

Ittron, Inc.

ADDENDUM TEST REPORT FOR 90893-10A

CCU100

(SRR+WWAN+WIFI+GPS RX-Internal WWAN & GPS Antenna)

CCU100R

(SRR+WWAN+WIFI+GPS RX-External WWAN & GPS Antenna)

Tested To The Following Standards:

FCC Part 15 Subpart C Section 15.247 (FHSS)
and
RSS-210 Version 8

Report No.: 90893-10C

Date of issue: March 8, 2011



TESTING
CERT #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:

ltron, Inc.
2111 N. Molter Rd.
Liberty Lake, WA 99019

Representative: Jay Holcomb
Customer Reference Number: 19103

DATE OF EQUIPMENT RECEIPT:**DATE(S) OF TESTING:****REPORT PREPARED BY:**

Joyce Walker
CKC Laboratories, Inc.
5046 Sierra Pines Drive
Mariposa, CA 95338

Project Number: 90893

August 2,, 2010

August 2-13, 2010

Revision History

Original: Testing of the CCU100 & CCU100R, (SRR+WWAN+WIFI+GPS RX-Internal WWAN & GPS Antenna) to FCC Part 15 Subpart C Section 15.247 (FHSS) and RSS-210 Version 7.

Addendum A: Removed a note in Radiated Spurious Emissions regarding bandwidth settings.

Addendum B: Testing of the CCU100 & CCU100R, (SRR+WWAN+WIFI+GPS RX-Internal WWAN & GPS Antenna) to Part 15 Subpart C Section 15.247 (FHSS) and RSS-210 Version 8 in accordance with Class II Permissive Change requirements in order to add a 3 dB vertically polarized antenna.

Addendum C: This addendum is to amend incorrect Peak Power data reported in 90893-10A, which was the original test data. Also corrected was the addition of a 10 dB attenuator that was actually used during testing but was accidentally left out of the reporting information for 15.31, 15.241(a)(1) and 15.241(a)(1)(i).

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	Japan	Canada	FCC
Bothell	R-2296, C-2506 & T-1489	3082C-1	318736

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C 15.247 (FHSS)

Description	Test Procedure/Method	Results
Voltage Variation	FCC Part 15 Subpart C Section 15.31(e) / ANSI C63.4 (2003)	Pass
AC Conducted Emissions	FCC Part 15 Subpart C Section 15.207 / ANSI C63.4 (2003)	Pass
Carrier Frequency Separation	FCC Part 15 Subpart C Section 15.247 (a)(1) / DA00-705	Pass
20dB Bandwidth	FCC Part 15 Subpart C Section 15.247(a)(1)(i) / DA00-705	Pass
Number of Hopping Frequencies	FCC Part 15 Subpart C Section 15.247(a)(1)(i) / DA00-705	Pass
Time of Occupancy	FCC Part 15 Subpart C Section 15.247(a)(1)(i) / DA00-705	Pass
Peak Conducted Power	FCC Part 15 Subpart C Section 15.247(b)(2)/ DA00-705	Pass
Antenna Conducted Spurious	FCC Part 15 Subpart C Section 15.247(d)/ DA00-705	Pass
Radiated Spurious	FCC Part 15 Subpart C Section 15.247(d)/ DA00-705	Pass
99% Bandwidth	RSS-210 Version 8/RSS-GEN	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
<p>The changes required to pass radiated spurious emissions were to add ferrites to both the incoming AC power line and the internal power line to the cellular modem, as well as re-routing the internal RF cable from the Active GPS antenna to the on-board GPS receiver and attaching a 16 AWG ground wire from the cellular modem mounting plate to the ground lug on the main enclosure.</p> <p>Ferrite Part numbers used: Laird ferrite 28A2432-0A2 (AC input power line). Laird ferrite 28A0392-0A2 (cell modem power line).</p>



ACTIVE GPS ANTENNA CABLE ROUTING (FAIL)



ACTIVE GPS ANTENNA CABLE ROUTING (PASS)



GROUND WIRE

EQUIPMENT UNDER TEST (EUT)

CKC Laboratories tested the following devices:

CCU100 (SRR+WWAN+WIFI+GPS RX Internal WWAN & GPS Antenna)

CCU100R (SRR+WWAN+WIFI+GPS RX External WWAN & GPS Antenna)

During testing it was found that the two devices above with either the AT&T or Verizon cellular modems had a much worse emissions profile than without either cellular modem in the device. The difference between the repeater versions of these devices and the non-repeater versions is that the repeater versions do not have a cellular modem in them. Therefore, the manufacturer claims that any differences between the following devices without modems in them do not affect their EMC characteristics, and therefore meet the level of testing equivalent to the tested models:

CCU100 Repeater (SRR+WIFI+GPS RX Internal GPS Antenna)

CCU100R Repeater (SRR+WIFI+GPS RX External GPS Antenna)

EQUIPMENT UNDER TEST

**(SRR+WWAN+WIFI+GPS RX
Internal WWAN & GPS Antenna)**

Manuf: Itron, Inc.

Model: CCU100

Serial: 7404FCC5

H-Pol Omni Antenna

Manuf: Taoglas

Model: TIC.95.2F11

Serial: NA

**(SRR+WWAN+WIFI+GPS RX
External WWAN & GPS Antenna)**

Manuf: Itron, Inc.

Model: CCU100R

Serial: 7404FCC5

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: Latitude D630

Serial: 9JQRJH1

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 Variation

Test Set up

The EUT was setup on the bench and connected to a spectrum analyzer via an RF cable and 10 dB attenuator. The correction factors for the cable and attenuator were entered into the spectrum analyzer. 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 testing, all models (CCU100, CCU100-Repeater, CCU100R, and CCU100R-Repeater) are identical.

Engineer Name: J. Gilbert

Test Equipment				
Equipment	Serial	Cal Date	Cal Due	Asset
Spectrum Analyzer	MY46186330	08/25/2009	08/25/2011	02872
Cable 10k-18G	NA	10/23/2009	10/23/2011	03121
10 dB Attenuator	NA	09/05/2008	09/05/2010	P05435
Programmable Power Source	9999-0190	05/27/2010	05/27/2012	01314

Test Data

FHSS-AM 16 kBaud	903 MHz	915 MHz	926.8 MHz
Voltage	dBm	dBm	dBm
102	25.9	27.8	11.5
120	26.0	27.9	11.3
138	26.0	27.8	11.3
204	25.9	27.8	11.4
240	26.0	27.9	11.4
265	25.9	27.8	11.3

FHSS-FM 12.5 kBaud	903 MHz	915 MHz	926.8 MHz
Voltage	dBm	dBm	dBm
102	24.7	26.5	12.0
120	24.7	26.5	11.9
138	24.8	26.6	12.0
204	24.8	26.6	11.9
240	24.9	26.6	11.8
265	24.8	26.6	11.8

FHSS-FM 37.5 kBaud	903 MHz	915 MHz	926.8 MHz
Voltage	dBm	dBm	dBm
102	24.6	26.4	11.5
120	24.6	25.9	11.5
138	24.6	26.4	11.6
204	24.6	26.5	11.4
240	24.6	26.5	11.5
265	24.6	26.5	11.4

Note: The maximum voltage tested (265VAC) is less than 240 +15% because the EUT power supply is only spec'd to 265VAC.

Test Setup Photos



VOLTAGE VARIATION

15.207 AC Conducted Emissions

For this requirement, only one model was tested; **CCU100 (SRR+WWAN+WIFI+GPS RX Internal WWAN & GPS Antenna)**. The manufacturer declares that, with regards to this particular test, all models are electrically identical and therefore meet the level of testing equivalent to the tested model.

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 #: **90893** Date: 8/3/2010
 Test Type: **Conducted Emissions** Time: 3:19:53 PM
 Equipment: **(SRR+WWAN+WIFI+GPS RX internal WWAN & GPS antenna)** Sequence#: 1
 Manufacturer: Itron, Inc. Tested By: Jeff Gilbert
 Model: CCU100 240V 60Hz
 S/N: 7404FCC5

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	9/5/2008	9/5/2010
T3	ANP05366	Cable	RG-214	10/20/2009	10/20/2011
T4	ANP05360	Cable	RG214	11/10/2008	11/10/2010
T5	AN03121	Cable	32026-2-29080-84	10/23/2009	10/23/2011
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 Internal WWAN & GPS Antenna)*	Itron, Inc.	CCU100	7404FCC5
H-pol omni antenna	Taoglas	TIC.95.2F11	NA

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Dell	Latitude D630	9JQRJH1

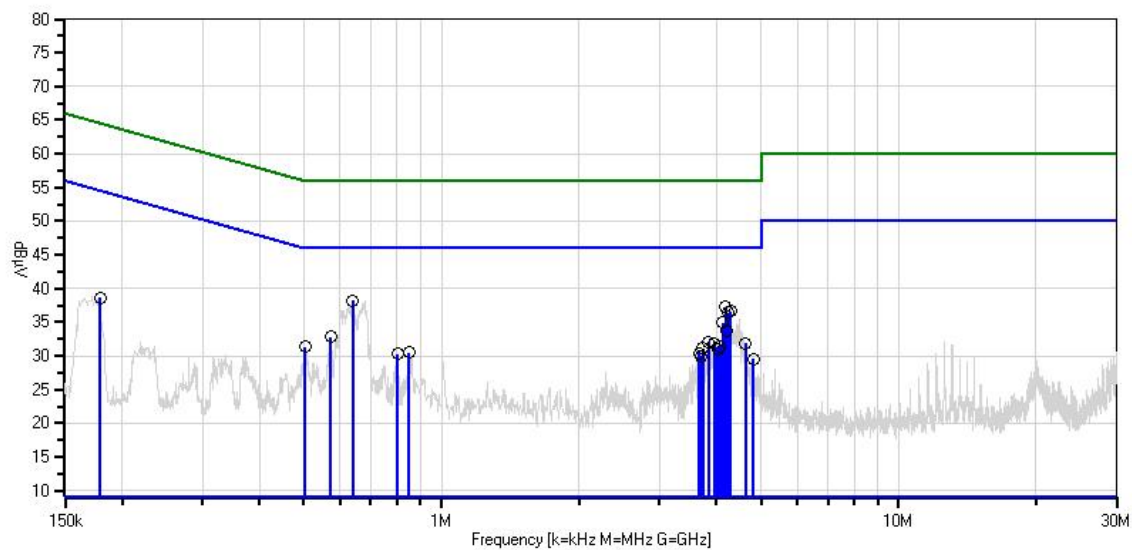
Test Conditions / Notes:

Frequency Range Investigated: 150 kHz - 30 MHz
 Temp: 24° C
 Humidity: 39%
 Pressure: 102.3 kPa
 EUT has the Cell modem, Wi-Fi radio, and ISM radio transmitting continuously.
 GPS receiver is active.

Ext Attn: 0 dB

Measurement Data:			Reading listed by margin.					Test Lead: Line			
#	Freq	Rdng	T1 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	dB	dB	dB	dB	Table	dB μ V	dB μ V	dB	Ant
1	638.682k	28.3	+0.1 +0.0	+9.6 +0.0	+0.1	+0.1	+0.0	38.2	46.0	-7.8	Line
2	4.182M	27.2	+0.2 +0.0	+9.5 +0.0	+0.2	+0.2	+0.0	37.3	46.0	-8.7	Line
3	4.296M	26.5	+0.2 +0.0	+9.5 +0.0	+0.2	+0.2	+0.0	36.6	46.0	-9.4	Line
4	4.241M	26.3	+0.2 +0.0	+9.5 +0.0	+0.2	+0.2	+0.0	36.4	46.0	-9.6	Line
5	4.126M	24.8	+0.2 +0.0	+9.5 +0.0	+0.2	+0.2	+0.0	34.9	46.0	-11.1	Line
6	4.220M	23.7	+0.2 +0.0	+9.5 +0.0	+0.2	+0.2	+0.0	33.8	46.0	-12.2	Line
7	571.779k	22.9	+0.1 +0.0	+9.6 +0.0	+0.1	+0.1	+0.0	32.8	46.0	-13.2	Line
8	3.846M	22.0	+0.2 +0.0	+9.5 +0.0	+0.2	+0.2	+0.0	32.1	46.0	-13.9	Line
9	4.620M	21.6	+0.3 +0.0	+9.5 +0.1	+0.2	+0.2	+0.0	31.9	46.0	-14.1	Line
10	3.952M	21.7	+0.2 +0.0	+9.5 +0.0	+0.2	+0.2	+0.0	31.8	46.0	-14.2	Line
11	4.067M	21.4	+0.2 +0.0	+9.5 +0.0	+0.2	+0.2	+0.0	31.5	46.0	-14.5	Line
12	502.695k	21.3	+0.1 +0.0	+9.6 +0.1	+0.1	+0.1	+0.0	31.3	46.0	-14.7	Line
13	3.731M	21.0	+0.2 +0.0	+9.5 +0.0	+0.2	+0.2	+0.0	31.1	46.0	-14.9	Line
14	4.020M	20.9	+0.2 +0.0	+9.5 +0.0	+0.2	+0.2	+0.0	31.0	46.0	-15.0	Line
15	847.391k	20.7	+0.1 +0.0	+9.6 +0.0	+0.0	+0.1	+0.0	30.5	46.0	-15.5	Line
16	3.667M	20.3	+0.2 +0.0	+9.5 +0.0	+0.2	+0.2	+0.0	30.4	46.0	-15.6	Line
17	801.577k	20.5	+0.1 +0.0	+9.6 +0.0	+0.0	+0.1	+0.0	30.3	46.0	-15.7	Line
18	179.088k	28.6	+0.1 +0.0	+9.6 +0.1	+0.2	+0.0	+0.0	38.6	54.5	-15.9	Line
19	3.701M	19.9	+0.2 +0.0	+9.5 +0.0	+0.2	+0.2	+0.0	30.0	46.0	-16.0	Line
20	4.819M	19.2	+0.3 +0.0	+9.5 +0.1	+0.2	+0.2	+0.0	29.5	46.0	-16.5	Line

CKC Laboratories, Inc. Date: 8/3/2010 Time: 3:19:53 PM Itron, Inc. WO#: 90893
15.207 AC Mains - Average Test Lead: Line Line Sequence#: 1 Ext ATTN: 0 dB



— Sweep Data	— Readings
○ Peak Readings	× QP Readings
* Average 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 #: **90893**
 Test Type: **Conducted Emissions**
 Equipment: **(SRR+WWAN+WIFI+GPS RX
Internal WWAN & GPS Antenna)**
 Manufacturer: Itron, Inc.
 Model: CCU100
 S/N: 7404FCC5

Date: 8/3/2010
 Time: 3:28:49 PM
 Sequence#: 2

Tested By: Jeff Gilbert
 240V 60Hz

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	9/5/2008	9/5/2010
T3	ANP05366	Cable	RG-214	10/20/2009	10/20/2011
T4	ANP05360	Cable	RG214	11/10/2008	11/10/2010
T5	AN03121	Cable	32026-2-29080-84	10/23/2009	10/23/2011
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 Internal WWAN & GPS Antenna)*	Itron, Inc.	CCU100	7404FCC5
H-pol omni antenna	Taoglas	TIC.95.2F11	NA

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop	Dell	Latitude D630	9JQRJH1

Test Conditions / Notes:

Frequency Range Investigated: 150 kHz - 30 MHz
 Temp: 24° C
 Humidity: 39%
 Pressure: 102.3 kPa
 EUT has the Cell modem, Wi-Fi radio, and ISM radio transmitting continuously.
 GPS receiver is active.

Ext Attn: 0 dB

Measurement Data:

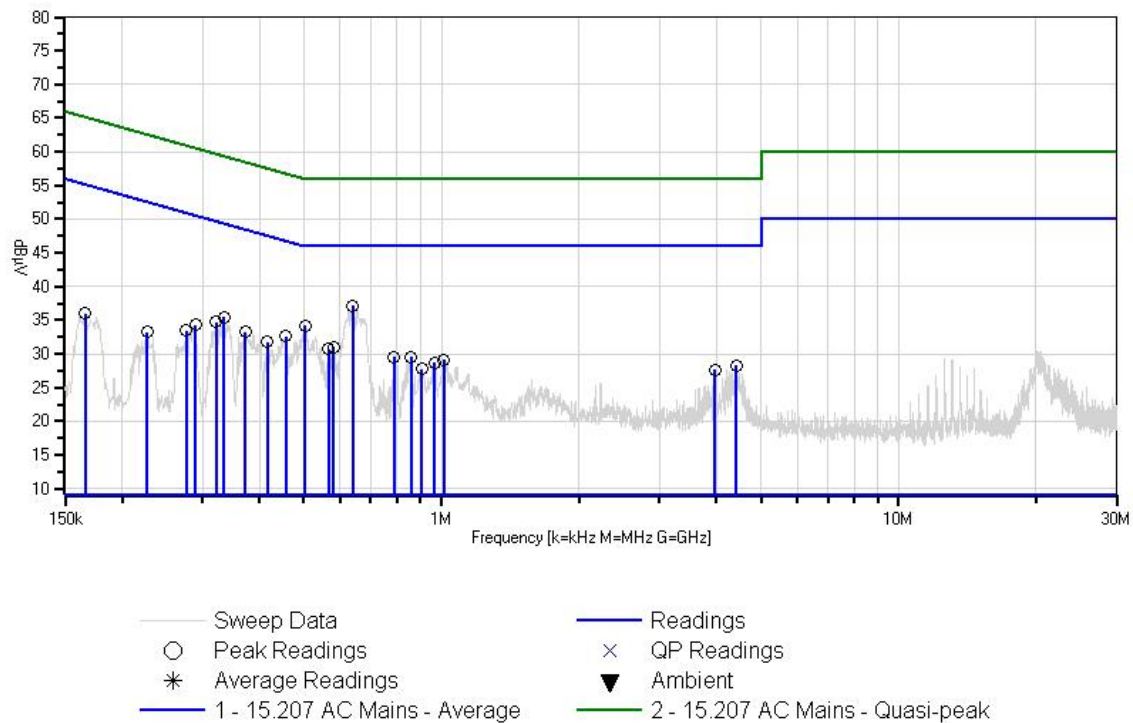
Reading listed by margin.

Test Lead: Neutral

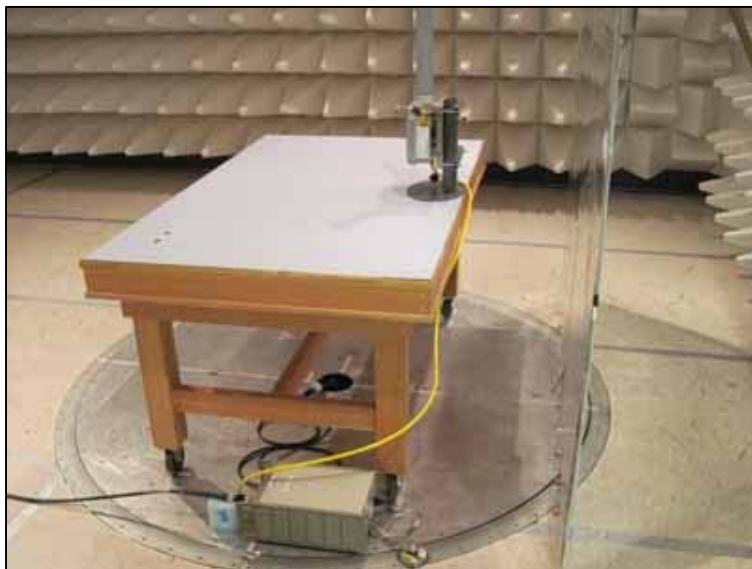
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBμV	T5 dB	T6 dB	dB	dB	Table	dBμV	dBμV	dB	Ant
1	638.682k	27.4	+0.0 +0.0	+9.6 +0.0	+0.1	+0.1	+0.0	37.2	46.0	-8.8	Neutr
2	503.422k	24.3	+0.0 +0.0	+9.6 +0.1	+0.1	+0.1	+0.0	34.2	46.0	-11.8	Neutr
3	334.710k	25.6	+0.0 +0.0	+9.6 +0.1	+0.1	+0.1	+0.0	35.5	49.3	-13.8	Neutr
4	456.881k	22.7	+0.0 +0.0	+9.6 +0.1	+0.1	+0.1	+0.0	32.6	46.7	-14.1	Neutr

5	320.893k	24.8	+0.0 +0.0	+9.6 +0.1	+0.1	+0.1	+0.0	34.7	49.7	-15.0	Neutr
6	581.233k	21.2	+0.0 +0.0	+9.6 +0.0	+0.1	+0.1	+0.0	31.0	46.0	-15.0	Neutr
7	372.525k	23.4	+0.0 +0.0	+9.6 +0.1	+0.1	+0.1	+0.0	33.3	48.4	-15.1	Neutr
8	565.235k	20.9	+0.0 +0.0	+9.6 +0.0	+0.1	+0.1	+0.0	30.7	46.0	-15.3	Neutr
9	415.430k	21.9	+0.0 +0.0	+9.6 +0.1	+0.1	+0.1	+0.0	31.8	47.5	-15.7	Neutr
10	289.624k	24.4	+0.0 +0.0	+9.6 +0.1	+0.2	+0.0	+0.0	34.3	50.5	-16.2	Neutr
11	788.487k	19.9	+0.0 +0.0	+9.6 +0.0	+0.0	+0.1	+0.0	29.6	46.0	-16.4	Neutr
12	858.299k	19.9	+0.0 +0.0	+9.6 +0.0	+0.0	+0.1	+0.0	29.6	46.0	-16.4	Neutr
13	1.013M	19.4	+0.0 +0.0	+9.6 +0.0	+0.0	+0.1	+0.0	29.1	46.0	-16.9	Neutr
14	966.512k	19.0	+0.0 +0.0	+9.6 +0.0	+0.0	+0.1	+0.0	28.7	46.0	-17.3	Neutr
15	276.534k	23.6	+0.0 +0.0	+9.6 +0.1	+0.2	+0.0	+0.0	33.5	50.9	-17.4	Neutr
16	4.420M	18.3	+0.1 +0.0	+9.5 +0.0	+0.2	+0.2	+0.0	28.3	46.0	-17.7	Neutr
17	906.974k	18.1	+0.0 +0.0	+9.6 +0.0	+0.0	+0.1	+0.0	27.8	46.0	-18.2	Neutr
18	3.969M	17.7	+0.1 +0.0	+9.5 +0.0	+0.2	+0.2	+0.0	27.7	46.0	-18.3	Neutr
19	165.999k	26.0	+0.1 +0.0	+9.6 +0.1	+0.2	+0.0	+0.0	36.0	55.2	-19.2	Neutr
20	227.084k	23.3	+0.0 +0.0	+9.6 +0.1	+0.2	+0.0	+0.0	33.2	52.6	-19.4	Neutr

CKC Laboratories, Inc. Date: 8/3/2010 Time: 3:28:49 PM Itron, Inc. WO#: 90893
15.207 AC Mains - Average Test Lead: Neutral Neutral Sequence#: 2 Ext ATTN: 0 dB



Test Setup Photos



15.247(a)(1) Carrier Frequency Separation

Test Set up

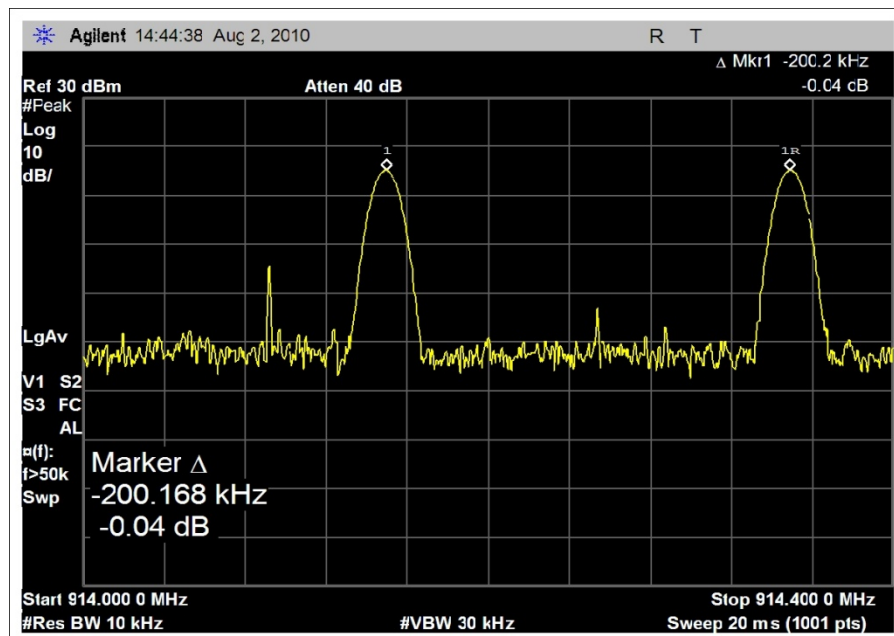
The EUT was setup on the bench and connected to a spectrum analyzer via an RF cable and 10 dB attenuator. The EUT was cycled through the different channels and modes by test software on a support laptop, connected to the EUT by an Ethernet cable. For this testing, all models (CCU100, CCU100-Repeater, CCU100R, and CCU100R-Repeater) are identical.

Engineer Name: J. Gilbert

Test Equipment

Equipment	Serial	Cal Date	Cal Due	Asset
Spectrum Analyzer	MY46186330	08/25/2009	08/25/2011	02872
Cable 10k-18G	NA	10/23/2009	10/23/2011	03121
10 dB Attenuator	NA	09/05/2008	09/05/2010	P05435

Test Data



Test Setup Photos



CARRIER FREQUENCY SEPARATION

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

Test Set up

The EUT was setup on the bench and connected to a spectrum analyzer via an RF cable and 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 testing, all models (CCU100, CCU100-Repeater, CCU100R, and CCU100R-Repeater) are identical.

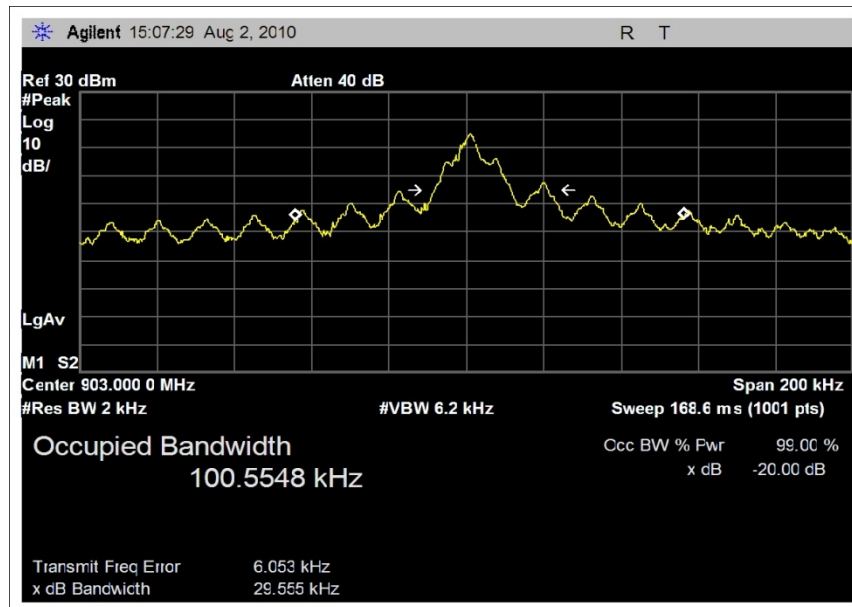
Engineer Name: J. Gilbert

Test Equipment				
Equipment	Serial	Cal Date	Cal Due	Asset
Spectrum Analyzer	MY46186330	08/25/2009	08/25/2011	02872
Cable 10k-18G	NA	10/23/2009	10/23/2011	03121
10 dB Attenuator	NA	09/05/2008	09/05/2010	P05435

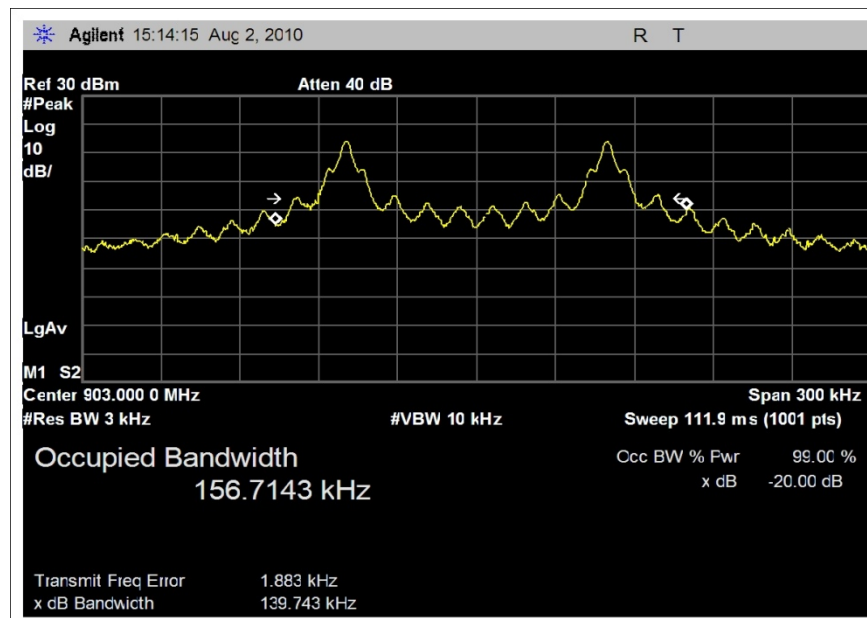
Test Data

903 MHz	AM	FM-12.5 kBaud	FM-37.5 kBaud
	29.56 kHz	139.74 kHz	53.95 kHz
915 MHz	AM	FM-12.5 kBaud	FM-37.5 kBaud
	29.69 kHz	139.91 kHz	54.25 kHz
926.8 MHz	AM	FM-12.5 kBaud	FM-37.5 kBaud
	29.07 kHz	129.50 kHz	53.03 kHz

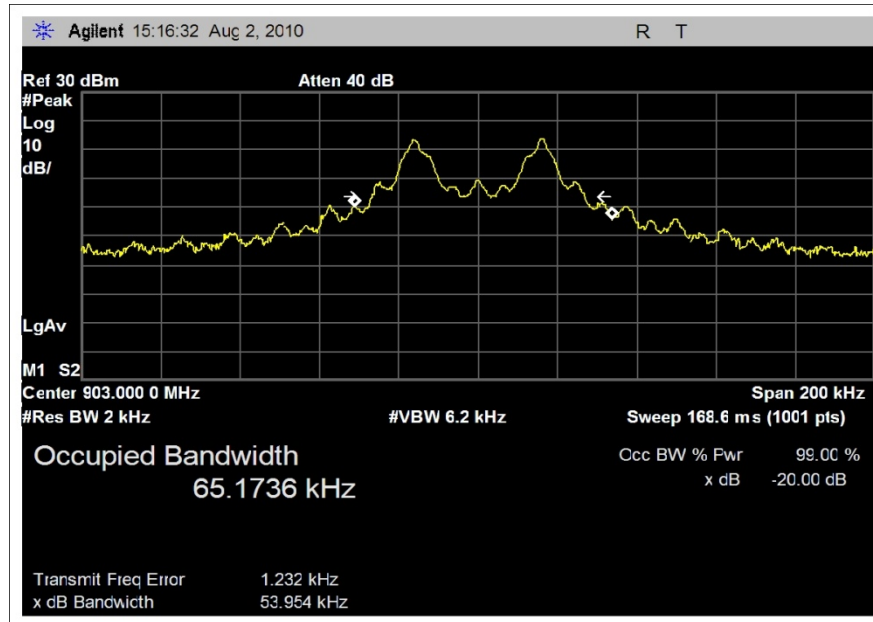
Requirement: The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.



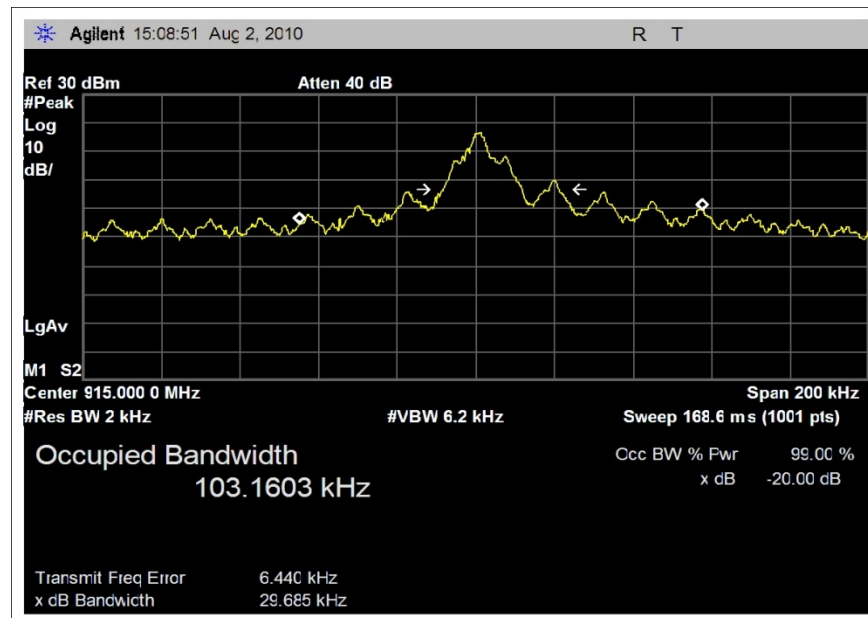
903-AM



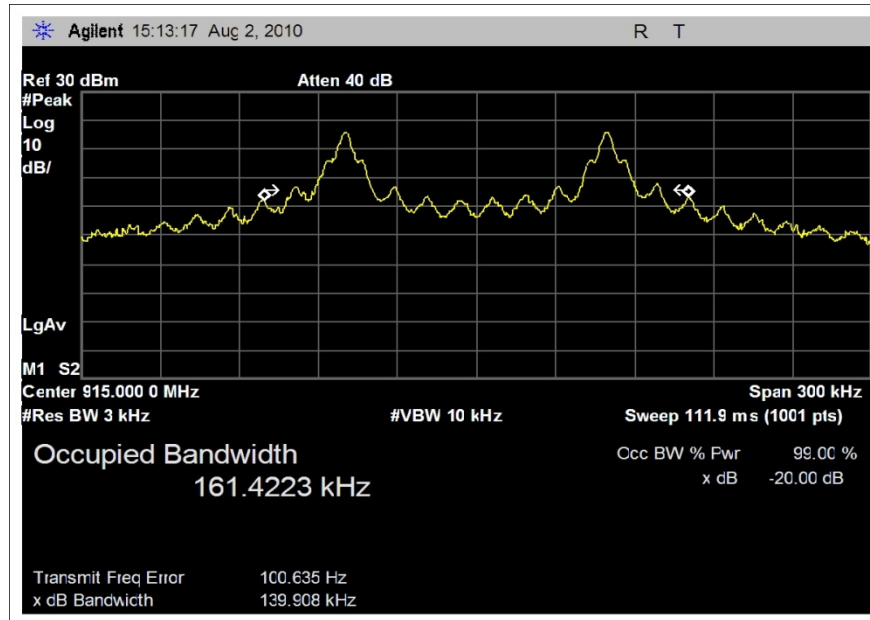
903-FM-12.5



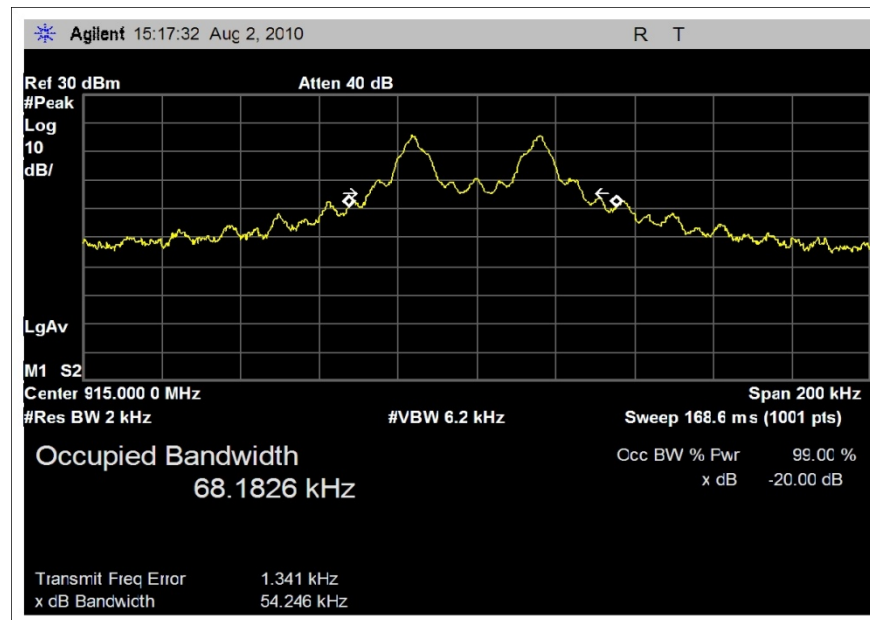
903-FM-37.5



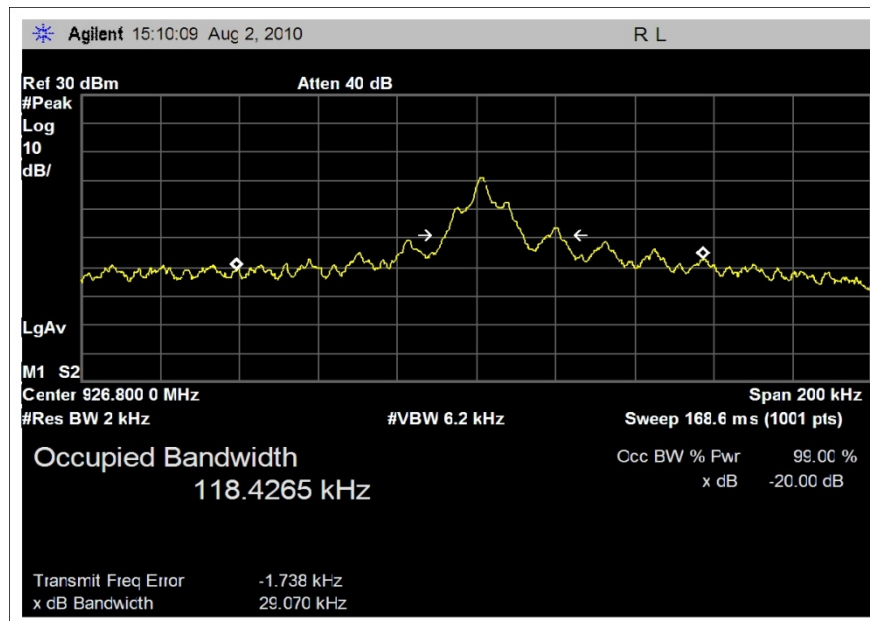
915-AM



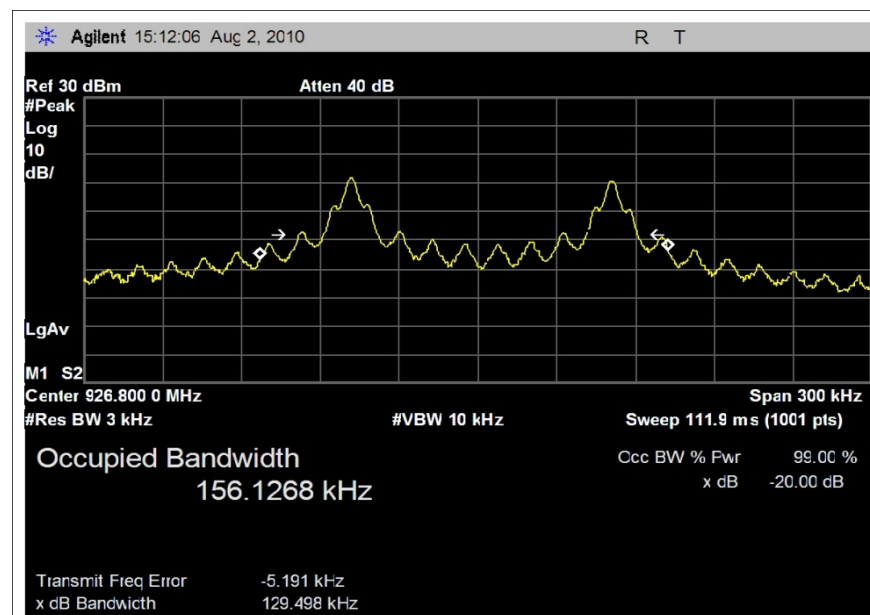
915-FM-12.5



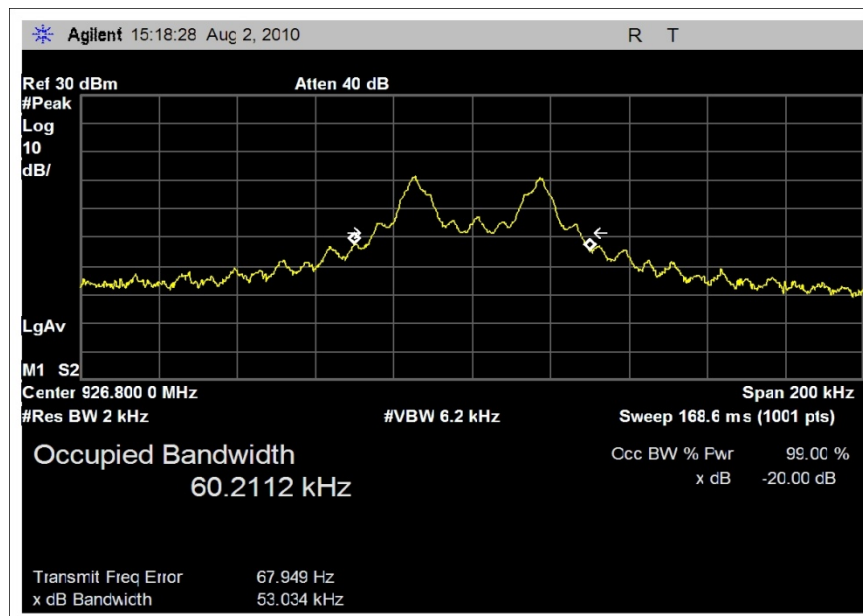
915-FM-37.5



926.8-AM



926.8-FM-12.5



926.8-FM-37.5

Test Setup Photos



20dB BANDWIDTH

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

Test Set up

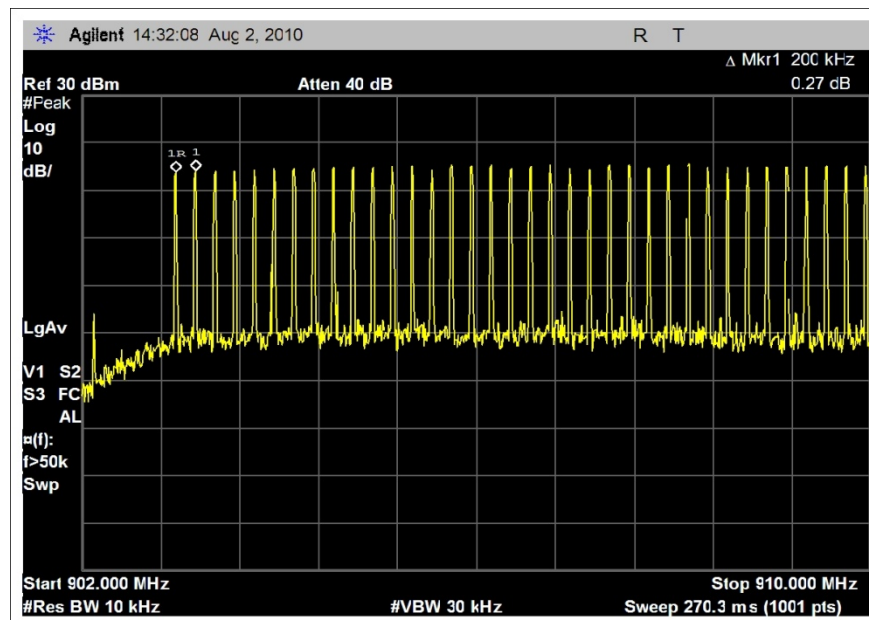
The EUT was setup on the bench and connected to a spectrum analyzer via an RF cable and 10 dB attenuator. The EUT was cycled through the different channels and modes by test software on a support laptop, connected to the EUT by an Ethernet cable. For this testing, all models (CCU100, CCU100-Repeater, CCU100R, and CCU100R-Repeater) are identical.

Engineer Name: J. Gilbert

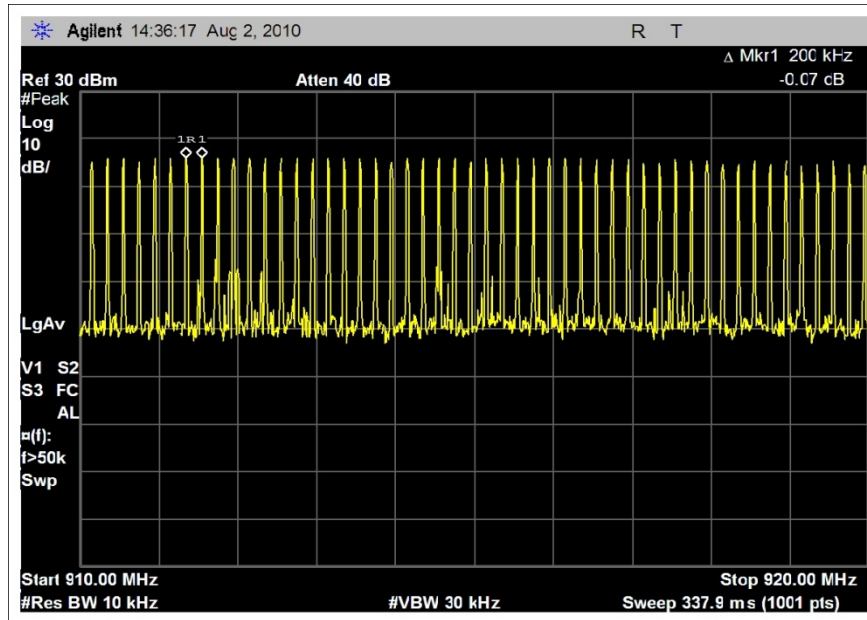
Test Equipment

Equipment	Serial	Cal Date	Cal Due	Asset
Spectrum Analyzer	MY46186330	08/25/2009	08/25/2011	02872
Cable 10k-18G	NA	10/23/2009	10/23/2011	03121
10 dB Attenuator	NA	09/05/2008	09/05/2010	P05435

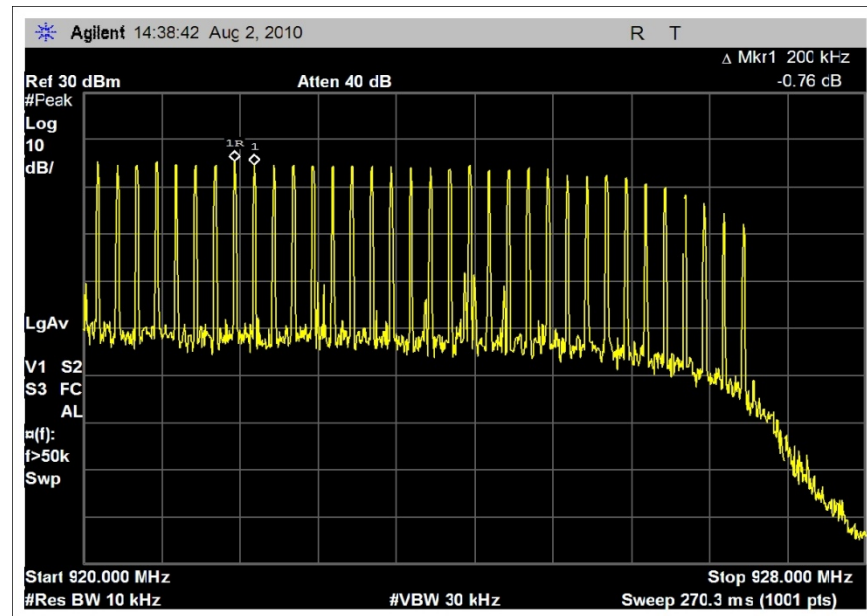
Test Data



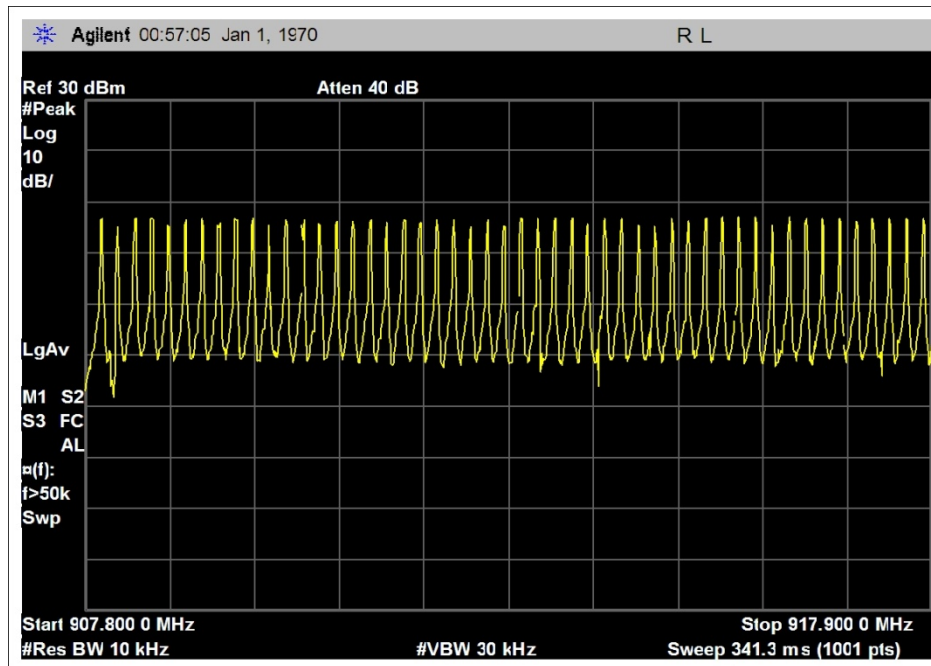
902M-910M - FM



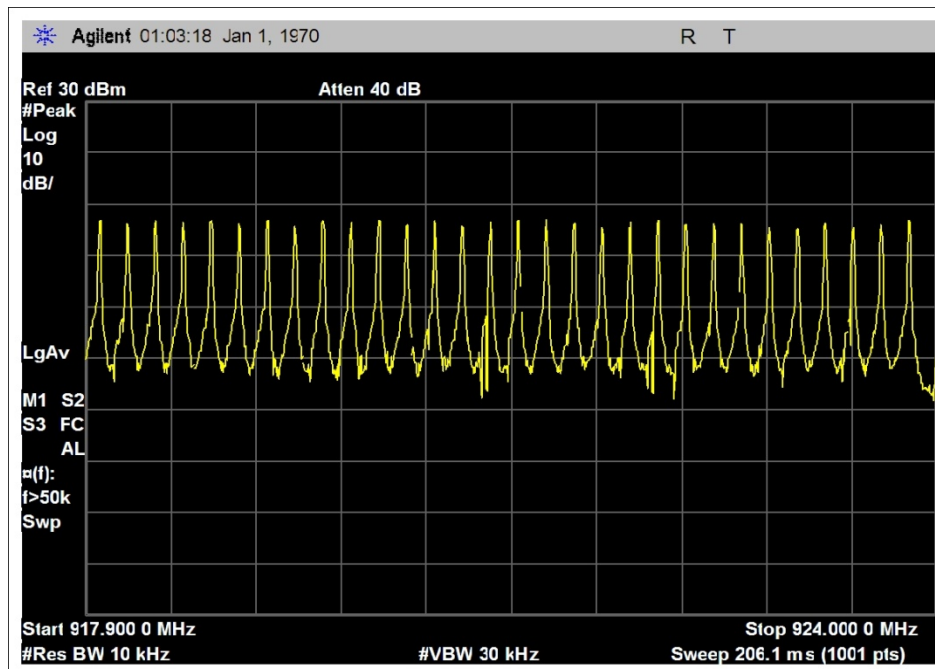
910M-920M - FM



920M-928M - FM



908 – 917.8 MHz – AM



918 – 923.8 MHz - AM

Requirement: If the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies.

Result: The manufacturer declares that the system uses from 50 to 120 hopping frequencies for FM and 80 hopping frequencies for AM. PASS

Test Setup Photos



NUMBER OF HOPPING FREQUENCIES

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

Test Set up

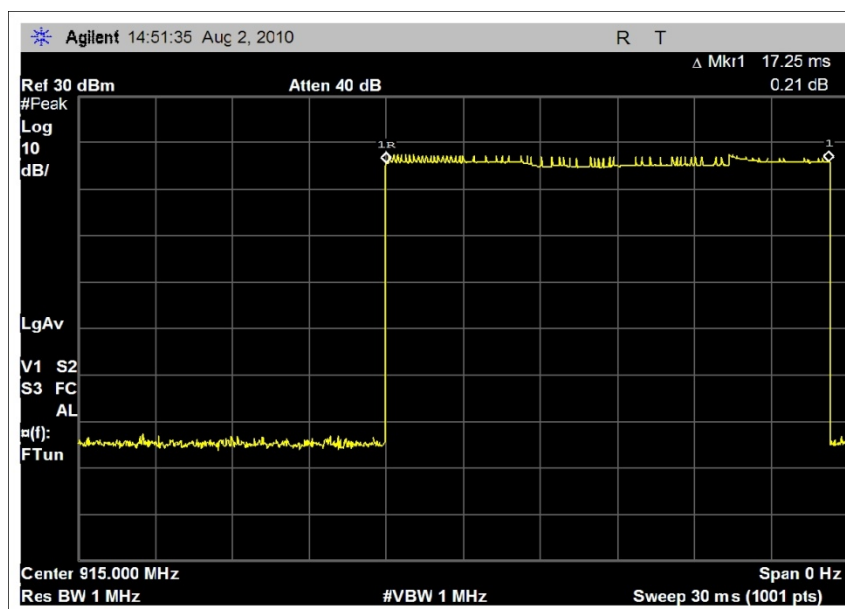
The EUT was setup on the bench and connected to a spectrum analyzer via an RF cable and 10 dB attenuator. The EUT was cycled through the different channels and modes by test software on a support laptop, connected to the EUT by an Ethernet cable. For this testing, all models (CCU100, CCU100-Repeater, CCU100R, and CCU100R-Repeater) are identical.

Engineer Name: J. Gilbert

Test Equipment

Equipment	Serial	Cal Date	Cal Due	Asset
Spectrum Analyzer	MY46186330	08/25/2009	08/25/2011	02872
Cable 10k-18G	NA	10/23/2009	10/23/2011	03121
10 dB Attenuator	NA	09/05/2008	09/05/2010	P05435

Test Data



TIME OF OCCUPANCY

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 0.01725 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 Setup Photos



TIME OF OCCUPANCY