

Itron

MLC4

Report No. ITRO0001

Report Prepared By



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

© 2009 Northwest EMC, Inc

EMC Test Report

Certificate of Test
Last Date of Test: October 26, 2009
Itron
Model: MLC4

Emissions			
Test Description	Specification	Test Method	Pass/Fail
Spurious Radiated Emissions	FCC 15.247 (FHSS):2009	ANSI C63.4:2003 DA 00-705:2000	Pass
Receiver Radiated Emissions	FCC 15.109:2009	ANSI C63.4:2003	Pass
Occupied Bandwidth	FCC 15.247 (FHSS):2009	ANSI C63.4:2003 DA 00-705:2000	Pass
Output Power	FCC 15.247 (FHSS):2009	ANSI C63.4:2003 DA 00-705:2000	Pass
Band Edge Compliance	FCC 15.247 (FHSS):2009	ANSI C63.4:2003 DA 00-705:2000	Pass
Spurious Conducted Emissions	FCC 15.247 (FHSS):2009	ANSI C63.4:2003 DA 00-705:2000	Pass
Channel Spacing	FCC 15.247 (FHSS):2009	ANSI C63.4:2003 DA 00-705:2000	Pass
Number of Hopping Frequencies	FCC 15.247 (FHSS):2009	ANSI C63.4:2003 DA 00-705:2000	Pass
Dwell Time	FCC 15.247 (FHSS):2009	ANSI C63.4:2003 DA 00-705:2000	Pass
Power Spectral Density	FCC 15.247 (FHSS):2009	ANSI C63.4:2003 DA 00-705:2000	Pass
AC Powerline Conducted Emissions	FCC 15.207:2009	ANSI C63.4:2003	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 Fecteau, IS Manager



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).



Australia/New Zealand

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



VCCI

Accepted as an Associate Member to the VCCI, Acceptance No. 564. Conducted and radiated measurement facilities have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. (Registration Numbers. - Hillsboro: C-1071, R-1025, C-2687, T-289, and R-2318, Irvine: R-1943, C-2766, and T-298, Sultan: R-871, C-1784, and T-294, Brooklyn Park: R-3125, 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)



SCOPE

For details on the Scopes of our Accreditations, please visit:

<http://www.nwemc.com/accreditations/>



Northwest EMC Locations



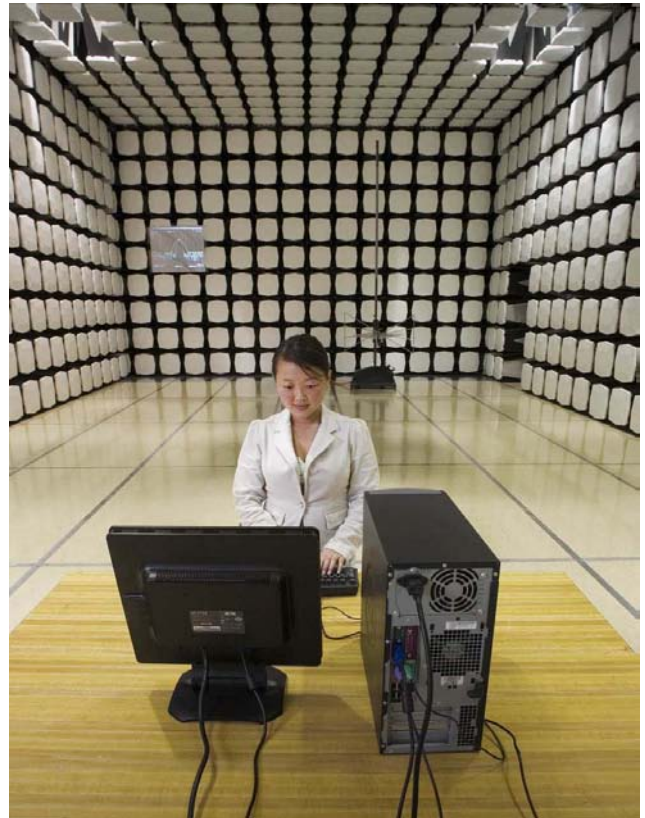
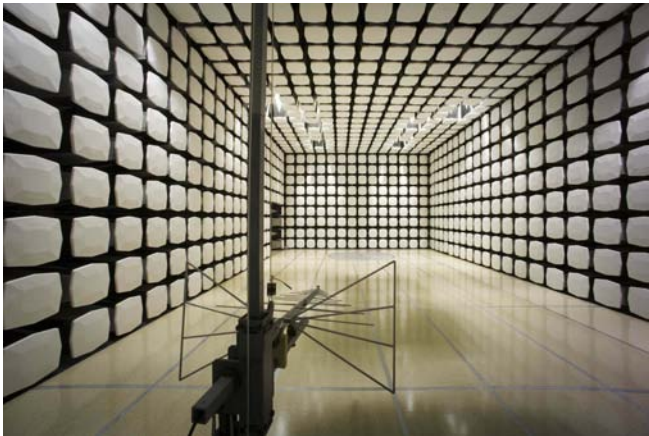
Oregon
Labs EV01-EV12
22975 NW Evergreen Pkwy
Suite 400
Hillsboro, OR 97124
(503) 844-4066

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

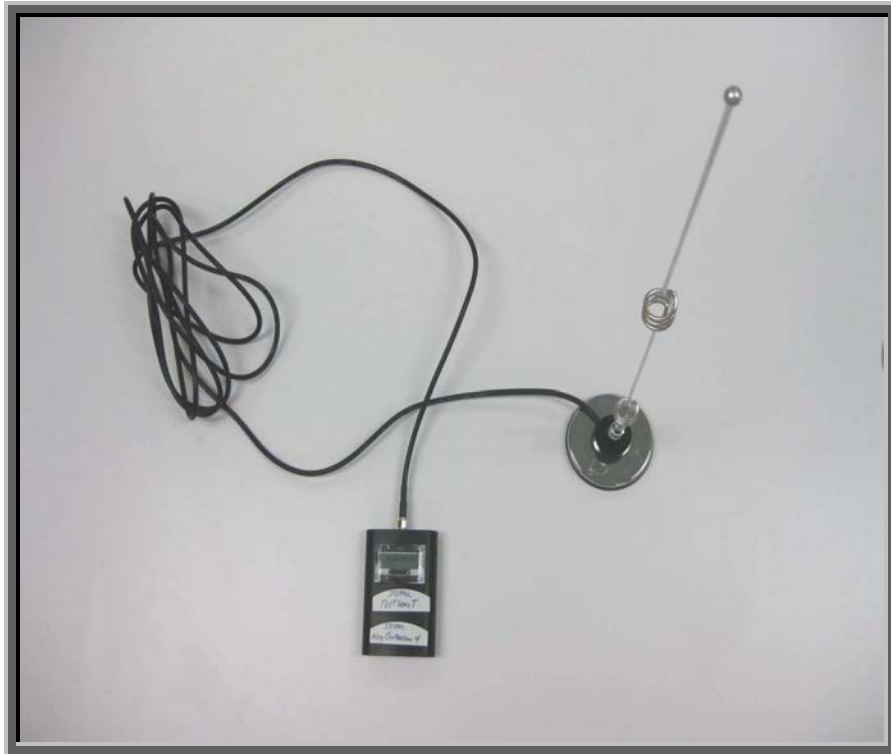
Company Name:	Itron
Address:	2111 N Molter Road
City, State, Zip:	Liberty Lake, WA 99019
Test Requested By:	Jay Holcomb
Model:	MLC4
First Date of Test:	October 21, 2009
Last Date of Test:	October 26, 2009
Receipt Date of Samples:	October 21, 2009
Equipment Design Stage:	Production
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test**Functional Description of the EUT (Equipment Under Test):**

Spread spectrum hybrid with only 5 hopping channels.

Testing Objective:

Seeking FCC certification under FCC 15.247 as a hybrid spread spectrum radio.

EUT Photo



CONFIGURATION 1 ITRO0001

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
MLOG Controller 4 Test Unit	Itron Inc	4	435
Whip Antenna	PCTEL	MEXE902RPSM	None

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
USB	No	.9m	No	MLOG Controller 4 Test Unit	Unterminated
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

CONFIGURATION 2 ITRO0001

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
MLOG Controller 4 Test Unit	Itron Inc	4	435
Mobile antenna with base	PCTEL	RG58/U	None

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
USB	No	.9m	No	MLOG Controller 4 Test Unit	Unterminated
SMA	Yes	3.6m	No	Mobile antenna with base	MLOG Controller 4 Test Unit
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

CONFIGURATION 3 ITRO0001

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
MLOG Controller 4 Test Unit	Itron Inc	4	435

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
USB	No	.9m	No	MLOG Controller 4 Test Unit	Unterminated
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

CONFIGURATION 4 ITRO0001**EUT**

Description	Manufacturer	Model/Part Number	Serial Number
MLOG Controller 4 Test Unit	Itron Inc	4	435
Mobile antenna with base	PCTEL	RG58/U	None

Peripherals in test setup boundary

Description	Manufacturer	Model/Part Number	Serial Number
Laptop	Lenovo	7417TPU	L3-A9994

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
SMA	Yes	3.6m	No	Mobile antenna with base	MLOG Controller 4 Test Unit
AC Power Cable	No	1.8m	No	AC Mains	DC Power Block
DC Power Cable	No	1.5m	No	C Power block	Laptop
USB	No	.9m	No	MLOG Controller 4 Test	PC USB

PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.

CONFIGURATION 5 ITRO0001**EUT**

Description	Manufacturer	Model/Part Number	Serial Number
Mobile antenna with base	PCTEL	RG58/U	None
MLOG Controller 4 Test Unit	Itron Inc	4	461

Peripherals in test setup boundary

Description	Manufacturer	Model/Part Number	Serial Number
Laptop	Lenovo	7417TPU	L3-A9994

Cables

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
SMA	Yes	3.6m	No	Mobile antenna with base	MLOG Controller 4 Test Unit
AC Power Cable	No	1.8m	No	AC Mains	DC Power Block
DC Power Cable	No	1.5m	No	C Power block	Laptop
USB	No	.9m	No	MLOG Controller 4 Test	PC USB

PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.

Equipment modifications					
Item	Date	Test	Modification	Note	Disposition of EUT
1	10/21/2009	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	10/22/2009	Spurious 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.
3	10/22/2009	Band Edge Compliance	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	10/22/2009	Channel Spacing	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.
5	10/22/2009	Dwell Time	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.
6	10/22/2009	Power Spectral Density	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.
7	10/22/2009	Number of Hopping Frequencies	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.
8	10/22/2009	Output Power	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.
9	10/22/2009	Occupied Bandwidth	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.
10	10/23/2009	Receiver 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.
11	10/26/2009	AC Powerline Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4446A	AAT	12/12/2008	13

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 channel carrier frequencies must be separated by 25 kHz or the 20dB bandwidth of the hopping channel, whichever is greater. Or, if the output power is less than 125 mW, the channel separation can be 25 kHz or 2/3 of the 20dB bandwidth. The EUT was operated in hopping mode. The spectrum was scanned across two adjacent peaks. The separation between the peaks of these channels was measured.

EMC

CHANNEL SPACING

EUT:	MLC4	Work Order:	ITRO0001
Serial Number:	435	Date:	10/22/09
Customer:	Itron	Temperature:	23.14°C
Attendees:	None	Humidity:	30%
Project:	None	Barometric Pres.:	1021.5
Tested by:	Trevor Buls	Power:	Battery
		Job Site:	MN05

TEST SPECIFICATIONS		TEST METHOD	
FCC 15.247 (FHSS):2009		ANSI C63.4:2003 DA 00-705:2000	

COMMENTS
None

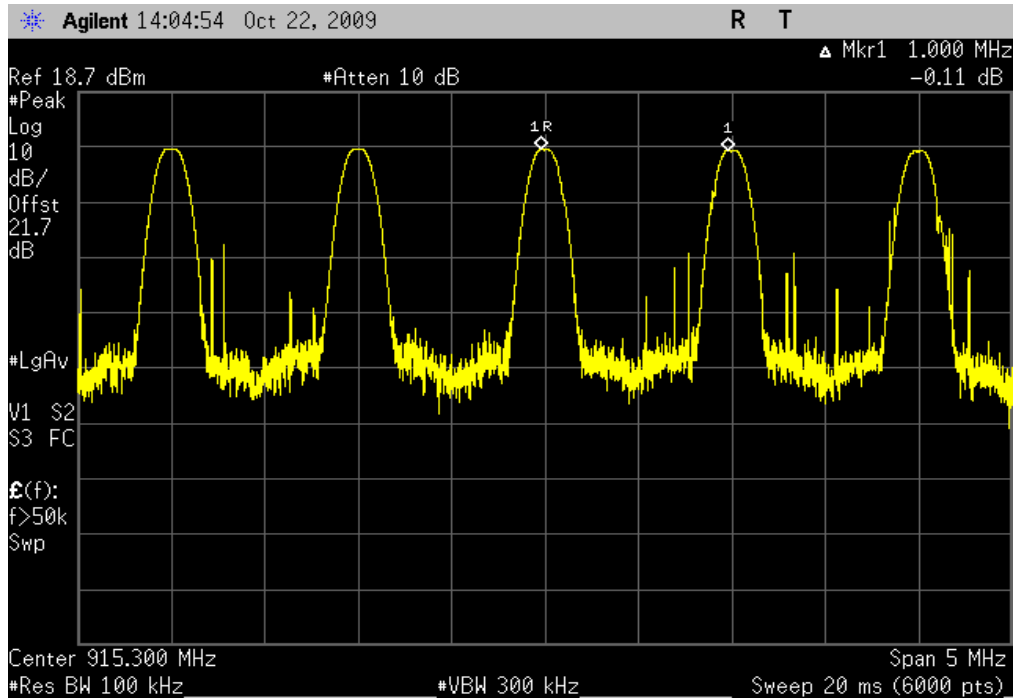
DEVIATIONS FROM TEST STANDARD
No Deviations

Configuration #	3	Signature <i>Timothy P. Dylka</i>
-----------------	---	-----------------------------------

	Value	Limit	Results
Hopping Mode	1 MHz	> 25 kHz	Pass

Hopping Mode

Result: Pass	Value: 1 MHz	Limit: > 25 kHz
---------------------	---------------------	------------------------





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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4446A	AAT	12/12/2008	13

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 average dwell time per hopping channel was measured at one hopping channel in the middle of the authorized band. The measurements were made using a direct connection between the RF output of the EUT and the spectrum analyzer. The hopping function of the EUT was enabled.

EMC

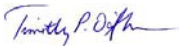
DWELL TIME

EUT: MLC4	Work Order: ITRO0001
Serial Number: 435	Date: 10/22/09
Customer: Itron	Temperature: 23.14°C
Attendees: None	Humidity: 30%
Project: None	Barometric Pres.: 1021.5
Tested by: Trevor Buls	Power: Battery
	Job Site: MN05

TEST SPECIFICATIONS	TEST METHOD
FCC 15.247 (FHSS):2009	ANSI C63.4:2003 DA 00-705:2000

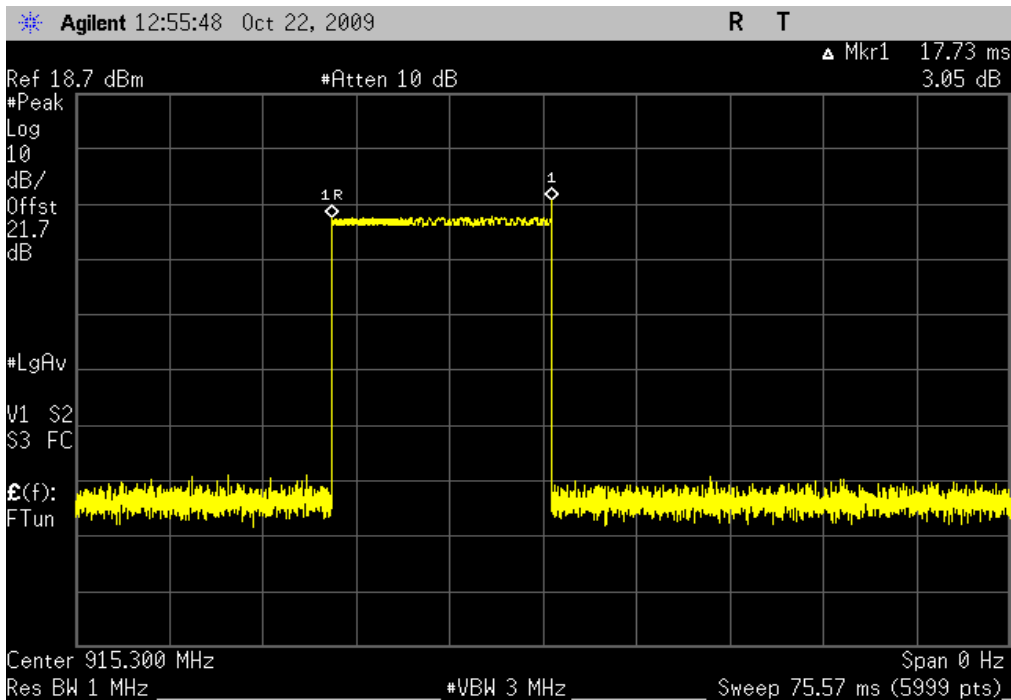
COMMENTS
None

DEVIATIONS FROM TEST STANDARD
No Deviations

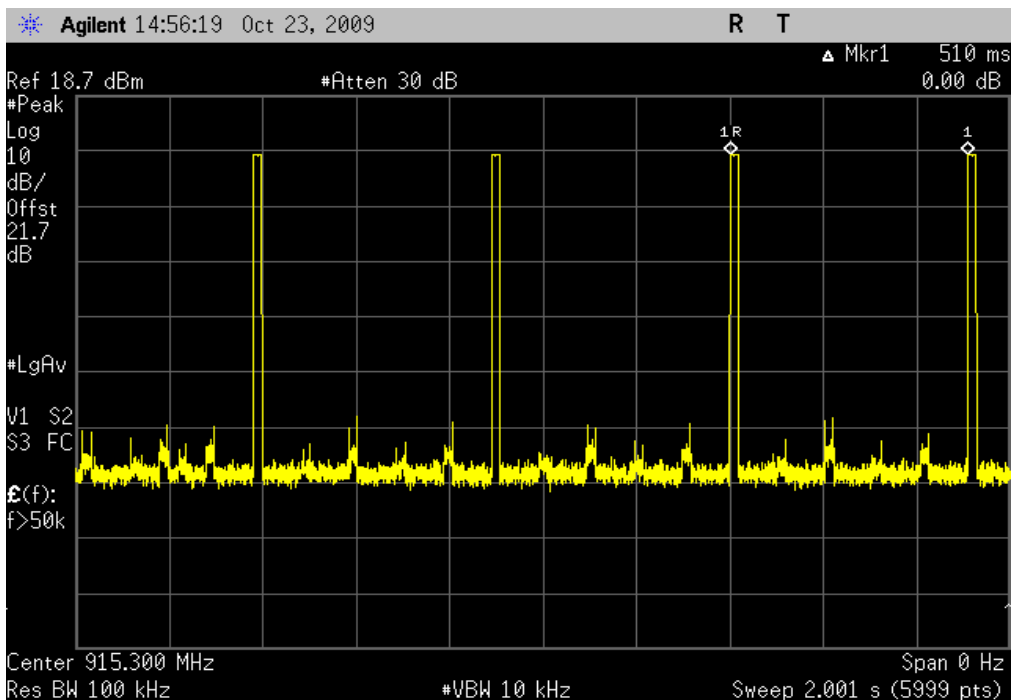
Configuration #	3	Signature 
------------------------	---	---

	Value	Limit	Results
Dwell Time, Hopping Mode	17.73 mS	See Comments	Pass
Dwell Time, Hopping Mode	4 transmissions in 2 s	See Comments	Pass

Dwell Time, Hopping Mode
Result: Pass **Value:** 17.73 mS **Limit:** See Comments



Dwell Time, Hopping Mode
Result: Pass **Value:** 4 transmissions in 2 s **Limit:** See Comments





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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4446A	AAT	12/12/2008	13

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 number of hopping frequencies was measured across the authorized band. The measurements were made using a direct connection between the RF output of the EUT and the spectrum analyzer. The hopping function of the EUT was enabled.

EMC

NUMBER OF HOPPING FREQUENCIES

EUT: MLC4	Work Order: ITRO0001
Serial Number: 435	Date: 10/22/09
Customer: Itron	Temperature: 23.14°C
Attendees: None	Humidity: 30%
Project: None	Barometric Pres.: 1021.5
Tested by: Trevor Buls	Power: Battery
	Job Site: MN05

TEST SPECIFICATIONS	TEST METHOD
FCC 15.247 (FHSS):2009	ANSI C63.4:2003 DA 00-705:2000

COMMENTS
None

DEVIATIONS FROM TEST STANDARD
No Deviations

Configuration #	3	<i>Timothy P. D'Ala</i> Signature
------------------------	---	--------------------------------------

	Value	Limit	Results
Hopping Mode	5 Frequencies	See Graph	Pass

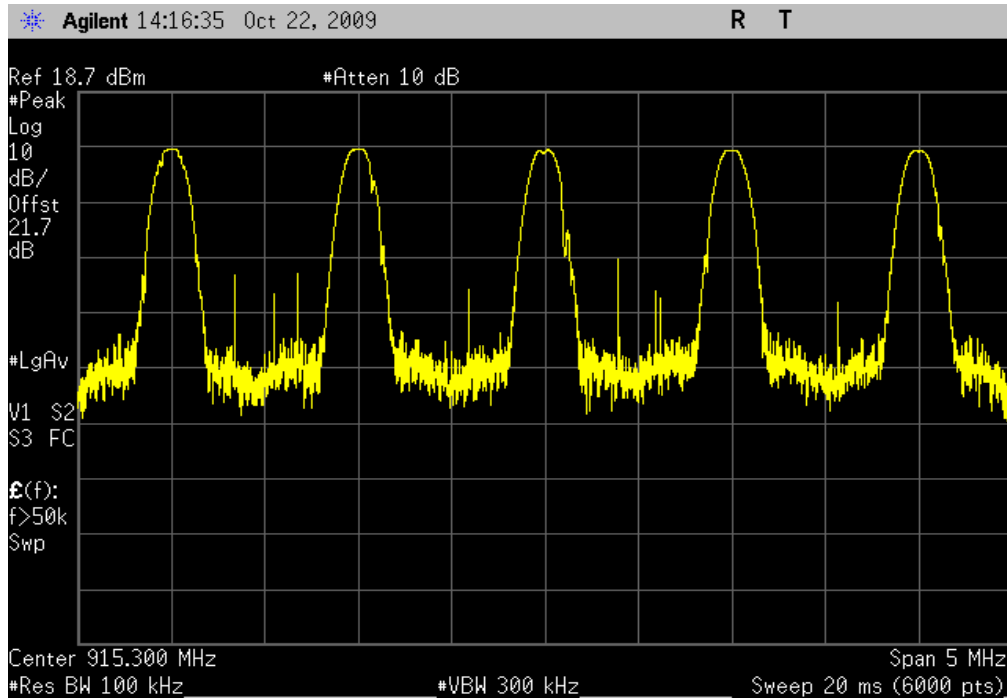
NUMBER OF HOPPING FREQUENCIES

Hopping Mode

Result: Pass

Value: 5 Frequencies

Limit: See Graph





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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4446A	AAT	12/12/2008	13

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 occupied bandwidth was measured with the EUT set to low and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate in a no hop mode.

EMC

OCCUPIED BANDWIDTH

EUT: MLC4	Work Order: ITRO0001
Serial Number: 435	Date: 10/22/09
Customer: Itron	Temperature: 23.14°C
Attendees: None	Humidity: 30%
Project: None	Barometric Pres.: 1021.5
Tested by: Trevor Buls	Power: Battery
	Job Site: MN05

TEST SPECIFICATIONS	TEST METHOD
FCC 15.247 (FHSS):2009	ANSI C63.4:2003 DA 00-705:2000

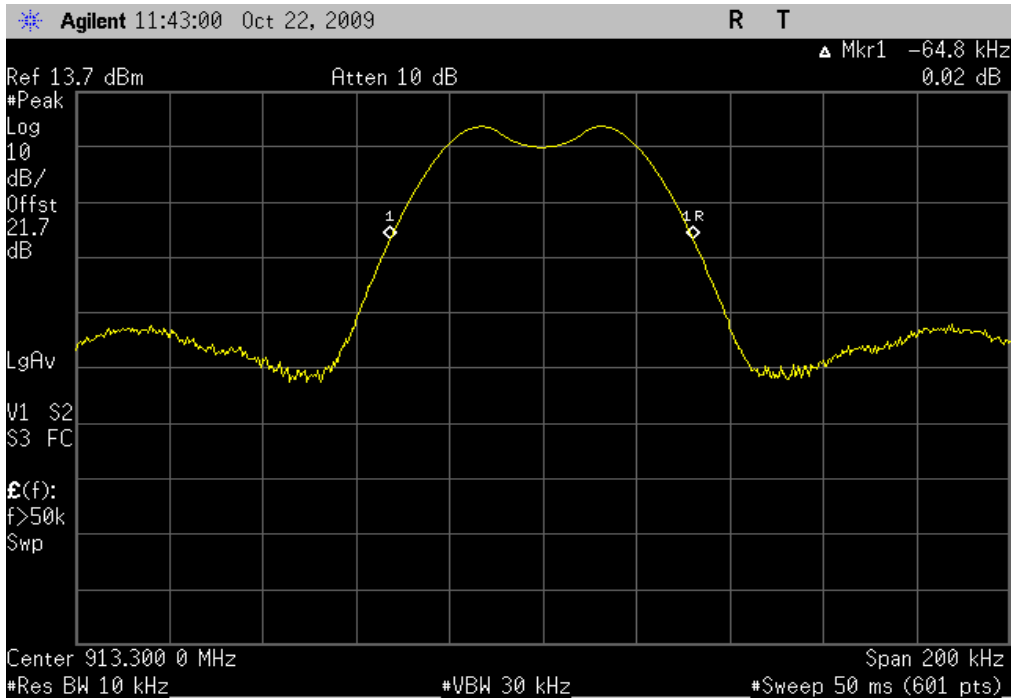
COMMENTS
None

DEVIATIONS FROM TEST STANDARD
No Deviations

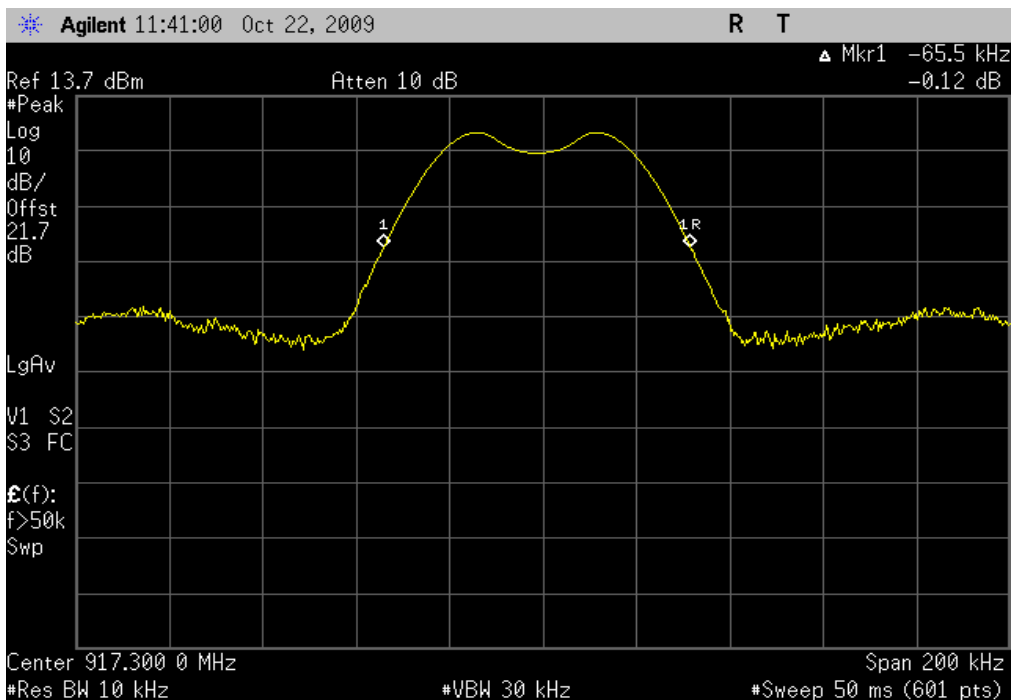
Configuration #	3	Signature <i>Timothy P. D'Ala</i>
-----------------	---	-----------------------------------

	Value	Limit	Results
Low Channel 913.3MHz	64.8 kHz	1.5 MHz	Pass
High Channel 917.3MHz	65.5 kHz	1.5 MHz	Pass

Low Channel 913.3MHz		
Result: Pass	Value: 64.8 kHz	Limit: 1.5 MHz



High Channel 917.3MHz		
Result: Pass	Value: 65.5 kHz	Limit: 1.5 MHz





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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4446A	AAT	12/12/2008	13

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 peak output power was measured with the EUT set to low and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The EUT was transmitting at its maximum data rate in a no hop mode.

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

EMC

OUTPUT POWER

EUT: MLC4	Work Order: ITRO0001
Serial Number: 435	Date: 10/22/09
Customer: Itron	Temperature: 23.14°C
Attendees: None	Humidity: 30%
Project: None	Barometric Pres.: 1021.5
Tested by: Trevor Buls	Power: Battery
	Job Site: MN05

TEST SPECIFICATIONS	TEST METHOD
FCC 15.247 (FHSS):2009	ANSI C63.4:2003 DA 00-705:2000

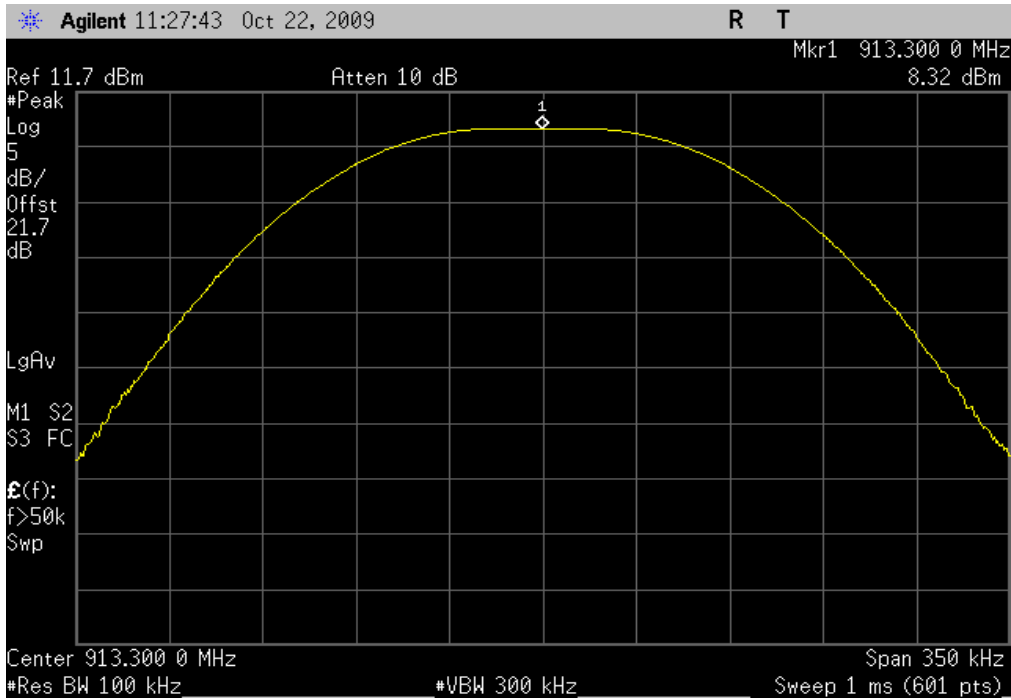
COMMENTS
None

DEVIATIONS FROM TEST STANDARD
No Deviations

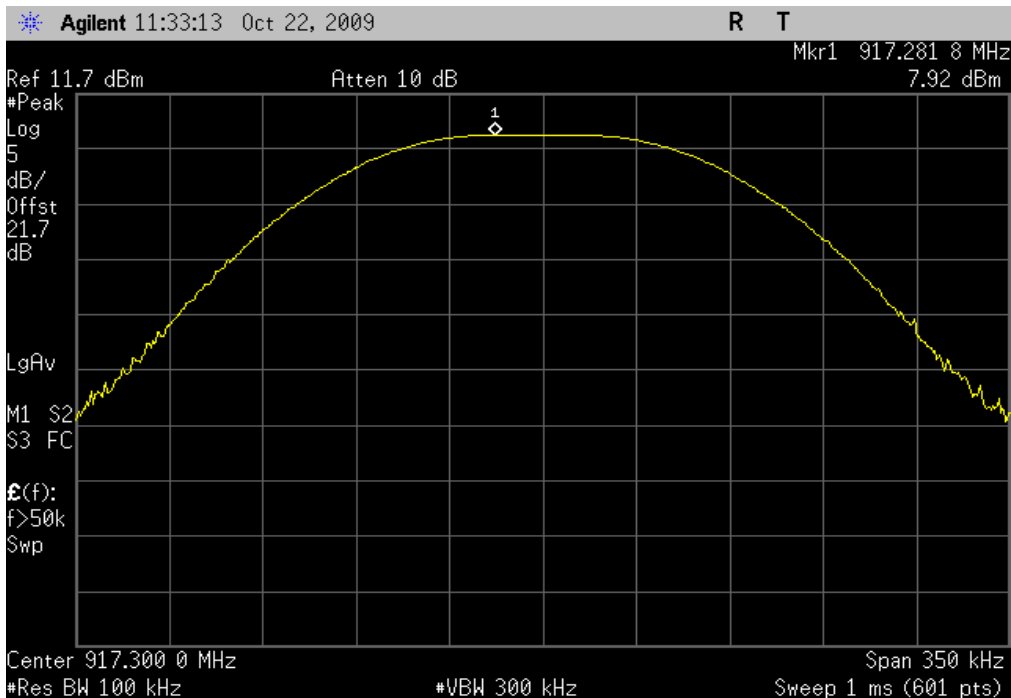
Configuration #	3	Signature <i>Timothy P. D'Alto</i>
------------------------	---	------------------------------------

	Value	Limit	Results
Low Channel 913.3MHz	8.32 dBm	24 dBm	Pass
High Channel 917.3MHz	7.92 dBm	24 dBm	Pass

Low Channel 913.3MHz		
Result: Pass	Value: 8.32 dBm	Limit: 24 dBm



High Channel 917.3MHz		
Result: Pass	Value: 7.92 dBm	Limit: 24 dBm





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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4446A	AAT	12/12/2008	13

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 spurious RF conducted emissions at the edges of the authorized band were measured with the EUT set to low and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate in a no hop mode. The channels closest to the band edges were selected. The spectrum was scanned across each band edge from 5 MHz below the band edge to 5 MHz above the band edge.

EMC

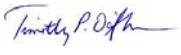
BAND EDGE COMPLIANCE

EUT: MLC4	Work Order: ITRO0001
Serial Number: 435	Date: 10/22/09
Customer: Itron	Temperature: 23.14°C
Attendees: None	Humidity: 30%
Project: None	Barometric Pres.: 1021.5
Tested by: Trevor Buls	Power: Battery
	Job Site: MN05

TEST SPECIFICATIONS	TEST METHOD
FCC 15.247 (FHSS):2009	ANSI C63.4:2003 DA 00-705:2000

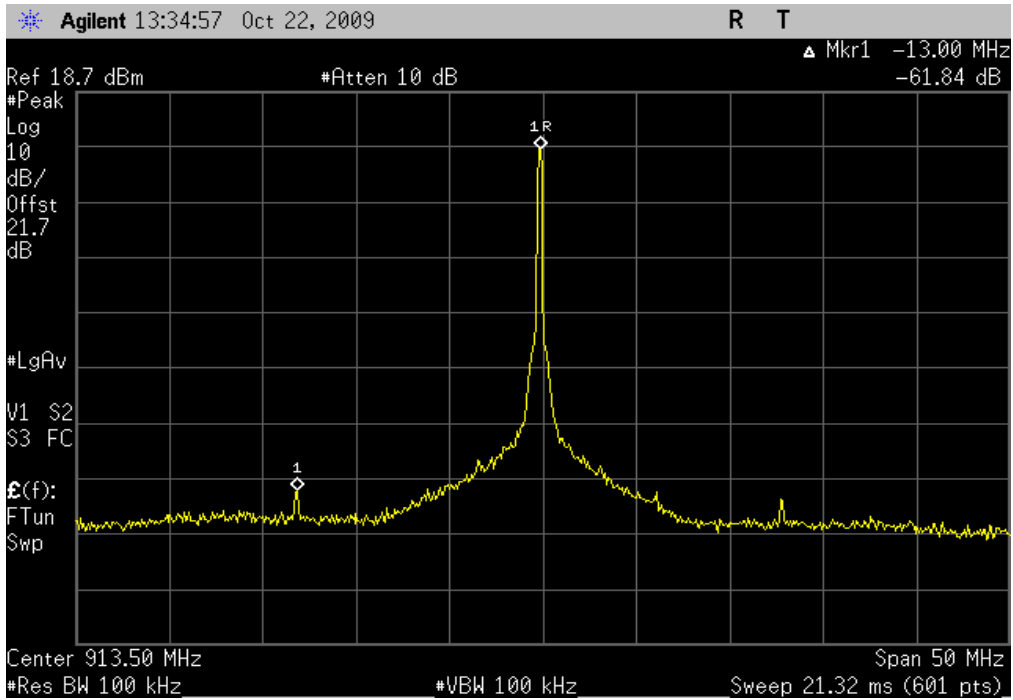
COMMENTS
None

DEVIATIONS FROM TEST STANDARD
No Deviations

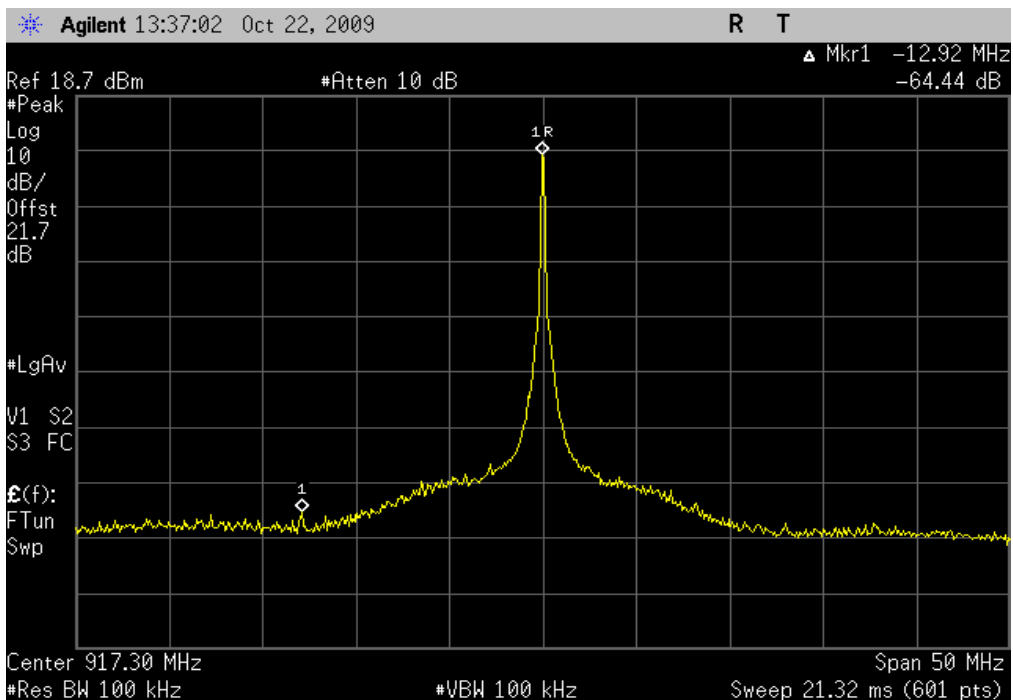
Configuration #	3	Signature 
------------------------	---	---

	Value	Limit	Results
Low Channel, 913.3 MHz	-61.84 dB	-20 dBc	Pass
High Channel, 917.3 MHz	-64.44 dB	-20 dBc	Pass
Hopping Mode	-54.33 dB	-20 dBc	Pass

Low Channel, 913.3 MHz
Result: Pass **Value:** -61.84 dB **Limit:** -20 dBc



High Channel, 917.3 MHz
Result: Pass **Value:** -64.44 dB **Limit:** -20 dBc



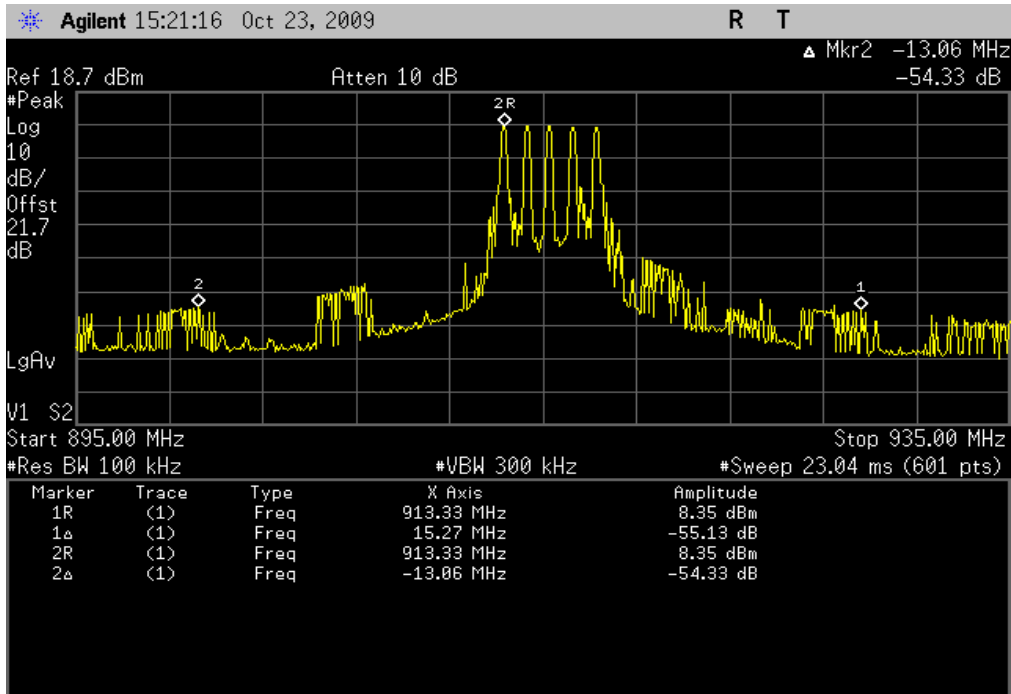
BAND EDGE COMPLIANCE

Hopping Mode

Result: Pass

Value: -54.33 dB

Limit: -20 dBc





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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4446A	AAT	12/12/2008	13

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 spurious RF conducted emissions were measured with the EUT set to low and high transmit frequencies. The measurements were made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate using direct sequence modulation. For each transmit frequency, the spectrum was scanned throughout the specified frequency range.

EMC

SPURIOUS CONDUCTED EMISSIONS

EUT: MLC4	Work Order: ITRO0001
Serial Number: 435	Date: 10/22/09
Customer: Itron	Temperature: 23.14°C
Attendees: None	Humidity: 30%
Project: None	Barometric Pres.: 1021.5
Tested by: Trevor Buls	Power: Battery
	Job Site: MN05

TEST SPECIFICATIONS	TEST METHOD
FCC 15.247 (FHSS):2009	ANSI C63.4:2003 DA 00-705:2000

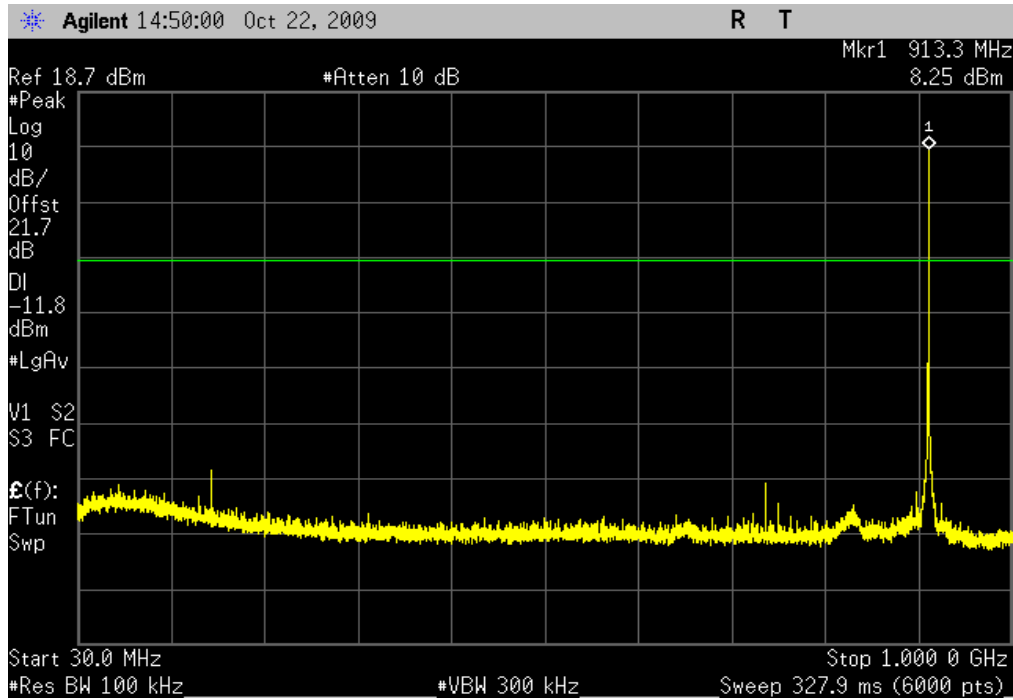
COMMENTS
None

DEVIATIONS FROM TEST STANDARD
No Deviations

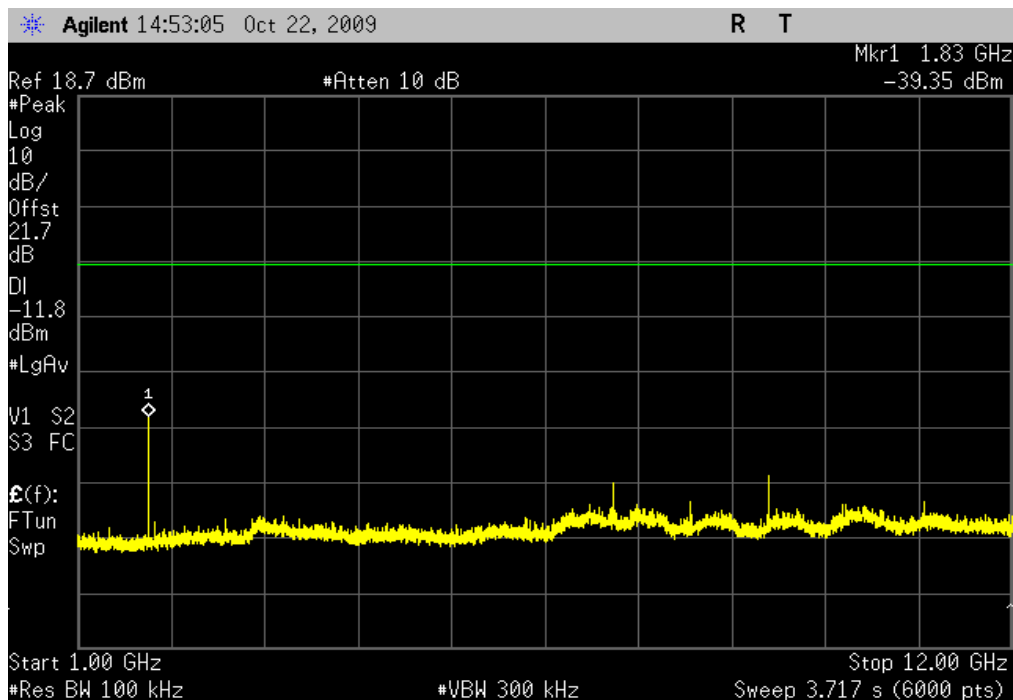
Configuration #	3	Signature 
-----------------	---	---

		Value	Limit	Results
Low Channel, 913.3 MHz				
	30-1000 MHz	> 20 dB See Graph	-20 dBc	Pass
	1-12GHz	> 20 dB See Graph	-20 dBc	Pass
High Channel, 917.3 MHz				
	30-1000 MHz	> 20 dB See Graph	-20 dBc	Pass
	1-12GHz	> 20 dB See Graph	-20 dBc	Pass

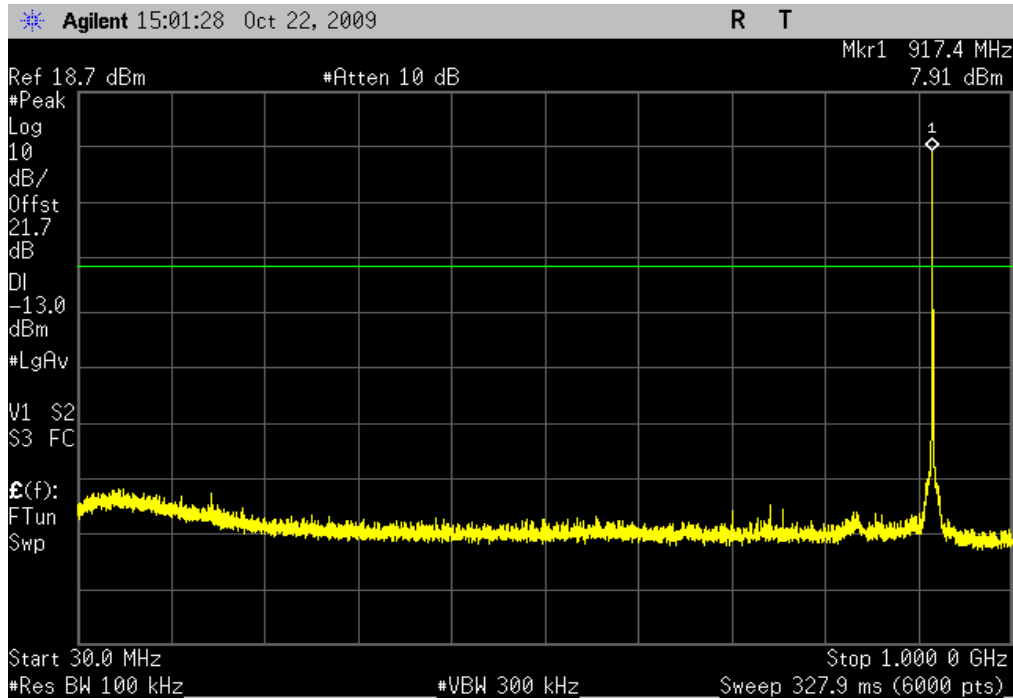
Low Channel, 913.3 MHz, 30-1000 MHz
Result: Pass **Value:** > 20 dB See Graph **Limit:** -20 dBc



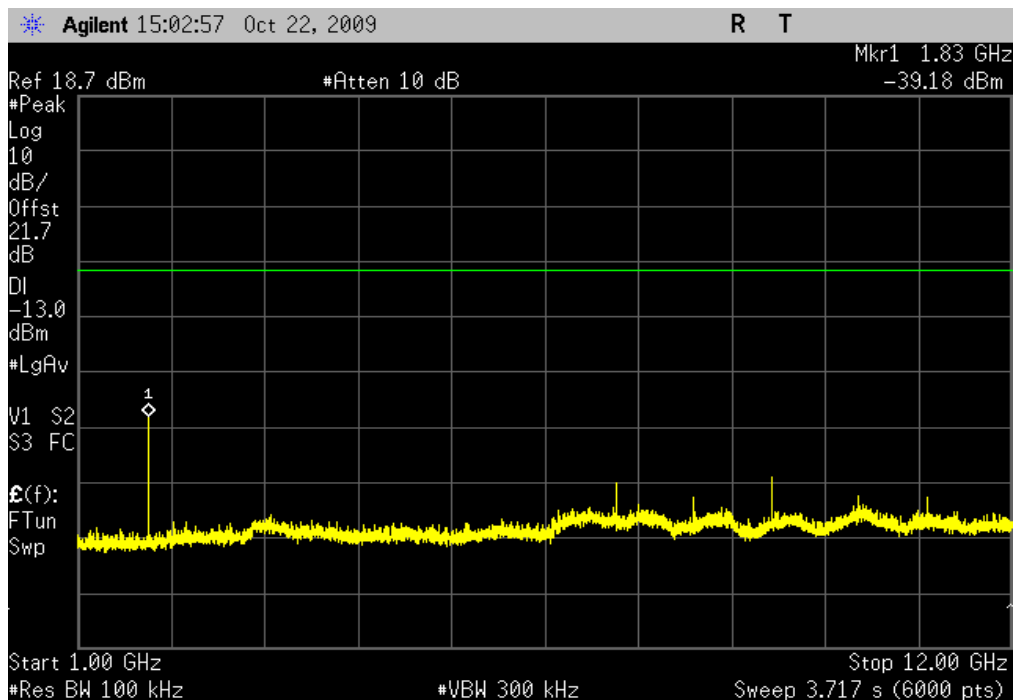
Low Channel, 913.3 MHz, 1-12GHz
Result: Pass **Value:** > 20 dB See Graph **Limit:** -20 dBc



High Channel, 917.3 MHz, 30-1000 MHz
Result: Pass **Value:** > 20 dB See Graph **Limit:** -20 dBc



High Channel, 917.3 MHz, 1-12GHz
Result: Pass **Value:** > 20 dB See Graph **Limit:** -20 dBc





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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Spectrum Analyzer	Agilent	E4446A	AAT	12/12/2008	13

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 peak power spectral density measurements were measured with the EUT set to low and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at its maximum data rate for each modulation type available. Per the procedure outlined in FCC KDB 558074, March 23, 2005, the spectrum analyzer was used as follows:

The emission peak(s) were located and zoom in on within the passband. The resolution bandwidth was set to 3 kHz, the video bandwidth was set to greater than or equal to the resolution bandwidth. The sweep speed was set equal to the span divided by 3 kHz (sweep = (SPAN/3 kHz)). For example, given a span of 1.5 MHz, the sweep should be $1.5 \times 10^6 \div 3 \times 10^3 = 500$ seconds. External attenuation was used and added to the reading. The following FCC procedure was used for modifying the power spectral density measurements:

"If the spectrum line spacing cannot be resolved on the available spectrum analyzer, the noise density function on most modern conventional spectrum analyzers will directly measure the noise power density normalized to a 1 Hz noise power bandwidth. Add 35 dB for correction to 3 kHz."

EMC

POWER SPECTRAL DENSITY

EUT:	MLC4	Work Order:	ITRO0001
Serial Number:	435	Date:	10/22/09
Customer:	Itron	Temperature:	23.14°C
Attendees:	None	Humidity:	30%
Project:	None	Barometric Pres.:	1021.5
Tested by:	Trevor Buls	Power:	Battery
		Job Site:	MN05

TEST SPECIFICATIONS		TEST METHOD	
FCC 15.247 (FHSS):2009		ANSI C63.4:2003 DA 00-705:2000	

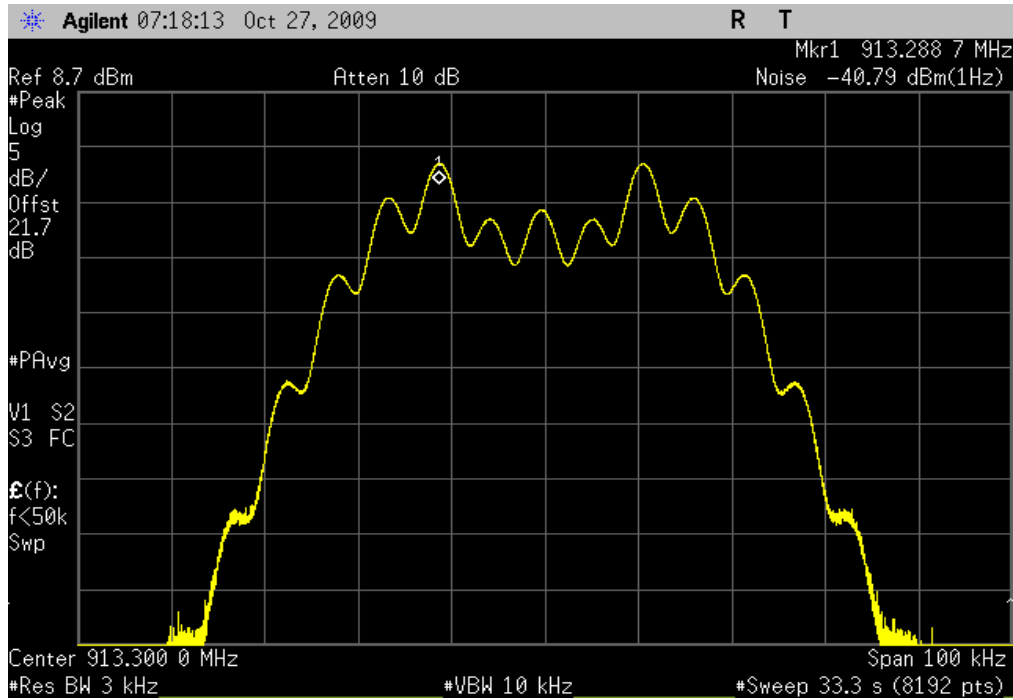
COMMENTS
None

DEVIATIONS FROM TEST STANDARD
No Deviations

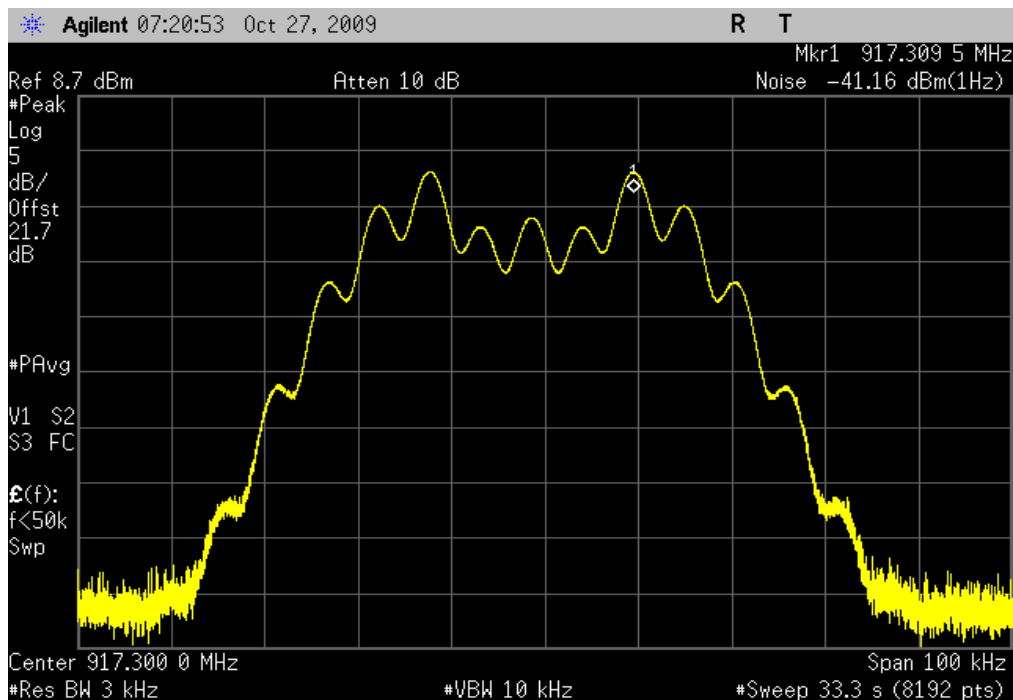
Configuration #	3	Signature <i>Timothy P. Dylka</i>
-----------------	---	-----------------------------------

	Value	Limit	Results
Low Channel 913.3MHz	-5.79 dBm / 3kHz	8 dBm / 3kHz	Pass
High Channel 917.3MHz	-6.16 dBm / 3kHz	8 dBm / 3kHz	Pass

Low Channel 913.3MHz		
Result: Pass	Value: -5.79 dBm / 3kHz	Limit: 8 dBm / 3kHz



High Channel 917.3MHz		
Result: Pass	Value: -6.16 dBm / 3kHz	Limit: 8 dBm / 3kHz





EMC**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

No hop, high channel 917.3MHz
No hop, low channel 913.3MHz

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

ITRO0001 - 1
ITRO0001 - 2

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	12 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
High Pass Filter	Micro-Tronics	HPM50108	HGP	6/24/2009	13 mo
MN05 Cables		Standard Gain Horn Cables	MNJ	7/1/2009	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
Pre-Amplifier	Miteq	AM-1616-1000	AVY	7/1/2009	13 mo
MN05 Cables		Bilog Cables	MNH	7/1/2009	13 mo
Antenna, Biconilog	ETS Lindgren	3142D	AXN	3/17/2009	12 mo
Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVX	7/1/2009	13 mo
MN05 Cables		Double Ridge Guide Horn Cables	MNI	7/1/2009	13 mo
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
Antenna, Horn (DRG)	ETS Lindgren	3115	AIP	6/23/2009	24 mo
Spectrum Analyzer	Agilent	E4446A	AAT	12/12/2008	13 mo

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

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 C63.4:2003). A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

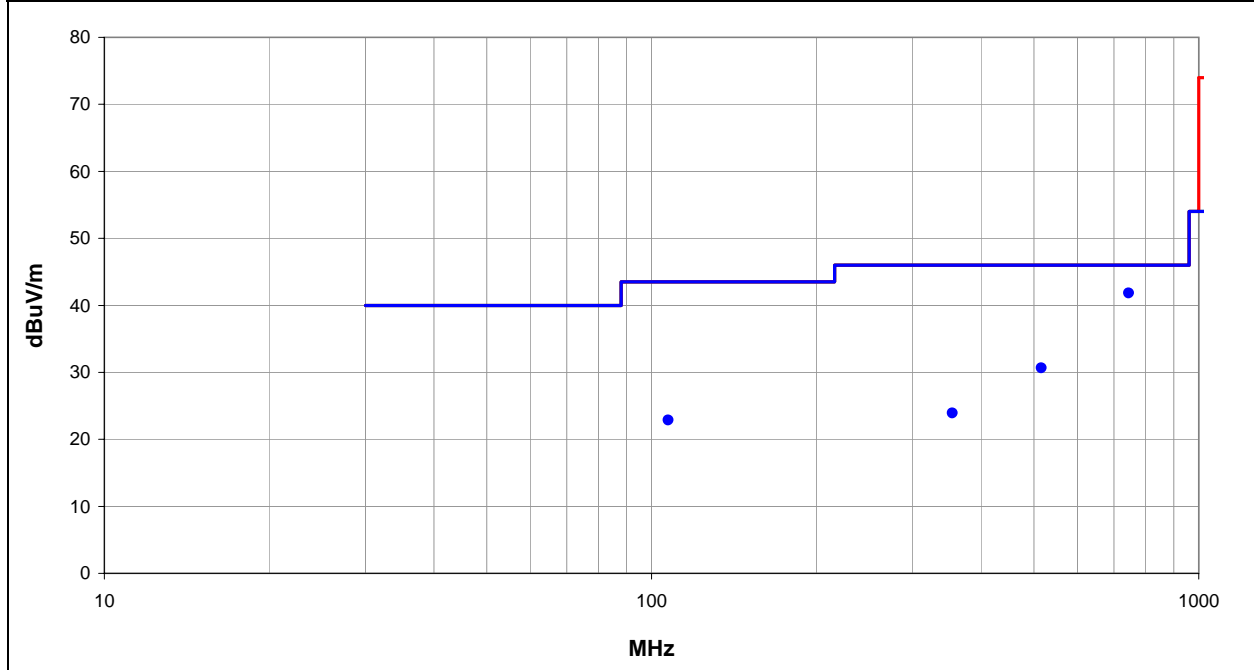
EMC

Spurious Radiated Emissions

Work Order:	ITRO0001	Date:	10/21/09	<i>Trevor P. O'Neil</i>
Project:	None	Temperature:	22.86	
Job Site:	MN05	Humidity:	36.51	
Serial Number:	435	Barometric Pres.:	1016.4	
EUT:	MLC4			
Configuration:	1 - Basic Configuration			
Customer:	Itron			
Attendees:	None			
EUT Power:	Battery			
Operating Mode:	No hop, low channel 913.3MHz			
Deviations:	None			
Comments:	EUT horizontal, display parallel to ground.			

Test Specifications FCC 15.247 (FHSS):2009	Test Method ANSI C63.4:2003 DA 00-705:2000
--	--

Run #	13	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)
744.301	27.4	4.4	1.0	313.0	3.0	10.0	Horz	QP	0.0	41.8	46.0	-4.2
515.704	20.6	0.1	1.5	231.0	3.0	10.0	Horz	QP	0.0	30.7	46.0	-15.3
107.282	24.2	-11.3	2.5	295.0	3.0	10.0	Vert	QP	0.0	22.9	43.5	-20.6
354.545	18.0	-4.1	3.2	134.0	3.0	10.0	Vert	QP	0.0	23.9	46.0	-22.1

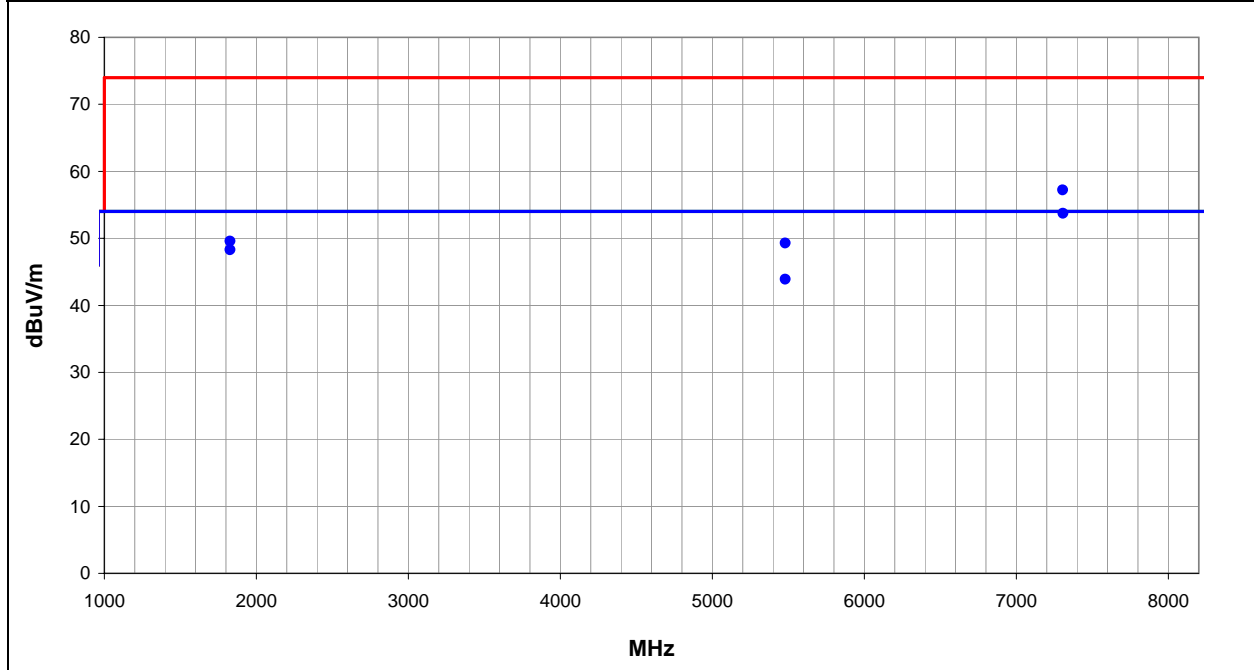
EMC

Spurious Radiated Emissions

Work Order:	ITRO0001	Date:	10/22/09	<i>Trevor P. O'Neil</i>
Project:	None	Temperature:	23.14	
Job Site:	MN05	Humidity:	29.99	
Serial Number:	435	Barometric Pres.:	1021.5	
EUT:	MLC4			
Configuration:	1 - Basic Configuration			
Customer:	Itron			
Attendees:	None			
EUT Power:	Battery			
Operating Mode:	No hop, low channel 913.3MHz			
Deviations:	None			
Comments:	EUT horizontal, display parallel to ground.			

Test Specifications FCC 15.247 (FHSS):2009	Test Method ANSI C63.4:2003 DA 00-705:2000
--	--

Run #	29	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)
7306.430	43.7	10.0	1.2	74.0	3.0	0.0	Horz	AV	0.0	53.7	54.0	-0.3
1826.627	55.8	-7.5	1.1	154.0	3.0	0.0	Horz	AV	0.0	48.3	54.0	-5.7
5479.811	40.0	3.9	2.5	35.0	3.0	0.0	Vert	AV	0.0	43.9	54.0	-10.1
7306.305	47.2	10.0	1.2	74.0	3.0	0.0	Horz	PK	0.0	57.2	74.0	-16.8
1826.602	57.1	-7.5	1.1	154.0	3.0	0.0	Horz	PK	0.0	49.6	74.0	-24.4
5479.861	45.4	3.9	2.5	35.0	3.0	0.0	Vert	PK	0.0	49.3	74.0	-24.7

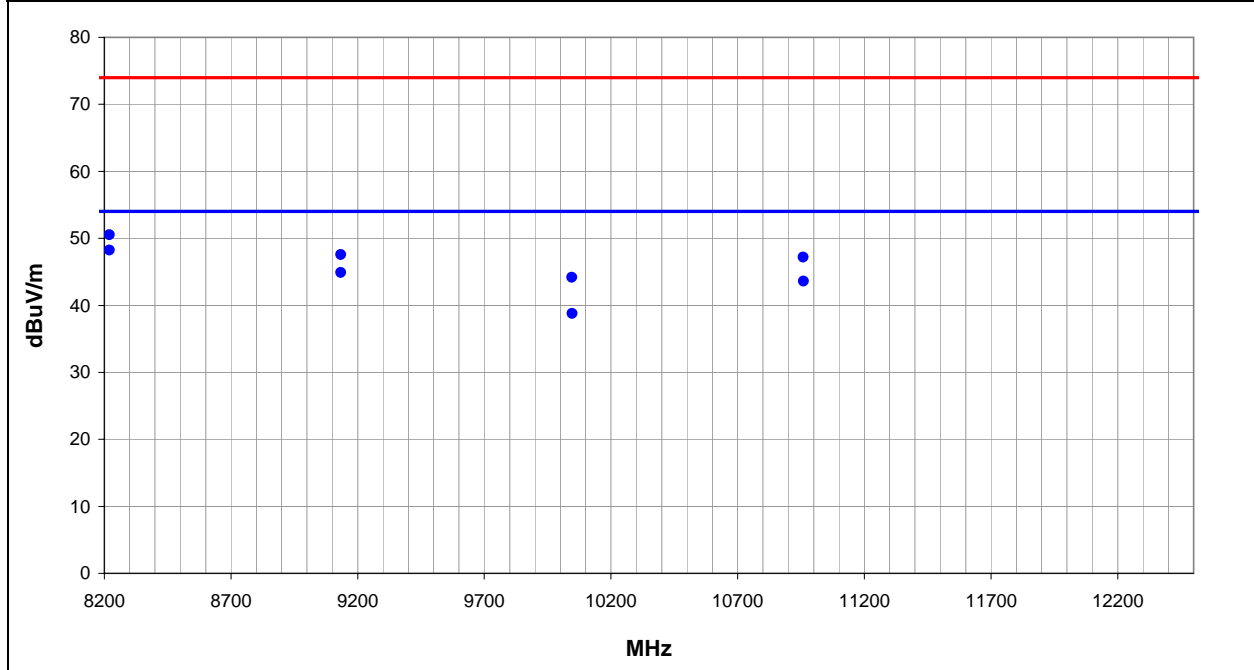
EMC

Spurious Radiated Emissions

Work Order:	ITRO0001	Date:	10/21/09	<i>Trevor P. Buls</i>
Project:	None	Temperature:	22.86	
Job Site:	MN05	Humidity:	36.51	
Serial Number:	435	Barometric Pres.:	1016.4	
EUT:	MLC4			
Configuration:	1 - Basic Configuration			
Customer:	Itron			
Attendees:	None			
EUT Power:	Battery			
Operating Mode:	No hop, low channel 913.3MHz			
Deviations:	None			
Comments:	EUT horizontal, display parallel to ground.			

Test Specifications FCC 15.247 (FHSS):2009	Test Method ANSI C63.4:2003 DA 00-705:2000
--	--

Run #	10	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)
8219.723	58.3	-10.1	1.2	157.0	3.0	0.0	Vert	AV	0.0	48.2	54.0	-5.8
9133.032	53.8	-8.9	1.2	46.0	3.0	0.0	Horz	AV	0.0	44.9	54.0	-9.1
10959.630	51.9	-8.3	1.1	55.0	3.0	0.0	Vert	AV	0.0	43.6	54.0	-10.4
10046.330	46.5	-7.7	1.0	145.0	3.0	0.0	Vert	AV	0.0	38.8	54.0	-15.2
8219.665	60.6	-10.1	1.2	157.0	3.0	0.0	Vert	PK	0.0	50.5	74.0	-23.5
9133.123	56.5	-8.9	1.2	46.0	3.0	0.0	Horz	PK	0.0	47.6	74.0	-26.4
10959.420	55.5	-8.3	1.1	55.0	3.0	0.0	Vert	PK	0.0	47.2	74.0	-26.8
10045.960	51.9	-7.7	1.0	145.0	3.0	0.0	Vert	PK	0.0	44.2	74.0	-29.8

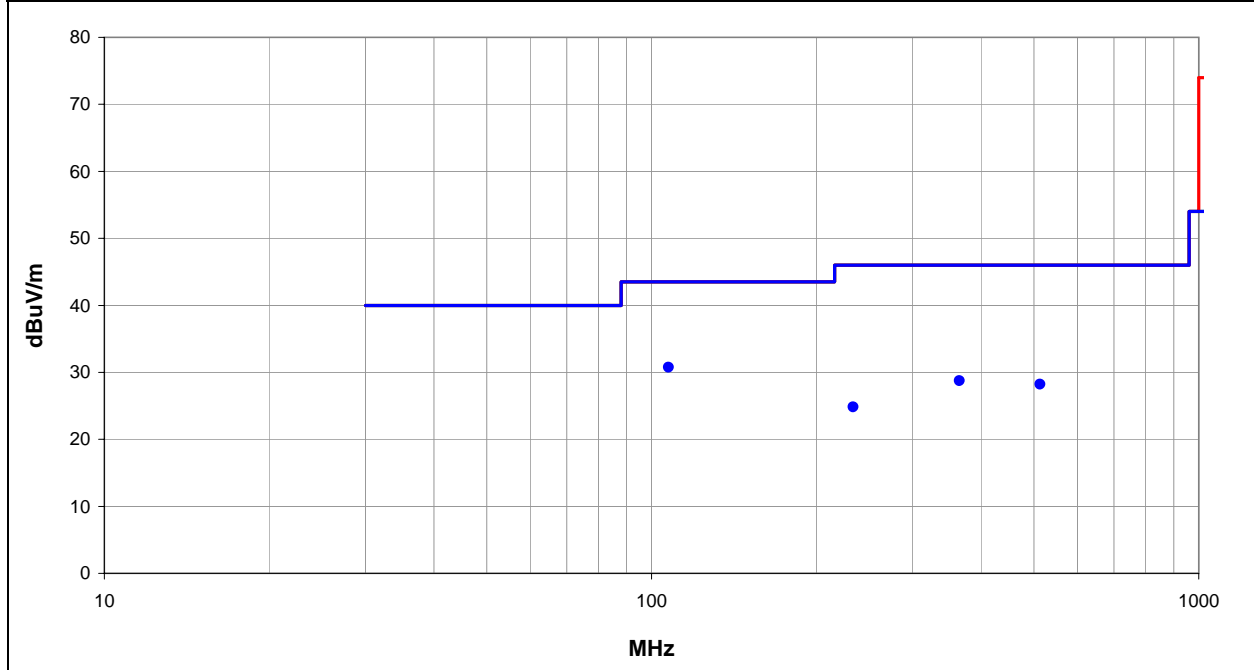
EMC

Spurious Radiated Emissions

Work Order:	ITRO0001	Date:	10/21/09	<i>Trevor P. O'Neil</i>
Project:	None	Temperature:	22.86	
Job Site:	MN05	Humidity:	36.51	
Serial Number:	435	Barometric Pres.:	1016.4	
EUT:	MLC4			
Configuration:	1 - Basic Configuration			
Customer:	Itron			
Attendees:	None			
EUT Power:	Battery			
Operating Mode:	No hop, high channel 917.3MHz			
Deviations:	None			
Comments:	EUT horizontal, display parallel to ground.			

Test Specifications FCC 15.247 (FHSS):2009	Test Method ANSI C63.4:2003 DA 00-705:2000
--	--

Run #	16	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)
107.453	32.1	-11.3	2.5	180.0	3.0	10.0	Horz	QP	0.0	30.8	43.5	-12.7
365.395	22.5	-3.8	1.0	81.0	3.0	10.0	Horz	QP	0.0	28.7	46.0	-17.3
512.615	18.2	0.0	2.0	28.0	3.0	10.0	Horz	QP	0.0	28.2	46.0	-17.8
233.600	22.6	-7.8	1.2	275.0	3.0	10.0	Horz	QP	0.0	24.8	46.0	-21.2

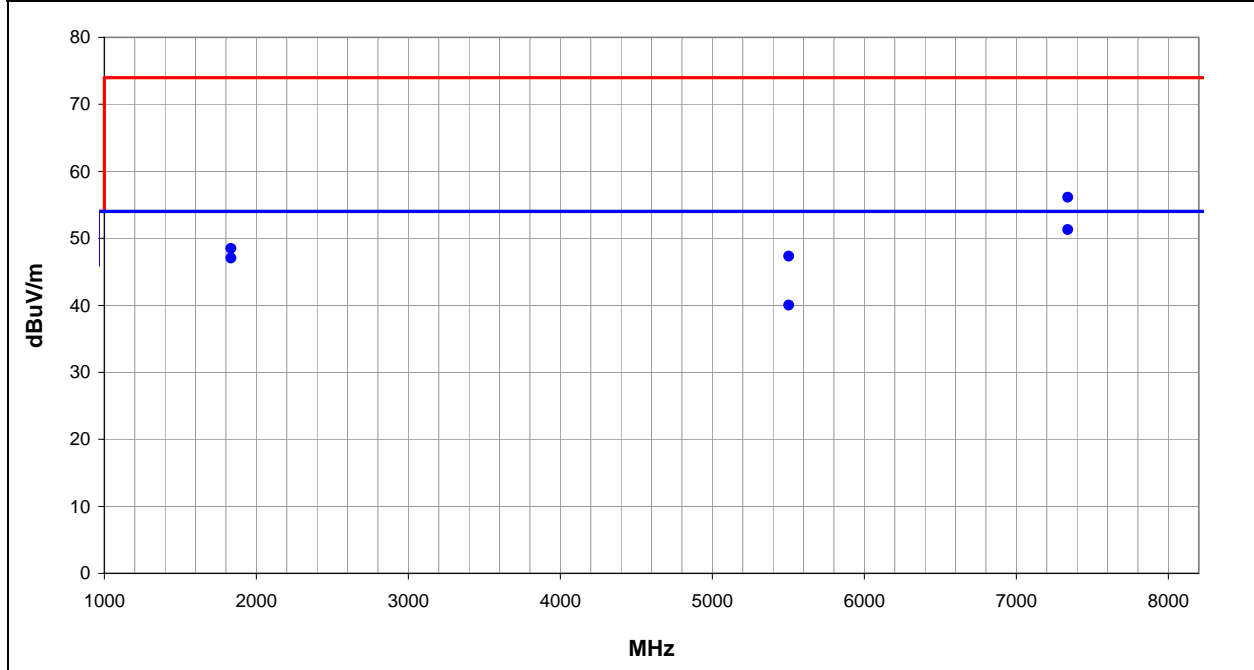
EMC

Spurious Radiated Emissions

Work Order:	ITRO0001	Date:	10/22/09	<i>Trevor P. O'Neil</i> Tested by: Trevor Buls
Project:	None	Temperature:	23.14	
Job Site:	MN05	Humidity:	29.99	
Serial Number:	435	Barometric Pres.:	1021.5	
EUT:	MLC4			
Configuration:	1 - Basic Configuration			
Customer:	Itron			
Attendees:	None			
EUT Power:	Battery			
Operating Mode:	No hop, high channel 917.3MHz			
Deviations:	None			
Comments:	EUT horizontal, display parallel to ground.			

Test Specifications FCC 15.247 (FHSS):2009	Test Method ANSI C63.4:2003 DA 00-705:2000
--	--

Run #	30	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)
7338.441	41.1	10.2	1.2	75.0	3.0	0.0	Horz	AV	0.0	51.3	54.0	-2.7
1834.623	54.5	-7.4	1.1	154.0	3.0	0.0	Horz	AV	0.0	47.1	54.0	-6.9
5503.806	36.1	3.9	1.6	75.0	3.0	0.0	Horz	AV	0.0	40.0	54.0	-14.0
7338.491	45.9	10.2	1.2	75.0	3.0	0.0	Horz	PK	0.0	56.1	74.0	-17.9
1834.590	55.9	-7.4	1.1	154.0	3.0	0.0	Horz	PK	0.0	48.5	74.0	-25.5
5503.848	43.4	3.9	1.6	75.0	3.0	0.0	Horz	PK	0.0	47.3	74.0	-26.7

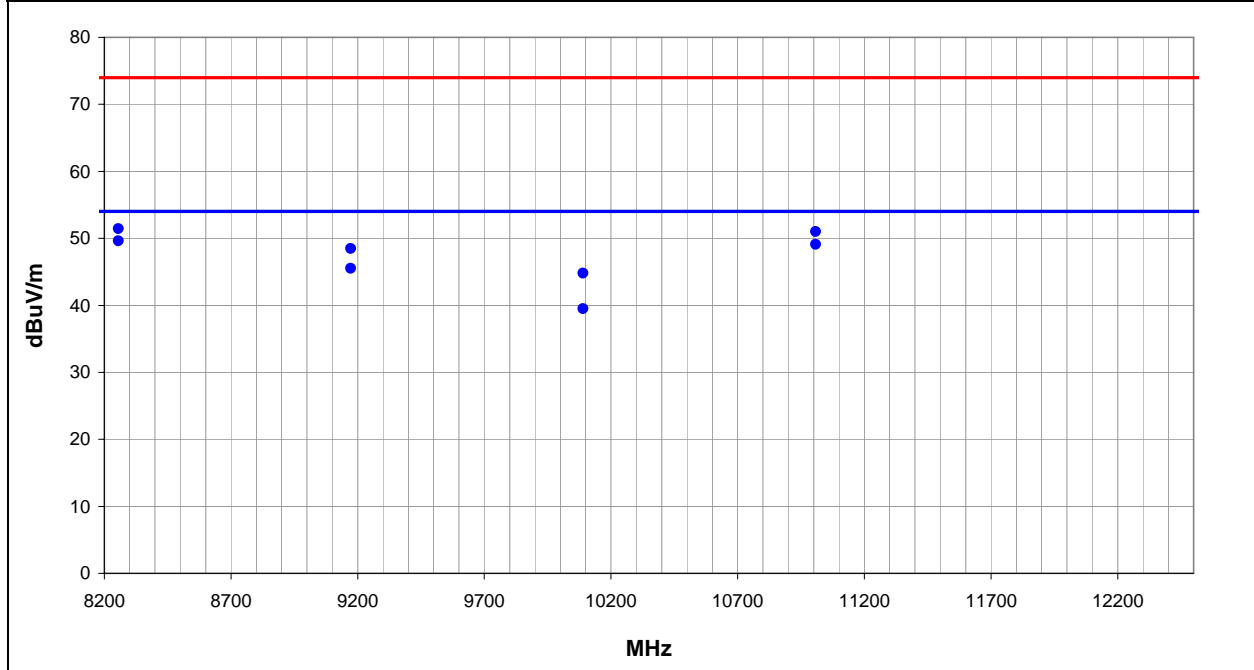
EMC

Spurious Radiated Emissions

Work Order:	ITRO0001	Date:	10/22/09	<i>Trevor P. Buls</i> Tested by: Trevor Buls
Project:	None	Temperature:	23.14	
Job Site:	MN05	Humidity:	29.99	
Serial Number:	435	Barometric Pres.:	1021.5	
EUT:	MLC4			
Configuration:	1 - Basic Configuration			
Customer:	Itron			
Attendees:	None			
EUT Power:	Battery			
Operating Mode:	No hop, high channel 917.3MHz			
Deviations:	None			
Comments:	EUT horizontal, display perpendicular to ground.			

Test Specifications FCC 15.247 (FHSS):2009	Test Method ANSI C63.4:2003 DA 00-705:2000
--	--

Run #	33	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)
8255.721	59.6	-10.0	1.3	135.0	3.0	0.0	Horz	AV	0.0	49.6	54.0	-4.4
11007.620	57.4	-8.3	1.1	263.0	3.0	0.0	Horz	AV	0.0	49.1	54.0	-4.9
9173.021	54.3	-8.8	1.5	169.0	3.0	0.0	Horz	AV	0.0	45.5	54.0	-8.5
10090.300	47.3	-7.8	1.2	104.0	3.0	0.0	Horz	AV	0.0	39.5	54.0	-14.5
8255.671	61.4	-10.0	1.3	135.0	3.0	0.0	Horz	PK	0.0	51.4	74.0	-22.6
11007.680	59.3	-8.3	1.1	263.0	3.0	0.0	Horz	PK	0.0	51.0	74.0	-23.0
9172.963	57.3	-8.8	1.5	169.0	3.0	0.0	Horz	PK	0.0	48.5	74.0	-25.5
10090.010	52.6	-7.8	1.2	104.0	3.0	0.0	Horz	PK	0.0	44.8	74.0	-29.2

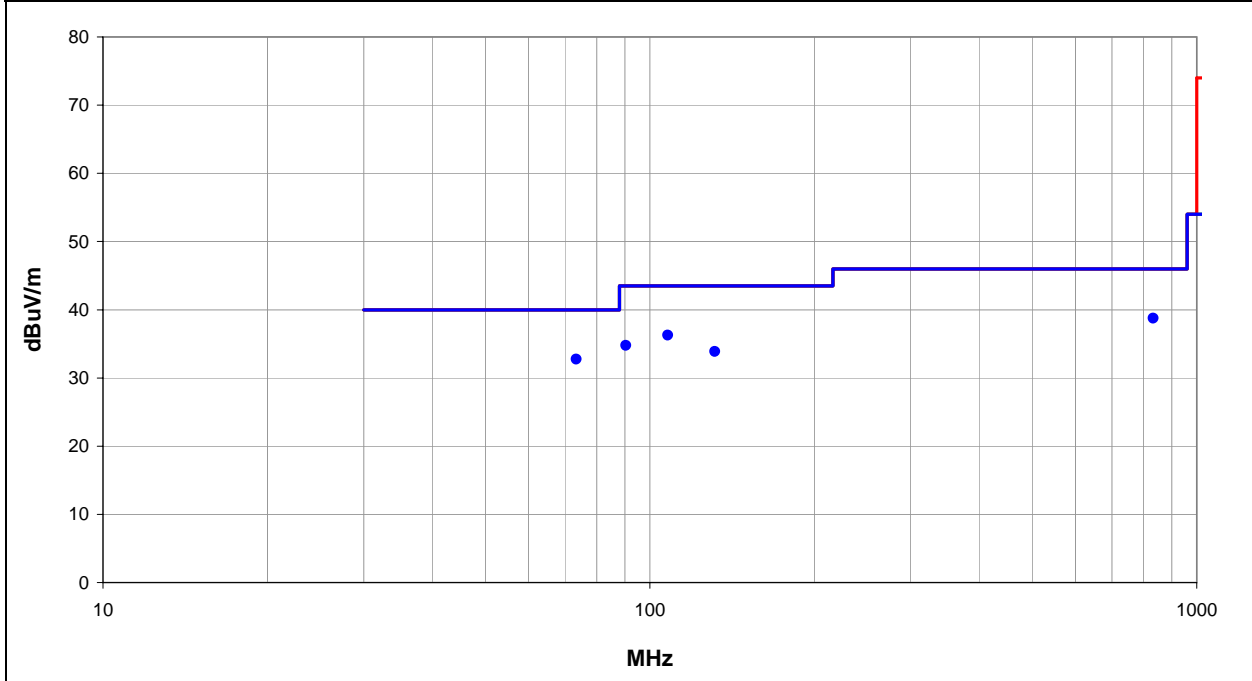
EMC

Spurious Radiated Emissions

Work Order:	ITRO0001	Date:	10/23/09	<i>Timothy P. O'Neil</i>
Project:	None	Temperature:	23.13	
Job Site:	MN05	Humidity:	25.5	
Serial Number:	435	Barometric Pres.:	1010.2	
				Tested by: Bryan Weller
EUT:	MLC4			
Configuration:	2 - Mobile Antenna			
Customer:	Itron			
Attendees:	None			
EUT Power:	Battery			
Operating Mode:	No hop, Low channel, 913.3MHz			
Deviations:	None			
Comments:	EUT horizontal. SMA cable parallel to ground.			

Test Specifications FCC 15.247 (FHSS):2009	Test Method ANSI C63.4:2003 DA 00-705:2000
--	--

Run #	45	Test Distance (m)	3	Antenna Height(s)	1-4m	Results	Pass
--------------	----	--------------------------	---	--------------------------	------	----------------	------



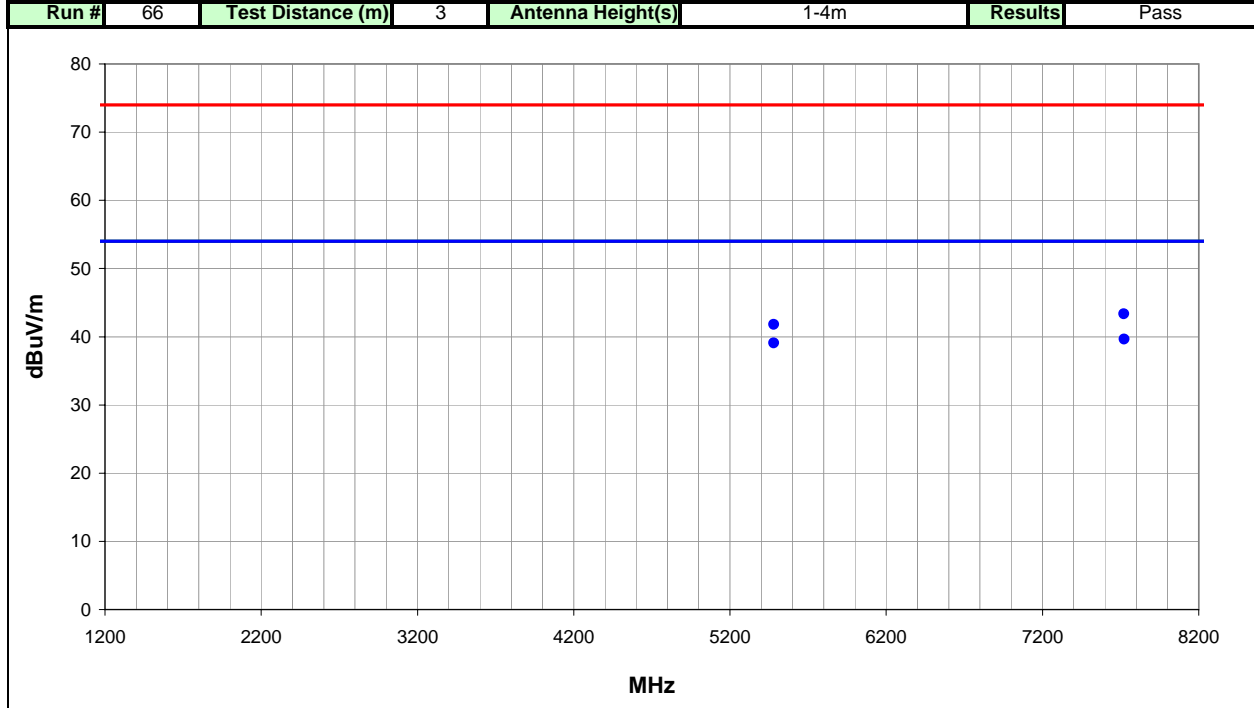
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
107.859	37.6	-11.4	2.5	264.0	3.0	10.0	Horz	QP	0.0	36.2	43.5	-7.3
73.340	36.0	-13.3	1.4	25.0	3.0	10.0	Vert	QP	0.0	32.7	40.0	-7.3
832.529	23.6	5.1	1.0	268.0	3.0	10.0	Horz	QP	0.0	38.7	46.0	-7.3
90.386	36.4	-11.6	1.0	131.0	3.0	10.0	Vert	QP	0.0	34.8	43.5	-8.7
131.508	36.1	-12.2	2.0	248.0	3.0	10.0	Horz	QP	0.0	33.9	43.5	-9.6

EMC

Spurious Radiated Emissions

Work Order:	ITRO0001	Date:	10/23/09	<i>Timothy P. O'Neil</i>
Project:	None	Temperature:	23.13	
Job Site:	MN05	Humidity:	25.5	
Serial Number:	435	Barometric Pres.:	1010.2	
EUT:	MLC4			
Configuration:	2 - Mobile Antenna			
Customer:	Itron			
Attendees:	None			
EUT Power:	Battery			
Operating Mode:	No hop, low channel, 913.3MHz			
Deviations:	None			
Comments:	EUT Horizontal cable perpendicular to ground.			

Test Specifications FCC 15.247 (FHSS):2009	Test Method ANSI C63.4:2003 DA 00-705:2000						
Run #	66	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)
7721.890	28.8	10.9	1.2	357.0	3.0	0.0	Vert	AV	0.0	39.7	54.0	-14.3
5479.802	35.2	3.9	1.3	165.0	3.0	0.0	Vert	AV	0.0	39.1	54.0	-14.9
7720.765	32.5	10.9	1.2	357.0	3.0	0.0	Vert	PK	0.0	43.4	74.0	-30.6
5479.894	37.9	3.9	1.3	165.0	3.0	0.0	Vert	PK	0.0	41.8	74.0	-32.2

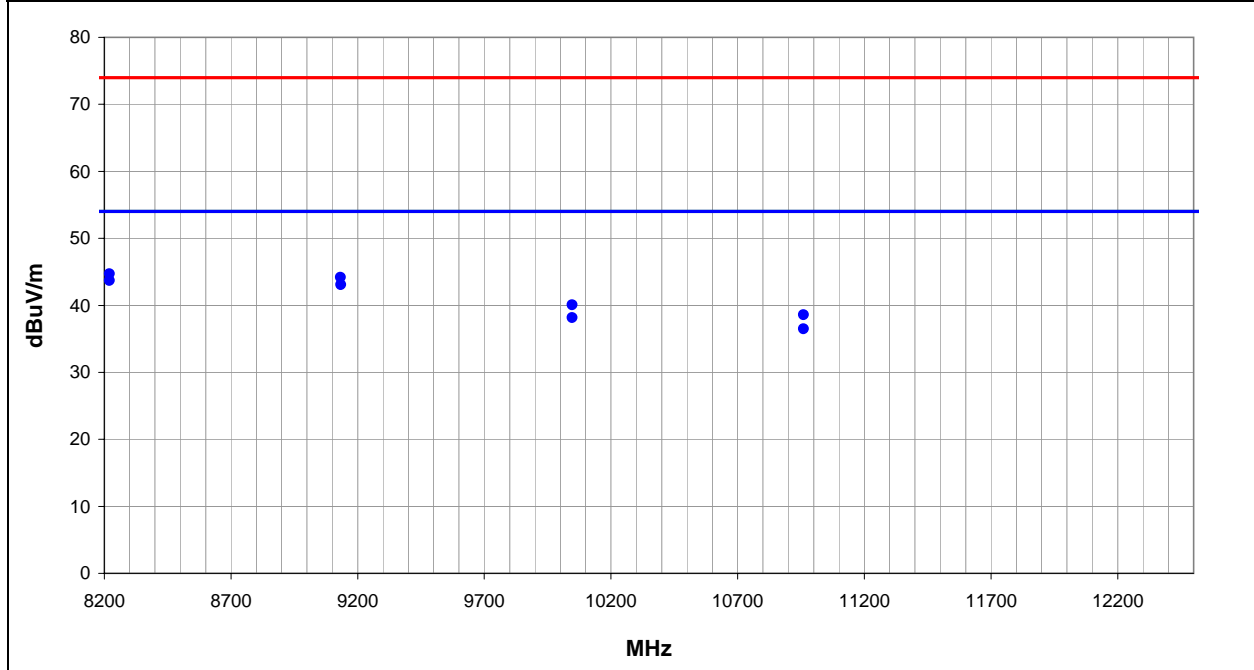
EMC

Spurious Radiated Emissions

Work Order:	ITRO0001	Date:	10/23/09	<i>Timothy P. O'Neil</i> Tested by: Bryan Weller
Project:	None	Temperature:	23.13	
Job Site:	MN05	Humidity:	25.5	
Serial Number:	435	Barometric Pres.:	1010.2	
EUT:	MLC4			
Configuration:	2 - Mobile Antenna			
Customer:	Itron			
Attendees:	None			
EUT Power:	Battery			
Operating Mode:	No hop, Low channel, 913.3MHz			
Deviations:	None			
Comments:	EUT Horizontal cable perpendicular to ground			

Test Specifications FCC 15.247 (FHSS):2009	Test Method ANSI C63.4:2003 DA 00-705:2000
--	--

Run #	51	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)
8219.740	53.8	-10.1	1.2	186.0	3.0	0.0	Vert	AV	0.0	43.7	54.0	-10.3
9133.023	52.0	-8.9	1.1	200.0	3.0	0.0	Vert	AV	0.0	43.1	54.0	-10.9
10046.330	45.9	-7.7	1.2	189.0	3.0	0.0	Vert	AV	0.0	38.2	54.0	-15.8
10959.610	44.8	-8.3	1.2	349.0	3.0	0.0	Vert	AV	0.0	36.5	54.0	-17.5
8219.623	54.8	-10.1	1.2	186.0	3.0	0.0	Vert	PK	0.0	44.7	74.0	-29.3
9132.798	53.1	-8.9	1.1	200.0	3.0	0.0	Vert	PK	0.0	44.2	74.0	-29.8
10046.210	47.8	-7.7	1.2	189.0	3.0	0.0	Vert	PK	0.0	40.1	74.0	-33.9
10959.580	46.9	-8.3	1.2	349.0	3.0	0.0	Vert	PK	0.0	38.6	74.0	-35.4

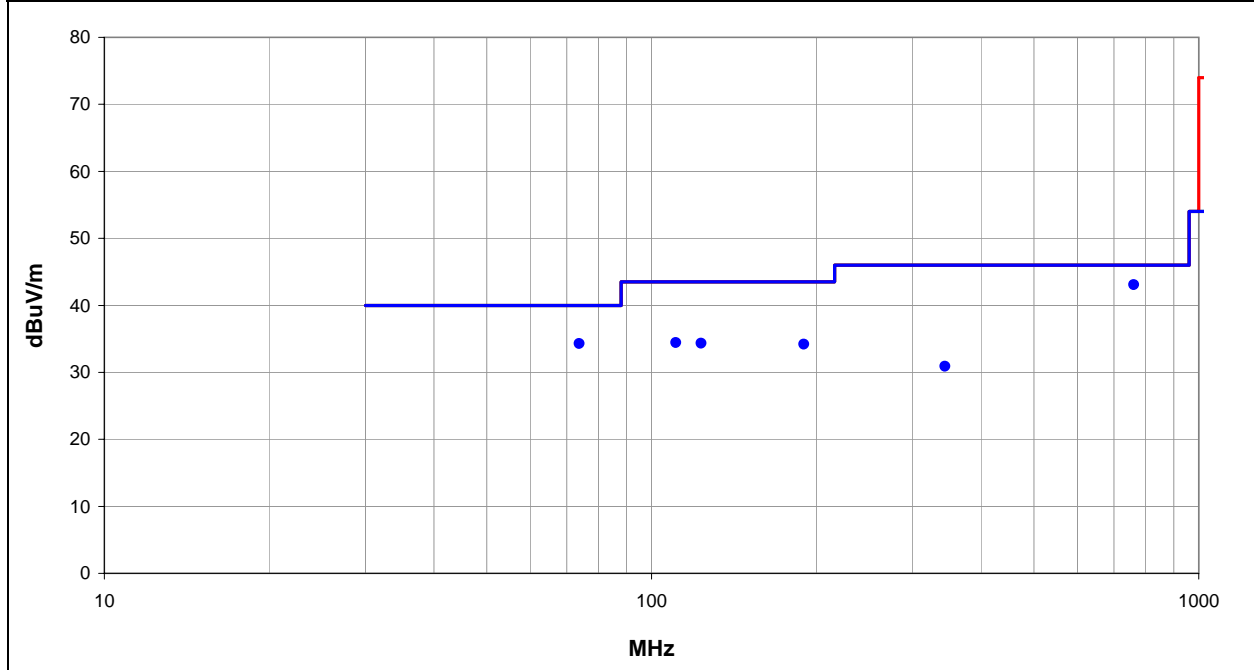
EMC

Spurious Radiated Emissions

Work Order:	ITRO0001	Date:	10/23/09	<i>Timothy P. O'Neil</i> Tested by: Bryan Weller
Project:	None	Temperature:	23.13	
Job Site:	MN05	Humidity:	25.5	
Serial Number:	435	Barometric Pres.:	1010.2	
EUT:	MLC4			
Configuration:	2 - Mobile Antenna			
Customer:	Itron			
Attendees:	None			
EUT Power:	Battery			
Operating Mode:	No hop, High channel, 917.3MHz			
Deviations:	None			
Comments:	EUT Horizontal cable perpendicular to ground			

Test Specifications FCC 15.247 (FHSS):2009	Test Method ANSI C63.4:2003 DA 00-705:2000
--	--

Run #	60	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)
761.298	28.6	4.5	1.0	269.0	3.0	10.0	Horz	QP	0.0	43.1	46.0	-2.9
73.774	37.5	-13.2	2.0	332.0	3.0	10.0	Vert	QP	0.0	34.3	40.0	-5.7
110.729	35.9	-11.5	2.0	64.0	3.0	10.0	Horz	QP	0.0	34.4	43.5	-9.1
123.288	36.5	-12.2	3.0	93.0	3.0	10.0	Horz	QP	0.0	34.3	43.5	-9.2
189.780	34.2	-10.0	1.6	239.0	3.0	10.0	Horz	QP	0.0	34.2	43.5	-9.3
343.810	25.3	-4.4	1.1	23.0	3.0	10.0	Horz	QP	0.0	30.9	46.0	-15.1

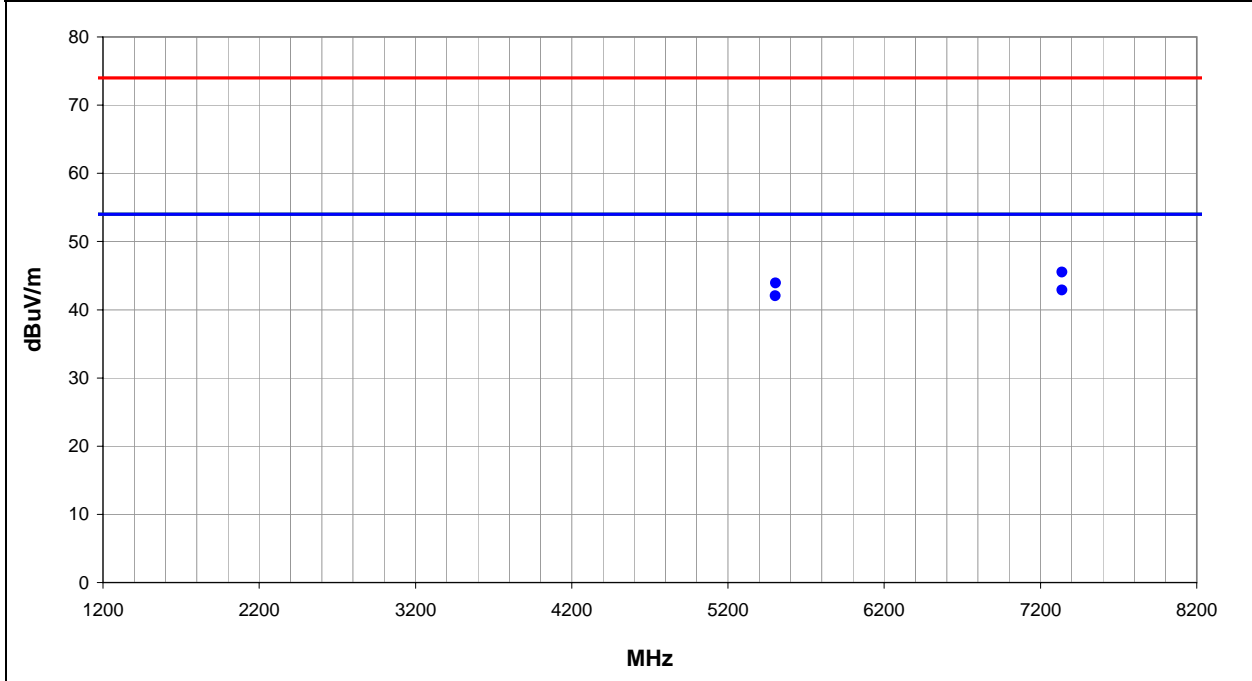
EMC

Spurious Radiated Emissions

Work Order:	ITRO0001	Date:	10/23/09	<i>Timothy P. O'Neil</i>
Project:	None	Temperature:	23.13	
Job Site:	MN05	Humidity:	25.5	
Serial Number:	435	Barometric Pres.:	1010.2	
EUT:	MLC4			
Configuration:	2 - Mobile Antenna			
Customer:	Itron			
Attendees:	None			
EUT Power:	Battery			
Operating Mode:	No hop, high channel, 917.3MHz			
Deviations:	None			
Comments:	EUT vertical.			

Test Specifications FCC 15.247 (FHSS):2009	Test Method ANSI C63.4:2003 DA 00-705:2000
--	--

Run #	69	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)
7338.383	32.7	10.2	1.5	195.0	3.0	0.0	Horz	AV	0.0	42.9	54.0	-11.1
5503.831	38.1	3.9	1.8	249.0	3.0	0.0	Vert	AV	0.0	42.0	54.0	-12.0
7338.341	35.3	10.2	1.5	195.0	3.0	0.0	Horz	PK	0.0	45.5	74.0	-28.5
5503.948	40.0	3.9	1.8	249.0	3.0	0.0	Vert	PK	0.0	43.9	74.0	-30.1

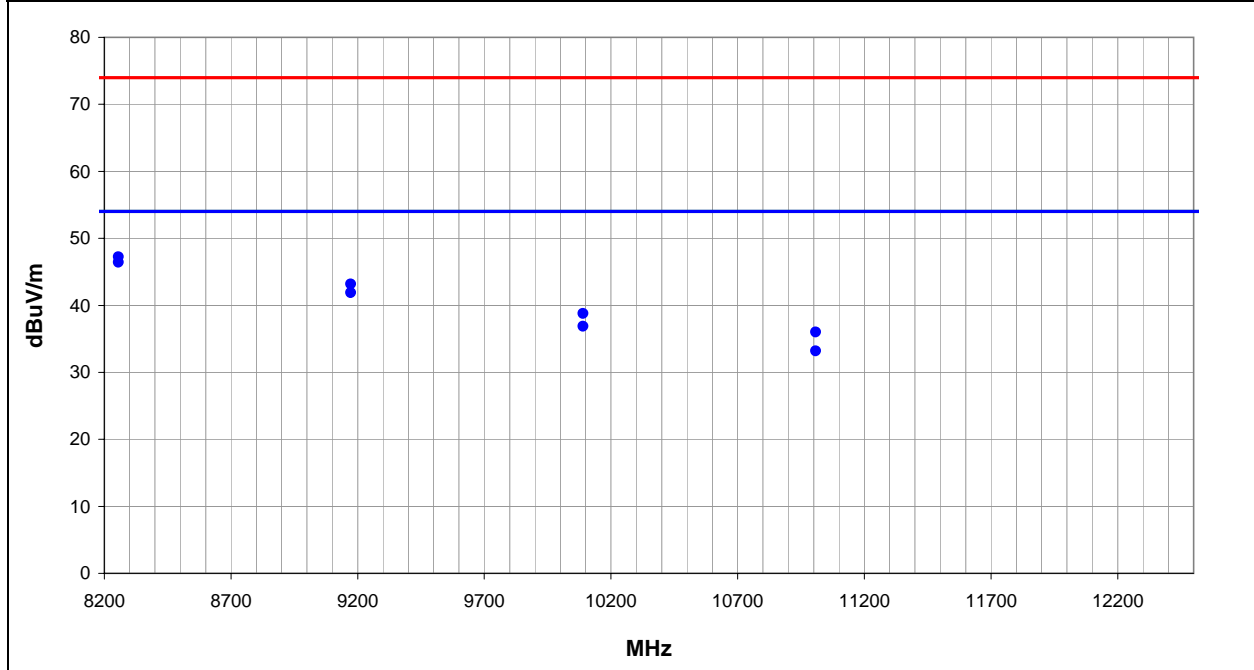
EMC

Spurious Radiated Emissions

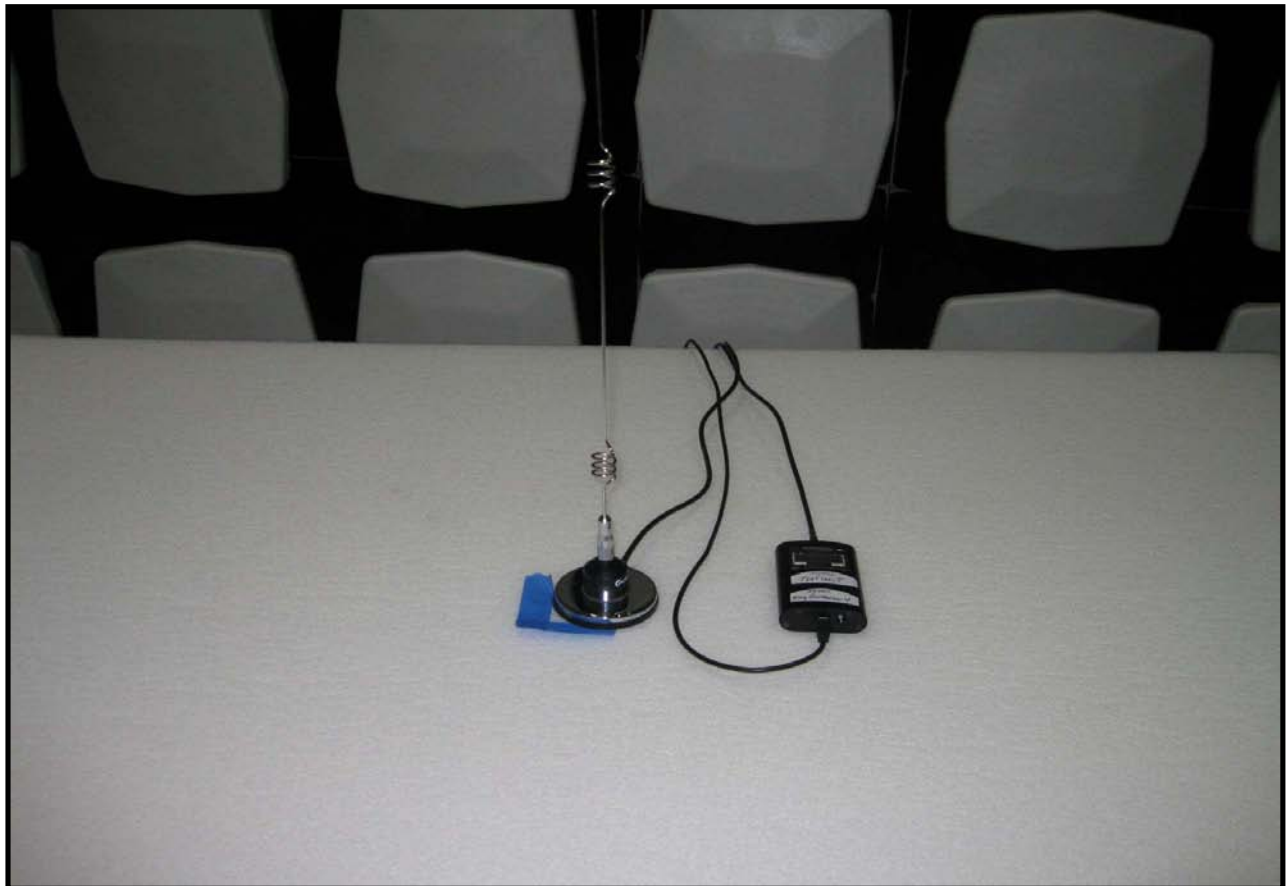
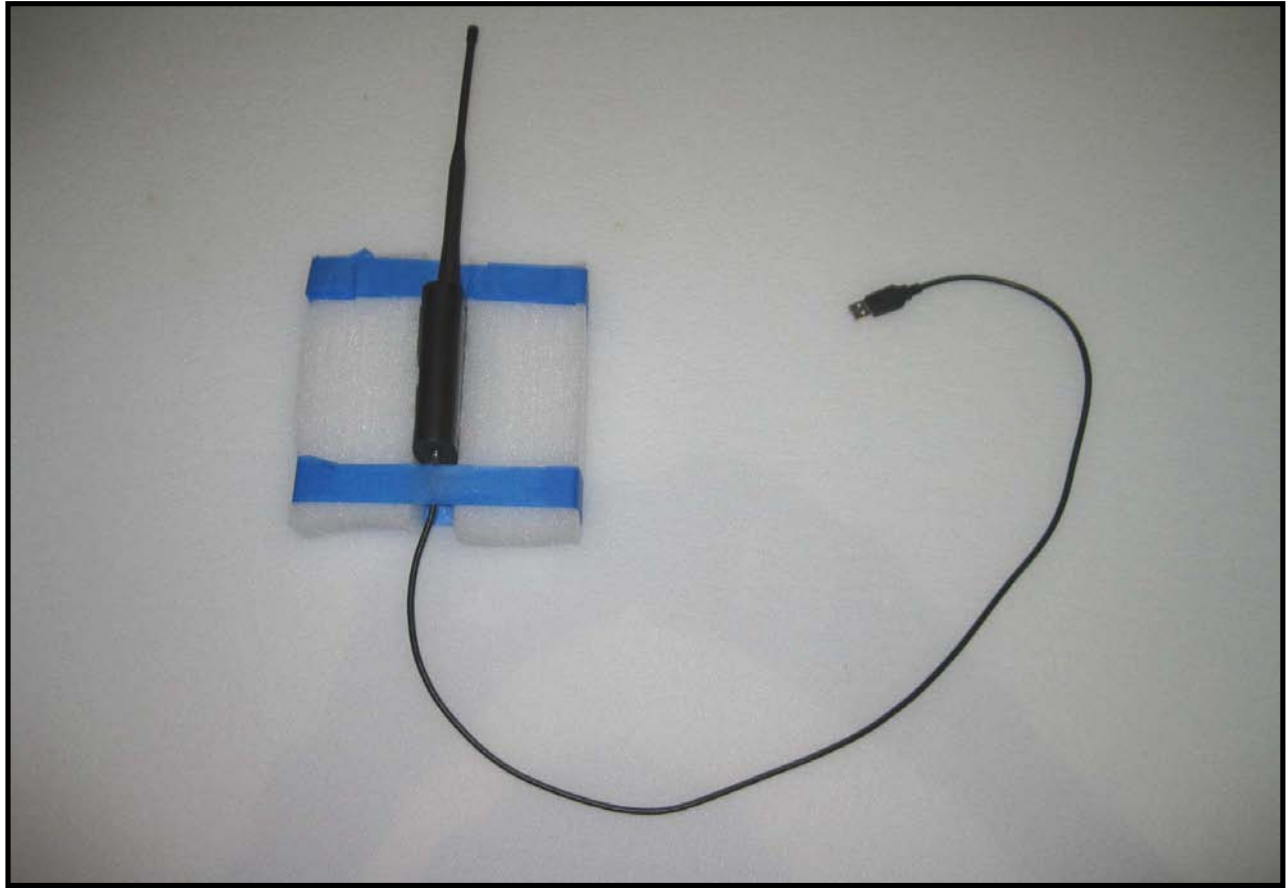
Work Order:	ITRO0001	Date:	10/23/09	<i>Timothy P. O'Neil</i> Tested by: Bryan Weller
Project:	None	Temperature:	23.13	
Job Site:	MN05	Humidity:	25.5	
Serial Number:	435	Barometric Pres.:	1010.2	
EUT:	MLC4			
Configuration:	2 - Mobile Antenna			
Customer:	Itron			
Attendees:	None			
EUT Power:	Battery			
Operating Mode:	No hop, High channel, 917.3MHz			
Deviations:	None			
Comments:	EUT Horizontal cable parallel to ground			

Test Specifications FCC 15.247 (FHSS):2009	Test Method ANSI C63.4:2003 DA 00-705:2000
--	--

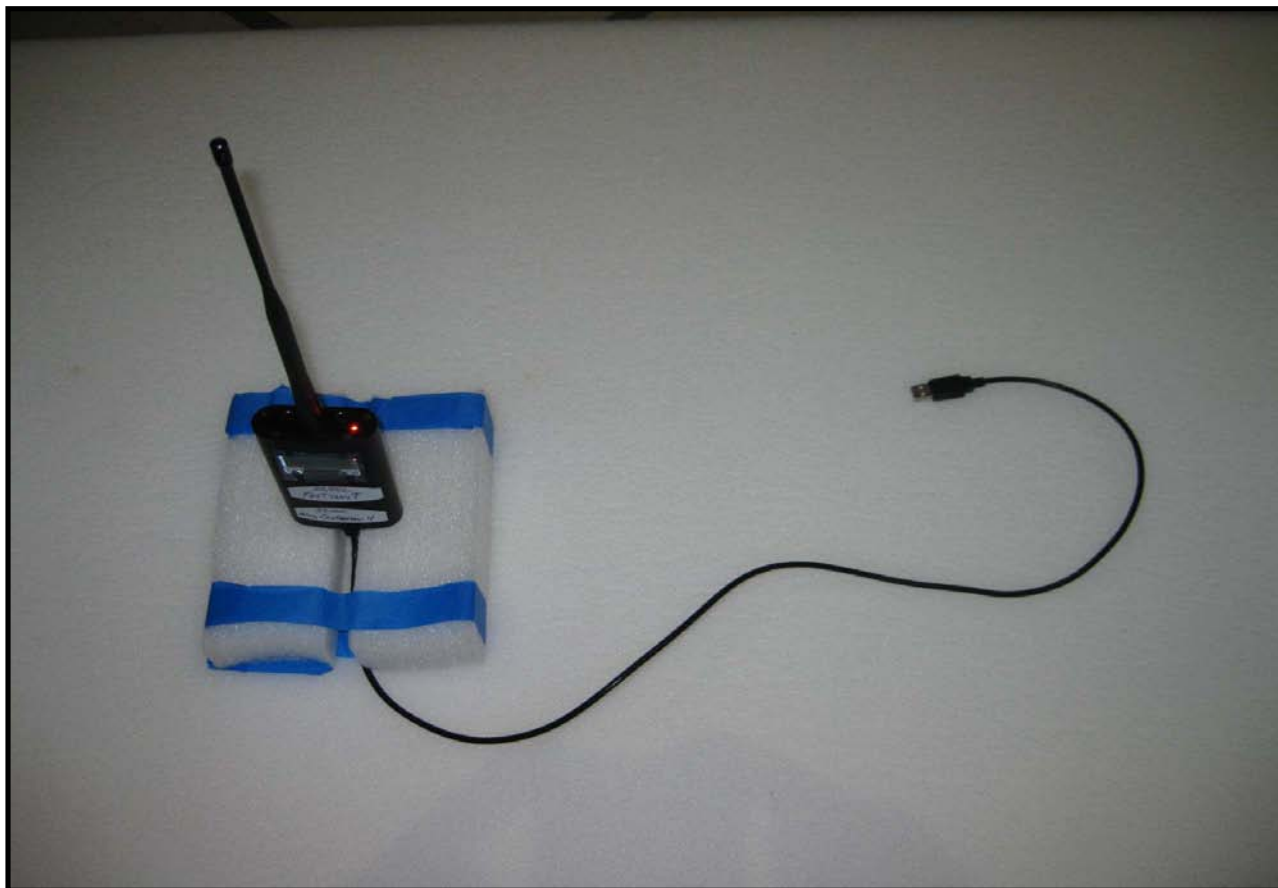
Run #	54	Test Distance (m)	3	Antenna Height(s)	1-4m	Results	Pass
--------------	----	--------------------------	---	--------------------------	------	----------------	------

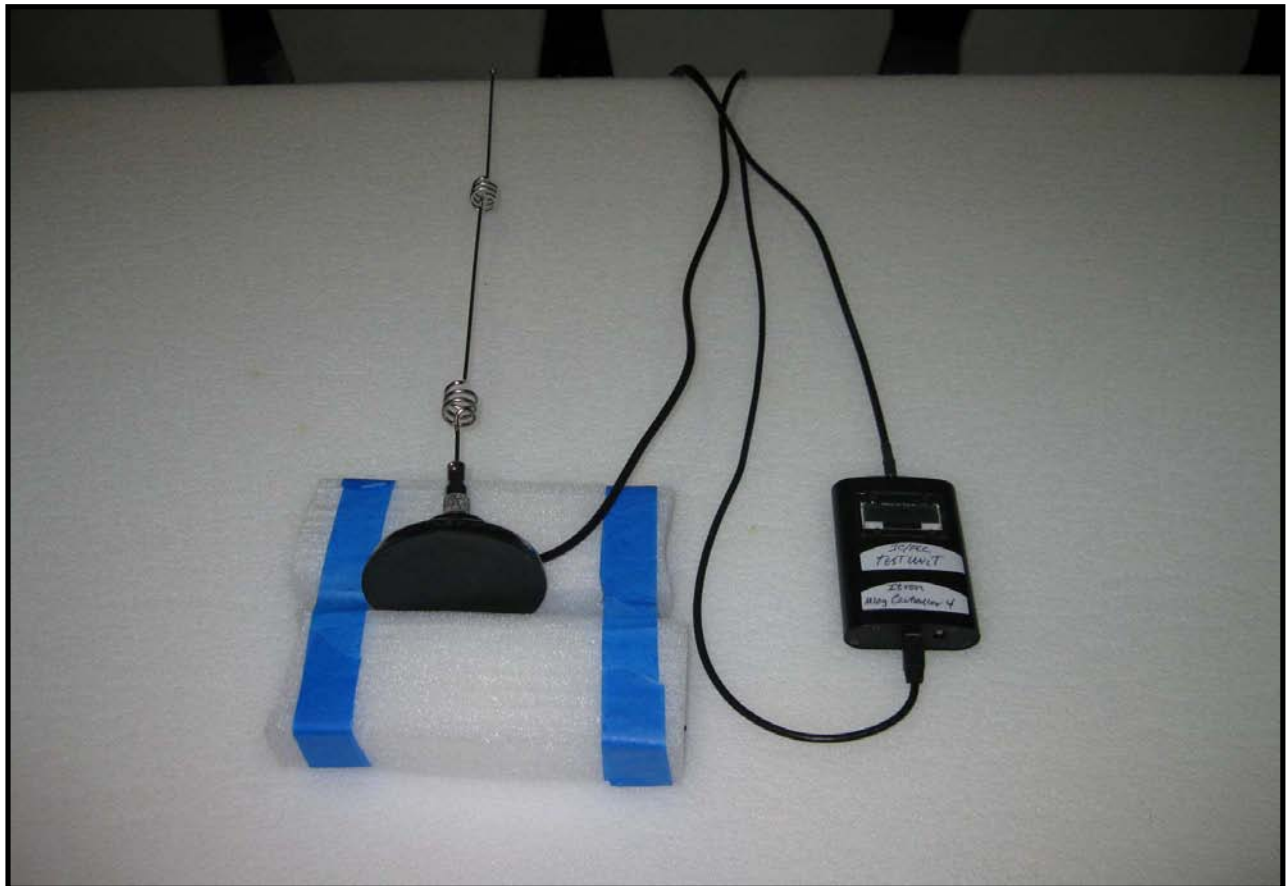


Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)
8255.713	56.4	-10.0	1.1	185.0	3.0	0.0	Vert	AV	0.0	46.4	54.0	-7.6
9173.030	50.7	-8.8	1.3	190.0	3.0	0.0	Vert	AV	0.0	41.9	54.0	-12.1
10090.310	44.7	-7.8	1.3	189.0	3.0	0.0	Vert	AV	0.0	36.9	54.0	-17.1
11007.570	41.5	-8.3	1.1	150.0	3.0	0.0	Vert	AV	0.0	33.2	54.0	-20.8
8255.471	57.2	-10.0	1.1	185.0	3.0	0.0	Vert	PK	0.0	47.2	74.0	-26.8
9172.921	52.0	-8.8	1.3	190.0	3.0	0.0	Vert	PK	0.0	43.2	74.0	-30.8
10090.210	46.6	-7.8	1.3	189.0	3.0	0.0	Vert	PK	0.0	38.8	74.0	-35.2
11007.870	44.3	-8.3	1.1	150.0	3.0	0.0	Vert	PK	0.0	36.0	74.0	-38.0









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

No hop Low Channel 913.3MHz
No hop High Channel 917.3 MHz
Receive Low channel 913.3MHz
Receive High channel 917.3MHz

POWER SETTINGS INVESTIGATED

USB Power from PC

CONFIGURATIONS INVESTIGATED

ITRO0001 - 4
ITRO0001 - 5
ITRO0001 - 6

SAMPLE CALCULATIONS

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Receiver	Rohde & Schwarz	ESCI	ARE	4/8/2009	24 mo
High Pass Filter	TTE	H97-100K-50-720B	HGN	6/9/2009	13 mo
LISN	Solar	9252-50-R-24-BNC	LIO	2/5/2009	13 mo
MN03 Cables	ESM Cable Corp.	Conducted Cables	MNC	5/27/2009	13 mo

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

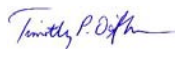
A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 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.

EMC

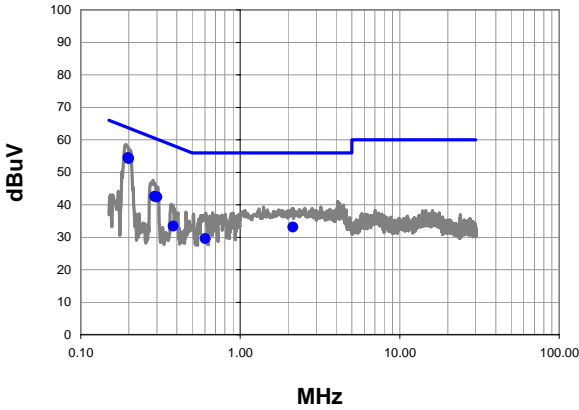
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	ITRO0001	Date:	10/23/09	 Tested by: Bryan weller
Project:	None	Temperature:	23.13	
Job Site:	MN03	Humidity:	25.5	
Serial Number:	435	Barometric Pres.:	1010.2	
EUT:	MLC4			
Configuration:	4 - Conducted Emissions			
Customer:	Itron			
Attendees:	None			
EUT Power:	USB Power from PC			
Operating Mode:	No hop High Channel 917.3 MHz			
Deviations:	None			
Comments:	None			

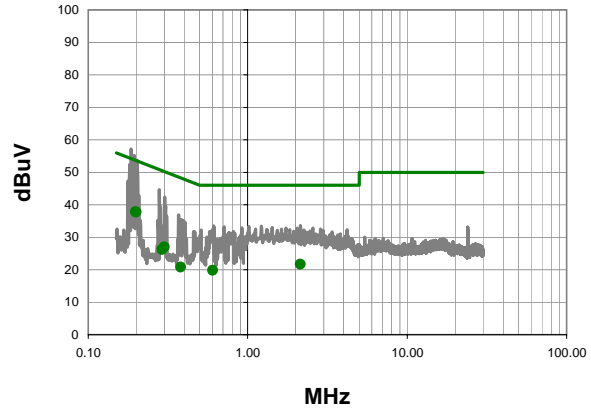
Test Specifications FCC 15.207:2009	Class B	Test Method ANSI C63.4:2003
---	----------------	---------------------------------------

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

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.198	33.4	21.1	54.5	63.7	-9.2
0.200	33.1	21.1	54.2	63.6	-9.4
0.301	21.7	20.7	42.4	60.2	-17.8
0.291	21.9	20.7	42.6	60.5	-17.9
2.144	12.7	20.4	33.1	56.0	-22.9
0.380	12.8	20.6	33.4	58.3	-24.9
0.603	9.1	20.4	29.5	56.0	-26.5

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.198	16.7	21.1	37.8	53.7	-15.9
0.200	16.6	21.1	37.7	53.6	-15.9
0.301	6.3	20.7	27.0	50.2	-23.2
0.291	5.5	20.7	26.2	50.5	-24.3
2.144	1.2	20.4	21.6	46.0	-24.4
0.603	-0.6	20.4	19.8	46.0	-26.2
0.380	0.2	20.6	20.8	48.3	-27.5

EMC

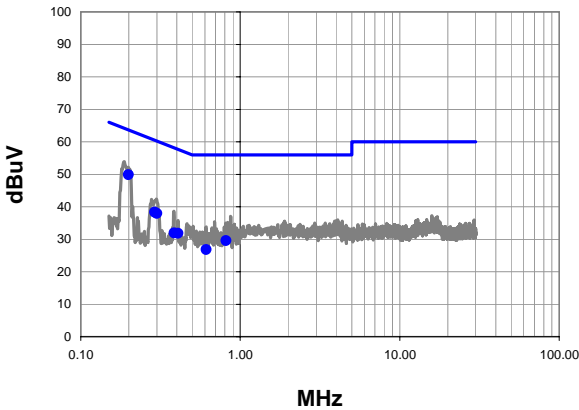
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	ITRO0001	Date:	10/23/09	<i>Timothy P. O'Neil</i> Tested by: Bryan Weller
Project:	None	Temperature:	23.13	
Job Site:	MN03	Humidity:	25.5	
Serial Number:	435	Barometric Pres.:	1010.2	
EUT:	MLC4			
Configuration:	4 - Conducted Emissions			
Customer:	Itron			
Attendees:	None			
EUT Power:	USB Power from PC			
Operating Mode:	No hop High Channel 917.3 MHz			
Deviations:	None			
Comments:	None			

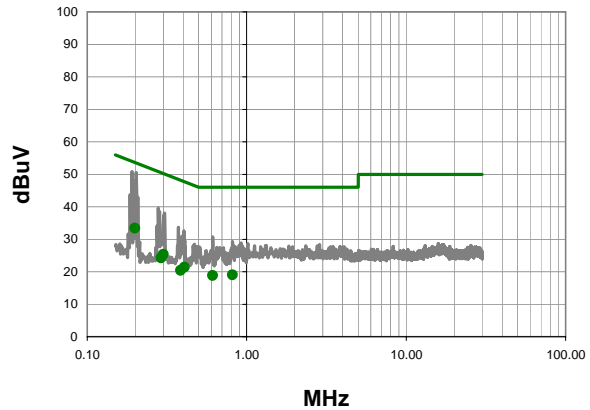
Test Specifications FCC 15.207:2009	Class B	Test Method ANSI C63.4:2003
---	----------------	---------------------------------------

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

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.199	28.7	21.1	49.8	63.7	-13.8
0.291	17.6	20.7	38.3	60.5	-22.2
0.301	17.2	20.7	37.9	60.2	-22.3
0.407	11.3	20.5	31.8	57.7	-25.9
0.385	11.3	20.6	31.9	58.2	-26.3
0.815	9.2	20.4	29.6	56.0	-26.4
0.612	6.4	20.4	26.8	56.0	-29.2

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.199	12.3	21.1	33.4	53.7	-20.2
0.301	4.6	20.7	25.3	50.2	-24.9
0.291	3.5	20.7	24.2	50.5	-26.3
0.407	0.9	20.5	21.4	47.7	-26.3
0.815	-1.3	20.4	19.1	46.0	-26.9
0.612	-1.6	20.4	18.8	46.0	-27.2
0.385	-0.2	20.6	20.4	48.2	-27.8

EMC

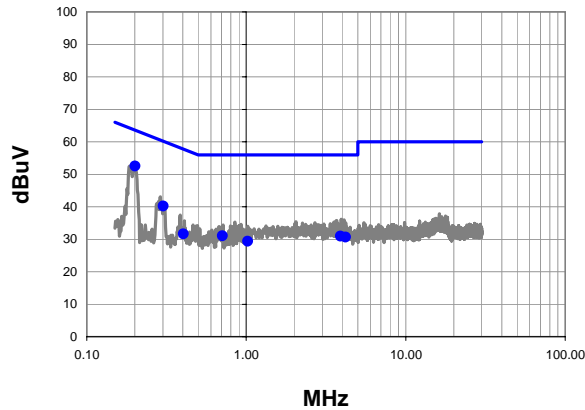
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	ITRO0001	Date:	10/23/09	<i>Timothy P. O'Neil</i> Tested by: Bryan Weller
Project:	None	Temperature:	23.13	
Job Site:	MN03	Humidity:	25.5	
Serial Number:	435	Barometric Pres.:	1010.2	
EUT:	MLC4			
Configuration:	4 - Conducted Emissions			
Customer:	Itron			
Attendees:	None			
EUT Power:	USB Power from PC			
Operating Mode:	No hop Low Channel 913.3MHz			
Deviations:	None			
Comments:	None			

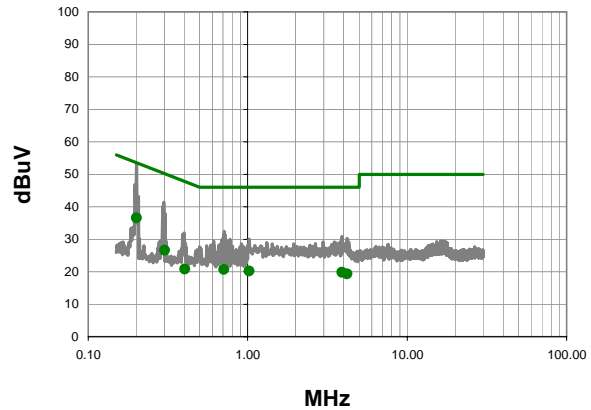
Test Specifications FCC 15.207:2009	Class B	Test Method ANSI C63.4:2003
---	----------------	---------------------------------------

Run #	5	Line:	Neutral	Ext. Attenuation:	20	Results	Pass
--------------	---	--------------	---------	--------------------------	----	----------------	------

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.201	31.4	21.1	52.5	63.6	-11.1
0.302	19.5	20.7	40.2	60.2	-20.0
0.709	10.6	20.4	31.0	56.0	-25.0
3.900	10.5	20.5	31.0	56.0	-25.0
4.204	10.2	20.5	30.7	56.0	-25.3
0.404	11.1	20.5	31.6	57.8	-26.2
1.024	9.0	20.4	29.4	56.0	-26.6

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.201	15.5	21.1	36.6	53.6	-17.0
0.302	5.9	20.7	26.6	50.2	-23.6
0.709	0.2	20.4	20.6	46.0	-25.4
1.024	-0.2	20.4	20.2	46.0	-25.8
3.900	-0.7	20.5	19.8	46.0	-26.2
4.204	-1.2	20.5	19.3	46.0	-26.7
0.404	0.3	20.5	20.8	47.8	-27.0

EMC

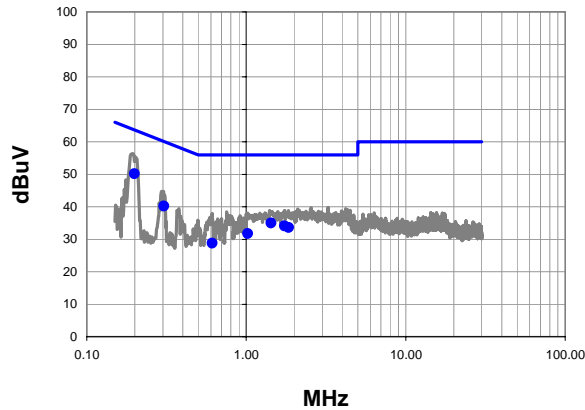
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	ITRO0001	Date:	10/23/09	<i>Timothy P. O'Neil</i> Tested by: Bryan Weller
Project:	None	Temperature:	23.13	
Job Site:	MN03	Humidity:	25.5	
Serial Number:	435	Barometric Pres.:	1010.2	
EUT:	MLC4			
Configuration:	4 - Conducted Emissions			
Customer:	Itron			
Attendees:	None			
EUT Power:	USB Power from PC			
Operating Mode:	No hop Low Channel 913.3MHz			
Deviations:	None			
Comments:	None			

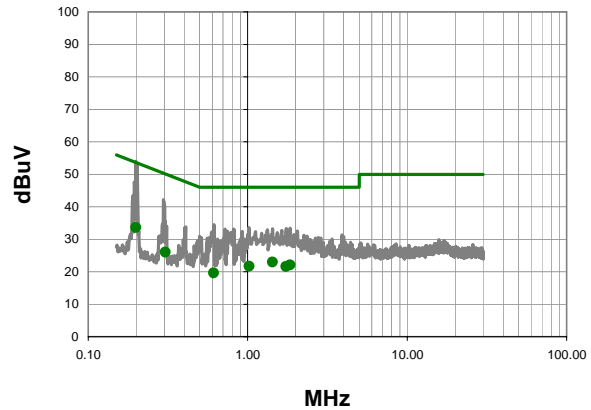
Test Specifications FCC 15.207:2009	Class B	Test Method ANSI C63.4:2003
---	----------------	---------------------------------------

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

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.199	29.0	21.1	50.1	63.7	-13.5
0.304	19.5	20.7	40.2	60.1	-19.9
1.432	14.6	20.4	35.0	56.0	-21.0
1.740	13.7	20.4	34.1	56.0	-21.9
1.844	13.2	20.4	33.6	56.0	-22.4
1.024	11.3	20.4	31.7	56.0	-24.3
0.612	8.3	20.4	28.7	56.0	-27.3

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.199	12.5	21.1	33.6	53.7	-20.0
1.432	2.5	20.4	22.9	46.0	-23.1
1.844	1.6	20.4	22.0	46.0	-24.0
0.304	5.3	20.7	26.0	50.1	-24.1
1.024	1.3	20.4	21.7	46.0	-24.3
1.740	1.2	20.4	21.6	46.0	-24.4
0.612	-0.8	20.4	19.6	46.0	-26.4

EMC

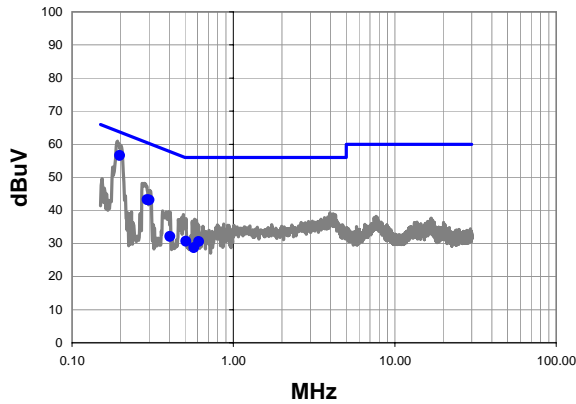
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	ITRO0001	Date:	10/26/09	<i>Timothy P. O'Neil</i> Tested by: Bryan Weller
Project:	None	Temperature:	23.13	
Job Site:	MN03	Humidity:	25.5	
Serial Number:	435	Barometric Pres.:	1010.2	
EUT:	MLC4			
Configuration:	5 - Alternate FCC Recieve Mode			
Customer:	Itron			
Attendees:	None			
EUT Power:	USB Power from PC			
Operating Mode:	Receive Low channel 913.3MHz			
Deviations:	None			
Comments:	None			

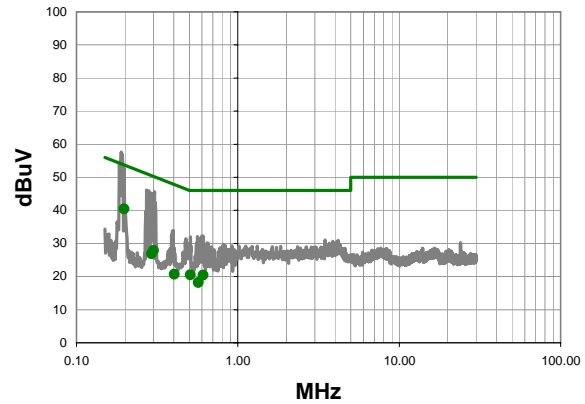
Test Specifications FCC 15.207:2009	Class B	Test Method ANSI C63.4:2003
---	----------------	---------------------------------------

Run #	9	Line:	High Line	Ext. Attenuation:	20	Results	Pass
--------------	---	--------------	-----------	--------------------------	----	----------------	------

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.197	35.4	21.1	56.5	63.7	-7.2
0.301	22.4	20.7	43.1	60.2	-17.1
0.293	22.5	20.7	43.2	60.4	-17.2
0.509	10.3	20.4	30.7	56.0	-25.3
0.610	10.1	20.4	30.5	56.0	-25.5
0.405	11.6	20.5	32.1	57.8	-25.7
0.569	8.3	20.4	28.7	56.0	-27.3

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.197	19.3	21.1	40.4	53.7	-13.3
0.301	7.2	20.7	27.9	50.2	-22.3
0.293	6.2	20.7	26.9	50.4	-23.5
0.509	0.1	20.4	20.5	46.0	-25.5
0.610	0.0	20.4	20.4	46.0	-25.6
0.405	0.2	20.5	20.7	47.8	-27.1
0.569	-2.2	20.4	18.2	46.0	-27.8

EMC

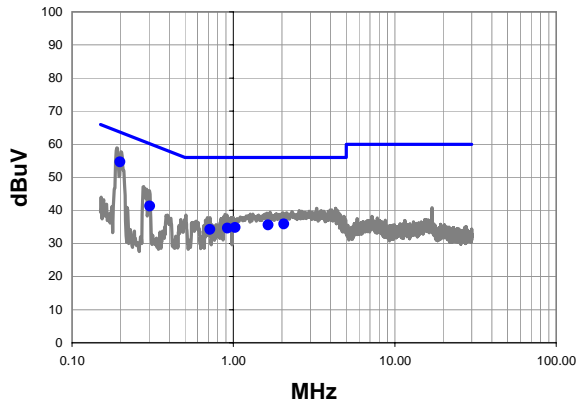
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	ITRO0001	Date:	10/26/09	<i>Timothy P. O'Neil</i> Tested by: Bryan Weller
Project:	None	Temperature:	23.13	
Job Site:	MN03	Humidity:	25.5	
Serial Number:	435	Barometric Pres.:	1010.2	
EUT:	MLC4			
Configuration:	5- Alternate FCC Receive Mode			
Customer:	Itron			
Attendees:	None			
EUT Power:	USB Power from PC			
Operating Mode:	Receive Low channel 913.3MHz			
Deviations:	None			
Comments:	None			

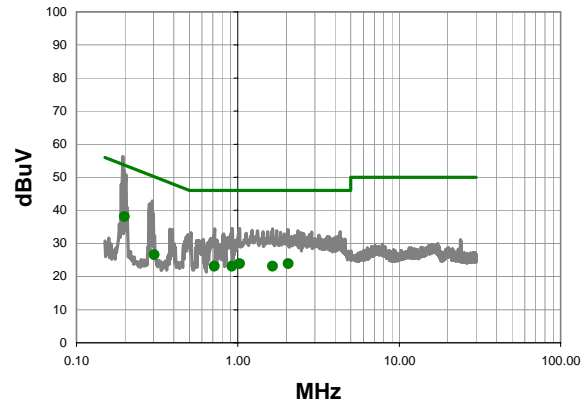
Test Specifications FCC 15.207:2009	Class B	Test Method ANSI C63.4:2003
---	----------------	---------------------------------------

Run #	10	Line:	Neutral	Ext. Attenuation:	20	Results	Pass
--------------	----	--------------	---------	--------------------------	----	----------------	------

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.198	33.5	21.1	54.6	63.7	-9.1
0.303	20.6	20.7	41.3	60.2	-18.9
2.052	15.5	20.4	35.9	56.0	-20.1
1.640	15.2	20.4	35.6	56.0	-20.4
1.024	14.4	20.4	34.8	56.0	-21.2
0.920	14.2	20.4	34.6	56.0	-21.4
0.714	13.8	20.4	34.2	56.0	-21.8

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.198	17.0	21.1	38.1	53.7	-15.6
2.052	3.5	20.4	23.9	46.0	-22.1
1.024	3.5	20.4	23.9	46.0	-22.1
0.714	2.7	20.4	23.1	46.0	-22.9
1.640	2.7	20.4	23.1	46.0	-22.9
0.920	2.7	20.4	23.1	46.0	-22.9
0.303	5.9	20.7	26.6	50.2	-23.6

EMC

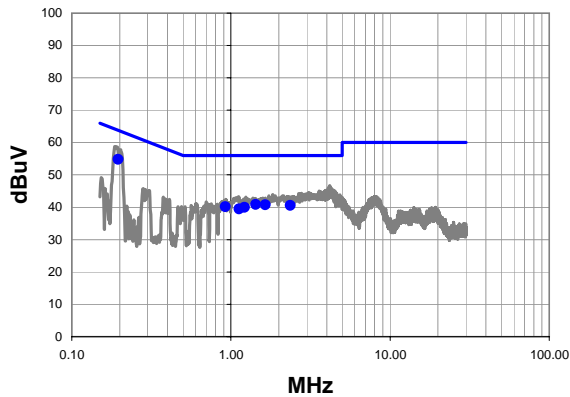
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	ITRO0001	Date:	10/26/09	<i>Trevor P. Buls</i>
Project:	None	Temperature:	23.18	
Job Site:	MN03	Humidity:	31.86	
Serial Number:	435	Barometric Pres.:	1018	
EUT:	MLC4			
Configuration:	5- Alternate FCC Recieve Mode			
Customer:	Itron			
Attendees:	None			
EUT Power:	USB through PC			
Operating Mode:	Receive Mid channel 915.3MHz			
Deviations:	None			
Comments:	None			

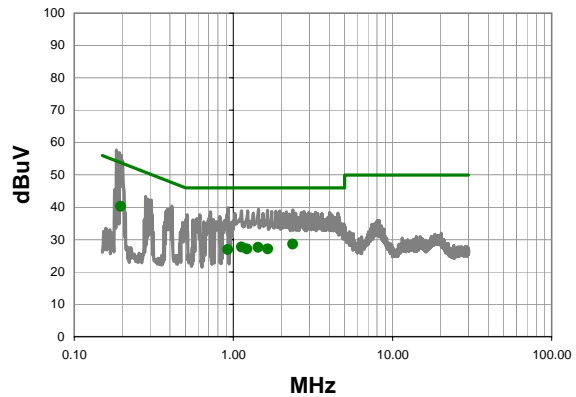
Test Specifications FCC 15.207:2009	Class B	Test Method ANSI C63.4:2003
---	----------------	---------------------------------------

Run #	15	Line:	High Line	Ext. Attenuation:	20	Results	Pass
--------------	----	--------------	-----------	--------------------------	----	----------------	------

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.196	33.7	21.1	54.8	63.8	-8.9
1.436	20.4	20.4	40.8	56.0	-15.2
1.644	20.3	20.4	40.7	56.0	-15.3
2.360	20.1	20.4	40.5	56.0	-15.5
0.925	19.8	20.4	40.2	56.0	-15.8
1.220	19.6	20.4	40.0	56.0	-16.0
1.128	19.1	20.4	39.5	56.0	-16.5

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.196	19.1	21.1	40.2	53.8	-13.5
2.360	8.2	20.4	28.6	46.0	-17.4
1.128	7.3	20.4	27.7	46.0	-18.3
1.436	7.2	20.4	27.6	46.0	-18.4
1.644	6.7	20.4	27.1	46.0	-18.9
1.220	6.7	20.4	27.1	46.0	-18.9
0.925	6.5	20.4	26.9	46.0	-19.1

EMC

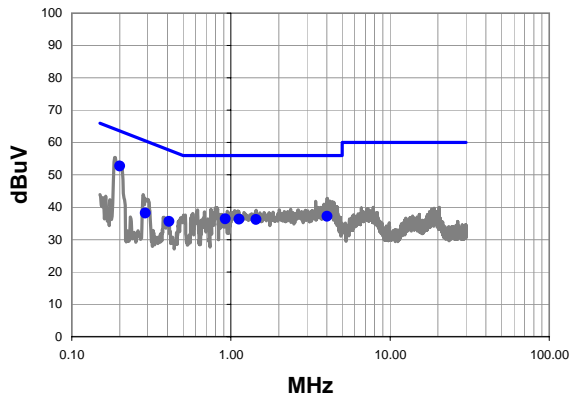
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	ITRO0001	Date:	10/26/09	<i>Trevor P. O'Neil</i>
Project:	None	Temperature:	23.18	
Job Site:	MN03	Humidity:	31.86	
Serial Number:	435	Barometric Pres.:	1018	
EUT:	MLC4			
Configuration:	5- Alternate FCC Recieve Mode			
Customer:	Itron			
Attendees:	None			
EUT Power:	USB through PC			
Operating Mode:	Receive Mid channel 915.3MHz			
Deviations:	None			
Comments:	None			

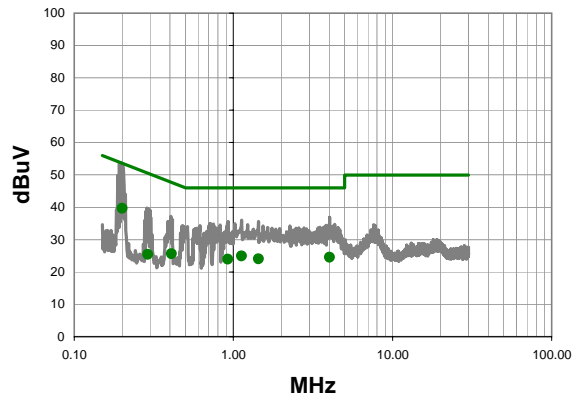
Test Specifications FCC 15.207:2009	Class B	Test Method ANSI C63.4:2003
---	----------------	---------------------------------------

Run #	16	Line:	Neutral	Ext. Attenuation:	20	Results	Pass
--------------	----	--------------	---------	--------------------------	----	----------------	------

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.200	31.6	21.1	52.7	63.6	-10.9
4.020	16.7	20.5	37.2	56.0	-18.8
0.925	16.0	20.4	36.4	56.0	-19.6
1.128	15.9	20.4	36.3	56.0	-19.7
1.440	15.8	20.4	36.2	56.0	-19.8
0.409	15.1	20.5	35.6	57.7	-22.1
0.290	17.5	20.7	38.2	60.5	-22.3

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.200	18.6	21.1	39.7	53.6	-13.9
1.128	4.5	20.4	24.9	46.0	-21.1
4.020	4.1	20.5	24.6	46.0	-21.4
1.440	3.6	20.4	24.0	46.0	-22.0
0.925	3.6	20.4	24.0	46.0	-22.0
0.409	5.1	20.5	25.6	47.7	-22.1
0.290	4.7	20.7	25.4	50.5	-25.1

EMC

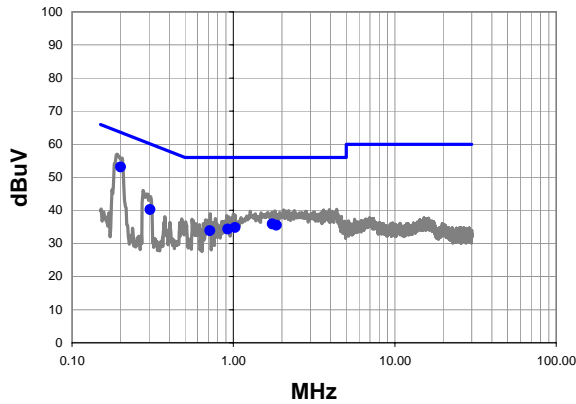
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	ITRO0001	Date:	10/26/09	<i>Timothy P. O'Neil</i> Tested by: Elaine Reeves
Project:	None	Temperature:	23.13	
Job Site:	MN03	Humidity:	25.5	
Serial Number:	435	Barometric Pres.:	1010.2	
EUT:	MLC4			
Configuration:	5 - Alternate FCC Recieve Mode			
Customer:	Itron			
Attendees:	None			
EUT Power:	USB Power from PC			
Operating Mode:	Receive High channel 917.3MHz			
Deviations:	None			
Comments:	None			

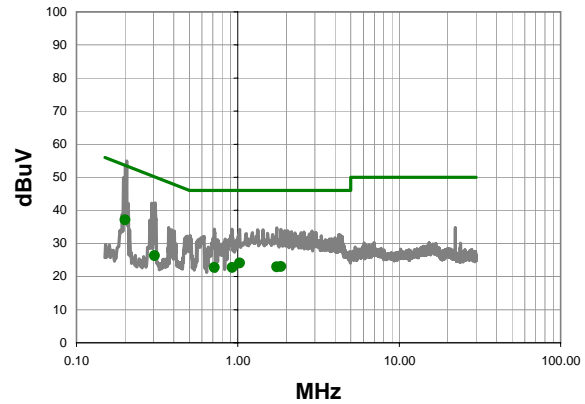
Test Specifications FCC 15.207:2009	Class B	Test Method ANSI C63.4:2003
---	----------------	---------------------------------------

Run #	11	Line:	Neutral	Ext. Attenuation:	20	Results	Pass
--------------	----	--------------	---------	--------------------------	----	----------------	------

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.200	32.0	21.1	53.1	63.6	-10.5
0.304	19.5	20.7	40.2	60.1	-19.9
1.744	15.5	20.4	35.9	56.0	-20.1
1.848	15.1	20.4	35.5	56.0	-20.5
1.024	14.4	20.4	34.8	56.0	-21.2
0.922	13.9	20.4	34.3	56.0	-21.7
0.716	13.4	20.4	33.8	56.0	-22.2

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.200	16.0	21.1	37.1	53.6	-16.5
1.024	3.7	20.4	24.1	46.0	-21.9
1.848	2.6	20.4	23.0	46.0	-23.0
1.744	2.5	20.4	22.9	46.0	-23.1
0.716	2.3	20.4	22.7	46.0	-23.3
0.922	2.3	20.4	22.7	46.0	-23.3
0.304	5.6	20.7	26.3	50.1	-23.8

EMC

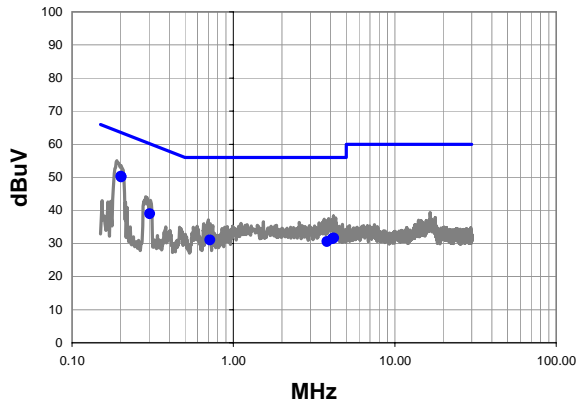
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	ITRO0001	Date:	10/26/09	<i>Timothy P. O'Neil</i>
Project:	None	Temperature:	23.13	
Job Site:	MN03	Humidity:	25.5	
Serial Number:	435	Barometric Pres.:	1010.2	
EUT:	MLC4			
Configuration:	5 - Alternate FCC Recieve Mode			
Customer:	Itron			
Attendees:	None			
EUT Power:	USB Power from PC			
Operating Mode:	Receive High channel 917.3MHz			
Deviations:	None			
Comments:	None			

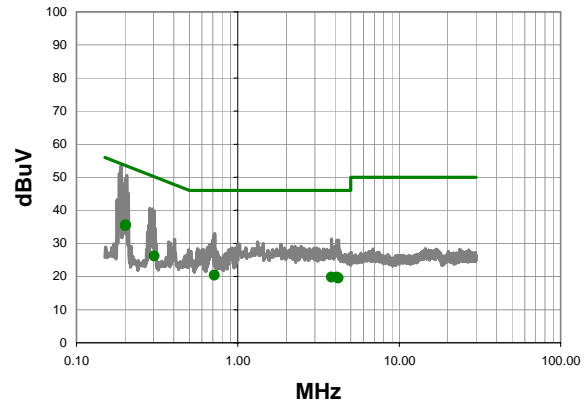
Test Specifications	Class B	Test Method
FCC 15.207:2009		ANSI C63.4:2003

Run #	12	Line:	High Line	Ext. Attenuation:	20	Results	Pass
--------------	----	--------------	-----------	--------------------------	----	----------------	------

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit

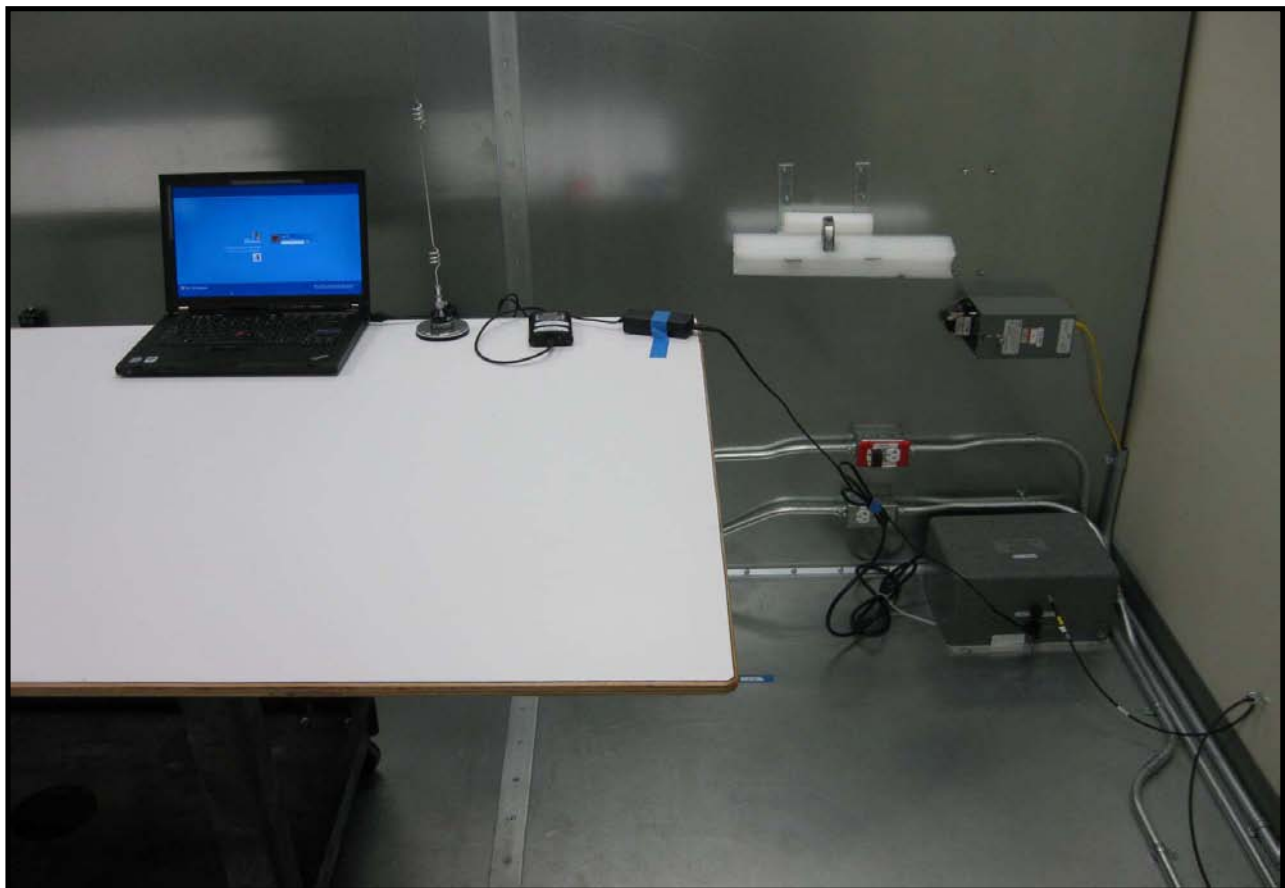
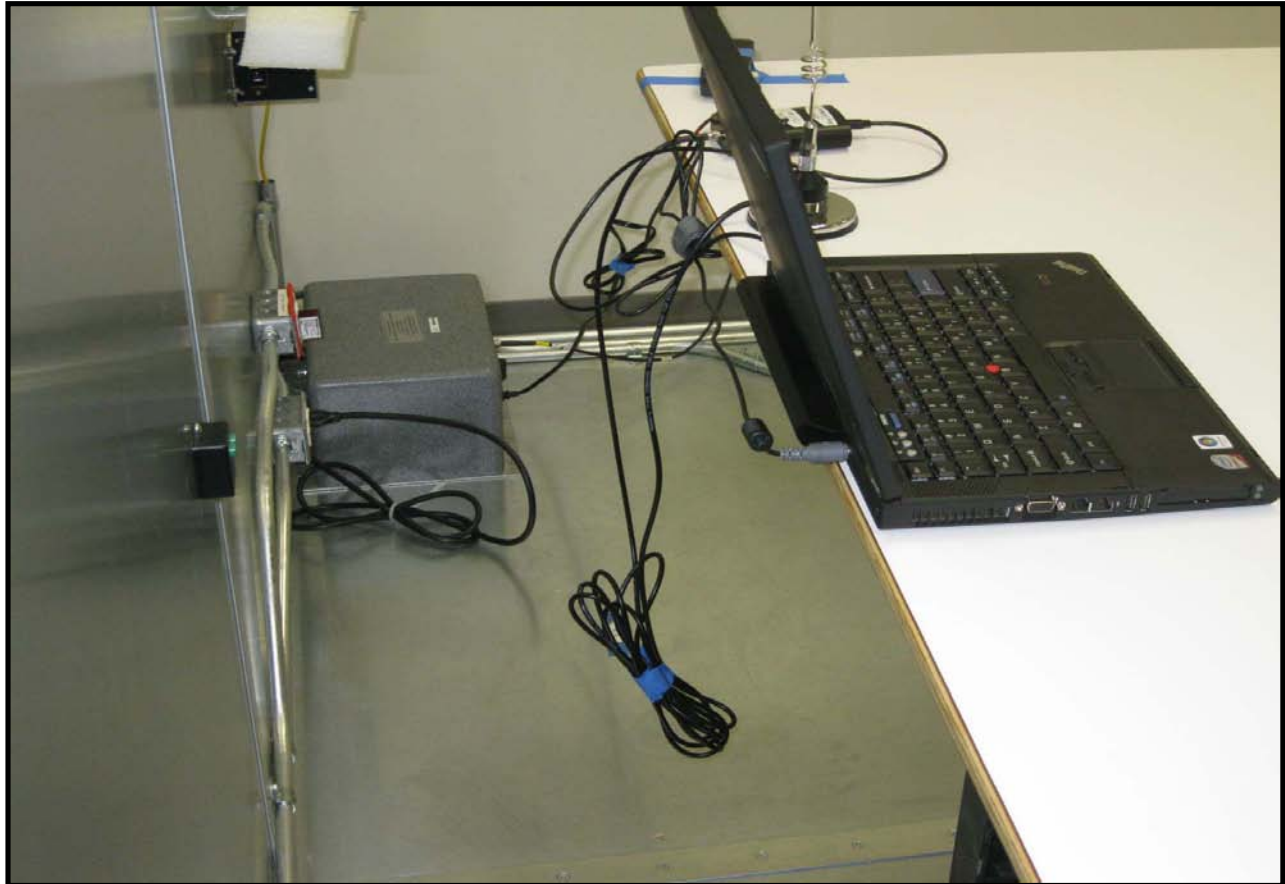


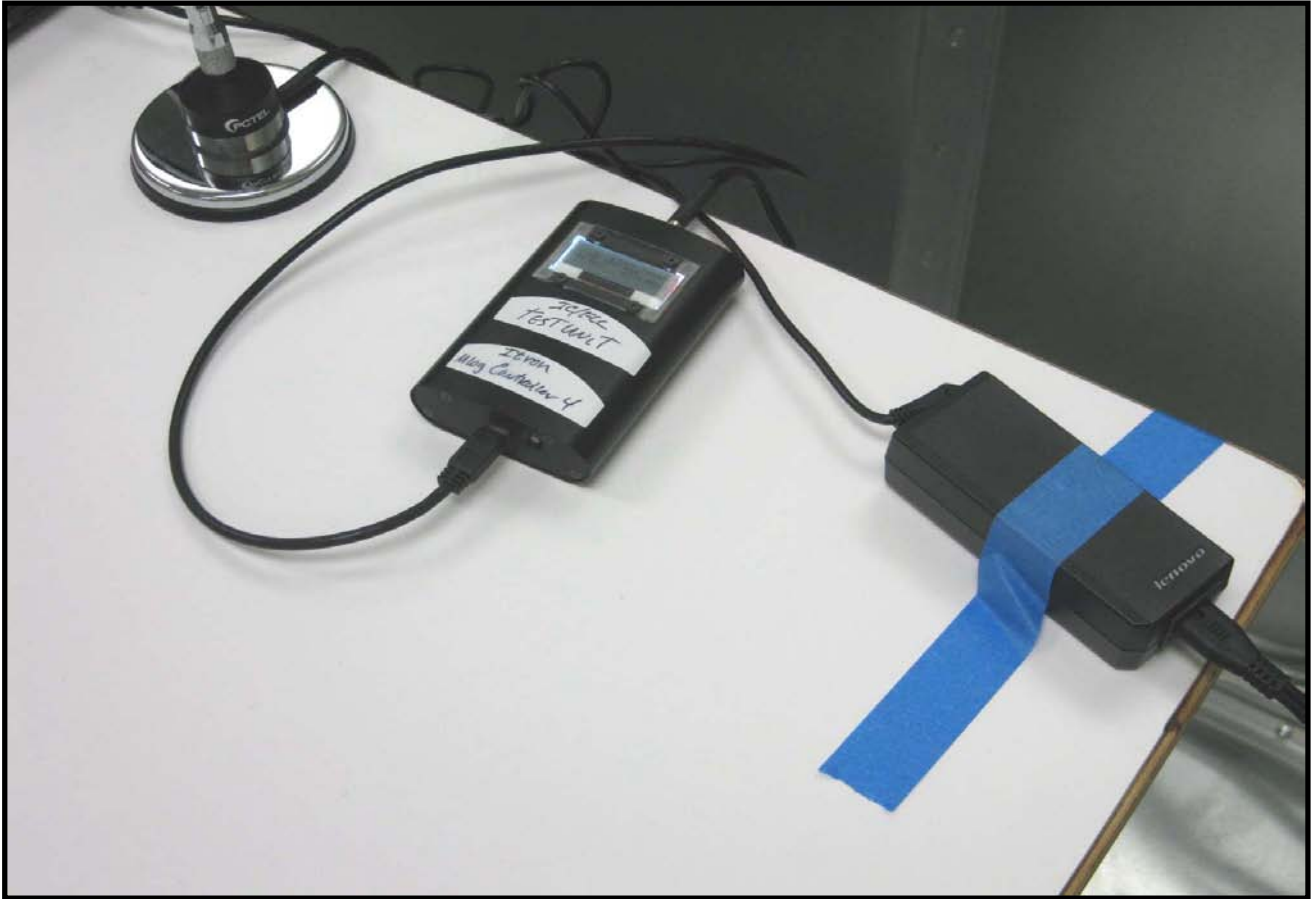
Quasi Peak Data - vs - Quasi Peak Limit

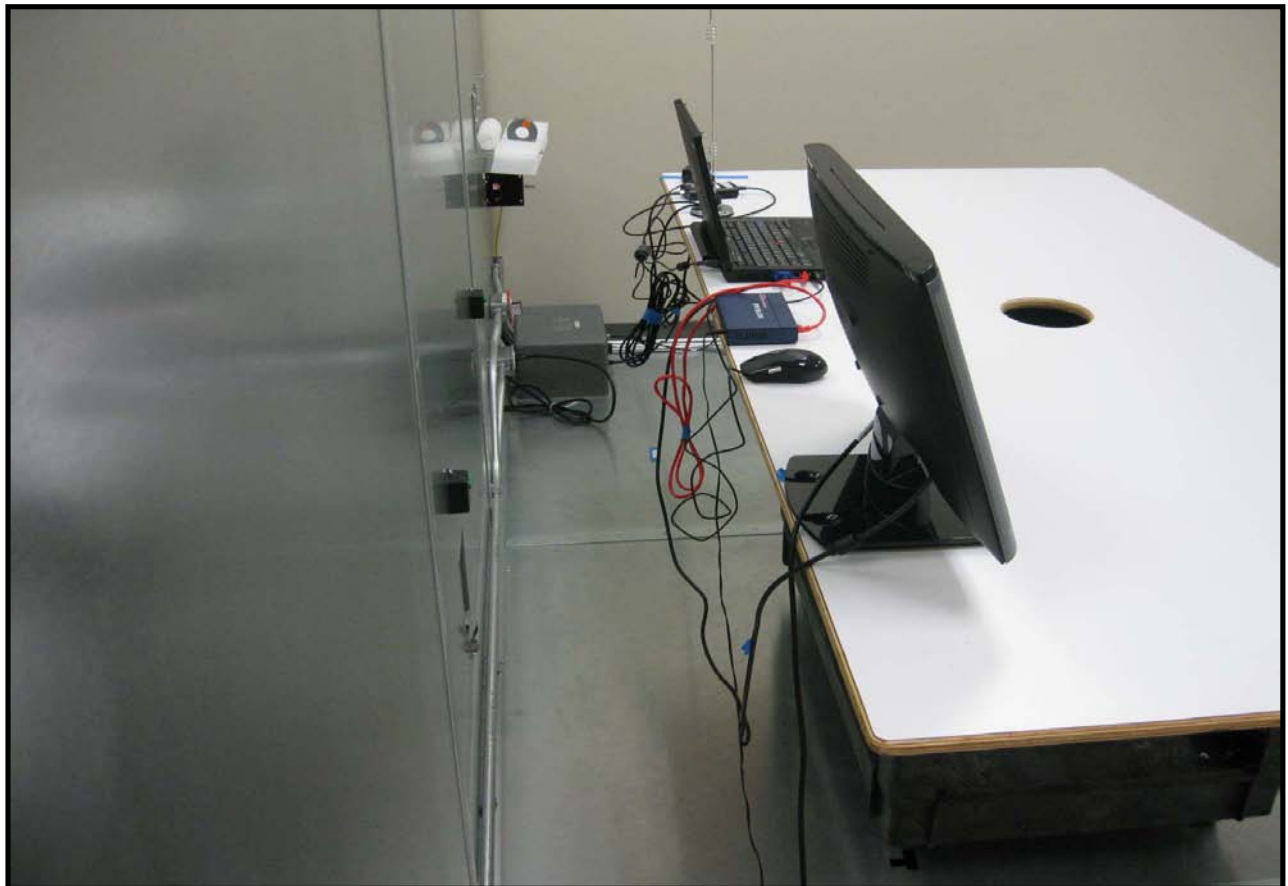
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.201	29.2	21.1	50.3	63.6	-13.3
0.202	29.0	21.1	50.1	63.5	-13.4
0.303	18.3	20.7	39.0	60.2	-21.2
4.188	11.1	20.5	31.6	56.0	-24.4
4.108	11.0	20.5	31.5	56.0	-24.5
0.715	10.6	20.4	31.0	56.0	-25.0
3.804	10.1	20.5	30.6	56.0	-25.4

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.202	14.5	21.1	35.6	53.5	-17.9
0.201	14.3	21.1	35.4	53.6	-18.2
0.303	5.5	20.7	26.2	50.2	-24.0
0.715	0.0	20.4	20.4	46.0	-25.6
3.804	-0.6	20.5	19.9	46.0	-26.1
4.108	-0.7	20.5	19.8	46.0	-26.2
4.188	-0.9	20.5	19.6	46.0	-26.4







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

Receive Mode

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

ITRO0001 - 2

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	12 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
MN05 Cables		Standard Gain Horn Cables	MNJ	7/1/2009	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
Pre-Amplifier	Miteq	AM-1616-1000	AVY	7/1/2009	13 mo
MN05 Cables		Bilog Cables	MNH	7/1/2009	13 mo
Antenna, Biconilog	ETS Lindgren	3142D	AXN	3/17/2009	12 mo
Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVX	7/1/2009	13 mo
MN05 Cables		Double Ridge Guide Horn Cables	MNI	7/1/2009	13 mo
Antenna, Horn (DRG)	ETS Lindgren	3115	AIP	6/23/2009	24 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

The EUT was configured for mid channel receive frequency. The spectrum was scanned through out the range specified in RSS-Gen. RSS GEN defines the start frequency for receiver spurious emissions as 30MHz and the stop frequency the 3rd harmonic of the highest tuneable receive frequency. Unwanted emissions were measured to demonstrate compliance. While scanning, emissions from the EUT were maximized by rotating the EUT 360 degrees, measuring the EUT in three orthogonal axis, and adjusting the measurement antenna height and polarization between 1 and 4 meters. A preamp was used for this test in order to provide sufficient measurement sensitivity.

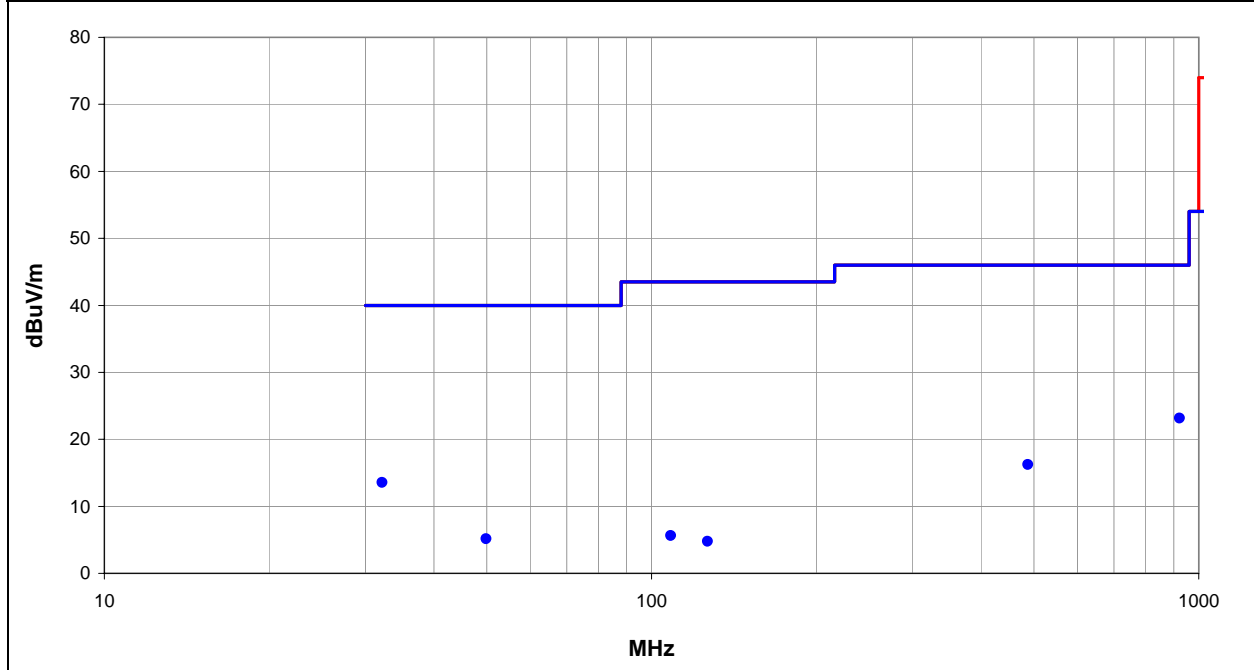
EMC

Receiver Radiated Emissions

Work Order:	ITRO0001	Date:	10/23/09	<i>Timothy P. O'Neil</i> Tested by: Bryan Weller
Project:	None	Temperature:	23.13	
Job Site:	MN05	Humidity:	25.5	
Serial Number:	435	Barometric Pres.:	1010.2	
EUT:	MLC4			
Configuration:	2 - Mobile Antenna			
Customer:	Itron			
Attendees:	None			
EUT Power:	Battery			
Operating Mode:	Receive Mode			
Deviations:	None			
Comments:	EUT Vertical			

Test Specifications FCC 15.109:2009	Test Method ANSI C63.4: 2003
---	--

Run #	36	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)
921.872	16.6	6.6	2.5	196.0	3.0	0.0	Vert	QP	0.0	23.2	46.0	-22.8
32.170	17.4	-3.8	1.5	80.0	3.0	0.0	Vert	QP	0.0	13.6	40.0	-26.4
487.042	16.7	-0.5	1.0	146.0	3.0	0.0	Horz	QP	0.0	16.2	46.0	-29.8
49.831	17.3	-12.1	3.2	316.0	3.0	0.0	Horz	QP	0.0	5.2	40.0	-34.8
108.372	17.0	-11.4	1.0	18.0	3.0	0.0	Horz	QP	0.0	5.6	43.5	-37.9
126.637	17.0	-12.2	1.5	247.0	3.0	0.0	Horz	QP	0.0	4.8	43.5	-38.7

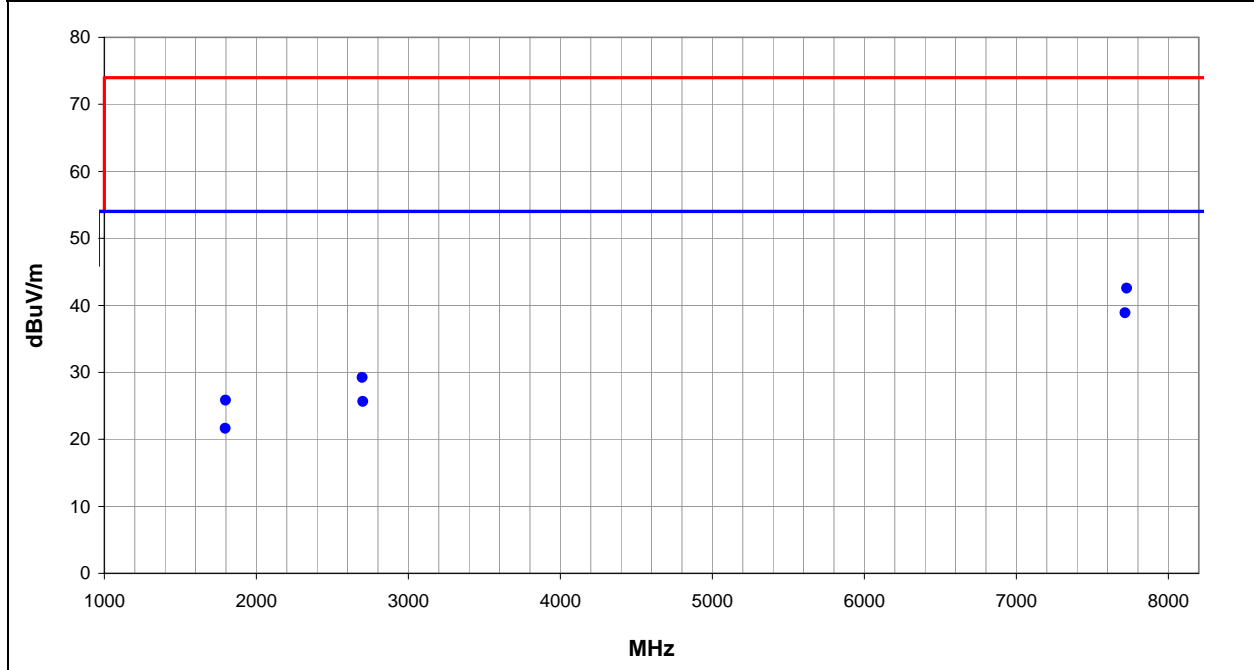
EMC

Receiver Radiated Emissions

Work Order:	ITRO0001	Date:	10/23/09	<i>Timothy P. O'Neil</i> Tested by: Bryan Weller
Project:	None	Temperature:	23.13	
Job Site:	MN05	Humidity:	25.5	
Serial Number:	435	Barometric Pres.:	1010.2	
EUT:	MLC4			
Configuration:	2 - Mobile Antenna			
Customer:	Itron			
Attendees:	None			
EUT Power:	Battery			
Operating Mode:	Receive Mode			
Deviations:	None			
Comments:	EUT horizontal, SMA cable perpendicular to ground.			

Test Specifications FCC 15.109:2009	Test Method ANSI C63.4: 2003
---	--

Run #	39	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)
7714.761	28.0	10.9	1.2	196.0	3.0	0.0	Vert	AV	0.0	38.9	54.0	-15.1
2700.933	30.7	-5.1	1.0	204.0	3.0	0.0	Horz	AV	0.0	25.6	54.0	-28.4
7726.540	31.7	10.8	1.2	196.0	3.0	0.0	Vert	PK	0.0	42.5	74.0	-31.5
1795.933	29.4	-7.8	1.6	132.0	3.0	0.0	Horz	AV	0.0	21.6	54.0	-32.4
2696.708	34.3	-5.1	1.0	204.0	3.0	0.0	Horz	PK	0.0	29.2	74.0	-44.8
1796.983	33.6	-7.8	1.6	132.0	3.0	0.0	Horz	PK	0.0	25.8	74.0	-48.2

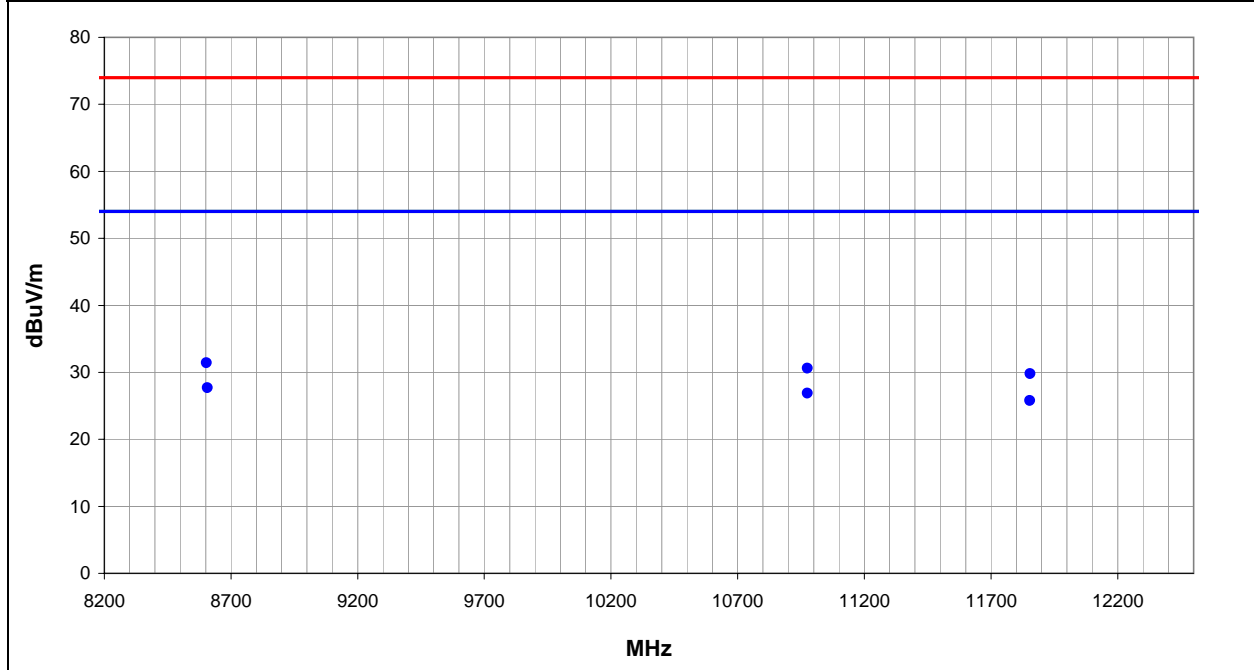
EMC

Receiver Radiated Emissions

Work Order:	ITRO0001	Date:	10/23/09	<i>Timothy P. O'Neil</i> Tested by: Bryan Weller
Project:	None	Temperature:	23.13	
Job Site:	MN05	Humidity:	25.5	
Serial Number:	435	Barometric Pres.:	1010.2	
EUT:	MLC4			
Configuration:	2 - Mobile Antenna			
Customer:	Itron			
Attendees:	None			
EUT Power:	Battery			
Operating Mode:	Receive Mode			
Deviations:	None			
Comments:	EUT Vertical			

Test Specifications FCC 15.109:2009	Test Method ANSI C63.4: 2003
---	--

Run #	42	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)
8606.582	37.0	-9.3	1.2	208.0	3.0	0.0	Horz	AV	0.0	27.7	54.0	-26.3
10975.920	35.2	-8.3	2.6	18.0	3.0	0.0	Horz	AV	0.0	26.9	54.0	-27.1
11852.900	33.9	-8.1	1.2	114.0	3.0	0.0	Vert	AV	0.0	25.8	54.0	-28.2
8603.007	40.7	-9.3	1.2	208.0	3.0	0.0	Horz	PK	0.0	31.4	74.0	-42.6
10974.780	38.9	-8.3	2.6	18.0	3.0	0.0	Horz	PK	0.0	30.6	74.0	-43.4
11854.640	37.9	-8.1	1.2	114.0	3.0	0.0	Vert	PK	0.0	29.8	74.0	-44.2

