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

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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	FCC 15.207 AC Powerline Conducted	ANSI C62 4.2002	D			
Emissions	Emissions:2005-9	ANSI C03.4.2003				
Conducted Emissions	FCC 15.107 Class B:2005-10	ANSI C63.4:2003	\boxtimes			
Radiated Emissions	FCC 15.109(g) (CISPR 22:1997) Class B:2005-10	ANSI C63.4:2003	\boxtimes			
Spurious Radiated	FCC 15.247(d) Spurious Radiated	ANGL C62 4:2002				
Emissions	Emissions:2005-9	ANSI 003.4.2003				

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:
AJU.K.P
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.

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.





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









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







NEMKO

Revision 03/18/05





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					
		Spurious	Tested as	No EMI suppression	EUT remained at					
1	4/28/2006	Radiated	delivered to	devices were added or	Northwest EMC					
		Emissions	Test Station.	modified during this test.	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 Test Stati		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 OPE	ODES OF OPERATION												
Typical operating	mode - Radios tran	smitting	and receiving.										
POWER SETTIN	GS INVESTIGATEL	J											
120VAC/60HZ													
230VAC/50HZ													
POWER SETTIN	GS LISED FOR FIN		Δ										
	63 03LD FOR TIN		A										
230 V AO/30112													
FREQUENCY R	ANGE INVESTIGAT	ED											
Start Frequency		30	MHz	Stop Fre	auencv		1 GHz						
jj						Į							
SAMPLE CALCU	JLATIONS												
Radiated Emissions:	Field Strength = Measured Le	evel + Antenr	a Factor + Cable Factor - An	nplifier Gain +	Distance Adjustment Factor	+ External Atte	enuation						
TEST EQUIPME	EST EQUIPMENT												
Desc	ription	Μ	anufacturer		Model	ID	Last Cal.	Interval					
Antenna	, Biconilog		EMCO		3142	AXB	1/6/2005	24					
Pre-A	mplifier		Miteq		AM-1551	AOY	4/5/2006	13					
Spectrun	n Analyzer		Agilent		E4443A	AAS	12/8/2005	12					
MEASUREMENT	IEASUREMENT 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						

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.

	RTHWEST		R/		ED E	MISS	0	NS	DATA	SHE	ET		P	SA 2006.04.25 EMI 2006.4.26
	EUT:	Cirronet Fl	HSS (2.4G	Hz), 802.11	(b)/(g), and	Bluetoot	h radi	os			W	ork Order:	TRPO001	5
Seri	al Number:	EMI 2		11	(// (J //)							Date:	05/01/06	
	Customer:	Tripod Dat	a Systems	s, Inc.							Ter	nperature:	21	
	Attendees:	None										Humidity:	30%	
	Project:	None	annaihad					Dowor.	2201/ A C/EO	U-	Barome	etric Pres.:	30.34	
TEST SE	PECIFICATI	IONS	annejnau					-ower:	Test Metho	nz d		Job Sile:	EVUI	
FCC 15.	109(g) (CIS	PR 22:1997) Class B:	2005-10					ANSI C63.4	:2003				
TEST P/		(m)	1 1				Tos	t Dieta	nce (m)	10				
COMME	NTS	(11)	1-4				163	i Dista	nce (m)	10				
All 3 into	ernal radios	s active: Ci	rronet FH	SS (2.4GHz), 802.11(b)	/(g), and I	Blueto	ooth.						
EUT OP Typical	ERATING N operating n	NODES mode - Radi	os transm	nitting and r	eceiving.									
No devi	ations.		MBAND											
Run #		1												
Configu	ration #	2	2								11 0.	1 lint	2	
Results		Pa	SS	NVLAP La	b Code 200	630-0				Signature	Holy ,	and he		
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							M	Hz						
		•					r		•					
	Frea	Amplitude	Factor	Azimuth	Height	Distance	Ex Atto	cternal	Polarity	Detector	Distance Adjustment	Adjusted	Spec. Limit	Compared to Spec
	MHz)	(dBuV)	(dB)	(degrees)	(meters)	(meters)	7 110	(dB)	1 oldiniy	Deteolor	(dB)	dBuV/m	dBuV/m	(dB)
93	6.062	43.9	-8.6	164.0	1.0	10.0		0.0	H-Bilog	QP	0.0	35.3	37.0	-1.7
83	2.059	41.3	-10.5	345.0	2.0	10.0		0.0	V-Bilog	QP	0.0	30.8	37.0	-6.2
72	.8.052 7.626	40.1	-10.7	48.0	1.0	10.0		0.0	H-Bilog	QP	0.0	29.4	37.0	-7.6
66	6.070	49.2	-27.0	49.0	1.0	10.0		0.0	V-Bilog V-Bilog	QP	0.0	19.1	30.0	-10.9
72	8.055	36.8	-10.7	256.0	2.2	10.0		0.0	V-Bilog	QP	0.0	26.1	37.0	-10.9
12	4.579	45.2	-26.9	294.0	1.0	10.0		0.0	V-Bilog	QP	0.0	18.3	30.0	-11.7
91	1.830	44.7	-27.2	154.0	1.0	10.0		0.0	V-Bilog	QP	0.0	17.5	30.0	-12.5
93	6.064	33.0	-8.6	190.0	1.0	10.0		0.0	V-Bilog	QP	0.0	24.4	37.0	-12.6
34 R3	+.150	34.0 33.8	-17.5	29.0 184 ∩	1.0	10.0		0.0	v-Bilog H-Bilog	QP OP	0.0	23.3	30.0	-12.9
3	1.701	31.5	-16.3	197.0	1.0	10.0		0.0	H-Bilog	QP	0.0	15.2	30.0	-14.8
21	3.140	36.9	-22.6	300.0	1.0	10.0		0.0	V-Bilog	QP	0.0	14.3	30.0	-15.7
20	7.139	36.7	-22.9	238.0	1.0	10.0		0.0	V-Bilog	QP	0.0	13.8	30.0	-16.2
22	5.154	34.6	-22.0	294.0	1.4	10.0		0.0	V-Bilog	QP	0.0	12.6	30.0	-17.4
22 יד	:4.882 5.200	33.7 28 F	-22.1 -27.5	110.0	2.8	10.0		0.0 0.0	H-Bilog	QP OP	0.0	11.6	30.0	-18.4
7: 21	3.778	33.6	-27.5	100.0	∠.9 2.8	10.0		0.0	H-Bilog	0P	0.0	11.0	30.0	-19.0
20	07.141	33.0	-22.9	129.0	1.0	10.0		0.0	H-Bilog	QP	0.0	10.1	30.0	-19.9
65	5.128	33.5	-26.9	308.0	2.6	10.0		0.0	H-Bilog	QP	0.0	6.6	30.0	-23.4
12	0.917	33.4	-26.9	196.0	1.0	10.0		0.0	H-Bilog	QP	0.0	6.5	30.0	-23.5



Radiated Emissions



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	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										
N	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 50 Ω .











Conducted Emissions



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 INVESTIGATE

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.



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	EUT:	Cirro	onet	FHS	S (2	2.4G	HZ F	Radi	io)																		W	ork	Ord	der:	TR	POC	0015		
Serial Nu	mber:	WIT2	2410	/14-	N- 11	147	43																						D	ate:	04/	28/0)6		
Cust	omer:	Tripo	od Da	ata S	Syst	em	s, In	с.																			Ten	npe	ratu	ure:	25				
Atter	dees:	None	e																									Hu	mid	lity:	329	%		-	
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Test	ed by:	Rod	Pelo	quiı	n												Po	wer:	120	OVA	C/60	Hz						Jo	b S	Site:	ΕV	01			
TEST SPECI	FICATI	ONS																	Te	st M	letho	d													
FCC 15.247(d	l) Spui	rious	Radi	ate	d En	nis	sions	5:20	05-9)									AN	SI (C63.4	1:200)3												
TEST PARAM	NEIER	S														-				<i>,</i>															
Antenna Heig	ght(s)	(m)		1 -	- 4											Te	est D	Dista	nce	: (m)			3										_	
COMMENTS																																			
Cirronet Rad	io																																		
EUT OPERA		IODE	s																																
High channe	FROM	TEO	TOT																											_			_		
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Configuratio	n #			1																						1	7 4	c	~	en	m	2			
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				-			1									-	E.c.								~	- 1 -					1		<u> </u>		
Free		Amn	litude		Fact	or		zim	th		loiah	nt.	Du	uty C	ycle		Exter	nal		olar	itv	D-	toot		Di: Adia	stand	ce ent	۸.	linet	tod	Sn	er I	imi+	Con	npared to
(MH=)		(dF	BuV)		(dB	5)	(d	egree	es)	(n	neter	s)	C	Fact	τιon or	1	(dB)	'	oral	···y	De			, uji	(dB)	ont	dF	Jusi BuV/	/m	b b	BuV/	m		(dB)
2483 00	4	20	6.6		0.5	5	1,0	138 /	0	, ti	1 1	-1	L	0.0)		20	, 0	L \/	/-Hr	orn		ΡK			0.0		1	57	1	L 4	74 ()		16.9
2403.99	- - 0	31	0.0 6.5		0.0	5		130.U 207 /	0		1.1			0.0	, N		∠0. 20	0	v L	-170 1_Hz	nn					0.0			57. 57.0	0		74.U	,)	-	17.0
2404.42	9 0	31	2.0		0.0	,		ו זכי. י דמכ	0		1.2			26	, 5		∠0. 20	0		-пС LЦ-			Δ\/			0.0		:	57.U 17 1	3		14.U	,)	-	36.7
2484.02	4	2.	3.3 2.2		0.5	5	4	120 /	0		1.2			20. 26	5		20. 20	0		ーロC / レー			~\V			0.0			17.	ว ว		04.U	י ר	-	26.0
2403.74	4	Ζ.	J.Z		0.5	,		130.0	0		1.1			∠ 0.	J		∠0.	U	v	-170	/11	4	٨v			0.0			11.4	<u>د</u>		J4.(,	-	0.00

	NORTHWEST	SP	URIO			TED E	MISS	IONS	DAT	A SHE	ET	PS	A 2006.04.25 EMI 2006.4.26
	EUT	Cirronet F	HSS (2.4G	HZ Radio)						W	ork Order:	TRPO0015	;
	Serial Numbe	r: WIT2410N	14-W-1147	43							Date:	04/28/06	
	Custome	r: Tripod Da	ta System	s, Inc.						Ter	nperature:	25	
	Attendees	s: None								Barome	Humidity:	32%	
	Tested by	y: Rod Peloo	quin				Power:	120VAC/6	0Hz		Job Site:	EV01	
TES	ST SPECIFICA	TIONS						Test Metho	bd				
FCC	C 15.247(d) Sp	urious Radia	ated Emiss	sions:2005-	9			ANSI C63.	4:2003				
TES	ST PARAMETE	RS											
Ant	enna Height(s) (m)	1 - 4				Test Dista	nce (m)	3				
COI	MMENTS												
Cirr	ronet Radio												
EU1 Mid	T OPERATING I channel	MODES											
DE\ No	VIATIONS FRO deviations.	OM TEST ST	ANDARD										
Rur	า #		4							10	DO	1	
Cor	nfiguration #		1							Moren l	n Feli	mgs	
Res	sults	Pa	ass	NVLAP La	b Code 200	0630-0			Signature	U	U		
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	3000.00	00 4000.0	00 500	0.000 60	000.000	7000.000	8000.00 MHz	0 9000.	000 1000	00.000 11	000.000	12000.000)
<u> </u>		1	r	Γ	Г	D. C.	Evternal		1	Distance	1		Compared to
	Freq	Amplitude	Factor	Azimuth	Height	Correction	Attenuation	Polarity	Detector	Adjustment	Adjusted	Spec. Limit	Spec.
	(MHz)	(dBuV)	(dB)	(degrees)	(meters)	Factor	(dB)		DI	(dB)	dBuV/m	dBuV/m	(dB)
	7306.918	58.7 58.6	13.4 13.4	254.0 257.0	1.5 1.4	0.0	0.0	H-Horn V-Horn	PK PK	0.0	72.1	74.0 74.0	-1.9
	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 60.2	6.5 6.5	233.0 178.0	1.5 1.6	0.0	0.0	V-Horn H-Horn	PK PK	0.0	67.4 66.7	74.0 74.0	-6.6 -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
	12179 080	51.9 40.6	13.4 16.1	231.0	1.3 1.1	26.5 0 0	0.0 0.0	v-Hom V-Hom	AV PK	0.0	38.8 56 7	54.0 74 0	-15.2 -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 6 5	190.0	1.1	0.0	0.0	V-Horn	PK	0.0	49.6	74.0	-24.4
	4871.552	40.4 47.7	0.5 6.5	233.0 178.0	1.0 1.6	20.5 26.5	0.0	v-nom H-Horn	AV	0.0	∠o.4 27.7	54.0 54.0	-25.0 -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
	3653.71240.54.5190.01.112179.08026.316.1178.01.2			1.1 1.2	26.5 26.5	0.0	v-Horn H-Horn	AV AV	0.0	18.5 15.9	54.0 54.0	-35.5 -38.1	

NORTHWEST	SP	URIO	US R	ADIA	TED	EMIS	SIONS	DAT	A SHE	ET	P	SA 2006.04.25 EMI 2006.4.26
EUT:	Cirronet F	HSS (2.4G	HZ Radio)						N	ork Order:	TRPO001	5
Serial Number:	WIT2410M	4-W-11474	3							Date	04/28/06	
Customer:	Tripod Dat	ta Systems	s, Inc.						Те	mperature	25	
Project:	None								Barom	etric Pres.	32%	
Tested by:	Rod Pelog	uin				Powe	r: 120VAC/6	60Hz	24.011	Job Site:	EV01	
TEST SPECIFICATI	ONS						Test Meth	od				
FCC 15.247(d) Spur	rious Radia	ated Emiss	ions:2005-4	9			ANSI C63	.4:2003				
Antenna Height(s)	(m)	1 - 4				Test Dis	tance (m)	3	}			
COMMENTS												
Cirronet Radio												
EUT OPERATING N	IODES											
Low channel												
DEVIATIONS FROM	I TEST STA	ANDARD										
No deviations.		5	1									
Run # Configuration #		J 1							Roch	1. Pet	lun l	
Configuration #	Pa	1		h Code 20	0630-0			Signatura	0		\mathcal{T}	
Results	10			D COUE 20	0030-0			Signature				
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						NAL 1_						-
						IVIHZ						
From	Amerikan	Fastas	Animuth	11 - Color	Duty Cyc	e External	n. Delevitu		Distance	Adianta	On an Uimit	Compared to
(MHz)	(dBuV)	(dB)	(degrees)	(meters)	Correctio	n Attenuatio (dB)	n Polarity	Detector	(dB)	dBuV/m	dBuV/m	(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
3602.013	40.∠ 47.6	4.3 4.3	240.0 170.0	⊥.∠ 1 1	0.0	0.0	V-Horn	PK	0.0	52.5 51.9	74.0 74.0	-∠1.5 -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
3002.532	43.U 26.6	4.3 16 1	87.0	1.1	26.5 26.5	0.0	v-Horn V-Horn	AV AV	0.0	∠∪.ŏ 16.2	54.0 54.0	-33.2 -37.8
12000.400	20.0	10.1	07.0		20.0	0.0	* HOIH	/1 V	0.0	10.2	07.0	01.0

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Nome SPURIOUS RADIATED EMISSIONS DATA SHEET Page EUT: Cirronet FHSS (2.46H2 Radio) Work Order: TRP00015 Base (2.266) Constance: Introd Data Systems, Inc. Interperature: 26 Base (2.266) Proper: None Barometric Frazi Base (2.266) Proper: None Frazi Mandord Status Status PC 15.347(d) Spurious Radiated Emissions:2005-9 ANSI (25.4.2003) Status Status PUT OPERATING MODES Contract Radio Status Status Status Point of Status NVLAP Lab Code 200630-0 Status Status Status Status Pass NVLAP Lab Code 200630-0 Status																													
SPURIOUS RADIATED EMISSIONS DATA SHEET EUT: Cirronet FHS3 (2.40H2 Radio) Work Order: [TRPODIATE] Serial Number: WIT2410M4-W-114743 Date: 04/22006 Casto date ystems, Inc. Temperature: 25 Attendes: None Humidity: 132%. Project: None Project: None Project: 120VAC/60Hz Job Site: EV01 Tested by: Rod Peloquin Power: 120VAC/60Hz Job Site: EV01 Tested by: Rod Peloquin Power: 120VAC/60Hz Job Site: EV01 Test data ystems, Inc. Antenna Height(a) (m) 1 - 4 Test data ystems, 2005-9 Antenna Height(a) (m) 1 - 4 Test PARAMETERS Antenna Height(a) (m) 1 - 4 Test PARAMETERS Antenna Height(a) (m) 1 - 4 Colspan="2">Colspan="2">MULAP Lab Code 200630-0 Signature Signature 0 - 4																													
Cust	omer:	Tripoc	l Data	a Syste	ems,	Inc.																Те	mpe	erat	ure:	25			
Atter	ndees:	None																					Ηι	ımi	dity:	32%	,		
P	roject:	None																			В	arom	etri	c Pi	res.:	30.1	5		
Test	ed by:	Rod P	eloqu	ıin										Po	ower	: 12	OVAC/6	60Hz	z				J	ob S	Site:	EVO	1		
TEST SPECI	FICATI	ONS														Te	st Meth	od											
FCC 15.247(0	d) Spui	rious R	adiat	ed Em	issio	ons:2	2005-	9								AN	ISI C63	.4:2	003										
TEST PARA		(5) (m)	1.										17		Diet	_	(100)			2									
Antenna Heig	gnt(S)	(m)		1 - 4										est	Dist	ance	e (m)			3							_	_	
Cirronet Rad EUT OPERA mid channel DEVIATIONS	io TING N FRON	NODES N TEST	STA	NDARI	D																								
No deviation	5.		6		-																~	-			_	0			
Run #																					Ror	l.	1.		Pe	ľ.,			
Configuratio	n #		1																			0	a	~ ~	-	//	\sim		
Results			Pas	SS	1	NVLA	NP La	ıb C	ode 2	2006	30-0							Si	gnatı	ıre		0							
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														мН	z														
Freq (MHz)	10	Amplit (dBu	ude V) 9	Facto (dB)	or D	Azin (degi 101	nuth rees) 3.0	(Height (meters 1 0	: 5)	Duty Corre Fac	Cycle ection ctor	e 1	Exte Atten (d	ernal uatior B) .0		Polarity	rr	Detect	or	Dist Adju: (c	tance stment dB)).0	A	\djus dBu∖ 54	sted //m	Spe dE	c. Limi 3uV/m 74.0	t Co	ompared to Spec. (dB) -19.9
19485 64	40	43. 42	8	10.2	-	210	9.0 9.0		1.0		0	0		0	0	√-H	liah Ho	rr	PK		r	0		53	0	-	74 N		-21.0
19486 20	0	31	7	10.2	-	10	3.0		10		26	.0 3.5		0	0		ligh Ho	rr	Δ\/		r	0		15	4	-	54 O		-38.6
19486.20	00	30.	7	10.2	2	219	9.0		1.2		26	6.5		0	.0	√-H	ligh Ho	rr	AV		C	0.0		14.	4	5	54.0		-39.6

SPURIOUS RADIATED EMISSIONS



SPURIOUS RADIATED EMISSIONS



SPURIOUS RADIATED EMISSIONS



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	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				
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 50 Ω .

ACQ-2006.04.25













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