Trimble Navigation Limited MCS

Nomad with Cirronet Module

Report #: TRPO0070

Report Prepared By Northwest EMC Inc.

NORTHWEST EMC – (888) 364-2378 – www.nwemc.com

California – Minnesota – Oregon – New York – Washington

22975 NW Evergreen Parkway
Suite 400
Hillsboro, Oregon 97124

Certificate of Test

Last Date of Test: January 17, 2012
Trimble Navigation Limited MCS
Model: Nomad with Cirronet Module

Emissions

Test Description	Specification	Test Method	Pass/Fail
Spurious Radiated Emissions	FCC 15.247:2012	ANSI C63.10:2009	**Pass**
AC Powerline Conducted Emissions	FCC 15.207:2012	ANSI C63.10:2009	**Pass**

Deviations From Test Standards

None

Approved By:

Tim O'Shea, Operations Manager

NVLAP Lab Code: 200630-0

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 (Site filing #2834D-1).

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 History

Revision Number	Description	Date	Page Number
00	None		

Accreditations and Authorizations

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 National Voluntary Laboratory Accreditation Program (NVLAP) for satisfactory compliance with the requirements of ISO/IEC 17025 for Testing Laboratories. NVLAP is administered by the National Institute of Standards and Technology (NIST), an agency of the U.S. Commerce Department. The NVLAP accreditation encompasses Electromagnetic Compatibility Testing in accordance with the European Union EMC Directive 2004/108/EC, 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-Gen, Issue 2 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. (*Site Filing Numbers - Hillsboro: 2834D-1, 2834D-2, Sultan: 2834C-1, Irvine: 2834B-1, 2834B-2, Brooklyn Park: 2834E-1)*

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.

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).

Accreditations and Authorizations

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, G-84, C-2687, T-1658, and R-2318, Irvine: R-1943, G-85, C-2766, and T-1659, Sultan: R-871, G-83, C-3265, and T-1511, Brooklyn Park: R-3125, G-86, G-141, C-3464, and T-1634).*

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 (US0017).

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

KCC

Northwest EMC, Inc is a CAB designated by MRA partners and recognized by Korea. (*Assigned Lab Numbers: Hillsboro: US0017, Irvine: US0158, Sultan: US0157, Brooklyn Park: US0175)*

VIETNAM

Vietnam MIC has approved Northwest EMC as an accredited test lab. Per Decision No. 194/QD-QLCL (dated December 15, 2009), Northwest EMC test reports can be used for Vietnam approval submissions.

SCOPE

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

Locations

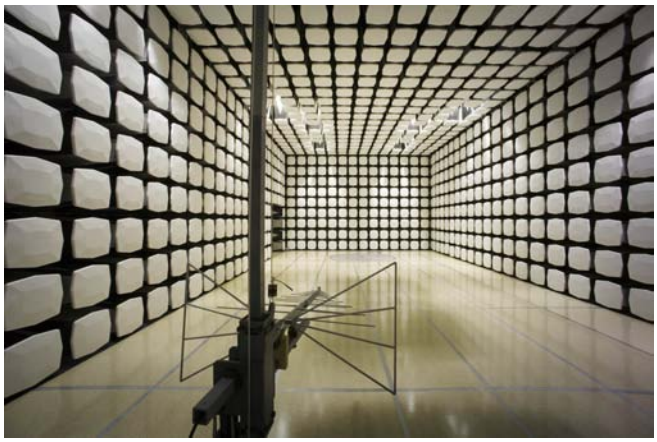
Oregon
Labs EV01-EV12
22975 NW Evergreen Pkwy
Suite 400
Hillsboro, OR 97124
(503) 844-4066

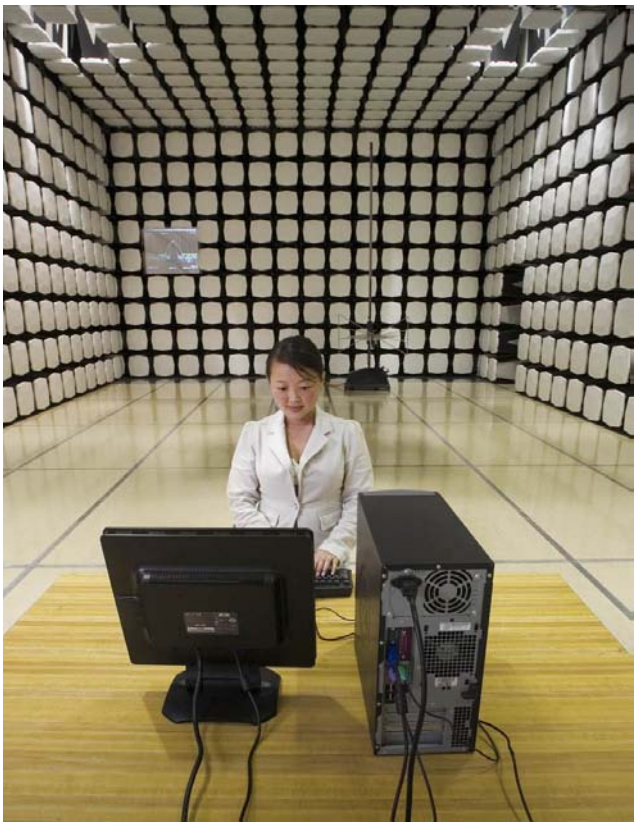
California
Labs OC01-OC13
41 Tesla
Irvine, CA 92618
(949) 861-8918

Minnesota
Labs MN01-MN08
9349 W Broadway Ave.
Brooklyn Park,
MN 55445
(763) 425-2281

Washington
Labs SU01-SU07
14128 339th Ave. SE
Sultan, WA 98294
(360) 793-8675

New York
Labs WA01-WA04
4939 Jordan Rd.
Elbridge, NY 13060
(315) 685-0796





Product Description

Client and Equipment Under Test (EUT) Information

Company Name:	Trimble Navigation Limited MCS
Address:	345 SW Avery Ave
City, State, Zip:	Corvallis, OR 97333
Test Requested By:	Bob Grant
Model:	Nomad with Cirronet Module
First Date of Test:	January 04, 2012
Last Date of Test:	January 17, 2012
Receipt Date of Samples:	January 04, 2012
Equipment Design Stage:	Production
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT (Equipment Under Test):
2.4 GHz FHSS previously certified under FCC ID: S9E-RNGR2410 with limited modular approval. This testing is for a new host device and a new antenna.

Testing Objective:
To demonstrate compliance to FCC 15.247 requirements.

Configurations

Configuration 1 TRPO0070

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Handheld Computer	Tripod Data Systems, Inc.	Nomad with Cirronet module	None
AC Adapter	Cincon Electronics, LTD	TR30R050	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power	PA	1.8m	PA	AC Adapter	Nomad with Cirronet module
USB	Yes	0.9m	No	Nomad with Cirronet module	Unterminated
USB	Yes	2.0m	No	Nomad with Cirronet module	Unterminated
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
1	1/4/2012	AC Powerline 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.
2	1/17/2012	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

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. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

Transmitting single channel 5% duty cycle

POWER SETTINGS INVESTIGATED

120VAC/60Hz

CONFIGURATIONS INVESTIGATED

TRPO0070-1

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	25 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
Spectrum Analyzer	Agilent	E4446A	AAQ	6/24/2011	12
Low Pass Filter 0-1000 MHz	Micro-Tronics	LPM50004	LFD	7/12/2010	24
High Pass Filter	Micro-Tronics	HPM50111	HFO	8/9/2010	24
Pre-Amplifier	Miteq	AM-1616-1000	AOL	6/28/2011	12
Antenna, Biconilog	EMCO	3142	AXJ	5/17/2011	12
EV01 Cables	N/A	Bilog Cables	EVA	6/28/2011	12
EV01 Cables	N/A	Double Ridge Horn Cables	EVB	6/28/2011	12
Pre-Amplifier	Miteq	AMF-4D-010100-24-10P	APW	6/28/2011	12
Antenna, Horn	ETS	3115	AIZ	1/24/2011	24
Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVC	3/2/2011	12
Antenna, Horn	ETS	3160-07	AHU	NCR	0
Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVD	3/2/2011	12
Antenna, Horn	ETS	3160-08	AHV	NCR	0
EV01 Cables	N/A	Standard Gain Horns Cables	EVF	3/2/2011	12
Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AVU	9/12/2011	12
Antenna, Horn	ETS Lindgren	3160-09	AIV	NCR	0
Cable	ESM Cable Corp.	KMKM-72	EVY	9/12/2011	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 IF bandwidths and detectors specified. No video filter was used, except in the case of the FCC Average Measurements above 1GHz. In that case, a peak detector with a 10Hz video bandwidth was used.

MEASUREMENT UNCERTAINTY

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are 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 C63.10:2009). A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

SPURIOUS RADIATED EMISSIONS

EUT:	Nomad with Cirronet Module			**Work Order:**	TRPO0070
Serial Number:	None			**Date:**	01/16/12
Customer:	Trimble Navigation Limited MCS			**Temperature:**	22.3
Attendees:	None			**Humidity:**	28%
Project:	None			**Barometric Pres.:**	30.21 in
Tested by:	Rod Peloquin	**Power:**	120VAC/60Hz	**Job Site:**	EV01

TEST SPECIFICATIONS	TEST METHOD
FCC 15.247:2012	ANSI C63.10:2009

TEST PARAMETERS

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

COMMENTS

None

EUT OPERATING MODES

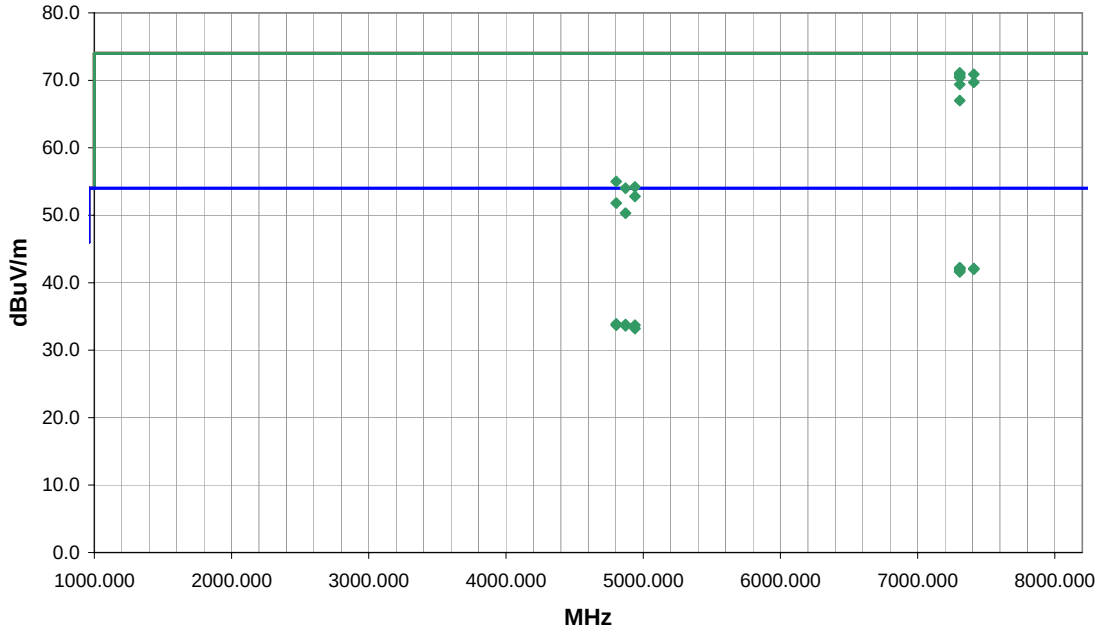
Transmitting single channel 5% duty cycle

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	1
Configuration #	1
Results	Pass

Signature



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)	Comments
7307.373	54.5	16.6	109.0	1.2	3.0	0.0	V-Horn	PK	0.0	71.1	74.0	-2.9	Mid Channel, EUT horizontal
7307.430	54.3	16.6	344.0	1.4	3.0	0.0	V-Horn	PK	0.0	70.9	74.0	-3.1	Mid Channel, EUT on end
7409.657	54.2	16.7	111.0	1.1	3.0	0.0	V-Horn	PK	0.0	70.9	74.0	-3.1	High Channel, EUT horizontal
7307.060	54.0	16.6	102.0	1.9	3.0	0.0	H-Horn	PK	0.0	70.6	74.0	-3.4	Mid Channel, EUT horizontal
7307.137	53.8	16.6	85.0	1.7	3.0	0.0	H-Horn	PK	0.0	70.4	74.0	-3.6	Mid Channel, EUT on end
7409.633	53.0	16.7	99.0	1.9	3.0	0.0	H-Horn	PK	0.0	69.7	74.0	-4.3	High Channel, EUT horizontal
7307.237	52.8	16.6	257.0	1.4	3.0	0.0	V-Horn	PK	0.0	69.4	74.0	-4.6	Mid Channel, EUT on side
7307.373	50.4	16.6	68.0	1.0	3.0	0.0	H-Horn	PK	0.0	67.0	74.0	-7.0	Mid Channel, EUT on side
7307.183	25.6	16.6	102.0	1.9	3.0	0.0	H-Horn	AV	0.0	42.2	54.0	-11.8	Mid Channel, EUT horizontal
7307.193	25.6	16.6	109.0	1.2	3.0	0.0	V-Horn	AV	0.0	42.2	54.0	-11.8	Mid Channel, EUT horizontal
7307.413	25.5	16.6	85.0	1.7	3.0	0.0	H-Horn	AV	0.0	42.1	54.0	-11.9	Mid Channel, EUT on end
7409.613	25.4	16.7	111.0	1.1	3.0	0.0	V-Horn	AV	0.0	42.1	54.0	-11.9	High Channel, EUT horizontal
7307.130	25.4	16.6	257.0	1.4	3.0	0.0	V-Horn	AV	0.0	42.0	54.0	-12.0	Mid Channel, EUT on side
7409.520	25.3	16.7	99.0	1.9	3.0	0.0	H-Horn	AV	0.0	42.0	54.0	-12.0	High Channel, EUT horizontal
7307.147	25.2	16.6	68.0	1.0	3.0	0.0	H-Horn	AV	0.0	41.8	54.0	-12.2	Mid Channel, EUT on side
7307.330	25.0	16.6	344.0	1.4	3.0	0.0	V-Horn	AV	0.0	41.6	54.0	-12.4	Mid Channel, EUT on end
4803.033	45.6	9.4	314.0	1.0	3.0	0.0	H-Horn	PK	0.0	55.0	74.0	-19.0	Low Channel, EUT horizontal
4939.767	44.7	9.5	294.0	1.0	3.0	0.0	V-Horn	PK	0.0	54.2	74.0	-19.8	High Channel, EUT horizontal

SPURIOUS RADIATED EMISSIONS

EUT:	Nomad with Cirronet Module	**Work Order:**	TRPO0070
Serial Number:	None	**Date:**	01/17/12
Customer:	Trimble Navigation Limited MCS	**Temperature:**	22.3
Attendees:	None	**Humidity:**	28%
Project:	None	**Barometric Pres.:**	30.21 in
Tested by:	Rod Peloquin	**Power:** 120VAC/60Hz	**Job Site:** EV01

TEST SPECIFICATIONS	TEST METHOD
FCC 15.247:2012	ANSI C63.10:2009

TEST PARAMETERS

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

COMMENTS

None

EUT OPERATING MODES

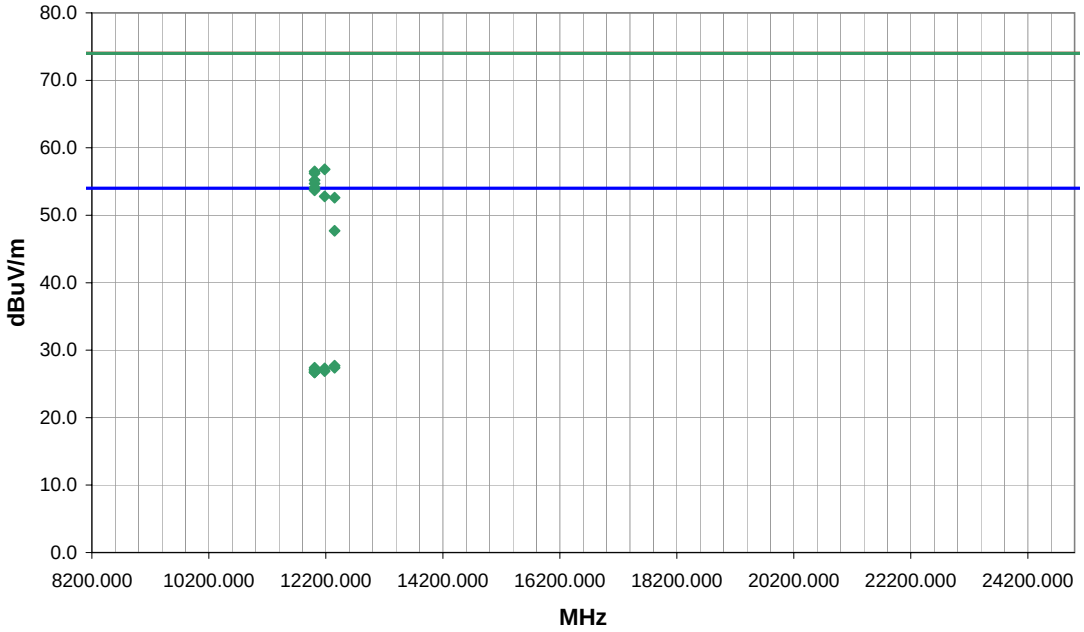
Transmitting single channel 5% duty cycle

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	2
Configuration #	1
Results	Pass

Signature



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)	Comments
12178.780	61.8	-5.0	132.0	1.1	3.0	0.0	H-Horn	PK	0.0	56.8	74.0	-17.2	Mid channel, EUT on side
12008.040	62.4	-5.9	78.0	1.1	3.0	0.0	H-Horn	PK	0.0	56.5	74.0	-17.5	Low channel, EUT on side
12007.950	62.1	-5.9	252.0	1.0	3.0	0.0	H-Horn	PK	0.0	56.2	74.0	-17.8	Low channel, EUT horizontal
12007.940	61.1	-5.9	293.0	1.5	3.0	0.0	V-Horn	PK	0.0	55.2	74.0	-18.8	Low channel, EUT horizontal
12008.140	60.6	-5.9	154.0	1.6	3.0	0.0	H-Horn	PK	0.0	54.7	74.0	-19.3	Low channel, EUT on end
12007.970	60.0	-5.9	129.0	1.2	3.0	0.0	V-Horn	PK	0.0	54.1	74.0	-19.9	Low channel, EUT on side
12008.010	59.6	-5.9	244.0	1.3	3.0	0.0	V-Horn	PK	0.0	53.7	74.0	-20.3	Low channel, EUT on end
12178.710	57.8	-5.0	91.0	1.1	3.0	0.0	V-Horn	PK	0.0	52.8	74.0	-21.2	Mid channel, EUT horizontal
12348.590	56.7	-4.1	134.0	1.1	3.0	0.0	H-Horn	PK	0.0	52.6	74.0	-21.4	High channel, EUT on side
12349.290	31.8	-4.1	134.0	1.1	3.0	0.0	H-Horn	AV	0.0	27.7	54.0	-26.3	High channel, EUT on side
12348.750	51.8	-4.1	88.0	1.1	3.0	0.0	V-Horn	PK	0.0	47.7	74.0	-26.3	High channel, EUT horizontal
12008.170	33.3	-5.9	252.0	1.0	3.0	0.0	H-Horn	AV	0.0	27.4	54.0	-26.6	Low channel, EUT horizontal
12349.200	31.5	-4.1	88.0	1.1	3.0	0.0	V-Horn	AV	0.0	27.4	54.0	-26.6	High channel, EUT horizontal
12178.830	32.3	-5.0	132.0	1.1	3.0	0.0	H-Horn	AV	0.0	27.3	54.0	-26.7	Mid channel, EUT on side
12008.110	33.0	-5.9	78.0	1.1	3.0	0.0	H-Horn	AV	0.0	27.1	54.0	-26.9	Low channel, EUT on side
12008.200	33.0	-5.9	293.0	1.5	3.0	0.0	V-Horn	AV	0.0	27.1	54.0	-26.9	Low channel, EUT horizontal
12008.160	32.8	-5.9	244.0	1.3	3.0	0.0	V-Horn	AV	0.0	26.9	54.0	-27.1	Low channel, EUT on end
12178.760	31.9	-5.0	91.0	1.1	3.0	0.0	V-Horn	AV	0.0	26.9	54.0	-27.1	Mid channel, EUT horizontal
12008.180	32.6	-5.9	154.0	1.6	3.0	0.0	H-Horn	AV	0.0	26.7	54.0	-27.3	Low channel, EUT on end
12008.240	32.6	-5.9	129.0	1.2	3.0	0.0	V-Horn	AV	0.0	26.7	54.0	-27.3	Low channel, EUT on side

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

110VAC/60Hz

CONFIGURATIONS INVESTIGATED

TRPO0070 - 1

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	LIP	5/9/2011	12 mo
Receiver	Rohde & Schwarz	ESCI	ARH	3/30/2011	12 mo
Attenuator	Coaxicom	66702 2910-20	RBR	8/3/2011	12 mo
High Pass Filter	TTE	H97-100K-50-720B	HFX	2/9/2011	24 mo
EV07 Cables	N/A	Conducted Cables	EVG	6/17/2011	12 mo

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

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are 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 50ohm measuring port is terminated by a 50ohm EMI meter or a 50ohm resistive load. All 50ohm measuring ports of the LISN are terminated by 50ohm.

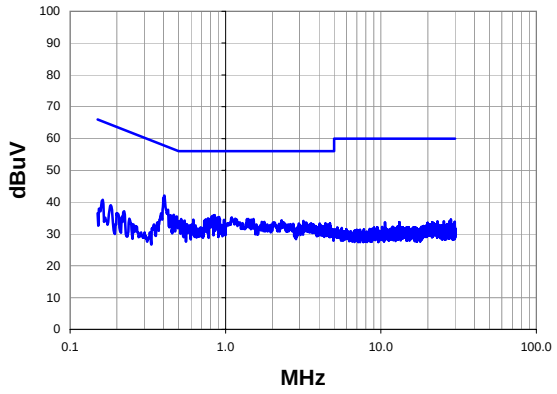
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	TRPO0070	**Date:**	01/04/12		
Project:	None	**Temperature:**	22.3 °C		
Job Site:	EV07	**Humidity:**	33.3% RH		
Serial Number:	None	**Barometric Pres.:**	1023 mbar	**Tested by:**	Kyle Holgate
EUT:	Nomad with Cirronet Module				
Configuration:	1				
Customer:	Trimble Navigation Limited MCS				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting - Low channel				
Deviations:	None				
Comments:	None				

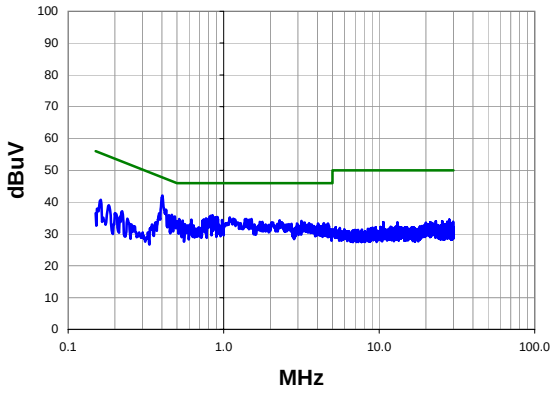
Test Specifications	**Test Method**
FCC 15.207:2012	ANSI C63.10:2009

Run #	1	**Line:**	Neutral	**Ext. Attenuation:**	20	**Results**	Pass

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.403	22.0	20.1	42.1	57.8	-15.7
0.849	15.8	20.1	35.9	56.0	-20.1
0.823	15.6	20.1	35.7	56.0	-20.3
0.465	15.9	20.1	36.0	56.6	-20.6
0.910	15.2	20.1	35.3	56.0	-20.7
0.485	15.4	20.1	35.5	56.3	-20.8
1.096	15.1	20.1	35.2	56.0	-20.8
0.884	15.1	20.1	35.2	56.0	-20.8
0.444	15.8	20.1	35.9	57.0	-21.1
0.772	14.8	20.1	34.9	56.0	-21.1
0.517	14.6	20.1	34.7	56.0	-21.3
1.376	14.5	20.2	34.7	56.0	-21.3
1.512	14.5	20.2	34.7	56.0	-21.3
0.745	14.5	20.1	34.6	56.0	-21.4
0.621	14.4	20.1	34.5	56.0	-21.5
0.978	14.3	20.1	34.4	56.0	-21.6
2.296	14.1	20.2	34.3	56.0	-21.7
0.546	14.1	20.1	34.2	56.0	-21.8
0.731	14.1	20.1	34.2	56.0	-21.8
3.168	13.9	20.2	34.1	56.0	-21.9

Peak Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.403	22.0	20.1	42.1	47.8	-5.7
0.849	15.8	20.1	35.9	46.0	-10.1
0.823	15.6	20.1	35.7	46.0	-10.3
0.465	15.9	20.1	36.0	46.6	-10.6
0.910	15.2	20.1	35.3	46.0	-10.7
0.485	15.4	20.1	35.5	46.3	-10.8
1.096	15.1	20.1	35.2	46.0	-10.8
0.884	15.1	20.1	35.2	46.0	-10.8
0.444	15.8	20.1	35.9	47.0	-11.1
0.772	14.8	20.1	34.9	46.0	-11.1
0.517	14.6	20.1	34.7	46.0	-11.3
1.376	14.5	20.2	34.7	46.0	-11.3
1.512	14.5	20.2	34.7	46.0	-11.3
0.745	14.5	20.1	34.6	46.0	-11.4
0.621	14.4	20.1	34.5	46.0	-11.5
0.978	14.3	20.1	34.4	46.0	-11.6
2.296	14.1	20.2	34.3	46.0	-11.7
0.546	14.1	20.1	34.2	46.0	-11.8
0.731	14.1	20.1	34.2	46.0	-11.8
3.168	13.9	20.2	34.1	46.0	-11.9

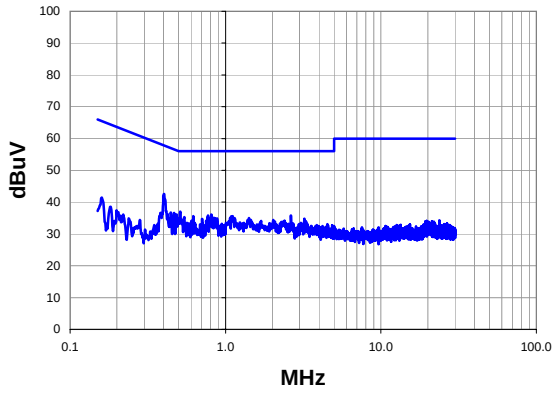
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	TRPO0070	**Date:**	01/04/12		
Project:	None	**Temperature:**	22.3 °C		
Job Site:	EV07	**Humidity:**	33.3% RH		
Serial Number:	None	**Barometric Pres.:**	1023 mbar	**Tested by:**	Kyle Holgate
EUT:	Nomad with Cirronet Module				
Configuration:	1				
Customer:	Trimble Navigation Limited MCS				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting - Low channel				
Deviations:	None				
Comments:	None				

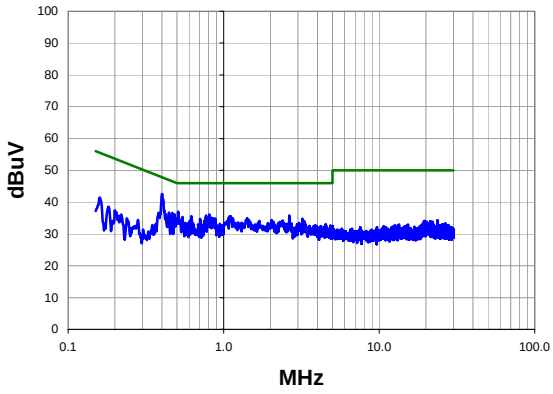
Test Specifications	**Test Method**
FCC 15.207:2012	ANSI C63.10:2009

Run #	2	**Line:**	High Line	**Ext. Attenuation:**	20	**Results**	Pass

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.402	22.5	20.1	42.6	57.8	-15.2
0.510	16.9	20.1	37.0	56.0	-19.0
0.810	16.0	20.1	36.1	56.0	-19.9
0.466	16.5	20.1	36.6	56.6	-20.0
0.483	16.0	20.1	36.1	56.3	-20.2
0.770	15.7	20.1	35.8	56.0	-20.2
2.640	15.6	20.2	35.8	56.0	-20.2
0.444	16.6	20.1	36.7	57.0	-20.3
1.112	15.5	20.1	35.6	56.0	-20.4
0.619	15.5	20.1	35.6	56.0	-20.4
0.543	15.2	20.1	35.3	56.0	-20.7
0.849	14.9	20.1	35.0	56.0	-21.0
1.072	14.9	20.1	35.0	56.0	-21.0
1.416	14.8	20.2	35.0	56.0	-21.0
0.883	14.8	20.1	34.9	56.0	-21.1
3.208	14.6	20.2	34.8	56.0	-21.2
0.706	14.6	20.1	34.7	56.0	-21.3
2.032	14.2	20.2	34.4	56.0	-21.6
0.606	14.1	20.1	34.2	56.0	-21.8
2.400	14.0	20.2	34.2	56.0	-21.8

Peak Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.402	22.5	20.1	42.6	47.8	-5.2
0.510	16.9	20.1	37.0	46.0	-9.0
0.810	16.0	20.1	36.1	46.0	-9.9
0.466	16.5	20.1	36.6	46.6	-10.0
0.483	16.0	20.1	36.1	46.3	-10.2
0.770	15.7	20.1	35.8	46.0	-10.2
2.640	15.6	20.2	35.8	46.0	-10.2
0.444	16.6	20.1	36.7	47.0	-10.3
1.112	15.5	20.1	35.6	46.0	-10.4
0.619	15.5	20.1	35.6	46.0	-10.4
0.543	15.2	20.1	35.3	46.0	-10.7
0.849	14.9	20.1	35.0	46.0	-11.0
1.072	14.9	20.1	35.0	46.0	-11.0
1.416	14.8	20.2	35.0	46.0	-11.0
0.883	14.8	20.1	34.9	46.0	-11.1
3.208	14.6	20.2	34.8	46.0	-11.2
0.706	14.6	20.1	34.7	46.0	-11.3
2.032	14.2	20.2	34.4	46.0	-11.6
0.606	14.1	20.1	34.2	46.0	-11.8
2.400	14.0	20.2	34.2	46.0	-11.8

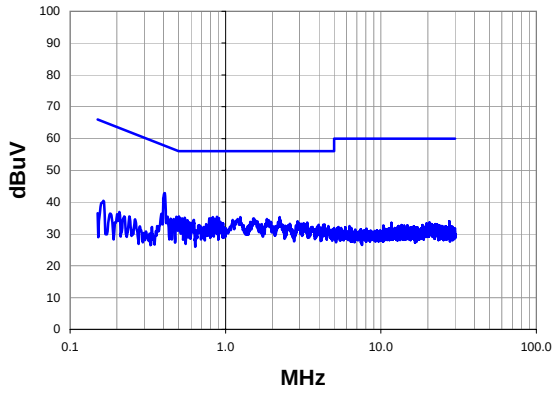
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	TRPO0070	**Date:**	01/04/12		
Project:	None	**Temperature:**	22.3 °C		
Job Site:	EV07	**Humidity:**	33.3% RH		
Serial Number:	None	**Barometric Pres.:**	1023 mbar	**Tested by:**	Kyle Holgate
EUT:	Nomad with Cirronet Module				
Configuration:	1				
Customer:	Trimble Navigation Limited MCS				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting - Mid channel				
Deviations:	None				
Comments:	None				

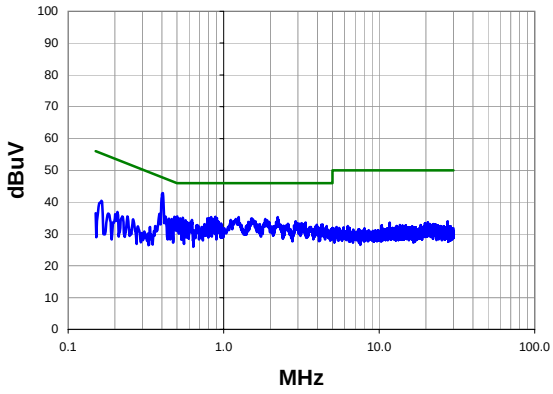
Test Specifications	**Test Method**
FCC 15.207:2012	ANSI C63.10:2009

Run #	3	**Line:**	High Line	**Ext. Attenuation:**	20	**Results**	Pass

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.407	22.8	20.1	42.9	57.7	-14.8
0.502	15.4	20.1	35.5	56.0	-20.5
0.883	15.3	20.1	35.4	56.0	-20.6
0.830	15.2	20.1	35.3	56.0	-20.7
1.248	15.1	20.2	35.3	56.0	-20.7
2.232	15.1	20.2	35.3	56.0	-20.7
0.483	15.3	20.1	35.4	56.3	-20.9
0.546	15.0	20.1	35.1	56.0	-20.9
0.905	14.9	20.1	35.0	56.0	-21.0
0.526	14.8	20.1	34.9	56.0	-21.1
0.786	14.8	20.1	34.9	56.0	-21.1
0.808	14.8	20.1	34.9	56.0	-21.1
1.520	14.7	20.2	34.9	56.0	-21.1
0.845	14.6	20.1	34.7	56.0	-21.3
0.872	14.6	20.1	34.7	56.0	-21.3
1.848	14.5	20.2	34.7	56.0	-21.3
0.624	14.3	20.1	34.4	56.0	-21.6
0.568	14.2	20.1	34.3	56.0	-21.7
0.386	16.2	20.1	36.3	58.1	-21.8
0.465	14.6	20.1	34.7	56.6	-21.9

Peak Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.407	22.8	20.1	42.9	47.7	-4.8
0.502	15.4	20.1	35.5	46.0	-10.5
0.883	15.3	20.1	35.4	46.0	-10.6
0.830	15.2	20.1	35.3	46.0	-10.7
1.248	15.1	20.2	35.3	46.0	-10.7
2.232	15.1	20.2	35.3	46.0	-10.7
0.483	15.3	20.1	35.4	46.3	-10.9
0.546	15.0	20.1	35.1	46.0	-10.9
0.905	14.9	20.1	35.0	46.0	-11.0
0.526	14.8	20.1	34.9	46.0	-11.1
0.786	14.8	20.1	34.9	46.0	-11.1
0.808	14.8	20.1	34.9	46.0	-11.1
1.520	14.7	20.2	34.9	46.0	-11.1
0.845	14.6	20.1	34.7	46.0	-11.3
0.872	14.6	20.1	34.7	46.0	-11.3
1.848	14.5	20.2	34.7	46.0	-11.3
0.624	14.3	20.1	34.4	46.0	-11.6
0.568	14.2	20.1	34.3	46.0	-11.7
0.386	16.2	20.1	36.3	48.1	-11.8
0.465	14.6	20.1	34.7	46.6	-11.9

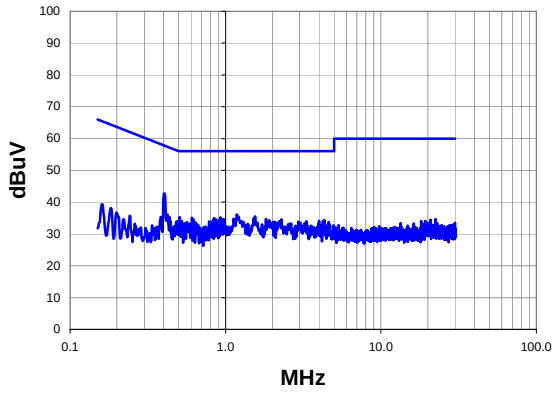
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	TRPO0070	**Date:**	01/04/12		
Project:	None	**Temperature:**	22.3 °C		
Job Site:	EV07	**Humidity:**	33.3% RH		
Serial Number:	None	**Barometric Pres.:**	1023 mbar	**Tested by:**	Kyle Holgate
EUT:	Nomad with Cirronet Module				
Configuration:	1				
Customer:	Trimble Navigation Limited MCS				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting - Mid channel				
Deviations:	None				
Comments:	None				

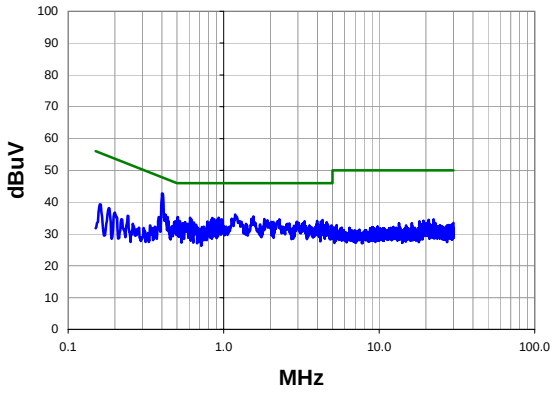
Test Specifications	**Test Method**
FCC 15.207:2012	ANSI C63.10:2009

Run #	4	**Line:**	Neutral	**Ext. Attenuation:**	20	**Results**	Pass

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.403	22.7	20.1	42.8	57.8	-15.0
1.184	15.9	20.2	36.1	56.0	-19.9
1.552	15.3	20.2	35.5	56.0	-20.5
0.505	15.2	20.1	35.3	56.0	-20.7
0.609	15.0	20.1	35.1	56.0	-20.9
0.929	15.0	20.1	35.1	56.0	-20.9
0.844	14.9	20.1	35.0	56.0	-21.0
1.824	14.5	20.2	34.7	56.0	-21.3
0.871	14.5	20.1	34.6	56.0	-21.4
0.969	14.5	20.1	34.6	56.0	-21.4
2.280	14.4	20.2	34.6	56.0	-21.4
0.623	14.4	20.1	34.5	56.0	-21.5
0.833	14.4	20.1	34.5	56.0	-21.5
0.910	14.4	20.1	34.5	56.0	-21.5
0.988	14.3	20.1	34.4	56.0	-21.6
4.320	14.2	20.2	34.4	56.0	-21.6
0.436	15.2	20.1	35.3	57.1	-21.8
0.522	14.0	20.1	34.1	56.0	-21.9
3.992	13.9	20.2	34.1	56.0	-21.9
3.312	13.8	20.2	34.0	56.0	-22.0

Peak Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.403	22.7	20.1	42.8	47.8	-5.0
1.184	15.9	20.2	36.1	46.0	-9.9
1.552	15.3	20.2	35.5	46.0	-10.5
0.505	15.2	20.1	35.3	46.0	-10.7
0.609	15.0	20.1	35.1	46.0	-10.9
0.929	15.0	20.1	35.1	46.0	-10.9
0.844	14.9	20.1	35.0	46.0	-11.0
1.824	14.5	20.2	34.7	46.0	-11.3
0.871	14.5	20.1	34.6	46.0	-11.4
0.969	14.5	20.1	34.6	46.0	-11.4
2.280	14.4	20.2	34.6	46.0	-11.4
0.623	14.4	20.1	34.5	46.0	-11.5
0.833	14.4	20.1	34.5	46.0	-11.5
0.910	14.4	20.1	34.5	46.0	-11.5
0.988	14.3	20.1	34.4	46.0	-11.6
4.320	14.2	20.2	34.4	46.0	-11.6
0.436	15.2	20.1	35.3	47.1	-11.8
0.522	14.0	20.1	34.1	46.0	-11.9
3.992	13.9	20.2	34.1	46.0	-11.9
3.312	13.8	20.2	34.0	46.0	-12.0

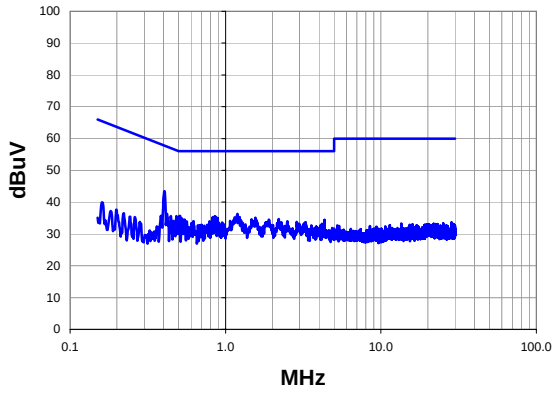
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	TRPO0070	**Date:**	01/04/12		
Project:	None	**Temperature:**	22.3 °C		
Job Site:	EV07	**Humidity:**	33.3% RH		
Serial Number:	None	**Barometric Pres.:**	1023 mbar	**Tested by:**	Kyle Holgate
EUT:	Nomad with Cirronet Module				
Configuration:	1				
Customer:	Trimble Navigation Limited MCS				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting - High channel				
Deviations:	None				
Comments:	None				

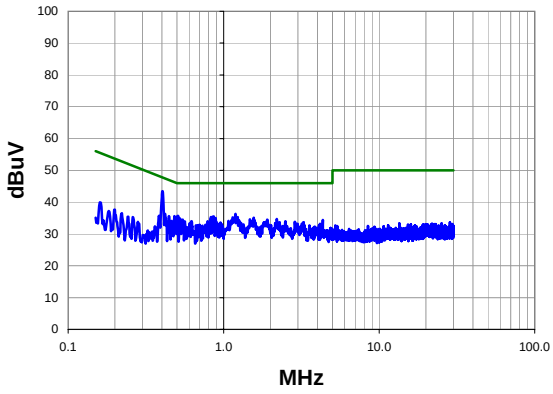
Test Specifications	**Test Method**
FCC 15.207:2012	ANSI C63.10:2009

Run #	6	**Line:**	High Line	**Ext. Attenuation:**	20	**Results**	Pass

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.405	23.4	20.1	43.5	57.8	-14.3
1.192	16.1	20.2	36.3	56.0	-19.7
0.509	15.6	20.1	35.7	56.0	-20.3
0.862	15.4	20.1	35.5	56.0	-20.5
0.849	15.3	20.1	35.4	56.0	-20.6
0.483	15.5	20.1	35.6	56.3	-20.7
0.828	15.2	20.1	35.3	56.0	-20.7
1.560	14.9	20.2	35.1	56.0	-20.9
0.889	14.9	20.1	35.0	56.0	-21.0
0.522	14.8	20.1	34.9	56.0	-21.1
0.420	16.2	20.1	36.3	57.4	-21.1
2.200	14.5	20.2	34.7	56.0	-21.3
0.446	15.5	20.1	35.6	57.0	-21.4
0.544	14.4	20.1	34.5	56.0	-21.5
1.904	14.3	20.2	34.5	56.0	-21.5
4.336	14.2	20.2	34.4	56.0	-21.6
0.621	13.9	20.1	34.0	56.0	-22.0
0.791	13.9	20.1	34.0	56.0	-22.0
2.496	13.8	20.2	34.0	56.0	-22.0
0.561	13.8	20.1	33.9	56.0	-22.1

Peak Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.405	23.4	20.1	43.5	47.8	-4.3
1.192	16.1	20.2	36.3	46.0	-9.7
0.509	15.6	20.1	35.7	46.0	-10.3
0.862	15.4	20.1	35.5	46.0	-10.5
0.849	15.3	20.1	35.4	46.0	-10.6
0.483	15.5	20.1	35.6	46.3	-10.7
0.828	15.2	20.1	35.3	46.0	-10.7
1.560	14.9	20.2	35.1	46.0	-10.9
0.889	14.9	20.1	35.0	46.0	-11.0
0.522	14.8	20.1	34.9	46.0	-11.1
0.420	16.2	20.1	36.3	47.4	-11.1
2.200	14.5	20.2	34.7	46.0	-11.3
0.446	15.5	20.1	35.6	47.0	-11.4
0.544	14.4	20.1	34.5	46.0	-11.5
1.904	14.3	20.2	34.5	46.0	-11.5
4.336	14.2	20.2	34.4	46.0	-11.6
0.621	13.9	20.1	34.0	46.0	-12.0
0.791	13.9	20.1	34.0	46.0	-12.0
2.496	13.8	20.2	34.0	46.0	-12.0
0.561	13.8	20.1	33.9	46.0	-12.1

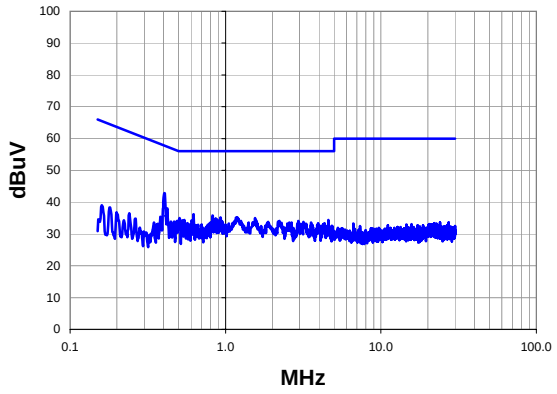
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	TRPO0070	**Date:**	01/04/12		
Project:	None	**Temperature:**	22.3 °C		
Job Site:	EV07	**Humidity:**	33.3% RH		
Serial Number:	None	**Barometric Pres.:**	1023 mbar	**Tested by:**	Kyle Holgate
EUT:	Nomad with Cirronet Module				
Configuration:	1				
Customer:	Trimble Navigation Limited MCS				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting - High channel				
Deviations:	None				
Comments:	None				

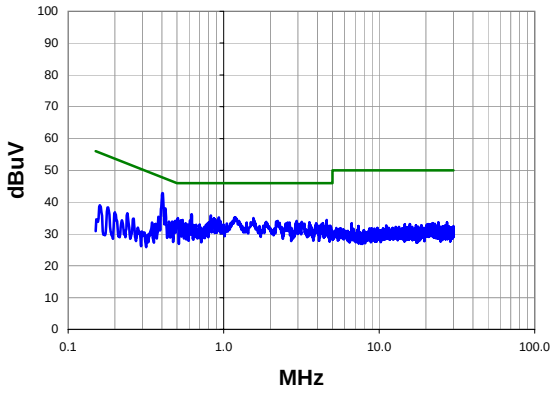
Test Specifications	**Test Method**
FCC 15.207:2012	ANSI C63.10:2009

Run #	7	**Line:**	Neutral	**Ext. Attenuation:**	20	**Results**	Pass

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.405	22.8	20.1	42.9	57.8	-14.9
0.420	17.9	20.1	38.0	57.4	-19.4
0.623	16.1	20.1	36.2	56.0	-19.8
0.827	15.7	20.1	35.8	56.0	-20.2
0.930	15.1	20.1	35.2	56.0	-20.8
1.184	15.0	20.2	35.2	56.0	-20.8
0.507	14.9	20.1	35.0	56.0	-21.0
1.552	14.8	20.2	35.0	56.0	-21.0
0.862	14.7	20.1	34.8	56.0	-21.2
0.544	14.3	20.1	34.4	56.0	-21.6
0.886	14.3	20.1	34.4	56.0	-21.6
4.592	14.2	20.2	34.4	56.0	-21.6
0.529	14.2	20.1	34.3	56.0	-21.7
0.607	14.2	20.1	34.3	56.0	-21.7
0.912	14.0	20.1	34.1	56.0	-21.9
2.224	13.9	20.2	34.1	56.0	-21.9
2.944	13.9	20.2	34.1	56.0	-21.9
0.487	14.0	20.1	34.1	56.2	-22.1
1.880	13.6	20.2	33.8	56.0	-22.2
3.176	13.6	20.2	33.8	56.0	-22.2

Peak Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.405	22.8	20.1	42.9	47.8	-4.9
0.420	17.9	20.1	38.0	47.4	-9.4
0.623	16.1	20.1	36.2	46.0	-9.8
0.827	15.7	20.1	35.8	46.0	-10.2
0.930	15.1	20.1	35.2	46.0	-10.8
1.184	15.0	20.2	35.2	46.0	-10.8
0.507	14.9	20.1	35.0	46.0	-11.0
1.552	14.8	20.2	35.0	46.0	-11.0
0.862	14.7	20.1	34.8	46.0	-11.2
0.544	14.3	20.1	34.4	46.0	-11.6
0.886	14.3	20.1	34.4	46.0	-11.6
4.592	14.2	20.2	34.4	46.0	-11.6
0.529	14.2	20.1	34.3	46.0	-11.7
0.607	14.2	20.1	34.3	46.0	-11.7
0.912	14.0	20.1	34.1	46.0	-11.9
2.224	13.9	20.2	34.1	46.0	-11.9
2.944	13.9	20.2	34.1	46.0	-11.9
0.487	14.0	20.1	34.1	46.2	-12.1
1.880	13.6	20.2	33.8	46.0	-12.2
3.176	13.6	20.2	33.8	46.0	-12.2