Itron

MLOG03

Report No. ITRO0004

Report Prepared By

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

EMC Test Report

NORTHWEST EMC

22975 NW Evergreen Parkway
Suite 400
Hillsboro, Oregon 97124

Certificate of Test

Last Date of Test: June 9, 2010
Itron
Model: MLOG03

Emissions			
Test Description	**Specification**	**Test Method**	**Pass/Fail**
Spurious Radiated Emissions	FCC 15.247:2010	ANSI C63.10:2009	**Pass**
Receiver Spurious Emissions	FCC 15.109:2010 Class B	ANSI C63.10:2009	**Pass**

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.
9349 W Broadway Ave.
Brooklyn Park, MN 55445

Phone: (763) 425-2281 Fax: (763) 424-3469

This site has been fully described in a report filed with and accepted by the FCC (Federal Communications Commission) and Industry Canada (Site filing #2834E-1).

Approved By:

Don Facteau, IS Manager

NVLAP

NVLAP Lab Code: 200881-0

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		

Barometric Pressure

The recorded barometric pressure has been normalized to sea level.

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 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 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.

NVLAP LAB CODE 200629-0
NVLAP LAB CODE 200630-0
NVLAP LAB CODE 200676-0
NVLAP LAB CODE 200761-0
NVLAP LAB CODE 200881-0

Industry Canada

Accredited by NVLAP for performance of Industry Canada RSS and ICES testing. Our Open Area Test Sites and certification chambers comply with RSS-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.

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).

Accreditations and Authorizations

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, 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-1784, 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). 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

KCC

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

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/

Northwest EMC Locations

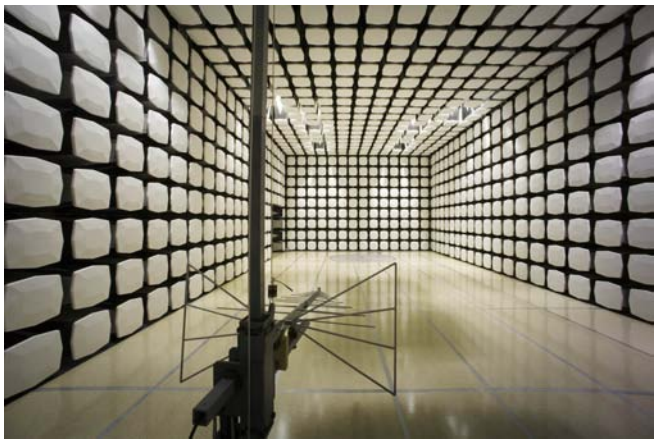
Oregon
Labs EV01-EV12
22975 NW Evergreen Pkwy
Suite 400
Hillsboro, OR 97124
(503) 844-4066

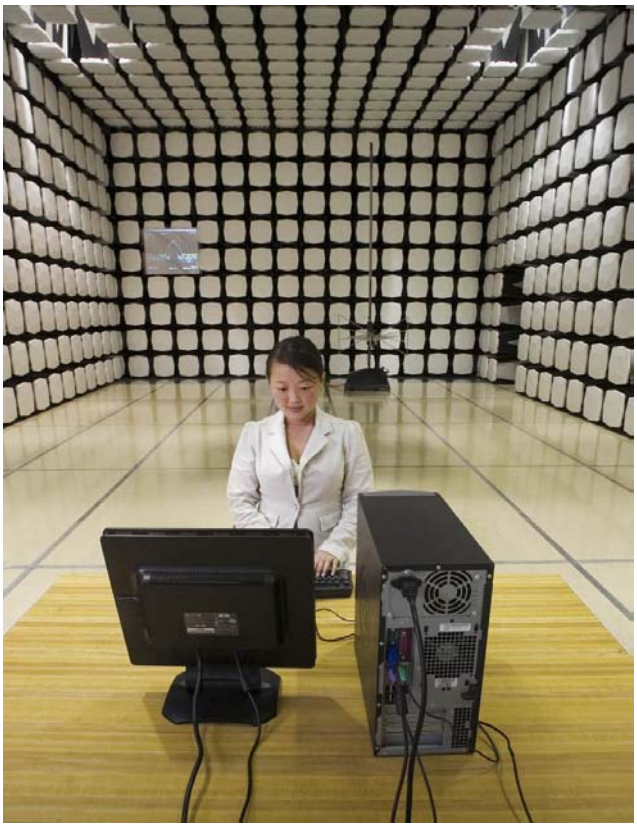
California
Labs OC01-OC13
41 Tesla
Irvine, CA 92618
(949) 861-8918

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





Party Requesting the Test

Company Name:	Itron
Address:	2111 N Molter Road
City, State, Zip:	Liberty Lake, WA 99019
Test Requested By:	Jay Holcomb
Model:	MLOG03
First Date of Test:	June 9, 2010
Last Date of Test:	June 9, 2010
Receipt Date of Samples:	June 9, 2010
Equipment Design Stage:	Production
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT (Equipment Under Test):

Spread Spectrum hybrid with a 915 MHz, 5-channel frequency hopper.

Testing Objective:

To demonstrate compliance to FCC 15.247 spurious radiated emissions requirements of both the transmitter and receiver portions for the MLOG03 radio.

EUT Photo

CONFIGURATION 1 ITRO0004

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
MLOG03	Itron	MLOG03	46-074539

CONFIGURATION 2 ITRO0004

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
MLOG03	Itron	MLOG03	46-074541

CONFIGURATION 4 ITRO0004

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
MLOG03	Itron	MLOG03	46-074533

CONFIGURATION 5 ITRO0004

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
MLOG03	Itron	MLOG03	46-074535

Equipment modifications					
Item	Date	Test	Modification	Note	Disposition of EUT
1	6/9/2010	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
2	6/9/2010	Receiver Spurious Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

Receiver Spurious 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
No Hop, Receive, Low channel 913.3 MHz.
No Hop, Receive, High channel 917.3 MHz.

POWER SETTINGS INVESTIGATED
Battery

CONFIGURATIONS INVESTIGATED
ITRO0004 - 4
ITRO0004 - 5

FREQUENCY RANGE INVESTIGATED			
Start Frequency	30 MHz	Stop Frequency	10 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
Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVV	7/1/2009	13 mo
Antenna, Horn	ETS	3160-07	AXP	NCR	0 mo
MN05 Cables	ESM Cable Corp.	Standard Gain Horn Cables	MNJ	7/1/2009	13 mo
MN05 Cables	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	7/1/2009	13 mo
MN05 Cables	ESM Cable Corp.	Bilog Cables	MNH	1/15/2010	13 mo
Antenna, Horn (DRG)	ETS Lindgren	3115	AIP	12/22/2009	24 mo
Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVX	7/1/2009	13 mo
Pre-Amplifier	Miteq	AM-1616-1000	AVY	7/1/2009	13 mo
Antenna, Biconilog	ETS Lindgren	3142D	AXN	12/30/2009	13 mo
Spectrum Analyzer	Agilent	E4446A	AAT	2/24/2010	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 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 and high channel receive frequency. For this configuration, the spectrum was scanned throughout the specified range. 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.

NORTHWEST

EMC

Receiver Spurious Emissions

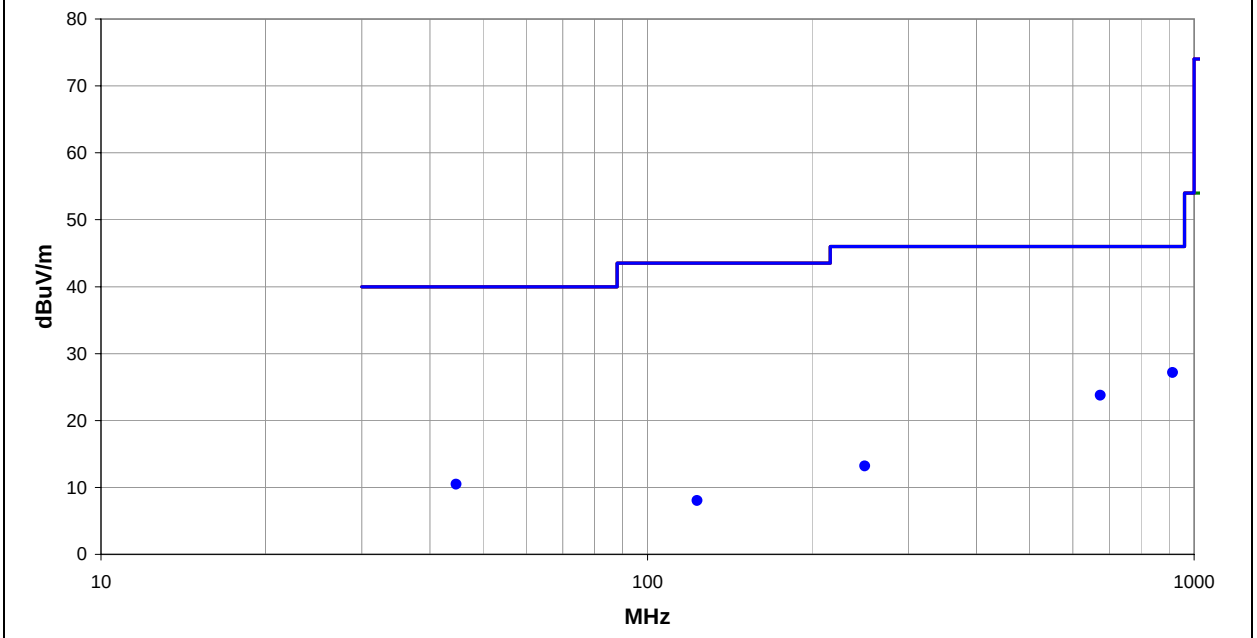
PSA-ESCI 2010.04.06
Version 2010.3.17

Work Order:	ITRO0004	**Date:**	06/09/10	Trevor Buls
Project:	None	**Temperature:**	21.72	
Job Site:	MN05	**Humidity:**	52.42	
Serial Number:	46-074535	**Barometric Pres.:**	1008.5	**Tested by:** Trevor Buls

EUT:	MLOG03
Configuration:	5 - SN 46-074535 Receive High
Customer:	Itron
Attendees:	None
EUT Power:	Battery
Operating Mode:	No Hop, Receive, High channel 917.3 MHz.
Deviations:	None
Comments:	EUT Vertical.

Test Specifications	**Class B**	**Test Method**
FCC 15.109:2010		ANSI C63.4:2003

Run #	19	**Test Distance (m)**	3	**Antenna Height(s)**	1-4m	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
914.174	16.5	10.7	2.3	10.0	3.0	0.0	Vert	QP	0.0	27.2	46.0	-18.8
673.789	16.5	7.3	1.5	329.0	3.0	0.0	Vert	QP	0.0	23.8	46.0	-22.2
44.630	17.2	-6.7	1.9	346.0	3.0	0.0	Vert	QP	0.0	10.5	40.0	-29.5
249.622	17.0	-3.8	1.9	171.0	3.0	0.0	Vert	QP	0.0	13.2	46.0	-32.8
123.241	16.9	-8.9	2.1	227.0	3.0	0.0	Vert	QP	0.0	8.0	43.5	-35.5

NORTHWEST

EMC

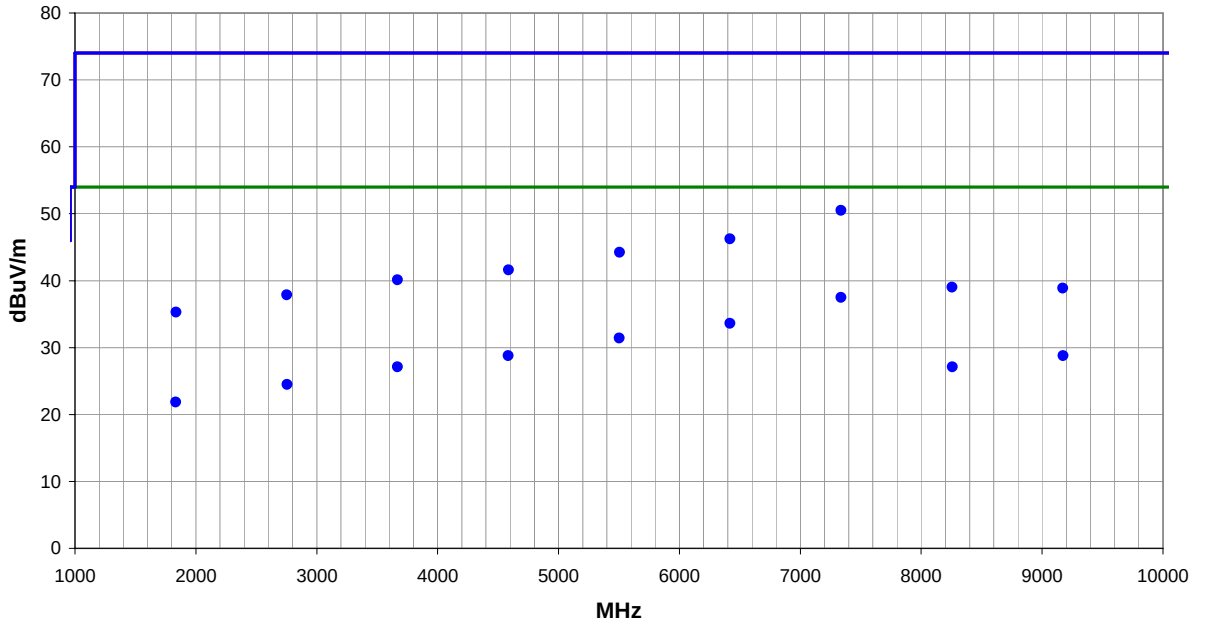
Receiver Spurious Emissions

PSA-ESCI 2010.04.06
Version 2010.3.17

Work Order:	ITRO0004	**Date:**	06/09/10	Trevor Buls	
Project:	None	**Temperature:**	21.72		
Job Site:	MN05	**Humidity:**	52.42		
Serial Number:	46-074535	**Barometric Pres.:**	1008.5	**Tested by:**	Trevor Buls
EUT:	MLOG03				
Configuration:	5 - SN 46-074535 Receive High				
Customer:	Itron				
Attendees:	None				
EUT Power:	Battery				
Operating Mode:	No Hop, Receive, High channel 917.3 MHz.				
Deviations:	None				
Comments:	EUT Vertical.				

Test Specifications	**Class B**	**Test Method**
FCC 15.109:2010		ANSI C63.4:2003

Run #	20	**Test Distance (m)**	3	**Antenna Height(s)**	1-4m	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
7336.579	27.3	10.2	3.0	271.0	3.0	0.0	Vert	AV	0.0	37.5	54.0	-16.5
6418.863	26.3	7.3	3.1	212.0	3.0	0.0	Vert	AV	0.0	33.6	54.0	-20.4
5502.221	27.5	3.9	1.2	322.0	3.0	0.0	Vert	AV	0.0	31.4	54.0	-22.6
7337.366	40.3	10.2	3.0	271.0	3.0	0.0	Vert	PK	0.0	50.5	74.0	-23.5
4584.786	28.1	0.7	1.2	304.0	3.0	0.0	Vert	AV	0.0	28.8	54.0	-25.2
3668.396	29.6	-2.5	1.2	249.0	3.0	0.0	Vert	AV	0.0	27.1	54.0	-26.9
6419.130	38.9	7.3	3.1	212.0	3.0	0.0	Vert	PK	0.0	46.2	74.0	-27.8
2753.940	29.7	-5.2	1.2	0.0	3.0	0.0	Horz	AV	0.0	24.5	54.0	-29.5
5504.775	40.3	3.9	1.2	322.0	3.0	0.0	Vert	PK	0.0	44.2	74.0	-29.8
1833.338	29.3	-7.5	1.2	91.0	3.0	0.0	Vert	AV	0.0	21.8	54.0	-32.2
4586.686	40.9	0.7	1.2	304.0	3.0	0.0	Vert	PK	0.0	41.6	74.0	-32.4
3667.289	42.6	-2.5	1.2	249.0	3.0	0.0	Vert	PK	0.0	40.1	74.0	-33.9
2752.580	43.1	-5.2	1.2	0.0	3.0	0.0	Horz	PK	0.0	37.9	74.0	-36.1
1835.972	42.7	-7.4	1.2	91.0	3.0	0.0	Vert	PK	0.0	35.3	74.0	-38.7
9173.380	37.6	-8.8	1.2	309.0	3.0	0.0	Horz	AV	0.0	28.8	54.0	-25.2
8258.088	37.1	-10.0	2.5	113.0	3.0	0.0	Horz	AV	0.0	27.1	54.0	-26.9
8254.646	49.0	-10.0	2.5	113.0	3.0	0.0	Horz	PK	0.0	39.0	74.0	-35.0
9170.696	47.7	-8.8	1.2	309.0	3.0	0.0	Horz	PK	0.0	38.9	74.0	-35.1

NORTHWEST

EMC

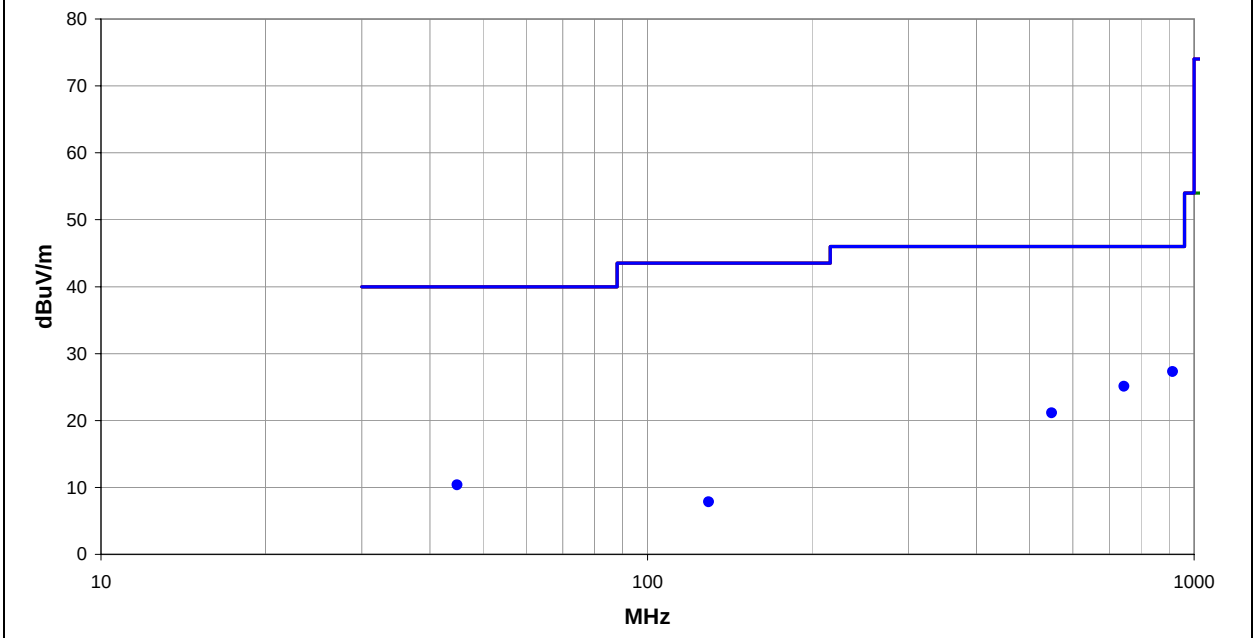
Receiver Spurious Emissions

PSA-ESCI 2010.04.06
Version 2010.3.17

Work Order:	ITRO0004	**Date:**	06/09/10	Trevor Buls	
Project:	None	**Temperature:**	21.72		
Job Site:	MN05	**Humidity:**	52.42		
Serial Number:	46-074533	**Barometric Pres.:**	1008.5	**Tested by:**	Trevor Buls
EUT:	MLOG03				
Configuration:	4 - SN 46-074533 Receive Low				
Customer:	Itron				
Attendees:	None				
EUT Power:	Battery				
Operating Mode:	No Hop, Receive, Low channel 913.3 MHz.				
Deviations:	None				
Comments:	EUT Vertical.				

Test Specifications	**Class B**	**Test Method**
FCC 15.109:2010		ANSI C63.4:2003

Run #	22	**Test Distance (m)**	3	**Antenna Height(s)**	1-4m	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
913.138	16.6	10.7	1.2	35.0	3.0	0.0	Vert	QP	0.0	27.3	46.0	-18.7
744.631	16.7	8.4	1.0	148.0	3.0	0.0	Vert	QP	0.0	25.1	46.0	-20.9
548.514	16.8	4.3	3.0	168.0	3.0	0.0	Horz	QP	0.0	21.1	46.0	-24.9
44.823	17.2	-6.8	3.0	26.0	3.0	0.0	Vert	QP	0.0	10.4	40.0	-29.6
129.366	16.8	-9.0	1.0	55.0	3.0	0.0	Horz	QP	0.0	7.8	43.5	-35.7

NORTHWEST

EMC

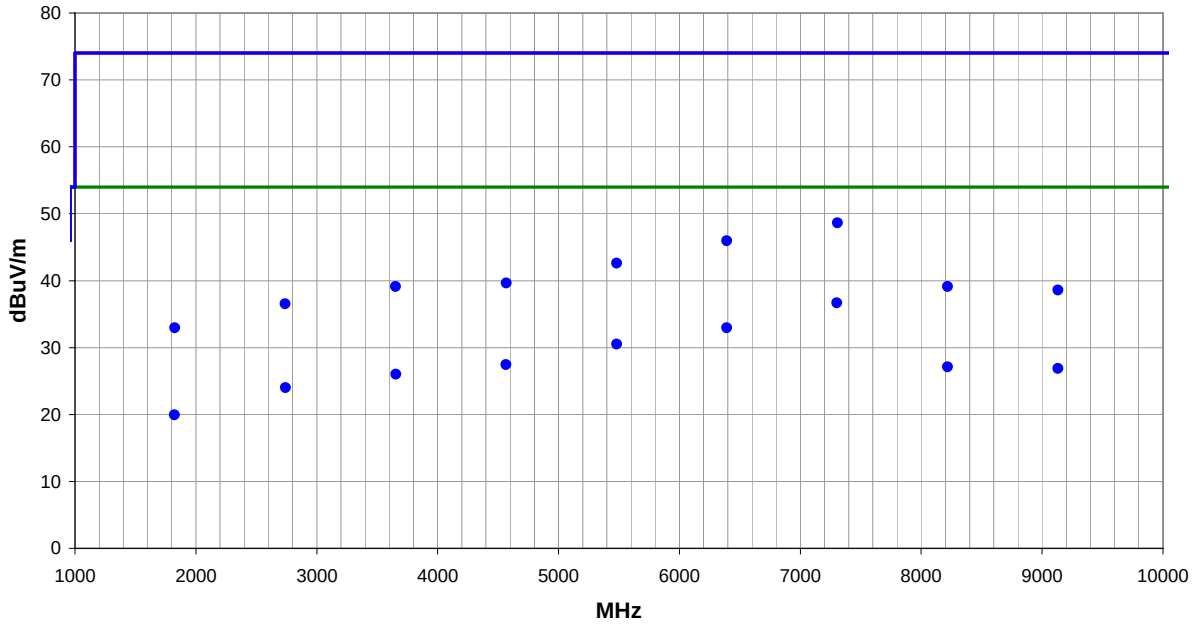
Receiver Spurious Emissions

PSA-ESCI 2010.04.06
Version 2010.3.17

Work Order:	ITRO0004	**Date:**	06/09/10	Trevor Buls	
Project:	None	**Temperature:**	21.72		
Job Site:	MN05	**Humidity:**	52.42		
Serial Number:	46-074533	**Barometric Pres.:**	1008.5	**Tested by:**	Trevor Buls
EUT:	MLOG03				
Configuration:	4 - SN 46-074533 Receive Low				
Customer:	Itron				
Attendees:	None				
EUT Power:	Battery				
Operating Mode:	No Hop, Receive, Low channel 913.3 MHz.				
Deviations:	None				
Comments:	EUT Vertical.				

Test Specifications	**Class B**	**Test Method**
FCC 15.109:2010		ANSI C63.4:2003

Run #	23	**Test Distance (m)**	3	**Antenna Height(s)**	1-4m	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
7303.592	26.7	10.0	1.2	165.0	3.0	0.0	Horz	AV	0.0	36.7	54.0	-17.3
6391.116	25.8	7.2	3.9	60.0	3.0	0.0	Horz	AV	0.0	33.0	54.0	-21.0
5480.727	26.6	3.9	1.2	360.0	3.0	0.0	Vert	AV	0.0	30.5	54.0	-23.5
7307.100	38.6	10.0	1.2	165.0	3.0	0.0	Horz	PK	0.0	48.6	74.0	-25.4
4566.730	26.9	0.6	1.2	142.0	3.0	0.0	Vert	AV	0.0	27.5	54.0	-26.5
3653.805	28.6	-2.6	1.2	317.0	3.0	0.0	Vert	AV	0.0	26.0	54.0	-28.0
6392.491	38.8	7.2	3.7	60.0	3.0	0.0	Horz	PK	0.0	46.0	74.0	-28.0
2742.283	29.2	-5.2	1.2	180.0	3.0	0.0	Horz	AV	0.0	24.0	54.0	-30.0
5480.377	38.7	3.9	1.2	360.0	3.0	0.0	Vert	PK	0.0	42.6	74.0	-31.4
1824.044	27.5	-7.5	1.2	333.0	3.0	0.0	Vert	AV	0.0	20.0	54.0	-34.0
4568.388	39.1	0.6	1.2	142.0	3.0	0.0	Vert	PK	0.0	39.7	74.0	-34.3
3653.564	41.7	-2.6	1.2	317.0	3.0	0.0	Vert	PK	0.0	39.1	74.0	-34.9
2737.908	41.7	-5.2	1.2	180.0	3.0	0.0	Horz	PK	0.0	36.5	74.0	-37.5
1825.219	40.5	-7.5	1.2	333.0	3.0	0.0	Vert	PK	0.0	33.0	74.0	-41.0
8217.490	37.2	-10.1	2.1	69.0	3.0	0.0	Horz	AV	0.0	27.1	54.0	-26.9
9131.473	35.8	-8.9	1.2	320.0	3.0	0.0	Horz	AV	0.0	26.9	54.0	-27.1
8217.781	49.2	-10.1	2.1	69.0	3.0	0.0	Horz	PK	0.0	39.1	74.0	-34.9
9131.340	47.5	-8.9	1.2	320.0	3.0	0.0	Horz	PK	0.0	38.6	74.0	-35.4

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
No Hop, Transmit, High channel 917.3 MHz.
No Hop, Transmit, Low channel 913.3 MHz.

POWER SETTINGS INVESTIGATED
Battery

CONFIGURATIONS INVESTIGATED
ITRO0004 - 1
ITRO0004 - 2

FREQUENCY RANGE INVESTIGATED			
Start Frequency	30 MHz	Stop Frequency	10 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
Attenuator, 20 dB, 'SMA'	SM Electronics	SA6-20	REO	6/18/2009	13 mo
Attenuator, 10db, 'SMA'	S.M. Electronics	SA18H-10	REN	6/18/2009	13 mo
High Pass Filter 0-425 MHz	Micro-Tronics	LPM50003	HGO	6/24/2009	13 mo
High Pass Filter	Micro-Tronics	HPM50108	HGP	6/24/2009	13 mo
Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVV	7/1/2009	13 mo
Antenna, Horn	ETS	3160-07	AXP	NCR	0 mo
Antenna, Horn (DRG)	ETS Lindgren	3115	AIP	12/22/2009	24 mo
MN05 Cables	ESM Cable Corp.	Standard Gain Horn Cables	MNJ	7/1/2009	13 mo
MN05 Cables	ESM Cable Corp.	uble Ridge Guide Horn Cabl	MNI	7/1/2009	13 mo
Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVX	7/1/2009	13 mo
MN05 Cables	ESM Cable Corp.	Bilog Cables	MNH	1/15/2010	13 mo
Pre-Amplifier	Miteq	AM-1616-1000	AVY	7/1/2009	13 mo
Antenna, Biconilog	ETS Lindgren	3142D	AXN	12/30/2009	13 mo
Spectrum Analyzer	Agilent	E4446A	AAT	2/24/2010	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 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 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.

The formula for duty cycle correction factor is 20*Log(42.375 ms / 100 ms) = -7.5 dB.

NORTHWEST

EMC

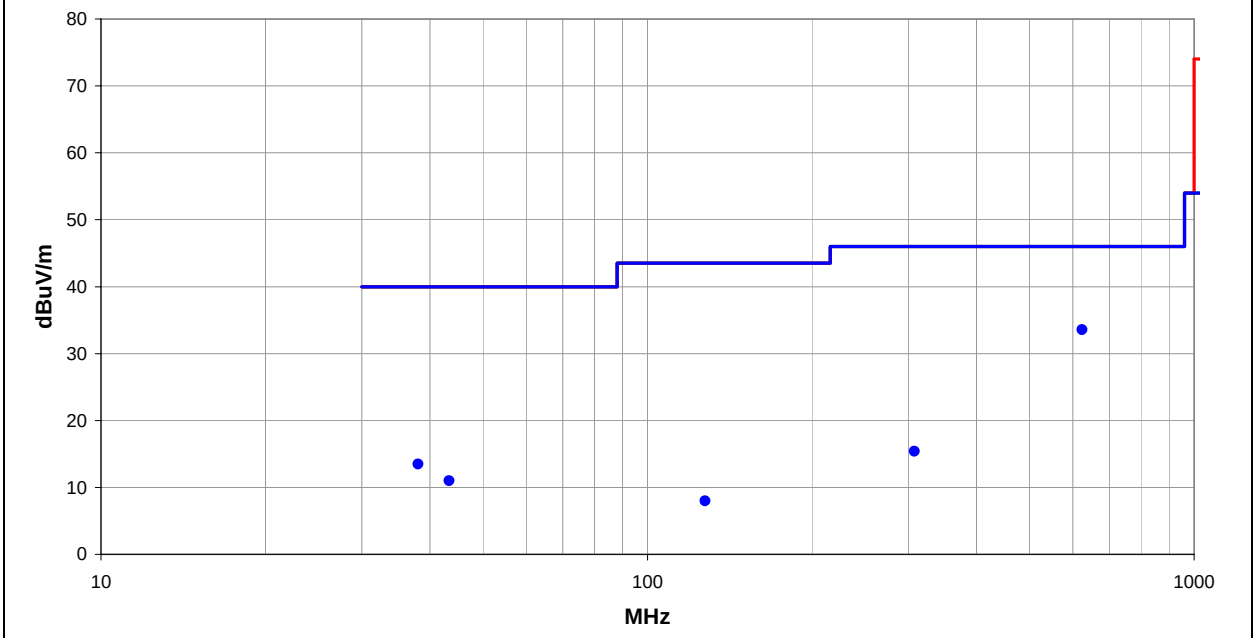
Spurious Radiated Emissions

PSA-ESCI 2010.04.06
Version 2010.3.17

Work Order:	ITRO0004	**Date:**	06/09/10	Trevor Buls	
Project:	None	**Temperature:**	21.72		
Job Site:	MN05	**Humidity:**	52.42		
Serial Number:	46-074539	**Barometric Pres.:**	1008.5	**Tested by:**	Trevor Buls
EUT:	MLOG03				
Configuration:	1 - SN 46-074539 Transmit Low				
Customer:	Itron				
Attendees:	None				
EUT Power:	Battery				
Operating Mode:	No Hop, Transmit, Low channel 913.3 MHz.				
Deviations:	None				
Comments:	EUT Vertical. The formula for duty cycle correction factor is 20*Log(42.375 ms / 100 ms) = -7.5 dB.				

Test Specifications	**Test Method**
FCC 15.247:2010	ANSI C63.10:2009

Run #	4	**Test Distance (m)**	3	**Antenna Height(s)**	1-4m	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
623.857	16.8	6.8	1.0	136.0	3.0	10.0	Vert	QP	0.0	33.6	46.0	-12.4
38.021	17.2	-3.7	2.0	176.0	3.0	0.0	Vert	QP	0.0	13.5	40.0	-26.5
43.379	17.2	-6.2	1.5	237.0	3.0	0.0	Vert	QP	0.0	11.0	40.0	-29.0
307.855	17.4	-2.0	1.5	26.0	3.0	0.0	Vert	QP	0.0	15.4	46.0	-30.6
127.435	16.9	-8.9	2.0	101.0	3.0	0.0	Vert	QP	0.0	8.0	43.5	-35.5

NORTHWEST

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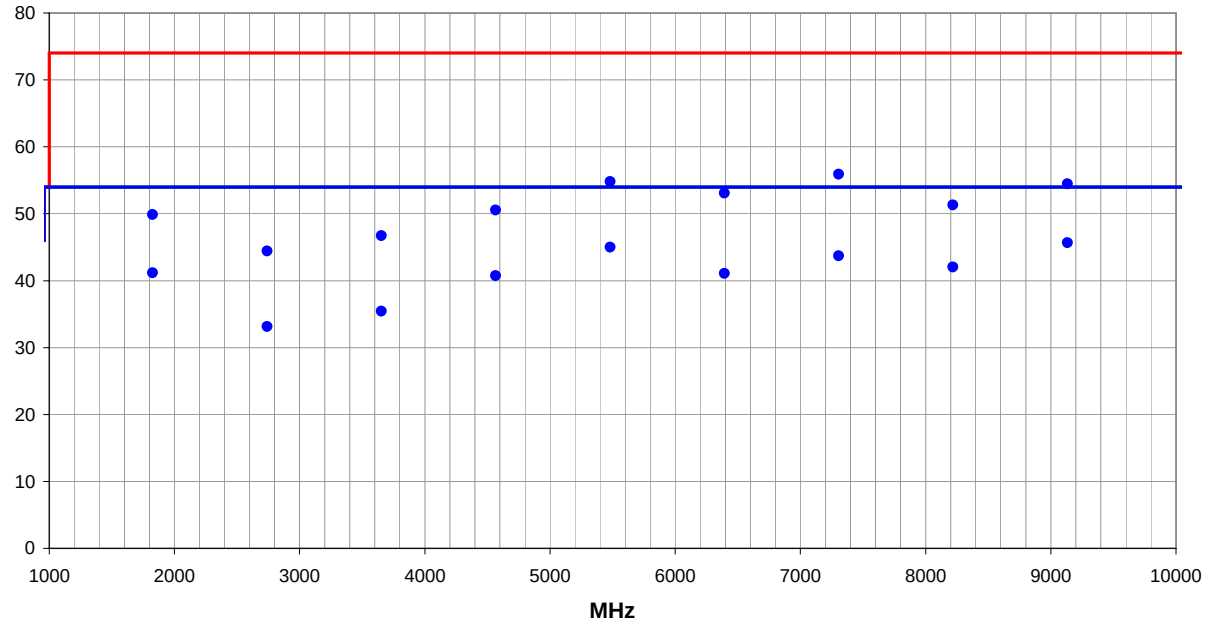
Spurious Radiated Emissions

PSA-ESCI 2010.04.06
Version 2010.3.17

Work Order:	ITRO0004	**Date:**	06/09/10	Trevor Buls	
Project:	None	**Temperature:**	21.72		
Job Site:	MN05	**Humidity:**	52.42		
Serial Number:	46-074539	**Barometric Pres.:**	1008.5	**Tested by:**	Trevor Buls
EUT:	MLOG03				
Configuration:	1 - SN 46-074539 Transmit Low				
Customer:	Itron				
Attendees:	None				
EUT Power:	Battery				
Operating Mode:	No Hop, Transmit, Low channel 913.3 MHz.				
Deviations:	None				
Comments:	EUT Vertical. The formula for duty cycle correction factor is 20*Log(42.375 ms / 100 ms) = -7.5 dB.				

Test Specifications	**Test Method**
FCC 15.247:2010	ANSI C63.10:2009

Run #	11	**Test Distance (m)**	3	**Antenna Height(s)**	1-4m	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
9132.907	62.1	-8.9	1.2	19.0	7.5	0.0	Horz	AV	0.0	45.7	54.0	-8.3
5479.777	48.6	3.9	1.4	360.0	7.5	0.0	Vert	AV	0.0	45.0	54.0	-9.0
7306.359	41.2	10.0	1.3	70.0	7.5	0.0	Horz	AV	0.0	43.7	54.0	-10.3
8219.606	59.6	-10.1	1.0	17.0	7.5	0.0	Horz	AV	0.0	42.0	54.0	-12.0
1826.611	56.2	-7.5	1.1	116.0	7.5	0.0	Vert	AV	0.0	41.2	54.0	-12.8
6393.016	41.4	7.2	1.4	350.0	7.5	0.0	Horz	AV	0.0	41.1	54.0	-12.9
4566.463	47.7	0.5	1.3	57.0	7.5	0.0	Vert	AV	0.0	40.7	54.0	-13.3
7306.459	45.9	10.0	1.3	70.0	0.0	0.0	Horz	PK	0.0	55.9	74.0	-18.1
3653.197	45.5	-2.6	1.4	202.0	7.5	0.0	Vert	AV	0.0	35.4	54.0	-18.6
5479.977	50.9	3.9	1.4	360.0	0.0	0.0	Vert	PK	0.0	54.8	74.0	-19.2
9132.807	63.4	-8.9	1.2	19.0	0.0	0.0	Horz	PK	0.0	54.5	74.0	-19.5
2739.891	45.8	-5.2	1.2	313.0	7.5	0.0	Horz	AV	0.0	33.1	54.0	-20.9
6393.083	45.9	7.2	1.4	350.0	0.0	0.0	Horz	PK	0.0	53.1	74.0	-20.9
8219.656	61.4	-10.1	1.0	17.0	0.0	0.0	Horz	PK	0.0	51.3	74.0	-22.7
4566.397	50.0	0.5	1.3	57.0	0.0	0.0	Vert	PK	0.0	50.5	74.0	-23.5
1826.536	57.4	-7.5	1.1	116.0	0.0	0.0	Vert	PK	0.0	49.9	74.0	-24.1
3653.139	49.3	-2.6	1.4	202.0	0.0	0.0	Vert	PK	0.0	46.7	74.0	-27.3
2740.025	49.6	-5.2	1.2	313.0	0.0	0.0	Horz	PK	0.0	44.4	74.0	-29.6

NORTHWEST

EMC

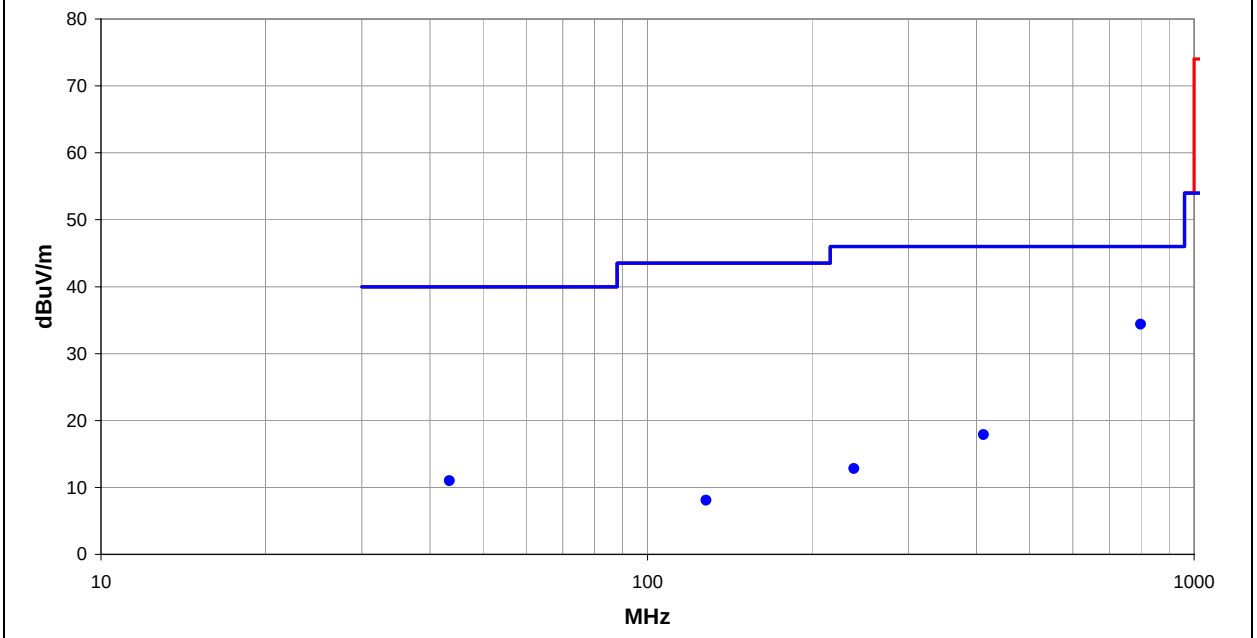
Spurious Radiated Emissions

PSA-ESCI 2010.04.06
Version 2010.3.17

Work Order:	ITRO0004	**Date:**	06/09/10	Trevor Buls	
Project:	None	**Temperature:**	21.72		
Job Site:	MN05	**Humidity:**	52.42		
Serial Number:	46-074541	**Barometric Pres.:**	1008.5	**Tested by:**	Trevor Buls
EUT:	MLOG03				
Configuration:	2 - SN 46-074541 Transmit High				
Customer:	Itron				
Attendees:	None				
EUT Power:	Battery				
Operating Mode:	No Hop, Transmit, High channel 917.3 MHz.				
Deviations:	None				
Comments:	EUT Vertical. The formula for duty cycle correction factor is 20*Log(42.375 ms / 100 ms) = -7.5 dB.				

Test Specifications	**Test Method**
FCC 15.247:2010	ANSI C63.10:2009

Run #	15	**Test Distance (m)**	3	**Antenna Height(s)**	1-4m	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
798.919	15.2	9.2	3.0	306.0	3.0	10.0	Vert	QP	0.0	34.4	46.0	-11.6
411.992	17.0	0.9	1.5	92.0	3.0	0.0	Vert	QP	0.0	17.9	46.0	-28.1
43.431	17.2	-6.2	1.9	322.0	3.0	0.0	Vert	QP	0.0	11.0	40.0	-29.0
238.466	17.0	-4.2	4.0	119.0	3.0	0.0	Vert	QP	0.0	12.8	46.0	-33.2
128.008	17.0	-8.9	1.5	147.0	3.0	0.0	Vert	QP	0.0	8.1	43.5	-35.4

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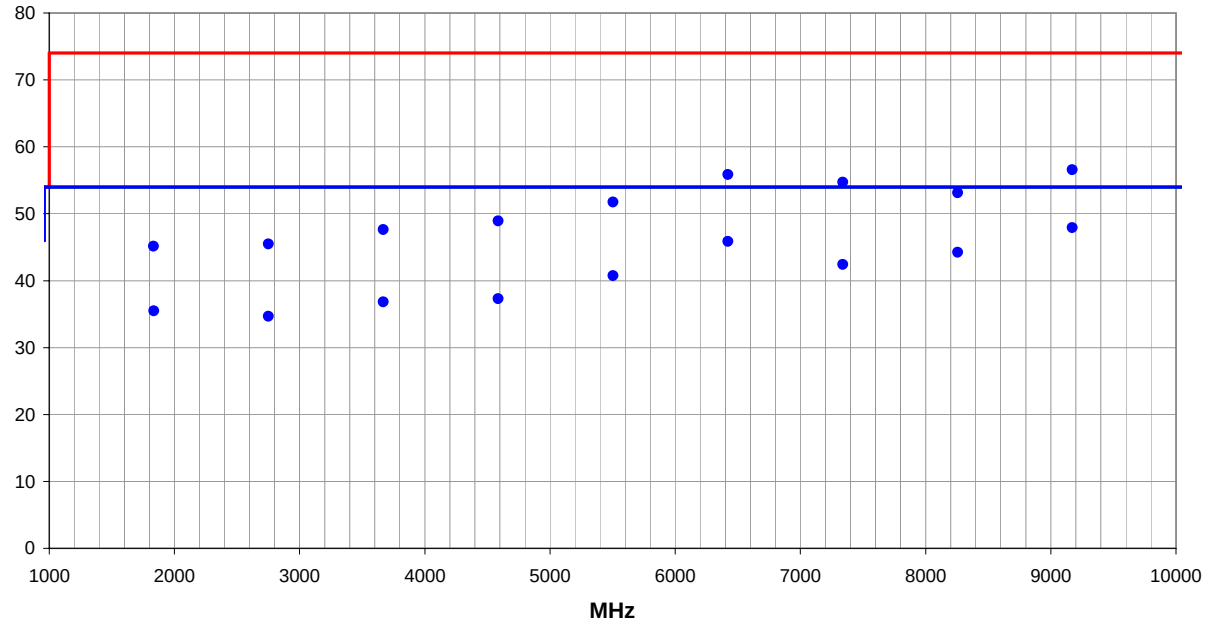
Spurious Radiated Emissions

PSA-ESCI 2010.04.06
Version 2010.3.17

Work Order:	ITRO0004	**Date:**	06/09/10	Trevor Buls	
Project:	None	**Temperature:**	21.72		
Job Site:	MN05	**Humidity:**	52.42		
Serial Number:	46-074541	**Barometric Pres.:**	1008.5	**Tested by:**	Trevor Buls
EUT:	MLOG03				
Configuration:	2 - SN 46-074541 Transmit High				
Customer:	Itron				
Attendees:	None				
EUT Power:	Battery				
Operating Mode:	No Hop, Transmit, High channel 917.3 MHz.				
Deviations:	None				
Comments:	EUT Vertical. The formula for duty cycle correction factor is 20*Log(42.375 ms / 100 ms) = -7.5 dB.				

Test Specifications	**Test Method**
FCC 15.247:2010	ANSI C63.10:2009

Run #	17	**Test Distance (m)**	3	**Antenna Height(s)**	1-4m	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
9172.863	64.2	-8.8	1.4	195.0	7.5	0.0	Horz	AV	0.0	47.9	54.0	-6.1
6421.022	46.0	7.3	1.4	247.0	7.5	0.0	Vert	AV	0.0	45.8	54.0	-8.2
8255.604	61.7	-10.0	1.0	196.0	7.5	0.0	Horz	AV	0.0	44.2	54.0	-9.8
7338.316	39.7	10.2	1.3	330.0	7.5	0.0	Vert	AV	0.0	42.4	54.0	-11.6
5503.740	44.3	3.9	1.2	153.0	7.5	0.0	Vert	AV	0.0	40.7	54.0	-13.3
4586.474	44.1	0.7	1.1	50.0	7.5	0.0	Vert	AV	0.0	37.3	54.0	-16.7
3669.179	46.8	-2.5	1.5	38.0	7.5	0.0	Vert	AV	0.0	36.8	54.0	-17.2
9172.938	65.4	-8.8	1.4	195.0	0.0	0.0	Horz	PK	0.0	56.6	74.0	-17.4
6420.772	48.5	7.3	1.4	247.0	0.0	0.0	Vert	PK	0.0	55.8	74.0	-18.2
1834.598	50.4	-7.4	1.2	359.0	7.5	0.0	Vert	AV	0.0	35.5	54.0	-18.5
7338.566	44.5	10.2	1.3	330.0	0.0	0.0	Vert	PK	0.0	54.7	74.0	-19.3
2751.897	47.4	-5.2	1.3	112.0	7.5	0.0	Horz	AV	0.0	34.7	54.0	-19.3
8255.804	63.1	-10.0	1.0	196.0	0.0	0.0	Horz	PK	0.0	53.1	74.0	-20.9
5503.331	47.8	3.9	1.2	153.0	0.0	0.0	Vert	PK	0.0	51.7	74.0	-22.3
4586.249	48.2	0.7	1.1	50.0	0.0	0.0	Vert	PK	0.0	48.9	74.0	-25.1
3669.004	50.1	-2.5	1.5	38.0	0.0	0.0	Vert	PK	0.0	47.6	74.0	-26.4
2751.847	50.7	-5.2	1.3	112.0	0.0	0.0	Horz	PK	0.0	45.5	74.0	-28.5
1834.415	52.6	-7.4	1.2	359.0	0.0	0.0	Vert	PK	0.0	45.2	74.0	-28.8