ITRON, Inc.

TEST REPORT FOR

Water Endpoint
Model: RIVAW

Tested to The Following Standards:

FCC Part 15 Subpart C
Section: 15.247
(FHSS 902-928 MHz)

Report No.: 98804-13

Date of issue: August 31, 2016

ACCREDITED
Testing Certificates:
803.01, 803.02, 803.05, 803.06

This test report bears the accreditation symbol indicating that the testing performed herein meets the test and reporting requirements of ISO/IEC 17025 under the applicable scope of EMC testing for CKC Laboratories, Inc.

We strive to create long-term, trust based relationships by providing sound, adaptive, customer first testing services. We embrace each of our customers' unique EMC challenges, not as an interruption to set processes, but rather as the reason we are in business.

Testing the Future
CKC LABORATORIES, INC.

This report contains a total of 47 pages and may be reproduced in full only. Partial reproduction may only be done with the written consent of CKC Laboratories, Inc.

TABLE OF CONTENTS

Administrative Information 3

Test Report Information 3

Report Authorization 3

Test Facility Information 4

Software Versions 4

Site Registration & Accreditation Information 4

Summary of Results 5

Modifications During Testing 5

Conditions During Testing 5

Equipment Under Test 6

General Product Information 7

FCC Part 15 Subpart C 8

15.247(d) Radiated Emissions & Band Edge 8

Supplemental Information 46

Measurement Uncertainty 46

Emissions Test Details 46

ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

Itron, Inc.
2111 N. Molter Road
Liberty Lake, WA 99019

Representative: Jay Holcomb
Customer Reference Number: 103450

REPORT PREPARED BY:

Dianne Dudley
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 98804

DATE OF EQUIPMENT RECEIPT: August 18,.2016
DATE(S) OF TESTING: August 18-20, 2016

Report Authorization

The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the sample equipment tested in the agreed upon operational mode(s) and configuration(s) as identified herein. Compliance assessment remains the client's responsibility. This report may not be used to claim product endorsement by A2LA or any government agencies. This test report has been authorized for release under quality control from CKC Laboratories, Inc.

Steve Behm
Director of Quality Assurance & Engineering Services
CKC Laboratories, Inc.

Test Facility Information

Our laboratories are configured to effectively test a wide variety of product types. CKC utilizes first class test equipment, anechoic chambers, data acquisition and information services to create accurate, repeatable and affordable test results.

TEST LOCATION(S):
CKC Laboratories, Inc.
22116 23rd Drive S.E., Suite A
Bothell, WA 98021-4413

Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.03.02

Site Registration & Accreditation Information

Location	CB #	TAIWAN	CANADA	FCC	JAPAN
Bothell	US0081	SL2-IN-E-1145R	3082C-1	318736	A-0148

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C - 15.247 (FHSS 902-928MHz)

Test Procedure	Description	Modifications	Results
15.247(a)(1)(i)	Occupied Bandwidth	NA	NP
15.247(a)(1)	Carrier Separation	NA	NP
15.247(a)(1)(i)	Number of Hopping Channels	NA	NP
15.247(a)(1)(i)	Average Time of Occupancy	NA	NP
15.247(b)(2)	Output Power	NA	NP
15.247(d)	RF Conducted Emissions & Band Edge	NA	NP
15.247(d)	Radiated Emissions & Band Edge	NA	Pass
15.207	AC Conducted Emissions	NA	NP

NA = Not Applicable
NP = CKC Laboratories was not contracted to perform test.

Modifications During Testing

This list is a summary of the modifications made to the equipment during testing.

Summary of Conditions
No modifications were made during testing.

Modifications listed above must be incorporated into all production units.

Conditions During Testing

This list is a summary of the conditions noted to the equipment during testing.

Summary of Conditions
Note: Emissions from both configurations was used to determine the emissions limit in accordance with 15.247(d). Some spurious emissions data >1GHz for GFSK mode was taken using configuration 1. All other data were taken using configuration 2. Emissions <1GHz for configuration 1 are not represented in this report.

EQUIPMENT UNDER TEST (EUT)

During testing numerous configurations may have been utilized. The configurations listed below support compliance to the standard(s) listed in the Summary of Results section.

Configuration 1

Equipment Tested:

Device	Manufacturer	Model #	S/N
Water Endpoint	Itron, Inc.	RIVAWR	1

Support Equipment:

Device	Manufacturer	Model #	S/N
None			

Configuration 2

Equipment Tested:

Device	Manufacturer	Model #	S/N
Water Endpoint	Itron, Inc.	RIVAW	1

Support Equipment:

Device	Manufacturer	Model #	S/N
None			

General Product Information:

Product Information	Manufacturer-Provided Details
Equipment Type:	Stand-Alone Equipment
Type of Wideband System:	FHSS
Operating Frequency Range:	902-928 MHz
Number of Hopping Channels:	See supplemental report.
Modulation Type(s):	OOK, GFSK
Maximum Duty Cycle:	See supplemental report.
Number of TX Chains:	1
Antenna Type(s) and Gain:	See supplemental report.
Beamforming Type:	None
Antenna Connection Type:	Integral
Nominal Input Voltage:	Battery
Firmware / Software used for Test:	CLITool.exe and manufacturer provided scripts

FCC Part 15 Subpart C

15.247(d) Radiated Emissions & Band Edge

Test Setup/Conditions			
Test Location:	Bothell Lab C3	Test Engineer:	Randal Clark
Test Method:	ANSI C63.10 (2013)	Test Date(s):	8/18/2016-8/20/2016
Configuration:	1, 2		

Environmental Conditions			
Temperature (ºC)	27	Relative Humidity (%):	34

See data sheets for test setup and test equipment.

Test Data

Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE Suite A • Bothell, WA 98021 • 800-500-4EMC (4362)
Customer: **Itron, Inc.**
Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
Work Order #: **98804** Date: 8/20/2016
Test Type: **Maximized Emissions** Time: 02:26:00
Tested by: Randal Clark Sequence#: 33
Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N

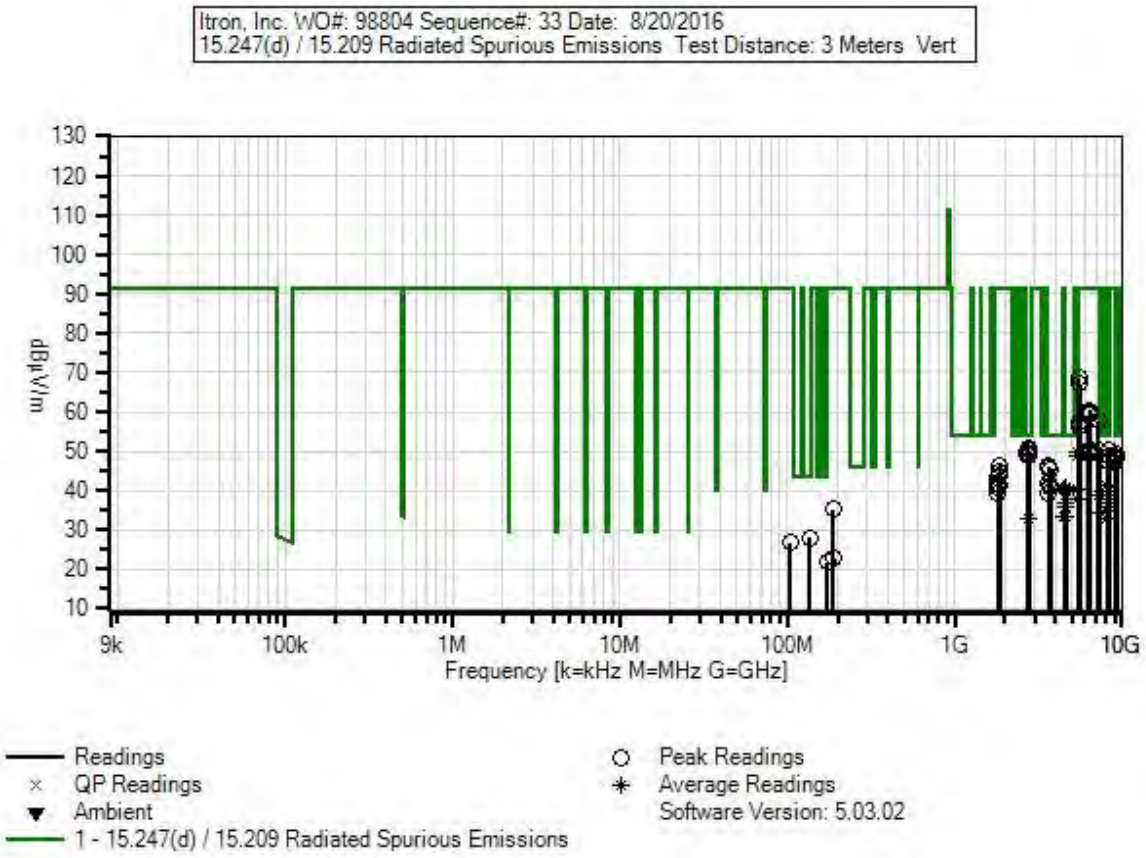
Test Conditions / Notes:

EUT is a transmitter operating within 902-928 MHz. EUT is battery operated, fresh batteries installed. EUT has IO ports with cables attached. Middle port is for remote antenna and must be left open for testing integral antenna. Equipment installed according to manufacturer specifications. Equipment is configured for10dBm output power with OOK modulation.
Test procedure: ANSI C63.10 (2013)

Frequency range investigated: 9kHz - 10GHz
Transmitter Frequency: 903, 910, 915, 926.8 MHz.

No emissions detected within 20dB of the limit at frequencies <100MHz. See band edge emissions data for emissions near transmit band.

Emissions >1GHz where average measurements are employed utilized averaging only during periods when transmitter was on. Additionally, average measurements applied a duty cycle correction factor in accordance with 15.35(c) 20 log(12.2ms*100ms) = 18.3db relaxation.


Itron, Inc. WO#: 98804 Sequence#: 33 Date: 8/20/2016
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert
dBµV/m
130
120
110
100
90
80
70
60
50
40
30
20
10
9k
100k
1M
10M
100M
1G
10G
Frequency [k=kHz M=MHz G=GHz]
Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02872	Spectrum Analyzer	E4440A	11/18/2015	11/18/2017
T2	AN02307	Preamp	8447D	2/15/2016	2/15/2018
T3	AN03540	Preamp	83017A	4/30/2015	4/30/2017
T4	AN03170	High Pass Filter	HM1155-11SS	12/17/2015	12/17/2017
T5	AN01994	Biconilog Antenna	CBL6111C	3/11/2016	3/11/2018
T6	ANP05505	Attenuator	NAT-6	3/31/2016	3/31/2018
	AN00052	Loop Antenna	6502	4/8/2016	4/8/2018
T7	AN01467	Horn Antenna-ANSI C63.5 Calibration	3115	8/12/2015	8/12/2017
T8	ANP05305	Cable	ETSI-50T	2/15/2016	2/15/2018
T9	ANP06935	Cable	32026-29801-29801-18	3/11/2016	3/11/2018
T10	ANP06540	Cable	Heliax	10/29/2015	10/29/2017
T11	ANP05360	Cable	RG214	12/1/2014	12/1/2016
T12	ANP05963	Cable	RG-214	2/15/2016	2/15/2018
T13	ANDCCF	Duty Cycle Correction Factor		7/18/2016	7/18/2018

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1 T5 T9 T13	T2 T6 T10	T3 T7 T11	T4 T8 T12	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	2730.000M	51.8	+0.0 +0.0 +0.4 +0.0	+0.0 +0.0 +0.7	-34.5 +28.7 +0.0	+0.5 +3.0 +0.0	+0.0	50.6	54.0 Mid1 channel	-3.4	Horiz
2	8190.000M	41.2	+0.0 +0.0 +0.7 +0.0	+0.0 +0.0 +1.3	-35.1 +36.7 +0.0	+0.3 +5.3 +0.0	+0.0	50.4	54.0 Mid1 channel	-3.6	Vert
3	7320.000M	42.0	+0.0 +0.0 +0.6 +0.0	+0.0 +0.0 +1.2	-34.6 +36.1 +0.0	+0.3 +4.7 +0.0	+0.0	50.3	54.0 Mid2 channel	-3.7	Vert
4	7280.000M	42.1	+0.0 +0.0 +0.6 +0.0	+0.0 +0.0 +1.2	-34.6 +36.0 +0.0	+0.3 +4.6 +0.0	+0.0	50.2	54.0 Mid1 channel	-3.8	Vert
5	2780.400M	51.3	+0.0 +0.0 +0.4 +0.0	+0.0 +0.0 +0.7	-34.5 +28.9 +0.0	+0.4 +3.0 +0.0	+0.0	50.2	54.0 High channel	-3.8	Horiz

6	5460.000M	63.0	+0.0	+0.0	-34.2	+0.3	+0.0	50.0	54.0	-4.0	Horiz
	Ave		+0.0	+0.0	+33.1	+4.5			Mid1 channel		
			+0.6	+1.0	+0.0	+0.0					
			-18.3								
^	5460.000M	63.5	+0.0	+0.0	-34.2	+0.3	+0.0	68.8	54.0	+14.8	Horiz
			+0.0	+0.0	+33.1	+4.5			Mid1 channel		
			+0.6	+1.0	+0.0	+0.0					
			+0.0								
8	2709.000M	51.1	+0.0	+0.0	-34.5	+0.5	+0.0	49.8	54.0	-4.2	Horiz
			+0.0	+0.0	+28.6	+3.0			Low channel		
			+0.4	+0.7	+0.0	+0.0					
			+0.0								
9	2745.000M	50.7	+0.0	+0.0	-34.5	+0.4	+0.0	49.5	54.0	-4.5	Vert
			+0.0	+0.0	+28.8	+3.0			Mid2 channel		
			+0.4	+0.7	+0.0	+0.0					
			+0.0								
10	9150.000M	38.0	+0.0	+0.0	-34.7	+0.2	+0.0	49.4	54.0	-4.6	Vert
			+0.0	+0.0	+37.7	+6.1			Mid2 channel		
			+0.7	+1.4	+0.0	+0.0					
			+0.0								
11	9150.000M	37.9	+0.0	+0.0	-34.7	+0.2	+0.0	49.3	54.0	-4.7	Horiz
			+0.0	+0.0	+37.7	+6.1			Mid2 channel		
			+0.7	+1.4	+0.0	+0.0					
			+0.0								
12	2709.000M	50.4	+0.0	+0.0	-34.5	+0.5	+0.0	49.1	54.0	-4.9	Vert
			+0.0	+0.0	+28.6	+3.0			Low channel		
			+0.4	+0.7	+0.0	+0.0					
			+0.0								
13	2745.000M	50.3	+0.0	+0.0	-34.5	+0.4	+0.0	49.1	54.0	-4.9	Horiz
			+0.0	+0.0	+28.8	+3.0			Mid2 channel		
			+0.4	+0.7	+0.0	+0.0					
			+0.0								
14	9100.000M	37.6	+0.0	+0.0	-34.7	+0.2	+0.0	48.9	54.0	-5.1	Vert
			+0.0	+0.0	+37.7	+6.1			Mid1 channel		
			+0.7	+1.3	+0.0	+0.0					
			+0.0								
15	8341.200M	39.5	+0.0	+0.0	-35.0	+0.3	+0.0	48.9	54.0	-5.1	Vert
			+0.0	+0.0	+36.6	+5.4			High channel		
			+0.7	+1.4	+0.0	+0.0					
			+0.0								
16	5418.000M	61.8	+0.0	+0.0	-34.2	+0.3	+0.0	48.8	54.0	-5.2	Horiz
	Ave		+0.0	+0.0	+33.1	+4.5			Low channel		
			+0.6	+1.0	+0.0	+0.0					
			-18.3								
^	5418.000M	62.1	+0.0	+0.0	-34.2	+0.3	+0.0	67.4	54.0	+13.4	Horiz
			+0.0	+0.0	+33.1	+4.5			Low channel		
			+0.6	+1.0	+0.0	+0.0					
			+0.0								

18	2730.000M	49.8	+0.0 +0.0 +0.4 +0.0	+0.0 +0.0 +0.7	-34.5 +28.7 +0.0	+0.5 +3.0 +0.0	+0.0	48.6	54.0 Mid1 channel	-5.4	Vert
19	9100.000M	37.3	+0.0 +0.0 +0.7 +0.0	+0.0 +0.0 +1.3	-34.7 +37.7 +0.0	+0.2 +6.1 +0.0	+0.0	48.6	54.0 Mid1 channel	-5.4	Horiz
20	9030.000M	36.9	+0.0 +0.0 +0.7 +0.0	+0.0 +0.0 +1.3	-34.6 +37.8 +0.0	+0.2 +6.0 +0.0	+0.0	48.3	54.0 Low channel	-5.7	Vert
21	9030.000M	36.1	+0.0 +0.0 +0.7 +0.0	+0.0 +0.0 +1.3	-34.6 +37.8 +0.0	+0.2 +6.0 +0.0	+0.0	47.5	54.0 Low channel	-6.5	Horiz
22	8235.000M	38.1	+0.0 +0.0 +0.7 +0.0	+0.0 +0.0 +1.3	-35.1 +36.7 +0.0	+0.3 +5.3 +0.0	+0.0	47.3	54.0 Mid2 channel	-6.7	Vert
23	3640.000M	45.3	+0.0 +0.0 +0.5 +0.0	+0.0 +0.0 +0.7	-34.2 +29.9 +0.0	+0.4 +3.7 +0.0	+0.0	46.3	54.0 Mid1 channel	-7.7	Vert
24	3612.000M	44.9	+0.0 +0.0 +0.4 +0.0	+0.0 +0.0 +0.8	-34.2 +29.8 +0.0	+0.4 +3.6 +0.0	+0.0	45.7	54.0 Low channel	-8.3	Vert
25	3707.200M	44.2	+0.0 +0.0 +0.5 +0.0	+0.0 +0.0 +0.7	-34.1 +30.1 +0.0	+0.3 +3.8 +0.0	+0.0	45.5	54.0 High channel	-8.5	Vert
26	3660.000M	44.6	+0.0 +0.0 +0.5 +0.0	+0.0 +0.0 +0.7	-34.2 +29.9 +0.0	+0.3 +3.7 +0.0	+0.0	45.5	54.0 Mid2 channel	-8.5	Vert
27	3640.000M	41.0	+0.0 +0.0 +0.5 +0.0	+0.0 +0.0 +0.7	-34.2 +29.9 +0.0	+0.4 +3.7 +0.0	+0.0	42.0	54.0 Mid1 channel	-12.0	Horiz
28	8127.000M Ave	50.7	+0.0 +0.0 +0.7 -18.3	+0.0 +0.0 +1.3	-35.1 +36.7 +0.0	+0.3 +5.3 +0.0	+0.0	41.6	54.0 Low channel	-12.4	Horiz
^	8127.000M	50.9	+0.0 +0.0 +0.7 +0.0	+0.0 +0.0 +1.3	-35.1 +36.7 +0.0	+0.3 +5.3 +0.0	+0.0	60.1	54.0 Low channel	+6.1	Horiz
30	3660.000M	40.3	+0.0 +0.0 +0.5 +0.0	+0.0 +0.0 +0.7	-34.2 +29.9 +0.0	+0.3 +3.7 +0.0	+0.0	41.2	54.0 Mid2 channel	-12.8	Horiz

31	3707.200M	39.7	+0.0 +0.0 +0.5 +0.0	+0.0 +0.0 +0.7	-34.1 +30.1 +0.0	+0.3 +3.8 +0.0	+0.0	41.0	54.0 High channel	-13.0	Horiz
32	4575.000M Ave	54.7	+0.0 +0.0 +0.5 -18.3	+0.0 +0.0 +0.9	-34.1 +32.5 +0.0	+0.4 +4.2 +0.0	+0.0	40.8	54.0 Mid2 channel	-13.2	Horiz
^	4575.000M	55.2	+0.0 +0.0 +0.5 +0.0	+0.0 +0.0 +0.9	-34.1 +32.5 +0.0	+0.4 +4.2 +0.0	+0.0	59.6	54.0 Mid2 channel	+5.6	Horiz
34	4634.000M Ave	54.2	+0.0 +0.0 +0.5 -18.3	+0.0 +0.0 +0.9	-34.1 +32.6 +0.0	+0.5 +4.3 +0.0	+0.0	40.6	54.0 High channel	-13.4	Horiz
^	4634.000M	54.6	+0.0 +0.0 +0.5 +0.0	+0.0 +0.0 +0.9	-34.1 +32.6 +0.0	+0.5 +4.3 +0.0	+0.0	59.3	54.0 High channel	+5.3	Horiz
36	4515.000M Ave	54.2	+0.0 +0.0 +0.5 -18.3	+0.0 +0.0 +0.9	-34.1 +32.5 +0.0	+0.4 +4.2 +0.0	+0.0	40.3	54.0 Low channel	-13.7	Horiz
^	4515.000M	54.6	+0.0 +0.0 +0.5 +0.0	+0.0 +0.0 +0.9	-34.1 +32.5 +0.0	+0.4 +4.2 +0.0	+0.0	59.0	54.0 Low channel	+5.0	Horiz
38	5460.000M Ave	53.3	+0.0 +0.0 +0.6 -18.3	+0.0 +0.0 +1.0	-34.2 +33.1 +0.0	+0.3 +4.5 +0.0	+0.0	40.3	54.0 Mid1 channel	-13.7	Vert
^	5460.000M	53.7	+0.0 +0.0 +0.6 +0.0	+0.0 +0.0 +1.0	-34.2 +33.1 +0.0	+0.3 +4.5 +0.0	+0.0	59.0	54.0 Mid1 channel	+5.0	Vert
40	8190.000M Ave	49.2	+0.0 +0.0 +0.7 -18.3	+0.0 +0.0 +1.3	-35.1 +36.7 +0.0	+0.3 +5.3 +0.0	+0.0	40.1	54.0 Mid1 channel	-13.9	Horiz
^	8190.000M	49.4	+0.0 +0.0 +0.7 +0.0	+0.0 +0.0 +1.3	-35.1 +36.7 +0.0	+0.3 +5.3 +0.0	+0.0	58.6	54.0 Mid1 channel	+4.6	Horiz
42	4550.000M Ave	53.7	+0.0 +0.0 +0.5 -18.3	+0.0 +0.0 +0.9	-34.1 +32.5 +0.0	+0.3 +4.2 +0.0	+0.0	39.7	54.0 Mid1 channel	-14.3	Horiz
^	4550.000M	54.1	+0.0 +0.0 +0.5 +0.0	+0.0 +0.0 +0.9	-34.1 +32.5 +0.0	+0.3 +4.2 +0.0	+0.0	58.4	54.0 Mid1 channel	+4.4	Horiz

44	3612.000M	38.8	+0.0 +0.0 +0.4 +0.0	+0.0 +0.0 +0.8	-34.2 +29.8 +0.0	+0.4 +3.6 +0.0	+0.0	39.6	54.0 Low channel	-14.4	Horiz
45	7320.000M Ave	49.1	+0.0 +0.0 +0.6 -18.3	+0.0 +0.0 +1.2	-34.6 +36.1 +0.0	+0.3 +4.7 +0.0	+0.0	39.1	54.0 Mid2 channel	-14.9	Horiz
^	7320.000M	49.6	+0.0 +0.0 +0.6 +0.0	+0.0 +0.0 +1.2	-34.6 +36.1 +0.0	+0.3 +4.7 +0.0	+0.0	57.9	54.0 Mid2 channel	+3.9	Horiz
47	7280.000M Ave	49.1	+0.0 +0.0 +0.6 -18.3	+0.0 +0.0 +1.2	-34.6 +36.0 +0.0	+0.3 +4.6 +0.0	+0.0	38.9	54.0 Mid1 channel	-15.1	Horiz
^	7280.000M	49.5	+0.0 +0.0 +0.6 +0.0	+0.0 +0.0 +1.2	-34.6 +36.0 +0.0	+0.3 +4.6 +0.0	+0.0	57.6	54.0 Mid1 channel	+3.6	Horiz
49	7414.400M Ave	48.5	+0.0 +0.0 +0.6 -18.3	+0.0 +0.0 +1.3	-34.7 +36.5 +0.0	+0.2 +4.8 +0.0	+0.0	38.9	54.0 High channel	-15.1	Horiz
^	7414.400M	49.0	+0.0 +0.0 +0.6 +0.0	+0.0 +0.0 +1.3	-34.7 +36.5 +0.0	+0.2 +4.8 +0.0	+0.0	57.7	54.0 High channel	+3.7	Horiz
51	136.350M	35.6	+0.0 +12.0 +0.0 +0.0	-27.6 +6.1 +0.1	+0.0 +0.0 +0.7	+0.0 +0.0 +1.2	+0.0	28.1	43.5	-15.4	Horiz
52	5418.000M Ave	51.0	+0.0 +0.0 +0.6 -18.3	+0.0 +0.0 +1.0	-34.2 +33.1 +0.0	+0.3 +4.5 +0.0	+0.0	38.0	54.0 Low channel	-16.0	Vert
^	5418.000M	52.9	+0.0 +0.0 +0.6 +0.0	+0.0 +0.0 +1.0	-34.2 +33.1 +0.0	+0.3 +4.5 +0.0	+0.0	58.2	54.0 Low channel	+4.2	Vert
54	8235.000M Ave	46.2	+0.0 +0.0 +0.7 -18.3	+0.0 +0.0 +1.3	-35.1 +36.7 +0.0	+0.3 +5.3 +0.0	+0.0	37.1	54.0 Mid2 channel	-16.9	Horiz
^	8235.000M	46.5	+0.0 +0.0 +0.7 +0.0	+0.0 +0.0 +1.3	-35.1 +36.7 +0.0	+0.3 +5.3 +0.0	+0.0	55.7	54.0 Mid2 channel	+1.7	Horiz

56	4634.000M Ave	50.5	+0.0 +0.0 +0.5 -18.3	+0.0 +0.0 +0.9	-34.1 +32.6 +0.0	+0.5 +4.3 +0.0	+0.0	36.9	54.0 High channel	-17.1	Vert
^	4634.000M	50.9	+0.0 +0.0 +0.5 +0.0	+0.0 +0.0 +0.9	-34.1 +32.6 +0.0	+0.5 +4.3 +0.0	+0.0	55.6	54.0 High channel	+1.6	Vert
58	4575.000M Ave	49.8	+0.0 +0.0 +0.5 -18.3	+0.0 +0.0 +0.9	-34.1 +32.5 +0.0	+0.4 +4.2 +0.0	+0.0	35.9	54.0 Mid2 channel	-18.1	Vert
^	4575.000M	50.1	+0.0 +0.0 +0.5 +0.0	+0.0 +0.0 +0.9	-34.1 +32.5 +0.0	+0.4 +4.2 +0.0	+0.0	54.5	54.0 Mid2 channel	+0.5	Vert
60	8341.200M Ave	44.7	+0.0 +0.0 +0.7 -18.3	+0.0 +0.0 +1.4	-35.0 +36.6 +0.0	+0.3 +5.4 +0.0	+0.0	35.8	54.0 High channel	-18.2	Horiz
^	8341.200M	45.0	+0.0 +0.0 +0.7 +0.0	+0.0 +0.0 +1.4	-35.0 +36.6 +0.0	+0.3 +5.4 +0.0	+0.0	54.4	54.0 High channel	+0.4	Horiz
62	7414.400M Ave	43.8	+0.0 +0.0 +0.6 -18.3	+0.0 +0.0 +1.3	-34.7 +36.5 +0.0	+0.2 +4.8 +0.0	+0.0	34.2	54.0 High channel	-19.8	Vert
^	7414.400M	43.3	+0.0 +0.0 +0.6 +0.0	+0.0 +0.0 +1.3	-34.7 +36.5 +0.0	+0.2 +4.8 +0.0	+0.0	52.0	54.0 High channel	-2.0	Vert
64	4550.000M Ave	47.6	+0.0 +0.0 +0.5 -18.3	+0.0 +0.0 +0.9	-34.1 +32.5 +0.0	+0.3 +4.2 +0.0	+0.0	33.6	54.0 Mid1 channel	-20.4	Vert
^	4550.000M	48.9	+0.0 +0.0 +0.5 +0.0	+0.0 +0.0 +0.9	-34.1 +32.5 +0.0	+0.3 +4.2 +0.0	+0.0	53.2	54.0 Mid1 channel	-0.8	Vert
66	4515.000M Ave	47.4	+0.0 +0.0 +0.5 -18.3	+0.0 +0.0 +0.9	-34.1 +32.5 +0.0	+0.4 +4.2 +0.0	+0.0	33.5	54.0 Low channel	-20.5	Vert
^	4515.000M	49.4	+0.0 +0.0 +0.5 +0.0	+0.0 +0.0 +0.9	-34.1 +32.5 +0.0	+0.4 +4.2 +0.0	+0.0	53.8	54.0 Low channel	-0.2	Vert

68	2780.400M Ave	52.3	+0.0 +0.0 +0.4 -18.3	+0.0 +0.0 +0.7	-34.5 +28.9 +0.0	+0.4 +3.0 +0.0	+0.0	32.9	54.0 High channel	-21.1	Vert
^	2780.400M	52.0	+0.0 +0.0 +0.4 +0.0	+0.0 +0.0 +0.7	-34.5 +28.9 +0.0	+0.4 +3.0 +0.0	+0.0	50.9	54.0 High channel	-3.1	Vert
70	8127.000M Ave	41.9	+0.0 +0.0 +0.7 -18.3	+0.0 +0.0 +1.3	-35.1 +36.7 +0.0	+0.3 +5.3 +0.0	+0.0	32.8	54.0 Low channel	-21.2	Vert
^	8127.000M	42.9	+0.0 +0.0 +0.7 +0.0	+0.0 +0.0 +1.3	-35.1 +36.7 +0.0	+0.3 +5.3 +0.0	+0.0	52.1	54.0 Low channel	-1.9	Vert
^	8127.000M	37.3	+0.0 +0.0 +0.7 +0.0	+0.0 +0.0 +1.3	-35.1 +36.7 +0.0	+0.3 +5.3 +0.0	+0.0	46.5	54.0 Low channel	-7.5	Vert
73	173.190M	31.2	+0.0 +9.4 +0.0 +0.0	-27.4 +6.1 +0.2	+0.0 +0.0 +0.8	+0.0 +0.0 +1.4	+0.0	21.7	43.5	-21.8	Horiz
74	5490.000M	63.3	+0.0 +0.0 +0.6 +0.0	+0.0 +0.0 +1.0	-34.1 +33.1 +0.0	+0.3 +4.5 +0.0	+0.0	68.7	91.3 Mid2 channel	-22.6	Horiz
75	5560.800M	61.4	+0.0 +0.0 +0.6 +0.0	+0.0 +0.0 +1.0	-34.1 +33.4 +0.0	+0.3 +4.5 +0.0	+0.0	67.1	91.3 High channel	-24.2	Horiz
76	6405.000M	53.1	+0.0 +0.0 +0.6 +0.0	+0.0 +0.0 +1.2	-34.2 +34.6 +0.0	+0.3 +4.7 +0.0	+0.0	60.3	91.3 Mid2 channel	-31.0	Horiz
77	6487.600M	52.8	+0.0 +0.0 +0.6 +0.0	+0.0 +0.0 +1.2	-34.2 +34.4 +0.0	+0.3 +4.6 +0.0	+0.0	59.7	91.3 High channel	-31.6	Horiz
78	6370.000M	52.3	+0.0 +0.0 +0.6 +0.0	+0.0 +0.0 +1.3	-34.2 +34.7 +0.0	+0.3 +4.7 +0.0	+0.0	59.7	91.3 Mid1 channel	-31.6	Horiz
79	6321.000M	51.6	+0.0 +0.0 +0.6 +0.0	+0.0 +0.0 +1.3	-34.2 +34.8 +0.0	+0.4 +4.7 +0.0	+0.0	59.2	91.3 Low channel	-32.1	Horiz
80	7224.000M	49.8	+0.0 +0.0 +0.6 +0.0	+0.0 +0.0 +1.2	-34.5 +35.8 +0.0	+0.3 +4.6 +0.0	+0.0	57.8	91.3 Low channel	-33.5	Horiz

81	5490.000M	51.9	+0.0 +0.0 +0.6 +0.0	+0.0 +0.0 +1.0	-34.1 +33.1 +0.0	+0.3 +4.5 +0.0	+0.0	57.3	91.3 Mid2 channel	-34.0	Vert
82	5560.800M	50.5	+0.0 +0.0 +0.6 +0.0	+0.0 +0.0 +1.0	-34.1 +33.4 +0.0	+0.3 +4.5 +0.0	+0.0	56.2	91.3 High channel	-35.1	Vert
83	6487.600M	43.5	+0.0 +0.0 +0.6 +0.0	+0.0 +0.0 +1.2	-34.2 +34.4 +0.0	+0.3 +4.6 +0.0	+0.0	50.4	91.3 High channel	-40.9	Vert
84	6405.000M	43.1	+0.0 +0.0 +0.6 +0.0	+0.0 +0.0 +1.2	-34.2 +34.6 +0.0	+0.3 +4.7 +0.0	+0.0	50.3	91.3 Mid2 channel	-41.0	Vert
85	7224.000M	42.3	+0.0 +0.0 +0.6 +0.0	+0.0 +0.0 +1.2	-34.5 +35.8 +0.0	+0.3 +4.6 +0.0	+0.0	50.3	91.3 Low channel	-41.0	Vert
86	6321.000M	42.1	+0.0 +0.0 +0.6 +0.0	+0.0 +0.0 +1.3	-34.2 +34.8 +0.0	+0.4 +4.7 +0.0	+0.0	49.7	91.3 Low channel	-41.6	Vert
87	6370.000M	42.1	+0.0 +0.0 +0.6 +0.0	+0.0 +0.0 +1.3	-34.2 +34.7 +0.0	+0.3 +4.7 +0.0	+0.0	49.5	91.3 Mid1 channel	-41.8	Vert
88	9268.000M	37.8	+0.0 +0.0 +0.7 +0.0	+0.0 +0.0 +1.4	-34.8 +37.6 +0.0	+0.2 +6.2 +0.0	+0.0	49.1	91.3 High channel	-42.2	Horiz
89	9268.000M	36.8	+0.0 +0.0 +0.7 +0.0	+0.0 +0.0 +1.4	-34.8 +37.6 +0.0	+0.2 +6.2 +0.0	+0.0	48.1	91.3 High channel	-43.2	Vert
90	1853.600M	50.9	+0.0 +0.0 +0.3 +0.0	+0.0 +0.0 +0.5	-35.1 +27.0 +0.0	+0.3 +2.5 +0.0	+0.0	46.4	91.3 High channel	-44.9	Vert
91	1853.600M	49.3	+0.0 +0.0 +0.3 +0.0	+0.0 +0.0 +0.5	-35.1 +27.0 +0.0	+0.3 +2.5 +0.0	+0.0	44.8	91.3 High channel	-46.5	Horiz
92	1830.000M	48.4	+0.0 +0.0 +0.3 +0.0	+0.0 +0.0 +0.5	-35.1 +26.9 +0.0	+0.4 +2.5 +0.0	+0.0	43.9	91.3 Mid2 channel	-47.4	Vert
93	1820.000M	47.7	+0.0 +0.0 +0.3 +0.0	+0.0 +0.0 +0.5	-35.1 +26.9 +0.0	+0.4 +2.5 +0.0	+0.0	43.2	91.3 Mid1 channel	-48.1	Vert

94	1806.000M	46.2	+0.0 +0.0 +0.3 +0.0	+0.0 +0.0 +0.5	-35.1 +26.8 +0.0	+0.4 +2.5 +0.0	+0.0	41.6	91.3 Low channel	-49.7	Vert
95	1830.000M	45.8	+0.0 +0.0 +0.3 +0.0	+0.0 +0.0 +0.5	-35.1 +26.9 +0.0	+0.4 +2.5 +0.0	+0.0	41.3	91.3 Mid2 channel	-50.0	Horiz
96	1806.000M	45.5	+0.0 +0.0 +0.3 +0.0	+0.0 +0.0 +0.5	-35.1 +26.8 +0.0	+0.4 +2.5 +0.0	+0.0	40.9	91.3 Low channel	-50.4	Horiz
97	1820.000M	43.8	+0.0 +0.0 +0.3 +0.0	+0.0 +0.0 +0.5	-35.1 +26.9 +0.0	+0.4 +2.5 +0.0	+0.0	39.3	91.3 Mid1 channel	-52.0	Horiz
98	187.870M	44.6	+0.0 +9.5 +0.0 +0.0	-27.3 +6.1 +0.2	+0.0 +0.0 +0.8	+0.0 +0.0 +1.4	+0.0	35.3	91.3	-56.0	Horiz
99	103.600M	35.9	+0.0 +10.6 +0.0 +0.0	-27.7 +6.1 +0.1	+0.0 +0.0 +0.6	+0.0 +0.0 +1.2	+0.0	26.8	91.3	-64.5	Horiz
100	187.410M	32.1	+0.0 +9.5 +0.0 +0.0	-27.3 +6.1 +0.2	+0.0 +0.0 +0.8	+0.0 +0.0 +1.4	+0.0	22.8	91.3	-68.5	Vert

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE Suite A • Bothell, WA 98021 • 800-500-4EMC (4362)		
Customer:	**Itron, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**98804**	Date:	8/20/2016
Test Type:	**Maximized Emissions**	Time:	02:08:16
Tested by:	Randal Clark	Sequence#:	30
Software:	EMITest 5.03.02		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N

Test Conditions / Notes:

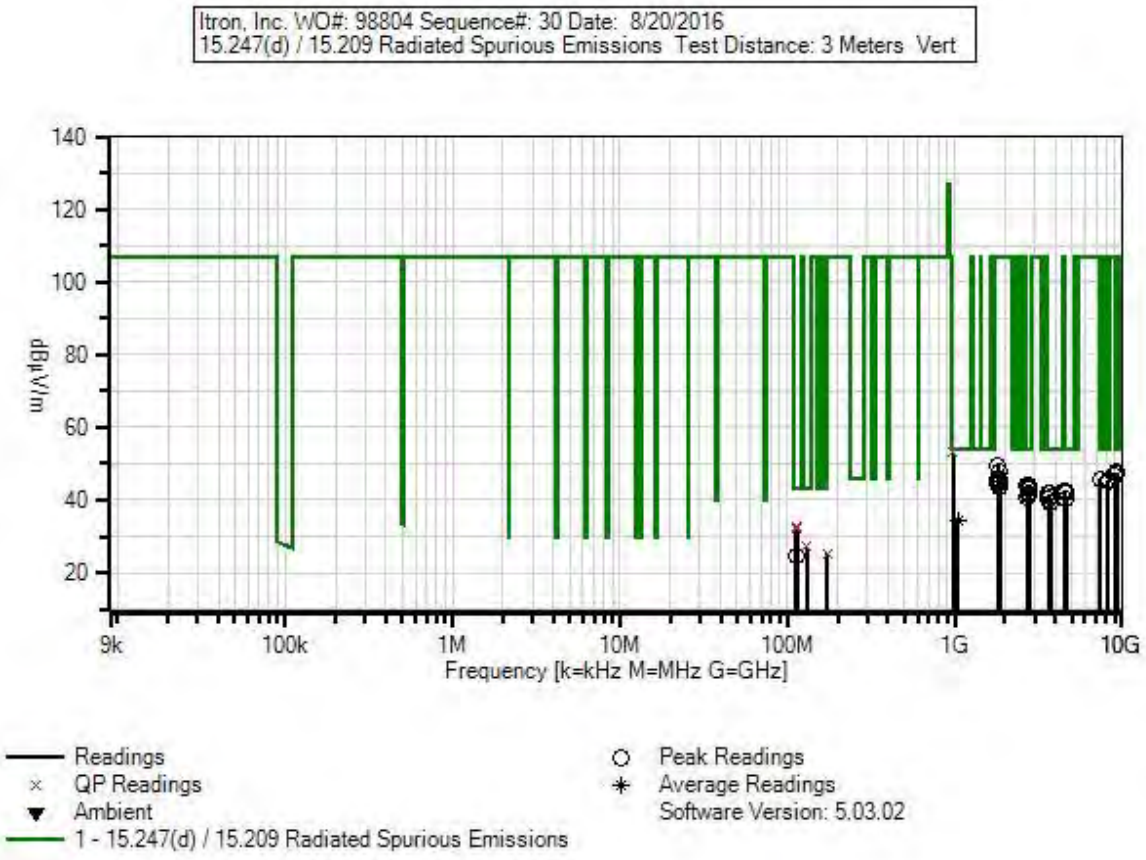
EUT is a transmitter operating within 902-928 MHz. EUT is battery operated, fresh batteries installed. EUT has IO ports with cables attached. Middle port is for remote antenna and must be left open for testing integral antenna. Equipment installed according to manufacturer specifications.
Equipment is configured for maximum output power with OOK modulation.

Test procedure: ANSI C63.10 (2013)

Frequency range investigated: 9kHz - 10GHz
Transmitter Frequency: 903, 910, 915, 926.8 MHz.

No emissions detected within 20dB of the limit at frequencies <100MHz. See band edge emissions data for emissions near transmit band.

Temperature: 27ºC
Relative Humidity: 34%


Itron, Inc. WO#: 98804 Sequence#: 30 Date: 8/20/2016
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert
140
120
100
80
60
40
20
dBµV/m
9k
100k
1M
10M
100M
1G
10G
Frequency [k=kHz M=MHz G=GHz]
Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02872	Spectrum Analyzer	E4440A	11/18/2015	11/18/2017
T2	AN02307	Preamp	8447D	2/15/2016	2/15/2018
T3	AN03540	Preamp	83017A	4/30/2015	4/30/2017
T4	AN03170	High Pass Filter	HM1155-11SS	12/17/2015	12/17/2017
T5	AN01994	Biconilog Antenna	CBL6111C	3/11/2016	3/11/2018
T6	ANP05505	Attenuator	NAT-6	3/31/2016	3/31/2018
	AN00052	Loop Antenna	6502	4/8/2016	4/8/2018
T7	AN01467	Horn Antenna-ANSI C63.5 Calibration	3115	8/12/2015	8/12/2017
T8	ANP05305	Cable	ETSI-50T	2/15/2016	2/15/2018
T9	ANP06935	Cable	32026-29801-29801-18	3/11/2016	3/11/2018
T10	ANP06540	Cable	Heliax	10/29/2015	10/29/2017
T11	ANP05360	Cable	RG214	12/1/2014	12/1/2016
T12	ANP05963	Cable	RG-214	2/15/2016	2/15/2018
	ANP05503	Attenuator	766-10	6/18/2015	6/18/2017
	ANP05660	Attenuator	766-3	6/15/2015	6/15/2017
	ANP06219	Attenuator	768-10	4/12/2016	4/12/2018

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1 T5 T9	T2 T6 T10	T3 T7 T11	T4 T8 T12	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	978.742M	43.9	+0.0	-27.1	+0.0	+0.0	+0.0	53.2	54.0	-0.8	Vert
	QP		+25.1	+6.3	+0.0	+0.0					
			+0.0	+0.4	+2.1	+2.5					
^	978.736M	48.4	+0.0	-27.1	+0.0	+0.0	+0.0	57.7	54.0	+3.7	Vert
			+25.1	+6.3	+0.0	+0.0					
			+0.0	+0.4	+2.1	+2.5					
3	9150.000M	36.0	+0.0	+0.0	-34.7	+0.2	+0.0	47.4	54.0	-6.6	Horiz
			+0.0	+0.0	+37.7	+6.1			Mid2 channel		
			+0.7	+1.4	+0.0	+0.0					
4	9030.000M	35.4	+0.0	+0.0	-34.6	+0.2	+0.0	46.8	54.0	-7.2	Horiz
			+0.0	+0.0	+37.8	+6.0			Low channel		
			+0.7	+1.3	+0.0	+0.0					
5	7414.400M	37.2	+0.0	+0.0	-34.7	+0.2	+0.0	45.9	54.0	-8.1	Horiz
			+0.0	+0.0	+36.5	+4.8			High channel		
			+0.6	+1.3	+0.0	+0.0					
6	8190.000M	36.2	+0.0	+0.0	-35.1	+0.3	+0.0	45.4	54.0	-8.6	Horiz
			+0.0	+0.0	+36.7	+5.3			Mid1 channel		
			+0.7	+1.3	+0.0	+0.0					
7	8235.000M	35.9	+0.0	+0.0	-35.1	+0.3	+0.0	45.1	54.0	-8.9	Horiz
			+0.0	+0.0	+36.7	+5.3			Mid2 channel		
			+0.7	+1.3	+0.0	+0.0					
8	2709.000M	45.3	+0.0	+0.0	-34.5	+0.5	+0.0	44.0	54.0	-10.0	Horiz
			+0.0	+0.0	+28.6	+3.0			Low channel		
			+0.4	+0.7	+0.0	+0.0					

9	2745.000M	45.1	+0.0	+0.0	-34.5	+0.4	+0.0	43.9	54.0	-10.1	Horiz
			+0.0	+0.0	+28.8	+3.0			Mid2 channel		
			+0.4	+0.7	+0.0	+0.0					
10	2780.400M	44.9	+0.0	+0.0	-34.5	+0.4	+0.0	43.8	54.0	-10.2	Horiz
			+0.0	+0.0	+28.9	+3.0			High channel		
			+0.4	+0.7	+0.0	+0.0					
11	2780.400M	44.7	+0.0	+0.0	-34.5	+0.4	+0.0	43.6	54.0	-10.4	Vert
			+0.0	+0.0	+28.9	+3.0			High channel		
			+0.4	+0.7	+0.0	+0.0					
12	114.387M	40.6	+0.0	-27.7	+0.0	+0.0	+0.0	32.5	43.5	-11.0	Horiz
	QP		+11.6	+6.1	+0.0	+0.0					
			+0.0	+0.1	+0.6	+1.2					
^	114.370M	45.7	+0.0	-27.7	+0.0	+0.0	+0.0	37.6	43.5	-5.9	Horiz
			+11.6	+6.1	+0.0	+0.0					
			+0.0	+0.1	+0.6	+1.2					
14	2730.000M	44.1	+0.0	+0.0	-34.5	+0.5	+0.0	42.9	54.0	-11.1	Horiz
			+0.0	+0.0	+28.7	+3.0			Mid1 channel		
			+0.4	+0.7	+0.0	+0.0					
15	113.193M	40.1	+0.0	-27.7	+0.0	+0.0	+0.0	31.9	43.5	-11.6	Horiz
	QP		+11.5	+6.1	+0.0	+0.0					
			+0.0	+0.1	+0.6	+1.2					
^	113.210M	45.7	+0.0	-27.7	+0.0	+0.0	+0.0	37.5	43.5	-6.0	Horiz
			+11.5	+6.1	+0.0	+0.0					
			+0.0	+0.1	+0.6	+1.2					
17	4575.000M	37.8	+0.0	+0.0	-34.1	+0.4	+0.0	42.2	54.0	-11.8	Horiz
			+0.0	+0.0	+32.5	+4.2			Mid2 channel		
			+0.5	+0.9	+0.0	+0.0					
18	4515.000M	37.8	+0.0	+0.0	-34.1	+0.4	+0.0	42.2	54.0	-11.8	Horiz
			+0.0	+0.0	+32.5	+4.2			Low channel		
			+0.5	+0.9	+0.0	+0.0					
19	4550.000M	37.8	+0.0	+0.0	-34.1	+0.3	+0.0	42.1	54.0	-11.9	Horiz
			+0.0	+0.0	+32.5	+4.2			Mid1 channel		
			+0.5	+0.9	+0.0	+0.0					
20	2745.000M	43.0	+0.0	+0.0	-34.5	+0.4	+0.0	41.8	54.0	-12.2	Vert
			+0.0	+0.0	+28.8	+3.0			Mid2 channel		
			+0.4	+0.7	+0.0	+0.0					
21	3640.000M	40.7	+0.0	+0.0	-34.2	+0.4	+0.0	41.7	54.0	-12.3	Horiz
			+0.0	+0.0	+29.9	+3.7			Mid1 channel		
			+0.5	+0.7	+0.0	+0.0					
22	3660.000M	40.7	+0.0	+0.0	-34.2	+0.3	+0.0	41.6	54.0	-12.4	Horiz
			+0.0	+0.0	+29.9	+3.7			Mid2 channel		
			+0.5	+0.7	+0.0	+0.0					
23	2730.000M	42.3	+0.0	+0.0	-34.5	+0.5	+0.0	41.1	54.0	-12.9	Vert
			+0.0	+0.0	+28.7	+3.0			Mid1 channel		
			+0.4	+0.7	+0.0	+0.0					
24	2709.000M	42.1	+0.0	+0.0	-34.5	+0.5	+0.0	40.8	54.0	-13.2	Vert
			+0.0	+0.0	+28.6	+3.0			Low channel		
			+0.4	+0.7	+0.0	+0.0					
25	3707.200M	39.5	+0.0	+0.0	-34.1	+0.3	+0.0	40.8	54.0	-13.2	Horiz
			+0.0	+0.0	+30.1	+3.8			High channel		
			+0.5	+0.7	+0.0	+0.0					

26	4634.000M	35.5	+0.0	+0.0	-34.1	+0.5	+0.0	40.2	54.0	-13.8	Horiz
			+0.0	+0.0	+32.6	+4.3			High channel		
			+0.5	+0.9	+0.0	+0.0					
27	3612.000M	39.3	+0.0	+0.0	-34.2	+0.4	+0.0	40.1	54.0	-13.9	Horiz
			+0.0	+0.0	+29.8	+3.6			Low channel		
			+0.4	+0.8	+0.0	+0.0					
28	3707.200M	37.9	+0.0	+0.0	-34.1	+0.3	+0.0	39.2	54.0	-14.8	Vert
			+0.0	+0.0	+30.1	+3.8			High channel		
			+0.5	+0.7	+0.0	+0.0					
29	130.160M	34.7	+0.0	-27.6	+0.0	+0.0	+0.0	27.2	43.5	-16.3	Horiz
	QP		+12.1	+6.1	+0.0	+0.0					
			+0.0	+0.1	+0.6	+1.2					
^	130.160M	40.7	+0.0	-27.6	+0.0	+0.0	+0.0	33.2	43.5	-10.3	Horiz
			+12.1	+6.1	+0.0	+0.0					
			+0.0	+0.1	+0.6	+1.2					
31	172.997M	34.7	+0.0	-27.4	+0.0	+0.0	+0.0	25.2	43.5	-18.3	Horiz
	QP		+9.4	+6.1	+0.0	+0.0					
			+0.0	+0.2	+0.8	+1.4					
^	172.996M	51.6	+0.0	-27.4	+0.0	+0.0	+0.0	42.1	43.5	-1.4	Horiz
			+9.4	+6.1	+0.0	+0.0					
			+0.0	+0.2	+0.8	+1.4					
33	113.937M	32.7	+0.0	-27.7	+0.0	+0.0	+0.0	24.6	43.5	-18.9	Vert
			+11.6	+6.1	+0.0	+0.0					
			+0.0	+0.1	+0.6	+1.2					
34	1040.000M	29.4	+0.0	+0.0	-37.4	+15.8	+0.0	34.5	54.0	-19.5	Vert
	Ave		+0.0	+0.0	+24.2	+1.9					
			+0.2	+0.4	+0.0	+0.0					
^	1040.000M	50.1	+0.0	+0.0	-37.4	+15.8	+0.0	55.2	54.0	+1.2	Vert
			+0.0	+0.0	+24.2	+1.9					
			+0.2	+0.4	+0.0	+0.0					
36	1040.000M	29.3	+0.0	+0.0	-37.4	+15.8	+0.0	34.4	54.0	-19.6	Horiz
	Ave		+0.0	+0.0	+24.2	+1.9					
			+0.2	+0.4	+0.0	+0.0					
^	1040.000M	47.7	+0.0	+0.0	-37.4	+15.8	+0.0	52.8	54.0	-1.2	Horiz
			+0.0	+0.0	+24.2	+1.9					
			+0.2	+0.4	+0.0	+0.0					
38	1820.000M	54.0	+0.0	+0.0	-35.1	+0.4	+0.0	49.5	106.7	-57.2	Horiz
			+0.0	+0.0	+26.9	+2.5			Mid1 channel		
			+0.3	+0.5	+0.0	+0.0					
39	1853.600M	52.5	+0.0	+0.0	-35.1	+0.3	+0.0	48.0	106.7	-58.7	Horiz
			+0.0	+0.0	+27.0	+2.5			High channel		
			+0.3	+0.5	+0.0	+0.0					
40	9268.000M	36.5	+0.0	+0.0	-34.8	+0.2	+0.0	47.8	106.7	-58.9	Vert
			+0.0	+0.0	+37.6	+6.2			High channel		
			+0.7	+1.4	+0.0	+0.0					
41	9268.000M	36.2	+0.0	+0.0	-34.8	+0.2	+0.0	47.5	106.7	-59.2	Horiz
			+0.0	+0.0	+37.6	+6.2			High channel		
			+0.7	+1.4	+0.0	+0.0					
42	1806.000M	50.2	+0.0	+0.0	-35.1	+0.4	+0.0	45.6	106.7	-61.1	Horiz
			+0.0	+0.0	+26.8	+2.5			Low channel		
			+0.3	+0.5	+0.0	+0.0					

43	1830.000M	50.0	+0.0 +0.0 +0.3	+0.0 +0.0 +0.5	-35.1 +26.9 +0.0	+0.4 +2.5 +0.0	+0.0	45.5	106.7 Mid2 channel	-61.2	Horiz
44	1820.000M	49.3	+0.0 +0.0 +0.3	+0.0 +0.0 +0.5	-35.1 +26.9 +0.0	+0.4 +2.5 +0.0	+0.0	44.8	106.7 Mid1 channel	-61.9	Vert
45	1830.000M	48.8	+0.0 +0.0 +0.3	+0.0 +0.0 +0.5	-35.1 +26.9 +0.0	+0.4 +2.5 +0.0	+0.0	44.3	106.7 Mid2 channel	-62.4	Vert
46	1853.600M	48.0	+0.0 +0.0 +0.3	+0.0 +0.0 +0.5	-35.1 +27.0 +0.0	+0.3 +2.5 +0.0	+0.0	43.5	106.7 High channel	-63.2	Vert

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE Suite A • Bothell, WA 98021 • 800-500-4EMC (4362)		
Customer:	**Itron, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**98804**	Date:	8/20/2016
Test Type:	**Maximized Emissions**	Time:	02:16:20
Tested by:	Randal Clark	Sequence#:	31
Software:	EMITest 5.03.02		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N

Test Conditions / Notes:

EUT is a transmitter operating within 902-928 MHz. EUT is battery operated, fresh batteries installed. EUT has IO ports with cables attached. Middle port is for remote antenna and must be left open for testing integral antenna. Equipment installed according to manufacturer specifications.
Equipment is configured for maximum output power with GFSK modulation.

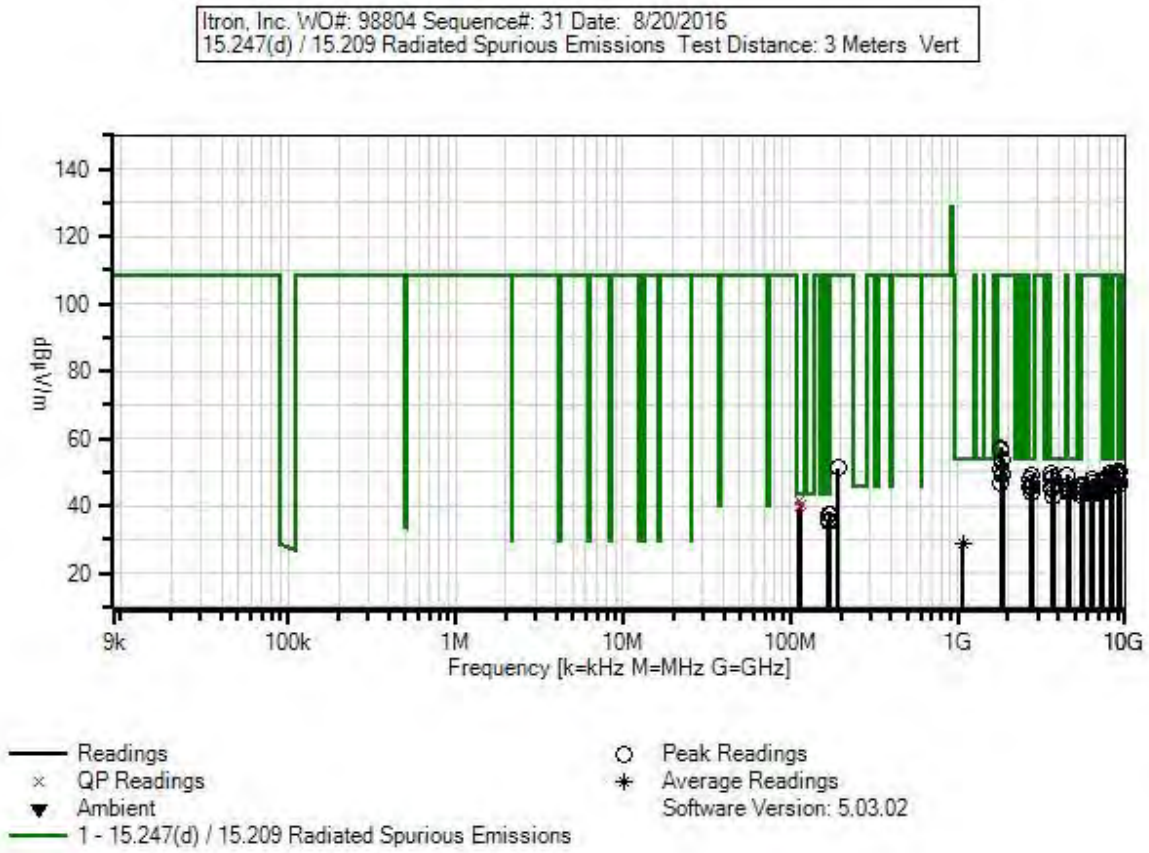
Test procedure: ANSI C63.10 (2013)

Frequency range investigated: 9kHz - 10GHz
Transmitter Frequency: 902.4, 910, 915.2, 927.6 MHz.

No emissions detected within 20dB of the limit at frequencies <100MHz. See band edge emissions data for emissions near transmit band.

Temperature: 27ºC
Rel Humidity: 34%

Data taken using configuration 1 as noted below is representative for configuration 2 as determined during testing. All other data is taken using only configuration 2.


Itron, Inc. WO#: 98804 Sequence#: 31 Date: 8/20/2016
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert
140
120
100
80
60
40
20
dBµV/m
9k
100k
1M
10M
100M
1G
10G
Frequency [k=kHz M=MHz G=GHz]
Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02872	Spectrum Analyzer	E4440A	11/18/2015	11/18/2017
T2	AN02307	Preamp	8447D	2/15/2016	2/15/2018
T3	AN03540	Preamp	83017A	4/30/2015	4/30/2017
T4	AN03170	High Pass Filter	HM1155-11SS	12/17/2015	12/17/2017
T5	AN01994	Biconilog Antenna	CBL6111C	3/11/2016	3/11/2018
T6	ANP05505	Attenuator	NAT-6	3/31/2016	3/31/2018
	AN00052	Loop Antenna	6502	4/8/2016	4/8/2018
T7	AN01467	Horn Antenna-ANSI C63.5 Calibration	3115	8/12/2015	8/12/2017
T8	ANP06935	Cable	32026-29801-29801-18	3/11/2016	3/11/2018
T9	ANP05305	Cable	ETSI-50T	2/15/2016	2/15/2018
T10	ANP06540	Cable	Heliax	10/29/2015	10/29/2017
T11	ANP05360	Cable	RG214	12/1/2014	12/1/2016
T12	ANP05963	Cable	RG-214	2/15/2016	2/15/2018
	ANP05503	Attenuator	766-10	6/18/2015	6/18/2017
	ANP05660	Attenuator	766-3	6/15/2015	6/15/2017
	ANP06219	Attenuator	768-10	4/12/2016	4/12/2018

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1 T5 T9	T2 T6 T10	T3 T7 T11	T4 T8 T12	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	113.966M QP	49.4	+0.0 +11.6 +0.0	-27.7 +6.1 +0.1	+0.0 +0.0 +0.6	+0.0 +0.0 +1.2	+0.0	41.3	43.5	-2.2	Vert
^	113.940M	52.4	+0.0 +11.6 +0.0	-27.7 +6.1 +0.1	+0.0 +0.0 +0.6	+0.0 +0.0 +1.2	+0.0	44.3	43.5	+0.8	Vert
3	115.924M QP	48.3	+0.0 +11.7 +0.0	-27.6 +6.1 +0.1	+0.0 +0.0 +0.6	+0.0 +0.0 +1.2	+0.0	40.4	43.5	-3.1	Vert
^	115.940M	51.3	+0.0 +11.7 +0.0	-27.6 +6.1 +0.1	+0.0 +0.0 +0.6	+0.0 +0.0 +1.2	+0.0	43.4	43.5	-0.1	Vert
5	111.968M QP	48.0	+0.0 +11.4 +0.0	-27.7 +6.1 +0.1	+0.0 +0.0 +0.6	+0.0 +0.0 +1.2	+0.0	39.7	43.5	-3.8	Vert
^	111.940M	50.8	+0.0 +11.4 +0.0	-27.7 +6.1 +0.1	+0.0 +0.0 +0.6	+0.0 +0.0 +1.2	+0.0	42.5	43.5	-1.0	Vert
7	9100.000M	38.7	+0.0 +0.0 +6.1	+0.0 +0.0 +1.3	-34.7 +37.7 +0.0	+0.2 +0.7 +0.0	+0.0	50.0	54.0 Mid1 channel - Config 1	-4.0	Horiz
8	9152.010M	38.6	+0.0 +0.0 +6.1	+0.0 +0.0 +1.4	-34.7 +37.7 +0.0	+0.2 +0.7 +0.0	+0.0	50.0	54.0 Mid2 channel	-4.0	Vert

9	3609.600M	49.0	+0.0 +0.0 +3.6	+0.0 +0.0 +0.8	-34.2 +29.8 +0.0	+0.4 +0.4 +0.0	+0.0	49.8	54.0 Low channel - Config 1	-4.2	Vert
10	8121.600M	40.7	+0.0 +0.0 +5.3	+0.0 +0.0 +1.2	-35.1 +36.7 +0.0	+0.3 +0.7 +0.0	+0.0	49.8	54.0 Low channel - Config 1	-4.2	Horiz
11	8121.600M	40.5	+0.0 +0.0 +5.3	+0.0 +0.0 +1.2	-35.1 +36.7 +0.0	+0.3 +0.7 +0.0	+0.0	49.6	54.0 Low channel - Config 1	-4.4	Vert
12	9100.000M	38.1	+0.0 +0.0 +6.1	+0.0 +0.0 +1.3	-34.7 +37.7 +0.0	+0.2 +0.7 +0.0	+0.0	49.4	54.0 Mid1 channel - Config 1	-4.6	Vert
13	2782.800M	50.4	+0.0 +0.0 +3.0	+0.0 +0.0 +0.7	-34.5 +28.9 +0.0	+0.4 +0.4 +0.0	+0.0	49.3	54.0 High channel	-4.7	Vert
14	9024.000M	37.8	+0.0 +0.0 +6.0	+0.0 +0.0 +1.3	-34.6 +37.8 +0.0	+0.2 +0.7 +0.0	+0.0	49.3	54.0 Low channel - Config 1	-4.8	Horiz
15	8190.000M	40.0	+0.0 +0.0 +5.3	+0.0 +0.0 +1.3	-35.1 +36.7 +0.0	+0.3 +0.7 +0.0	+0.0	49.2	54.0 Mid1 channel - Config 1	-4.8	Vert
16	4512.000M	44.7	+0.0 +0.0 +4.2	+0.0 +0.0 +0.9	-34.1 +32.5 +0.0	+0.4 +0.5 +0.0	+0.0	49.1	54.0 Low channel - Config 1	-4.9	Horiz
17	8236.810M	39.6	+0.0 +0.0 +5.3	+0.0 +0.0 +1.3	-35.1 +36.7 +0.0	+0.3 +0.7 +0.0	+0.0	48.8	54.0 Mid2 channel	-5.2	Vert
18	8348.400M	39.3	+0.0 +0.0 +5.4	+0.0 +0.0 +1.5	-35.0 +36.6 +0.0	+0.3 +0.7 +0.0	+0.0	48.8	54.0 High channel	-5.2	Vert
19	3660.810M	47.7	+0.0 +0.0 +3.7	+0.0 +0.0 +0.7	-34.2 +29.9 +0.0	+0.3 +0.5 +0.0	+0.0	48.6	54.0 Mid2 channel	-5.4	Vert
20	8348.400M	39.0	+0.0 +0.0 +5.4	+0.0 +0.0 +1.5	-35.0 +36.6 +0.0	+0.3 +0.7 +0.0	+0.0	48.5	54.0 High channel	-5.5	Horiz
21	3710.400M	47.1	+0.0 +0.0 +3.8	+0.0 +0.0 +0.7	-34.1 +30.1 +0.0	+0.3 +0.5 +0.0	+0.0	48.4	54.0 High channel	-5.6	Vert
22	172.410M	47.2	+0.0 +9.4 +0.0	-27.4 +6.1 +0.2	+0.0 +0.0 +0.8	+0.0 +0.0 +1.4	+0.0	37.7	43.5	-5.8	Vert
23	9024.000M	36.5	+0.0 +0.0 +6.0	+0.0 +0.0 +1.3	-34.6 +37.8 +0.0	+0.2 +0.7 +0.0	+0.0	47.9	54.0 Low channel - Config 1	-6.1	Vert
24	7420.800M	39.2	+0.0 +0.0 +4.8	+0.0 +0.0 +1.3	-34.7 +36.5 +0.0	+0.2 +0.6 +0.0	+0.0	47.9	54.0 High channel	-6.1	Vert
25	8190.000M	38.6	+0.0 +0.0 +5.3	+0.0 +0.0 +1.3	-35.1 +36.7 +0.0	+0.3 +0.7 +0.0	+0.0	47.8	54.0 Mid1 channel - Config 1	-6.2	Horiz

26	9024.000M	36.4	+0.0 +0.0 +6.0	+0.0 +0.0 +1.3	-34.6 +37.8 +0.0	+0.2 +0.7 +0.0	+0.0	47.8	54.0 Low channel	-6.2	Vert
27	171.430M	46.7	+0.0 +9.5 +0.0	-27.4 +6.1 +0.2	+0.0 +0.0 +0.8	+0.0 +0.0 +1.4	+0.0	37.3	43.5	-6.2	Vert
28	2707.200M	49.0	+0.0 +0.0 +3.0	+0.0 +0.0 +0.7	-34.5 +28.6 +0.0	+0.5 +0.4 +0.0	+0.0	47.7	54.0 Low channel - Config 1	-6.3	Horiz
29	3640.000M	46.6	+0.0 +0.0 +3.7	+0.0 +0.0 +0.7	-34.2 +29.9 +0.0	+0.4 +0.5 +0.0	+0.0	47.6	54.0 Mid1 channel - Config 1	-6.4	Vert
30	9152.000M Ave	36.2	+0.0 +0.0 +6.1	+0.0 +0.0 +1.4	-34.7 +37.7 +0.0	+0.2 +0.7 +0.0	+0.0	47.6	54.0 Mid2 channel	-6.4	Horiz
^	9152.010M	40.0	+0.0 +0.0 +6.1	+0.0 +0.0 +1.4	-34.7 +37.7 +0.0	+0.2 +0.7 +0.0	+0.0	51.4	54.0 Mid2 channel	-2.6	Horiz
32	7321.600M	39.3	+0.0 +0.0 +4.7	+0.0 +0.0 +1.2	-34.6 +36.1 +0.0	+0.3 +0.6 +0.0	+0.0	47.6	54.0 Mid2 channel	-6.4	Horiz
33	2745.600M	48.1	+0.0 +0.0 +3.0	+0.0 +0.0 +0.7	-34.5 +28.8 +0.0	+0.4 +0.4 +0.0	+0.0	46.9	54.0 Mid2 channel	-7.1	Horiz
34	7321.610M	38.2	+0.0 +0.0 +4.7	+0.0 +0.0 +1.2	-34.6 +36.1 +0.0	+0.3 +0.6 +0.0	+0.0	46.5	54.0 Mid2 channel	-7.5	Vert
35	2782.800M	47.6	+0.0 +0.0 +3.0	+0.0 +0.0 +0.7	-34.5 +28.9 +0.0	+0.4 +0.4 +0.0	+0.0	46.5	54.0 High channel	-7.5	Horiz
36	170.440M	45.2	+0.0 +9.6 +0.0	-27.4 +6.1 +0.2	+0.0 +0.0 +0.8	+0.0 +0.0 +1.4	+0.0	35.9	43.5	-7.6	Vert
37	4550.000M	42.0	+0.0 +0.0 +4.2	+0.0 +0.0 +0.9	-34.1 +32.5 +0.0	+0.3 +0.5 +0.0	+0.0	46.3	54.0 Mid1 channel - Config 1	-7.7	Horiz
38	3710.400M	44.8	+0.0 +0.0 +3.8	+0.0 +0.0 +0.7	-34.1 +30.1 +0.0	+0.3 +0.5 +0.0	+0.0	46.1	54.0 High channel	-7.9	Horiz
39	4638.000M	41.3	+0.0 +0.0 +4.3	+0.0 +0.0 +0.9	-34.1 +32.6 +0.0	+0.5 +0.5 +0.0	+0.0	46.0	54.0 High channel	-8.0	Horiz
40	5460.000M	40.6	+0.0 +0.0 +4.5	+0.0 +0.0 +1.0	-34.2 +33.1 +0.0	+0.3 +0.6 +0.0	+0.0	45.9	54.0 Mid1 channel - Config 1	-8.1	Vert
41	2730.000M	47.0	+0.0 +0.0 +3.0	+0.0 +0.0 +0.7	-34.5 +28.7 +0.0	+0.5 +0.4 +0.0	+0.0	45.8	54.0 Mid1 channel - Config 1	-8.2	Horiz
42	3609.600M	45.0	+0.0 +0.0 +3.6	+0.0 +0.0 +0.8	-34.2 +29.8 +0.0	+0.4 +0.4 +0.0	+0.0	45.8	54.0 Low channel - Config 1	-8.2	Horiz

43	5414.400M	40.5	+0.0 +0.0 +4.5	+0.0 +0.0 +1.0	-34.2 +33.1 +0.0	+0.3 +0.6 +0.0	+0.0	45.8	54.0 Low channel - Config 1	-8.2	Vert
44	169.430M	44.4	+0.0 +9.7 +0.0	-27.4 +6.1 +0.2	+0.0 +0.0 +0.8	+0.0 +0.0 +1.4	+0.0	35.2	43.5	-8.3	Vert
45	8236.800M	36.4	+0.0 +0.0 +5.3	+0.0 +0.0 +1.3	-35.1 +36.7 +0.0	+0.3 +0.7 +0.0	+0.0	45.6	54.0 Mid2 channel	-8.4	Horiz
46	2707.200M	46.6	+0.0 +0.0 +3.0	+0.0 +0.0 +0.7	-34.5 +28.6 +0.0	+0.5 +0.4 +0.0	+0.0	45.3	54.0 Low channel - Config 1	-8.7	Vert
47	7420.800M	36.6	+0.0 +0.0 +4.8	+0.0 +0.0 +1.3	-34.7 +36.5 +0.0	+0.2 +0.6 +0.0	+0.0	45.3	54.0 High channel	-8.7	Horiz
48	3640.000M	44.1	+0.0 +0.0 +3.7	+0.0 +0.0 +0.7	-34.2 +29.9 +0.0	+0.4 +0.5 +0.0	+0.0	45.1	54.0 Mid1 channel - Config 1	-8.9	Horiz
49	4576.000M	40.3	+0.0 +0.0 +4.2	+0.0 +0.0 +0.9	-34.1 +32.5 +0.0	+0.4 +0.5 +0.0	+0.0	44.7	54.0 Mid2 channel	-9.3	Horiz
50	5460.000M	39.3	+0.0 +0.0 +4.5	+0.0 +0.0 +1.0	-34.2 +33.1 +0.0	+0.3 +0.6 +0.0	+0.0	44.6	54.0 Mid1 channel - Config 1	-9.4	Horiz
51	4576.010M	39.9	+0.0 +0.0 +4.2	+0.0 +0.0 +0.9	-34.1 +32.5 +0.0	+0.4 +0.5 +0.0	+0.0	44.3	54.0 Mid2 channel	-9.7	Vert
52	4550.000M	39.9	+0.0 +0.0 +4.2	+0.0 +0.0 +0.9	-34.1 +32.5 +0.0	+0.3 +0.5 +0.0	+0.0	44.2	54.0 Mid1 channel - Config 1	-9.8	Vert
53	7280.000M	36.0	+0.0 +0.0 +4.6	+0.0 +0.0 +1.2	-34.6 +36.0 +0.0	+0.3 +0.6 +0.0	+0.0	44.1	54.0 Mid1 channel - Config 1	-9.9	Vert
54	2745.610M	45.0	+0.0 +0.0 +3.0	+0.0 +0.0 +0.7	-34.5 +28.8 +0.0	+0.4 +0.4 +0.0	+0.0	43.8	54.0 Mid2 channel	-10.2	Vert
55	4638.000M	39.0	+0.0 +0.0 +4.3	+0.0 +0.0 +0.9	-34.1 +32.6 +0.0	+0.5 +0.5 +0.0	+0.0	43.7	54.0 High channel	-10.3	Vert
56	2730.000M	44.9	+0.0 +0.0 +3.0	+0.0 +0.0 +0.7	-34.5 +28.7 +0.0	+0.5 +0.4 +0.0	+0.0	43.7	54.0 Mid1 channel - Config 1	-10.3	Vert
57	5414.400M	38.2	+0.0 +0.0 +4.5	+0.0 +0.0 +1.0	-34.2 +33.1 +0.0	+0.3 +0.6 +0.0	+0.0	43.5	54.0 Low channel - Config 1	-10.5	Horiz
58	3660.800M	41.9	+0.0 +0.0 +3.7	+0.0 +0.0 +0.7	-34.2 +29.9 +0.0	+0.3 +0.5 +0.0	+0.0	42.8	54.0 Mid2 channel	-11.2	Horiz
59	1073.300M Ave	30.6	+0.0 +0.0 +1.9	+0.0 +0.0 +0.4	-37.2 +24.2 +0.0	+8.6 +0.2 +0.0	+0.0	28.7	54.0 Config 1	-25.3	Vert

^	1073.300M	59.0	+0.0 +0.0 +1.9	+0.0 +0.0 +0.4	-37.2 +24.2 +0.0	+8.6 +0.2 +0.0	+0.0	57.1	54.0 Config 1	+3.1	Vert
61	1804.800M	62.0	+0.0 +0.0 +2.5	+0.0 +0.0 +0.5	-35.1 +26.8 +0.0	+0.4 +0.3 +0.0	+0.0	57.4	108.7 Low channel - Config 1	-51.3	Horiz
62	1804.800M	61.2	+0.0 +0.0 +2.5	+0.0 +0.0 +0.5	-35.1 +26.8 +0.0	+0.4 +0.3 +0.0	+0.0	56.6	108.7 Config 1	-52.1	Vert
63	1855.200M	58.2	+0.0 +0.0 +2.5	+0.0 +0.0 +0.5	-35.1 +27.1 +0.0	+0.3 +0.3 +0.0	+0.0	53.8	108.7 High channel	-54.9	Horiz
64	1830.400M	58.0	+0.0 +0.0 +2.5	+0.0 +0.0 +0.5	-35.1 +26.9 +0.0	+0.4 +0.3 +0.0	+0.0	53.5	108.7 Mid2 channel	-55.2	Horiz
65	193.300M	60.3	+0.0 +9.6 +0.0	-27.3 +6.2 +0.2	+0.0 +0.0 +0.8	+0.0 +0.0 +1.4	+0.0	51.2	108.7	-57.5	Vert
66	1820.000M	55.6	+0.0 +0.0 +2.5	+0.0 +0.0 +0.5	-35.1 +26.9 +0.0	+0.4 +0.3 +0.0	+0.0	51.1	108.7 Mid1 channel - Config 1	-57.6	Horiz
67	1855.200M	54.1	+0.0 +0.0 +2.5	+0.0 +0.0 +0.5	-35.1 +27.1 +0.0	+0.3 +0.3 +0.0	+0.0	49.7	108.7 High channel	-59.0	Vert
68	1830.410M	53.8	+0.0 +0.0 +2.5	+0.0 +0.0 +0.5	-35.1 +26.9 +0.0	+0.4 +0.3 +0.0	+0.0	49.3	108.7 Mid2 channel	-59.4	Vert
69	6370.000M	40.6	+0.0 +0.0 +4.7	+0.0 +0.0 +1.3	-34.2 +34.7 +0.0	+0.3 +0.6 +0.0	+0.0	48.0	108.7 Mid1 channel - Config 1	-60.7	Horiz
70	9276.000M	36.1	+0.0 +0.0 +6.2	+0.0 +0.0 +1.4	-34.8 +37.6 +0.0	+0.2 +0.7 +0.0	+0.0	47.4	108.7 High channel	-61.3	Vert
71	6406.400M	39.6	+0.0 +0.0 +4.7	+0.0 +0.0 +1.2	-34.2 +34.6 +0.0	+0.3 +0.6 +0.0	+0.0	46.8	108.7 Mid2 channel	-61.9	Horiz
72	1820.000M	51.1	+0.0 +0.0 +2.5	+0.0 +0.0 +0.5	-35.1 +26.9 +0.0	+0.4 +0.3 +0.0	+0.0	46.6	108.7 Mid1 channel - Config 1	-62.1	Vert
73	6316.800M	38.9	+0.0 +0.0 +4.7	+0.0 +0.0 +1.3	-34.2 +34.8 +0.0	+0.4 +0.6 +0.0	+0.0	46.5	108.7 Low channel - Config 1	-62.2	Horiz
74	9276.000M	35.0	+0.0 +0.0 +6.2	+0.0 +0.0 +1.4	-34.8 +37.6 +0.0	+0.2 +0.7 +0.0	+0.0	46.3	108.7 High channel	-62.4	Horiz
75	5491.200M	40.7	+0.0 +0.0 +4.5	+0.0 +0.0 +1.0	-34.1 +33.1 +0.0	+0.3 +0.6 +0.0	+0.0	46.1	108.7 Mid2 channel	-62.6	Horiz
76	5491.210M	40.1	+0.0 +0.0 +4.5	+0.0 +0.0 +1.0	-34.1 +33.1 +0.0	+0.3 +0.6 +0.0	+0.0	45.5	108.7 Mid2 channel	-63.2	Vert

77	7219.200M	37.5	+0.0 +0.0 +4.6	+0.0 +0.0 +1.2	-34.5 +35.7 +0.0	+0.3 +0.6 +0.0	+0.0	45.4	108.7 Low channel - Config 1	-63.3	Horiz
78	6493.200M	38.4	+0.0 +0.0 +4.6	+0.0 +0.0 +1.2	-34.2 +34.4 +0.0	+0.3 +0.6 +0.0	+0.0	45.3	108.7 High channel	-63.4	Vert
79	6370.000M	37.8	+0.0 +0.0 +4.7	+0.0 +0.0 +1.3	-34.2 +34.7 +0.0	+0.3 +0.6 +0.0	+0.0	45.2	108.7 Mid1 channel - Config 1	-63.5	Vert
80	6406.410M	37.5	+0.0 +0.0 +4.7	+0.0 +0.0 +1.2	-34.2 +34.6 +0.0	+0.3 +0.6 +0.0	+0.0	44.7	108.7 Mid2 channel	-64.0	Vert
81	7219.200M	36.8	+0.0 +0.0 +4.6	+0.0 +0.0 +1.2	-34.5 +35.7 +0.0	+0.3 +0.6 +0.0	+0.0	44.7	108.7 Low channel - Config 1	-64.0	Vert
82	6493.200M	37.5	+0.0 +0.0 +4.6	+0.0 +0.0 +1.2	-34.2 +34.4 +0.0	+0.3 +0.6 +0.0	+0.0	44.4	108.7 High channel	-64.3	Horiz
83	5565.600M	38.1	+0.0 +0.0 +4.5	+0.0 +0.0 +1.0	-34.1 +33.4 +0.0	+0.3 +0.6 +0.0	+0.0	43.8	108.7 High channel	-64.9	Horiz
84	6316.800M	35.9	+0.0 +0.0 +4.7	+0.0 +0.0 +1.3	-34.2 +34.8 +0.0	+0.4 +0.6 +0.0	+0.0	43.5	108.7 Low channel - Config 1	-65.2	Vert

Band Edge Summary					
Frequency (MHz)	Modulation	Ant. Type	Field Strength (dBuV/m @3m)	Limit (dBuV/m @3m)	Results
614	OOK 10dBm	Integral	35.8	<46	Pass
902	OOK 10dBm	Integral	78.9	<91.3	Pass
928	OOK 10dBm	Integral	75.2	< 91.3	Pass
960	OOK 10dBm	Integral	42.1	<54	Pass
614	OOK 27dBm	Integral	35.2	<46	Pass
902	OOK 27dBm	Integral	95.0	<106.7	Pass
928	OOK 27dBm	Integral	95.1	<106.7	Pass
960	OOK 27dBm	Integral	53.7	<54	Pass
614	GFSK 27dBm	Integral	42.0	<46	Pass
901.42	GFSK 27dBm	Integral	85.2	<108.7	Pass
928.64	GFSK 27dBm	Integral	86.0	<108.7	Pass
960	GFSK 27dBm	Integral	47.0	<54	Pass

Test Setup / Conditions

Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE Suite A • Bothell, WA 98021 • 800-500-4EMC (4362)
Customer: **Itron, Inc.**
Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
Work Order #: **98804** Date: 8/20/2016
Test Type: **Maximized Emissions** Time: 02:26:00
Tested by: Randal Clark Sequence#: 37
Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			
Configuration 2			

Support Equipment:

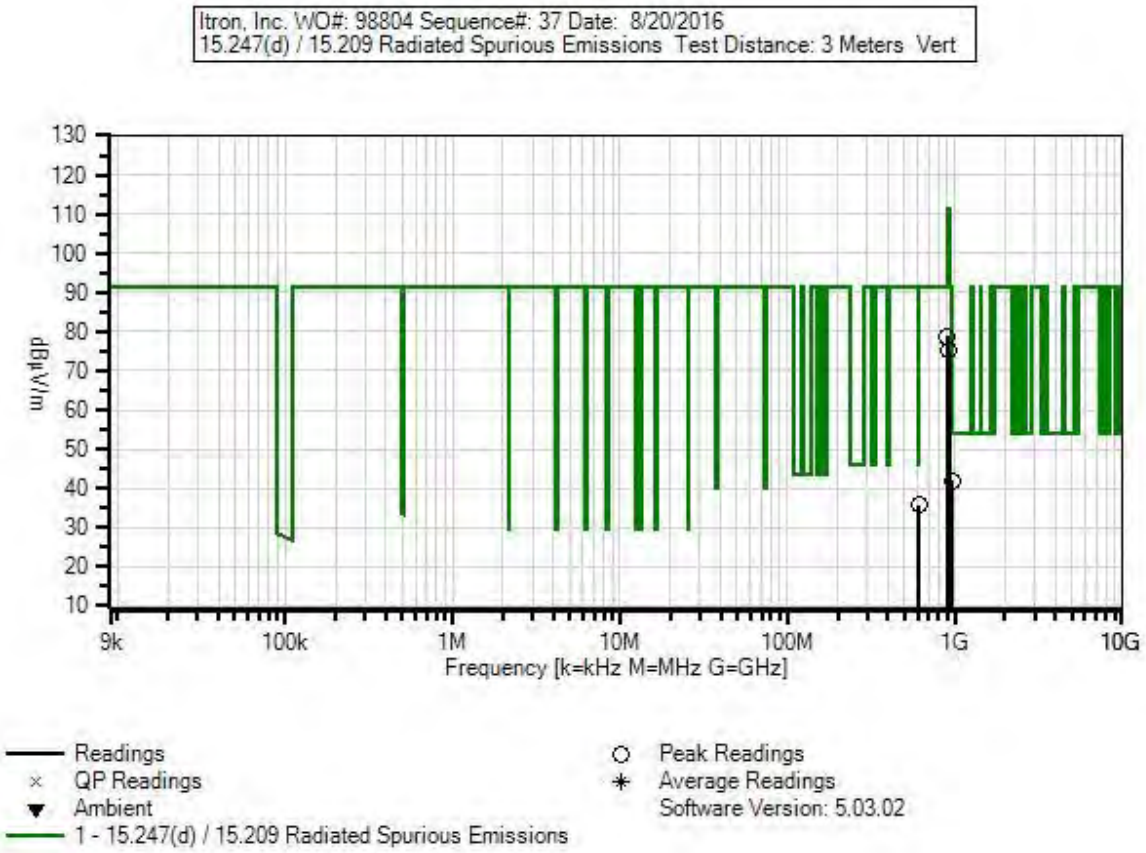
Device	Manufacturer	Model #	S/N

Test Conditions / Notes:

EUT is a transmitter operating within 902-928 MHz. EUT is battery operated, fresh batteries installed. EUT has IO ports with cables attached. Middle port is for remote antenna and must be left open for testing integral antenna. Equipment installed according to manufacturer specifications. Equipment is configured for10dBm output power with OOK modulation. Worst case emissions reported, including effects from hopping.
Test procedure: ANSI C63.10 (2013)

Frequency range investigated: 614-960 MHz
Transmitter Frequency: 903, 910, 915, 926.8 MHz.

Temperature: 27ºC
Relative Humidity: 34%


Itron, Inc. WO#: 98804 Sequence#: 37 Date: 8/20/2016
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert
130
120
110
100
90
80
70
60
50
40
30
20
10
dBµV/m
9k
100k
1M
10M
100M
1G
10G
Frequency [k=kHz M=MHz G=GHz]
Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02872	Spectrum Analyzer	E4440A	11/18/2015	11/18/2017
T1	AN02307	Preamp	8447D	2/15/2016	2/15/2018
	AN03540	Preamp	83017A	4/30/2015	4/30/2017
	AN03170	High Pass Filter	HM1155-11SS	12/17/2015	12/17/2017
T2	AN01994	Biconilog Antenna	CBL6111C	3/11/2016	3/11/2018
T3	ANP05505	Attenuator	NAT-6	3/31/2016	3/31/2018
	AN00052	Loop Antenna	6502	4/8/2016	4/8/2018
	AN01467	Horn Antenna-ANSI C63.5 Calibration	3115	8/12/2015	8/12/2017
	ANP05305	Cable	ETSI-50T	2/15/2016	2/15/2018
	ANP06935	Cable	32026-29801-29801-18	3/11/2016	3/11/2018
T4	ANP06540	Cable	Heliax	10/29/2015	10/29/2017
T5	ANP05360	Cable	RG214	12/1/2014	12/1/2016
T6	ANP05963	Cable	RG-214	2/15/2016	2/15/2018
	ANDCCF	Duty Cycle Correction Factor		7/18/2016	7/18/2018

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	614.000M	32.9	-28.1 +1.6	+20.8 +2.1	+6.2	+0.3	+0.0	35.8	46.0	-10.2	Vert
2	960.000M	33.1	-27.1 +2.1	+24.8 +2.5	+6.3	+0.4	+0.0	42.1	54.0	-11.9	Vert
3	902.000M	43.9	+0.0 +2.0	+24.1 +2.4	+6.2	+0.3	+0.0	78.9	91.3	-12.4	Vert
4	928.000M	39.7	+0.0 +2.1	+24.4 +2.4	+6.2	+0.4	+0.0	75.2	91.3	-16.1	Vert

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE Suite A • Bothell, WA 98021 • 800-500-4EMC (4362)		
Customer:	**Itron, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**98804**	Date:	8/20/2016
Test Type:	**Maximized Emissions**	Time:	02:08:16
Tested by:	Randal Clark	Sequence#:	38
Software:	EMITest 5.03.02		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N

Test Conditions / Notes:

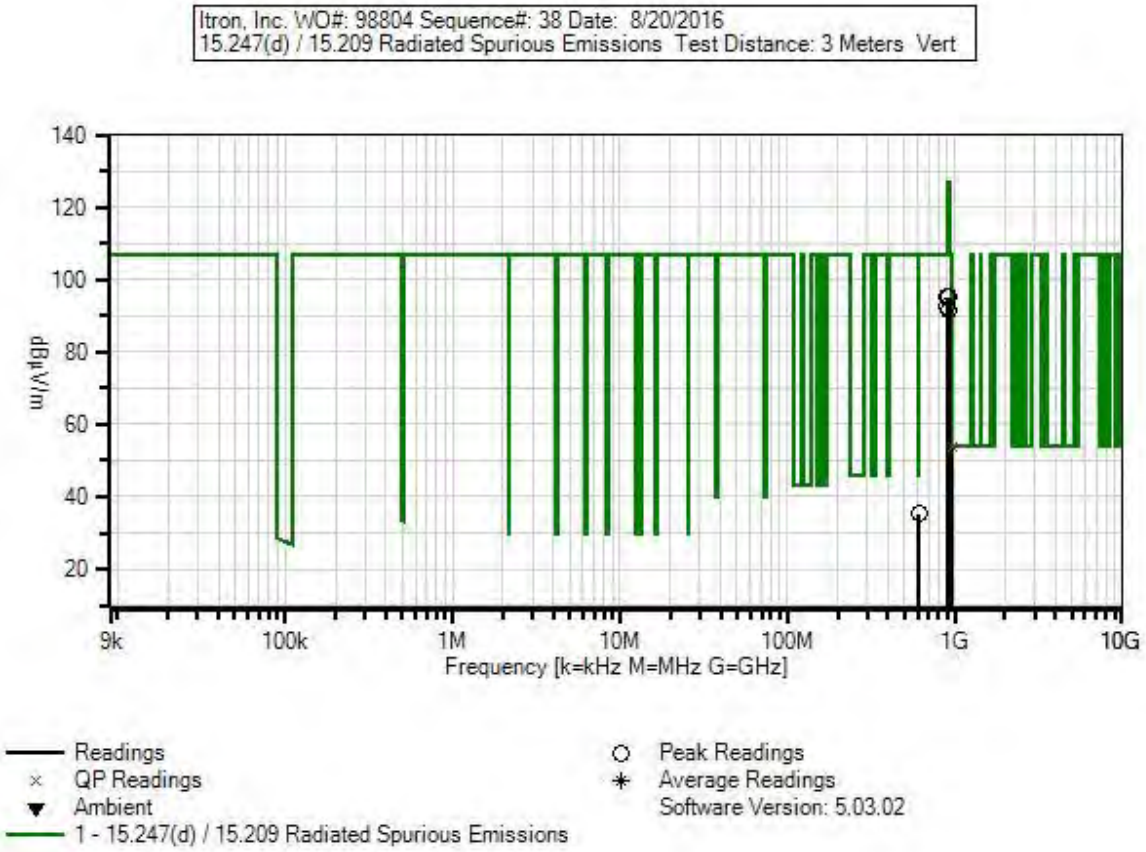
EUT is a transmitter operating within 902-928 MHz. EUT is battery operated, fresh batteries installed. EUT has IO ports with cables attached. Middle port is for remote antenna and must be left open for testing integral antenna. Equipment installed according to manufacturer specifications.
Equipment is configured for maximum output power with OOK modulation. Worst case emissions reported, including effects from hopping.

Test procedure: ANSI C63.10 (2013)

Frequency range investigated: 9kHz - 10GHz
Transmitter Frequency: 903, 910, 915, 926.8 MHz.

No emissions detected within 20dB of the limit at frequencies <100MHz. See band edge emissions data for emissions near transmit band.

Temperature: 27ºC
Relative Humidity: 34%


Itron, Inc. WO#: 98804 Sequence#: 38 Date: 8/20/2016
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert
140
120
100
80
60
40
20
dBµV/m
9k
100k
1M
10M
100M
1G
10G
Frequency [k=kHz M=MHz G=GHz]
Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02872	Spectrum Analyzer	E4440A	11/18/2015	11/18/2017
T2	AN02307	Preamp	8447D	2/15/2016	2/15/2018
	AN03540	Preamp	83017A	4/30/2015	4/30/2017
	AN03170	High Pass Filter	HM1155-11SS	12/17/2015	12/17/2017
T3	AN01994	Biconilog Antenna	CBL6111C	3/11/2016	3/11/2018
T4	ANP05505	Attenuator	NAT-6	3/31/2016	3/31/2018
	AN00052	Loop Antenna	6502	4/8/2016	4/8/2018
	AN01467	Horn Antenna-ANSI C63.5 Calibration	3115	8/12/2015	8/12/2017
	ANP05305	Cable	ETSI-50T	2/15/2016	2/15/2018
	ANP06935	Cable	32026-29801-29801-18	3/11/2016	3/11/2018
T5	ANP06540	Cable	Heliax	10/29/2015	10/29/2017
T6	ANP05360	Cable	RG214	12/1/2014	12/1/2016
T7	ANP05963	Cable	RG-214	2/15/2016	2/15/2018
	ANP05503	Attenuator	766-10	6/18/2015	6/18/2017
	ANP05660	Attenuator	766-3	6/15/2015	6/15/2017
	ANP06219	Attenuator	768-10	4/12/2016	4/12/2018

Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2 T6	T3 T7	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	960.001M	44.7	+0.0 +0.4	-27.1 +2.1	+24.8 +2.5	+6.3	+0.0	53.7	54.0	-0.3	Vert
	QP										
^	960.000M	51.4	+0.0 +0.4	-27.1 +2.1	+24.8 +2.5	+6.3	+0.0	60.4	54.0	+6.4	Vert
3	614.000M	32.3	+0.0 +0.3	-28.1 +1.6	+20.8 +2.1	+6.2	+0.0	35.2	46.0	-10.8	Vert
4	928.000M	59.6	+0.0 +0.4	+0.0 +2.1	+24.4 +2.4	+6.2	+0.0	95.1	106.7 With hopping enabled.	-11.6	Vert
5	902.000M	60.0	+0.0 +0.3	+0.0 +2.0	+24.1 +2.4	+6.2	+0.0	95.0	106.7 With hopping enabled.	-11.7	Vert
6	902.000M	57.4	+0.0 +0.3	+0.0 +2.0	+24.1 +2.4	+6.2	+0.0	92.4	106.7	-14.3	Vert
7	928.000M	56.1	+0.0 +0.4	+0.0 +2.1	+24.4 +2.4	+6.2	+0.0	91.6	106.7	-15.1	Vert

Test Location:	CKC Laboratories, Inc. • 22116 23rd Drive SE Suite A • Bothell, WA 98021 • 800-500-4EMC (4362)		
Customer:	**Itron, Inc.**		
Specification:	**15.247(d) / 15.209 Radiated Spurious Emissions**		
Work Order #:	**98804**	Date:	8/20/2016
Test Type:	**Maximized Emissions**	Time:	02:16:20
Tested by:	Randal Clark	Sequence#:	39
Software:	EMITest 5.03.02		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N

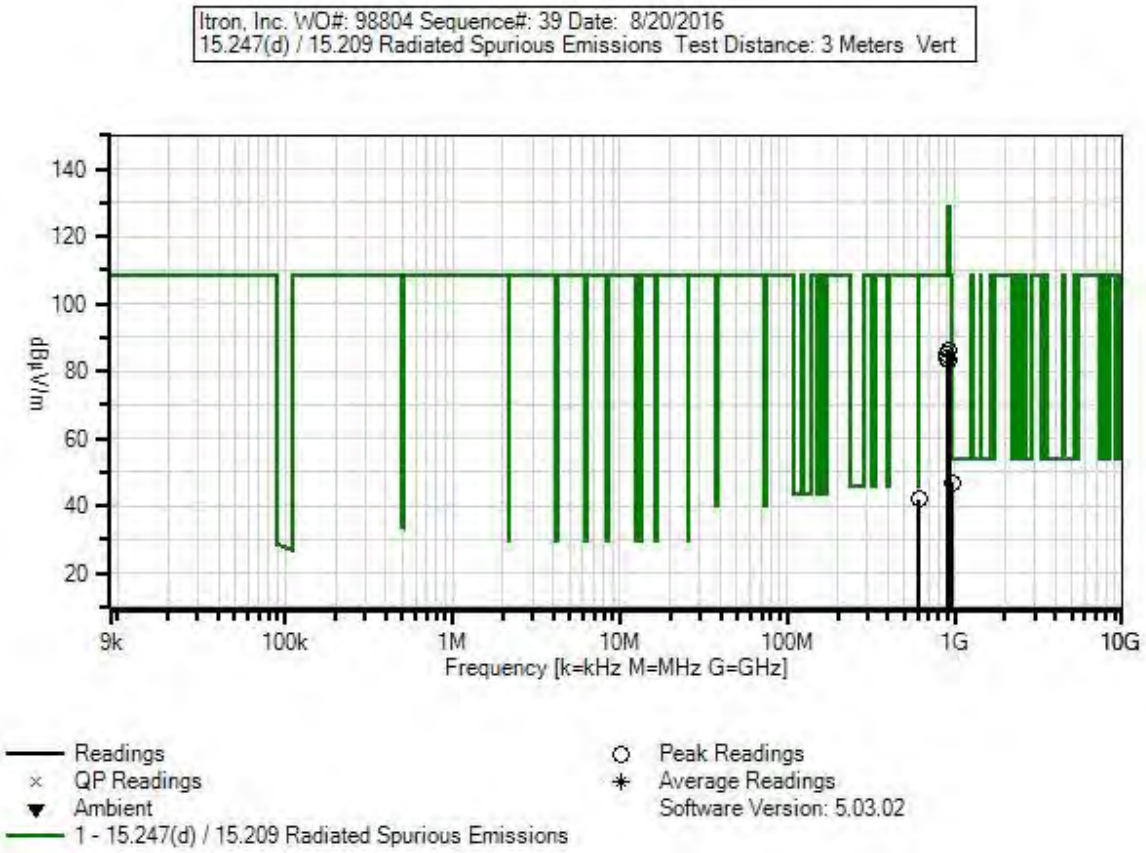
Test Conditions / Notes:

EUT is a transmitter operating within 902-928 MHz. EUT is battery operated, fresh batteries installed. EUT has IO ports with cables attached. Middle port is for remote antenna and must be left open for testing integral antenna. Equipment installed according to manufacturer specifications.
Equipment is configured for maximum output power with GFSK modulation. Worst case emissions reported, including effects from hopping.

Test procedure: ANSI C63.10 (2013)

Frequency range investigated: 614-960 MHz
Transmitter Frequency: 902.4, 910, 915.2, 927.6 MHz.

Temperature: 27ºC
Relative Humidity: 34%


Itron, Inc. WO#: 98804 Sequence#: 39 Date: 8/20/2016
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert
140
120
100
80
60
40
20
dBµV/m
9k
100k
1M
10M
100M
1G
10G
Frequency [k=kHz M=MHz G=GHz]
Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.02

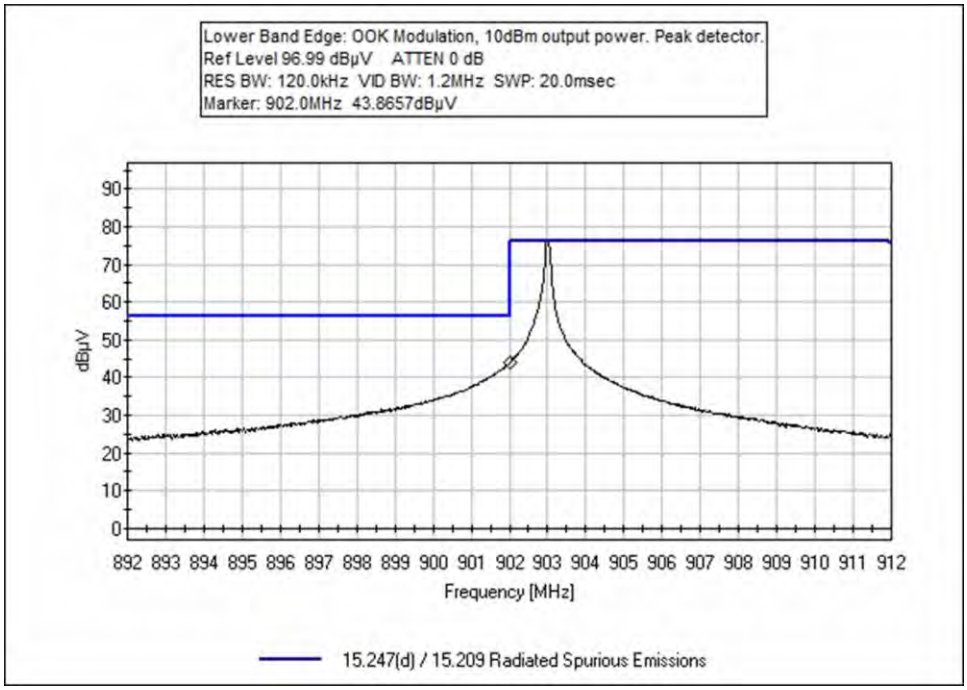
Test Equipment:

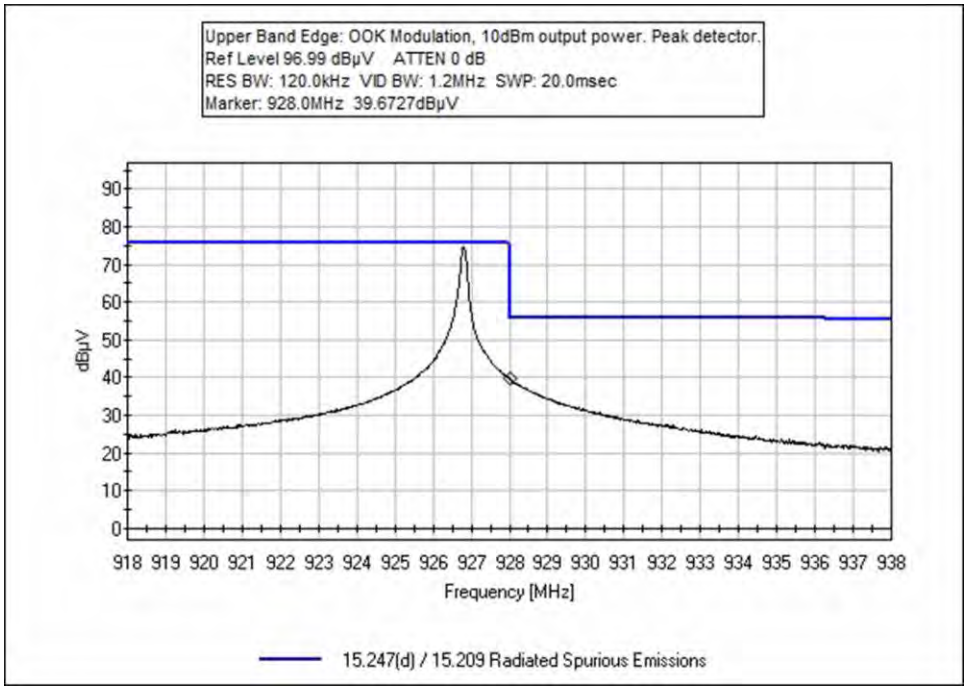
ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02872	Spectrum Analyzer	E4440A	11/18/2015	11/18/2017
	AN02307	Preamp	8447D	2/15/2016	2/15/2018
	AN03540	Preamp	83017A	4/30/2015	4/30/2017
	AN03170	High Pass Filter	HM1155-11SS	12/17/2015	12/17/2017
T2	AN01994	Biconilog Antenna	CBL6111C	3/11/2016	3/11/2018
T3	ANP05505	Attenuator	NAT-6	3/31/2016	3/31/2018
	AN00052	Loop Antenna	6502	4/8/2016	4/8/2018
	AN01467	Horn Antenna-ANSI C63.5 Calibration	3115	8/12/2015	8/12/2017
	ANP06935	Cable	32026-29801-29801-18	3/11/2016	3/11/2018
	ANP05305	Cable	ETSI-50T	2/15/2016	2/15/2018
T4	ANP06540	Cable	Heliax	10/29/2015	10/29/2017
T5	ANP05360	Cable	RG214	12/1/2014	12/1/2016
T6	ANP05963	Cable	RG-214	2/15/2016	2/15/2018
	ANP05503	Attenuator	766-10	6/18/2015	6/18/2017
	ANP05660	Attenuator	766-3	6/15/2015	6/15/2017
	ANP06219	Attenuator	768-10	4/12/2016	4/12/2018

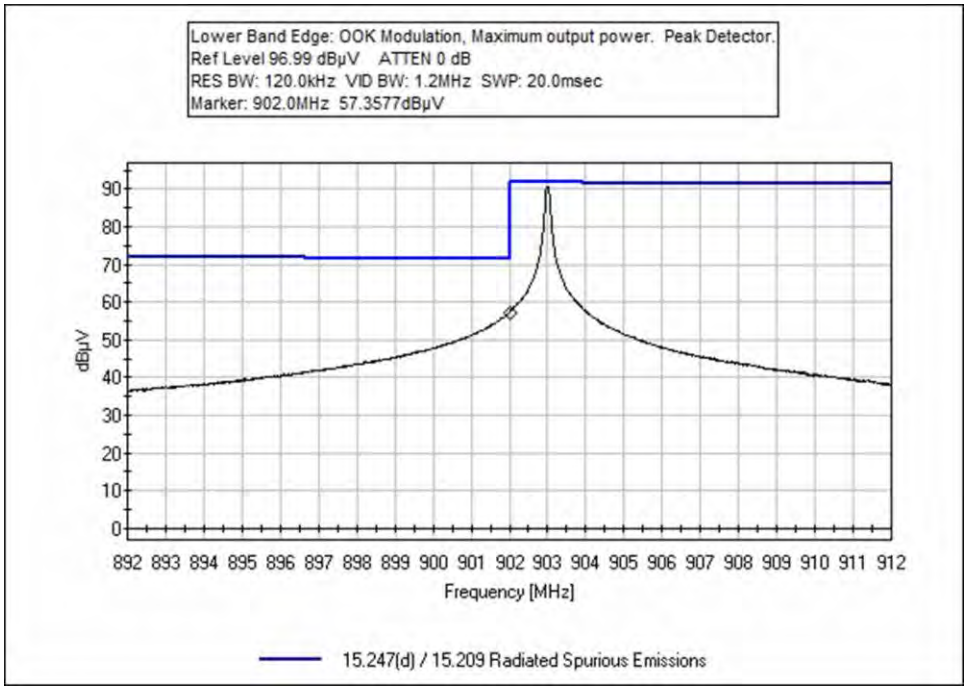
Measurement Data: Reading listed by margin. Test Distance: 3 Meters

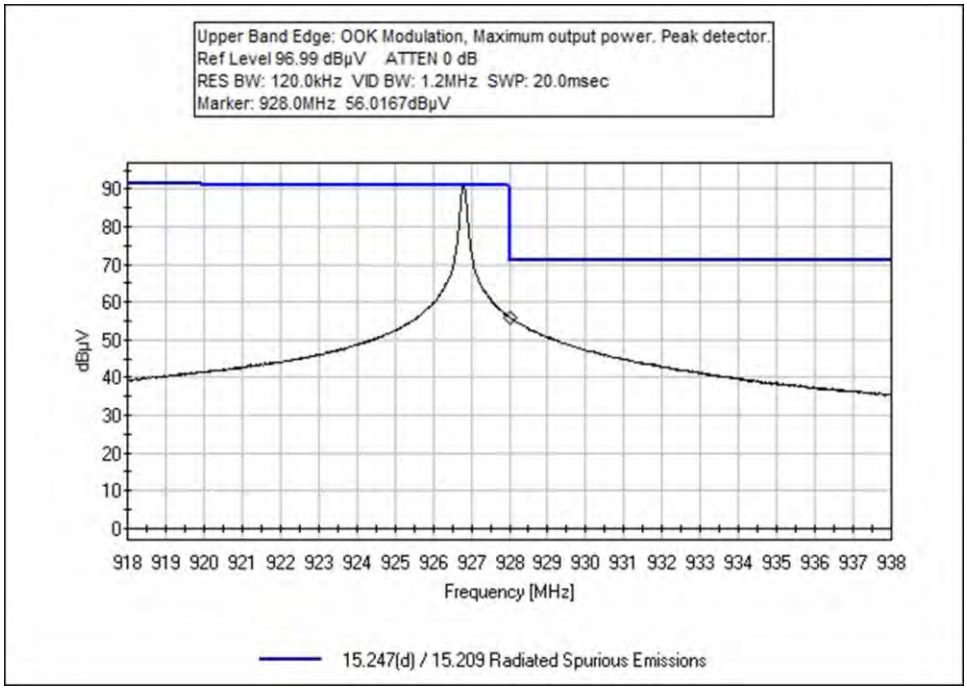
#	Freq	Rdng	T1 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	614.000M	11.0	+0.0 +1.6	+20.8 +2.1	+6.2	+0.3	+0.0	42.0	46.0	-4.0	Vert
2	960.000M	10.9	+0.0 +2.1	+24.8 +2.5	+6.3	+0.4	+0.0	47.0	54.0	-7.0	Vert
3	928.620M	50.4	+0.0 +2.1	+24.5 +2.4	+6.2	+0.4	+0.0	86.0	108.7	-22.7	Vert
4	901.420M	50.2	+0.0 +2.0	+24.1 +2.4	+6.2	+0.3	+0.0	85.2	108.7	-23.5	Vert
5	901.420M	48.9	+0.0 +2.0	+24.1 +2.4	+6.2	+0.3	+0.0	83.9	108.7 With hopping enabled.	-24.8	Vert
6	928.640M	47.6	+0.0 +2.1	+24.5 +2.4	+6.2	+0.4	+0.0	83.2	108.7 With hopping enabled.	-25.5	Vert

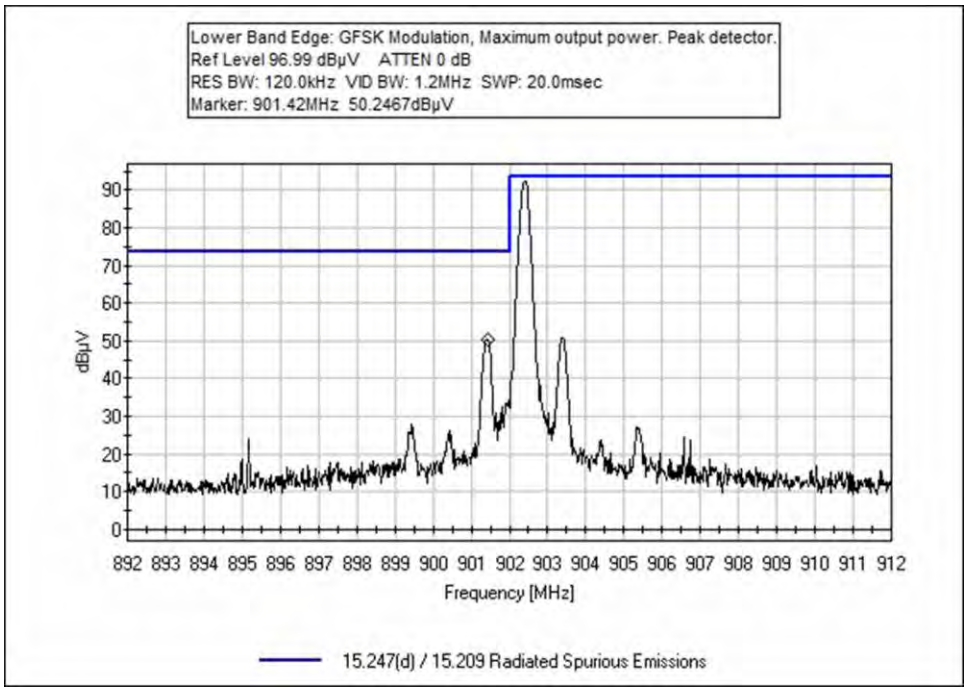
Band Edge Plots

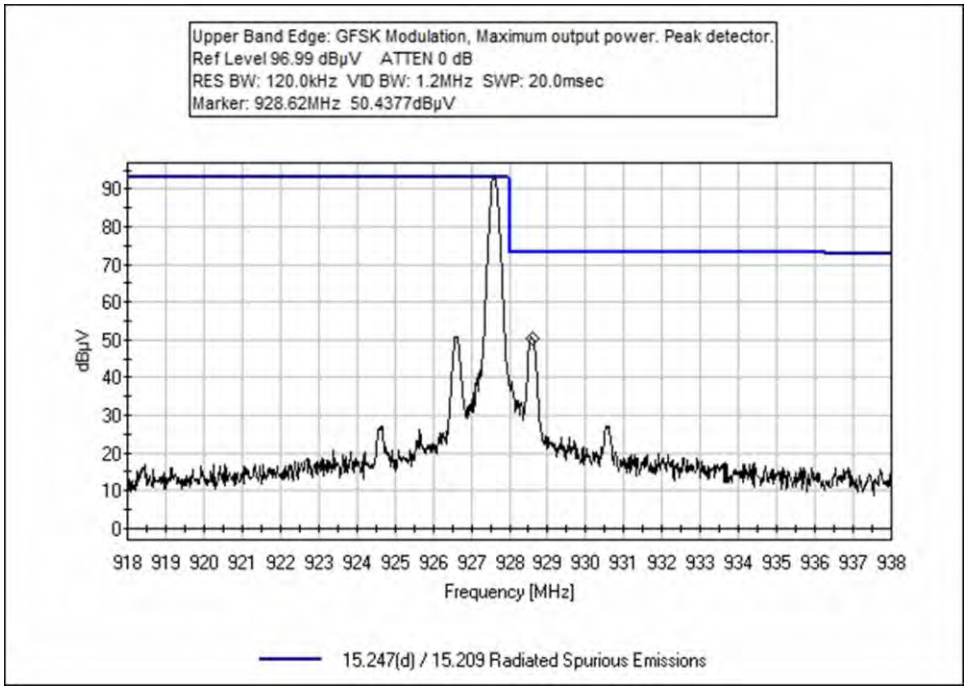




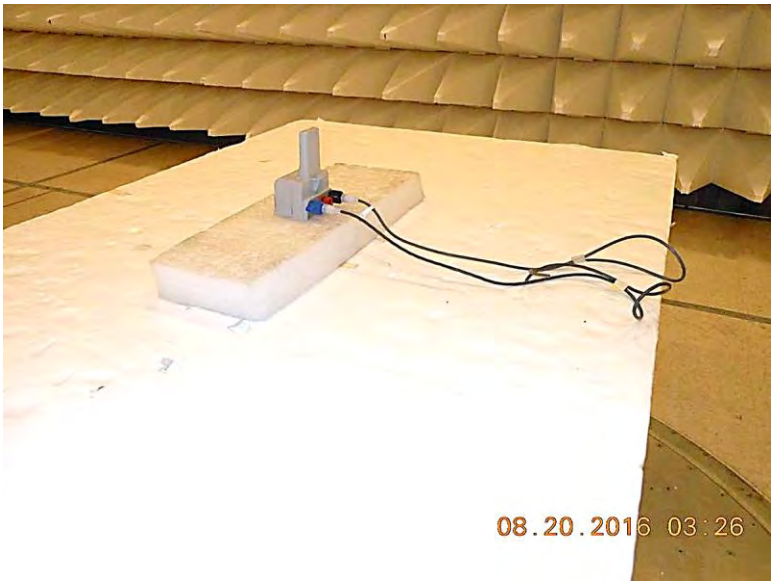

Lower Band Edge: OOK Modulation, Maximum output power. Peak Detector.
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 120.0kHz VID BW: 1.2MHz SWP: 20.0msec
Marker: 902.0MHz 57.3577dBµV
dBµV
90
80
70
60
50
40
30
20
10
0
892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions


Upper Band Edge: OOK Modulation, Maximum output power. Peak detector.
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 120.0kHz VID BW: 1.2MHz SWP: 20.0msec
Marker: 928.0MHz 56.0167dBµV
dBµV
90
80
70
60
50
40
30
20
10
0
918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions


Lower Band Edge: GFSK Modulation, Maximum output power. Peak detector.
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 120.0kHz VID BW: 1.2MHz SWP: 20.0msec
Marker: 901.42MHz 50.2467dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions


Upper Band Edge: GFSK Modulation, Maximum output power. Peak detector.
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 120.0kHz VID BW: 1.2MHz SWP: 20.0msec
Marker: 928.62MHz 50.4377dBµV
dBµV
Frequency [MHz]
15.247(d) / 15.209 Radiated Spurious Emissions

Test Setup Photo(s)



SUPPLEMENTAL INFORMATION

Measurement Uncertainty

Uncertainty Value	Parameter
4.73 dB	Radiated Emissions
3.34 dB	Mains Conducted Emissions
3.30 dB	Disturbance Power

Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k=2. Compliance is deemed to occur provided measurements are below the specified limits.

Emissions Test Details

TESTING PARAMETERS

Unless otherwise indicated, the following configuration parameters are used for equipment setup: The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. Cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the setup photographs. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables.

The emissions data was taken with a spectrum analyzer or receiver. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the table below. The corrected data was then compared to the applicable emission limits. Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in dBµV/m, the spectrum analyzer reading in dBµV was corrected by using the following formula. This reading was then compared to the applicable specification limit. Individual measurements were compared with the displayed limit value in the margin column. The margin was calculated based on subtracting the limit value from the corrected measurement value; a positive margin represents a measurement exceeding the limit, while a negative margin represents a measurement less than the limit.

SAMPLE CALCULATIONS		
	Meter reading	(dBµV)
+	Antenna Factor	(dB/m)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dBµV/m)

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed were used to collect the emissions data. A spectrum analyzer or receiver was used for all measurements. Unless otherwise specified, the following table shows the measuring equipment bandwidth settings that were used in designated frequency bands. For testing emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used.

MEASURING EQUIPMENT BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	9 kHz	150 kHz	200 Hz
RADIATED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	>1 GHz	1 MHz

SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the emissions tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "positive peak" detector mode. Whenever a "quasi-peak" or "average" reading was recorded, the measurement was annotated with a "QP" or an "Ave" on the appropriate rows of the data sheets. In cases where quasi-peak or average limits were employed and data exists for multiple measurement types for the same frequency then the peak measurement was retained in the report for reference, however the numbering for the affected row was removed and an arrow or caret ("^") was placed in the far left-hand column indicating that the row above takes precedence for comparison to the limit. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

Peak

In this mode, the spectrum analyzer or receiver recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature called "peak hold," the measurement device had the ability to measure intermittent or low duty cycle transient emission peak levels. In this mode the measuring device made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

Quasi-peak measurements were taken using the quasi-peak detector when the true peak values exceeded or were within 2 dB of a quasi-peak specification limit. Additional QP measurements may have been taken at the discretion of the operator.

Average

Average measurements were taken using the average detector when the true peak values exceeded or were within 2 dB of an average specification limit. Additional average measurements may have been taken at the discretion of the operator. If the specification or test procedure requires trace averaging, then the averaging was performed using 100 samples or as required by the specification. All other average measurements are performed using video bandwidth averaging. To make these measurements, the test engineer reduces the video bandwidth on the measuring device until the modulation of the signal is filtered out. At this point the measuring device is set into the linear mode and the scan time is reduced.