



FOR THE SCOPE OF ACCREDITATION UNDER NVLAP LAB CODE 500051-0

TEST REPORT #090616

STANDARD: FCC PART 15

SUBPART C--INTENTIONAL RADIATORS

SECTION 15. 247 OPERATION WITHIN THE BANDS 902-928 MHZ

EQUIPMENT TESTED:

ITRON, INC.

WATER METER ENDPOINT

MODEL: RIVAW UNIT

TEST DATE: 09 JUNE 2016

1100 Falcon Avenue
Glencoe, MN 55336



Tele: 320-864-4444
Fax: 320-864-6611

Prepared for:

ITRON, Inc.
2111 N Molter Road
Liberty Lake, WA 99019-9469

Test agent:

International Certification Services, Inc.
1100 Falcon Avenue
Glencoe, MN 55336
Tele: 320-864-4444
Fax: 320-864-6611

Test location:

International Certification Services, Inc.
1100 Falcon Avenue
Glencoe, MN 55336
Tele: 320-864-4444
Fax: 320-864-6611

Prepared by:

International Certification Services, Inc.
1100 Falcon Avenue
Glencoe, MN 55336

International Certification Services represents to the client that testing is done in accordance with standard procedures applicable and that reported test results are accurate within generally accepted commercial ranges of accuracy.

This report only applies to the specific samples tested under stated test conditions. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. International Certification Services shall have no liability for any deductions, inferences or generalizations drawn by the client or others from this report.

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1.0 TEST SUMMARY

TEST REPORT: #090616

COMPANY: ITRON, Inc.

AGENT: International Certification Services, Inc.

PHONE: 320-864-4444

TEST DATE: 06 June, 2016

EQUIPMENT UNDER TEST: 902 to 928 Mhz Intentional Radiator used as an end point in a water meter (Rivaw Unit)

GENERAL TEST SUMMARY: The testing was performed at International Certification Services, Inc. at 1100 Falcon Ave, Glencoe, MN 55336

VERIFICATION / CERTIFICATION STATUS: The 902 to 928 Mhz Intentional Radiator used as an end point in a water meter (Rivaw Unit) was found to be in compliance with the Output Amplitude (b) (2), Band Edge (d) and RSS 247 5.4 (1)

MODIFICATIONS NECESSARY: None

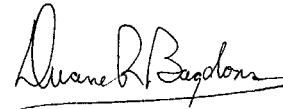
TESTED BY

Steve Wendlandt



WRITTEN BY

Duane R. Bagdons



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Applicable Standards

47 CFR Ch.1 (02-12-16 Edition)
FCC Part 15 Radio Frequency Devices
Subpart C Intentional Radiators
Section 15.247 Operation within the bands 902-928 Mhz

2.1 Referenced Standards

ANSI C63.4-2009 Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 Khz to 40 Ghz.

2.2 Equipment Units Tested

The equipment tested was a battery powered 902 to 928 Mhz transmitter used in a water meter as an end point device.

2.3 Equipment and Cable Configuration

See photo of the EUT test configuration setup in Attachment A

2.4 List of Test Equipment

<u>Test Equipment</u>	<u>Model</u>	<u>S/N</u>	<u>Cal Date</u>
Spectrum Analyzer	Hewlett-Packard 8566B	2421A00458	04/07/15
Preamp	P0035	2443A03658	03/26/15
Preamp	P0013 Nextec	NB00391	06/26/15
Biconical Antenna	EMCO Model 93110B	105799	04/17/15
Log Periodic Antenna (200-1000 MHz)	EMCO 3146	9101-2991	04/06/15
Horn Antenna	EMCO 3115	2334	08/17/15

Measurement cable losses, and antenna correction factors are included in the data sheets. All measurements were taken in Peak detection mode since there were no signals over the allowed limit.

2.5 Units of Measurement.

All measurements were taken in dBuV/m. Frequency measurements are recorded in Mhz

2.6 Location of Test Site

The open area test site (OATS) measurement facility used to collect the data was International Certification Services, Inc. at 1100 Falcon Ave in Glencoe, MN 55336. This site has been certified to be in spec of the normalized site attenuation per ANSI C63.4-2009.

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2.7 Measurement Procedures

The EUT was set on an insulating table in the OATS site and rotated through 360 degrees to determine the worst case EUT orientation. The antenna was then positioned vertical and horizontal to determine which antenna polarity orientation was worst case. Then certification data was recorded at all the transmitter frequencies from the fundamental to the 10th harmonic at an antenna height variation of from 1-4 meters.

2.8 Reporting Measurement Data

See data sheets and plots in Attachment B.

2.9 Radiated Emissions Data

The frequency and amplitude of the tuned frequency of the EUT along with the frequencies and amplitudes of the harmonics up to the 10th harmonic are reported in the data sheets in Attachment B. This information is plotted against the limit of section 15.247 of FCC Part 15 subpart C. Both Horizontal and Vertical antenna polarities as well as antenna heights of 1 to 4 meters were observed but all maximum signal strengths occurred in the Horizontal antenna polarity and at 1 meter antenna height.

The Final Level, expressed in dBuV/m, is arrived at by taking the reading from the spectrum analyzer (Level dBuV) and adding the antenna correction factor and cable loss factor (Factor dB) and subtracting the preamp gain. This result then has the FCC limit subtracted from it to provide the margin which gives the tabular data as shown in the data sheets in Attachment B.

Example:

<u>Frequency</u> <u>(MHz)</u>	<u>Level</u> <u>(dBuV)</u>	+	<u>Factor</u> <u>(dB)</u>	=	<u>Corr Data</u> <u>(dBuV/m)</u>	-	<u>FCC Limit</u> <u>(dBuV/m)</u>	=	<u>Margin</u> <u>(dB)</u>
100.0	20.6	+	11.0	=	31.6	-	43.5	=	-11.9

2.10 Operating Frequency Data for Intentional Radiators

All operating frequencies and harmonic frequencies and ambient temperature at which all data was taken at is recorded in the data sheets in Attachment B.

2.11 Summary of Results

The EUT passed the requirements of FCC Part 15 Subpart C, Section 15.247 sections Output Amplitude (b) (2), Band Edge (d) and RSS 247 5.4 (1). No modifications were necessary to accomplish this compliance.

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ATTACHMENT A

RADIATED MEASUREMENT

TEST SET UP

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**ITRON, Inc.
Water Meter End Point
Model: Rivaw Unit
Radiated Emissions
Test Configuration**



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**ITRON, Inc.
Water Meter End Point
Model: Rivaw Unit
Radiated Emissions
Test Configuration**



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ATTACHMENT B

DETAILED TEST DATA SHEETS

Each radiated emissions plot indicates the receiving antenna measurement distance in meters and the emission amplitudes with respect to their applicable limits. The associated tabulation for each radiated plot lists the emission frequency, the final emission level, and the margin from the limit.

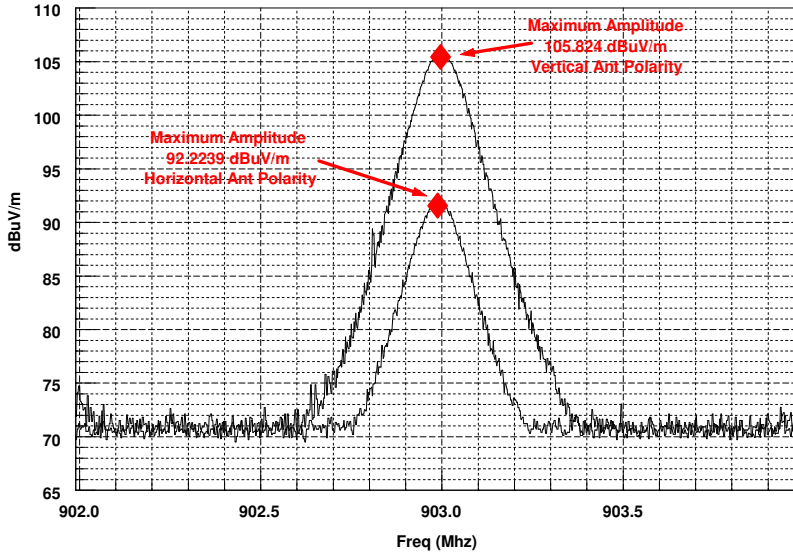
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Rivaw Unit: AM OOK 10 dBm Output Amplitude FCC 15.247 (b)(2) / RSS 247 5.4 (1)

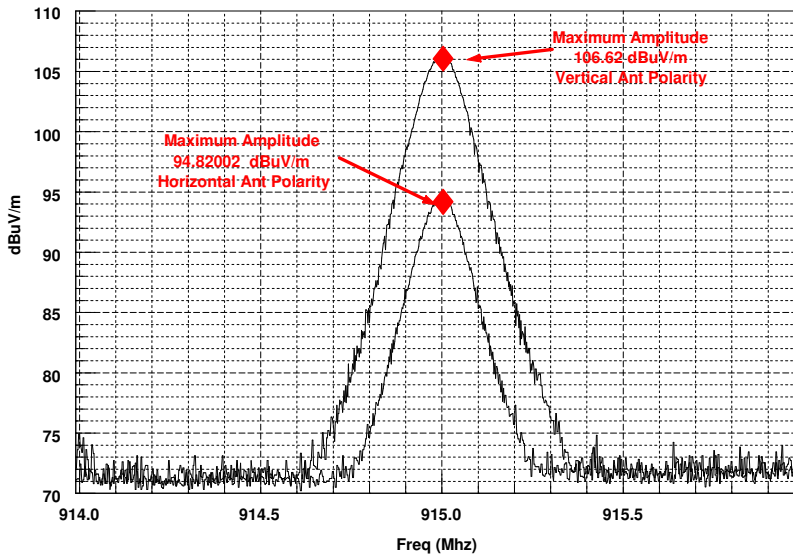
ITRON, Inc.
Water Unit Model: Rivaw AM OOK 10 dBm
Maximum Amplitude FCC 15.247 (b) (2) and RSS 247 5.4 (1)
Low Frequency



International Certification Services, Inc.

June 06, 2016

ITRON, Inc.
Water Unit Model: Rivaw AM OOK 10 dBm
Maximum Amplitude FCC 15.247 (b) (2) and RSS 247 5.4 (1)
Middle Frequency



International Certification Services, Inc.

June 06, 2016

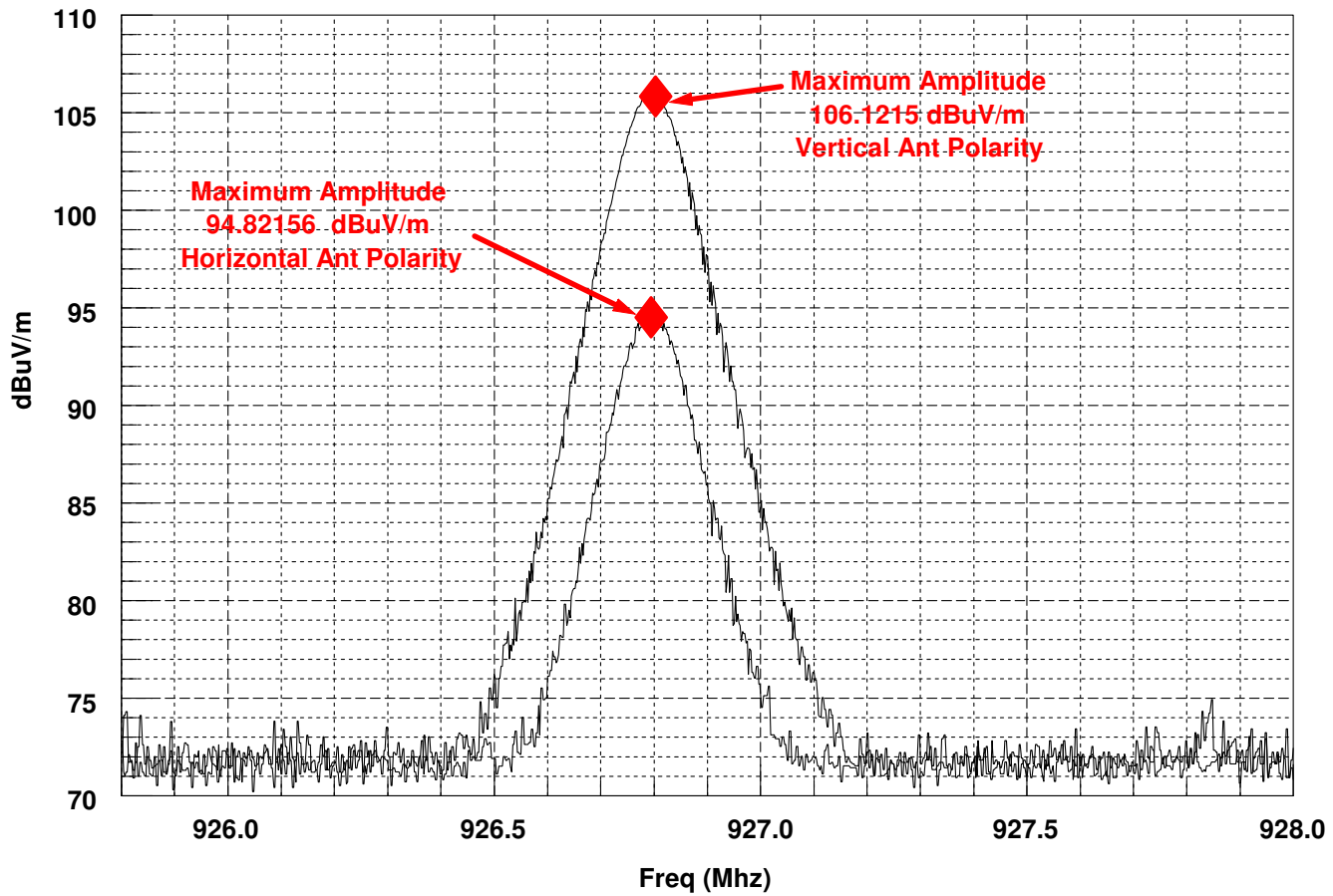
INTERNATIONAL



CERTIFICATION SERVICES, INC.

Rivaw Unit: AM OOK 10 dBm Output Amplitude FCC 15.247 (b)(2) / RSS 247 5.4 (1)

ITRON, Inc.
Water Unit Model: Rivaw AM OOK 10 dBm
Maximum Amplitude FCC 15.247 (b) (2) and RSS 247 5.4 (1)
High Frequency



International Certification Services, Inc.

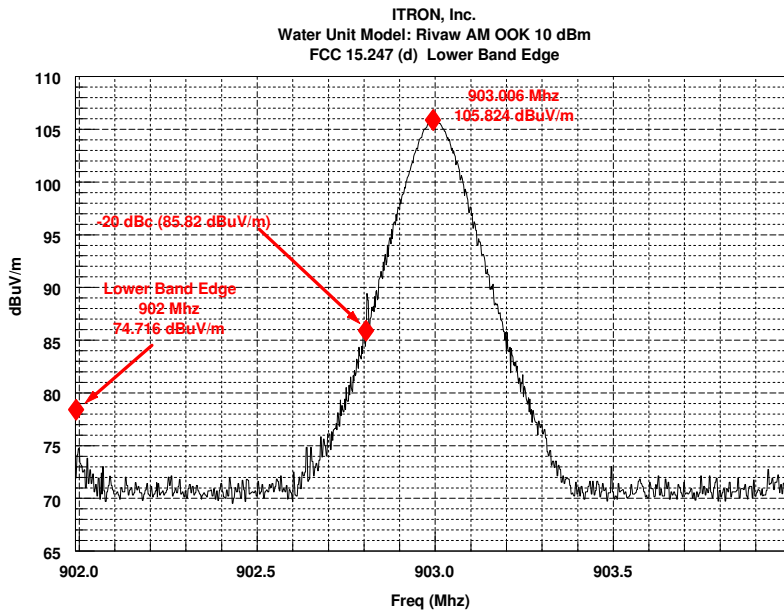
June 06, 2016

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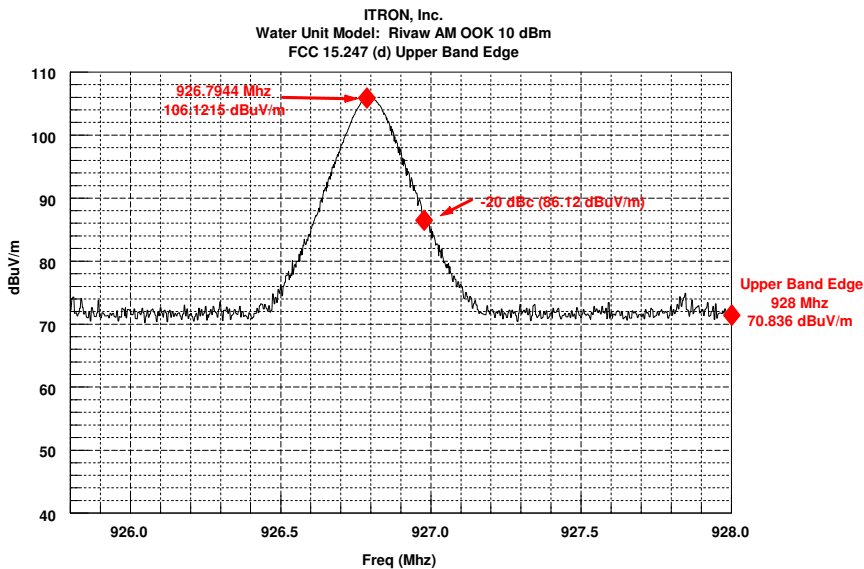
CERTIFICATION SERVICES, INC.

Rivaw Unit: AM OOK 10 dBm Band Edges FCC 15.247 (d) / RSS 247 5.4 (1)



International Certification Services, Inc.

June 06, 2016



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June 06, 2016

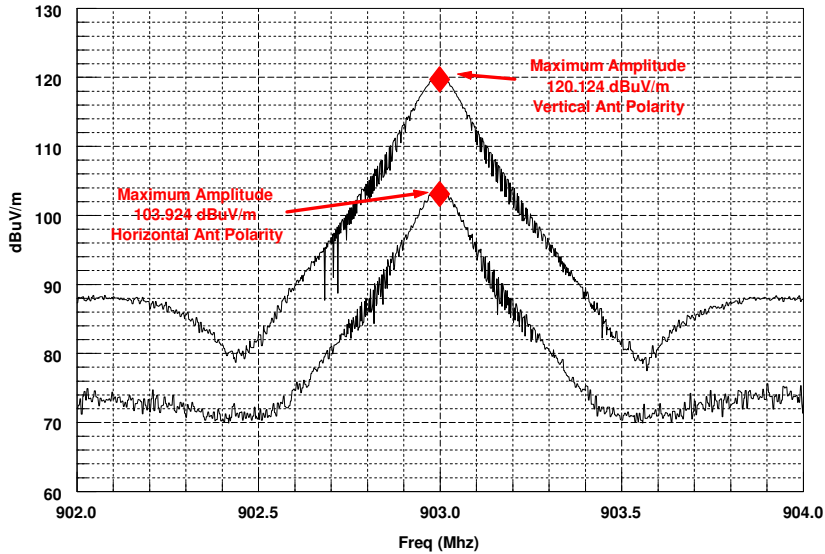
INTERNATIONAL



CERTIFICATION SERVICES, INC.

Rivaw Unit: AM OOK 27 dBm Output Amplitude FCC 15.247 (b)(2) / RSS 247 5.4 (1)

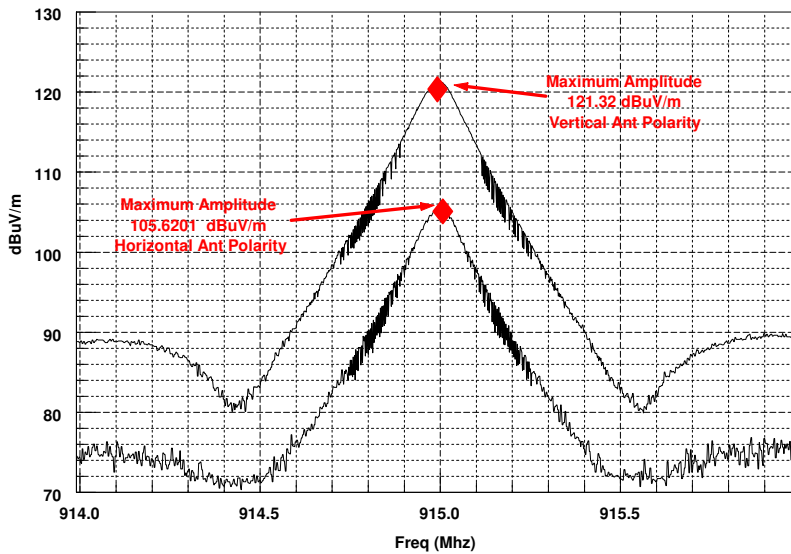
ITRON, Inc.
Water Unit Model: Rivaw AM OOK 27 dBm
Maximum Amplitude FCC 15.247 (b) (2) and RSS 247 5.4 (1)
Low Frequency



International Certification Services, Inc.

June 06, 2016

ITRON, Inc.
Water Unit Model: Rivaw AM OOK 27 dBm
Maximum Amplitude FCC 15.247 (b) (2) and RSS 247 5.4 (1)
Middle Frequency



International Certification Services, Inc.

June 06, 2016

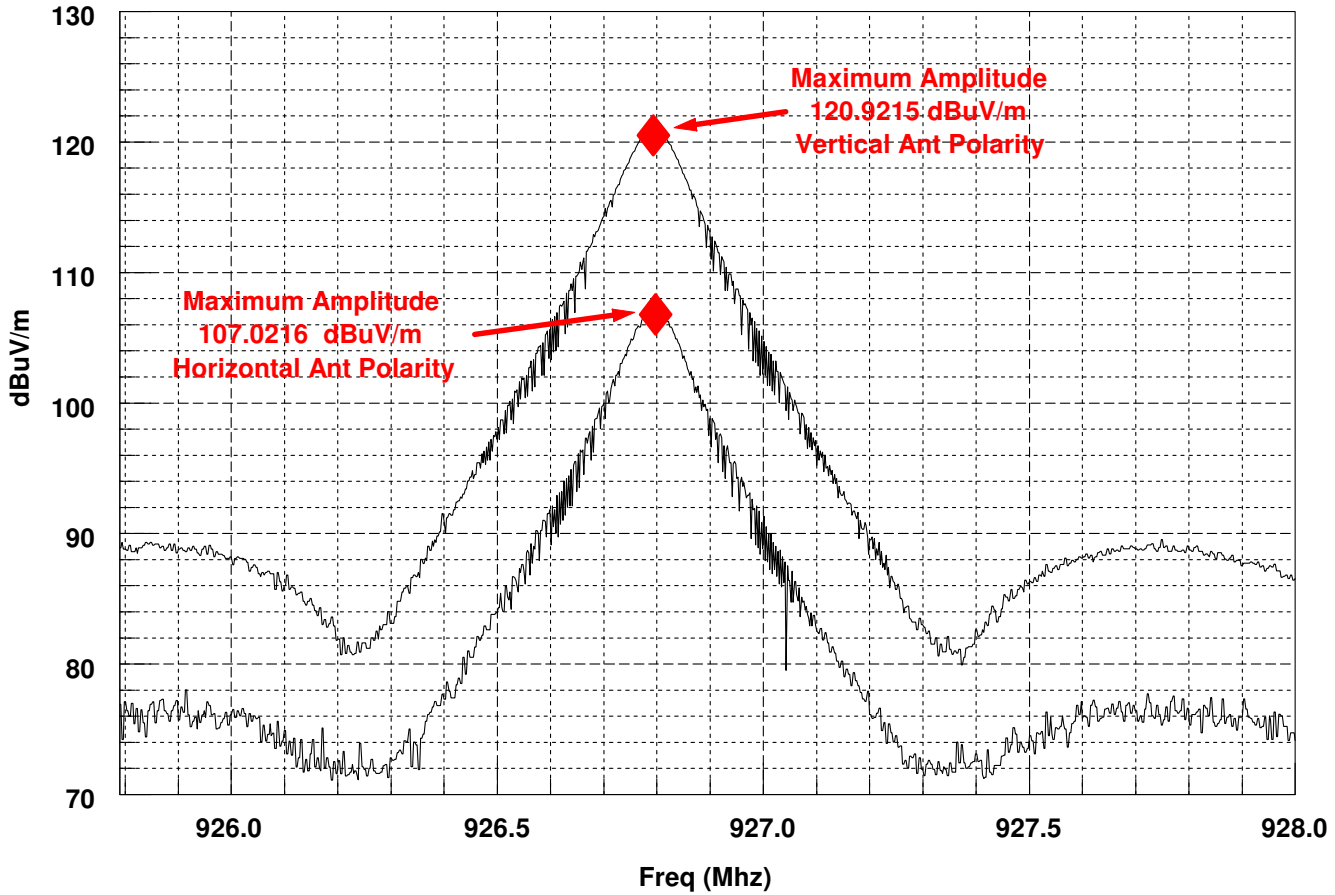
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CERTIFICATION SERVICES, INC.

Rivaw Unit: AM OOK 27 dBm Output Amplitude FCC 15.247 (b)(2) / RSS 247 5.4 (1)

ITRON, Inc.
Water Unit Model: Rivaw AM OOK 27 dBm
Maximum Amplitude FCC 15.247 (b) (2) and RSS 247 5.4 (1)
High Frequency



International Certification Services, Inc.

June 06, 2016

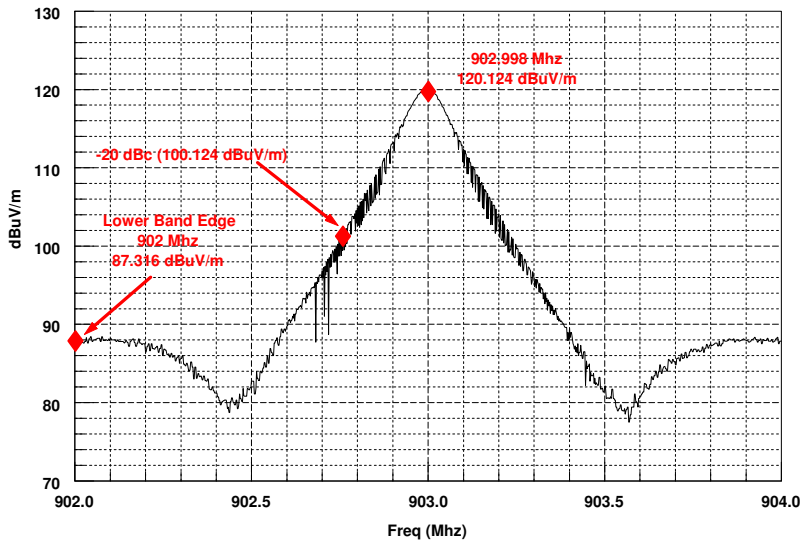
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CERTIFICATION SERVICES, INC.

Rivaw Unit: AM OOK 27 dBm Band Edges FCC 15.247 (d) / RSS 247 5.4 (1)

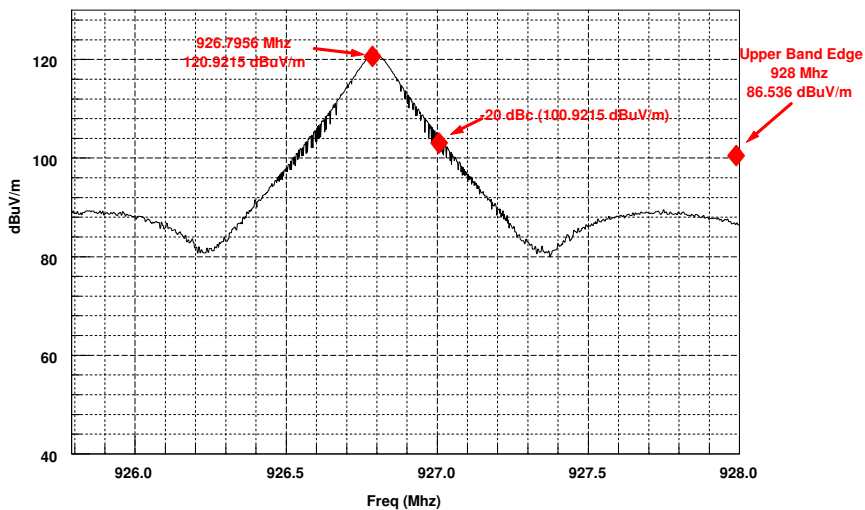
ITRON, Inc.
Water Unit Model: Rivaw AM OOK 27 dBm
FCC 15.247 (d) Lower Band Edge



International Certification Services, Inc.

June 06, 2016

ITRON, Inc.
Water Unit Model: Rivaw AM OOK 27 dBm
FCC 15.247 (d) Upper Band Edge



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ATTACHMENT C

**PRODUCT DATA SHEET OR PRODUCT INFORMATION FORM AS SUPPLIED
BY THE CUSTOMER**

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CERTIFICATION SERVICES, INC.

COMPANY NAME: ITRON, Inc.

CUSTOMER REPRESENTATIVE: International Certification Services, Inc.

EQUIPMENT DESCRIPTION: Water Meter End Point (902-928 Mhz Transmitter)

MODEL NUMBER: Rivaw Unit

SERIAL NUMBER: N/A

TYPE OF TEST: ☐ Development
☐ Initial Design Verification
☐ Design Change (Please describe exact changes below)
☒ Production Sample (Audit Test)
Changes made: NONE

OSCILLATOR FREQUENCIES:

Unknown

PRODUCT SHIELDING PROVISION:

Plastic enclosure

SOFTWARE AND / OR OPERATING MODES:

Unknown

I/O CABLES: NONE

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