

# Itron, Inc.

## TEST REPORT FOR

**Gas Endpoint  
Model: 500GA**

**Tested to The Following Standards:**

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

**Report No.: 98804-17**

**Date of issue: August 3, 2016**



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.

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## ADMINISTRATIVE INFORMATION

### Test Report Information

**REPORT PREPARED FOR:**

Ittron, 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:**  
**DATE(S) OF TESTING:**

July 26, 2016  
July 26-27, 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: The equipment was evaluated during preliminary testing in three orthogonal axis. The orientation selected represents that which provides worst case emissions.

## 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
Gas Endpoint	Itron, Inc.	500GA	1

**Support Equipment:**

Device	Manufacturer	Model #	S/N
None			

### Configuration 2

**Equipment Tested:**

Device	Manufacturer	Model #	S/N
Gas Endpoint	Itron, Inc.	500GA	2

**Support Equipment:**

Device	Manufacturer	Model #	S/N
None			

### Configuration 3

**Equipment Tested:**

Device	Manufacturer	Model #	S/N
Gas Endpoint	Itron, Inc.	500GA	3

**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
Maximum Duty Cycle:	See supplemental report
Number of TX Chains:	1
Antenna Type(s) and Gain:	See supplemental report
Beamforming Type:	NA
Antenna Connection Type:	Integral
Nominal Input Voltage:	Battery
Firmware / Software used for Test:	App Version:1.9.13.174 CSL Version:2.9.1.1

## FCC Part 15 Subpart C

### 15.247(d) Radiated Emissions & Band Edge

#### Test Setup/Conditions

Test Location:	Canyon Park C3	Test Engineer:	Randal Clark
Test Method:	ANSI C63.10 (2013)	Test Date(s):	7/26/2016-7/27/206
Configuration:	Configurations 1, 2 and 3		

#### Environmental Conditions

Temperature (°C)	24	Relative Humidity (%):	36
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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: 7/27/2016  
 Test Type: **Maximized Emissions** Time: 19:14:33  
 Tested by: Randal Clark Sequence#: 10  
 Software: EMITest 5.03.02

#### Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

#### Support Equipment:

Device	Manufacturer	Model #	S/N
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#### Test Conditions / Notes:

The EUT is a transmitter operating within 902-928 MHz. The EUT is battery operated, fresh batteries installed.  
 The EUT has no IO ports. Equipment installed according to manufacturer specifications.  
 Equipment is configured for maximum output power with no modulation. Measurements include spurious emissions from hopping sequence on listed channels.

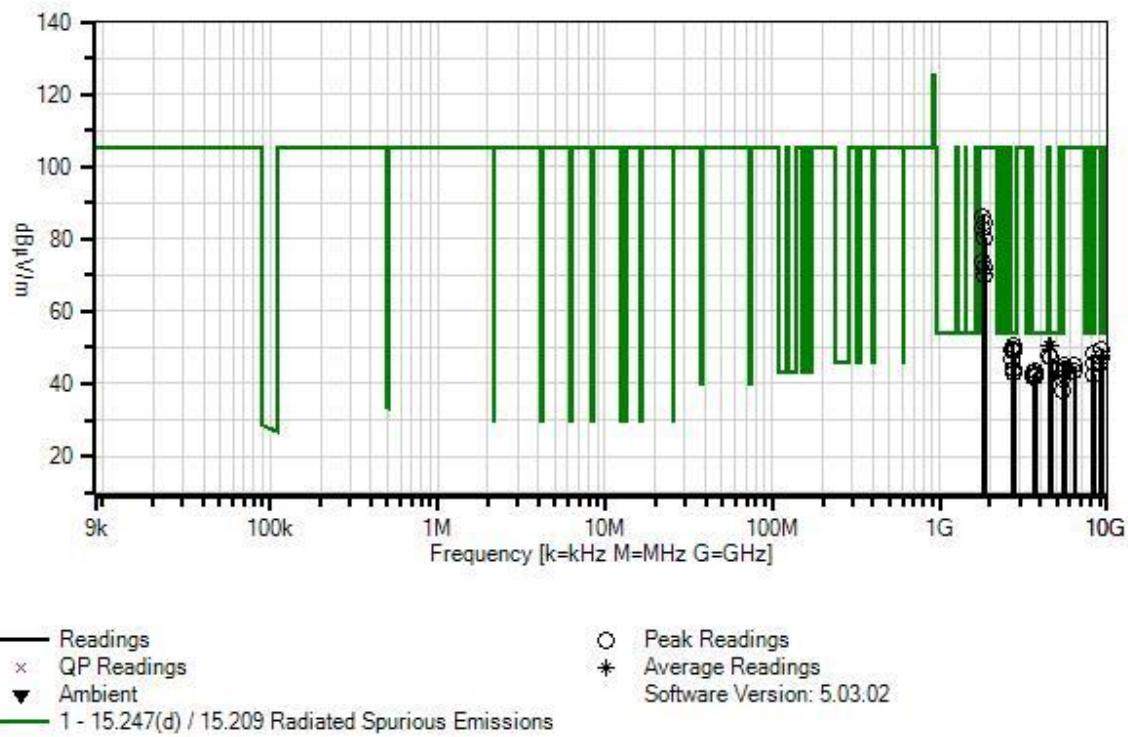
Test procedure: ANSI C63.10 (2013)

Frequency range investigated: 9kHz - 10GHz  
 Transmitter Frequency: 902.2, 910, 915 and 927.75 MHz.

**No emissions detected within 20dB of the limit at frequencies <600MHz. See band edge emissions data for emissions near transmit band.**

Temperature: 24°C  
 Relative Humidity: 36%

Itron, Inc. WO#: 98804 Sequence#: 10 Date: 7/27/2016  
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



**Test Equipment:**

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

**Measurement Data:**

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6			Table	dB $\mu$ V/m	dB $\mu$ V/m		
	MHz	dB $\mu$ V	dB	dB	dB	dB				dB	Ant
1	4550.000M	46.4	-34.1	+32.5	+4.2	+0.9	+0.0	50.7	54.0	-3.3	Horiz
	Ave		+0.3	+0.5							
^	4550.000M	48.0	-34.1	+32.5	+4.2	+0.9	+0.0	52.3	54.0	-1.7	Horiz
			+0.3	+0.5							
3	2730.000M	51.9	-34.5	+28.7	+3.0	+0.7	+0.0	50.7	54.0	-3.3	Vert
			+0.5	+0.4							
4	4511.000M	46.2	-34.1	+32.5	+4.2	+0.9	+0.0	50.6	54.0	-3.4	Horiz
	Ave		+0.4	+0.5							
^	4511.000M	48.3	-34.1	+32.5	+4.2	+0.9	+0.0	52.7	54.0	-1.3	Horiz
			+0.4	+0.5							
6	2745.000M	51.7	-34.5	+28.8	+3.0	+0.7	+0.0	50.5	54.0	-3.5	Horiz
			+0.4	+0.4							
7	2706.600M	51.0	-34.5	+28.6	+3.0	+0.7	+0.0	49.7	54.0	-4.3	Horiz
			+0.5	+0.4							
8	2730.000M	50.6	-34.5	+28.7	+3.0	+0.7	+0.0	49.4	54.0	-4.6	Horiz
			+0.5	+0.4							
9	2783.250M	50.0	-34.5	+28.9	+3.0	+0.7	+0.0	48.9	54.0	-5.1	Horiz
			+0.4	+0.4							
10	8190.000M	38.9	-35.1	+36.7	+5.3	+1.3	+0.0	48.1	54.0	-5.9	Horiz
			+0.3	+0.7							
11	4510.990M	43.7	-34.1	+32.5	+4.2	+0.9	+0.0	48.1	54.0	-5.9	Vert
			+0.4	+0.5							
12	9150.000M	36.1	-34.7	+37.7	+6.1	+1.4	+0.0	47.5	54.0	-6.5	Vert
			+0.2	+0.7							
13	4638.750M	42.4	-34.1	+32.6	+4.3	+0.9	+0.0	47.1	54.0	-6.9	Horiz
			+0.5	+0.5							

14	2706.590M	47.8	-34.5 +0.5	+28.6 +0.4	+3.0	+0.7	+0.0	46.5	54.0	-7.5	Vert
15	9100.000M	34.4	-34.7 +0.2	+37.7 +0.7	+6.1	+1.3	+0.0	45.7	54.0	-8.3	Horiz
16	8235.000M	36.2	-35.1 +0.3	+36.7 +0.7	+5.3	+1.3	+0.0	45.4	54.0	-8.6	Horiz
17	2745.000M	45.0	-34.5 +0.4	+28.8 +0.4	+3.0	+0.7	+0.0	43.8	54.0	-10.2	Vert
18	3711.000M	42.2	-34.1 +0.3	+30.1 +0.5	+3.8	+0.7	+0.0	43.5	54.0	-10.5	Horiz
19	5460.000M	37.7	-34.2 +0.3	+33.1 +0.6	+4.5	+1.0	+0.0	43.0	54.0	-11.0	Horiz
20	2783.260M	43.9	-34.5 +0.4	+28.9 +0.4	+3.0	+0.7	+0.0	42.8	54.0	-11.2	Vert
21	3640.000M	41.8	-34.2 +0.4	+29.9 +0.5	+3.7	+0.7	+0.0	42.8	54.0	-11.2	Vert
22	8349.750M	33.0	-35.0 +0.3	+36.6 +0.7	+5.4	+1.5	+0.0	42.5	54.0	-11.5	Vert
23	3660.000M	41.5	-34.2 +0.3	+29.9 +0.5	+3.7	+0.7	+0.0	42.4	54.0	-11.6	Horiz
24	3608.800M	41.2	-34.2 +0.4	+29.8 +0.4	+3.6	+0.8	+0.0	42.0	54.0	-12.0	Horiz
25	3711.000M	40.7	-34.1 +0.3	+30.1 +0.5	+3.8	+0.7	+0.0	42.0	54.0	-12.0	Vert
26	5413.190M	36.1	-34.2 +0.3	+33.0 +0.6	+4.5	+1.0	+0.0	41.3	54.0	-12.7	Vert
27	5460.000M	32.6	-34.2 +0.3	+33.1 +0.6	+4.5	+1.0	+0.0	37.9	54.0	-16.1	Vert
28	1820.000M	90.8	-35.1 +0.4	+26.9 +0.3	+2.5	+0.5	+0.0	86.3	105.3	-19.0	Horiz
29	1830.000M	89.1	-35.1 +0.4	+26.9 +0.3	+2.5	+0.5	+0.0	84.6	105.3	-20.7	Horiz
30	1804.400M	87.4	-35.1 +0.4	+26.8 +0.3	+2.5	+0.5	+0.0	82.8	105.3	-22.5	Horiz
31	1855.500M	84.8	-35.1 +0.3	+27.1 +0.3	+2.5	+0.5	+0.0	80.4	105.3	-24.9	Horiz
32	1819.980M	78.3	-35.1 +0.4	+26.9 +0.3	+2.5	+0.5	+0.0	73.8	105.3	-31.5	Vert
33	1804.400M	78.2	-35.1 +0.4	+26.8 +0.3	+2.5	+0.5	+0.0	73.6	105.3	-31.7	Vert
34	1830.000M	76.4	-35.1 +0.4	+26.9 +0.3	+2.5	+0.5	+0.0	71.9	105.3	-33.4	Vert
35	1855.510M	74.1	-35.1 +0.3	+27.1 +0.3	+2.5	+0.5	+0.0	69.7	105.3	-35.6	Vert
36	9277.500M	38.4	-34.8 +0.2	+37.6 +0.7	+6.2	+1.4	+0.0	49.7	105.3	-55.6	Horiz
37	9277.500M	35.8	-34.8 +0.2	+37.6 +0.7	+6.2	+1.4	+0.0	47.1	105.3	-58.2	Vert

38	5490.000M	39.9	-34.1 +0.3	+33.1 +0.6	+4.5	+1.0	+0.0	45.3	105.3	-60.0	Horiz
39	6405.000M	37.9	-34.2 +0.3	+34.6 +0.6	+4.7	+1.2	+0.0	45.1	105.3	-60.2	Horiz
40	5490.000M	38.7	-34.1 +0.3	+33.1 +0.6	+4.5	+1.0	+0.0	44.1	105.3	-61.2	Vert
41	6370.000M	36.2	-34.2 +0.3	+34.7 +0.6	+4.7	+1.3	+0.0	43.6	105.3	-61.7	Horiz
42	5566.500M	37.8	-34.1 +0.3	+33.4 +0.6	+4.5	+1.0	+0.0	43.5	105.3	-61.8	Horiz
43	5566.500M	37.6	-34.1 +0.3	+33.4 +0.6	+4.5	+1.0	+0.0	43.3	105.3	-62.0	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: 7/27/2016  
 Test Type: **Maximized Emissions** Time: 21:18:38  
 Tested by: Randal Clark Sequence#: 12  
 Software: EMITest 5.03.02

***Equipment Tested:***

Device	Manufacturer	Model #	S/N
Configuration 2			

***Support Equipment:***

Device	Manufacturer	Model #	S/N

***Test Conditions / Notes:***

The EUT is a transmitter operating within 902-928 MHz. The EUT is battery operated, fresh batteries installed. The EUT has no IO ports. Equipment installed according to manufacturer specifications. Equipment is configured for 10dBm output power with OOK modulation. Measurements include spurious emissions from hopping sequence on listed channels.

Test procedure: ANSI C63.10 (2013)

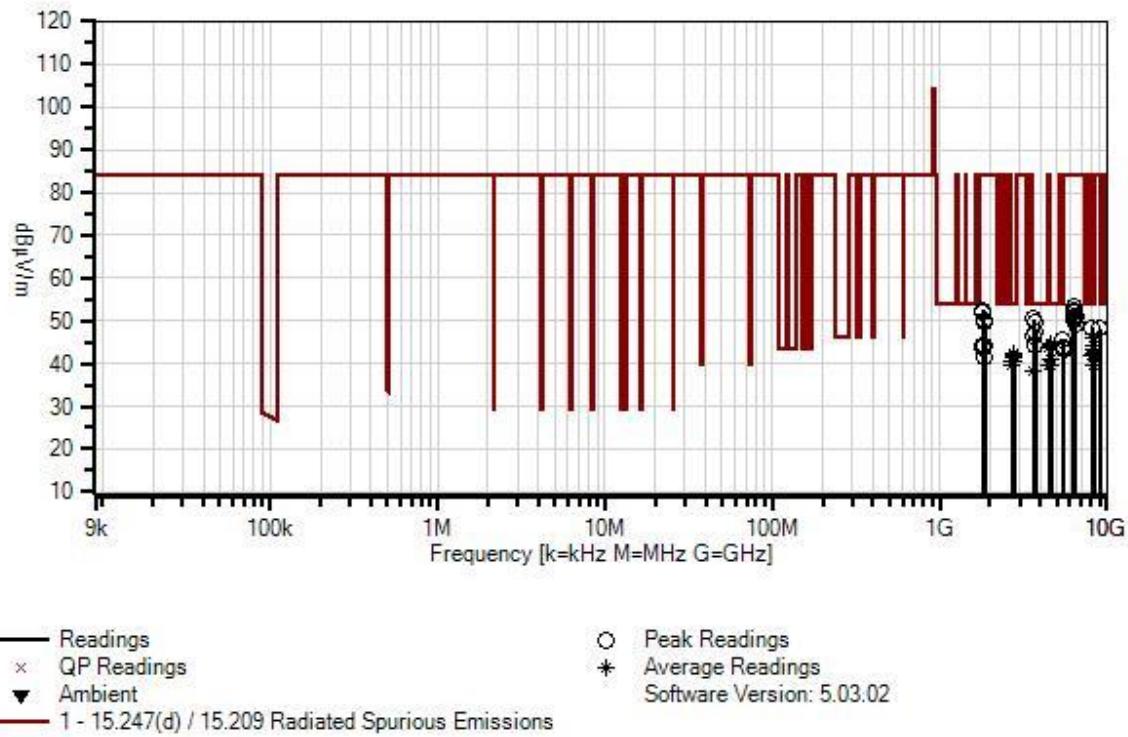
Frequency range investigated: 9kHz - 10GHz  
 Transmitter Frequency: 903, 909.8, 915 and 926.8 MHz.

**No emissions detected within 20dB of the limit at frequencies <600MHz. See band edge emissions data for emissions near transmit band.**

Temperature: 24°C

Relative Humidity: 36%

Itron, Inc. WO#: 98804 Sequence#: 12 Date: 7/27/2016  
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



**Test Equipment:**

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

**Measurement Data:**

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6			Table	dB $\mu$ V/m	dB $\mu$ V/m		
	MHz	dB $\mu$ V	dB	dB	dB	dB				dB	Ant
1	3612.000M	49.6	-34.2 +0.4	+29.8 +0.4	+3.6	+0.8	+0.0	50.4	54.0	-3.6	Vert
2	3660.000M	48.6	-34.2 +0.3	+29.9 +0.5	+3.7	+0.7	+0.0	49.5	54.0	-4.5	Horiz
3	8127.000M	39.2	-35.1 +0.3	+36.7 +0.7	+5.3	+1.3	+0.0	48.4	54.0	-5.6	Vert
4	9030.000M	36.8	-34.6 +0.2	+37.8 +0.7	+6.0	+1.3	+0.0	48.2	54.0	-5.8	Horiz
5	3707.200M	46.2	-34.1 +0.3	+30.1 +0.5	+3.8	+0.7	+0.0	47.5	54.0	-6.5	Horiz
6	3639.200M	45.2	-34.2 +0.4	+29.9 +0.5	+3.7	+0.7	+0.0	46.2	54.0	-7.8	Vert
7	8341.200M Ave	36.4	-35.0 +0.3	+36.6 +0.7	+5.4	+1.4	+0.0	45.8	54.0	-8.2	Horiz
^	8341.200M	51.1	-35.0 +0.3	+36.6 +0.7	+5.4	+1.4	+0.0	60.5	54.0	+6.5	Horiz
9	5418.000M	40.4	-34.2 +0.3	+33.1 +0.6	+4.5	+1.0	+0.0	45.7	54.0	-8.3	Vert
10	4575.000M Ave	40.1	-34.1 +0.4	+32.5 +0.5	+4.2	+0.9	+0.0	44.5	54.0	-9.5	Vert
^	4575.000M	57.0	-34.1 +0.4	+32.5 +0.5	+4.2	+0.9	+0.0	61.4	54.0	+7.4	Vert

12	8235.000M	35.2	-35.1 +0.3	+36.7 +0.7	+5.3	+1.3	+0.0	44.4	54.0	-9.6	Horiz
^	8235.000M	50.3	-35.1 +0.3	+36.7 +0.7	+5.3	+1.3	+0.0	59.5	54.0	+5.5	Horiz
14	4634.000M	39.6	-34.1 +0.5	+32.6 +0.5	+4.3	+0.9	+0.0	44.3	54.0	-9.7	Vert
^	4634.000M	56.7	-34.1 +0.5	+32.6 +0.5	+4.3	+0.9	+0.0	61.4	54.0	+7.4	Vert
16	3660.000M	43.3	-34.2 +0.3	+29.9 +0.5	+3.7	+0.7	+0.0	44.2	54.0	-9.8	Vert
17	3707.200M	42.7	-34.1 +0.3	+30.1 +0.5	+3.8	+0.7	+0.0	44.0	54.0	-10.0	Vert
18	4549.000M	39.7	-34.1 +0.3	+32.5 +0.5	+4.2	+0.9	+0.0	44.0	54.0	-10.0	Vert
^	4549.000M	56.3	-34.1 +0.3	+32.5 +0.5	+4.2	+0.9	+0.0	60.6	54.0	+6.6	Vert
20	5458.800M	38.6	-34.2 +0.3	+33.1 +0.6	+4.5	+1.0	+0.0	43.9	54.0	-10.1	Horiz
21	5418.000M	38.3	-34.2 +0.3	+33.1 +0.6	+4.5	+1.0	+0.0	43.6	54.0	-10.4	Horiz
22	4515.000M	39.1	-34.1 +0.4	+32.5 +0.5	+4.2	+0.9	+0.0	43.5	54.0	-10.5	Vert
^	4515.000M	55.8	-34.1 +0.4	+32.5 +0.5	+4.2	+0.9	+0.0	60.2	54.0	+6.2	Vert
24	5458.800M	38.2	-34.2 +0.3	+33.1 +0.6	+4.5	+1.0	+0.0	43.5	54.0	-10.5	Vert
25	8341.200M	33.8	-35.0 +0.3	+36.6 +0.7	+5.4	+1.4	+0.0	43.2	54.0	-10.8	Vert
^	8341.200M	47.5	-35.0 +0.3	+36.6 +0.7	+5.4	+1.4	+0.0	56.9	54.0	+2.9	Vert
27	2745.000M	43.7	-34.5 +0.4	+28.8 +0.4	+3.0	+0.7	+0.0	42.5	54.0	-11.5	Vert
^	2745.000M	60.7	-34.5 +0.4	+28.8 +0.4	+3.0	+0.7	+0.0	59.5	54.0	+5.5	Vert
29	8188.200M	33.3	-35.1 +0.3	+36.7 +0.7	+5.3	+1.3	+0.0	42.5	54.0	-11.5	Horiz
^	8188.200M	47.5	-35.1 +0.3	+36.7 +0.7	+5.3	+1.3	+0.0	56.7	54.0	+2.7	Horiz
31	2745.000M	43.4	-34.5 +0.4	+28.8 +0.4	+3.0	+0.7	+0.0	42.2	54.0	-11.8	Horiz
^	2745.000M	60.5	-34.5 +0.4	+28.8 +0.4	+3.0	+0.7	+0.0	59.3	54.0	+5.3	Horiz
33	2780.400M	43.1	-34.5 +0.4	+28.9 +0.4	+3.0	+0.7	+0.0	42.0	54.0	-12.0	Horiz
^	2780.400M	60.6	-34.5 +0.4	+28.9 +0.4	+3.0	+0.7	+0.0	59.5	54.0	+5.5	Horiz
35	2780.400M	43.1	-34.5 +0.4	+28.9 +0.4	+3.0	+0.7	+0.0	42.0	54.0	-12.0	Vert
^	2780.400M	60.2	-34.5 +0.4	+28.9 +0.4	+3.0	+0.7	+0.0	59.1	54.0	+5.1	Vert

37	8127.000M	32.7	-35.1 +0.3	+36.7 +0.7	+5.3	+1.3	+0.0	41.9	54.0	-12.1	Horiz
^	8127.000M	47.7	-35.1 +0.3	+36.7 +0.7	+5.3	+1.3	+0.0	56.9	54.0	+2.9	Horiz
39	8235.000M	32.7	-35.1 +0.3	+36.7 +0.7	+5.3	+1.3	+0.0	41.9	54.0	-12.1	Vert
^	8235.000M	45.1	-35.1 +0.3	+36.7 +0.7	+5.3	+1.3	+0.0	54.3	54.0	+0.3	Vert
41	2729.400M	42.5	-34.5 +0.5	+28.7 +0.4	+3.0	+0.7	+0.0	41.3	54.0	-12.7	Horiz
^	2729.400M	59.1	-34.5 +0.5	+28.7 +0.4	+3.0	+0.7	+0.0	57.9	54.0	+3.9	Horiz
43	4575.000M	36.7	-34.1 +0.4	+32.5 +0.5	+4.2	+0.9	+0.0	41.1	54.0	-12.9	Horiz
^	4575.000M	48.2	-34.1 +0.4	+32.5 +0.5	+4.2	+0.9	+0.0	52.6	54.0	-1.4	Horiz
45	4634.000M	36.1	-34.1 +0.5	+32.6 +0.5	+4.3	+0.9	+0.0	40.8	54.0	-13.2	Horiz
^	4634.000M	48.6	-34.1 +0.5	+32.6 +0.5	+4.3	+0.9	+0.0	53.3	54.0	-0.7	Horiz
47	2729.400M	41.9	-34.5 +0.5	+28.7 +0.4	+3.0	+0.7	+0.0	40.7	54.0	-13.3	Vert
^	2729.400M	59.2	-34.5 +0.5	+28.7 +0.4	+3.0	+0.7	+0.0	58.0	54.0	+4.0	Vert
49	2709.000M	41.9	-34.5 +0.5	+28.6 +0.4	+3.0	+0.7	+0.0	40.6	54.0	-13.4	Horiz
^	2709.000M	58.3	-34.5 +0.5	+28.6 +0.4	+3.0	+0.7	+0.0	57.0	54.0	+3.0	Horiz
51	2709.000M	41.1	-34.5 +0.5	+28.6 +0.4	+3.0	+0.7	+0.0	39.8	54.0	-14.2	Vert
^	2709.000M	58.3	-34.5 +0.5	+28.6 +0.4	+3.0	+0.7	+0.0	57.0	54.0	+3.0	Vert
53	4549.000M	35.4	-34.1 +0.3	+32.5 +0.5	+4.2	+0.9	+0.0	39.7	54.0	-14.3	Horiz
^	4549.000M	47.4	-34.1 +0.3	+32.5 +0.5	+4.2	+0.9	+0.0	51.7	54.0	-2.3	Horiz
55	8188.200M	30.3	-35.1 +0.3	+36.7 +0.7	+5.3	+1.3	+0.0	39.5	54.0	-14.5	Vert
^	8188.200M	42.9	-35.1 +0.3	+36.7 +0.7	+5.3	+1.3	+0.0	52.1	54.0	-1.9	Vert
57	4515.000M	35.0	-34.1 +0.4	+32.5 +0.5	+4.2	+0.9	+0.0	39.4	54.0	-14.6	Horiz
^	4515.000M	47.2	-34.1 +0.4	+32.5 +0.5	+4.2	+0.9	+0.0	51.6	54.0	-2.4	Horiz
59	3639.200M	37.4	-34.2 +0.4	+29.9 +0.5	+3.7	+0.7	+0.0	38.4	54.0	-15.6	Horiz
^	3639.200M	51.2	-34.2 +0.4	+29.9 +0.5	+3.7	+0.7	+0.0	52.2	54.0	-1.8	Horiz

61	6405.000M	46.1	-34.2 +0.3	+34.6 +0.6	+4.7	+1.2	+0.0	53.3	84.2	-30.9	Horiz
62	1806.000M	57.2	-35.1 +0.4	+26.8 +0.3	+2.5	+0.5	+0.0	52.6	84.2	-31.6	Vert
63	6321.000M	44.9	-34.2 +0.4	+34.8 +0.6	+4.7	+1.3	+0.0	52.5	84.2	-31.7	Vert
64	6368.600M	44.7	-34.2 +0.3	+34.7 +0.6	+4.7	+1.3	+0.0	52.1	84.2	-32.1	Horiz
65	1819.600M	56.2	-35.1 +0.4	+26.9 +0.3	+2.5	+0.5	+0.0	51.7	84.2	-32.5	Vert
66	6487.600M	44.2	-34.2 +0.3	+34.4 +0.6	+4.6	+1.2	+0.0	51.1	84.2	-33.1	Horiz
67	6321.000M	43.4	-34.2 +0.4	+34.8 +0.6	+4.7	+1.3	+0.0	51.0	84.2	-33.2	Horiz
68	6368.600M	43.3	-34.2 +0.3	+34.7 +0.6	+4.7	+1.3	+0.0	50.7	84.2	-33.5	Vert
69	1830.000M	54.8	-35.1 +0.4	+26.9 +0.3	+2.5	+0.5	+0.0	50.3	84.2	-33.9	Vert
70	6405.000M	42.9	-34.2 +0.3	+34.6 +0.6	+4.7	+1.2	+0.0	50.1	84.2	-34.1	Vert
71	1853.600M	54.1	-35.1 +0.3	+27.0 +0.3	+2.5	+0.5	+0.0	49.6	84.2	-34.6	Vert
72	6487.600M	42.5	-34.2 +0.3	+34.4 +0.6	+4.6	+1.2	+0.0	49.4	84.2	-34.8	Vert
73	1819.600M	48.9	-35.1 +0.4	+26.9 +0.3	+2.5	+0.5	+0.0	44.4	84.2	-39.8	Horiz
74	1830.000M	48.7	-35.1 +0.4	+26.9 +0.3	+2.5	+0.5	+0.0	44.2	84.2	-40.0	Horiz
75	5490.000M	38.3	-34.1 +0.3	+33.1 +0.6	+4.5	+1.0	+0.0	43.7	84.2	-40.5	Horiz
76	1806.000M	48.2	-35.1 +0.4	+26.8 +0.3	+2.5	+0.5	+0.0	43.6	84.2	-40.6	Horiz
77	5490.000M	37.9	-34.1 +0.3	+33.1 +0.6	+4.5	+1.0	+0.0	43.3	84.2	-40.9	Vert
78	1853.600M	46.0	-35.1 +0.3	+27.0 +0.3	+2.5	+0.5	+0.0	41.5	84.2	-42.7	Horiz

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: 7/27/2016  
 Test Type: **Maximized Emissions** Time: 18:57:20  
 Tested by: Randal Clark Sequence#: 11  
 Software: EMITest 5.03.02

***Equipment Tested:***

Device	Manufacturer	Model #	S/N
Configuration 3			

***Support Equipment:***

Device	Manufacturer	Model #	S/N

***Test Conditions / Notes:***

The EUT is a transmitter operating within 902-928 MHz. The EUT is battery operated, fresh batteries installed.  
 The EUT has no IO ports. Equipment installed according to manufacturer specifications.  
 Equipment is configured for maximum output power with OOK modulation. Measurements include spurious emissions from hopping sequence on listed channels.

Test procedure: ANSI C63.10 (2013)

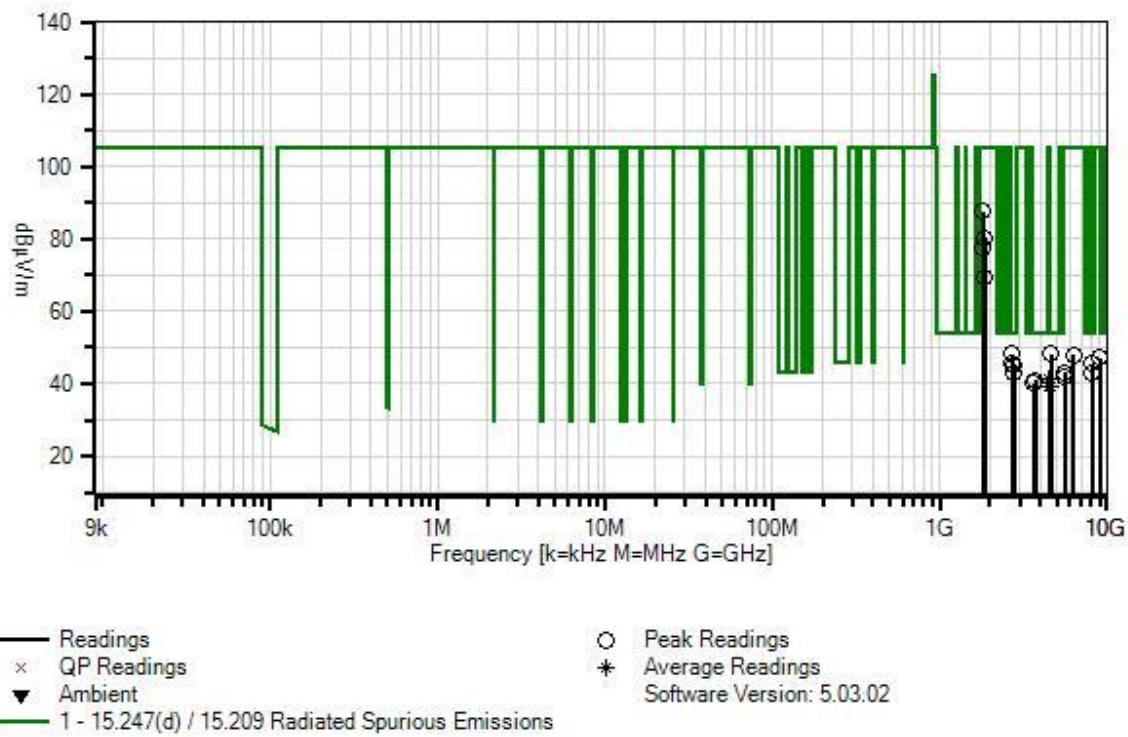
Frequency range investigated: 9kHz - 10GHz  
 Transmitter Frequency: 903 and 926.8 MHz.

**No emissions detected within 20dB of the limit at frequencies <600MHz. See band edge emissions data for emissions near transmit band.**

Temperature: 24°C

Relative Humidity: 36%

Itron, Inc. WO#: 98804 Sequence#: 11 Date: 7/27/2016  
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert



**Test Equipment:**

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

**Measurement Data:**

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6			Table	dB $\mu$ V/m	dB $\mu$ V/m		
	MHz	dB $\mu$ V	dB	dB	dB	dB				dB	Ant
1	2709.000M	49.5	-34.5 +0.5	+28.6 +0.4	+3.0	+0.7	+0.0	48.2	54.0	-5.8	Horiz
2	4634.000M	43.5	-34.1 +0.5	+32.6 +0.5	+4.3	+0.9	+0.0	48.2	54.0	-5.8	Vert
3	9030.000M	35.6	-34.6 +0.2	+37.8 +0.7	+6.0	+1.3	+0.0	47.0	54.0	-7.0	Vert
4	2709.000M	47.2	-34.5 +0.5	+28.6 +0.4	+3.0	+0.7	+0.0	45.9	54.0	-8.1	Vert
5	8127.000M	36.4	-35.1 +0.3	+36.7 +0.7	+5.3	+1.3	+0.0	45.6	54.0	-8.4	Horiz
6	2780.400M	46.2	-34.5 +0.4	+28.9 +0.4	+3.0	+0.7	+0.0	45.1	54.0	-8.9	Horiz
7	8127.000M	34.0	-35.1 +0.3	+36.7 +0.7	+5.3	+1.3	+0.0	43.2	54.0	-10.8	Vert
8	2780.400M	44.1	-34.5 +0.4	+28.9 +0.4	+3.0	+0.7	+0.0	43.0	54.0	-11.0	Vert
9	4515.000M Ave	37.1	-34.1 +0.4	+32.5 +0.5	+4.2	+0.9	+0.0	41.5	54.0	-12.5	Horiz
^	4515.000M	48.2	-34.1 +0.4	+32.5 +0.5	+4.2	+0.9	+0.0	52.6	54.0	-1.4	Horiz
11	3707.200M	39.7	-34.1 +0.3	+30.1 +0.5	+3.8	+0.7	+0.0	41.0	54.0	-13.0	Horiz

12	3612.000M	39.2	-34.2 +0.4	+29.8 +0.4	+3.6	+0.8	+0.0	40.0	54.0	-14.0	Vert
13	4634.000M	34.6	-34.1 +0.5	+32.6 +0.5	+4.3	+0.9	+0.0	39.3	54.0	-14.7	Horiz
^	4634.000M	46.7	-34.1 +0.5	+32.6 +0.5	+4.3	+0.9	+0.0	51.4	54.0	-2.6	Horiz
15	4515.000M	34.8	-34.1 +0.4	+32.5 +0.5	+4.2	+0.9	+0.0	39.2	54.0	-14.8	Vert
^	4515.000M	47.6	-34.1 +0.4	+32.5 +0.5	+4.2	+0.9	+0.0	52.0	54.0	-2.0	Vert
17	1806.000M	92.2	-35.1 +0.4	+26.8 +0.3	+2.5	+0.5	+0.0	87.6	105.3	-17.7	Horiz
18	1853.600M	84.7	-35.1 +0.3	+27.0 +0.3	+2.5	+0.5	+0.0	80.2	105.3	-25.1	Horiz
19	1806.000M	82.2	-35.1 +0.4	+26.8 +0.3	+2.5	+0.5	+0.0	77.6	105.3	-27.7	Vert
20	1853.600M	74.0	-35.1 +0.3	+27.0 +0.3	+2.5	+0.5	+0.0	69.5	105.3	-35.8	Vert
21	6321.000M	40.3	-34.2 +0.4	+34.8 +0.6	+4.7	+1.3	+0.0	47.9	105.3	-57.4	Vert
22	5560.800M	37.3	-34.1 +0.3	+33.4 +0.6	+4.5	+1.0	+0.0	43.0	105.3	-62.3	Horiz
23	5560.800M	36.3	-34.1 +0.3	+33.4 +0.6	+4.5	+1.0	+0.0	42.0	105.3	-63.3	Vert

### Band Edge Summary

Frequency (MHz)	Modulation	Ant. Type	Field Strength (dBuV/m @3m)	Limit (dBuV/m @3m)	Results
614	Worst Case	Integral	37.7	<54	Pass
902	CW	Integral	74 (QP)	<105.3	Pass
902	OOK (10dBm)	Integral	68.4	<84.2	Pass
902	OOK Max Power	Integral	89.8	<105.3	Pass
928	CW	Integral	72.3 (QP)	<105.3	Pass
928	OOK (10dBm)	Integral	67.5	<84.2	Pass
928	OOK Max Power	Integral	87.0	<105.3	Pass
960	Worst Case	Integral	52.5 (QP)	<54	Pass

Worst case: Max power with OOK modulation.

Emissions limits outside of restricted bands are 20dB from maximum measured inband emissions in 100kHz.

### Band Edge Test Setup / Test Conditions / 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: 7/26/2016  
 Test Type: **Maximized Emissions** Time: 17:30:56  
 Tested by: Randal Clark Sequence#: 6  
 Software: EMITest 5.03.02

#### Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

#### Support Equipment:

Device	Manufacturer	Model #	S/N

#### Test Conditions / Notes:

The EUT is a transmitter operating within 902-928 MHz. The EUT is battery operated, fresh batteries installed.  
 The EUT has no IO ports. Equipment installed according to manufacturer specifications.  
 Equipment is configured for maximum output power without modulation. Measurements include spurious emissions from hopping sequence on listed channels.

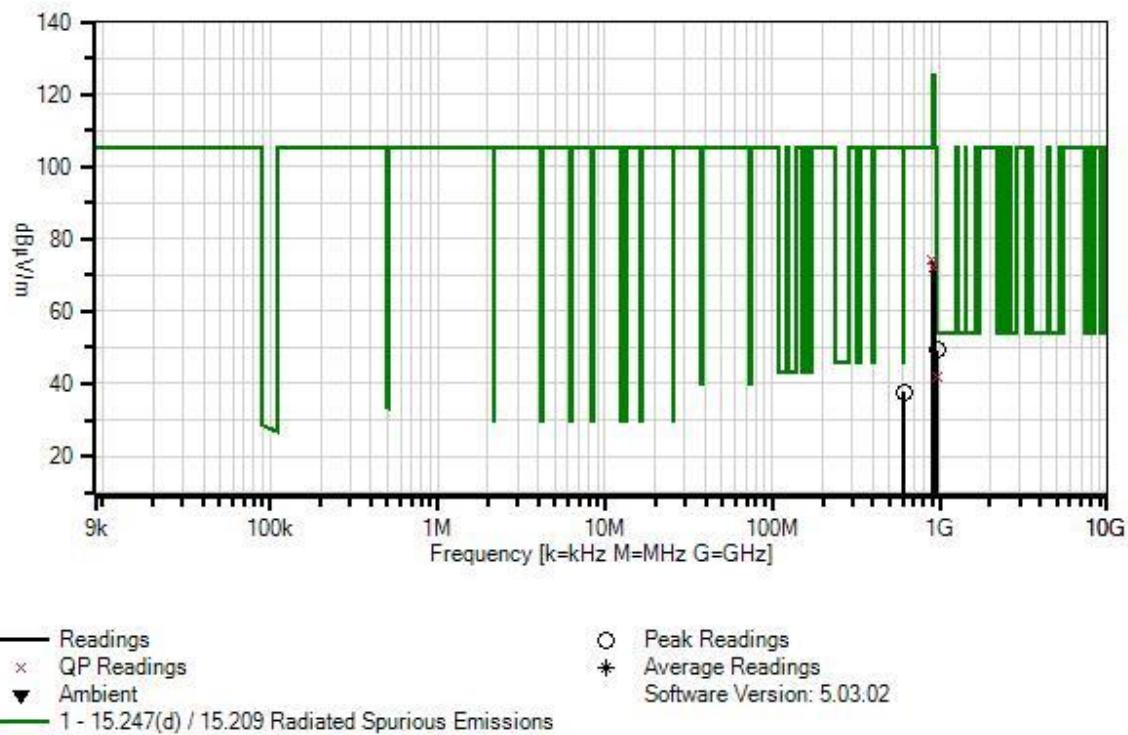
Test procedure: ANSI C63.10 (2013)

Frequency range investigated: Band Edges  
 Transmitter Frequency: 902.2, 910, 915, and 927.75.

Temperature: 24°C

Relative Humidity: 36%

Itron, Inc. WO#: 98804 Sequence#: 6 Date: 7/26/2016  
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02307	Preamp	8447D	2/15/2016	2/15/2018
T2	AN01994	Biconilog Antenna	CBL6111C	3/11/2016	3/11/2018
T3	ANP05505	Attenuator	NAT-6	3/31/2016	3/31/2018
T4	ANP05360	Cable	RG214	12/1/2014	12/1/2016
T5	ANP05963	Cable	RG-214	2/15/2016	2/15/2018
T6	ANP06540	Cable	Heliax	10/29/2015	10/29/2017
T7	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	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6	T7		Table	dB $\mu$ V/m	dB $\mu$ V/m		
	MHz	dB $\mu$ V	dB	dB	dB	dB					Ant
1	960.000M	30.2	-27.1	+24.8	+6.3	+2.1	+0.0	49.4	54.0	-4.6	Vert
			+2.5	+0.4	+10.2						No Modulation, Max output power
2	614.000M	24.6	-28.1	+20.8	+6.2	+1.6	+0.0	37.6	46.0	-8.4	Horiz
			+2.1	+0.3	+10.1						No Modulation, Max output power
3	960.001M	22.7	-27.1	+24.8	+6.3	+2.1	+0.0	41.9	54.0	-12.1	Horiz
	QP		+2.5	+0.4	+10.2						No Modulation, Max output power
^	960.000M	37.2	-27.1	+24.8	+6.3	+2.1	+0.0	56.4	54.0	+2.4	Horiz
			+2.5	+0.4	+10.2						No Modulation, Max output power
5	902.000M	39.0	+0.0	+24.1	+6.2	+2.0	+0.0	74.0	105.3	-31.3	Horiz
	QP		+2.4	+0.3	+0.0						No Modulation, Max output power
^	902.000M	70.6	+0.0	+24.1	+6.2	+2.0	+0.0	105.6	105.3	+0.3	Horiz
			+2.4	+0.3	+0.0						No Modulation, Max output power
7	928.000M	36.8	+0.0	+24.4	+6.2	+2.1	+0.0	72.3	105.3	-33.0	Horiz
	QP		+2.4	+0.4	+0.0						No Modulation, Max output power
^	928.005M	68.0	+0.0	+24.4	+6.2	+2.1	+0.0	103.5	105.3	-1.8	Horiz
			+2.4	+0.4	+0.0						No Modulation, Max output power

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: 7/26/2016  
 Test Type: **Maximized Emissions** Time: 17:30:56  
 Tested by: Randal Clark Sequence#: 7  
 Software: EMITest 5.03.02

***Equipment Tested:***

Device	Manufacturer	Model #	S/N
Configuration 2			

***Support Equipment:***

Device	Manufacturer	Model #	S/N

***Test Conditions / Notes:***

The EUT is a transmitter operating within 902-928 MHz. The EUT is battery operated, fresh batteries installed.  
 The EUT has no IO ports. Equipment installed according to manufacturer specifications.  
 Equipment is configured for 10dBm rated output power with OOK modulation. Measurements include spurious emissions from hopping sequence on listed channels.

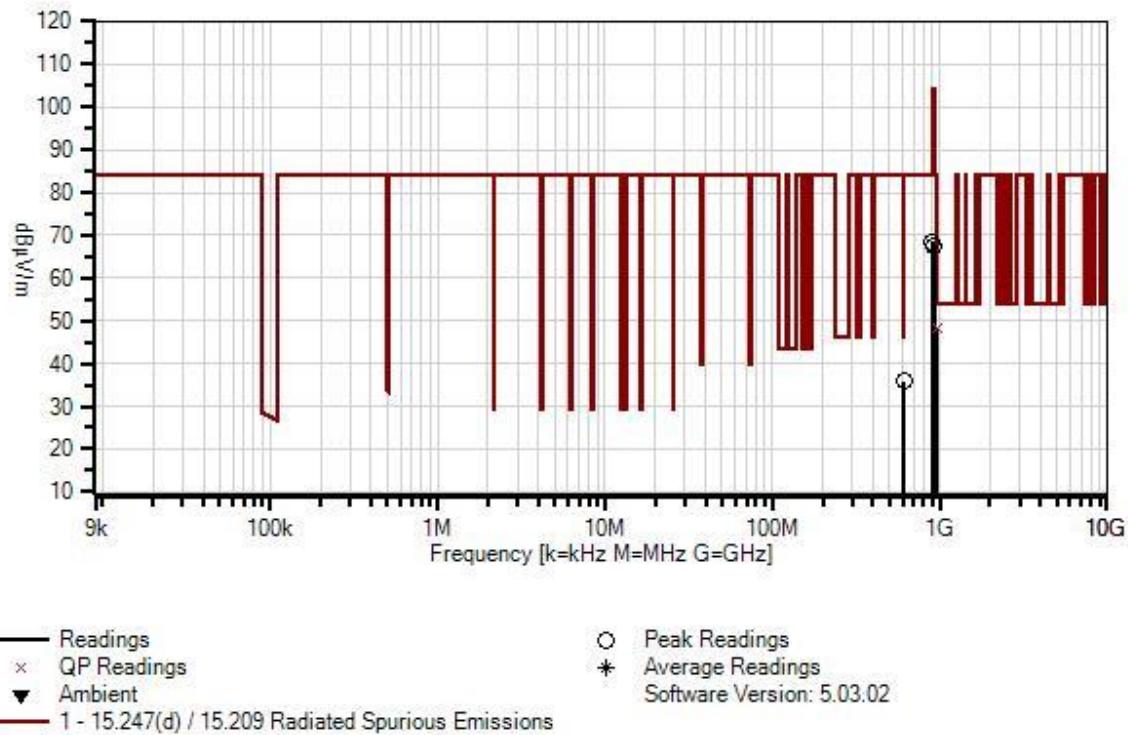
Test procedure: ANSI C63.10 (2013)

Frequency range investigated: Band Edges  
 Transmitter Frequency: 903, 910, 915 and 926.8 MHz

Temperature: 24°C

Relative Humidity: 36%

Itron, Inc. WO#: 98804 Sequence#: 7 Date: 7/26/2016  
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02307	Preamp	8447D	2/15/2016	2/15/2018
T2	AN01994	Biconilog Antenna	CBL6111C	3/11/2016	3/11/2018
T3	ANP05505	Attenuator	NAT-6	3/31/2016	3/31/2018
T4	ANP05360	Cable	RG214	12/1/2014	12/1/2016
T5	ANP05963	Cable	RG-214	2/15/2016	2/15/2018
T6	ANP06540	Cable	Heliax	10/29/2015	10/29/2017
T7	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	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6	T7		Table	dB $\mu$ V/m	dB $\mu$ V/m		
	MHz	dB $\mu$ V	dB	dB	dB	dB					Ant
1	960.010M	29.0	-27.1	+24.8	+6.3	+2.1	+0.0	48.2	54.0	-5.8	Horiz
	QP		+2.5	+0.4	+10.2						OOK Modulation, 10dBm output power
^	960.000M	32.1	-27.1	+24.8	+6.3	+2.1	+0.0	51.3	54.0	-2.7	Horiz
			+2.5	+0.4	+10.2						OOK Modulation, 10dBm output power
3	614.000M	22.8	-28.1	+20.8	+6.2	+1.6	+0.0	35.8	46.0	-10.2	Vert
			+2.1	+0.3	+10.1						OOK Modulation, 10dBm output power
4	902.000M	60.8	-27.4	+24.1	+6.2	+2.0	+0.0	68.4	84.2	-15.8	Horiz
			+2.4	+0.3	+0.0						OOK Modulation, 10dBm output
5	928.000M	59.3	-27.3	+24.4	+6.2	+2.1	+0.0	67.5	84.2	-16.7	Horiz
			+2.4	+0.4	+0.0						OOK Modulation, 10dBm output

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: 7/26/2016  
 Test Type: **Maximized Emissions** Time: 17:30:56  
 Tested by: Randal Clark Sequence#: 5  
 Software: EMITest 5.03.02

***Equipment Tested:***

Device	Manufacturer	Model #	S/N
Configuration 3			

***Support Equipment:***

Device	Manufacturer	Model #	S/N

***Test Conditions / Notes:***

The EUT is a transmitter operating within 902-928 MHz. The EUT is battery operated, fresh batteries installed.  
 The EUT has no IO ports. Equipment installed according to manufacturer specifications.  
 Equipment is configured for maximum output power with OOK modulation. Measurements include spurious emissions from hopping sequence on listed channels.

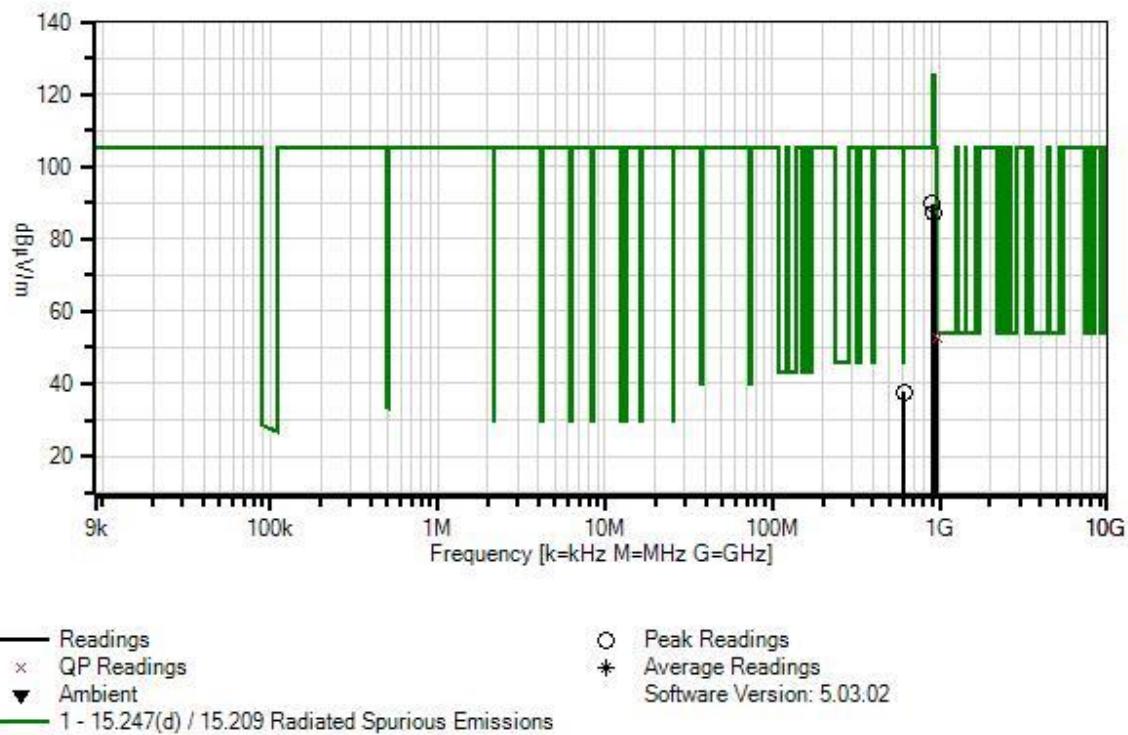
Test procedure: ANSI C63.10 (2013)

Frequency range investigated: Band Edges  
 Transmitter Frequency: 903 and 926.8 MHz.

Temperature: 24°C

Relative Humidity: 36%

Itron, Inc. WO#: 98804 Sequence#: 5 Date: 7/26/2016  
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



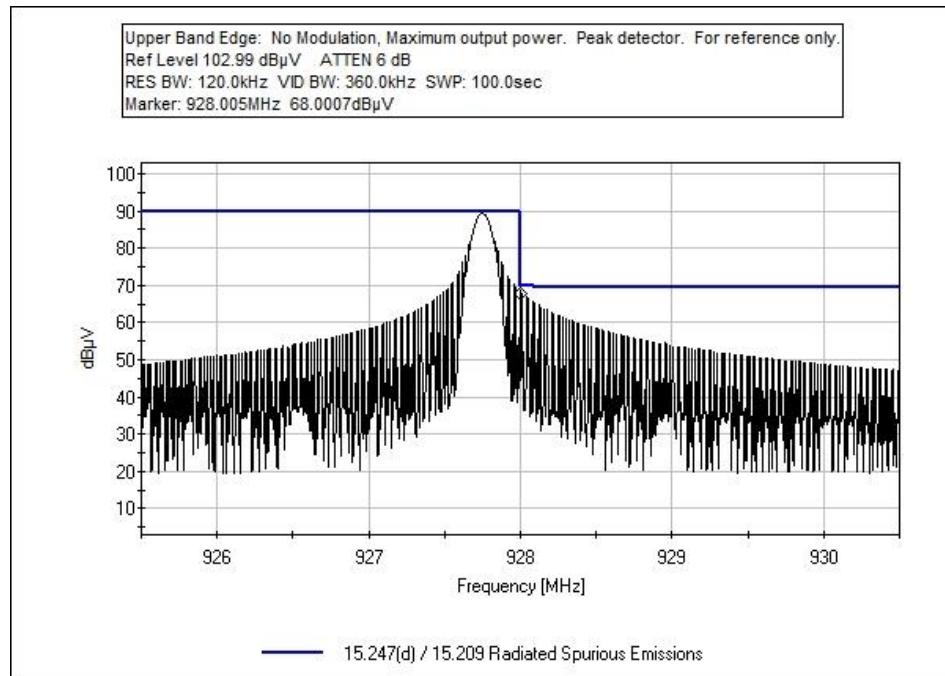
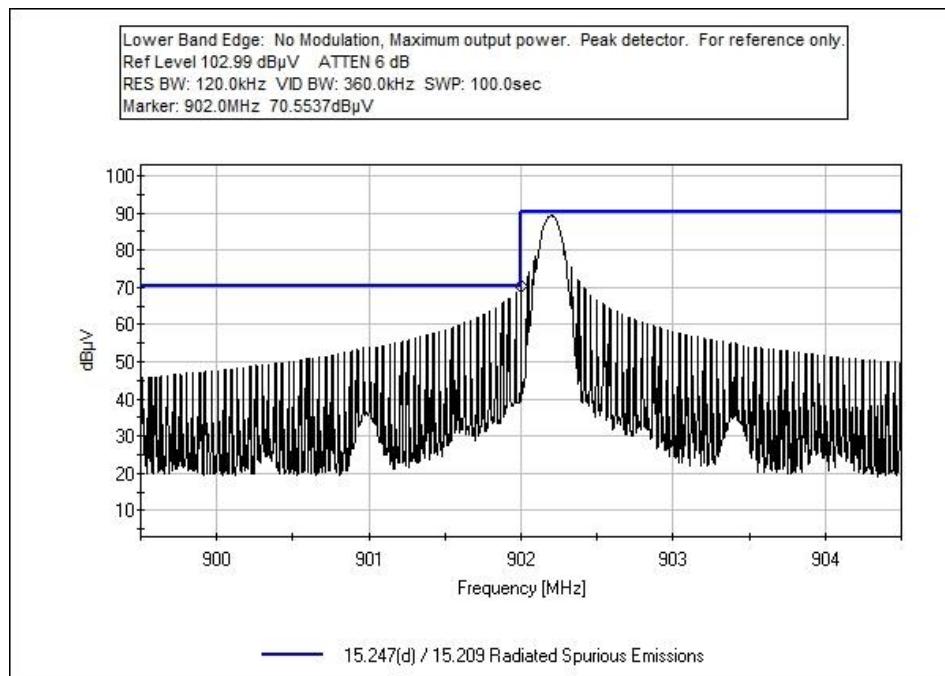
**Test Equipment:**

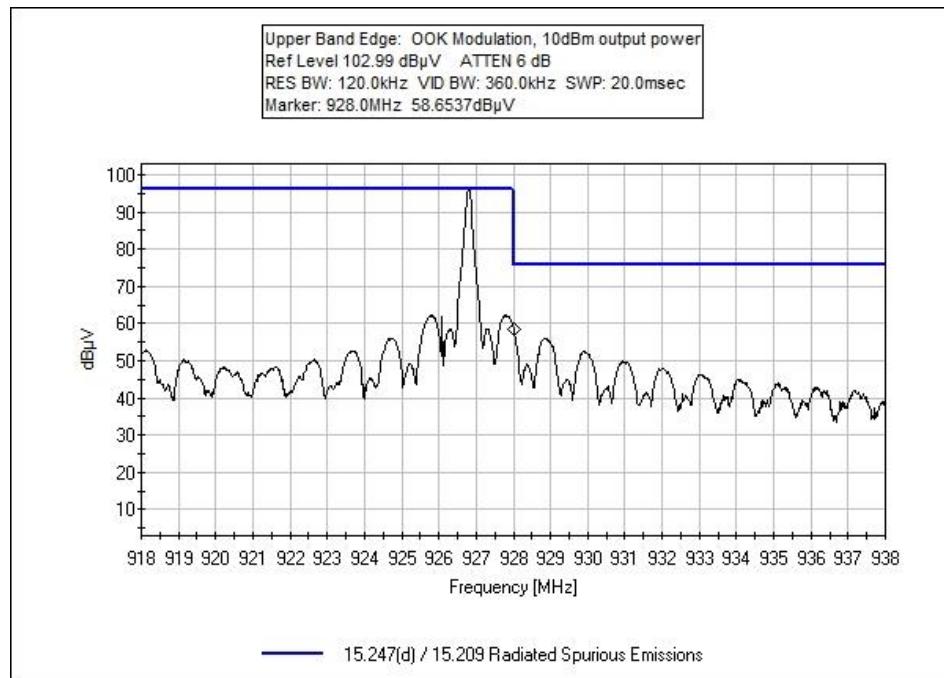
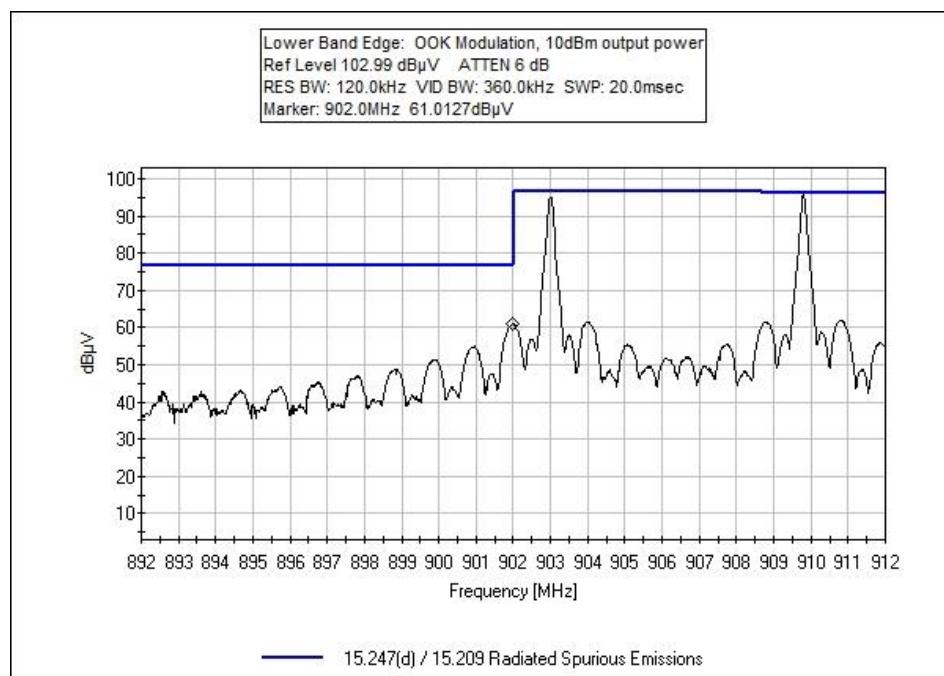
ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02307	Preamp	8447D	2/15/2016	2/15/2018
T2	AN01994	Biconilog Antenna	CBL6111C	3/11/2016	3/11/2018
T3	ANP05505	Attenuator	NAT-6	3/31/2016	3/31/2018
T4	ANP05360	Cable	RG214	12/1/2014	12/1/2016
T5	ANP05963	Cable	RG-214	2/15/2016	2/15/2018
T6	ANP06540	Cable	Heliax	10/29/2015	10/29/2017
T7	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

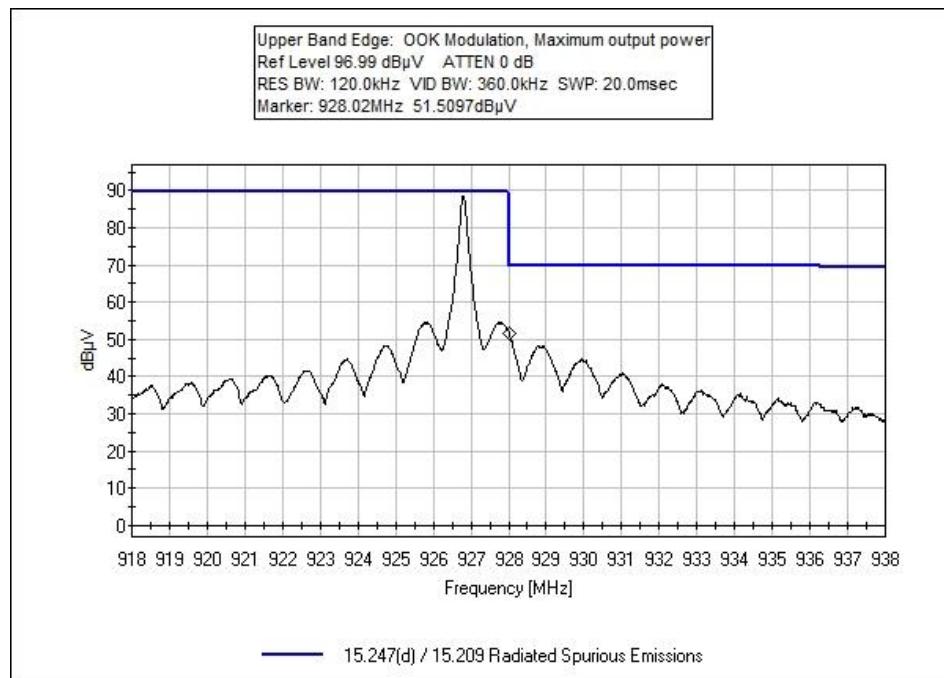
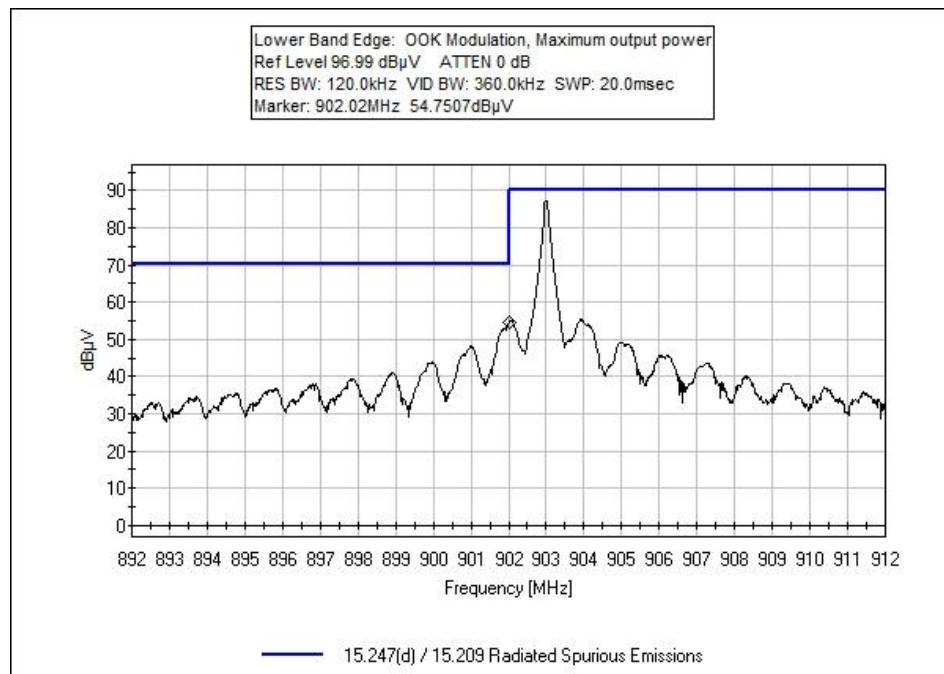
**Measurement Data:** Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6	T7		Table	dB $\mu$ V/m	dB $\mu$ V/m		
	MHz	dB $\mu$ V	dB	dB	dB	dB					Ant
1	960.017M	33.3	-27.1	+24.8	+6.3	+2.1	+0.0	52.5	54.0	-1.5	Horiz
	QP		+2.5	+0.4	+10.2						OOK Modulation, Max output power
^	960.000M	38.2	-27.1	+24.8	+6.3	+2.1	+0.0	57.4	54.0	+3.4	Horiz
			+2.5	+0.4	+10.2						OOK Modulation, Max output power
3	614.000M	24.7	-28.1	+20.8	+6.2	+1.6	+0.0	37.7	46.0	-8.3	Horiz
			+2.1	+0.3	+10.1						OOK Modulation, Max output power
4	928.020M	51.5	+0.0	+24.4	+6.2	+2.1	+0.0	87.0	105.3	-18.3	Horiz
			+2.4	+0.4	+0.0						OOK Modulation, Max output power
5	902.020M	54.8	+0.0	+24.1	+6.2	+2.0	+0.0	89.8	125.3	-35.5	Horiz
			+2.4	+0.3	+0.0						OOK Modulation, Max output power

## Band Edge Plots







**Test Setup Photo(s)**



500G It 30 parallel



500G lt 1000 setup



500G gt 1000 setup

## 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  $\text{dB}\mu\text{V}/\text{m}$ , the spectrum analyzer reading in  $\text{dB}\mu\text{V}$  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	( $\text{dB}\mu\text{V}$ )
+ Antenna Factor	( $\text{dB}/\text{m}$ )
+ Cable Loss	(dB)
- Distance Correction	(dB)
- Preamplifier Gain	(dB)
= Corrected Reading	( $\text{dB}\mu\text{V}/\text{m}$ )

## 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.