | | 2.2 | 0.0 | 20.0 | | | | 42.1 | 48.1 | -6.0 |
| 0.550 | 13.6 | | | 1.7 | 0.0 | 20.0 | | | | 35.3 | 46.0 | -10.7 |
| 1.225 | 13.6 | | | 0.5 | 0.0 | 20.0 | | | | 34.1 | 46.0 | -11.9 |
| 0.534 | 12.2 | | | 1.8 | 0.0 | 20.0 | | | | 34.0 | 46.0 | -12.0 |
| 0.573 | 12.1 | | | 1.7 | 0.0 | 20.0 | | | | 33.8 | 46.0 | -12.2 |
| 0.514 | 11.6 | | | 1.8 | 0.0 | 20.0 | | | | 33.4 | 46.0 | -12.6 |
| 2.636 | 12.9 | | | 0.5 | 0.0 | 20.0 | | | | 33.4 | 46.0 | -12.6 |
| 0.878 | 12.5 | | | 0.8 | 0.0 | 20.0 | | | | 33.3 | 46.0 | -12.7 |
| 0.865 | 12.4 | | | 0.9 | 0.0 | 20.0 | | | | 33.3 | 46.0 | -12.7 |
| 3.656 | 12.7 | | | 0.5 | 0.0 | 20.0 | | | | 33.2 | 46.0 | -12.8 |
| 0.586 | 11.4 | | | 1.7 | 0.0 | 20.0 | | | | 33.1 | 46.0 | -12.9 |
| 0.825 | 12.0 | | | 1.0 | 0.0 | 20.0 | | | | 33.0 | 46.0 | -13.0 |
| 0.612 | 11.4 | | | 1.6 | 0.0 | 20.0 | | | | 33.0 | 46.0 | -13.0 |
| 0.927 | 12.2 | | | 0.7 | 0.0 | 20.0 | | | | 32.9 | 46.0 | -13.1 |
| 0.901 | 12.1 | | | 0.8 | 0.0 | 20.0 | | | | 32.9 | 46.0 | -13.1 |
| 0.943 | 12.2 | | | 0.7 | 0.0 | 20.0 | | | | 32.9 | 46.0 | -13.1 |
| 0.635 | 11.3 | | | 1.5 | 0.0 | 20.0 | | | | 32.8 | 46.0 | -13.2 |
| 0.674 | 11.3 | | | 1.4 | 0.0 | 20.0 | | | | 32.7 | 46.0 | -13.3 |

NORTHWEST EMC

# AC POWERLINE CONDUCTED EMISSIONS

ACQ-2006.04.25
EMI 2005.9.18

| | | | | | |
|---|---|---|---|---|---|
| EUT: | Cirronet FHSS (2.4GHZ Radio) | | | Work Order: | TRPO0015 |
| Serial Number: | Unknown | | | Date: | 05/08/06 |
| Customer: | Tripod Data Systems, Inc. | | | Temperature: | 25 |
| Attendees: | None | | | Humidity: | 32% |
| Project: | None | | | Barometric Pres.: | 30.15 |
| Tested by: | David Divergigelis | Power: | 120VAC/60Hz | Job Site: | EV07 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 15.207 AC Powerline Conducted Emissions: 2005-9 | ANSI C63.4:2003 |

| TEST PARAMETERS | |
|---|---|
| Cable or Line Tested | N |

**COMMENTS**

Cirronet Radio transmitting.

**EUT OPERATING MODES**

mid channel

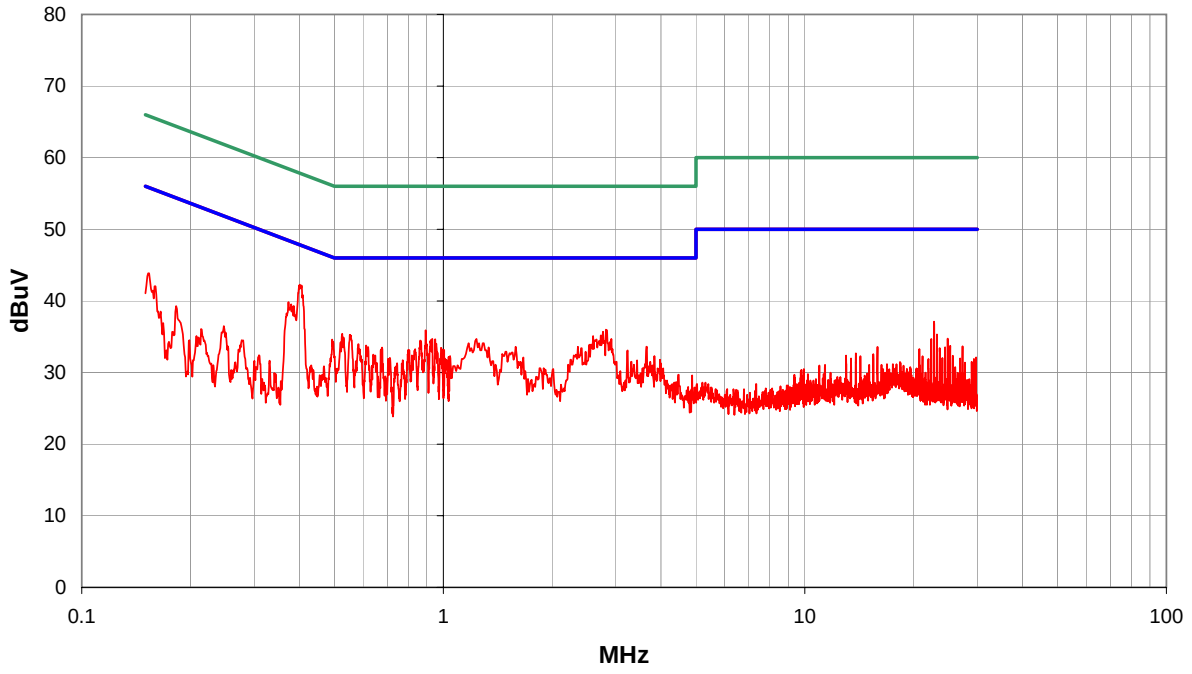
**DEVIATIONS FROM TEST STANDARD**

No deviations.

| | |
|---|---|
| Run # | 3 |
| Configuration # | 1 |
| Results | Pass |

NVLAP Lab Code 200630-0

*Signature* David DiVergigelis




| Freq (MHz) | Amplitude (dBuV) | | | Transducer (dB) | Cable (dB) | External Attenuation (dB) | | Detector (blank equal peaks [PK] from scan) | | Adjusted dBuV | Spec. Limit dBuV | Compared to Spec. (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.401 | 20.1 | | | 2.2 | 0.0 | 20.0 | | | | 42.3 | 47.8 | -5.6 |
| 0.373 | 17.6 | | | 2.2 | 0.0 | 20.0 | | | | 39.8 | 48.4 | -8.6 |
| 2.816 | 15.5 | | | 0.5 | 0.0 | 20.0 | | | | 36.0 | 46.0 | -10.0 |
| 0.893 | 15.1 | | | 0.8 | 0.0 | 20.0 | | | | 35.9 | 46.0 | -10.1 |
| 2.766 | 15.2 | | | 0.5 | 0.0 | 20.0 | | | | 35.7 | 46.0 | -10.3 |
| 0.525 | 13.6 | | | 1.8 | 0.0 | 20.0 | | | | 35.4 | 46.0 | -10.6 |
| 0.551 | 13.5 | | | 1.7 | 0.0 | 20.0 | | | | 35.2 | 46.0 | -10.8 |
| 1.235 | 14.2 | | | 0.5 | 0.0 | 20.0 | | | | 34.7 | 46.0 | -11.3 |
| 0.931 | 14.0 | | | 0.7 | 0.0 | 20.0 | | | | 34.7 | 46.0 | -11.3 |
| 0.950 | 14.0 | | | 0.6 | 0.0 | 20.0 | | | | 34.6 | 46.0 | -11.4 |
| 0.493 | 12.7 | | | 1.9 | 0.0 | 20.0 | | | | 34.6 | 46.1 | -11.5 |
| 0.864 | 13.6 | | | 0.9 | 0.0 | 20.0 | | | | 34.5 | 46.0 | -11.5 |
| 0.153 | 21.0 | | | 2.9 | 0.0 | 20.0 | | | | 43.9 | 55.9 | -12.0 |
| 0.582 | 12.3 | | | 1.7 | 0.0 | 20.0 | | | | 34.0 | 46.0 | -12.0 |
| 0.612 | 12.2 | | | 1.6 | 0.0 | 20.0 | | | | 33.8 | 46.0 | -12.2 |
| 1.585 | 13.1 | | | 0.5 | 0.0 | 20.0 | | | | 33.6 | 46.0 | -12.4 |
| 2.356 | 13.1 | | | 0.5 | 0.0 | 20.0 | | | | 33.6 | 46.0 | -12.4 |
| 3.646 | 13.1 | | | 0.5 | 0.0 | 20.0 | | | | 33.6 | 46.0 | -12.4 |
| 0.677 | 12.1 | | | 1.4 | 0.0 | 20.0 | | | | 33.5 | 46.0 | -12.5 |

NORTHWEST
**EMC**

# AC POWERLINE CONDUCTED EMISSIONS

ACQ-2006.04.25
EMI 2005.9.18

| | | | | | |
|---|---|---|---|---|---|
| **EUT:** | Cirronet FHSS (2.4GHZ Radio) | | | **Work Order:** | TRPO0015 |
| **Serial Number:** | Unknown | | | **Date:** | 05/08/06 |
| **Customer:** | Tripod Data Systems, Inc. | | | **Temperature:** | 25 |
| **Attendees:** | None | | | **Humidity:** | 32% |
| **Project:** | None | | | **Barometric Pres.:** | 30.15 |
| **Tested by:** | David Divergigelis | **Power:** | 120VAC/60Hz | **Job Site:** | EV07 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 15.207 AC Powerline Conducted Emissions: 2005-9 | ANSI C63.4:2003 |

**TEST PARAMETERS**

| | |
|---|---|
| **Cable or Line Tested** | L1 |

**COMMENTS**

Cirronet Radio transmitting.

**EUT OPERATING MODES**

mid channel

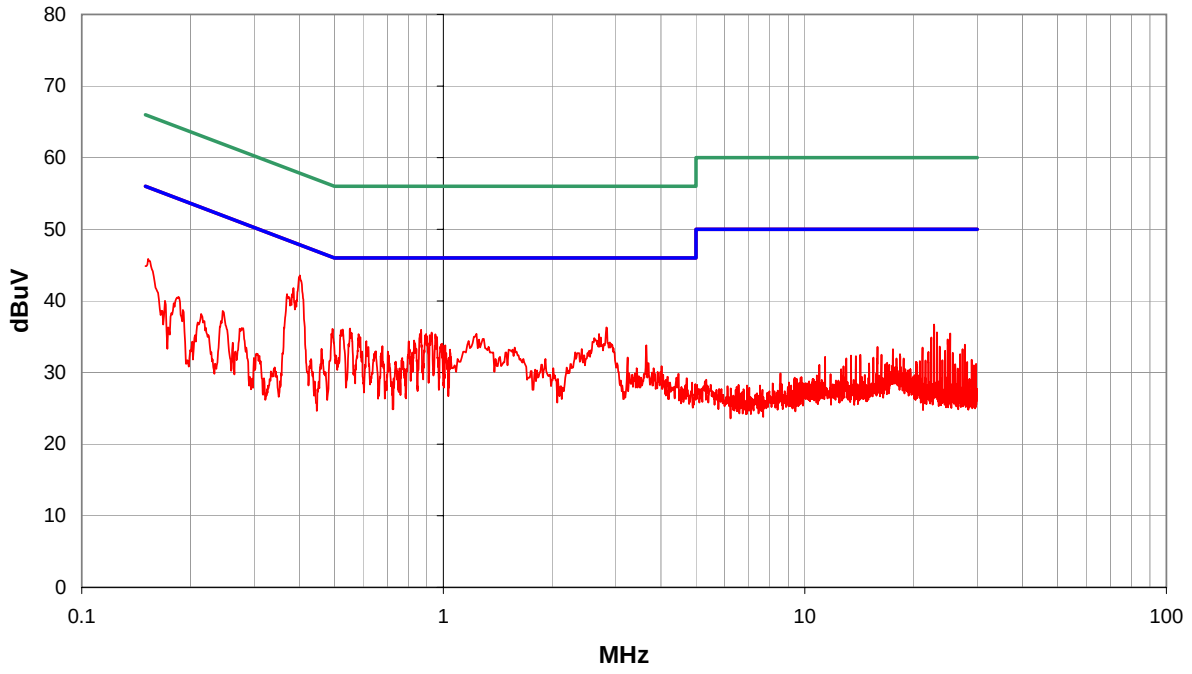
**DEVIATIONS FROM TEST STANDARD**

No deviations.

| | |
|---|---|
| **Run #** | 4 |
| **Configuration #** | 1 |
| **Results** | Pass |

NVLAP Lab Code 200630-0

*Signature* David DiVergigelis




| Freq (MHz) | Amplitude (dBuV) | | | Transducer (dB) | Cable (dB) | External Attenuation (dB) | | Detector (blank equal peaks [PK] from scan) | | Adjusted dBuV | Spec. Limit dBuV | Compared to Spec. (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.401 | 21.4 | | | 2.2 | 0.0 | 20.0 | | | | 43.6 | 47.8 | -4.3 |
| 0.385 | 19.6 | | | 2.2 | 0.0 | 20.0 | | | | 41.8 | 48.2 | -6.4 |
| 2.826 | 15.8 | | | 0.5 | 0.0 | 20.0 | | | | 36.3 | 46.0 | -9.7 |
| 0.552 | 14.4 | | | 1.7 | 0.0 | 20.0 | | | | 36.1 | 46.0 | -9.9 |
| 0.527 | 14.2 | | | 1.8 | 0.0 | 20.0 | | | | 36.0 | 46.0 | -10.0 |
| 0.494 | 14.2 | | | 1.9 | 0.0 | 20.0 | | | | 36.1 | 46.1 | -10.0 |
| 0.153 | 23.0 | | | 2.9 | 0.0 | 20.0 | | | | 45.9 | 55.9 | -10.0 |
| 0.868 | 15.1 | | | 0.9 | 0.0 | 20.0 | | | | 36.0 | 46.0 | -10.0 |
| 0.928 | 14.9 | | | 0.7 | 0.0 | 20.0 | | | | 35.6 | 46.0 | -10.4 |
| 1.235 | 14.9 | | | 0.5 | 0.0 | 20.0 | | | | 35.4 | 46.0 | -10.6 |
| 2.696 | 14.9 | | | 0.5 | 0.0 | 20.0 | | | | 35.4 | 46.0 | -10.6 |
| 0.896 | 14.6 | | | 0.8 | 0.0 | 20.0 | | | | 35.4 | 46.0 | -10.6 |
| 0.583 | 13.7 | | | 1.7 | 0.0 | 20.0 | | | | 35.4 | 46.0 | -10.6 |
| 0.951 | 14.7 | | | 0.6 | 0.0 | 20.0 | | | | 35.3 | 46.0 | -10.7 |
| 0.830 | 13.5 | | | 1.0 | 0.0 | 20.0 | | | | 34.5 | 46.0 | -11.5 |
| 0.613 | 12.8 | | | 1.6 | 0.0 | 20.0 | | | | 34.4 | 46.0 | -11.6 |
| 0.802 | 13.3 | | | 1.0 | 0.0 | 20.0 | | | | 34.3 | 46.0 | -11.7 |
| 0.992 | 13.5 | | | 0.5 | 0.0 | 20.0 | | | | 34.0 | 46.0 | -12.0 |
| 1.012 | 13.3 | | | 0.5 | 0.0 | 20.0 | | | | 33.8 | 46.0 | -12.2 |

NORTHWEST EMC

# AC POWERLINE CONDUCTED EMISSIONS

ACQ-2006.04.25
EMI 2005.9.18

| | | | | | |
|---|---|---|---|---|---|
| EUT: | Cirronet FHSS (2.4GHZ Radio) | | | Work Order: | TRPO0015 |
| Serial Number: | Unknown | | | Date: | 05/08/06 |
| Customer: | Tripod Data Systems, Inc. | | | Temperature: | 25 |
| Attendees: | None | | | Humidity: | 32% |
| Project: | None | | | Barometric Pres.: | 30.15 |
| Tested by: | David Divergigelis | Power: | 120VAC/60Hz | Job Site: | EV07 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 15.207 AC Powerline Conducted Emissions: 2005-9 | ANSI C63.4:2003 |

| TEST PARAMETERS | |
|---|---|
| Cable or Line Tested | L1 |

**COMMENTS**

Cirronet Radio transmitting.

**EUT OPERATING MODES**

high channel

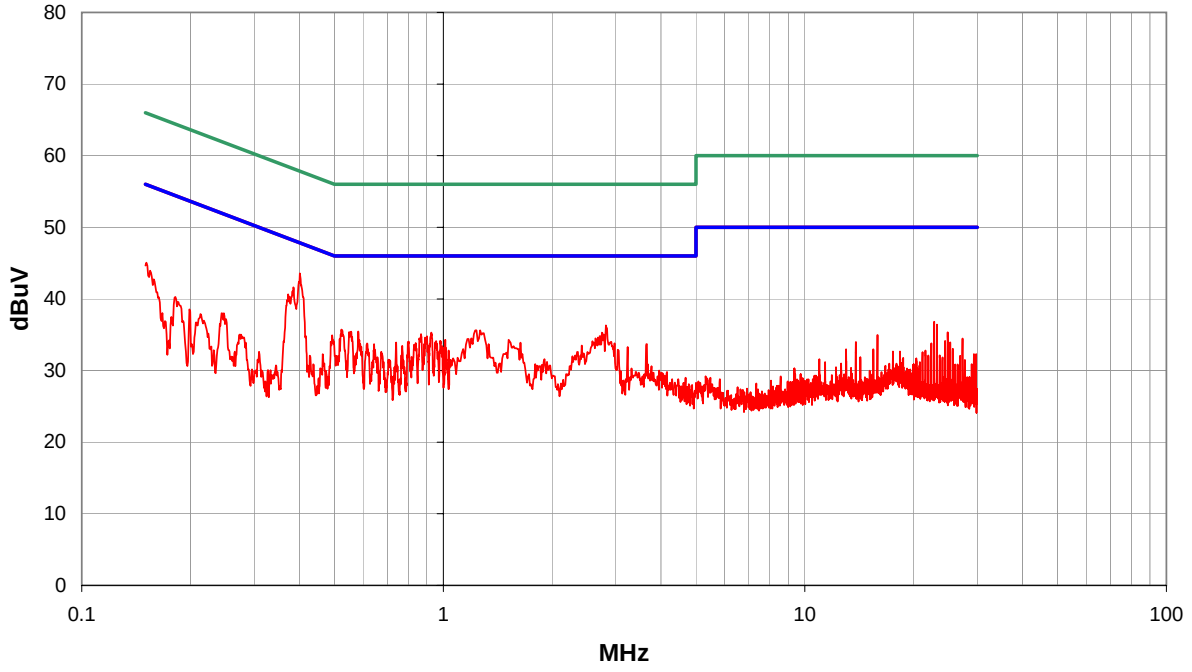
**DEVIATIONS FROM TEST STANDARD**

No deviations.

| | |
|---|---|
| Run # | 5 |
| Configuration # | 1 |
| Results | Pass |

NVLAP Lab Code 200630-0

*Signature* David DiVergigelis




| Freq (MHz) | Amplitude (dBuV) | | | Transducer (dB) | Cable (dB) | External Attenuation (dB) | | Detector (blank equal peaks [PK] from scan) | | Adjusted dBuV | Spec. Limit dBuV | Compared to Spec. (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.401 | 21.4 | | | 2.2 | 0.0 | 20.0 | | | | 43.6 | 47.8 | -4.3 |
| 0.385 | 19.4 | | | 2.2 | 0.0 | 20.0 | | | | 41.6 | 48.2 | -6.6 |
| 2.816 | 15.8 | | | 0.5 | 0.0 | 20.0 | | | | 36.3 | 46.0 | -9.7 |
| 0.523 | 13.9 | | | 1.8 | 0.0 | 20.0 | | | | 35.7 | 46.0 | -10.3 |
| 1.225 | 15.1 | | | 0.5 | 0.0 | 20.0 | | | | 35.6 | 46.0 | -10.4 |
| 0.582 | 13.8 | | | 1.7 | 0.0 | 20.0 | | | | 35.5 | 46.0 | -10.5 |
| 0.556 | 13.7 | | | 1.7 | 0.0 | 20.0 | | | | 35.4 | 46.0 | -10.6 |
| 0.927 | 14.6 | | | 0.7 | 0.0 | 20.0 | | | | 35.3 | 46.0 | -10.7 |
| 2.746 | 14.8 | | | 0.5 | 0.0 | 20.0 | | | | 35.3 | 46.0 | -10.7 |
| 0.151 | 22.2 | | | 2.9 | 0.0 | 20.0 | | | | 45.1 | 56.0 | -10.9 |
| 0.867 | 14.2 | | | 0.9 | 0.0 | 20.0 | | | | 35.1 | 46.0 | -10.9 |
| 0.493 | 13.0 | | | 1.9 | 0.0 | 20.0 | | | | 34.9 | 46.1 | -11.2 |
| 0.901 | 14.0 | | | 0.8 | 0.0 | 20.0 | | | | 34.8 | 46.0 | -11.2 |
| 1.012 | 13.8 | | | 0.5 | 0.0 | 20.0 | | | | 34.3 | 46.0 | -11.7 |
| 1.515 | 13.8 | | | 0.5 | 0.0 | 20.0 | | | | 34.3 | 46.0 | -11.7 |
| 0.981 | 13.6 | | | 0.6 | 0.0 | 20.0 | | | | 34.2 | 46.0 | -11.8 |
| 0.955 | 13.5 | | | 0.6 | 0.0 | 20.0 | | | | 34.1 | 46.0 | -11.9 |
| 0.802 | 13.0 | | | 1.1 | 0.0 | 20.0 | | | | 34.1 | 46.0 | -11.9 |
| 0.740 | 12.7 | | | 1.2 | 0.0 | 20.0 | | | | 33.9 | 46.0 | -12.1 |

NORTHWEST
**EMC**

# AC POWERLINE CONDUCTED EMISSIONS

ACQ-2006.04.25
EMI 2005.9.18

| | | | | | |
|---|---|---|---|---|---|
| **EUT:** | Cirronet FHSS (2.4GHZ Radio) | | | **Work Order:** | TRPO0015 |
| **Serial Number:** | Unknown | | | **Date:** | 05/08/06 |
| **Customer:** | Tripod Data Systems, Inc. | | | **Temperature:** | 25 |
| **Attendees:** | None | | | **Humidity:** | 32% |
| **Project:** | None | | | **Barometric Pres.:** | 30.15 |
| **Tested by:** | David Divergigelis | **Power:** | 120VAC/60Hz | **Job Site:** | EV07 |

| TEST SPECIFICATIONS | Test Method |
|---|---|
| FCC 15.207 AC Powerline Conducted Emissions: 2005-9 | ANSI C63.4:2003 |

| TEST PARAMETERS | |
|---|---|
| Cable or Line Tested | N |

**COMMENTS**

Cirronet Radio transmitting.

**EUT OPERATING MODES**

high channel

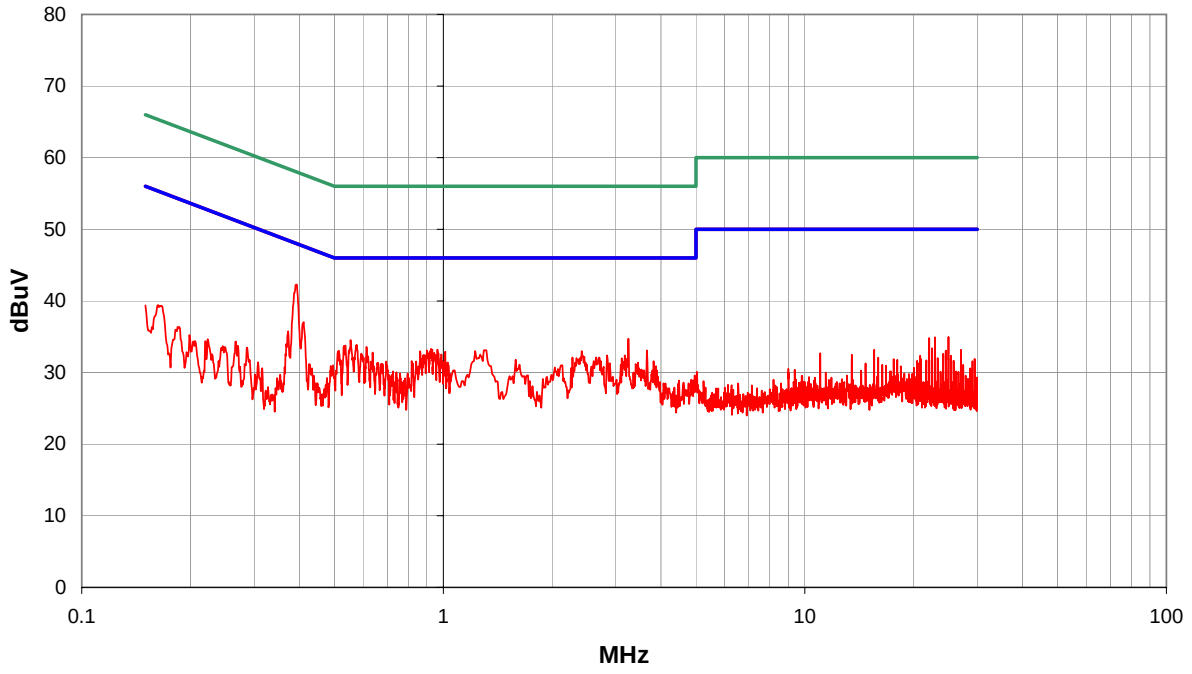
**DEVIATIONS FROM TEST STANDARD**

No deviations.

| | |
|---|---|
| Run # | 6 |
| Configuration # | 1 |
| Results | Pass |

NVLAP Lab Code 200630-0

*Signature* David DiVergigelis




| Freq (MHz) | Amplitude (dBuV) | | | Transducer (dB) | Cable (dB) | External Attenuation (dB) | | Detector (blank equal peaks [PK] from scan) | | Adjusted dBuV | Spec. Limit dBuV | Compared to Spec. (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.393 | 20.1 | | | 2.2 | 0.0 | 20.0 | | | | 42.3 | 48.0 | -5.7 |
| 0.411 | 14.9 | | | 2.1 | 0.0 | 20.0 | | | | 37.0 | 47.6 | -10.6 |
| 3.246 | 14.2 | | | 0.5 | 0.0 | 20.0 | | | | 34.7 | 46.0 | -11.3 |
| 0.554 | 12.8 | | | 1.7 | 0.0 | 20.0 | | | | 34.5 | 46.0 | -11.5 |
| 0.576 | 12.2 | | | 1.7 | 0.0 | 20.0 | | | | 33.9 | 46.0 | -12.1 |
| 0.536 | 12.0 | | | 1.8 | 0.0 | 20.0 | | | | 33.8 | 46.0 | -12.2 |
| 0.613 | 12.0 | | | 1.6 | 0.0 | 20.0 | | | | 33.6 | 46.0 | -12.4 |
| 0.925 | 12.6 | | | 0.7 | 0.0 | 20.0 | | | | 33.3 | 46.0 | -12.7 |
| 0.372 | 13.5 | | | 2.2 | 0.0 | 20.0 | | | | 35.7 | 48.4 | -12.7 |
| 0.964 | 12.6 | | | 0.6 | 0.0 | 20.0 | | | | 33.2 | 46.0 | -12.8 |
| 1.295 | 12.6 | | | 0.5 | 0.0 | 20.0 | | | | 33.1 | 46.0 | -12.9 |
| 3.656 | 12.6 | | | 0.5 | 0.0 | 20.0 | | | | 33.1 | 46.0 | -12.9 |
| 0.901 | 12.3 | | | 0.8 | 0.0 | 20.0 | | | | 33.1 | 46.0 | -12.9 |
| 0.514 | 11.2 | | | 1.8 | 0.0 | 20.0 | | | | 33.0 | 46.0 | -13.0 |
| 2.416 | 12.5 | | | 0.5 | 0.0 | 20.0 | | | | 33.0 | 46.0 | -13.0 |
| 0.863 | 12.1 | | | 0.9 | 0.0 | 20.0 | | | | 33.0 | 46.0 | -13.0 |
| 1.012 | 12.4 | | | 0.5 | 0.0 | 20.0 | | | | 32.9 | 46.0 | -13.1 |
| 0.638 | 11.3 | | | 1.5 | 0.0 | 20.0 | | | | 32.8 | 46.0 | -13.2 |
| 0.944 | 12.1 | | | 0.7 | 0.0 | 20.0 | | | | 32.8 | 46.0 | -13.2 |