

Itron, Inc.

TEST REPORT FOR

**SRR+WWAN+WIFI+GPS RX (Always External Antennas), CCU100TA
Model: TowerCCUA**

Tested To The Following Standards:

**FCC Part 15 Subpart C Sections 15.247
and
RSS-210 Issue 8**

Report No.: 91910-4

Date of issue: June 3, 2011



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: 27640

DATE OF EQUIPMENT RECEIPT:

DATE(S) OF TESTING:

REPORT PREPARED BY:

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

Project Number: 91910

April 26, 2011

April 26-May 20, 2011

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

Site Registration & Accreditation Information

Location	CB #	Japan	Canada	FCC
Bothell	US0081	R-2296, C-2506, T-1489 & G-284	3082C-1	318736

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C 15.247 and RSS-210 Issue 8

Description	Test Procedure/Method	Results
Input Voltage Variations	15.31(e)	Pass
AC Conducted Emissions	FCC Part 15 Subpart C Section 15.207(a) / FHSS-DA00-705 / ANSI C63.4	Pass
Carrier Frequency Separation	FCC Part 15 Subpart C Section 15.247(a)(1) / FHSS-DA00-705 / ANSI C63.4	Pass
20 dB Bandwidth	FCC Part 15 Subpart C Section 15.247(a)(1)(i) / FHSS-DA00-705 / ANSI C63.4	Pass
Number of Hopping Frequencies	FCC Part 15 Subpart C Section 15.247(a)(1)(i) / FHSS- DA00-705 / ANSI C63.4	Pass
Time of Occupancy	FCC Part 15 Subpart C Section 15.247(a)(1)(i) / FHSS-DA00-705 / ANSI C63.4	Pass
Peak Conducted Output Power	FCC Part 15 Subpart C Section 15.247(b)(2) / FHSS-DA00-705 / ANSI C63.4	Pass
Spurious Emissions – Antenna Conducted	FCC Part 15 Subpart C Section 15.247(d) / FHSS-DA00-705 / ANSI C63.4	Pass
Spurious Emissions - Radiated	FCC Part 15 Subpart C Section 15.247(d) / FHSS-DA00-705 / ANSI C63.4	Pass
99% Bandwidth	RSS-210 Issue 8 / RSS-GEN / RSP-100 / ANSI C63.4	Pass

Conditions During Testing

This list is a summary of the conditions noted for or modifications made to the equipment during testing.

Summary of Conditions
None

EQUIPMENT UNDER TEST (EUT)

EQUIPMENT UNDER TEST

SRR+WWAN+WIFI+GPS RX (always external antennas)

Manuf: Itron, Inc.
Model: CCU100TA (Model: TowerCCUA)
Serial: 74045191

Filter

Manuf: Delta Microwave
Model: U1993
Serial: 103

V-Pol Omni-6 dBd

Manuf: Laird Technologies
Model: FG9026
Serial: NA

External WWAN Antenna

Manuf: Laird Technologies
Model: FG821/18503
Serial: 40353

External GPS Antenna

Manuf: Trimble
Model: 57861-00
Serial: 213100323

PERIPHERAL DEVICES

The EUT was tested with the following peripheral device(s):

Laptop

Manuf: Dell
Model: E6400
Serial: H4CSTK1

EUT GENERAL PHOTOS



EUT inside Label



Cabinet Interior



Filter

FCC PART 15 SUBPART C

This report contains EMC emissions test results under United States Federal Communications Commission (FCC) 47 CFR 15C requirements for Unlicensed Radio Frequency Devices, Subpart C - Intentional Radiators.

15.31(e) Voltage Variations

NOTE: For this requirement, only one model was tested; **CCU100A (SRR+WWAN+WIFI+GPS RX Internal WWAN & GPS Antenna) – Report 91909-6**. The manufacturer declares that, with regards to this particular test, all CCU100x models are electrically identical and therefore meet the level of testing equivalent to the tested model.

Test Conditions / Setup

Comments

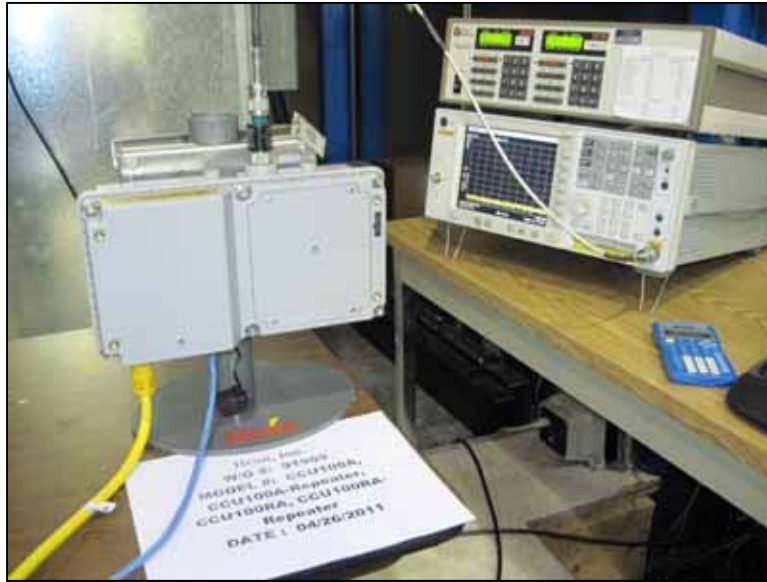
The EUT (CCU100A) was setup on the bench and connected to a spectrum analyzer via an RF cable and a 10 dB attenuator. The EUT was cycled through the different channels and modes by test software on a support laptop, connected to the EUT by an Ethernet cable. For this set of tests, all models (CCU100A, CCU100A-Repeater, CCU100RA, and CCU100RA-Repeater) are identical.

Test Equipment

Asset/Serial #	Description	Model	Manufacturer	Cal Date	Cal Due
02872	Spectrum Analyzer	E4440A	Agilent	08/25/2009	08/25/2011
05435	Attenuator	PE7015-10	Pasternack	09/08/2010	09/08/2012
03122	Cable 10k-18G	32026-2-29801-36	Astrolab	12/23/2010	12/23/2012
01314	Programmable power source	345AMXT-UPC3	PPS	05/27/2010	05/27/2012

Results Table			
FHSS-AM 16 kBaud	903 MHz	915 MHz	926.8 MHz
Voltage	dBm	dBm	dBm
102	28.3	29.6	26.0
120	28.5	29.7	26.0
138	28.4	29.6	25.8
204	28.3	29.5	25.8
240	28.3	29.6	25.9
265	28.2	29.5	25.9
FHSS-FM 12.5 kBaud	903 MHz	915 MHz	926.8 MHz
Voltage	dBm	dBm	dBm
102	28.1	29.4	26.0
120	28.2	29.4	25.9
138	28.1	29.4	26.0
204	28.2	29.5	25.9
240	28.1	29.5	26.0
265	28.3	29.5	25.9
FHSS-FM 37.5 kBaud	903 MHz	915 MHz	926.8 MHz
Voltage	dBm	dBm	dBm
102	28.1	29.4	25.8
120	28.0	29.4	25.9
138	28.1	29.4	25.8
204	28.0	29.4	25.9
240	28.1	29.4	25.8
265	27.9	29.4	25.9

Test Setup Photos



15.207 AC Conducted Emissions

Test Data Sheets

Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717

Customer: **Itron, Inc.**

Specification: **15.207 AC Mains - Average**

Work Order #: **91909**

Date: 5/19/2011

Test Type: **Conducted Emissions**

Time: 15:33:45

Equipment: **SRR+WWAN+WIFI+GPS RX
(always external antennas)**

Sequence#: 27

Manufacturer: Itron, Inc.

Tested By: Jeff Gilbert

Model: CCU100TA (Model: TowerCCUA)

120V 60Hz

S/N: 74045191

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN01492	50uH LISN-Line (dB)	3816/2NM	6/2/2009	6/2/2011
	AN01492	50uH LISN-Neutral (dB)	3816/2NM	6/2/2009	6/2/2011
T2	ANP05435	Attenuator	PE7015-10	9/8/2010	9/8/2012
T3	ANP05360	Cable	RG214	11/8/2010	11/8/2012
T4	ANP05547	Cable	Heliac	5/18/2010	5/18/2012
T5	AN03227	Cable	32026-29080- 29080-84	5/2/2011	5/2/2013
T6	AN01717	High Pass Filter	F3440-P005	5/27/2010	5/27/2012
	AN02872	Spectrum Analyzer	E4440A	8/25/2009	8/25/2011

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
SRR+WWAN+WIFI+GPS RX (always external antennas)*	Itron, Inc.	CCU100TA (Model: TowerCCUA)	74045191
Filter	Delta Microwave	U1993	103
V-Pol Omni-6 dBd	Laird Technologies	FG9026	NA
External WWAN Antenna	Laird Technologies	FG821/18503	40353
External GPS Antenna	Trimble	57861-00	213100323

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Dell	E6400	H4CSTK1

Test Conditions / Notes:

Frequency Range Investigated: 150 kHz - 30 MHz
 Temp: 25°C
 Humidity: 33%
 Pressure: 102.7 kPa

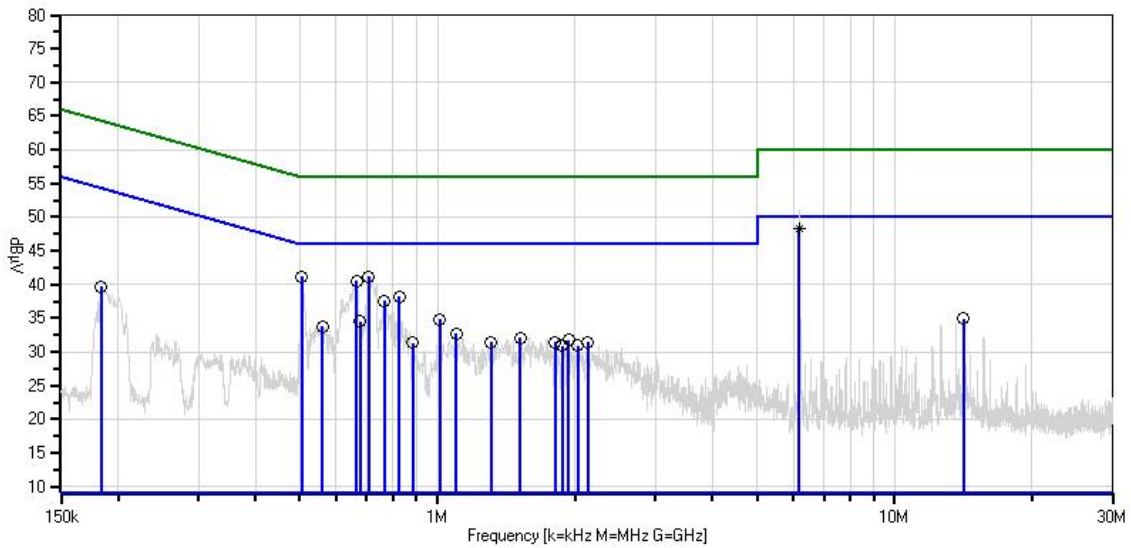
The EUT is in RX mode.

Ext Attn: 0 dB

Measurement Data:		Reading listed by margin.					Test Lead: Line					
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar	
	MHz	dB μ V	T5	T6			Table	dB μ V	dB μ V	dB	Ant	
			dB	dB	dB	dB						
1	6.194M	37.8	+0.3	+9.7	+0.1	+0.1	+0.0	48.2	50.0	-1.8	Line	
	Ave		+0.1	+0.1								
^	6.196M	41.4	+0.3	+9.7	+0.1	+0.1	+0.0	51.8	50.0	+1.8	Line	
			+0.1	+0.1								
^	6.193M	40.6	+0.3	+9.7	+0.1	+0.1	+0.0	51.0	50.0	+1.0	Line	
			+0.1	+0.1								
4	707.767k	31.3	+0.1	+9.7	+0.0	+0.1	+0.0	41.2	46.0	-4.8	Line	
			+0.0	+0.0								
5	504.877k	31.3	+0.1	+9.7	+0.0	+0.0	+0.0	41.2	46.0	-4.8	Line	
			+0.0	+0.1								
6	666.316k	30.7	+0.1	+9.7	+0.0	+0.0	+0.0	40.5	46.0	-5.5	Line	
			+0.0	+0.0								
7	824.120k	28.3	+0.1	+9.7	+0.0	+0.1	+0.0	38.2	46.0	-7.8	Line	
			+0.0	+0.0								
8	763.762k	27.7	+0.1	+9.7	+0.0	+0.1	+0.0	37.6	46.0	-8.4	Line	
			+0.0	+0.0								
9	1.013M	24.9	+0.1	+9.7	+0.0	+0.1	+0.0	34.8	46.0	-11.2	Line	
			+0.0	+0.0								
10	677.224k	24.7	+0.1	+9.7	+0.0	+0.0	+0.0	34.5	46.0	-11.5	Line	
			+0.0	+0.0								
11	560.871k	24.0	+0.1	+9.7	+0.0	+0.0	+0.0	33.8	46.0	-12.2	Line	
			+0.0	+0.0								
12	1.098M	22.7	+0.1	+9.7	+0.0	+0.1	+0.0	32.7	46.0	-13.3	Line	
			+0.0	+0.1								
13	1.519M	22.1	+0.1	+9.7	+0.0	+0.1	+0.0	32.1	46.0	-13.9	Line	
			+0.0	+0.1								
14	1.936M	21.9	+0.1	+9.7	+0.0	+0.1	+0.0	31.8	46.0	-14.2	Line	
			+0.0	+0.0								
15	1.311M	21.5	+0.1	+9.7	+0.0	+0.1	+0.0	31.5	46.0	-14.5	Line	
			+0.0	+0.1								
16	183.451k	29.8	+0.1	+9.7	+0.0	+0.0	+0.0	39.7	54.3	-14.6	Line	
			+0.0	+0.1								
17	2.136M	21.5	+0.1	+9.7	+0.0	+0.1	+0.0	31.4	46.0	-14.6	Line	
			+0.0	+0.0								
18	1.809M	21.5	+0.1	+9.7	+0.0	+0.1	+0.0	31.4	46.0	-14.6	Line	
			+0.0	+0.0								
19	881.458k	21.4	+0.1	+9.7	+0.0	+0.1	+0.0	31.3	46.0	-14.7	Line	
			+0.0	+0.0								

20	2.025M	21.0	+0.1	+9.7	+0.0	+0.1	+0.0	30.9	46.0	-15.1	Line
			+0.0	+0.0							
21	14.148M	24.2	+0.6	+9.7	+0.1	+0.2	+0.0	34.9	50.0	-15.1	Line
			+0.1	+0.0							
22	1.877M	21.0	+0.1	+9.7	+0.0	+0.1	+0.0	30.9	46.0	-15.1	Line
			+0.0	+0.0							

CKC Laboratories, Inc. Date: 5/19/2011 Time: 15:33:45 Itron, Inc. WO#: 91909
 15.207 AC Mains - Average Test Lead: Line 120V 60Hz Sequence#: 27 Ext ATTN: 0 dB



- Sweep Data
- Peak Readings
- * Average Readings
- 1 - 15.207 AC Mains - Average
- Readings
- × QP Readings
- ▼ Ambient
- 2 - 15.207 AC Mains - Quasi-peak



Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717

Customer: **Itron, Inc.**
 Specification: **15.207 AC Mains - Average**
 Work Order #: **91909** Date: 5/19/2011
 Test Type: **Conducted Emissions** Time: 15:38:57
 Equipment: **SRR+WWAN+WIFI+GPS RX** Sequence#: 28
(always external antennas)
 Manufacturer: Itron, Inc. Tested By: Jeff Gilbert
 Model: CCU100TA (Model: TowerCCUA) 120V 60Hz
 S/N: 74045191

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN01492	50uH LISN-Line (dB)	3816/2NM	6/2/2009	6/2/2011
T1	AN01492	50uH LISN-Neutral (dB)	3816/2NM	6/2/2009	6/2/2011
T2	ANP05435	Attenuator	PE7015-10	9/8/2010	9/8/2012
T3	ANP05360	Cable	RG214	11/8/2010	11/8/2012
T4	ANP05547	Cable	Helix	5/18/2010	5/18/2012
T5	AN03227	Cable	32026-29080-29080-84	5/2/2011	5/2/2013
T6	AN01717	High Pass Filter	F3440-P005	5/27/2010	5/27/2012
	AN02872	Spectrum Analyzer	E4440A	8/25/2009	8/25/2011

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
SRR+WWAN+WIFI+GPS RX (always external antennas)*	Itron, Inc.	CCU100TA (Model: TowerCCUA)	74045191
Filter	Delta Microwave	U1993	103
V-Pol Omni-6 dBd	Laird Technologies	FG9026	NA
External WWAN Antenna	Laird Technologies	FG821/18503	40353
External GPS Antenna	Trimble	57861-00	213100323

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Dell	E6400	H4CSTK1

Test Conditions / Notes:

Frequency Range Investigated: 150 kHz - 30 MHz
 Temp: 25°C
 Humidity: 33%
 Pressure: 102.7 kPa
 The EUT is in RX mode.

Ext Attn: 0 dB

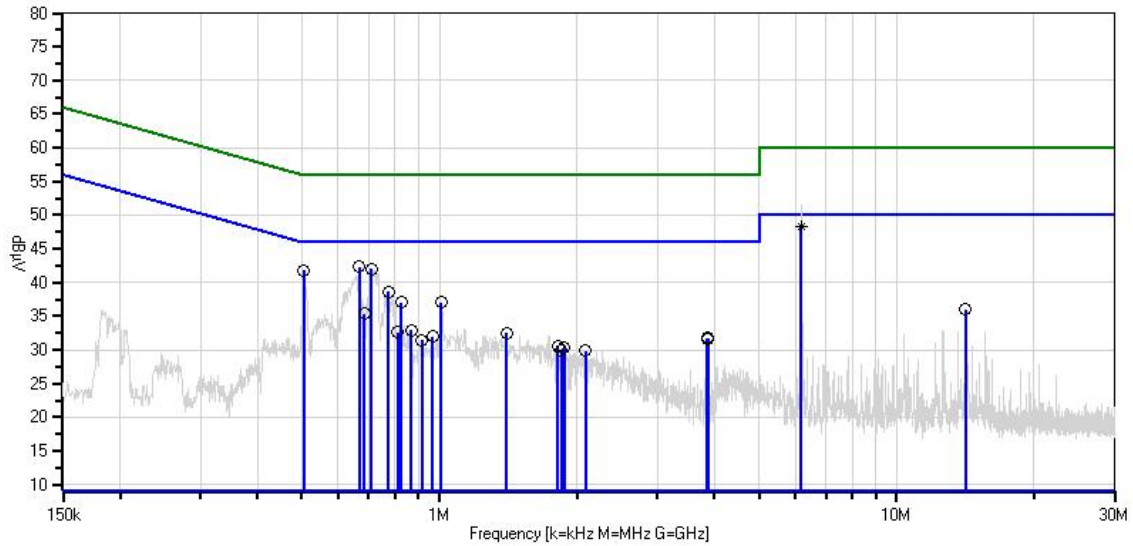
Measurement Data:

Reading listed by margin.

Test Lead: Neutral

#	Freq MHz	Rdng dB μ V	T1 T5 dB	T2 T6 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	6.193M	38.1	+0.1	+9.7	+0.1	+0.1	+0.0	48.3	50.0	-1.7	Neutr
	Ave		+0.1	+0.1							
^	6.196M	41.6	+0.1	+9.7	+0.1	+0.1	+0.0	51.8	50.0	+1.8	Neutr
			+0.1	+0.1							
^	6.193M	41.4	+0.1	+9.7	+0.1	+0.1	+0.0	51.6	50.0	+1.6	Neutr
			+0.1	+0.1							
4	667.043k	32.6	+0.0	+9.7	+0.0	+0.0	+0.0	42.3	46.0	-3.7	Neutr
			+0.0	+0.0							
5	710.676k	32.2	+0.0	+9.7	+0.0	+0.1	+0.0	42.0	46.0	-4.0	Neutr
			+0.0	+0.0							
6	505.604k	32.0	+0.0	+9.7	+0.0	+0.0	+0.0	41.8	46.0	-4.2	Neutr
			+0.0	+0.1							
7	773.943k	28.8	+0.0	+9.7	+0.0	+0.1	+0.0	38.6	46.0	-7.4	Neutr
			+0.0	+0.0							
8	1.009M	27.2	+0.0	+9.7	+0.0	+0.1	+0.0	37.0	46.0	-9.0	Neutr
			+0.0	+0.0							
9	823.393k	27.2	+0.0	+9.7	+0.0	+0.1	+0.0	37.0	46.0	-9.0	Neutr
			+0.0	+0.0							
10	685.224k	25.7	+0.0	+9.7	+0.0	+0.0	+0.0	35.4	46.0	-10.6	Neutr
			+0.0	+0.0							
11	866.298k	23.1	+0.0	+9.7	+0.0	+0.1	+0.0	32.9	46.0	-13.1	Neutr
			+0.0	+0.0							
12	811.030k	22.8	+0.0	+9.7	+0.0	+0.1	+0.0	32.6	46.0	-13.4	Neutr
			+0.0	+0.0							
13	1.405M	22.6	+0.0	+9.7	+0.0	+0.1	+0.0	32.5	46.0	-13.5	Neutr
			+0.0	+0.1							
14	14.148M	25.6	+0.3	+9.7	+0.1	+0.2	+0.0	36.0	50.0	-14.0	Neutr
			+0.1	+0.0							
15	966.512k	22.2	+0.0	+9.7	+0.0	+0.1	+0.0	32.0	46.0	-14.0	Neutr
			+0.0	+0.0							
16	3.871M	21.8	+0.1	+9.7	+0.1	+0.1	+0.0	31.8	46.0	-14.2	Neutr
			+0.0	+0.0							
17	3.858M	21.7	+0.1	+9.7	+0.1	+0.1	+0.0	31.7	46.0	-14.3	Neutr
			+0.0	+0.0							
18	915.480k	21.6	+0.0	+9.7	+0.0	+0.1	+0.0	31.4	46.0	-14.6	Neutr
			+0.0	+0.0							
19	1.813M	20.6	+0.1	+9.7	+0.0	+0.1	+0.0	30.5	46.0	-15.5	Neutr
			+0.0	+0.0							
20	1.872M	20.4	+0.1	+9.7	+0.0	+0.1	+0.0	30.3	46.0	-15.7	Neutr
			+0.0	+0.0							
21	1.847M	20.1	+0.1	+9.7	+0.0	+0.1	+0.0	30.0	46.0	-16.0	Neutr
			+0.0	+0.0							
22	2.085M	20.0	+0.1	+9.7	+0.0	+0.1	+0.0	29.9	46.0	-16.1	Neutr
			+0.0	+0.0							

CKC Laboratories, Inc. Date: 5/19/2011 Time: 15:38:57 Itron, Inc. WO#: 91909
15.207 AC Mains - Average Test Lead: Neutral 120V 60Hz Sequence#: 28 Ext ATTN: 0 dB



— Sweep Data
○ Peak Readings
* Average Readings
— Readings
× QP Readings
▼ Ambient
— 1 - 15.207 AC Mains - Average
— 2 - 15.207 AC Mains - Quasi-peak



Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717

Customer: **Itron, Inc.**
 Specification: **15.207 AC Mains - Average**
 Work Order #: **91909** Date: 5/19/2011
 Test Type: **Conducted Emissions** Time: 15:47:01
 Equipment: **SRR+WWAN+WIFI+GPS RX** Sequence#: 29
(always external antennas)
 Manufacturer: Itron, Inc. Tested By: Jeff Gilbert
 Model: CCU100TA (Model: TowerCCUA) 240V 60Hz
 S/N: 74045191

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN01492	50uH LISN-Line (dB)	3816/2NM	6/2/2009	6/2/2011
	AN01492	50uH LISN-Neutral (dB)	3816/2NM	6/2/2009	6/2/2011
T2	ANP05435	Attenuator	PE7015-10	9/8/2010	9/8/2012
T3	ANP05360	Cable	RG214	11/8/2010	11/8/2012
T4	ANP05547	Cable	Helix	5/18/2010	5/18/2012
T5	AN03227	Cable	32026-29080-29080-84	5/2/2011	5/2/2013
T6	AN01717	High Pass Filter	F3440-P005	5/27/2010	5/27/2012
	AN02872	Spectrum Analyzer	E4440A	8/25/2009	8/25/2011

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
SRR+WWAN+WIFI+GPS RX (always external antennas)*	Itron, Inc.	CCU100TA (Model: TowerCCUA)	74045191
Filter	Delta Microwave	U1993	103
V-Pol Omni-6 dBd	Laird Technologies	FG9026	NA
External WWAN Antenna	Laird Technologies	FG821/18503	40353
External GPS Antenna	Trimble	57861-00	213100323

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Dell	E6400	H4CSTK1

Test Conditions / Notes:

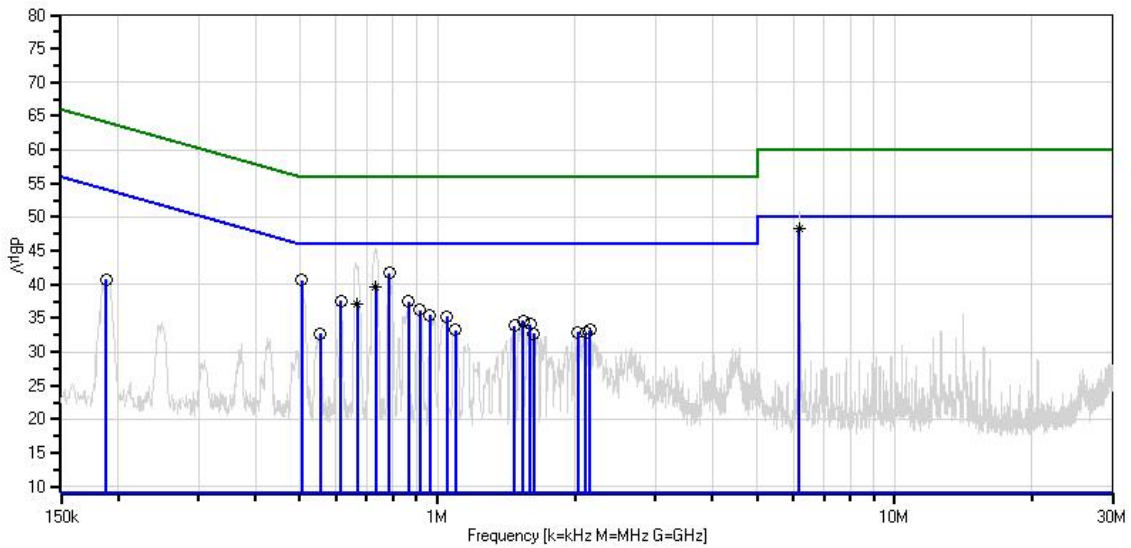
Frequency Range Investigated: 150 kHz - 30 MHz
 Temp: 25°C
 Humidity: 33%
 Pressure: 102.7 kPa
 The EUT is in RX mode.

Ext Attn: 0 dB

#	Measurement Data:		Reading listed by margin.					Test Lead: Line				
	Freq MHz	Rdng dB μ V	T1 T5 dB	T2 T6 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant	
1	6.193M	37.9	+0.3	+9.7	+0.1	+0.1	+0.0	48.3	50.0	-1.7	Line	
	Ave		+0.1	+0.1								
^	6.196M	40.9	+0.3	+9.7	+0.1	+0.1	+0.0	51.3	50.0	+1.3	Line	
			+0.1	+0.1								
^	6.193M	40.4	+0.3	+9.7	+0.1	+0.1	+0.0	50.8	50.0	+0.8	Line	
			+0.1	+0.1								
4	784.124k	31.8	+0.1	+9.7	+0.0	+0.1	+0.0	41.7	46.0	-4.3	Line	
			+0.0	+0.0								
5	505.604k	30.7	+0.1	+9.7	+0.0	+0.0	+0.0	40.6	46.0	-5.4	Line	
			+0.0	+0.1								
6	732.270k	29.8	+0.1	+9.7	+0.0	+0.1	+0.0	39.7	46.0	-6.3	Line	
	Ave		+0.0	+0.0								
^	731.770k	35.8	+0.1	+9.7	+0.0	+0.1	+0.0	45.7	46.0	-0.3	Line	
			+0.0	+0.0								
^	730.310k	35.5	+0.1	+9.7	+0.0	+0.1	+0.0	45.4	46.0	-0.6	Line	
			+0.0	+0.0								
9	615.412k	27.8	+0.1	+9.7	+0.0	+0.0	+0.0	37.6	46.0	-8.4	Line	
			+0.0	+0.0								
10	862.662k	27.6	+0.1	+9.7	+0.0	+0.1	+0.0	37.5	46.0	-8.5	Line	
			+0.0	+0.0								
11	668.300k	27.2	+0.1	+9.7	+0.0	+0.0	+0.0	37.0	46.0	-9.0	Line	
	Ave		+0.0	+0.0								
^	664.880k	33.5	+0.1	+9.7	+0.0	+0.0	+0.0	43.3	46.0	-2.7	Line	
			+0.0	+0.0								
^	664.499k	33.5	+0.1	+9.7	+0.0	+0.0	+0.0	43.3	46.0	-2.7	Line	
			+0.0	+0.0								
14	915.480k	26.3	+0.1	+9.7	+0.0	+0.1	+0.0	36.2	46.0	-9.8	Line	
			+0.0	+0.0								
15	962.259k	25.6	+0.1	+9.7	+0.0	+0.1	+0.0	35.5	46.0	-10.5	Line	
			+0.0	+0.0								
16	1.047M	25.4	+0.1	+9.7	+0.0	+0.1	+0.0	35.3	46.0	-10.7	Line	
			+0.0	+0.0								
17	1.536M	24.6	+0.1	+9.7	+0.0	+0.1	+0.0	34.6	46.0	-11.4	Line	
			+0.0	+0.1								
18	1.596M	24.1	+0.1	+9.7	+0.0	+0.1	+0.0	34.1	46.0	-11.9	Line	
			+0.0	+0.1								
19	1.473M	23.9	+0.1	+9.7	+0.0	+0.1	+0.0	33.9	46.0	-12.1	Line	
			+0.0	+0.1								
20	2.153M	23.4	+0.1	+9.7	+0.0	+0.1	+0.0	33.3	46.0	-12.7	Line	
			+0.0	+0.0								
21	1.094M	23.2	+0.1	+9.7	+0.0	+0.1	+0.0	33.2	46.0	-12.8	Line	
			+0.0	+0.1								
22	2.030M	23.0	+0.1	+9.7	+0.0	+0.1	+0.0	32.9	46.0	-13.1	Line	
			+0.0	+0.0								
23	2.106M	22.9	+0.1	+9.7	+0.0	+0.1	+0.0	32.8	46.0	-13.2	Line	
			+0.0	+0.0								

24	553.599k	22.9	+0.1	+9.7	+0.0	+0.0	+0.0	32.7	46.0	-13.3	Line
			+0.0	+0.0							
25	1.626M	22.7	+0.1	+9.7	+0.0	+0.1	+0.0	32.7	46.0	-13.3	Line
			+0.0	+0.1							
26	188.542k	30.8	+0.1	+9.7	+0.0	+0.0	+0.0	40.7	54.1	-13.4	Line
			+0.0	+0.1							

CKC Laboratories, Inc. Date: 5/19/2011 Time: 15:47:01 Itron, Inc. WO#: 91909
 15.207 AC Mains - Average Test Lead: Line 240V 60Hz Sequence#: 29 Ext ATTN: 0 dB



- Sweep Data
- Peak Readings
- * Average Readings
- 1 - 15.207 AC Mains - Average
- Readings
- × QP Readings
- ▼ Ambient
- 2 - 15.207 AC Mains - Quasi-peak



Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717

Customer: **Itron, Inc.**
 Specification: **15.207 AC Mains - Average**
 Work Order #: **91909** Date: 5/19/2011
 Test Type: **Conducted Emissions** Time: 15:57:48
 Equipment: **SRR+WWAN+WIFI+GPS RX** Sequence#: 30
(always external antennas)
 Manufacturer: Itron, Inc. Tested By: Jeff Gilbert
 Model: CCU100TA (Model: TowerCCUA) 240V 60Hz
 S/N: 74045191

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN01492	50uH LISN-Line (dB)	3816/2NM	6/2/2009	6/2/2011
T1	AN01492	50uH LISN-Neutral (dB)	3816/2NM	6/2/2009	6/2/2011
T2	ANP05435	Attenuator	PE7015-10	9/8/2010	9/8/2012
T3	ANP05360	Cable	RG214	11/8/2010	11/8/2012
T4	ANP05547	Cable	Heliax	5/18/2010	5/18/2012
T5	AN03227	Cable	32026-29080-29080-84	5/2/2011	5/2/2013
T6	AN01717	High Pass Filter	F3440-P005	5/27/2010	5/27/2012
	AN02872	Spectrum Analyzer	E4440A	8/25/2009	8/25/2011

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
SRR+WWAN+WIFI+GPS RX (always external antennas)*	Itron, Inc.	CCU100TA (Model: TowerCCUA)	74045191
Filter	Delta Microwave	U1993	103
V-Pol Omni-6 dBd	Laird Technologies	FG9026	NA
External WWAN Antenna	Laird Technologies	FG821/18503	40353
External GPS Antenna	Trimble	57861-00	213100323

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Dell	E6400	H4CSTK1

Test Conditions / Notes:

Frequency Range Investigated: 150 kHz - 30 MHz
 Temp: 25°C
 Humidity: 33%
 Pressure: 102.7 kPa
 The EUT is in RX mode.

Ext Attn: 0 dB

Measurement Data:

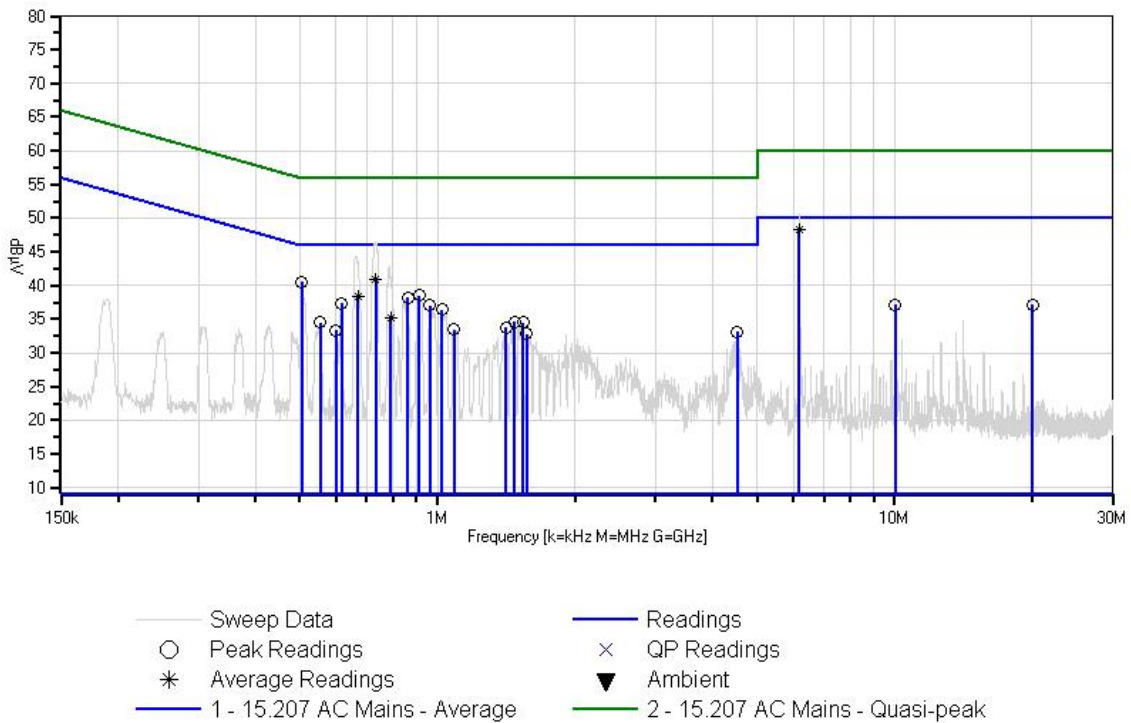
Reading listed by margin.

Test Lead: Neutral

#	Freq MHz	Rdng dB μ V	T1 T5 dB	T2 T6 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	6.193M	38.2	+0.1	+9.7	+0.1	+0.1	+0.0	48.4	50.0	-1.6	Neutr
	Ave		+0.1	+0.1							
^	6.196M	41.2	+0.1	+9.7	+0.1	+0.1	+0.0	51.4	50.0	+1.4	Neutr
			+0.1	+0.1							
^	6.193M	40.5	+0.1	+9.7	+0.1	+0.1	+0.0	50.7	50.0	+0.7	Neutr
			+0.1	+0.1							
4	732.570k	31.2	+0.0	+9.7	+0.0	+0.1	+0.0	41.0	46.0	-5.0	Neutr
	Ave		+0.0	+0.0							
^	730.180k	36.8	+0.0	+9.7	+0.0	+0.1	+0.0	46.6	46.0	+0.6	Neutr
			+0.0	+0.0							
^	731.765k	36.6	+0.0	+9.7	+0.0	+0.1	+0.0	46.4	46.0	+0.4	Neutr
			+0.0	+0.0							
7	505.604k	30.7	+0.0	+9.7	+0.0	+0.0	+0.0	40.5	46.0	-5.5	Neutr
			+0.0	+0.1							
8	911.227k	28.7	+0.0	+9.7	+0.0	+0.1	+0.0	38.5	46.0	-7.5	Neutr
			+0.0	+0.0							
9	669.130k	28.6	+0.0	+9.7	+0.0	+0.0	+0.0	38.3	46.0	-7.7	Neutr
	Ave		+0.0	+0.0							
^	664.350k	35.0	+0.0	+9.7	+0.0	+0.0	+0.0	44.7	46.0	-1.3	Neutr
			+0.0	+0.0							
^	664.320k	34.7	+0.0	+9.7	+0.0	+0.0	+0.0	44.4	46.0	-1.6	Neutr
			+0.0	+0.0							
12	860.480k	28.4	+0.0	+9.7	+0.0	+0.1	+0.0	38.2	46.0	-7.8	Neutr
			+0.0	+0.0							
13	616.139k	27.7	+0.0	+9.7	+0.0	+0.0	+0.0	37.4	46.0	-8.6	Neutr
			+0.0	+0.0							
14	962.259k	27.2	+0.0	+9.7	+0.0	+0.1	+0.0	37.0	46.0	-9.0	Neutr
			+0.0	+0.0							
15	1.022M	26.6	+0.0	+9.7	+0.0	+0.1	+0.0	36.4	46.0	-9.6	Neutr
			+0.0	+0.0							
16	790.200k	25.3	+0.0	+9.7	+0.0	+0.1	+0.0	35.1	46.0	-10.9	Neutr
	Ave		+0.0	+0.0							
^	789.880k	33.3	+0.0	+9.7	+0.0	+0.1	+0.0	43.1	46.0	-2.9	Neutr
			+0.0	+0.0							
^	789.124k	33.1	+0.0	+9.7	+0.0	+0.1	+0.0	42.9	46.0	-3.1	Neutr
			+0.0	+0.0							
19	1.477M	24.6	+0.1	+9.7	+0.0	+0.1	+0.0	34.6	46.0	-11.4	Neutr
			+0.0	+0.1							
20	554.327k	24.8	+0.0	+9.7	+0.0	+0.0	+0.0	34.5	46.0	-11.5	Neutr
			+0.0	+0.0							
21	1.536M	24.5	+0.1	+9.7	+0.0	+0.1	+0.0	34.5	46.0	-11.5	Neutr
			+0.0	+0.1							
22	1.413M	23.9	+0.0	+9.7	+0.0	+0.1	+0.0	33.8	46.0	-12.2	Neutr
			+0.0	+0.1							
23	1.086M	23.6	+0.0	+9.7	+0.0	+0.1	+0.0	33.5	46.0	-12.5	Neutr
			+0.0	+0.1							

24	600.141k	23.7	+0.0 +0.0	+9.7 +0.0	+0.0	+0.0	+0.0	33.4	46.0	-12.6	Neutr
25	20.058M	26.4	+0.5 +0.1	+9.7 +0.1	+0.2	+0.2	+0.0	37.2	50.0	-12.8	Neutr
26	10.031M	26.7	+0.3 +0.1	+9.7 +0.1	+0.1	+0.2	+0.0	37.2	50.0	-12.8	Neutr
27	4.522M	22.9	+0.1 +0.1	+9.7 +0.1	+0.1	+0.1	+0.0	33.1	46.0	-12.9	Neutr
28	1.566M	22.8	+0.1 +0.0	+9.7 +0.1	+0.0	+0.1	+0.0	32.8	46.0	-13.2	Neutr

CKC Laboratories, Inc. Date: 5/19/2011 Time: 15:57:48 Itron, Inc. WO#: 91909
 15.207 AC Mains - Average Test Lead: Neutral 240V 60Hz Sequence#: 30 Ext ATTN: 0 dB



Test Setup Photos



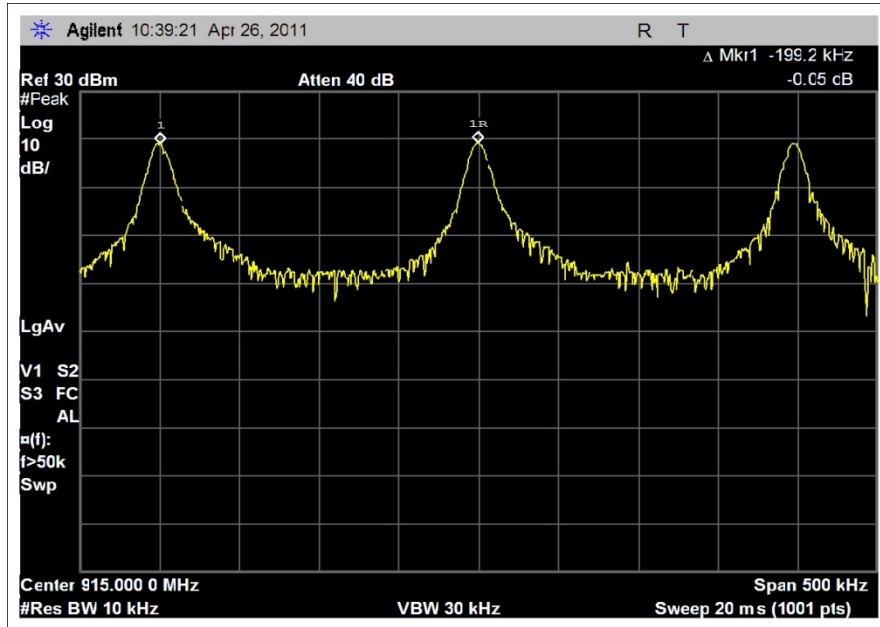
15.247(a)(1) Carrier Frequency Separation

Test Conditions / Setup
Comments
<p>The EUT was setup on the bench and connected to a spectrum analyzer via an RF cable and a 10 dB attenuator. The EUT was cycled through the different channels and modes by test software on a support laptop, connected to the EUT by an Ethernet cable.</p> <p>Requirement: Carrier Frequencies shall be separated by a minimum of 25 kHz or the 20 dB bandwidth, whichever is greater.</p> <p>Result: The Carrier Frequencies are separated by 200 kHz. PASS</p>

Test Equipment					
Asset/Serial #	Description	Model	Manufacturer	Cal Date	Cal Due
02872	Spectrum Analyzer	E4440A	Agilent	08/25/2009	08/25/2011
P05435	Attenuator	PE7015-10	Pasternack	09/08/2010	09/08/2012
03122	Cable 10k-18G	32026-2-29801-36	Astrolab	12/23/2010	12/23/2012

Engineer: J. Gilbert

Test Data



Test Setup Photos



15.247(a)(1)(i) 20 dB Bandwidth

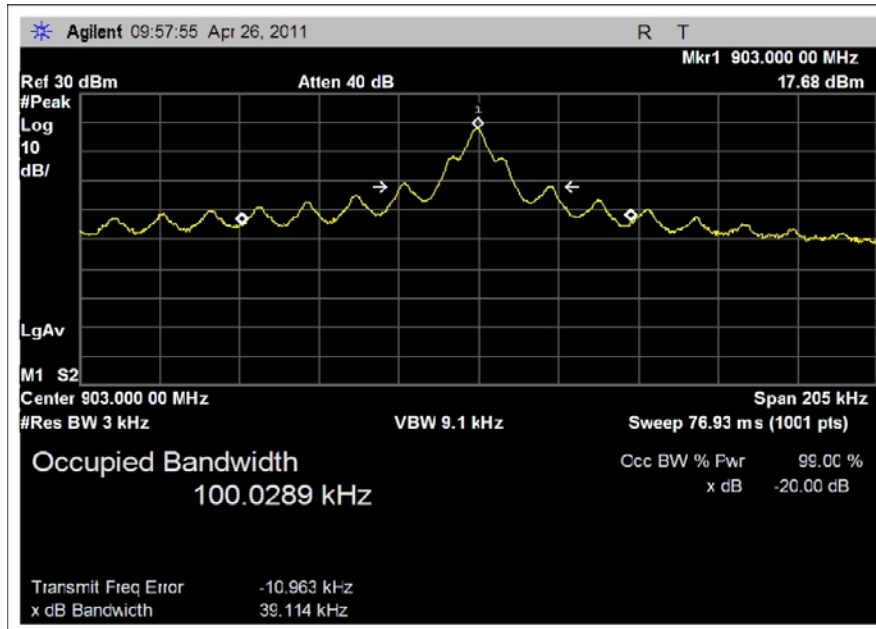
Test Conditions / Setup
Comments
<p>The EUT was setup on the bench and connected to a spectrum analyzer via an RF cable and a 10 dB attenuator. The EUT was cycled through the different channels and modes by test software on a support laptop, connected to the EUT by an Ethernet cable.</p> <p>Requirement: The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz. PASS</p>

Test Equipment					
Asset/Serial #	Description	Model	Manufacturer	Cal Date	Cal Due
02872	Spectrum Analyzer	E4440A	Agilent	08/25/2009	08/25/2011
P05435	Attenuator	PE7015-10	Pasternack	09/08/2010	09/08/2012
03122	Cable 10k-18G	32026-2-29801-36	Astrolab	12/23/2010	12/23/2012

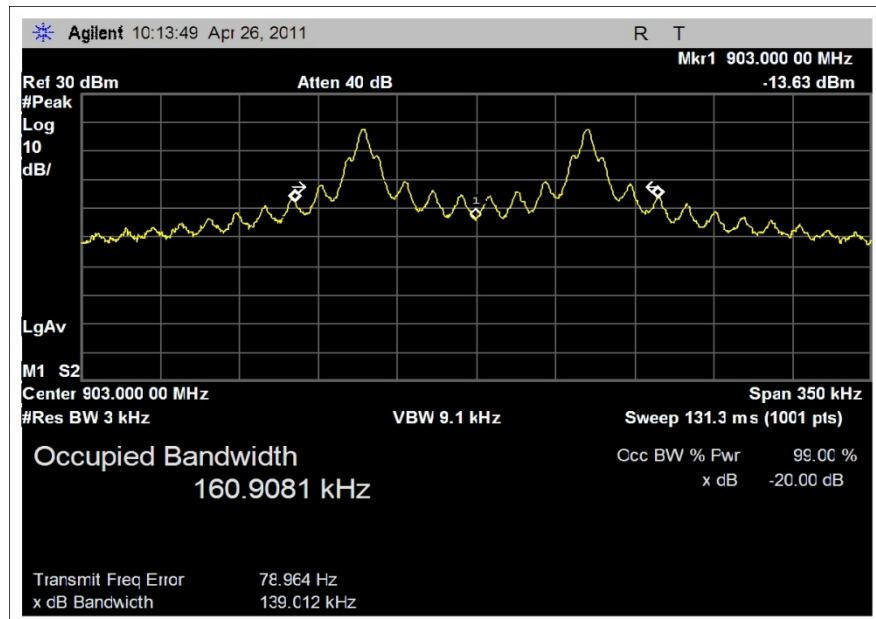
Engineer Name: J. Gilbert

Results Table			
903 MHz	AM	FM-12.5 kBaud	FM-37.5 kBaud
	39.114 kHz	139.012 kHz	54.376 kHz
915 MHz	AM	FM-12.5 kBaud	FM-37.5 kBaud
	39.084 kHz	139.191 kHz	54.618 kHz
926.8 MHz	AM	FM-12.5 kBaud	FM-37.5 kBaud
	38.823 kHz	139.134 kHz	54.643 kHz

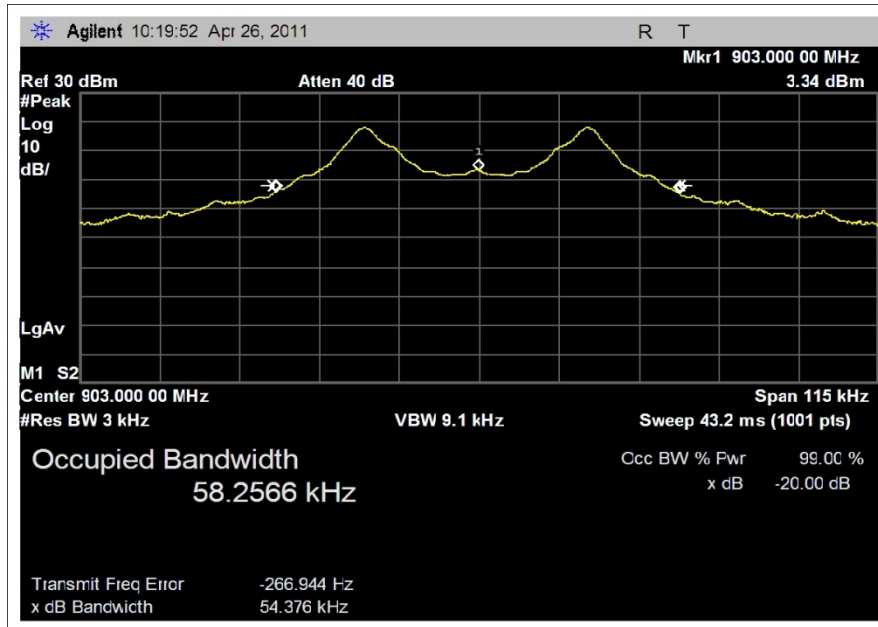
Test Data



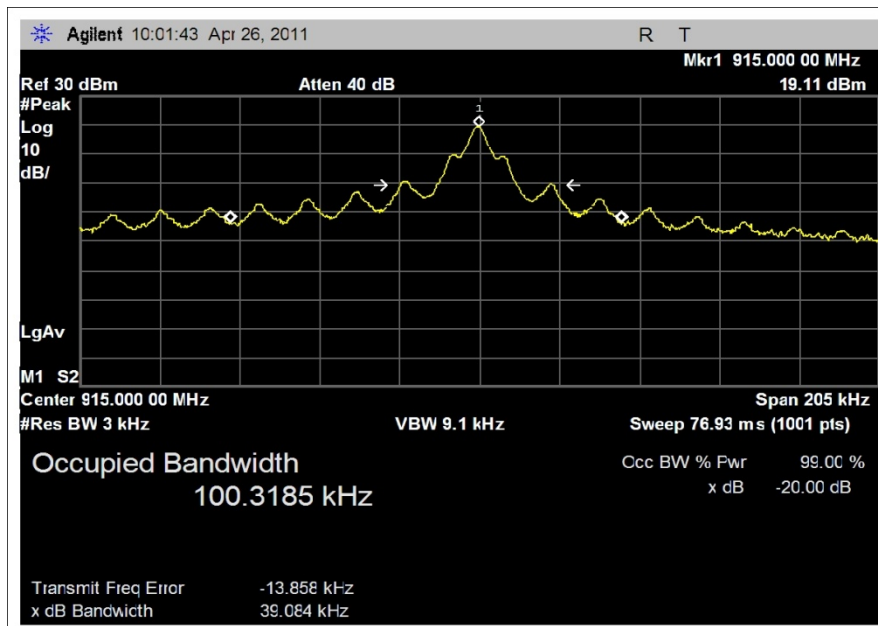
903-AM



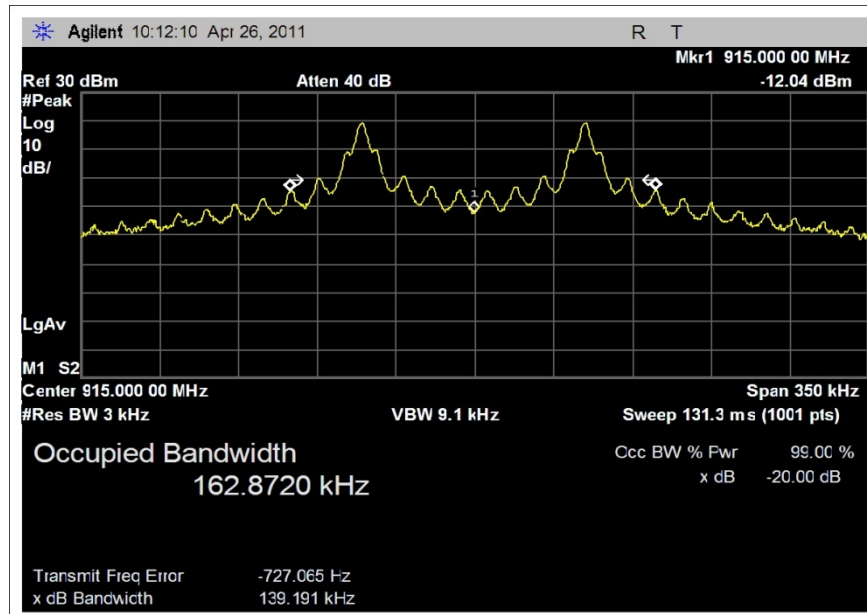
903-FM-12.5kBaund



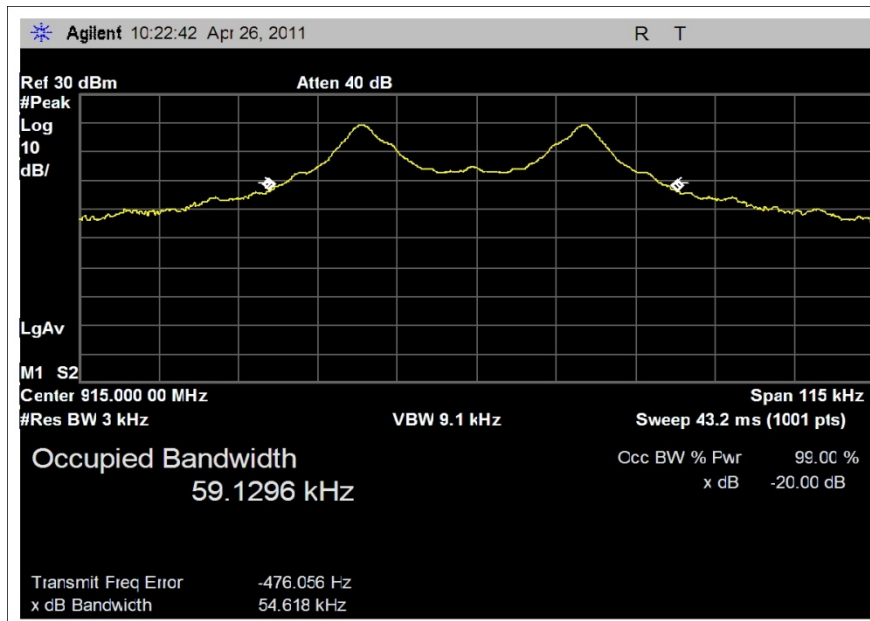
903-FM-37.5kBaund



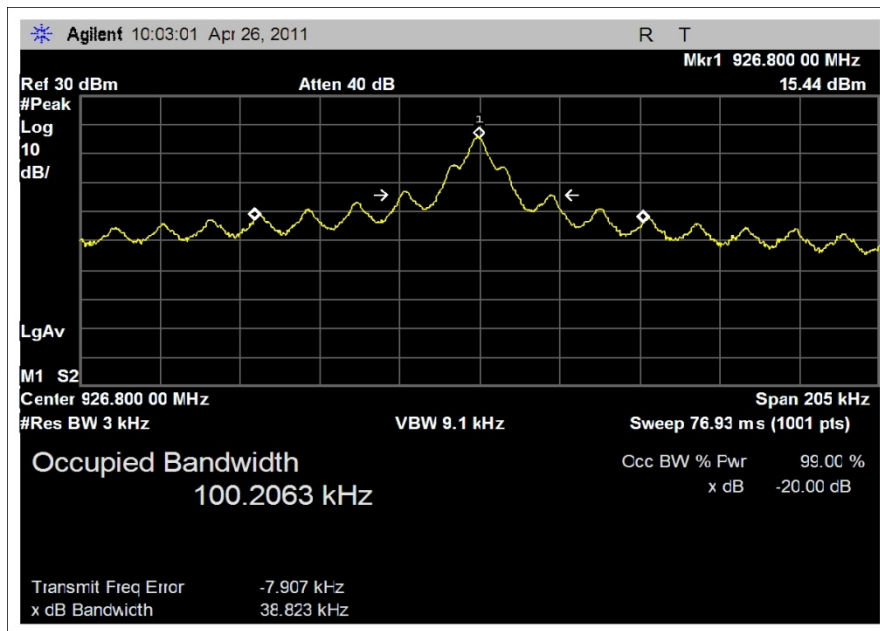
915-AM



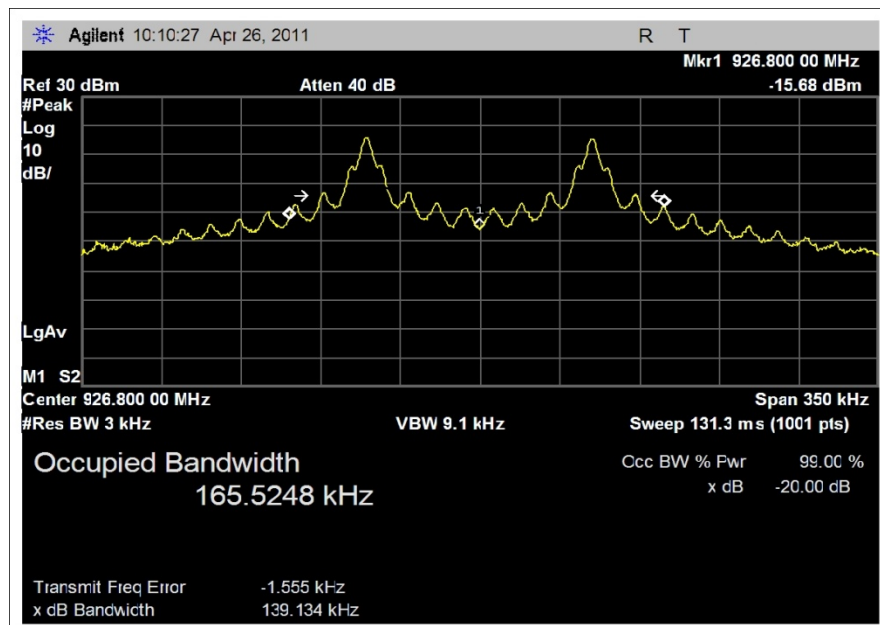
915-FM-12.5kBaud



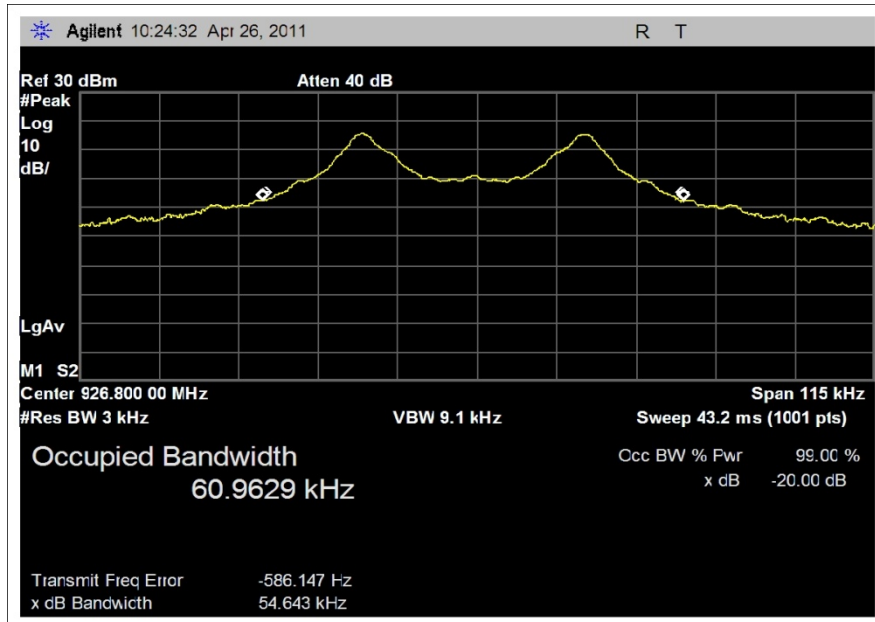
915-FM-37.5kBaud



926.8-AM



926.8-FM-12.5kBaud



926.8-FM-37.5kBaud

Test Setup Photos



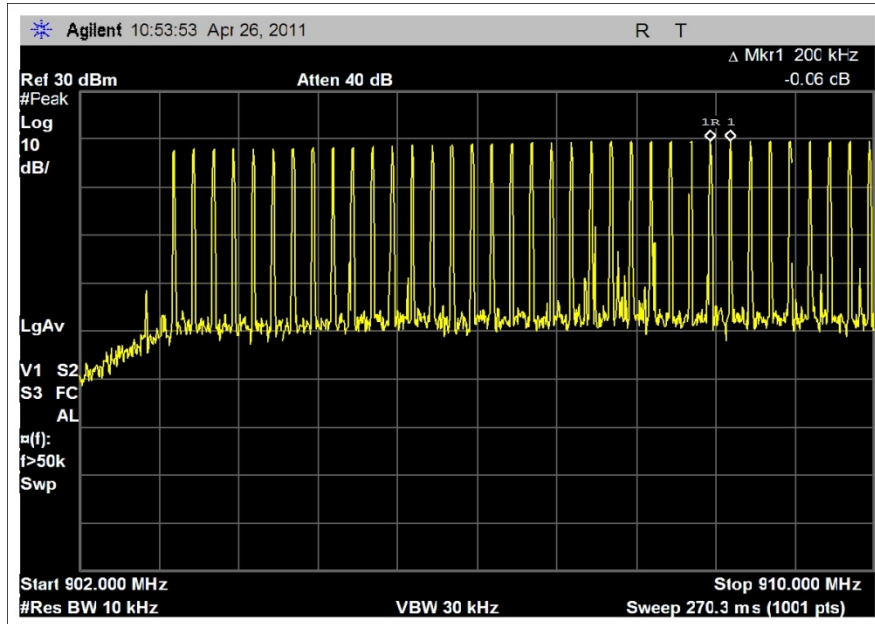
15.247(a)(1)(i) Number of Hopping Frequencies

Test Conditions / Setup
Comments
<p>The EUT was setup on the bench and connected to a spectrum analyzer via an RF cable and a 10 dB attenuator. The EUT was cycled through the different channels and modes by test software on a support laptop, connected to the EUT by an Ethernet cable.</p> <p>Requirement: If the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies.</p> <p>Result: The system uses 120 hopping frequencies. PASS</p>

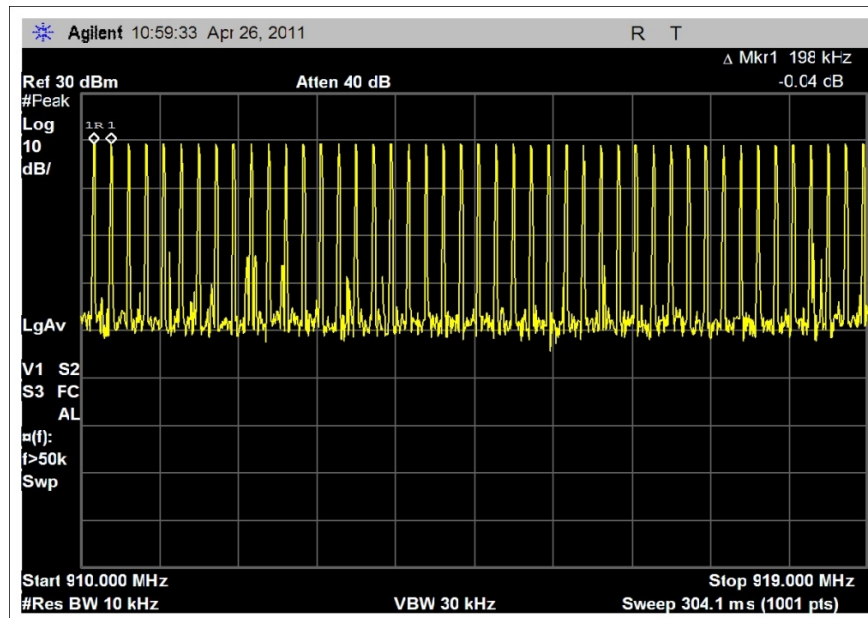
Test Equipment					
Asset/Serial #	Description	Model	Manufacturer	Cal Date	Cal Due
02872	Spectrum Analyzer	E4440A	Agilent	08/25/2009	08/25/2011
P05435	Attenuator	PE7015-10	Pasternack	09/08/2010	09/08/2012
03122	Cable 10k-18G	32026-2-29801-36	Astrolab	12/23/2010	12/23/2012

Engineer: J. Gilbert

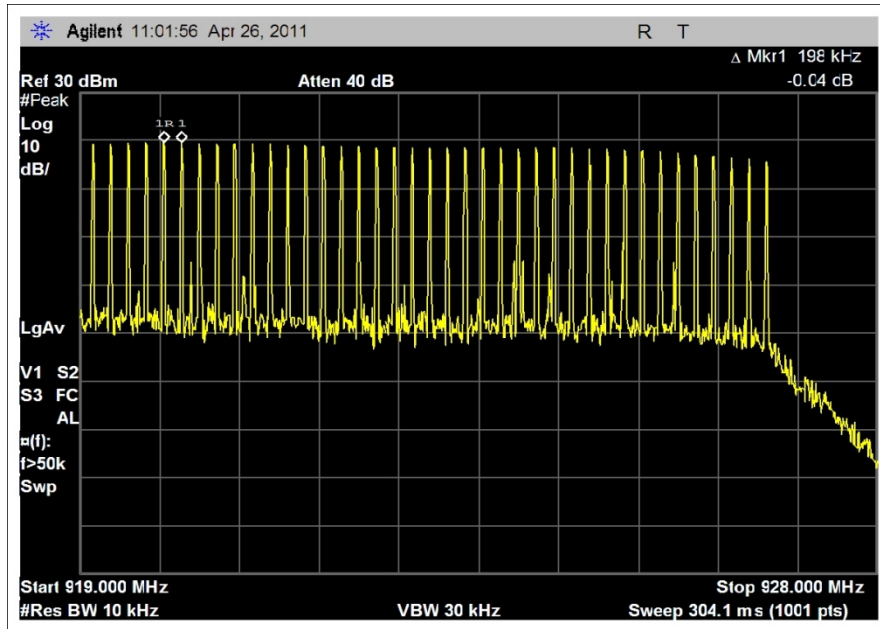
Test Data



902-910 MHz



910-919 MHz



919-928 MHz

Test Setup Photos



15.247(a)(1)(i) Time of Occupancy

Test Conditions / Setup

Comments

The EUT was setup on the bench and connected to a spectrum analyzer via an RF cable and a 10 dB attenuator. The EUT was cycled through the different channels and modes by test software on a support laptop, connected to the EUT by an Ethernet cable.

Requirement: If the 20 dB bandwidth of the hopping channel is less than 250 kHz, the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period.

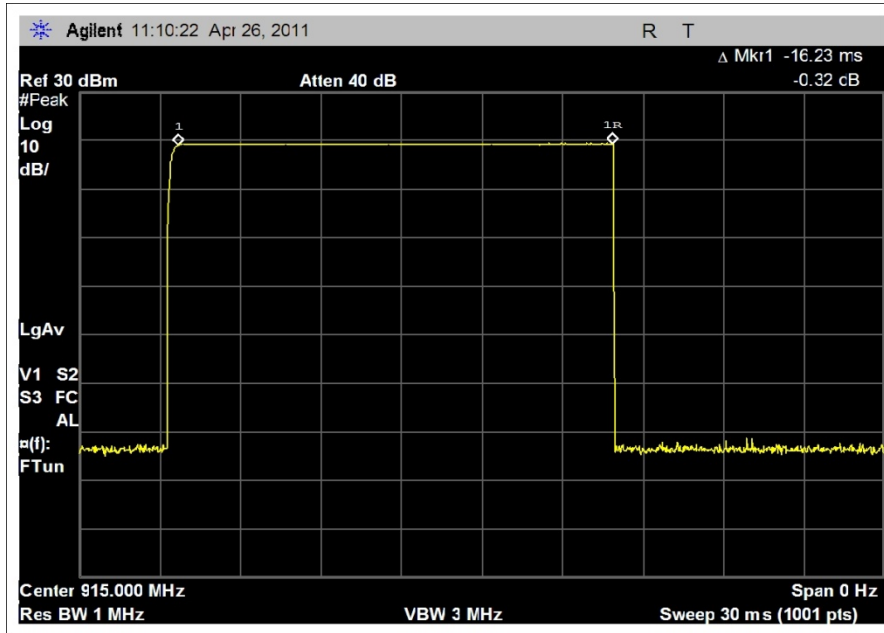
Result: The average time of occupancy is 0.01623 seconds. The manufacturer declares that the maximum individual transmission is < 20mS as shown in this report, however, there could be up to 10 transmissions on a channel within a 20 second period. Therefore, the maximum on channel time in a 20 second period would be < 200mS. PASS

Test Equipment

Asset/Serial #	Description	Model	Manufacturer	Cal Date	Cal Due
02872	Spectrum Analyzer	E4440A	Agilent	08/25/2009	08/25/2011
P05435	Attenuator	PE7015-10	Pasternack	09/08/2010	09/08/2012
03122	Cable 10k-18G	32026-2-29801-36	Astrolab	12/23/2010	12/23/2012

Engineer: J. Gilbert

Test Data



Test Setup Photos



15.247(b)(2) Peak Conducted Output Power

Summary
Comments
<p>Requirement: For frequency hopping systems operating in the 902–928 MHz band: 1 watt for systems employing at least 50 hopping channels.</p> <p>Result: The maximum peak conducted power is 0.56W. PASS</p>

Test Data Sheets

Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717

Customer: **Itron, Inc.**
 Specification: **15.247(b) Power Output (902-928 MHz FHSS >50 Channels)**
 Work Order #: **91910** Date: 4/26/2011
 Test Type: **Maximized Emissions** Time: 13:52:32
 Equipment: **SRR+WWAN+WIFI+GPS RX (always external antennas)** Sequence#: 4
 Manufacturer: Itron, Inc. Tested By: Jeff Gilbert
 Model: CCU100TA (Model: TowerCCUA)
 S/N: 74045191

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05435	Attenuator	PE7015-10	9/8/2010	9/8/2012
T2	AN03122	Cable	32026-2-29801-36	12/23/2010	12/23/2012
	AN02872	Spectrum Analyzer	E4440A	8/25/2009	8/25/2011

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
SRR+WWAN+WIFI+GPS RX (always external antennas)*	Itron, Inc.	CCU100TA (Model: TowerCCUA)	74045191

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Dell	E6400	H4CSTK1

Test Conditions / Notes:

Frequency Range Investigated: 903, 915, 926.8 MHz
 Temp: 22° C
 Humidity: 35%
 Pressure: 102.5 kPa
 AM16 kBaud.
 Peak RF power measured per DA00-705.

Ext Attn: 0 dB

Measurement Data:		Reading listed by margin.				Test Distance: None					
#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBm	Spec dBm	Margin dB	Polar Ant
1	914.999M	17.1	+9.7	+0.4			+0.0	27.2	30.0	-2.8	Condu 100
2	926.800M	16.4	+9.7	+0.4			+0.0	26.5	30.0	-3.5	Condu 100
3	903.000M	15.2	+9.7	+0.4			+0.0	25.3	30.0	-4.7	Condu 100



Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717

Customer: **Itron, Inc.**
 Specification: **15.247(b) Power Output (902-928 MHz FHSS >50 Channels)**
 Work Order #: **91910** Date: 4/26/2011
 Test Type: **Maximized Emissions** Time: 14:17:06
 Equipment: **SRR+WWAN+WIFI+GPS RX** Sequence#: 5
 (always external antennas)
 Manufacturer: Itron, Inc. Tested By: Jeff Gilbert
 Model: CCU100TA (Model: TowerCCUA)
 S/N: 74045191

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05435	Attenuator	PE7015-10	9/8/2010	9/8/2012
T2	AN03122	Cable	32026-2-29801-36	12/23/2010	12/23/2012
	AN02872	Spectrum Analyzer	E4440A	8/25/2009	8/25/2011

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
SRR+WWAN+WIFI+GPS RX (always external antennas)*	Itron, Inc.	CCU100TA (Model: TowerCCUA)	74045191

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Dell	E6400	H4CSTK1

Test Conditions / Notes:

Frequency Range Investigated: 903, 915, 926.8 MHz
 Temp: 22°C
 Humidity: 35%
 Pressure: 102.5 kPa
 FM12.5 kBaud.
 Peak RF power measured per DA00-705.

Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Distance: None

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBm	Spec dBm	Margin dB	Polar Ant
1	915.067M	17.4	+9.7	+0.4			+0.0	27.5	30.0	-2.5	Condu 100
2	926.759M	16.6	+9.7	+0.4			+0.0	26.7	30.0	-3.3	Condu 100
3	903.056M	15.9	+9.7	+0.4			+0.0	26.0	30.0	-4.0	Condu 100



Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717

Customer: **Itron, Inc.**
 Specification: **15.247(b) Power Output (902-928 MHz FHSS >50 Channels)**
 Work Order #: **91910** Date: 4/26/2011
 Test Type: **Maximized Emissions** Time: 14:01:32
 Equipment: **SRR+WWAN+WIFI+GPS RX** Sequence#: 6
(always external antennas)
 Manufacturer: Itron, Inc. Tested By: Jeff Gilbert
 Model: CCU100TA (Model: TowerCCUA)
 S/N: 74045191

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05435	Attenuator	PE7015-10	9/8/2010	9/8/2012
T2	AN03122	Cable	32026-2-29801-36	12/23/2010	12/23/2012
	AN02872	Spectrum Analyzer	E4440A	8/25/2009	8/25/2011

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
SRR+WWAN+WIFI+GPS RX (always external antennas)*	Itron, Inc.	CCU100TA (Model: TowerCCUA)	74045191

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Dell	E6400	H4CSTK1

Test Conditions / Notes:

Frequency Range Investigated: 903, 915, 926.8 MHz
 Temp: 22°C
 Humidity: 35%
 Pressure: 102.5 kPa
 FM37.5 kBaud.
 Peak RF power measured per DA00-705.

Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Distance: None

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	dB	Dist Table	Corr dBm	Spec dBm	Margin dB	Polar Ant
1	915.016M	17.3	+9.7	+0.4		+0.0	27.4	30.0	-2.6	Condu 100
2	926.817M	16.6	+9.7	+0.4		+0.0	26.7	30.0	-3.3	Condu 100
3	903.017M	15.5	+9.7	+0.4		+0.0	25.6	30.0	-4.4	Condu 100

Test Setup Photos



15.247(d) Spurious Emissions – Antenna Conducted

Summary
Comments
<p>Requirement: Spurious emissions in a 100 kHz bandwidth outside the band of operation shall be at least 20 dB below the level of the carrier.</p> <p>Result: PASS</p>

Test Data Sheets

Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717

Customer: **Itron, Inc.**

Specification: **15.247(d) Conducted Spurious Emissions**

Work Order #: **91910** Date: 4/26/2011

Test Type: **Maximized Emissions** Time: 2:20:22 PM

Equipment: **SRR+WWAN+WIFI+GPS RX** Sequence#: 14
(always external antennas)

Manufacturer: Itron, Inc. Tested By: Jeff Gilbert

Model: CCU100TA (Model: TowerCCUA)

S/N: 74045191

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05508	Attenuator	BW-S20W2	10/12/2009	10/12/2011
T2	AN03122	Cable	32026-2-29801-36	12/23/2010	12/23/2012
	AN02872	Spectrum Analyzer	E4440A	8/25/2009	8/25/2011

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
SRR+WWAN+WIFI+GPS RX (always external antennas)*	Itron, Inc.	CCU100TA (Model: TowerCCUA)	74045191

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Dell	E6400	H4CSTK1

Test Conditions / Notes:

<p>Frequency Range Investigated: 30 kHz - 9300 MHz</p> <p>Temp: 22° C</p> <p>Humidity: 35%</p> <p>Pressure: 102.5 kPa</p> <p>AM16 kBaud</p> <p>903 MHz</p> <p>Measured per DA00-705.</p>
--

Ext Attn: 0 dB

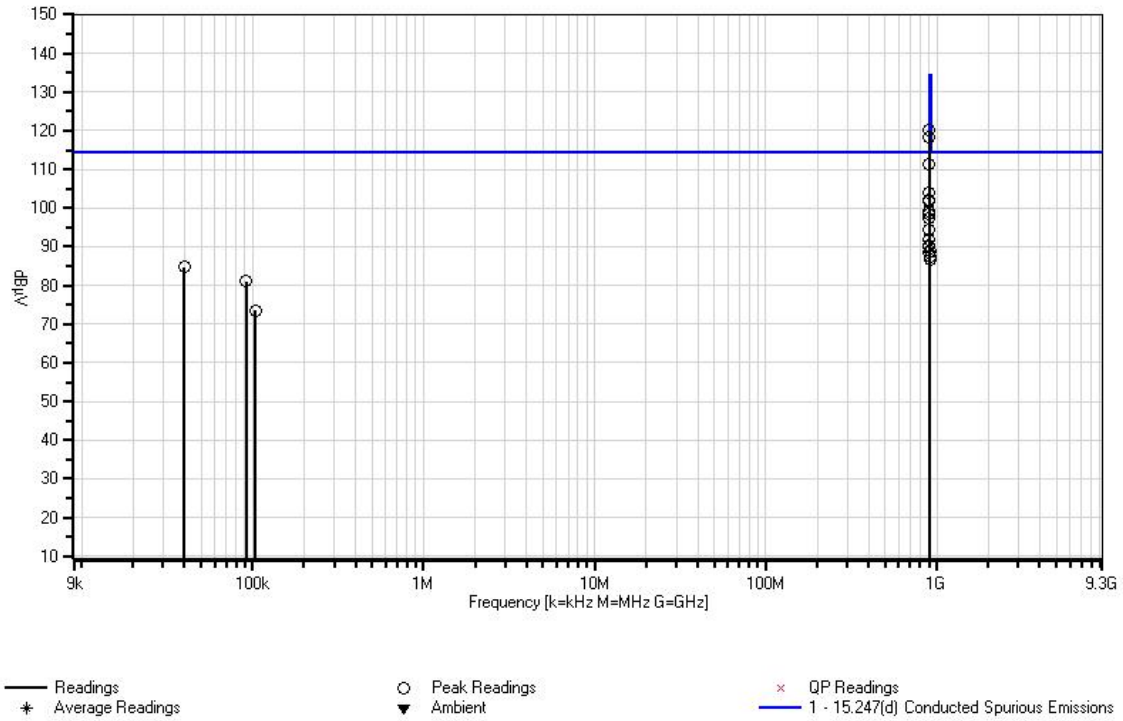
Measurement Data:

Reading listed by margin.

Test Distance: None

#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	dB	dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	902.872M	99.5	+20.2	+0.4			+0.0	120.1	134.4	-14.3	Condu 100
2	903.072M	97.8	+20.2	+0.4			+0.0	118.4	134.4	-16.0	Condu 100
3	902.672M	90.7	+20.2	+0.4			+0.0	111.3	134.4	-23.1	Condu 100
4	40.002k	64.7	+20.1	+0.0			+0.0	84.8	114.4	-29.6	Condu 100
5	903.873M	83.2	+20.2	+0.4			+0.0	103.8	134.4	-30.6	Condu 100
6	904.073M	81.4	+20.2	+0.4			+0.0	102.0	134.4	-32.4	Condu 100
7	904.273M	81.0	+20.2	+0.4			+0.0	101.6	134.4	-32.8	Condu 100
8	92.011k	60.9	+20.1	+0.0			+0.0	81.0	114.4	-33.4	Condu 100
9	905.675M	78.5	+20.2	+0.4			+0.0	99.1	134.4	-35.3	Condu 100
10	904.674M	77.7	+20.2	+0.4			+0.0	98.3	134.4	-36.1	Condu 100
11	904.874M	76.9	+20.2	+0.4			+0.0	97.5	134.4	-36.9	Condu 100
12	905.274M	73.8	+20.2	+0.4			+0.0	94.4	134.4	-40.0	Condu 100
13	104.014k	53.4	+20.1	+0.0			+0.0	73.5	114.4	-40.9	Condu 100
14	906.476M	71.4	+20.2	+0.4			+0.0	92.0	134.4	-42.4	Condu 100
15	907.076M	69.8	+20.2	+0.4			+0.0	90.4	134.4	-44.0	Condu 100
16	906.175M	69.4	+20.2	+0.4			+0.0	90.0	134.4	-44.4	Condu 100
17	908.177M	68.3	+20.2	+0.4			+0.0	88.9	134.4	-45.5	Condu 100
18	906.676M	67.8	+20.2	+0.4			+0.0	88.4	134.4	-46.0	Condu 100
19	908.578M	66.9	+20.2	+0.4			+0.0	87.5	134.4	-46.9	Condu 100
20	909.579M	66.0	+20.2	+0.4			+0.0	86.6	134.4	-47.8	Condu 100

CKC Laboratories, Inc. Date: 4/26/2011 Time: 2:20:22 PM Itron, Inc. WO#: 91910
15.247(d) Conducted Spurious Emissions Test Distance: None Conducted Sequence#: 14 Ext ATTN: 0 dB





Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717

Customer: **Itron, Inc.**
 Specification: **15.247(d) Conducted Spurious Emissions**
 Work Order #: **91910** Date: 4/26/2011
 Test Type: **Maximized Emissions** Time: 2:28:03 PM
 Equipment: **SRR+WWAN+WIFI+GPS RX (always external antennas)** Sequence#: 15
 Manufacturer: Itron, Inc. Tested By: Jeff Gilbert
 Model: CCU100TA (Model: TowerCCUA)
 S/N: 74045191

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05508	Attenuator	BW-S20W2	10/12/2009	10/12/2011
T2	AN03122	Cable	32026-2-29801-36	12/23/2010	12/23/2012
	AN02872	Spectrum Analyzer	E4440A	8/25/2009	8/25/2011

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
SRR+WWAN+WIFI+GPS RX (always external antennas)*	Itron, Inc.	CCU100TA (Model: TowerCCUA)	74045191

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Dell	E6400	H4CSTK1

Test Conditions / Notes:

Frequency Range Investigated: 30 kHz - 9300 MHz
 Temp: 22° C
 Humidity: 35%
 Pressure: 102.5 kPa
 AM16 kBaud
 915 MHz
 Measured per DA00-705.

Ext Attn: 0 dB

Measurement Data:

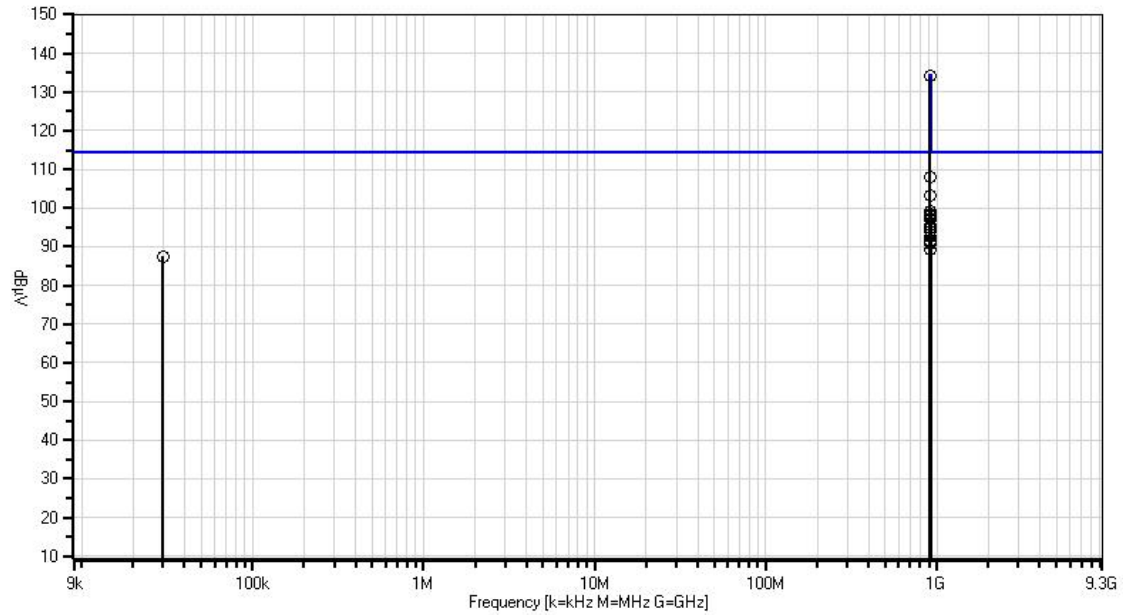
Reading listed by margin.

Test Distance: None

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	914.984M	113.5	+20.2	+0.4			+0.0	134.1	134.4	-0.3	Condu 100
2	915.485M	87.5	+20.2	+0.4			+0.0	108.1	134.4	-26.3	Condu 100
3	30.000k	67.4	+20.1	+0.0			+0.0	87.5	114.4	-26.9	Condu 100
4	915.685M	82.7	+20.2	+0.4			+0.0	103.3	134.4	-31.1	Condu 100
5	916.486M	78.7	+20.2	+0.4			+0.0	99.3	134.4	-35.1	Condu 100
6	917.086M	77.7	+20.2	+0.4			+0.0	98.3	134.4	-36.1	Condu 100
7	916.686M	77.5	+20.2	+0.4			+0.0	98.1	134.4	-36.3	Condu 100

8	913.583M	76.8	+20.2	+0.4	+0.0	97.4	134.4	-37.0	Condu 100
9	913.783M	76.5	+20.2	+0.4	+0.0	97.1	134.4	-37.3	Condu 100
10	913.282M	74.9	+20.2	+0.4	+0.0	95.5	134.4	-38.9	Condu 100
11	912.382M	74.9	+20.2	+0.4	+0.0	95.5	134.4	-38.9	Condu 100
12	912.782M	74.3	+20.2	+0.4	+0.0	94.9	134.4	-39.5	Condu 100
13	911.781M	73.5	+20.2	+0.4	+0.0	94.1	134.4	-40.3	Condu 100
14	912.582M	71.9	+20.2	+0.4	+0.0	92.5	134.4	-41.9	Condu 100
15	917.687M	70.8	+20.2	+0.4	+0.0	91.4	134.4	-43.0	Condu 100
16	912.181M	70.6	+20.2	+0.4	+0.0	91.2	134.4	-43.2	Condu 100
17	918.888M	70.3	+20.2	+0.4	+0.0	90.9	134.4	-43.5	Condu 100
18	918.488M	70.0	+20.2	+0.4	+0.0	90.6	134.4	-43.8	Condu 100
19	918.688M	68.8	+20.2	+0.4	+0.0	89.4	134.4	-45.0	Condu 100
20	919.489M	68.5	+20.2	+0.4	+0.0	89.1	134.4	-45.3	Condu 100

CKC Laboratories, Inc. Date: 4/26/2011 Time: 2:28:03 PM Itron, Inc. WO#: 91910
 15.247(d) Conducted Spurious Emissions Test Distance: None Conducted Sequence#: 15 Ext ATTN: 0 dB



— Readings
 * Average Readings
 ○ Peak Readings
 ▼ Ambient
 × QP Readings
 — 1 - 15.247(d) Conducted Spurious Emissions

Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717

Customer: **Itron, Inc.**
 Specification: **15.247(d) Conducted Spurious Emissions**
 Work Order #: **91910** Date: 4/26/2011
 Test Type: **Maximized Emissions** Time: 2:32:33 PM
 Equipment: **SRR+WWAN+WIFI+GPS RX** Sequence#: 16
(always external antennas)
 Manufacturer: Itron, Inc. Tested By: Jeff Gilbert
 Model: CCU100TA (Model: TowerCCUA)
 S/N: 74045191

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05508	Attenuator	BW-S20W2	10/12/2009	10/12/2011
T2	AN03122	Cable	32026-2-29801-36	12/23/2010	12/23/2012
	AN02872	Spectrum Analyzer	E4440A	8/25/2009	8/25/2011

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
SRR+WWAN+WIFI+GPS RX (always external antennas)*	Itron, Inc.	CCU100TA (Model: TowerCCUA)	74045191

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Dell	E6400	H4CSTK1

Test Conditions / Notes:

Frequency Range Investigated: 30 kHz - 9300 MHz
 Temp: 22°C
 Humidity: 35%
 Pressure: 102.5 kPa
 AM16 kBaud
 926.8 MHz
 Measured per DA00-705.

Ext Attn: 0 dB

Measurement Data:

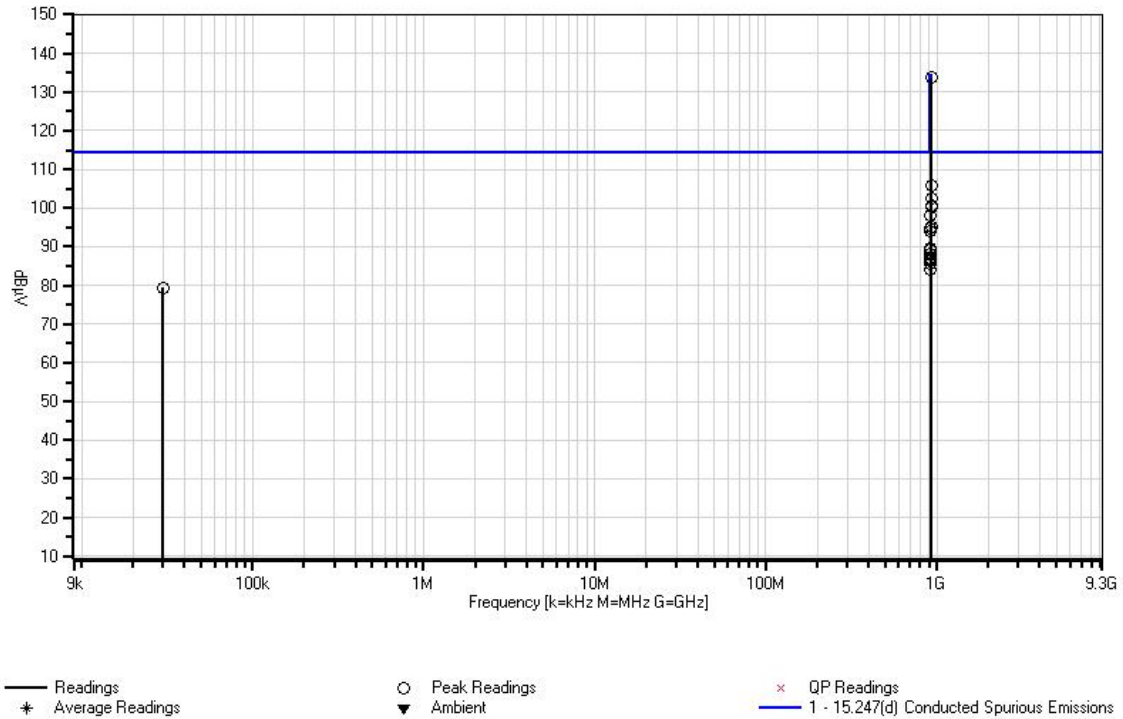
Reading listed by margin.

Test Distance: None

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	dB	Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	926.796M	113.1	+20.2	+0.4		+0.0	133.7	134.4	-0.7	Condu 100
2	926.195M	85.2	+20.2	+0.4		+0.0	105.8	134.4	-28.6	Condu 100
3	925.995M	81.8	+20.2	+0.4		+0.0	102.4	134.4	-32.0	Condu 100
4	925.194M	80.1	+20.2	+0.4		+0.0	100.7	134.4	-33.7	Condu 100
5	925.595M	79.8	+20.2	+0.4		+0.0	100.4	134.4	-34.0	Condu 100
6	30.000k	59.4	+20.1	+0.0		+0.0	79.5	114.4	-34.9	Condu 100

7	924.794M	77.5	+20.2	+0.4	+0.0	98.1	134.4	-36.3	Condu 100
8	924.994M	74.7	+20.2	+0.4	+0.0	95.3	134.4	-39.1	Condu 100
9	923.793M	74.0	+20.2	+0.4	+0.0	94.6	134.4	-39.8	Condu 100
10	924.594M	73.4	+20.2	+0.4	+0.0	94.0	134.4	-40.4	Condu 100
11	922.392M	69.0	+20.2	+0.4	+0.0	89.6	134.4	-44.8	Condu 100
12	922.792M	68.6	+20.2	+0.4	+0.0	89.2	134.4	-45.2	Condu 100
13	921.791M	67.5	+20.2	+0.4	+0.0	88.1	134.4	-46.3	Condu 100
14	922.592M	66.4	+20.2	+0.4	+0.0	87.0	134.4	-47.4	Condu 100
15	920.189M	66.2	+20.2	+0.4	+0.0	86.8	134.4	-47.6	Condu 100
16	920.790M	65.9	+20.2	+0.4	+0.0	86.5	134.4	-47.9	Condu 100
17	921.991M	65.7	+20.2	+0.4	+0.0	86.3	134.4	-48.1	Condu 100
18	919.889M	65.1	+20.2	+0.4	+0.0	85.7	134.4	-48.7	Condu 100
19	924.394M	63.6	+20.2	+0.4	+0.0	84.2	134.4	-50.2	Condu 100
20	918.888M	63.4	+20.2	+0.4	+0.0	84.0	134.4	-50.4	Condu 100

CKC Laboratories, Inc. Date: 4/26/2011 Time: 2:32:33 PM Itron, Inc. WO#: 91910
 15.247(d) Conducted Spurious Emissions Test Distance: None Conducted Sequence#: 16 Ext ATTN: 0 dB





Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717

Customer: **Itron, Inc.**
 Specification: **15.247(d) Conducted Spurious Emissions**
 Work Order #: **91910** Date: 4/26/2011
 Test Type: **Maximized Emissions** Time: 2:37:33 PM
 Equipment: **SRR+WWAN+WIFI+GPS RX** Sequence#: 17
(always external antennas)
 Manufacturer: Itron, Inc. Tested By: Jeff Gilbert
 Model: CCU100TA (Model: TowerCCUA)
 S/N: 74045191

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05508	Attenuator	BW-S20W2	10/12/2009	10/12/2011
T2	AN03122	Cable	32026-2-29801-36	12/23/2010	12/23/2012
	AN02872	Spectrum Analyzer	E4440A	8/25/2009	8/25/2011

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
SRR+WWAN+WIFI+GPS RX (always external antennas)*	Itron, Inc.	CCU100TA (Model: TowerCCUA)	74045191

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Dell	E6400	H4CSTK1

Test Conditions / Notes:

Frequency Range Investigated: 30 kHz - 9300 MHz
 Temp: 22°C
 Humidity: 35%
 Pressure: 102.5 kPa
 FM12.5 kBaud
 903 MHz
 Measured per DA00-705.

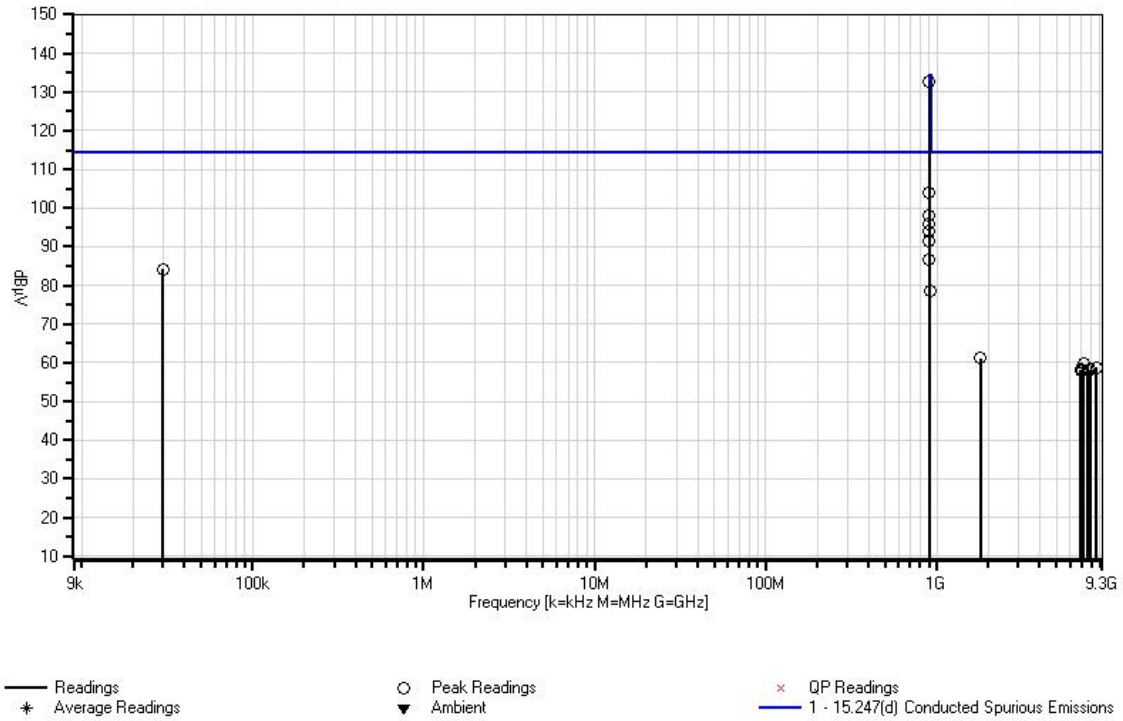
Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Distance: None

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	903.072M	112.1	+20.2	+0.4			+0.0	132.7	134.4	-1.7	Condu 100
2	30.000k	64.1	+20.1	+0.0			+0.0	84.2	114.4	-30.2	Condu 100
3	903.573M	83.4	+20.2	+0.4			+0.0	104.0	134.4	-30.4	Condu 100
4	904.073M	77.5	+20.2	+0.4			+0.0	98.1	134.4	-36.3	Condu 100
5	904.374M	75.4	+20.2	+0.4			+0.0	96.0	134.4	-38.4	Condu 100
6	904.674M	73.6	+20.2	+0.4			+0.0	94.2	134.4	-40.2	Condu 100
7	905.174M	70.9	+20.2	+0.4			+0.0	91.5	134.4	-42.9	Condu 100

8	906.576M	66.0	+20.2	+0.4	+0.0	86.6	134.4	-47.8	Condu 100
9	906.175M	65.9	+20.2	+0.4	+0.0	86.5	134.4	-47.9	Condu 100
10	1806.074M	40.6	+20.0	+0.6	+0.0	61.2	114.4	-53.2	Condu 100
11	7247.711M	38.8	+19.7	+1.3	+0.0	59.8	114.4	-54.6	Condu 100
12	8580.542M	36.5	+20.9	+1.3	+0.0	58.7	114.4	-55.7	Condu 100
13	909.078M	57.8	+20.2	+0.4	+0.0	78.4	134.4	-56.0	Condu 100
14	6959.823M	36.7	+20.2	+1.3	+0.0	58.2	114.4	-56.2	Condu 100
15	6981.545M	36.5	+20.3	+1.4	+0.0	58.2	114.4	-56.2	Condu 100
16	7861.724M	36.3	+20.5	+1.4	+0.0	58.2	114.4	-56.2	Condu 100
17	7064.728M	36.3	+20.2	+1.4	+0.0	57.9	114.4	-56.5	Condu 100
18	7033.997M	36.1	+20.3	+1.4	+0.0	57.8	114.4	-56.6	Condu 100
19	7101.164M	36.2	+20.2	+1.4	+0.0	57.8	114.4	-56.6	Condu 100
20	7675.037M	36.2	+20.3	+1.3	+0.0	57.8	114.4	-56.6	Condu 100

CKC Laboratories, Inc. Date: 4/26/2011 Time: 2:37:33 PM Itron, Inc. WO#: 91910
 15.247(d) Conducted Spurious Emissions Test Distance: None Conducted Sequence#: 17 Ext ATTN: 0 dB





Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717

Customer: **Itron, Inc.**
 Specification: **15.247(d) Conducted Spurious Emissions**
 Work Order #: **91910** Date: 4/26/2011
 Test Type: **Maximized Emissions** Time: 2:41:50 PM
 Equipment: **SRR+WWAN+WIFI+GPS RX** Sequence#: 18
 (always external antennas)
 Manufacturer: Itron, Inc. Tested By: Jeff Gilbert
 Model: CCU100TA (Model: TowerCCUA)
 S/N: 74045191

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05508	Attenuator	BW-S20W2	10/12/2009	10/12/2011
T2	AN03122	Cable	32026-2-29801-36	12/23/2010	12/23/2012
	AN02872	Spectrum Analyzer	E4440A	8/25/2009	8/25/2011

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
SRR+WWAN+WIFI+GPS RX (always external antennas)*	Itron, Inc.	CCU100TA (Model: TowerCCUA)	74045191

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Dell	E6400	H4CSTK1

Test Conditions / Notes:

Frequency Range Investigated: 30 kHz - 9300 MHz
 Temp: 22°C
 Humidity: 35%
 Pressure: 102.5 kPa
 FM12.5 kBaud
 915 MHz
 Measured per DA00-705.

Ext Attn: 0 dB

Measurement Data:

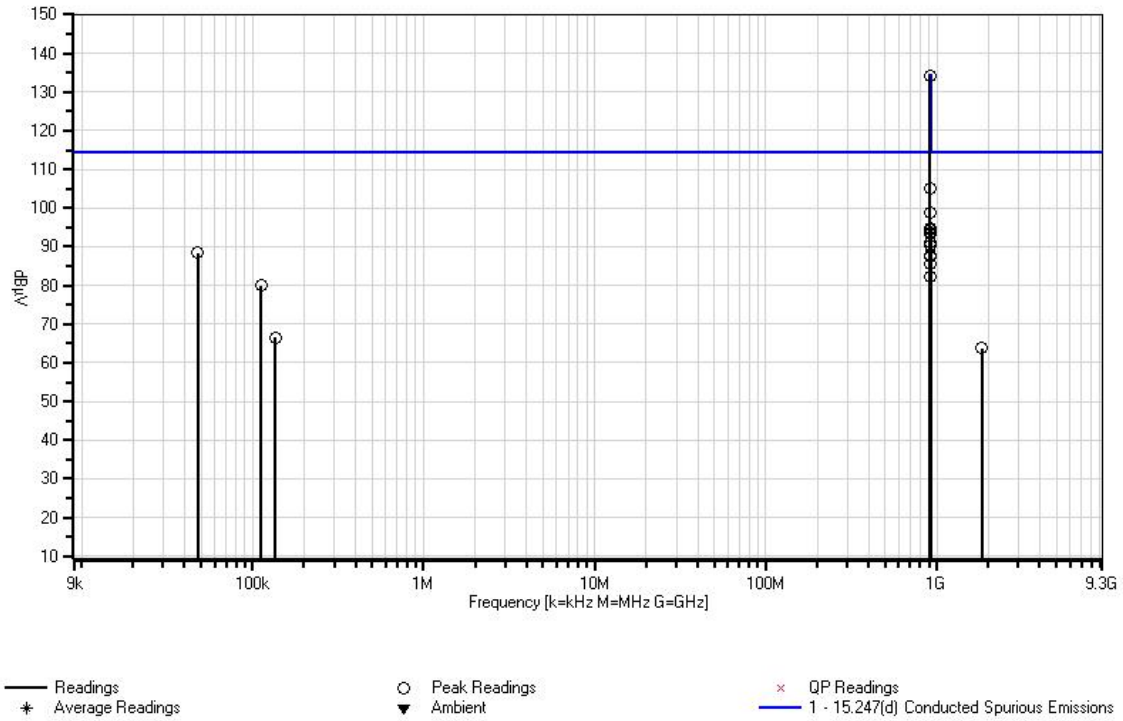
Reading listed by margin.

Test Distance: None

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	915.084M	113.7	+20.2	+0.4			+0.0	134.3	134.4	-0.1	Condu 100
2	48.003k	68.4	+20.1	+0.0			+0.0	88.5	114.4	-25.9	Condu 100
3	914.684M	84.5	+20.2	+0.4			+0.0	105.1	134.4	-29.3	Condu 100
4	112.015k	59.8	+20.1	+0.0			+0.0	79.9	114.4	-34.5	Condu 100
5	915.585M	78.2	+20.2	+0.4			+0.0	98.8	134.4	-35.6	Condu 100
6	917.987M	74.0	+20.2	+0.4			+0.0	94.6	134.4	-39.8	Condu 100
7	913.683M	73.8	+20.2	+0.4			+0.0	94.4	134.4	-40.0	Condu 100

8	913.383M	72.9	+20.2	+0.4	+0.0	93.5	134.4	-40.9	Condu 100
9	912.281M	72.7	+20.2	+0.4	+0.0	93.3	134.4	-41.1	Condu 100
10	917.787M	72.6	+20.2	+0.4	+0.0	93.2	134.4	-41.2	Condu 100
11	918.388M	70.4	+20.2	+0.4	+0.0	91.0	134.4	-43.4	Condu 100
12	916.986M	69.9	+20.2	+0.4	+0.0	90.5	134.4	-43.9	Condu 100
13	912.782M	67.3	+20.2	+0.4	+0.0	87.9	134.4	-46.5	Condu 100
14	917.186M	67.1	+20.2	+0.4	+0.0	87.7	134.4	-46.7	Condu 100
15	912.482M	67.0	+20.2	+0.4	+0.0	87.6	134.4	-46.8	Condu 100
16	918.187M	66.8	+20.2	+0.4	+0.0	87.4	134.4	-47.0	Condu 100
17	136.020k	46.4	+20.1	+0.0	+0.0	66.5	114.4	-47.9	Condu 100
18	917.387M	64.9	+20.2	+0.4	+0.0	85.5	134.4	-48.9	Condu 100
19	1830.098M	43.1	+20.0	+0.6	+0.0	63.7	114.4	-50.7	Condu 100
20	918.788M	61.6	+20.2	+0.4	+0.0	82.2	134.4	-52.2	Condu 100

CKC Laboratories, Inc. Date: 4/26/2011 Time: 2:41:50 PM Itron, Inc. WO#: 91910
15.247(d) Conducted Spurious Emissions Test Distance: None Conducted Sequence#: 18 Ext ATTN: 0 dB





Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717

Customer: **Itron, Inc.**
 Specification: **15.247(d) Conducted Spurious Emissions**
 Work Order #: **91910** Date: 4/26/2011
 Test Type: **Maximized Emissions** Time: 2:46:28 PM
 Equipment: **SRR+WWAN+WIFI+GPS RX (always external antennas)** Sequence#: 19
 Manufacturer: Itron, Inc. Tested By: Jeff Gilbert
 Model: CCU100TA (Model: TowerCCUA)
 S/N: 74045191

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05508	Attenuator	BW-S20W2	10/12/2009	10/12/2011
T2	AN03122	Cable	32026-2-29801-36	12/23/2010	12/23/2012
	AN02872	Spectrum Analyzer	E4440A	8/25/2009	8/25/2011

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
SRR+WWAN+WIFI+GPS RX (always external antennas)*	Itron, Inc.	CCU100TA (Model: TowerCCUA)	74045191

Support Devices:

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

Frequency Range Investigated: 30 kHz - 9300 MHz
 Temp: 22°C
 Humidity: 35%
 Pressure: 102.5 kPa
 FM12.5 kBaud
 926.8 MHz
 Measured per DA00-705.

Ext Attn: 0 dB

Measurement Data:

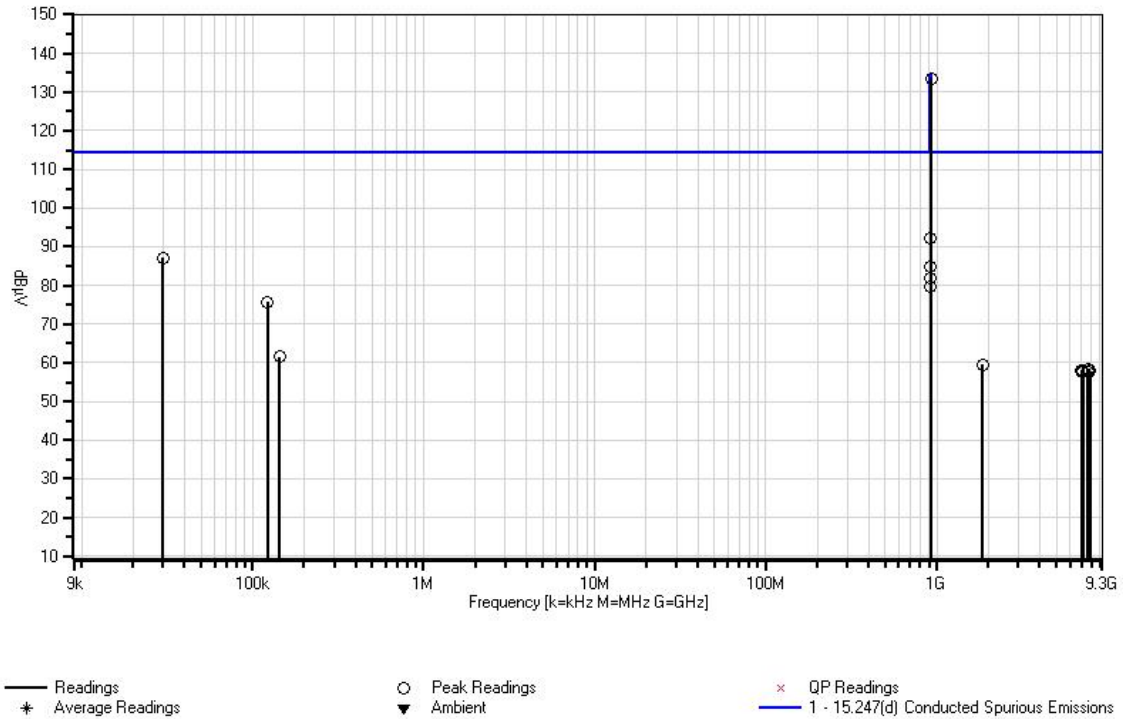
Reading listed by margin.

Test Distance: None

#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	dB	dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	926.796M	113.0	+20.2	+0.4			+0.0	133.6	134.4	-0.8	Condu 100
2	30.000k	67.1	+20.1	+0.0			+0.0	87.2	114.4	-27.2	Condu 100
3	122.017k	55.7	+20.1	+0.0			+0.0	75.8	114.4	-38.6	Condu 100
4	923.693M	71.6	+20.2	+0.4			+0.0	92.2	134.4	-42.2	Condu 100
5	924.394M	64.3	+20.2	+0.4			+0.0	84.9	134.4	-49.5	Condu 100
6	924.093M	61.4	+20.2	+0.4			+0.0	82.0	134.4	-52.4	Condu 100
7	144.021k	41.4	+20.1	+0.0			+0.0	61.5	114.4	-52.9	Condu 100

8	922.892M	59.2	+20.2	+0.4	+0.0	79.8	134.4	-54.6	Condu 100
9	922.592M	59.0	+20.2	+0.4	+0.0	79.6	134.4	-54.8	Condu 100
10	1853.722M	39.0	+20.0	+0.6	+0.0	59.6	114.4	-54.8	Condu 100
11	7749.912M	36.5	+20.5	+1.4	+0.0	58.4	114.4	-56.0	Condu 100
12	7017.681M	36.3	+20.3	+1.4	+0.0	58.0	114.4	-56.4	Condu 100
13	7115.078M	36.4	+20.2	+1.4	+0.0	58.0	114.4	-56.4	Condu 100
14	7858.220M	35.8	+20.6	+1.4	+0.0	57.8	114.4	-56.6	Condu 100
15	7729.892M	35.9	+20.5	+1.3	+0.0	57.7	114.4	-56.7	Condu 100
16	7666.529M	36.1	+20.2	+1.3	+0.0	57.6	114.4	-56.8	Condu 100
17	7689.852M	36.0	+20.3	+1.3	+0.0	57.6	114.4	-56.8	Condu 100
18	7061.424M	35.9	+20.2	+1.4	+0.0	57.5	114.4	-56.9	Condu 100
19	7086.550M	35.9	+20.2	+1.4	+0.0	57.5	114.4	-56.9	Condu 100
20	7688.551M	35.9	+20.3	+1.3	+0.0	57.5	114.4	-56.9	Condu 100

CKC Laboratories, Inc. Date: 4/26/2011 Time: 2:46:28 PM Itron, Inc. WO#: 91910
 15.247(d) Conducted Spurious Emissions Test Distance: None Conducted Sequence#: 19 Ext ATTN: 0 dB





Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717

Customer: **Itron, Inc.**
 Specification: **15.247(d) Conducted Spurious Emissions**
 Work Order #: **91910** Date: 4/26/2011
 Test Type: **Maximized Emissions** Time: 2:51:13 PM
 Equipment: **SRR+WWAN+WIFI+GPS RX** Sequence#: 20
(always external antennas)
 Manufacturer: Itron, Inc. Tested By: Jeff Gilbert
 Model: CCU100TA (Model: TowerCCUA)
 S/N: 74045191

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05508	Attenuator	BW-S20W2	10/12/2009	10/12/2011
T2	AN03122	Cable	32026-2-29801-36	12/23/2010	12/23/2012
	AN02872	Spectrum Analyzer	E4440A	8/25/2009	8/25/2011

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
SRR+WWAN+WIFI+GPS RX (always external antennas)*	Itron, Inc.	CCU100TA (Model: TowerCCUA)	74045191

Support Devices:

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

Frequency Range Investigated: 30 kHz - 9300 MHz
 Temp: 22°C
 Humidity: 35%
 Pressure: 102.5 kPa
 FM37.5 kBaud
 903 MHz
 Measured per DA00-705.

Ext Attn: 0 dB

Measurement Data:

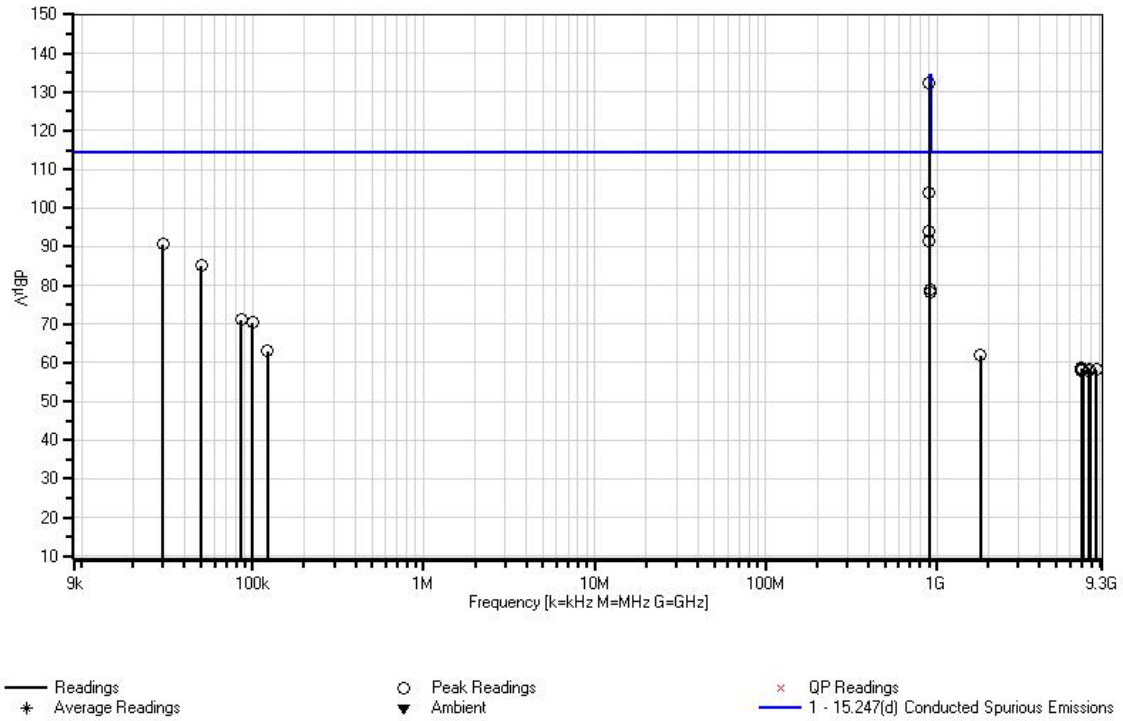
Reading listed by margin.

Test Distance: None

#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	dB	dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	902.972M	111.8	+20.2	+0.4			+0.0	132.4	134.4	-2.0	Condu 100
2	30.000k	70.6	+20.1	+0.0			+0.0	90.7	114.4	-23.7	Condu 100
3	50.004k	65.0	+20.1	+0.0			+0.0	85.1	114.4	-29.3	Condu 100
4	903.473M	83.4	+20.2	+0.4			+0.0	104.0	134.4	-30.4	Condu 100
5	906.175M	73.6	+20.2	+0.4			+0.0	94.2	134.4	-40.2	Condu 100
6	905.775M	70.7	+20.2	+0.4			+0.0	91.3	134.4	-43.1	Condu 100
7	86.010k	51.0	+20.1	+0.0			+0.0	71.1	114.4	-43.3	Condu 100

8	100.013k	50.2	+20.1	+0.0	+0.0	70.3	114.4	-44.1	Condu 100
9	122.017k	43.0	+20.1	+0.0	+0.0	63.1	114.4	-51.3	Condu 100
10	1806.074M	41.3	+20.0	+0.6	+0.0	61.9	114.4	-52.5	Condu 100
11	908.478M	58.2	+20.2	+0.4	+0.0	78.8	134.4	-55.6	Condu 100
12	7042.606M	36.9	+20.3	+1.4	+0.0	58.6	114.4	-55.8	Condu 100
13	7754.016M	36.5	+20.5	+1.4	+0.0	58.4	114.4	-56.0	Condu 100
14	7837.300M	36.4	+20.6	+1.4	+0.0	58.4	114.4	-56.0	Condu 100
15	909.078M	57.7	+20.2	+0.4	+0.0	78.3	134.4	-56.1	Condu 100
16	6995.058M	36.6	+20.3	+1.4	+0.0	58.3	114.4	-56.1	Condu 100
17	7120.684M	36.6	+20.2	+1.4	+0.0	58.2	114.4	-56.2	Condu 100
18	8550.212M	36.1	+20.8	+1.3	+0.0	58.2	114.4	-56.2	Condu 100
19	7751.113M	36.2	+20.5	+1.4	+0.0	58.1	114.4	-56.3	Condu 100
20	7043.206M	36.2	+20.3	+1.4	+0.0	57.9	114.4	-56.5	Condu 100

CKC Laboratories, Inc. Date: 4/26/2011 Time: 2:51:13 PM Itron, Inc. WO#: 91910
 15.247(d) Conducted Spurious Emissions Test Distance: None Conducted Sequence#: 20 Ext ATTN: 0 dB





Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717

Customer: **Itron, Inc.**
 Specification: **15.247(d) Conducted Spurious Emissions**
 Work Order #: **91910** Date: 4/26/2011
 Test Type: **Maximized Emissions** Time: 2:55:47 PM
 Equipment: **SRR+WWAN+WIFI+GPS RX** Sequence#: 21
(always external antennas)
 Manufacturer: Itron, Inc. Tested By: Jeff Gilbert
 Model: CCU100TA (Model: TowerCCUA)
 S/N: 74045191

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05508	Attenuator	BW-S20W2	10/12/2009	10/12/2011
T2	AN03122	Cable	32026-2-29801-36	12/23/2010	12/23/2012
	AN02872	Spectrum Analyzer	E4440A	8/25/2009	8/25/2011

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
SRR+WWAN+WIFI+GPS RX (always external antennas)*	Itron, Inc.	CCU100TA (Model: TowerCCUA)	74045191

Support Devices:

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

Frequency Range Investigated: 30 kHz - 9300 MHz
 Temp: 22°C
 Humidity: 35%
 Pressure: 102.5 kPa
 FM37.5 kBaud
 915 MHz
 Measured per DA00-705.

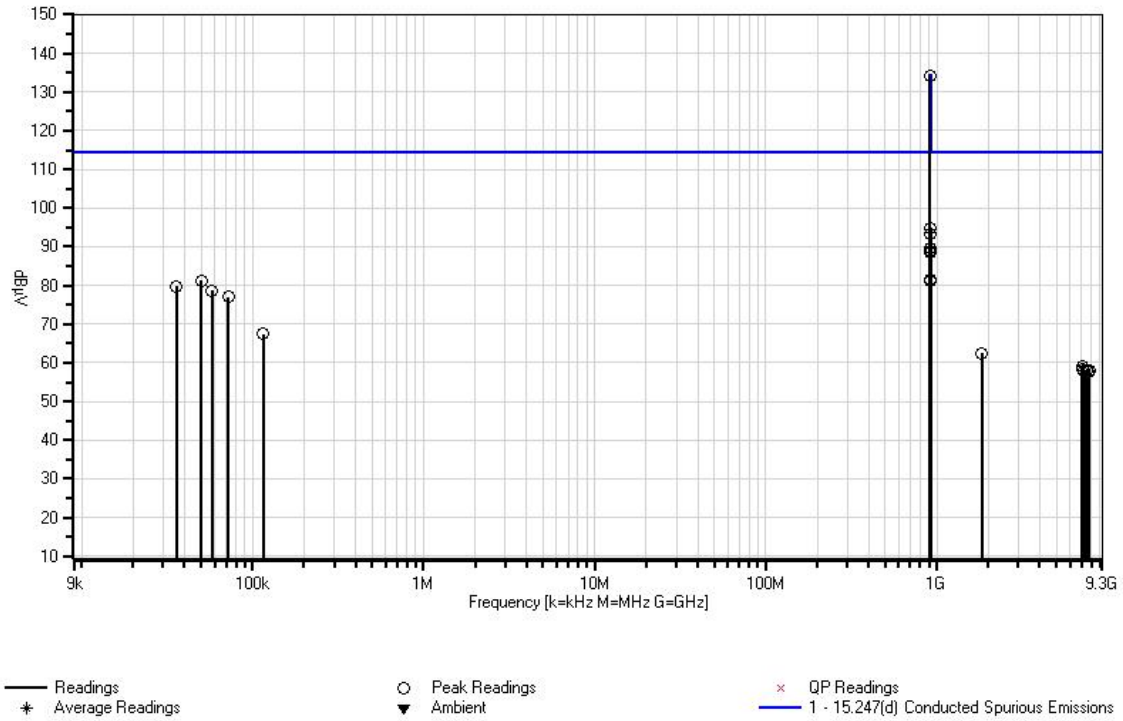
Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Distance: None

#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	dB	dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	914.984M	113.6	+20.2	+0.4			+0.0	134.2	134.4	-0.2	Condu 100
2	50.004k	61.2	+20.1	+0.0			+0.0	81.3	114.4	-33.1	Condu 100
3	36.001k	59.6	+20.1	+0.0			+0.0	79.7	114.4	-34.7	Condu 100
4	58.005k	58.5	+20.1	+0.0			+0.0	78.6	114.4	-35.8	Condu 100
5	72.008k	57.0	+20.1	+0.0			+0.0	77.1	114.4	-37.3	Condu 100
6	916.586M	74.1	+20.2	+0.4			+0.0	94.7	134.4	-39.7	Condu 100
7	912.181M	72.6	+20.2	+0.4			+0.0	93.2	134.4	-41.2	Condu 100

8	912.582M	69.1	+20.2	+0.4	+0.0	89.7	134.4	-44.7	Condu 100
9	917.387M	68.2	+20.2	+0.4	+0.0	88.8	134.4	-45.6	Condu 100
10	917.787M	68.0	+20.2	+0.4	+0.0	88.6	134.4	-45.8	Condu 100
11	116.016k	47.4	+20.1	+0.0	+0.0	67.5	114.4	-46.9	Condu 100
12	1829.998M	41.9	+20.0	+0.6	+0.0	62.5	114.4	-51.9	Condu 100
13	911.681M	60.8	+20.2	+0.4	+0.0	81.4	134.4	-53.0	Condu 100
14	918.287M	60.6	+20.2	+0.4	+0.0	81.2	134.4	-53.2	Condu 100
15	7050.213M	37.3	+20.2	+1.4	+0.0	58.9	114.4	-55.5	Condu 100
16	7087.851M	36.7	+20.2	+1.4	+0.0	58.3	114.4	-56.1	Condu 100
17	7245.508M	37.1	+19.7	+1.3	+0.0	58.1	114.4	-56.3	Condu 100
18	7527.790M	37.1	+19.8	+1.2	+0.0	58.1	114.4	-56.3	Condu 100
19	7759.922M	35.9	+20.6	+1.4	+0.0	57.9	114.4	-56.5	Condu 100
20	7707.670M	36.0	+20.4	+1.3	+0.0	57.7	114.4	-56.7	Condu 100

CKC Laboratories, Inc. Date: 4/26/2011 Time: 2:55:47 PM Itron, Inc. WO#: 91910
 15.247(d) Conducted Spurious Emissions Test Distance: None Conducted Sequence#: 21 Ext ATTN: 0 dB





Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717

Customer: **Itron, Inc.**
 Specification: **15.247(d) Conducted Spurious Emissions**
 Work Order #: **91910** Date: 4/26/2011
 Test Type: **Maximized Emissions** Time: 3:00:35 PM
 Equipment: **SRR+WWAN+WIFI+GPS RX** Sequence#: 22
(always external antennas)
 Manufacturer: Itron, Inc. Tested By: Jeff Gilbert
 Model: CCU100TA (Model: TowerCCUA)
 S/N: 74045191

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP05508	Attenuator	BW-S20W2	10/12/2009	10/12/2011
T2	AN03122	Cable	32026-2-29801-36	12/23/2010	12/23/2012
	AN02872	Spectrum Analyzer	E4440A	8/25/2009	8/25/2011

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
SRR+WWAN+WIFI+GPS RX (always external antennas)*	Itron, Inc.	CCU100TA (Model: TowerCCUA)	74045191

Support Devices:

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

Frequency Range Investigated: 30 kHz - 9300 MHz
 Temp: 22°C
 Humidity: 35%
 Pressure: 102.5 kPa
 FM37.5 kBaud
 926.8 MHz
 Measured per DA00-705.

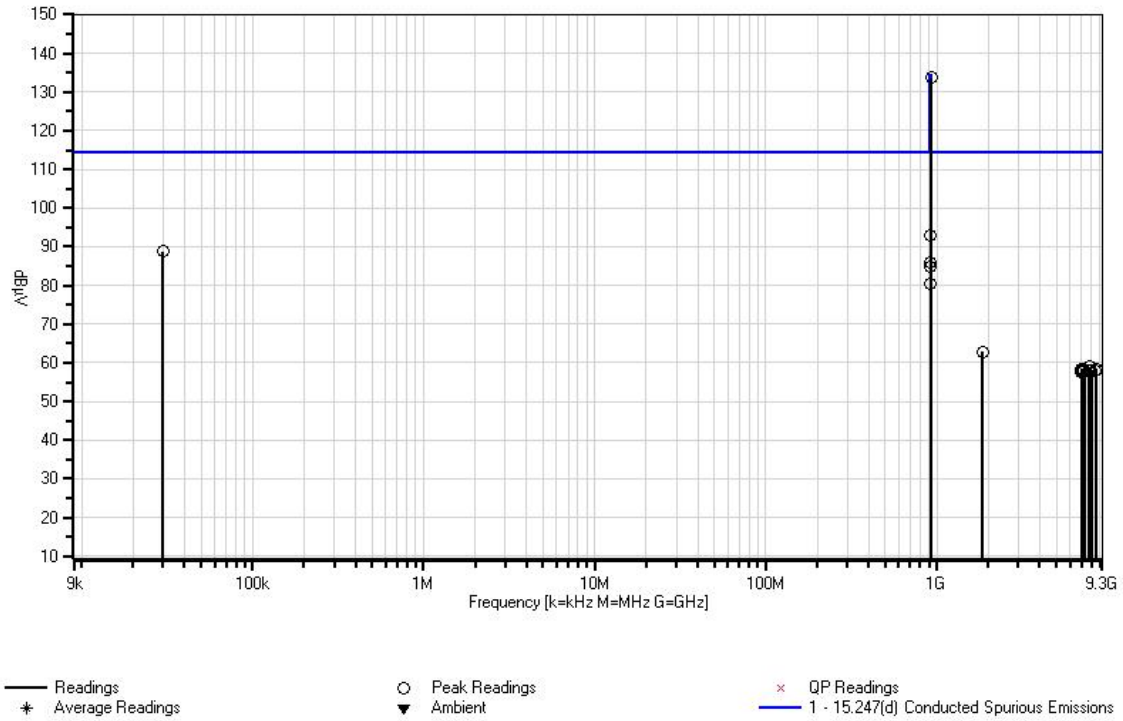
Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Distance: None

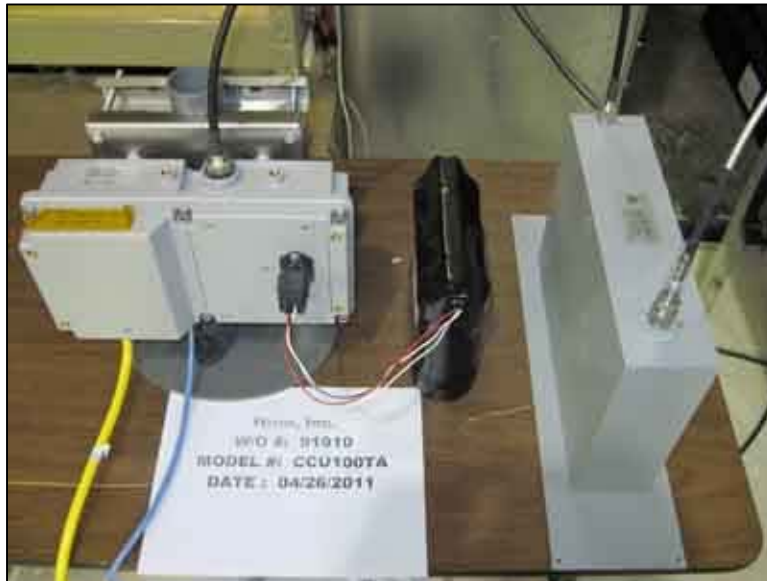
#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	926.796M	113.1	+20.2	+0.4			+0.0	133.7	134.4	-0.7	Condu 100
2	30.000k	68.7	+20.1	+0.0			+0.0	88.8	114.4	-25.6	Condu 100
3	923.893M	72.4	+20.2	+0.4			+0.0	93.0	134.4	-41.4	Condu 100
4	924.794M	65.5	+20.2	+0.4			+0.0	86.1	134.4	-48.3	Condu 100
5	924.594M	64.3	+20.2	+0.4			+0.0	84.9	134.4	-49.5	Condu 100
6	1853.622M	42.2	+20.0	+0.6			+0.0	62.8	114.4	-51.6	Condu 100
7	922.392M	59.7	+20.2	+0.4			+0.0	80.3	134.4	-54.1	Condu 100

8	7758.120M	37.0	+20.6	+1.4	+0.0	59.0	114.4	-55.4	Condu 100
9	7039.402M	36.7	+20.3	+1.4	+0.0	58.4	114.4	-56.0	Condu 100
10	8578.040M	36.2	+20.9	+1.3	+0.0	58.4	114.4	-56.0	Condu 100
11	7108.071M	36.7	+20.2	+1.4	+0.0	58.3	114.4	-56.1	Condu 100
12	7287.751M	37.2	+19.6	+1.3	+0.0	58.1	114.4	-56.3	Condu 100
13	8026.388M	36.6	+20.2	+1.3	+0.0	58.1	114.4	-56.3	Condu 100
14	7743.606M	36.2	+20.5	+1.3	+0.0	58.0	114.4	-56.4	Condu 100
15	7100.864M	36.2	+20.2	+1.4	+0.0	57.8	114.4	-56.6	Condu 100
16	7072.335M	36.2	+20.2	+1.4	+0.0	57.8	114.4	-56.6	Condu 100
17	8527.389M	35.7	+20.8	+1.3	+0.0	57.8	114.4	-56.6	Condu 100
18	7897.960M	35.9	+20.5	+1.4	+0.0	57.8	114.4	-56.6	Condu 100
19	7041.004M	36.0	+20.3	+1.4	+0.0	57.7	114.4	-56.7	Condu 100
20	7089.452M	36.1	+20.2	+1.4	+0.0	57.7	114.4	-56.7	Condu 100

CKC Laboratories, Inc. Date: 4/26/2011 Time: 3:00:35 PM Itron, Inc. WO#: 91910
 15.247(d) Conducted Spurious Emissions Test Distance: None Conducted Sequence#: 22 Ext ATTN: 0 dB



Test Setup Photos



15.247(d) Spurious Emissions – Radiated

Summary
Comments
<p>Requirement: Spurious emissions in a 100 kHz bandwidth outside the band of operation shall be at least 20 dB below the level of the carrier.</p> <p>Result: PASS</p>

Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717

Customer: **Itron, Inc.**
 Specification: **15.247(d) Radiated Spurious Emissions**
 Work Order #: **91909** Date: 5/20/2011
 Test Type: **Radiated Scan** Time: 6:26:55 AM
 Equipment: **SRR+WWAN+WIFI+GPS RX** Sequence#: 31
(always external antennas)
 Manufacturer: Itron, Inc. Tested By: Jeff Gilbert
 Model: CCU100TA (Model: TowerCCUA)
 S/N: 74045191

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00052	Loop Antenna	6502	6/8/2010	6/8/2012
T2	ANP05360	Cable	RG214	11/8/2010	11/8/2012
T3	ANP05547	Cable	Heliac	5/18/2010	5/18/2012
T4	AN03227	Cable	32026-29080-29080-84	5/2/2011	5/2/2013
T5	AN01717	High Pass Filter	F3440-P005	5/27/2010	5/27/2012
	AN02872	Spectrum Analyzer	E4440A	8/25/2009	8/25/2011

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
SRR+WWAN+WIFI+GPS RX (always external antennas)*	Itron, Inc.	CCU100TA (Model: TowerCCUA)	74045191
Filter	Delta Microwave	U1993	103
V-Pol Omni-6 dBd	Laird Technologies	FG9026	NA
External WWAN Antenna	Laird Technologies	FG821/18503	40353
External GPS Antenna	Trimble	57861-00	213100323

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Dell	E6400	H4CSTK1

Test Conditions / Notes:

Frequency Range Investigated: 30 kHz - 30 MHz
 Temp: 23°C
 Humidity: 34%
 Pressure: 102.7 kPa

The EUT is in TX mode. 903, 915, & 926.8 MHz were investigated.
 All three modulations were investigated (AM, 12.5 FM & 37.5 FM).
 Cell modem is in RX only mode.
 Wi-Fi modem PA voltage is off.

Ext Attn: 0 dB

Measurement Data:

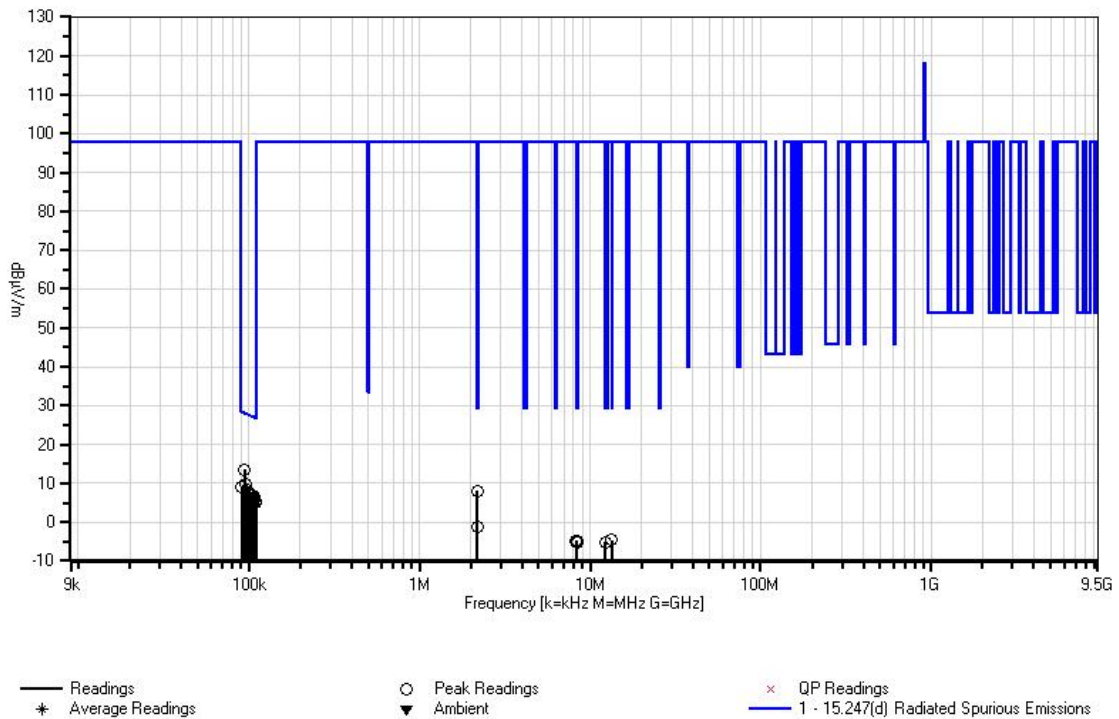
Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dBμV	T1 T5 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	93.840k	83.8	+9.7 +0.1	+0.0	+0.0	+0.0	-80.0	13.6	28.1	-14.5	Verti 129
2	95.400k	80.0	+9.7 +0.1	+0.0	+0.0	+0.0	-80.0	9.8	28.0	-18.2	Verti 129
3	97.320k	78.5	+9.7 +0.1	+0.0	+0.0	+0.0	-80.0	8.3	27.8	-19.5	Verti 129
4	91.080k	79.1	+9.7 +0.1	+0.0	+0.0	+0.0	-80.0	8.9	28.4	-19.5	Verti 129
5	104.640k	77.2	+9.7 +0.1	+0.0	+0.0	+0.0	-80.0	7.0	27.2	-20.2	Verti 129
6	98.160k	77.7	+9.7 +0.1	+0.0	+0.0	+0.0	-80.0	7.5	27.8	-20.3	Verti 129
7	104.160k	77.0	+9.7 +0.1	+0.0	+0.0	+0.0	-80.0	6.8	27.3	-20.5	Verti 129
8	107.520k	76.7	+9.7 +0.1	+0.0	+0.0	+0.0	-80.0	6.5	27.0	-20.5	Verti 129
9	101.280k	77.1	+9.7 +0.1	+0.0	+0.0	+0.0	-80.0	6.9	27.5	-20.6	Verti 129
10	108.120k	75.8	+9.7 +0.1	+0.0	+0.0	+0.0	-80.0	5.6	26.9	-21.3	Verti 129
11	109.440k	75.6	+9.7 +0.1	+0.0	+0.0	+0.0	-80.0	5.4	26.8	-21.4	Verti 129
12	2.176M	38.2	+9.7 +0.0	+0.0	+0.1	+0.0	-40.0	8.0	29.5	-21.5	Verti 129

13	101.880k	75.8	+9.7 +0.1	+0.0	+0.0	+0.0	-80.0	5.6	27.4	-21.8	Verti 129
14	108.840k	75.1	+9.7 +0.1	+0.0	+0.0	+0.0	-80.0	4.9	26.9	-22.0	Verti 129
15	2.185M	29.1	+9.7 +0.0	+0.0	+0.1	+0.0	-40.0	-1.1	29.5	-30.6	Verti 129
16	13.365M	25.6	+9.3 +0.1	+0.1	+0.2	+0.1	-40.0	-4.6	29.5	-34.1	Verti 129
17	8.293M	25.3	+9.5 +0.1	+0.1	+0.2	+0.1	-40.0	-4.7	29.5	-34.2	Verti 129
18	8.383M	25.2	+9.5 +0.1	+0.1	+0.2	+0.1	-40.0	-4.8	29.5	-34.3	Verti 129
19	8.365M	24.9	+9.5 +0.1	+0.1	+0.2	+0.1	-40.0	-5.1	29.5	-34.6	Verti 129
20	12.293M	25.0	+9.3 +0.1	+0.1	+0.2	+0.1	-40.0	-5.2	29.5	-34.7	Verti 129

CKC Laboratories, Inc. Date: 5/20/2011 Time: 6:26:55 AM Itron, Inc. WO#: 91909
 15.247(d) Radiated Spurious Emissions Test Distance: 3 Meters Vertical Sequence#: 31 Ext ATTN: 0 dB





Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717

Customer: **Itron, Inc.**
 Specification: **15.247(d) Radiated Spurious Emissions**
 Work Order #: **91909** Date: 5/20/2011
 Test Type: **Radiated Scan** Time: 10:20:22
 Equipment: **SRR+WWAN+WIFI+GPS RX** Sequence#: 34
(always external antennas)
 Manufacturer: Itron, Inc. Tested By: Jeff Gilbert
 Model: CCU100TA (Model: TowerCCUA)
 S/N: 74045191

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN01993	Biconilog Antenna	CBL6111C	10/9/2009	10/9/2011
T2	ANP05360	Cable	RG214	11/8/2010	11/8/2012
T3	AN01316	Preamp	8447D	5/21/2010	5/21/2012
T4	ANP05547	Cable	Heliac	5/18/2010	5/18/2012
T5	AN03227	Cable	32026-29080-29080-84	5/2/2011	5/2/2013
	AN02872	Spectrum Analyzer	E4440A	8/25/2009	8/25/2011

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
SRR+WWAN+WIFI+GPS RX (always external antennas)*	Itron, Inc.	CCU100TA (Model: TowerCCUA)	74045191
Filter	Delta Microwave	U1993	103
V-Pol Omni-6 dBd	Laird Technologies	FG9026	NA
External WWAN Antenna	Laird Technologies	FG821/18503	40353
External GPS Antenna	Trimble	57861-00	213100323

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Dell	E6400	H4CSTK1

Test Conditions / Notes:

Frequency Range Investigated: 30 - 1000 MHz
 Temp: 23°C
 Humidity: 34%
 Pressure: 102.7 kPa

The EUT is in TX mode. 903, 915, & 926.8 MHz were investigated.
 All three modulations were investigated (AM, 12.5 FM & 37.5 FM).
 Cell modem is in RX only mode.
 Wi-Fi modem PA voltage is off.

Ext Attn: 0 dB

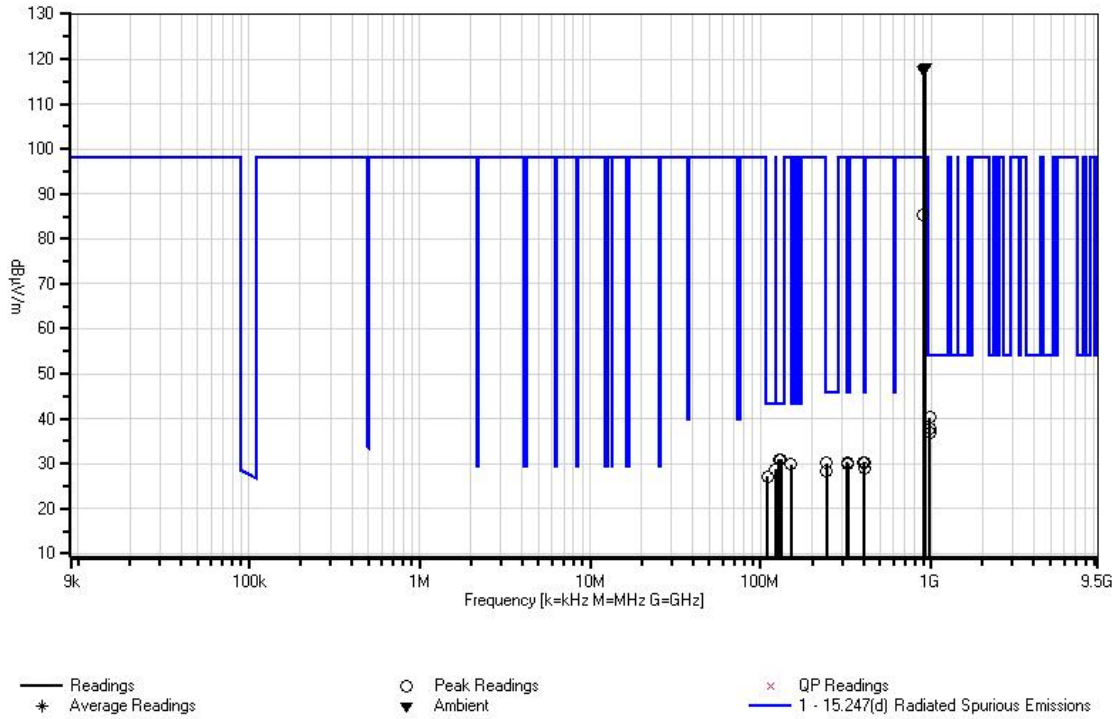
Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dB μ V	T1 T5 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	926.830M Ambient	119.4	+23.5 +0.9	+2.0	-29.1	+1.5	+0.0 360	118.2	118.1 Fundamental	+0.1	Verti 130
2	914.926M Ambient	119.5	+23.3 +0.9	+2.0	-29.2	+1.5	+0.0	118.0	118.1 Fundamental	-0.1	Verti 130
3	902.930M Ambient	119.5	+23.1 +0.9	+1.9	-29.2	+1.5	+0.0 360	117.7	118.1 Fundamental	-0.4	Verti 130
4	128.501M	46.5	+12.3 +0.3	+0.6	-29.2	+0.5	+0.0	31.0	43.5	-12.5	Verti 130
5	131.504M	46.5	+12.2 +0.3	+0.6	-29.2	+0.5	+0.0	30.9	43.5	-12.6	Verti 130
6	901.996M	87.2	+23.1 +0.9	+1.9	-29.2	+1.5	+0.0	85.4	98.1 Band-Edge	-12.7	Verti 130
7	150.002M	45.2	+12.1 +0.4	+0.7	-29.1	+0.6	+0.0	29.9	43.5	-13.6	Verti 130
8	977.210M	40.7	+24.1 +0.9	+2.0	-29.0	+1.6	+0.0	40.3	54.0	-13.7	Verti 130
9	121.654M	45.0	+11.5 +0.3	+0.6	-29.2	+0.5	+0.0	28.7	43.5	-14.8	Verti 130
10	322.975M	42.3	+14.2 +0.5	+1.0	-28.6	+0.9	+0.0	30.3	46.0	-15.7	Horiz 130
11	242.495M	44.3	+12.2 +0.5	+0.9	-28.6	+0.8	+0.0	30.1	46.0	-15.9	Horiz 130
12	402.134M	40.0	+16.4 +0.6	+1.2	-29.1	+1.0	+0.0	30.1	46.0	-15.9	Horiz 130
13	404.056M	39.9	+16.5 +0.6	+1.2	-29.1	+1.0	+0.0	30.1	46.0	-15.9	Horiz 130
14	403.215M	39.9	+16.5 +0.6	+1.2	-29.1	+1.0	+0.0	30.1	46.0	-15.9	Horiz 130
15	323.696M	41.9	+14.3 +0.5	+1.0	-28.6	+0.9	+0.0	30.0	46.0	-16.0	Horiz 130
16	979.025M	38.2	+24.1 +0.9	+2.0	-29.0	+1.6	+0.0	37.8	54.0	-16.2	Verti 130
17	109.282M	44.4	+10.7 +0.3	+0.6	-29.3	+0.5	+0.0	27.2	43.5	-16.3	Verti 130
18	403.576M	38.8	+16.5 +0.6	+1.2	-29.1	+1.0	+0.0	29.0	46.0	-17.0	Horiz 130
19	979.777M	37.4	+24.1 +0.9	+2.0	-29.0	+1.6	+0.0	37.0	54.0	-17.0	Verti 130
20	242.855M	42.5	+12.3 +0.5	+0.9	-28.6	+0.8	+0.0	28.4	46.0	-17.6	Horiz 130

CKC Laboratories, Inc. Date: 5/20/2011 Time: 10:20:22 Itron, Inc. WO#: 91909
15.247(d) Radiated Spurious Emissions Test Distance: 3 Meters H & V Sequence#: 34 Ext ATTN: 0 dB





Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • (425) 402-1717

Customer: **Itron, Inc.**
 Specification: **15.247(d) Radiated Spurious Emissions**
 Work Order #: **91909** Date: 5/20/2011
 Test Type: **Radiated Scan** Time: 09:25:16
 Equipment: **SRR+WWAN+WIFI+GPS RX** Sequence#: 33
(always external antennas)
 Manufacturer: Itron, Inc. Tested By: Jeff Gilbert
 Model: CCU100TA (Model: TowerCCUA)
 S/N: 74045191

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN01467	Horn Antenna-ANSI C63.5 Calibration	3115	5/7/2010	5/7/2012
T2	AN03170	High Pass Filter	HM1155-11SS	9/14/2009	9/14/2011
T3	AN03123	Cable	32026-2-29801- 12	10/23/2009	10/23/2011
T4	AN01271	Preamp	83017A	9/17/2009	9/17/2011
T5	ANP05542	Cable	Heliac	10/23/2009	10/23/2011
T6	AN03227	Cable	32026-29080- 29080-84	5/2/2011	5/2/2013
	AN02872	Spectrum Analyzer	E4440A	8/25/2009	8/25/2011

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
SRR+WWAN+WIFI+GPS RX (always external antennas)*	Itron, Inc.	CCU100TA (Model: TowerCCUA)	74045191
Filter	Delta Microwave	U1993	103
V-Pol Omni-6 dBd	Laird Technologies	FG9026	NA
External WWAN Antenna	Laird Technologies	FG821/18503	40353
External GPS Antenna	Trimble	57861-00	213100323

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Dell	E6400	H4CSTK1

Test Conditions / Notes:

Frequency Range Investigated: 1 - 9.3 GHz
 Temp: 23°C
 Humidity: 34%
 Pressure: 102.7 kPa

The EUT is in TX mode. 903, 915, & 926.8 MHz were investigated.
 All three modulations were investigated (AM, 12.5 FM & 37.5 FM).
 Cell modem is in RX only mode.
 Wi-Fi modem PA voltage is off.

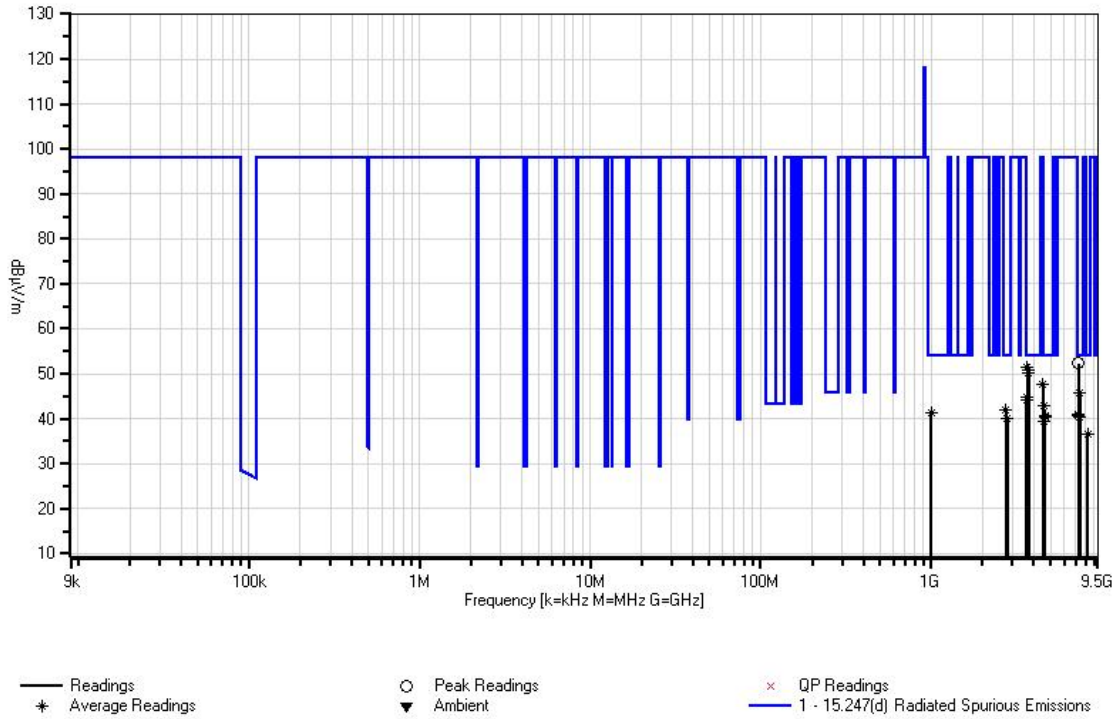
Ext Attn: 0 dB

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

#	Freq MHz	Rdng dB μ V	T1 T5 dB	T2 T6 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	7319.740M	41.7	+36.1 +5.2	+0.2 +3.2	+0.5	-34.6	+0.0 330	52.3	54.0	-1.7	Verti 120
2	3659.991M Ave	48.6	+30.8 +3.6	+0.2 +1.9	+0.3	-33.8	+0.0 320	51.6	54.0	-2.4	Verti 120
^	3659.983M	51.6	+30.8 +3.6	+0.2 +1.9	+0.3	-33.8	+0.0 320	54.6	54.0	+0.6	Verti 120
4	3707.221M Ave	47.7	+30.9 +3.7	+0.2 +1.9	+0.3	-33.8	+0.0 325	50.9	54.0	-3.1	Verti 115
^	3707.250M	51.0	+30.9 +3.7	+0.2 +1.9	+0.3	-33.8	+0.0 325	54.2	54.0	+0.2	Verti 115
6	3707.207M Ave	47.0	+30.9 +3.7	+0.2 +1.9	+0.3	-33.8	+0.0 65	50.2	54.0	-3.8	Horiz 145
^	3707.210M	50.7	+30.9 +3.7	+0.2 +1.9	+0.3	-33.8	+0.0 65	53.9	54.0	-0.1	Horiz 145
8	4515.013M Ave	42.1	+32.6 +4.1	+0.3 +2.1	+0.4	-33.9	+0.0 4	47.7	54.0	-6.3	Verti 105
^	4515.013M	50.1	+32.6 +4.1	+0.3 +2.1	+0.4	-33.9	+0.0 4	55.7	54.0	+1.7	Verti 105
^	4515.013M	45.3	+32.6 +4.1	+0.3 +2.1	+0.4	-33.9	+0.0 360	50.9	54.0	-3.1	Verti 130
11	7414.106M Ave	34.9	+36.2 +5.3	+0.2 +3.3	+0.5	-34.6	+0.0 360	45.8	54.0	-8.2	Verti 110
^	7414.136M	43.8	+36.2 +5.3	+0.2 +3.3	+0.5	-34.6	+0.0 360	54.7	54.0	+0.7	Verti 110
13	3660.001M Ave	41.8	+30.8 +3.6	+0.2 +1.9	+0.3	-33.8	+0.0 57	44.8	54.0	-9.2	Horiz 130
^	3659.910M	46.4	+30.8 +3.6	+0.2 +1.9	+0.3	-33.8	+0.0 57	49.4	54.0	-4.6	Horiz 130
15	3612.002M Ave	41.5	+30.6 +3.6	+0.2 +1.9	+0.3	-33.9	+0.0 317	44.2	54.0	-9.8	Verti 105
^	3612.011M	49.5	+30.6 +3.6	+0.2 +1.9	+0.3	-33.9	+0.0 317	52.2	54.0	-1.8	Verti 105
^	3612.005M	46.5	+30.6 +3.6	+0.2 +1.9	+0.3	-33.9	+0.0 360	49.2	54.0	-4.8	Verti 130
18	4575.021M Ave	37.2	+32.6 +4.1	+0.3 +2.1	+0.4	-33.8	+0.0 55	42.9	54.0	-11.1	Horiz 120
^	4575.023M	43.8	+32.6 +4.1	+0.3 +2.1	+0.4	-33.8	+0.0 55	49.5	54.0	-4.5	Horiz 120
20	2745.005M Ave	42.5	+28.5 +3.1	+0.2 +1.6	+0.3	-34.3	+0.0 345	41.9	54.0	-12.1	Verti 155
^	2745.016M	47.1	+28.5 +3.1	+0.2 +1.6	+0.3	-34.3	+0.0 345	46.5	54.0	-7.5	Verti 155
22	1000.999M Ave	32.0	+23.4 +1.8	+20.3 +0.9	+0.1	-37.2	+0.0	41.3	54.0	-12.7	Verti 130
^	1000.900M	45.2	+23.4 +1.8	+20.3 +0.9	+0.1	-37.2	+0.0	54.5	54.0	+0.5	Verti 130

^ 1000.900M	43.3	+23.4	+20.3	+0.1	-37.2	+0.0	52.6	54.0	-1.4	Verti
		+1.8	+0.9			360				130
25 7319.640M	30.5	+36.1	+0.2	+0.5	-34.6	+0.0	41.1	54.0	-12.9	Verti
Ave		+5.2	+3.2			330				120
26 7319.656M	30.1	+36.1	+0.2	+0.5	-34.6	+0.0	40.7	54.0	-13.3	Horiz
Ave		+5.2	+3.2			60				135
^ 7319.658M	41.0	+36.1	+0.2	+0.5	-34.6	+0.0	51.6	54.0	-2.4	Horiz
		+5.2	+3.2			60				135
28 4634.000M	34.6	+32.7	+0.3	+0.4	-33.8	+0.0	40.6	54.0	-13.4	Verti
Ave		+4.2	+2.2			350				120
^ 4633.945M	42.0	+32.7	+0.3	+0.4	-33.8	+0.0	48.0	54.0	-6.0	Verti
		+4.2	+2.2			350				120
30 4634.021M	34.4	+32.7	+0.3	+0.4	-33.8	+0.0	40.4	54.0	-13.6	Horiz
Ave		+4.2	+2.2			65				155
^ 4634.106M	42.2	+32.7	+0.3	+0.4	-33.8	+0.0	48.2	54.0	-5.8	Horiz
		+4.2	+2.2			65				155
32 7414.040M	29.4	+36.2	+0.2	+0.5	-34.6	+0.0	40.3	54.0	-13.7	Horiz
Ave		+5.3	+3.3			65				101
^ 7414.050M	41.1	+36.2	+0.2	+0.5	-34.6	+0.0	52.0	54.0	-2.0	Horiz
		+5.3	+3.3			65				101
34 2780.402M	40.6	+28.6	+0.2	+0.3	-34.3	+0.0	40.1	54.0	-13.9	Verti
Ave		+3.1	+1.6			314				140
^ 2780.400M	45.4	+28.6	+0.2	+0.3	-34.3	+0.0	44.9	54.0	-9.1	Verti
		+3.1	+1.6			314				140
36 4575.033M	33.8	+32.6	+0.3	+0.4	-33.8	+0.0	39.5	54.0	-14.5	Verti
Ave		+4.1	+2.1			345				116
^ 4575.003M	41.8	+32.6	+0.3	+0.4	-33.8	+0.0	47.5	54.0	-6.5	Verti
		+4.1	+2.1			345				116
38 8234.616M	25.0	+36.0	+0.3	+0.4	-34.7	+0.0	36.5	54.0	-17.5	Verti
Ave		+5.5	+4.0			330				130
^ 8234.620M	38.7	+36.0	+0.3	+0.4	-34.7	+0.0	50.2	54.0	-3.8	Verti
		+5.5	+4.0			330				130

CKC Laboratories, Inc. Date: 5/20/2011 Time: 09:25:16 Itron, Inc. WO#: 91909
 15.247(d) Radiated Spurious Emissions Test Distance: 3 Meters H & V Sequence#: 33 Ext ATTN: 0 dB



Test Setup Photos



CCU100TA-30kHz-30MHz Position 1



CCU100TA-30kHz-30MHz Position 2



CCU100TA-30MHz-1GHz



CCU100TA-1-9.3GHz

RSS-210

99% Bandwidth

Test Conditions / Setup

Comments
<p>The EUT was setup on the bench and connected to a spectrum analyzer via an RF cable and a 10 dB attenuator. The EUT was cycled through the different channels and modes by test software on a support laptop, connected to the EUT by an Ethernet cable.</p> <p>Requirement: The transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured. PASS</p>

Test Equipment

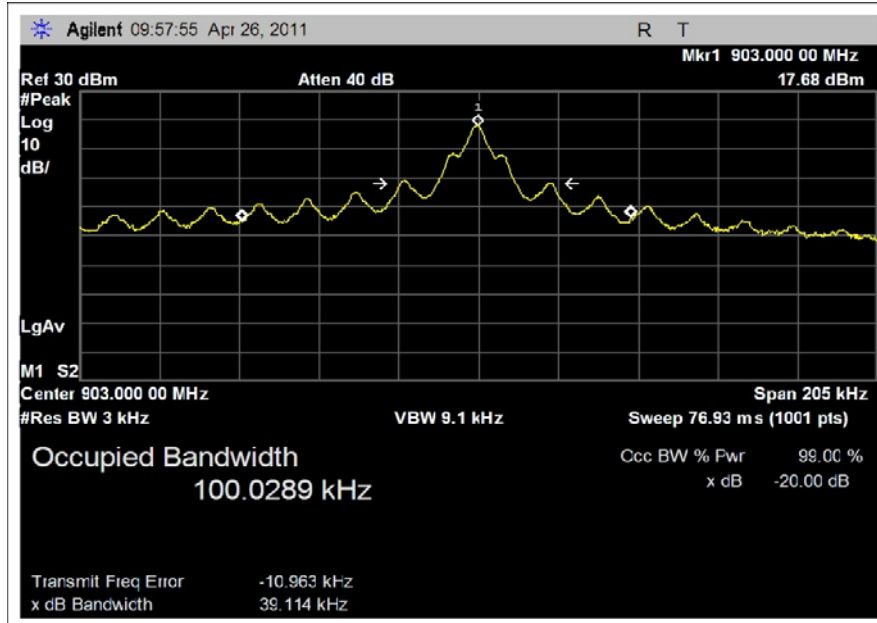
Asset/Serial #	Description	Model	Manufacturer	Cal Date	Cal Due
02872	Spectrum Analyzer	E4440A	Agilent	08/25/2009	08/25/2011
P05435	Attenuator	PE7015-10	Pasternack	09/08/2010	09/08/2012
03122	Cable 10k-18G	32026-2-29801-36	Astrolab	12/23/2010	12/23/2012

Engineer Name: J. Gilbert

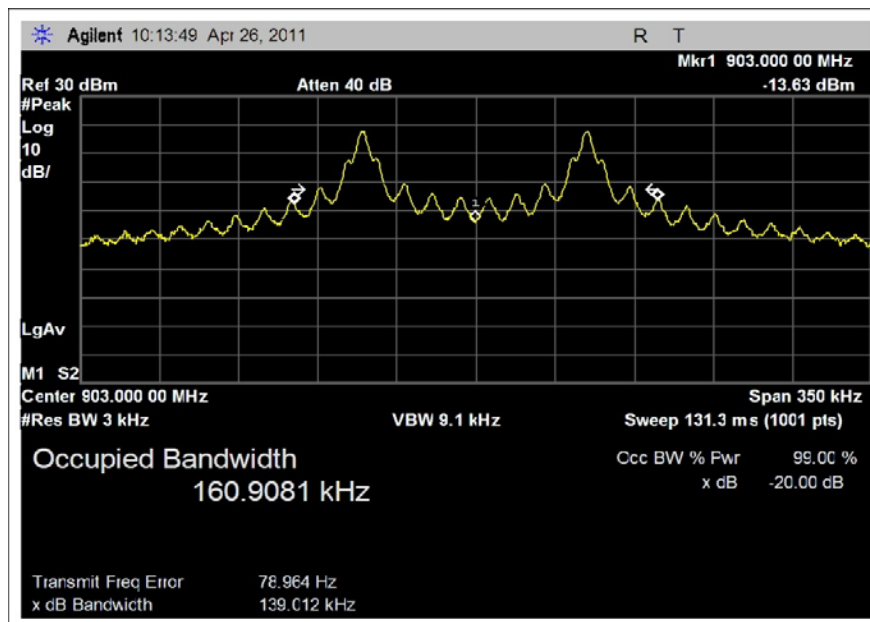
Results Table

903 MHz	AM	FM-12.5 kBaud	FM-37.5 kBaud
	100.0829 kHz	160.9081 kHz	58.2566 kHz
915 MHz	AM	FM-12.5 kBaud	FM-37.5 kBaud
	100.3185 kHz	162.8720 kHz	59.1296 kHz
926.8 MHz	AM	FM-12.5 kBaud	FM-37.5 kBaud
	100.2063 kHz	165.5248 kHz	60.9629 kHz

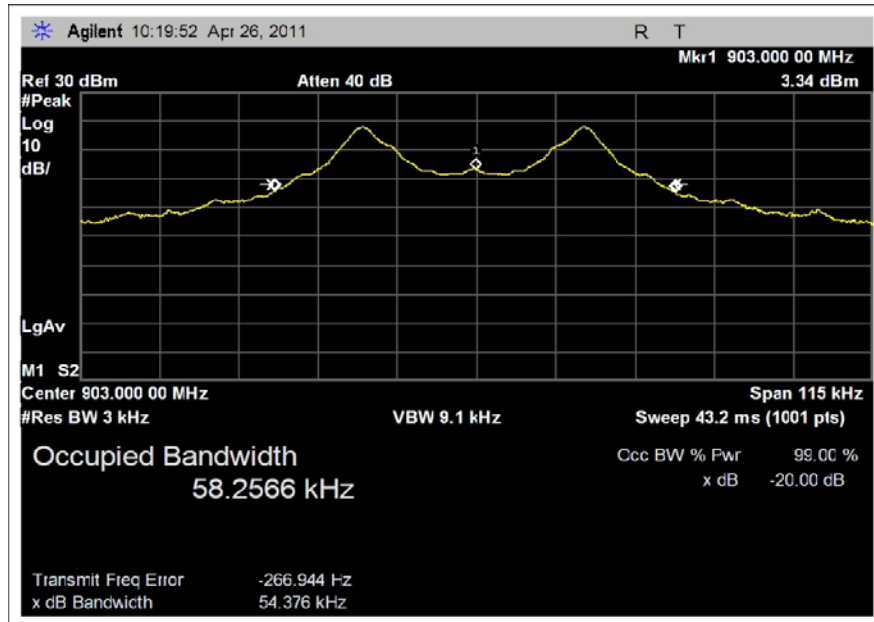
Test Data



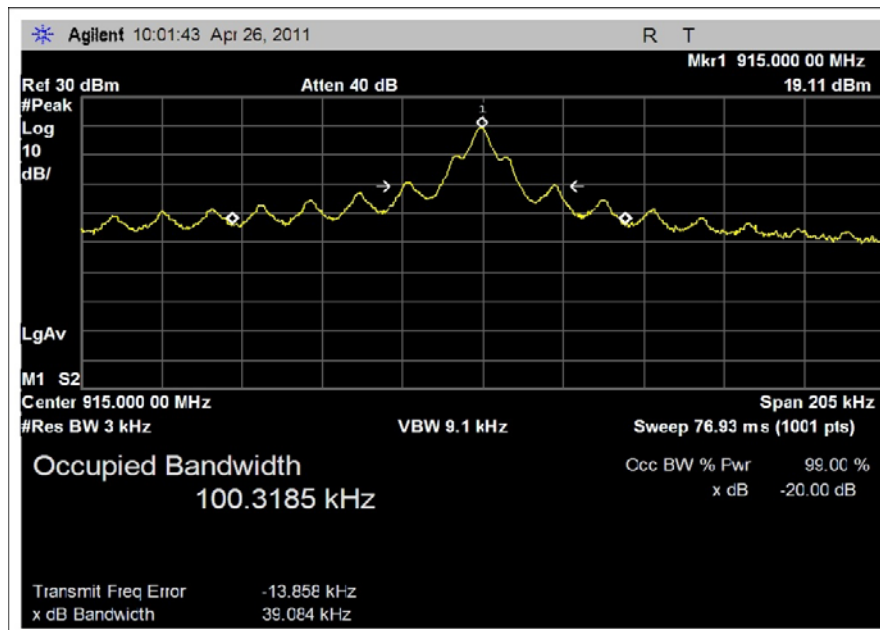
903 AM



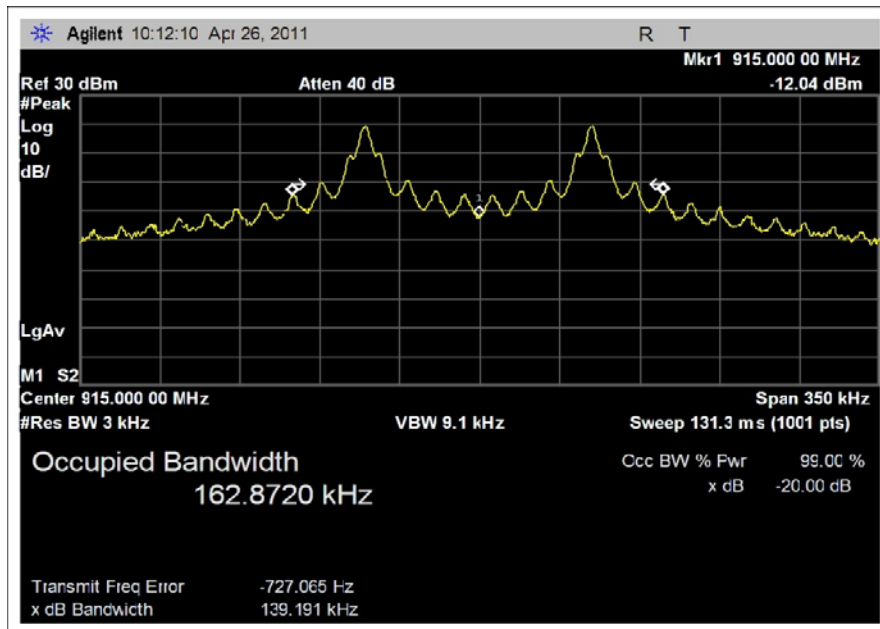
903 FM – 12.5kbaud



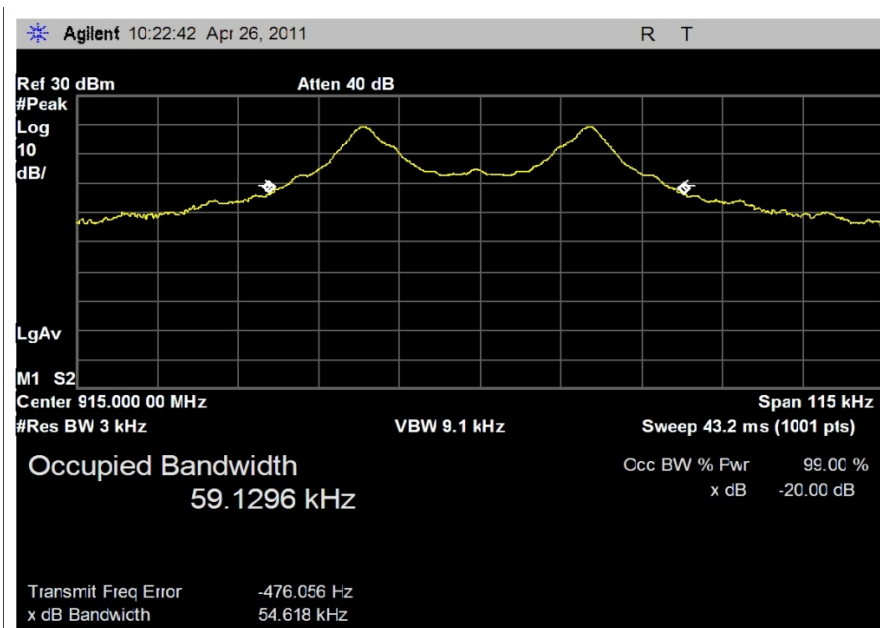
903 FM-37.5kBaud



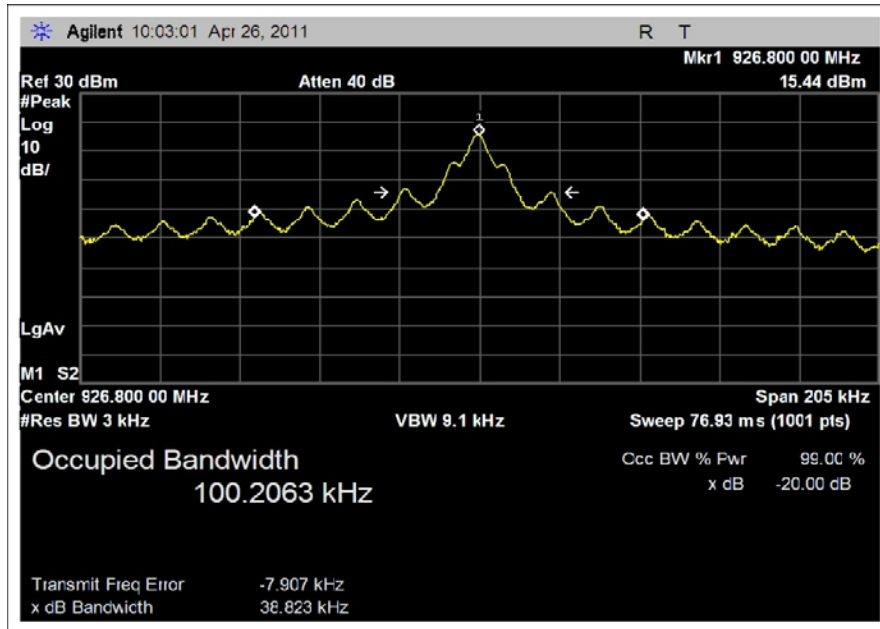
915 AM



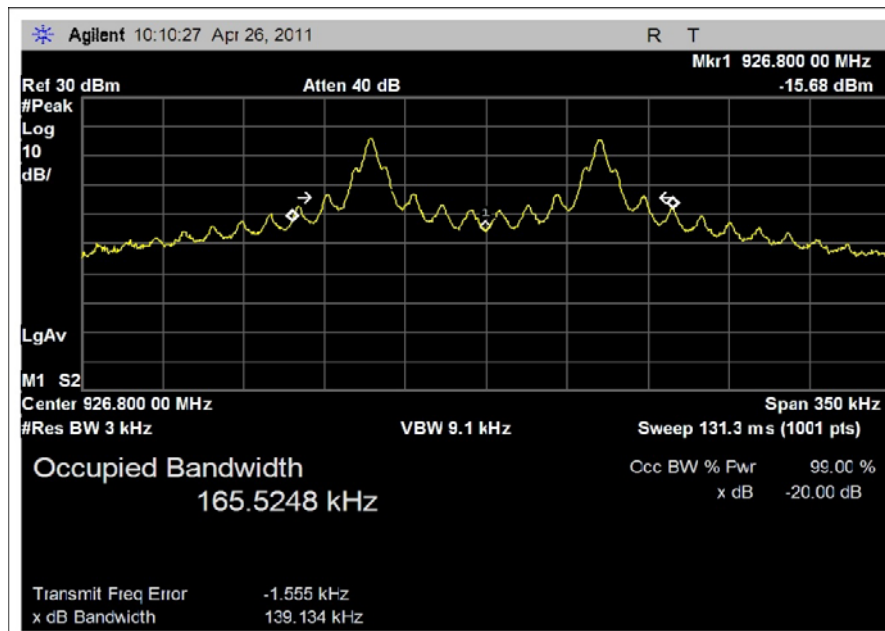
915 FM-12.5kBaud



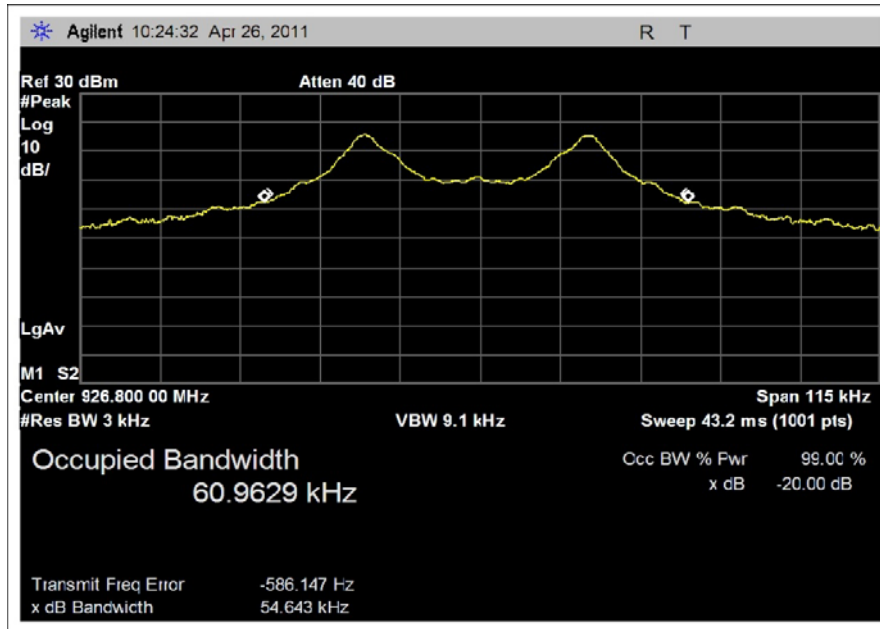
915 FM-37.5kBaud



926.8 AM



926.8 FM-12.5kBaud



926.8 FM-37.5kBaund

Test Setup Photos



SUPPLEMENTAL INFORMATION

Measurement Uncertainty

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

The reported measurement uncertainties are calculated based on the worst case of all laboratory environments from CKC Laboratories, Inc. test sites. Only those parameters which require estimation of measurement uncertainty are reported. The reported worst case measurement uncertainty is less than the maximum values derived in CISPR 16-4-2. 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

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.

SAMPLE CALCULATIONS		
	Meter reading	(dB μ V)
+	Antenna Factor	(dB)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dB μ V/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. 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	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 "Peak" mode. Whenever a "Quasi-Peak" or "Average" reading is listed as one of the highest readings, this is indicated as a "QP" or an "Ave" on the appropriate rows of the data sheets. 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/receiver readings recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature of the measuring device called "peak hold," the measuring device had the ability to measure transients 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

When the true peak values exceeded or were within 2 dB of the specification limit, quasi-peak measurements were taken using the quasi-peak detector.

Average

For certain frequencies, average measurements may be made using the spectrum analyzer/receiver. 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.