# Tripod Data Systems, Inc.

# **USI WM-G-MR-05 in Eagle**

July 03, 2007

Report No. TRPO0034

Report Prepared By



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# **Certificate of Test**

Issue Date: July 03, 2007 Tripod Data Systems, Inc. Model: USI WM-G-MR-05 in Eagle

Emissions						
Test Description	Specification	Test Method	Pass	Fail		
AC Powerline Conducted Emissions	FCC 15.207:2006	ANSI C63.4:2003	$\boxtimes$			
Occupied Bandwidth	FCC 15.247(DTS):2006	ANSI C63.4:2003 KDB No. 558074	$\boxtimes$			
Output Power	FCC 15.247(DTS):2006	ANSI C63.4:2003 KDB No. 558074	$\boxtimes$			
Band Edge Compliance	FCC 15.247(DTS):2006	ANSI C63.4:2003 KDB No. 558074	$\boxtimes$			
Spurious Conducted Emissions	FCC 15.247(DTS):2006	ANSI C63.4:2003 KDB No. 558074	$\boxtimes$			
Power Spectral Density	FCC 15.247(DTS):2006	ANSI C63.4:2003 KDB No. 558074	$\boxtimes$			
Spurious Radiated Emissions	FCC 15.247(DTS):2006	ANSI C63.4:2003 KDB No. 558074	$\boxtimes$			

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:
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Don Facteau, IS Manager

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, and ANSI C63.4. 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.

**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. USA0604C.

**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, C-2687, T-289, and R-2318, Irvine: R-1943, C-2766, and T-298, Sultan: R-871, C-1784, and T-294*).

**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: <u>http://www.nwemc.com/scope.asp</u>





BSMI







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 – EV11

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





Washington – Sultan Facility Labs SU01 – SU07

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



Rev 11/17/06

#### 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:	USI WM-G-MR-05 in Eagle
First Date of Test:	June 5, 2007
Last Date of Test:	June 28, 2007
Receipt Date of Samples:	June 5, 2007
Equipment Design Stage:	Prototype
Equipment Condition:	No Damage

#### Information Provided by the Party Requesting the Test

**Functional Description of the EUT (Equipment Under Test):** The Eagle is a PDA that contains 802.11b/g and Bluetooth radios.

#### **Testing Objective:**

To demonstrate compliance of the 802.11b/g radio to FCC 15.247 requirements.



### **CONFIGURATION 2 TRPO0034**

Software/Firmware Running during test			
Description	Version		
USI LabTool (Black Su)	Unknown		

EUT					
Description	Manufacturer	Model/Part Number	Serial Number		
Host PDA	Tripod Data Systems, Inc.	Eagle LP3	ETL3A00343		
EUT - 802.11 Radio	USI	WM-G-MR-05	Unknown		

Remote Equipment Outside of Test Setup Boundary				
Description Manufacturer Model/Part Number Serial Number				
AC Adapter	Cincon Electronics Co., LTD.	TR30R050	None	

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
DC Lead	PA	1.8m	Yes	Host PDA	AC Mains
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

## **CONFIGURATION 3 TRPO0034**

Software/Firmware Running during test			
Description	Version		
USI LabTool (Black Su)	Unknown		

EUT				
Description	Manufacturer	Model/Part Number	Serial Number	
EUT - 802.11 Radio	USI	WM-G-MR-05	Unknown	
Host PDA	Tripod Data Systems, Inc.	Eagle LP3	ETL4A00444	

Peripherals in test setup boundary				
Description Manufacturer Model/Part Number Serial Number				
AC Adapter	Cincon Electronics Co., LTD.	TR30R050	None	

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
DC Lead	PA	1.8m	Yes	Host PDA	AC Mains
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					



# Modifications

	Equipment modifications							
Item	Date	Test	Modification	Note	Disposition of EUT			
		Output	Tested as	No EMI suppression	EUT remained at			
1	6/5/2007	Power	delivered to	devices were added or	Northwest EMC			
		rower	Test Station.	modified during this test.	following the test.			
		Power	Tested as	No EMI suppression	EUT remained at			
2	6/5/2007	Spectral	delivered to	devices were added or	Northwest EMC			
		Density	Test Station.	modified during this test.	following the test.			
		Occupied	Tested as	No EMI suppression	EUT remained at			
3	3 6/5/2007	Bandwidth	delivered to	devices were added or	Northwest EMC			
			Test Station.	modified during this test.	following the test.			
		Rand Edgo	Tested as	No EMI suppression	EUT remained at			
4	6/6/2007		delivered to	devices were added or	Northwest EMC			
		Compliance	Test Station.	modified during this test.	following the test.			
		Spurious	Tested as	No EMI suppression	EUT remained at			
5	6/6/2007	007 Conducted	delivered to	devices were added or	Northwest EMC			
		Emissions	Test Station.	modified during this test.	following the test.			
		Spurious	Tested as	No EMI suppression	EUT remained at			
6	6/25/2007	Radiated	delivered to	devices were added or	Northwest EMC			
		Emissions	Test Station.	modified during this test.	following the test.			
7	6/28/2007	AC Powerline Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.			

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.

TEST EQUIPMENT								
Description	Manufacturer	Model	ID	Last Cal.	Interval			
Spectrum Analyzer	Agilent	E4407B	AAU	12/8/2006	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 occupied bandwidth was measured with the EUT set to low, medium, and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at multiple data rates.

NORTHWEST			>	(Mit 2006.08.2
EMC		Occupied Bandwidth		
EUT:IU	JSI WM-G-MR-05 in Eagle	Work Order: T	RPO0034	
Serial Number:	None	Date: 0	6/05/07	
Customer: 1	ripod Data Systems, Inc.	Temperature: 2	4°C	
Attendees:	None	Humidity: 3	51%	
Project: N	lone	Barometric Pres.: 2	9.81	
Tested by: H	lolly Ashkannejhad	Power: 120VAC/60Hz Job Site: E	V06	
EST SPECIFICATIC	INS	Test Method		
CC 15.247(DTS):20	06	ANSI C63.4:2003, KDB No. 558074		
OMMENTS				
EVIATIONS FROM	TEST STANDARD			
		i i i i		
Configuration #	2	11 les Julinghi		
		Signature How J		
		Value	Limit	Results
02.11(b), 1Mbps				_
L	LOW	10.078 MHz	> 500 kHz	Pass
N	Aid	10.102 MHz	> 500 kHz	Pass
F	ligh	10.114 MHz	> 500  kHz	Pass
J2.11(b), 11Mbps				
L		40.050 MU-	500 141-	Deee
	-OW	10.350 MHz	> 500 kHz	Pass
N	-ow Mid	10.350 MHz 11.030 MHz	> 500 kHz > 500 kHz	Pass Pass
N H	-ow ⁄lid High	10.350 MHz 11.030 MHz 10.362 MHz	> 500 kHz > 500 kHz > 500 kHz > 500 kHz	Pass Pass Pass
N F D2.11(g), 6Mbps	Low Vid High	10.350 MHz 11.030 MHz 10.362 MHz	> 500 kHz > 500 kHz > 500 kHz	Pass Pass Pass
N F D2.11(g), 6Mbps L	.ow Vid High .ow	10.350 MHz 11.030 MHz 10.362 MHz 16.571 Mhz	> 500 kHz > 500 kHz > 500 kHz > 500 kHz	Pass Pass Pass Pass
N F D2.11(g), 6Mbps L N	ow Vid High .ow Aid	10.350 MHz 11.030 MHz 10.362 MHz 16.571 Mhz 16.571 MHz 16.571 MHz	<ul> <li>&gt; 500 kHz</li> </ul>	Pass Pass Pass Pass Pass
N D2.11(g), 6Mbps L N F	.ow Vid High .ow Aid High	10.350 MHz 11.030 MHz 10.362 MHz 16.571 Mhz 16.571 MHz 16.575 MHz	<ul> <li>&gt; 500 kHz</li> </ul>	Pass Pass Pass Pass Pass Pass Pass
M F 02.11(g), 6Mbps L N F 02.11(g), 36Mbps	.ow Vid High .ow Jid High	10.350 MHz 11.030 MHz 10.362 MHz 16.571 Mhz 16.571 MHz 16.575 MHz	<ul> <li>&gt; 500 kHz</li> </ul>	Pass Pass Pass Pass Pass Pass
N D2.11(g), 6Mbps L N D2.11(g), 36Mbps L	.ow Hid High Jow Hid High	10.350 MHz 11.030 MHz 10.362 MHz 16.571 Mhz 16.571 MHz 16.575 MHz 16.575 MHz	> 500 kHz > 500 kHz > 500 kHz > 500 kHz > 500 kHz > 500 kHz > 500 kHz	Pass Pass Pass Pass Pass Pass
N )2.11(g), 6Mbps N N )2.11(g), 36Mbps N N N	ow Vid High ow Vid High ow Aid	10.350 MHz 11.030 MHz 10.362 MHz 16.571 Mhz 16.571 MHz 16.575 MHz 16.575 MHz 16.547 MHz 16.547 MHz 16.547 MHz	<ul> <li>&gt; 500 kHz</li> </ul>	Pass Pass Pass Pass Pass Pass Pass
N D2.11(g), 6Mbps L D2.11(g), 36Mbps L D2.11(g), 36Mbps L H H H H	.ow Vid -ow Vid tigh -ow Aid tigh	10.350 MHz 11.030 MHz 10.362 MHz 16.571 Mhz 16.571 MHz 16.575 MHz 16.575 MHz 16.547 MHz 16.547 MHz 16.543 MHz	<ul> <li>&gt; 500 kHz</li> </ul>	Pass Pass Pass Pass Pass Pass Pass Pass
N D2.11(g), 6Mbps L D2.11(g), 36Mbps L D2.11(g), 36Mbps L D2.11(g), 54Mbps	Low Vid High Low Vid High Low Vid High	10.350 MHz 11.030 MHz 10.362 MHz 16.571 Mhz 16.571 MHz 16.575 MHz 16.547 MHz 16.547 MHz 16.543 MHz	<ul> <li>&gt; 500 kHz</li> </ul>	Pass Pass Pass Pass Pass Pass Pass Pass
N D2.11(g), 6Mbps L D2.11(g), 36Mbps L D2.11(g), 36Mbps L D2.11(g), 54Mbps L	ow Vid High Low Vid High Low Vid High	10.350 MHz 11.030 MHz 10.362 MHz 16.571 MHz 16.575 MHz 16.575 MHz 16.577 MHz 16.571 MHz 16.573 MHz 16.543 MHz 16.548 MHz	<ul> <li>&gt; 500 kHz</li> </ul>	Pass Pass Pass Pass Pass Pass Pass Pass
02.11(g), 6Mbps 02.11(g), 36Mbps 02.11(g), 36Mbps 02.11(g), 54Mbps 02.11(g), 54Mbps	Low Vid Ligh Jow Vid Ligh Jigh Jigh Jow Aid	10.350 MHz 11.030 MHz 10.362 MHz 16.571 Mhz 16.571 MHz 16.575 MHz 16.575 MHz 16.547 MHz 16.543 MHz 16.543 MHz 16.543 MHz	<ul> <li>&gt; 500 kHz</li> </ul>	Pass Pass Pass Pass Pass Pass Pass Pass

Result

### **Occupied Bandwidth**

	802.11(b), 1Mbps, Low	
Result: Pass	Value: 10.078 MHz	Limit: > 500 kHz



802.11(b), 1Mbps, Mid					
: Pass	Value: 10.102 MHz	Limit: > 500 kHz			



Result:

### **Occupied Bandwidth**

	802.1	1(b), 1Mbps, High		
Result: Pass	Value:	10.114 MHz	Limit:	> 500 kHz



802.11(b), 11Mbps, Low					
Pass	Value: 10.350 MHz	<b>Limit:</b> > 500 kHz			



Result:

### **Occupied Bandwidth**

		802.11	(b), 11Mbps, Mid		
Result:	Pass	Value:	11.030 MHz	Limit:	> 500 kHz



	802.11(b), 11Mbps, High	
Pass	Value: 10.362 MHz	Limit: > 500 kHz



Result:

### **Occupied Bandwidth**

		802.1	1(g), 6Mbps, Low		
Result:	Pass	Value:	16.571 Mhz	Limit:	> 500 kHz



802.11(g), 6Mbps, Mid					
Pass	Value:	16.571 MHz	Limit:	> 500 kHz	



### **Occupied Bandwidth**

	802.1	I1(g), 6Mbps, High		
Result: Pa	ss Value:	16.575 MHz	Limit:	> 500 kHz



802.11(g), 36Mbps, Low						
Result: Pass	Value:	16.547 MHz Limit:	> 500 kHz			



Res

### **Occupied Bandwidth**

802.11(g), 36Mbps, Mid						
Result: Pass	Value: 16.571 MHz	Limit: > 500 kHz				



	802.1 <i>°</i>	1(g), 36Mbps, High		
ult: Pass	Value:	16.543 MHz	Limit:	> 500 kHz



## **Occupied Bandwidth**

802.11(g), 54Mbps, Low						
Result:	Pass	Value:	16.546 MHz	Limit:	> 500 kHz	



802.11(g), 54Mbps, Mid						
Result:	Pass	Value:	16.535 MHz	Limit:	> 500 kHz	



# **Occupied Bandwidth**

Result: Pass Value: 16.531 MHz Limit: > 500 kHz		802.1 <sup>-</sup>	1(g), 54Mbps, High		
	Result: Pass	Value:	16.531 MHz	Limit:	> 500 kHz





# Occupied Bandwidth



# **Output Power**

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.

TEST EQUIPMENT					
Description	Manufacturer	Model	ID	Last Cal.	Interval
RF Detector	RLC Electronics	CR-133-R	ZZA	NCR	0
Signal Generator	Hewlett-Packard	8648D	TGC	12/7/2006	13
Power Sensor	Gigatronics	80701A	SPL	9/19/2006	12
Power Meter	Gigatronics	8651A	SPM	9/19/2006	12
Oscilloscope	Tektronix	2465B	TOA	NCR	0

#### 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 peak output power was measured with the EUT set to low, medium, and high transmit frequencies. The EUT was transmitting at its maximum output power. The data rate of the radio was varied to determine the level that produced the highest output power.

The measurement was made using a direct connection between the RF output of the EUT and a RF detector diode. The DC output of the diode was measured with the oscilloscope. The signal generator, tuned to the transmit frequency, was then substituted for the EUT. The CW output of the signal generator was adjusted until the DC output of the RF detector diode match the peak level produced when connected to the EUT. To further reduce measurement error, the power meter and sensor were then used to measure the output power level of the signal generator.

De Facto EIRP Limit: Per 47 CFR 15.247 (b)(1-3), the EUT meets the de facto EIRP limit of +36dBm.

NORTHWEST					XMit 2006.08.24
EMC		Output Power			
EUT:	USI WM-G-MR-05 in Eagle		Work Order:	TRP00034	
Serial Number:	UNKNOWN		Date:	00/05/07	
Attendees	Nono		remperature:	24 0	
Attendees:	None		Barometria Bros	30%	
Tostod by	Holly Ashkannaihad	Bowers 120VAC/60Hz	Barometric Fres.	29.91	
TEST SPECIEICAT		Fower: 120VAC/00H2	Job Site.	EVUO	
FCC 15 247(DTS):2	006	ANSLC63 4:2003 KDB N	6 558074		
FCC 15.247(D15).2	008	ANSI 605.4.2003, NDB N	0. 556074		
COMMENTS					
COMMENTS					
DEVIATIONS ERON	A TEST STANDARD				
DEVIATIONSTROM	I TEST STANDARD				
Configuration #	2	11 0. A here has			
ooningaration "					
<u> </u>		Signature Hory			
		Signature Hory Jo-			
		Signature How Jose P	Value	Limit	Results
802 11(b) 1Mbps	I	Signature Hory Joseph P	Value	Limit	Results
802.11(b), 1Mbps	Low	Signature How Joseph P	Value 21.88 mW	Limit	Results
802.11(b), 1Mbps	Low	Signature How Joseph	<b>Value</b> 21.88 mW 21.73 mW	Limit 1 Watt 1 Watt	Results Pass Pass
802.11(b), 1Mbps	Low Mid High	Signature How Joseph	Value 21.88 mW 21.73 mW 22.91 mW	Limit 1 Watt 1 Watt 1 Watt	Results Pass Pass Pass Pass
802.11(b), 1Mbps 802.11(b), 11Mbps	Low Mid High	Signature How Joseph	<b>Value</b> 21.88 mW 21.73 mW 22.91 mW	Limit 1 Watt 1 Watt 1 Watt	Results Pass Pass Pass
802.11(b), 1Mbps 802.11(b), 11Mbps	Low Mid High Low	Signature How Joseph P	Value 21.88 mW 21.73 mW 22.91 mW 21.43 mW	Limit 1 Watt 1 Watt 1 Watt 1 Watt	Results Pass Pass Pass Pass
802.11(b), 1Mbps 802.11(b), 11Mbps	Low Mid High Low Mid	Signature How Joseph P	Value 21.88 mW 21.73 mW 22.91 mW 21.43 mW 21.73 mW	Limit 1 Watt 1 Watt 1 Watt 1 Watt 1 Watt	Results Pass Pass Pass Pass Pass
802.11(b), 1Mbps 802.11(b), 11Mbps	Low Mid High Low Mid High	Signature How Joseph	Value 21.88 mW 21.73 mW 22.91 mW 21.43 mW 21.73 mW 23.39 mW	Limit 1 Watt 1 Watt 1 Watt 1 Watt 1 Watt 1 Watt	Results Pass Pass Pass Pass Pass Pass
802.11(b), 1Mbps 802.11(b), 11Mbps 802.11(g), 6Mbps	Low Mid High Low Mid High	Signature How Jos P	Value           21.88 mW           21.73 mW           22.91 mW           21.43 mW           21.73 mW           23.39 mW	Limit 1 Watt 1 Watt 1 Watt 1 Watt 1 Watt 1 Watt	Results Pass Pass Pass Pass Pass Pass
802.11(b), 1Mbps 802.11(b), 11Mbps 802.11(g), 6Mbps	Low Mid High Low Mid High Low	Signature How Joseph P	Value           21.88 mW           21.73 mW           22.91 mW           21.43 mW           21.73 mW           23.39 mW           32.06 mW	Limit 1 Watt 1 Watt 1 Watt 1 Watt 1 Watt 1 Watt 1 Watt 1 Watt	Results Pass Pass Pass Pass Pass Pass Pass Pa
802.11(b), 1Mbps 802.11(b), 11Mbps 802.11(g), 6Mbps	Low Mid High Low Mid High Low Mid	Signature How Joseph P	Value 21.88 mW 21.73 mW 22.91 mW 21.73 mW 21.73 mW 23.39 mW 32.06 mW 35.56 mW	Limit 1 Watt 1 Watt 1 Watt 1 Watt 1 Watt 1 Watt 1 Watt 1 Watt	Results Pass Pass Pass Pass Pass Pass Pass Pa
802.11(b), 1Mbps 802.11(b), 11Mbps 802.11(g), 6Mbps	Low Mid High Low Mid High	Signature How Joseph	Value 21.88 mW 21.73 mW 22.91 mW 21.73 mW 21.73 mW 23.39 mW 35.56 mW 38.73 mW	Limit 1 Watt 1 Watt 1 Watt 1 Watt 1 Watt 1 Watt 1 Watt 1 Watt 1 Watt 1 Watt	Results Pass Pass Pass Pass Pass Pass Pass Pa
802.11(b), 1Mbps 802.11(b), 11Mbps 802.11(g), 6Mbps 802.11(g), 36Mbps	Low Mid High Low Mid High Low Mid High	Signature How Jos P	Value           21.88 mW           21.73 mW           22.91 mW           21.43 mW           21.73 mW           23.39 mW           32.06 mW           35.56 mW           38.73 mW	Limit           1 Watt	Results Pass Pass Pass Pass Pass Pass Pass Pa
802.11(b), 1Mbps 802.11(b), 11Mbps 802.11(g), 6Mbps 802.11(g), 36Mbps	Low Mid High Low Mid High Low Mid High Low	Signature How Joseph	Value           21.88 mW           21.73 mW           22.91 mW           21.43 mW           21.73 mW           23.39 mW           32.06 mW           35.56 mW           38.73 mW           35.4 mW	Limit 1 Watt 1 W	Results Pass Pass Pass Pass Pass Pass Pass Pa
802.11(b), 1Mbps 802.11(b), 11Mbps 802.11(g), 6Mbps 802.11(g), 36Mbps	Low Mid High Low Mid High Low Mid High Low Mid	Signature How Joseph	Value 21.88 mW 21.73 mW 22.91 mW 21.73 mW 21.73 mW 23.39 mW 32.06 mW 35.56 mW 38.73 mW 35.4 mW 44.87 mW	Limit 1 Watt 1 W	Results Pass Pass Pass Pass Pass Pass Pass Pa
802.11(b), 1Mbps 802.11(b), 11Mbps 802.11(g), 6Mbps 802.11(g), 36Mbps	Low Mid High Low Mid High Low Mid High	Signature How Joseph	Value 21.88 mW 21.73 mW 22.91 mW 21.73 mW 21.73 mW 23.39 mW 32.06 mW 35.56 mW 35.56 mW 38.73 mW 35.4 mW 44.87 mW 51.17 mW	Limit 1 Watt 1 W	Results Pass Pass Pass Pass Pass Pass Pass Pa
802.11(b), 1Mbps 802.11(b), 11Mbps 802.11(g), 6Mbps 802.11(g), 36Mbps 802.11(g), 54Mbps	Low Mid High Low Mid High Low Mid High Low Mid High	Signature How Jose P	Value           21.88 mW           21.73 mW           22.91 mW           21.43 mW           21.73 mW           23.39 mW           32.06 mW           35.56 mW           38.73 mW           35.4 mW           44.87 mW           51.17 mW	Limit 1 Watt 1 W	Results Pass Pass Pass Pass Pass Pass Pass Pa
802.11(b), 1Mbps 802.11(b), 11Mbps 802.11(g), 6Mbps 802.11(g), 36Mbps 802.11(g), 36Mbps	Low Mid High Low Mid High Low Mid High Low Mid High Low	Signature How Joseph	Value           21.88 mW           21.73 mW           22.91 mW           21.43 mW           21.73 mW           23.39 mW           32.06 mW           35.56 mW           38.73 mW           51.17 mW           38.28 mW	Limit  Uatt Watt Watt Watt Watt Watt Watt Wa	Results Pass Pass Pass Pass Pass Pass Pass Pa
802.11(b), 1Mbps 802.11(b), 11Mbps 802.11(g), 6Mbps 802.11(g), 36Mbps 802.11(g), 54Mbps	Low Mid High Low Mid High Low Mid High Low Mid High	Signature How Josephine	Value 21.88 mW 21.73 mW 22.91 mW 21.73 mW 21.73 mW 23.39 mW 32.06 mW 35.56 mW 38.73 mW 35.4 mW 44.87 mW 51.17 mW	Limit 1 Watt 1 W	Results Pass Pass Pass Pass Pass Pass Pass Pa

# **Output Power**

		80	2.11(b), 1Mbps		
Result:	Pass	Value:	< 1 W	Limit:	1 W

802.11(b)	1 Mbps				
Xmit Frequency	Channel	DC on Scope	Sig Gen Output	Power Meter	Power Meter
(MHz)		(mV)	(dBm)	(dBm)	(mVV)
2412	1	25.4	13	13.4	21.88
2442	6	25	12.9	13.37	21.73
2462	11	25.4	13	13.6	22.91

		802.	.11(b), 11Mbps		
Result:	Pass	Value:	< 1 W	Limit:	1 W

802.11(b)	11 Mbps				
Xmit Frequency	Channel	DC on Scope	Sig Gen Output	Power Meter	Power Meter
(MHz)		(mV)	(dBm)	(dBm)	(mVV)
2412	1	25	12.9	13.31	21.43
2442	6	25	12.9	13.37	21.73
2462	11	25.6	13.1	13.69	23.39

# **Output Power**

	802.11(g), 6Mbps		
Result: Pass	<b>Value:</b> < 1 W	Limit:	1 W

802.11(g)	6 Mbps				
Xmit Frequency	Channel	DC on Scope	Sig Gen Output	Power Meter	Power Meter
(MHz)		(mV)	(dBm)	(dBm)	(mVV)
2412	1	34.2	14.8	15.06	32.06
2442	6	36.4	15.2	15.51	35.56
2462	11	38.4	15.5	15.88	38.73

		80	)2.1	1(g), 36Mbps			
Result:	Pass	Value:	~	< 1 W	Limit:	1 W	

802.11(g)	36 Mbps				
Xmit Frequency	Channel	DC on Scope	Sig Gen Output	Power Meter	Power Meter
(MHz)		(mV)	(dBm)	(dBm)	(mVV)
2412	1	36.6	15.3	15.49	35.40
2442	6	43	16.4	16.52	44.87
2462	11	46.4	17	17.09	51.17

# **Output Power**

	802.11(g), 54Mbps		
Result: Pass	<b>Value:</b> < 1 W	Limit:	1 W

802.11(g)	54 Mbps				
Xmit Frequency	Channel	DC on Scope	Sig Gen Output	Power Meter	Power Meter
(MHz)		(mV)	(dBm)	(dBm)	(mVV)
2412	1	38.8	15.7	15.83	38.28
2442	6	43.8	16.6	16.67	46.45
2462	11	50.2	17.7	17.63	57.94



# Output Power



# Output Power



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.

TEST EQUIPMENT					
Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4407B	AAU	12/8/2006	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 requirements of FCC 15.247(d) for emissions at least 20dB below the carrier in any 100kHz bandwidth outside the allowable band was measured with the EUT set to low and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate using direct sequence modulation. The channels closest to the band edges were selected. The spectrum was scanned across each band edge from 10 MHz below the band edge to 10 MHz above the band edge.

NODTHINEST			_	XMit 2006 08 24
		Bandedge Compliance		7.000.200.24
EMC		Banadage compilation		
EUT:	USI WM-G-MR-05 in Eagle	Work Order:	TRPO0034	
Serial Number:	Unknown	Date:	06/06/07	
Customer:	Tripod Data Systems, Inc.	Temperature:	24°C	
Attendees:	None	Humidity:	32%	
Project:	None	Barometric Pres.:	30.01	
Tested by:	Holly Ashkannejhad	Power: 120VAC/60Hz Job Site:	EV06	
TEST SPECIFICAT	IONS	Test Method		
FCC 15.247(DTS):2	006	ANSI C63.4:2003, KDB No. 558074		
COMMENTS				
DEVIATIONS FROM	M TEST STANDARD			
		VANIA D		
Configuration #	2	Holy Arright		
		Signature / 1 0		
		Valuo	Limit	Poculte
802 11(b) 1Mbps		Value		Results
002.11(0), 111003	I ow channel	-42 59 dBc	≤ - 20 dBc	Pass
	High channel	-53.51 dBc	≤ - 20 dBc	Pass
802.11(b), 11Mbps	- ign chaine		- 20 0.50	1 400
····	Low channel	-44.97 dBc	≤ - 20 dBc	Pass
	High channel	-54.08 dBc	≤ - 20 dBc	Pass
802.11(a), 6Mbps	3			
(0)/ 1	Low channel	-24.08 dBc	≤ - 20 dBc	Pass
	High channel	-46.36 dBc	≤ - 20 dBc	Pass
802.11(g), 36Mbps	0			
	Low channel	-24.3 dBc	≤ - 20 dBc	Pass
	High channel	-46.5 dBc	≤ - 20 dBc	Pass
802.11(g), 54Mbps	· ·			
	Low channel	-24.39 dBc	≤ - 20 dBc	Pass
	High channel	-47.78 dBc	≤ - 20 dBc	Pass

	802.11(b), 1Mbps, Low channel			
Result: Pass	Value: -42.59 dBc	Limit:	≤ - 20 dBc	



	002.11(D)	, nups, nigh channei		
Result: Pass	Value:	-53.51 dBc	Limit:	≤ - 20 dBc



	802.11(b)	, 11Mbps, Low channel		
Result: Pa	ss Value:	-44.97 dBc	Limit:	≤ - 20 dBc



Result:         Pass         Value:         -54.08 dBc         Limit:         ≤ - 20 dBc			802.11(D	),	r nvibps, riigh channei		
	Result:	Pass	Value:		-54.08 dBc	Limit:	≤ - 20 dBc



	802.11(g), 6Mbps, Low channel			
Result: Pass	Value: -24.08 dBc	Limit:	≤ - 20 dBc	



Result: Pass Value: -46.36 dBc Limit: ≤ - 20 dBc			002.11(y	), olviops, riigh channei		
	Result:	Pass	Value:	-46.36 dBc	Limit:	≤ - 20 dBc



		802.11(g), 36Mbps, Low	v channel		
<b>Result:</b> Pass Value: $-24.3 \text{ dBc}$ Limit: $\leq -20 \text{ dBc}$	sult: Pass	Value: -24.3 dBc	Limit:	≤ - 20 dBc	



		802.11(g)	, solviops, riigh channei		
Result:	Pass	Value:	-46.5 dBc	Limit:	≤ - 20 dBc



	ouz. i i (y)	, 54Mbps, Low channel		
Result: Pass	Value:	-24.39 dBc	Limit:	≤ - 20 dBc



		802.11(g)	, 541	Mbps, High channel		
Result:	Pass	Value:	-4	17.78 dBc	Limit:	≤ - 20 dBc







# 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									
Transmit mode, 802.11(b), 1 Mbps									
Transmit mode, 802.11(b), 11 Mbps									
Transmit mode, 802.11(g), 6 Mbps									
Transmit mode, 802.11(g), 36 Mbp	s								
Transmit mode, 802.11(g), 54 Mbps									
· ····									
CHANNELS INVESTIGATED									
Low Channel, Channel 1, 2412 MH	Low Channel, Channel 1, 2412 MHz								
Mid Channel, Channel 6, 2437 MH	Z								
High Channel, Channel 11, 2462 M	IHz								
POWER SETTINGS INVESTIGAT	ED								
120VAC/60Hz									
FREQUENCY RANGE INVESTIGA	ATED								
Start Frequency	30 MHz	Stop Frequency		26 GHz					
CLOCKS AND OSCILLATORS									
None Provided									
SAMPLE CALCULATIONS									
Radiated Emissions: Field Strength = Measured	Level + Antenna Factor + Cable Factor	or - Amplifier Gain + Distance Adjustment Fact	or + External A	Attenuation					
		· · · · · · · · · · · · · · · · · · ·							
TEST EQUIPMENT									
Description	Manufacturer	Model	ID	Last Cal.	Interval				
Spectrum Analyzer	Agilent	E4446A	AAT	12/7/2006	13				
High Pass Filter	Micro-Tronics	HPM50111	HFO	12/29/2006	13				
Pre-Amplifier	Miteq	AM-1616-1000	AOL	12/29/2006	13				
Antenna, Biconilog	EMCO	3141	AXE	12/28/2005	24				
EV01 cables c,g, h			EVA	12/29/2006	13				
Pre-Amplifier	Miteq	AMF-4D-010100-24-10P	APW	5/10/2007	13				
Antenna, Horn	EMCO	3115	AHC	8/24/2006	12				
EV01 cables g,h,j			EVB	5/10/2007	13				
Pre-Amplifier	Miteq	AMF-4D-005180-24-10P	APC	5/10/2007	13				
Antenna, Horn	EMCO	3160-08	AHK	NCR	0				
EV01 Cable D			EVD	3/30/2006	15				
Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	3/23/2006	17				
EV01 cables g,h,I			EVF	5/10/2007	13				
· · · · · · · · · · · · · · · · · · ·	•	1			-				

MEASUREMENT BANDWIDTHS							
	Frequency Range	Peak Data	Quasi-Peak Data	Average Data			
(MHz) (kHz) (kHz) (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			
M	easurements were made us	ing the bandwidths and dete	ctors specified. No video filt	er 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

**EMC** 

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.









# SPURIOUS RADIATED EMISSIONS

PSA 2007.05.07





# SPURIOUS RADIATED EMISSIONS





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