Itron, Inc.

TEST REPORT FOR

OpenWay Gas Remote Disconnect
Model: OWGRD

Tested to The Following Standards:

FCC Part 15 Subpart C Section(s)

15.247
(FHSS AND HYBRID 902-928 MHz)

Report No.: 100666-47

Date of issue: December 17, 2018

Test Certificate # 803.02

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 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:

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Liberty Lake WA 99019

Representative: Jay Holcomb
Customer Reference Number: 163774

REPORT PREPARED BY:

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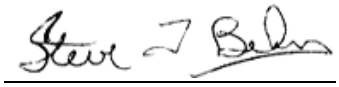
Mariposa, CA 95338

Project Number: 100666

DATE OF EQUIPMENT RECEIPT: November 12, 2018
DATE(S) OF TESTING: November 12-23, 2018

Report Authorization

The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the equipment provided by the client, tested in the agreed upon operational mode(s) and configuration(s) as identified herein. Compliance assessment remains the client's responsibility. This report may not be used to claim product endorsement by A2LA or any government agencies. This test report has been authorized for release under quality control from CKC Laboratories, Inc.



Steve Behm
Director of Quality Assurance & Engineering Services
CKC Laboratories, Inc.

Test Facility Information

Our laboratories are configured to effectively test a wide variety of product types. CKC utilizes first class test equipment, anechoic chambers, data acquisition and information services to create accurate, repeatable and affordable test results.

TEST LOCATION(S):
CKC Laboratories, Inc.
110 Olinda Place
Brea, CA 92823

Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.03.11

Site Registration & Accreditation Information

Location	NIST CB #	TAIWAN	CANADA	FCC	JAPAN
Brea D, CA	US0060	SL2-IN-E-1146R	3082D-2	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
15.247(f)	Average Time of Occupancy	NA	NP
15.247(f)	6dB Bandwidth	NA	Pass
15.247(f)	Power Spectral Density	NA	Pass
15.207	AC Conducted Emissions	NA	NA1

NA = Not Applicable
NA1 = Not applicable because the EUT is battery powered
NP = CKC Laboratories was not contracted to perform test. A statement of conformity will be provided by the manufacturer. See Appendix A for Manufacturer Declaration

ISO/IEC 17025 Decision Rule
The declaration of pass or fail herein is based upon assessment to the specification(s) listed above, including where applicable, assessment of measurement uncertainties. For performance related tests, equipment was monitored for specified criteria identified in that section of testing.

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
OpenWay Gas Remote Disconnect	Itron, Inc.	OWGRD	100666-cond3

Support Equipment:

Device	Manufacturer	Model #	S/N
Laptop	Dell	Latitude E6420	8P954R1
Laptop AC/DC Adapter	Dell	DA130PE1-00	CN-0JU012-48661-080-753M-A04
USB to serial adapter card	Segger	J-Link	NA

Configuration 2

Equipment Tested:

Device	Manufacturer	Model #	S/N
OpenWay Gas Remote Disconnect	Itron, Inc.	OWGRD	100666-rad3

Support Equipment:

Device	Manufacturer	Model #	S/N
Laptop	Dell	Latitude E6420	8P954R1
Laptop AC/DC Adapter	Dell	DA130PE1-00	CN-0JU012-48661-080-753M-A04
USB to serial adapter card	Segger	J-Link	NA

General Product Information:

Product Information	Manufacturer-Provided Details
Equipment Type:	Stand-Alone Equipment
Type of Wideband System:	Proprietary FHSS
Operating Frequency Range:	902.3MHz to 926.9MHz (100kbps FSK) 902.4MHz to 927.6MHz (300kbps GSFK) 902.4MHz to 927.6MHz (300kbps Hybrid)
Number of Hopping Channels:	83 (100kbps) 64 (300kbps) 64 (300kbps hybrid)
Modulation Type(s):	FSK GFSK Hybrid
Maximum Duty Cycle:	100%
Number of TX Chains:	1
Antenna Type(s) and Gain:	Integral / 0.6 dBi (Vert pipe) Integral / 1.7 dBi (Horiz pipe)
Beamforming Type:	NA
Antenna Connection Type:	Integral (External connector provided to facilitate testing)
Nominal Input Voltage:	6.0Vdc
Firmware / Software used for Test:	4.1.6.0 / Command Line Interface (CLI) Tool 2.0.0.11

FCC Part 15 Subpart C

15.247(a) Transmitter Characteristics

Test Setup/Conditions			
Test Location:	Brea Lab D	Test Engineer:	S. Yamamoto
Test Method:	ANSI C63.10 (2013)	Test Date(s):	11/12/2018
Configuration:	1		
Test Setup:	The equipment under test (EUT) is placed on the table top. The EUT serial port is connected to a support laptop via serial to USB adapter. The laptop is running software Command Line Interface Tool to command the EUT to transmit and on specific frequencies. The EUT is powered from fresh batteries providing nominal voltage to the EUT. Frequency of measurement: 902 MHz to 928MHz. RBW=3kHz/10kHz/100kHz, VBW=10kHz/30kHz/100kHz		

Environmental Conditions			
Temperature (ºC)	22	Relative Humidity (%):	36

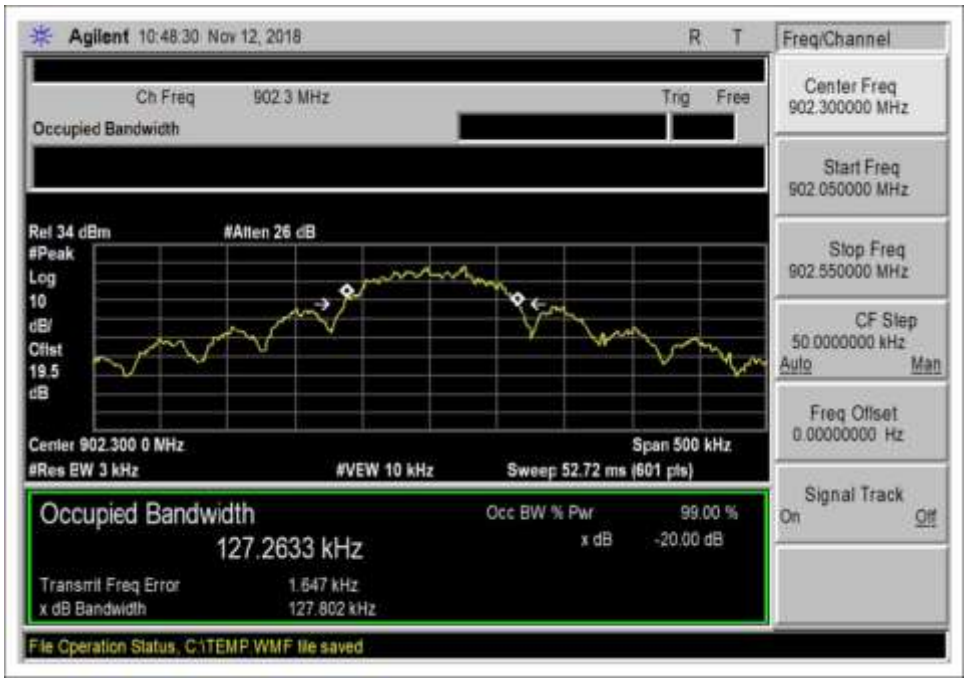
Test Equipment					
Asset#	**Description**	**Manufacturer**	**Model**	**Cal Date**	**Cal Due**
02869	Spectrum Analyzer	Agilent	E4440A	8/10/2018	8/10/2019
03431	Attenuator	Aeroflex/Weinschel	89-20-21	12/19/2017	12/19/2019
P07247	Cable	H&S	32022-29094K-29094K-24TC	7/5/2018	7/5/2020

15.247(a)(1) 20 dB Bandwidth

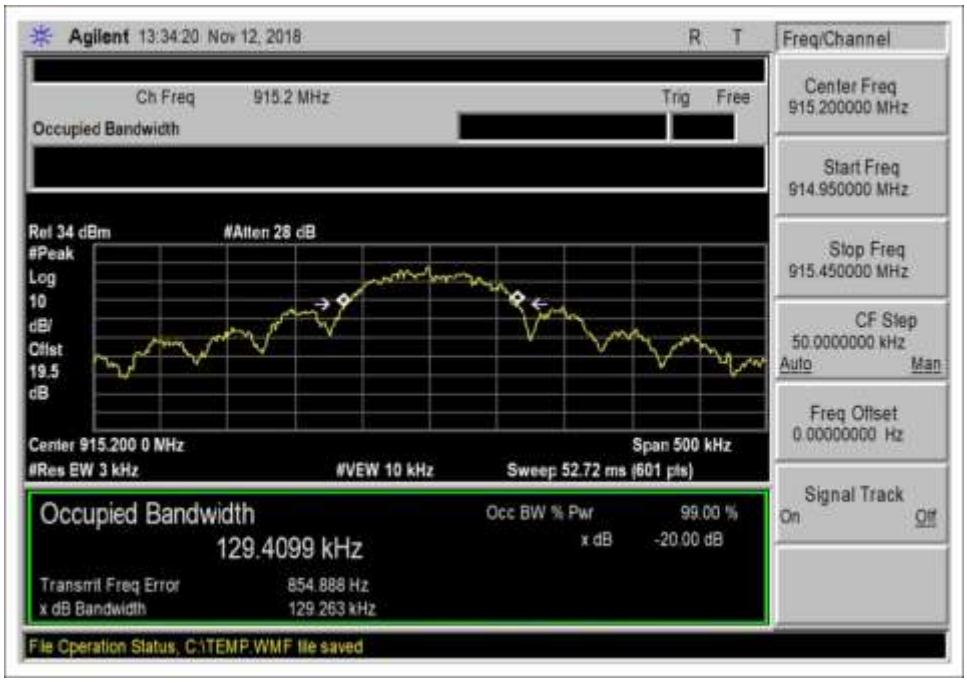
Test Data Summary					
Frequency (MHz)	**Antenna Port**	**Modulation**	**Measured (kHz)**	**Limit (kHz)**	**Results**
902.3	Vert pipe	100kbps FSK	127.8	≤500	Pass
915.2	Vert pipe	100kbps FSK	127.7	≤500	Pass
926.9	Vert pipe	100kbps FSK	127.7	≤500	Pass
902.4	Vert pipe	300kbps GFSK	365.5	≤500	Pass
915.2	Vert pipe	300kbps GFSK	365.0	≤500	Pass
927.6	Vert pipe	300kbps GFSK	366.5	≤500	Pass
902.4	Vert pipe	300kbps Hybrid	365.3	≤500	Pass
915.2	Vert pipe	300kbps Hybrid	365.0	≤500	Pass
927.6	Vert pipe	300kbps Hybrid	365.3	≤500	Pass
902.3	Horiz pipe	100kbps FSK	129.7	≤500	Pass
915.2	Horiz pipe	100kbps FSK	129.3	≤500	Pass
926.9	Horiz pipe	100kbps FSK	129.1	≤500	Pass
902.4	Horiz pipe	300kbps GFSK	369.1	≤500	Pass
915.2	Horiz pipe	300kbps GFSK	368.0	≤500	Pass
927.6	Horiz pipe	300kbps GFSK	369.6	≤500	Pass
902.4	Horiz pipe	300kbps Hybrid	368.2	≤500	Pass
915.2	Horiz pipe	300kbps Hybrid	366.2	≤500	Pass
927.6	Horiz pipe	300kbps Hybrid	369.8	≤500	Pass

Plots

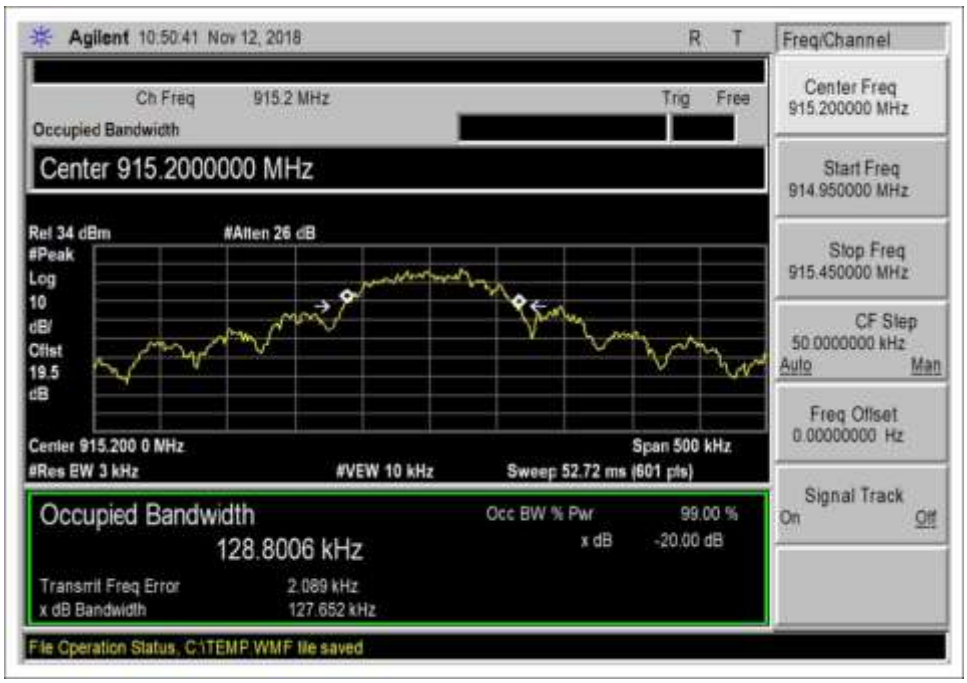
100kbps, Low Channel, Horizontal Pipe



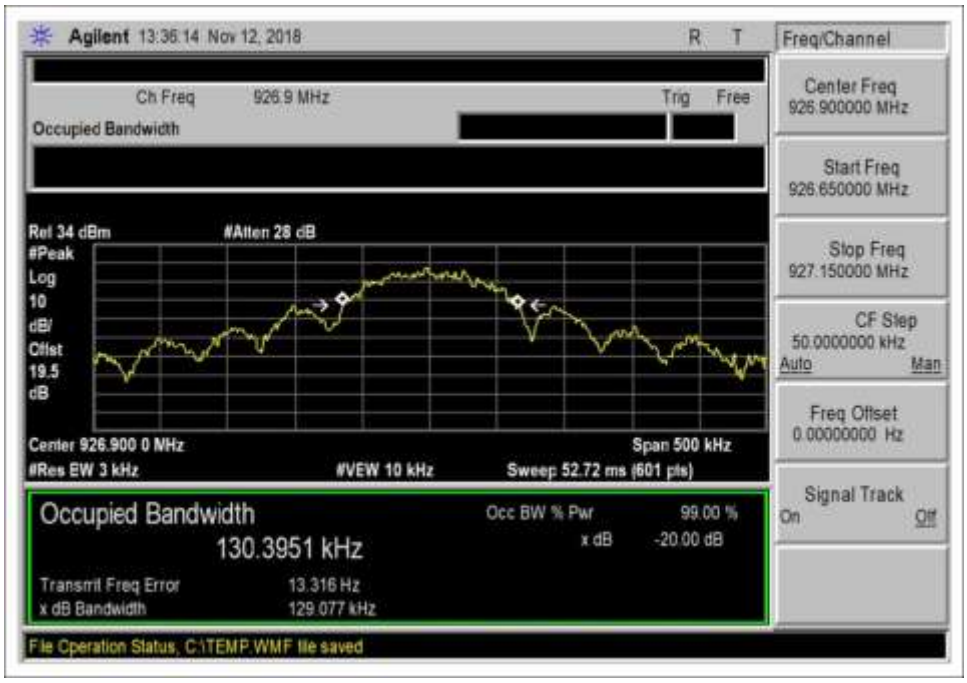
100kbps, Low Channel, Vertical Pipe



100kbps, Middle Channel, Horizontal Pipe

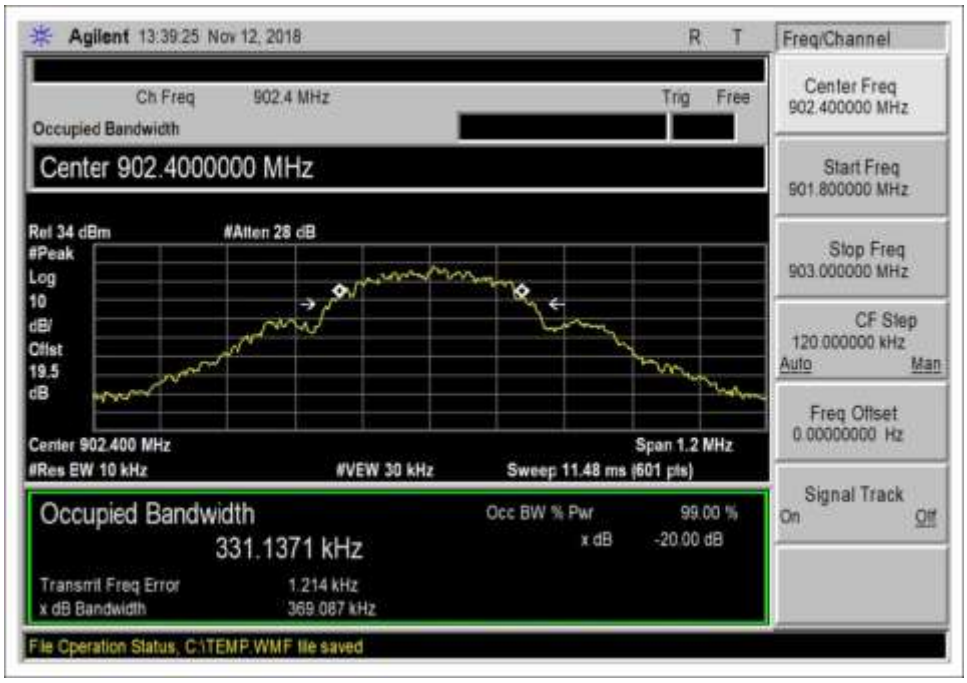


100kbps, Middle Channel, Vertical Pipe

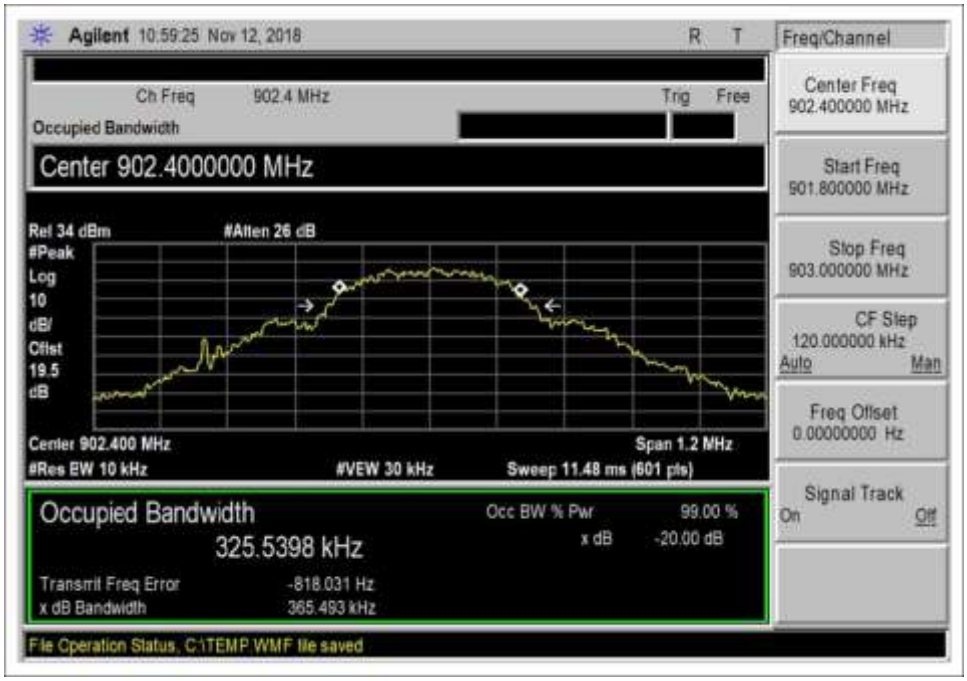


100kbps, High Channel, Horizontal Pipe

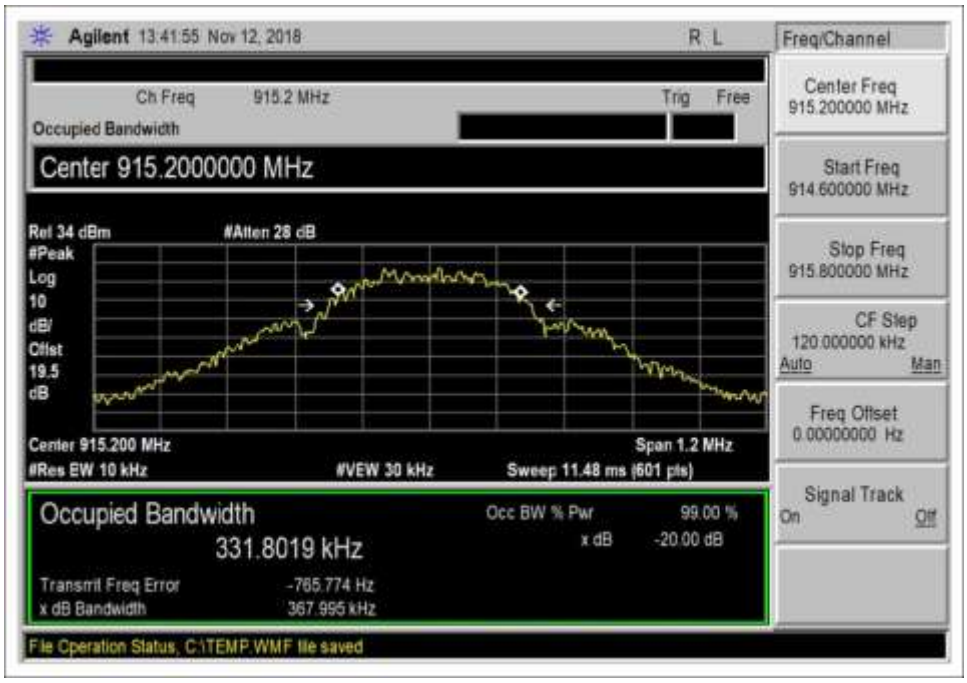
100kbps, High Channel, Vertical Pipe



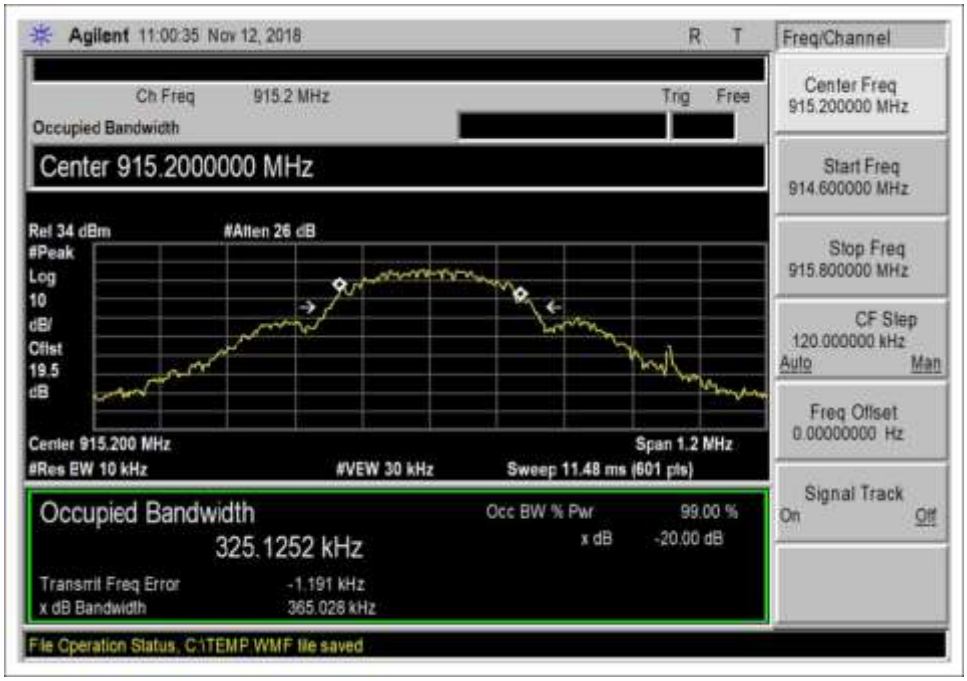
300kbps, Low Channel, Horizontal Pipe



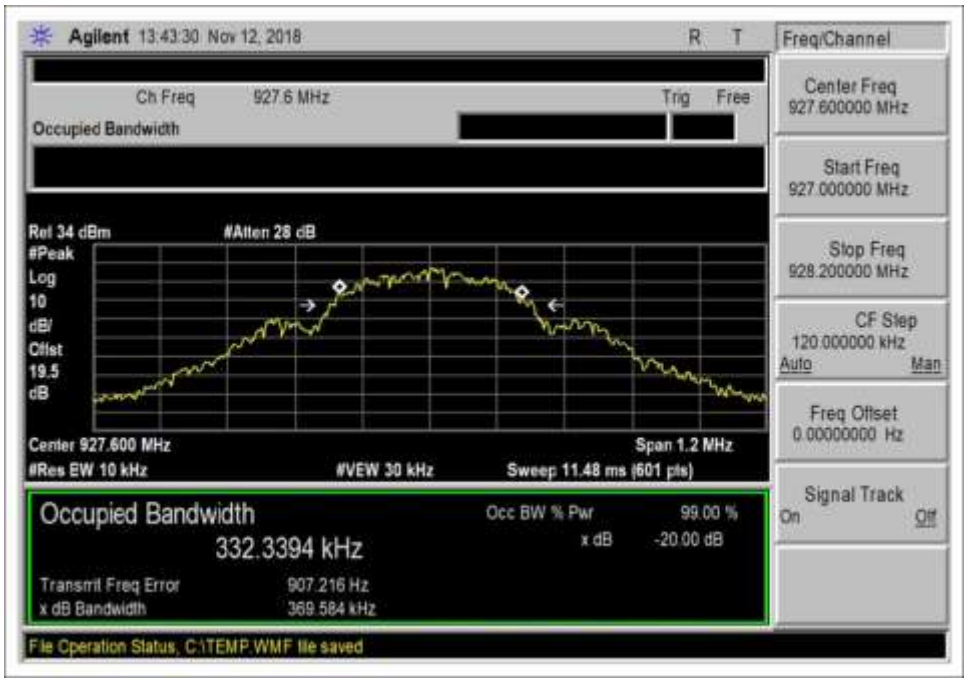
300kbps, Low Channel, Vertical Pipe



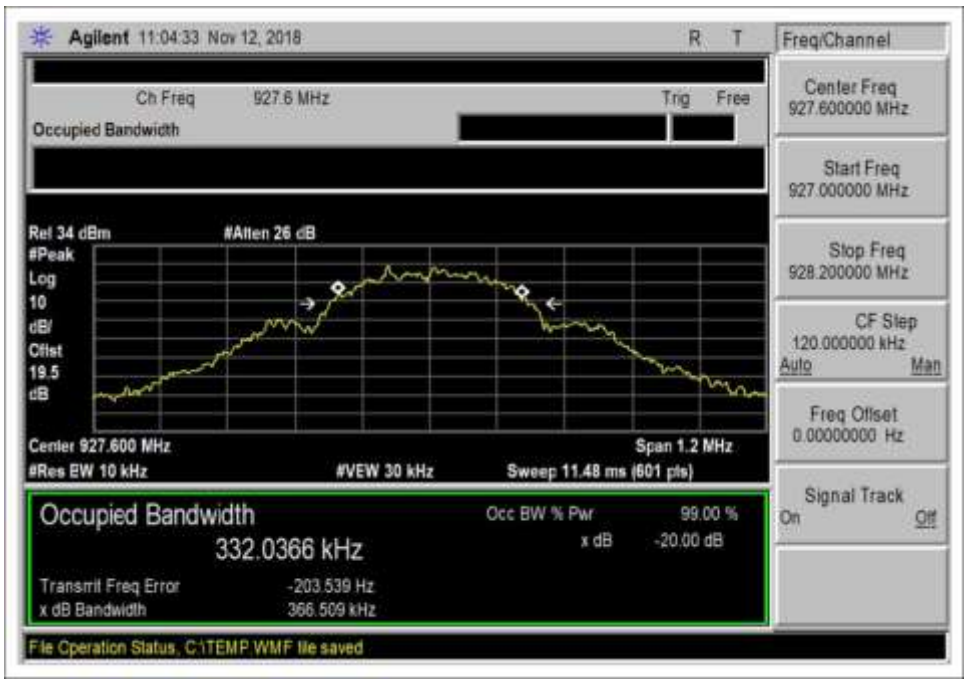
300kbps, Middle Channel, Horizontal Pipe



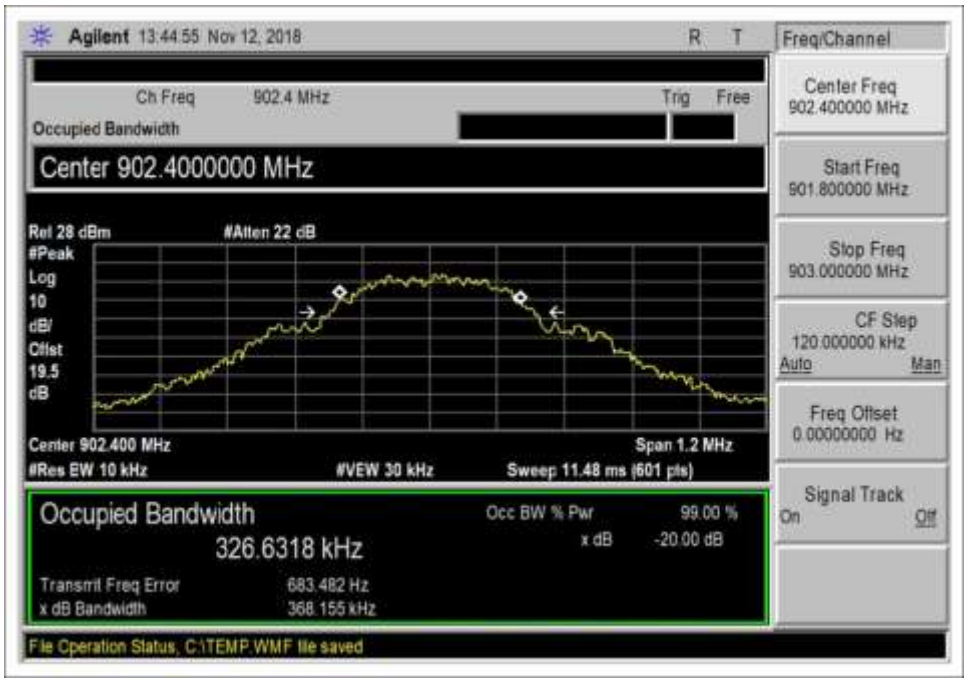
300kbps, Middle Channel, Vertical Pipe



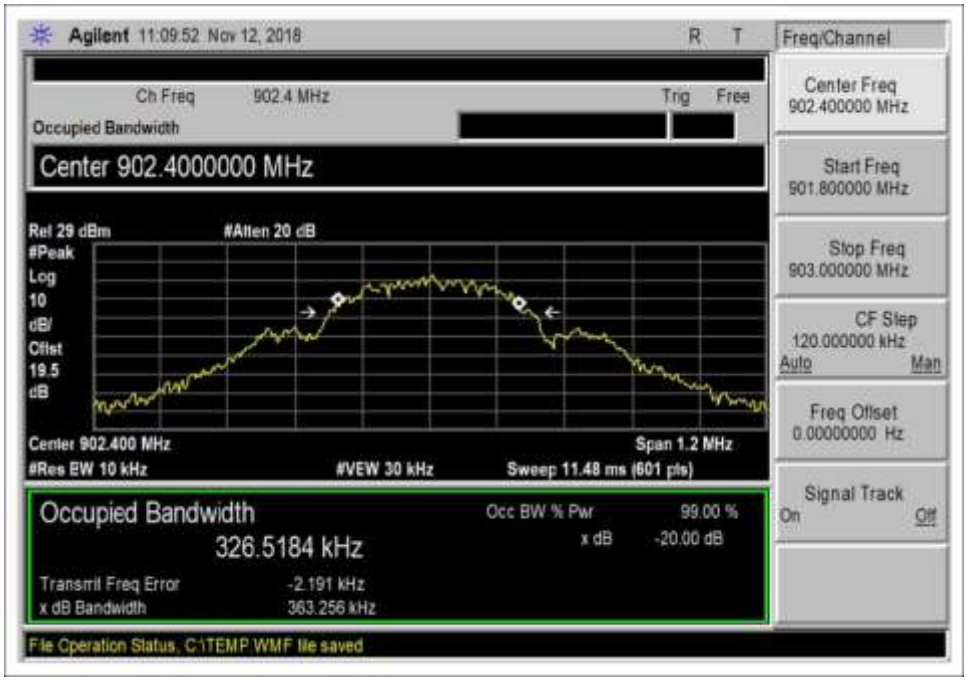
300kbps, High Channel, Horizontal Pipe



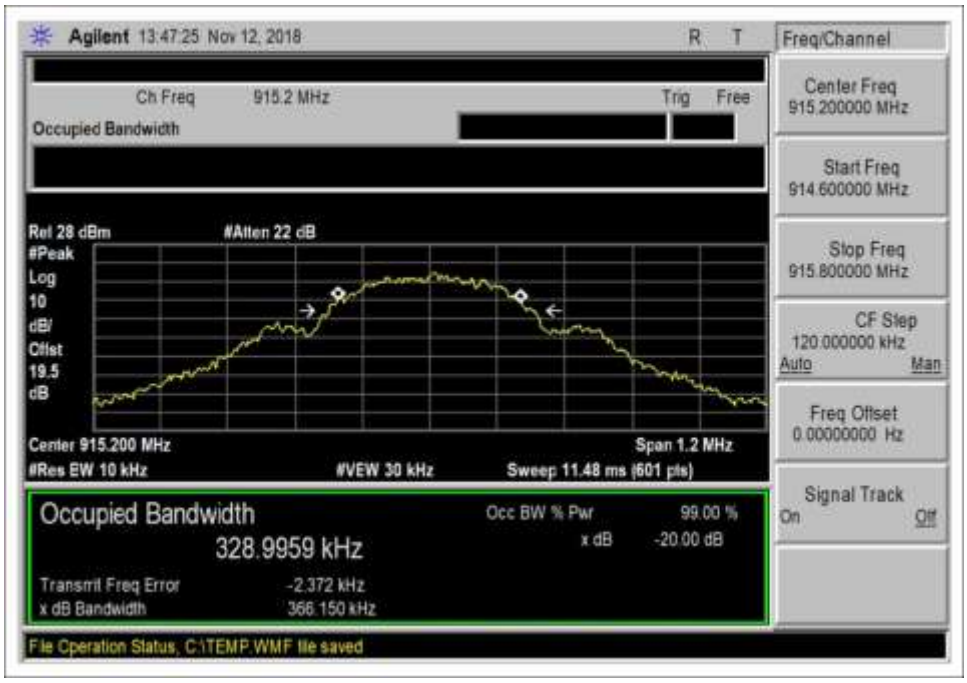
300kbps, High Channel, Vertical Pipe



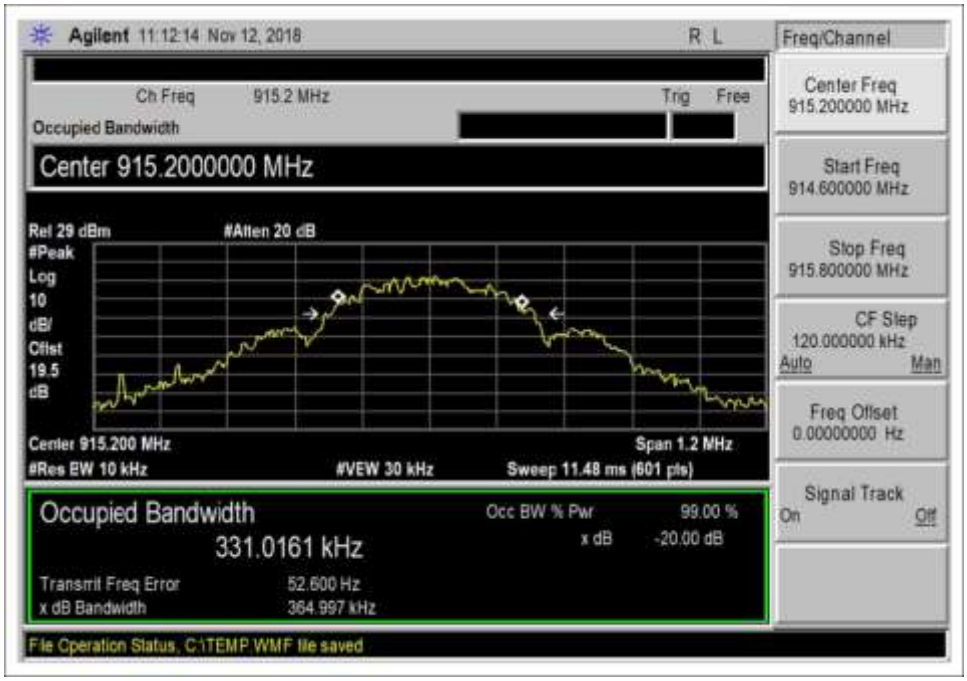
Hybrid, 300kbps, Low Channel, Horizontal Pipe



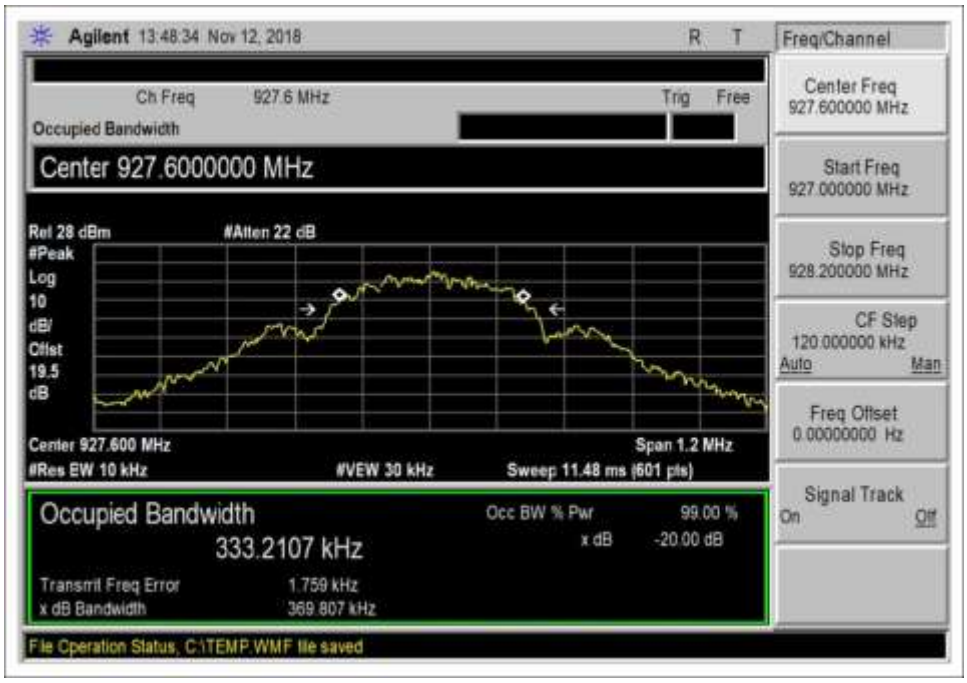
Hybrid, 300kbps, Low Channel, Vertical Pipe



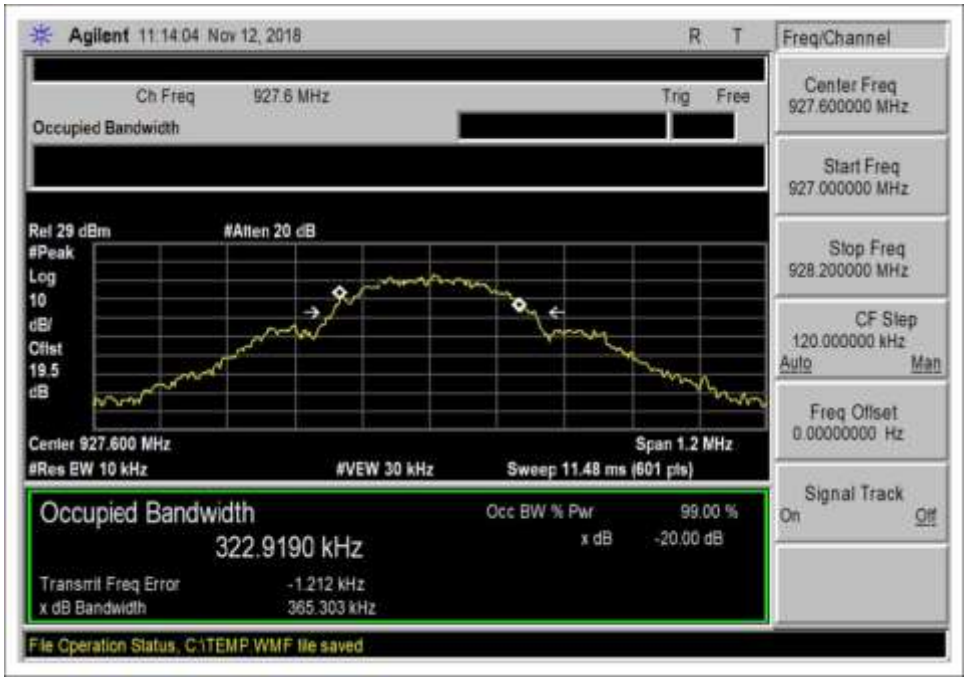
Hybrid, 300kbps, Middle Channel, Horizontal Pipe



Hybrid, 300kbps, Middle Channel, Vertical Pipe



Hybrid, 300kbps, High Channel, Horizontal Pipe

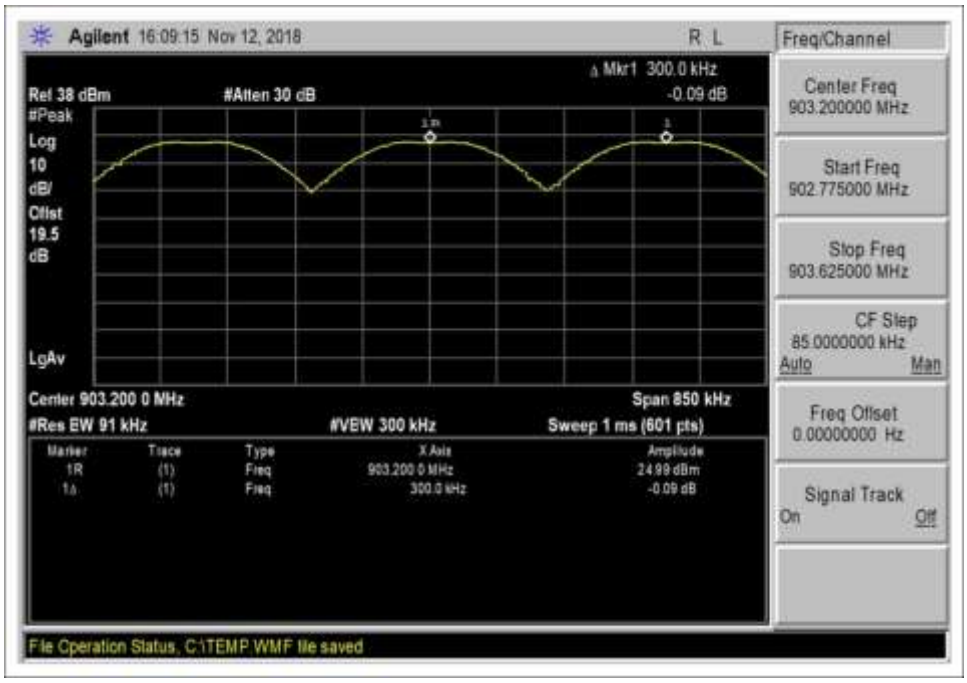


Hybrid, 300kbps, High Channel, Vertical Pipe

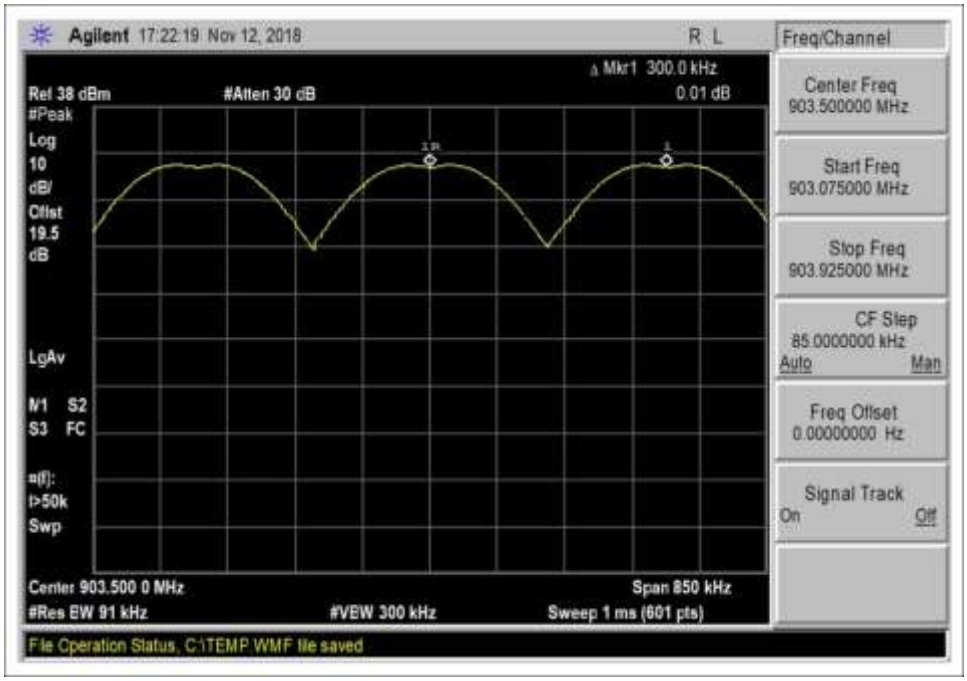
15.247(a)(1) Carrier Separation

Test Data Summary				
Limit applied: 20dB bandwidth of the hopping channel.				
Antenna Port	**Operational Mode**	**Measured (kHz)**	**Limit (kHz)**	**Results**
Vert pipe	100kbps FSK	300	>127.8	Pass
Vert pipe	300kbps GFSK	400	>366.5	Pass
Vert pipe	300kbps Hybrid	400	>365.3	Pass
Horiz pipe	100kbps FSK	300	>129.7	Pass
Horiz pipe	300kbps GFSK	400	>369.6	Pass
Horiz pipe	300kbps Hybrid	400	>369.8	Pass

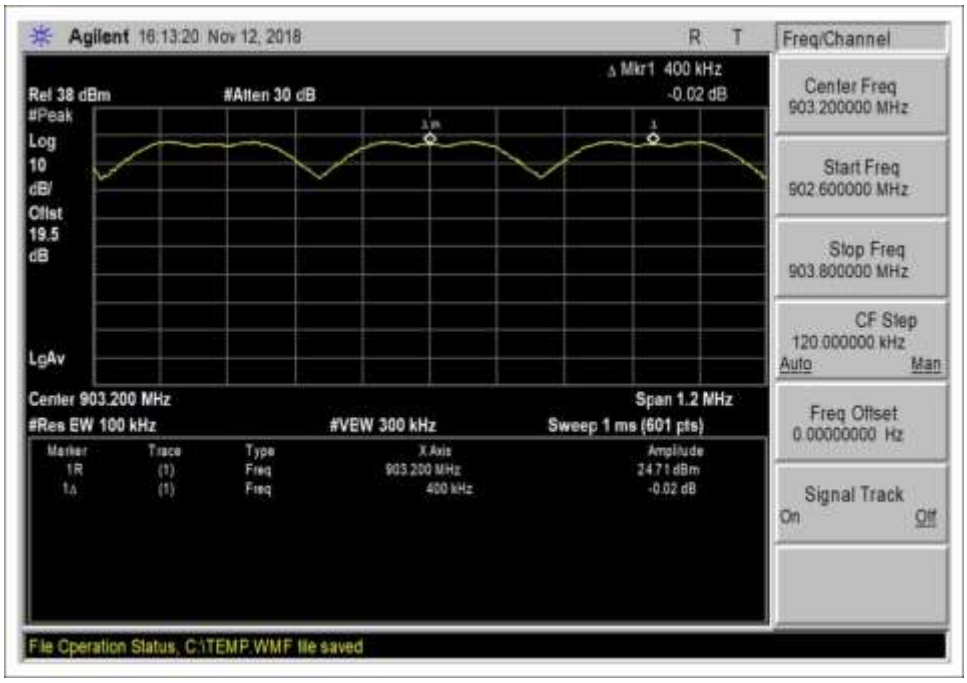
Plots



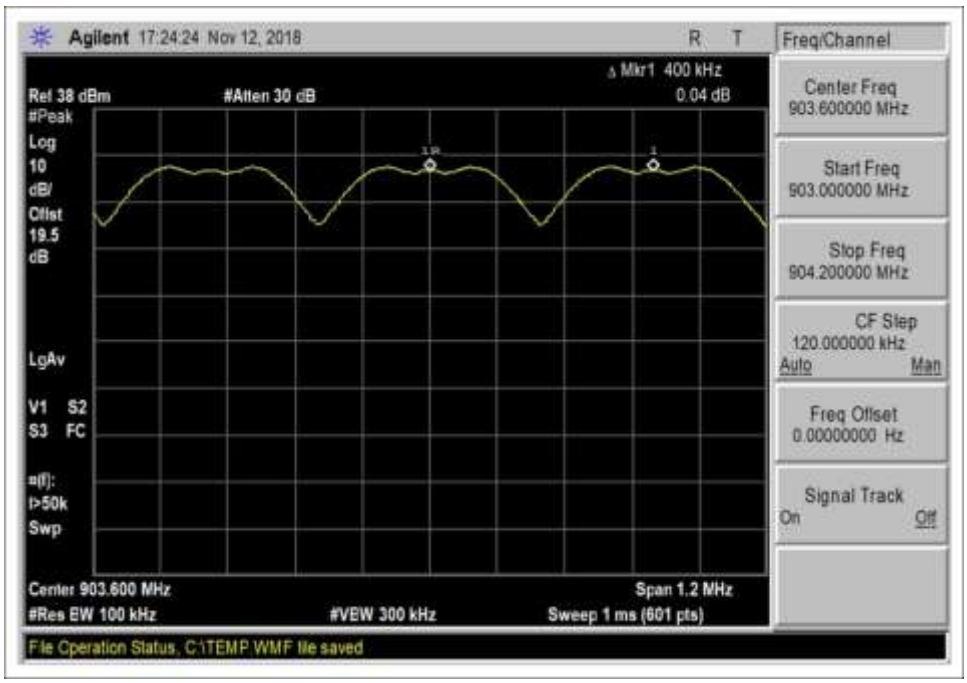
100kbps, Horizontal Pipe



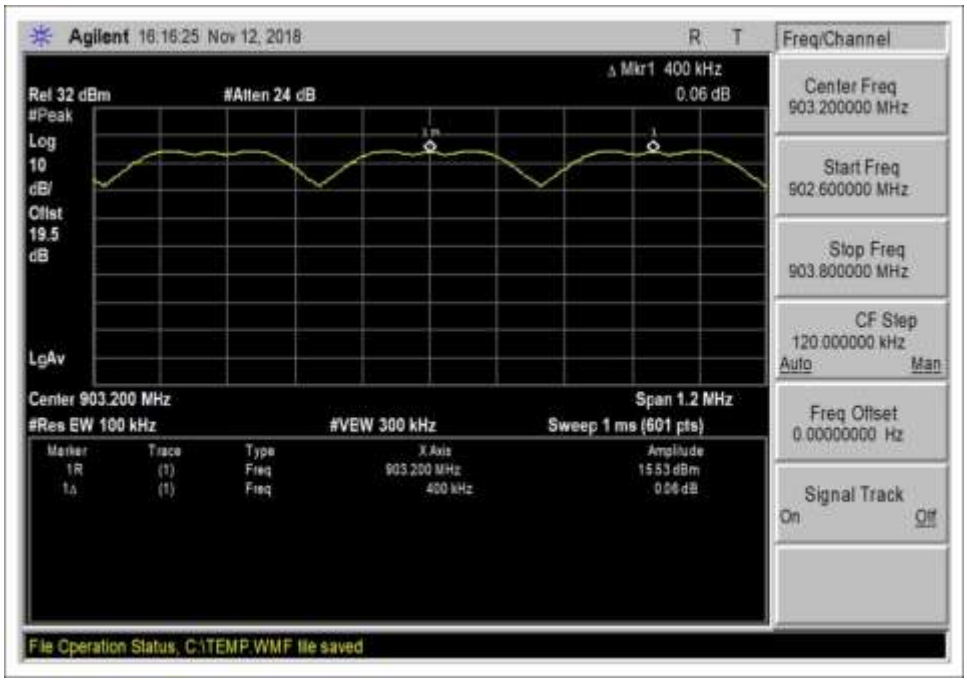
100kbps, Vertical Pipe



300kbps, Horizontal Pipe



300kbps, Vertical Pipe



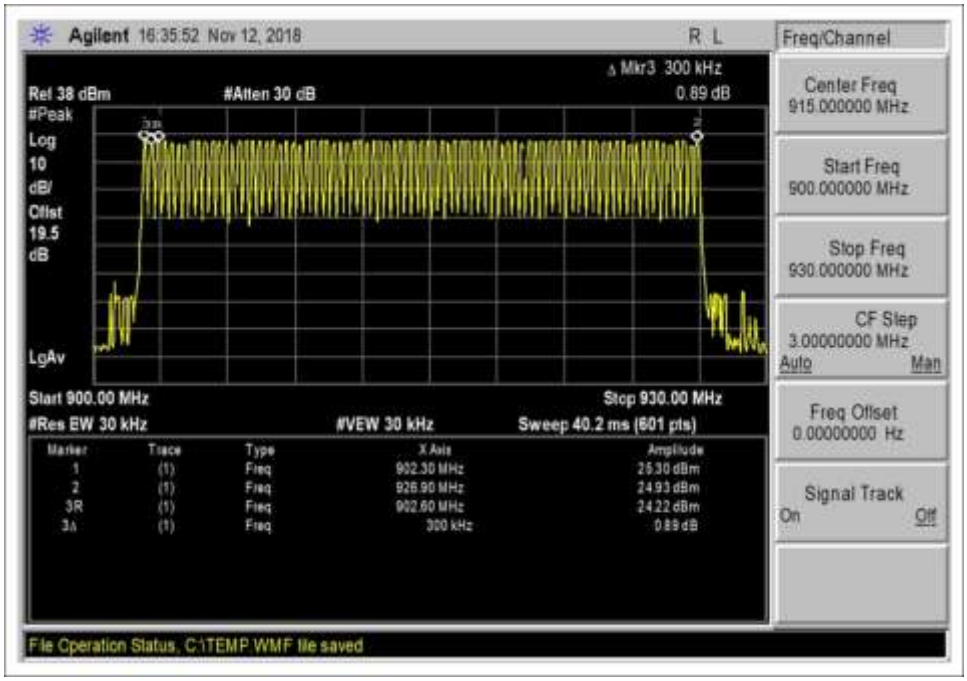
Hybrid, 300kbps, Horizontal Pipe

Hybrid, 300kbps, Vertical Pipe

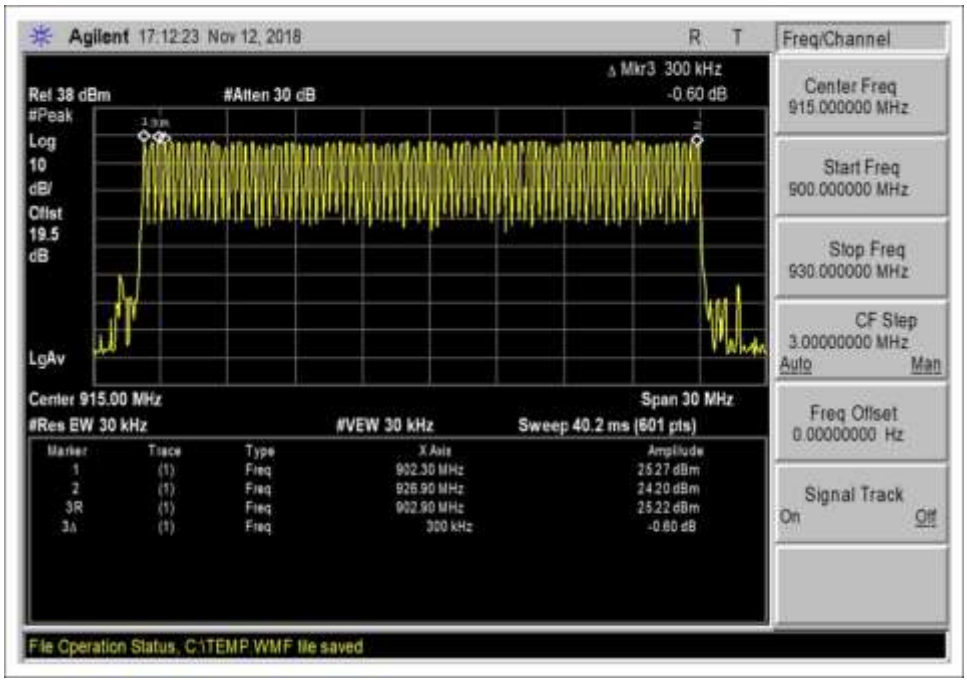
15.247(a)(1)(iii) Number of Hopping Channels

Test Data Summary				
$Limit = \begin{cases} 50\ Channels \mid 20\ dB\ BW < 250kHz \\ 25\ Channels \mid 20\ dB\ BW \geq 250kHz \end{cases}$				
Antenna Port	**Operational Mode**	**Measured (Channels)**	**Limit (Channels)**	**Results**
Vert pipe	100kbps FSK	83	≥50	Pass
Vert pipe	300kbps GFSK	64	≥25	Pass
Vert pipe	300kbps Hybrid	64	≥25	Pass
Horiz pipe	100kbps FSK	83	≥50	Pass
Horiz pipe	300kbps GFSK	64	≥25	Pass
Horiz pipe	300kbps Hybrid	64	≥25	Pass

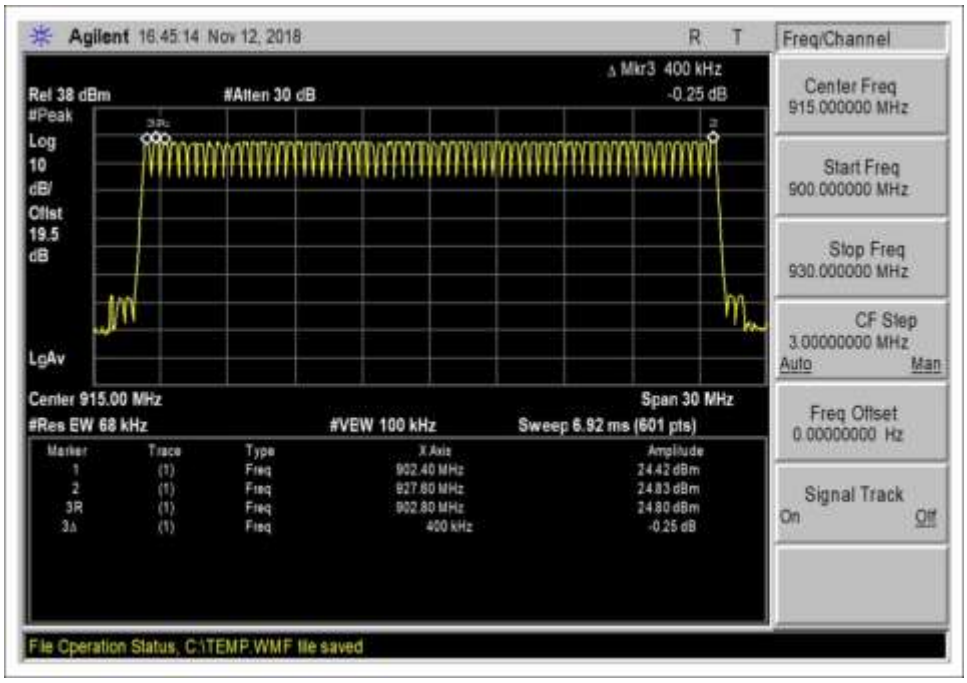
Plots



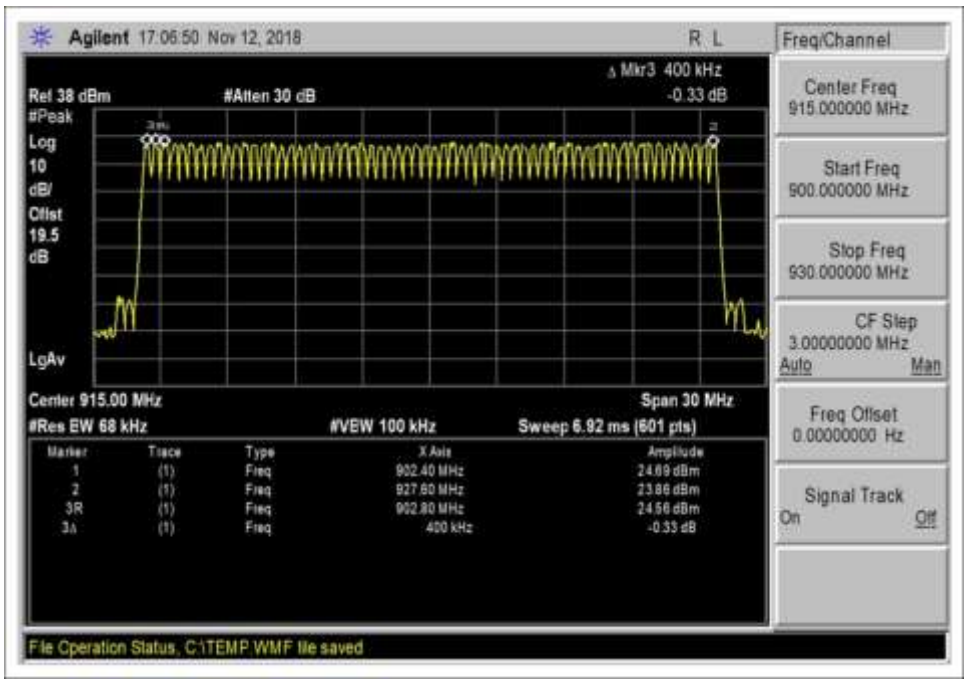
100kbps, Horizontal Pipe



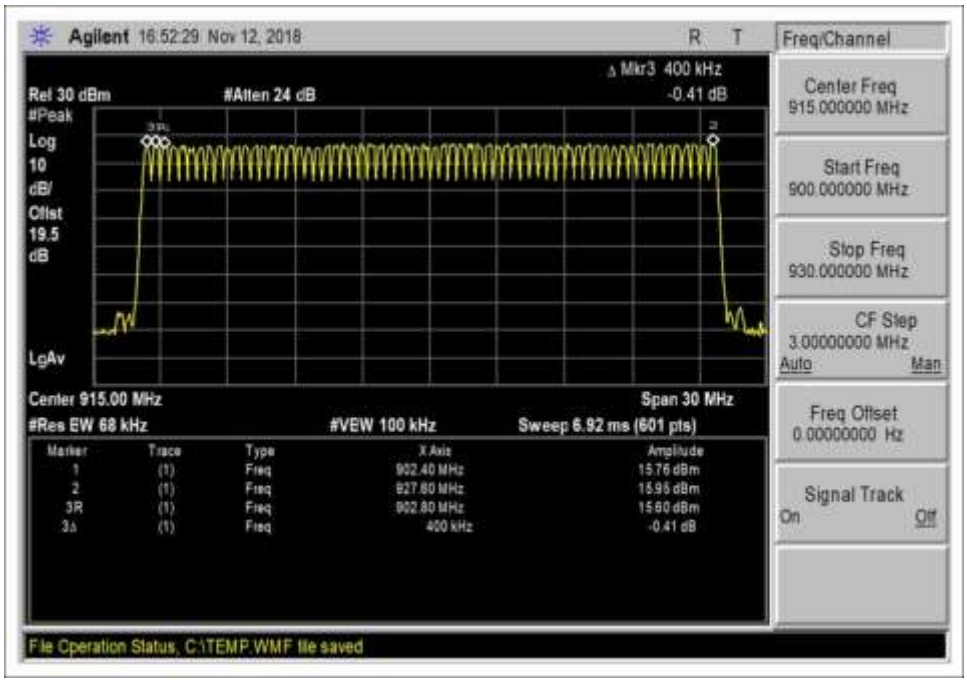
100kbps, Vertical Pipe



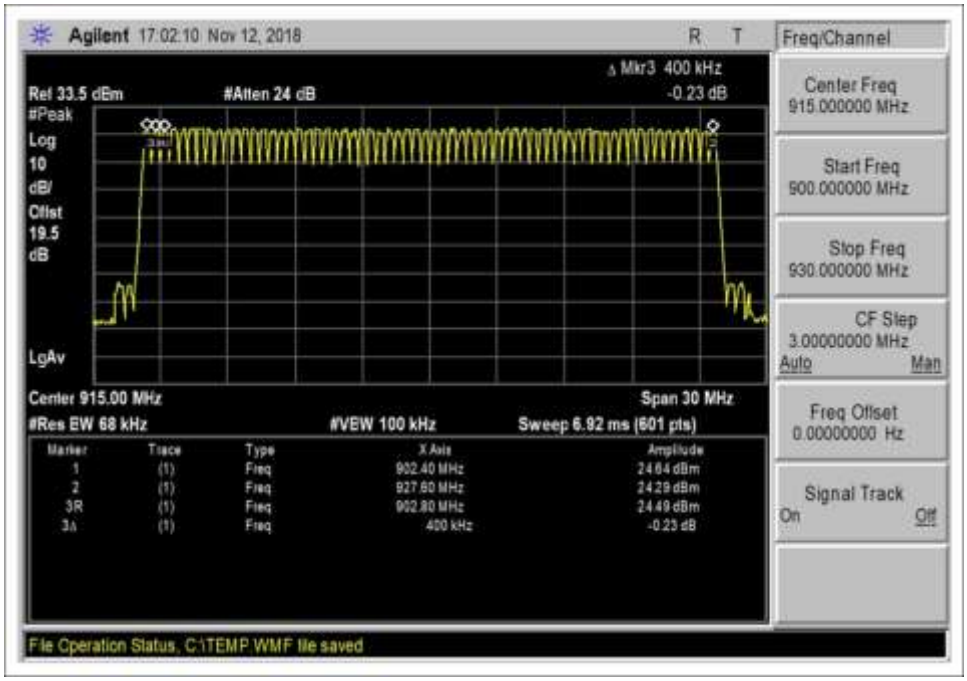
300kbps, Horizontal Pipe



300kbps, Vertical Pipe

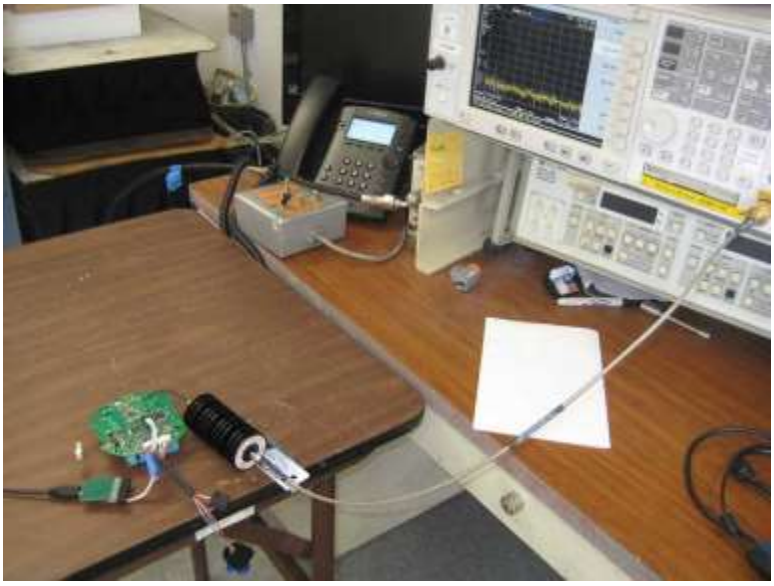


Hybrid, 300kbps, Horizontal Pipe



Hybrid, 300kbps, Vertical Pipe

Test Setup Photo



15.247(b)(1) Output Power

Test Setup/Conditions			
Test Location:	Brea Lab D	Test Engineer:	S. Yamamoto
Test Method:	ANSI C63.10 (2013)	Test Date(s):	11/12/2018
Configuration:	1		
Test Setup:	The equipment under test (EUT) is placed on the table top. The EUT serial port is connected to a support laptop via serial to USB adapter. The laptop is running software Command Line Interface Tool to command the EUT to transmit and on specific frequencies. The EUT is powered from fresh batteries supplying the nominal voltage to the EUT. Frequency of measurement: 902 MHz to 928MHz. RBW=120kHz/430kHz, VBW=300kHz/1MHz		

Environmental Conditions			
Temperature (ºC)	22	Relative Humidity (%):	36

Test Equipment					
Asset#	**Description**	**Manufacturer**	**Model**	**Cal Date**	**Cal Due**
02869	Spectrum Analyzer	Agilent	E4440A	8/10/2018	8/10/2019
03431	Attenuator	Aeroflex/Weinschel	89-20-21	12/19/2017	12/19/2019
P07247	Cable	H&S	32022-29094K-29094K-24TC	7/5/2018	7/5/2020

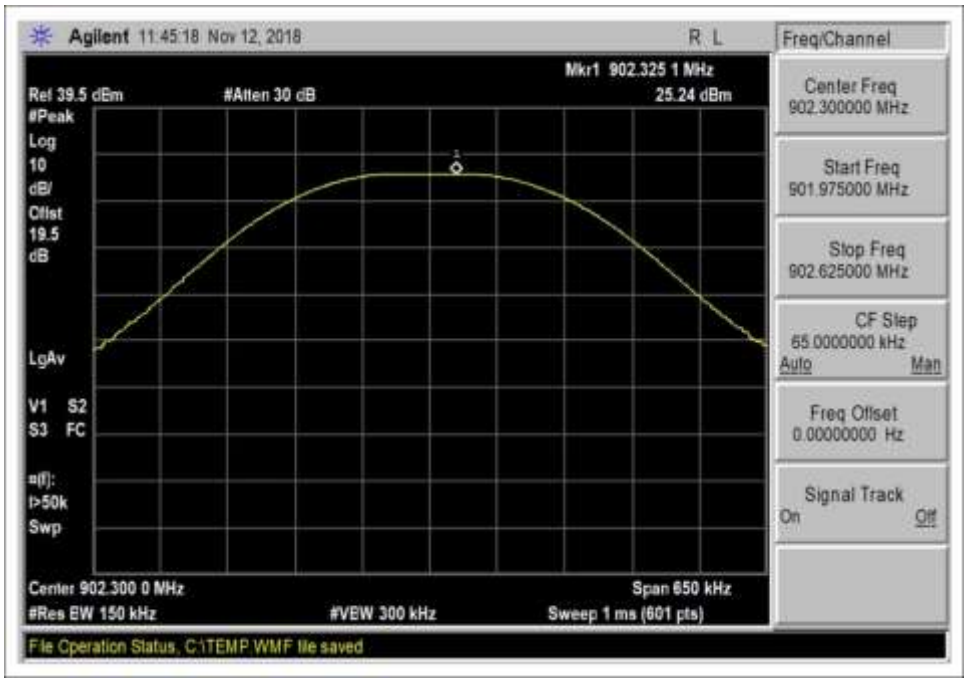
Test Data Summary - Voltage Variations

This equipment is battery powered and manufacturer declares the equipment cannot operate while charging.
Power output tests were performed using a fresh battery.

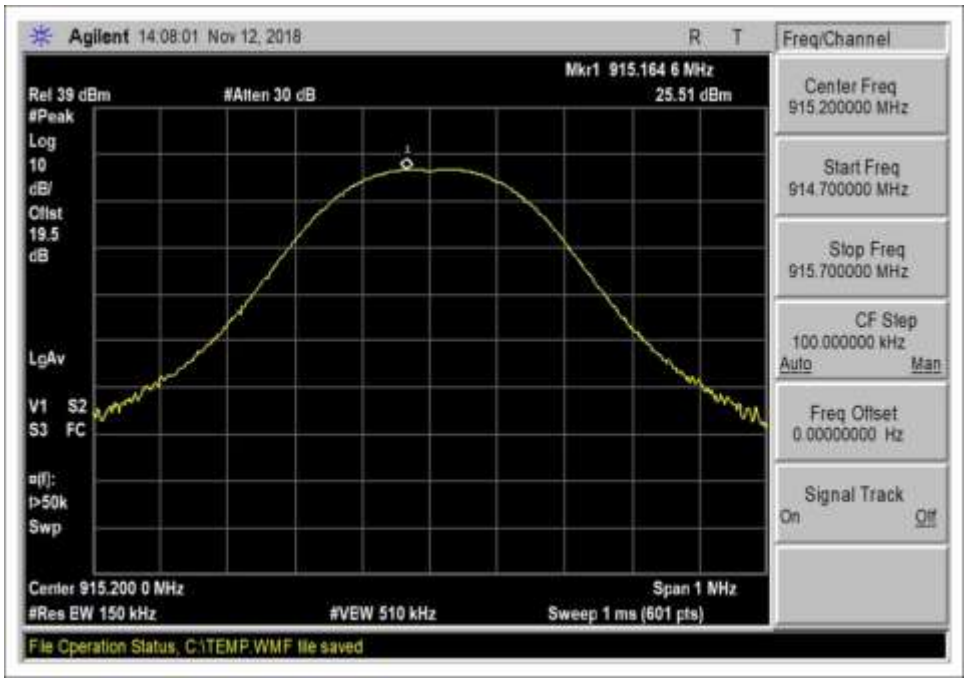
Test Data Summary - RF Conducted Measurement					
$Limit = \begin{cases} 30dBm\ Conducted/36dBm\ EIRP \mid \geq 50\ Channels \\ 24dBm\ Conducted/30dBm\ EIRP \mid < 50\ Channels\ (\min 25) \end{cases}$					
Frequency (MHz)	**Modulation**	**Ant. Type / Gain (dBi)**	**Measured (dBm)**	**Limit (dBm)**	**Results**
902.3	100kbps FSK	Integral / 0.6	25.2	≤30	Pass
915.2	100kbps FSK	Integral / 0.6	25.4	≤30	Pass
926.9	100kbps FSK	Integral / 0.6	25.4	≤30	Pass
902.4	300kbps GFSK	Integral / 0.6	25.2	≤30	Pass
915.2	300kbps GFSK	Integral / 0.6	25.4	≤30	Pass
927.6	300kbps GFSK	Integral / 0.6	25.4	≤30	Pass
902.4	300kbps Hybrid	Integral / 0.6	16.0	≤30	Pass
915.2	300kbps Hybrid	Integral / 0.6	16.2	≤30	Pass
927.6	300kbps Hybrid	Integral / 0.6	16.4	≤30	Pass
902.3	100kbps FSK	Integral / 1.7	25.4	≤30	Pass
915.2	100kbps FSK	Integral / 1.7	25.5	≤30	Pass
926.9	100kbps FSK	Integral / 1.7	25.6	≤30	Pass
902.4	300kbps GFSK	Integral / 1.7	25.4	≤30	Pass
915.2	300kbps GFSK	Integral / 1.7	25.5	≤30	Pass
927.6	300kbps GFSK	Integral / 1.7	25.6	≤30	Pass
902.4	300kbps Hybrid	Integral / 1.7	16.2	≤30	Pass
915.2	300kbps Hybrid	Integral / 1.7	16.5	≤30	Pass
927.6	300kbps Hybrid	Integral / 1.7	16.7	≤30	Pass

Plots

100kbps, Low Channel, Horizontal Pipe

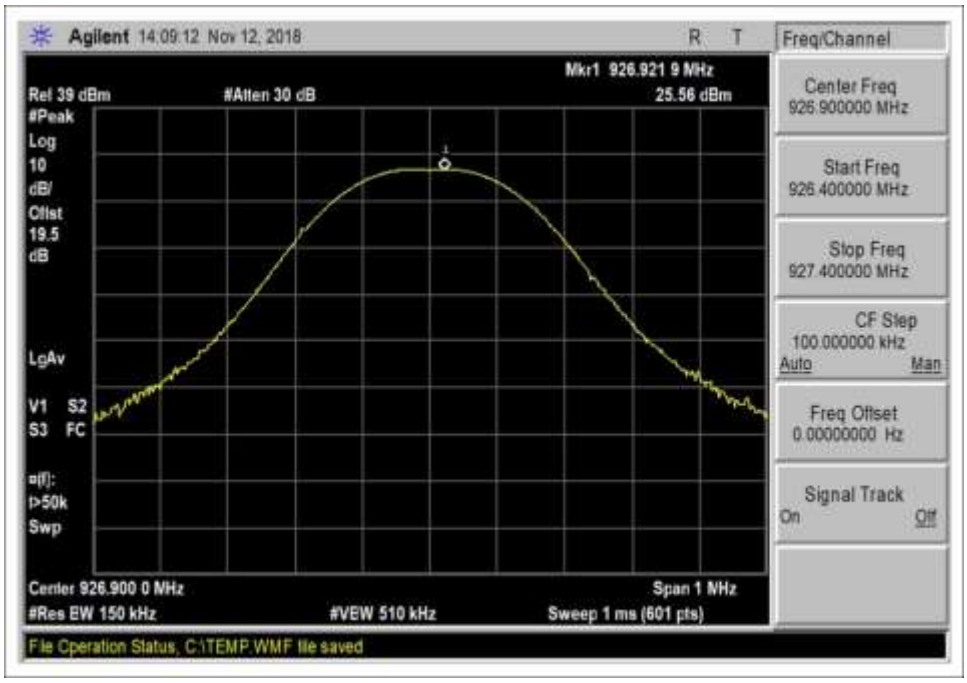


100kbps, Low Channel, Vertical Pipe



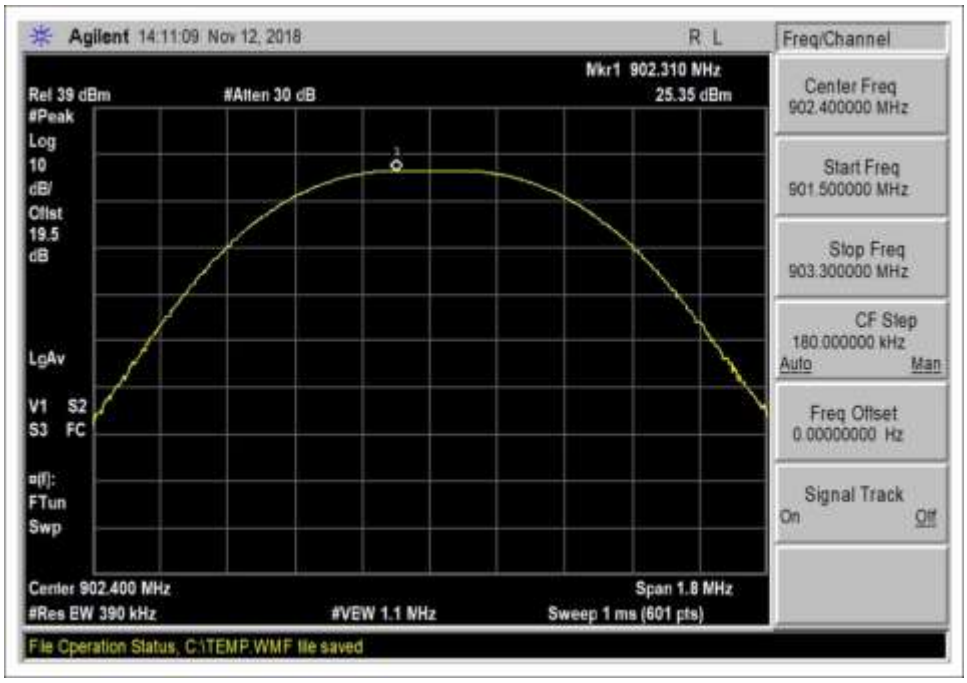
100kbps, Middle Channel, Horizontal Pipe

100kbps, Middle Channel, Vertical Pipe



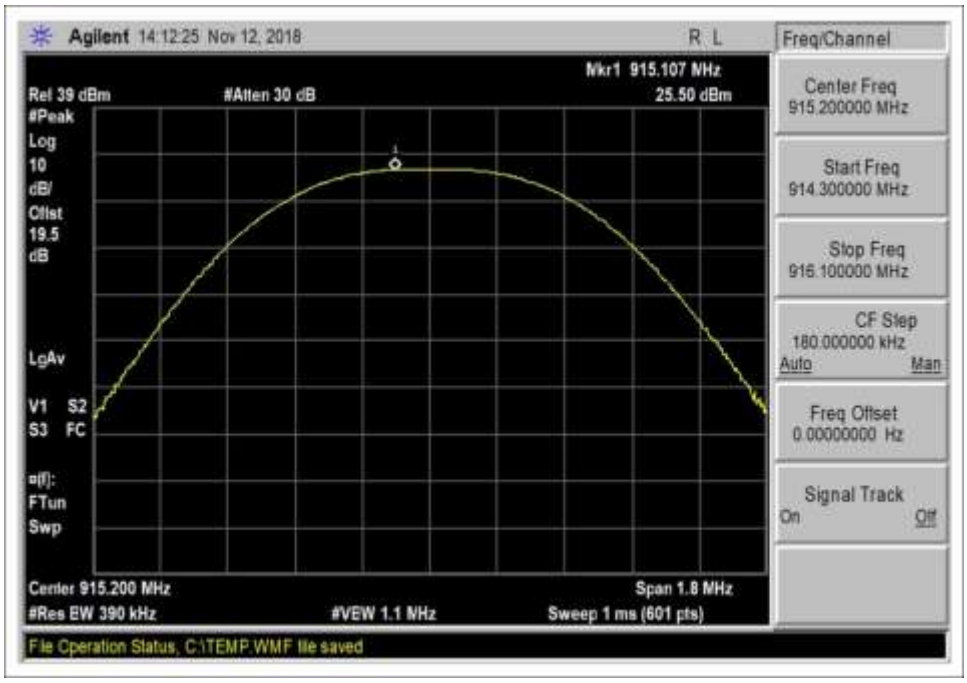
100kbps, High Channel, Horizontal Pipe

100kbps, High Channel, Vertical Pipe

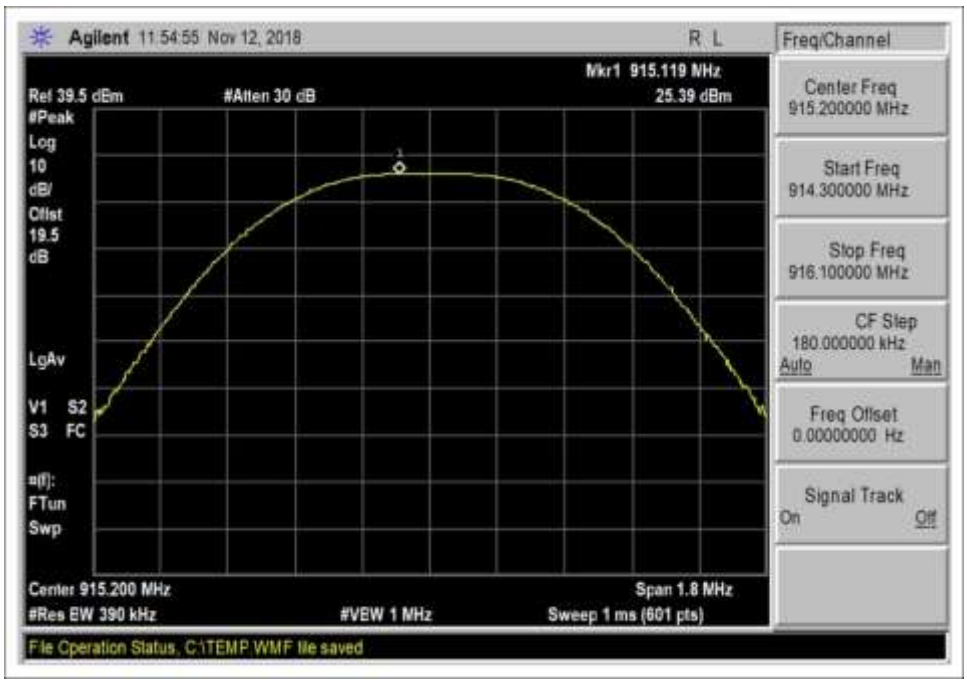


300kbps, Low Channel, Horizontal Pipe

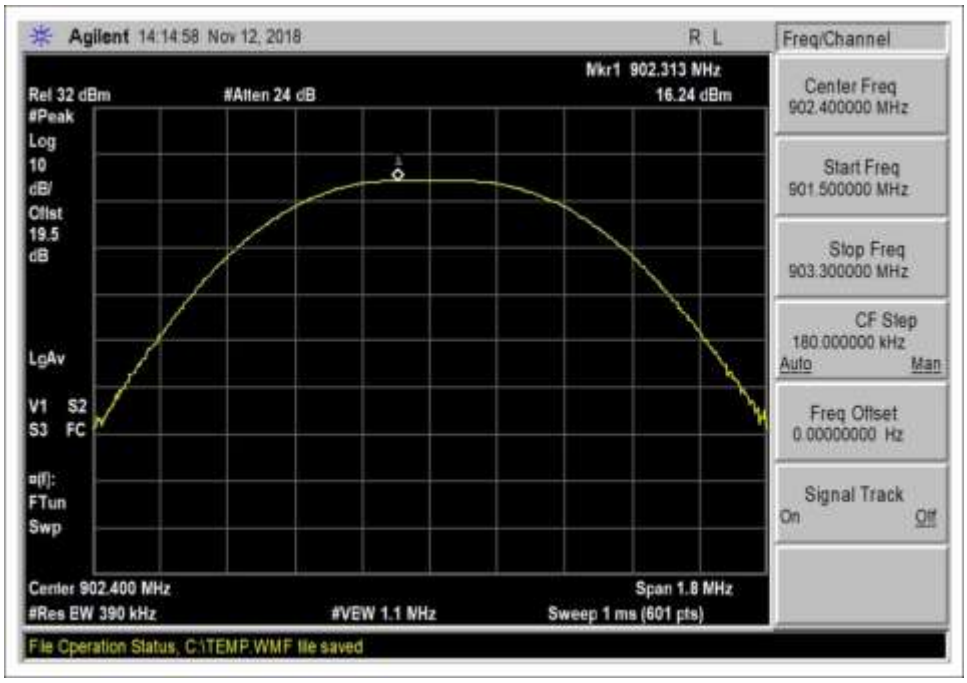
300kbps, Low Channel, Vertical Pipe



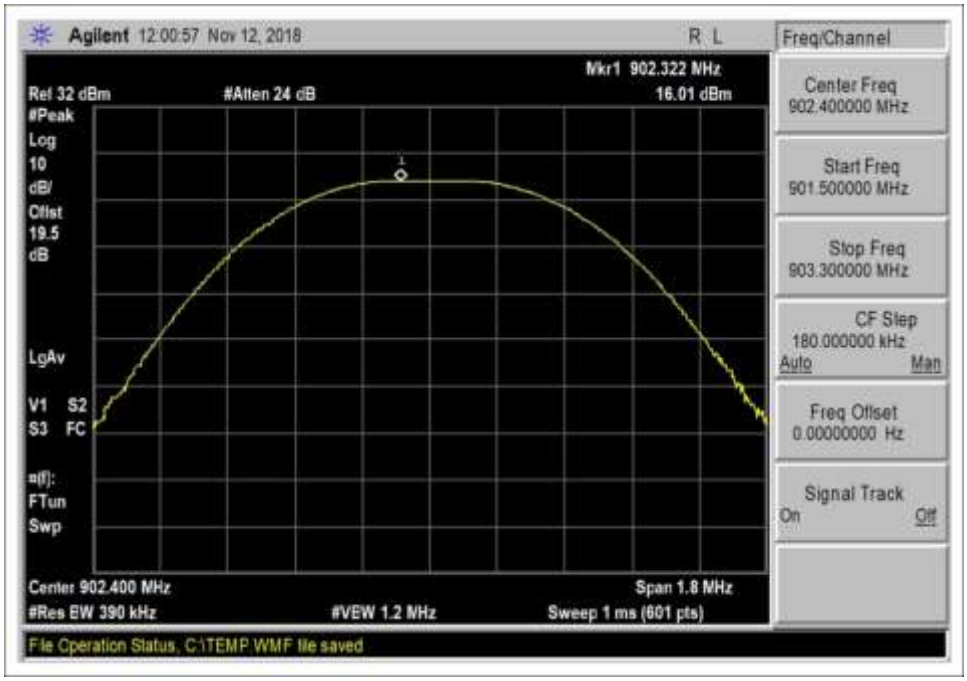
300kbps, High Channel, Horizontal Pipe



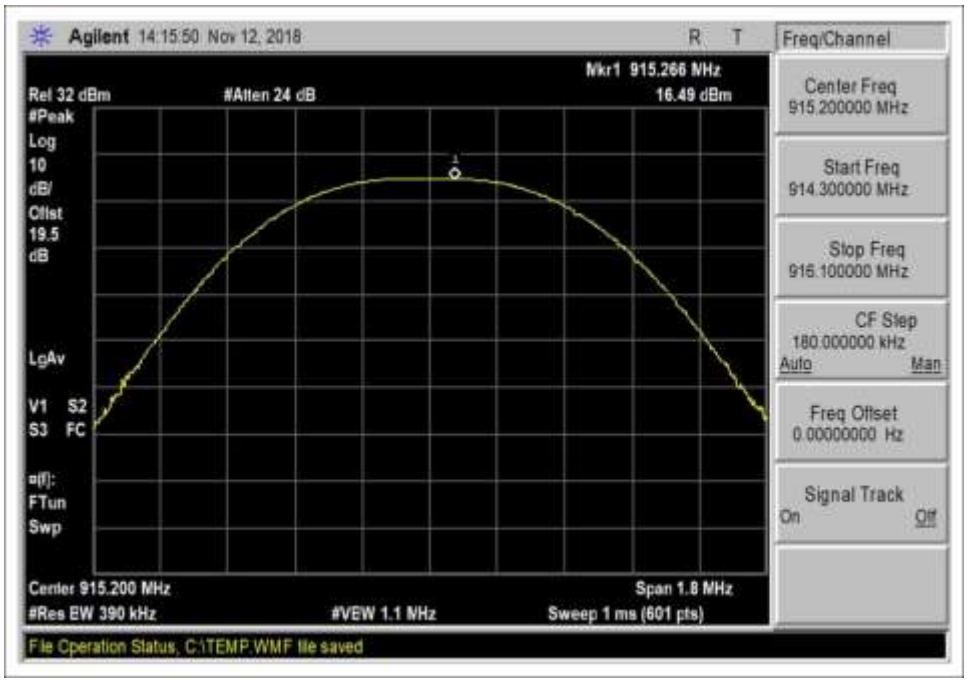
300kbps, High Channel, Vertical Pipe



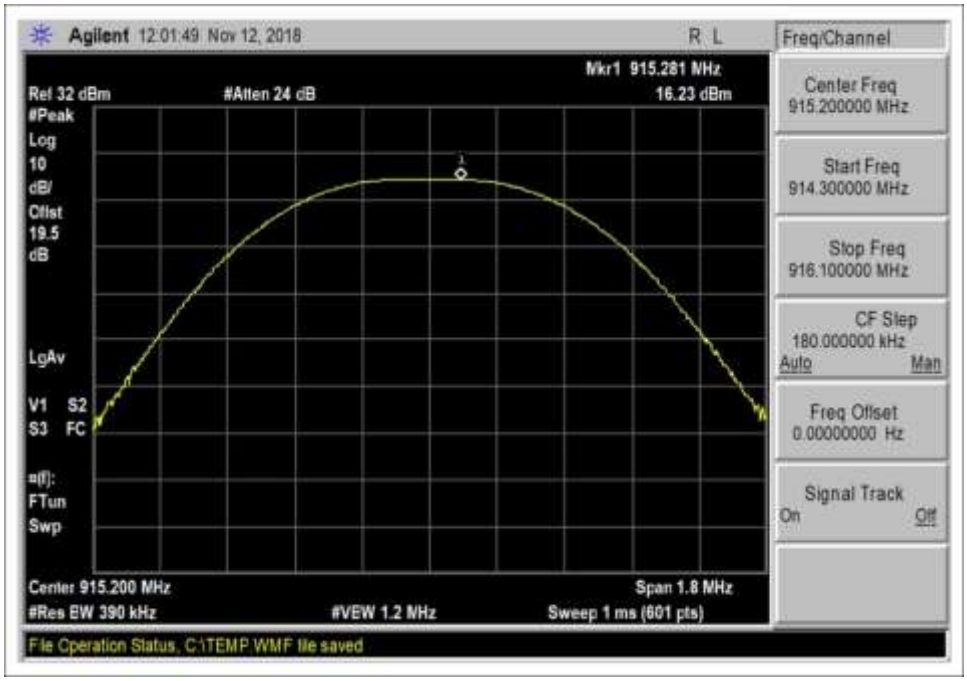
Hybrid, 300kbps, Low Channel, Horizontal Pipe



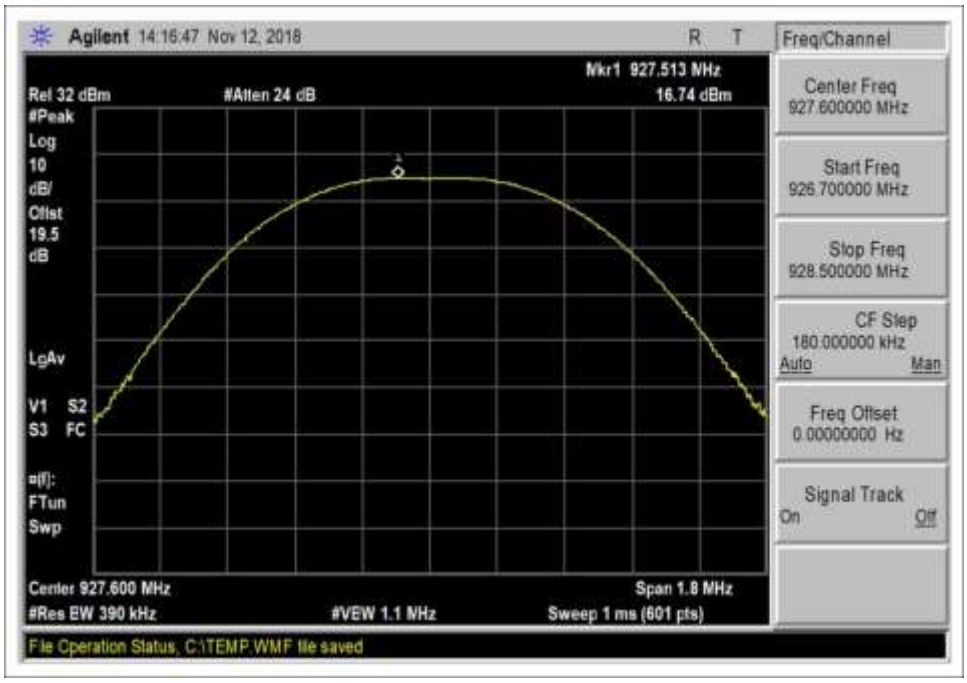
Hybrid, 300kbps, Low Channel, Vertical Pipe



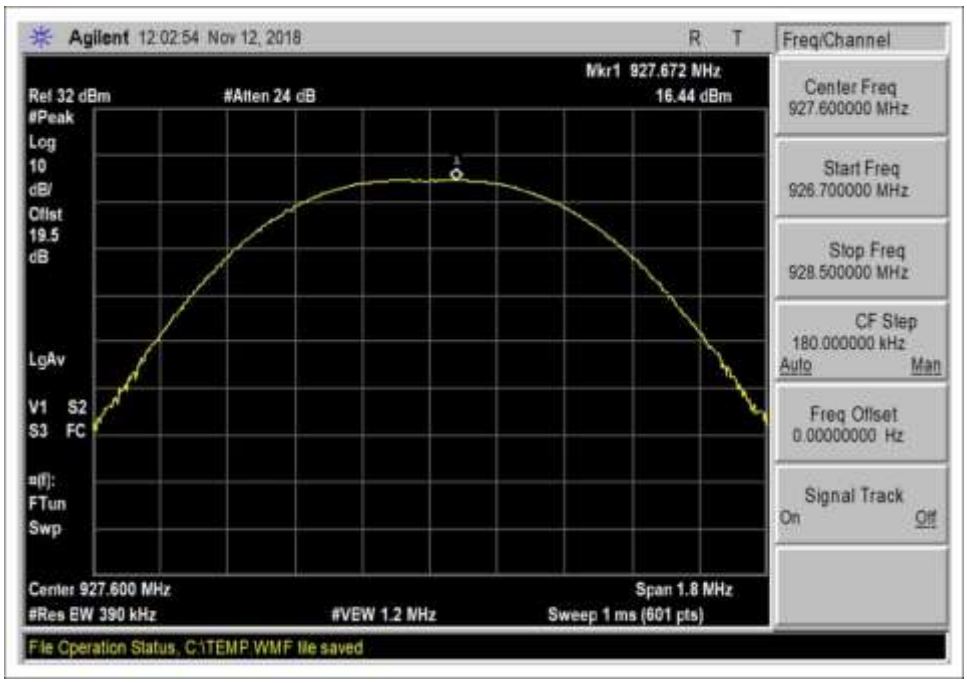
Hybrid, 300kbps, Middle Channel, Horizontal Pipe



Hybrid, 300kbps, Middle Channel, Vertical Pipe

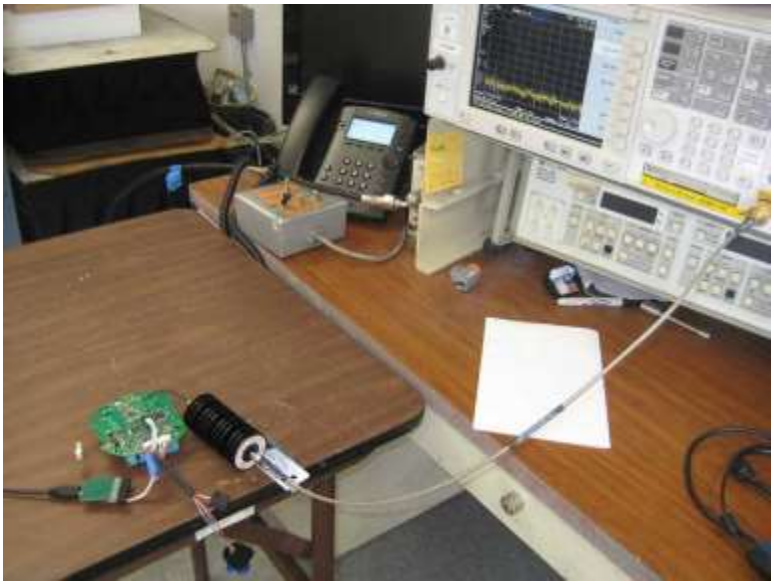


Hybrid, 300kbps, High Channel, Horizontal Pipe



Hybrid, 300kbps, High Channel, Vertical Pipe

Test Setup Photo



15.247(d) RF Conducted Emissions & Band Edge

Test Setup / Conditions / Data

Test Location:	CKC Laboratories Inc. • 110 N Olinda Pl • Brea CA 92823 • 7149936112		
Customer:	**Itron, Inc.**		
Specification:	**15.247(d) Conducted Spurious Emissions**		
Work Order #:	**100666**	Date:	11/13/2018
Test Type:	**Conducted Emissions**	Time:	10:47:32
Tested By:	S. Yamamoto	Sequence#:	1
Software:	EMITest 5.03.11		6V Battery

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

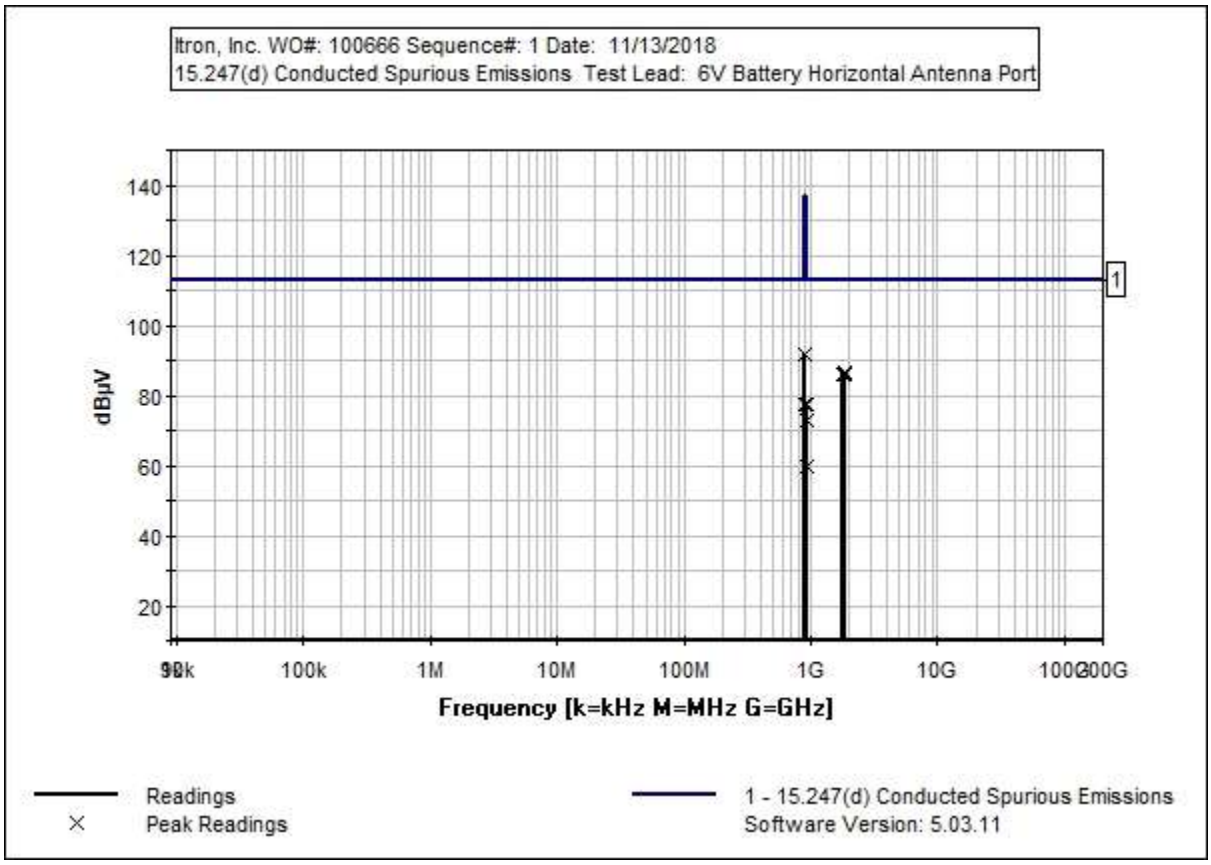
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

The equipment under test (EUT) is placed on the table top. The serial port is connected to a support laptop via serial to USB adapter. The laptop is running software Command Line Interface (CLI) Tool which is running script to command the EUT to specific channels and protocols at 100% duty cycle.
The EUT is powered from a 6.0Vdc fresh battery.
Site D.
Frequency range of data sheet 9kHz to 9.3GHz. RBW=100kHz, VBW=300kHz.
100kbps 83 channels
300kHz spacing FSK power level 3 .

Temperature: 23°C, Humidity: 30%, Pressure: 100kPa.
Test method ANSI C63.10 2013


ltron, Inc. WO#: 100666 Sequence#: 1 Date: 11/13/2018
15.247(d) Conducted Spurious Emissions Test Lead: 6V Battery Horizontal Antenna Port
140
120
100
80
60
40
20
dBµV
1
100k
1M
10M
100M
1G
10G
Frequency [k=kHz M=MHz G=GHz]
Readings
Peak Readings
1 - 15.247(d) Conducted Spurious Emissions
Software Version: 5.03.11

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP07247	Cable	32022-29094K-29094K-24TC	7/5/2018	7/5/2020
	AN02869	Spectrum Analyzer	E4440A	8/10/2018	8/10/2019
T2	AN03431	Attenuator	89-20-21	12/19/2017	12/19/2019

Measurement Data: Reading listed by margin. Test Lead: Horizontal Antenna Port

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	902.000M	72.0	+0.2	+19.3			+0.0	91.5	112.6	-21.1	Horiz
2	1853.742M	66.8	+0.2	+19.3			+0.0	86.3	112.6	-26.3	Horiz
3	1830.342M	66.4	+0.2	+19.3			+0.0	85.9	112.6	-26.7	Horiz
4	1804.567M	66.3	+0.2	+19.3			+0.0	85.8	112.6	-26.8	Horiz
5	928.100M	58.1	+0.2	+19.3			+0.0	77.6	112.6	-35.0	Horiz
6	901.130M	58.0	+0.2	+19.3			+0.0	77.5	112.6	-35.1	Horiz
7	928.000M	53.2	+0.2	+19.3			+0.0	72.7	112.6	-39.9	Horiz
8	928.300M	40.3	+0.2	+19.3			+0.0	59.8	112.6	-52.8	Horiz

Test Location:	CKC Laboratories Inc. • 110 N Olinda Pl • Brea CA 92823 • 7149936112		
Customer:	**Itron, Inc.**		
Specification:	**15.247(d) Conducted Spurious Emissions**		
Work Order #:	**100666**	Date:	11/13/2018
Test Type:	**Conducted Emissions**	Time:	11:45:46
Tested By:	S. Yamamoto	Sequence#:	4
Software:	EMITest 5.03.11		6V Battery

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

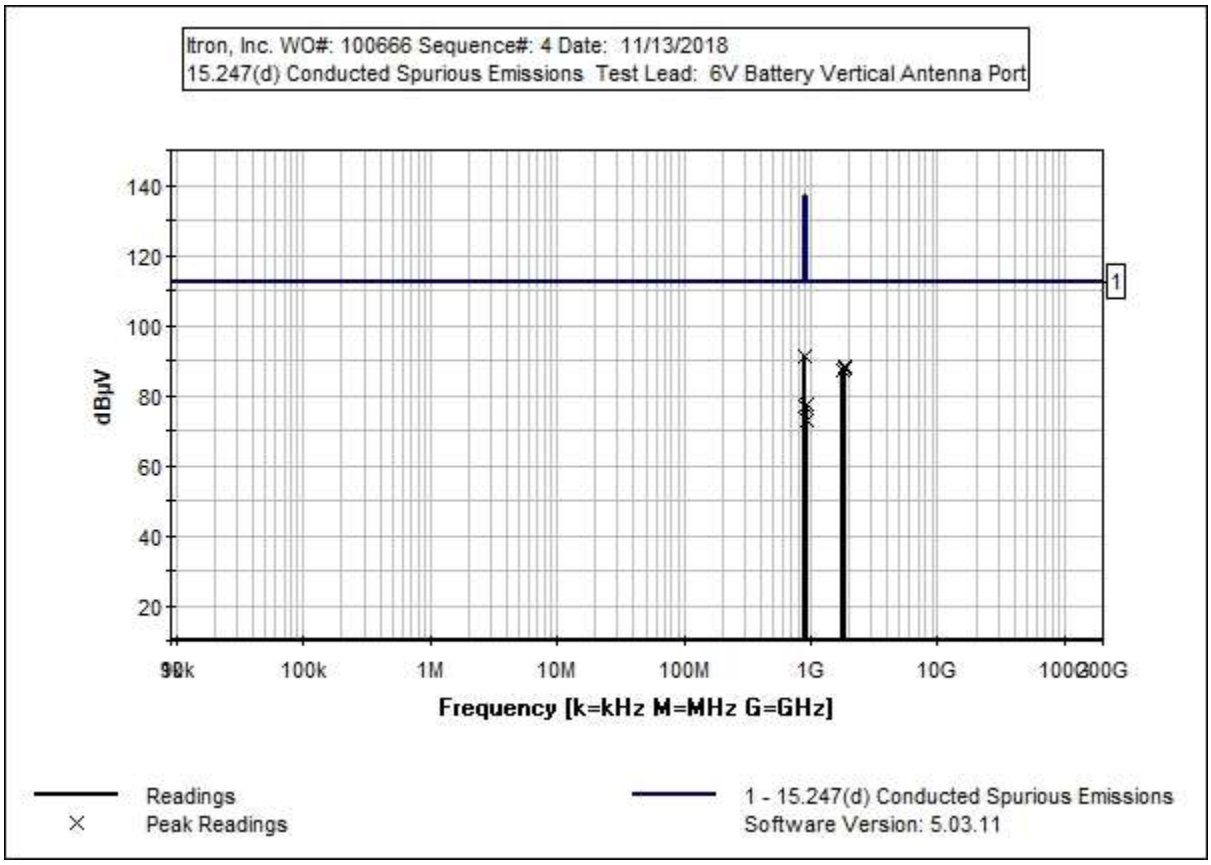
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

The equipment under test (EUT) is placed on the table top. The serial port is connected to a support laptop via serial to USB adapter. The laptop is running software Command Line Interface (CLI) Tool which is running script to command the EUT to specific channels and protocols at 100% duty cycle.
The EUT is powered from a 6.0Vdc fresh battery.
Site D.
Frequency range of data sheet 9kHz to 9.3GHz. RBW=100kHz, VBW=300kHz.
100kbps 83 channels
300kHz spacing FSK power level 3 .

Temperature: 23°C, Humidity: 30%, Pressure: 100kPa.
Test method ANSI C63.10 2013


Itron, Inc. WO#: 100666 Sequence#: 4 Date: 11/13/2018
15.247(d) Conducted Spurious Emissions Test Lead: 6V Battery Vertical Antenna Port
140
120
100
80
60
40
20
dBµV
1
100k
1M
10M
100M
1G
10G
Frequency [k=kHz M=MHz G=GHz]
Readings
Peak Readings
1 - 15.247(d) Conducted Spurious Emissions
Software Version: 5.03.11

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP07247	Cable	32022-29094K-29094K-24TC	7/5/2018	7/5/2020
	AN02869	Spectrum Analyzer	E4440A	8/10/2018	8/10/2019
T2	AN03431	Attenuator	89-20-21	12/19/2017	12/19/2019

Measurement Data: Reading listed by margin. Test Lead: Vertical Antenna Port

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	902.000M	71.5	+0.2	+19.3			+0.0	91.0	112.4	-21.4	Verti
2	1853.851M	69.0	+0.2	+19.3			+0.0	88.5	112.4	-23.9	Verti
3	1830.351M	68.3	+0.2	+19.3			+0.0	87.8	112.4	-24.6	Verti
4	1804.548M	67.8	+0.2	+19.3			+0.0	87.3	112.4	-25.1	Verti
5	928.075M	57.8	+0.2	+19.3			+0.0	77.3	112.4	-35.1	Verti
6	901.060M	57.5	+0.2	+19.3			+0.0	77.0	112.4	-35.4	Verti
7	928.000M	53.5	+0.2	+19.3			+0.0	73.0	112.4	-39.4	Verti

Test Location:	CKC Laboratories Inc. • 110 N Olinda Pl • Brea CA 92823 • 7149936112		
Customer:	**Itron, Inc.**		
Specification:	**15.247(d) Conducted Spurious Emissions**		
Work Order #:	**100666**	Date:	11/13/2018
Test Type:	**Conducted Emissions**	Time:	11:06:04
Tested By:	S. Yamamoto	Sequence#:	2
Software:	EMITest 5.03.11		6V Battery

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

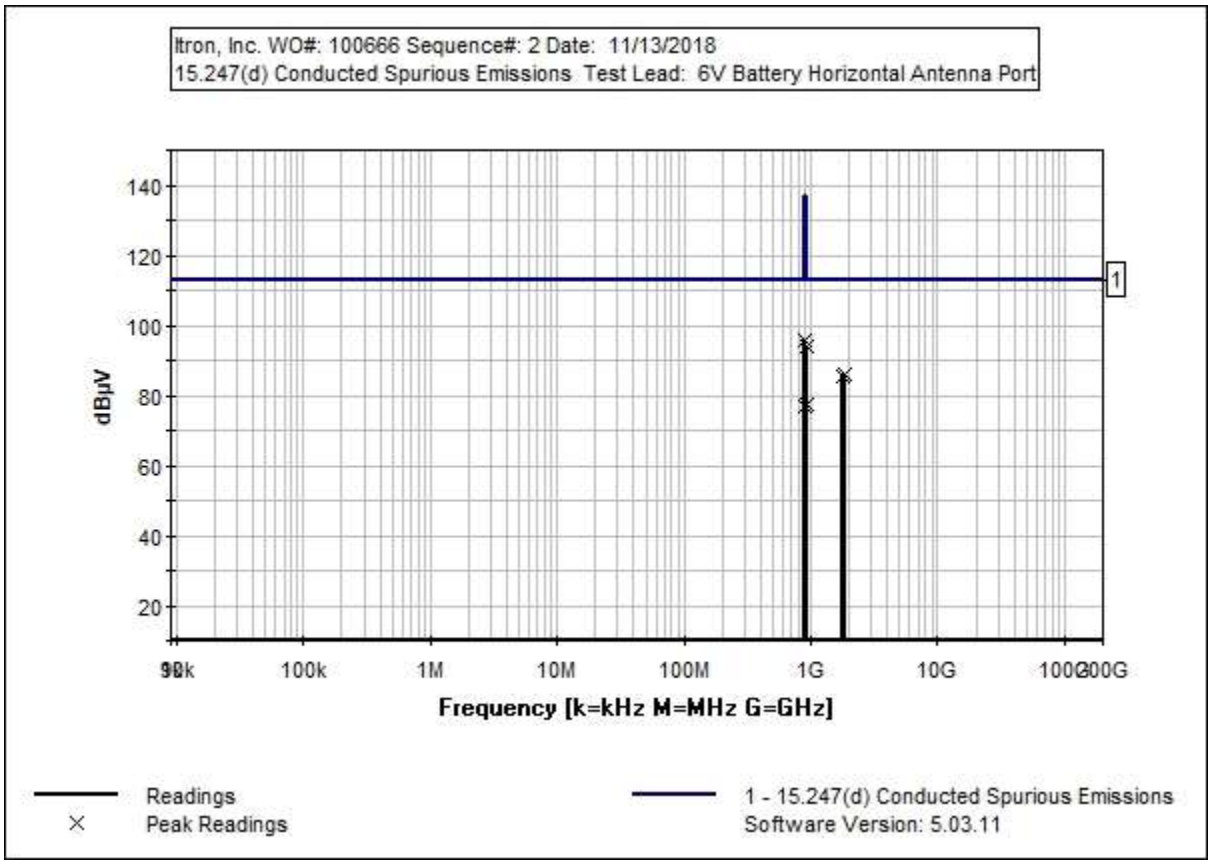
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

The equipment under test (EUT) is placed on the table top. The serial port is connected to a support laptop via serial to USB adapter. The laptop is running software Command Line Interface (CLI) Tool which is running script to command the EUT to specific channels and protocols at 100% duty cycle.
The EUT is powered from a 6.0Vdc fresh battery.
Site D.
Frequency range of data sheet 9kHz to 9.3GHz. RBW=100kHz, VBW=300kHz.
300kbps 64 channels 400kHz spacing GFSK power level 3 .

Temperature: 23°C, Humidity: 30%, Pressure: 100kPa.
Test method ANSI C63.10 2013


ltron, Inc. WO#: 100666 Sequence#: 2 Date: 11/13/2018
15.247(d) Conducted Spurious Emissions Test Lead: 6V Battery Horizontal Antenna Port
140
120
100
80
60
40
20
dBµV
1
100k
1M
10M
100M
1G
10G
Frequency [k=kHz M=MHz G=GHz]
Readings
Peak Readings
1 - 15.247(d) Conducted Spurious Emissions
Software Version: 5.03.11

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP07247	Cable	32022-29094K-29094K-24TC	7/5/2018	7/5/2020
	AN02869	Spectrum Analyzer	E4440A	8/10/2018	8/10/2019
T2	AN03431	Attenuator	89-20-21	12/19/2017	12/19/2019

Measurement Data: Reading listed by margin. Test Lead: Horizontal Antenna Port

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	902.000M	76.2	+0.2	+19.3			+0.0	95.7	112.6	-16.9	Horiz
2	928.000M	74.4	+0.2	+19.3			+0.0	93.9	112.6	-18.7	Horiz
3	1855.351M	66.7	+0.2	+19.3			+0.0	86.2	112.6	-26.4	Horiz
4	1830.244M	66.4	+0.2	+19.3			+0.0	85.9	112.6	-26.7	Horiz
5	1804.649M	66.1	+0.2	+19.3			+0.0	85.6	112.6	-27.0	Horiz
6	928.867M	58.0	+0.2	+19.3			+0.0	77.5	112.6	-35.1	Horiz
7	901.267M	57.6	+0.2	+19.3			+0.0	77.1	112.6	-35.5	Horiz

Test Location:	CKC Laboratories Inc. • 110 N Olinda Pl • Brea CA 92823 • 7149936112		
Customer:	**Itron, Inc.**		
Specification:	**15.247(d) Conducted Spurious Emissions**		
Work Order #:	**100666**	Date:	11/13/2018
Test Type:	**Conducted Emissions**	Time:	13:12:21
Tested By:	S. Yamamoto	Sequence#:	5
Software:	EMITest 5.03.11		6V Battery

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

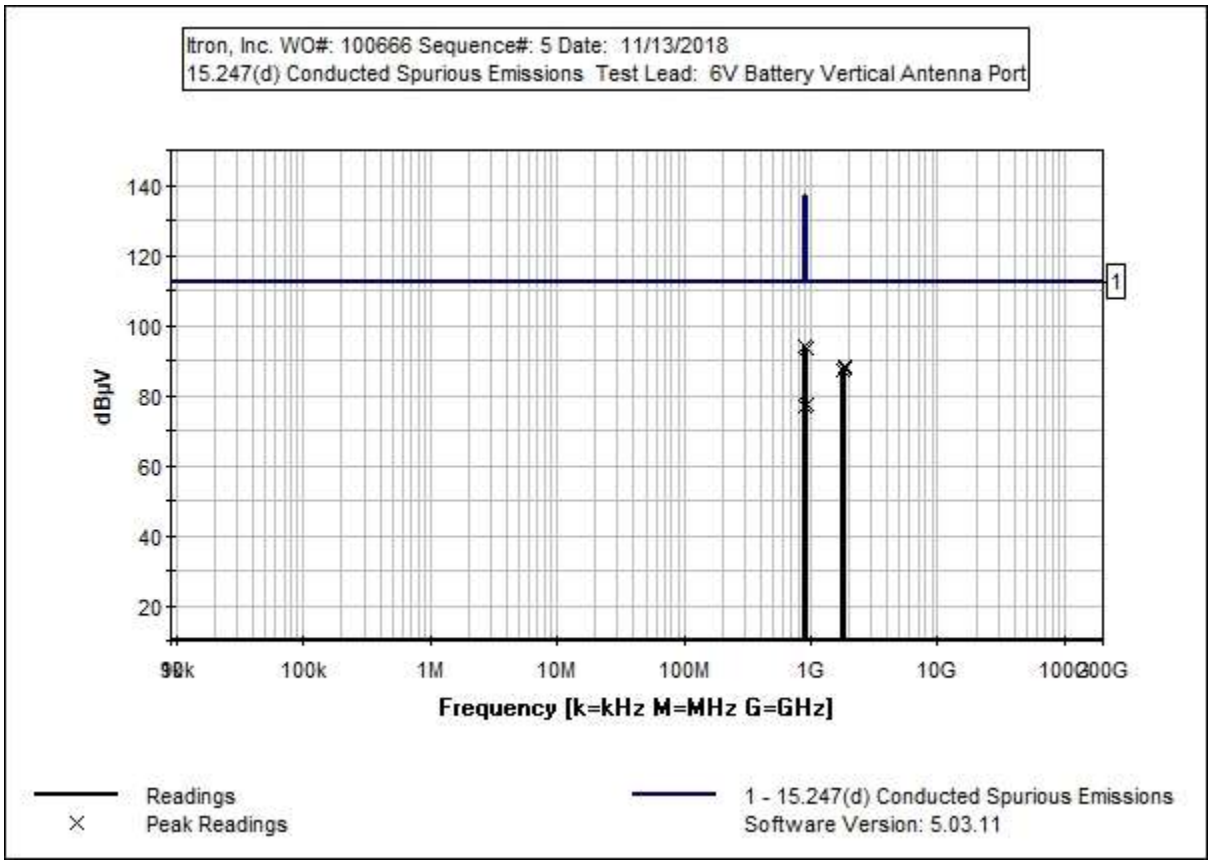
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

The equipment under test (EUT) is placed on the table top. The serial port is connected to a support laptop via serial to USB adapter. The laptop is running software Command Line Interface (CLI) Tool which is running script to command the EUT to specific channels and protocols at 100% duty cycle.
The EUT is powered from a 6.0Vdc fresh battery.
Site D.
Frequency range of data sheet 9kHz to 9.3GHz. RBW=100kHz, VBW=300kHz.
300kbps 64 channels 400kHz spacing GFSK power level 3 .

Temperature: 23°C, Humidity: 30%, Pressure: 100kPa.
Test method ANSI C63.10 2013


Itron, Inc. WO#: 100666 Sequence#: 5 Date: 11/13/2018
15.247(d) Conducted Spurious Emissions Test Lead: 6V Battery Vertical Antenna Port
140
120
100
80
60
40
20
dBµV
1
100k
1M
10M
100M
1G
10G
Frequency [k=kHz M=MHz G=GHz]
Readings
Peak Readings
1 - 15.247(d) Conducted Spurious Emissions
Software Version: 5.03.11

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP07247	Cable	32022-29094K-29094K-24TC	7/5/2018	7/5/2020
	AN02869	Spectrum Analyzer	E4440A	8/10/2018	8/10/2019
T2	AN03431	Attenuator	89-20-21	12/19/2017	12/19/2019

Measurement Data: Reading listed by margin. Test Lead: Vertical Antenna Port

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	902.000M	74.3	+0.2	+19.3			+0.0	93.8	112.4	-18.6	Verti
2	928.000M	74.0	+0.2	+19.3			+0.0	93.5	112.4	-18.9	Verti
3	1855.049M	68.9	+0.2	+19.3			+0.0	88.4	112.4	-24.0	Verti
4	1830.248M	68.2	+0.2	+19.3			+0.0	87.7	112.4	-24.7	Verti
5	1804.646M	67.8	+0.2	+19.3			+0.0	87.3	112.4	-25.1	Verti
6	928.725M	58.1	+0.2	+19.3			+0.0	77.6	112.4	-34.8	Verti
7	901.282M	57.2	+0.2	+19.3			+0.0	76.7	112.4	-35.7	Verti

Test Location:	CKC Laboratories Inc. • 110 N Olinda Pl • Brea CA 92823 • 7149936112		
Customer:	**Itron, Inc.**		
Specification:	**15.247(d) Conducted Spurious Emissions**		
Work Order #:	**100666**	Date:	11/13/2018
Test Type:	**Conducted Emissions**	Time:	11:29:20
Tested By:	S. Yamamoto	Sequence#:	3
Software:	EMITest 5.03.11		6V Battery

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

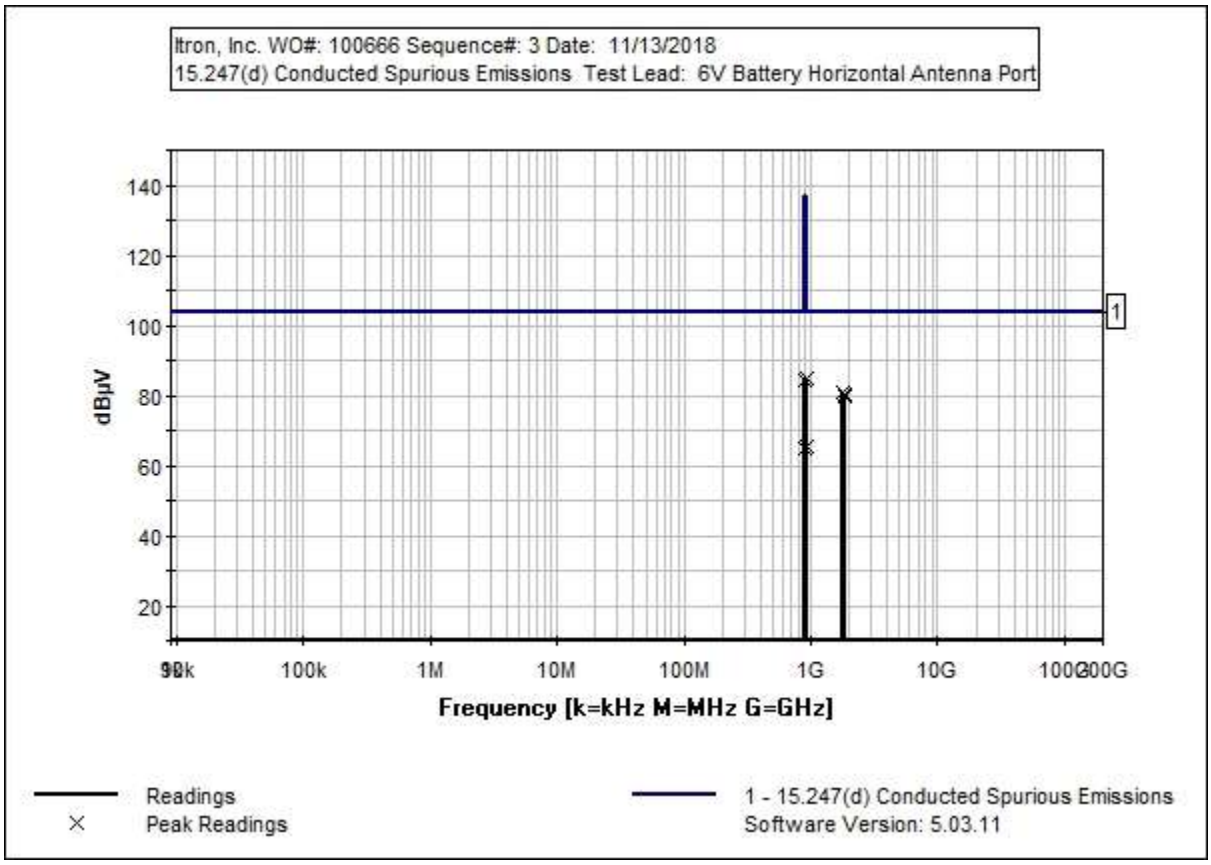
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

The equipment under test (EUT) is placed on the table top. The serial port is connected to a support laptop via serial to USB adapter. The laptop is running software Command Line Interface (CLI) Tool which is running script to command the EUT to specific channels and protocols at 100% duty cycle.
The EUT is powered from a 6.0Vdc fresh battery.
Site D.
Frequency range of data sheet 9kHz to 9.3GHz. RBW=100kHz, VBW=300kHz.
300kbps 64 channels 400kHz spacing **Hybrid** power level 2.

Temperature: 23°C, Humidity: 30%, Pressure: 100kPa. Test method
ANSI C63.10 2013


ltron, Inc. WO#: 100666 Sequence#: 3 Date: 11/13/2018
15.247(d) Conducted Spurious Emissions Test Lead: 6V Battery Horizontal Antenna Port
140
120
100
80
60
40
20
dBµV
1
100k
1M
10M
100M
1G
10G
Frequency [k=kHz M=MHz G=GHz]
Readings
Peak Readings
1 - 15.247(d) Conducted Spurious Emissions
Software Version: 5.03.11

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP07247	Cable	32022-29094K-29094K-24TC	7/5/2018	7/5/2020
	AN02869	Spectrum Analyzer	E4440A	8/10/2018	8/10/2019
T2	AN03431	Attenuator	89-20-21	12/19/2017	12/19/2019

Measurement Data: Reading listed by margin. Test Lead: Horizontal Antenna Port

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	928.000M	65.3	+0.2	+19.3			+0.0	84.8	103.7	-18.9	Horiz
2	902.000M	64.8	+0.2	+19.3			+0.0	84.3	103.7	-19.4	Horiz
3	1804.944M	61.5	+0.2	+19.3			+0.0	81.0	103.7	-22.7	Horiz
4	1830.246M	60.7	+0.2	+19.3			+0.0	80.2	103.7	-23.5	Horiz
5	1855.039M	60.1	+0.2	+19.3			+0.0	79.6	103.7	-24.1	Horiz
6	928.816M	46.0	+0.2	+19.3			+0.0	65.5	103.7	-38.2	Horiz
7	901.100M	45.4	+0.2	+19.3			+0.0	64.9	103.7	-38.8	Horiz

Test Location:	CKC Laboratories Inc. • 110 N Olinda Pl • Brea CA 92823 • 7149936112		
Customer:	**Itron, Inc.**		
Specification:	**15.247(d) Conducted Spurious Emissions**		
Work Order #:	**100666**	Date:	11/13/2018
Test Type:	**Conducted Emissions**	Time:	13:30:33
Tested By:	S. Yamamoto	Sequence#:	6
Software:	EMITest 5.03.11		6V Battery

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

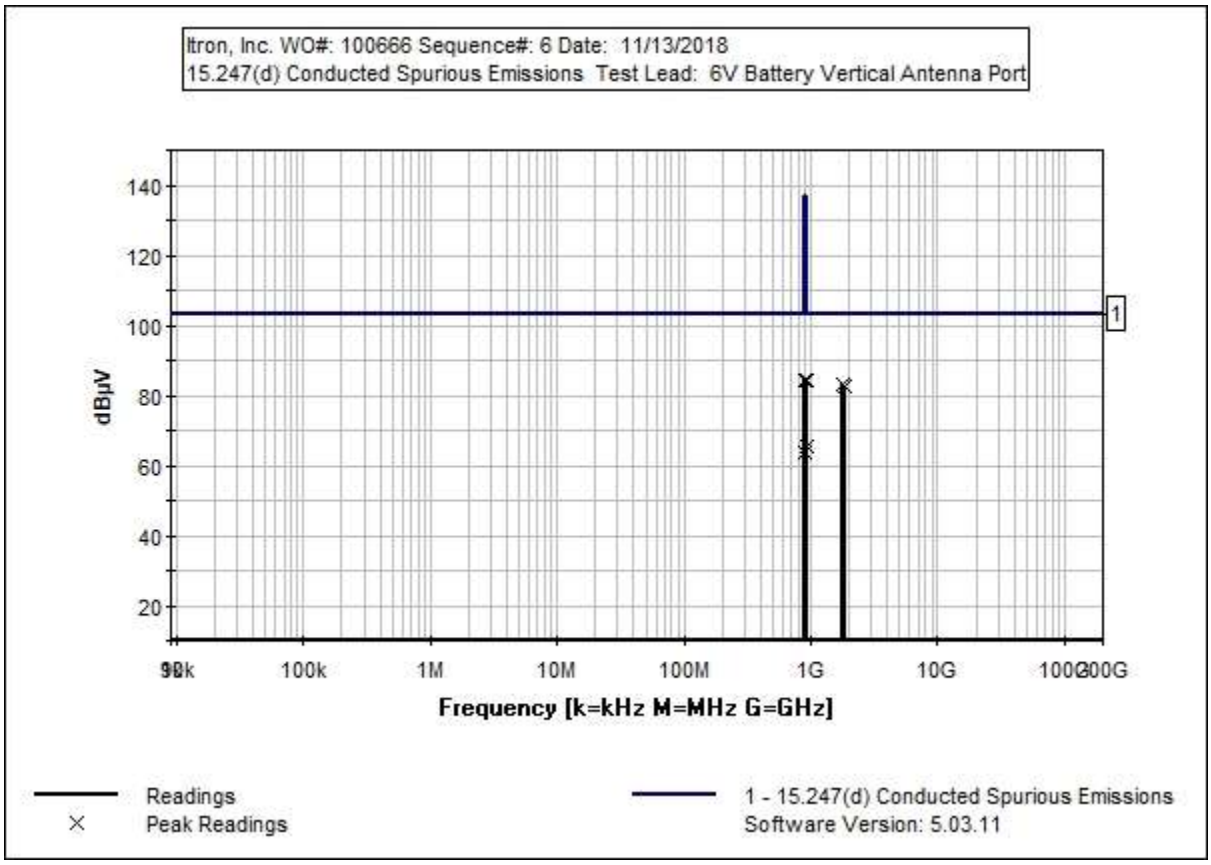
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

The equipment under test (EUT) is placed on the table top. The serial port is connected to a support laptop via serial to USB adapter. The laptop is running software Command Line Interface (CLI) Tool which is running script to command the EUT to specific channels and protocols at 100% duty cycle.
The EUT is powered from a 6.0Vdc fresh battery.
Site D.
Frequency range of data sheet 9kHz to 9.3GHz. RBW=100kHz, VBW=300kHz.
300kbps 64 channels 400kHz spacing **Hybrid** power level 2.

Temperature: 23°C, Humidity: 30%, Pressure: 100kPa.
Test method ANSI C63.10 2013


Itron, Inc. WO#: 100666 Sequence#: 6 Date: 11/13/2018
15.247(d) Conducted Spurious Emissions Test Lead: 6V Battery Vertical Antenna Port
140
120
100
80
60
40
20
dBµV
1
100k
1M
10M
100M
1G
10G
Frequency [k=kHz M=MHz G=GHz]
Readings
Peak Readings
1 - 15.247(d) Conducted Spurious Emissions
Software Version: 5.03.11

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP07247	Cable	32022-29094K-29094K-24TC	7/5/2018	7/5/2020
	AN02869	Spectrum Analyzer	E4440A	8/10/2018	8/10/2019
T2	AN03431	Attenuator	89-20-21	12/19/2017	12/19/2019

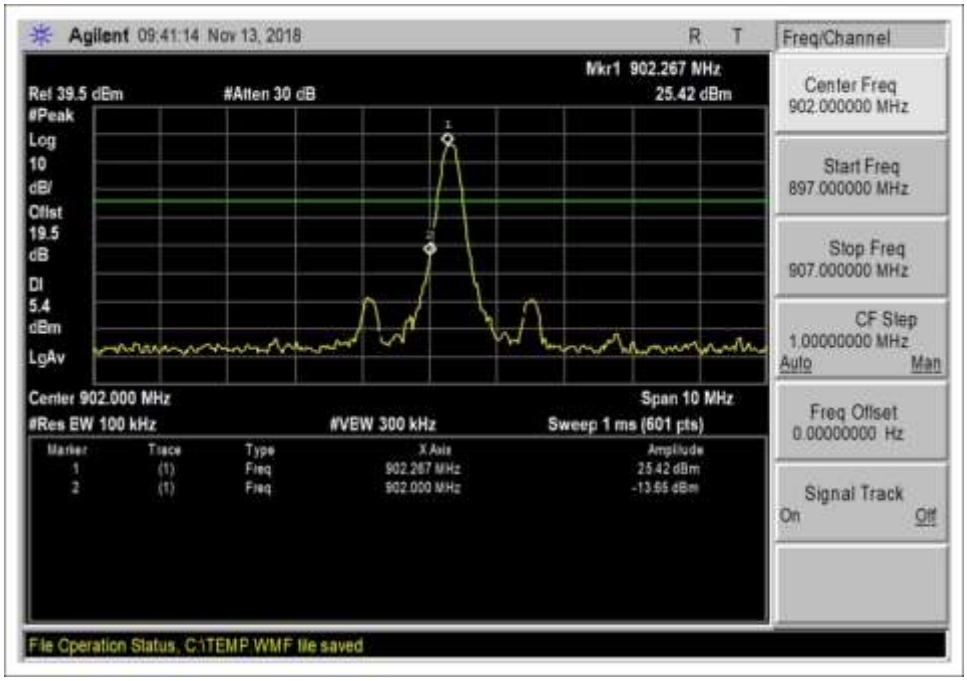
Measurement Data: Reading listed by margin. Test Lead: Vertical Antenna Port

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	928.000M	65.0	+0.2	+19.3			+0.0	84.5	103.4	-18.9	Verti
2	902.000M	64.9	+0.2	+19.3			+0.0	84.4	103.4	-19.0	Verti
3	1804.645M	63.7	+0.2	+19.3			+0.0	83.2	103.4	-20.2	Verti
4	1830.242M	63.2	+0.2	+19.3			+0.0	82.7	103.4	-20.7	Verti
5	1855.047M	62.8	+0.2	+19.3			+0.0	82.3	103.4	-21.1	Verti
6	928.743M	46.2	+0.2	+19.3			+0.0	65.7	103.4	-37.7	Verti
7	901.267M	44.2	+0.2	+19.3			+0.0	63.7	103.4	-39.7	Verti

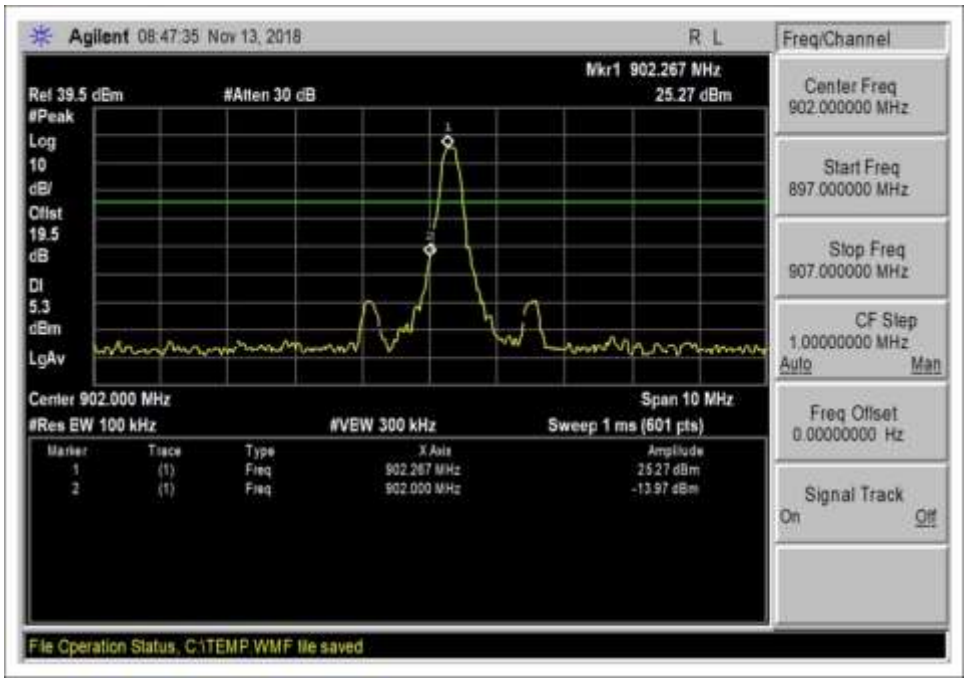
Band Edge

Band Edge Summary				
Limit applied: Max Power/100kHz - 20dB.				
Frequency (MHz)	**Modulation**	**Measured (dBm)**	**Limit (dBm)**	**Results**
902	100kbps FSK. Vert pipe	-14	<5.3	Pass
928	100kbps FSK. Vert pipe	-33.4	<5.5	Pass
902	300kbps GFSK. Vert pipe	-13	<5.2	Pass
928	300kbps GFSK. Vert pipe	-11.5	<5.4	Pass
902	300kbps Hybrid. Vert pipe	-21.3	<-3.9	Pass
928	300kbps Hybrid. Vert pipe	-19.9	<-3.4	Pass
902	100kbps FSK Hopping. Vert pipe	-15.5	<5.3	Pass
928	100kbps FSK Hopping. Vert pipe	-34.4	<5.5	Pass
902	300kbps GFSK Hopping. Vert pipe	-13.9	<5.2	Pass
928	300kbps GFSK. Vert pipe Hopping	-10.9	<5.4	Pass
902	300kbps Hybrid Hopping. Vert pipe	-13.5	<-3.9	Pass
928	300kbps Hybrid Hopping. Vert pipe	-11.5	<-3.4	Pass
902	100kbps FSK. Horiz pipe	-13.7	<5.4	Pass
928	100kbps FSK Horiz pipe	-33.6	<5.6	Pass
902	300kbps GFSK Horiz pipe	-12.4	<5.3	Pass
928	300kbps GFSK Horiz pipe	-10.9	<5.6	Pass
902	300kbps Hybrid Horiz pipe	-21.8	<-3.7	Pass
928	300kbps Hybrid Horiz pipe	-20.1	<-3.3	Pass
902	100kbps FSK Hopping Horiz pipe	-14.4	<5.4	Pass
928	100kbps FSK Hopping Horiz pipe	-34.4	<5.6	Pass
902	300kbps GFSK Hopping Horiz pipe	-12	<5.3	Pass
928	300kbps GFSK Hopping Horiz pipe	-11.8	<5.6	Pass
902	300kbps Hybrid Hopping Horiz pipe	-22.2	<-3.7	Pass
928	300kbps Hybrid Hopping Horiz pipe	-20.6	<-3.3	Pass

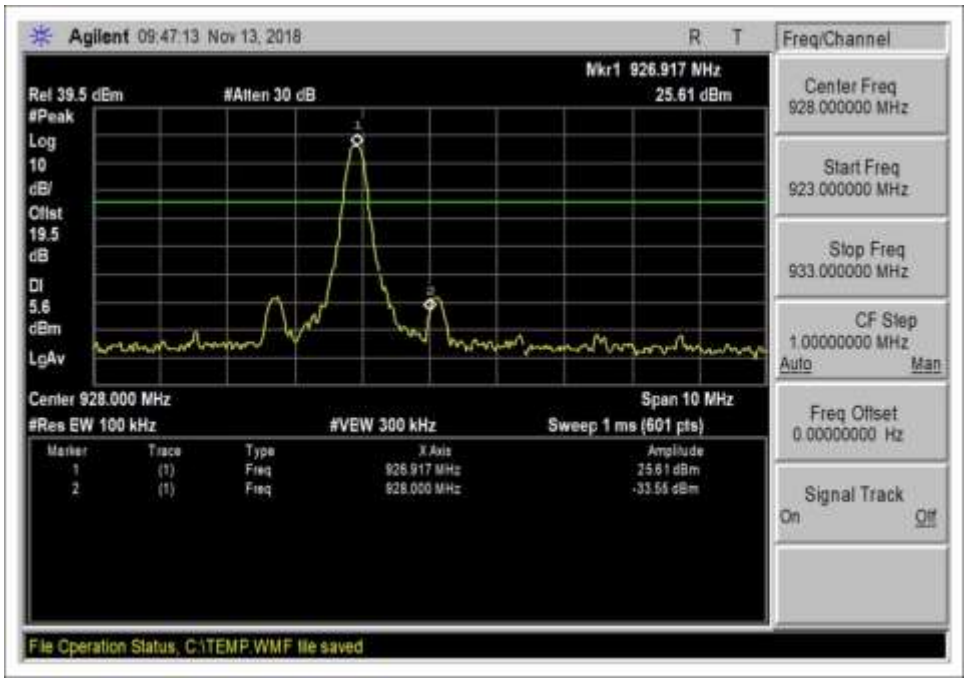
Band Edge Plots



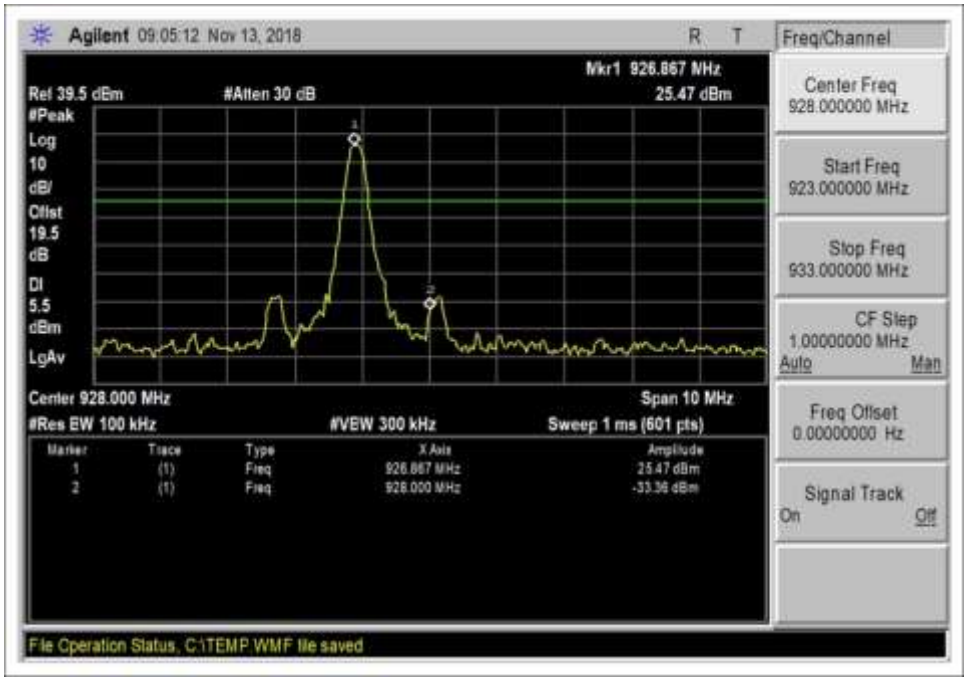
100kbps, Low Channel, Horizontal Pipe



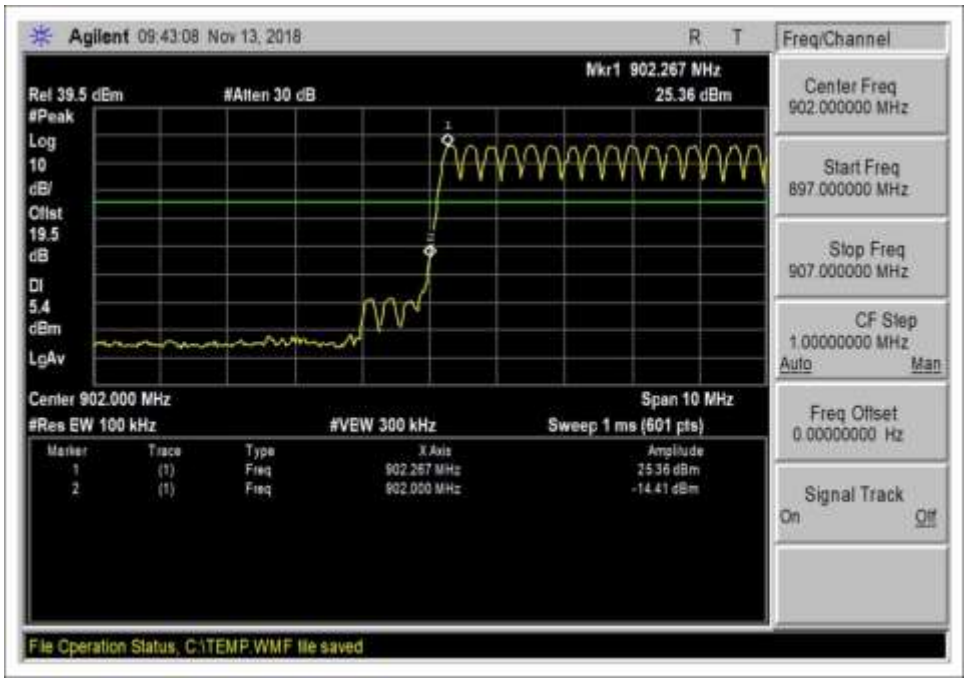
100kbps, Low Channel, Vertical Pipe



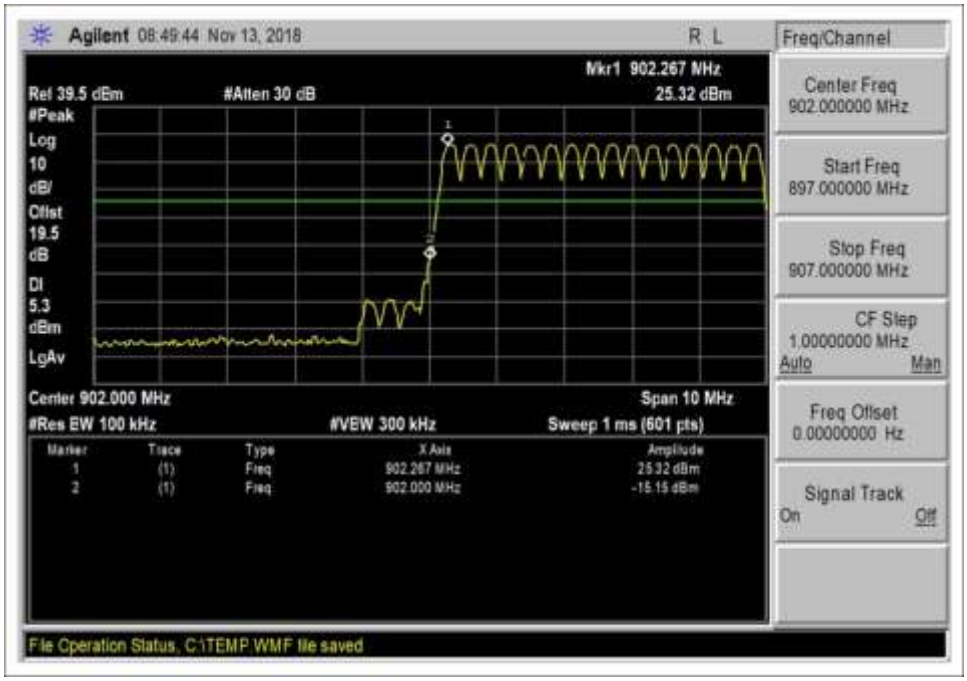
100kbps, High Channel, Horizontal Pipe



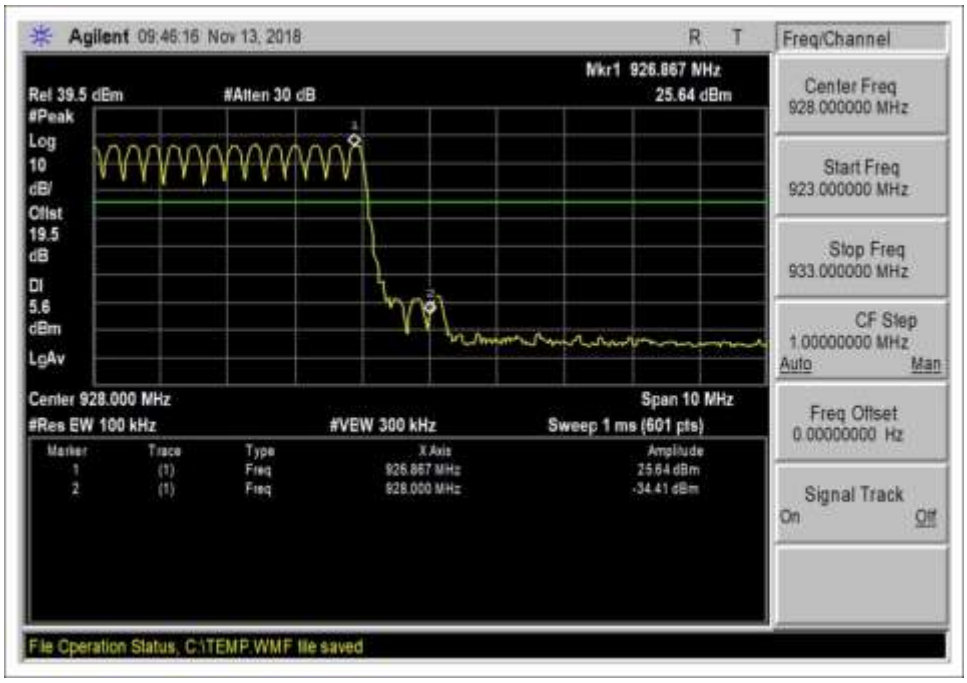
100kbps, High Channel, Vertical Pipe



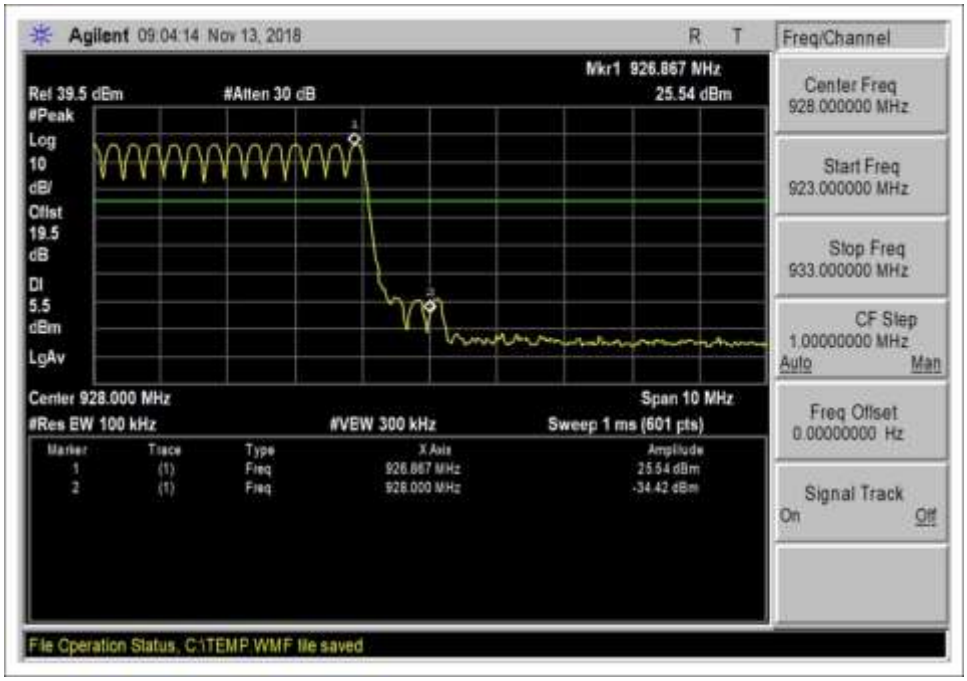
100kbps, Hopping, Low Channel, Horizontal Pipe



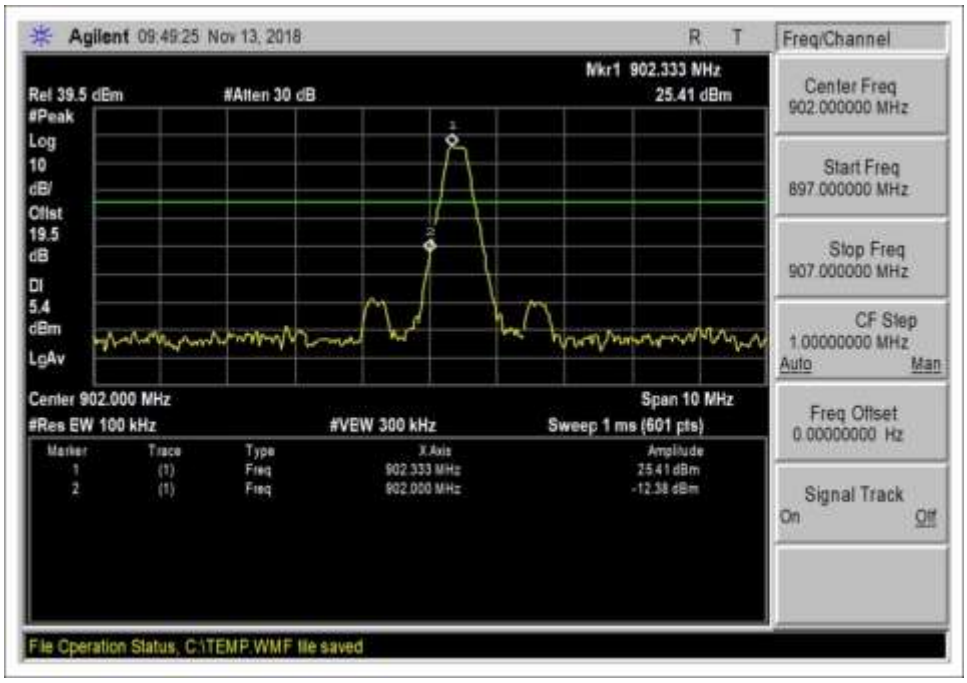
100kbps, Hopping, Low Channel, Vertical Pipe



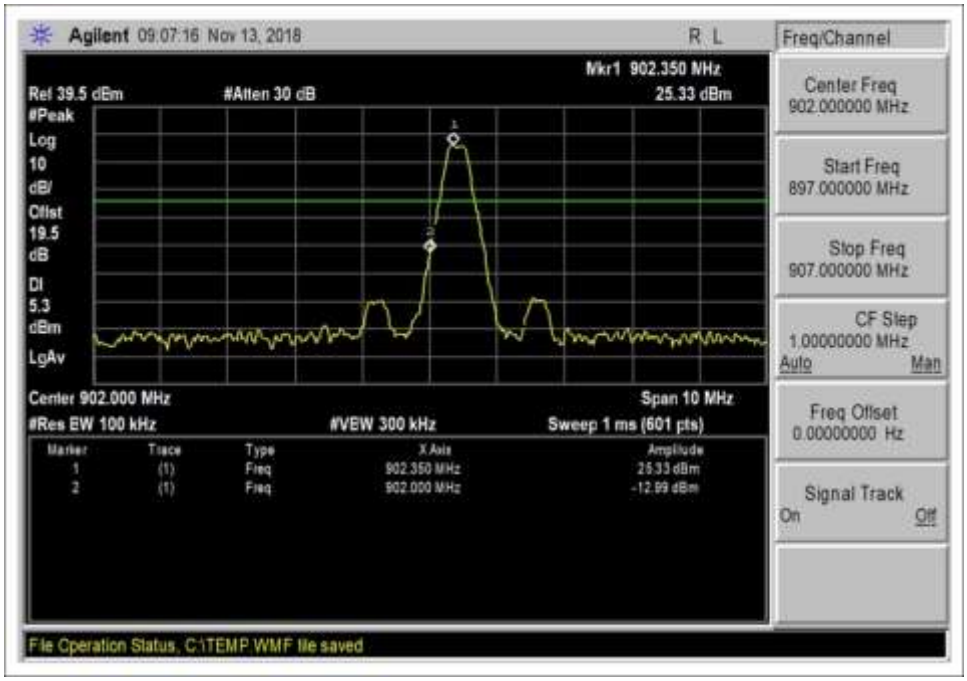
100kbps, Hopping, High Channel, Horizontal Pipe



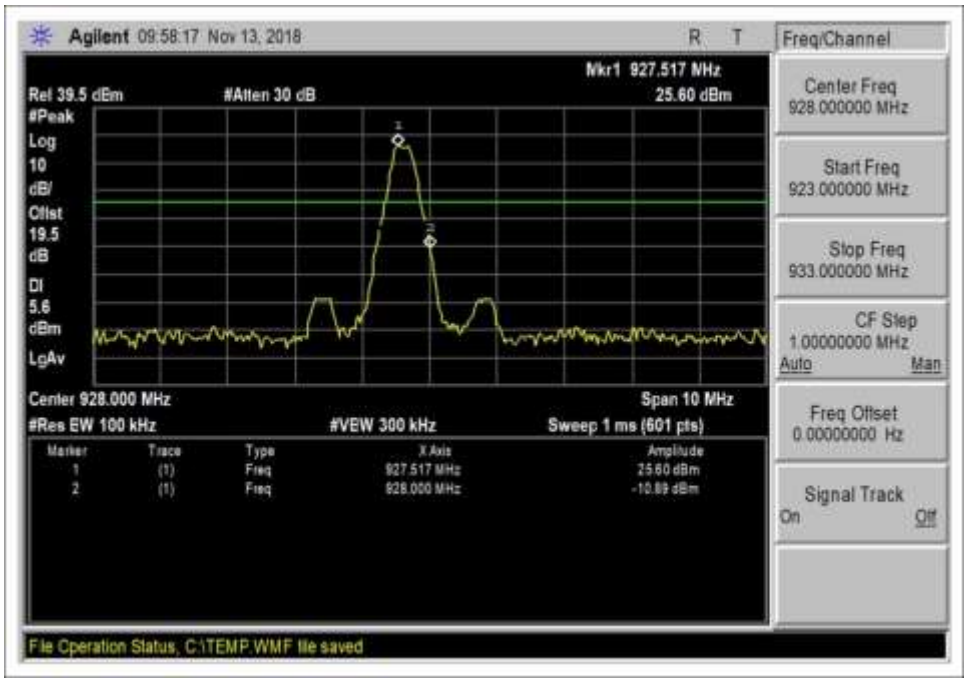
100kbps, Hopping, High Channel, Vertical Pipe



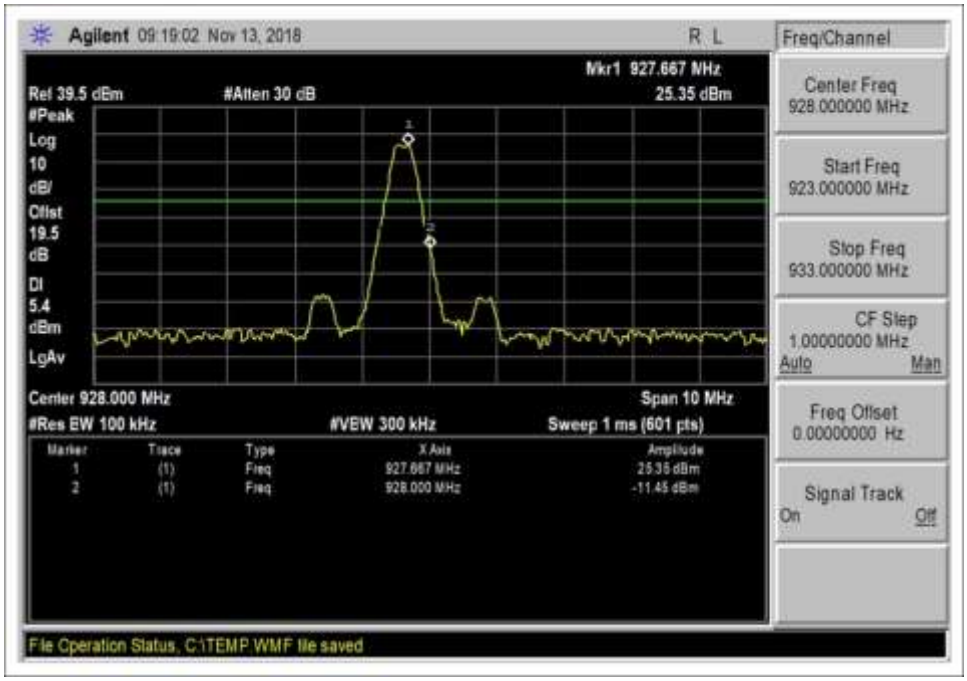
300kbps, Low Channel, Horizontal Pipe



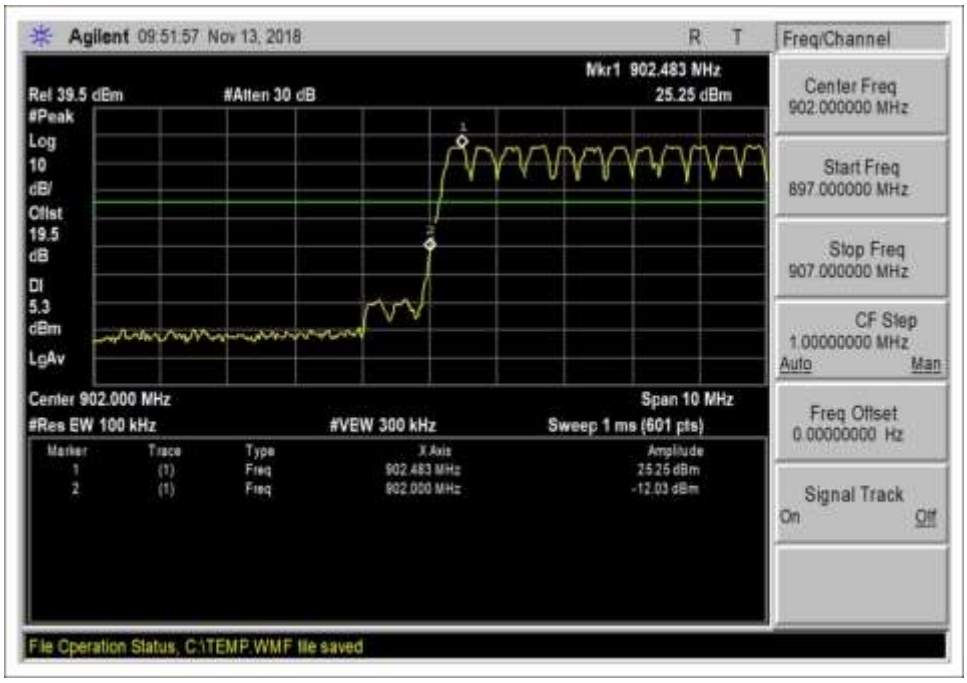
300kbps, Low Channel, Vertical Pipe



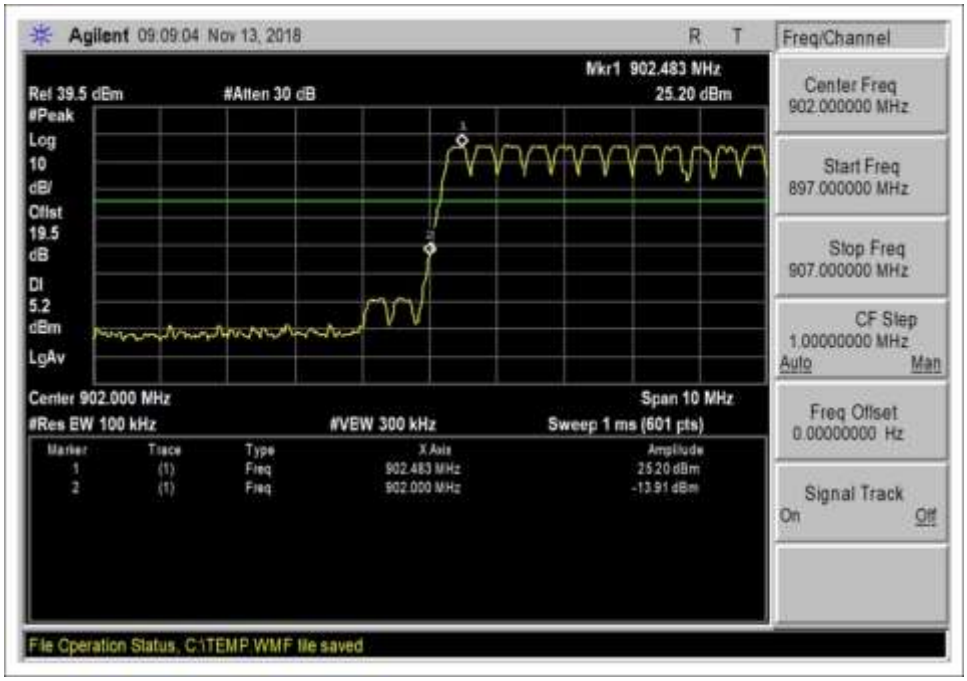
300kbps, High Channel, Horizontal Pipe



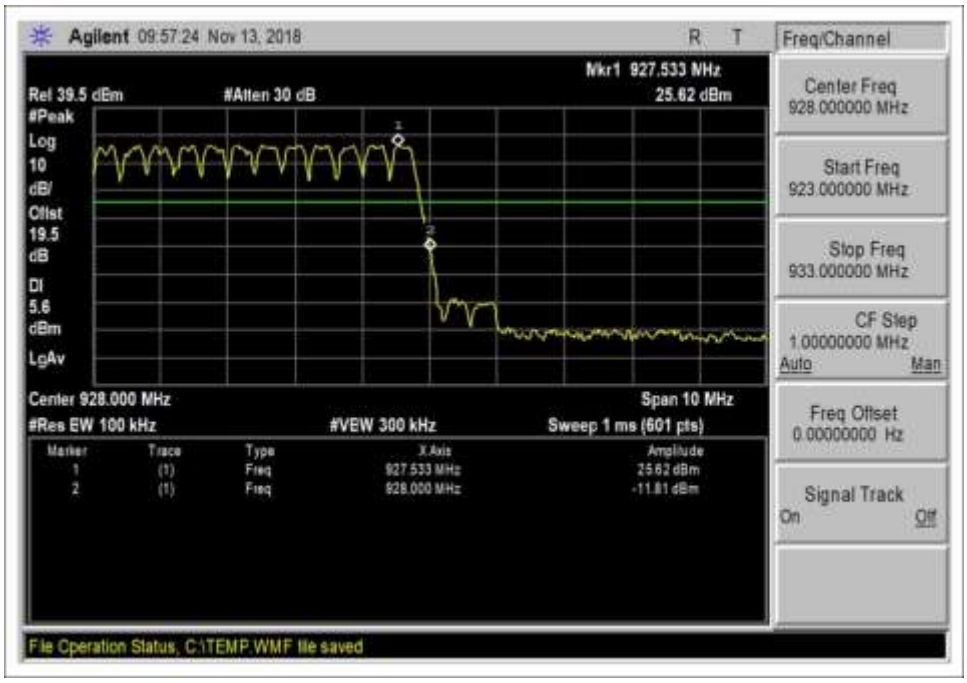
300kbps, High Channel, Vertical Pipe



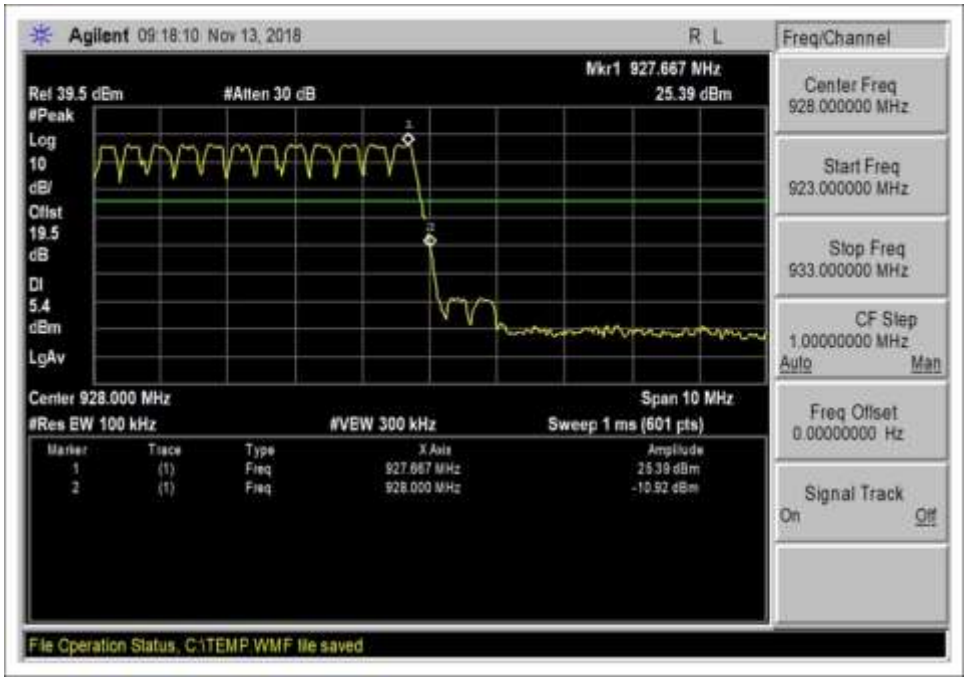
300kbps, Hopping, Low Channel, Horizontal Pipe



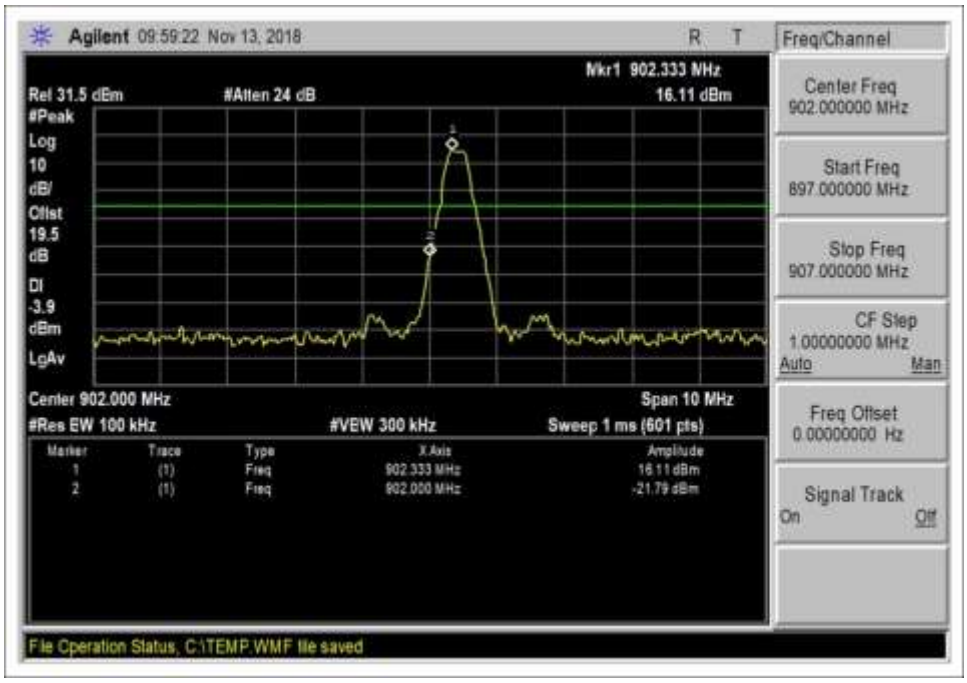
300kbps, Hopping, Low Channel, Vertical Pipe



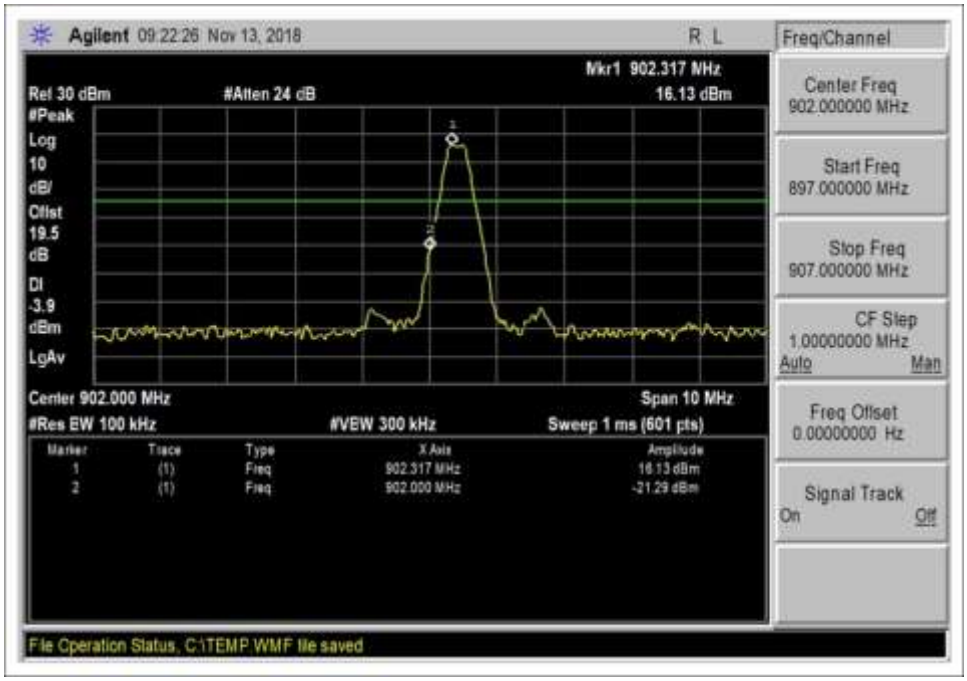
300kbps, Hopping, High Channel, Horizontal Pipe



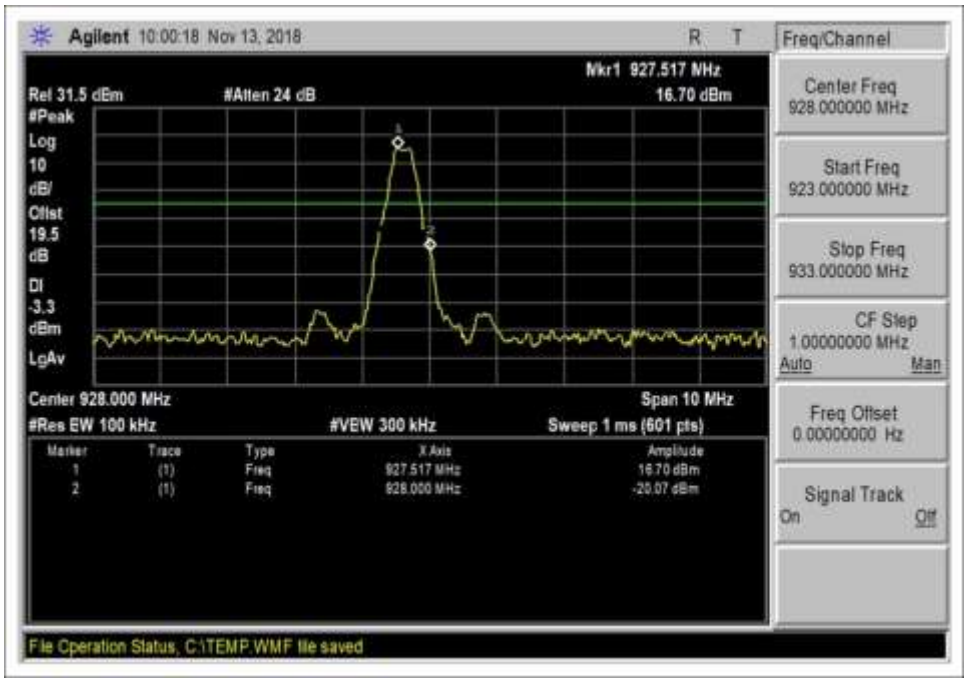
300kbps, Hopping, High Channel, Vertical Pipe



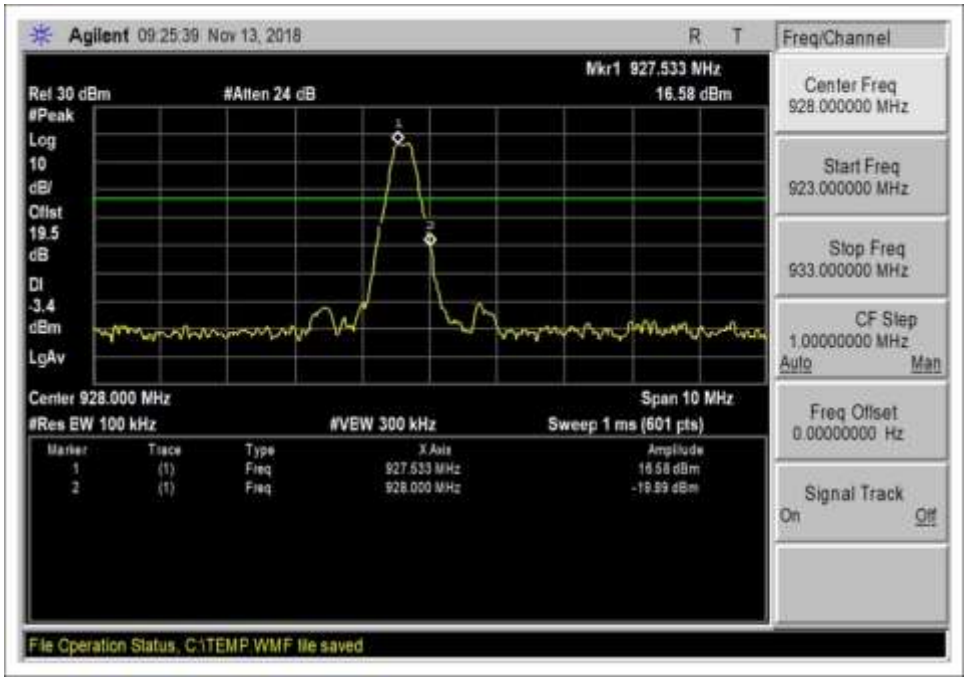
Hybrid, 300kbps, Low Channel, Horizontal Pipe



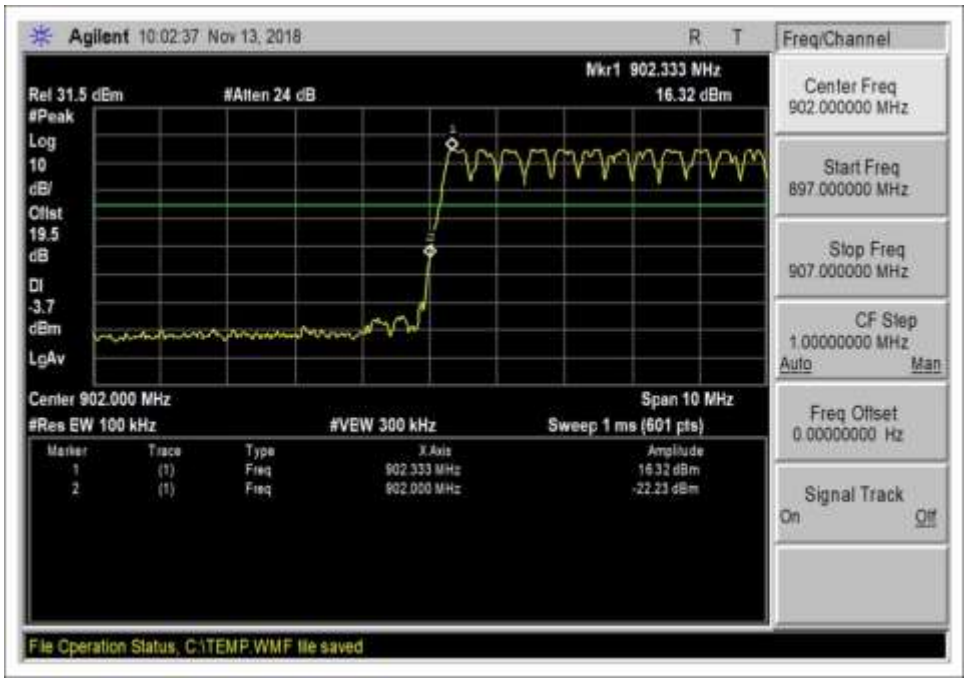
Hybrid, 300kbps, Low Channel, Vertical Pipe



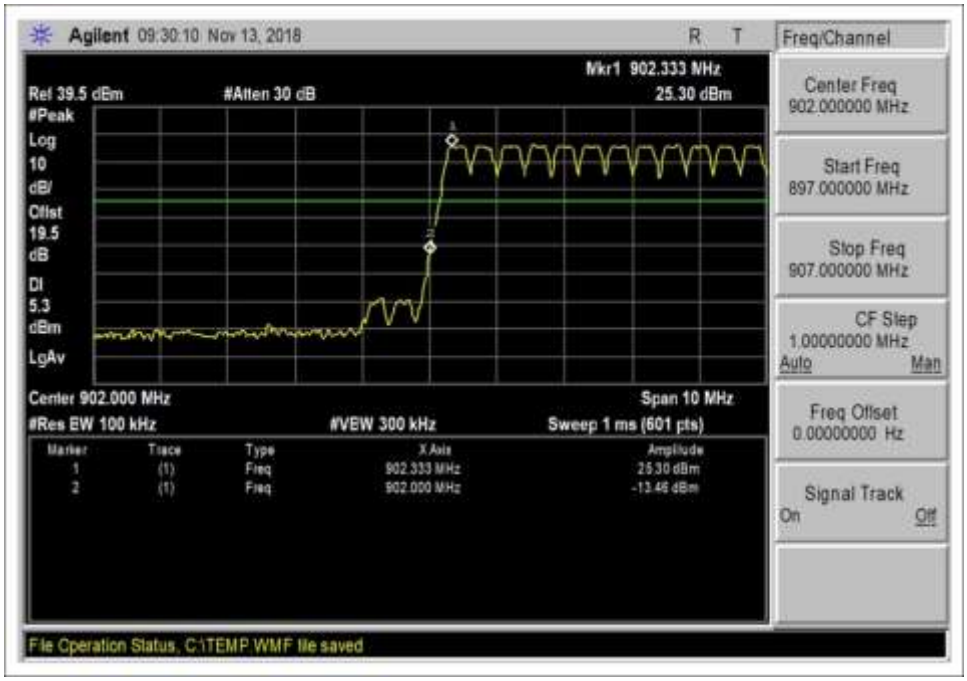
Hybrid, 300kbps, High Channel, Horizontal Pipe



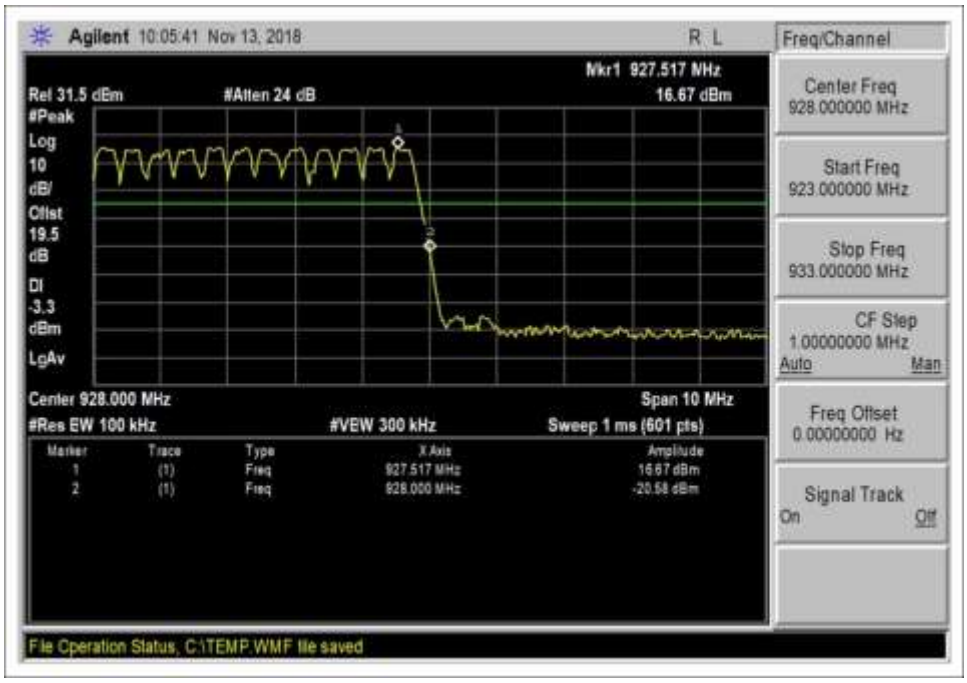
Hybrid, 300kbps, High Channel, Vertical Pipe



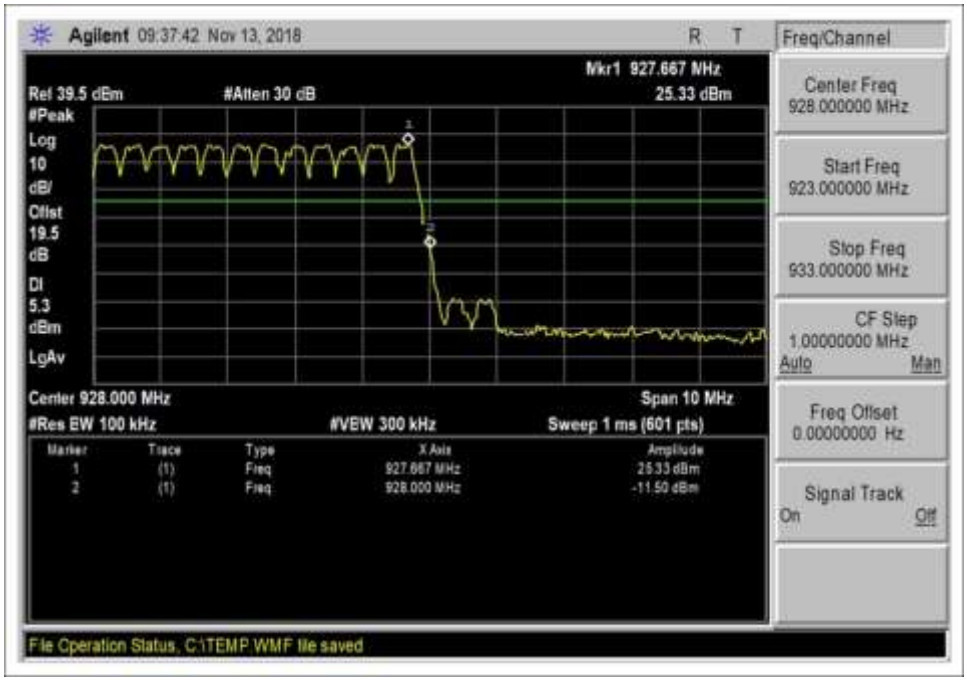
Hybrid, 300kbps, Hopping, Low Channel, Horizontal Pipe



Hybrid, 300kbps, Hopping, Low Channel, Vertical Pipe

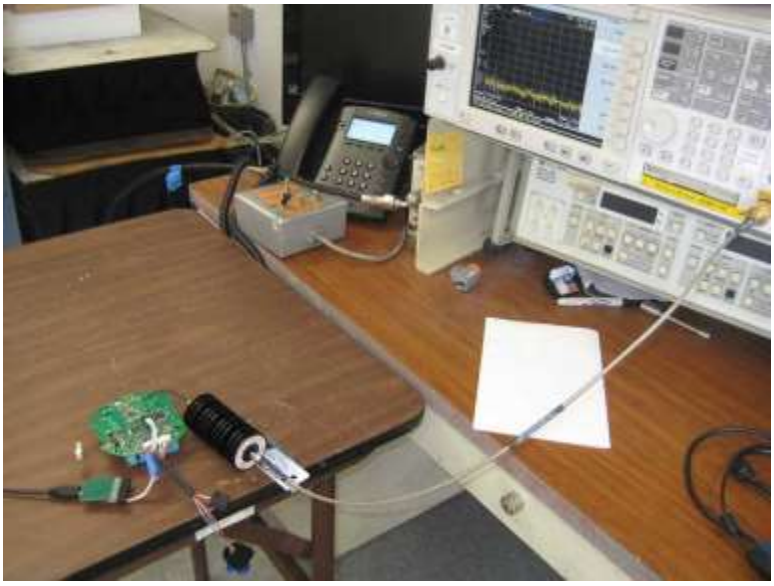


Hybrid, 300kbps, Hopping, High Channel, Horizontal Pipe



Hybrid, 300kbps, Hopping, High Channel, Vertical Pipe

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 #:	**100666**	Date:	11/23/2018
Test Type:	**Maximized Emissions**	Time:	13:25:36
Tested By:	S. Yamamoto	Sequence#:	1
Software:	EMITest 5.03.11		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

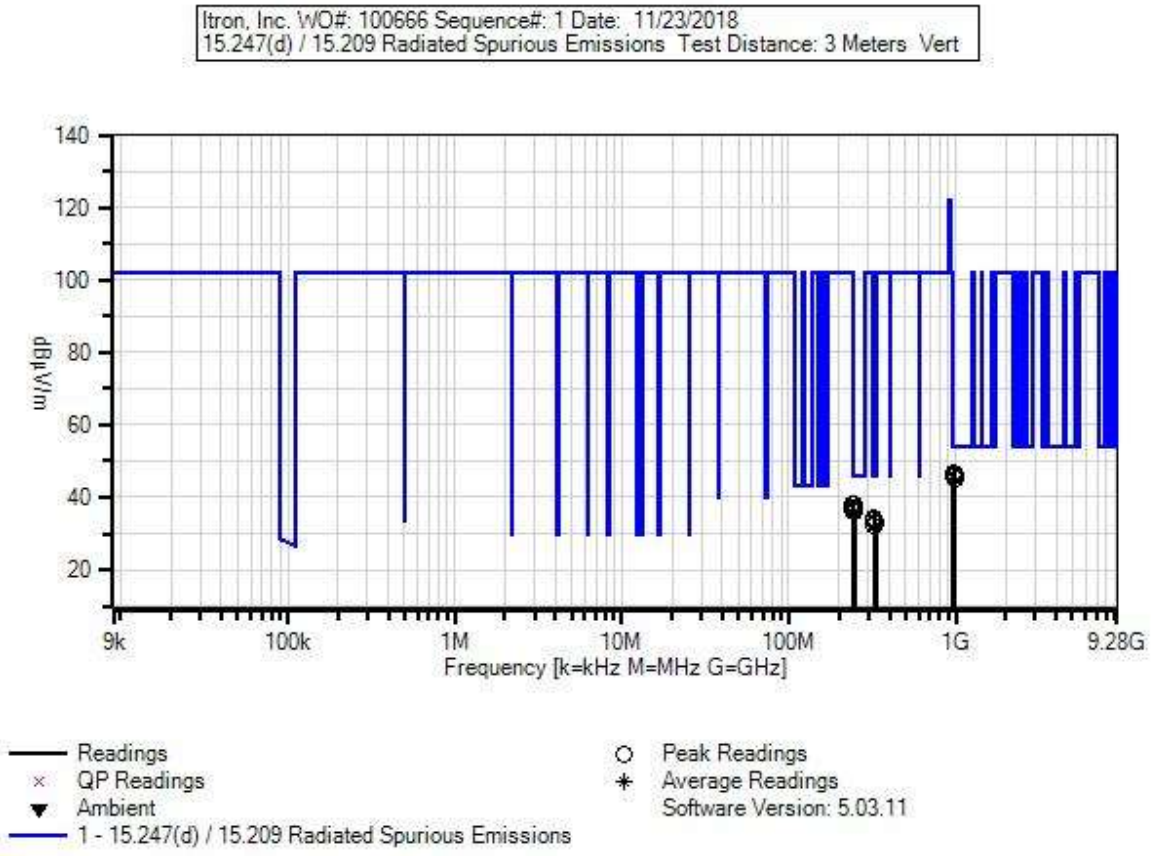
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

The equipment under test (EUT) is placed stand alone on a Styrofoam table top. Connected to the EUT is a laptop computer via USB to serial interface board. The EUT is turned on and set in transmitting mode. The EUT has fresh batteries installed. Nominal input voltage is 6.0Vdc.
The EUT is tested in horizontal pipe orientation.
Operating frequency: 902.3MHz, 915.2MHz, and 926.9MHz.
100kbps FSK modulation.
Firmware power: power level 3.
Frequency range of measurement = 9kHz to 1000MHz.
For data contained within this document, RBW=120kHz, VBW=300kHz.

Temperature: 20°C, Humidity: 40%, Pressure: 100kPa.
Site D.
Test Method: ANSI C63.10 (2013)


Itron, Inc. WO#: 100666 Sequence#: 1 Date: 11/23/2018
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert
140
120
100
80
60
40
20
dBµV/m
9k
100k
1M
10M
100M
1G
9.28G
Frequency [k=kHz M=MHz G=GHz]
Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.11

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02869	Spectrum Analyzer	E4440A	8/10/2018	8/10/2019
T1	ANP06978	Cable	Sucoflex 104A	3/31/2018	3/31/2020
T2	AN00010	Preamp	8447D	2/19/2018	2/19/2020
T3	ANP04382	Cable	LDF-50	6/2/2018	6/2/2020
T4	ANP05569	Cable-Amplitude +15C to +45C (dB)	RG-214/U	12/7/2016	12/7/2018
T5	ANP05283	Attenuator	ATT-0218-06-NNN-02	4/5/2018	4/5/2020
T6	AN01994	Biconilog Antenna	CBL6111C	4/23/2018	4/23/2020

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

#	Freq	Rdng	T1 T5 dB	T2 T6 dB	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV			dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	978.876M	36.6	+0.3 +5.9	-27.3 +24.3	+3.5	+3.7	+0.0	47.0	54.0	-7.0	Horiz
2	967.228M	36.9	+0.3 +5.9	-27.4 +24.2	+3.4	+3.6	+0.0	46.9	54.0	-7.1	Vert
3	978.875M	35.9	+0.3 +5.9	-27.3 +24.3	+3.5	+3.7	+0.0	46.3	54.0	-7.7	Vert
4	980.279M	35.8	+0.3 +5.9	-27.3 +24.3	+3.5	+3.7	+0.0	46.2	54.0	-7.8	Vert
5	241.550M	43.8	+0.1 +5.8	-26.5 +11.7	+1.6	+1.6	+0.0	38.1	46.0	-7.9	Vert
6	993.219M	35.6	+0.3 +5.9	-27.3 +24.4	+3.5	+3.7	+0.0	46.1	54.0	-7.9	Vert
7	242.951M	43.5	+0.1 +5.8	-26.5 +11.8	+1.6	+1.6	+0.0	37.9	46.0	-8.1	Horiz
8	980.293M	35.5	+0.3 +5.9	-27.3 +24.3	+3.5	+3.7	+0.0	45.9	54.0	-8.1	Horiz
9	967.219M	35.6	+0.3 +5.9	-27.4 +24.2	+3.4	+3.6	+0.0	45.6	54.0	-8.4	Horiz
10	244.001M	42.8	+0.1 +5.8	-26.5 +11.9	+1.6	+1.6	+0.0	37.3	46.0	-8.7	Horiz
11	240.333M	43.0	+0.1 +5.8	-26.5 +11.6	+1.6	+1.6	+0.0	37.2	46.0	-8.8	Vert
12	241.567M	42.7	+0.1 +5.8	-26.5 +11.7	+1.6	+1.6	+0.0	37.0	46.0	-9.0	Horiz
13	993.163M	34.4	+0.3 +5.9	-27.3 +24.4	+3.5	+3.7	+0.0	44.9	54.0	-9.1	Horiz
14	244.100M	42.4	+0.1 +5.8	-26.5 +11.9	+1.6	+1.6	+0.0	36.9	46.0	-9.1	Vert
15	247.717M	42.2	+0.1 +5.8	-26.5 +12.1	+1.6	+1.6	+0.0	36.9	46.0	-9.1	Horiz
16	242.933M	42.2	+0.1 +5.8	-26.5 +11.8	+1.6	+1.6	+0.0	36.6	46.0	-9.4	Vert
17	245.267M	41.9	+0.1 +5.8	-26.5 +11.9	+1.6	+1.6	+0.0	36.4	46.0	-9.6	Vert

18	240.383M	42.2	+0.1 +5.8	-26.5 +11.6	+1.6	+1.6	+0.0	36.4	46.0	-9.6	Horiz
19	245.251M	41.8	+0.1 +5.8	-26.5 +11.9	+1.6	+1.6	+0.0	36.3	46.0	-9.7	Horiz
20	246.550M	41.4	+0.1 +5.8	-26.5 +12.0	+1.6	+1.6	+0.0	36.0	46.0	-10.0	Vert
21	323.820M	37.2	+0.2 +5.8	-26.6 +14.1	+1.8	+1.9	+0.0	34.4	46.0	-11.6	Horiz
22	325.033M	36.7	+0.2 +5.8	-26.7 +14.1	+1.9	+1.9	+0.0	33.9	46.0	-12.1	Horiz
23	322.620M	36.5	+0.2 +5.8	-26.6 +14.1	+1.8	+1.9	+0.0	33.7	46.0	-12.3	Horiz
24	331.263M	35.8	+0.2 +5.8	-26.7 +14.3	+1.9	+1.9	+0.0	33.2	46.0	-12.8	Vert
25	330.027M	35.7	+0.2 +5.8	-26.7 +14.3	+1.9	+1.9	+0.0	33.1	46.0	-12.9	Vert
26	332.360M	35.6	+0.2 +5.8	-26.7 +14.3	+1.9	+1.9	+0.0	33.0	46.0	-13.0	Vert
27	328.743M	35.6	+0.2 +5.8	-26.7 +14.2	+1.9	+1.9	+0.0	32.9	46.0	-13.1	Vert
28	326.107M	35.1	+0.2 +5.8	-26.7 +14.2	+1.9	+1.9	+0.0	32.4	46.0	-13.6	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 #:	**100666**	Date:	11/23/2018
Test Type:	**Maximized Emissions**	Time:	15:28:21
Tested By:	S. Yamamoto	Sequence#:	1
Software:	EMITest 5.03.11		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

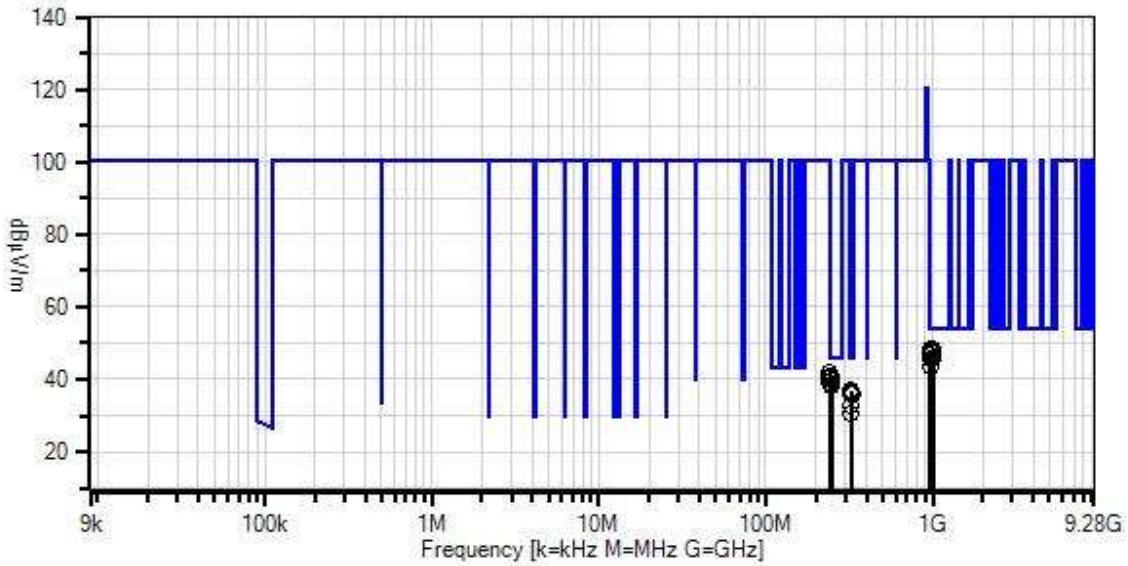
Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

The equipment under test (EUT) is placed stand alone on a Styrofoam table top. Connected to the EUT is a laptop computer via USB to serial interface board. The EUT is turned on and set in transmitting mode. The EUT has fresh batteries installed. Nominal input voltage is 6.0Vdc.
The EUT is tested in vertical pipe orientation.
Operating frequency: 902.3MHz, 915.2MHz, and 926.9MHz.
100kbps FSK modulation.
Firmware power: power level 3.
Frequency range of measurement = 9kHz to 1000MHz.
For data contained within this document, RBW=120kHz, VBW=300kHz.

Temperature: 20°C, Humidity: 40%, Pressure: 100kPa.
Site D.
Test Method: ANSI C63.10 (2013)

Itron, Inc. WO#: 100666 Sequence#: 1 Date: 11/23/2018
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: 5.03.11

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02869	Spectrum Analyzer	E4440A	8/10/2018	8/10/2019
T2	ANP06978	Cable	Sucoflex 104A	3/31/2018	3/31/2020
T3	AN00010	Preamp	8447D	2/19/2018	2/19/2020
T4	ANP04382	Cable	LDF-50	6/2/2018	6/2/2020
T5	ANP05569	Cable-Amplitude +15C to +45C (dB)	RG-214/U	12/7/2016	12/7/2018
T6	ANP05283	Attenuator	ATT-0218-06-NNN-02	4/5/2018	4/5/2020
T7	AN01994	Biconilog Antenna	CBL6111C	4/23/2018	4/23/2020

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	242.802M	47.4	+0.0 +1.6	+0.1 +5.8	-26.5 +11.8	+1.6	+0.0	41.8	46.0	-4.2	Vert
2	240.429M	46.8	+0.0 +1.6	+0.1 +5.8	-26.5 +11.6	+1.6	+0.0	41.0	46.0	-5.0	Vert
3	241.599M	46.6	+0.0 +1.6	+0.1 +5.8	-26.5 +11.7	+1.6	+0.0	40.9	46.0	-5.1	Vert
4	244.088M	46.2	+0.0 +1.6	+0.1 +5.8	-26.5 +11.9	+1.6	+0.0	40.7	46.0	-5.3	Vert
5	998.184M	37.9	+0.0 +3.7	+0.3 +5.9	-27.3 +24.5	+3.5	+0.0	48.5	54.0	-5.5	Vert
6	240.412M	46.1	+0.0 +1.6	+0.1 +5.8	-26.5 +11.6	+1.6	+0.0	40.3	46.0	-5.7	Horiz
7	980.278M	37.9	+0.0 +3.7	+0.3 +5.9	-27.3 +24.3	+3.5	+0.0	48.3	54.0	-5.7	Horiz
8	241.582M	45.9	+0.0 +1.6	+0.1 +5.8	-26.5 +11.7	+1.6	+0.0	40.2	46.0	-5.8	Horiz
9	245.242M	45.4	+0.0 +1.6	+0.1 +5.8	-26.5 +11.9	+1.6	+0.0	39.9	46.0	-6.1	Vert
10	246.478M	45.2	+0.0 +1.6	+0.1 +5.8	-26.5 +12.0	+1.6	+0.0	39.8	46.0	-6.2	Vert
11	993.195M	37.2	+0.0 +3.7	+0.3 +5.9	-27.3 +24.4	+3.5	+0.0	47.7	54.0	-6.3	Horiz
12	242.736M	45.0	+0.0 +1.6	+0.1 +5.8	-26.5 +11.8	+1.6	+0.0	39.4	46.0	-6.6	Horiz
13	993.215M	36.6	+0.0 +3.7	+0.3 +5.9	-27.3 +24.4	+3.5	+0.0	47.1	54.0	-6.9	Vert
14	243.857M	44.5	+0.0 +1.6	+0.1 +5.8	-26.5 +11.8	+1.6	+0.0	38.9	46.0	-7.1	Horiz
15	978.955M	36.5	+0.0 +3.7	+0.3 +5.9	-27.3 +24.3	+3.5	+0.0	46.9	54.0	-7.1	Vert
16	245.176M	44.3	+0.0 +1.6	+0.1 +5.8	-26.5 +11.9	+1.6	+0.0	38.8	46.0	-7.2	Horiz
17	967.187M	36.6	+0.0 +3.6	+0.3 +5.9	-27.4 +24.2	+3.4	+0.0	46.6	54.0	-7.4	Horiz

18	246.445M	43.3	+0.0 +1.6	+0.1 +5.8	-26.5 +12.0	+1.6	+0.0	37.9	46.0	-8.1	Horiz
19	998.249M	35.0	+0.0 +3.7	+0.3 +5.9	-27.3 +24.5	+3.5	+0.0	45.6	54.0	-8.4	Horiz
20	978.897M	35.0	+0.0 +3.7	+0.3 +5.9	-27.3 +24.3	+3.5	+0.0	45.4	54.0	-8.6	Horiz
21	326.270M	39.7	+0.0 +1.9	+0.2 +5.8	-26.7 +14.2	+1.9	+0.0	37.0	46.0	-9.0	Horiz
22	324.940M	39.2	+0.0 +1.9	+0.2 +5.8	-26.7 +14.1	+1.9	+0.0	36.4	46.0	-9.6	Horiz
23	327.483M	38.9	+0.0 +1.9	+0.2 +5.8	-26.7 +14.2	+1.9	+0.0	36.2	46.0	-9.8	Horiz
24	323.727M	38.9	+0.0 +1.9	+0.2 +5.8	-26.6 +14.1	+1.8	+0.0	36.1	46.0	-9.9	Horiz
25	967.175M	33.6	+0.0 +3.6	+0.3 +5.9	-27.4 +24.2	+3.4	+0.0	43.6	54.0	-10.4	Vert
26	980.330M	33.2	+0.0 +3.7	+0.3 +5.9	-27.3 +24.3	+3.5	+0.0	43.6	54.0	-10.4	Vert
27	322.560M	35.4	+0.0 +1.9	+0.2 +5.8	-26.6 +14.1	+1.8	+0.0	32.6	46.0	-13.4	Vert
28	323.680M	33.1	+0.0 +1.9	+0.2 +5.8	-26.6 +14.1	+1.8	+0.0	30.3	46.0	-15.7	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 #:	**100666**	Date:	11/21/2018
Test Type:	**Maximized Emissions**	Time:	19:30:12
Tested By:	S. Yamamoto	Sequence#:	1
Software:	EMITest 5.03.11		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

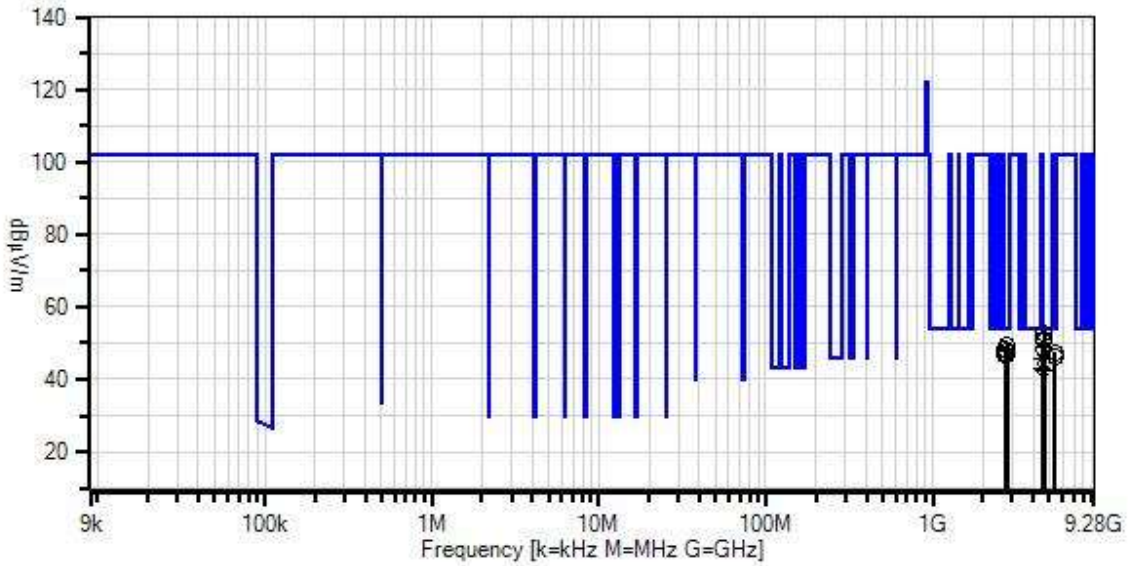
Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

The equipment under test (EUT) is placed stand alone on a Styrofoam table top. Connected to the EUT is a laptop computer via USB to serial interface board. The EUT is turned on and set in transmitting mode. The EUT has fresh batteries installed. Nominal input voltage is 6.0Vdc.
The EUT is tested in horizontal pipe orientation.
Operating frequency: 902.3MHz, 915.2MHz, and 926.9MHz.
100kbps FSK modulation.
Firmware power: power level 3.
Frequency range of measurement = 1GHz to 9.3GHz.
For data contained within this document, RBW=1MHz, VBW=3MHz.

Temperature: 22°C, Humidity: 30%, Pressure: 100kPa.
Site D.
Test Method: ANSI C63.10 (2013)

Itron, Inc. WO#: 100666 Sequence#: 1 Date: 11/21/2018
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: 5.03.11

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02869	Spectrum Analyzer	E4440A	8/10/2018	8/10/2019
T1	ANP04382	Cable	LDF-50	6/2/2018	6/2/2020
T2	ANP07138	Cable	ANDL1-PNMNM-60	3/1/2017	3/1/2019
T3	AN00787	Preamp	83017A	6/9/2017	6/9/2019
T4	AN03169	High Pass Filter	HM1155-11SS	6/15/2017	6/15/2019
T5	ANP07245	Cable	32022-29094K-29094K-24TC	7/5/2018	7/5/2020
T6	AN01646	Horn Antenna	3115	3/14/2018	3/14/2020

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	4634.667M	45.9	+7.8 +0.8	+5.9 +32.6	-40.7	+0.2	+0.0	52.5	54.0	-1.5	Vert
2	4575.717M	44.4	+7.7 +0.8	+5.8 +32.7	-40.5	+0.1	+0.0	51.0	54.0	-3.0	Vert
3	4576.000M	44.1	+7.7 +0.8	+5.8 +32.7	-40.5	+0.1	+0.0	50.7	54.0	-3.3	Horiz
4	2780.570M	49.9	+5.8 +0.5	+4.4 +29.1	-40.3	+0.2	+0.0	49.6	54.0	-4.4	Vert
5	2706.920M	49.1	+5.7 +0.5	+4.3 +28.9	-40.3	+0.2	+0.0	48.4	54.0	-5.6	Horiz
6	4634.527M	41.8	+7.8 +0.8	+5.9 +32.6	-40.7	+0.2	+0.0	48.4	54.0	-5.6	Horiz
7	2780.673M	48.0	+5.8 +0.5	+4.4 +29.1	-40.3	+0.2	+0.0	47.7	54.0	-6.3	Horiz
8	2745.297M	48.3	+5.7 +0.5	+4.3 +29.0	-40.3	+0.2	+0.0	47.7	54.0	-6.3	Vert
9	5413.343M	37.5	+8.9 +0.5	+6.4 +33.8	-39.7	+0.1	+0.0	47.5	54.0	-6.5	Vert
10	2745.400M	47.6	+5.7 +0.5	+4.3 +29.0	-40.3	+0.2	+0.0	47.0	54.0	-7.0	Horiz
11	2706.923M	47.4	+5.7 +0.5	+4.3 +28.9	-40.3	+0.2	+0.0	46.7	54.0	-7.3	Vert
12	5413.847M	36.3	+8.9 +0.5	+6.4 +33.8	-39.7	+0.1	+0.0	46.3	54.0	-7.7	Horiz
13	4511.500M Ave	39.1	+7.7 +0.8	+5.6 +32.8	-40.2	+0.1	+0.0	45.9	54.0	-8.1	Horiz
^	4511.500M	45.9	+7.7 +0.8	+5.6 +32.8	-40.2	+0.1	+0.0	52.7	54.0	-1.3	Horiz
15	4511.500M Ave	36.1	+7.7 +0.8	+5.6 +32.8	-40.2	+0.1	+0.0	42.9	54.0	-11.1	Vert
^	4511.500M	46.0	+7.7 +0.8	+5.6 +32.8	-40.2	+0.1	+0.0	52.8	54.0	-1.2	Vert
17	4634.500M Ave	35.8	+7.8 +0.8	+5.9 +32.6	-40.7	+0.2	+0.0	42.4	54.0	-11.6	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 #:	**100666**	Date:	11/21/2018
Test Type:	**Maximized Emissions**	Time:	15:37:08
Tested By:	S. Yamamoto	Sequence#:	1
Software:	EMITest 5.03.11		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

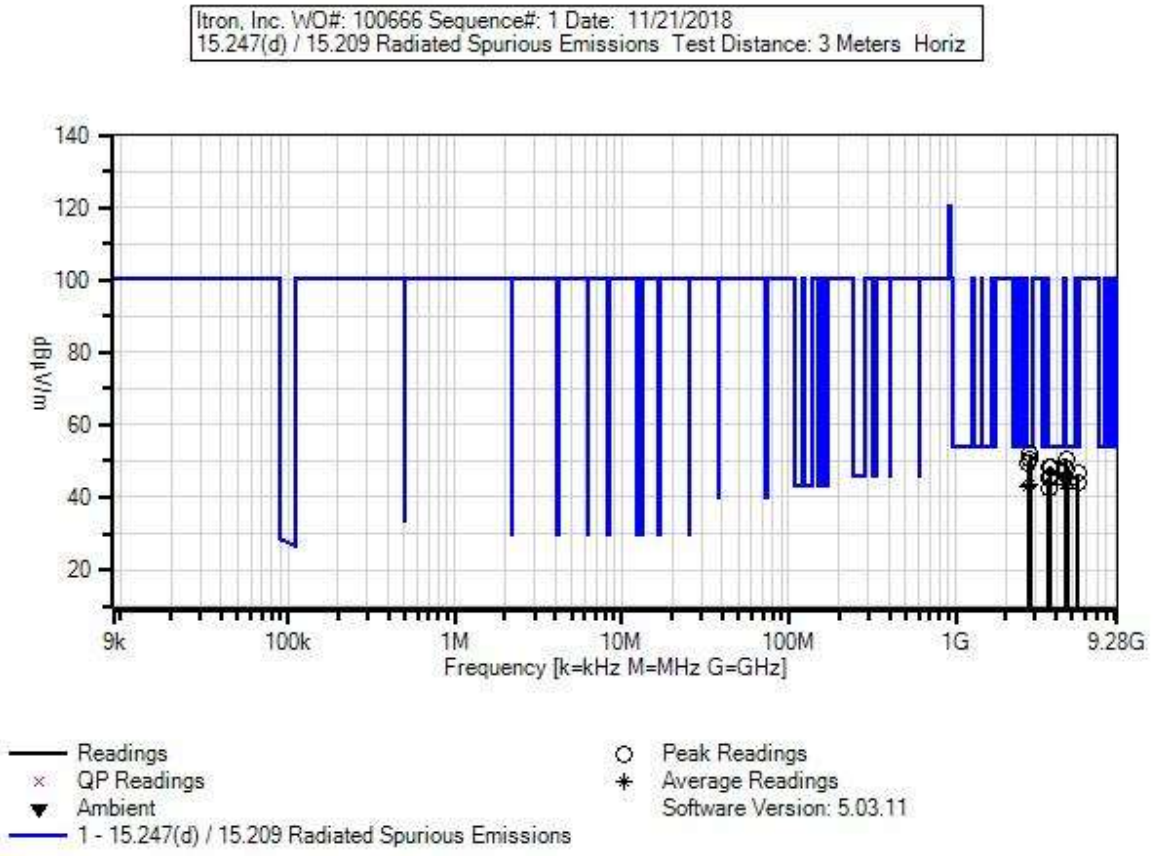
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

The equipment under test (EUT) is placed stand alone on a Styrofoam table top. Connected to the EUT is a laptop computer via USB to serial interface board. The EUT is turned on and set in transmitting mode. The EUT has fresh batteries installed. Nominal input voltage is 6.0Vdc.
The EUT is tested in vertical pipe orientation.
Operating frequency: 902.3MHz, 915.2MHz, and 926.9MHz.
100kbps FSK modulation.
Firmware power: power level 3.
Frequency range of measurement = 1GHz to 9.3GHz.
For data contained within this document, RBW=1MHz, VBW=3MHz.

Temperature: 22°C, Humidity: 30%, Pressure: 100kPa.
Site D.
Test Method: ANSI C63.10 (2013)


Itron, Inc. WO#: 100666 Sequence#: 1 Date: 11/21/2018
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz
140
120
100
80
60
40
20
dBµV/m
9k
100k
1M
10M
100M
1G
9.28G
Frequency [k=kHz M=MHz G=GHz]
Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.11

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02869	Spectrum Analyzer	E4440A	8/10/2018	8/10/2019
T2	ANP04382	Cable	LDF-50	6/2/2018	6/2/2020
T3	ANP07138	Cable	ANDL1-PNMNM-60	3/1/2017	3/1/2019
T4	AN00787	Preamp	83017A	6/9/2017	6/9/2019
T5	AN03169	High Pass Filter	HM1155-11SS	6/15/2017	6/15/2019
T6	ANP07245	Cable	32022-29094K-29094K-24TC	7/5/2018	7/5/2020
T7	AN01646	Horn Antenna	3115	3/14/2018	3/14/2020

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	2780.597M	52.2	+0.0 +0.2	+5.8 +0.5	+4.4 +29.1	-40.3	+0.0	51.9	54.0	-2.1	Vert
2	2745.660M	51.1	+0.0 +0.2	+5.7 +0.5	+4.3 +29.0	-40.3	+0.0	50.5	54.0	-3.5	Vert
3	4575.923M	43.8	+0.0 +0.1	+7.7 +0.8	+5.8 +32.7	-40.5	+0.0	50.4	54.0	-3.6	Vert
4	2780.703M	50.7	+0.0 +0.2	+5.8 +0.5	+4.4 +29.1	-40.3	+0.0	50.4	54.0	-3.6	Horiz
5	2706.823M	49.9	+0.0 +0.2	+5.7 +0.5	+4.3 +28.9	-40.3	+0.0	49.2	54.0	-4.8	Vert
6	4511.730M	41.8	+0.0 +0.1	+7.7 +0.8	+5.6 +32.8	-40.2	+0.0	48.6	54.0	-5.4	Vert
7	3661.000M	43.8	+0.0 +0.2	+7.1 +0.6	+5.2 +31.8	-40.3	+0.0	48.4	54.0	-5.6	Vert
8	3707.927M	43.2	+0.0 +0.2	+7.1 +0.6	+5.2 +32.1	-40.2	+0.0	48.2	54.0	-5.8	Horiz
9	4634.133M	41.3	+0.0 +0.2	+7.8 +0.8	+5.9 +32.6	-40.7	+0.0	47.9	54.0	-6.1	Vert
10	5413.667M	36.5	+0.0 +0.1	+8.9 +0.5	+6.4 +33.8	-39.7	+0.0	46.5	54.0	-7.5	Horiz
11	3707.660M	40.9	+0.0 +0.2	+7.1 +0.6	+5.2 +32.1	-40.2	+0.0	45.9	54.0	-8.1	Vert
12	4576.000M Ave	39.0	+0.0 +0.1	+7.7 +0.8	+5.8 +32.7	-40.5	+0.0	45.6	54.0	-8.4	Horiz
^	4576.000M	47.1	+0.0 +0.1	+7.7 +0.8	+5.8 +32.7	-40.5	+0.0	53.7	54.0	-0.3	Horiz
14	3608.945M	41.7	+0.0 +0.2	+7.0 +0.7	+5.1 +31.3	-40.4	+0.0	45.6	54.0	-8.4	Vert
15	4634.500M Ave	38.4	+0.0 +0.2	+7.8 +0.8	+5.9 +32.6	-40.7	+0.0	45.0	54.0	-9.0	Horiz
16	3660.890M	40.3	+0.0 +0.2	+7.1 +0.6	+5.2 +31.8	-40.3	+0.0	44.9	54.0	-9.1	Horiz
17	5413.750M	33.8	+0.0 +0.1	+8.9 +0.5	+6.4 +33.8	-39.7	+0.0	43.8	54.0	-10.2	Vert

18	2745.600M	44.2	+0.0	+5.7	+4.3	-40.3	+0.0	43.6	54.0	-10.4	Horiz
	Ave		+0.2	+0.5	+29.0						
	^ 2745.600M	52.9	+0.0	+5.7	+4.3	-40.3	+0.0	52.3	54.0	-1.7	Horiz
			+0.2	+0.5	+29.0						
20	4511.500M	36.8	+0.0	+7.7	+5.6	-40.2	+0.0	43.6	54.0	-10.4	Horiz
	Ave		+0.1	+0.8	+32.8						
	^ 4511.500M	46.5	+0.0	+7.7	+5.6	-40.2	+0.0	53.3	54.0	-0.7	Horiz
			+0.1	+0.8	+32.8						
22	4634.500M	37.0	+0.0	+7.8	+5.9	-40.7	+0.0	43.6	54.0	-10.4	Horiz
	Ave		+0.2	+0.8	+32.6						
	^ 4634.500M	47.1	+0.0	+7.8	+5.9	-40.7	+0.0	53.7	54.0	-0.3	Horiz
			+0.2	+0.8	+32.6						
	^ 4634.500M	46.8	+0.0	+7.8	+5.9	-40.7	+0.0	53.4	54.0	-0.6	Horiz
			+0.2	+0.8	+32.6						
25	2706.900M	43.4	+0.0	+5.7	+4.3	-40.3	+0.0	42.7	54.0	-11.3	Horiz
	Ave		+0.2	+0.5	+28.9						
	^ 2706.900M	51.6	+0.0	+5.7	+4.3	-40.3	+0.0	50.9	54.0	-3.1	Horiz
			+0.2	+0.5	+28.9						
27	3609.380M	38.5	+0.0	+7.0	+5.1	-40.4	+0.0	42.4	54.0	-11.6	Horiz
			+0.2	+0.7	+31.3						

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 #:	**100666**	Date:	11/23/2018
Test Type:	**Maximized Emissions**	Time:	14:23:28
Tested By:	S. Yamamoto	Sequence#:	1
Software:	EMITest 5.03.11		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

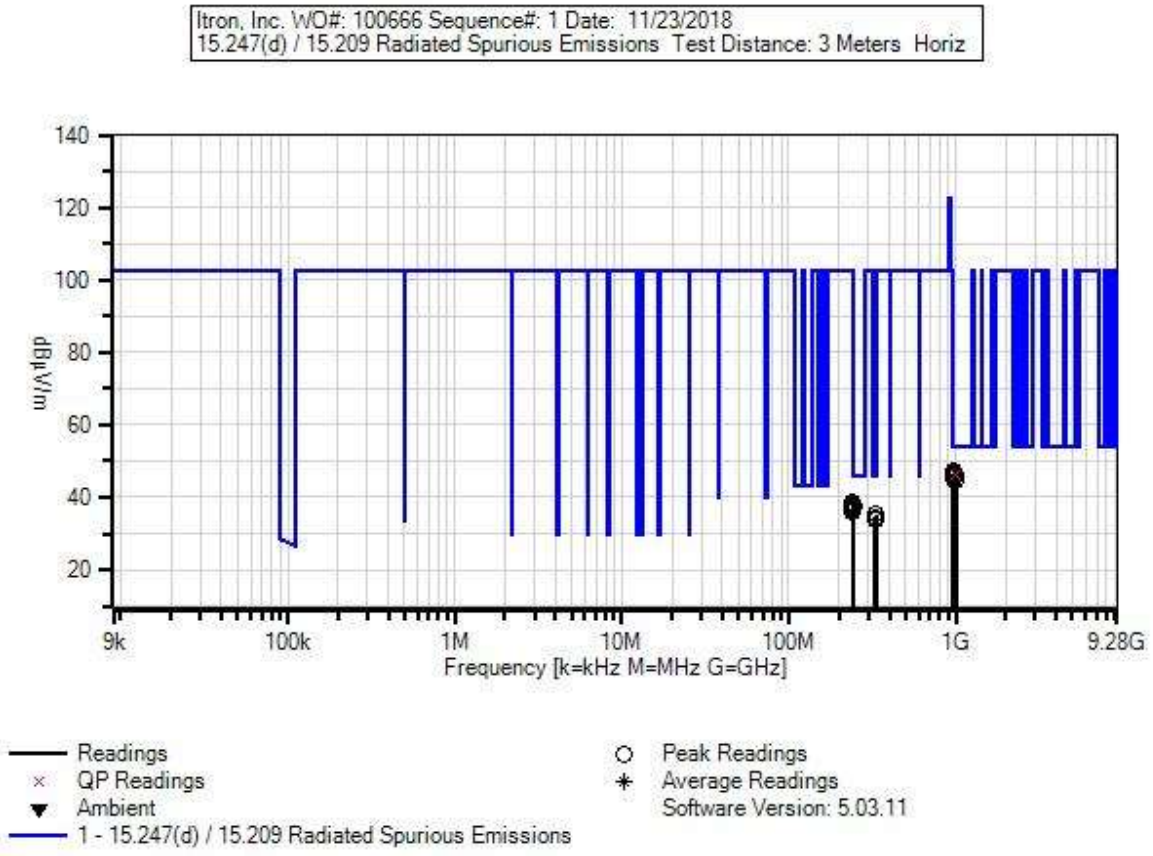
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

The equipment under test (EUT) is placed stand alone on a Styrofoam table top. Connected to the EUT is a laptop computer via USB to serial interface board. The EUT is turned on and set in transmitting mode. The EUT has fresh batteries installed. Nominal input voltage is 6.0Vdc.
The EUT is tested in horizontal pipe orientation.
Operating frequency: 902.4MHz, 915.2MHz, and 927.6MHz.
300kbps GFSK modulation.
Firmware power: power level 3.
Frequency range of measurement = 9kHz to 1000MHz.
For data contained within this document, RBW=120kHz, VBW=300kHz.

Temperature: 20°C, Humidity: 40%, Pressure: 100kPa.
Site D.
Test Method: ANSI C63.10 (2013)


Itron, Inc. WO#: 100666 Sequence#: 1 Date: 11/23/2018
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz
140
120
100
80
60
40
20
dBµV/m
9k
100k
1M
10M
100M
1G
9.28G
Frequency [k=kHz M=MHz G=GHz]
Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.11

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02869	Spectrum Analyzer	E4440A	8/10/2018	8/10/2019
T1	ANP06978	Cable	Sucoflex 104A	3/31/2018	3/31/2020
T2	AN00010	Preamp	8447D	2/19/2018	2/19/2020
T3	ANP04382	Cable	LDF-50	6/2/2018	6/2/2020
T4	ANP05569	Cable-Amplitude +15C to +45C (dB)	RG-214/U	12/7/2016	12/7/2018
T5	ANP05283	Attenuator	ATT-0218-06-NNN-02	4/5/2018	4/5/2020
T6	AN01994	Biconilog Antenna	CBL6111C	4/23/2018	4/23/2020

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

#	Freq	Rdng	T1 T5 dB	T2 T6 dB	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV			dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	979.685M	36.8	+0.3 +5.9	-27.3 +24.3	+3.5	+3.7	+0.0	47.2	54.0	-6.8	Vert
2	979.686M	36.4	+0.3 +5.9	-27.3 +24.3	+3.5	+3.7	+0.0	46.8	54.0	-7.2	Horiz
3	967.118M	36.6	+0.3 +5.9	-27.4 +24.2	+3.4	+3.6	+0.0	46.6	54.0	-7.4	Vert
4	241.583M	44.2	+0.1 +5.8	-26.5 +11.7	+1.6	+1.6	+0.0	38.5	46.0	-7.5	Horiz
5	967.119M	36.4	+0.3 +5.9	-27.4 +24.2	+3.4	+3.6	+0.0	46.4	54.0	-7.6	Horiz
6	993.271M	35.9	+0.3 +5.9	-27.3 +24.4	+3.5	+3.7	+0.0	46.4	54.0	-7.6	Vert
7	993.284M	35.9	+0.3 +5.9	-27.3 +24.4	+3.5	+3.7	+0.0	46.4	54.0	-7.6	Horiz
8	998.376M QP	35.7	+0.3 +5.9	-27.3 +24.5	+3.5	+3.7	+0.0	46.3	54.0	-7.7	Vert
^	998.376M	41.5	+0.3 +5.9	-27.3 +24.5	+3.5	+3.7	+0.0	52.1	54.0	-1.9	Vert
10	979.661M	35.6	+0.3 +5.9	-27.3 +24.3	+3.5	+3.7	+0.0	46.0	54.0	-8.0	Horiz
11	240.350M	43.8	+0.1 +5.8	-26.5 +11.6	+1.6	+1.6	+0.0	38.0	46.0	-8.0	Vert
12	980.469M	35.3	+0.3 +5.9	-27.3 +24.3	+3.5	+3.7	+0.0	45.7	54.0	-8.3	Vert
13	244.067M	43.0	+0.1 +5.8	-26.5 +11.9	+1.6	+1.6	+0.0	37.5	46.0	-8.5	Horiz
14	240.383M	43.2	+0.1 +5.8	-26.5 +11.6	+1.6	+1.6	+0.0	37.4	46.0	-8.6	Horiz
15	242.867M	42.8	+0.1 +5.8	-26.5 +11.8	+1.6	+1.6	+0.0	37.2	46.0	-8.8	Horiz
16	980.350M	34.6	+0.3 +5.9	-27.3 +24.3	+3.5	+3.7	+0.0	45.0	54.0	-9.0	Horiz
17	241.500M	42.4	+0.1 +5.8	-26.5 +11.7	+1.6	+1.6	+0.0	36.7	46.0	-9.3	Vert

18	998.295M	34.1	+0.3 +5.9	-27.3 +24.5	+3.5	+3.7	+0.0	44.7	54.0	-9.3	Horiz
19	242.800M	41.3	+0.1 +5.8	-26.5 +11.8	+1.6	+1.6	+0.0	35.7	46.0	-10.3	Vert
20	331.240M	37.8	+0.2 +5.8	-26.7 +14.3	+1.9	+1.9	+0.0	35.2	46.0	-10.8	Horiz
21	332.243M	37.1	+0.2 +5.8	-26.7 +14.3	+1.9	+1.9	+0.0	34.5	46.0	-11.5	Horiz
22	327.530M	37.1	+0.2 +5.8	-26.7 +14.2	+1.9	+1.9	+0.0	34.4	46.0	-11.6	Horiz
23	328.697M	36.8	+0.2 +5.8	-26.7 +14.2	+1.9	+1.9	+0.0	34.1	46.0	-11.9	Horiz
24	332.220M	36.3	+0.2 +5.8	-26.7 +14.3	+1.9	+1.9	+0.0	33.7	46.0	-12.3	Vert
25	333.573M	36.2	+0.2 +5.8	-26.7 +14.4	+1.9	+1.9	+0.0	33.7	46.0	-12.3	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 #:	**100666**	Date:	11/23/2018
Test Type:	**Maximized Emissions**	Time:	16:04:00
Tested By:	S. Yamamoto	Sequence#:	1
Software:	EMITest 5.03.11		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

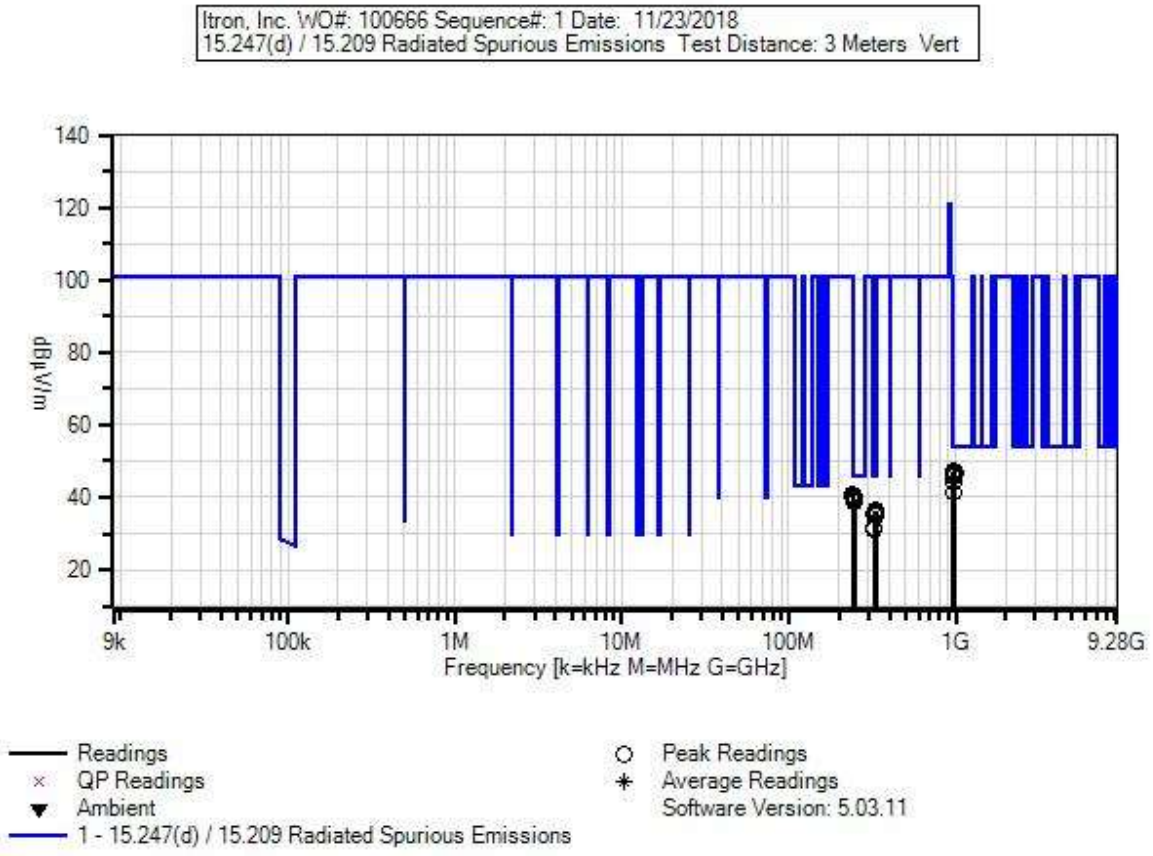
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

The equipment under test (EUT) is placed stand alone on a Styrofoam table top. Connected to the EUT is a laptop computer via USB to serial interface board. The EUT is turned on and set in transmitting mode. The EUT has fresh batteries installed. Nominal input voltage is 6.0Vdc.
The EUT is tested in vertical pipe orientation.
Operating frequency: 902.4MHz, 915.2MHz, and 927.6MHz.
300kbps GFSK modulation.
Firmware power: power level 3.
Frequency range of measurement = 9kHz to 1000MHz.
For data contained within this document, RBW=120kHz, VBW=300kHz.

Temperature: 20°C, Humidity: 40%, Pressure: 100kPa.
Site D.
Test Method: ANSI C63.10 (2013)


Itron, Inc. WO#: 100666 Sequence#: 1 Date: 11/23/2018
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert
140
120
100
80
60
40
20
dBµV/m
9k
100k
1M
10M
100M
1G
9.28G
Frequency [k=kHz M=MHz G=GHz]
Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.11

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02869	Spectrum Analyzer	E4440A	8/10/2018	8/10/2019
T2	ANP06978	Cable	Sucoflex 104A	3/31/2018	3/31/2020
T3	AN00010	Preamp	8447D	2/19/2018	2/19/2020
T4	ANP04382	Cable	LDF-50	6/2/2018	6/2/2020
T5	ANP05569	Cable-Amplitude +15C to +45C (dB)	RG-214/U	12/7/2016	12/7/2018
T6	ANP05283	Attenuator	ATT-0218-06-NNN-02	4/5/2018	4/5/2020
T7	AN01994	Biconilog Antenna	CBL6111C	4/23/2018	4/23/2020

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	242.833M	46.3	+0.0 +1.6	+0.1 +5.8	-26.5 +11.8	+1.6	+0.0	40.7	46.0	-5.3	Horiz
2	242.850M	46.3	+0.0 +1.6	+0.1 +5.8	-26.5 +11.8	+1.6	+0.0	40.7	46.0	-5.3	Vert
3	241.583M	46.2	+0.0 +1.6	+0.1 +5.8	-26.5 +11.7	+1.6	+0.0	40.5	46.0	-5.5	Horiz
4	240.333M	46.3	+0.0 +1.6	+0.1 +5.8	-26.5 +11.6	+1.6	+0.0	40.5	46.0	-5.5	Horiz
5	244.083M	45.9	+0.0 +1.6	+0.1 +5.8	-26.5 +11.9	+1.6	+0.0	40.4	46.0	-5.6	Vert
6	241.650M	46.0	+0.0 +1.6	+0.1 +5.8	-26.5 +11.7	+1.6	+0.0	40.3	46.0	-5.7	Vert
7	240.417M	45.8	+0.0 +1.6	+0.1 +5.8	-26.5 +11.6	+1.6	+0.0	40.0	46.0	-6.0	Vert
8	245.200M	45.0	+0.0 +1.6	+0.1 +5.8	-26.5 +11.9	+1.6	+0.0	39.5	46.0	-6.5	Vert
9	980.324M	36.9	+0.0 +3.7	+0.3 +5.9	-27.3 +24.3	+3.5	+0.0	47.3	54.0	-6.7	Horiz
10	244.217M	44.7	+0.0 +1.6	+0.1 +5.8	-26.5 +11.9	+1.6	+0.0	39.2	46.0	-6.8	Horiz
11	993.266M	36.5	+0.0 +3.7	+0.3 +5.9	-27.3 +24.4	+3.5	+0.0	47.0	54.0	-7.0	Horiz
12	246.483M	44.4	+0.0 +1.6	+0.1 +5.8	-26.5 +12.0	+1.6	+0.0	39.0	46.0	-7.0	Vert
13	993.137M	36.4	+0.0 +3.7	+0.3 +5.9	-27.3 +24.4	+3.5	+0.0	46.9	54.0	-7.1	Vert
14	967.209M	36.9	+0.0 +3.6	+0.3 +5.9	-27.4 +24.2	+3.4	+0.0	46.9	54.0	-7.1	Vert
15	245.350M	44.0	+0.0 +1.6	+0.1 +5.8	-26.5 +11.9	+1.6	+0.0	38.5	46.0	-7.5	Horiz
16	246.517M	43.8	+0.0 +1.6	+0.1 +5.8	-26.5 +12.0	+1.6	+0.0	38.4	46.0	-7.6	Horiz
17	967.130M	36.0	+0.0 +3.6	+0.3 +5.9	-27.4 +24.2	+3.4	+0.0	46.0	54.0	-8.0	Horiz

18	979.675M	35.2	+0.0 +3.7	+0.3 +5.9	-27.3 +24.3	+3.5	+0.0	45.6	54.0	-8.4	Horiz
19	331.100M	38.9	+0.0 +1.9	+0.2 +5.8	-26.7 +14.3	+1.9	+0.0	36.3	46.0	-9.7	Horiz
20	328.743M	38.8	+0.0 +1.9	+0.2 +5.8	-26.7 +14.2	+1.9	+0.0	36.1	46.0	-9.9	Horiz
21	979.627M	33.5	+0.0 +3.7	+0.3 +5.9	-27.3 +24.3	+3.5	+0.0	43.9	54.0	-10.1	Vert
22	980.313M	33.4	+0.0 +3.7	+0.3 +5.9	-27.3 +24.3	+3.5	+0.0	43.8	54.0	-10.2	Vert
23	324.963M	38.4	+0.0 +1.9	+0.2 +5.8	-26.7 +14.1	+1.9	+0.0	35.6	46.0	-10.4	Horiz
24	327.483M	38.2	+0.0 +1.9	+0.2 +5.8	-26.7 +14.2	+1.9	+0.0	35.5	46.0	-10.5	Horiz
25	326.223M	37.9	+0.0 +1.9	+0.2 +5.8	-26.7 +14.2	+1.9	+0.0	35.2	46.0	-10.8	Horiz
26	323.797M	38.0	+0.0 +1.9	+0.2 +5.8	-26.6 +14.1	+1.8	+0.0	35.2	46.0	-10.8	Horiz
27	329.933M	37.4	+0.0 +1.9	+0.2 +5.8	-26.7 +14.3	+1.9	+0.0	34.8	46.0	-11.2	Horiz
28	967.166M	31.6	+0.0 +3.6	+0.3 +5.9	-27.4 +24.2	+3.4	+0.0	41.6	54.0	-12.4	Vert
29	323.750M	34.3	+0.0 +1.9	+0.2 +5.8	-26.6 +14.1	+1.8	+0.0	31.5	46.0	-14.5	Vert
30	326.037M	33.9	+0.0 +1.9	+0.2 +5.8	-26.7 +14.2	+1.9	+0.0	31.2	46.0	-14.8	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 #:	**100666**	Date:	11/21/2018
Test Type:	**Maximized Emissions**	Time:	20:38:45
Tested By:	S. Yamamoto	Sequence#:	1
Software:	EMITest 5.03.11		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

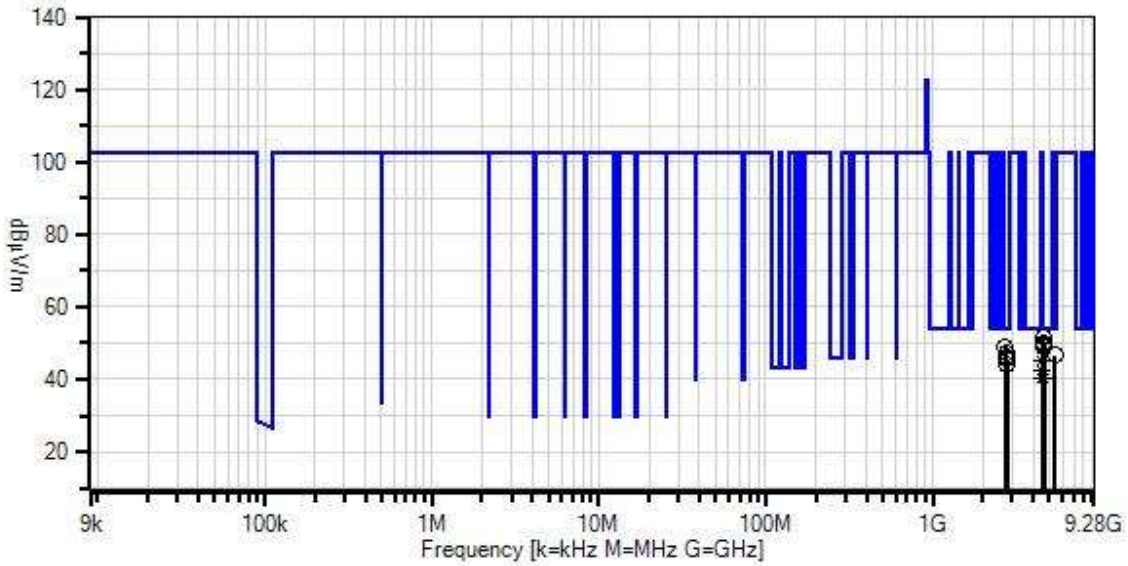
Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

The equipment under test (EUT) is placed stand alone on a Styrofoam table top. Connected to the EUT is a laptop computer via USB to serial interface board. The EUT is turned on and set in transmitting mode. The EUT has fresh batteries installed. Nominal input voltage is 6.0Vdc.
The EUT is tested in horizontal pipe orientation.
Operating frequency: 902.4MHz, 915.2MHz, and 927.6MHz.
300kbps GFSK modulation.
Firmware power: power level 3.
Frequency range of measurement = 1GHz to 9.3GHz.
For data contained within this document, RBW=1MHz, VBW=3MHz.

Temperature: 22°C, Humidity: 30%, Pressure: 100kPa.
Site D.
Test Method: ANSI C63.10 (2013)

Itron, Inc. WO#: 100666 Sequence#: 1 Date: 11/21/2018
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: 5.03.11

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02869	Spectrum Analyzer	E4440A	8/10/2018	8/10/2019
T2	ANP04382	Cable	LDF-50	6/2/2018	6/2/2020
T3	ANP07138	Cable	ANDL1-PNMNM-60	3/1/2017	3/1/2019
T4	AN00787	Preamp	83017A	6/9/2017	6/9/2019
T5	AN03169	High Pass Filter	HM1155-11SS	6/15/2017	6/15/2019
T6	ANP07245	Cable	32022-29094K-29094K-24TC	7/5/2018	7/5/2020
T7	AN01646	Horn Antenna	3115	3/14/2018	3/14/2020

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	4576.000M	44.8	+0.0 +0.1	+7.7 +0.8	+5.8 +32.7	-40.5	+0.0	51.4	54.0	-2.6	Horiz
2	4637.913M	43.5	+0.0 +0.2	+7.8 +0.8	+5.9 +32.6	-40.7	+0.0	50.1	54.0	-3.9	Vert
3	4637.550M	43.1	+0.0 +0.2	+7.8 +0.8	+5.9 +32.6	-40.7	+0.0	49.7	54.0	-4.3	Vert
4	2707.133M	49.7	+0.0 +0.2	+5.7 +0.5	+4.3 +28.9	-40.3	+0.0	49.0	54.0	-5.0	Horiz
5	4638.367M	42.4	+0.0 +0.2	+7.8 +0.8	+5.9 +32.6	-40.7	+0.0	49.0	54.0	-5.0	Horiz
6	2707.207M	49.4	+0.0 +0.2	+5.7 +0.5	+4.3 +28.9	-40.3	+0.0	48.7	54.0	-5.3	Vert
7	2745.557M	48.0	+0.0 +0.2	+5.7 +0.5	+4.3 +29.0	-40.3	+0.0	47.4	54.0	-6.6	Vert
8	5414.700M	36.7	+0.0 +0.1	+8.9 +0.5	+6.4 +33.8	-39.7	+0.0	46.7	54.0	-7.3	Vert
9	2745.797M	46.6	+0.0 +0.2	+5.7 +0.5	+4.3 +29.0	-40.3	+0.0	46.0	54.0	-8.0	Horiz
10	2782.623M	45.7	+0.0 +0.2	+5.8 +0.5	+4.4 +29.1	-40.3	+0.0	45.4	54.0	-8.6	Horiz
11	4512.477M Ave	38.5	+0.0 +0.1	+7.7 +0.8	+5.6 +32.8	-40.2	+0.0	45.3	54.0	-8.7	Horiz
^	4512.477M	45.4	+0.0 +0.1	+7.7 +0.8	+5.6 +32.8	-40.2	+0.0	52.2	54.0	-1.8	Horiz

13	2782.630M	44.6	+0.0	+5.8	+4.4	-40.3	+0.0	44.3	54.0	-9.7	Vert
			+0.2	+0.5	+29.1						
14	4512.034M	35.4	+0.0	+7.7	+5.6	-40.2	+0.0	42.2	54.0	-11.8	Vert
	Ave		+0.1	+0.8	+32.8						
^	4512.034M	46.3	+0.0	+7.7	+5.6	-40.2	+0.0	53.1	54.0	-0.9	Vert
			+0.1	+0.8	+32.8						
16	4576.000M	33.8	+0.0	+7.7	+5.8	-40.5	+0.0	40.4	54.0	-13.6	Vert
	Ave		+0.1	+0.8	+32.7						
^	4576.000M	45.6	+0.0	+7.7	+5.8	-40.5	+0.0	52.2	54.0	-1.8	Vert
			+0.1	+0.8	+32.7						
18	4512.274M	33.3	+0.0	+7.7	+5.6	-40.2	+0.0	40.1	54.0	-13.9	Vert
	Ave		+0.1	+0.8	+32.8						
^	4512.274M	45.5	+0.0	+7.7	+5.6	-40.2	+0.0	52.3	54.0	-1.7	Vert
			+0.1	+0.8	+32.8						

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 #:	**100666**	Date:	11/21/2018
Test Type:	**Maximized Emissions**	Time:	16:42:43
Tested By:	S. Yamamoto	Sequence#:	1
Software:	EMITest 5.03.11		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

The equipment under test (EUT) is placed stand alone on a Styrofoam table top. Connected to the EUT is a laptop computer via USB to serial interface board. The EUT is turned on and set in transmitting mode. The EUT has fresh batteries installed. Nominal input voltage is 6.0Vdc.
The EUT is tested in vertical pipe orientation.
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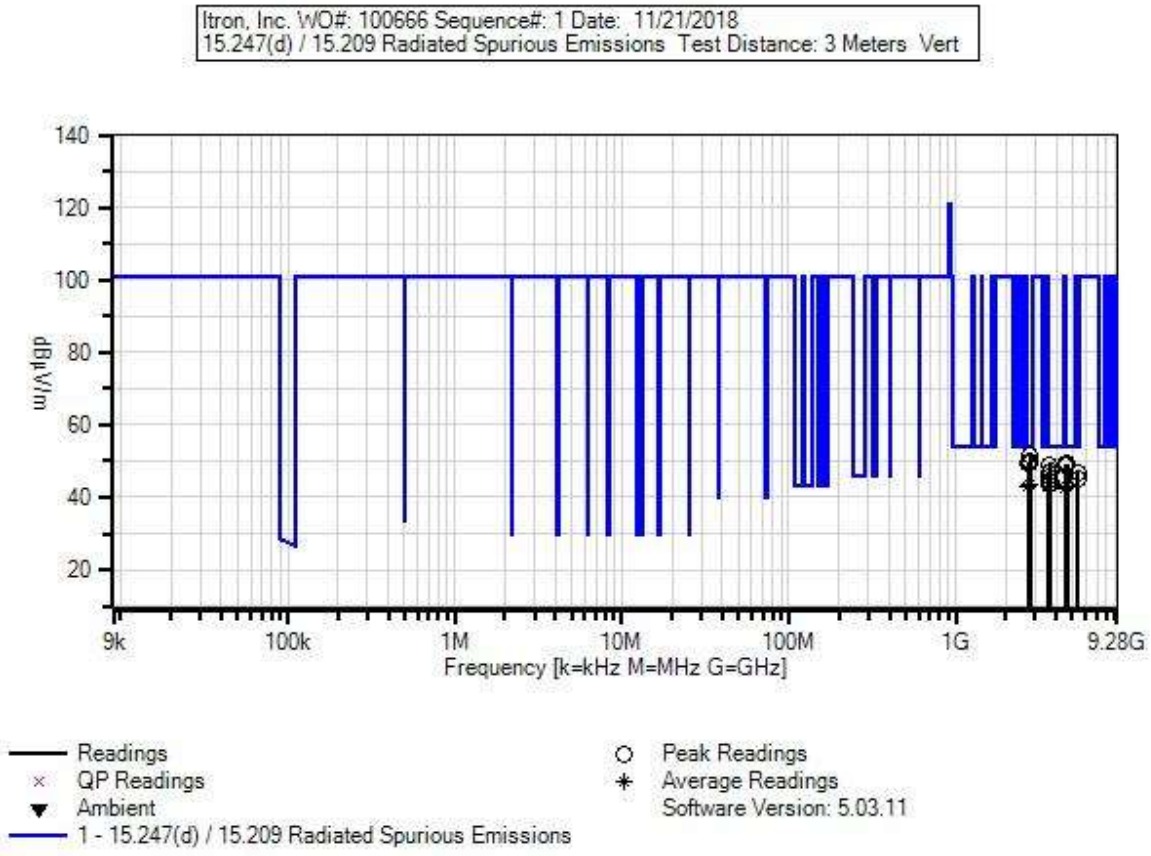
300kbps GFSK modulation.
Firmware power: power level 3.
Frequency range of measurement = 1GHz to 9.3GHz.
For data contained within this document, RBW=1MHz, VBW=3MHz.

Temperature: 22°C, Humidity: 30%, Pressure: 100kPa.
Site D.
Test Method: ANSI C63.10 (2013)


Itron, Inc. WO#: 100666 Sequence#: 1 Date: 11/21/2018
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert
140
120
100
80
60
40
20
dBµV/m
9k
100k
1M
10M
100M
1G
9.28G
Frequency [k=kHz M=MHz G=GHz]
Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.11

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02869	Spectrum Analyzer	E4440A	8/10/2018	8/10/2019
T1	ANP04382	Cable	LDF-50	6/2/2018	6/2/2020
T2	ANP07138	Cable	ANDL1-PNMNM-60	3/1/2017	3/1/2019
T3	AN00787	Preamp	83017A	6/9/2017	6/9/2019
T4	AN03169	High Pass Filter	HM1155-11SS	6/15/2017	6/15/2019
T5	ANP07245	Cable	32022-29094K-29094K-24TC	7/5/2018	7/5/2020
T6	AN01646	Horn Antenna	3115	3/14/2018	3/14/2020

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	2782.543M	51.8	+5.8 +0.5	+4.4 +29.1	-40.3	+0.2	+0.0	51.5	54.0	-2.5	Vert
2	2745.307M	50.5	+5.7 +0.5	+4.3 +29.0	-40.3	+0.2	+0.0	49.9	54.0	-4.1	Vert
3	2783.080M	49.9	+5.8 +0.5	+4.4 +29.1	-40.3	+0.2	+0.0	49.6	54.0	-4.4	Horiz
4	4637.727M	42.8	+7.8 +0.8	+5.9 +32.6	-40.7	+0.2	+0.0	49.4	54.0	-4.6	Vert
5	2707.183M	49.9	+5.7 +0.5	+4.3 +28.9	-40.3	+0.2	+0.0	49.2	54.0	-4.8	Vert
6	4576.337M	42.5	+7.7 +0.8	+5.8 +32.7	-40.5	+0.1	+0.0	49.1	54.0	-4.9	Vert
7	3661.147M	44.5	+7.1 +0.6	+5.2 +31.8	-40.3	+0.2	+0.0	49.1	54.0	-4.9	Vert
8	4511.453M	42.2	+7.7 +0.8	+5.6 +32.8	-40.2	+0.1	+0.0	49.0	54.0	-5.0	Vert
9	3710.297M	42.2	+7.1 +0.6	+5.2 +32.1	-40.2	+0.2	+0.0	47.2	54.0	-6.8	Horiz
10	5414.063M	36.8	+8.9 +0.5	+6.4 +33.8	-39.7	+0.1	+0.0	46.8	54.0	-7.2	Horiz
11	3609.480M	42.9	+7.0 +0.7	+5.1 +31.3	-40.4	+0.2	+0.0	46.8	54.0	-7.2	Vert
12	3660.363M	41.2	+7.1 +0.6	+5.2 +31.8	-40.3	+0.2	+0.0	45.8	54.0	-8.2	Horiz
13	5414.653M	35.1	+8.9 +0.5	+6.4 +33.8	-39.7	+0.1	+0.0	45.1	54.0	-8.9	Vert

14	3609.300M	40.8	+7.0	+5.1	-40.4	+0.2	+0.0	44.7	54.0	-9.3	Horiz
			+0.7	+31.3							
15	3710.760M	38.8	+7.1	+5.2	-40.2	+0.2	+0.0	43.8	54.0	-10.2	Vert
			+0.6	+32.1							
16	3609.257M	39.8	+7.0	+5.1	-40.4	+0.2	+0.0	43.7	54.0	-10.3	Horiz
			+0.7	+31.3							
17	2745.600M	43.9	+5.7	+4.3	-40.3	+0.2	+0.0	43.3	54.0	-10.7	Horiz
	Ave		+0.5	+29.0							
^	2745.600M	53.8	+5.7	+4.3	-40.3	+0.2	+0.0	53.2	54.0	-0.8	Horiz
			+0.5	+29.0							
19	2707.200M	43.9	+5.7	+4.3	-40.3	+0.2	+0.0	43.2	54.0	-10.8	Horiz
	Ave		+0.5	+28.9							
^	2707.200M	53.1	+5.7	+4.3	-40.3	+0.2	+0.0	52.4	54.0	-1.6	Horiz
			+0.5	+28.9							
21	4576.000M	36.4	+7.7	+5.8	-40.5	+0.1	+0.0	43.0	54.0	-11.0	Horiz
	Ave		+0.8	+32.7							
^	4576.000M	47.2	+7.7	+5.8	-40.5	+0.1	+0.0	53.8	54.0	-0.2	Horiz
			+0.8	+32.7							
23	4638.000M	36.4	+7.8	+5.9	-40.7	+0.2	+0.0	43.0	54.0	-11.0	Horiz
	Ave		+0.8	+32.6							
^	4638.000M	47.2	+7.8	+5.9	-40.7	+0.2	+0.0	53.8	54.0	-0.2	Horiz
			+0.8	+32.6							
25	4512.000M	35.4	+7.7	+5.6	-40.2	+0.1	+0.0	42.2	54.0	-11.8	Horiz
	Ave		+0.8	+32.8							
^	4512.000M	46.4	+7.7	+5.6	-40.2	+0.1	+0.0	53.2	54.0	-0.8	Horiz
			+0.8	+32.8							

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 #:	**100666**	Date:	11/23/2018
Test Type:	**Maximized Emissions**	Time:	14:39:55
Tested By:	S. Yamamoto	Sequence#:	1
Software:	EMITest 5.03.11		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

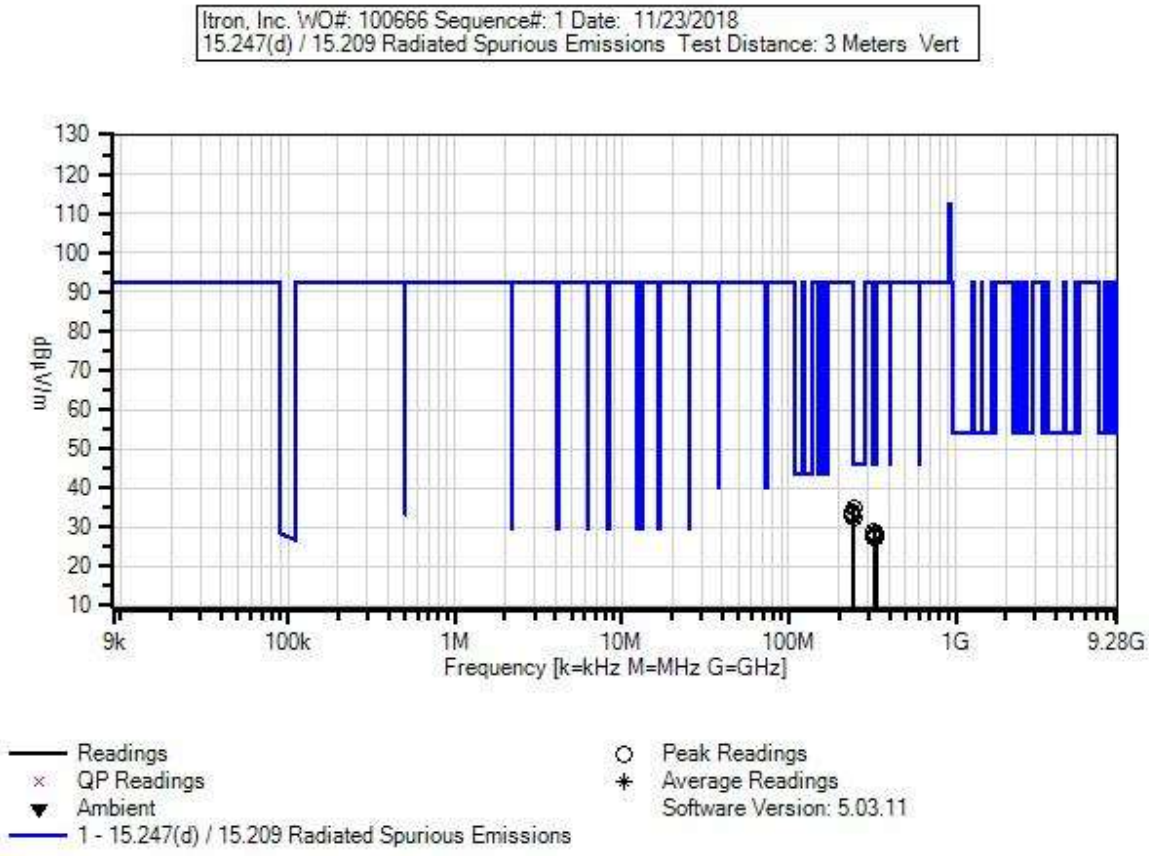
Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

The equipment under test (EUT) is placed stand alone on a Styrofoam table top. Connected to the EUT is a laptop computer via USB to serial interface board. The EUT is turned on and set in transmitting mode. The EUT has fresh batteries installed. Nominal input voltage is 6.0Vdc.
The EUT is tested in horizontal pipe orientation.
Operating frequency: 902.4MHz, 915.2MHz, and 927.6MHz.
300kbps hybrid modulation.
Firmware power: power level 2.
Frequency range of measurement = 9kHz to 1000MHz.
For data contained within this document, RBW=120kHz, VBW=300kHz.

Temperature: 20°C, Humidity: 40%, Pressure: 100kPa.
Site D.
Test Method: ANSI C63.10 (2013)


Itron, Inc. WO#: 100666 Sequence#: 1 Date: 11/23/2018
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Vert
dBµV/m
130
120
110
100
90
80
70
60
50
40
30
20
10
9k
100k
1M
10M
100M
1G
9.28G
Frequency [k=kHz M=MHz G=GHz]
Readings
QP Readings
Ambient
1 - 15.247(d) / 15.209 Radiated Spurious Emissions
Peak Readings
Average Readings
Software Version: 5.03.11

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02869	Spectrum Analyzer	E4440A	8/10/2018	8/10/2019
T1	ANP06978	Cable	Sucoflex 104A	3/31/2018	3/31/2020
T2	AN00010	Preamp	8447D	2/19/2018	2/19/2020
T3	ANP04382	Cable	LDF-50	6/2/2018	6/2/2020
T4	ANP05569	Cable-Amplitude +15C to +45C (dB)	RG-214/U	12/7/2016	12/7/2018
T5	ANP05283	Attenuator	ATT-0218-06-NNN-02	4/5/2018	4/5/2020
T6	AN01994	Biconilog Antenna	CBL6111C	4/23/2018	4/23/2020
	AN00314	Loop Antenna	6502	5/13/2018	5/13/2020

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	244.850M	40.2	+0.1 +5.8	-26.5 +11.9	+1.6	+1.6	+0.0	34.7	46.0	-11.3	Vert
2	240.800M	39.6	+0.1 +5.8	-26.5 +11.7	+1.6	+1.6	+0.0	33.9	46.0	-12.1	Horiz
3	242.167M	39.4	+0.1 +5.8	-26.5 +11.7	+1.6	+1.6	+0.0	33.7	46.0	-12.3	Horiz
4	241.317M	39.3	+0.1 +5.8	-26.5 +11.7	+1.6	+1.6	+0.0	33.6	46.0	-12.4	Horiz
5	242.433M	38.5	+0.1 +5.8	-26.5 +11.8	+1.6	+1.6	+0.0	32.9	46.0	-13.1	Vert
6	243.117M	38.0	+0.1 +5.8	-26.5 +11.8	+1.6	+1.6	+0.0	32.4	46.0	-13.6	Vert
7	323.330M	31.8	+0.2 +5.8	-26.6 +14.1	+1.8	+1.9	+0.0	29.0	46.0	-17.0	Vert
8	327.087M	31.2	+0.2 +5.8	-26.7 +14.2	+1.9	+1.9	+0.0	28.5	46.0	-17.5	Horiz
9	329.793M	30.6	+0.2 +5.8	-26.7 +14.3	+1.9	+1.9	+0.0	28.0	46.0	-18.0	Horiz
10	330.913M	30.2	+0.2 +5.8	-26.7 +14.3	+1.9	+1.9	+0.0	27.6	46.0	-18.4	Horiz
11	327.343M	30.2	+0.2 +5.8	-26.7 +14.2	+1.9	+1.9	+0.0	27.5	46.0	-18.5	Horiz
12	323.843M	30.2	+0.2 +5.8	-26.6 +14.1	+1.8	+1.9	+0.0	27.4	46.0	-18.6	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 #:	**100666**	Date:	11/23/2018
Test Type:	**Maximized Emissions**	Time:	16:18:25
Tested By:	S. Yamamoto	Sequence#:	1
Software:	EMITest 5.03.11		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

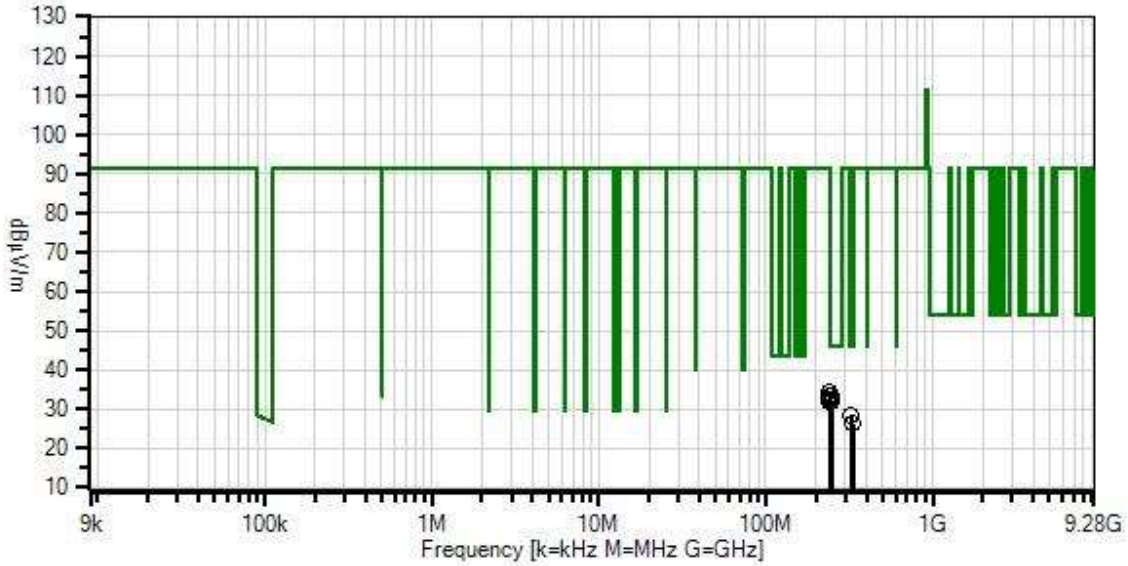
Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

The equipment under test (EUT) is placed stand alone on a Styrofoam table top. Connected to the EUT is a laptop computer via USB to serial interface board. The EUT is turned on and set in transmitting mode. The EUT has fresh batteries installed. Nominal input voltage is 6.0Vdc.
The EUT is tested in vertical pipe orientation.
Operating frequency: 902.4MHz, 915.2MHz, and 927.6MHz.
300kbps hybrid modulation.
Firmware power: power level 2.
Frequency range of measurement = 9kHz to 1000MHz.
For data contained within this document, RBW=120kHz, VBW=300kHz.

Temperature: 20°C, Humidity: 40%, Pressure: 100kPa.
Site D.
Test Method: ANSI C63.10 (2013)

Itron, Inc. WO#: 100666 Sequence#: 1 Date: 11/23/2018
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: 5.03.11

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02869	Spectrum Analyzer	E4440A	8/10/2018	8/10/2019
T2	ANP06978	Cable	Sucoflex 104A	3/31/2018	3/31/2020
T3	AN00010	Preamp	8447D	2/19/2018	2/19/2020
T4	ANP04382	Cable	LDF-50	6/2/2018	6/2/2020
T5	ANP05569	Cable-Amplitude +15C to +45C (dB)	RG-214/U	12/7/2016	12/7/2018
T6	ANP05283	Attenuator	ATT-0218-06-NNN-02	4/5/2018	4/5/2020
T7	AN01994	Biconilog Antenna	CBL6111C	4/23/2018	4/23/2020

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	241.250M	40.2	+0.0 +1.6	+0.1 +5.8	-26.5 +11.7	+1.6	+0.0	34.5	46.0	-11.5	Horiz
2	241.417M	39.0	+0.0 +1.6	+0.1 +5.8	-26.5 +11.7	+1.6	+0.0	33.3	46.0	-12.7	Horiz
3	243.883M	38.8	+0.0 +1.6	+0.1 +5.8	-26.5 +11.8	+1.6	+0.0	33.2	46.0	-12.8	Vert
4	246.333M	37.8	+0.0 +1.6	+0.1 +5.8	-26.5 +12.0	+1.6	+0.0	32.4	46.0	-13.6	Vert
5	241.433M	37.9	+0.0 +1.6	+0.1 +5.8	-26.5 +11.7	+1.6	+0.0	32.2	46.0	-13.8	Vert
6	242.667M	37.6	+0.0 +1.6	+0.1 +5.8	-26.5 +11.8	+1.6	+0.0	32.0	46.0	-14.0	Horiz
7	243.800M	37.5	+0.0 +1.6	+0.1 +5.8	-26.5 +11.8	+1.6	+0.0	31.9	46.0	-14.1	Horiz
8	323.540M	31.0	+0.0 +1.9	+0.2 +5.8	-26.6 +14.1	+1.8	+0.0	28.2	46.0	-17.8	Horiz
9	332.033M	28.9	+0.0 +1.9	+0.2 +5.8	-26.7 +14.3	+1.9	+0.0	26.3	46.0	-19.7	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 #:	**100666**	Date:	11/21/2018
Test Type:	**Maximized Emissions**	Time:	21:03:10
Tested By:	S. Yamamoto	Sequence#:	1
Software:	EMITest 5.03.11		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

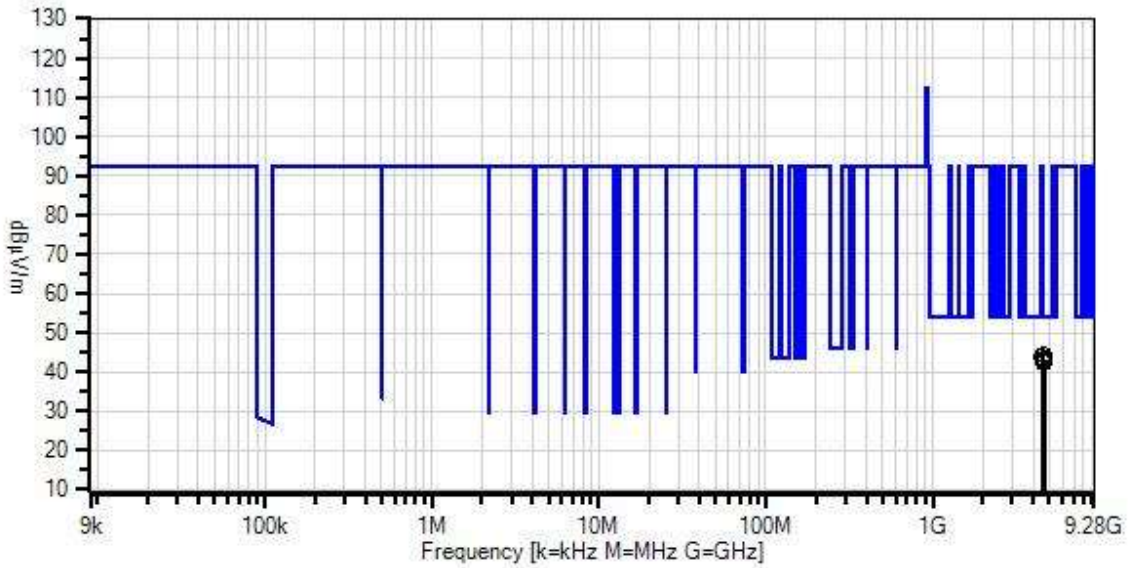
Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

The equipment under test (EUT) is placed stand alone on a Styrofoam table top. Connected to the EUT is a laptop computer via USB to serial interface board. The EUT is turned on and set in transmitting mode. The EUT has fresh batteries installed. Nominal input voltage is 6.0Vdc.
The EUT is tested in horizontal pipe orientation.
Operating frequency: 902.4MHz, 915.2MHz, and 927.6MHz.
300kbps hybrid modulation.
Firmware power: power level 2.
Frequency range of measurement = 1GHz to 9.3GHz.
For data contained within this document, RBW=1MHz, VBW=3MHz.

Temperature: 22°C, Humidity: 30%, Pressure: 100kPa.
Site D.
Test Method: ANSI C63.10 (2013)

Itron, Inc. WO#: 100666 Sequence#: 1 Date: 11/21/2018
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: 5.03.11

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02869	Spectrum Analyzer	E4440A	8/10/2018	8/10/2019
T1	ANP04382	Cable	LDF-50	6/2/2018	6/2/2020
T2	ANP07138	Cable	ANDL1-PNMNM-60	3/1/2017	3/1/2019
T3	AN00787	Preamp	83017A	6/9/2017	6/9/2019
T4	AN03169	High Pass Filter	HM1155-11SS	6/15/2017	6/15/2019
T5	ANP07245	Cable	32022-29094K-29094K-24TC	7/5/2018	7/5/2020
T6	AN01646	Horn Antenna	3115	3/14/2018	3/14/2020

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	4576.437M	37.9	+7.7 +0.8	+5.8 +32.7	-40.5	+0.1	+0.0	44.5	54.0	-9.5	Vert
2	4511.840M	37.1	+7.7 +0.8	+5.6 +32.8	-40.2	+0.1	+0.0	43.9	54.0	-10.1	Vert
3	4511.493M	37.0	+7.7 +0.8	+5.6 +32.8	-40.2	+0.1	+0.0	43.8	54.0	-10.2	Horiz
4	4575.827M	36.7	+7.7 +0.8	+5.8 +32.7	-40.5	+0.1	+0.0	43.3	54.0	-10.7	Horiz
5	4637.803M	36.4	+7.8 +0.8	+5.9 +32.6	-40.7	+0.2	+0.0	43.0	54.0	-11.0	Vert
6	4637.037M	36.0	+7.8 +0.8	+5.9 +32.6	-40.7	+0.2	+0.0	42.6	54.0	-11.4	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 #:	**100666**	Date:	11/21/2018
Test Type:	**Maximized Emissions**	Time:	18:25:06
Tested By:	S. Yamamoto	Sequence#:	1
Software:	EMITest 5.03.11		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

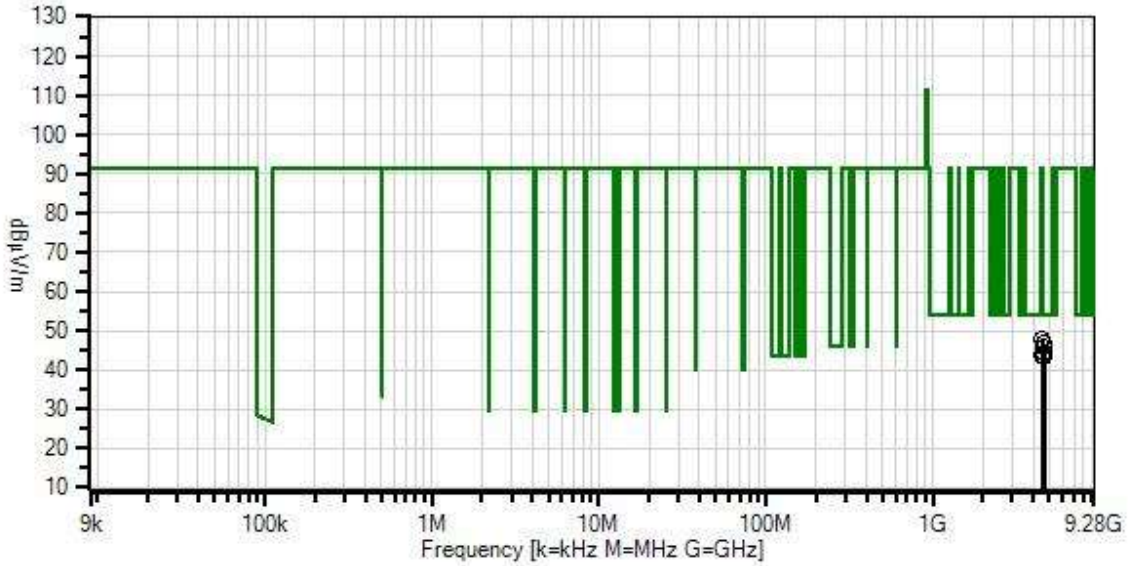
Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

The equipment under test (EUT) is placed stand alone on a Styrofoam table top. Connected to the EUT is a laptop computer via USB to serial interface board. The EUT is turned on and set in transmitting mode. The EUT has fresh batteries installed. Nominal input voltage is 6.0Vdc.
The EUT is tested in vertical pipe orientation.
Operating frequency: 902.4MHz, 915.2MHz, and 927.6MHz.
300kbps hybrid modulation.
Firmware power: power level 2.
Frequency range of measurement = 1GHz to 9.3GHz.
For data contained within this document, RBW=1MHz, VBW=3MHz.

Temperature: 22°C, Humidity: 30%, Pressure: 100kPa.
Site D.
Test Method: ANSI C63.10 (2013)

Itron, Inc. WO#: 100666 Sequence#: 1 Date: 11/21/2018
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: 5.03.11

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN02869	Spectrum Analyzer	E4440A	8/10/2018	8/10/2019
T1	ANP04382	Cable	LDF-50	6/2/2018	6/2/2020
T2	ANP07138	Cable	ANDL1-PNMNM-60	3/1/2017	3/1/2019
T3	AN00787	Preamp	83017A	6/9/2017	6/9/2019
T4	AN03169	High Pass Filter	HM1155-11SS	6/15/2017	6/15/2019
T5	ANP07245	Cable	32022-29094K-29094K-24TC	7/5/2018	7/5/2020
T6	AN01646	Horn Antenna	3115	3/14/2018	3/14/2020

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	4511.770M	40.8	+7.7 +0.8	+5.6 +32.8	-40.2	+0.1	+0.0	47.6	54.0	-6.4	Horiz
2	4575.747M	40.4	+7.7 +0.8	+5.8 +32.7	-40.5	+0.1	+0.0	47.0	54.0	-7.0	Horiz
3	4637.863M	39.3	+7.8 +0.8	+5.9 +32.6	-40.7	+0.2	+0.0	45.9	54.0	-8.1	Horiz
4	4576.190M	38.0	+7.7 +0.8	+5.8 +32.7	-40.5	+0.1	+0.0	44.6	54.0	-9.4	Vert
5	4511.907M	36.9	+7.7 +0.8	+5.6 +32.8	-40.2	+0.1	+0.0	43.7	54.0	-10.3	Vert
6	4637.413M	36.6	+7.8 +0.8	+5.9 +32.6	-40.7	+0.2	+0.0	43.2	54.0	-10.8	Vert

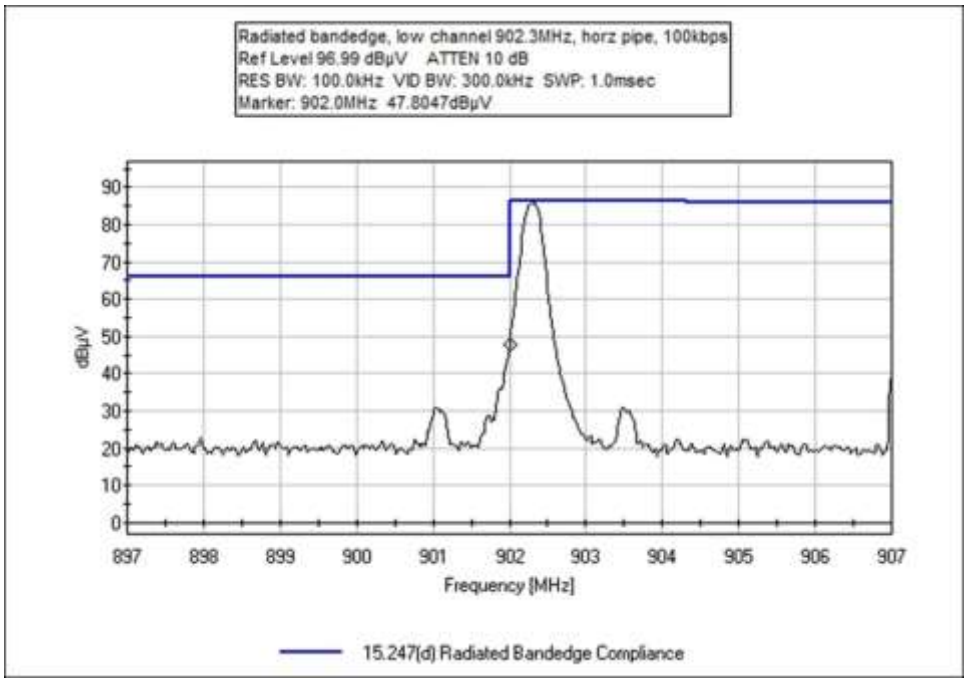
Band Edge

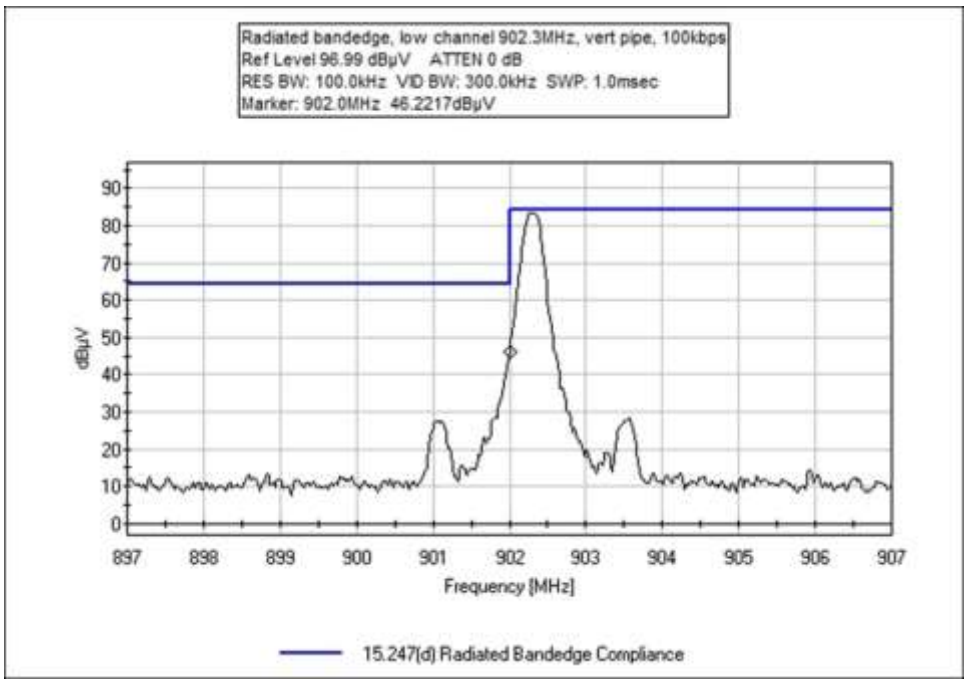
Band Edge Summary					
Frequency (MHz)	Modulation	Ant. Type	Field Strength (dBuV/m @3m)	Limit (dBuV/m @3m)	Results
614	100kbps FSK	Vert pipe	36.2	<46	Pass
614	100kbps FSK Hopping	Vert pipe	39.1	<46	Pass
902	100kbps FSK	Vert pipe	80.8	<100.4	Pass
902	100kbps FSK Hopping	Vert pipe	82.2	<100.4	Pass
928	100kbps FSK	Vert pipe	58	<100.4	Pass
928	100kbps FSK Hopping	Vert pipe	58.3	<100.4	Pass
960	100kbps FSK	Vert pipe	46.9	<54	Pass
960	100kbps FSK Hopping	Vert pipe	50.3	<54	Pass
614	300kbps GFSK	Vert pipe	38.6	<46	Pass
614	300kbps GFSK Hopping	Vert pipe	41	<46	Pass
902	300kbps GFSK	Vert pipe	82.5	<101	Pass
902	300kbps GFSK Hopping	Vert pipe	83.5	<101	Pass
928	300kbps GFSK	Vert pipe	82.9	<101	Pass
928	300kbps GFSK Hopping	Vert pipe	83.8	<101	Pass
960	300kbps GFSK	Vert pipe	46.8	<54	Pass
960	300kbps GFSK Hopping	Vert pipe	50.4	<54	Pass
614	300kbps Hybrid	Vert pipe	38.5	<46	Pass
614	300kbps Hybrid Hopping	Vert pipe	39.4	<46	Pass
902	300kbps Hybrid	Vert pipe	72.6	<91.3	Pass
902	300kbps Hybrid Hopping	Vert pipe	74	<91.3	Pass
928	300kbps Hybrid	Vert pipe	73.9	<91.3	Pass
928	300kbps Hybrid Hopping	Vert pipe	74.5	<91.3	Pass
960	300kbps Hybrid	Vert pipe	46.8	<54	Pass
960	300kbps Hybrid Hopping	Vert pipe	50.1	<54	Pass
614	100kbps FSK	Horiz pipe	39.6	<46	Pass
614	100kbps FSK Hopping	Horiz pipe	41.9	<46	Pass
902	100kbps FSK	Horiz pipe	83.4	<102.2	Pass
902	100kbps FSK Hopping	Horiz pipe	83.8	<102.2	Pass
928	100kbps FSK	Horiz pipe	59.8	<102.2	Pass
928	100kbps FSK Hopping	Horiz pipe	61.9	<102.2	Pass
960	100kbps FSK	Horiz pipe	46.2	<54	Pass
960	100kbps FSK Hopping	Horiz pipe	48.4	<54	Pass
614	300kbps GFSK	Horiz pipe	39.1	<46	Pass
614	300kbps GFSK Hopping	Horiz pipe	40.3	<46	Pass
902	300kbps GFSK	Horiz pipe	84.1	<102.3	Pass
902	300kbps GFSK Hopping	Horiz pipe	84.4	<102.3	Pass
928	300kbps GFSK	Horiz pipe	84.9	<102.3	Pass
928	300kbps GFSK Hopping	Horiz pipe	85.2	<102.3	Pass
960	300kbps GFSK	Horiz pipe	46.6	<54	Pass
960	300kbps GFSK Hopping	Horiz pipe	48.3	<54	Pass
614	300kbps Hybrid	Horiz pipe	38.9	<46	Pass
614	300kbps Hybrid Hopping	Horiz pipe	41.4	<46	Pass
902	300kbps Hybrid	Horiz pipe	74.5	<92.5	Pass

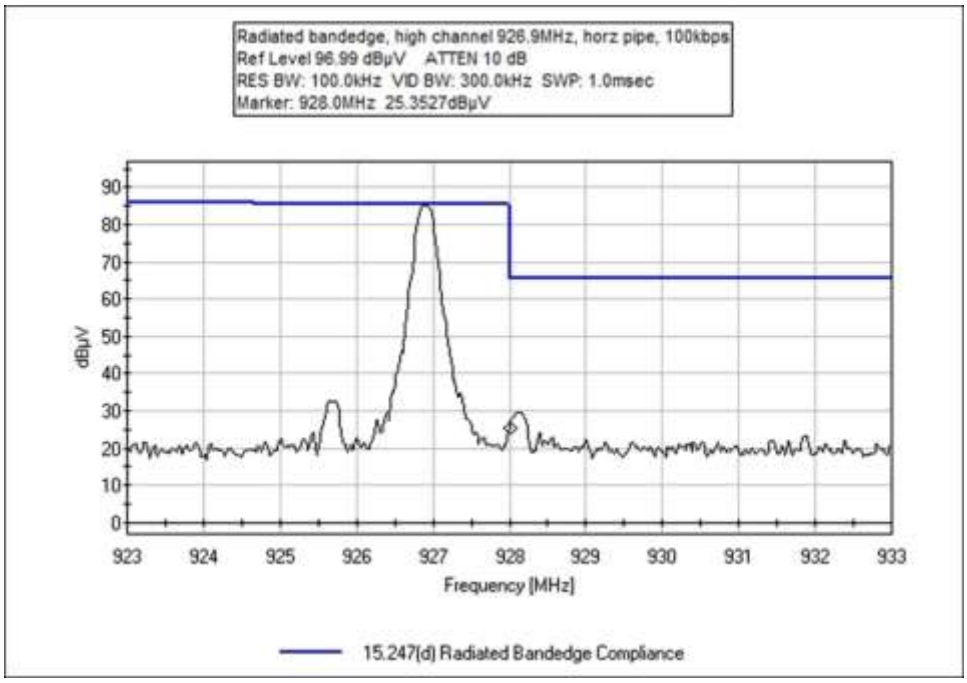
Frequency (MHz)	Modulation	Ant. Type	Field Strength (dBuV/m @3m)	Limit (dBuV/m @3m)	Results
902	300kbps Hybrid Hopping	Horiz pipe	74.8	<92.5	Pass
928	300kbps Hybrid	Horiz pipe	74.5	<92.5	Pass
928	300kbps Hybrid Hopping	Horiz pipe	75.6	<92.5	Pass
960	300kbps Hybrid	Horiz pipe	47.7	<54	Pass
960	300kbps Hybrid Hopping	Horiz pipe	50.4	<54	Pass

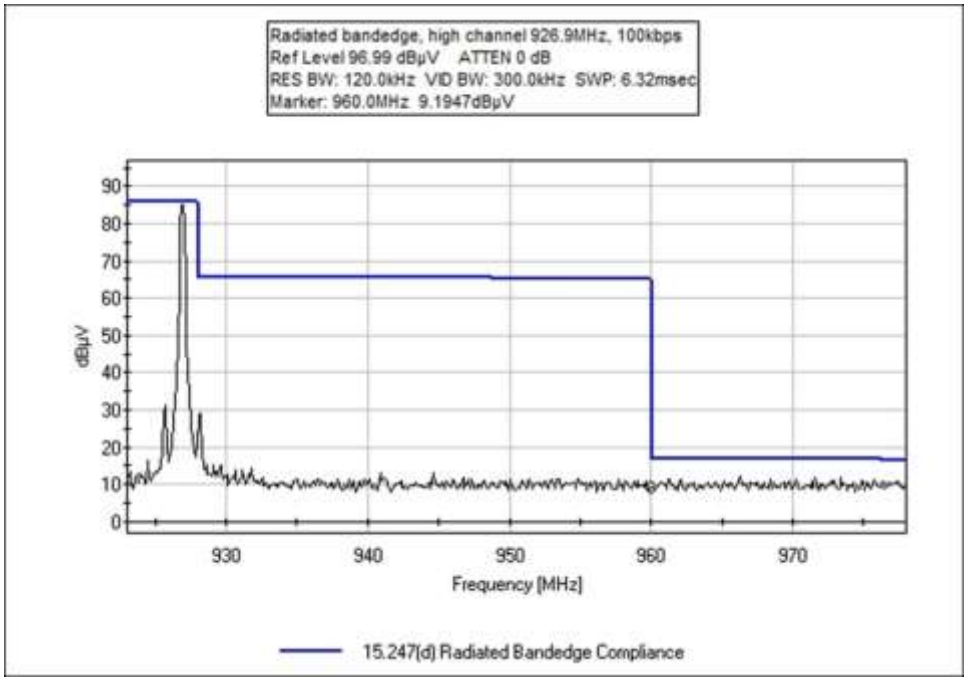
Band Edge Plots

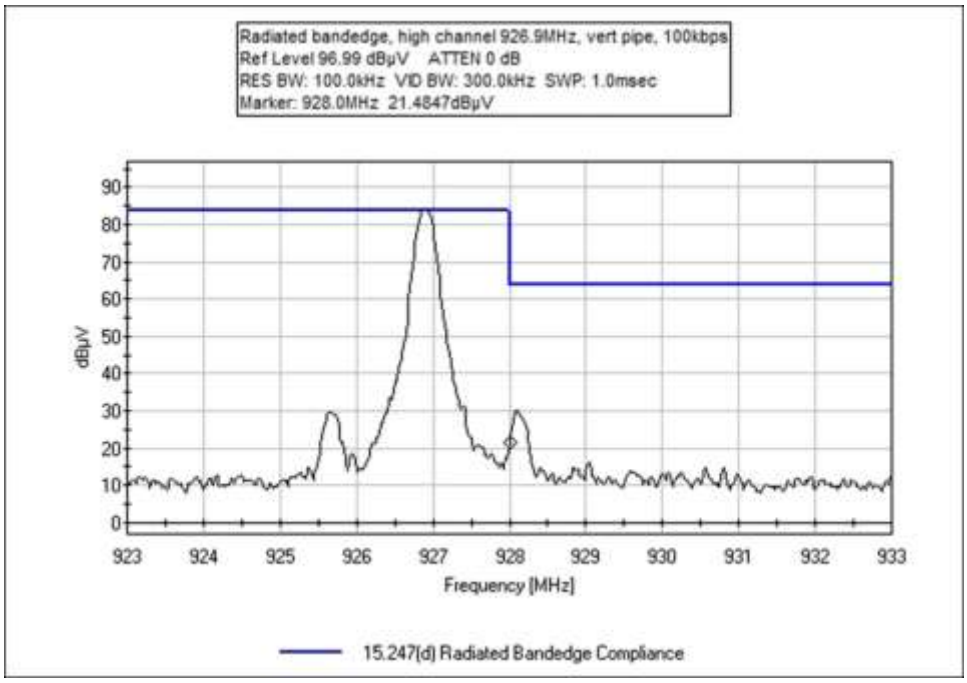
100kbps

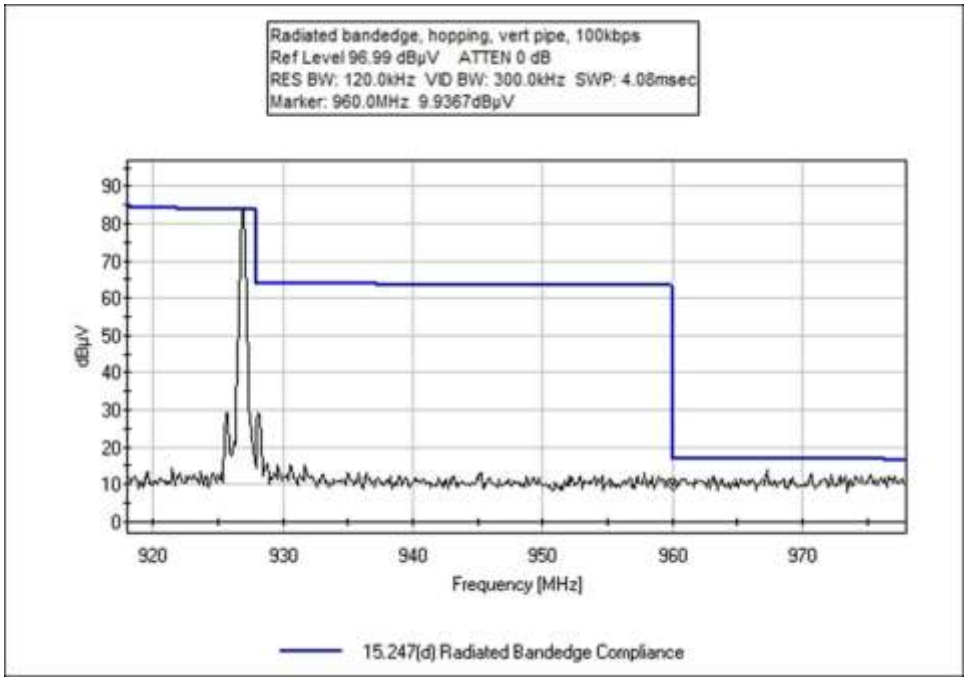


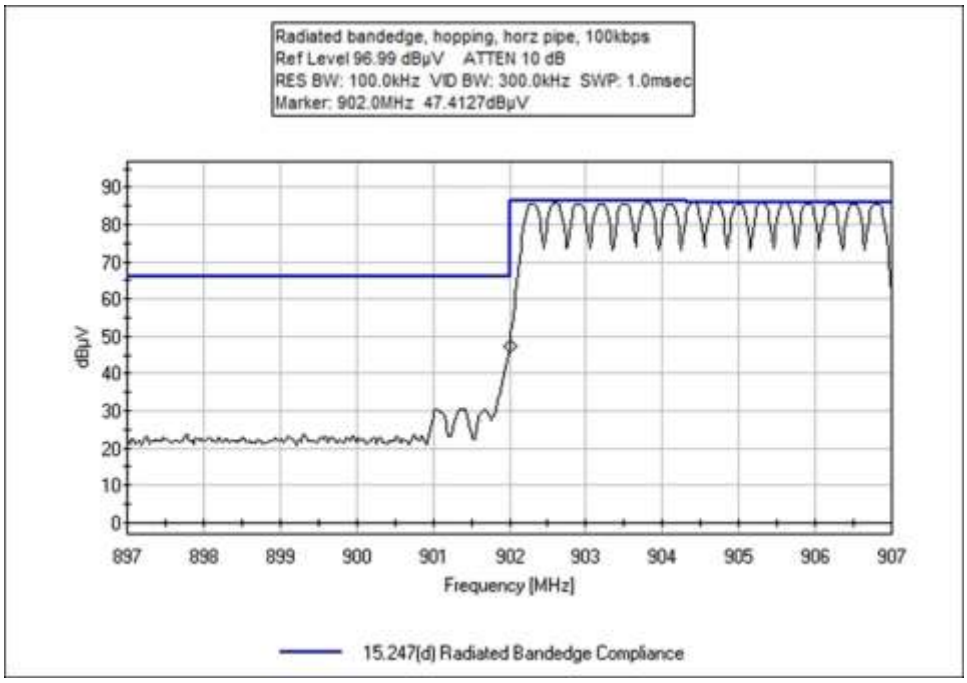


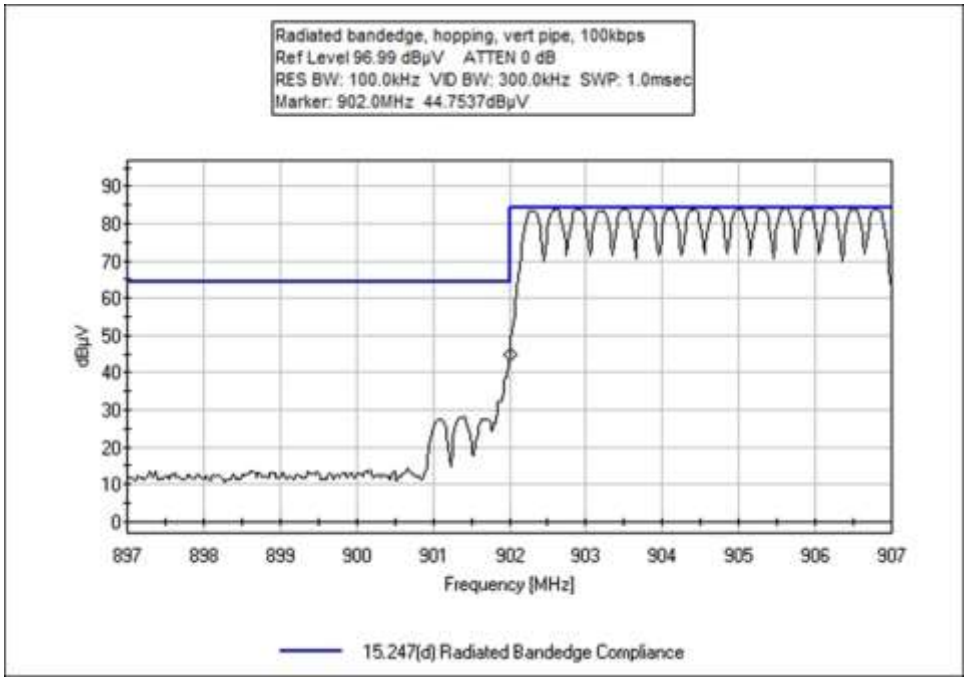

Radiated bandedge, high channel 926.9MHz, horz pipe, 100kbps
Ref Level 96.99 dBµV ATTEN 10 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 1.0msec
Marker: 928.0MHz 25.3527dBµV
dBµV
Frequency [MHz]
15.247(d) Radiated Bandedge Compliance

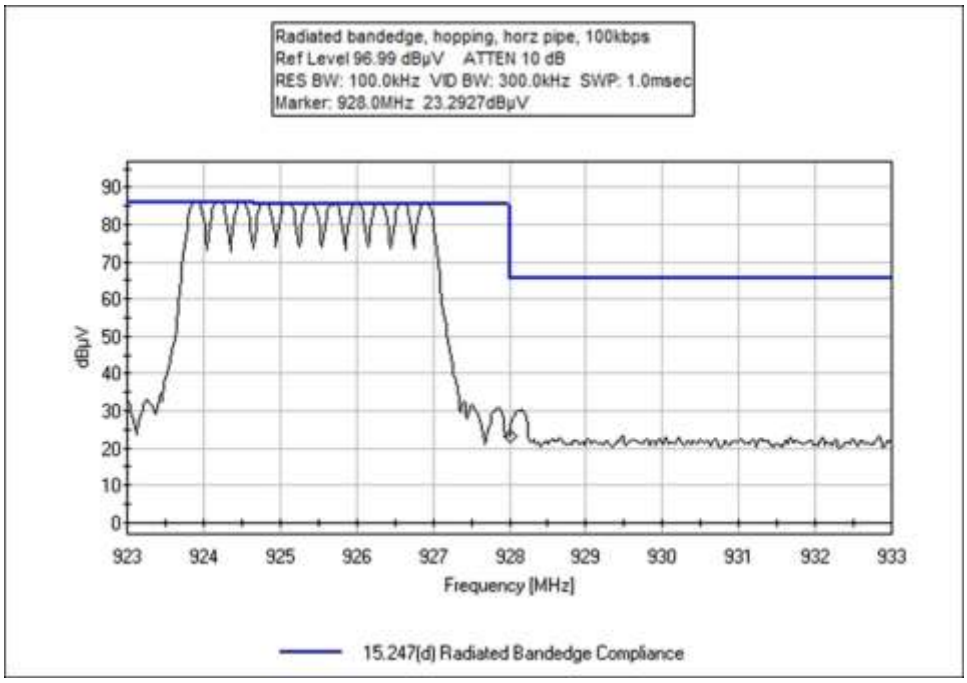

Radiated bandedge, high channel 926.9MHz, 100kbps
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 120.0kHz VID BW: 300.0kHz SWP: 6.32msec
Marker: 960.0MHz 9.1947dBµV
dBµV
Frequency [MHz]
15.247(d) Radiated Bandedge Compliance

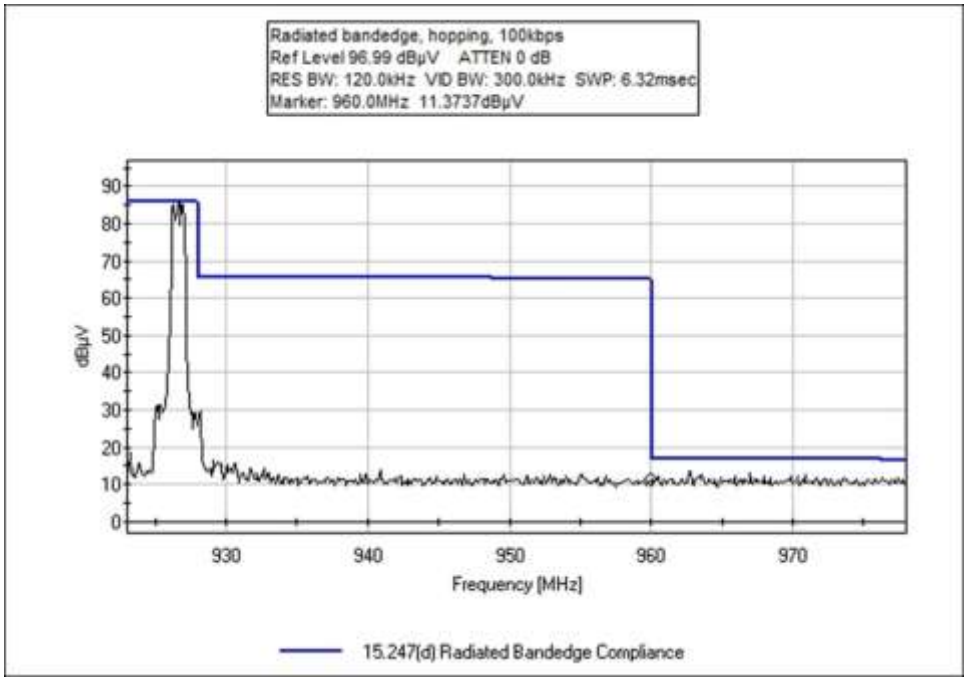

Radiated bandedge, high channel 926.9MHz, vert pipe, 100kbps
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 1.0msec
Marker: 928.0MHz 21.4847dBµV
dBµV
Frequency [MHz]
15.247(d) Radiated Bandedge Compliance

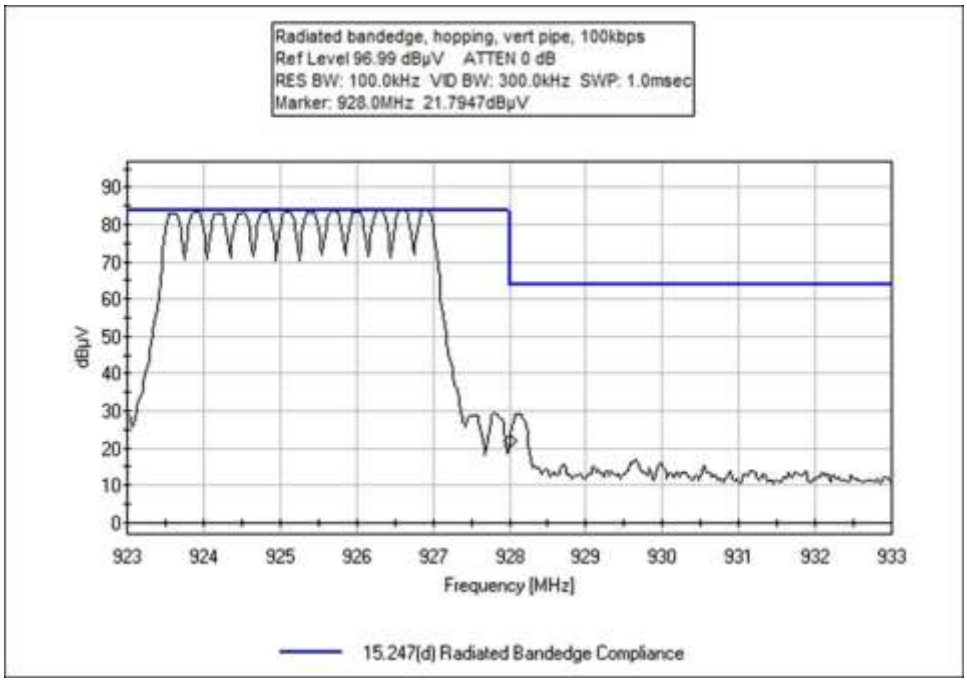

Radiated bandedge, hopping, vert pipe, 100kbps
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 120.0kHz VID BW: 300.0kHz SWP: 4.08msec
Marker: 960.0MHz 9.9367dBµV
dBµV
Frequency [MHz]
15.247(d) Radiated Bandedge Compliance

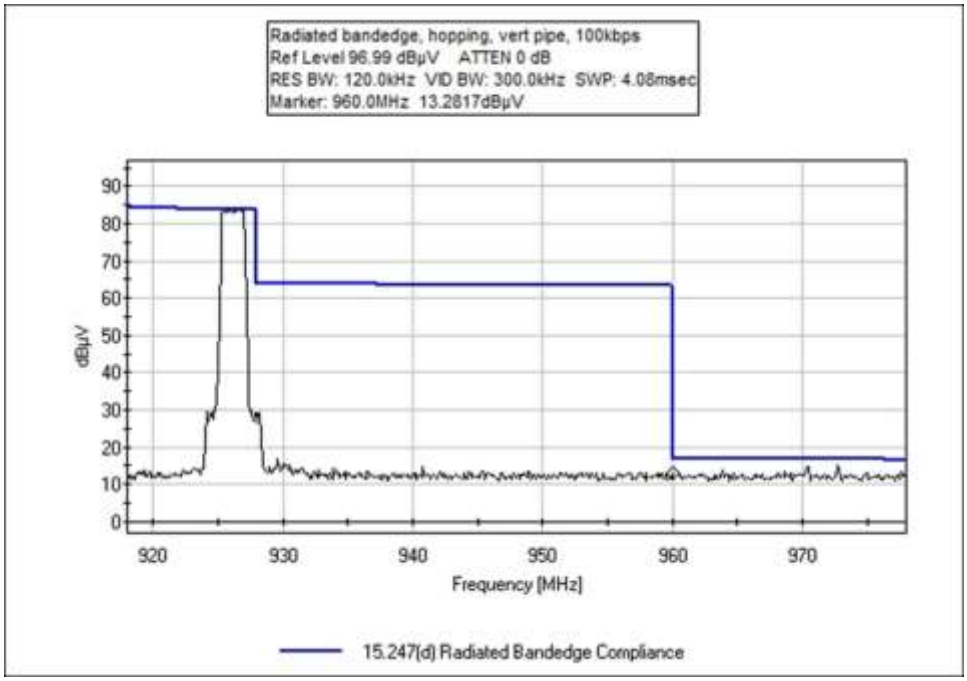

Radiated bandedge, hopping, horz pipe, 100kbps
Ref Level 96.99 dBµV ATTEN 10 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 1.0msec
Marker: 902.0MHz 47.4127dBµV
dBµV
Frequency [MHz]
15.247(d) Radiated Bandedge Compliance


Radiated bandedge, hopping, vert pipe, 100kbps
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 1.0msec
Marker: 902.0MHz 44.7537dBµV
dBµV
Frequency [MHz]
15.247(d) Radiated Bandedge Compliance

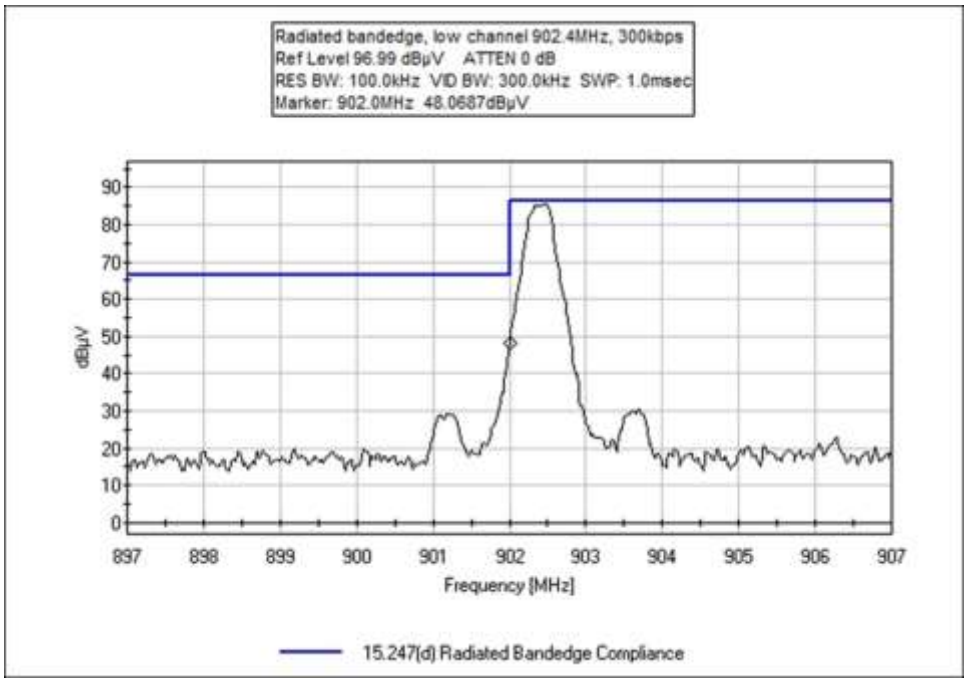

Radiated bandedge, hopping, horz pipe, 100kbps
Ref Level 96.99 dBµV ATTEN 10 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 1.0msec
Marker: 928.0MHz 23.2927dBµV
dBµV
Frequency [MHz]
15.247(d) Radiated Bandedge Compliance

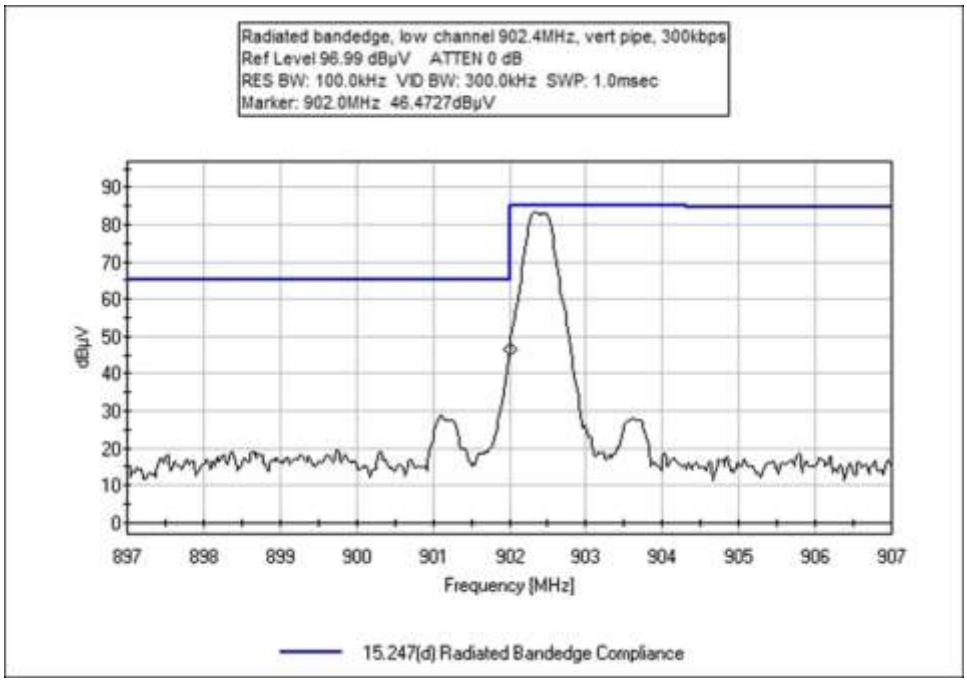

Radiated bandedge, hopping, 100kbps
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 120.0kHz VID BW: 300.0kHz SWP: 6.32msec
Marker: 960.0MHz 11.3737dBµV
dBµV
Frequency [MHz]
15.247(d) Radiated Bandedge Compliance

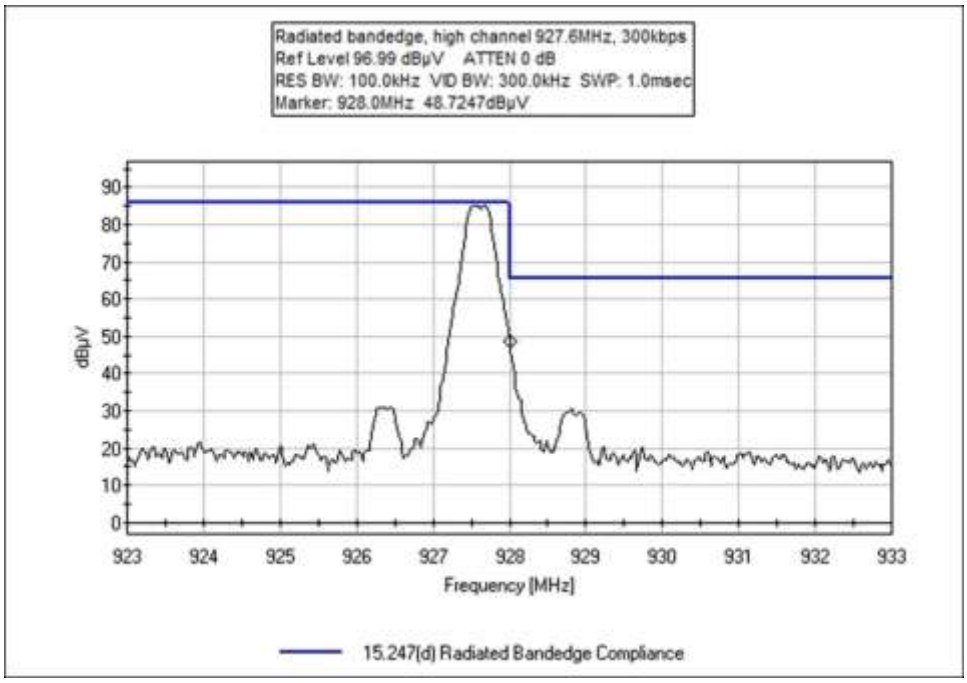

Radiated bandedge, hopping, vert pipe, 100kbps
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 1.0msec
Marker: 928.0MHz 21.7947dBµV
dBµV
Frequency [MHz]
15.247(d) Radiated Bandedge Compliance

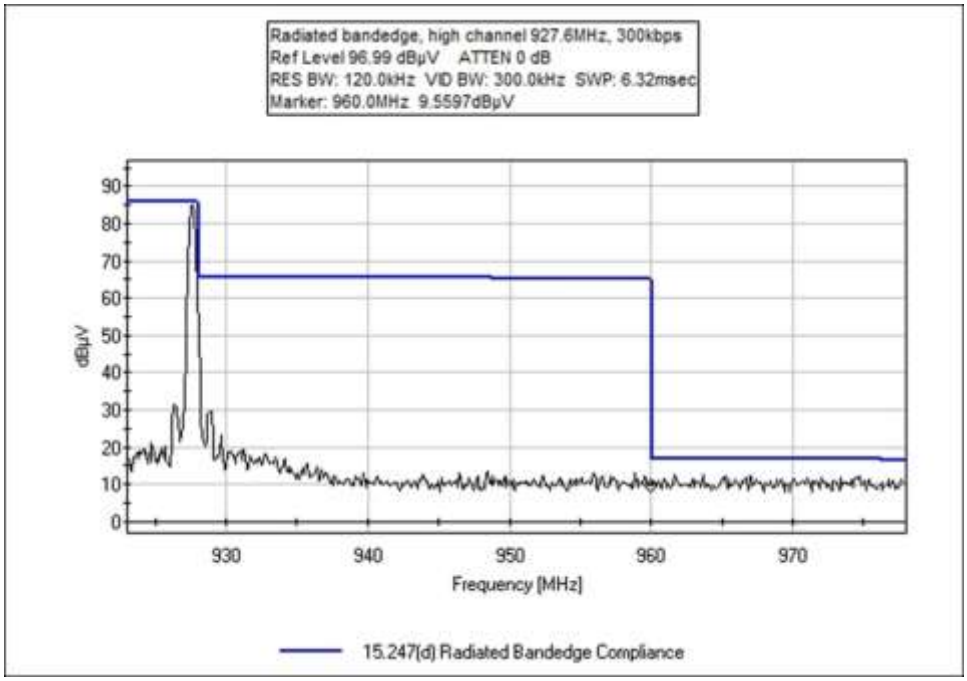

Radiated bandedge, hopping, vert pipe, 100kbps
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 120.0kHz VID BW: 300.0kHz SWP: 4.08msec
Marker: 960.0MHz 13.2817dBµV
dBµV
Frequency [MHz]
15.247(d) Radiated Bandedge Compliance

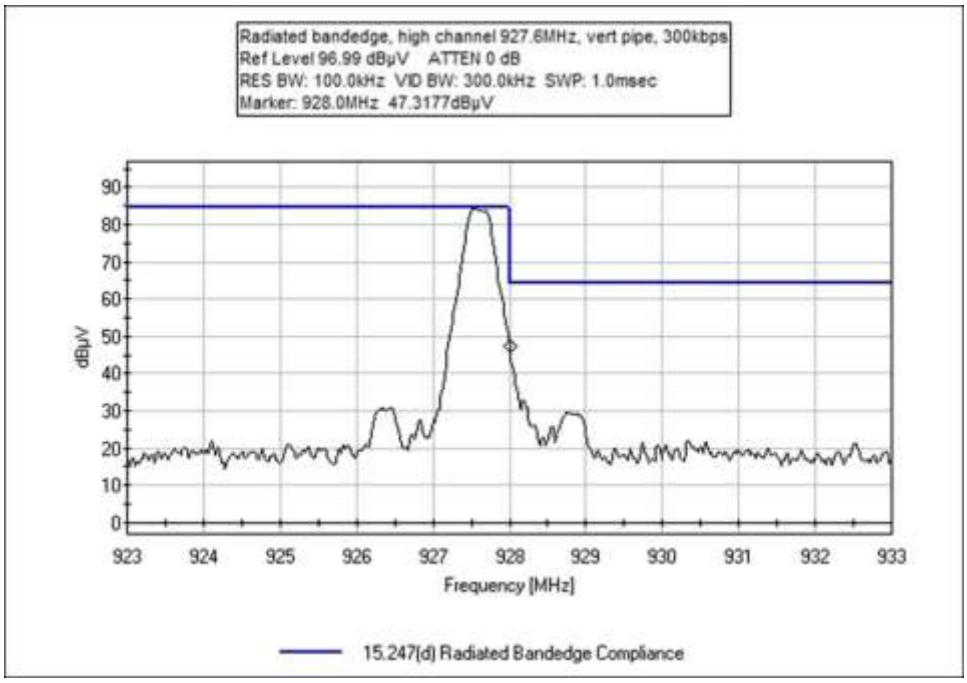
300kbps

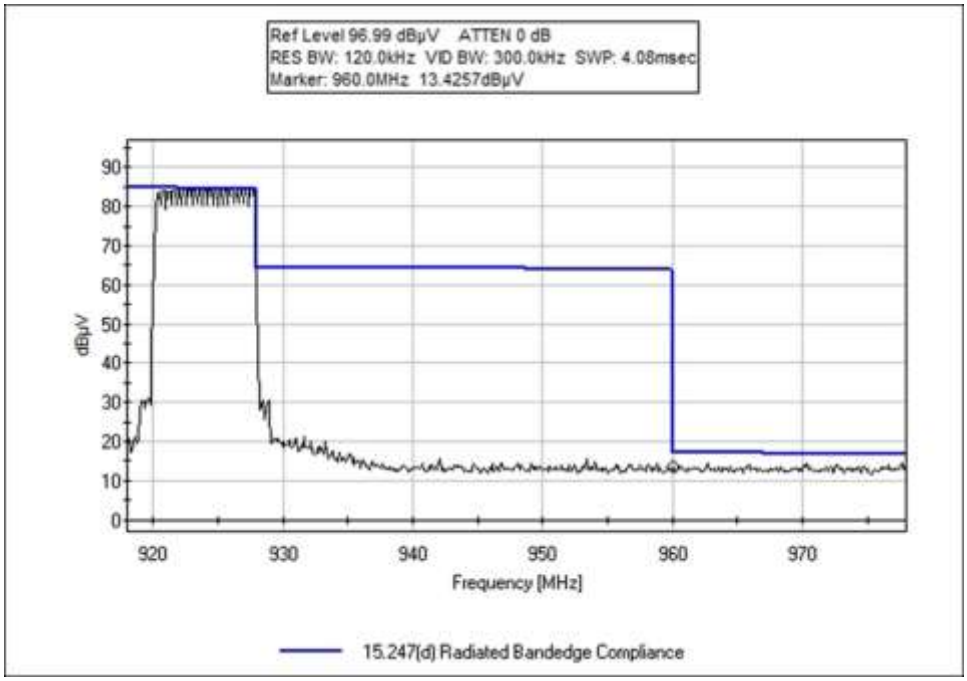

Radiated bandedge, low channel 902.4MHz, 300kbps
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 1.0msec
Marker: 902.0MHz 48.0687dBµV
dBµV
Frequency [MHz]
15.247(d) Radiated Bandedge Compliance

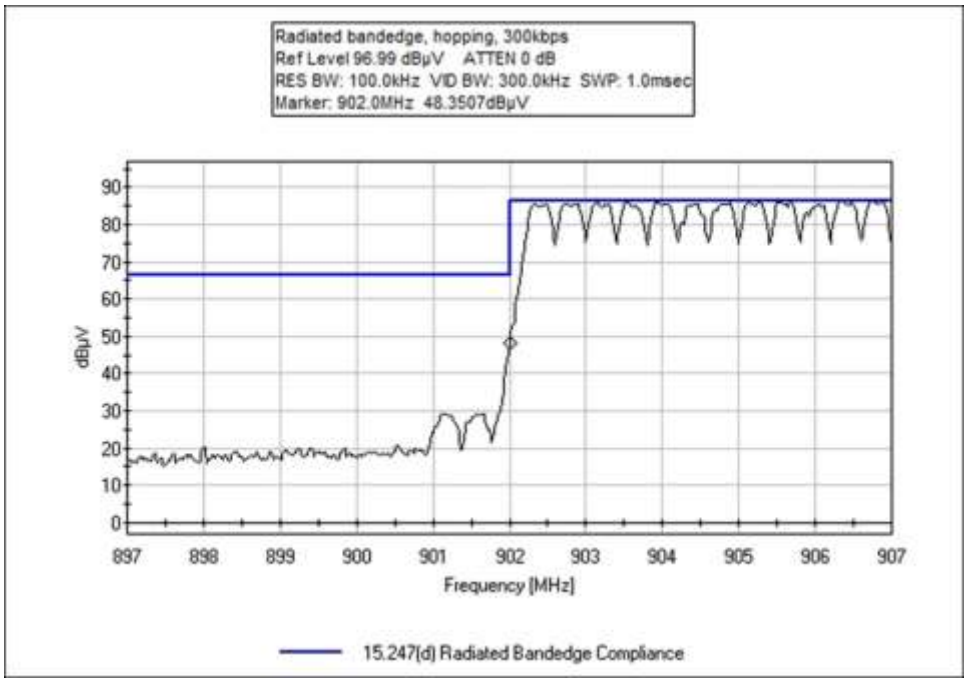

Radiated bandedge, low channel 902.4MHz, vert pipe, 300kbps
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 1.0msec
Marker: 902.0MHz 46.4727dBµV
dBµV
Frequency [MHz]
15.247(d) Radiated Bandedge Compliance

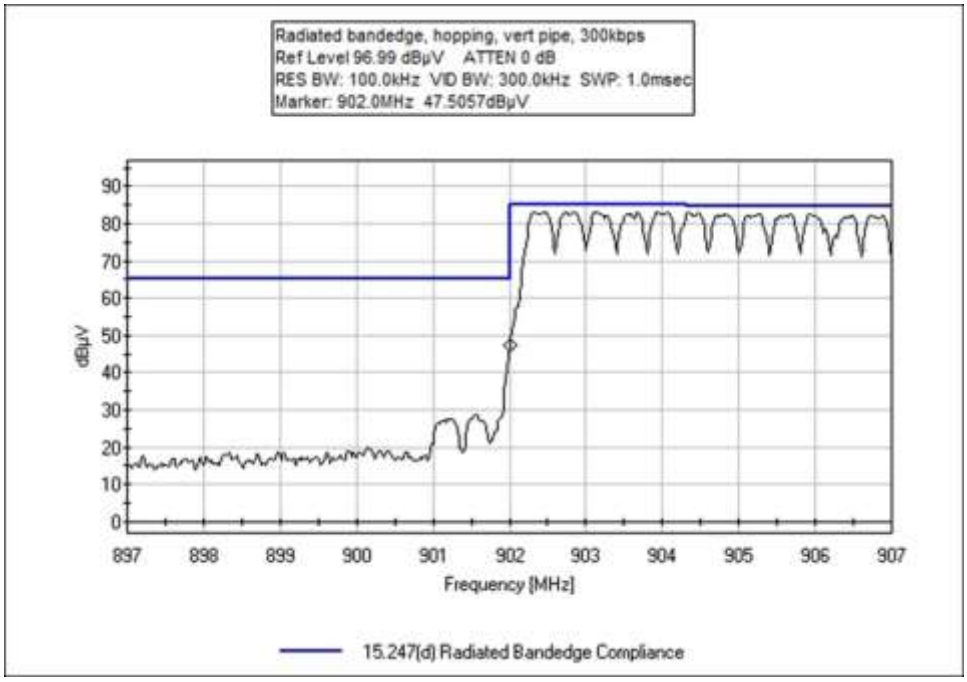

Radiated bandedge, high channel 927.6MHz, 300kbps
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 1.0msec
Marker: 928.0MHz 48.7247dBµV
dBµV
Frequency [MHz]
15.247(d) Radiated Bandedge Compliance

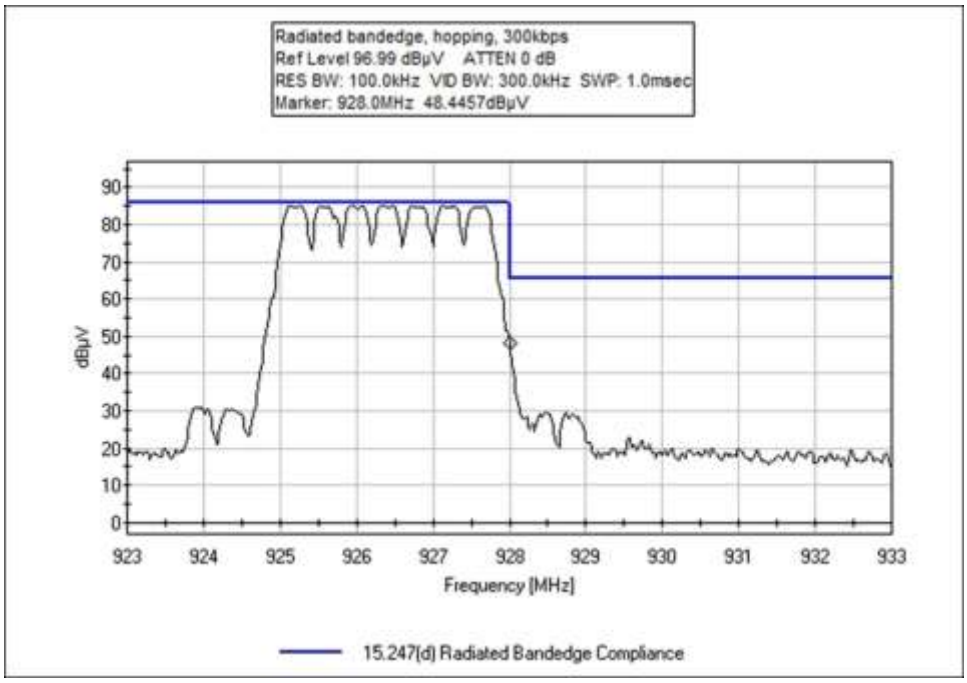

Radiated bandedge, high channel 927.6MHz, 300kbps
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 120.0kHz VID BW: 300.0kHz SWP: 6.32msec
Marker: 960.0MHz 9.5597dBµV
dBµV
Frequency [MHz]
15.247(d) Radiated Bandedge Compliance

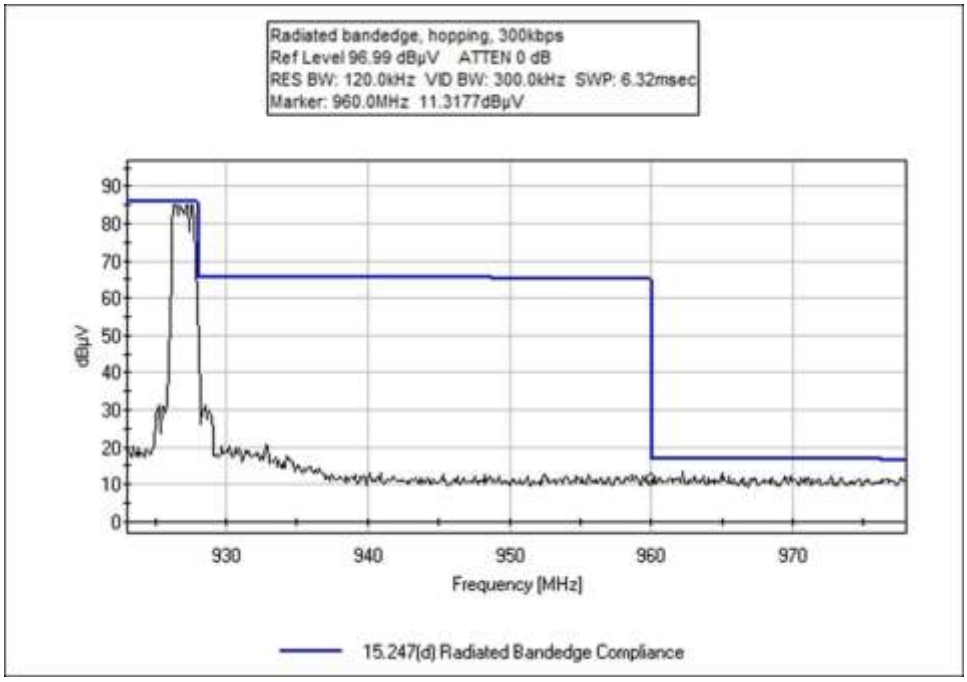

Radiated bandedge, high channel 927.6MHz, vert pipe, 300kbps
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 1.0msec
Marker: 928.0MHz 47.3177dBµV
dBµV
Frequency [MHz]
15.247(d) Radiated Bandedge Compliance

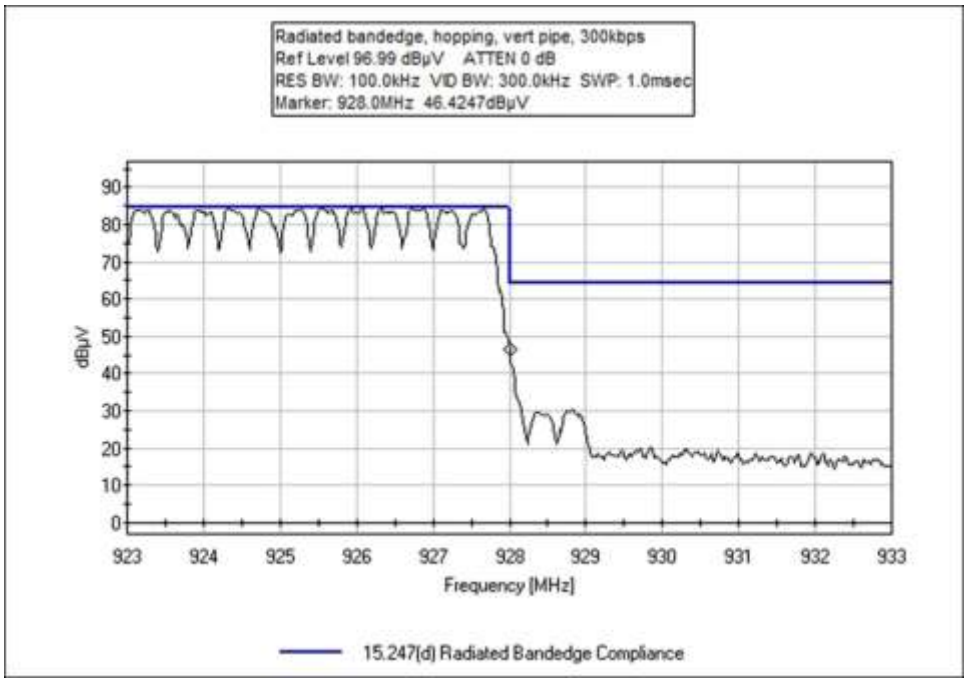

Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 120.0kHz VID BW: 300.0kHz SWP: 4.08msec
Marker: 960.0MHz 13.4257dBµV
dBµV
Frequency [MHz]
15.247(d) Radiated Bandedge Compliance

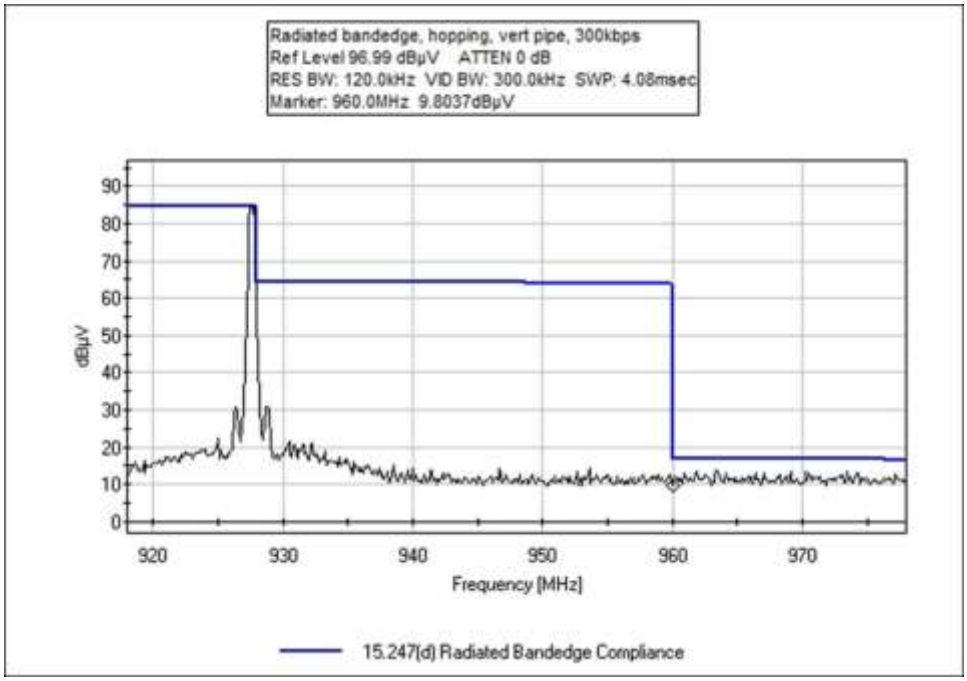

Radiated bandedge, hopping, 300kbps
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 1.0msec
Marker: 902.0MHz 48.3507dBµV
dBµV
Frequency [MHz]
15.247(d) Radiated Bandedge Compliance


Radiated bandedge, hopping, vert pipe, 300kbps
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 1.0msec
Marker: 902.0MHz 47.5057dBµV
dBµV
Frequency [MHz]
15.247(d) Radiated Bandedge Compliance

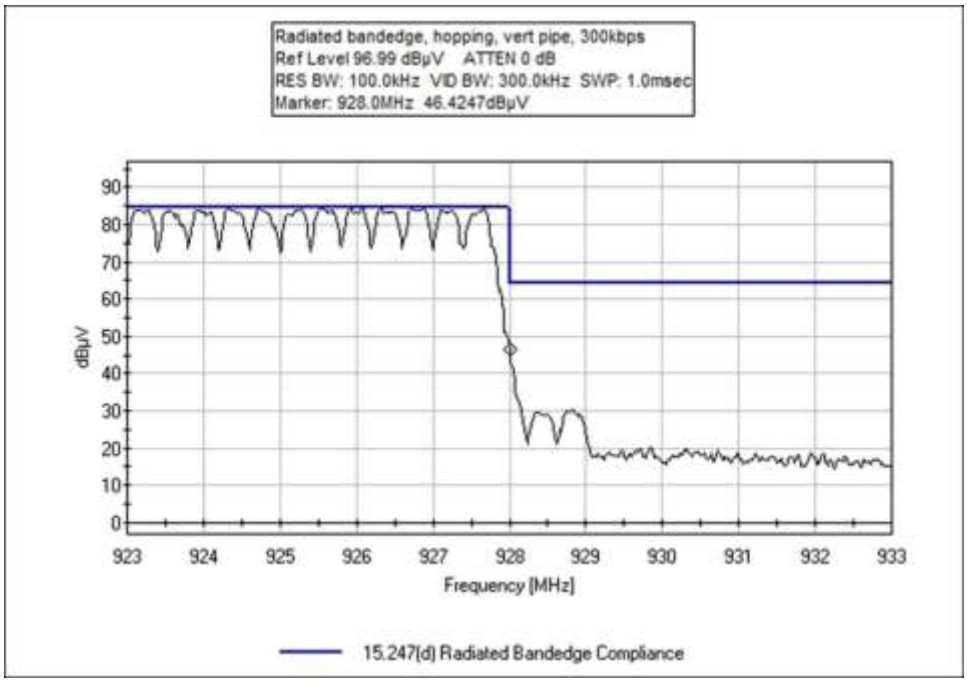

Radiated bandedge, hopping, 300kbps
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 1.0msec
Marker: 928.0MHz 48.4457dBµV
dBµV
Frequency [MHz]
15.247(d) Radiated Bandedge Compliance

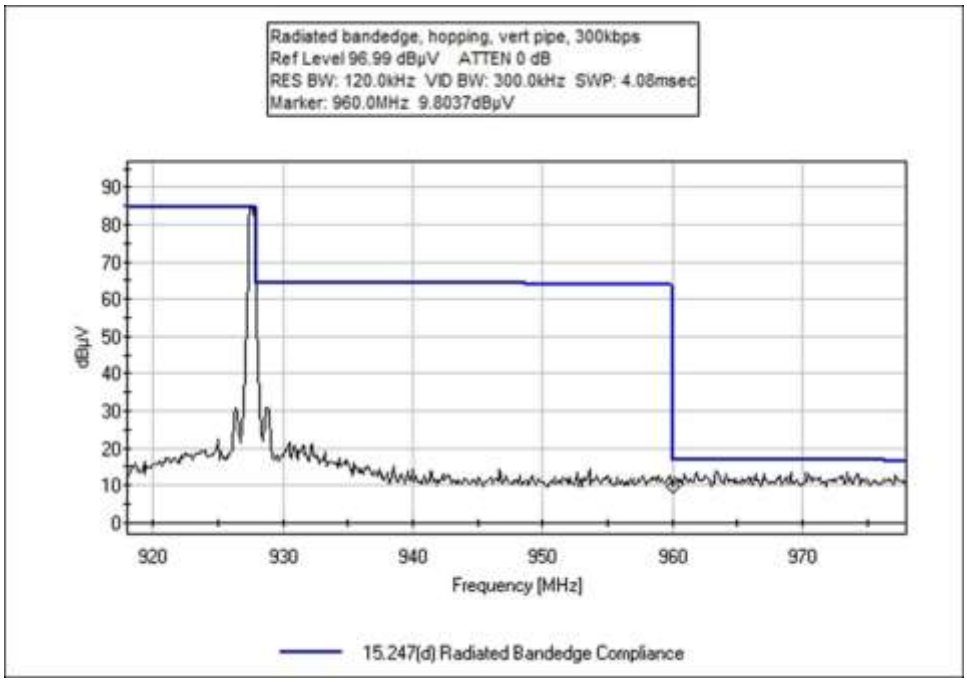

Radiated bandedge, hopping, 300kbps
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 120.0kHz VID BW: 300.0kHz SWP: 6.32msec
Marker: 960.0MHz 11.3177dBµV
dBµV
Frequency [MHz]
15.247(d) Radiated Bandedge Compliance

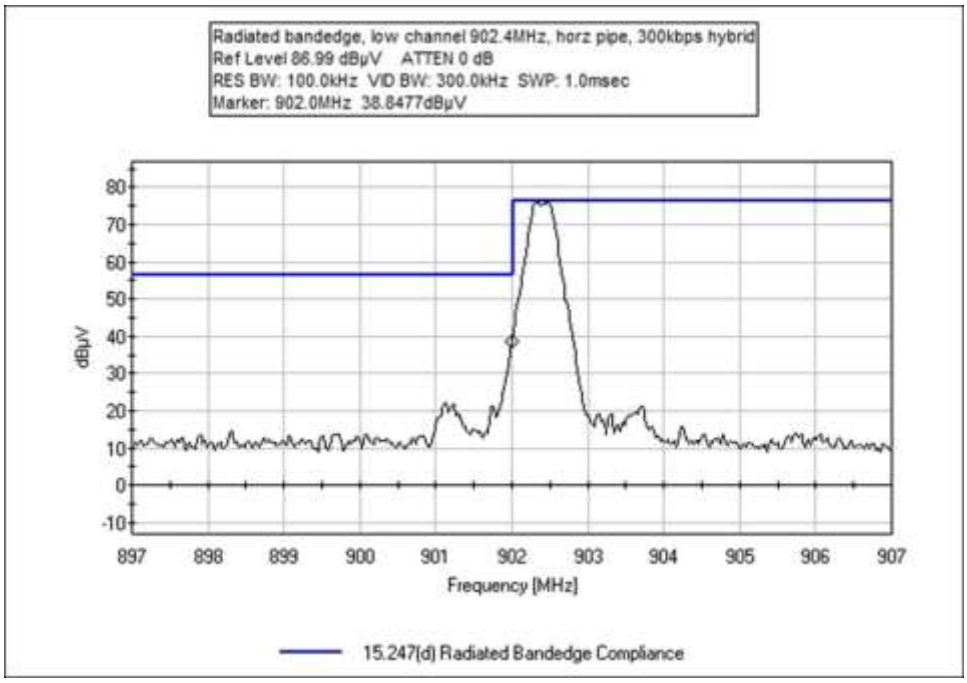

Radiated bandedge, hopping, vert pipe, 300kbps
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 1.0msec
Marker: 928.0MHz 46.4247dBµV
dBµV
Frequency [MHz]
15.247(d) Radiated Bandedge Compliance

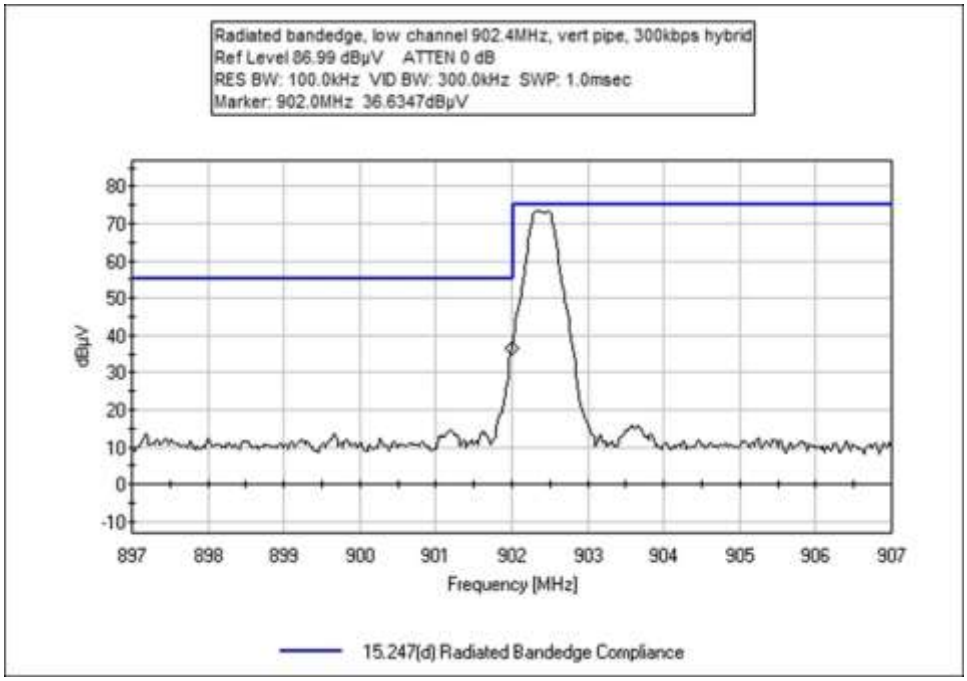

Radiated bandedge, hopping, vert pipe, 300kbps
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 120.0kHz VID BW: 300.0kHz SWP: 4.08msec
Marker: 960.0MHz 9.8037dBµV
dBµV
Frequency [MHz]
15.247(d) Radiated Bandedge Compliance

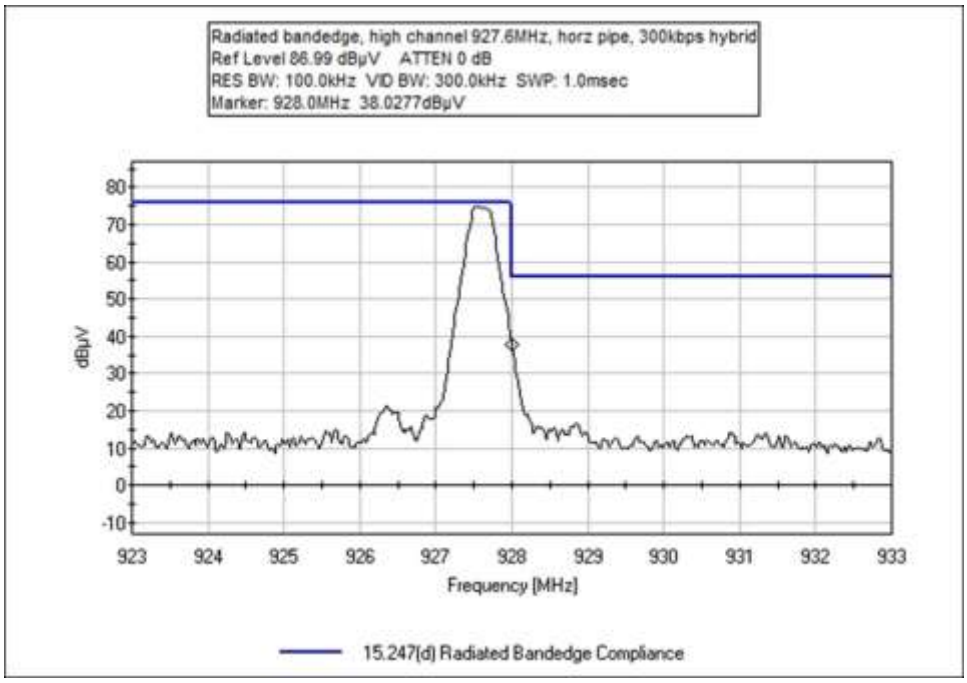
Hybrid

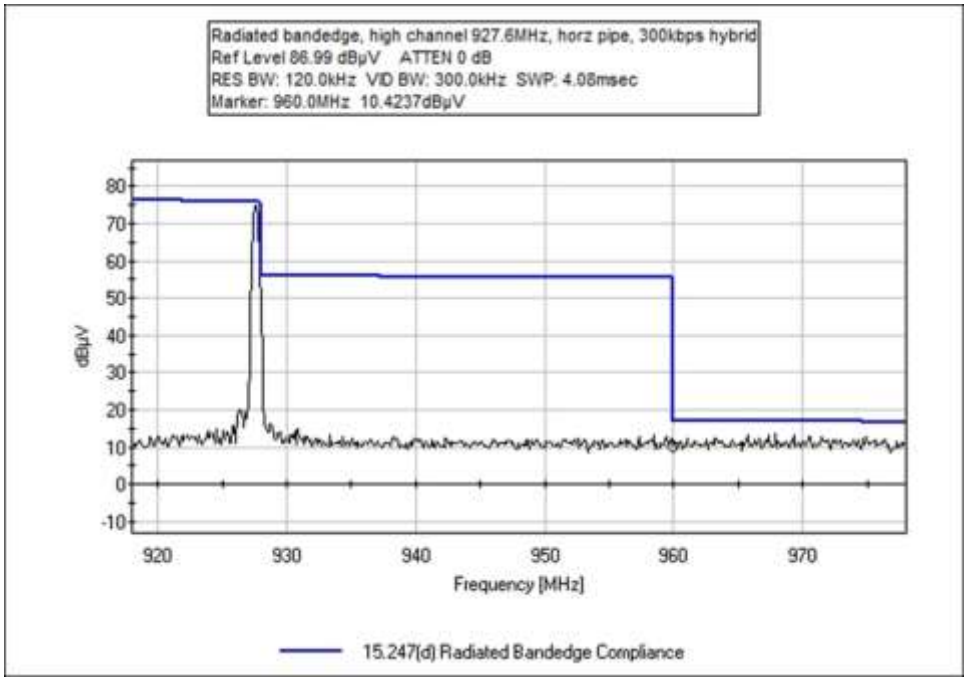

Radiated bandedge, hopping, vert pipe, 300kbps
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 1.0msec
Marker: 928.0MHz 46.4247dBµV
dBµV
Frequency [MHz]
15.247(d) Radiated Bandedge Compliance

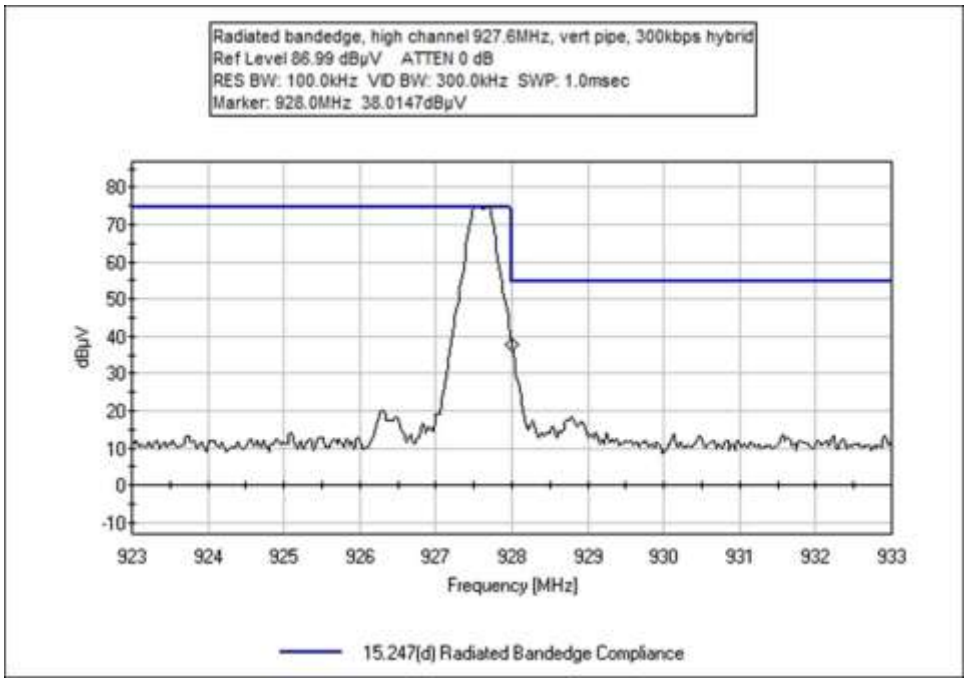

Radiated bandedge, hopping, vert pipe, 300kbps
Ref Level 96.99 dBµV ATTEN 0 dB
RES BW: 120.0kHz VID BW: 300.0kHz SWP: 4.08msec
Marker: 960.0MHz 9.8037dBµV
dBµV
Frequency [MHz]
15.247(d) Radiated Bandedge Compliance

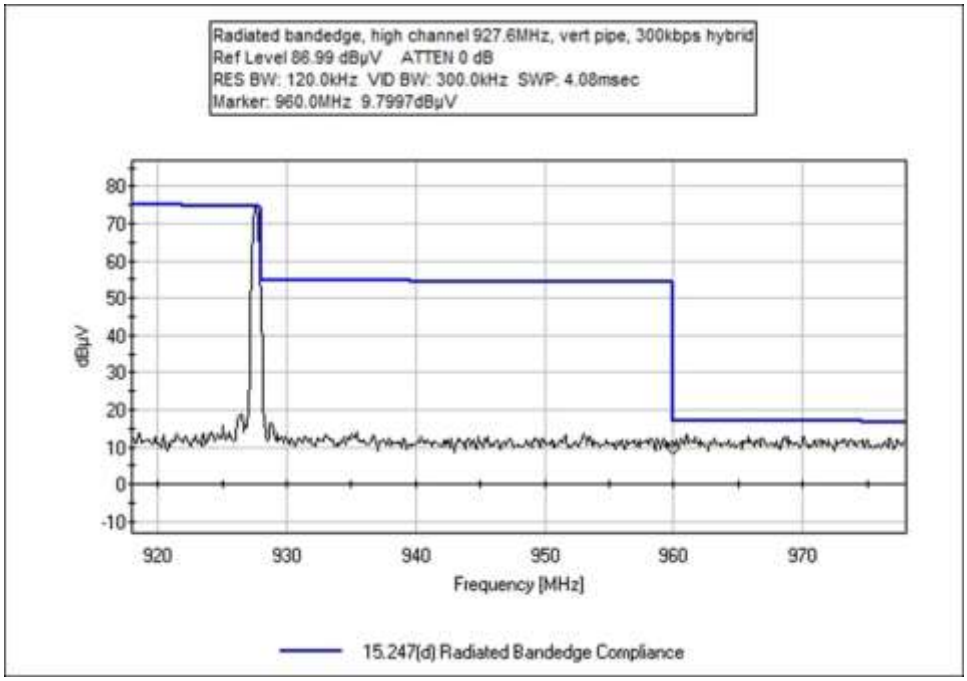

Radiated bandedge, low channel 902.4MHz, horz pipe, 300kbps hybrid
Ref Level 86.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 1.0msec
Marker: 902.0MHz 38.8477dBµV
dBµV
80
70
60
50
40
30
20
10
0
-10
897
898
899
900
901
902
903
904
905
906
907
Frequency [MHz]
15.247(d) Radiated Bandedge Compliance

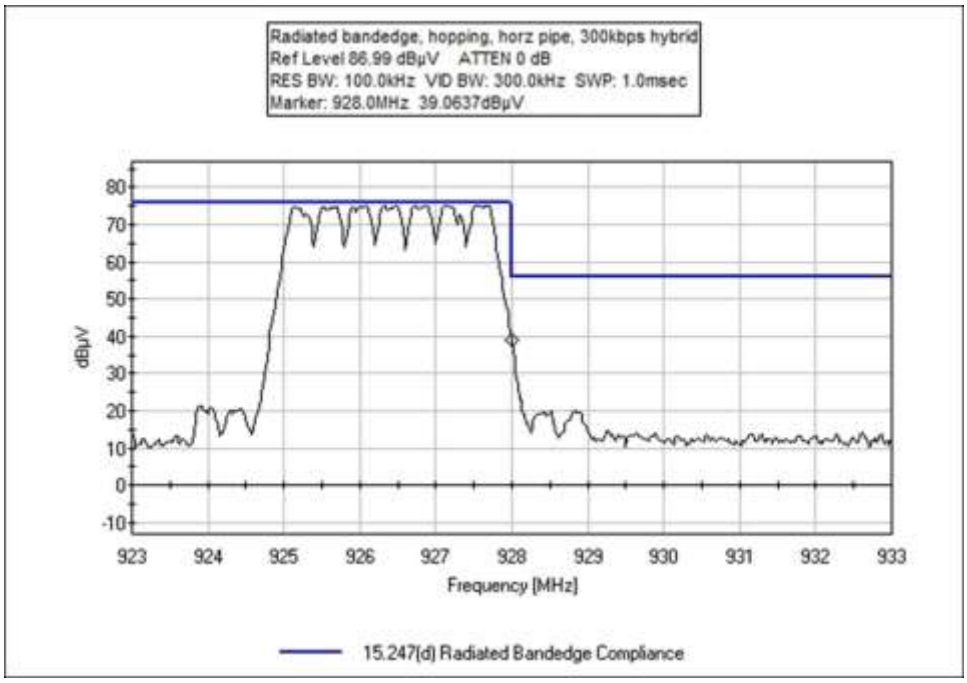

Radiated bandedge, low channel 902.4MHz, vert pipe, 300kbps hybrid
Ref Level 86.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 1.0msec
Marker: 902.0MHz 36.6347dBµV
dBµV
80
70
60
50
40
30
20
10
0
-10
897
898
899
900
901
902
903
904
905
906
907
Frequency [MHz]
15.247(d) Radiated Bandedge Compliance

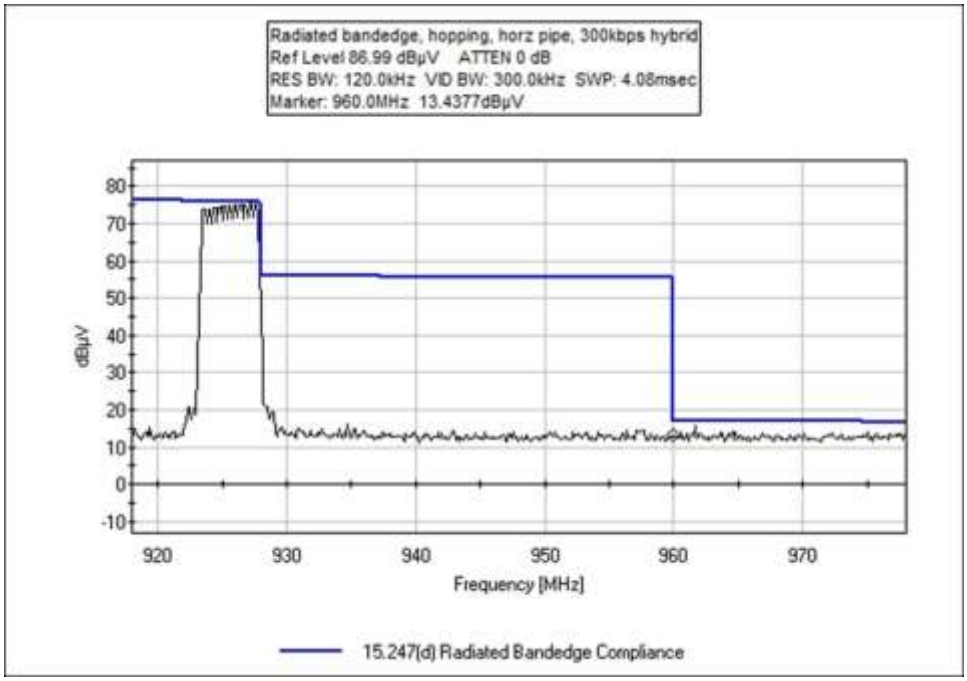

Radiated bandedge, high channel 927.6MHz, horz pipe, 300kbps hybrid
Ref Level 86.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 1.0msec
Marker: 928.0MHz 38.0277dBµV
dBµV
80
70
60
50
40
30
20
10
0
-10
923
924
925
926
927
928
929
930
931
932
933
Frequency [MHz]
15.247(d) Radiated Bandedge Compliance

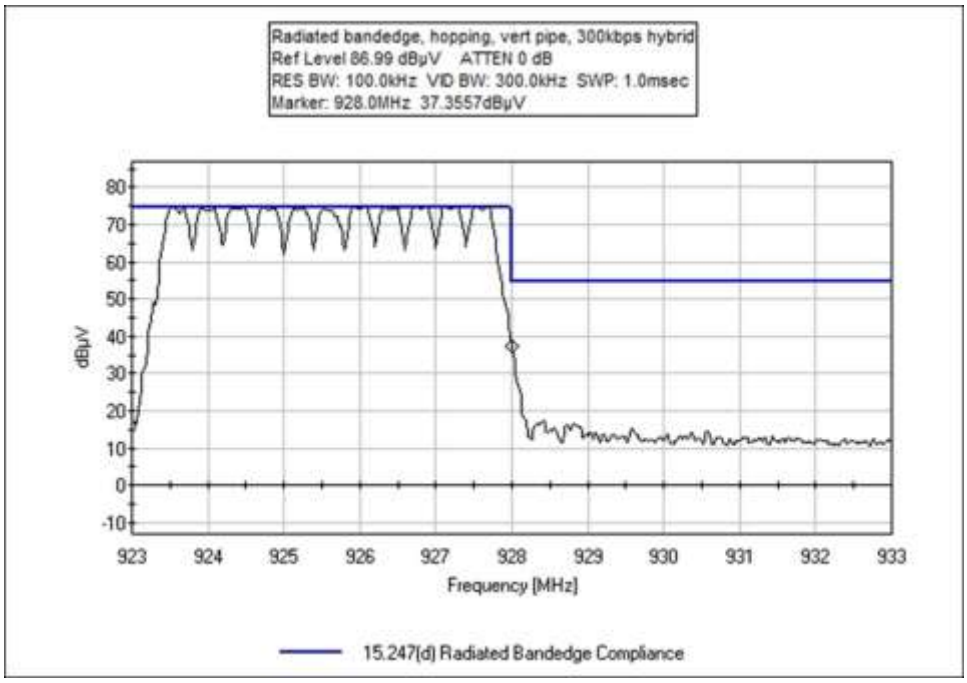

Radiated bandedge, high channel 927.6MHz, horz pipe, 300kbps hybrid
Ref Level 86.99 dBµV ATTEN 0 dB
RES BW: 120.0kHz VID BW: 300.0kHz SWP: 4.08msec
Marker: 960.0MHz 10.4237dBµV
dBµV
80
70
60
50
40
30
20
10
0
-10
920
930
940
950
960
970
Frequency [MHz]
15.247(d) Radiated Bandedge Compliance

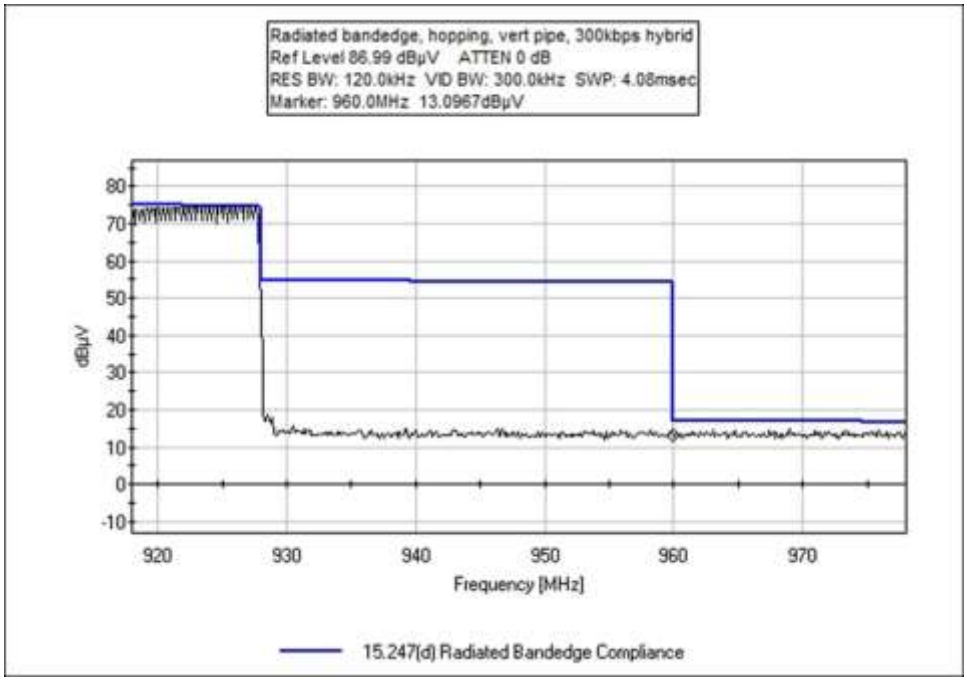

Radiated bandedge, high channel 927.6MHz, vert pipe, 300kbps hybrid
Ref Level 86.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 1.0msec
Marker: 928.0MHz 38.0147dBµV
dBµV
Frequency [MHz]
15.247(d) Radiated Bandedge Compliance


Radiated bandedge, high channel 927.6MHz, vert pipe, 300kbps hybrid
Ref Level 86.99 dBµV ATTEN 0 dB
RES BW: 120.0kHz VID BW: 300.0kHz SWP: 4.08msec
Marker: 960.0MHz 9.7997dBµV
dBµV
Frequency [MHz]
15.247(d) Radiated Bandedge Compliance


Radiated bandedge, hopping, horz pipe, 300kbps hybrid
Ref Level 86.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 1.0msec
Marker: 928.0MHz 39.0637dBµV
dBµV
80
70
60
50
40
30
20
10
0
-10
923
924
925
926
927
928
929
930
931
932
933
Frequency [MHz]
15.247(d) Radiated Bandedge Compliance


Radiated bandedge, hopping, horz pipe, 300kbps hybrid
Ref Level 86.99 dBµV ATTEN 0 dB
RES BW: 120.0kHz VID BW: 300.0kHz SWP: 4.08msec
Marker: 960.0MHz 13.4377dBµV
dBµV
80
70
60
50
40
30
20
10
0
-10
920
930
940
950
960
970
Frequency [MHz]
15.247(d) Radiated Bandedge Compliance


Radiated bandedge, hopping, vert pipe, 300kbps hybrid
Ref Level 86.99 dBµV ATTEN 0 dB
RES BW: 100.0kHz VID BW: 300.0kHz SWP: 1.0msec
Marker: 928.0MHz 37.3557dBµV
dBµV
80
70
60
50
40
30
20
10
0
-10
923
924
925
926
927
928
929
930
931
932
933
Frequency [MHz]
15.247(d) Radiated Bandedge Compliance


Radiated bandedge, hopping, vert pipe, 300kbps hybrid
Ref Level 86.99 dBµV ATTEN 0 dB
RES BW: 120.0kHz VID BW: 300.0kHz SWP: 4.08msec
Marker: 960.0MHz 13.0967dBµV
dBµV
80
70
60
50
40
30
20
10
0
-10
920
930
940
950
960
970
Frequency [MHz]
15.247(d) Radiated Bandedge Compliance

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) Radiated Bandedge Compliance**		
Work Order #:	**100666**	Date:	11/19/2018
Test Type:	**Maximized Emissions**	Time:	13:20:28
Tested By:	S. Yamamoto	Sequence#:	1
Software:	EMITest 5.03.11		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

The equipment under test (EUT) is placed stand alone on a Styrofoam table top. Connected to the EUT is a laptop computer via USB to serial interface board. The EUT is turned on and set in transmitting mode. The EUT has fresh batteries installed. Nominal input voltage is 6.0Vdc.
The EUT is tested in horizontal pipe orientation.
Operating frequency: 902.3MHz, 914.8MHz, and 926.9MHz. 100kbps FSK modulation.
Firmware power: power level 3.
Frequency range of measurement = 614-960MHz
RBW=100kHz and VBW=300kHz unless for RB where RBW=120kHz and VBW=300kHz.

Temperature: 22°C, Humidity: 30%, Pressure: 100kPa.
Site D.
Test Method: ANSI C63.10 (2013)

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02869	Spectrum Analyzer	E4440A	8/10/2018	8/10/2019
T2	ANP04382	Cable	LDF-50	6/2/2018	6/2/2020
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	4/5/2018	4/5/2020
T5	AN01994	Biconilog Antenna	CBL6111C	4/23/2018	4/23/2020

Measurement Data: Reading listed by margin. Test Distance: 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	614.000M	10.4	+0.0	+2.6	+2.7	+5.8	+0.0	41.9	46.0	-4.1	Horiz
			+20.4								
2	960.000M	11.4	+0.0	+3.4	+3.6	+5.9	+0.0	48.4	54.0	-5.6	Horiz
			+24.1								
3	614.000M	8.1	+0.0	+2.6	+2.7	+5.8	+0.0	39.6	46.0	-6.4	Horiz
			+20.4								
4	960.000M	9.2	+0.0	+3.4	+3.6	+5.9	+0.0	46.2	54.0	-7.8	Horiz
			+24.1								
5	902.000M	47.8	+0.0	+3.2	+3.5	+5.9	+0.0	83.8	102.2	-18.4	Horiz
			+23.4								
6	902.000M	47.4	+0.0	+3.2	+3.5	+5.9	+0.0	83.4	102.2	-18.8	Horiz
			+23.4								
7	928.000M	25.4	+0.0	+3.3	+3.6	+5.9	+0.0	61.9	102.2	-40.3	Horiz
			+23.7								
8	928.000M	23.3	+0.0	+3.3	+3.6	+5.9	+0.0	59.8	102.2	-42.4	Horiz
			+23.7								

Test Location:	CKC Laboratories Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714-993-6112		
Customer:	**Itron, Inc.**		
Specification:	**15.247(d) Radiated Bandedge Compliance**		
Work Order #:	**100666**	Date:	11/19/2018
Test Type:	**Maximized Emissions**	Time:	17:28:22
Tested By:	S. Yamamoto	Sequence#:	1
Software:	EMITest 5.03.11		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

The equipment under test (EUT) is placed stand alone on a Styrofoam table top. Connected to the EUT is a laptop computer via USB to serial interface board. The EUT is turned on and set in transmitting mode. The EUT has fresh batteries installed. Nominal input voltage is 6.0Vdc.
The EUT is tested in vertical pipe orientation.
Operating frequency: 902.3MHz, 914.8MHz, and 926.9MHz. 100kbps FSK modulation.
Firmware power: power level 3.
Frequency range of measurement = 614-960MHz RBW=100kHz and VBW=300kHz unless for RB where RBW=120kHz and VBW=300kHz.

Temperature: 22°C, Humidity: 30%, Pressure: 100kPa.
Site D.
Test Method: ANSI C63.10 (2013)

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02869	Spectrum Analyzer	E4440A	8/10/2018	8/10/2019
T2	ANP04382	Cable	LDF-50	6/2/2018	6/2/2020
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	4/5/2018	4/5/2020
T5	AN01994	Biconilog Antenna	CBL6111C	4/23/2018	4/23/2020

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

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	960.000M	13.3	+0.0 +24.1	+3.4	+3.6	+5.9	+0.0	50.3	54.0	-3.7	Horiz
2	614.000M	7.6	+0.0 +20.4	+2.6	+2.7	+5.8	+0.0	39.1	46.0	-6.9	Horiz
3	960.000M	9.9	+0.0 +24.1	+3.4	+3.6	+5.9	+0.0	46.9	54.0	-7.1	Horiz
4	614.000M	4.7	+0.0 +20.4	+2.6	+2.7	+5.8	+0.0	36.2	46.0	-9.8	Horiz
5	902.000M	46.2	+0.0 +23.4	+3.2	+3.5	+5.9	+0.0	82.2	100.4	-18.2	Horiz
6	902.000M	44.8	+0.0 +23.4	+3.2	+3.5	+5.9	+0.0	80.8	100.4	-19.6	Horiz
7	928.000M	21.8	+0.0 +23.7	+3.3	+3.6	+5.9	+0.0	58.3	100.4	-42.1	Horiz
8	928.000M	21.5	+0.0 +23.7	+3.3	+3.6	+5.9	+0.0	58.0	100.4	-42.4	Horiz

Test Location:	CKC Laboratories Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714-993-6112		
Customer:	**Itron, Inc.**		
Specification:	**15.247(d) Radiated Bandedge Compliance**		
Work Order #:	**100666**	Date:	11/19/2018
Test Type:	**Maximized Emissions**	Time:	13:28:40
Tested By:	S. Yamamoto	Sequence#:	1
Software:	EMITest 5.03.11		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

The equipment under test (EUT) is placed stand alone on a Styrofoam table top. Connected to the EUT is a laptop computer via USB to serial interface board. The EUT is turned on and set in transmitting mode. The EUT has fresh batteries installed. Nominal input voltage is 6.0Vdc.
The EUT is tested in horizontal pipe orientation.
Operating frequency: 902.4MHz, 914.8MHz, and 927.6MHz. 300kbps GFSK modulation.
Firmware power: power level 3.
Frequency range of measurement = 614-960MHz RBW=100kHz and VBW=300kHz unless for RB where RBW=120kHz and VBW=300kHz.

Temperature: 22°C, Humidity: 30%, Pressure: 100kPa.
Site D.
Test Method: ANSI C63.10 (2013)

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02869	Spectrum Analyzer	E4440A	8/10/2018	8/10/2019
T2	ANP04382	Cable	LDF-50	6/2/2018	6/2/2020
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	4/5/2018	4/5/2020
T5	AN01994	Biconilog Antenna	CBL6111C	4/23/2018	4/23/2020

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

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	614.000M	8.8	+0.0 +20.4	+2.6	+2.7	+5.8	+0.0	40.3	46.0	-5.7	Horiz
2	960.000M	11.3	+0.0 +24.1	+3.4	+3.6	+5.9	+0.0	48.3	54.0	-5.7	Horiz
3	614.000M	7.6	+0.0 +20.4	+2.6	+2.7	+5.8	+0.0	39.1	46.0	-6.9	Horiz
4	960.000M	9.6	+0.0 +24.1	+3.4	+3.6	+5.9	+0.0	46.6	54.0	-7.4	Horiz
5	928.000M	48.7	+0.0 +23.7	+3.3	+3.6	+5.9	+0.0	85.2	102.3	-17.1	Horiz
6	928.000M	48.4	+0.0 +23.7	+3.3	+3.6	+5.9	+0.0	84.9	102.3	-17.4	Horiz
7	902.000M	48.4	+0.0 +23.4	+3.2	+3.5	+5.9	+0.0	84.4	102.3	-17.9	Horiz
8	902.000M	48.1	+0.0 +23.4	+3.2	+3.5	+5.9	+0.0	84.1	102.3	-18.2	Horiz

Test Location:	CKC Laboratories Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714-993-6112		
Customer:	**Itron, Inc.**		
Specification:	**15.247(d) Radiated Bandedge Compliance**		
Work Order #:	**100666**	Date:	11/20/2018
Test Type:	**Maximized Emissions**	Time:	17:31:41
Tested By:	S. Yamamoto	Sequence#:	1
Software:	EMITest 5.03.11		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

The equipment under test (EUT) is placed stand alone on a Styrofoam table top. Connected to the EUT is a laptop computer via USB to serial interface board. The EUT is turned on and set in transmitting mode. The EUT has fresh batteries installed. Nominal input voltage is 6.0Vdc.
The EUT is tested in vertical pipe orientation.
Operating frequency: 902.4MHz, 914.8MHz, and 927.6MHz. 300kbps GFSK modulation.
Firmware power: power level 3.
Frequency range of measurement = 614-960MHz RBW=100kHz and VBW=300kHz unless for RB where RBW=120kHz and VBW=300kHz.

Temperature: 22°C, Humidity: 30%, Pressure: 100kPa.
Site D.
Test Method: ANSI C63.10 (2013)

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02869	Spectrum Analyzer	E4440A	8/10/2018	8/10/2019
T2	ANP04382	Cable	LDF-50	6/2/2018	6/2/2020
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	4/5/2018	4/5/2020
T5	AN01994	Biconilog Antenna	CBL6111C	4/23/2018	4/23/2020

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

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	960.000M	13.4	+0.0 +24.1	+3.4	+3.6	+5.9	+0.0	50.4	54.0	-3.6	Horiz
2	614.000M	9.5	+0.0 +20.4	+2.6	+2.7	+5.8	+0.0	41.0	46.0	-5.0	Horiz
3	960.000M	9.8	+0.0 +24.1	+3.4	+3.6	+5.9	+0.0	46.8	54.0	-7.2	Horiz
4	614.000M	7.1	+0.0 +20.4	+2.6	+2.7	+5.8	+0.0	38.6	46.0	-7.4	Horiz
5	928.000M	47.3	+0.0 +23.7	+3.3	+3.6	+5.9	+0.0	83.8	101.0	-17.2	Horiz
6	902.000M	47.5	+0.0 +23.4	+3.2	+3.5	+5.9	+0.0	83.5	101.0	-17.5	Horiz
7	928.000M	46.4	+0.0 +23.7	+3.3	+3.6	+5.9	+0.0	82.9	101.0	-18.1	Horiz
8	902.000M	46.5	+0.0 +23.4	+3.2	+3.5	+5.9	+0.0	82.5	101.0	-18.5	Horiz

Test Location:	CKC Laboratories Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714-993-6112		
Customer:	**Itron, Inc.**		
Specification:	**15.247(d) Radiated Bandedge Compliance**		
Work Order #:	**100666**	Date:	11/19/2018
Test Type:	**Maximized Emissions**	Time:	17:28:49
Tested By:	S. Yamamoto	Sequence#:	1
Software:	EMITest 5.03.11		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

The equipment under test (EUT) is placed stand alone on a Styrofoam table top. Connected to the EUT is a laptop computer via USB to serial interface board. The EUT is turned on and set in transmitting mode. The EUT has fresh batteries installed. Nominal input voltage is 6.0Vdc.
The EUT is tested in horizontal pipe orientation.
Operating frequency: 902.4MHz, 914.8MHz, and 927.6MHz. 300kbps hybrid modulation.
Firmware power: power level 2.
Frequency range of measurement = 614-960MHz RBW=100kHz and VBW=300kHz unless for RB where RBW=120kHz and VBW=300kHz.

Temperature: 22°C, Humidity: 30%, Pressure: 100kPa.
Site D.
Test Method: ANSI C63.10 (2013)

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02869	Spectrum Analyzer	E4440A	8/10/2018	8/10/2019
T2	ANP04382	Cable	LDF-50	6/2/2018	6/2/2020
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	4/5/2018	4/5/2020
T5	AN01994	Biconilog Antenna	CBL6111C	4/23/2018	4/23/2020

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

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	960.000M	13.4	+0.0 +24.1	+3.4	+3.6	+5.9	+0.0	50.4	54.0	-3.6	Horiz
2	614.000M	9.9	+0.0 +20.4	+2.6	+2.7	+5.8	+0.0	41.4	46.0	-4.6	Horiz
3	960.000M	10.4	+0.0 +24.1	+3.4	+3.6	+5.9	+0.0	47.4	54.0	-6.6	Horiz
4	614.000M	7.4	+0.0 +20.4	+2.6	+2.7	+5.8	+0.0	38.9	46.0	-7.1	Horiz
5	928.000M	39.1	+0.0 +23.7	+3.3	+3.6	+5.9	+0.0	75.6	92.5	-16.9	Horiz
6	902.000M	38.8	+0.0 +23.4	+3.2	+3.5	+5.9	+0.0	74.8	92.5	-17.7	Horiz
7	902.000M	38.5	+0.0 +23.4	+3.2	+3.5	+5.9	+0.0	74.5	92.5	-18.0	Horiz
8	928.000M	38.0	+0.0 +23.7	+3.3	+3.6	+5.9	+0.0	74.5	92.5	-18.0	Horiz

Test Location:	CKC Laboratories Inc. • 110 N. Olinda Place • Brea, CA 92823 • 714-993-6112		
Customer:	**Itron, Inc.**		
Specification:	**15.247(d) Radiated Bandedge Compliance**		
Work Order #:	**100666**	Date:	11/21/2018
Test Type:	**Maximized Emissions**	Time:	11:02:02
Tested By:	S. Yamamoto	Sequence#:	1
Software:	EMITest 5.03.11		

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

The equipment under test (EUT) is placed stand alone on a Styrofoam table top. Connected to the EUT is a laptop computer via USB to serial interface board. The EUT is turned on and set in transmitting mode. The EUT has fresh batteries installed. Nominal input voltage is 6.0Vdc.
The EUT is tested in vertical pipe orientation.
Operating frequency: 902.4MHz, 914.8MHz, and 927.6MHz. 300kbps hybrid modulation.
Firmware power: power level 2.
Frequency range of measurement = 614-960MHz RBW=100kHz and VBW=300kHz unless for RB where RBW=120kHz and VBW=300kHz.

Temperature: 22°C, Humidity: 30%, Pressure: 100kPa.
Site D.
Test Method: ANSI C63.10 (2013)

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02869	Spectrum Analyzer	E4440A	8/10/2018	8/10/2019
T2	ANP04382	Cable	LDF-50	6/2/2018	6/2/2020
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	4/5/2018	4/5/2020
T5	AN01994	Biconilog Antenna	CBL6111C	4/23/2018	4/23/2020

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

#	Freq	Rdng	T1 T5	T2	T3	T4	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	960.000M	13.1	+0.0 +24.1	+3.4	+3.6	+5.9	+0.0	50.1	54.0	-3.9	Horiz
2	614.000M	7.9	+0.0 +20.4	+2.6	+2.7	+5.8	+0.0	39.4	46.0	-6.6	Horiz
3	960.000M	9.8	+0.0 +24.1	+3.4	+3.6	+5.9	+0.0	46.8	54.0	-7.2	Horiz
4	614.000M	7.0	+0.0 +20.4	+2.6	+2.7	+5.8	+0.0	38.5	46.0	-7.5	Horiz
5	928.000M	38.0	+0.0 +23.7	+3.3	+3.6	+5.9	+0.0	74.5	91.3	-16.8	Horiz
6	902.000M	38.0	+0.0 +23.4	+3.2	+3.5	+5.9	+0.0	74.0	91.3	-17.3	Horiz
7	928.000M	37.4	+0.0 +23.7	+3.3	+3.6	+5.9	+0.0	73.9	91.3	-17.4	Horiz
8	902.000M	36.6	+0.0 +23.4	+3.2	+3.5	+5.9	+0.0	72.6	91.3	-18.7	Horiz

Test Setup Photos

Horizontal Pipe

Horizontal Pipe

Vertical Pipe

Vertical Pipe

Above 1GHz, Cone placement

15.247(f) Hybrid Systems

Test Setup/Conditions			
Test Location:	Brea Lab D	Test Engineer:	S. Yamamoto
Test Method:	ANSI C63.10 (2013)	Test Date(s):	11/12/2018
Configuration:	1		
Test Setup:	The equipment under test (EUT) is placed on the table top. The EUT serial port is connected to a support laptop via serial to USB adapter. The laptop is running software Command Line Interface Tool to command the EUT to transmit and on specific frequencies. The EUT is powered from fresh batteries which are providing nominal voltage to the EUT. Frequency of measurement: 902 MHz to 928MHz. RBW=3kHz/10kHz/100kHz, VBW=10kHz/30kHz/100kHz		

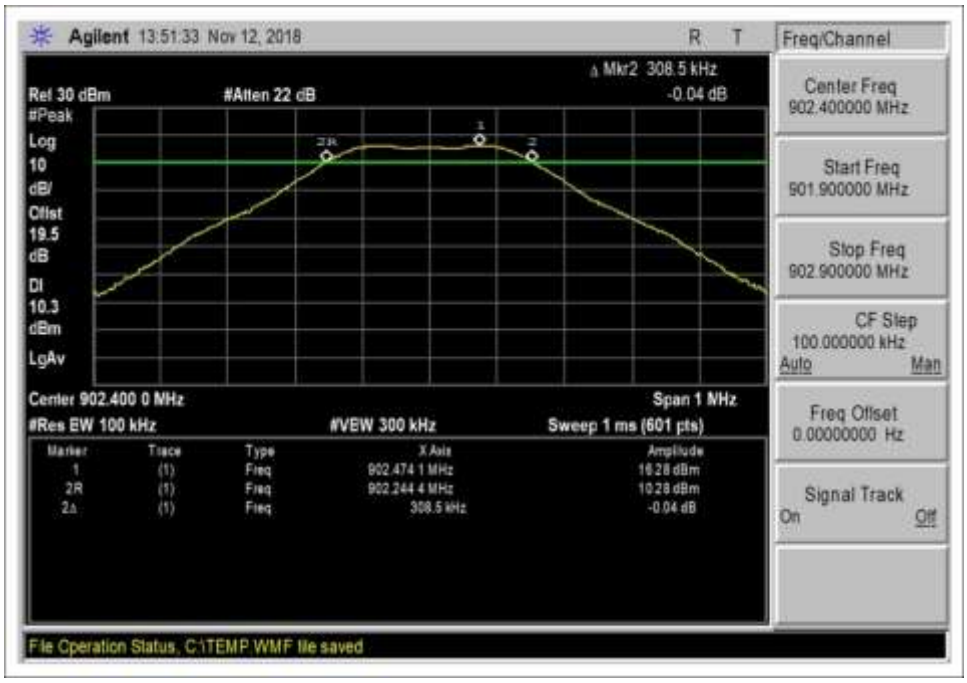
Environmental Conditions			
Temperature (ºC)	22	Relative Humidity (%):	36

Test Equipment					
Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
02869	Spectrum Analyzer	Agilent	E4440A	8/10/2018	8/10/2019
03431	Attenuator	Aeroflex/Weinschel	89-20-21	12/19/2017	12/19/2019
P07247	Cable	H&S	32022-29094K-29094K-24TC	7/5/2018	7/5/2020

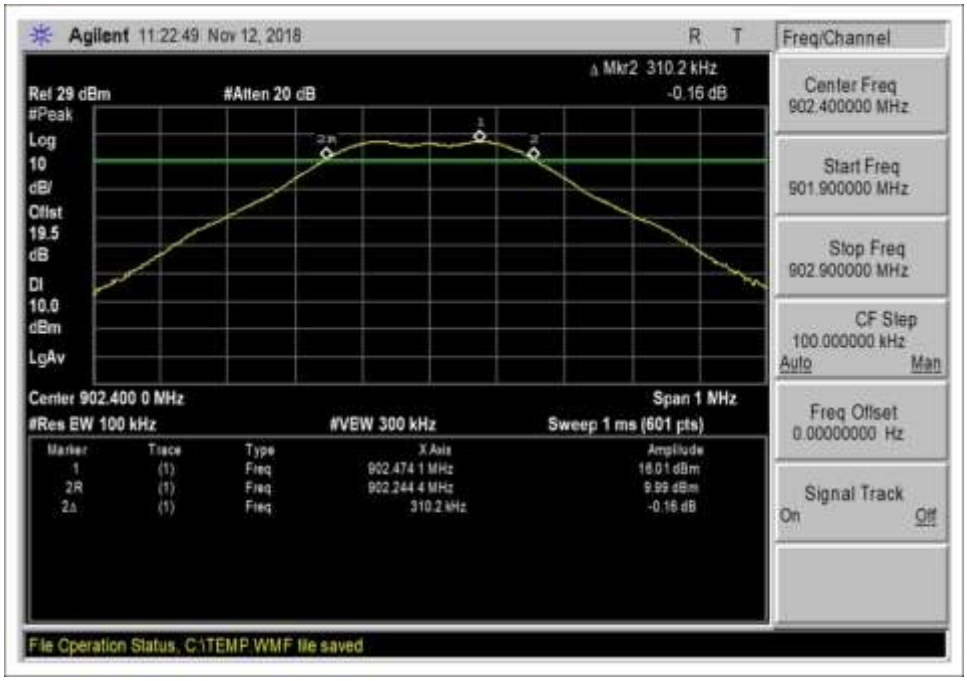
15.247(f) 6dB Bandwidth

Test Data Summary					
Frequency (MHz)	Antenna Port	Modulation	Measured (kHz)	Limit (kHz)	Results
902.4	Vert pipe	300kbps Hybrid	310.2	None	Pass
915.2	Vert pipe	300kbps Hybrid	310.3		
927.6	Vert pipe	300kbps Hybrid	309.1		
902.4	Horz pipe	300kbps Hybrid	308.5	None	Pass
915.2	Horz pipe	300kbps Hybrid	308.7		
927.6	Horz pipe	300kbps Hybrid	309.1		

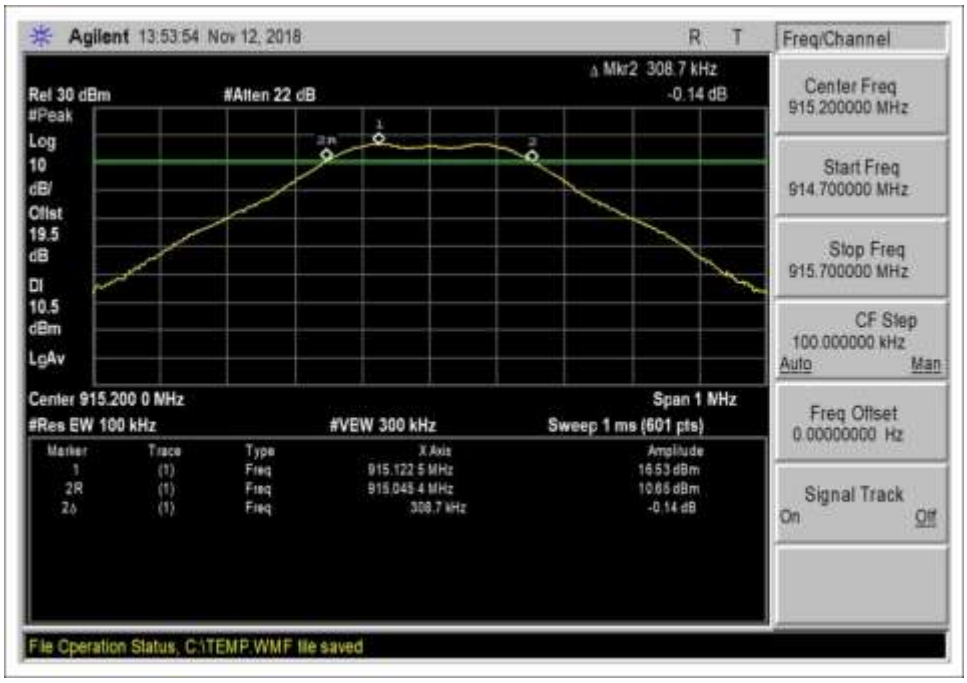
6dB Bandwidth Plots



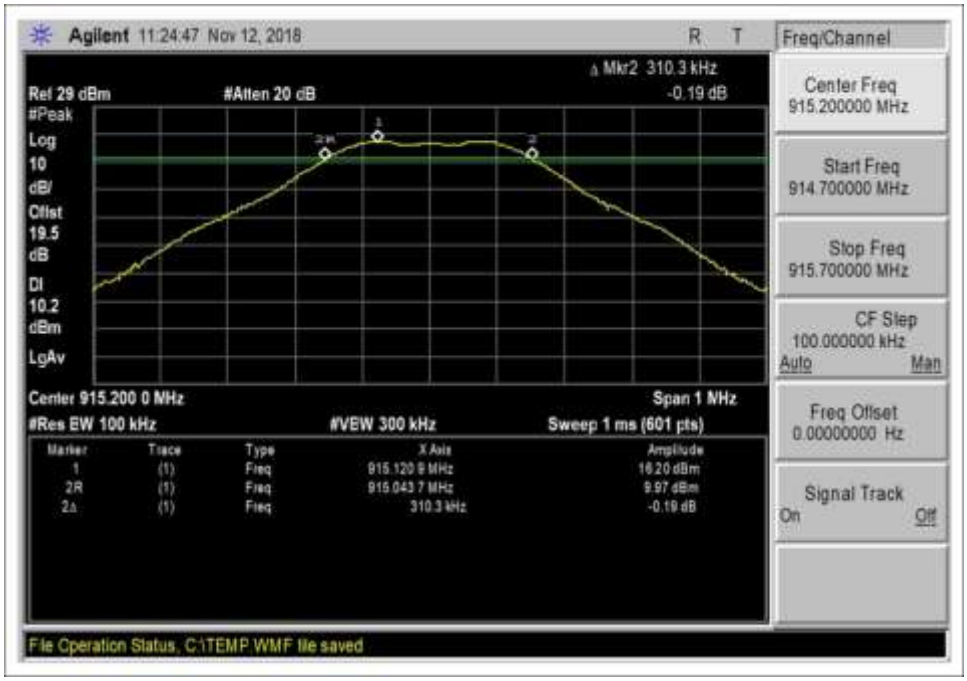
Low Channel, Horizontal Pipe



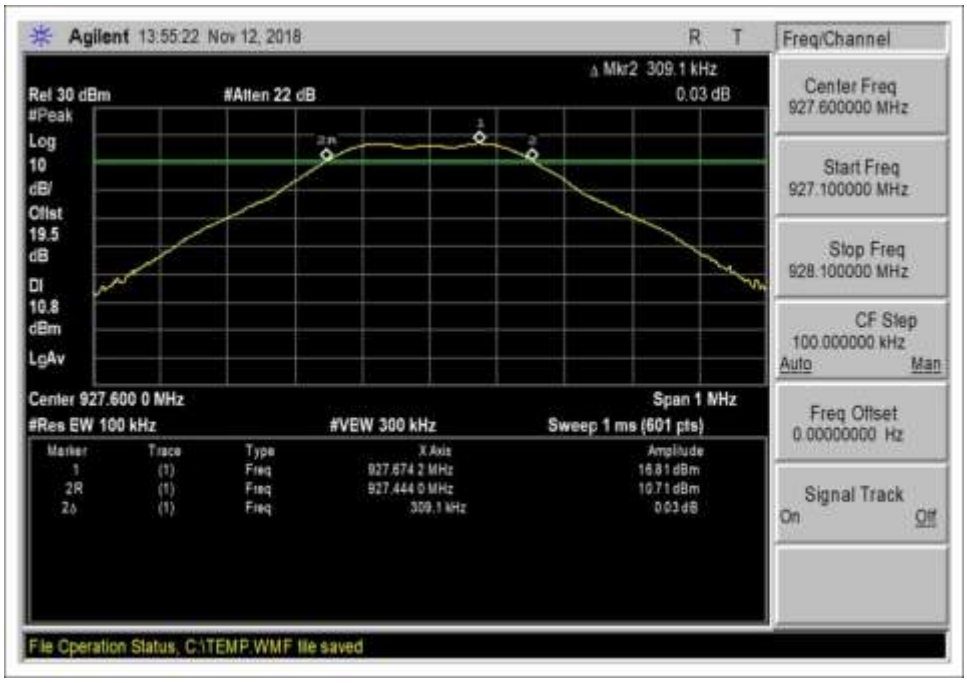
Low Channel, Vertical Pipe



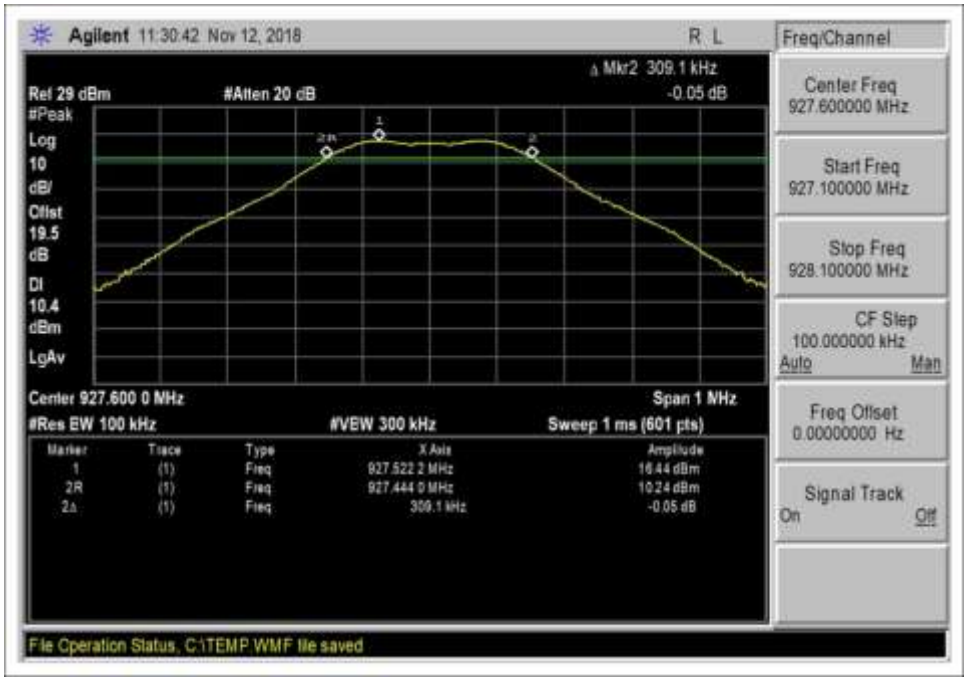
Middle Channel, Horizontal Pipe



Middle Channel, Vertical Pipe



High Channel, Horizontal Pipe

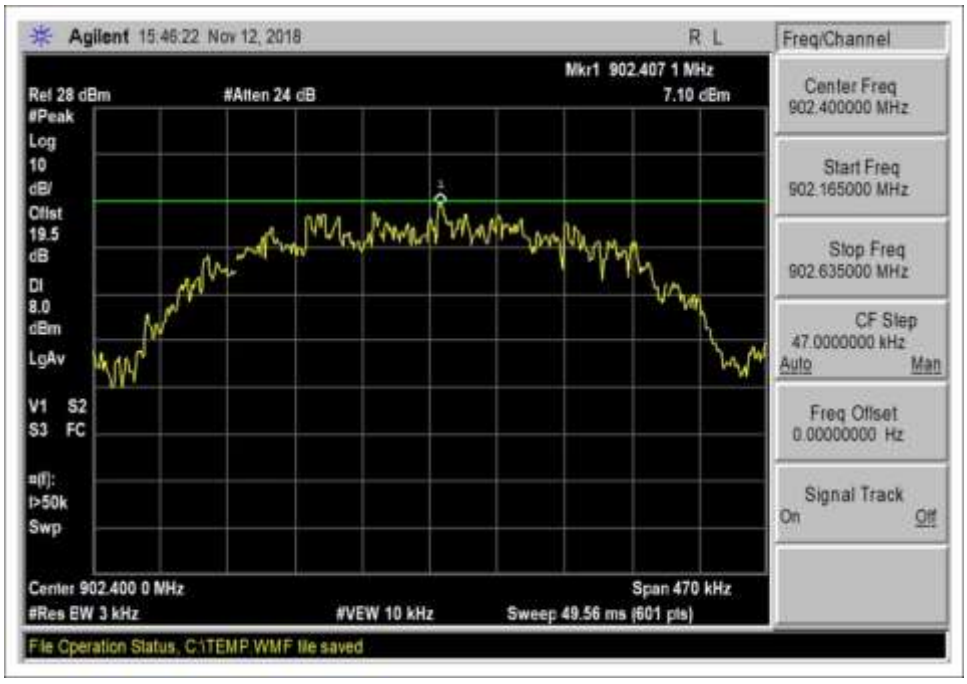


High Channel, Vertical Pipe

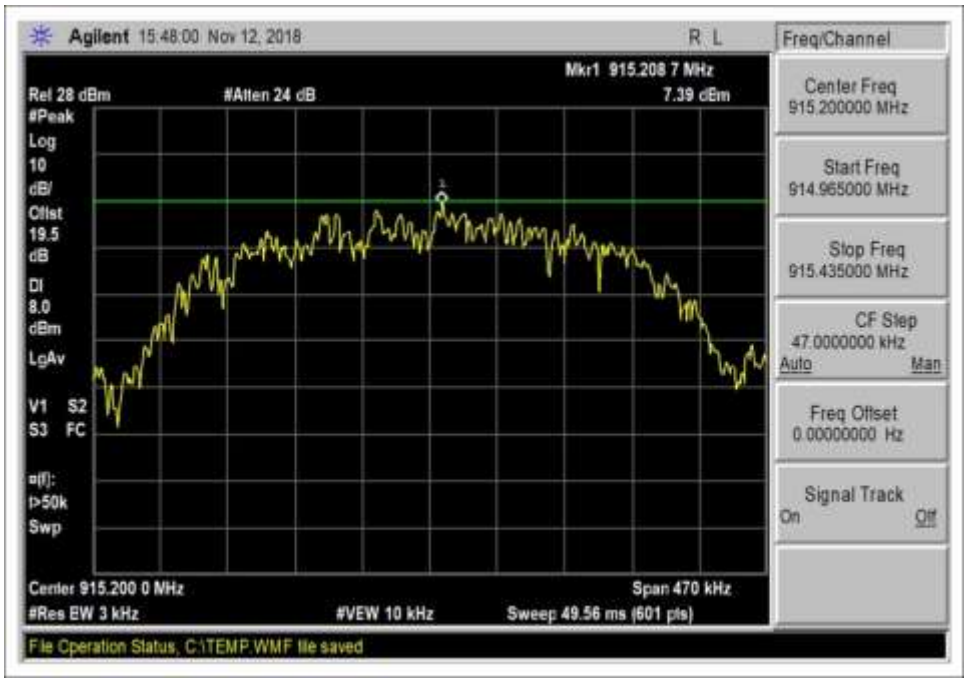
15.247(f) Power Spectral Density

Test Data Summary				
Measurement Method: PKPSD				
Frequency (MHz)	**Modulation**	**Measured (dBm/3kHz)**	**Limit (dBm/3kHz)**	**Results**
902.4	300kbps Hybrid, Vert pipe	7.1	≤8	Pass
915.2	300kbps Hybrid, Vert pipe	7.4	≤8	Pass
927.6	300kbps Hybrid, Vert pipe	7.3	≤8	Pass
902.4	300kbps Hybrid, Horiz pipe	7.4	≤8	Pass
915.2	300kbps Hybrid, Horiz pipe	7.5	≤8	Pass
927.6	300kbps Hybrid, Horiz pipe	7.5	≤8	Pass

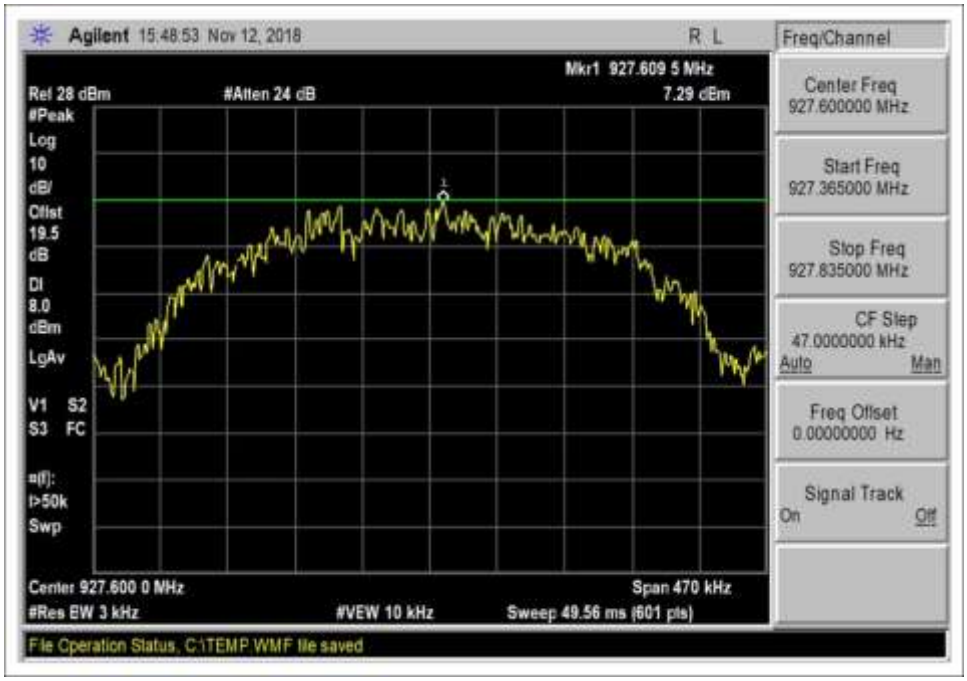
Power Spectral Density Plots



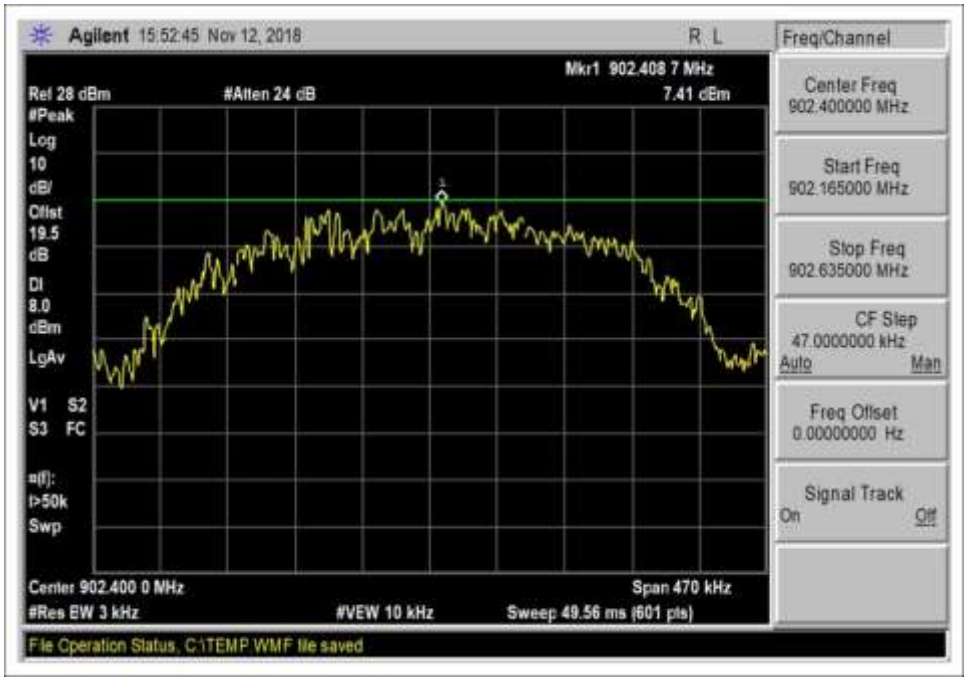
Low Channel, Vertical Pipe



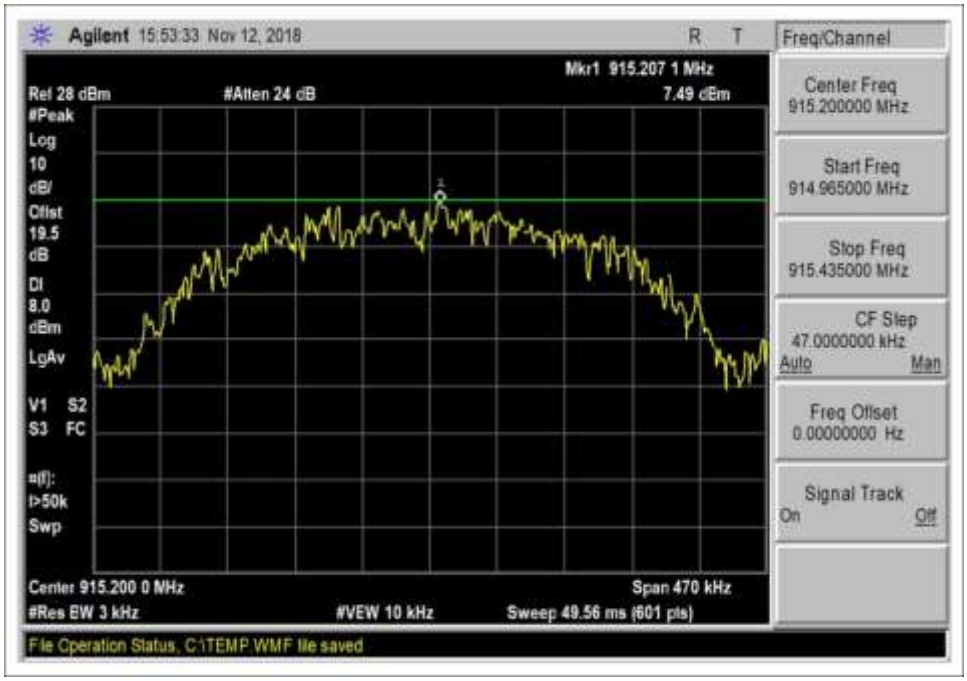
Middle Channel, Vertical Pipe



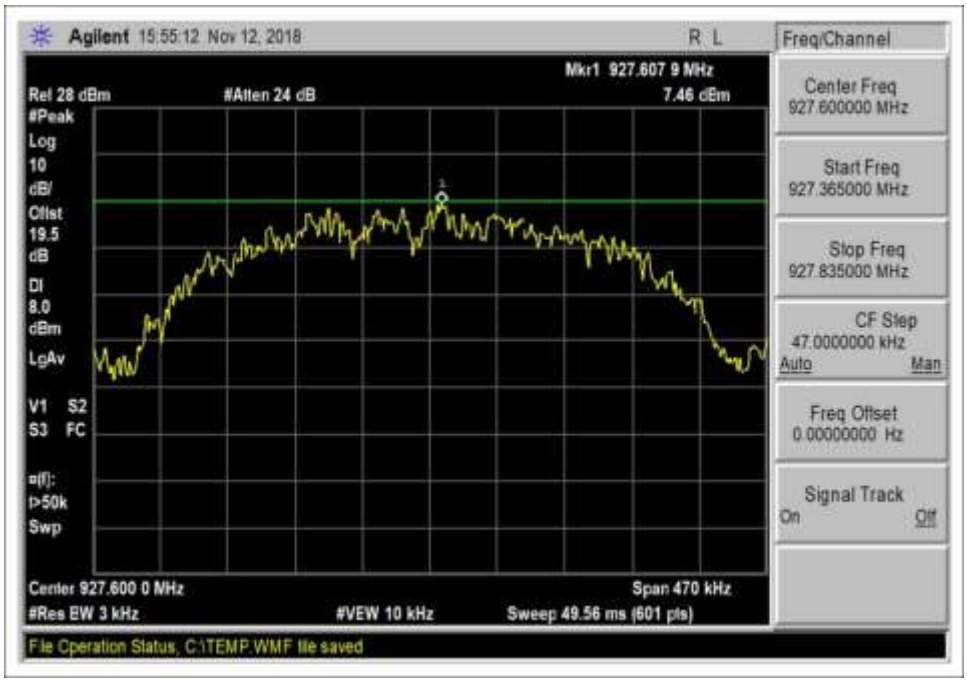
High Channel, Vertical Pipe



Low Channel, Horizontal Pipe

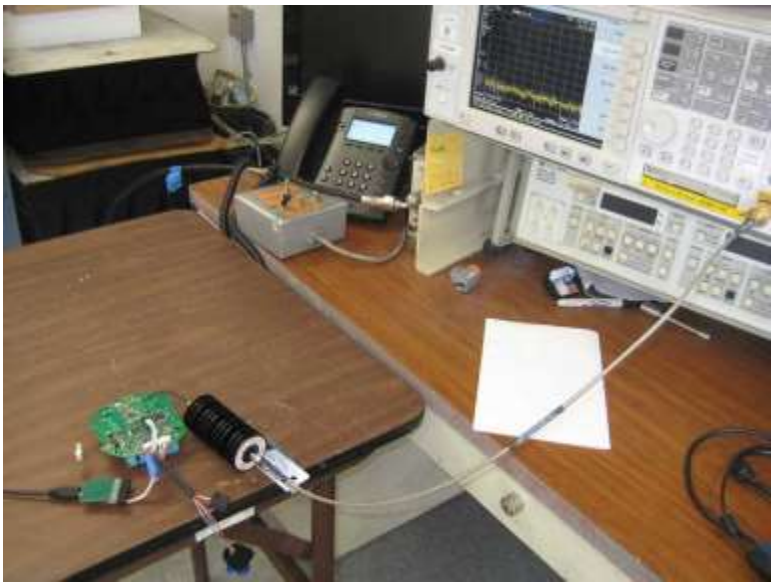


Middle Channel, Horizontal Pipe



High Channel, Horizontal Pipe

Test Setup Photo



APPENDIX A: CUSTOMER PROVIDED INFORMATION

Manufacturer's Declaration: 15.247(a)(1)(i) and (f) Average Time of Occupancy

CKC Laboratories was not contracted to perform the testing due to the required equipment and firmware to exercise the EUT's multiple pseudo-random hopping sequences was not available and that the complexity of the different modulations and modes depend on the device to be in a fully operating network environment.

Therefore, the manufacturer declares the following:

With the multiple modulations, modes and hop tables, the mode with the worst-case Time of Occupancy to demonstrate 400mS compliance is 399.9 mS in 20 seconds, since this modulation is less than 250kHz Occupied Band Width. Each session of multiple short transmissions takes place on channels out of a minimum of 50 channels in a pseudorandom sequence. The algorithm that determines the pseudo-random hop sequence ensures all active channels are used equally on the average.

Itron employs hopping patterns based on pseudo-random sequence generators or pseudo-random hop tables.

The firmware uses the channels in the prescribed pseudo random order, therefore it maintains equal channel usage.

The system has receiver channel bandwidths that match the transmitter's modulation bandwidth that is enabled.

With the transmitter and receiver in synchronization within the network, transmitters switch frequencies in synchronization with the receiver.

When the transmitter needs to send a continuous or long data stream, total time of the packet transmissions is monitored to comply with dwell time requirement of 400ms in the appropriate 10s or 20s window depending on the modulation/mode enabled.

This device does not employ any hopping avoidance techniques.

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 dBµV/m, the spectrum analyzer reading in dBµV was corrected by using the following formula. This reading was then compared to the applicable specification limit. Individual measurements were compared with the displayed limit value in the margin column. The margin was calculated based on subtracting the limit value from the corrected measurement value; a positive margin represents a measurement exceeding the limit, while a negative margin represents a measurement less than the limit.

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

TEST INSTRUMENTATION AND ANALYZER SETTINGS

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

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

SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS

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

Peak

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

Quasi-Peak

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

Average

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