Itron, Inc.

TEST REPORT FOR

Gas Endpoint
Model: 500GB

Tested To The Following Standard:

FCC Part 15 Subpart C Section(s)

15.247
(FHSS 902-928 MHz)

Report No.: 99317-4

Date of issue: March 9, 2017

A2LA 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.

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ADMINISTRATIVE INFORMATION

Test Report Information

REPORT PREPARED FOR:

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

Representative: Jay Holcomb
Customer Reference Number: 110651

REPORT PREPARED BY:

Terri Rayle
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 99317

DATE OF EQUIPMENT RECEIPT: January 5, 2017
DATE(S) OF TESTING: January 5 -25 , 2017

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
Canyon Park, Bothell, WA 98021

Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.03.02

Site Registration & Accreditation Information

Location	CB #	TAIWAN	CANADA	FCC	JAPAN
Canyon Park, Bothell, WA	US0081	SL2-IN-E-1145R	3082C-1	US1022	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
None

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.	500GB	0100001747

Support Equipment:

Device	Manufacturer	Model #	S/N
None			

Configuration 2

Equipment Tested:

Device	Manufacturer	Model #	S/N
Gas Endpoint	Itron, Inc.	500GB	0100001746

Support Equipment:

Device	Manufacturer	Model #	S/N
None			

Configuration 3

Equipment Tested:

Device	Manufacturer	Model #	S/N
Gas Endpoint	Itron, Inc.	500GB	0100001753

Support Equipment:

Device	Manufacturer	Model #	S/N
None			

Configuration 4

Equipment Tested:

Device	Manufacturer	Model #	S/N
Gas Endpoint	Itron, Inc.	500GB	0100001743

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:	903-926.8MHz (OOK) 902.4-927.6MHz (FSK 150kbps) 902.2 to 927.75MHz (FSK 10kbps)
Number of Hopping Channels:	See supplemental report
Modulation Type(s):	OOK and FSK
Maximum Duty Cycle:	See supplemental report
Number of TX Chains:	2
Antenna Type(s) and Gain:	See supplemental report
Beamforming Type:	NA
Antenna Connection Type:	Integral
Nominal Input Voltage:	Battery
Firmware / Software used for Test:	See supplemental report

FCC Part 15 Subpart C

15.247(d) Radiated Emissions & Band Edge

Test Setup / Conditions / 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 #:	**99317**	Date:	1/25/2017
Test Type:	**Maximized Emissions**	Time:	16:03:45
Tested By:	Steven Pittsford	Sequence#:	4
Software:	EMITest 5.03.02		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

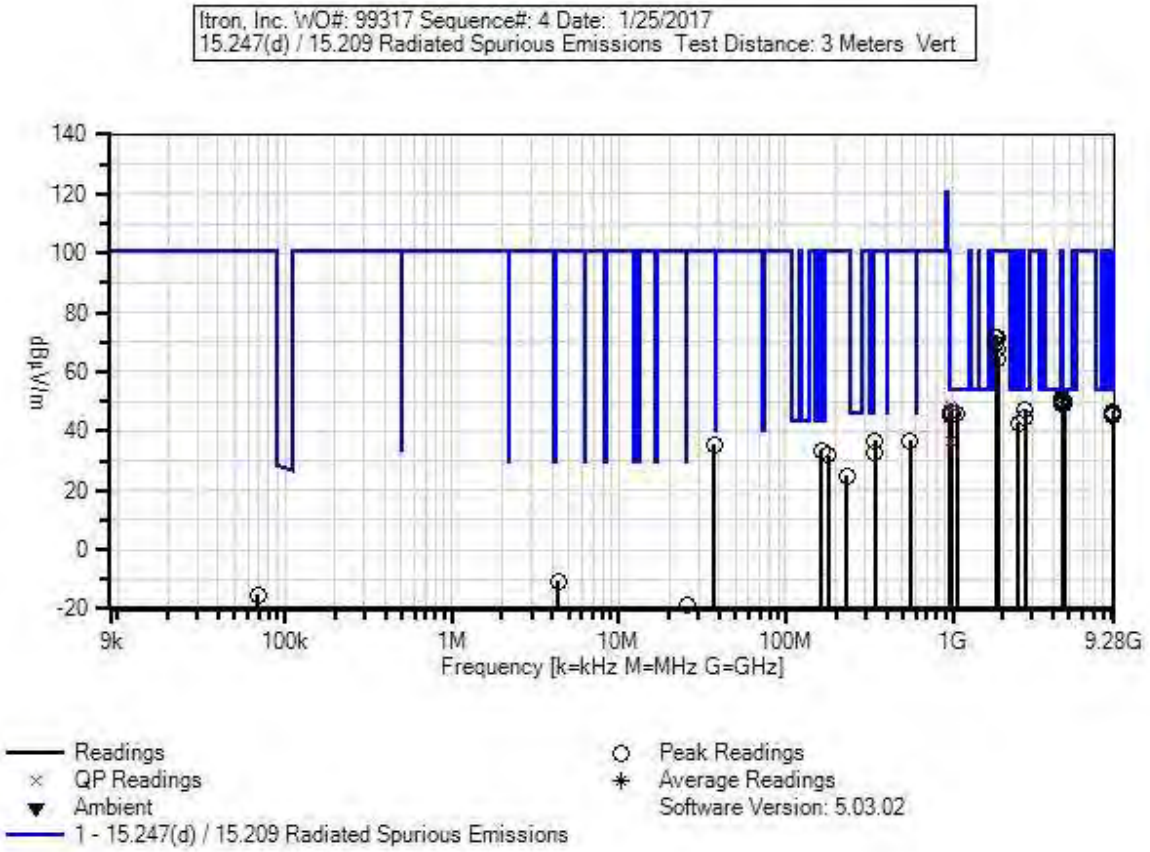
Test Conditions / Notes:

Temperature: 20-24ºC
Relative Humidity: 21-32%

Frequency range investigated: 9kHz-10GHz
Transmitter Frequency: 902.4-927.6MHz
Modulation: FSK 150kbps
Firmware Power Level: 3
EUT Firmware: App Version: 1.18.3.0, CSL Version: 2.22.1.0
Antenna Type: Internal Trace
Antenna Gain: -0.94dBi
Duty Cycle: Max

Test Method: ANSI C63.10 (2013)

The EUT is a transmitter operating hopping in band. The EUT is battery operated, fresh batteries installed.
The EUT has no IO ports. Parallel, Perpendicular, Ground parallel antenna polarities investigated below 30MHz, Horizontal and Vertical antenna polarities investigated above 30MHz, only worst case reported.
The EUT orientation selected based on manufacturer declared fixed installation orientation. Hopping operation selected as worst case based on previously collected data.


Itron, Inc. \WO#: 99317 Sequence#: 4 Date: 1/25/2017
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert
140
120
100
80
60
40
20
0
-20
dBµV/m
9k
100k
1M
10M
100M
1G
9.28G
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	ANP05360	Cable	RG214	11/30/2016	11/30/2018
T2	ANP05963	Cable	RG-214	2/15/2016	2/15/2018
T3	ANP06540	Cable	Heliax	10/29/2015	10/29/2017
T4	AN01816	Log Periodic Antenna-ANSI 63.5	3146	1/8/2016	1/8/2018
T5	AN02872	Spectrum Analyzer	E4440A	11/18/2015	11/18/2017
T6	AN01991	Biconilog Antenna	CBL6111C	3/11/2016	3/11/2018
T7	ANP05657	Attenuator	PE7004-6	12/22/2015	12/22/2017
T8	AN00052	Loop Antenna	6502	4/8/2016	4/8/2018
T9	AN03540	Preamp	83017A	4/30/2015	4/30/2017
T10	AN01467	Horn Antenna-ANSI C63.5 Calibration	3115	8/12/2015	8/12/2017
T11	ANP05305	Cable	ETSI-50T	2/15/2016	2/15/2018
T12	ANP06935	Cable	32026-29801-29801-18	3/11/2016	3/11/2018
T13	AN03170	High Pass Filter	HM1155-11SS	12/17/2015	12/17/2017

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	4576.029M Ave	47.0	+0.0 +0.0 -34.1 +0.4	+0.0 +0.0 +32.5	+0.9 +0.0 +4.2	+0.0 +0.0 +0.5	+0.0	51.4	54.0	-2.6	Vert
^	4576.029M	47.6	+0.0 +0.0 -34.1 +0.4	+0.0 +0.0 +32.5	+0.9 +0.0 +4.2	+0.0 +0.0 +0.5	+0.0	52.0	54.0	-2.0	Vert
3	4512.090M	46.7	+0.0 +0.0 -34.1 +0.4	+0.0 +0.0 +32.5	+0.9 +0.0 +4.2	+0.0 +0.0 +0.5	+0.0	51.1	54.0	-2.9	Vert
4	4549.930M	46.2	+0.0 +0.0 -34.1 +0.3	+0.0 +0.0 +32.5	+0.9 +0.0 +4.2	+0.0 +0.0 +0.5	+0.0	50.5	54.0	-3.5	Vert
5	4514.000M	45.3	+0.0 +0.0 -34.1 +0.4	+0.0 +0.0 +32.5	+0.9 +0.0 +4.2	+0.0 +0.0 +0.5	+0.0	49.7	54.0	-4.3	Horiz
6	4575.600M	45.1	+0.0 +0.0 -34.1 +0.4	+0.0 +0.0 +32.5	+0.9 +0.0 +4.2	+0.0 +0.0 +0.5	+0.0	49.5	54.0	-4.5	Vert

7	4546.000M	45.1	+0.0 +0.0 -34.1 +0.3	+0.0 +0.0 +32.5	+0.9 +0.0 +4.2	+0.0 +0.0 +0.5	+0.0	49.4	54.0	-4.6	Vert
8	4638.050M	44.7	+0.0 +0.0 -34.1 +0.5	+0.0 +0.0 +32.6	+0.9 +0.0 +4.3	+0.0 +0.0 +0.5	+0.0	49.4	54.0	-4.6	Vert
9	967.200M QP	20.3	+2.2 +0.0 +0.0 +0.0	+2.5 +0.0 +0.0	+0.4 +0.0 +0.0	+23.3 +0.0 +0.0	+0.0	48.7	54.0	-5.3	Vert
^	967.200M	24.5	+2.2 +0.0 +0.0 +0.0	+2.5 +0.0 +0.0	+0.4 +0.0 +0.0	+23.3 +0.0 +0.0	+0.0	52.9	54.0	-1.1	Vert
11	980.410M QP	19.1	+2.2 +0.0 +0.0 +0.0	+2.5 +0.0 +0.0	+0.4 +0.0 +0.0	+24.0 +0.0 +0.0	+0.0	48.2	54.0	-5.8	Vert
^	980.410M	23.1	+2.2 +0.0 +0.0 +0.0	+2.5 +0.0 +0.0	+0.4 +0.0 +0.0	+24.0 +0.0 +0.0	+0.0	52.2	54.0	-1.8	Vert
13	988.005M QP	18.5	+2.2 +0.0 +0.0 +0.0	+2.5 +0.0 +0.0	+0.4 +0.0 +0.0	+24.3 +0.0 +0.0	+0.0	47.9	54.0	-6.1	Vert
^	987.940M	21.8	+2.2 +0.0 +0.0 +0.0	+2.5 +0.0 +0.0	+0.4 +0.0 +0.0	+24.3 +0.0 +0.0	+0.0	51.2	54.0	-2.8	Vert
15	993.197M QP	18.2	+2.3 +0.0 +0.0 +0.0	+2.5 +0.0 +0.0	+0.4 +0.0 +0.0	+24.5 +0.0 +0.0	+0.0	47.9	54.0	-6.1	Vert
^	993.180M	21.8	+2.3 +0.0 +0.0 +0.0	+2.5 +0.0 +0.0	+0.4 +0.0 +0.0	+24.5 +0.0 +0.0	+0.0	51.5	54.0	-2.5	Vert
17	2710.000M	48.6	+0.0 +0.0 -34.5 +0.5	+0.0 +0.0 +28.6	+0.7 +0.0 +3.0	+0.0 +0.0 +0.4	+0.0	47.3	54.0	-6.7	Vert
18	9151.590M	35.1	+0.0 +0.0 -34.7 +0.2	+0.0 +0.0 +37.7	+1.4 +0.0 +6.1	+0.0 +0.0 +0.7	+0.0	46.5	54.0	-7.5	Horiz
19	1063.000M	45.9	+0.0 +0.0 -37.3 +10.7	+0.0 +0.0 +24.2	+0.4 +0.0 +1.9	+0.0 +0.0 +0.2	+0.0	46.0	54.0	-8.0	Vert

20	9099.880M	34.5	+0.0 +0.0 -34.7 +0.2	+0.0 +0.0 +37.7	+1.3 +0.0 +6.1	+0.0 +0.0 +0.7	+0.0	45.8	54.0	-8.2	Horiz
21	988.000M	16.3	+2.2 +0.0 +0.0 +0.0	+2.5 +0.0 +0.0	+0.4 +0.0 +0.0	+24.3 +0.0 +0.0	+0.0	45.7	54.0	-8.3	Horiz
22	9120.800M	34.1	+0.0 +0.0 -34.7 +0.2	+0.0 +0.0 +37.7	+1.3 +0.0 +6.1	+0.0 +0.0 +0.7	+0.0	45.4	54.0	-8.6	Vert
23	980.370M	15.9	+2.2 +0.0 +0.0 +0.0	+2.5 +0.0 +0.0	+0.4 +0.0 +0.0	+24.0 +0.0 +0.0	+0.0	45.0	54.0	-9.0	Horiz
24	2708.000M	46.1	+0.0 +0.0 -34.5 +0.5	+0.0 +0.0 +28.6	+0.7 +0.0 +3.0	+0.0 +0.0 +0.4	+0.0	44.8	54.0	-9.2	Horiz
25	162.430M	14.7	+0.7 +0.0 +0.0 +0.0	+1.4 +10.4 +0.0	+0.2 +6.0 +0.0	+0.0 +0.0 +0.0	+0.0	33.4	43.5	-10.1	Horiz
26	963.110M QP	8.3	+2.2 +0.0 +0.0 +0.0	+2.5 +0.0 +0.0	+0.4 +0.0 +0.0	+23.0 +0.0 +0.0	+0.0	36.4	54.0	-17.6	Vert
^	963.110M	25.8	+2.2 +0.0 +0.0 +0.0	+2.5 +0.0 +0.0	+0.4 +0.0 +0.0	+23.0 +0.0 +0.0	+0.0	53.9	54.0	-0.1	Vert
28	1833.000M	76.3	+0.0 +0.0 -35.1 +0.3	+0.0 +0.0 +26.9	+0.5 +0.0 +2.5	+0.0 +0.0 +0.3	+0.0	71.7	100.9	-29.2	Horiz
29	1819.000M	75.7	+0.0 +0.0 -35.1 +0.4	+0.0 +0.0 +26.9	+0.5 +0.0 +2.5	+0.0 +0.0 +0.3	+0.0	71.2	100.9	-29.7	Vert
30	1805.000M	73.9	+0.0 +0.0 -35.1 +0.4	+0.0 +0.0 +26.8	+0.5 +0.0 +2.5	+0.0 +0.0 +0.3	+0.0	69.3	100.9	-31.6	Vert
31	1831.000M	72.2	+0.0 +0.0 -35.1 +0.4	+0.0 +0.0 +26.9	+0.5 +0.0 +2.5	+0.0 +0.0 +0.3	+0.0	67.7	100.9	-33.2	Vert
32	1855.000M	69.0	+0.0 +0.0 -35.1 +0.3	+0.0 +0.0 +27.0	+0.5 +0.0 +2.5	+0.0 +0.0 +0.3	+0.0	64.5	100.9	-36.4	Vert

33	957.940M	18.5	+2.2 +0.0 +0.0 +0.0	+2.5 +0.0 +0.0	+0.4 +0.0 +0.0	+22.7 +0.0 +0.0	+0.0	46.3	100.9	-54.6	Horiz
34	2467.000M	45.1	+0.0 +0.0 -34.5 +0.4	+0.0 +0.0 +27.7	+0.6 +0.0 +2.9	+0.0 +0.0 +0.4	+0.0	42.6	100.9	-58.3	Vert
35	342.200M	19.8	+1.2 +0.0 +0.0 +0.0	+1.7 +0.0 +0.0	+0.2 +0.0 +0.0	+13.9 +0.0 +0.0	+0.0	36.8	100.9	-64.1	Horiz
36	557.848M	14.6	+1.5 +0.0 +0.0 +0.0	+2.0 +0.0 +0.0	+0.3 +0.0 +0.0	+18.3 +0.0 +0.0	+0.0	36.7	100.9	-64.2	Vert
37	37.480M	13.0	+0.3 +0.0 +0.0 +0.0	+0.5 +15.7 +0.0	+0.1 +6.0 +0.0	+0.0 +0.0 +0.0	+0.0	35.6	100.9	-65.3	Horiz
38	343.180M	16.0	+1.2 +0.0 +0.0 +0.0	+1.7 +0.0 +0.0	+0.2 +0.0 +0.0	+13.9 +0.0 +0.0	+0.0	33.0	100.9	-67.9	Vert
39	179.090M	14.4	+0.8 +0.0 +0.0 +0.0	+1.4 +9.2 +0.0	+0.2 +6.0 +0.0	+0.0 +0.0 +0.0	+0.0	32.0	100.9	-68.9	Horiz
40	230.239M	12.0	+0.9 +0.0 +0.0 +0.0	+1.4 +0.0 +0.0	+0.2 +0.0 +0.0	+10.5 +0.0 +0.0	+0.0	25.0	100.9	-75.9	Vert
41	4.358M	19.9	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0	+0.0 +0.0 +0.1	+0.0 +9.4 +0.0	-40.0	-10.6	100.9	-111.5	Para
42	69.000k	54.7	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0	+0.0 +0.0 +0.0	+0.0 +10.2 +0.0	-80.0	-15.1	100.9	-116.0	Para
43	26.041M	14.1	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0	+0.0 +0.0 +0.3	+0.0 +6.7 +0.0	-40.0	-18.9	100.9	-119.8	Para

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 #:	**99317**	Date:	1/25/2017
Test Type:	**Maximized Emissions**	Time:	16:19:01
Tested By:	Steven Pittsford	Sequence#:	3
Software:	EMITest 5.03.02		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

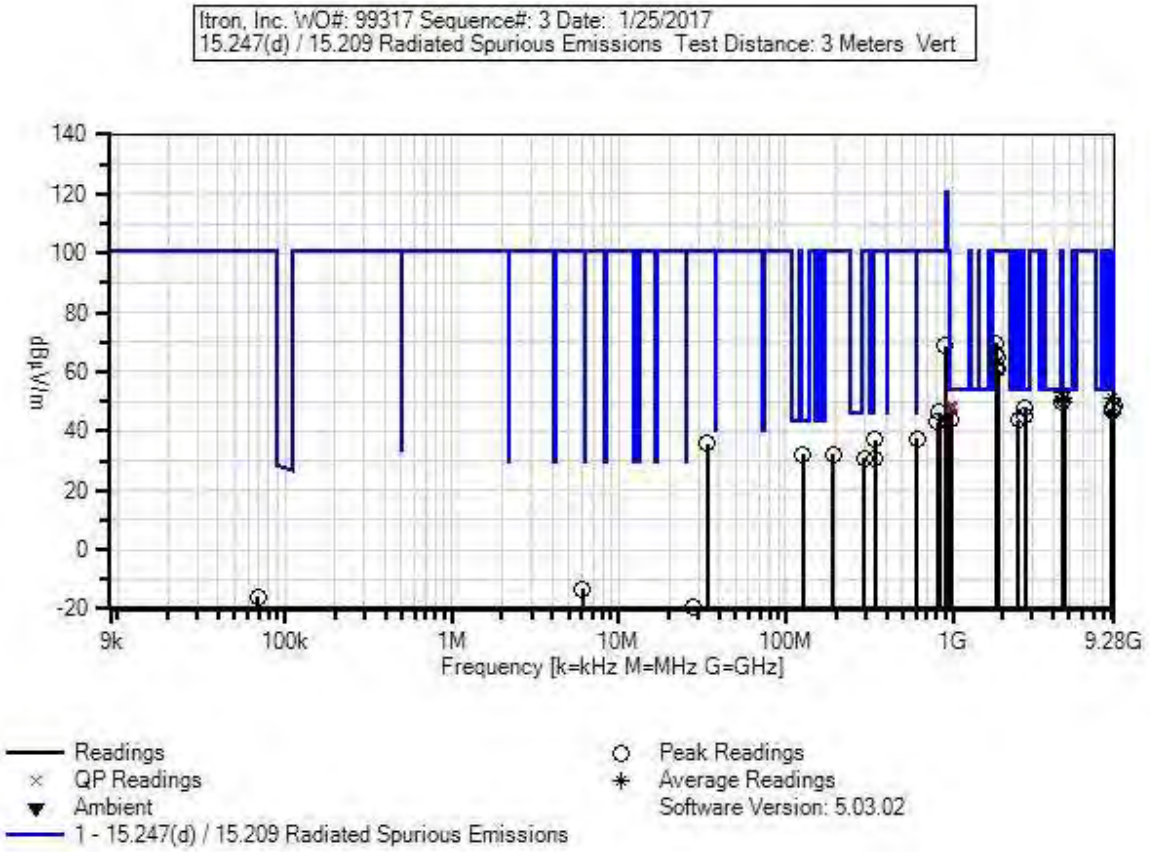
Test Conditions / Notes:

Temperature: 20-24ºC
Relative Humidity: 21-32%

Frequency range investigated: 9kHz-10GHz
Transmitter Frequency: 902.2 to 927.75 MHz
Modulation: FSK 10kbps
Firmware Power Level: 3
EUT Firmware: App Version: 1.18.3.0, CSL Version: 2.22.1.0
Antenna Type: Internal Trace
Antenna Gain: -0.94dBi
Duty Cycle: Max

Test Method: ANSI C63.10 (2013)

The EUT is a transmitter operating hopping in band. The EUT is battery operated, fresh batteries installed.
The EUT has no IO ports. Parallel, Perpendicular, Ground parallel antenna polarities investigated below 30MHz, Horizontal and Vertical antenna polarities investigated above 30MHz, only worst case reported.
The EUT orientation selected based on manufacturer declared fixed installation orientation. Hopping operation selected as worst case based on previously collected data.


Itron, Inc. WO#: 99317 Sequence#: 3 Date: 1/25/2017
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert
140
120
100
80
60
40
20
0
-20
dBµV/m
9k
100k
1M
10M
100M
1G
9.28G
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	ANP05360	Cable	RG214	11/30/2016	11/30/2018
T2	ANP05963	Cable	RG-214	2/15/2016	2/15/2018
T3	ANP06540	Cable	Heliax	10/29/2015	10/29/2017
T4	AN01816	Log Periodic Antenna-ANSI 63.5	3146	1/8/2016	1/8/2018
T5	AN02872	Spectrum Analyzer	E4440A	11/18/2015	11/18/2017
T6	AN01991	Biconilog Antenna	CBL6111C	3/11/2016	3/11/2018
T7	ANP05657	Attenuator	PE7004-6	12/22/2015	12/22/2017
T8	AN00052	Loop Antenna	6502	4/8/2016	4/8/2018
T9	AN03540	Preamp	83017A	4/30/2015	4/30/2017
T10	AN01467	Horn Antenna-ANSI C63.5 Calibration	3115	8/12/2015	8/12/2017
T11	ANP05305	Cable	ETSI-50T	2/15/2016	2/15/2018
T12	ANP06935	Cable	32026-29801-29801-18	3/11/2016	3/11/2018
T13	AN03170	High Pass Filter	HM1155-11SS	12/17/2015	12/17/2017

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	4510.958M Ave	48.9	+0.0 +0.0 -34.1 +0.4	+0.0 +0.0 +32.5	+0.9 +0.0 +4.2	+0.0 +0.0 +0.5	+0.0	53.3	54.0	-0.7	Vert
^	4510.958M	49.6	+0.0 +0.0 -34.1 +0.4	+0.0 +0.0 +32.5	+0.9 +0.0 +4.2	+0.0 +0.0 +0.5	+0.0	54.0	54.0	+0.0	Vert
3	9150.000M Ave	39.9	+0.0 +0.0 -34.7 +0.2	+0.0 +0.0 +37.7	+1.4 +0.0 +6.1	+0.0 +0.0 +0.7	+0.0	51.3	54.0	-2.7	Vert
^	9150.000M	40.5	+0.0 +0.0 -34.7 +0.2	+0.0 +0.0 +37.7	+1.4 +0.0 +6.1	+0.0 +0.0 +0.7	+0.0	51.9	54.0	-2.1	Vert
5	4574.879M Ave	46.8	+0.0 +0.0 -34.1 +0.4	+0.0 +0.0 +32.5	+0.9 +0.0 +4.2	+0.0 +0.0 +0.5	+0.0	51.2	54.0	-2.8	Vert
^	4574.879M	48.0	+0.0 +0.0 -34.1 +0.4	+0.0 +0.0 +32.5	+0.9 +0.0 +4.2	+0.0 +0.0 +0.5	+0.0	52.4	54.0	-1.6	Vert

7	4550.089M Ave	46.0	+0.0 +0.0 -34.1 +0.3	+0.0 +0.0 +32.5	+0.9 +0.0 +4.2	+0.0 +0.0 +0.5	+0.0	50.3	54.0	-3.7	Vert
^	4550.089M	47.2	+0.0 +0.0 -34.1 +0.3	+0.0 +0.0 +32.5	+0.9 +0.0 +4.2	+0.0 +0.0 +0.5	+0.0	51.5	54.0	-2.5	Vert
9	4638.625M Ave	44.9	+0.0 +0.0 -34.1 +0.5	+0.0 +0.0 +32.6	+0.9 +0.0 +4.3	+0.0 +0.0 +0.5	+0.0	49.6	54.0	-4.4	Vert
^	4638.625M	45.4	+0.0 +0.0 -34.1 +0.5	+0.0 +0.0 +32.6	+0.9 +0.0 +4.3	+0.0 +0.0 +0.5	+0.0	50.1	54.0	-3.9	Vert
11	4510.000M	45.2	+0.0 +0.0 -34.1 +0.4	+0.0 +0.0 +32.5	+0.9 +0.0 +4.2	+0.0 +0.0 +0.5	+0.0	49.6	54.0	-4.4	Horiz
12	980.200M QP	19.4	+2.2 +0.0 +0.0 +0.0	+2.5 +0.0 +0.0	+0.4 +0.0 +0.0	+24.0 +0.0 +0.0	+0.0	48.5	54.0	-5.5	Vert
^	980.200M	23.3	+2.2 +0.0 +0.0 +0.0	+2.5 +0.0 +0.0	+0.4 +0.0 +0.0	+24.0 +0.0 +0.0	+0.0	52.4	54.0	-1.6	Vert
14	988.000M QP	18.9	+2.2 +0.0 +0.0 +0.0	+2.5 +0.0 +0.0	+0.4 +0.0 +0.0	+24.3 +0.0 +0.0	+0.0	48.3	54.0	-5.7	Vert
^	988.000M	22.6	+2.2 +0.0 +0.0 +0.0	+2.5 +0.0 +0.0	+0.4 +0.0 +0.0	+24.3 +0.0 +0.0	+0.0	52.0	54.0	-2.0	Vert
16	962.000M QP	20.1	+2.2 +0.0 +0.0 +0.0	+2.5 +0.0 +0.0	+0.4 +0.0 +0.0	+23.0 +0.0 +0.0	+0.0	48.2	54.0	-5.8	Vert
^	962.000M	23.4	+2.2 +0.0 +0.0 +0.0	+2.5 +0.0 +0.0	+0.4 +0.0 +0.0	+23.0 +0.0 +0.0	+0.0	51.5	54.0	-2.5	Vert
18	966.995M QP	19.5	+2.2 +0.0 +0.0 +0.0	+2.5 +0.0 +0.0	+0.4 +0.0 +0.0	+23.3 +0.0 +0.0	+0.0	47.9	54.0	-6.1	Vert
^	967.080M	23.8	+2.2 +0.0 +0.0 +0.0	+2.5 +0.0 +0.0	+0.4 +0.0 +0.0	+23.3 +0.0 +0.0	+0.0	52.2	54.0	-1.8	Vert

20	993.003M QP	18.1	+2.3 +0.0 +0.0 +0.0	+2.5 +0.0 +0.0	+0.4 +0.0 +0.0	+24.5 +0.0 +0.0	+0.0	47.8	54.0	-6.2	Vert
^	993.000M	21.3	+2.3 +0.0 +0.0 +0.0	+2.5 +0.0 +0.0	+0.4 +0.0 +0.0	+24.5 +0.0 +0.0	+0.0	51.0	54.0	-3.0	Vert
22	9022.500M	36.3	+0.0 +0.0 -34.6 +0.2	+0.0 +0.0 +37.8	+1.3 +0.0 +6.0	+0.0 +0.0 +0.7	+0.0	47.7	54.0	-6.3	Vert
23	2728.000M	48.8	+0.0 +0.0 -34.5 +0.5	+0.0 +0.0 +28.7	+0.7 +0.0 +3.0	+0.0 +0.0 +0.4	+0.0	47.6	54.0	-6.4	Vert
24	9099.500M	36.1	+0.0 +0.0 -34.7 +0.2	+0.0 +0.0 +37.7	+1.3 +0.0 +6.1	+0.0 +0.0 +0.7	+0.0	47.4	54.0	-6.6	Vert
25	9100.030M Ave	34.5	+0.0 +0.0 -34.7 +0.2	+0.0 +0.0 +37.7	+1.3 +0.0 +6.1	+0.0 +0.0 +0.7	+0.0	45.8	54.0	-8.2	Vert
^	9100.030M	37.0	+0.0 +0.0 -34.7 +0.2	+0.0 +0.0 +37.7	+1.3 +0.0 +6.1	+0.0 +0.0 +0.7	+0.0	48.3	54.0	-5.7	Vert
27	2728.000M	46.6	+0.0 +0.0 -34.5 +0.5	+0.0 +0.0 +28.7	+0.7 +0.0 +3.0	+0.0 +0.0 +0.4	+0.0	45.4	54.0	-8.6	Horiz
28	609.600M	15.1	+1.6 +0.0 +0.0 +0.0	+2.1 +0.0 +0.0	+0.3 +0.0 +0.0	+18.3 +0.0 +0.0	+0.0	37.4	46.0	-8.6	Horiz
29	980.000M	15.0	+2.2 +0.0 +0.0 +0.0	+2.5 +0.0 +0.0	+0.4 +0.0 +0.0	+24.0 +0.0 +0.0	+0.0	44.1	54.0	-9.9	Horiz
30	127.070M	12.6	+0.6 +0.0 +0.0 +0.0	+1.2 +11.7 +0.0	+0.1 +6.0 +0.0	+0.0 +0.0 +0.0	+0.0	32.2	43.5	-11.3	Vert
31	1801.000M	74.3	+0.0 +0.0 -35.1 +0.4	+0.0 +0.0 +26.8	+0.5 +0.0 +2.5	+0.0 +0.0 +0.3	+0.0	69.7	100.9	-31.2	Vert
32	896.400M	41.3	+2.1 +0.0 +0.0 +0.0	+2.4 +0.0 +0.0	+0.3 +0.0 +0.0	+22.6 +0.0 +0.0	+0.0	68.7	100.9	-32.2	Vert

33	1820.100M	70.7	+0.0 +0.0 -35.1 +0.4	+0.0 +0.0 +26.9	+0.5 +0.0 +2.5	+0.0 +0.0 +0.3	+0.0	66.2	100.9	-34.7	Vert
34	1829.800M	69.2	+0.0 +0.0 -35.1 +0.4	+0.0 +0.0 +26.9	+0.5 +0.0 +2.5	+0.0 +0.0 +0.3	+0.0	64.7	100.9	-36.2	Vert
35	1801.000M	65.8	+0.0 +0.0 -35.1 +0.4	+0.0 +0.0 +26.8	+0.5 +0.0 +2.5	+0.0 +0.0 +0.3	+0.0	61.2	100.9	-39.7	Horiz
36	1855.400M	65.1	+0.0 +0.0 -35.1 +0.3	+0.0 +0.0 +27.1	+0.5 +0.0 +2.5	+0.0 +0.0 +0.3	+0.0	60.7	100.9	-40.2	Vert
37	9277.500M	36.9	+0.0 +0.0 -34.8 +0.2	+0.0 +0.0 +37.6	+1.4 +0.0 +6.2	+0.0 +0.0 +0.7	+0.0	48.2	100.9	-52.7	Vert
38	831.800M	20.4	+2.0 +0.0 +0.0 +0.0	+2.3 +0.0 +0.0	+0.3 +0.0 +0.0	+21.3 +0.0 +0.0	+0.0	46.3	100.9	-54.6	Horiz
39	2467.000M	46.4	+0.0 +0.0 -34.5 +0.4	+0.0 +0.0 +27.7	+0.6 +0.0 +2.9	+0.0 +0.0 +0.4	+0.0	43.9	100.9	-57.0	Vert
40	810.700M	17.8	+1.9 +0.0 +0.0 +0.0	+2.3 +0.0 +0.0	+0.3 +0.0 +0.0	+20.8 +0.0 +0.0	+0.0	43.1	100.9	-57.8	Horiz
41	340.000M	20.3	+1.1 +0.0 +0.0 +0.0	+1.7 +0.0 +0.0	+0.2 +0.0 +0.0	+13.9 +0.0 +0.0	+0.0	37.2	100.9	-63.7	Horiz
42	33.740M	11.8	+0.3 +0.0 +0.0 +0.0	+0.4 +17.3 +0.0	+0.0 +6.0 +0.0	+0.0 +0.0 +0.0	+0.0	35.8	100.9	-65.1	Vert
43	192.180M	14.7	+0.8 +0.0 +0.0 +0.0	+1.4 +9.0 +0.0	+0.2 +6.0 +0.0	+0.0 +0.0 +0.0	+0.0	32.1	100.9	-68.8	Horiz

44	341.800M	14.1	+1.1 +0.0 +0.0 +0.0	+1.7 +0.0 +0.0	+0.2 +0.0 +0.0	+13.9 +0.0 +0.0	+0.0	31.0	100.9	-69.9	Horiz
45	294.100M	14.6	+1.1 +0.0 +0.0 +0.0	+1.6 +0.0 +0.0	+0.2 +0.0 +0.0	+13.3 +0.0 +0.0	+0.0	30.8	100.9	-70.1	Vert
46	6.037M	17.3	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0	+0.0 +0.0 +0.1	+0.0 +9.3 +0.0	-40.0	-13.3	100.9	-114.2	Para
47	69.000k	54.0	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0	+0.0 +0.0 +0.0	+0.0 +10.2 +0.0	-80.0	-15.8	100.9	-116.7	Para
48	27.901M	14.5	+0.0 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0	+0.0 +0.0 +0.3	+0.0 +6.2 +0.0	-40.0	-19.0	100.9	-119.9	Para

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 #:	**99317**	Date:	1/9/2017
Test Type:	**Maximized Emissions**	Time:	09:56:37
Tested By:	Steven Pittsford	Sequence#:	3
Software:	EMITest 5.03.02		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 3			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 3			

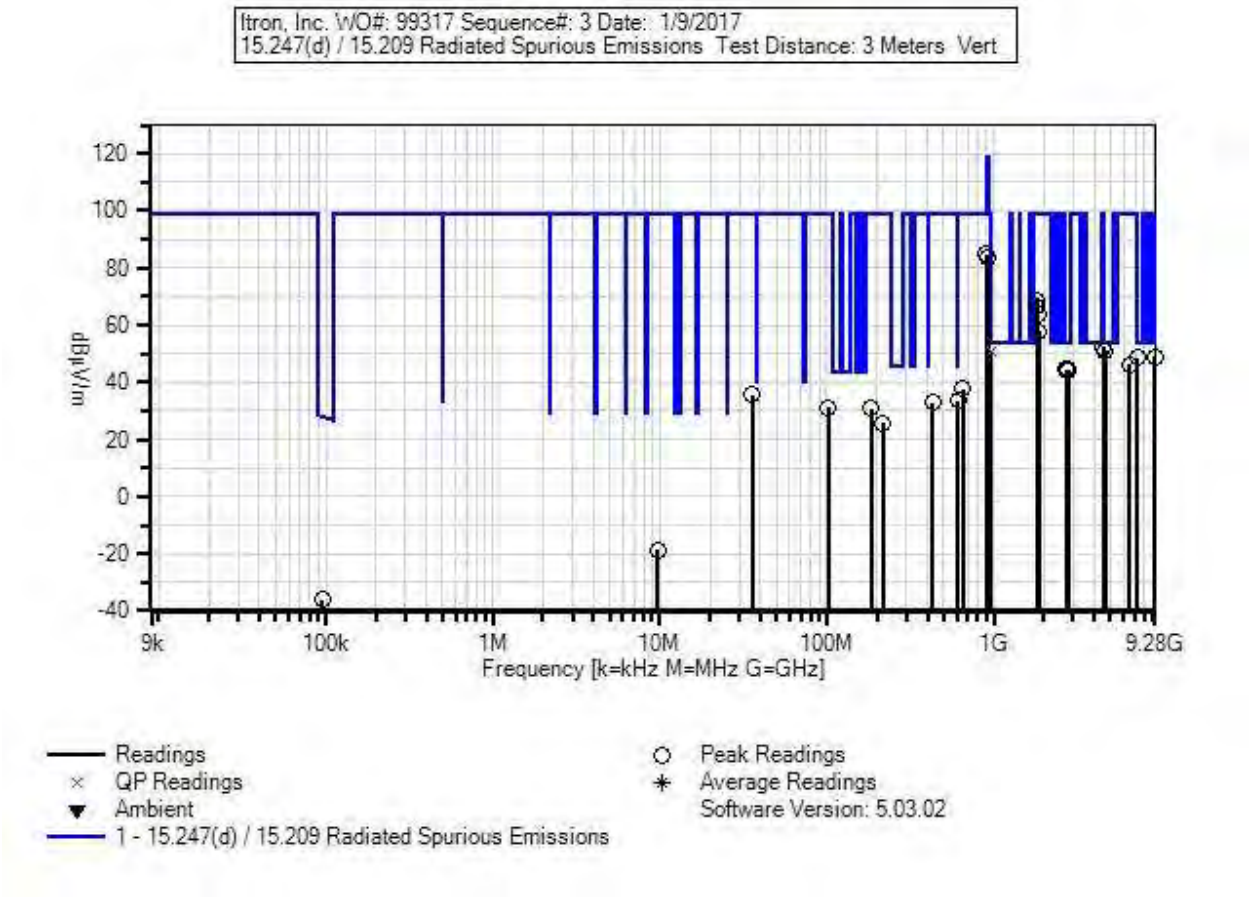
Test Conditions / Notes:

Temperature: 20-24ºC
Relative Humidity: 21-32%

Frequency range investigated: 9kHz-10GHz
Transmitter Frequency: 903-926.8MHz
Modulation: OOK
Firmware Power Level: 3
EUT Firmware: App Version: 1.18.3.0, CSL Version: 2.22.1.0
Antenna Type: Internal Trace
Antenna Gain: -0.94dBi
Duty Cycle: Max

Test Method: ANSI C63.10 (2013)

The EUT is a transmitter operating hopping in band. The EUT is battery operated, fresh batteries installed.
The EUT has no IO ports. Parallel, Perpendicular, Ground parallel antenna polarities investigated below 30MHz, Horizontal and Vertical antenna polarities investigated above 30MHz, only worst case reported.
The EUT orientation selected based on manufacturer declared fixed installation orientation. Hopping operation selected as worst case based on previously collected data.


Itron, Inc. \rO#: 99317 Sequence#: 3 Date: 1/9/2017
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert
120
100
80
60
40
20
0
-20
-40
dBµV/m
9k
100k
1M
10M
100M
1G
9.28G
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	ANP05360	Cable	RG214	11/30/2016	11/30/2018
T2	ANP05963	Cable	RG-214	2/15/2016	2/15/2018
T3	ANP06540	Cable	Heliax	10/29/2015	10/29/2017
T4	AN01816	Log Periodic Antenna-ANSI 63.5	3146	1/8/2016	1/8/2018
T5	AN02872	Spectrum Analyzer	E4440A	11/18/2015	11/18/2017
T6	AN01991	Biconilog Antenna	CBL6111C	3/11/2016	3/11/2018
T7	ANP05657	Attenuator	PE7004-6	12/22/2015	12/22/2017
T8	AN00052	Loop Antenna	6502	4/8/2016	4/8/2018
T9	AN03540	Preamp	83017A	4/30/2015	4/30/2017
T10	AN01467	Horn Antenna-ANSI C63.5 Calibration	3115	8/12/2015	8/12/2017
T11	ANP05305	Cable	ETSI-50T	2/15/2016	2/15/2018
T12	ANP06935	Cable	32026-29801-29801-18	3/11/2016	3/11/2018
T13	AN03170	High Pass Filter	HM1155-11SS	12/17/2015	12/17/2017

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	4515.002M	48.0	+0.0 +0.0 -34.1 +0.4	+0.0 +0.0 +32.5	+0.9 +0.0 +4.2	+0.0 +0.0 +0.5	+0.0	52.4	54.0	-1.6	Vert 161
2	4549.850M	48.0	+0.0 +0.0 -34.1 +0.3	+0.0 +0.0 +32.5	+0.9 +0.0 +4.2	+0.0 +0.0 +0.5	+0.0	52.3	54.0	-1.7	Vert 161
3	4634.094M	46.4	+0.0 +0.0 -34.1 +0.5	+0.0 +0.0 +32.6	+0.9 +0.0 +4.3	+0.0 +0.0 +0.5	+0.0	51.1	54.0	-2.9	Vert 157
4	4575.070M	46.5	+0.0 +0.0 -34.1 +0.4	+0.0 +0.0 +32.5	+0.9 +0.0 +4.2	+0.0 +0.0 +0.5	+0.0	50.9	54.0	-3.1	Vert 161
5	960.026M QP	22.8	+2.2 +0.0 +0.0 +0.0	+2.5 +0.0 +0.0	+0.4 +0.0 +0.0	+22.8 +0.0 +0.0	+0.0 100	50.7	54.0	-3.3	Horiz 145
^	960.000M	28.1	+2.2 +0.0 +0.0 +0.0	+2.5 +0.0 +0.0	+0.4 +0.0 +0.0	+22.8 +0.0 +0.0	+0.0 100	56.0	54.0	+2.0	Horiz 145

7	9165.000M	37.5	+0.0 +0.0 -34.7 +0.2	+0.0 +0.0 +37.7	+1.4 +0.0 +6.1	+0.0 +0.0 +0.7	+0.0 360	48.9	54.0	-5.1	Vert 144
8	7268.000M	40.6	+0.0 +0.0 -34.6 +0.3	+0.0 +0.0 +35.9	+1.2 +0.0 +4.6	+0.0 +0.0 +0.6	+0.0 11	48.6	54.0	-5.4	Vert 144
9	2730.000M	45.8	+0.0 +0.0 -34.5 +0.5	+0.0 +0.0 +28.7	+0.7 +0.0 +3.0	+0.0 +0.0 +0.4	+0.0 14	44.6	54.0	-9.4	Vert 144
10	2709.400M	45.9	+0.0 +0.0 -34.5 +0.5	+0.0 +0.0 +28.6	+0.7 +0.0 +3.0	+0.0 +0.0 +0.4	+0.0 14	44.6	54.0	-9.4	Vert 144
11	2780.600M	45.5	+0.0 +0.0 -34.5 +0.4	+0.0 +0.0 +28.9	+0.7 +0.0 +3.0	+0.0 +0.0 +0.4	+0.0 14	44.4	54.0	-9.6	Vert 144
12	2745.200M	45.3	+0.0 +0.0 -34.5 +0.4	+0.0 +0.0 +28.8	+0.7 +0.0 +3.0	+0.0 +0.0 +0.4	+0.0 14	44.1	54.0	-9.9	Vert 144
13	614.000M	11.2	+1.6 +0.0 +0.0 +0.0	+2.1 +0.0 +0.0	+0.3 +0.0 +0.0	+18.5 +0.0 +0.0	+0.0 100	33.7	46.0	-12.3	Horiz 145
14	902.000M	57.3	+2.1 +0.0 +0.0 +0.0	+2.4 +0.0 +0.0	+0.3 +0.0 +0.0	+22.6 +0.0 +0.0	+0.0 100	84.7	99.0	-14.3	Horiz 145
15	928.000M	56.6	+2.1 +0.0 +0.0 +0.0	+2.4 +0.0 +0.0	+0.4 +0.0 +0.0	+22.4 +0.0 +0.0	+0.0 100	83.9	99.0	-15.1	Horiz 145
16	1805.950M	73.4	+0.0 +0.0 -35.1 +0.4	+0.0 +0.0 +26.8	+0.5 +0.0 +2.5	+0.0 +0.0 +0.3	+0.0 315	68.8	99.0	-30.2	Horiz 146
17	1819.950M	70.7	+0.0 +0.0 -35.1 +0.4	+0.0 +0.0 +26.9	+0.5 +0.0 +2.5	+0.0 +0.0 +0.3	+0.0 315	66.2	99.0	-32.8	Horiz 146
18	1829.950M	68.6	+0.0 +0.0 -35.1 +0.4	+0.0 +0.0 +26.9	+0.5 +0.0 +2.5	+0.0 +0.0 +0.3	+0.0 315	64.1	99.0	-34.9	Horiz 146
19	1853.600M	62.4	+0.0 +0.0 -35.1 +0.3	+0.0 +0.0 +27.0	+0.5 +0.0 +2.5	+0.0 +0.0 +0.3	+0.0 315	57.9	99.0	-41.1	Horiz 146

20	6499.360M	39.4	+0.0 +0.0 -34.2 +0.3	+0.0 +0.0 +34.4	+1.2 +0.0 +4.6	+0.0 +0.0 +0.6	+0.0 222	46.3	99.0	-52.7	Vert 144
21	648.700M	13.8	+1.7 +0.0 +0.0 +0.0	+2.1 +0.0 +0.0	+0.3 +0.0 +0.0	+19.8 +0.0 +0.0	+0.0 360	37.7	99.0	-61.3	Horiz 127
22	35.780M	12.3	+0.3 +0.0 +0.0 +0.0	+0.4 +16.5 +0.0	+0.0 +6.0 +0.0	+0.0 +0.0 +0.0	+0.0	35.5	99.0	-63.5	Vert 102
23	95.879k	33.9	+0.0 +0.0 +0.0 +0.0	+0.1 +0.0 +0.0	+0.0 +0.0 +0.0	+0.0 +9.9 +0.0	-80.0	-36.1	28.0	-64.1	Paral 102
24	432.400M	13.4	+1.3 +0.0 +0.0 +0.0	+1.8 +0.0 +0.0	+0.3 +0.0 +0.0	+15.9 +0.0 +0.0	+0.0 360	32.7	99.0	-66.3	Horiz 127
25	102.420M	13.0	+0.6 +0.0 +0.0 +0.0	+1.2 +10.3 +0.0	+0.1 +6.0 +0.0	+0.0 +0.0 +0.0	+0.0	31.2	99.0	-67.8	Vert 102
26	184.870M	13.2	+0.8 +0.0 +0.0 +0.0	+1.4 +9.1 +0.0	+0.2 +6.0 +0.0	+0.0 +0.0 +0.0	+0.0 73	30.7	99.0	-68.3	Vert 102
27	215.400M	12.4	+0.9 +0.0 +0.0 +0.0	+1.4 +0.0 +0.0	+0.2 +0.0 +0.0	+10.6 +0.0 +0.0	+0.0 256	25.5	99.0	-73.5	Vert 108
28	9.762M	11.8	+0.1 +0.0 +0.0 +0.0	+0.2 +0.0 +0.0	+0.0 +0.0 +0.0	+0.0 +9.2 +0.0	-40.0	-18.7	99.0	-117.7	Perpe 102

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 #:	**99317**	Date:	1/9/2017
Test Type:	**Maximized Emissions**	Time:	10:47:06
Tested By:	Steven Pittsford	Sequence#:	4
Software:	EMITest 5.03.02		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 4			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 4			

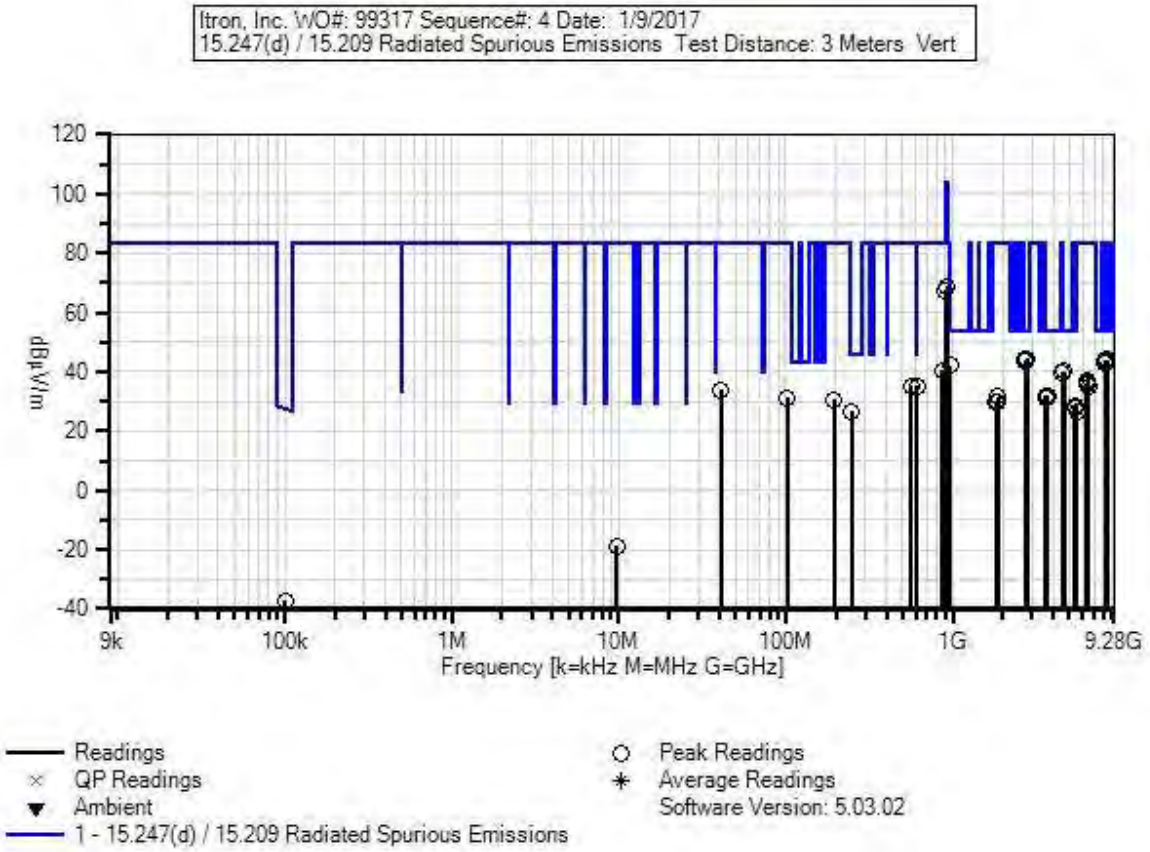
Test Conditions / Notes:

Temperature: 20-24ºC
Relative Humidity: 21-32%

Frequency range investigated: 9kHz-10GHz
Transmitter Frequency: 903-926.8MHz
Modulation: OOK
Firmware Power Level: 1
EUT Firmware: App Version: 1.18.3.0, CSL Version: 2.22.1.0
Antenna Type: Internal Trace
Antenna Gain: 1.99dBi
Duty Cycle: Max

Test Method: ANSI C63.10 (2013)

The EUT is a transmitter operating hopping in band. The EUT is battery operated, fresh batteries installed.
The EUT has no IO ports. Parallel, Perpendicular, Ground parallel antenna polarities investigated below 30MHz, Horizontal and Vertical antenna polarities investigated above 30MHz, only worst case reported.
The EUT orientation selected based on manufacturer declared fixed installation orientation. Hopping operation selected as worst case based on previously collected data.


Itron, Inc. \rO#: 99317 Sequence#: 4 Date: 1/9/2017
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert
120
100
80
60
40
20
0
-20
-40
dBµV/m
9k
100k
1M
10M
100M
1G
9.28G
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	ANP05360	Cable	RG214	11/30/2016	11/30/2018
T2	ANP05963	Cable	RG-214	2/15/2016	2/15/2018
T3	ANP06540	Cable	Heliax	10/29/2015	10/29/2017
T4	AN01816	Log Periodic Antenna-ANSI 63.5	3146	1/8/2016	1/8/2018
T5	AN02872	Spectrum Analyzer	E4440A	11/18/2015	11/18/2017
T6	AN01991	Biconilog Antenna	CBL6111C	3/11/2016	3/11/2018
T7	ANP05657	Attenuator	PE7004-6	12/22/2015	12/22/2017
T8	AN00052	Loop Antenna	6502	4/8/2016	4/8/2018
T9	AN03540	Preamp	83017A	4/30/2015	4/30/2017
T10	AN01467	Horn Antenna-ANSI C63.5 Calibration	3115	8/12/2015	8/12/2017
T11	ANP05305	Cable	ETSI-50T	2/15/2016	2/15/2018
T12	ANP06935	Cable	32026-29801-29801-18	3/11/2016	3/11/2018
T13	AN03170	High Pass Filter	HM1155-11SS	12/17/2015	12/17/2017
T14	AN12.2% DCCF	Test Data Adjustment		1/6/2017	1/6/2019

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

#	Freq	Rdng	T1 T5 T9 T13	T2 T6 T10 T14	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	2780.410M	63.7	+0.0 +0.0 -34.5 +0.4	+0.0 +0.0 +28.9 -18.2	+0.7 +0.0 +3.0	+0.0 +0.0 +0.4	+0.0 57	44.4	54.0	-9.6	Horiz 136
2	2709.000M	63.7	+0.0 +0.0 -34.5 +0.5	+0.0 +0.0 +28.6 -18.2	+0.7 +0.0 +3.0	+0.0 +0.0 +0.4	+0.0 57	44.2	54.0	-9.8	Horiz 136
3	2745.031M	63.5	+0.0 +0.0 -34.5 +0.4	+0.0 +0.0 +28.8 -18.2	+0.7 +0.0 +3.0	+0.0 +0.0 +0.4	+0.0 57	44.1	54.0	-9.9	Horiz 136
4	8341.213M	52.9	+0.0 +0.0 -35.0 +0.3	+0.0 +0.0 +36.6 -18.2	+1.4 +0.0 +5.4	+0.0 +0.0 +0.7	+0.0 88	44.1	54.0	-9.9	Vert 154
5	2730.077M	63.3	+0.0 +0.0 -34.5 +0.5	+0.0 +0.0 +28.7 -18.2	+0.7 +0.0 +3.0	+0.0 +0.0 +0.4	+0.0 57	43.9	54.0	-10.1	Horiz 136

6	8235.000M	52.8	+0.0 +0.0 -35.1 +0.3	+0.0 +0.0 +36.7 -18.2	+1.3 +0.0 +5.3	+0.0 +0.0 +0.7	+0.0 91	43.8	54.0	-10.2	Vert 154
7	8190.005M	52.7	+0.0 +0.0 -35.1 +0.3	+0.0 +0.0 +36.7 -18.2	+1.3 +0.0 +5.3	+0.0 +0.0 +0.7	+0.0 91	43.7	54.0	-10.3	Vert 154
8	614.000M	12.7	+1.6 +0.0 +0.0 +0.0	+2.1 +0.0 +0.0 +0.0	+0.3 +0.0 +0.0	+18.5 +0.0 +0.0	+0.0 100	35.2	46.0	-10.8	Horiz 145
9	8126.978M	51.8	+0.0 +0.0 -35.1 +0.3	+0.0 +0.0 +36.7 -18.2	+1.3 +0.0 +5.3	+0.0 +0.0 +0.7	+0.0 91	42.8	54.0	-11.2	Vert 154
10	960.000M	14.3	+2.2 +0.0 +0.0 +0.0	+2.5 +0.0 +0.0 +0.0	+0.4 +0.0 +0.0	+22.8 +0.0 +0.0	+0.0 100	42.2	54.0	-11.8	Horiz 145
11	4634.049M	53.8	+0.0 +0.0 -34.1 +0.5	+0.0 +0.0 +32.6 -18.2	+0.9 +0.0 +4.3	+0.0 +0.0 +0.5	+0.0 6	40.3	54.0	-13.7	Vert 159
12	4575.109M	53.8	+0.0 +0.0 -34.1 +0.4	+0.0 +0.0 +32.5 -18.2	+0.9 +0.0 +4.2	+0.0 +0.0 +0.5	+0.0 6	40.0	54.0	-14.0	Vert 159
13	4515.061M	53.7	+0.0 +0.0 -34.1 +0.4	+0.0 +0.0 +32.5 -18.2	+0.9 +0.0 +4.2	+0.0 +0.0 +0.5	+0.0 6	39.9	54.0	-14.1	Vert 159
14	4550.060M	53.7	+0.0 +0.0 -34.1 +0.3	+0.0 +0.0 +32.5 -18.2	+0.9 +0.0 +4.2	+0.0 +0.0 +0.5	+0.0 6	39.8	54.0	-14.2	Vert 159
15	928.000M	41.4	+2.1 +0.0 +0.0 +0.0	+2.4 +0.0 +0.0 +0.0	+0.4 +0.0 +0.0	+22.4 +0.0 +0.0	+0.0 100	68.7	83.6	-14.9	Horiz 145
16	902.000M	40.1	+2.1 +0.0 +0.0 +0.0	+2.4 +0.0 +0.0 +0.0	+0.3 +0.0 +0.0	+22.6 +0.0 +0.0	+0.0 100	67.5	83.6	-16.1	Horiz 145
17	248.000M	12.7	+1.0 +0.0 +0.0 +0.0	+1.5 +0.0 +0.0 +0.0	+0.2 +0.0 +0.0	+11.3 +0.0 +0.0	+0.0 263	26.7	46.0	-19.3	Horiz 113
18	3612.059M	49.3	+0.0 +0.0 -34.2 +0.4	+0.0 +0.0 +29.8 -18.2	+0.8 +0.0 +3.6	+0.0 +0.0 +0.4	+0.0 147	31.9	54.0	-22.1	Horiz 146

19	3707.197M	48.7	+0.0 +0.0 -34.1 +0.3	+0.0 +0.0 +30.1 -18.2	+0.7 +0.0 +3.8	+0.0 +0.0 +0.5	+0.0 152	31.8	54.0	-22.2	Horiz 147
20	3659.960M	48.8	+0.0 +0.0 -34.2 +0.3	+0.0 +0.0 +29.9 -18.2	+0.7 +0.0 +3.7	+0.0 +0.0 +0.5	+0.0 149	31.5	54.0	-22.5	Horiz 154
21	3640.010M	48.2	+0.0 +0.0 -34.2 +0.4	+0.0 +0.0 +29.9 -18.2	+0.7 +0.0 +3.7	+0.0 +0.0 +0.5	+0.0 147	31.0	54.0	-23.0	Horiz 146
22	5417.951M	41.0	+0.0 +0.0 -34.2 +0.3	+0.0 +0.0 +33.1 -18.2	+1.0 +0.0 +4.5	+0.0 +0.0 +0.6	+0.0 360	28.1	54.0	-25.9	Vert 155
23	5459.715M	40.7	+0.0 +0.0 -34.2 +0.3	+0.0 +0.0 +33.1 -18.2	+1.0 +0.0 +4.5	+0.0 +0.0 +0.6	+0.0 360	27.8	54.0	-26.2	Vert 155
24	860.800M	13.8	+2.0 +0.0 +0.0 +0.0	+2.3 +0.0 +0.0 +0.0	+0.3 +0.0 +0.0	+22.1 +0.0 +0.0	+0.0	40.5	83.6	-43.1	Vert 99
25	6404.947M	48.2	+0.0 +0.0 -34.2 +0.3	+0.0 +0.0 +34.6 -18.2	+1.2 +0.0 +4.7	+0.0 +0.0 +0.6	+0.0 24	37.2	83.6	-46.4	Vert 150
26	6320.985M	46.7	+0.0 +0.0 -34.2 +0.4	+0.0 +0.0 +34.8 -18.2	+1.3 +0.0 +4.7	+0.0 +0.0 +0.6	+0.0 24	36.1	83.6	-47.5	Vert 150
27	6370.005M	46.8	+0.0 +0.0 -34.2 +0.3	+0.0 +0.0 +34.7 -18.2	+1.3 +0.0 +4.7	+0.0 +0.0 +0.6	+0.0 24	36.0	83.6	-47.6	Vert 150
28	559.200M	13.0	+1.5 +0.0 +0.0 +0.0	+2.0 +0.0 +0.0 +0.0	+0.3 +0.0 +0.0	+18.3 +0.0 +0.0	+0.0	35.1	83.6	-48.5	Horiz 99
29	6487.576M	46.3	+0.0 +0.0 -34.2 +0.3	+0.0 +0.0 +34.4 -18.2	+1.2 +0.0 +4.6	+0.0 +0.0 +0.6	+0.0 24	35.0	83.6	-48.6	Vert 150
30	41.050M	12.9	+0.4 +0.0 +0.0 +0.0	+0.5 +13.8 +0.0 +0.0	+0.1 +6.0 +0.0	+0.0 +0.0 +0.0	+0.0 360	33.7	83.6	-49.9	Horiz 107
31	1853.770M	54.3	+0.0 +0.0 -35.1 +0.3	+0.0 +0.0 +27.0 -18.2	+0.5 +0.0 +2.5	+0.0 +0.0 +0.3	+0.0 62	31.6	83.6	-52.0	Vert 157

32	102.420M	13.0	+0.6 +0.0 +0.0 +0.0	+1.2 +10.3 +0.0 +0.0	+0.1 +6.0 +0.0	+0.0 +0.0 +0.0	+0.0 360	31.2	83.6	-52.4	Horiz 107
33	194.900M	13.1	+0.8 +0.0 +0.0 +0.0	+1.4 +9.0 +0.0 +0.0	+0.2 +6.0 +0.0	+0.0 +0.0 +0.0	+0.0 232	30.5	83.6	-53.1	Horiz 107
34	1806.010M	52.9	+0.0 +0.0 -35.1 +0.4	+0.0 +0.0 +26.8 -18.2	+0.5 +0.0 +2.5	+0.0 +0.0 +0.3	+0.0 62	30.1	83.6	-53.5	Vert 157
35	1829.530M	52.7	+0.0 +0.0 -35.1 +0.4	+0.0 +0.0 +26.9 -18.2	+0.5 +0.0 +2.5	+0.0 +0.0 +0.3	+0.0 62	30.0	83.6	-53.6	Vert 157
36	1819.930M	52.3	+0.0 +0.0 -35.1 +0.4	+0.0 +0.0 +26.9 -18.2	+0.5 +0.0 +2.5	+0.0 +0.0 +0.3	+0.0 62	29.6	83.6	-54.0	Vert 157
37	5490.274M	41.5	+0.0 +0.0 -34.1 +0.3	+0.0 +0.0 +33.1 -18.2	+1.0 +0.0 +4.5	+0.0 +0.0 +0.6	+0.0 360	28.7	83.6	-54.9	Vert 155
38	5560.800M	39.1	+0.0 +0.0 -34.1 +0.3	+0.0 +0.0 +33.4 -18.2	+1.0 +0.0 +4.5	+0.0 +0.0 +0.6	+0.0 360	26.6	83.6	-57.0	Vert 155
39	100.395k	32.6	+0.0 +0.0 +0.0 +0.0	+0.1 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0	+0.0 +9.9 +0.0	-80.0	-37.4	27.6	-65.0	Paral 102
40	9.762M	11.8	+0.1 +0.0 +0.0 +0.0	+0.2 +0.0 +0.0 +0.0	+0.0 +0.0 +0.0	+0.0 +9.2 +0.0	-40.0	-18.7	83.6	-102.3	Perpe 102

Band Edge

Band Edge Summary					
Frequency (MHz)	**Modulation**	**Ant. Type**	**Field Strength (dBuV/m @3m)**	**Limit (dBuV/m @3m)**	**Results**
614	Worst Case	Integral	33.7 (QP)	<46	Pass
902	FSK 150kbps Power Level 3	Integral	68.8 (QP)	100.9	Pass
902	FSK 10kbps Power Level 3	Integral	78.1 (QP)	100.9	Pass
902	OOK Power Level 3	Integral	84.7 (Peak)	99.0	Pass
902	OOK Power level 1	Integral	67.5 (Peak)	83.6	Pass
928	FSK 150kbps Power Level 3	Integral	70.0 (QP)	100.9	Pass
928	FSK 10kbps Power Level 3	Integral	79.3 (QP)	100.9	Pass
928	OOK Power Level 3	Integral	83.9 (Peak)	99.0	Pass
928	OOK Power level 1	Integral	68.7 (Peak)	83.6	Pass
960	Worst Case	Integral	50.7 (QP)	<54	Pass

Worst case: OOK Power Level 3

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

Test Setup / Conditions / 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 #:	**99317**	Date:	1/25/2017
Test Type:	**Maximized Emissions**	Time:	15:25:43
Tested By:	Steven Pittsford	Sequence#:	4
Software:	EMITest 5.03.02		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

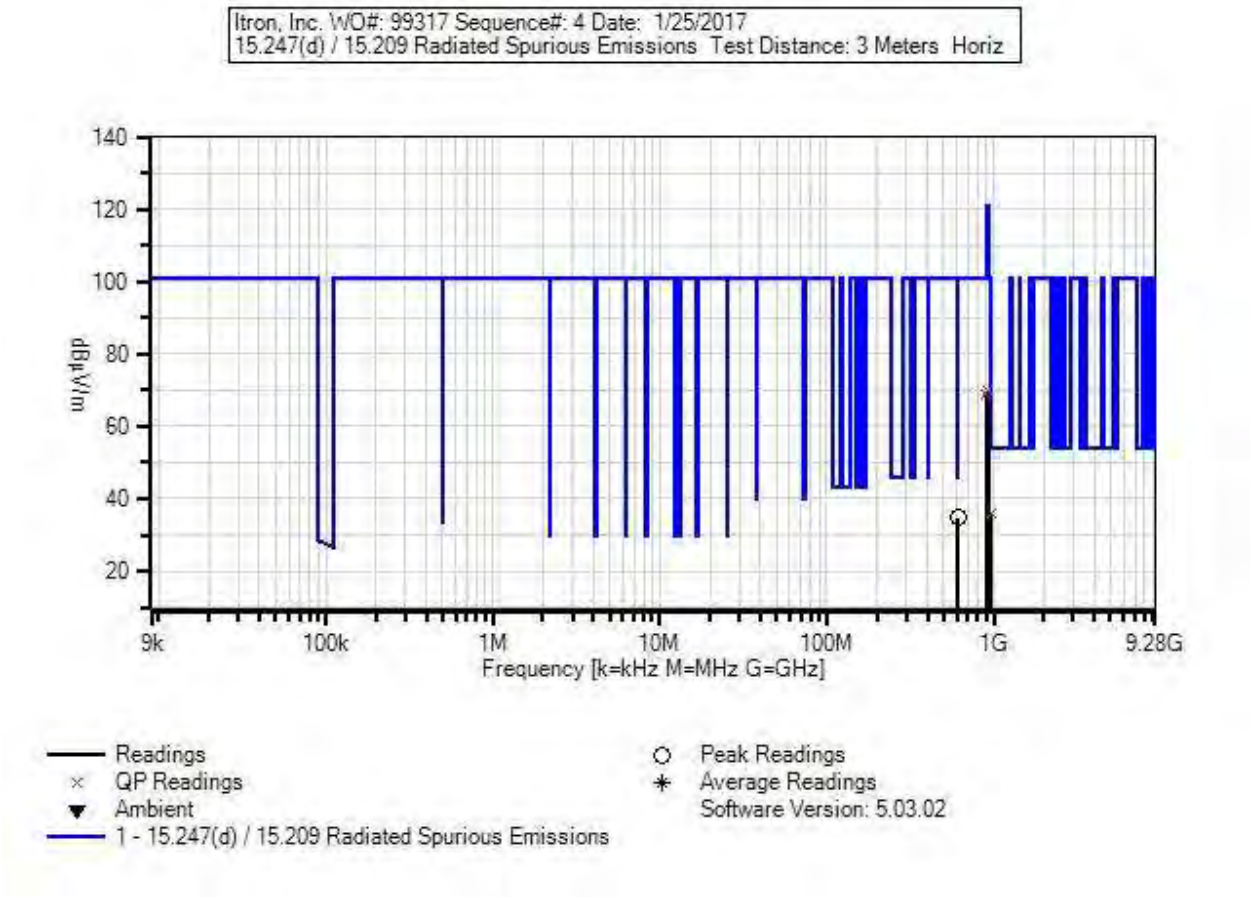
Test Conditions / Notes:

Temperature: 20-24ºC
Relative Humidity: 21-32%

Frequency range investigated: Band Edge
Transmitter Frequency: 902.4-927.6MHz
Modulation: FSK 150kbps
Firmware Power Level: 3
EUT Firmware: App Version: 1.18.3.0, CSL Version: 2.22.1.0
Antenna Type: Internal Trace
Antenna Gain: -0.94dBi
Duty Cycle: Max

Test Method: ANSI C63.10 (2013)

The EUT is a transmitter operating hopping in band. The EUT is battery operated, fresh batteries installed.
The EUT has no IO ports.
The EUT orientation selected based on manufacturer declared fixed installation orientation. Hopping operation selected as worst case based on previously collected data.



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05360	Cable	RG214	11/30/2016	11/30/2018
T2	ANP05963	Cable	RG-214	2/15/2016	2/15/2018
T3	ANP06540	Cable	Heliax	10/29/2015	10/29/2017
T4	AN01816	Log Periodic Antenna-ANSI 63.5	3146	1/8/2016	1/8/2018
	AN02872	Spectrum Analyzer	E4440A	11/18/2015	11/18/2017

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	614.000M	12.1	+1.6	+2.1	+0.3	+18.5	+0.0	34.6	46.0	-11.4	Horiz
2	960.000M QP	8.1	+2.2	+2.5	+0.4	+22.8	+0.0	36.0	54.0	-18.0	Horiz
3	928.004M QP	42.7	+2.1	+2.4	+0.4	+22.4	+0.0	70.0	100.9	-30.9	Horiz
4	901.992M QP	41.4	+2.1	+2.4	+0.3	+22.6	+0.0	68.8	100.9	-32.1	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 #:	**99317**	Date:	1/25/2017
Test Type:	**Maximized Emissions**	Time:	14:09:04
Tested By:	Steven Pittsford	Sequence#:	3
Software:	EMITest 5.03.02		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

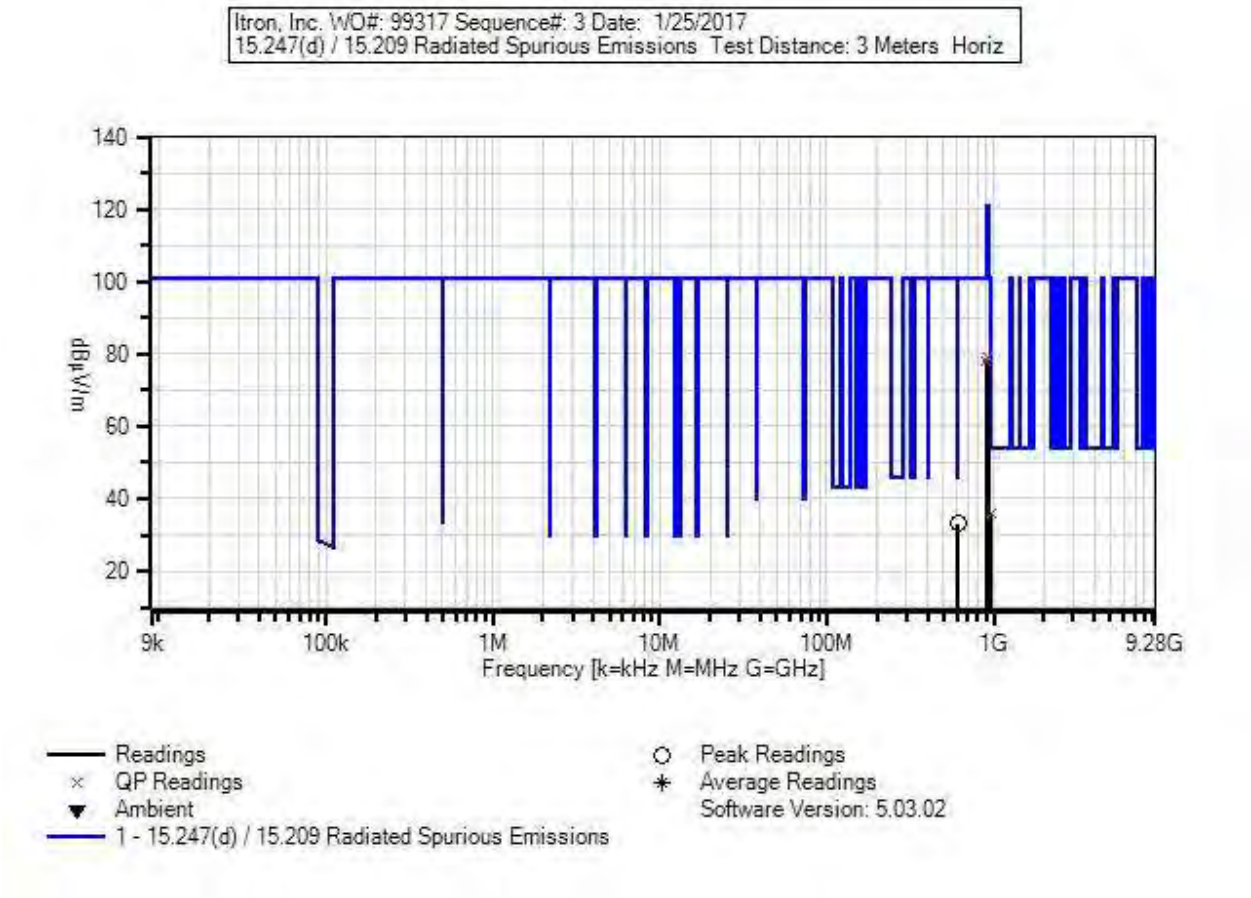
Test Conditions / Notes:

Temperature: 20-24ºC
Relative Humidity: 21-32%

Frequency range investigated: Band Edge
Transmitter Frequency: 902.2 to 927.75 MHz
Modulation: FSK 10kbps
Firmware Power Level: 3
EUT Firmware: App Version: 1.18.3.0, CSL Version: 2.22.1.0
Antenna Type: Internal Trace
Antenna Gain: -0.94dBi
Duty Cycle: Max

Test Method: ANSI C63.10 (2013)

The EUT is a transmitter operating hopping in band. The EUT is battery operated, fresh batteries installed.
The EUT has no IO ports.
The EUT orientation selected based on manufacturer declared fixed installation orientation. Hopping operation selected as worst case based on previously collected data.



Test Equipment:

ID	Asset #/Serial #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05360	Cable	RG214	11/30/2016	11/30/2018
T2	ANP05963	Cable	RG-214	2/15/2016	2/15/2018
T3	ANP06540	Cable	Heliax	10/29/2015	10/29/2017
T4	AN01816	Log Periodic Antenna-ANSI 63.5	3146	1/8/2016	1/8/2018
	AN02872	Spectrum Analyzer	E4440A	11/18/2015	11/18/2017

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

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
1	614.000M	10.5	+1.6	+2.1	+0.3	+18.5	+0.0	33.0	46.0	-13.0	Horiz
2	960.012M QP	7.9	+2.2	+2.5	+0.4	+22.8	+0.0	35.8	54.0	-18.2	Horiz
3	928.000M QP	52.0	+2.1	+2.4	+0.4	+22.4	+0.0	79.3	100.9	-21.6	Horiz
4	901.992M QP	50.7	+2.1	+2.4	+0.3	+22.6	+0.0	78.1	100.9	-22.8	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 #:	**99317**	Date:	1/5/2017
Test Type:	**Maximized Emissions**	Time:	11:56:40
Tested By:	Steven Pittsford	Sequence#:	3
Software:	EMITest 5.03.02		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 3			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 3			

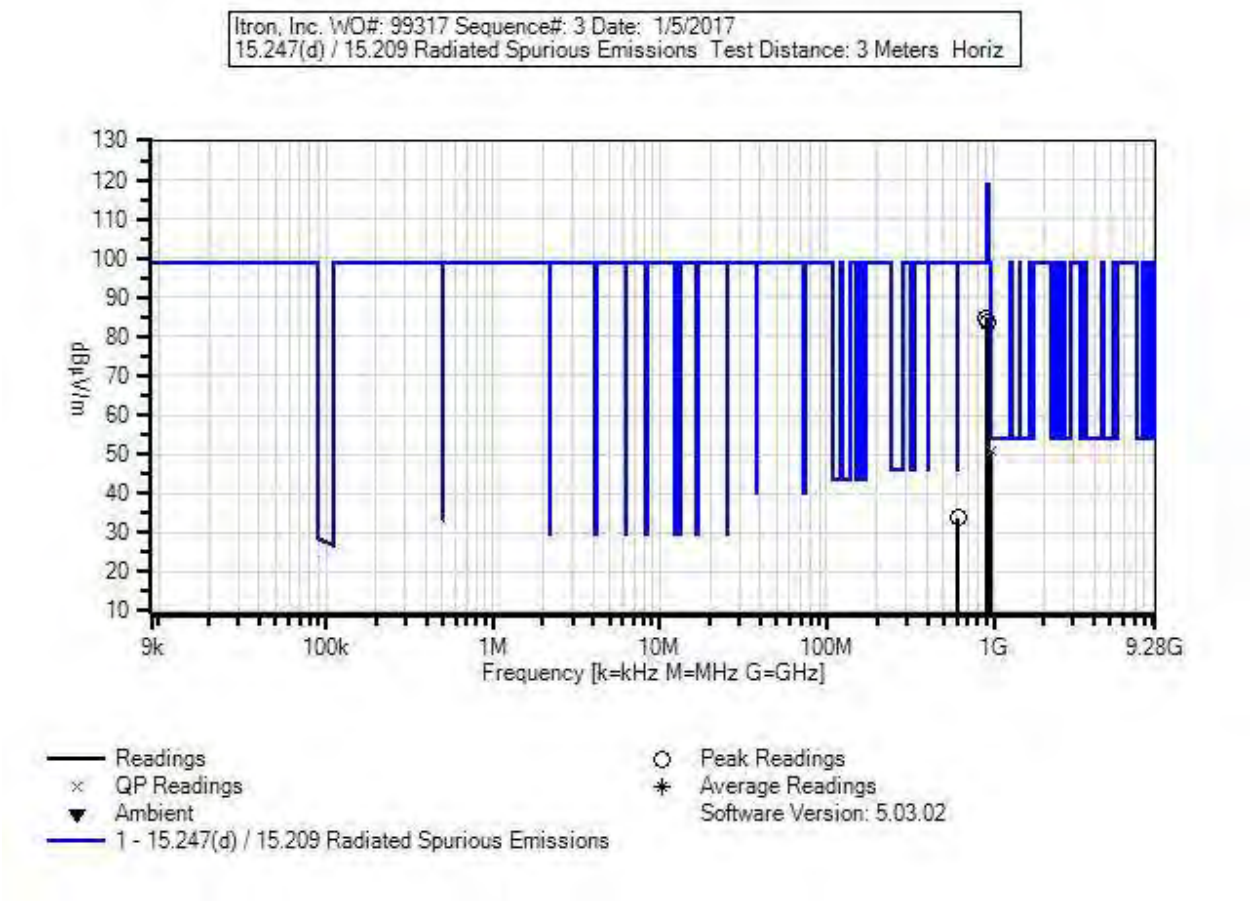
Test Conditions / Notes:

Temperature: 20-24ºC
Relative Humidity: 21-32%

Frequency range investigated: Band Edge
Transmitter Frequency: 903-926.8MHz
Modulation: OOK
Firmware Power Level: 3
EUT Firmware: App Version: 1.18.3.0, CSL Version: 2.22.1.0
Antenna Type: Internal Trace
Antenna Gain: -0.94dBi
Duty Cycle: Max

Test Method: ANSI C63.10 (2013)

The EUT is a transmitter operating hopping in band. The EUT is battery operated, fresh batteries installed.
The EUT has no IO ports.
The EUT orientation selected based on manufacturer declared fixed installation orientation. Hopping operation selected as worst case based on previously collected data.



Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05360	Cable	RG214	11/30/2016	11/30/2018
T2	ANP05963	Cable	RG-214	2/15/2016	2/15/2018
T3	ANP06540	Cable	Heliax	10/29/2015	10/29/2017
T4	AN01816	Log Periodic Antenna-ANSI 63.5	3146	1/8/2016	1/8/2018
T5	AN02872	Spectrum Analyzer	E4440A	11/18/2015	11/18/2017

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

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	960.026M QP	22.8	+2.2 +0.0	+2.5	+0.4	+22.8	+0.0 100	50.7	54.0	-3.3	Horiz 145
2	614.000M	11.2	+1.6 +0.0	+2.1	+0.3	+18.5	+0.0 100	33.7	46.0	-12.3	Horiz 145
3	902.000M	57.3	+2.1 +0.0	+2.4	+0.3	+22.6	+0.0 100	84.7	99.0	-14.3	Horiz 145
4	928.000M	56.6	+2.1 +0.0	+2.4	+0.4	+22.4	+0.0 100	83.9	99.0	-15.1	Horiz 145

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 #:	**99317**	Date:	1/5/2017
Test Type:	**Maximized Emissions**	Time:	13:40:12
Tested By:	Steven Pittsford	Sequence#:	4
Software:	EMITest 5.03.02		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 4			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 4			

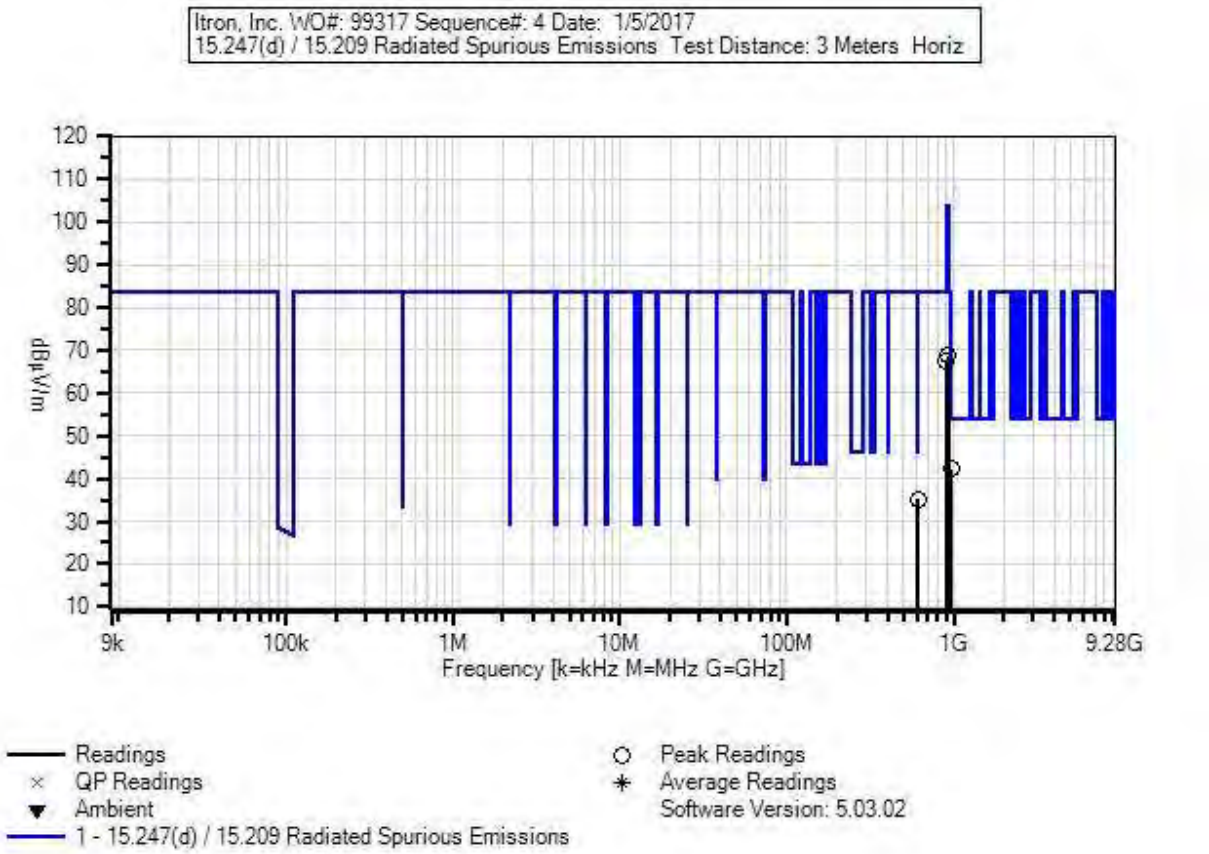
Test Conditions / Notes:

Temperature: 20-24ºC
Relative Humidity: 21-32%

Frequency range investigated: Band Edge
Transmitter Frequency: 903-926.8MHz
Modulation: OOK
Firmware Power Level: 1
EUT Firmware: App Version: 1.18.3.0, CSL Version: 2.22.1.0
Antenna Type: Internal Trace
Antenna Gain: 1.99dBi
Duty Cycle: Max

Test Method: ANSI C63.10 (2013)

The EUT is a transmitter operating hopping in band. The EUT is battery operated, fresh batteries installed.
The EUT has no IO ports.
The EUT orientation selected based on manufacturer declared fixed installation orientation. Hopping operation selected as worst case based on previously collected data.



Test Equipment:

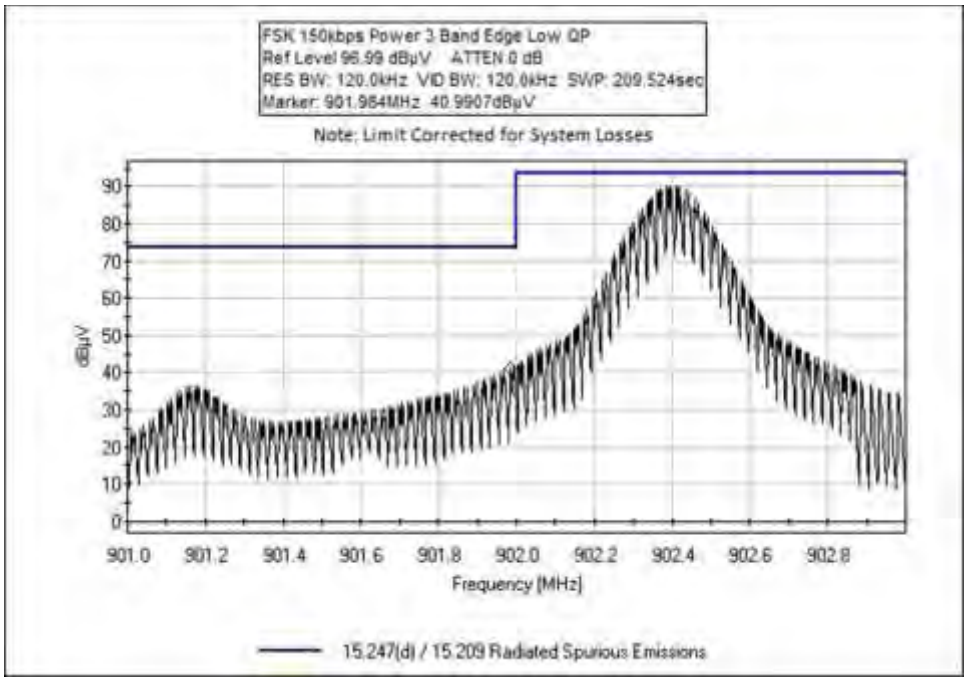
ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05360	Cable	RG214	11/30/2016	11/30/2018
T2	ANP05963	Cable	RG-214	2/15/2016	2/15/2018
T3	ANP06540	Cable	Heliax	10/29/2015	10/29/2017
T4	AN01816	Log Periodic Antenna-ANSI 63.5	3146	1/8/2016	1/8/2018
T5	AN02872	Spectrum Analyzer	E4440A	11/18/2015	11/18/2017

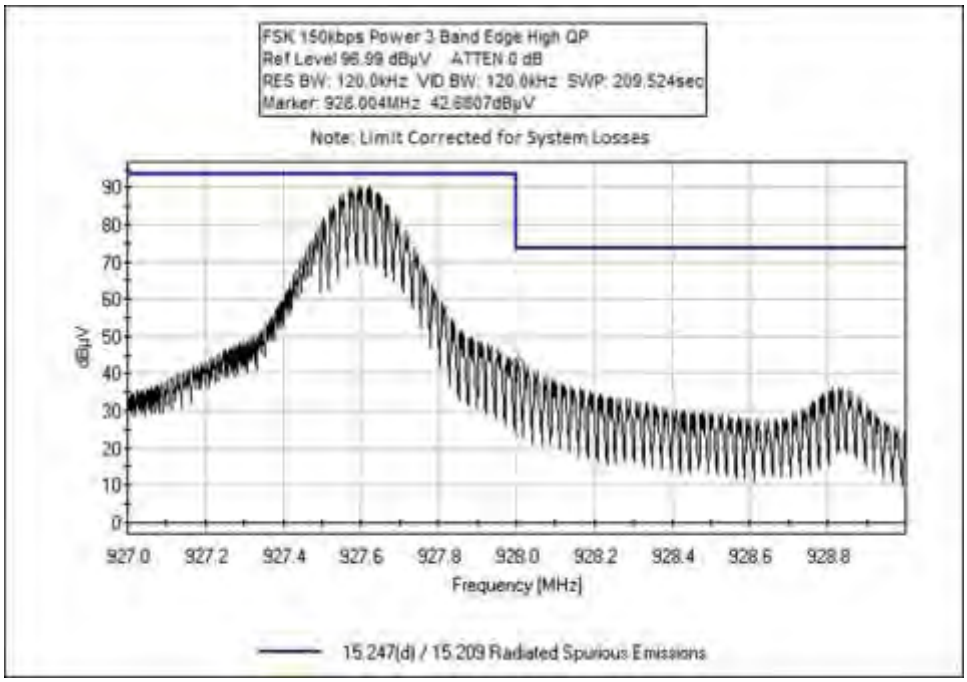
Measurement Data: Reading listed by margin. Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	614.000M	12.7	+1.6 +0.0	+2.1	+0.3	+18.5	+0.0 100	35.2	46.0	-10.8	Horiz 145
2	960.000M	14.3	+2.2 +0.0	+2.5	+0.4	+22.8	+0.0 100	42.2	54.0	-11.8	Horiz 145
3	928.000M	41.4	+2.1 +0.0	+2.4	+0.4	+22.4	+0.0 100	68.7	83.6	-14.9	Horiz 145
4	902.000M	40.1	+2.1 +0.0	+2.4	+0.3	+22.6	+0.0 100	67.5	83.6	-16.1	Horiz 145

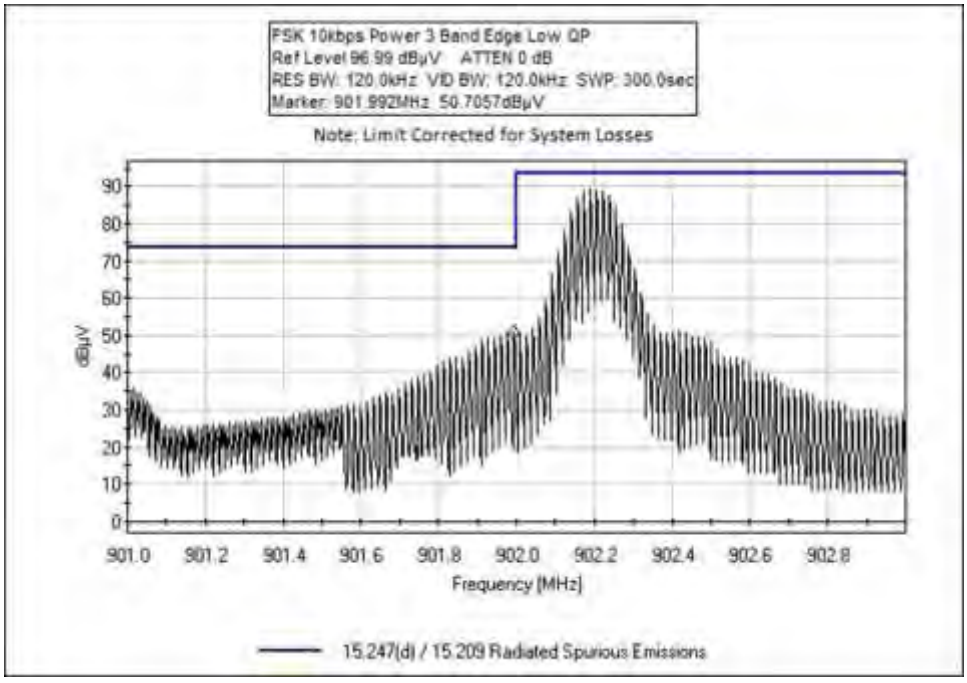
Band Edge Plots

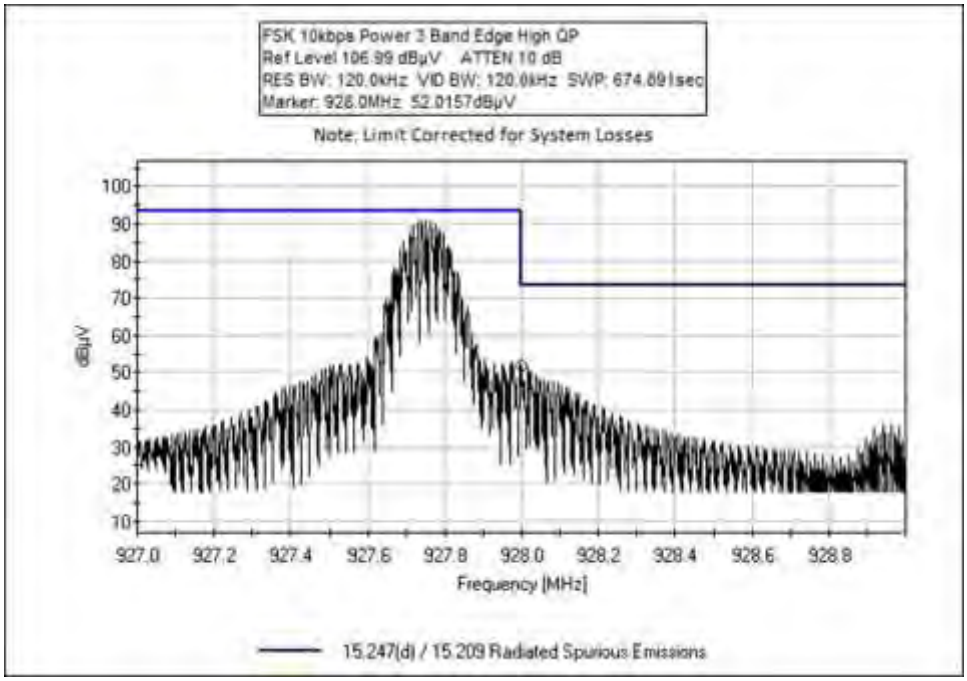
Configuration 1



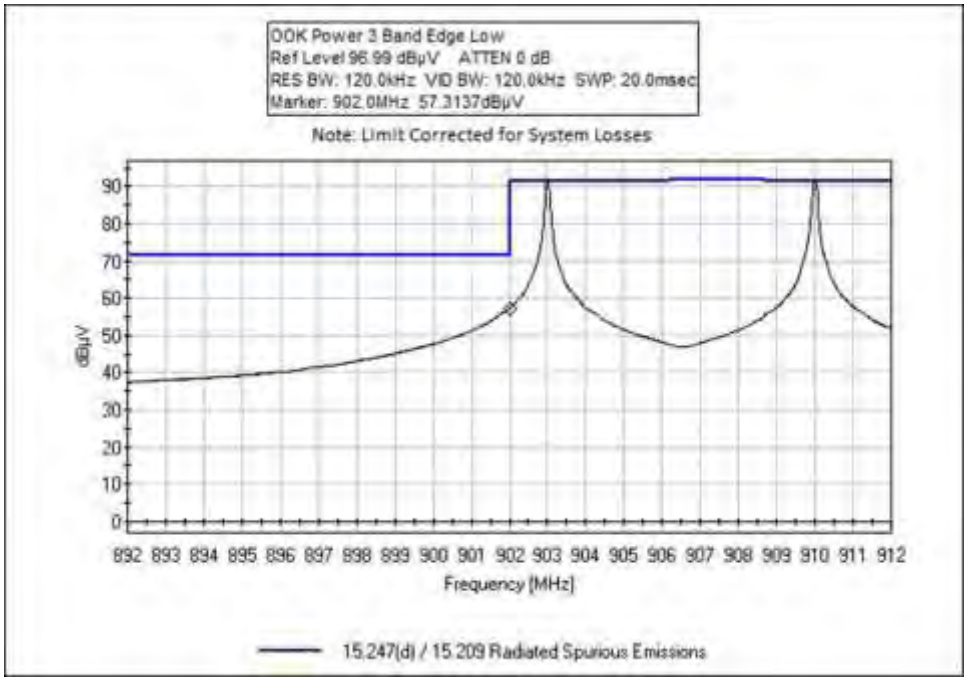


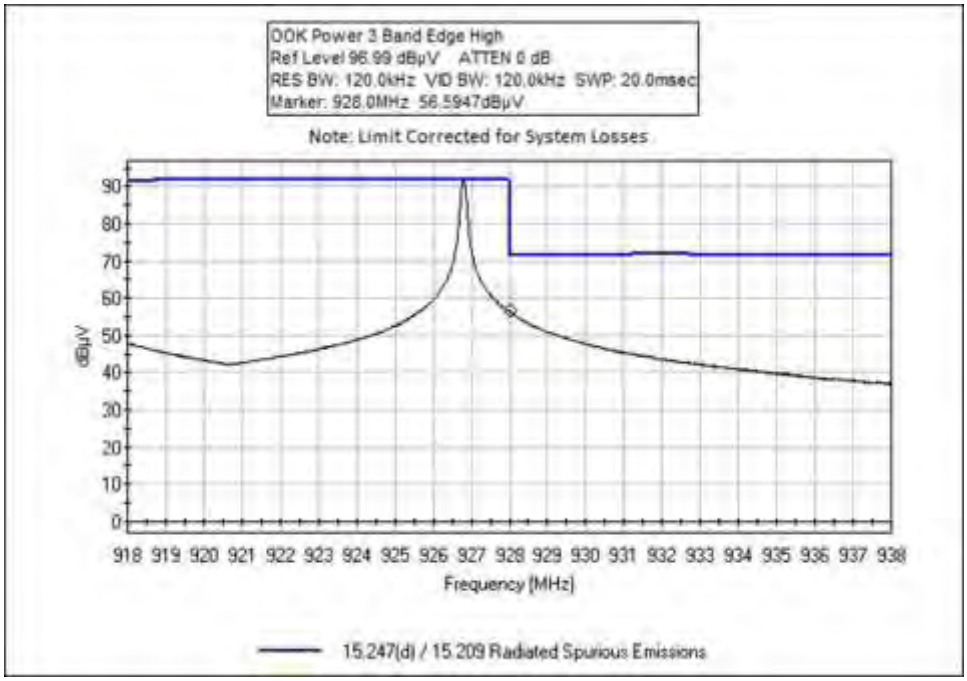
Configuration 2



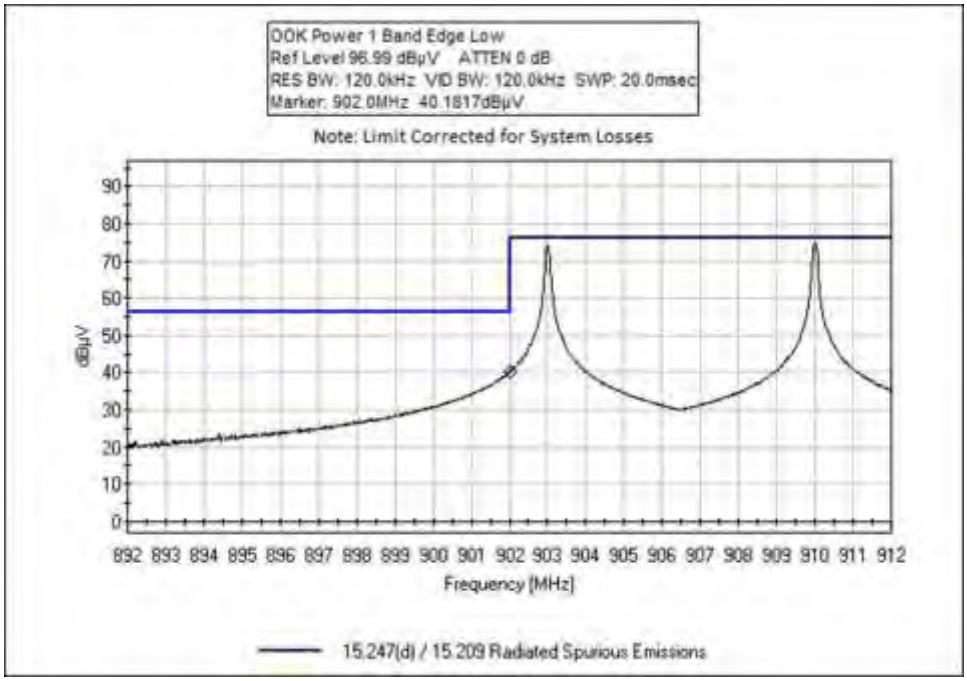


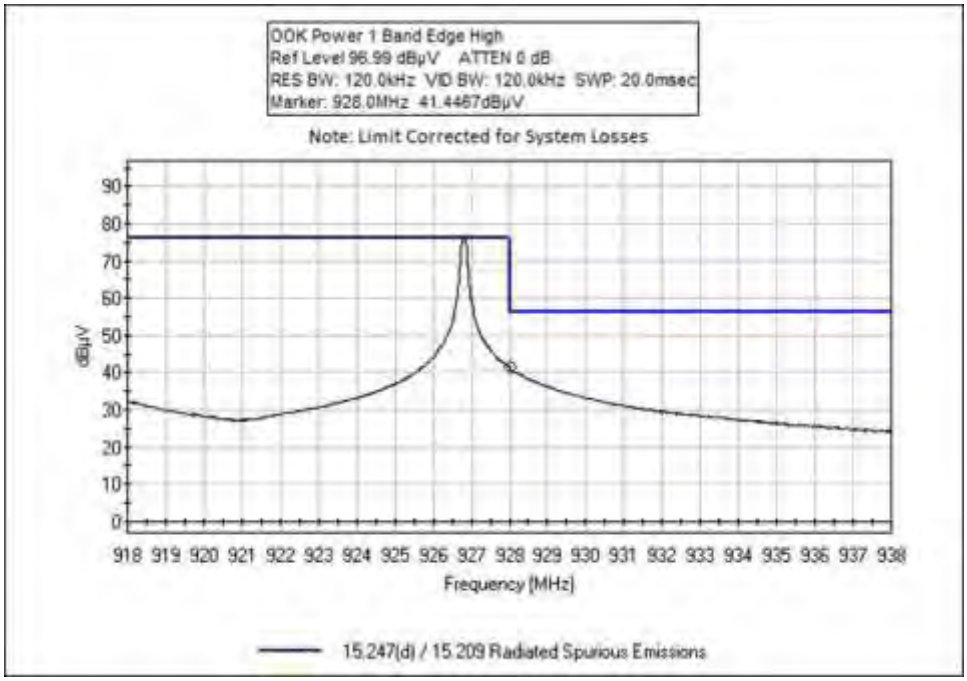
Configuration 3





Configuration 4





Test Setup Photos

Below 1GHz

Above 1GHz

APPENDIX A: CUSTOMER PROVIDED INFORMATION

15.35(c) Duty Cycle Correction Factor

Applies to OOK Power Level 1 Only

Test Data Summary			
Antenna Port	**Operational Mode**	**Measured On Time (mS / P_{obs})**	**Calculated DCCF (dB)**
Integral	OOK Power Level 1	12.2	18.2

Observation Period, P_{obs} is the duration of the pulse train or maximum 100mS

Measured results are calculated as follows:

$$On\ Time = \left(\sum_{Bursts} RF\ Burst\ On\ Time + \sum_{Control} Control\ Signal\ On\ time \right) \Bigg|_{P_{obs}\ (\max 100ms)}$$

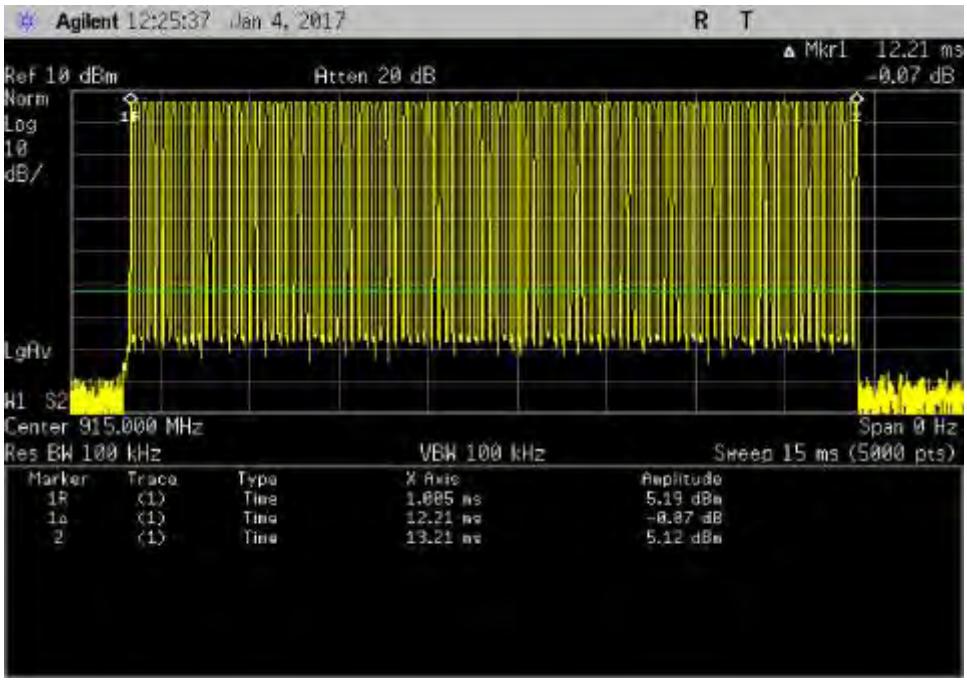
Measured Values:

Parameter	Value
Observation Period (P_{obs}):	100
Number of RF Bursts / P_{obs}:	1
On time of RF Burst:	12.2
Number of Control or other signals / P_{obs}:	0
On time of Control or other Signals:	0
Total Measured On Time:	12.2

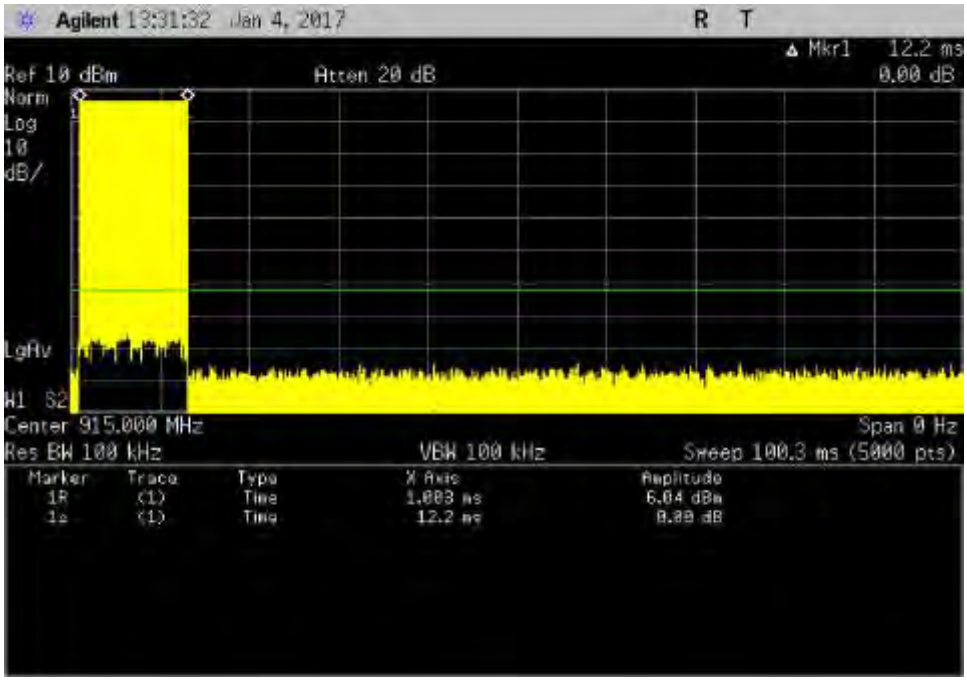
Duty Cycle Correction Factor (DCCF) is calculated in accordance with ANSI C63.10:

$$DCCF = 20 \cdot Log\left(\frac{On\ Time}{P_{obs}}\right)$$

Plots



DCCF Zoom In



DCCF Zoom Out

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.