



ADDENDUM TO ITRON, INC. TEST REPORT FC08-061

FOR THE

TRANSMITTER MODULE, HHSR

FCC PART 15 SUBPART C SECTION 15.249 AND RSS 210 ISSUE 7

TESTING

DATE OF ISSUE: JULY 28, 2008

PREPARED FOR:

PREPARED BY:

Itron, Inc. 2111 N. Molter Road Liberty Lake, WA 99215

P.O. No.: 6301 W.O. No.: 88086 Mary Ellen Clayton CKC Laboratories, Inc. 5046 Sierra Pines Drive Mariposa, CA 95338

Date of test: May 20 - June 17, 2008

Report No.: FC08-061A

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ADMINISTRATIVE INFORMATION

DATE OF TEST: May 20 - June 17, 2008

DATE OF RECEIPT: May 20, 2008

REPRESENTATIVE: Ray Stoner

MANUFACTURER: Itron, Inc. 2111 N. Molter Road Liberty Lake, WA 99215

TEST LOCATION:

CKC Laboratories, Inc. 1120 Fulton Place Fremont, CA 94539

TEST METHOD: ANSI C63.4 (2003), RSS 210 Issue 7 and RSS GEN Issue 2

PURPOSE OF TEST:

Original Report: To perform the testing of the Transmitter Module, HHSR with the requirements for FCC Part 15 Subpart C Section 15.249 and RSS 210 devices. **Addendum A:** To correct the spurious emissions data sheet with no new testing.

APPROVALS

Steve Behm, Director of Engineering Services

QUALITY ASSURANCE:

TEST PERSONNEL:

Amrinder Brar, EMC Engineer/Lab Manager

Art Rice, Senior EMC Engineer



SUMMARY OF RESULTS

Test	Specification/Method	Results
Voltage Variation	FCC 15.31(e)	Pass
Fundamental Field	FCC 15.249(a)	Pass
Strength/Band Edge		
Band Edge	FCC 15.249(d)/ ITU-R 55/1	Pass
Spurious Emissions	FCC 15.249(d)	Pass
99% Bandwidth	RSS 210/RSS GEN	Pass
Site File Numbers	FCC Site No. 958979	
	Industry of Canada File No. IC 5933	

CONDITIONS DURING TESTING

No modifications to the EUT were necessary during testing.

FCC 15.31(m) Number Of Channels

This device was tested on three channels.

FCC 15.33(a) Frequency Ranges Tested

15.249 Radiated Emissions: 30 MHz – 9.3 GHz

FCC 15.203 Antenna Requirements

The antenna is removable and has a unique Reverse SMA connector; therefore the EUT complies with Section 15.203 of the FCC rules.

EUT Operating Frequency

The EUT was operating at 908 MHz – 923.8 MHz.

Temperature And Humidity During Testing

The temperature during testing was within $+15^{\circ}$ C and $+35^{\circ}$ C. The relative humidity was between 20% and 75%.



EQUIPMENT UNDER TEST (EUT) DESCRIPTION

The customer declares the EUT tested by CKC Laboratories was representative of a production unit.

EQUIPMENT UNDER TEST

Transmitter Module

Manuf:	Itron, Inc.
Model:	HHSR
Serial:	7510800
FCC ID:	pending

PERIPHERAL DEVICES

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

5VDC Power Supply

Manuf: CUI Inc Model: EPAS-101W-05 Serial: NA

AC Adapter for PC

Manuf: Delta Electronics Model: ADP-90SB BB Serial: VCW0717010678

Laptop PC

Manuf: General Dynamics Model: IX270 Serial: ZZGEG7201ZZ7266

Interface Board

Manuf: Itron, Inc. Model: KIT-0019-001 Rev 5 Serial: NA



REPORT OF EMISSIONS MEASUREMENTS

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 $dB\mu V/m$, the spectrum analyzer reading in $dB\mu V$ was corrected by using the following formula. This reading was then compared to the applicable specification limit.

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



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. When conducted emissions testing was performed, a 10 dB external attenuator was used with internal offset correction in the analyzer.

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 were 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.



FCC 15.31(e) VOLTAGE VARIATIONS

Test Setup Photos



Data

15.31(e) Voltage Variation Test for 15.249(a) Note: This test was only performed to show the EUT internal Regulator is working. Device is intended for battery power only.

Channel	Frequency (MHz)	Voltage level	Power delta from nominal (dB)
Low	908.0	115, Nominal	0.0
Low	908.0	97.7, -15%	0.0
Low	908.0	132.2, +15%	0.0
Mid	916.0	132.2, +15%	0.0
Mid	916.0	115, Nominal	0.0
Mid	916.0	97.7, -15%	-0.1
High	923.8	97.7, -15%	0.0
High	923.8	115, Nominal	0.0
High	923.8	132.2, +15%	0.0



Test Data Sheets

Test Location:	CKC Laboratories,	Inc.	•1120 Fulton Place •	Fremont.	CA 94539 •	510-249-1170

Customer:	Itron, Inc.		
Specification:	FCC 15.31(e)		
Work Order #:	88086	Date:	5/20/2008
Test Type:	Voltage Variation on Power	Time:	11:46:20
Equipment:	Transmitter module	Sequence#:	17
Manufacturer:	Itron, Inc.	Tested By:	Art Rice
Model:	HHSR		
S/N:	7510800		

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
Antenna	2630	12/30/2006	12/30/2008	00852
E4446A Spectrum	US44300408	03/05/2007	03/05/2009	02668
Analyzer				
Cable	None	04/02/2007	04/02/2009	P05299
Cable	None	04/02/2007	04/02/2009	P05296
Cable	None	04/05/2007	04/05/2009	P05300
Preamp, HP88447D	2443A03707	02/05/2007	02/05/2009	00730
DMM, Fluke 85	65380320	07/18/2006	07/18/2008	02361
Powerstat Type 126	none	07/16/2007	07/16/2009	00435

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Transmitter module*	Itron, Inc.	HHSR	7510800

Support Devices:			
Function	Manufacturer	Model #	S/N
Interface board	Itron, Inc.	KIT-0019-001 Rev 5	
5VDC power supply	CUI Inc	EPAS-101W-05	
Laptop PC	General Dynamics	IX270	ZZGEG7201ZZ7266
AC Adapter for PC	Delta Electronics	ADP-90SB BB	VCW0717010678

Test Conditions / Notes:

F-C3 Unmodulated. PCB and antenna vertical (worst case). RBW=100 kHz, VBW=300 kHz. Low channel=908 MHz, Middle channel=916 MHz, High channel=923.8 MHz. Nominal=115V, 85%= 97.75V, 115%=132.25V. Software settings used to obtain this output level: Program=SRTESTSERIAL.EXE Frequency is set in tenths of Megahertz using the R80 command. Set transmitter power level using the R81 command. There are 127 steps to choose from. Step 0-63 are with the PA off. Step 64-127 are with PA on. The step is set to 71. R82 command sets CW or unmodulated mode. R83 command set modulated with 50% duty cycle square wave.



Transducer Legend: T1=ANT AN00852 25-1000MHz T3=Cable Calibration ANP05299 T5=AMP-AN00730-020507

T2=Cable Calibration ANP05296 T4=Cable Calibration ANP05300

Measu	asurement Data: Reading listed by margin.			Test Distance: 3 Meters							
#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	907.952M	94.9	+23.0	+2.2	+0.3	+0.8	+0.0	93.9	94.0	-0.1	Vert
			-27.3				210		Low chann	nel,	136
									115%, 132	.25V	
2	907.950M	94.9	+23.0	+2.2	+0.3	+0.8	+0.0	93.9	94.0	-0.1	Vert
			-27.3				210		Low chann	nel,	136
									Nominal, 1	115V	
3	907.950M	94.9	+23.0	+2.2	+0.3	+0.8	+0.0	93.9	94.0	-0.1	Vert
			-27.3				210		Low chanr	nel, 85%,	136
									97.75V		
4	923.752M	92.1	+23.1	+2.2	+0.2	+0.7	+0.0	90.9	94.0	-3.1	Vert
			-27.4				210		High chan	nel,	136
									115%, 132	.25V	
5	923.747M	92.1	+23.1	+2.2	+0.2	+0.7	+0.0	90.9	94.0	-3.1	Vert
			-27.4				210		High chan	nel, 85%,	136
									97.75V		
6	923.751M	92.1	+23.1	+2.2	+0.2	+0.7	+0.0	90.9	94.0	-3.1	Vert
			-27.4				210		High chan	nel,	136
									Nominal, 1	115V	
7	915.951M	92.1	+23.0	+2.2	+0.2	+0.7	+0.0	90.8	94.0	-3.2	Vert
			-27.4				210		Middle cha	annel,	136
									85%, 97.75	5V	
8	915.946M	92.0	+23.0	+2.2	+0.2	+0.7	+0.0	90.7	94.0	-3.3	Vert
			-27.4				210		Middle cha	annel,	136
									Nominal, 1	115V	
9	915.956M	92.0	+23.0	+2.2	+0.2	+0.7	+0.0	90.7	94.0	-3.3	Vert
			-27.4				210		Middle cha	annel,	136
									115%, 132	.25V	



FCC 15.249(a) FUNDAMENTAL EMISSIONS

Test Setup Photos





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Test Data Sheets

Test Location:	CKC Laboratories, Inc. •1120 Fulton Place • Fremont, CA 94539 • 510-249-1170					
Customer:	Itron, Inc.					
Specification:	FCC 15.249(a) Spurious/Harmonics	30Mhz to 100 GHz				
Work Order #:	88086	Date:	6/9/2008			
Test Type:	Maximized Emissions	Time:	15:35:10			
Equipment:	Transmitter module	Sequence#:	12			
Manufacturer:	Itron, Inc.	Tested By:	Art Rice			
Model:	HHSR					
S/N:	7510800					

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
E4446A Spectrum Analyzer	US44300408	03/05/2007	03/05/2009	02668
Preamp, HP8447D	2443A03707	02/05/2007	02/05/2009	00730
Cable	None	04/05/2007	04/05/2009	P05300
Cable	None	04/02/2007	04/02/2009	P05296
Cable	None	04/02/2007	04/02/2009	P05299
Antenna, Bilog	2630	12/30/2006	12/30/2008	00852

Equipment Under Test (* = EUT):

Transmitter module* Itron, Inc. HHSR 7510800	Function	Manufacturer	Model #	S/N
	Transmitter module*	Itron, Inc.	HHSR	7510800

Support Devices:

~~~ <i>FF</i> ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~			
Function	Manufacturer	Model #	S/N
Interface board	Itron, Inc.	KIT-0019-001 Rev 5	
5VDC power supply	CUI Inc	EPAS-101W-05	
Laptop PC	General Dynamics	IX270	ZZGEG7201ZZ7266
AC Adapter for PC	Delta Electronics	ADP-90SB BB	VCW0717010678

### Test Conditions / Notes:

F-C3 Modulated. PCB and antenna vertical (worst case). RBW=120 kHz, VBW=360 kHz. Low channel=908.0 MHz, Middle channel=916.0 MHz, High channel=923.8 MHz Software settings used to obtain this output level: Program=SRTESTSERIAL.EXE Frequency is set in tenths of Megahertz using the R80 command. R82 command sets CW or unmodulated mode. R83 command set modulated with 50% duty cycle square wave. Set transmitter power level using the R81 command. There are 127 steps to choose from. Step 0-63 are with the PA off. Step 64-127 are with PA on. The step is set to 71. Grounded module to the IF board via the serial connector only. Changed filter inductor in amplifier DC power circuit. Radiated emissions 30-1000 MHz.

### Transducer Legend:

T1=ANT AN00852 25-1000MHz	T2=Cable Calibration ANP05296
T3=Cable Calibration ANP05299	T4=Cable Calibration ANP05300
T5=AMP-AN00730-020507	

<i>Measurement Data:</i> Reading listed by margin.			argin.		Τe	est Distance	e: 3 Meters	5			
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5								
	MHz	dBµV	dB	dB	dB	dB	Table	$dB\mu V/m$	$dB\mu V/m$	dB	Ant
1	907.950M	94.2	+23.0	+2.2	+0.3	+0.8	+0.0	93.2	94.0	-0.8	Vert
	QP		-27.3				55		R81=71		113
^	907.952M	94.5	+23.0	+2.2	+0.3	+0.8	+0.0	93.5	94.0	-0.5	Vert
			-27.3				55		R81=71		113



3 923.751M	90.9	+23.1	+2.2	+0.2	+0.7	+0.0	89.7	94.0	-4.3	Vert
QP		-27.4				52		R81=71		109
^ 923.750M	91.3	+23.1	+2.2	+0.2	+0.7	+0.0	90.1	94.0	-3.9	Vert
		-27.4				52		R81=71		109
5 915.951M	90.9	+23.0	+2.2	+0.2	+0.7	+0.0	89.6	94.0	-4.4	Vert
QP		-27.4				56		R81=71		108
^ 915.952M	91.2	+23.0	+2.2	+0.2	+0.7	+0.0	89.9	94.0	-4.1	Vert
		-27.4				56		R81=71		108



# FCC 15.249(d) BAND EDGE

# **Test Setup Photos**





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# **Test Data Sheets**

Test Boeuton. Cite Buooratories, me. Tizo ration rate riemont, city 1559 510 219 117	Test Location:	CKC Laboratories, Inc.	•1120 Fulton Place •	Fremont, CA 94539 •	510-249-1170
--------------------------------------------------------------------------------------	----------------	------------------------	----------------------	---------------------	--------------

Customer:	Itron, Inc.		
Specification:	FCC 15.249(d)/15.209 Spurious/Ha	rmonics 30Mhz to 10	0 GHz
Work Order #:	88086	Date:	6/12/2008
Test Type:	Band Edge Measurements	Time:	13:46:17
Equipment:	Transmitter module	Sequence#:	13
Manufacturer:	Itron, Inc.	Tested By:	Art Rice
Model:	HHSR		
S/N:	7510800		

### Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
E4446A Spectrum	US44300408	03/05/2007	03/05/2009	02668
Analyzer				
Preamp, HP8447D	2443A03707	02/05/2007	02/05/2009	00730
Cable	None	04/05/2007	04/05/2009	P05300
Cable	None	04/02/2007	04/02/2009	P05296
Cable	None	04/02/2007	04/02/2009	P05299
Antenna, Bilog	2630	12/30/2006	12/30/2008	00852

#### Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Transmitter module*	Itron, Inc.	HHSR	7510800
Support Devices:			
Function	Manufacturer	Model #	S/N
Interface board	Itron, Inc.	KIT-0019-001 Rev 5	
5VDC power supply	CUI Inc	EPAS-101W-05	
Laptop PC	General Dynamics	IX270	ZZGEG7201ZZ7266
AC Adapter for PC	Delta Electronics	ADP-90SB BB	VCW0717010678

#### Test Conditions / Notes:

F-C3 Modulated. PCB and antenna vertical (worst case). RBW=120 kHz, VBW=360 kHz. Low channel=908.0 MHz, Middle channel=916.0 MHz, High channel=923.8 MHz Software settings used to obtain this output level: Program=SRTESTSERIAL.EXE Frequency is set in tenths of Megahertz using the R80 command. R82 command sets CW or unmodulated mode. R83 command set modulated with 50% duty cycle square wave. Set transmitter power level using the R81 command. There are 127 steps to choose from. Step 0-63 are with the PA off. Step 64-127 are with PA on. The step is set to 71. Grounded module to the IF board via the serial connector only. Changed filter inductor in amplifier DC power circuit. Radiated emissions 30-1000 MHz.



Transducer Legend:	
T1=ANT AN00852 25-1000MHz	T2=Cable Calibration ANP05296
T3=Cable Calibration ANP05299	T4=Cable Calibration ANP05300
T5=AMP-AN00730-020507	

Measu	rement Data:	Re	ading lis	ted by ma	argin.		Τe	est Distanc	e: 3 Meters		
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5								
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	907.950M	94.5	+23.0	+2.2	+0.3	+0.8	+0.0	93.5	93.5	+0.0	Vert
			-27.3				246		Low chann	el	104
									fundament	al	
2	923.750M	91.1	+23.1	+2.2	+0.2	+0.7	+0.0	89.9	93.5	-3.6	Vert
			-27.4				246		High chan	nel	104
									fundament	al	
3	902.000M	32.4	+22.9	+2.2	+0.3	+0.8	+0.0	31.3	46.0	-14.7	Vert
			-27.3				246		Lower ban	d edge.	104
4	928.000M	29.1	+23.1	+2.2	+0.2	+0.7	+0.0	27.9	46.0	-18.1	Vert
			-27.4				246		Upper band	d edge.	104

# 15.249 Band Edge

Channel	Frequency (MHz)	Level at edge of band	FCC 15.209 Limit	Pass/Fail
Low	902.0	31.3	46.0	Pass
High	928.0	27.9	46.0	Pass



**Plots** 

# FCC 15.249(a) LOWER BAND EDGE



# FCC 15.249(a) UPPER BAND EDGE





# FCC 15.249(d) SPURIOUS EMISSIONS

Test Setup Photos





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# **Test Data Sheets**

Test Location: CKC Laboratories, Inc. •1120 Fulton Place • Fremont, CA 94539 • 510-249-1170

Customer:	Itron, Inc.		
Specification:	FCC 15.249(d)/15.209		
Work Order #:	88086	Date:	6/10/2008
Test Type:	Maximized Emissions	Time:	14:20:32
Equipment:	Transmitter module	Sequence#:	14
Manufacturer:	Itron, Inc.	Tested By:	Art Rice
Model:	HHSR	-	
S/N:	7510800		

# Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
E4446A Spectrum	US44300408	03/05/2007	03/05/2009	02668
Analyzer				
Preamp, HP8447D	2443A03707	02/05/2007	02/05/2009	00730
Cable	None	04/05/2007	04/05/2009	P05300
Cable	None	04/02/2007	04/02/2009	P05296
Cable	None	04/02/2007	04/02/2009	P05299
Antenna, Bilog	2630	12/30/2006	12/30/2008	00852
Cable, HF	n/a	05/06/2008	05/06/2010	P04241
Cable, HF	n/a	05/06/2008	05/06/2010	P04240
1.5GHz HP Filter	PN 83400-80037	04/01/2008	04/01/2010	P01415
HF Cable		03/27/2007	03/27/2009	01952
Preamp, HP83017A	3123A00283	05/16/2007	05/16/2009	00785
Antenna, Horn 1-18	1064	03/19/2007	03/19/2009	02061
GHz				
Mag Loop - 6502	2078	06/11/2007	06/11/2009	00432



Function	Manufacturer	Model #	S/N
Transmitter module*	Itron, Inc.	HHSR	7510800
Support Devices:			
Function	Manufacturer	Model #	S/N
Interface board	Itron, Inc.	KIT-0019-001 Rev 5	
5VDC power supply	CUI Inc	EPAS-101W-05	
Laptop PC	General Dynamics	IX270	ZZGEG7201ZZ7266
AC Adapter for PC	Delta Electronics	ADP-90SB BB	VCW0717010678

#### *Equipment Under Test* (* = EUT):

### Test Conditions / Notes:

F-C3 Modulated. PCB and antenna vertical (worst case). SA Atten=10dB 1.0-1.5 GHz. SA Atten=0dB 30kHz-1000MHz, 1.5-9.3 GHz. RBW=1MHz, VBW=3 MHz, 1-9.3 GHz. RBW=120kHz, VBW=360kHz, 30-1000 MHz. RBW=200 Hz, VBW= 620 Hz, 30 kHz-150 kHz. RBW=9kHz, VBW=27kHz, 150 kHz-30 MHz. Low channel=908.0 MHz, Middle channel=916.0 MHz, High channel=923.8 MHz. Software settings used to obtain this output level: Program=SRTESTSERIAL.EXE Frequency is set in tenths of Megahertz using the R80 command. R82 command sets CW or unmodulated mode. R83 command set modulated with 50% duty cycle square wave. Set transmitter power level using the R81 command. There are 127 steps to choose from. Step 0-63 are with the PA off. Step 64-127 are with PA on. The step is set to 71. Grounded module to the IF board via the serial connector only. Changed filter inductor in amplifier DC power circuit. Radiated emissions 9 kHz-9.3 GHz.

#### Transducer Legend:

0	
T1=ANT AN00852 25-1000MHz	T2=Cable Calibration ANP05296
T3=Cable Calibration ANP05299	T4=Cable Calibration ANP05300
T5=AMP-AN00730-020507	T6=ANT AN02061 900MHz-18.5GHz
T7=Cable P01952 2'	T8=CAB-ANP04240-050608
T9=CAB-ANP04241-050608	T10=AMP-AN00785-051607
T11=HPF AN01415 1.5GHz	T12=Mag Loop - AN 00432- 9kHz-30M

Measi	urement Data:	R	eading lis	ted by ma	argin.		Τe	est Distanc	e: 3 Meters		
#	Freq	Rdng	T1	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
			T5	T6	T7	T8					
			T9	T10	T11	T12					
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	272.300k	43.3	+0.0	+0.2	+0.1	+0.0	-40.0	13.3	18.9	-5.6	Horiz
	Ave		+0.0	+0.0	+0.0	+0.0	223				99
			+0.0	+0.0	+0.0	+9.7					
^	272.340k	48.3	+0.0	+0.2	+0.1	+0.0	-40.0	18.3	18.9	-0.6	Horiz
			+0.0	+0.0	+0.0	+0.0	222				99
			+0.0	+0.0	+0.0	+9.7					
3	183.460k	46.3	+0.0	+0.2	+0.0	+0.1	-40.0	16.4	22.3	-5.9	Horiz
	Ave		+0.0	+0.0	+0.0	+0.0	321				99
			+0.0	+0.0	+0.0	+9.8					
^	183.530k	52.2	+0.0	+0.2	+0.0	+0.1	-40.0	22.3	22.3	+0.0	Horiz
			+0.0	+0.0	+0.0	+0.0	321				99
			+0.0	+0.0	+0.0	+9.8					
5	3663.991M	43.6	+0.0	+0.0	+0.0	+0.0	+0.0	45.3	54.0	-8.7	Horiz
	Ave		+0.0	+31.7	+0.4	+3.6	153		Mid CH		104
			+0.9	-35.1	+0.2						
^	3664.071M	49.1	+0.0	+0.0	+0.0	+0.0	+0.0	50.8	54.0	-3.2	Horiz
			+0.0	+31.7	+0.4	+3.6	153				104
			+0.9	-35.1	+0.2						

CKC AM Testing the Future

7 3695.222M	43.2	+0.0	+0.0	+0.0	+0.0	+0.0	45.3	54.0	-8.7	Horiz
Ave		+0.0	+31.7	+0.4	+3.8	156		High CH		118
		+1.1	-35.1	+0.2						
^ 3695.260M	47.2	+0.0	+0.0	+0.0	+0.0	+0.0	49.3	54.0	-4.7	Horiz
		+0.0	+31.7	+0.4	+3.8	156				118
		+1.1	-35.1	+0.2						
9 3695.233M	42.3	+0.0	+0.0	+0.0	+0.0	+0.0	44.4	54.0	-9.6	Vert
Ave		+0.0	+31.7	+0.4	+3.8	126		High CH		118
		+1.1	-35.1	+0.2				-		
^ 3695.260M	46.3	+0.0	+0.0	+0.0	+0.0	+0.0	48.4	54.0	-5.6	Vert
		+0.0	+31.7	+0.4	+3.8	126				118
		+1.1	-35.1	+0.2						
11 53.517M	48.4	+8.0	+0.5	+0.0	+0.2	+0.0	29.9	40.0	-10.1	Vert
QP		-27.2	+0.0	+0.0	+0.0	245		Mid CH		99
		+0.0	+0.0	+0.0						
^ 53.481M	50.8	+8.0	+0.5	+0.0	+0.2	+0.0	32.3	40.0	-7.7	Vert
		-27.2	+0.0	+0.0	+0.0	245				99
		+0.0	+0.0	+0.0						
13 3631.847M	42.5	+0.0	+0.0	+0.0	+0.0	+0.0	43.7	54.0	-10.3	Horiz
Ave		+0.0	+31.7	+0.3	+3.4	159		Low CH		105
		+0.8	-35.2	+0.2						
^ 3631.747M	49.6	+0.0	+0.0	+0.0	+0.0	+0.0	50.8	54.0	-3.2	Horiz
		+0.0	+31.7	+0.3	+3.4	159				105
		+0.8	-35.2	+0.2						
15 1497 869M	52.3	+0.0	+0.0	+0.0	+0.0	+0.0	43.4	54.0	-10.6	Vert
10 110/1000/11	02.0	+0.0	+24.3	+0.2	+2.2	9	15.1	High CH	10.0	99
		+0.6	-37.4	+1.2	. 2.2	-		ingii eii		
16 123 996M	46.6	+11.8	+0.7	+0.1	+0.3	+0.0	32.3	43.5	-11.2	Vert
OP	10.0	-27.2	+0.0	+0.0	+0.0	141	52.5	Low CH	11.2	99
×-		+0.0	+0.0	+0.0				2011 011		
^ 123 915M	50.5	+11.8	+0.7	+0.1	+0.3	+0.0	36.2	43.5	-73	Vert
125.910101	50.5	-27.2	+0.0	+0.0	+0.0	141	50.2	10.0	7.5	99
		+0.0	+0.0	+0.0	10.0	111				
18 131 099M	45.6	+11.8	+0.7	+0.1	+0.3	+0.0	31.4	43.5	-12.1	Vert
OP	15.0	-27.1	+0.0	+0.1	+0.0	250	51.1	Mid CH	12.1	101
×1		+0.0	+0.0	+0.0	10.0	200		inia err		101
^ 131 106M	50.0	+11.8	+0.7	+0.1	+0.3	+0.0	35.8	43.5	-77	Vert
151.1000	50.0	-27.1	+0.7	+0.1	+0.0	250	55.0	-5.5	/./	99
		+0.0	+0.0	+0.0	10.0	250				//
20 131 690M	45 A	+11.8	+0.7	+0.1	+0.3	+0.0	31.2	43.5	-12.3	Vert
OP	-12.7	-27.1	+0.7	+0.1	+0.0	210	51.2	Low CH	12.5	99
Q1		+0.0	+0.0	+0.0	10.0	210		Low en		//
^ 131.655M	50.0	±11.8	+0.7	+0.0	±0.3	±0.0	35.8	/3.5	_77	Vert
151.055141	50.0	-27.1	+0.7	+0.1	+0.0	210	55.0	-5.5	-7.7	99
		+0.0	+0.0	+0.0	10.0	210				,,
22 3632 009M	30.2	+0.0	+0.0	+0.0	+0.0	+0.0	40.5	54.0	-13.5	Vert
Δνρ	59.4	+0.0	+31.7	+0.0	+3.0	127	т <b>0</b> .3	Low CH	-15.5	141
1110		+0.0	-35.1	+0.3	- J. <b>T</b>	121				171
^ 3632 033M	177	10.0	<u></u>	+0.2	+0.0	+0.0	10.0	54.0	_5.0	Vort
5052.055M	+/./	+0.0 +0.0	+0.0 +31 7	+0.0 +0.3	+0.0 +3 /	+0.0 127	47.0	54.0	-5.0	1/1
		+0.0 ⊥0 ହ	-25 1	+0.5 _10 2	⊤J <b>.</b> 4	12/				141
L		$\pm 0.0$	-55.1	$\pm 0.2$						

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24 5898.957M	28.3	+0.0	+0.0	+0.0	+0.0	+0.0	35.3	54.0	-18.7	Vert
Ave		+0.0	+34.9	+0.5	+5.0	30		Low CH		103
		+1.3	-34.9	+0.2						
^ 5898.963M	42.3	+0.0	+0.0	+0.0	+0.0	+0.0	49.3	54.0	-4.7	Vert
		+0.0	+34.9	+0.5	+5.0	30				103
		+1.3	-34.9	+0.2						
26 1824.468M	35.2	+0.0	+0.0	+0.0	+0.0	+0.0	29.4	54.0	-24.6	Vert
Ave		+0.0	+27.3	+0.2	+2.4	191		Low CH		103
		+0.6	-36.9	+0.6						
^ 1824.467M	51.1	+0.0	+0.0	+0.0	+0.0	+0.0	45.3	54.0	-8.7	Vert
		+0.0	+27.3	+0.2	+2.4	191				103
		+0.6	-36.9	+0.6						
28 2503.706M	32.6	+0.0	+0.0	+0.0	+0.0	+0.0	29.2	54.0	-24.8	Vert
Ave		+0.0	+28.5	+0.3	+2.9	222		Low CH		103
		+0.8	-36.2	+0.3						
^ 2503.747M	50.7	+0.0	+0.0	+0.0	+0.0	+0.0	47.3	54.0	-6.7	Vert
		+0.0	+28.5	+0.3	+2.9	222				103
		+0.8	-36.2	+0.3						
30 2492.846M	32.6	+0.0	+0.0	+0.0	+0.0	+0.0	29.2	54.0	-24.8	Vert
Ave		+0.0	+28.5	+0.3	+2.9	355		High CH		106
		+0.8	-36.2	+0.3				-		
^ 2492.861M	52.2	+0.0	+0.0	+0.0	+0.0	+0.0	48.8	54.0	-5.2	Vert
		+0.0	+28.5	+0.3	+2.9	355				106
		+0.8	-36.2	+0.3						



### RSS 210 99% BANDWIDTH

Test Location: CKC Laboratories, Inc. •1120 Fulton Place • Fremont, CA 94539 • 510-249-1170

Customer: Specification:	Itron, Inc. 99% BW Plots		
Work Order #:	88086	Date:	5/20/2008
Manufacturer:	Itron, Inc.	Tested By:	Art Rice
Model:	HHSR		
S/N:	7510800		

#### **Test Equipment:** Function S/N Calibration Date Cal Due Date Asset # Antenna 2630 12/30/2006 12/30/2008 00852 E4446A Spectrum US44300408 03/05/2007 03/05/2009 02668 Analyzer Cable 04/02/2007 04/02/2009 P05299 None Cable None 04/02/2007 04/02/2009 P05296 04/05/2007 04/05/2009 Cable P05300 None Preamp, HP88447D 2443A03707 02/05/2007 02/05/2009 00730

# **Test Conditions**

F-C3 Modulated. PCB and antenna vertical (worst case). RBW=30 kHz, VBW=300 kHz. Low channel=908.0 MHz, Middle channel=916.0 MHz, High channel=923.8 MHz. Software settings used to obtain this output level: Program=SRTESTSERIAL.EXE. Frequency is set in tenths of Megahertz using the R80 command. R82 command sets CW or unmodulated mode. R83 command set modulated with 50% duty cycle square wave. Set transmitter power level using the R81 command. There are 127 steps to choose from. Step 0-63 are with the PA off. Step 64-127 are with PA on. The step is set to 71.

# **Test Setup Photos**







# Data

Channel	Frequency (MHz)	99% BW
Low	908.0	172.1
Mid	916.0	173.6
High	923.8	175.6



# Plots RSS 210 99% BANDWIDTH LOW CHANNEL



# **RSS 210 99% BANDWIDTH MIDDLE CHANNEL**





# RSS 210 99% BANDWIDTH HIGH CHANNEL

