

Ittron, Inc.

ADDENDUM TEST REPORT TO 99808-6

**Gas Endpoint
Model: 500GR**

Tested To The Following Standard:

FCC Part 15 Subpart C Section(s)

**15.247
(FHSS 902-928 MHz)**

Report No.: 99808-6A

Date of issue: May 22, 2017



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 Road
Liberty Lake, WA 99019

REPORT PREPARED BY:

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

REPRESENTATIVE: Jay Holcomb
Customer Reference Number: 119366

Project Number: 99808

DATE OF EQUIPMENT RECEIPT:

April 4, 2017

DATE(S) OF TESTING:

April 4-6 and 21, 2017

Revision History

Original: Testing of the Gas Endpoint, Model 500GR to FCC Part 15 Subpart C Section 15.247.

Addendum A: Level 0 data removed from Output Power section.

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.

A handwritten signature in black ink that reads "Steve Behm". The signature is written in a cursive style and is positioned above a horizontal line.

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.
110 North Olinda Place
Brea, CA 92823

Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.03.02

Site Registration & Accreditation Information

Location	CB #	TAIWAN	CANADA	FCC	JAPAN
Brea D, CA	US0060	SL2-IN-E-1146R	3082D-2	US1025	A-0147
Brea A, CA	US0060	SL2-IN-E-1146R	3082D-1	US1025	A-0147

SUMMARY OF RESULTS

Standard / Specification: FCC Part 15 Subpart C - 15.247 (FHSS 902-928MHz)

Test Procedure	Description	Modifications	Results
15.247(a)(1)(i)	Occupied Bandwidth	NA	Pass
15.247(a)(1)	Carrier Separation	NA	Pass
15.247(a)(1)(i)	Number of Hopping Channels	NA	Pass
15.247(a)(1)(i)	Average Time of Occupancy	NA	NP
15.247(b)(2)	Output Power	NA	Pass
15.247(d)	RF Conducted Emissions & Band Edge	NA	Pass
15.247(d)	Radiated Emissions & Band Edge	NA	Pass
15.207	AC Conducted Emissions	NA	NP

NA = Not Applicable

NP = CKC Laboratories was not contracted to perform test.

Modifications During Testing

This list is a summary of the modifications made to the equipment during testing.

Summary of Conditions
No modifications were made during testing.

Modifications listed above must be incorporated into all production units.

Conditions During Testing

This list is a summary of the conditions noted to the equipment during testing.

Summary of Conditions
None

EQUIPMENT UNDER TEST (EUT)

During testing numerous configurations may have been utilized. The configurations listed below support compliance to the standard(s) listed in the Summary of Results section.

Configuration 1

Equipment Tested:

Device	Manufacturer	Model #	S/N
Gas Endpoint	Ittron, Inc.	500GR	0100002762

Support Equipment:

Device	Manufacturer	Model #	S/N
None			

Configuration 3

Device	Manufacturer	Model #	S/N
Gas Endpoint	Ittron, Inc.	500GR	0100002761

Support Equipment:

Device	Manufacturer	Model #	S/N
None			

Configuration 4

Equipment Tested:

Device	Manufacturer	Model #	S/N
Gas Endpoint	Ittron, Inc.	500GR	0100002706

Support Equipment:

Device	Manufacturer	Model #	S/N
None			

Configuration 5

Equipment Tested:

Device	Manufacturer	Model #	S/N
Gas Endpoint	Ittron, Inc.	500GR	0100002768

Support Equipment:

Device	Manufacturer	Model #	S/N
None			

Configuration 6

Equipment Tested:

Device	Manufacturer	Model #	S/N
Gas Endpoint	Ittron, Inc.	500GR	0100002865

Support Equipment:

Device	Manufacturer	Model #	S/N
None			

General Product Information:

Product Information	Manufacturer-Provided Details
Equipment Type:	Stand-Alone Equipment
Type of Wideband System:	FHSS
Operating Frequency Range:	903MHz to 926.8MHz (OOK) 902.2MHz to 927.75MHz (GFSK) 902.4MHz to 927.6MHz (GFSK)
Number of Hopping Channels:	120 (903MHz to 926.8MHz OOK) 512 (902.2MHz to 927.75MHz GFSK) 64 (902.4MHz to 927.6MHz GFSK)
Modulation Type(s):	OOK and GFSK
Maximum Duty Cycle:	Power level 3 for OOK is 56.1% Power level 1 for OOK is 12.2% FM is 100%
Number of TX Chains:	2
Antenna Type(s) and Gain:	Integral
Beamforming Type:	NA
Antenna Connection Type:	PC board antenna
Nominal Input Voltage:	6.3Vdc Battery
Firmware / Software used for Test:	STM32 1.18.3.0 MSP 0.15.4.0

FCC Part 15 Subpart C

15.247(a) Transmitter Characteristics

Test Setup/Conditions			
Test Location:	Brea Lab A	Test Engineer:	E. Wong
Test Method:	ANSI C63.10 (2013)	Test Date(s):	4/21/2017
Configuration:	6		
Test Setup:	The equipment under test (EUT) is stand alone on the table top. The EUT is turned on and set in transmit mode. The EUT has new batteries installed. Nominal input voltage is 6.3Vdc. Frequency range: 902-928 MHz Modulation: GFSK. OOK Firmware power: power level, 1 and 3 Firmware version: STM32 1.18.3.0 MSP 0.15.4.0 Evaluation performed at antenna port. Duty cycle: 100% Level 1: 10dBm_16384bps OOK 903MHz, 915MHz, 926.8MHz Level 3: 27dBm_16384kbps OOK 903MHz, 915MHz, 926.8MHz Level 3: 27dBm_10kbps GFSK 902.2MHz, 915MHz, 927.75MHz Level 3: 27dBm_150kbps GFSK 902.4MHz, 915.2MHz, 927.6MHz Site A. Test Method: ANSI C63.10 (2013)		

Environmental Conditions			
Temperature (°C)	23	Relative Humidity (%):	46

Test Equipment					
Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
02672	Spectrum Analyzer	Agilent	E4446A	3/2/2017	3/2/2019
03431	Cable	Astrolab Inc.	32022-2-2909K-36TC	11/2/2015	11/2/2017
02946	Attenuator	Aeroflex/Weinschel	89-20-21	11/2/2015	11/2/2017

15.247(a)(1) Occupied Bandwidth

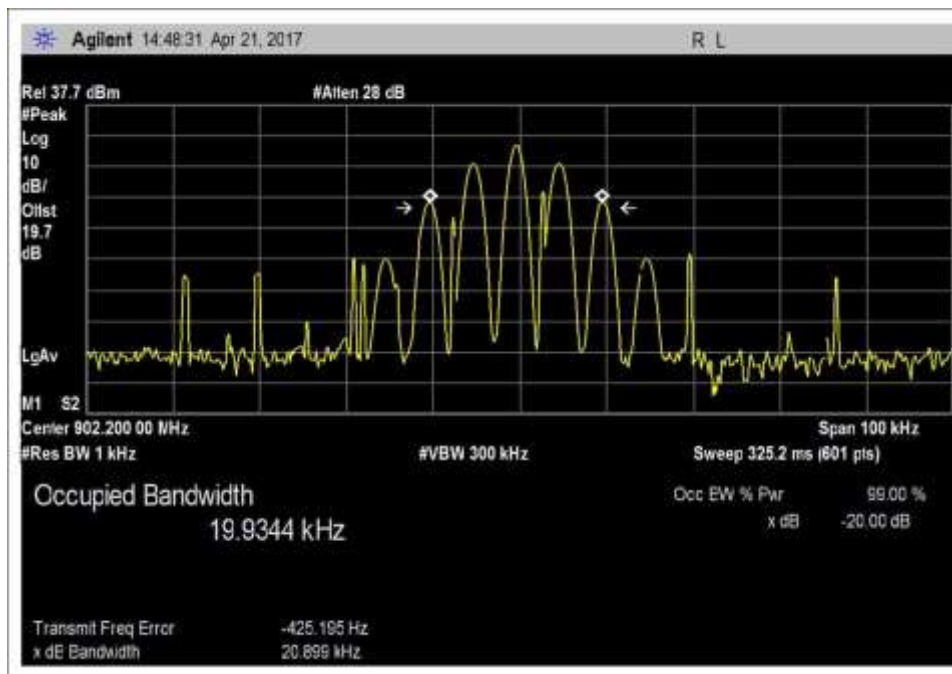
Test Data Summary – 20dB Occupied Bandwidth					
Frequency (MHz)	Antenna Port	Modulation	Measured (kHz)	Limit (kHz)	Results
Level 1- 10dBm_16384bps_OOK					
903.0	1	OOK	166.9	≤500	Pass
915.0	1	OOK	168.8	≤500	Pass
926.8	1	OOK	141.5	≤500	Pass
Level 3 -27dBm_10kbps_GFSK.					
902.2	1	GFSK	20.9	≤500	Pass
915.0	1	GFSK	20.9	≤500	Pass
927.75	1	GFSK	20.8	≤500	Pass
Level 3 -27dBm_150kbps_GFSK.JPG					
902.4	1	GFSK	160.9	≤500	Pass
915.2	1	GFSK	160.8	≤500	Pass
927.6	1	GFSK	161.0	≤500	Pass
Level 3 -27dBm_16384bps_OOK					
903.0	1	OOK	165.3	≤500	Pass
915.0	1	OOK	168.7	≤500	Pass
926.8	1	OOK	168.7	≤500	Pass

Test Data Summary – 99% Occupied Bandwidth					
Frequency (MHz)	Antenna Port	Modulation	Measured (kHz)	Limit (kHz)	Results
Level 1- 10dBm_16384bps_OOK					
903.0	1	OOK	251.4	None	NA
915.0	1	OOK	269.3		
926.8	1	OOK	231		
Level 3 -27dBm_10kbps_GSKF.					
902.2	1	GFSK	19.9	None	NA
915.0	1	GFSK	19.9		
927.75	1	GFSK	19.8		
Level 3 -27dBm_150kbps_GSKF					
902.4	1	GFSK	158.2	None	NA
915.2	1	GFSK	157.9		
927.6	1	GFSK	158.3		
Level 3 -27dBm_16384bps_OOK					
903.0	1	OOK	265.1	None	NA
915.0	1	OOK	285.6		
926.8	1	OOK	270.1		

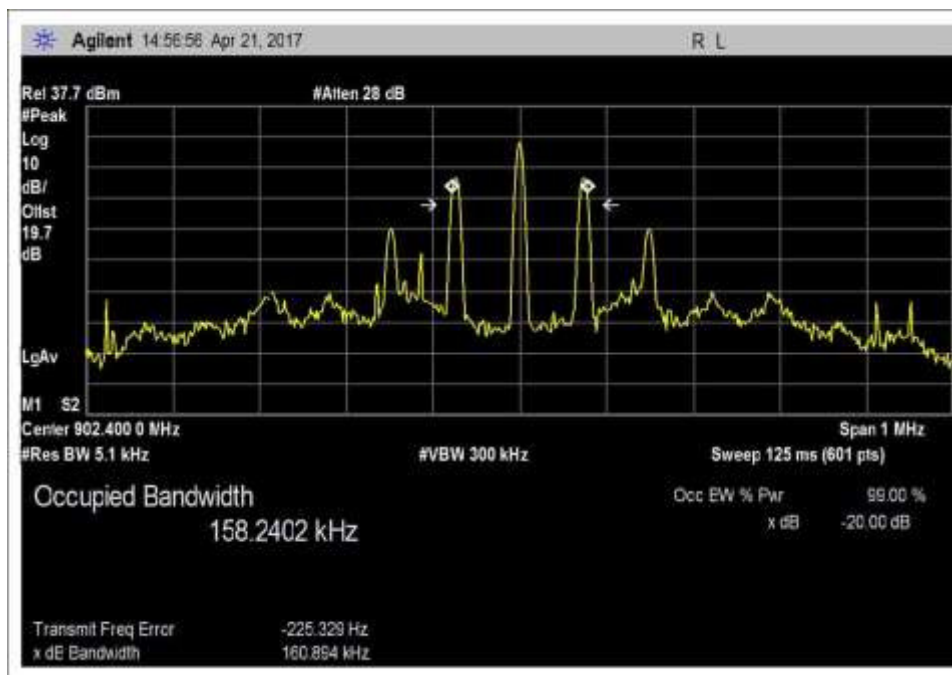
NA = Not Applicable

Plots – 20dB and 99%

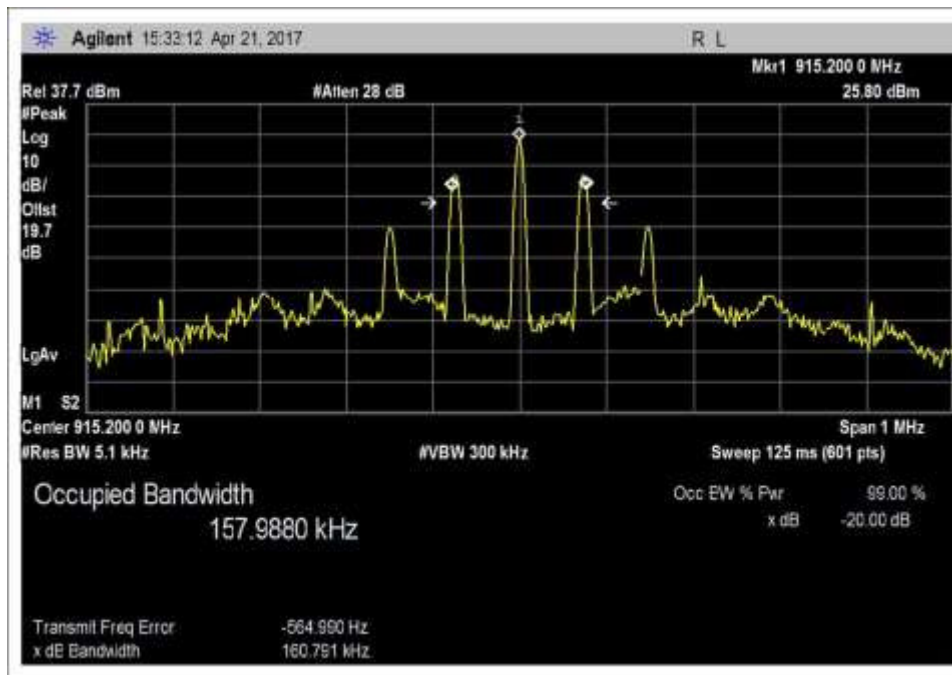
GFSK



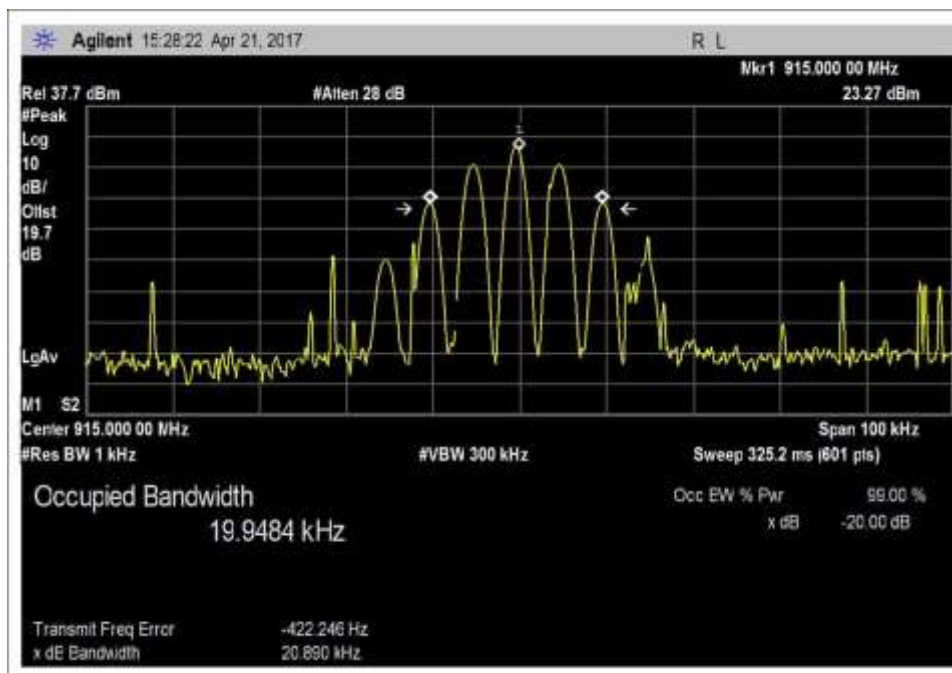
20dB_99%BW_902.2MHz_27dBm_10kbps



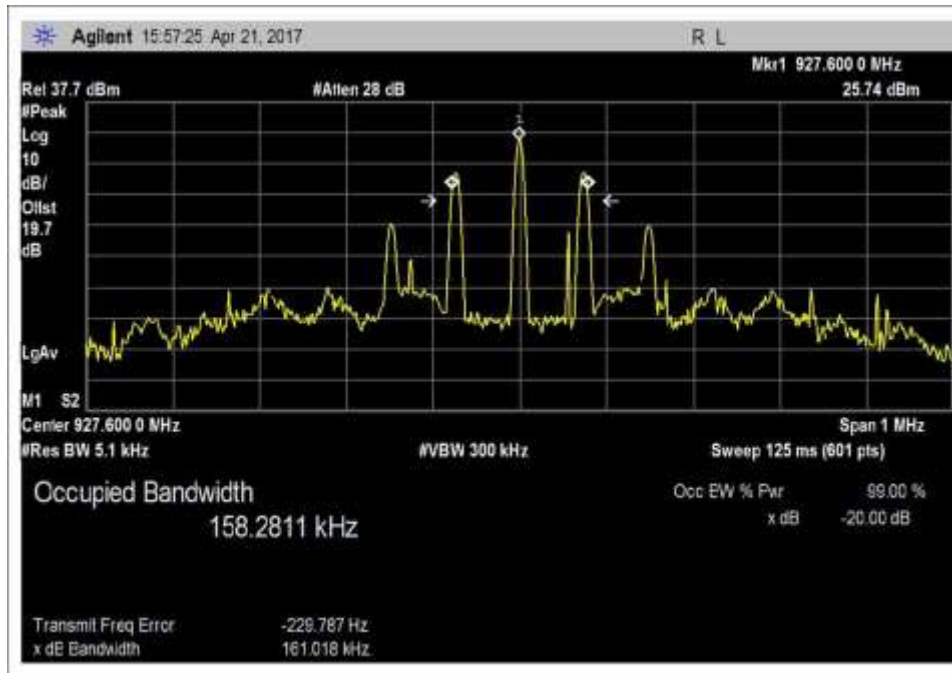
20dB_99%BW_902.4MHz_27dBm_150kbps



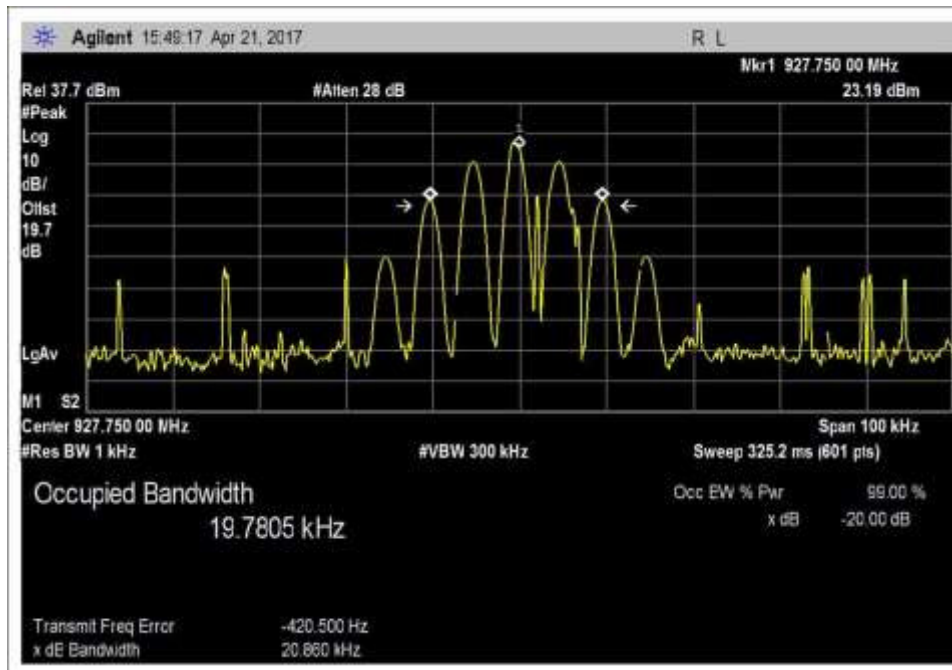
20dB_99%BW_915.2MHz_27dBm_150kbps



20dB_99%BW_915MHz_27dBm_10kbps

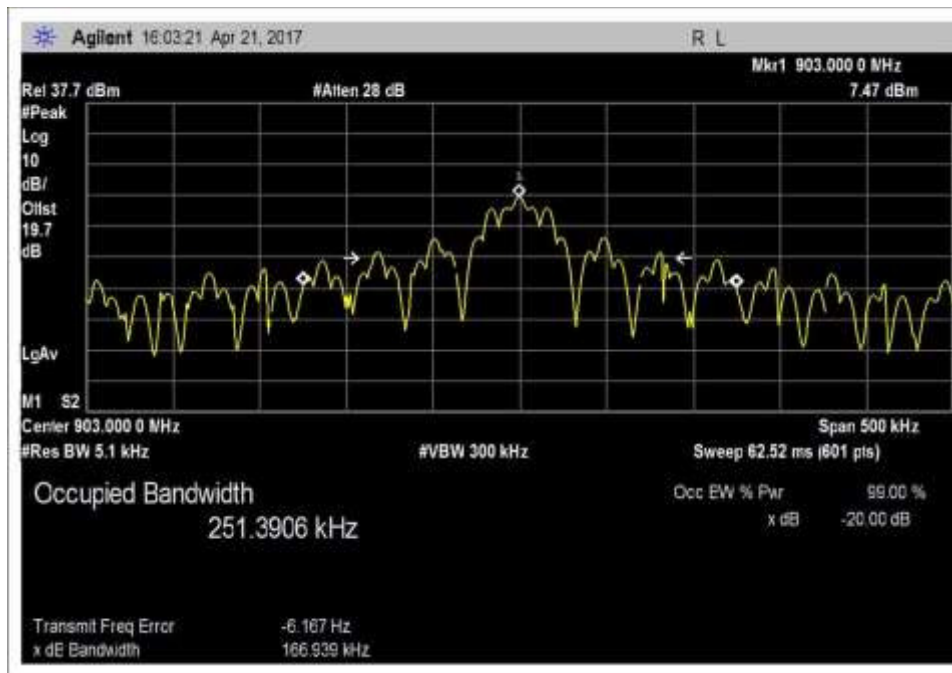


20dB_99%BW_927.6MHz_27dBm_150kbps

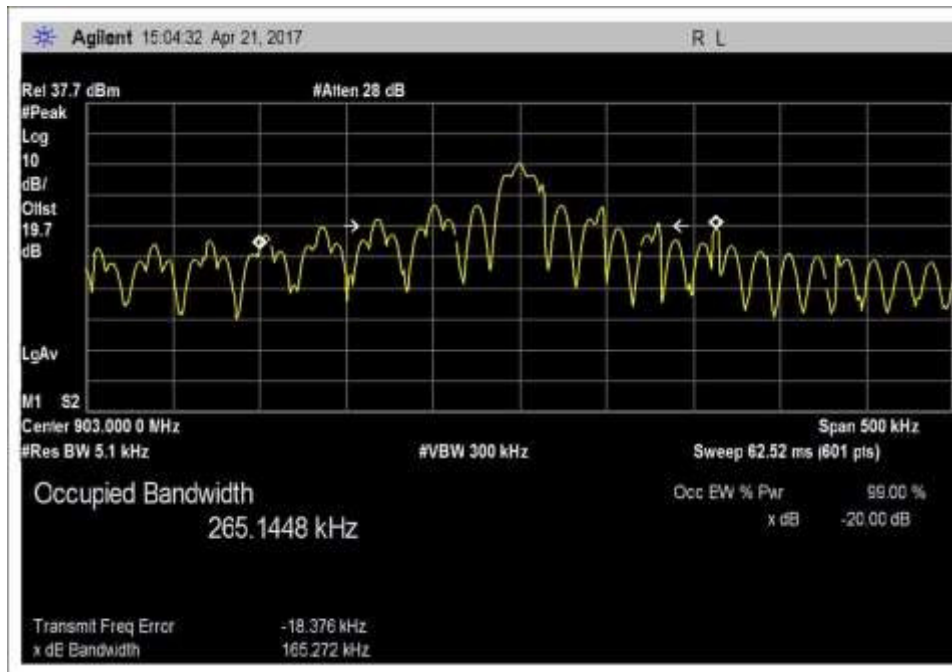


20dB_99%BW_927.75MHz_27dBm_10kbps

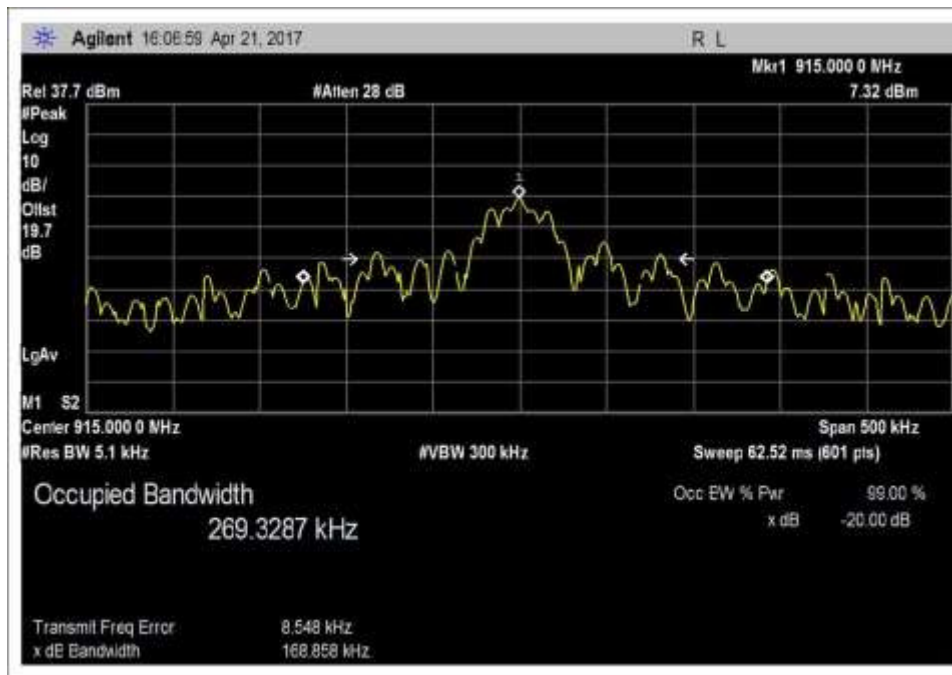
OOK



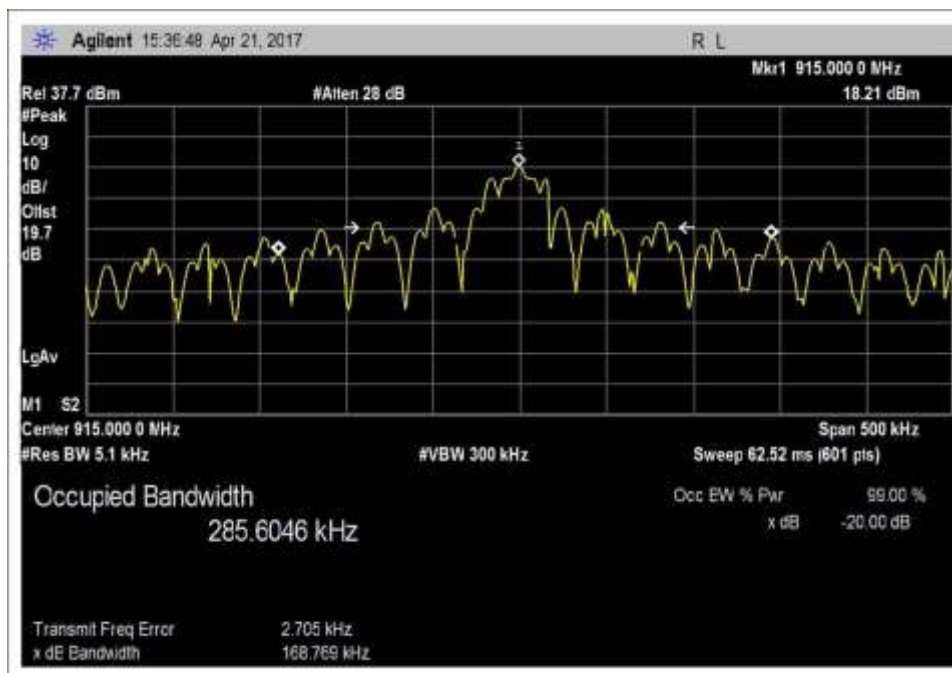
20dB_99%BW_903MHz_10dBm_16384bps_B



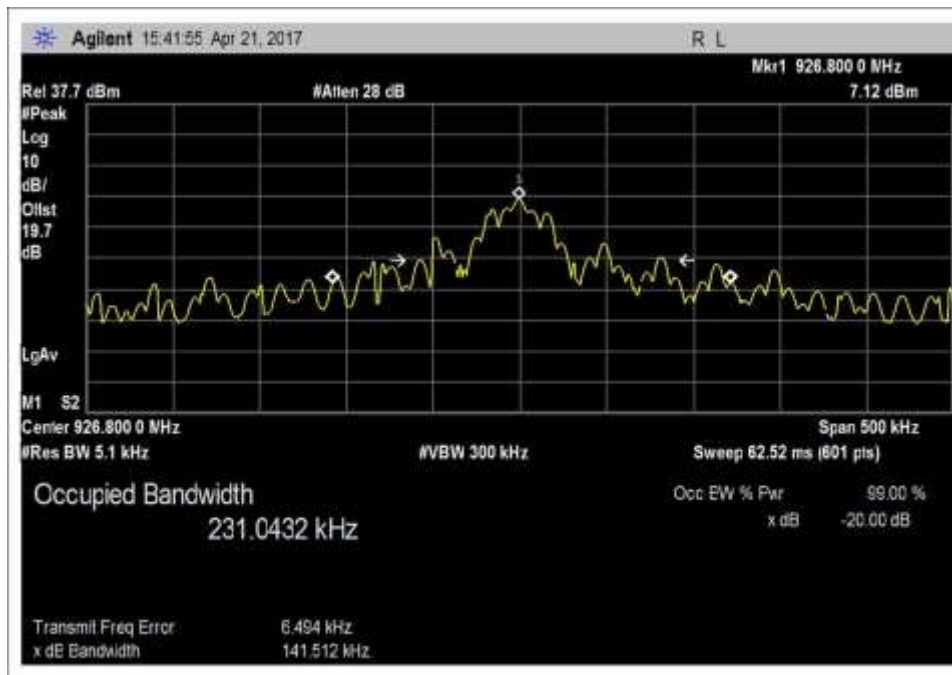
20dB_99%BW_903MHz_27dBm_16384bps



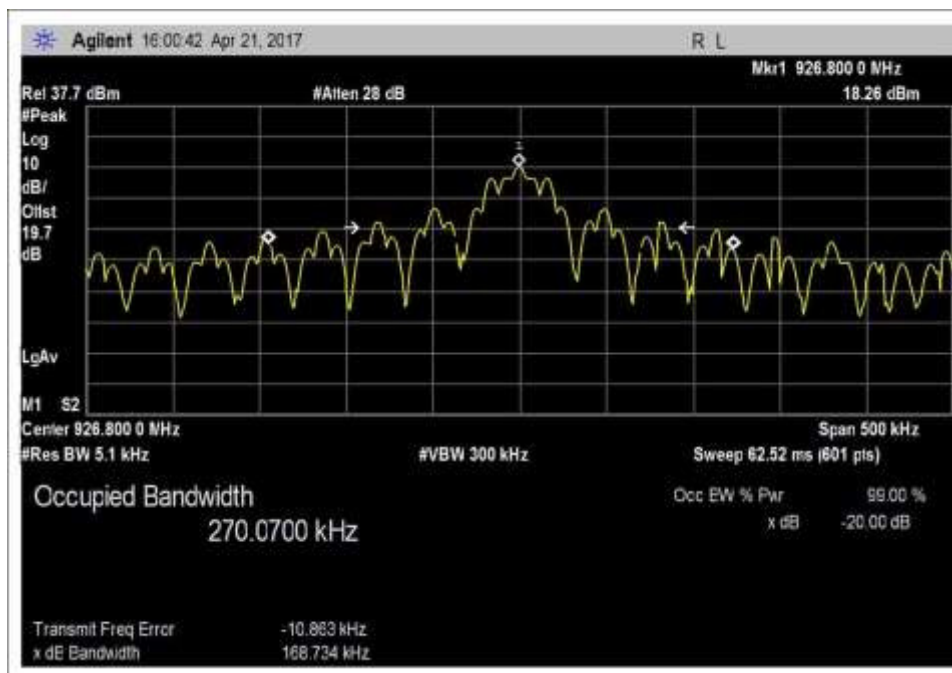
20dB_99%BW_915MHz_10dBm_16384bps_B



20dB_99%BW_915MHz_27dBm_16384bps



20dB_99%BW_926.8MHz_10dBm_16384bps

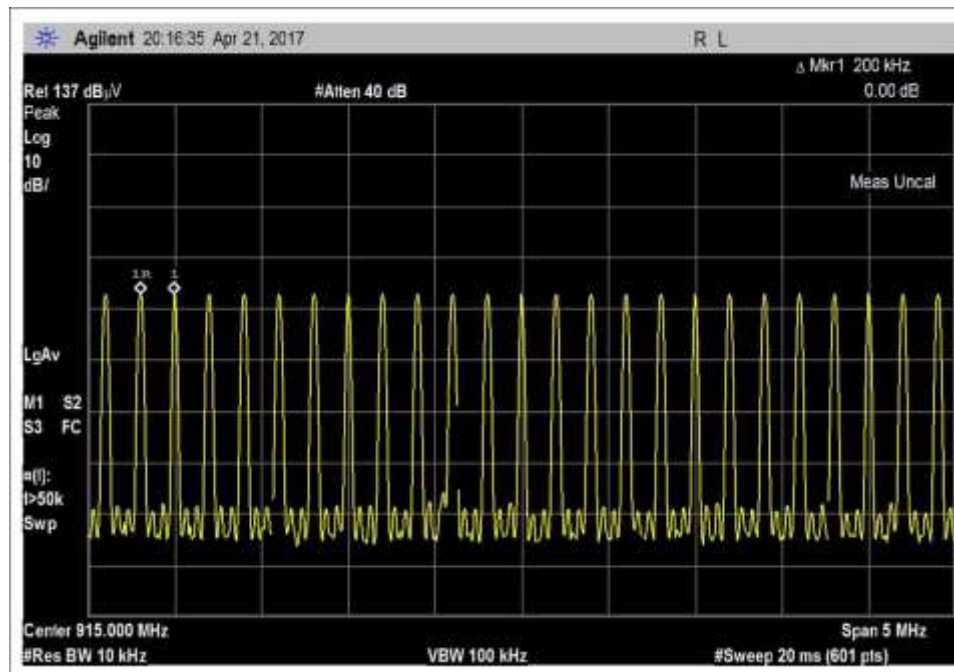


20dB_99%BW_926.8MHz_27dBm_16384bps

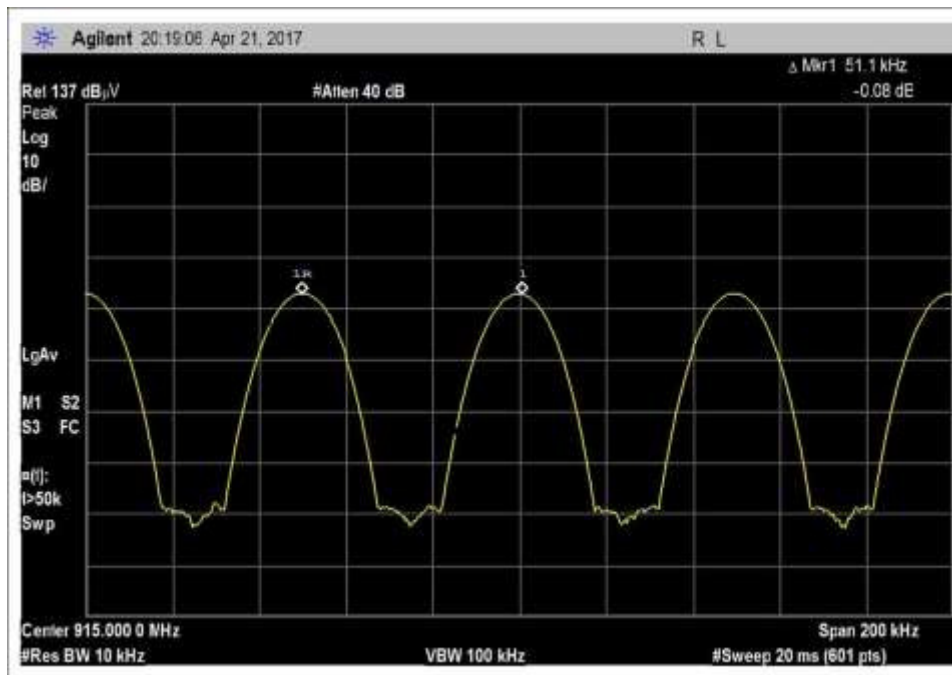
15.247(a)(1) Carrier Separation

Test Data Summary					
Limit applied: 20dB bandwidth of the hopping channel.					
Antenna Port	Operational Mode	Modulation	Measured (kHz)	Limit (kHz)	Results
1	CW AM	OOK 16384bps	200	≥ 168.8	Pass
1	CW_FM10	GFSK 10kbps	51.1	≥ 25.0	Pass
1	CW_FM150	GFSK 150kbps	400	≥ 161.0	Pass

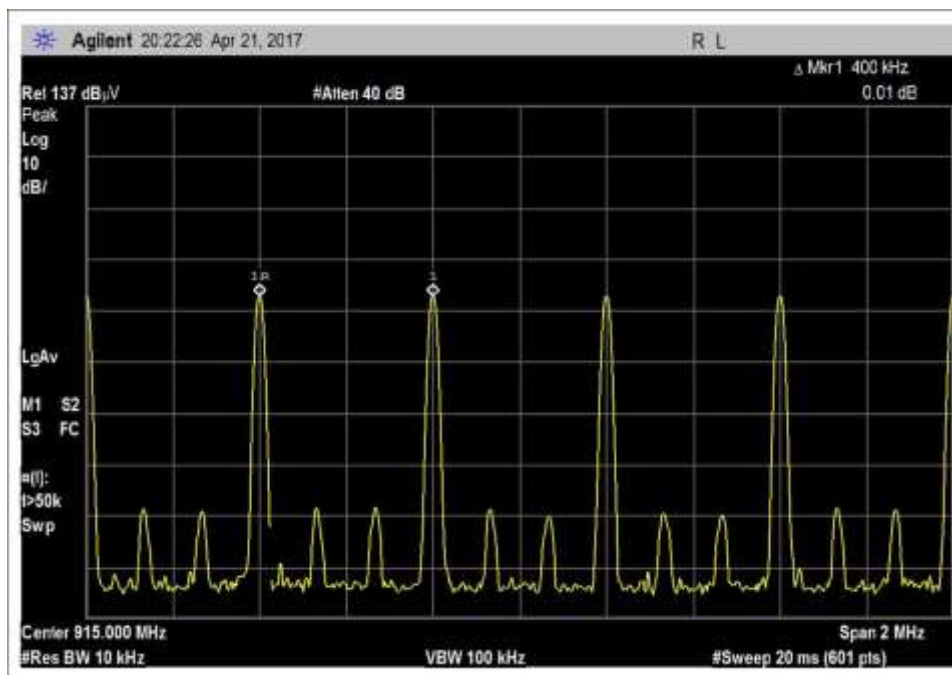
Plots



CW_AM



CW_FM10



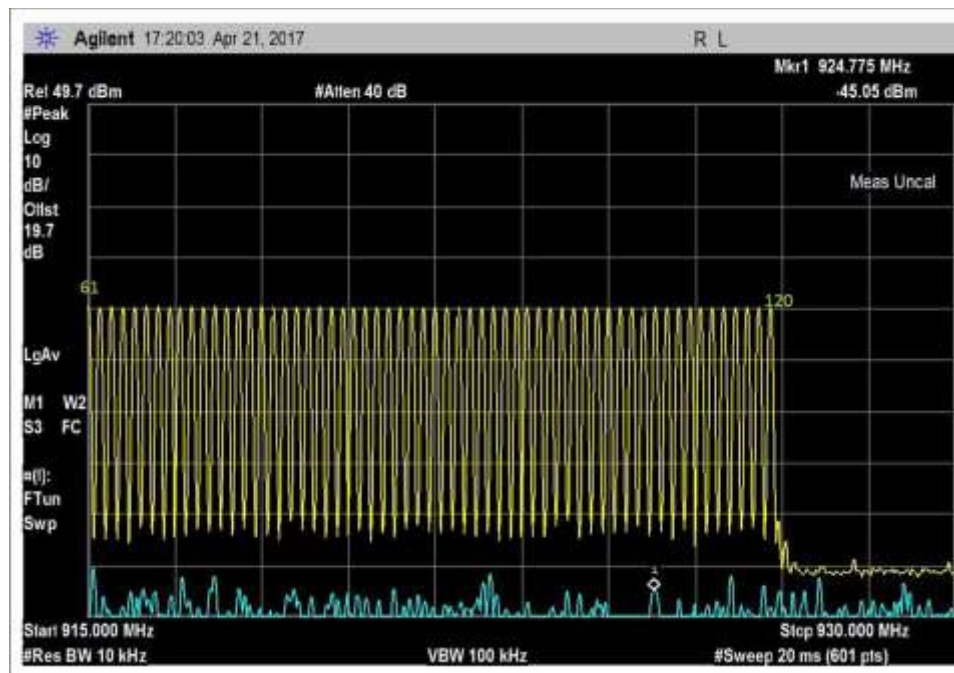
CW_FM150

15.247(a)(1)(iii) Number of Hopping Channels

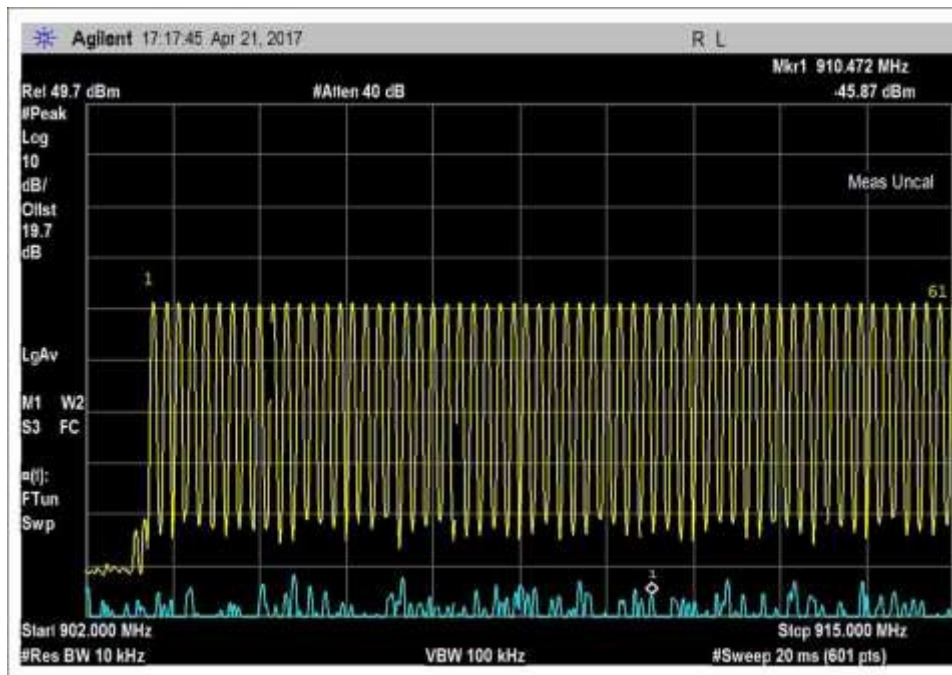
Test Data Summary					
$\text{Limit} = \begin{cases} 50 \text{ Channels} & 20 \text{ dB BW} < 250 \text{ kHz} \\ 25 \text{ Channels} & 20 \text{ dB BW} \geq 250 \text{ kHz} \end{cases}$					
Antenna Port	Operational Mode	Modulation	Measured (Channels)	Limit (Channels)	Results
1	CW AM	OOK 16384bps	120	50	Pass
1	CW_FM10	GFSK 10kbps	At least 126*	50	Pass
1	CW_FM150	GFSK 150kbps	64	50	Pass

* Total of 6 MHz, 21 channel per MHz

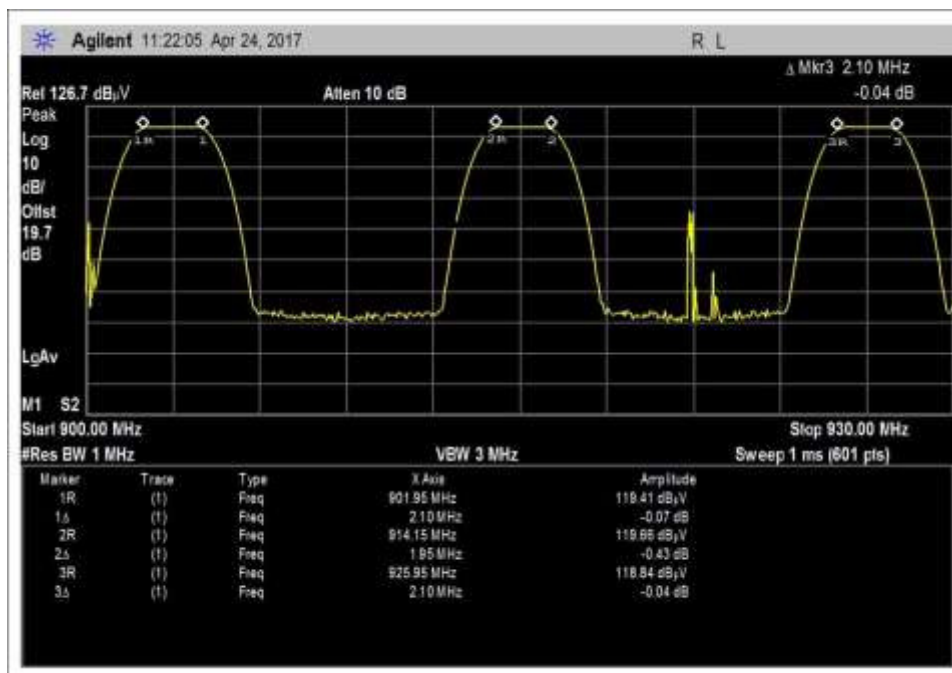
Plots



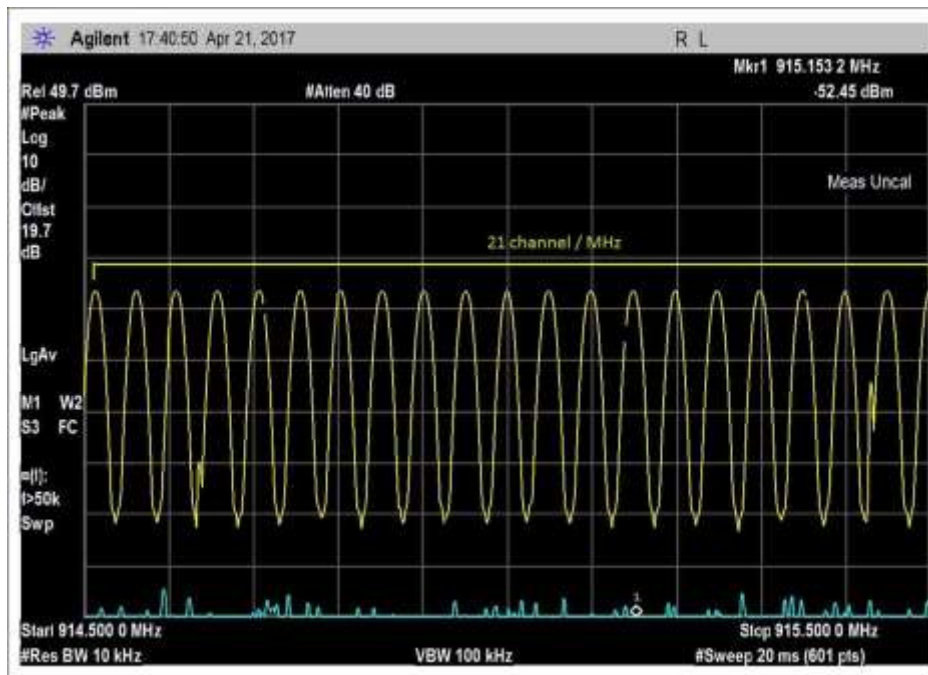
CW_AM_H



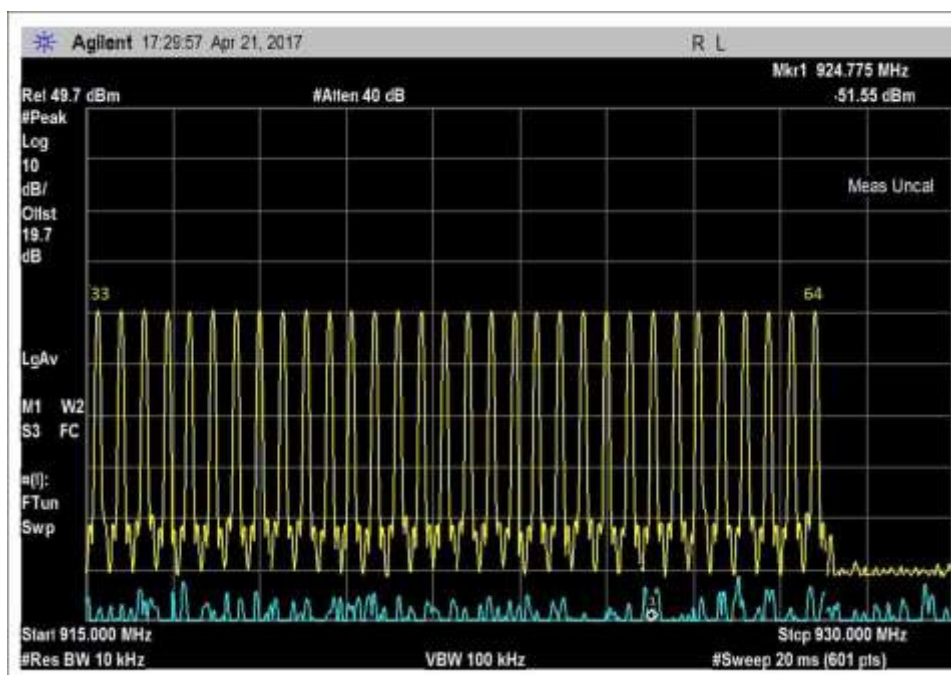
CW_AM_L



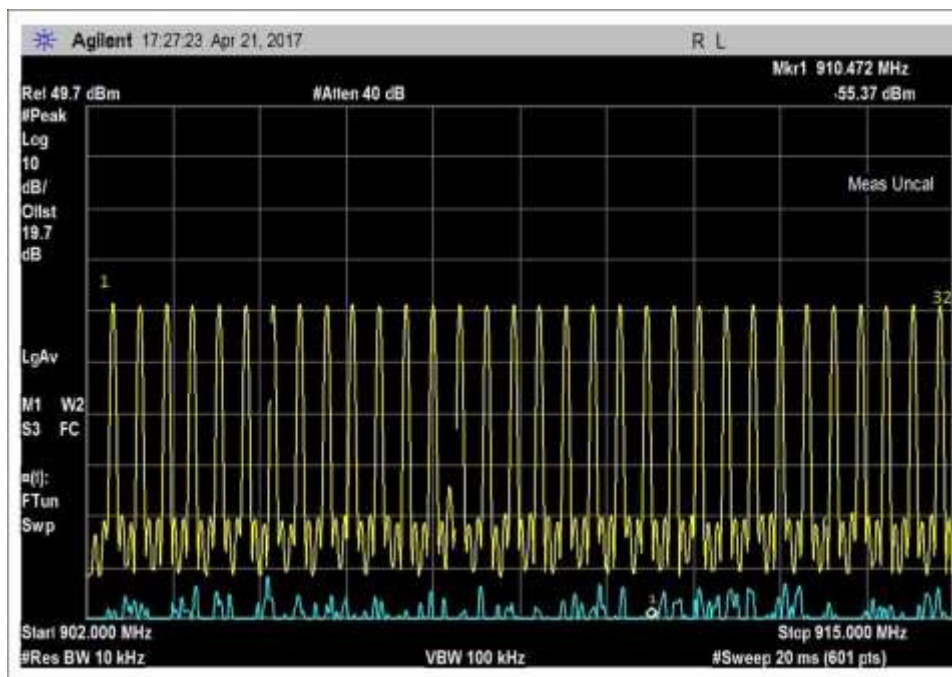
CW_FM10



CW_FM10_1MHz

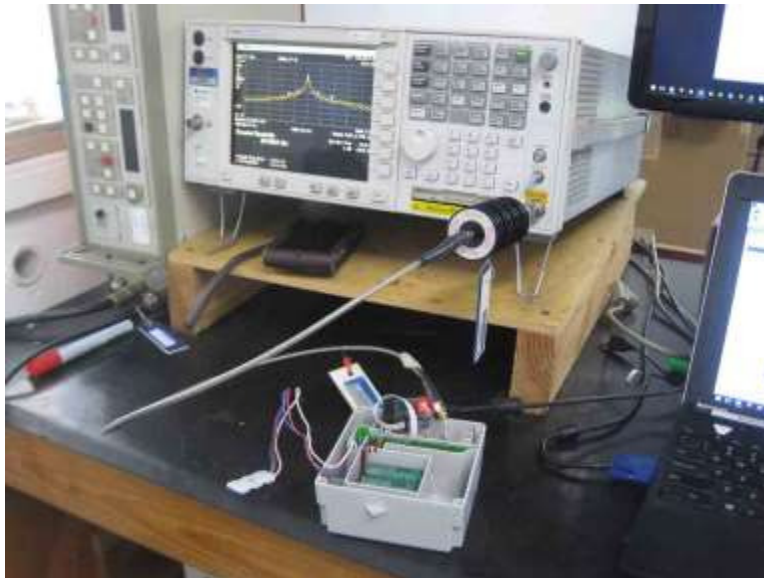


CW_FM!)150_H



CW_FM150_L

Test Setup Photo



15.247(b)(2) Output Power

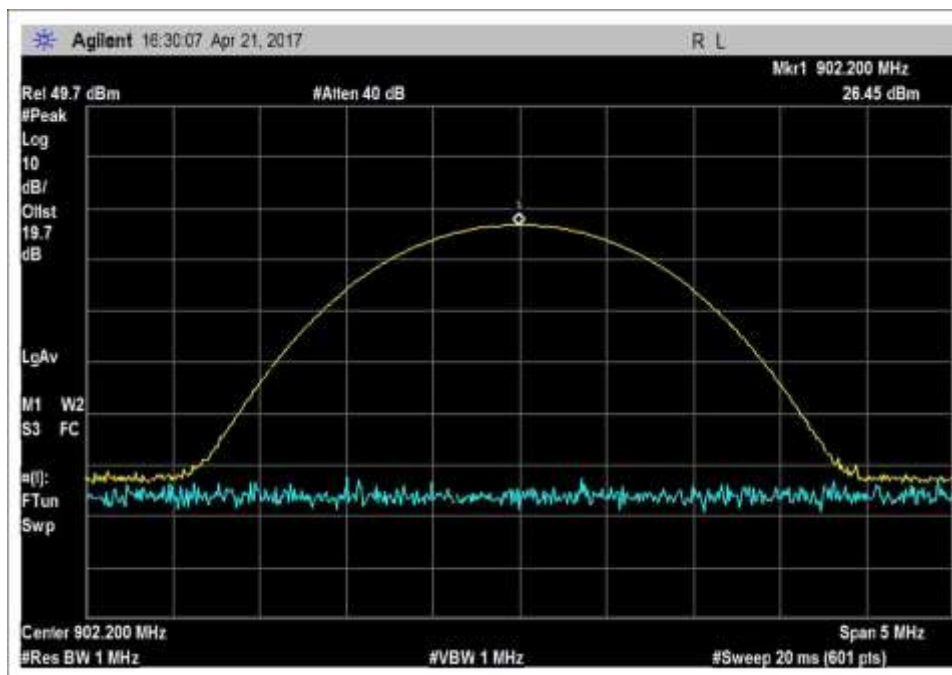
Test Setup/Conditions			
Test Location:	Brea Lab A	Test Engineer:	E. Wong
Test Method:	ANSI C63.10 (2013)	Test Date(s):	4/21/2017
Configuration:	6		
Test Setup:	The equipment under test (EUT) is stand alone on the table top. The EUT is turned on and set in transmit mode. The EUT has new batteries installed. Nominal input voltage is 6.3Vdc. Frequency range: 902-928 MHz Modulation: GFSK. OOK Firmware power: power level, 1 and 3 Firmware version: STM32 1.18.3.0 MSP 0.15.4.0 Evaluation performed at antenna port. Duty cycle: 100% Level 1: 10dBm_16384bps OOK 903MHz, 915MHz, 926.8MHz Level 3: 27dBm_16384kbps OOK 903MHz, 915MHz, 926.8MHz Level 3: 27dBm_10kbps GFSK 902.2MHz, 915MHz, 927.75MHz Level 3: 27dBm_150kbps GFSK 902.4MHz, 915.2MHz, 927.6MHz Site A. Test Method: ANSI C63.10 (2013)		

Environmental Conditions			
Temperature (°C)	23	Relative Humidity (%):	46

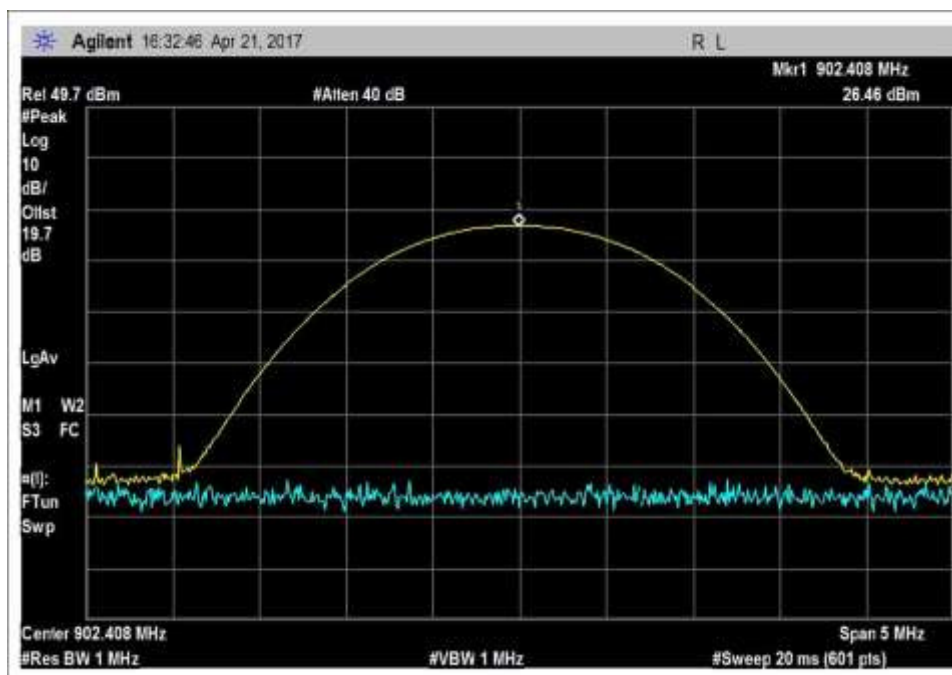
Test Equipment					
Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
02672	Spectrum Analyzer	Agilent	E4446A	3/2/2017	3/2/2019
03431	Cable	Astrolab Inc.	32022-2-2909K-36TC	11/2/2015	11/2/2017
02946	Attenuator	Aeroflex/Weinschel	89-20-21	11/2/2015	11/2/2017

Test Data Summary - RF Conducted Measurement					
$\text{Limit} = \begin{cases} 30\text{dBm Conducted}/36\text{dBm EIRP} & \geq 50 \text{ Channels} \\ 24\text{dBm Conducted}/30\text{dBm EIRP} & < 50 \text{ Channels (min 25)} \end{cases}$					
Frequency (MHz)	Modulation	Ant. Type / Gain (dBi)	Measured (dBm)	Limit (dBm)	Results
Level 1- 10dBm_16384bps_OOK					
903.0	OOK		13.37	≤ 30	Pass
915.0	OOK		13.24	≤ 30	Pass
926.8	OOK		13.17	≤ 30	Pass
Level 3 -27dBm_10kbps_GFSK.					
902.2	GFSK		26.45	≤ 30	Pass
915.0	GFSK		26.47	≤ 30	Pass
927.75	GFSK		26.44	≤ 30	Pass
Level 3 -27dBm_150kbps_GFSK					
902.4	GFSK		26.46	≤ 30	Pass
915.2	GFSK		26.49	≤ 30	Pass
927.6	GFSK		26.35	≤ 30	Pass
Level 3 -27dBm_16384bps_OOK					
903.0	OOK		24.1	≤ 30	Pass
915.0	OOK		24.17	≤ 30	Pass
926.8	OOK		24.2	≤ 30	Pass

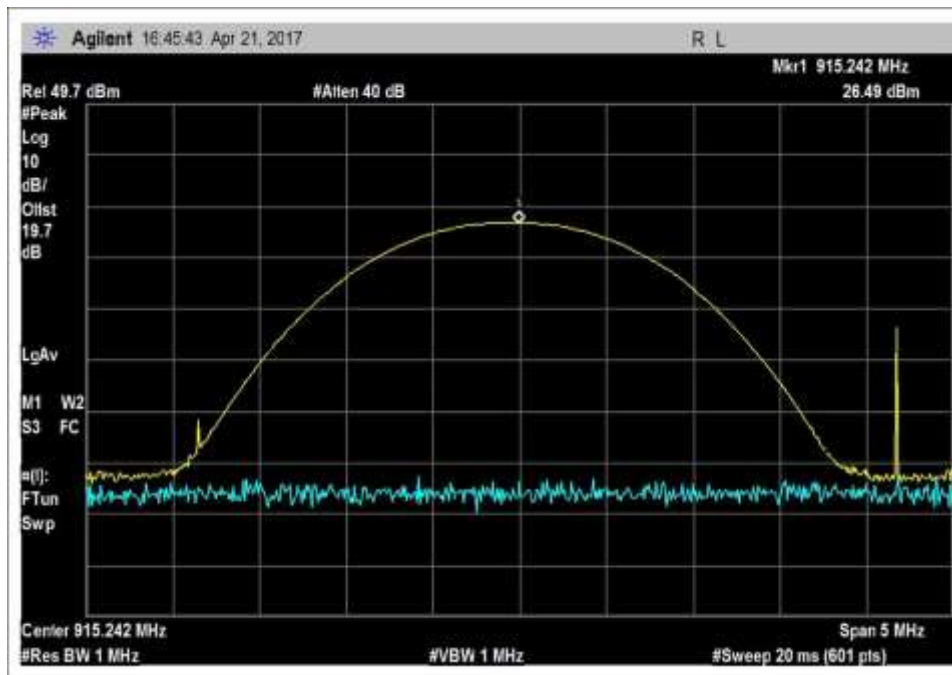
Plots



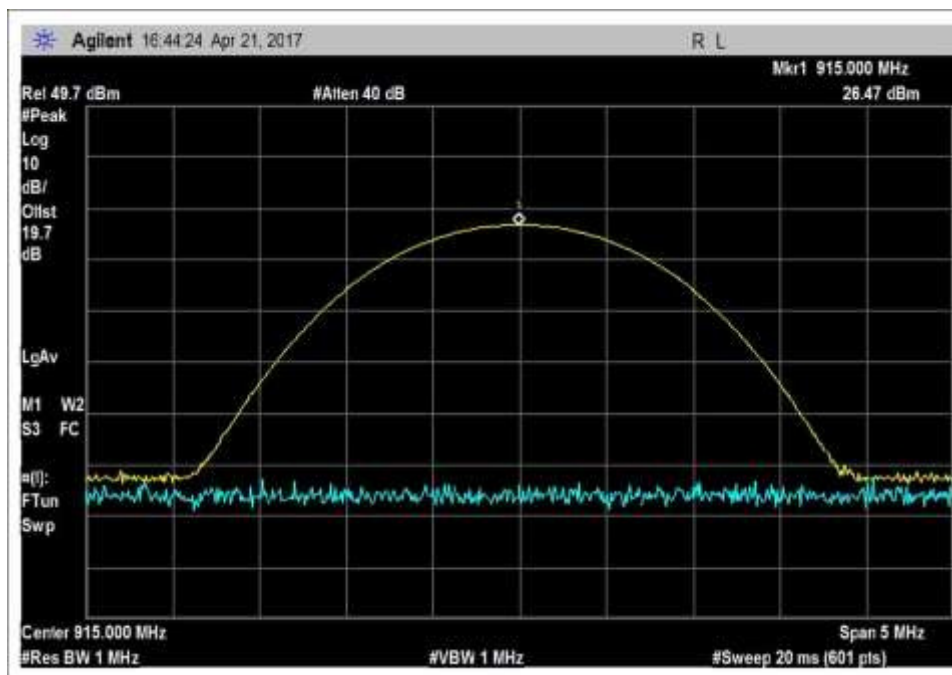
RF Power_902.2MHz_27dBm_10kbps_GSKF



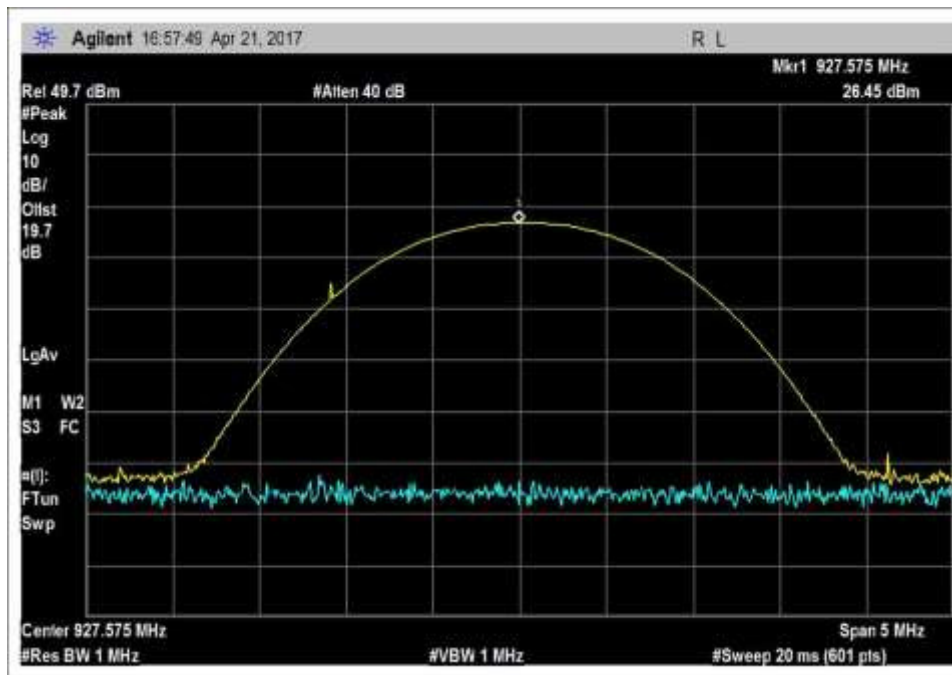
RF Power_902.4MHz_27dBm_150kbps_GSKF



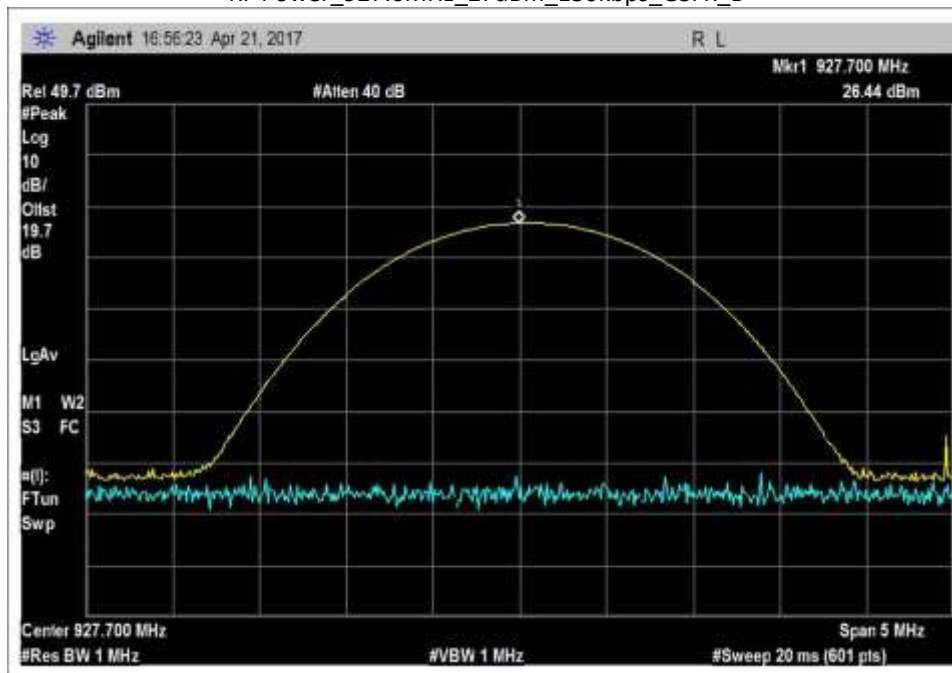
RF Power_915.2MHz_27dBm_150kbps_GSKF



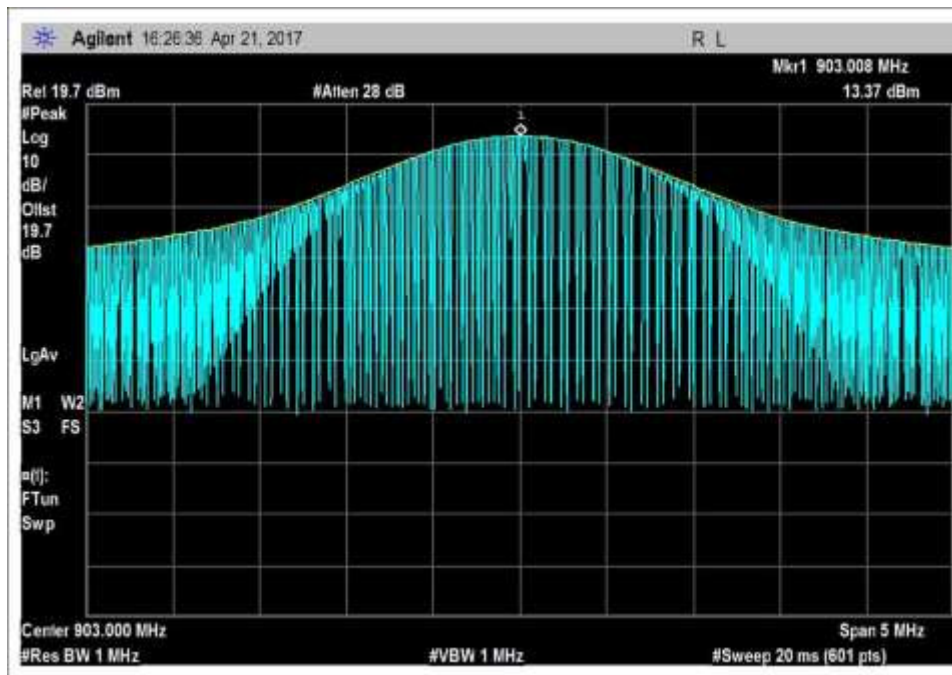
RF Power_915MHz_27dBm_10kbps_GSKF



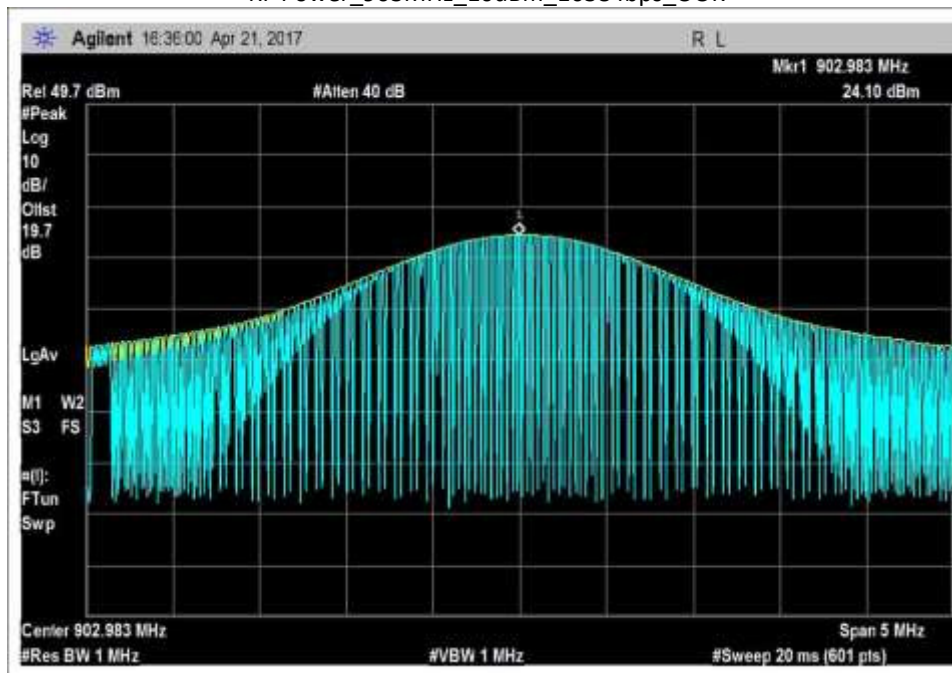
RF Power_927.6MHz_27dBm_150kbps_GSKF_B



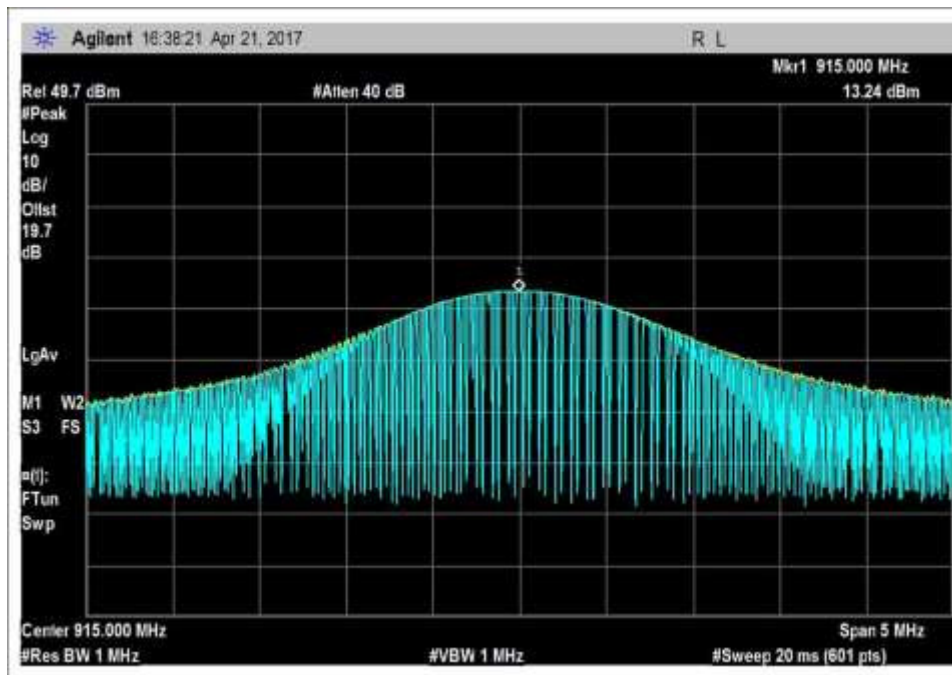
RF Power_927.75MHz_27dBm_10kbps_GSKF



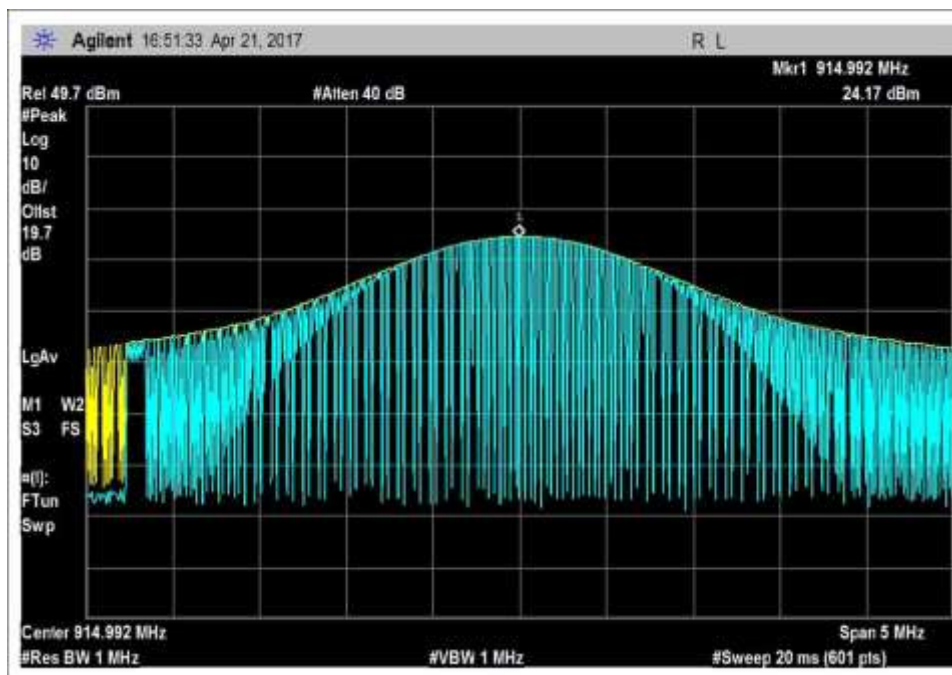
RF Power_903MHz_10dBm_16384bps_OOK



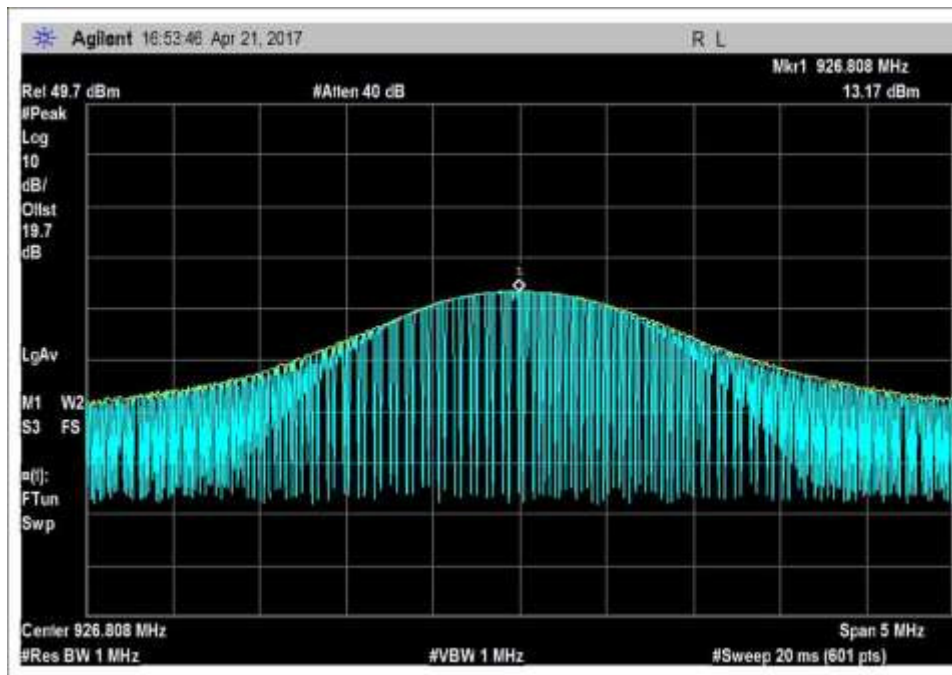
RF Power_903MHz_27dBm_16384bps_OOK



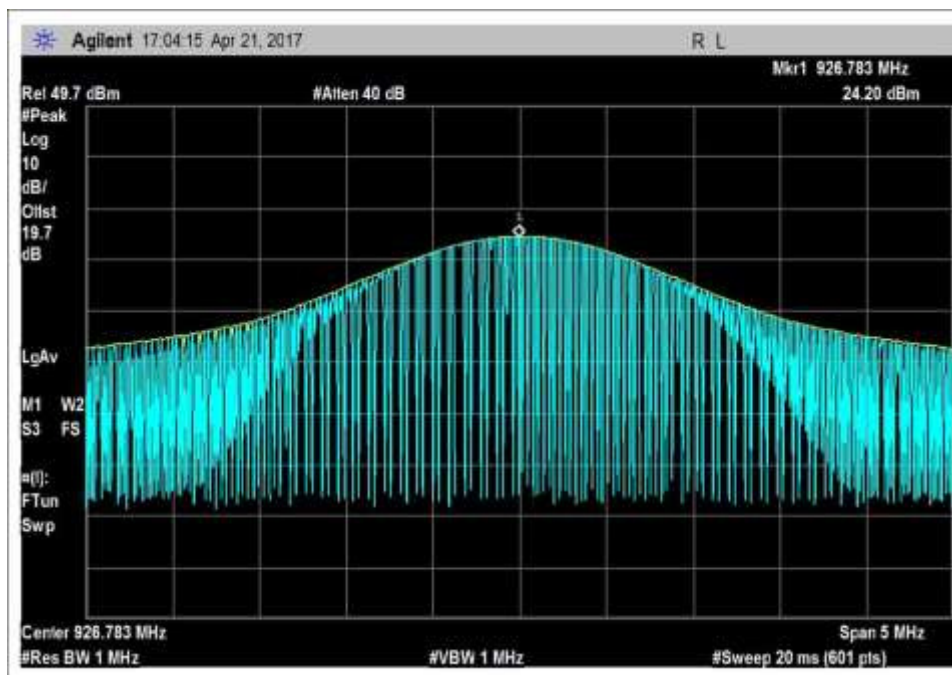
RF Power_915MHz_10dBm_16384bps_OOK_B



RF Power_915MHz_27dBm_16384bps_OOK

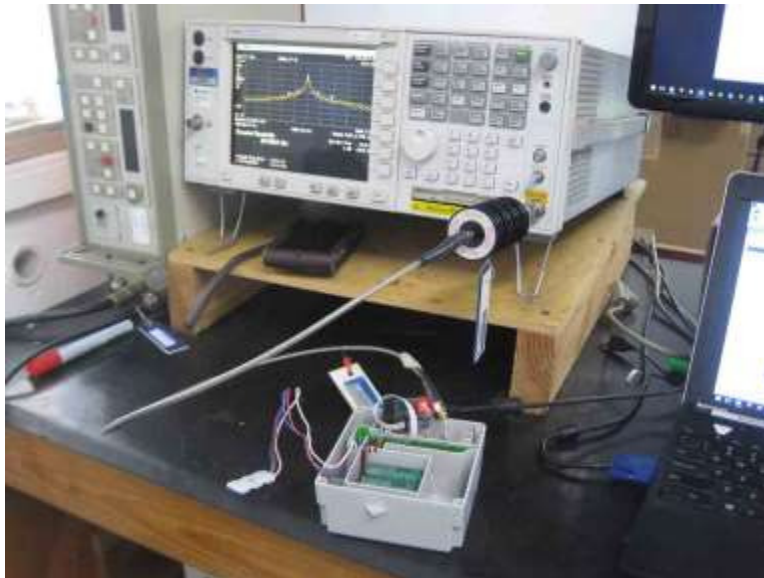


RF Power_926.8MHz_10dBm_16384bps_OOK



RF Power_926.8MHz_27dBm_16384bps_OOK

Test Setup Photo



15.247(d) RF Conducted Emissions & Band Edge

Test Setup / Conditions / Data

Test Location: CKC Laboratories Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714-993-6112
 Customer: **Itron, Inc.**
 Specification: **15.247(d) Conducted Spurious Emissions**
 Work Order #: **99808** Date: 4/21/2017
 Test Type: **Conducted Emissions** Time: 19:05:25
 Tested By: E. Wong Sequence#: 2
 Software: EMITest 5.03.02 110V 60Hz

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 6			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 6			

Test Conditions / Notes:

The equipment under test (EUT) is stand alone on the table top. The EUT is turned on and set in transmit mode. The EUT has new batteries installed. Nominal input voltage is 6.3Vdc.

Frequency range: 902-928 MHz

Modulation: GFSK. OOK

Firmware power: power level, 1 and 3

Firmware version: STM32 1.18.3.0 MSP 0.15.4.0

Evaluation performed at antenna port. Duty cycle: 100%

Level 1: 10dBm_16384bps OOK 903MHz, 915MHz, 926.8MHz

Level 3: 27dBm_16384kbps OOK 903MHz, 915MHz, 926.8MHz

Level 3: 27dBm_10kbps GFSK 902.2MHz, 915MHz, 927.75MHz

Level 3: 27dBm_150kbps GFSK 902.4MHz, 915.2MHz, 927.6MHz

Frequency range of measurement = 9 kHz- 10GHz.

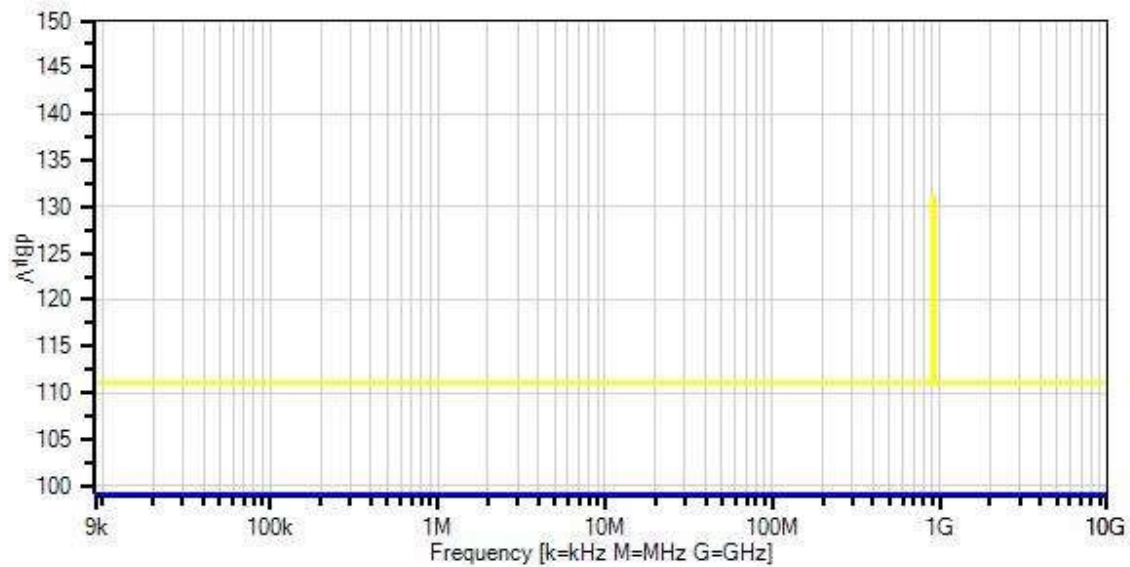
9 kHz -10000 MHz; RBW=100kHz,VBW=100kHz.

Test environment conditions Temperature: 23°C, Humidity: 46%, Pressure: 100.1kPa.

Site A. Test Method: ANSI C63.10 (2013)

No emission within 20dB of the limit was detected.

Itron, Inc. WD#: 99808 Sequence#: 2 Date: 4/21/2017
15.247(d) Conducted Spurious Emissions Test Lead: 110V 60Hz Antenna port



— Sweep Data
○ Peak Readings
* Average Readings
Software Version: 5.03.02
— Readings
× QP Readings
▼ Ambient
1 - 15.247(d) Conducted Spurious Emissions

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02672	Spectrum Analyzer	E4446A	3/2/2017	3/2/2019
	AN03431	Attenuator	89-20-21	11/2/2015	11/2/2017
	AN02946	Cable	32022-2-2909K-36TC	11/2/2015	11/2/2017

Band Edge

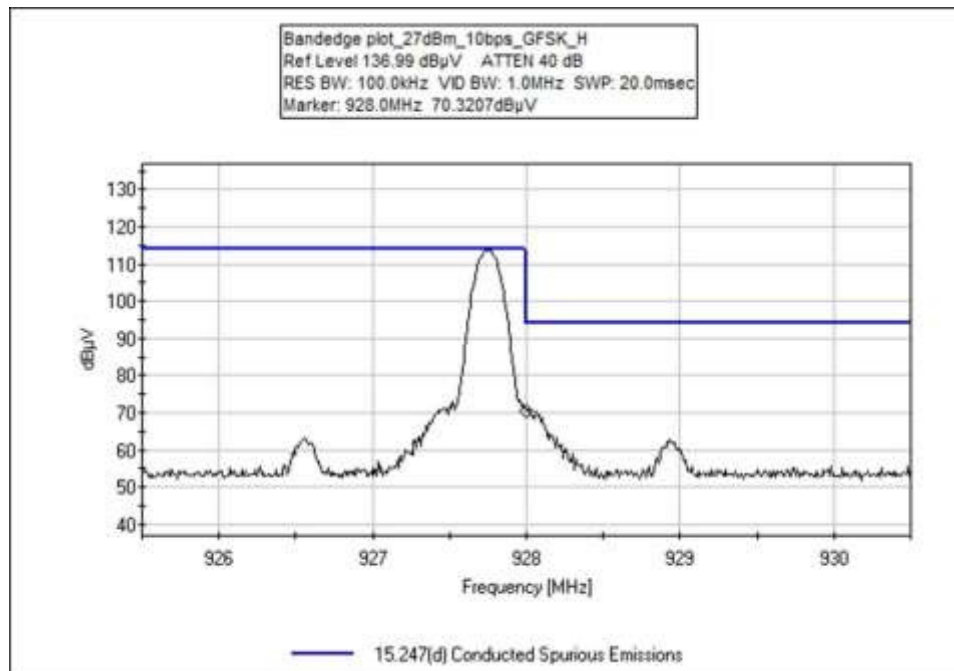
Band Edge Summary

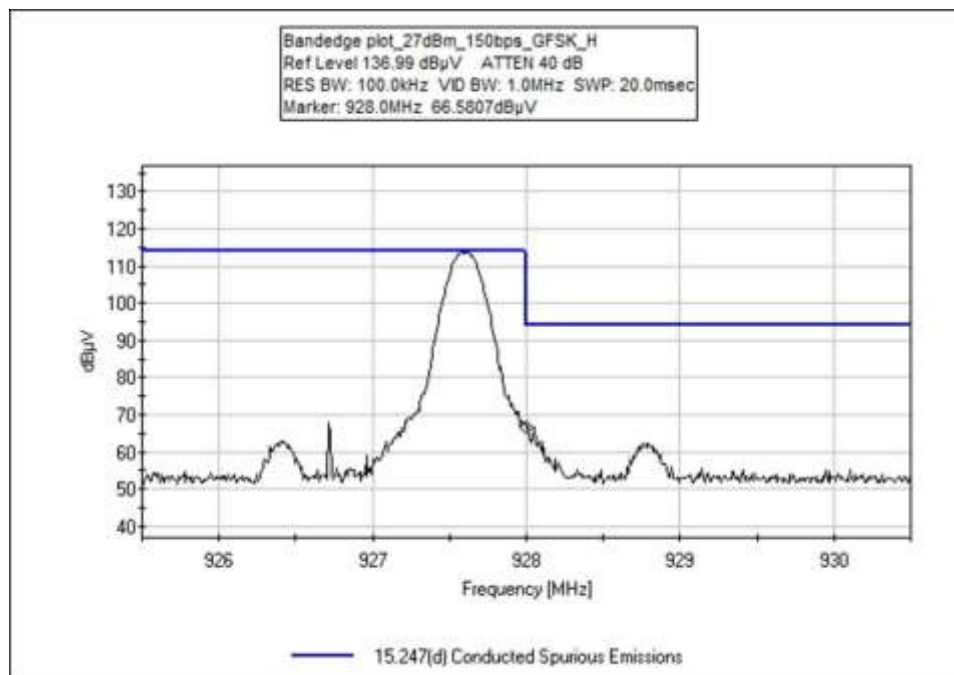
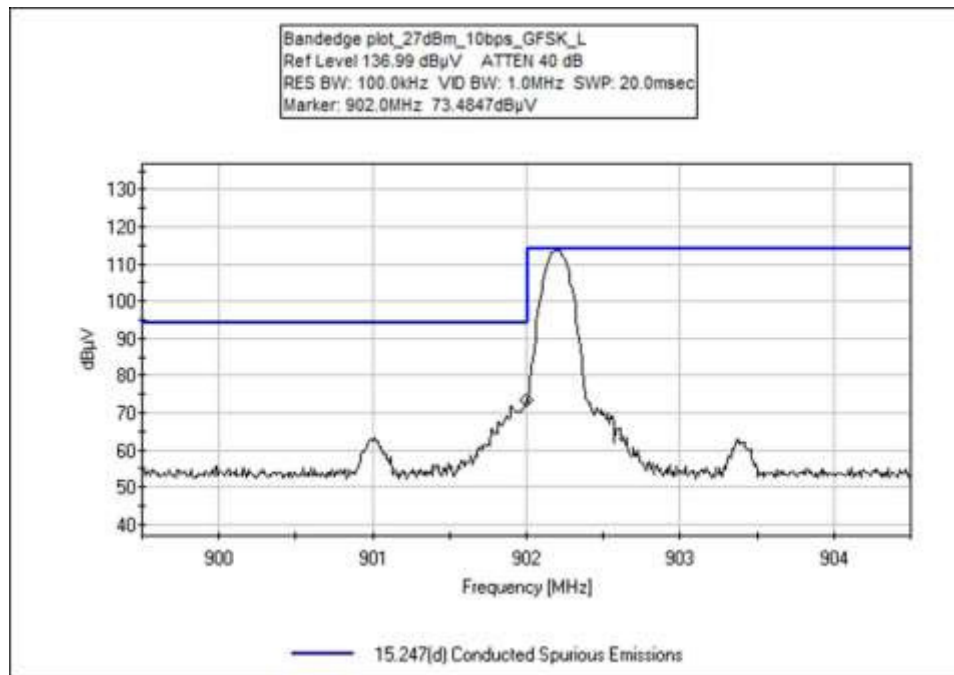
Limit applied: Max Power/100kHz - 20dB.

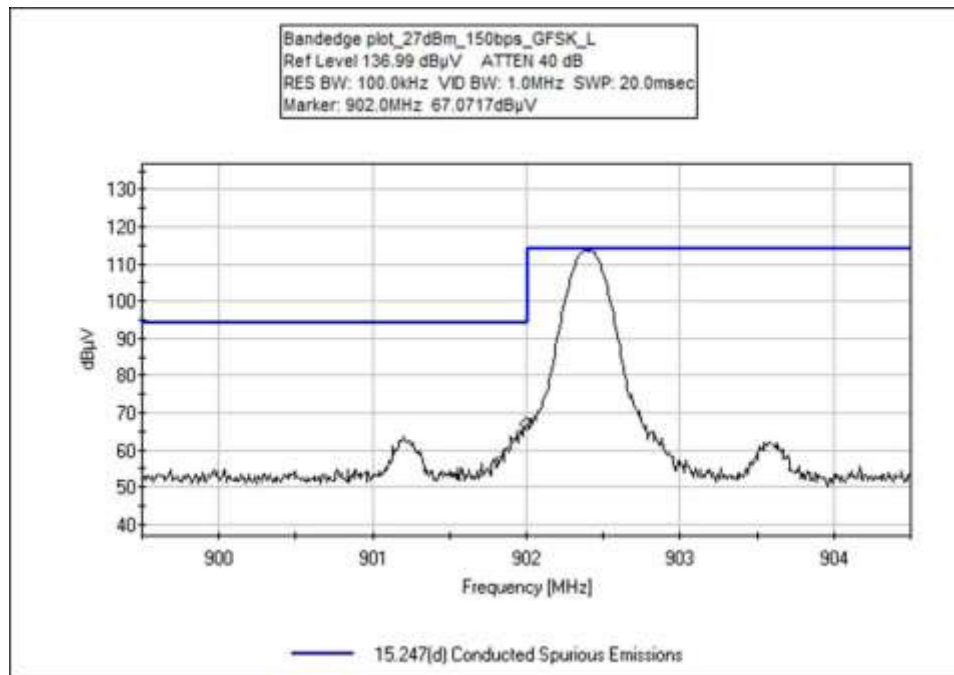
Frequency (MHz)	Modulation	Measured (dBm)	Limit (dBm)	Results
Level 1- 10dBm_16384bps_OOK				
902	OOK	-18.4	< -6.3	Pass
928	OOK	-19.9	< -6.3	Pass
Level 3 -27dBm_10kbps_GFSK.				
902	GFSK	-17.5	< 6.5	Pass
928	GFSK	-17.0	< 6.5	Pass
Level 3 -27dBm_150kbps_GSKF				
902	OOK	-20.2	< 6.5	Pass
928	OOK	-20.7	< 6.5	Pass
Level 3 -27dBm_16384bps_OOK				
902	GFSK	-8.2	< 4.2	Pass
928	GFSK	-10.0	< 4.2	Pass

Band Edge Plots

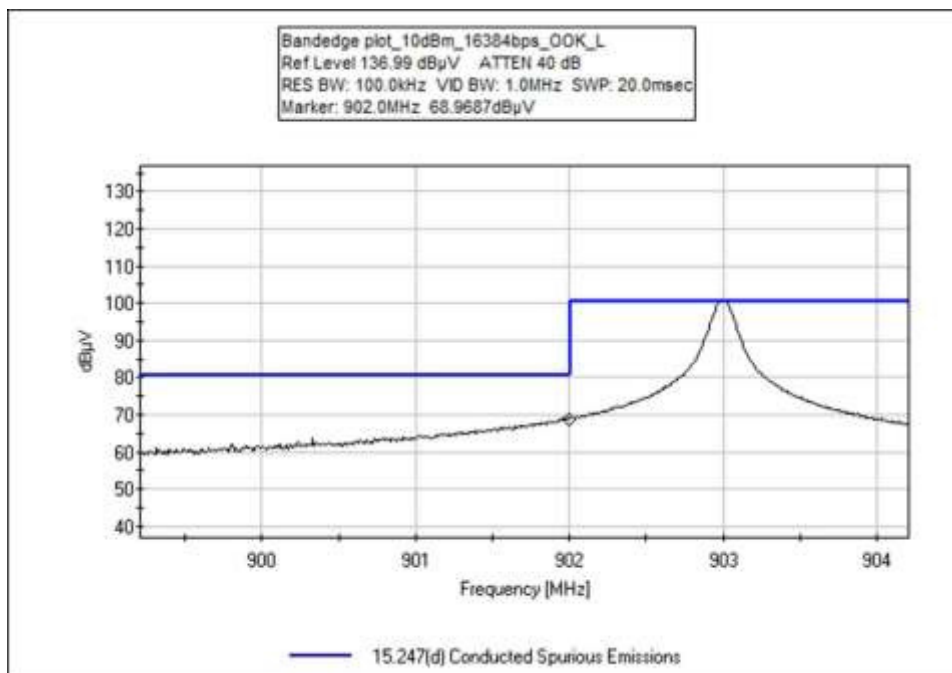
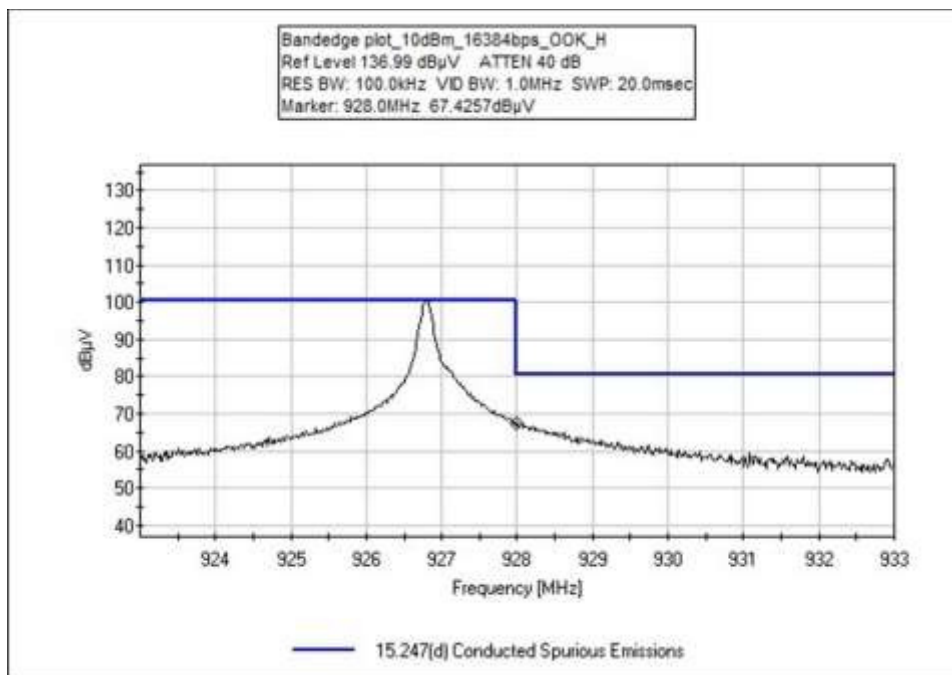
GFSK

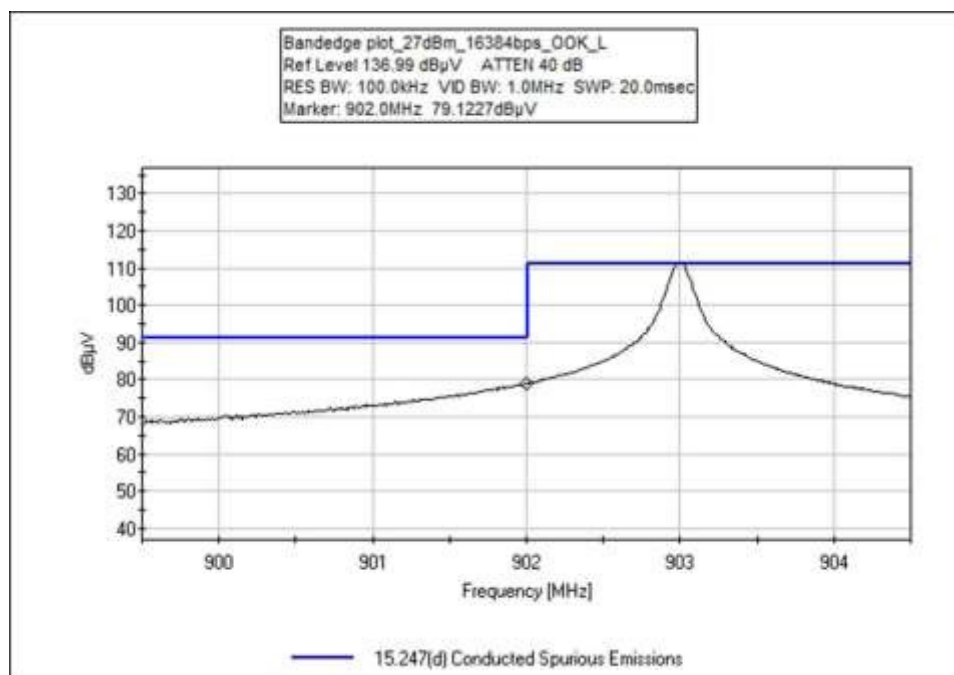
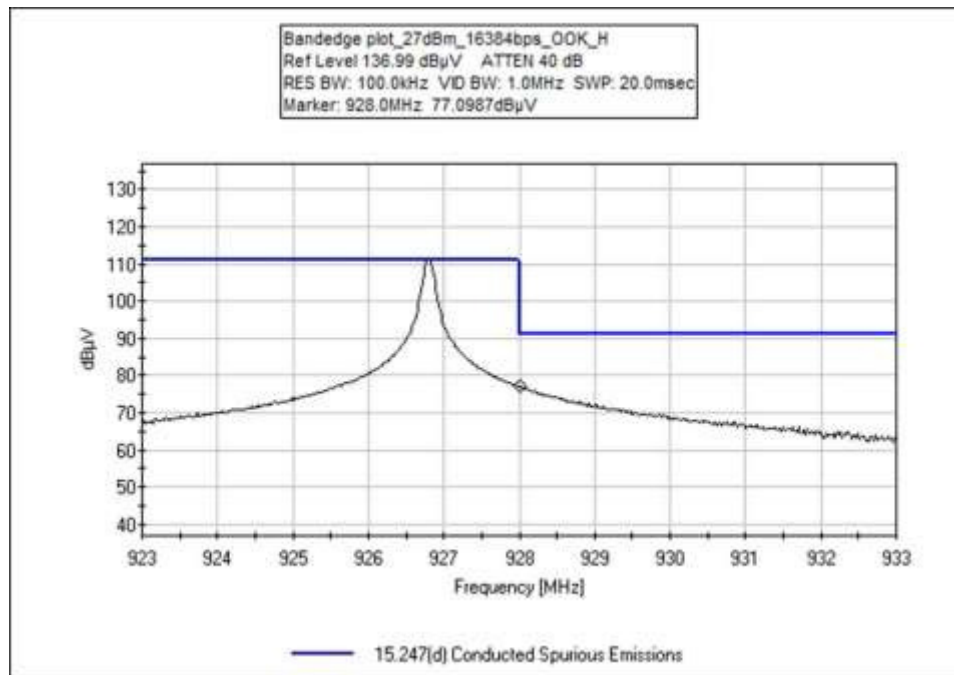




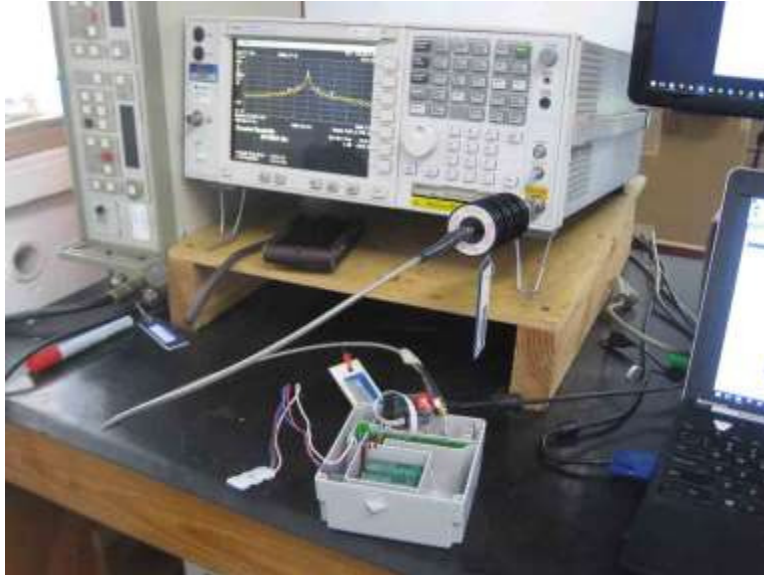


OOK





Test Setup Photo



15.247(d) Radiated Emissions & Band Edge

Test Setup / Conditions / Data

Test Location: CKC Laboratories Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714-993-6112
 Customer: **Itron, Inc.**
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
 Work Order #: **99808** Date: 4/4/2017
 Test Type: **Maximized Emissions** Time: 15:11:48
 Tested By: Don Nguyen Sequence#: 3
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 3			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 3			

Test Conditions / Notes:

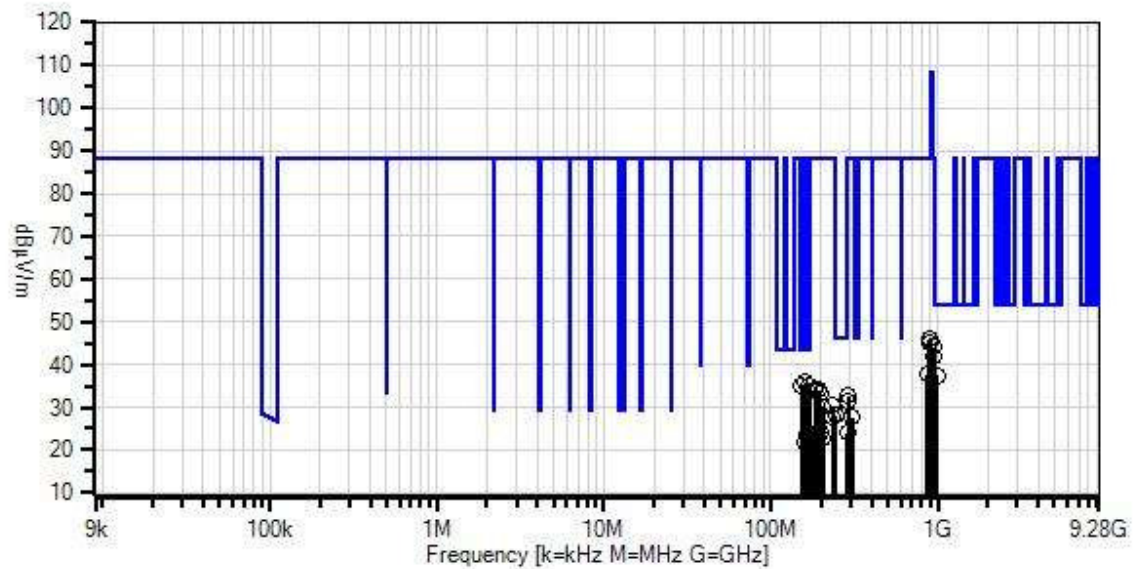
The EUT is placed on Styrofoam platform at 0.8m in height for measurement below 1GHz and 1.5m in height for measurement above 1GHz. The EUT is turned on and set in transmitting mode. The EUT has fresh battery installed. Nominal input voltage is 6.3Vdc.
 IO cable is unterminated.
 The EUT is tested in preferred orientation declared by the manufacturer.

 Operating frequency: 903, 910, 915, 926.8MHz
Modulation: OOK
 Firmware power: power level 1

 Frequency range of measurement = 9kHz-1GHz
 9 kHz - 150 kHz, RBW=200 Hz, VBW=600 Hz
 150 kHz - 30 MHz, RBW=9 kHz, VBW=27 kHz
 30 MHz - 1000MHz, RBW=120 kHz, VBW=360 kHz

 Temperature: 19°C, Humidity: 57%, Pressure: 100.1kPa.
 Site D.
 Test Method: ANSI C63.10 (2013)

Itron, Inc. WO#: 99808 Sequence#: 3 Date: 4/4/2017
 15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert



— Readings
 × QP Readings
 ▼ Ambient
 — 1 - 15.247(d) / 15.209 Radiated Spurious Emissions

○ Peak Readings
 * Average Readings
 Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00010	Preamp	8447D	3/14/2016	3/14/2018
T2	ANP05283	Attenuator	ATT-0218-06- NNN-02	5/5/2016	5/5/2018
T3	ANP04382	Cable	LDF-50	6/6/2016	6/6/2018
T4	ANP05555	Cable	RG223/U	4/5/2016	4/5/2018
T5	ANP05569	Cable-Amplitude +15C to +45C (dB)	RG-214/U	12/7/2016	12/7/2018
	AN02672	Spectrum Analyzer	E4446A	3/2/2017	3/2/2019
T6	AN01994	Biconilog Antenna	CBL6111C	3/11/2016	3/11/2018
	AN00314	Loop Antenna	6502	5/20/2016	5/20/2018

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dBμV	T1 T5 dB	T2 T6 dB	T3 dB	T4 dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	169.250M	43.4	-26.9 +1.3	+5.8 +9.8	+1.4	+0.2	+0.0	35.0	43.5	-8.5	Vert
2	995.300M	25.9	-27.4 +3.7	+5.9 +25.2	+3.5	+0.6	+0.0	37.4	54.0	-16.6	Horiz
3	243.000M	32.2	-26.6 +1.6	+5.8 +13.3	+1.6	+0.2	+0.0	28.1	46.0	-17.9	Vert
4	164.300M	31.7	-26.9 +1.3	+5.8 +10.3	+1.3	+0.2	+0.0	23.7	43.5	-19.8	Horiz
5	169.550M	29.0	-26.9 +1.3	+5.8 +9.7	+1.4	+0.2	+0.0	20.5	43.5	-23.0	Horiz
6	895.250M	36.3	-27.6 +3.5	+5.9 +24.1	+3.3	+0.5	+0.0	46.0	88.3	-42.3	Vert
7	886.550M	35.6	-27.6 +3.4	+5.9 +24.1	+3.3	+0.5	+0.0	45.2	88.3	-43.1	Horiz
8	953.300M	33.3	-27.5 +3.6	+5.9 +24.8	+3.4	+0.6	+0.0	44.1	88.3	-44.2	Horiz
9	946.750M	31.1	-27.5 +3.6	+5.9 +24.7	+3.4	+0.6	+0.0	41.8	88.3	-46.5	Vert
10	865.550M	28.3	-27.7 +3.4	+5.9 +24.0	+3.2	+0.6	+0.0	37.7	88.3	-50.6	Horiz
11	161.000M	43.5	-26.9 +1.3	+5.8 +10.6	+1.3	+0.2	+0.0	35.8	88.3	-52.5	Vert
12	153.500M	42.1	-26.9 +1.3	+5.8 +11.3	+1.3	+0.2	+0.0	35.1	88.3	-53.2	Vert
13	183.500M	42.8	-26.8 +1.3	+5.8 +9.5	+1.4	+0.2	+0.0	34.2	88.3	-54.1	Vert
14	193.750M	42.1	-26.7 +1.4	+5.8 +9.6	+1.5	+0.2	+0.0	33.9	88.3	-54.4	Vert
15	197.000M	41.2	-26.7 +1.4	+5.8 +9.7	+1.5	+0.2	+0.0	33.1	88.3	-55.2	Vert
16	290.050M	35.6	-26.6 +1.8	+5.8 +14.1	+1.8	+0.2	+0.0	32.7	88.3	-55.6	Horiz
17	292.300M	34.4	-26.6 +1.8	+5.8 +14.1	+1.8	+0.2	+0.0	31.5	88.3	-56.8	Horiz

18	235.750M	35.3	-26.7 +1.5	+5.8 +12.7	+1.6	+0.2	+0.0	30.4	88.3	-57.9	Vert
19	204.500M	37.8	-26.7 +1.4	+5.8 +10.1	+1.5	+0.2	+0.0	30.1	88.3	-58.2	Vert
20	308.050M	30.4	-26.7 +1.8	+5.8 +14.4	+1.8	+0.2	+0.0	27.7	88.3	-60.6	Horiz
21	235.800M	32.5	-26.7 +1.5	+5.8 +12.7	+1.6	+0.2	+0.0	27.6	88.3	-60.7	Horiz
22	197.050M	32.3	-26.7 +1.4	+5.8 +9.7	+1.5	+0.2	+0.0	24.2	88.3	-64.1	Horiz
23	287.000M	26.9	-26.6 +1.8	+5.8 +14.1	+1.8	+0.2	+0.0	24.0	88.3	-64.3	Vert
24	181.550M	32.1	-26.8 +1.3	+5.8 +9.4	+1.4	+0.2	+0.0	23.4	88.3	-64.9	Horiz
25	205.300M	30.3	-26.7 +1.4	+5.8 +10.2	+1.5	+0.2	+0.0	22.7	88.3	-65.6	Horiz
26	173.300M	30.9	-26.9 +1.3	+5.8 +9.4	+1.4	+0.2	+0.0	22.1	88.3	-66.2	Horiz
27	158.550M	29.4	-26.9 +1.3	+5.8 +10.8	+1.3	+0.2	+0.0	21.9	88.3	-66.4	Horiz



Test Location: CKC Laboratories Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714-993-6112
Customer: **Itron, Inc.**
Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
Work Order #: **99808** Date: 4/5/2017
Test Type: **Maximized Emissions** Time: 17:23:10
Tested By: S. Yamamoto Sequence#: 3
Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 3			

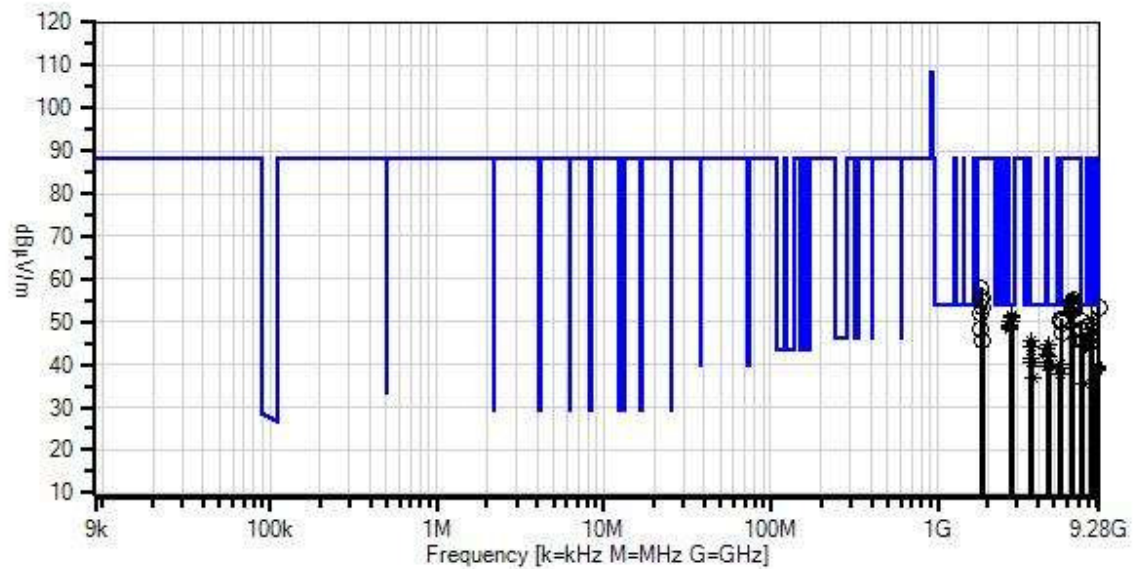
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 3			

Test Conditions / Notes:

The equipment under test (EUT) is stand alone on the table top. The EUT is turned on and set in transmit mode. The EUT has new batteries installed. Nominal input voltage is 6.3Vdc. The EUT is tested in the single worst case orientation as instructed by the manufacturer. The interface cable is unterminated. Operating frequency: 903, 910, 915, 926.8MHz. Modulation: OOK. Firmware power: power level 1. Firmware version: STM32 1.18.3.0 MSP 0.15.4.0 Antenna type: Internal PC board. Duty cycle: 12.2% Frequency range of measurement, 1GHz to 9.28GHz. RBW=1 MHz, VBW=3 MHz Temperature: 23°C, Humidity: 46%, Pressure: 100.1kPa. Site D. Test Method: ANSI C63.10 (2013)
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Itron, Inc. W/O#: 99808 Sequence#: 3 Date: 4/5/2017
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



— Readings
× QP Readings
▼ Ambient
— 1 - 15.247(d) / 15.209 Radiated Spurious Emissions
○ Peak Readings
* Average Readings
Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02672	Spectrum Analyzer	E4446A	3/2/2017	3/2/2019
T2	ANP04382	Cable	LDF-50	6/6/2016	6/6/2018
T3	ANP07139	Cable	ANDL1-PNMNM-48	3/1/2017	3/1/2019
T4	AN00787	Preamp	83017A	6/10/2015	6/10/2017
T5	ANP06554	Cable	32022-29094K-29094K-24TC	12/30/2015	12/30/2017
T6	AN03169	High Pass Filter	HM1155-11SS	6/24/2015	6/24/2017
T7	AN01646	Horn Antenna	3115	3/4/2016	3/4/2018

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2 T6	T3 T7	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBμV	dB	dB	dB	dB	Table	dBμV/m	dBμV/m	dB	Ant
1	2780.397M	54.4	+0.0	+6.6	+3.3	-40.0	+0.0	51.7	54.0	-2.3	Vert
	Ave		+0.6	+0.2	+26.6						
^	2780.397M	68.6	+0.0	+6.6	+3.3	-40.0	+0.0	65.9	54.0	+11.9	Vert
			+0.6	+0.2	+26.6						
3	2780.400M	53.7	+0.0	+6.6	+3.3	-40.0	+0.0	51.0	54.0	-3.0	Horiz
	Ave		+0.6	+0.2	+26.6						
^	2780.400M	68.2	+0.0	+6.6	+3.3	-40.0	+0.0	65.5	54.0	+11.5	Horiz
			+0.6	+0.2	+26.6						
5	8341.192M	35.6	+0.0	+12.2	+6.2	-39.9	+0.0	50.4	54.0	-3.6	Vert
	Ave		+1.2	+0.3	+34.8						
^	8341.192M	49.9	+0.0	+12.2	+6.2	-39.9	+0.0	64.7	54.0	+10.7	Vert
			+1.2	+0.3	+34.8						
7	2744.997M	53.3	+0.0	+6.5	+3.2	-40.0	+0.0	50.2	54.0	-3.8	Vert
	Ave		+0.6	+0.2	+26.4						
^	2744.997M	67.7	+0.0	+6.5	+3.2	-40.0	+0.0	64.6	54.0	+10.6	Vert
			+0.6	+0.2	+26.4						
9	2708.995M	53.3	+0.0	+6.4	+3.2	-39.9	+0.0	50.1	54.0	-3.9	Vert
	Ave		+0.6	+0.2	+26.3						
^	2708.995M	67.8	+0.0	+6.4	+3.2	-39.9	+0.0	64.6	54.0	+10.6	Vert
			+0.6	+0.2	+26.3						
11	2729.997M	52.4	+0.0	+6.5	+3.2	-40.0	+0.0	49.3	54.0	-4.7	Vert
	Ave		+0.6	+0.2	+26.4						
^	2729.997M	66.9	+0.0	+6.5	+3.2	-40.0	+0.0	63.8	54.0	+9.8	Vert
			+0.6	+0.2	+26.4						
13	2730.000M	51.8	+0.0	+6.5	+3.2	-40.0	+0.0	48.7	54.0	-5.3	Horiz
	Ave		+0.6	+0.2	+26.4						
^	2730.000M	66.7	+0.0	+6.5	+3.2	-40.0	+0.0	63.6	54.0	+9.6	Horiz
			+0.6	+0.2	+26.4						

15	2709.000M Ave	51.5	+0.0 +0.6	+6.4 +0.2	+3.2 +26.3	-39.9	+0.0	48.3	54.0	-5.7	Horiz
^	2709.000M	65.8	+0.0 +0.6	+6.4 +0.2	+3.2 +26.3	-39.9	+0.0	62.6	54.0	+8.6	Horiz
17	8341.200M Ave	33.3	+0.0 +1.2	+12.2 +0.3	+6.2 +34.8	-39.9	+0.0	48.1	54.0	-5.9	Horiz
^	8341.200M	47.7	+0.0 +1.2	+12.2 +0.3	+6.2 +34.8	-39.9	+0.0	62.5	54.0	+8.5	Horiz
19	7279.628M	37.9	+0.0 +1.1	+10.9 +0.2	+5.5 +32.7	-40.3	+0.0	48.0	54.0	-6.0	Horiz
20	8235.003M Ave	32.8	+0.0 +1.2	+12.1 +0.3	+6.2 +34.5	-40.0	+0.0	47.1	54.0	-6.9	Vert
^	8235.003M	47.1	+0.0 +1.2	+12.1 +0.3	+6.2 +34.5	-40.0	+0.0	61.4	54.0	+7.4	Vert
22	8190.000M Ave	31.6	+0.0 +1.2	+12.0 +0.3	+6.2 +34.3	-40.0	+0.0	45.6	54.0	-8.4	Horiz
^	8190.000M	45.6	+0.0 +1.2	+12.0 +0.3	+6.2 +34.3	-40.0	+0.0	59.6	54.0	+5.6	Horiz
24	3612.000M Ave	46.1	+0.0 +0.7	+7.3 +0.2	+3.8 +27.8	-40.4	+0.0	45.5	54.0	-8.5	Horiz
^	3612.000M	59.6	+0.0 +0.7	+7.3 +0.2	+3.8 +27.8	-40.4	+0.0	59.0	54.0	+5.0	Horiz
26	7414.410M	34.9	+0.0 +1.1	+11.2 +0.1	+5.6 +33.0	-40.4	+0.0	45.5	54.0	-8.5	Vert
27	7280.134M	35.4	+0.0 +1.1	+10.9 +0.2	+5.5 +32.7	-40.3	+0.0	45.5	54.0	-8.5	Vert
28	7320.222M	35.0	+0.0 +1.1	+11.0 +0.2	+5.6 +32.8	-40.3	+0.0	45.4	54.0	-8.6	Vert
29	8127.032M Ave	31.4	+0.0 +1.2	+11.9 +0.2	+6.1 +34.1	-40.0	+0.0	44.9	54.0	-9.1	Horiz
^	8127.032M	44.9	+0.0 +1.2	+11.9 +0.2	+6.1 +34.1	-40.0	+0.0	58.4	54.0	+4.4	Horiz
31	4633.997M Ave	41.4	+0.0 +0.8	+8.6 +0.1	+4.2 +29.9	-40.2	+0.0	44.8	54.0	-9.2	Vert
^	4633.997M	56.3	+0.0 +0.8	+8.6 +0.1	+4.2 +29.9	-40.2	+0.0	59.7	54.0	+5.7	Vert
33	3640.000M Ave	45.0	+0.0 +0.7	+7.3 +0.1	+3.8 +27.8	-40.4	+0.0	44.3	54.0	-9.7	Horiz
^	3640.000M	59.4	+0.0 +0.7	+7.3 +0.1	+3.8 +27.8	-40.4	+0.0	58.7	54.0	+4.7	Horiz
35	3611.968M Ave	44.9	+0.0 +0.7	+7.3 +0.2	+3.8 +27.8	-40.4	+0.0	44.3	54.0	-9.7	Vert
^	3611.968M	58.9	+0.0 +0.7	+7.3 +0.2	+3.8 +27.8	-40.4	+0.0	58.3	54.0	+4.3	Vert
37	8189.992M Ave	30.1	+0.0 +1.2	+12.0 +0.3	+6.2 +34.3	-40.0	+0.0	44.1	54.0	-9.9	Vert
^	8189.992M	44.0	+0.0 +1.2	+12.0 +0.3	+6.2 +34.3	-40.0	+0.0	58.0	54.0	+4.0	Vert
39	8126.988M Ave	30.4	+0.0 +1.2	+11.9 +0.2	+6.1 +34.1	-40.0	+0.0	43.9	54.0	-10.1	Vert
^	8126.988M	44.9	+0.0 +1.2	+11.9 +0.2	+6.1 +34.1	-40.0	+0.0	58.4	54.0	+4.4	Vert

41	4514.988M Ave	40.3	+0.0 +0.8	+8.5 +0.1	+4.1 +29.9	-40.2	+0.0	43.5	54.0	-10.5	Vert
^	4514.988M	54.5	+0.0 +0.8	+8.5 +0.1	+4.1 +29.9	-40.2	+0.0	57.7	54.0	+3.7	Vert
43	4550.007M Ave	39.3	+0.0 +0.8	+8.5 +0.1	+4.1 +29.9	-40.2	+0.0	42.5	54.0	-11.5	Vert
^	4550.007M	53.6	+0.0 +0.8	+8.5 +0.1	+4.1 +29.9	-40.2	+0.0	56.8	54.0	+2.8	Vert
45	4575.003M Ave	38.5	+0.0 +0.8	+8.6 +0.1	+4.1 +29.9	-40.2	+0.0	41.8	54.0	-12.2	Vert
^	4575.003M	52.9	+0.0 +0.8	+8.6 +0.1	+4.1 +29.9	-40.2	+0.0	56.2	54.0	+2.2	Vert
47	3639.997M Ave	42.2	+0.0 +0.7	+7.3 +0.1	+3.8 +27.8	-40.4	+0.0	41.5	54.0	-12.5	Vert
^	3639.997M	56.3	+0.0 +0.7	+7.3 +0.1	+3.8 +27.8	-40.4	+0.0	55.6	54.0	+1.6	Vert
49	3659.997M Ave	41.0	+0.0 +0.7	+7.4 +0.1	+3.8 +27.9	-40.4	+0.0	40.5	54.0	-13.5	Vert
^	3659.997M	55.4	+0.0 +0.7	+7.4 +0.1	+3.8 +27.9	-40.4	+0.0	54.9	54.0	+0.9	Vert
51	3707.200M Ave	40.7	+0.0 +0.7	+7.4 +0.1	+3.8 +28.0	-40.4	+0.0	40.3	54.0	-13.7	Horiz
^	3707.200M	55.2	+0.0 +0.7	+7.4 +0.1	+3.8 +28.0	-40.4	+0.0	54.8	54.0	+0.8	Horiz
53	5418.025M Ave	33.6	+0.0 +0.9	+9.4 +0.2	+4.6 +31.3	-40.1	+0.0	39.9	54.0	-14.1	Horiz
^	5418.025M	48.1	+0.0 +0.9	+9.4 +0.2	+4.6 +31.3	-40.1	+0.0	54.4	54.0	+0.4	Horiz
55	9030.002M Ave	22.8	+0.0 +1.2	+12.8 +0.1	+6.2 +36.3	-39.6	+0.0	39.8	54.0	-14.2	Horiz
^	9030.002M	36.7	+0.0 +1.2	+12.8 +0.1	+6.2 +36.3	-39.6	+0.0	53.7	54.0	-0.3	Horiz
57	4634.000M Ave	36.3	+0.0 +0.8	+8.6 +0.1	+4.2 +29.9	-40.2	+0.0	39.7	54.0	-14.3	Horiz
^	4634.000M	50.7	+0.0 +0.8	+8.6 +0.1	+4.2 +29.9	-40.2	+0.0	54.1	54.0	+0.1	Horiz
59	4515.000M Ave	36.3	+0.0 +0.8	+8.5 +0.1	+4.1 +29.9	-40.2	+0.0	39.5	54.0	-14.5	Horiz
^	4515.000M	50.6	+0.0 +0.8	+8.5 +0.1	+4.1 +29.9	-40.2	+0.0	53.8	54.0	-0.2	Horiz
61	4550.000M Ave	36.2	+0.0 +0.8	+8.5 +0.1	+4.1 +29.9	-40.2	+0.0	39.4	54.0	-14.6	Horiz
^	4550.000M	50.0	+0.0 +0.8	+8.5 +0.1	+4.1 +29.9	-40.2	+0.0	53.2	54.0	-0.8	Horiz
63	9029.988M Ave	22.3	+0.0 +1.2	+12.8 +0.1	+6.2 +36.3	-39.6	+0.0	39.3	54.0	-14.7	Vert
^	9029.988M	33.6	+0.0 +1.2	+12.8 +0.1	+6.2 +36.3	-39.6	+0.0	50.6	54.0	-3.4	Vert

65	9100.000M Ave	22.2	+0.0 +1.2	+13.0 +0.1	+6.2 +36.1	-39.5	+0.0	39.3	54.0	-14.7	Horiz
^	9100.000M	36.4	+0.0 +1.2	+13.0 +0.1	+6.2 +36.1	-39.5	+0.0	53.5	54.0	-0.5	Horiz
^	9100.000M	36.4	+0.0 +1.2	+13.0 +0.1	+6.2 +36.1	-39.5	+0.0	53.5	54.0	-0.5	Horiz
68	5460.000M Ave	32.7	+0.0 +0.9	+9.5 +0.2	+4.6 +31.4	-40.1	+0.0	39.2	54.0	-14.8	Horiz
^	5460.000M	46.8	+0.0 +0.9	+9.5 +0.2	+4.6 +31.4	-40.1	+0.0	53.3	54.0	-0.7	Horiz
70	9099.998M Ave	21.4	+0.0 +1.2	+13.0 +0.1	+6.2 +36.1	-39.5	+0.0	38.5	54.0	-15.5	Vert
^	9099.998M	35.6	+0.0 +1.2	+13.0 +0.1	+6.2 +36.1	-39.5	+0.0	52.7	54.0	-1.3	Vert
72	9150.003M Ave	21.2	+0.0 +1.2	+13.0 +0.2	+6.3 +36.1	-39.5	+0.0	38.5	54.0	-15.5	Vert
^	9150.003M	35.3	+0.0 +1.2	+13.0 +0.2	+6.3 +36.1	-39.5	+0.0	52.6	54.0	-1.4	Vert
74	5417.988M Ave	31.7	+0.0 +0.9	+9.4 +0.2	+4.6 +31.3	-40.1	+0.0	38.0	54.0	-16.0	Vert
^	5417.988M	45.9	+0.0 +0.9	+9.4 +0.2	+4.6 +31.3	-40.1	+0.0	52.2	54.0	-1.8	Vert
76	3707.197M Ave	37.3	+0.0 +0.7	+7.4 +0.1	+3.8 +28.0	-40.4	+0.0	36.9	54.0	-17.1	Vert
^	3707.197M	51.3	+0.0 +0.7	+7.4 +0.1	+3.8 +28.0	-40.4	+0.0	50.9	54.0	-3.1	Vert
78	7414.400M Ave	24.8	+0.0 +1.1	+11.2 +0.1	+5.6 +33.0	-40.4	+0.0	35.4	54.0	-18.6	Horiz
^	7414.400M	39.0	+0.0 +1.1	+11.2 +0.1	+5.6 +33.0	-40.4	+0.0	49.6	54.0	-4.4	Horiz
80	1805.985M	65.4	+0.0 +0.5	+5.0 +0.3	+2.5 +23.8	-39.4	+0.0	58.1	88.3	-30.2	Vert
81	1830.042M	62.6	+0.0 +0.5	+5.1 +0.3	+2.5 +23.8	-39.4	+0.0	55.4	88.3	-32.9	Vert
82	6487.490M	47.5	+0.0 +1.1	+10.1 +0.3	+5.1 +31.0	-40.0	+0.0	55.1	88.3	-33.2	Vert
83	1819.975M	62.3	+0.0 +0.5	+5.1 +0.3	+2.5 +23.8	-39.4	+0.0	55.1	88.3	-33.2	Vert
84	6321.022M	47.2	+0.0 +1.0	+10.0 +0.3	+5.0 +31.2	-39.9	+0.0	54.8	88.3	-33.5	Vert
85	6369.953M	46.5	+0.0 +1.0	+10.0 +0.3	+5.0 +31.2	-39.8	+0.0	54.2	88.3	-34.1	Horiz
86	6321.040M	46.0	+0.0 +1.0	+10.0 +0.3	+5.0 +31.2	-39.9	+0.0	53.6	88.3	-34.7	Horiz
87	9268.237M	36.2	+0.0 +1.2	+13.2 +0.2	+6.3 +35.9	-39.5	+0.0	53.5	88.3	-34.8	Horiz
88	6370.009M	45.8	+0.0 +1.0	+10.0 +0.3	+5.0 +31.2	-39.8	+0.0	53.5	88.3	-34.8	Vert
89	1853.545M	60.4	+0.0 +0.5	+5.2 +0.3	+2.6 +23.9	-39.5	+0.0	53.4	88.3	-34.9	Vert
90	9268.040M	35.8	+0.0 +1.2	+13.2 +0.2	+6.3 +35.9	-39.5	+0.0	53.1	88.3	-35.2	Vert

91	6405.117M	45.0	+0.0 +1.0	+10.1 +0.3	+5.0 +31.1	-39.8	+0.0	52.7	88.3	-35.6	Vert
92	6487.563M	45.1	+0.0 +1.1	+10.1 +0.3	+5.1 +31.0	-40.0	+0.0	52.7	88.3	-35.6	Horiz
93	1805.988M	59.4	+0.0 +0.5	+5.0 +0.3	+2.5 +23.8	-39.4	+0.0	52.1	88.3	-36.2	Horiz
94	5460.109M	44.1	+0.0 +0.9	+9.5 +0.2	+4.6 +31.4	-40.1	+0.0	50.6	88.3	-37.7	Vert
95	7224.148M	40.0	+0.0 +1.1	+10.9 +0.2	+5.5 +32.5	-40.2	+0.0	50.0	88.3	-38.3	Horiz
96	5489.798M	43.4	+0.0 +0.9	+9.5 +0.2	+4.6 +31.5	-40.1	+0.0	50.0	88.3	-38.3	Vert
97	5560.898M	43.2	+0.0 +0.9	+9.5 +0.2	+4.6 +31.5	-40.2	+0.0	49.7	88.3	-38.6	Horiz
98	1819.993M	55.5	+0.0 +0.5	+5.1 +0.3	+2.5 +23.8	-39.4	+0.0	48.3	88.3	-40.0	Horiz
99	7224.277M	38.1	+0.0 +1.1	+10.9 +0.2	+5.5 +32.5	-40.2	+0.0	48.1	88.3	-40.2	Vert
100	5560.968M	40.9	+0.0 +0.9	+9.5 +0.2	+4.6 +31.5	-40.2	+0.0	47.4	88.3	-40.9	Vert
101	1853.568M	52.6	+0.0 +0.5	+5.2 +0.3	+2.6 +23.9	-39.5	+0.0	45.6	88.3	-42.7	Horiz



Test Location: CKC Laboratories Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714-993-6112
Customer: **Itron, Inc.**
Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
Work Order #: **99808** Date: 4/6/2017
Test Type: **Maximized Emissions** Time: 20:00:10
Tested By: S. Yamamoto Sequence#: 10
Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 5			

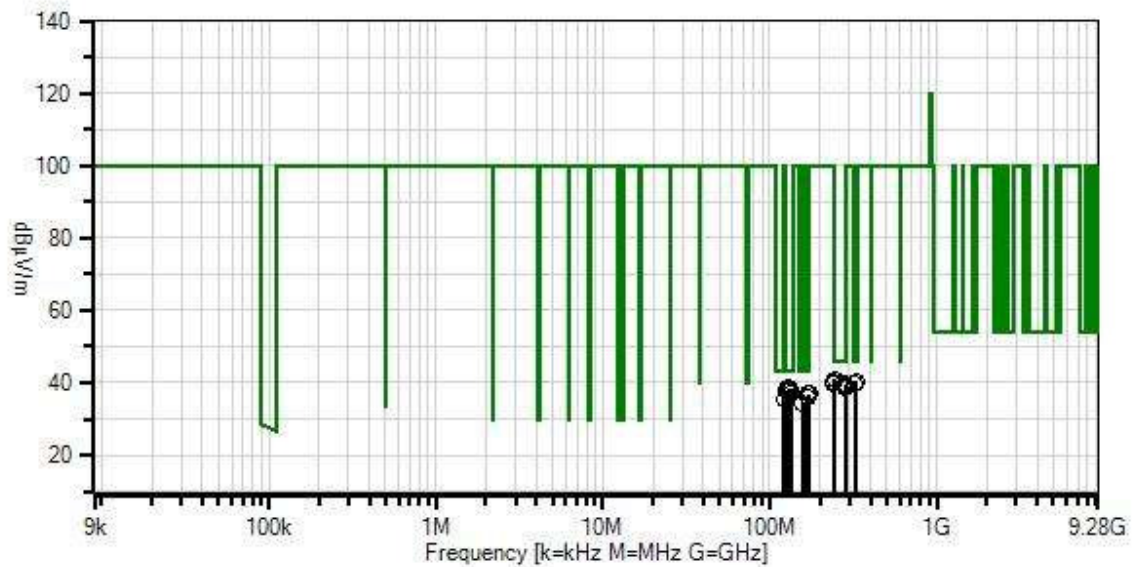
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 5			

Test Conditions / Notes:

The equipment under test (EUT) is stand alone on the table top. The EUT is turned on and set in transmit mode. The EUT has new batteries installed. Nominal input voltage is 6.3Vdc. The EUT is tested in the single orientation as requested by the manufacturer. The interface cable is unterminated. Operating frequency: 903, 910, 915, 926.8MHz. Modulation: OOK. Firmware power: power level 3. Firmware version: STM32 1.18.3.0 MSP 0.15.4.0 Antenna type: Internal PC board. Duty cycle: 56.1% Frequency range of measurement, 9kHz to 1GHz. RBW=100kHz, VBW=1MHz. Temperature: 23°C, Humidity: 40%, Pressure: 100.1kPa. Site D. Test Method: ANSI C63.10 (2013)
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Ittron, Inc. WO#: 99808 Sequence#: 10 Date: 4/6/2017
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert



— Readings
× QP Readings
▼ Ambient
— 1 - 15.247(d) / 15.209 Radiated Spurious Emissions

○ Peak Readings
* Average Readings
Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02672	Spectrum Analyzer	E4446A	3/2/2017	3/2/2019
T1	ANP04382	Cable	LDF-50	6/6/2016	6/6/2018
	ANP05555	Cable	RG223/U	4/5/2016	4/5/2018
	AN00010	Preamp	8447D	3/14/2016	3/14/2018
T2	ANP05569	Cable-Amplitude +15C to +45C (dB)	RG-214/U	12/7/2016	12/7/2018
T3	ANP05283	Attenuator	ATT-0218-06- NNN-02	5/5/2016	5/5/2018
T4	AN01994	Biconilog Antenna	CBL6111C	3/11/2016	3/11/2018
	AN00314	Loop Antenna	6502	5/20/2016	5/20/2018

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	130.175M	18.2	+1.2	+1.2	+5.8	+12.1	+0.0	38.5	43.5	-5.0	Horiz
2	244.875M	18.5	+1.6	+1.6	+5.8	+13.4	+0.0	40.9	46.0	-5.1	Horiz
3	133.975M	18.0	+1.2	+1.2	+5.8	+12.0	+0.0	38.2	43.5	-5.3	Horiz
4	131.500M	17.9	+1.2	+1.2	+5.8	+12.1	+0.0	38.2	43.5	-5.3	Horiz
5	126.575M	17.9	+1.1	+1.1	+5.8	+12.2	+0.0	38.1	43.5	-5.4	Horiz
6	328.760M	15.8	+1.9	+1.9	+5.8	+15.1	+0.0	40.5	46.0	-5.5	Horiz
7	128.925M	17.4	+1.1	+1.1	+5.8	+12.1	+0.0	37.5	43.5	-6.0	Horiz
8	242.025M	17.8	+1.6	+1.6	+5.8	+13.2	+0.0	40.0	46.0	-6.0	Horiz
9	240.750M	17.6	+1.6	+1.6	+5.8	+13.1	+0.0	39.7	46.0	-6.3	Horiz
10	325.990M	15.0	+1.9	+1.9	+5.8	+15.0	+0.0	39.6	46.0	-6.4	Vert
11	281.700M	16.2	+1.7	+1.7	+5.8	+14.1	+0.0	39.5	46.0	-6.5	Vert

12	132.625M	16.8	+1.2	+1.2	+5.8	+12.0	+0.0	37.0	43.5	-6.5	Horiz
13	170.120M	18.7	+1.4	+1.3	+5.8	+9.7	+0.0	36.9	43.5	-6.6	Vert
14	171.410M	18.8	+1.4	+1.3	+5.8	+9.5	+0.0	36.8	43.5	-6.7	Vert
15	284.700M	15.7	+1.7	+1.7	+5.8	+14.1	+0.0	39.0	46.0	-7.0	Horiz
16	168.890M	17.9	+1.4	+1.3	+5.8	+9.8	+0.0	36.2	43.5	-7.3	Vert
17	284.775M	15.3	+1.7	+1.7	+5.8	+14.1	+0.0	38.6	46.0	-7.4	Vert
18	121.762M	15.4	+1.1	+1.1	+5.8	+12.1	+0.0	35.5	43.5	-8.0	Horiz
19	156.840M	14.8	+1.3	+1.3	+5.8	+11.0	+0.0	34.2	43.5	-9.3	Vert



Test Location: CKC Laboratories Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714-993-6112
 Customer: **Itron, Inc.**
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
 Work Order #: **99808** Date: 4/6/2017
 Test Type: **Maximized Emissions** Time: 12:58:00
 Tested By: S. Yamamoto Sequence#: 5
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 5			

Support Equipment:

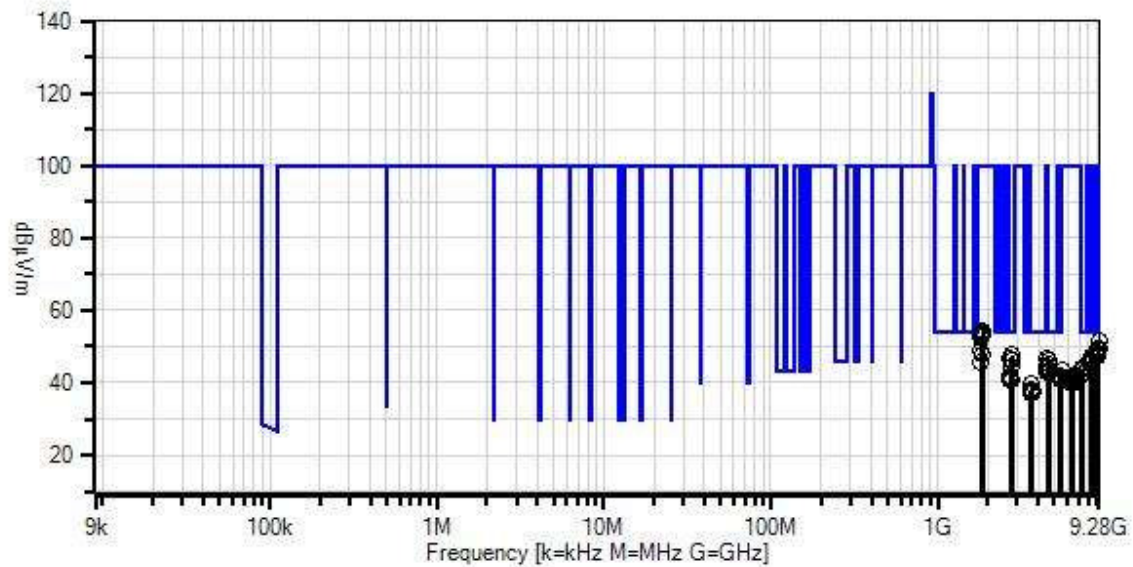
Device	Manufacturer	Model #	S/N
Configuration 5			

Test Conditions / Notes:

The equipment under test (EUT) is stand alone on the table top. The EUT is turned on and set in transmit mode.
 The EUT has new batteries installed. Nominal input voltage is 6.3Vdc.
 The EUT is tested in the single worst case orientation as instructed by the manufacturer.
 The interface cable is unterminated.
 Operating frequency: 903, 910, 915, 926.8MHz.
Modulation: OOK.
 Firmware power: power level 3. Firmware version: STM32 1.18.3.0 MSP 0.15.4.0
 Antenna type: Internal PC board. Duty cycle: 56.1%

 Frequency range of measurement, 1GHz to 9.28GHz. RBW=1 MHz, VBW=3 MHz
 Temperature: 20°C, Humidity: 45%, Pressure: 100.1kPa.
 Site D.
 Test Method: ANSI C63.10 (2013)

Itron, Inc. W/O#: 99808 Sequence#: 5 Date: 4/6/2017
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



— Readings
× QP Readings
▼ Ambient
— 1 - 15.247(d) / 15.209 Radiated Spurious Emissions

○ Peak Readings
* Average Readings
Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02672	Spectrum Analyzer	E4446A	3/2/2017	3/2/2019
T2	ANP04382	Cable	LDF-50	6/6/2016	6/6/2018
T3	ANP07139	Cable	ANDL1-PNMNM-48	3/1/2017	3/1/2019
T4	AN00787	Preamp	83017A	6/10/2015	6/10/2017
T5	ANP06554	Cable	32022-29094K-29094K-24TC	12/30/2015	12/30/2017
T6	AN03169	High Pass Filter	HM1155-11SS	6/24/2015	6/24/2017
T7	AN01646	Horn Antenna	3115	3/4/2016	3/4/2018

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2 T6	T3 T7	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBμV	dB	dB	dB	dB	Table	dBμV/m	dBμV/m	dB	Ant
1	9149.693M	32.4	+0.0 +1.2	+13.0 +0.2	+6.3 +36.1	-39.5	+0.0	49.7	54.0	-4.3	Horiz
2	9150.683M	31.2	+0.0 +1.2	+13.0 +0.2	+6.3 +36.1	-39.5	+0.0	48.5	54.0	-5.5	Vert
3	9029.647M	30.9	+0.0 +1.2	+12.8 +0.1	+6.2 +36.3	-39.6	+0.0	47.9	54.0	-6.1	Horiz
4	9099.810M	30.8	+0.0 +1.2	+13.0 +0.1	+6.2 +36.1	-39.5	+0.0	47.9	54.0	-6.1	Vert
5	9100.020M	30.5	+0.0 +1.2	+13.0 +0.1	+6.2 +36.1	-39.5	+0.0	47.6	54.0	-6.4	Horiz
6	2780.310M	50.2	+0.0 +0.6	+6.6 +0.2	+3.3 +26.6	-40.0	+0.0	47.5	54.0	-6.5	Horiz
7	8341.893M	32.6	+0.0 +1.2	+12.2 +0.3	+6.2 +34.8	-39.9	+0.0	47.4	54.0	-6.6	Horiz
8	9029.087M	30.3	+0.0 +1.2	+12.8 +0.1	+6.2 +36.3	-39.6	+0.0	47.3	54.0	-6.7	Vert
9	8340.863M	32.5	+0.0 +1.2	+12.2 +0.3	+6.2 +34.8	-39.9	+0.0	47.3	54.0	-6.7	Vert
10	8235.170M	32.9	+0.0 +1.2	+12.1 +0.3	+6.2 +34.5	-40.0	+0.0	47.2	54.0	-6.8	Vert
11	2709.043M	49.9	+0.0 +0.6	+6.4 +0.2	+3.2 +26.3	-39.9	+0.0	46.7	54.0	-7.3	Horiz
12	4515.083M	43.5	+0.0 +0.8	+8.5 +0.1	+4.1 +29.9	-40.2	+0.0	46.7	54.0	-7.3	Horiz
13	2744.927M	49.2	+0.0 +0.6	+6.5 +0.2	+3.2 +26.4	-40.0	+0.0	46.1	54.0	-7.9	Horiz
14	8234.077M	31.7	+0.0 +1.2	+12.1 +0.3	+6.2 +34.5	-40.0	+0.0	46.0	54.0	-8.0	Horiz
15	4634.003M	42.5	+0.0 +0.8	+8.6 +0.1	+4.2 +29.9	-40.2	+0.0	45.9	54.0	-8.1	Horiz
16	8190.757M	31.9	+0.0 +1.2	+12.0 +0.3	+6.2 +34.3	-40.0	+0.0	45.9	54.0	-8.1	Horiz
17	8189.587M	31.8	+0.0 +1.2	+12.0 +0.3	+6.2 +34.3	-40.0	+0.0	45.8	54.0	-8.2	Vert

18	8126.450M	32.2	+0.0 +1.2	+11.9 +0.2	+6.1 +34.1	-40.0	+0.0	45.7	54.0	-8.3	Horiz
19	8127.983M	31.8	+0.0 +1.2	+11.9 +0.2	+6.1 +34.1	-40.0	+0.0	45.3	54.0	-8.7	Vert
20	4575.000M	41.6	+0.0 +0.8	+8.6 +0.1	+4.1 +29.9	-40.2	+0.0	44.9	54.0	-9.1	Horiz
21	2780.497M	47.4	+0.0 +0.6	+6.6 +0.2	+3.3 +26.6	-40.0	+0.0	44.7	54.0	-9.3	Vert
22	4550.007M	41.2	+0.0 +0.8	+8.5 +0.1	+4.1 +29.9	-40.2	+0.0	44.4	54.0	-9.6	Horiz
23	4515.040M	40.8	+0.0 +0.8	+8.5 +0.1	+4.1 +29.9	-40.2	+0.0	44.0	54.0	-10.0	Vert
24	7319.817M	33.3	+0.0 +1.1	+11.0 +0.2	+5.6 +32.8	-40.3	+0.0	43.7	54.0	-10.3	Horiz
25	4575.063M	40.3	+0.0 +0.8	+8.6 +0.1	+4.1 +29.9	-40.2	+0.0	43.6	54.0	-10.4	Vert
26	4634.003M	39.4	+0.0 +0.8	+8.6 +0.1	+4.2 +29.9	-40.2	+0.0	42.8	54.0	-11.2	Vert
27	4550.087M	39.5	+0.0 +0.8	+8.5 +0.1	+4.1 +29.9	-40.2	+0.0	42.7	54.0	-11.3	Vert
28	7279.300M	32.6	+0.0 +1.1	+10.9 +0.2	+5.5 +32.7	-40.3	+0.0	42.7	54.0	-11.3	Vert
29	7415.337M	31.9	+0.0 +1.1	+11.2 +0.1	+5.6 +33.0	-40.4	+0.0	42.5	54.0	-11.5	Vert
30	7319.723M	32.0	+0.0 +1.1	+11.0 +0.2	+5.6 +32.8	-40.3	+0.0	42.4	54.0	-11.6	Vert
31	7415.047M	31.7	+0.0 +1.1	+11.2 +0.1	+5.6 +33.0	-40.4	+0.0	42.3	54.0	-11.7	Horiz
32	7280.527M	32.1	+0.0 +1.1	+10.9 +0.2	+5.5 +32.7	-40.3	+0.0	42.2	54.0	-11.8	Horiz
33	5417.823M	35.5	+0.0 +0.9	+9.4 +0.2	+4.6 +31.3	-40.1	+0.0	41.8	54.0	-12.2	Vert
34	2708.993M	44.8	+0.0 +0.6	+6.4 +0.2	+3.2 +26.3	-39.9	+0.0	41.6	54.0	-12.4	Vert
35	5418.433M	34.8	+0.0 +0.9	+9.4 +0.2	+4.6 +31.3	-40.1	+0.0	41.1	54.0	-12.9	Horiz
36	2730.077M	44.2	+0.0 +0.6	+6.5 +0.2	+3.2 +26.4	-40.0	+0.0	41.1	54.0	-12.9	Vert
37	5459.853M	34.5	+0.0 +0.9	+9.5 +0.2	+4.6 +31.4	-40.1	+0.0	41.0	54.0	-13.0	Horiz
38	2745.087M	43.9	+0.0 +0.6	+6.5 +0.2	+3.2 +26.4	-40.0	+0.0	40.8	54.0	-13.2	Vert
39	2729.980M	43.8	+0.0 +0.6	+6.5 +0.2	+3.2 +26.4	-40.0	+0.0	40.7	54.0	-13.3	Horiz
40	3639.913M	40.2	+0.0 +0.7	+7.3 +0.1	+3.8 +27.8	-40.4	+0.0	39.5	54.0	-14.5	Vert
41	3639.980M	39.0	+0.0 +0.7	+7.3 +0.1	+3.8 +27.8	-40.4	+0.0	38.3	54.0	-15.7	Horiz
42	3660.100M	38.6	+0.0 +0.7	+7.4 +0.1	+3.8 +27.9	-40.4	+0.0	38.1	54.0	-15.9	Vert
43	3612.000M	38.6	+0.0 +0.7	+7.3 +0.2	+3.8 +27.8	-40.4	+0.0	38.0	54.0	-16.0	Horiz

44	3707.347M	38.1	+0.0 +0.7	+7.4 +0.1	+3.8 +28.0	-40.4	+0.0	37.7	54.0	-16.3	Horiz
45	3660.420M	38.1	+0.0 +0.7	+7.4 +0.1	+3.8 +27.9	-40.4	+0.0	37.6	54.0	-16.4	Horiz
46	3707.233M	37.8	+0.0 +0.7	+7.4 +0.1	+3.8 +28.0	-40.4	+0.0	37.4	54.0	-16.6	Vert
47	3611.533M	37.7	+0.0 +0.7	+7.3 +0.2	+3.8 +27.8	-40.4	+0.0	37.1	54.0	-16.9	Vert
48	1853.600M	61.5	+0.0 +0.5	+5.2 +0.3	+2.6 +23.9	-39.5	+0.0	54.5	100.0	-45.5	Horiz
49	1853.610M	60.8	+0.0 +0.5	+5.2 +0.3	+2.6 +23.9	-39.5	+0.0	53.8	100.0	-46.2	Vert
50	1820.013M	60.3	+0.0 +0.5	+5.1 +0.3	+2.5 +23.8	-39.4	+0.0	53.1	100.0	-46.9	Horiz
51	1829.977M	60.2	+0.0 +0.5	+5.1 +0.3	+2.5 +23.8	-39.4	+0.0	53.0	100.0	-47.0	Horiz
52	1806.023M	60.1	+0.0 +0.5	+5.0 +0.3	+2.5 +23.8	-39.4	+0.0	52.8	100.0	-47.2	Horiz
53	9268.027M	34.4	+0.0 +1.2	+13.2 +0.2	+6.3 +35.9	-39.5	+0.0	51.7	100.0	-48.3	Horiz
54	9267.870M	32.2	+0.0 +1.2	+13.2 +0.2	+6.3 +35.9	-39.5	+0.0	49.5	100.0	-50.5	Vert
55	1806.000M	56.0	+0.0 +0.5	+5.0 +0.3	+2.5 +23.8	-39.4	+0.0	48.7	100.0	-51.3	Vert
56	1829.913M	54.9	+0.0 +0.5	+5.1 +0.3	+2.5 +23.8	-39.4	+0.0	47.7	100.0	-52.3	Vert
57	1820.013M	53.0	+0.0 +0.5	+5.1 +0.3	+2.5 +23.8	-39.4	+0.0	45.8	100.0	-54.2	Vert
58	7223.367M	33.9	+0.0 +1.1	+10.9 +0.2	+5.5 +32.5	-40.2	+0.0	43.9	100.0	-56.1	Horiz
59	5560.817M	37.3	+0.0 +0.9	+9.5 +0.2	+4.6 +31.5	-40.2	+0.0	43.8	100.0	-56.2	Vert
60	7223.613M	33.5	+0.0 +1.1	+10.9 +0.2	+5.5 +32.5	-40.2	+0.0	43.5	100.0	-56.5	Vert
61	5460.060M	35.3	+0.0 +0.9	+9.5 +0.2	+4.6 +31.4	-40.1	+0.0	41.8	100.0	-58.2	Vert
62	6321.383M	34.0	+0.0 +1.0	+10.0 +0.3	+5.0 +31.2	-39.9	+0.0	41.6	100.0	-58.4	Vert
63	5489.900M	35.0	+0.0 +0.9	+9.5 +0.2	+4.6 +31.5	-40.1	+0.0	41.6	100.0	-58.4	Horiz
64	6370.000M	33.7	+0.0 +1.0	+10.0 +0.3	+5.0 +31.2	-39.8	+0.0	41.4	100.0	-58.6	Vert
65	6486.690M	33.7	+0.0 +1.1	+10.1 +0.3	+5.1 +31.0	-40.0	+0.0	41.3	100.0	-58.7	Horiz

66	5490.977M	34.6	+0.0 +0.9	+9.5 +0.2	+4.6 +31.5	-40.1	+0.0	41.2	100.0	-58.8	Vert
67	6321.453M	33.6	+0.0 +1.0	+10.0 +0.3	+5.0 +31.2	-39.9	+0.0	41.2	100.0	-58.8	Horiz
68	6487.057M	33.3	+0.0 +1.1	+10.1 +0.3	+5.1 +31.0	-40.0	+0.0	40.9	100.0	-59.1	Vert
69	5559.967M	34.4	+0.0 +0.9	+9.5 +0.2	+4.6 +31.5	-40.2	+0.0	40.9	100.0	-59.1	Horiz
70	6369.737M	32.9	+0.0 +1.0	+10.0 +0.3	+5.0 +31.2	-39.8	+0.0	40.6	100.0	-59.4	Horiz
71	6404.407M	32.8	+0.0 +1.0	+10.1 +0.3	+5.0 +31.1	-39.8	+0.0	40.5	100.0	-59.5	Vert
72	6405.423M	32.1	+0.0 +1.0	+10.1 +0.3	+5.0 +31.1	-39.8	+0.0	39.8	100.0	-60.2	Horiz



Test Location: CKC Laboratories Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714-993-6112
 Customer: **Itron, Inc.**
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
 Work Order #: **99808** Date: 4/4/2017
 Test Type: **Maximized Emissions** Time: 11:22:53
 Tested By: Don Nguyen Sequence#: 0
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

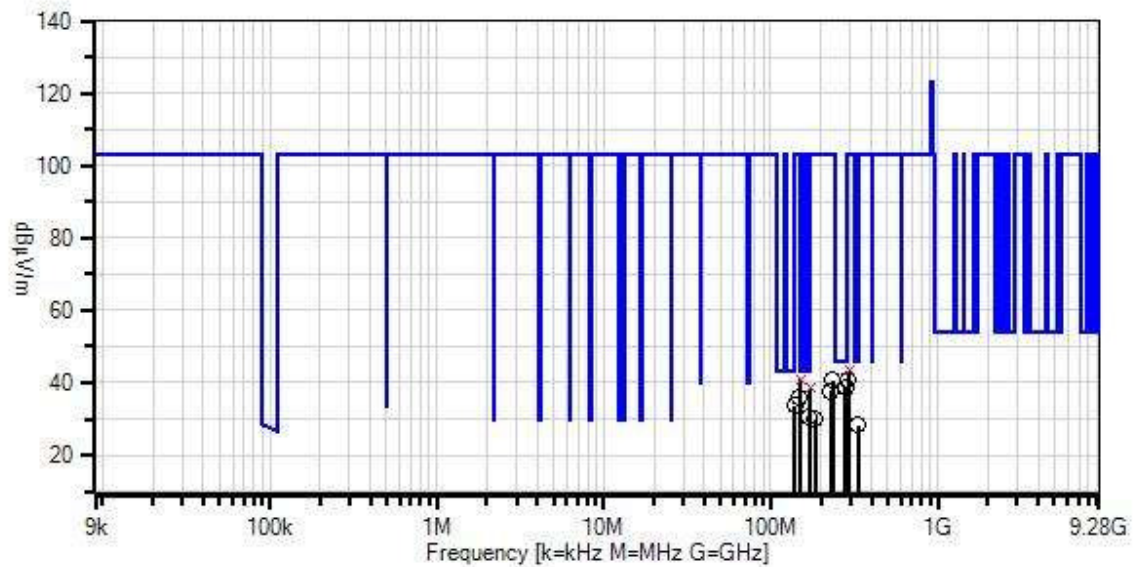
The EUT is placed on Styrofoam platform at 0.8m in height for measurement below 1GHz and 1.5m in height for measurement above 1GHz. The EUT is turned on and set in transmitting mode. The EUT has fresh battery installed. Nominal input voltage is 6.3Vdc.
 The EUT is tested in preferred orientation declared by the manufacturer.

 Operating frequency: 902.4, 910, 915.2, 927.6MHz
Modulation: GFSK
 Firmware power: power level 3

 Frequency range of measurement = 9kHz-1GHz
 9 kHz - 150 kHz, RBW=200 Hz, VBW=600 Hz
 150 kHz -30 MHz, RBW=9 kHz, VBW=27 kHz
 30 MHz - 1000MHz, RBW=120 kHz, VBW=360 kHz

 Temperature: 19°C, Humidity: 57%, Pressure: 100.1kPa.
 Site D.
 Test Method: ANSI C63.10 (2013)

Iron, Inc. WO#: 99808 Sequence#: 0 Date: 4/4/2017
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert



— Readings
 × QP Readings
 ▼ Ambient
 — 1 - 15.247(d) / 15.209 Radiated Spurious Emissions

○ Peak Readings
 * Average Readings
 Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00010	Preamp	8447D	3/14/2016	3/14/2018
T2	ANP05283	Attenuator	ATT-0218-06- NNN-02	5/5/2016	5/5/2018
T3	ANP04382	Cable	LDF-50	6/6/2016	6/6/2018
T4	ANP05555	Cable	RG223/U	4/5/2016	4/5/2018
T5	ANP05569	Cable-Amplitude +15C to +45C (dB)	RG-214/U	12/7/2016	12/7/2018
	AN02672	Spectrum Analyzer	E4446A	3/2/2017	3/2/2019
T6	AN01994	Biconilog Antenna	CBL6111C	3/11/2016	3/11/2018
	AN00314	Loop Antenna	6502	5/20/2016	5/20/2018

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1 T5 dB	T2 T6 dB	T3 dB	T4 dB	Dist	Corr	Spec	Margin	Polar
	MHz	dBμV					Table	dBμV/m	dBμV/m	dB	Ant
1	172.253M	47.2	-26.9 +1.3	+5.8 +9.5	+1.4	+0.2	+0.0	38.5	43.5	-5.0	Vert
^	172.253M	51.9	-26.9 +1.3	+5.8 +9.5	+1.4	+0.2	+0.0	43.2	43.5	-0.3	Vert
3	280.300M	41.8	-26.6 +1.7	+5.8 +14.1	+1.7	+0.2	+0.0	38.7	46.0	-7.3	Vert
4	170.750M	39.1	-26.9 +1.3	+5.8 +9.6	+1.4	+0.2	+0.0	30.5	43.5	-13.0	Horiz
5	334.300M	29.9	-26.8 +1.9	+5.8 +15.2	+1.9	+0.3	+0.0	28.2	46.0	-17.8	Vert
6	294.550M	46.3	-26.6 +1.8	+5.8 +14.2	+1.8	+0.2	+0.0	43.5	102.9	-59.4	Horiz
^	294.550M	51.1	-26.6 +1.8	+5.8 +14.2	+1.8	+0.2	+0.0	48.3	102.9	-54.6	Horiz
8	149.825M	47.8	-26.9 +1.3	+5.8 +11.6	+1.3	+0.2	+0.0	41.1	102.9	-61.8	Vert
^	149.825M	53.2	-26.9 +1.3	+5.8 +11.6	+1.3	+0.2	+0.0	46.5	102.9	-56.4	Vert
10	292.300M	43.7	-26.6 +1.8	+5.8 +14.1	+1.8	+0.2	+0.0	40.8	102.9	-62.1	Vert
11	234.300M	45.8	-26.7 +1.5	+5.8 +12.6	+1.6	+0.2	+0.0	40.8	102.9	-62.1	Vert
12	227.800M	43.2	-26.7 +1.5	+5.8 +12.1	+1.6	+0.2	+0.0	37.7	102.9	-65.2	Horiz
13	148.750M	42.7	-26.9 +1.2	+5.8 +11.6	+1.2	+0.1	+0.0	35.7	102.9	-67.2	Horiz
14	139.000M	40.2	-26.9 +1.2	+5.8 +11.9	+1.2	+0.1	+0.0	33.5	102.9	-69.4	Horiz
15	184.250M	38.5	-26.8 +1.3	+5.8 +9.5	+1.4	+0.2	+0.0	29.9	102.9	-73.0	Horiz

Test Location: CKC Laboratories Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714-993-6112
 Customer: **Itron, Inc.**
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
 Work Order #: **99808** Date: 4/5/2017
 Test Type: **Maximized Emissions** Time: 12:22:38
 Tested By: S. Yamamoto Sequence#: 1
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

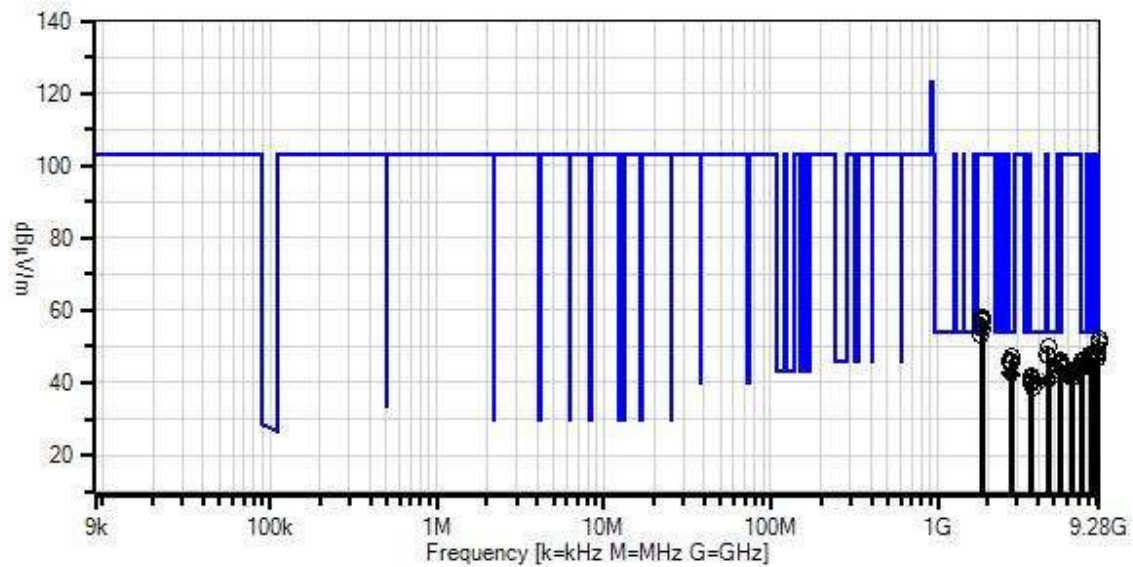
Test Conditions / Notes:

The equipment under test (EUT) is stand alone on the table top. The EUT is turned on and set in transmit mode.
 The EUT has new batteries installed. Nominal input voltage is 6.3Vdc.
 The EUT is tested in the single worst case orientation as instructed by the manufacturer.
 The interface cable is unterminated.
 Operating frequency: 902.4, 910, 915.2, 927.6MHz.
Modulation: GFSK.
 Firmware power: power level 3. Firmware version: STM32 1.18.3.0 MSP 0.15.4.0
 Antenna type: Internal PC board. Duty cycle: 100%

 Frequency range of measurement, 1GHz to 9.28GHz. RBW=1 MHz, VBW=3 MHz

 Temperature: 23°C, Humidity: 46%, Pressure: 100.1kPa.
 Site D.
 Test Method: ANSI C63.10 (2013)

Itron, Inc. W/O#: 99808 Sequence#: 1 Date: 4/5/2017
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



— Readings
× QP Readings
▼ Ambient
— 1 - 15.247(d) / 15.209 Radiated Spurious Emissions
○ Peak Readings
* Average Readings
Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02672	Spectrum Analyzer	E4446A	3/2/2017	3/2/2019
T2	ANP04382	Cable	LDF-50	6/6/2016	6/6/2018
T3	ANP07139	Cable	ANDL1-PNMNM-48	3/1/2017	3/1/2019
T4	AN00787	Preamp	83017A	6/10/2015	6/10/2017
T5	ANP06554	Cable	32022-29094K-29094K-24TC	12/30/2015	12/30/2017
T6	AN03169	High Pass Filter	HM1155-11SS	6/24/2015	6/24/2017
T7	AN01646	Horn Antenna	3115	3/4/2016	3/4/2018

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dBμV	T1 T5 dB	T2 T6 dB	T3 T7 dB	T4 dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	4576.023M	46.7	+0.0 +0.8	+8.6 +0.1	+4.1 +29.9	-40.2	+0.0	50.0	54.0	-4.0	Horiz
2	9099.593M	32.2	+0.0 +1.2	+13.0 +0.1	+6.2 +36.1	-39.5	+0.0	49.3	54.0	-4.7	Vert
3	9100.020M	31.2	+0.0 +1.2	+13.0 +0.1	+6.2 +36.1	-39.5	+0.0	48.3	54.0	-5.7	Horiz
4	4512.187M	44.8	+0.0 +0.8	+8.5 +0.1	+4.1 +29.9	-40.2	+0.0	48.0	54.0	-6.0	Vert
5	8236.433M	33.7	+0.0 +1.2	+12.1 +0.3	+6.2 +34.5	-40.0	+0.0	48.0	54.0	-6.0	Vert
6	9024.020M	30.9	+0.0 +1.2	+12.8 +0.1	+6.2 +36.3	-39.6	+0.0	47.9	54.0	-6.1	Horiz
7	4550.047M	44.6	+0.0 +0.8	+8.5 +0.1	+4.1 +29.9	-40.2	+0.0	47.8	54.0	-6.2	Vert
8	8190.137M	33.7	+0.0 +1.2	+12.0 +0.3	+6.2 +34.3	-40.0	+0.0	47.7	54.0	-6.3	Vert
9	9151.997M	30.3	+0.0 +1.2	+13.0 +0.2	+6.3 +36.1	-39.5	+0.0	47.6	54.0	-6.4	Horiz
10	9151.737M	30.3	+0.0 +1.2	+13.0 +0.2	+6.3 +36.1	-39.5	+0.0	47.6	54.0	-6.4	Vert
11	4575.667M	44.2	+0.0 +0.8	+8.6 +0.1	+4.1 +29.9	-40.2	+0.0	47.5	54.0	-6.5	Vert
12	2782.638M	50.0	+0.0 +0.6	+6.6 +0.2	+3.3 +26.6	-40.0	+0.0	47.3	54.0	-6.7	Vert
13	4637.990M	43.8	+0.0 +0.8	+8.6 +0.1	+4.2 +29.9	-40.2	+0.0	47.2	54.0	-6.8	Vert
14	8121.243M	33.5	+0.0 +1.2	+11.9 +0.2	+6.1 +34.1	-40.0	+0.0	47.0	54.0	-7.0	Vert
15	8348.398M	31.9	+0.0 +1.2	+12.2 +0.3	+6.2 +34.8	-39.9	+0.0	46.7	54.0	-7.3	Vert
16	9023.990M	29.5	+0.0 +1.2	+12.8 +0.1	+6.2 +36.3	-39.6	+0.0	46.5	54.0	-7.5	Vert
17	2729.850M	49.5	+0.0 +0.6	+6.5 +0.2	+3.2 +26.4	-40.0	+0.0	46.4	54.0	-7.6	Vert

18	8190.020M	32.3	+0.0 +1.2	+12.0 +0.3	+6.2 +34.3	-40.0	+0.0	46.3	54.0	-7.7	Horiz
19	5414.457M	39.7	+0.0 +0.9	+9.4 +0.2	+4.6 +31.3	-40.1	+0.0	46.0	54.0	-8.0	Vert
20	8348.417M	31.1	+0.0 +1.2	+12.2 +0.3	+6.2 +34.8	-39.9	+0.0	45.9	54.0	-8.1	Horiz
21	2745.627M	48.8	+0.0 +0.6	+6.5 +0.2	+3.2 +26.4	-40.0	+0.0	45.7	54.0	-8.3	Vert
22	2707.217M	48.8	+0.0 +0.6	+6.4 +0.2	+3.2 +26.2	-39.9	+0.0	45.5	54.0	-8.5	Vert
23	8236.810M	31.2	+0.0 +1.2	+12.1 +0.3	+6.2 +34.5	-40.0	+0.0	45.5	54.0	-8.5	Horiz
24	5459.960M	39.0	+0.0 +0.9	+9.5 +0.2	+4.6 +31.4	-40.1	+0.0	45.5	54.0	-8.5	Vert
25	8121.593M	31.8	+0.0 +1.2	+11.9 +0.2	+6.1 +34.1	-40.0	+0.0	45.3	54.0	-8.7	Horiz
26	7420.807M	34.4	+0.0 +1.1	+11.2 +0.1	+5.6 +33.0	-40.4	+0.0	45.0	54.0	-9.0	Vert
27	7420.550M	34.0	+0.0 +1.1	+11.2 +0.1	+5.6 +33.0	-40.4	+0.0	44.6	54.0	-9.4	Horiz
28	7322.057M	34.2	+0.0 +1.1	+11.0 +0.2	+5.6 +32.8	-40.3	+0.0	44.6	54.0	-9.4	Vert
29	7280.277M	34.3	+0.0 +1.1	+10.9 +0.2	+5.5 +32.7	-40.3	+0.0	44.4	54.0	-9.6	Horiz
30	7321.960M	33.9	+0.0 +1.1	+11.0 +0.2	+5.6 +32.8	-40.3	+0.0	44.3	54.0	-9.7	Horiz
31	7280.150M	34.0	+0.0 +1.1	+10.9 +0.2	+5.5 +32.7	-40.3	+0.0	44.1	54.0	-9.9	Vert
32	2730.023M Ave	46.1	+0.0 +0.6	+6.5 +0.2	+3.2 +26.4	-40.0	+0.0	43.0	54.0	-11.0	Horiz
^	2730.023M	53.9	+0.0 +0.6	+6.5 +0.2	+3.2 +26.4	-40.0	+0.0	50.8	54.0	-3.2	Horiz
34	5414.473M	36.4	+0.0 +0.9	+9.4 +0.2	+4.6 +31.3	-40.1	+0.0	42.7	54.0	-11.3	Horiz
35	2707.200M Ave	45.9	+0.0 +0.6	+6.4 +0.2	+3.2 +26.2	-39.9	+0.0	42.6	54.0	-11.4	Horiz
^	2707.200M	55.3	+0.0 +0.6	+6.4 +0.2	+3.2 +26.2	-39.9	+0.0	52.0	54.0	-2.0	Horiz
37	2782.800M Ave	45.3	+0.0 +0.6	+6.6 +0.2	+3.3 +26.6	-40.0	+0.0	42.6	54.0	-11.4	Horiz
^	2782.800M	54.7	+0.0 +0.6	+6.6 +0.2	+3.3 +26.6	-40.0	+0.0	52.0	54.0	-2.0	Horiz

39	2745.580M Ave	44.9	+0.0 +0.6	+6.5 +0.2	+3.2 +26.4	-40.0	+0.0	41.8	54.0	-12.2	Horiz
^	2745.580M	53.3	+0.0 +0.6	+6.5 +0.2	+3.2 +26.4	-40.0	+0.0	50.2	54.0	-3.8	Horiz
41	3660.993M	42.2	+0.0 +0.7	+7.4 +0.1	+3.8 +27.9	-40.4	+0.0	41.7	54.0	-12.3	Vert
42	3609.610M	42.0	+0.0 +0.7	+7.3 +0.2	+3.8 +27.8	-40.4	+0.0	41.4	54.0	-12.6	Horiz
43	4512.007M Ave	38.0	+0.0 +0.8	+8.5 +0.1	+4.1 +29.9	-40.2	+0.0	41.2	54.0	-12.8	Horiz
^	4512.007M	47.6	+0.0 +0.8	+8.5 +0.1	+4.1 +29.9	-40.2	+0.0	50.8	54.0	-3.2	Horiz
45	3710.287M	41.4	+0.0 +0.7	+7.4 +0.1	+3.8 +28.0	-40.4	+0.0	41.0	54.0	-13.0	Horiz
46	4638.007M Ave	37.1	+0.0 +0.8	+8.6 +0.1	+4.2 +29.9	-40.2	+0.0	40.5	54.0	-13.5	Horiz
^	4638.007M	47.0	+0.0 +0.8	+8.6 +0.1	+4.2 +29.9	-40.2	+0.0	50.4	54.0	-3.6	Horiz
48	3660.820M	40.7	+0.0 +0.7	+7.4 +0.1	+3.8 +27.9	-40.4	+0.0	40.2	54.0	-13.8	Horiz
49	3639.713M	40.7	+0.0 +0.7	+7.3 +0.1	+3.8 +27.8	-40.4	+0.0	40.0	54.0	-14.0	Horiz
50	4550.020M Ave	36.7	+0.0 +0.8	+8.5 +0.1	+4.1 +29.9	-40.2	+0.0	39.9	54.0	-14.1	Horiz
^	4550.020M	47.1	+0.0 +0.8	+8.5 +0.1	+4.1 +29.9	-40.2	+0.0	50.3	54.0	-3.7	Horiz
52	3640.350M	40.5	+0.0 +0.7	+7.3 +0.1	+3.8 +27.8	-40.4	+0.0	39.8	54.0	-14.2	Vert
53	3710.403M	38.8	+0.0 +0.7	+7.4 +0.1	+3.8 +28.0	-40.4	+0.0	38.4	54.0	-15.6	Vert
54	1830.557M	65.5	+0.0 +0.5	+5.1 +0.3	+2.5 +23.8	-39.4	+0.0	58.3	102.9	-44.6	Horiz
55	1820.050M	65.0	+0.0 +0.5	+5.1 +0.3	+2.5 +23.8	-39.4	+0.0	57.8	102.9	-45.1	Horiz
56	1855.100M	64.7	+0.0 +0.5	+5.2 +0.3	+2.6 +23.9	-39.5	+0.0	57.7	102.9	-45.2	Horiz
57	1855.191M	63.9	+0.0 +0.5	+5.2 +0.3	+2.6 +23.9	-39.5	+0.0	56.9	102.9	-46.0	Vert
58	1804.627M	62.8	+0.0 +0.5	+5.0 +0.3	+2.5 +23.8	-39.4	+0.0	55.5	102.9	-47.4	Horiz
59	1819.963M	62.6	+0.0 +0.5	+5.1 +0.3	+2.5 +23.8	-39.4	+0.0	55.4	102.9	-47.5	Vert
60	1830.483M	61.9	+0.0 +0.5	+5.1 +0.3	+2.5 +23.8	-39.4	+0.0	54.7	102.9	-48.2	Vert
61	1804.857M	60.4	+0.0 +0.5	+5.0 +0.3	+2.5 +23.8	-39.4	+0.0	53.1	102.9	-49.8	Vert
62	9275.547M	35.0	+0.0 +1.2	+13.2 +0.2	+6.3 +35.9	-39.5	+0.0	52.3	102.9	-50.6	Horiz
63	9276.259M	33.6	+0.0 +1.2	+13.2 +0.2	+6.3 +35.9	-39.5	+0.0	50.9	102.9	-52.0	Vert
64	7219.243M	36.2	+0.0 +1.1	+10.9 +0.2	+5.5 +32.5	-40.2	+0.0	46.2	102.9	-56.7	Horiz

65	7219.253M	35.6	+0.0 +1.1	+10.9 +0.2	+5.5 +32.5	-40.2	+0.0	45.6	102.9	-57.3	Vert
66	5491.467M	38.7	+0.0 +0.9	+9.5 +0.2	+4.6 +31.5	-40.1	+0.0	45.3	102.9	-57.6	Vert
67	5460.053M	38.4	+0.0 +0.9	+9.5 +0.2	+4.6 +31.4	-40.1	+0.0	44.9	102.9	-58.0	Vert
68	5565.642M	37.8	+0.0 +0.9	+9.6 +0.2	+4.6 +31.5	-40.2	+0.0	44.4	102.9	-58.5	Vert
69	5565.470M	37.2	+0.0 +0.9	+9.6 +0.2	+4.6 +31.5	-40.2	+0.0	43.8	102.9	-59.1	Horiz
70	6316.903M	35.8	+0.0 +1.0	+10.0 +0.3	+5.0 +31.2	-39.9	+0.0	43.4	102.9	-59.5	Vert
71	6492.842M	35.6	+0.0 +1.1	+10.1 +0.3	+5.1 +31.0	-40.0	+0.0	43.2	102.9	-59.7	Vert
72	6370.057M	35.4	+0.0 +1.0	+10.0 +0.3	+5.0 +31.2	-39.8	+0.0	43.1	102.9	-59.8	Vert
73	5460.030M	36.3	+0.0 +0.9	+9.5 +0.2	+4.6 +31.4	-40.1	+0.0	42.8	102.9	-60.1	Horiz
74	6316.793M	35.0	+0.0 +1.0	+10.0 +0.3	+5.0 +31.2	-39.9	+0.0	42.6	102.9	-60.3	Horiz
75	6406.053M	34.8	+0.0 +1.0	+10.1 +0.3	+5.0 +31.1	-39.8	+0.0	42.5	102.9	-60.4	Vert
76	6370.633M	34.5	+0.0 +1.0	+10.0 +0.3	+5.0 +31.2	-39.8	+0.0	42.2	102.9	-60.7	Horiz
77	5491.183M	35.3	+0.0 +0.9	+9.5 +0.2	+4.6 +31.5	-40.1	+0.0	41.9	102.9	-61.0	Horiz
78	6493.250M	34.1	+0.0 +1.1	+10.1 +0.3	+5.1 +31.0	-40.0	+0.0	41.7	102.9	-61.2	Horiz
79	6405.597M	33.7	+0.0 +1.0	+10.1 +0.3	+5.0 +31.1	-39.8	+0.0	41.4	102.9	-61.5	Horiz

Test Location: CKC Laboratories Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714-993-6112
 Customer: **Itron, Inc.**
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
 Work Order #: **99808** Date: 4/6/2017
 Test Type: **Maximized Emissions** Time: 20:41:51
 Tested By: S. Yamamoto Sequence#: 11
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 4			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 4			

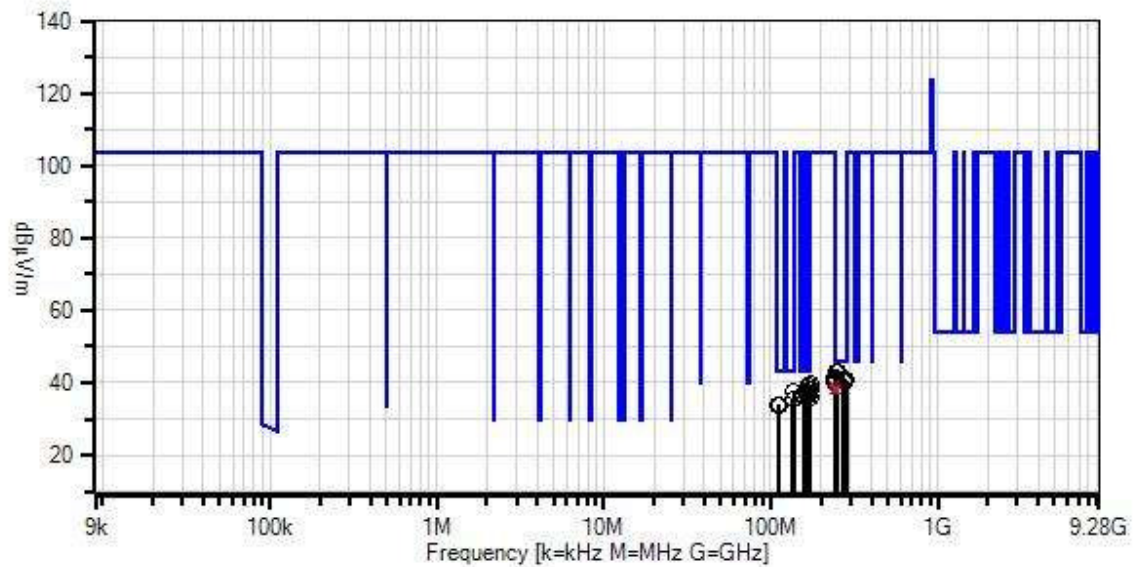
Test Conditions / Notes:

The equipment under test (EUT) is stand alone on the table top. The EUT is turned on and set in transmit mode.
 The EUT has new batteries installed. Nominal input voltage is 6.3Vdc.
 The EUT is tested in the single worst case orientation as instructed by the manufacturer. The interface cable is unterminated.
 Operating frequency: 902.2, 910, 915, 927.75MHz.
Modulation: GFSK.
 Firmware power: power level 3. Firmware version: STM32 1.18.3.0 MSP 0.15.4.0
 Antenna type: Internal PC board. Duty cycle: 100%

 Frequency range of measurement, 9kHz to 1GHz. RBW=100kHz and 1MHz, VBW=3 MHz

 Temperature: 23°C, Humidity: 40%, Pressure: 100.1kPa.
 Site D.
 Test Method: ANSI C63.10 (2013)

Itron, Inc. W/O#: 99808 Sequence#: 11 Date: 4/6/2017
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



— Readings
× QP Readings
▼ Ambient
— 1 - 15.247(d) / 15.209 Radiated Spurious Emissions

○ Peak Readings
* Average Readings
Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02672	Spectrum Analyzer	E4446A	3/2/2017	3/2/2019
T1	ANP04382	Cable	LDF-50	6/6/2016	6/6/2018
	ANP05555	Cable	RG223/U	4/5/2016	4/5/2018
	AN00010	Preamp	8447D	3/14/2016	3/14/2018
T2	ANP05569	Cable-Amplitude +15C to +45C (dB)	RG-214/U	12/7/2016	12/7/2018
T3	ANP05283	Attenuator	ATT-0218-06- NNN-02	5/5/2016	5/5/2018
T4	AN01994	Biconilog Antenna	CBL6111C	3/11/2016	3/11/2018
	AN00314	Loop Antenna	6502	5/20/2016	5/20/2018

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	244.817M	20.5	+1.6	+1.6	+5.8	+13.4	+0.0	42.9	46.0	-3.1	Horiz
2	251.925M	20.0	+1.6	+1.6	+5.8	+13.8	+0.0	42.8	46.0	-3.2	Horiz
3	172.950M	21.8	+1.4	+1.3	+5.8	+9.4	+0.0	39.7	43.5	-3.8	Vert
4	170.800M	21.2	+1.4	+1.3	+5.8	+9.6	+0.0	39.3	43.5	-4.2	Vert
5	168.130M	20.7	+1.4	+1.3	+5.8	+9.9	+0.0	39.1	43.5	-4.4	Vert
6	170.280M	20.8	+1.4	+1.3	+5.8	+9.7	+0.0	39.0	43.5	-4.5	Vert
7	247.200M	18.7	+1.6	+1.6	+5.8	+13.6	+0.0	41.3	46.0	-4.7	Vert
8	165.765M	20.3	+1.3	+1.3	+5.8	+10.1	+0.0	38.8	43.5	-4.7	Vert
9	240.450M	19.0	+1.6	+1.6	+5.8	+13.1	+0.0	41.1	46.0	-4.9	Vert
10	276.150M	17.8	+1.7	+1.7	+5.8	+14.0	+0.0	41.0	46.0	-5.0	Vert
11	284.625M	17.5	+1.7	+1.7	+5.8	+14.1	+0.0	40.8	46.0	-5.2	Vert
12	171.700M	20.3	+1.4	+1.3	+5.8	+9.5	+0.0	38.3	43.5	-5.2	Vert
13	243.300M	18.4	+1.6	+1.6	+5.8	+13.3	+0.0	40.7	46.0	-5.3	Vert
14	169.360M	19.9	+1.4	+1.3	+5.8	+9.7	+0.0	38.1	43.5	-5.4	Vert
15	271.725M	17.2	+1.7	+1.7	+5.8	+14.0	+0.0	40.4	46.0	-5.6	Horiz
16	241.950M	18.2	+1.6	+1.6	+5.8	+13.2	+0.0	40.4	46.0	-5.6	Vert
17	163.261M	19.0	+1.3	+1.3	+5.8	+10.4	+0.0	37.8	43.5	-5.7	Vert

18	277.725M	17.0	+1.7	+1.7	+5.8	+14.0	+0.0	40.2	46.0	-5.8	Vert
19	136.950M	17.4	+1.2	+1.2	+5.8	+12.0	+0.0	37.6	43.5	-5.9	Horiz
20	275.400M	16.8	+1.7	+1.7	+5.8	+14.0	+0.0	40.0	46.0	-6.0	Vert
21	164.370M	18.5	+1.3	+1.3	+5.8	+10.2	+0.0	37.1	43.5	-6.4	Horiz
22	240.648M QP	17.1	+1.6	+1.6	+5.8	+13.1	+0.0	39.2	46.0	-6.8	Horiz
^	240.648M	21.1	+1.6	+1.6	+5.8	+13.1	+0.0	43.2	46.0	-2.8	Horiz
24	169.160M	18.3	+1.4	+1.3	+5.8	+9.8	+0.0	36.6	43.5	-6.9	Horiz
25	156.868M	17.0	+1.3	+1.3	+5.8	+11.0	+0.0	36.4	43.5	-7.1	Vert
26	164.616M	17.8	+1.3	+1.3	+5.8	+10.2	+0.0	36.4	43.5	-7.1	Vert
27	165.540M	17.8	+1.3	+1.3	+5.8	+10.1	+0.0	36.3	43.5	-7.2	Horiz
28	171.550M	18.1	+1.4	+1.3	+5.8	+9.5	+0.0	36.1	43.5	-7.4	Horiz
29	246.750M QP	15.5	+1.6	+1.6	+5.8	+13.6	+0.0	38.1	46.0	-7.9	Horiz
^	246.750M	20.5	+1.6	+1.6	+5.8	+13.6	+0.0	43.1	46.0	-2.9	Horiz
31	135.900M	15.4	+1.2	+1.2	+5.8	+12.0	+0.0	35.6	43.5	-7.9	Horiz
32	242.389M QP	15.8	+1.6	+1.6	+5.8	+13.2	+0.0	38.0	46.0	-8.0	Horiz
^	242.389M	21.0	+1.6	+1.6	+5.8	+13.2	+0.0	43.2	46.0	-2.8	Horiz
34	112.055M	14.7	+1.1	+1.0	+5.8	+11.4	+0.0	34.0	43.5	-9.5	Vert
35	110.712M	14.4	+1.1	+1.0	+5.8	+11.3	+0.0	33.6	43.5	-9.9	Horiz

Test Location: CKC Laboratories Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714-993-6112
 Customer: **Itron, Inc.**
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
 Work Order #: **99808** Date: 4/6/2017
 Test Type: **Maximized Emissions** Time: 10:11:45
 Tested By: S. Yamamoto Sequence#: 4
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 4			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 4			

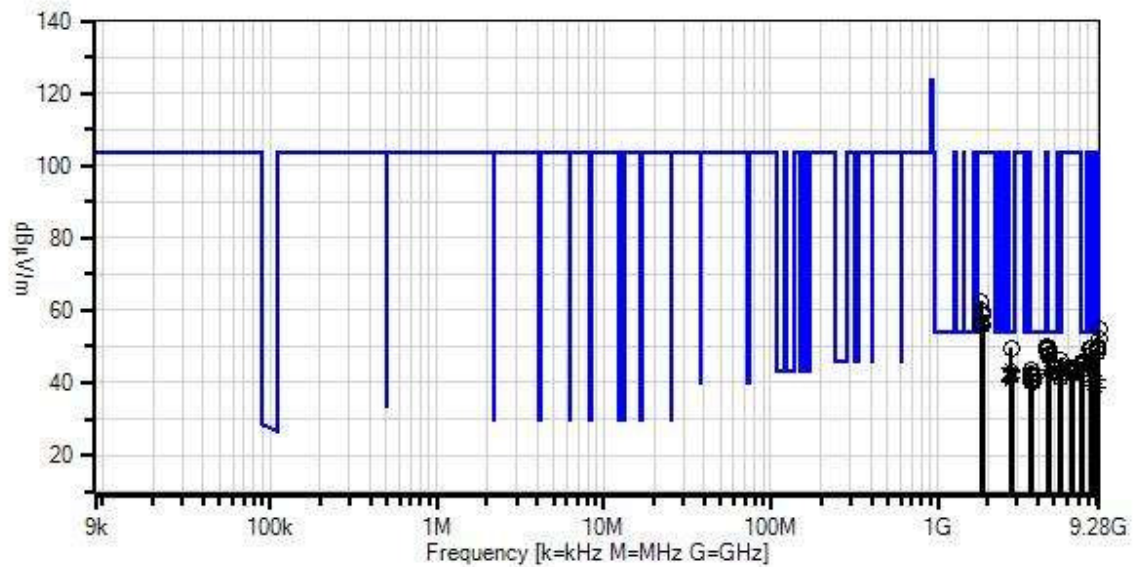
Test Conditions / Notes:

The equipment under test (EUT) is stand alone on the table top. The EUT is turned on and set in transmit mode.
 The EUT has new batteries installed. Nominal input voltage is 6.3Vdc.
 The EUT is tested in the single worst case orientation as instructed by the manufacturer.
 The interface cable is unterminated.
 Operating frequency: 902.2, 910, 915, 927.75MHz.
Modulation: GFSK.
 Firmware power: power level 3. Firmware version: STM32 1.18.3.0 MSP 0.15.4.0
 Antenna type: Internal PC board. Duty cycle: 100%

 Frequency range of measurement, 1GHz to 9.28GHz. RBW=1 MHz, VBW=3 MHz

 Temperature: 20°C, Humidity: 45%, Pressure: 100.1kPa.
 Site D.
 Test Method: ANSI C63.10 (2013)

Ittron, Inc. WO#: 99808 Sequence#: 4 Date: 4/6/2017
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert



— Readings
× QP Readings
▼ Ambient
○ Peak Readings
* Average Readings
Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02672	Spectrum Analyzer	E4446A	3/2/2017	3/2/2019
T1	ANP04382	Cable	LDF-50	6/6/2016	6/6/2018
T2	ANP07139	Cable	ANDL1-PNMNM-48	3/1/2017	3/1/2019
T3	AN00787	Preamp	83017A	6/10/2015	6/10/2017
T4	ANP06554	Cable	32022-29094K-29094K-24TC	12/30/2015	12/30/2017
T5	AN03169	High Pass Filter	HM1155-11SS	6/24/2015	6/24/2017
T6	AN01646	Horn Antenna	3115	3/4/2016	3/4/2018

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2 T6	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBμV	dB	dB	dB	dB	Table	dBμV/m	dBμV/m	dB	Ant
1	4550.117M	46.6	+8.5 +0.1	+4.1 +29.9	-40.2	+0.8	+0.0	49.8	54.0	-4.2	Horiz
2	9149.857M	32.5	+13.0 +0.2	+6.3 +36.1	-39.5	+1.2	+0.0	49.8	54.0	-4.2	Vert
3	2744.970M	52.7	+6.5 +0.2	+3.2 +26.4	-40.0	+0.6	+0.0	49.6	54.0	-4.4	Vert
4	4511.027M	46.4	+8.5 +0.1	+4.1 +29.9	-40.2	+0.8	+0.0	49.6	54.0	-4.4	Vert
5	8189.993M	35.5	+12.0 +0.3	+6.2 +34.3	-40.0	+1.2	+0.0	49.5	54.0	-4.5	Vert
6	4574.950M	46.1	+8.6 +0.1	+4.1 +29.9	-40.2	+0.8	+0.0	49.4	54.0	-4.6	Horiz
7	9022.383M	32.3	+12.8 +0.1	+6.2 +36.3	-39.6	+1.2	+0.0	49.3	54.0	-4.7	Horiz
8	8349.690M	34.5	+12.2 +0.3	+6.2 +34.8	-39.9	+1.2	+0.0	49.3	54.0	-4.7	Horiz
9	8119.690M	35.7	+11.9 +0.2	+6.1 +34.1	-40.0	+1.2	+0.0	49.2	54.0	-4.8	Vert
10	4550.010M	45.4	+8.5 +0.1	+4.1 +29.9	-40.2	+0.8	+0.0	48.6	54.0	-5.4	Vert
11	9022.897M	31.3	+12.8 +0.1	+6.2 +36.3	-39.6	+1.2	+0.0	48.3	54.0	-5.7	Vert
12	9099.943M	31.2	+13.0 +0.1	+6.2 +36.1	-39.5	+1.2	+0.0	48.3	54.0	-5.7	Vert
13	8235.127M	33.7	+12.1 +0.3	+6.2 +34.5	-40.0	+1.2	+0.0	48.0	54.0	-6.0	Vert
14	4638.710M	44.4	+8.6 +0.1	+4.2 +29.9	-40.2	+0.8	+0.0	47.8	54.0	-6.2	Vert
15	4574.920M	44.2	+8.6 +0.1	+4.1 +29.9	-40.2	+0.8	+0.0	47.5	54.0	-6.5	Vert
16	8190.247M	33.4	+12.0 +0.3	+6.2 +34.3	-40.0	+1.2	+0.0	47.4	54.0	-6.6	Horiz
17	5413.313M	40.0	+9.4 +0.2	+4.6 +31.2	-40.1	+0.9	+0.0	46.2	54.0	-7.8	Vert

18	7319.553M	35.0	+11.0 +0.2	+5.6 +32.8	-40.3	+1.1	+0.0	45.4	54.0	-8.6	Vert
19	8119.858M	31.4	+11.9 +0.2	+6.1 +34.1	-40.0	+1.2	+0.0	44.9	54.0	-9.1	Horiz
20	7422.107M	34.3	+11.2 +0.1	+5.6 +33.0	-40.4	+1.1	+0.0	44.9	54.0	-9.1	Vert
21	8234.967M	30.5	+12.1 +0.3	+6.2 +34.5	-40.0	+1.2	+0.0	44.8	54.0	-9.2	Horiz
22	7320.190M	34.0	+11.0 +0.2	+5.6 +32.8	-40.3	+1.1	+0.0	44.4	54.0	-9.6	Horiz
23	2730.000M Ave	47.2	+6.5 +0.2	+3.2 +26.4	-40.0	+0.6	+0.0	44.1	54.0	-9.9	Horiz
^	2730.000M	56.5	+6.5 +0.2	+3.2 +26.4	-40.0	+0.6	+0.0	53.4	54.0	-0.6	Horiz
25	2706.600M Ave	47.1	+6.4 +0.2	+3.2 +26.2	-39.9	+0.6	+0.0	43.8	54.0	-10.2	Horiz
^	2706.600M	56.5	+6.4 +0.2	+3.2 +26.2	-39.9	+0.6	+0.0	53.2	54.0	-0.8	Horiz
27	3608.842M	44.3	+7.3 +0.2	+3.8 +27.8	-40.4	+0.7	+0.0	43.7	54.0	-10.3	Horiz
28	4638.744M Ave	40.1	+8.6 +0.1	+4.2 +29.9	-40.2	+0.8	+0.0	43.5	54.0	-10.5	Horiz
^	4638.744M	49.2	+8.6 +0.1	+4.2 +29.9	-40.2	+0.8	+0.0	52.6	54.0	-1.4	Horiz
30	7279.900M	33.3	+10.9 +0.2	+5.5 +32.7	-40.3	+1.1	+0.0	43.4	54.0	-10.6	Vert
31	7279.642M	33.3	+10.9 +0.2	+5.5 +32.7	-40.3	+1.1	+0.0	43.4	54.0	-10.6	Horiz
32	3608.790M	43.9	+7.3 +0.2	+3.8 +27.8	-40.4	+0.7	+0.0	43.3	54.0	-10.7	Vert
33	2783.247M Ave	46.0	+6.6 +0.2	+3.3 +26.6	-40.0	+0.6	+0.0	43.3	54.0	-10.7	Horiz
^	2783.247M	55.1	+6.6 +0.2	+3.3 +26.6	-40.0	+0.6	+0.0	52.4	54.0	-1.6	Horiz
35	2745.000M Ave	45.9	+6.5 +0.2	+3.2 +26.4	-40.0	+0.6	+0.0	42.8	54.0	-11.2	Horiz
^	2745.000M	54.3	+6.5 +0.2	+3.2 +26.4	-40.0	+0.6	+0.0	51.2	54.0	-2.8	Horiz
37	7422.141M	32.1	+11.2 +0.1	+5.6 +33.0	-40.4	+1.1	+0.0	42.7	54.0	-11.3	Horiz
38	3639.843M	43.4	+7.3 +0.1	+3.8 +27.8	-40.4	+0.7	+0.0	42.7	54.0	-11.3	Vert
39	3659.867M	43.0	+7.4 +0.1	+3.8 +27.9	-40.4	+0.7	+0.0	42.5	54.0	-11.5	Vert
40	4511.000M Ave	39.1	+8.5 +0.1	+4.1 +29.9	-40.2	+0.8	+0.0	42.3	54.0	-11.7	Horiz
^	4511.000M	49.1	+8.5 +0.1	+4.1 +29.9	-40.2	+0.8	+0.0	52.3	54.0	-1.7	Horiz
42	3639.625M	42.4	+7.3 +0.1	+3.8 +27.8	-40.4	+0.7	+0.0	41.7	54.0	-12.3	Horiz
43	3711.019M	41.9	+7.4 +0.1	+3.8 +28.0	-40.4	+0.7	+0.0	41.5	54.0	-12.5	Horiz

44	5413.058M	35.3	+9.4 +0.2	+4.6 +31.2	-40.1	+0.9	+0.0	41.5	54.0	-12.5	Horiz
45	2783.250M Ave	44.0	+6.6 +0.2	+3.3 +26.6	-40.0	+0.6	+0.0	41.3	54.0	-12.7	Vert
^	2783.177M	53.0	+6.6 +0.2	+3.3 +26.6	-40.0	+0.6	+0.0	50.3	54.0	-3.7	Vert
47	9150.000M Ave	23.7	+13.0 +0.2	+6.3 +36.1	-39.5	+1.2	+0.0	41.0	54.0	-13.0	Horiz
^	9150.000M	34.3	+13.0 +0.2	+6.3 +36.1	-39.5	+1.2	+0.0	51.6	54.0	-2.4	Horiz
49	2706.600M Ave	44.0	+6.4 +0.2	+3.2 +26.2	-39.9	+0.6	+0.0	40.7	54.0	-13.3	Vert
^	2706.600M	55.0	+6.4 +0.2	+3.2 +26.2	-39.9	+0.6	+0.0	51.7	54.0	-2.3	Vert
51	2730.000M Ave	43.6	+6.5 +0.2	+3.2 +26.4	-40.0	+0.6	+0.0	40.5	54.0	-13.5	Vert
^	2730.000M	55.5	+6.5 +0.2	+3.2 +26.4	-40.0	+0.6	+0.0	52.4	54.0	-1.6	Vert
53	3660.150M	41.0	+7.4 +0.1	+3.8 +27.9	-40.4	+0.7	+0.0	40.5	54.0	-13.5	Horiz
54	3710.807M	40.7	+7.4 +0.1	+3.8 +28.0	-40.4	+0.7	+0.0	40.3	54.0	-13.7	Vert
55	8349.750M Ave	24.4	+12.2 +0.3	+6.2 +34.8	-39.9	+1.2	+0.0	39.2	54.0	-14.8	Vert
^	8349.750M	35.3	+12.2 +0.3	+6.2 +34.8	-39.9	+1.2	+0.0	50.1	54.0	-3.9	Vert
57	9100.000M Ave	21.5	+13.0 +0.1	+6.2 +36.1	-39.5	+1.2	+0.0	38.6	54.0	-15.4	Horiz
^	9100.000M	33.4	+13.0 +0.1	+6.2 +36.1	-39.5	+1.2	+0.0	50.5	54.0	-3.5	Horiz
59	1804.463M	69.8	+5.0 +0.3	+2.5 +23.8	-39.4	+0.5	+0.0	62.5	103.4	-40.9	Vert
60	1804.592M	69.7	+5.0 +0.3	+2.5 +23.8	-39.4	+0.5	+0.0	62.4	103.4	-41.0	Horiz
61	1830.000M	66.6	+5.1 +0.3	+2.5 +23.8	-39.4	+0.5	+0.0	59.4	103.4	-44.0	Horiz
62	1855.506M	65.7	+5.2 +0.3	+2.6 +23.9	-39.5	+0.5	+0.0	58.7	103.4	-44.7	Horiz
63	1819.908M	64.3	+5.1 +0.3	+2.5 +23.8	-39.4	+0.5	+0.0	57.1	103.4	-46.3	Horiz
64	1829.893M	63.2	+5.1 +0.3	+2.5 +23.8	-39.4	+0.5	+0.0	56.0	103.4	-47.4	Vert
65	1820.347M	63.1	+5.1 +0.3	+2.5 +23.8	-39.4	+0.5	+0.0	55.9	103.4	-47.5	Vert
66	1855.477M	62.8	+5.2 +0.3	+2.6 +23.9	-39.5	+0.5	+0.0	55.8	103.4	-47.6	Vert
67	9277.529M	37.5	+13.2 +0.2	+6.3 +35.9	-39.5	+1.2	+0.0	54.8	103.4	-48.6	Horiz
68	9277.377M	35.1	+13.2 +0.2	+6.3 +35.9	-39.5	+1.2	+0.0	52.4	103.4	-51.0	Vert
69	5460.053M	39.5	+9.5 +0.2	+4.6 +31.4	-40.1	+0.9	+0.0	46.0	103.4	-57.4	Vert

70	7217.547M	35.1	+10.9 +0.2	+5.5 +32.5	-40.2	+1.1	+0.0	45.1	103.4	-58.3	Vert
71	5566.480M	38.1	+9.6 +0.2	+4.6 +31.5	-40.2	+0.9	+0.0	44.7	103.4	-58.7	Vert
72	7218.175M	34.7	+10.9 +0.2	+5.5 +32.5	-40.2	+1.1	+0.0	44.7	103.4	-58.7	Horiz
73	5490.177M	37.6	+9.5 +0.2	+4.6 +31.5	-40.1	+0.9	+0.0	44.2	103.4	-59.2	Vert
74	5490.017M	37.4	+9.5 +0.2	+4.6 +31.5	-40.1	+0.9	+0.0	44.0	103.4	-59.4	Horiz
75	6494.137M	36.3	+10.1 +0.3	+5.1 +31.0	-40.0	+1.1	+0.0	43.9	103.4	-59.5	Vert
76	6315.470M	36.3	+10.0 +0.3	+5.0 +31.2	-39.9	+1.0	+0.0	43.9	103.4	-59.5	Vert
77	6370.140M	35.6	+10.0 +0.3	+5.0 +31.2	-39.8	+1.0	+0.0	43.3	103.4	-60.1	Vert
78	6493.949M	35.3	+10.1 +0.3	+5.1 +31.0	-40.0	+1.1	+0.0	42.9	103.4	-60.5	Horiz
79	6405.042M	35.2	+10.1 +0.3	+5.0 +31.1	-39.8	+1.0	+0.0	42.9	103.4	-60.5	Horiz
80	6315.400M	35.2	+10.0 +0.3	+5.0 +31.2	-39.9	+1.0	+0.0	42.8	103.4	-60.6	Horiz
81	5566.547M	36.1	+9.6 +0.2	+4.6 +31.5	-40.2	+0.9	+0.0	42.7	103.4	-60.7	Horiz
82	6404.967M	34.8	+10.1 +0.3	+5.0 +31.1	-39.8	+1.0	+0.0	42.5	103.4	-60.9	Vert
83	6370.192M	34.7	+10.0 +0.3	+5.0 +31.2	-39.8	+1.0	+0.0	42.4	103.4	-61.0	Horiz
84	5460.452M	35.8	+9.5 +0.2	+4.6 +31.4	-40.1	+0.9	+0.0	42.3	103.4	-61.1	Horiz

Band Edge

Band Edge Summary

Frequency (MHz)	Modulation	Ant. Type	Field Strength (dBuV/m @3m)	Limit (dBuV/m @3m)	Results
614	OOK and GFSK	Integral	45	<54	Pass
902	OOK and GFSK	Integral	86	<100	Pass
928	OOK and GFSK	Integral	85	<100	Pass
960	OOK and GFSK	Integral	47	<54	Pass

Test Setup / Conditions / Data

Test Location: CKC Laboratories Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714-993-6112
 Customer: **Itron, Inc.**
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
 Work Order #: **99808** Date: 4/4/2017
 Test Type: **Maximized Emissions** Time: 14:52:03
 Tested By: Don Nguyen Sequence#: 3
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 3			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 3			

Test Conditions / Notes:

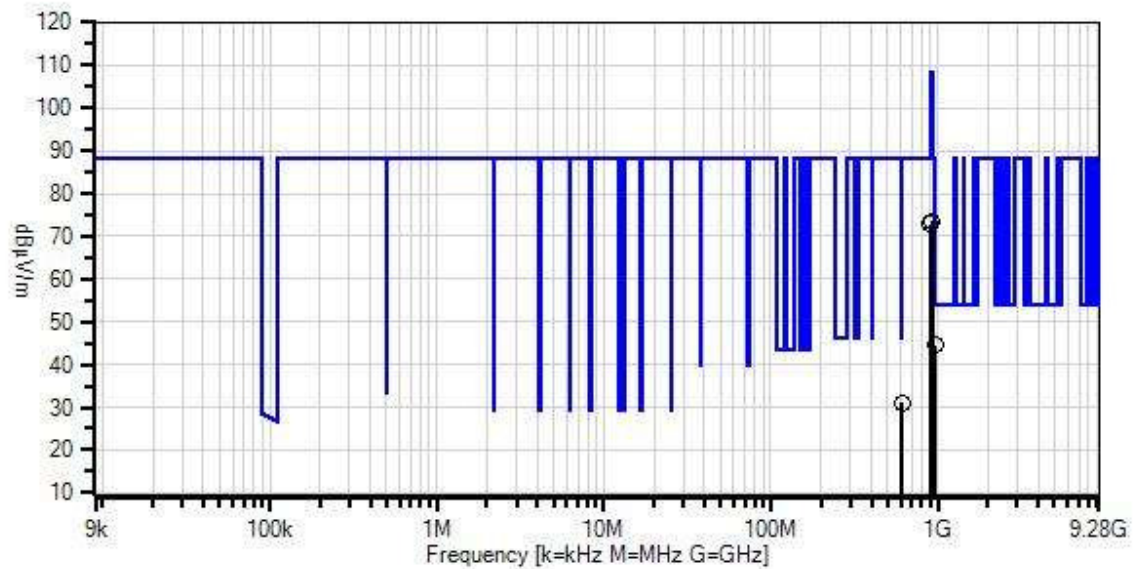
The EUT is placed on Styrofoam platform at 0.8m in height for measurement below 1GHz and 1.5m in height for measurement above 1GHz. The EUT is turned on and set in transmitting mode. The EUT has fresh battery installed. Nominal input voltage is 6.3Vdc.
 IO cable is unterminated.
 The EUT is tested in preferred orientation declared by the manufacturer.

 Operating frequency: 903, 910, 915, 926.8MHz
Modulation: OOK
 Firmware power: power level 1

 Frequency range of measurement = 902-928MHz
 RBW=120 kHz, VBW=360 kHz

 Temperature: 19°C, Humidity: 57%, Pressure: 100.1kPa.
 Site D.
 Test Method: ANSI C63.10 (2013)

Itron, Inc. W/O#: 99808 Sequence#: 3 Date: 4/4/2017
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



— Readings
× QP Readings
▼ Ambient
— 1 - 15.247(d) / 15.209 Radiated Spurious Emissions

○ Peak Readings
* Average Readings
Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00010	Preamplifier	8447D	3/14/2016	3/14/2018
T2	ANP05283	Attenuator	ATT-0218-06- NNN-02	5/5/2016	5/5/2018
T3	ANP04382	Cable	LDF-50	6/6/2016	6/6/2018
T4	ANP05555	Cable	RG223/U	4/5/2016	4/5/2018
T5	ANP05569	Cable-Amplitude +15C to +45C (dB)	RG-214/U	12/7/2016	12/7/2018
	AN02672	Spectrum Analyzer	E4446A	3/2/2017	3/2/2019
T6	AN01994	Biconilog Antenna	CBL6111C	3/11/2016	3/11/2018

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	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/m	dB μ V/m	dB	Ant
1	960.000M	33.7	-27.5 +3.6	+5.9 +24.8	+3.4	+0.6	+0.0	44.5	54.0	-9.5	Horiz
2	928.000M	63.2	-27.5 +3.6	+5.9 +24.4	+3.4	+0.6	+0.0	73.6	88.3	-14.7	Horiz
3	614.000M	26.6	-28.1 +2.7	+5.8 +20.8	+2.7	+0.5	+0.0	31.0	46.0	-15.0	Horiz
4	902.000M	63.2	-27.6 +3.5	+5.9 +24.1	+3.3	+0.5	+0.0	72.9	88.3	-15.4	Horiz



Test Location: CKC Laboratories Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714-993-6112
 Customer: **Itron, Inc.**
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
 Work Order #: **99808** Date: 4/6/2017
 Test Type: **Maximized Emissions** Time: 14:53:16
 Tested By: S. Yamamoto Sequence#: 9
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 5			

Support Equipment:

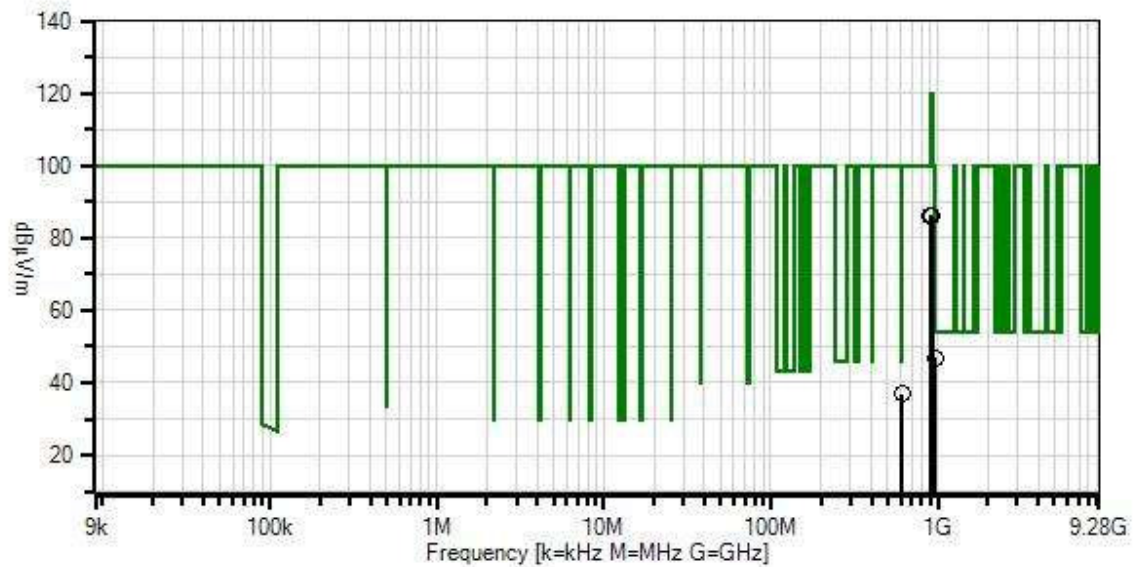
Device	Manufacturer	Model #	S/N
Configuration 5			

Test Conditions / Notes:

The equipment under test (EUT) is stand alone on the table top. The EUT is turned on and set in transmit mode.
 The EUT has new batteries installed. Nominal input voltage is 6.3Vdc.
 The EUT is tested in the single worst case orientation as instructed by the manufacturer. The interface cable is unterminated.
 Operating frequency: 903, 910, 915, 926.8MHz.
Modulation: OOK.
 Firmware power: power level 3.
 Frequency range investigated: Band edge.
 Firmware version: STM32 1.18.3.0 MSP 0.15.4.0
 Antenna type: Internal PC board. Duty cycle: 56.1%
 RBW=100kHz, VBW=1MHz.

 Temperature: 23°C, Humidity: 40%, Pressure: 100.1kPa.
 Site D.
 Test Method: ANSI C63.10 (2013)

Itron, Inc. W/O#: 99808 Sequence#: 9 Date: 4/6/2017
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



— Readings
 × QP Readings
 ▼ Ambient
 — 1 - 15.247(d) / 15.209 Radiated Spurious Emissions

○ Peak Readings
 * Average Readings
 Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02672	Spectrum Analyzer	E4446A	3/2/2017	3/2/2019
T2	ANP04382	Cable	LDF-50	6/6/2016	6/6/2018
	ANP05555	Cable	RG223/U	4/5/2016	4/5/2018
	AN00010	Preamplifier	8447D	3/14/2016	3/14/2018
T3	ANP05569	Cable-Amplitude +15C to +45C (dB)	RG-214/U	12/7/2016	12/7/2018
T4	ANP05283	Attenuator	ATT-0218-06- NNN-02	5/5/2016	5/5/2018
T5	AN01994	Biconilog Antenna	CBL6111C	3/11/2016	3/11/2018

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dB μ V	dB	dB	dB	dB	Table	dB μ V/m	dB μ V/m	dB	Ant
1	960.000M	9.3	+0.0 +24.8	+3.4	+3.6	+5.9	+0.0	47.0	54.0	-7.0	Horiz
2	614.000M	5.0	+0.0 +20.8	+2.7	+2.7	+5.8	+0.0	37.0	46.0	-9.0	Horiz
3	902.000M	49.4	+0.0 +24.1	+3.3	+3.5	+5.9	+0.0	86.2	100.0	-13.8	Horiz
4	928.000M	48.7	+0.0 +24.4	+3.4	+3.6	+5.9	+0.0	86.0	100.0	-14.0	Horiz

Test Location: CKC Laboratories Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714-993-6112
 Customer: **Itron, Inc.**
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
 Work Order #: **99808** Date: 4/4/2017
 Test Type: **Maximized Emissions** Time: 11:05:27
 Tested By: Don Nguyen Sequence#: 2
 Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

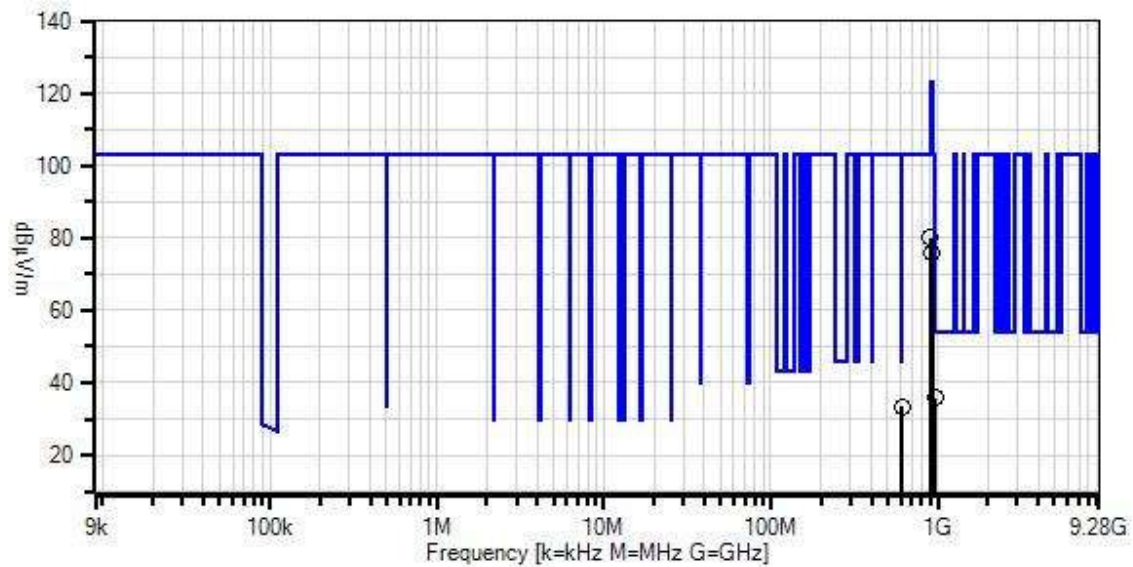
The EUT is placed on Styrofoam platform at 0.8m in height for measurement below 1GHz and 1.5m in height for measurement above 1GHz. The EUT is turned on and set in transmitting mode. The EUT has fresh battery installed. Nominal input voltage is 6.3Vdc.
 IO cable is unterminated.
 The EUT is tested in preferred orientation declared by the manufacturer.

 Operating frequency: 902.4, 910, 915.2, 927.6MHz
Modulation: GFSK
 Firmware power: power level 3

 Frequency range of measurement = 614-960MHz
 RBW=120 kHz, VBW=360 kHz

 Temperature: 19°C, Humidity: 57%, Pressure: 100.1kPa.
 Site D.
 Test Method: ANSI C63.10 (2013)

Itron, Inc. W/O#: 99808 Sequence#: 2 Date: 4/4/2017
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



— Readings
× QP Readings
▼ Ambient
— 1 - 15.247(d) / 15.209 Radiated Spurious Emissions

○ Peak Readings
* Average Readings
Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00010	Preamplifier	8447D	3/14/2016	3/14/2018
T2	ANP05283	Attenuator	ATT-0218-06- NNN-02	5/5/2016	5/5/2018
T3	ANP04382	Cable	LDF-50	6/6/2016	6/6/2018
T4	ANP05555	Cable	RG223/U	4/5/2016	4/5/2018
T5	ANP05569	Cable-Amplitude +15C to +45C (dB)	RG-214/U	12/7/2016	12/7/2018
	AN02672	Spectrum Analyzer	E4446A	3/2/2017	3/2/2019
T6	AN01994	Biconilog Antenna	CBL6111C	3/11/2016	3/11/2018

Measurement Data:

Reading listed by margin.

Test Distance: 3 Meters

#	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/m	dB μ V/m	dB	Ant
1	614.000M	29.1	-28.1 +2.7	+5.8 +20.8	+2.7	+0.5	+0.0	33.5	46.0	-12.5	Horiz
2	960.000M	25.1	-27.5 +3.6	+5.9 +24.8	+3.4	+0.6	+0.0	35.9	54.0	-18.1	Horiz
3	902.000M	70.4	-27.6 +3.5	+5.9 +24.1	+3.3	+0.5	+0.0	80.1	102.9	-22.8	Horiz
4	928.000M	65.4	-27.5 +3.6	+5.9 +24.4	+3.4	+0.6	+0.0	75.8	102.9	-27.1	Horiz



Test Location: CKC Laboratories Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714-993-6112
Customer: **Itron, Inc.**
Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
Work Order #: **99808** Date: 4/6/2017
Test Type: **Maximized Emissions** Time: 16:57:52
Tested By: S. Yamamoto Sequence#: 8
Software: EMITest 5.03.02

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 4			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 4			

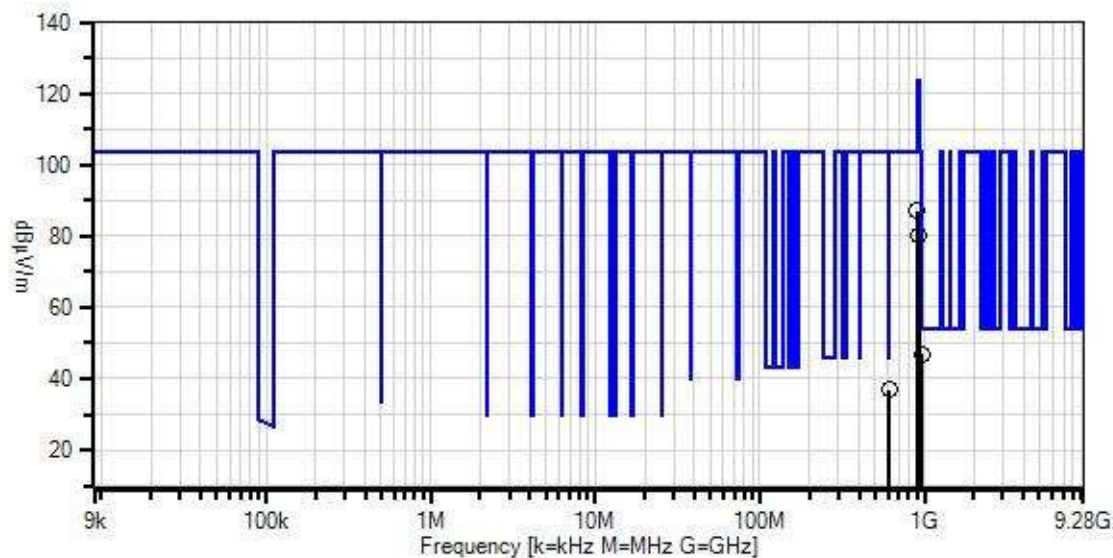
Test Conditions / Notes:

The equipment under test (EUT) is stand alone on the table top. The EUT is turned on and set in transmit mode. The EUT has new batteries installed. Nominal input voltage is 6.3Vdc.
The EUT is tested in the single worst case orientation as instructed by the manufacturer. The interface cable is unterminated.
Operating frequency: 902.2, 910, 915, 927.75MHz.
Modulation: GFSK.
Firmware power: power level 3.
Frequency range investigated: Band edge.
Firmware version: STM32 1.18.3.0 MSP 0.15.4.0
Antenna type: Internal PC board. Duty cycle: 100%

RBW=100kHz, VBW=1 MHz

Temperature: 23°C, Humidity: 40%, Pressure: 100.1kPa.
Site D.
Test Method: ANSI C63.10 (2013)

Ittron, Inc. WO#: 99808 Sequence#: 8 Date: 4/6/2017
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz



— Readings
× QP Readings
▼ Ambient
— 1 - 15.247(d) / 15.209 Radiated Spurious Emissions

○ Peak Readings
* Average Readings
Software Version: 5.03.02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02672	Spectrum Analyzer	E4446A	3/2/2017	3/2/2019
T2	ANP04382	Cable	LDF-50	6/6/2016	6/6/2018
T3	ANP05569	Cable-Amplitude +15C to +45C (dB)	RG-214/U	12/7/2016	12/7/2018
T4	ANP05283	Attenuator	ATT-0218-06-NNN-02	5/5/2016	5/5/2018
T5	AN01994	Biconilog Antenna	CBL6111C	3/11/2016	3/11/2018

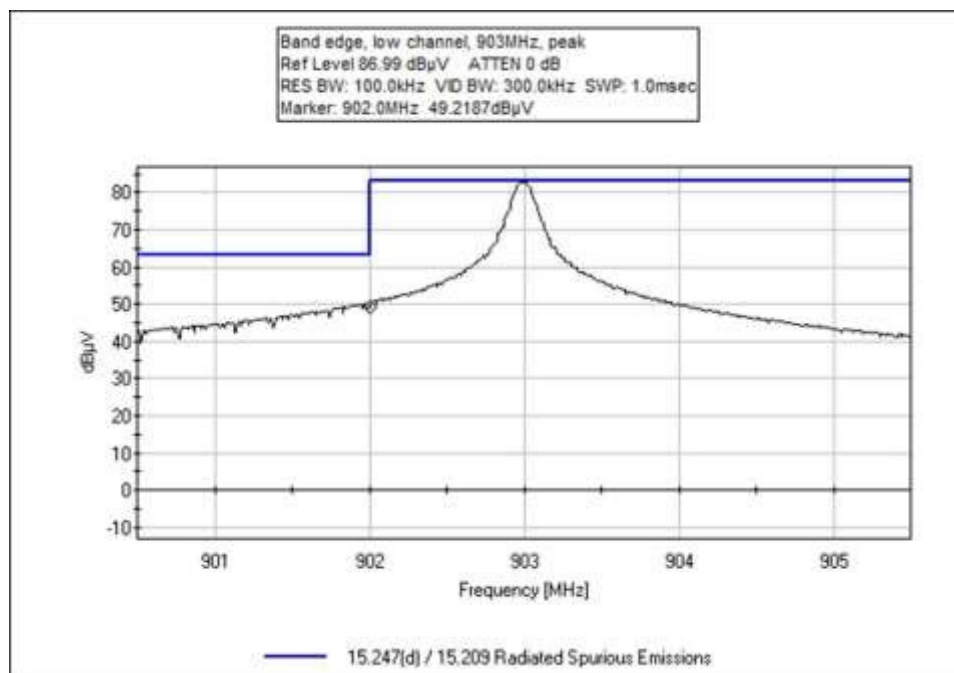
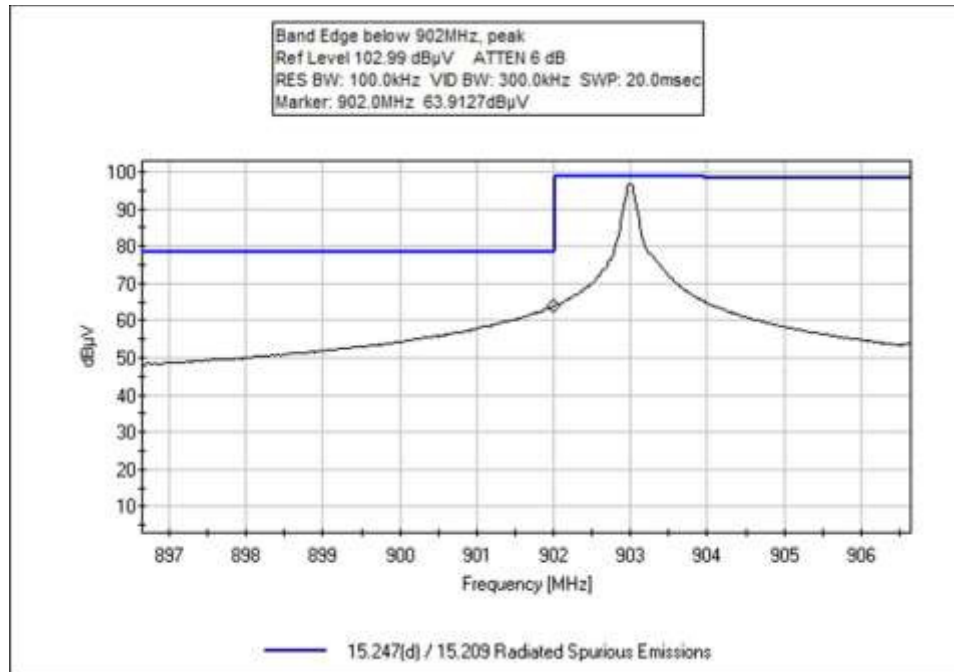
Measurement Data:

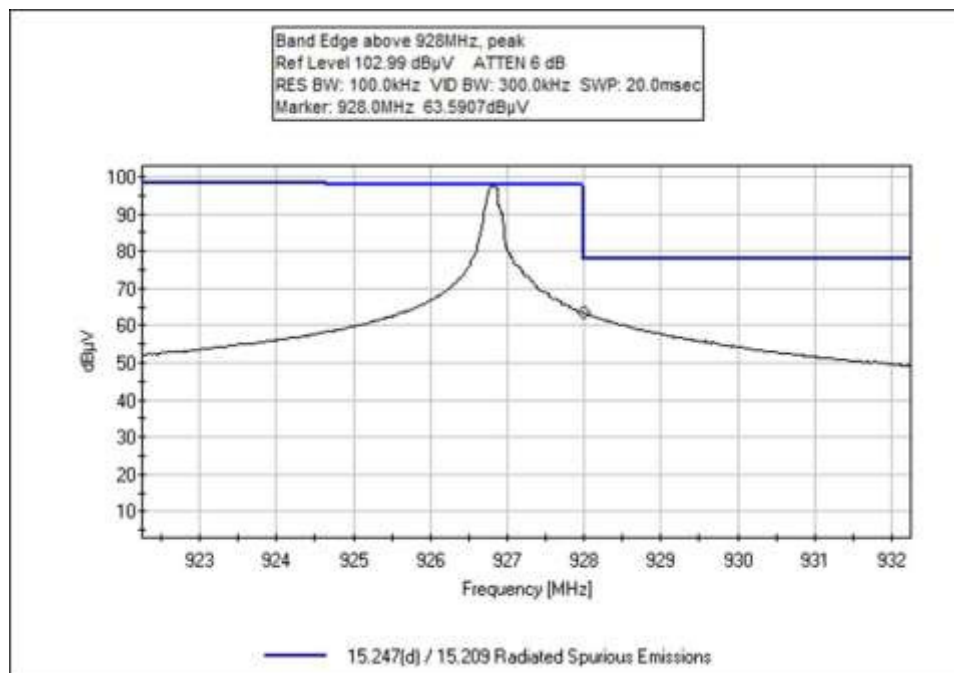
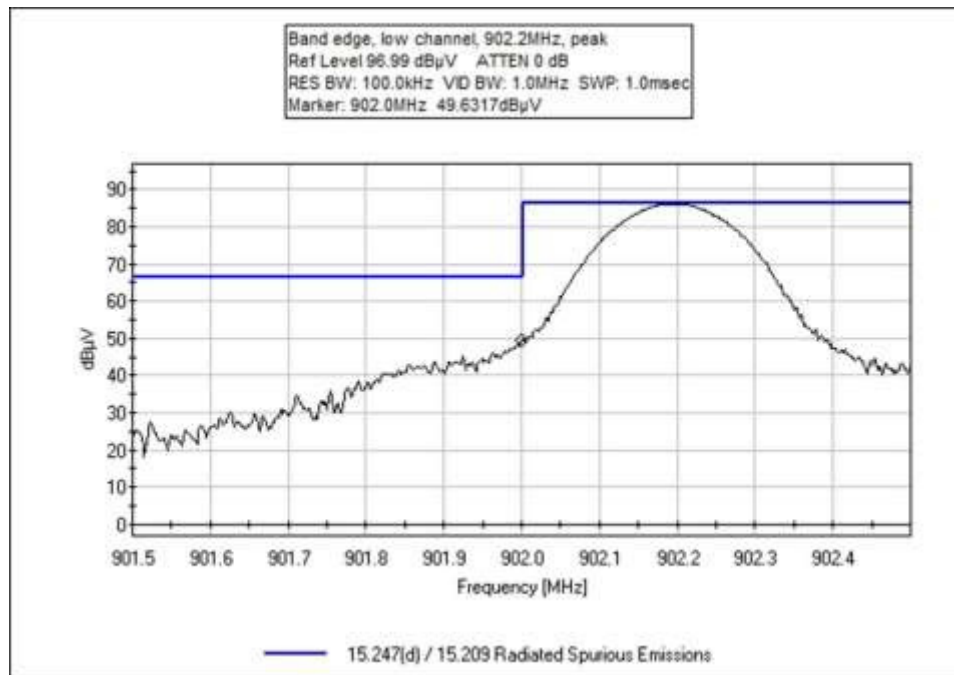
Reading listed by margin.

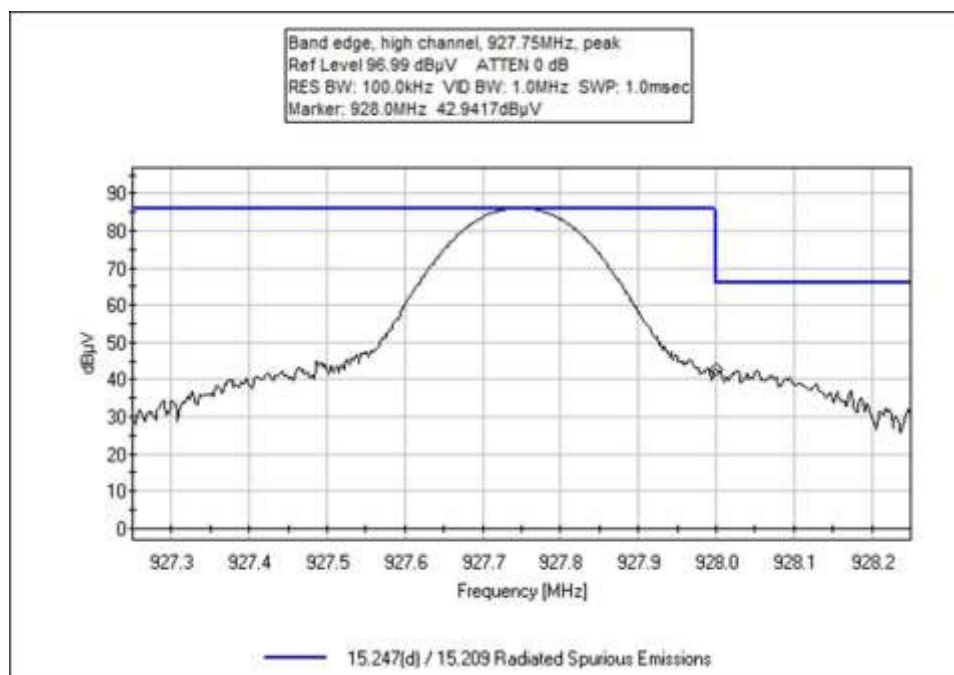
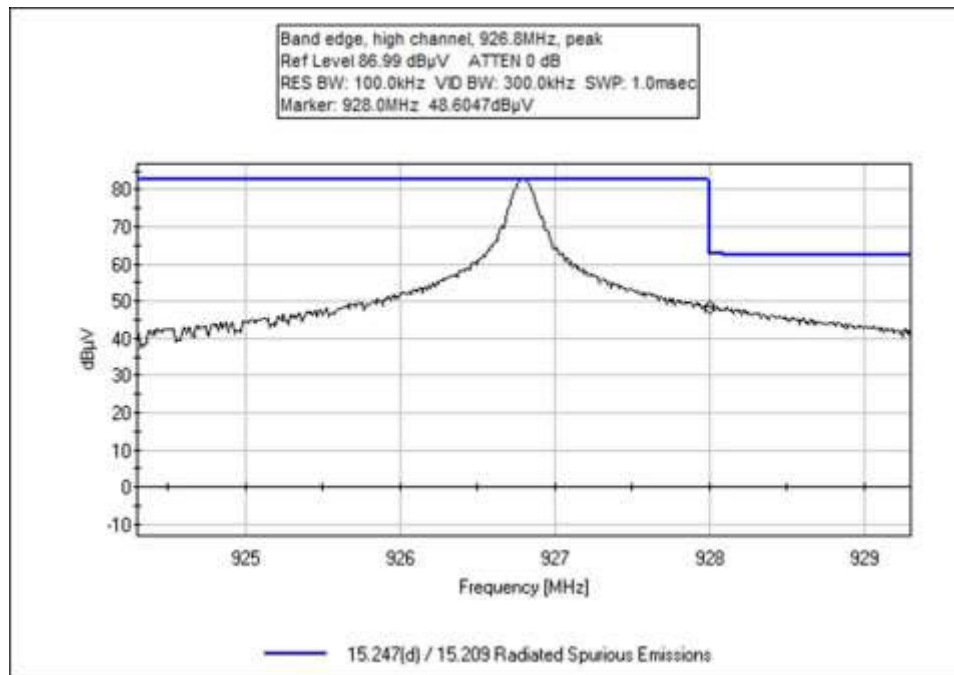
Test Distance: 3 Meters

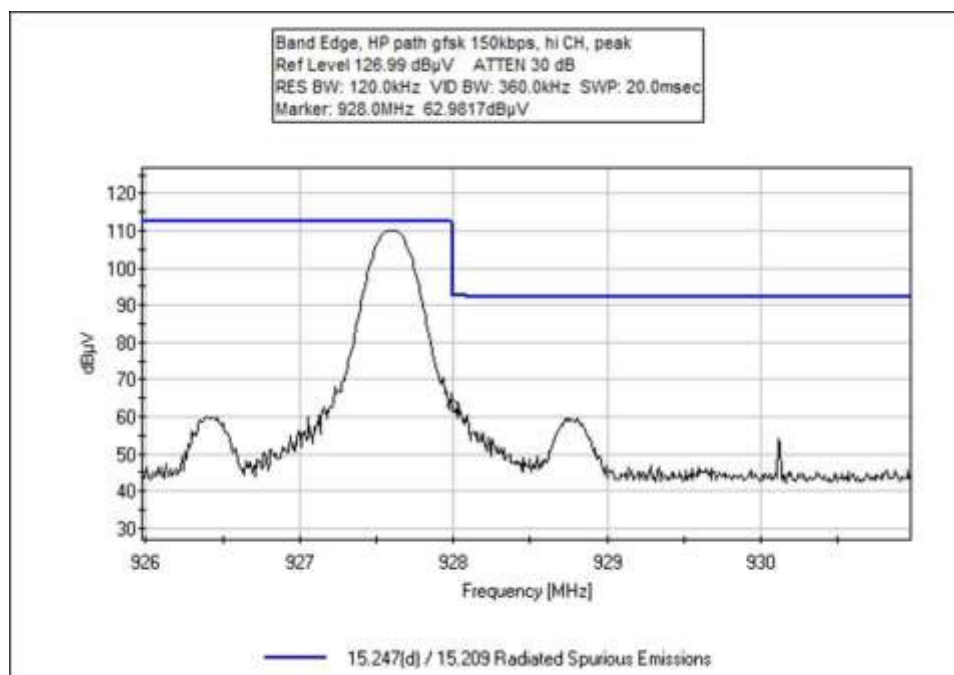
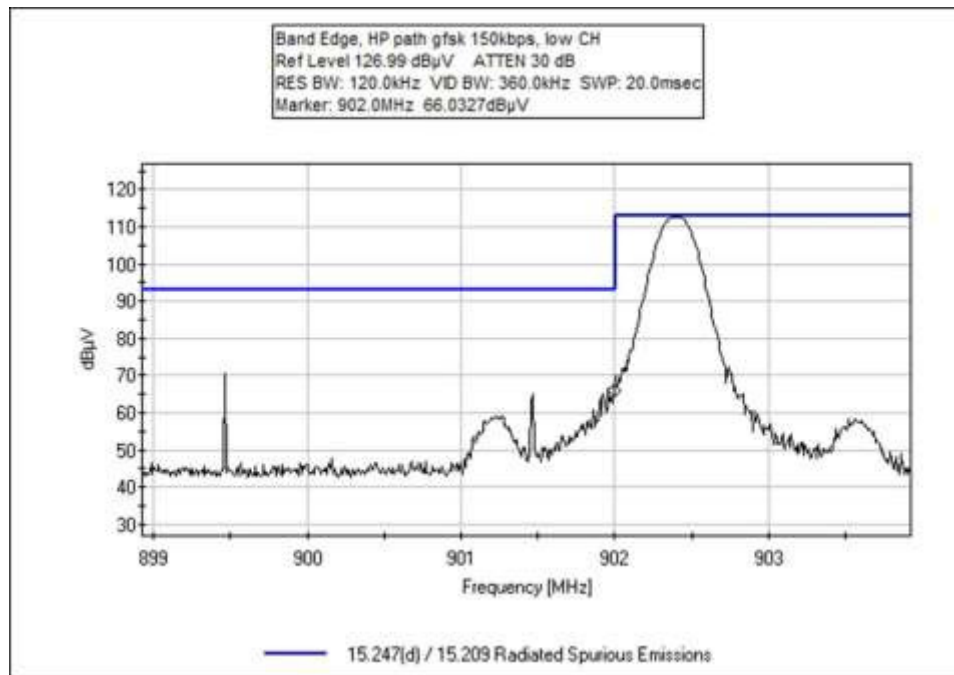
#	Freq MHz	Rdng dBμV	T1 T5 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	960.000M	9.3	+0.0 +24.8	+3.4	+3.6	+5.9	+0.0	47.0	54.0	-7.0	Horiz
2	614.000M	5.0	+0.0 +20.8	+2.7	+2.7	+5.8	+0.0	37.0	46.0	-9.0	Horiz
3	902.000M	50.2	+0.0 +24.1	+3.3	+3.5	+5.9	+0.0	87.0	103.4	-16.4	Horiz
4	928.000M	43.0	+0.0 +24.4	+3.4	+3.6	+5.9	+0.0	80.3	103.4	-23.1	Horiz

Band Edge Plots









Test Setup Photos



Below 1GHz



Below 1GHz



Above 1GHz



Above 1GHz

SUPPLEMENTAL INFORMATION

Measurement Uncertainty

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

Uncertainties reported are worst case for all CKC Laboratories' sites and represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of $k=2$. Compliance is deemed to occur provided measurements are below the specified limits.

Emissions Test Details

TESTING PARAMETERS

Unless otherwise indicated, the following configuration parameters are used for equipment setup: The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. Cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the setup photographs. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables.

The emissions data was taken with a spectrum analyzer or receiver. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the table below. The corrected data was then compared to the applicable emission limits. Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

CORRECTION FACTORS

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in $\text{dB}\mu\text{V}/\text{m}$, the spectrum analyzer reading in $\text{dB}\mu\text{V}$ was corrected by using the following formula. This reading was then compared to the applicable specification limit. Individual measurements were compared with the displayed limit value in the margin column. The margin was calculated based on subtracting the limit value from the corrected measurement value; a positive margin represents a measurement exceeding the limit, while a negative margin represents a measurement less than the limit.

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

TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed were used to collect the emissions data. A spectrum analyzer or receiver was used for all measurements. Unless otherwise specified, the following table shows the measuring equipment bandwidth settings that were used in designated frequency bands. For testing emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used.

MEASURING EQUIPMENT BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	9 kHz	150 kHz	200 Hz
RADIATED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	>1 GHz	1 MHz

SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the emissions tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "positive peak" detector mode. Whenever a "quasi-peak" or "average" reading was recorded, the measurement was annotated with a "QP" or an "Ave" on the appropriate rows of the data sheets. In cases where quasi-peak or average limits were employed and data exists for multiple measurement types for the same frequency then the peak measurement was retained in the report for reference, however the numbering for the affected row was removed and an arrow or caret ("^") was placed in the far left-hand column indicating that the row above takes precedence for comparison to the limit. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

Peak

In this mode, the spectrum analyzer or receiver recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature called "peak hold," the measurement device had the ability to measure intermittent or low duty cycle transient emission peak levels. In this mode the measuring device made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

Quasi-Peak

Quasi-peak measurements were taken using the quasi-peak detector when the true peak values exceeded or were within 2 dB of a quasi-peak specification limit. Additional QP measurements may have been taken at the discretion of the operator.

Average

Average measurements were taken using the average detector when the true peak values exceeded or were within 2 dB of an average specification limit. Additional average measurements may have been taken at the discretion of the operator. If the specification or test procedure requires trace averaging, then the averaging was performed using 100 samples or as required by the specification. All other average measurements are performed using video bandwidth averaging. To make these measurements, the test engineer reduces the video bandwidth on the measuring device until the modulation of the signal is filtered out. At this point the measuring device is set into the linear mode and the scan time is reduced.