



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

## **TEST REPORT #210616**

**STANDARD: FCC PART 15**

**SUBPART C--INTENTIONAL RADIATORS**

**SECTION 15. 247 OPERATION WITHIN THE BAND 902-928 MHZ**

**EQUIPMENT TESTED:**

**ITRON, INC.**

**GAS METER ENDPOINT**

**MODEL: SPRAGUE UNIT**

**TEST DATE: 21 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:** #210616

**COMPANY:** ITRON, Inc.

**AGENT:** International Certification Services, Inc.

**PHONE:** 320-864-4444

**TEST DATE:** 21 June, 2016

**EQUIPMENT UNDER TEST:** 902 to 928 Mhz Intentional Radiator used as an end point in a gas meter (Sprague 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 gas meter (Sprague Unit) was found to be in compliance with the Output Amplitude (b) (2), Band Edge (d) and RSS 247 section 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 gas 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        |
| Loop Antenna                           | EMCO Model: 6512      | 8912-1074  | 06/25/15        |
| Biconical Antenna                      | EMCO Model 93110B     | 105799     | 04/17/15        |
| Log Periodic Antenna<br>(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. FCC Registration #650574 and Industry Canada Number: 3710.

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## 2.7 Measurement Procedures

The antenna was placed at a distance of 3 meters from the EUT. 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 10<sup>th</sup> 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 10<sup>th</sup> 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>Level</u>  | + | <u>Factor</u> | = | <u>Corr Data</u> | - | <u>FCC Limit</u> | = | <u>Margin</u> |
|------------------|---------------|---|---------------|---|------------------|---|------------------|---|---------------|
| <u>(MHz)</u>     | <u>(dBuV)</u> | + | <u>(dB)</u>   | = | <u>(dBuV/m)</u>  | - | <u>(dBuV/m)</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). No modifications were necessary to accomplish this compliance.



## **ATTACHMENT A**

### **RADIATED MEASUREMENT**

#### **TEST SET UP**



**ITRON, Inc.  
Gas Meter End Point  
Model: Sprague Unit  
Radiated Emissions  
Test Configuration**



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Gas Meter End Point  
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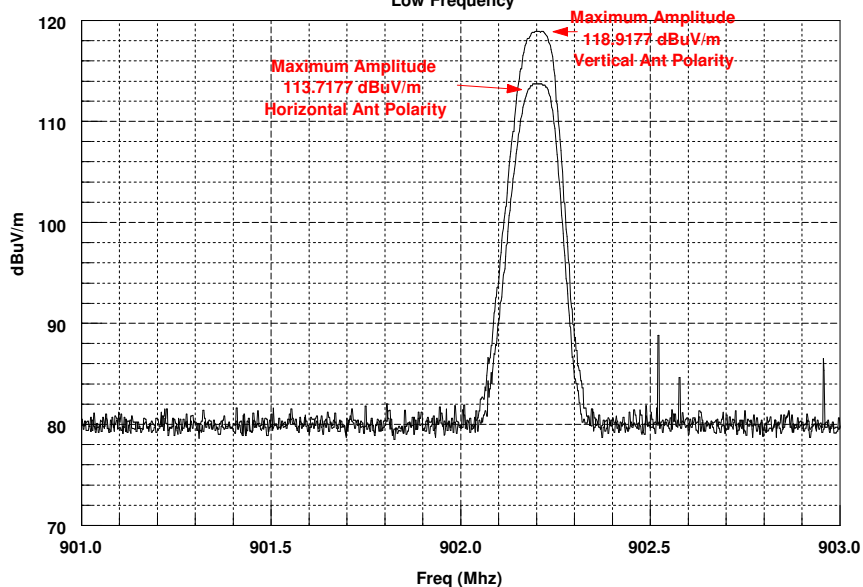
## **ATTACHMENT B**

### **DETAILED TEST DATA SHEETS**

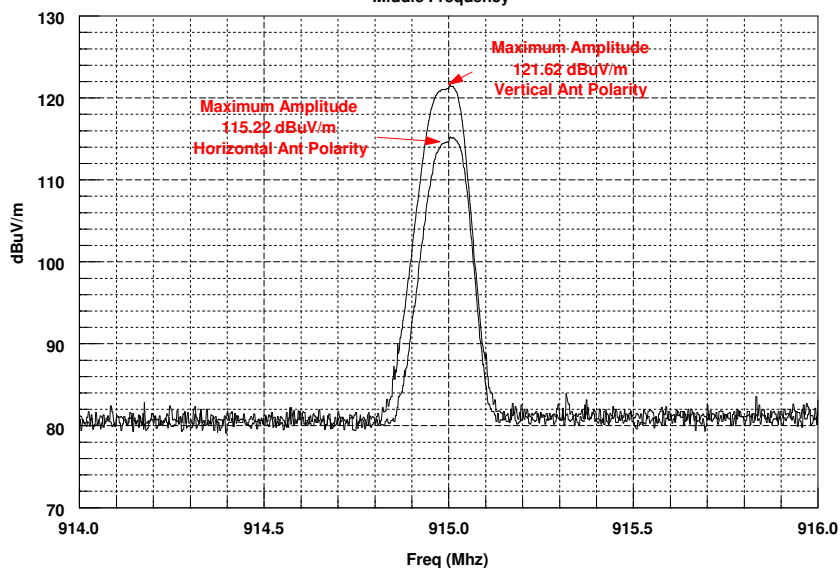
Each radiated emissions plot indicates the receiving antenna measurement distance in meters and the emission amplitudes with respect to their applicable limits. The associated tabulation for each radiated plot lists the emission frequency, the final emission level, and the margin from the limit.

# **Sprague Unit: FM10 Output Amplitude 27 dBm FCC 15.247 (b)(2) / RSS 247 5.4 (1)**

ITRON, Inc.  
 Sprague Unit Model: 500S FM10 27 dBm  
 Maximum Amplitude FCC 15.247 (b) (2) and RSS 247 5.4 (1)  
 Low Frequency



ITRON, Inc.  
 Sprague Unit Model: 500S FM10 27dBm  
 Maximum Amplitude FCC 15.247 (b) (2) and RSS 247 5.4 (1)  
 Middle Frequency



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June 21, 2016

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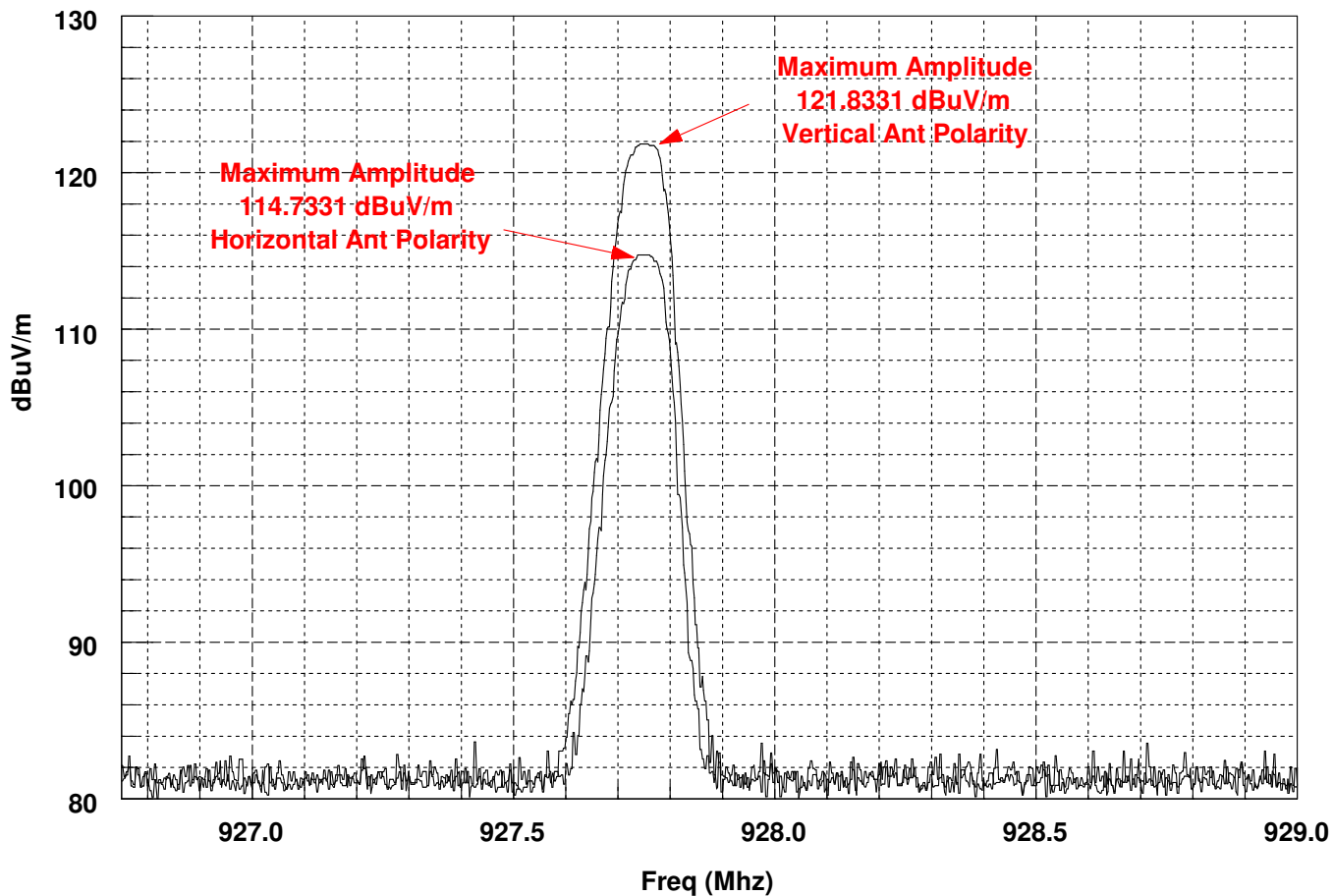
**Sprague Unit: FM10 Output Amplitude 27 dBm FCC 15.247 (b)(2) / RSS 247 5.4 (1)**

ITRON, Inc.

Sprague Unit Model: 500S FM10 27 dBm

Maximum Amplitude FCC 15.247 (b) (2) and RSS 247 5.4 (1)

High Frequency

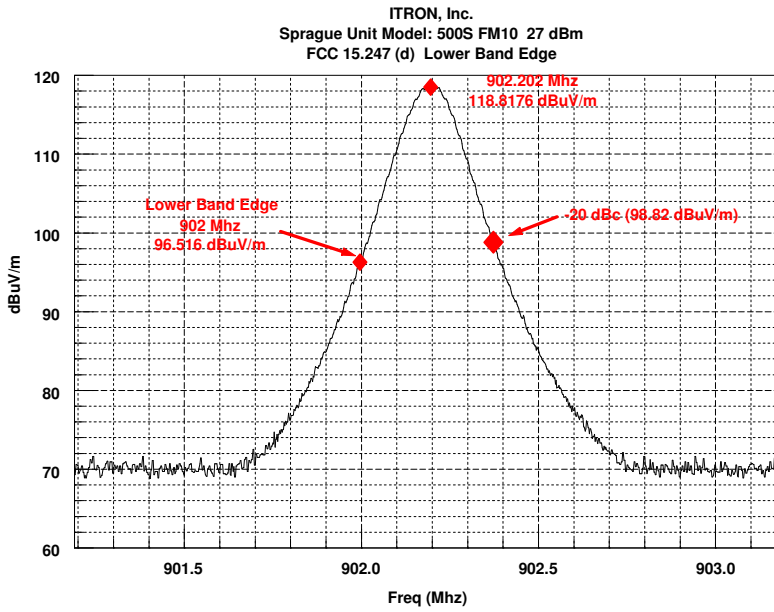


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June 21, 2016

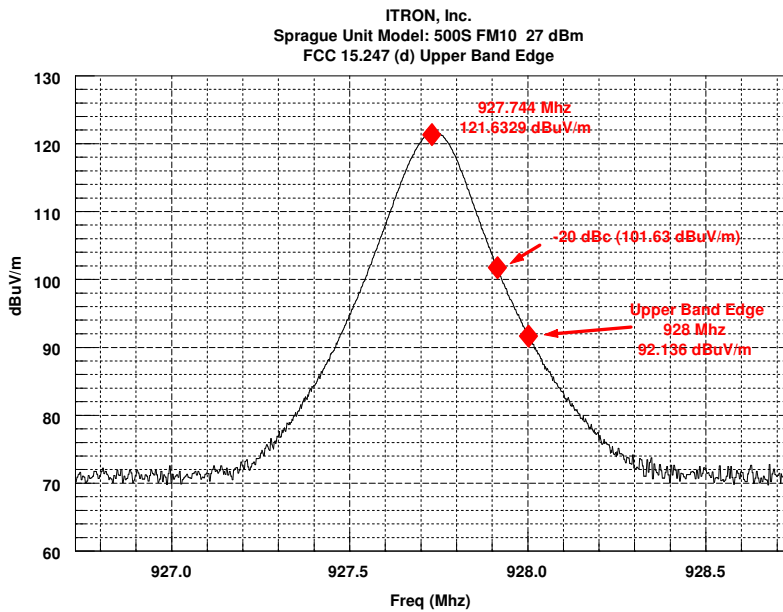


## Sprague Unit: FM10 Band Edges FCC 15.247 (d) / RSS 247 5.4 (1)



International Certification Services, Inc.

June 06, 2016



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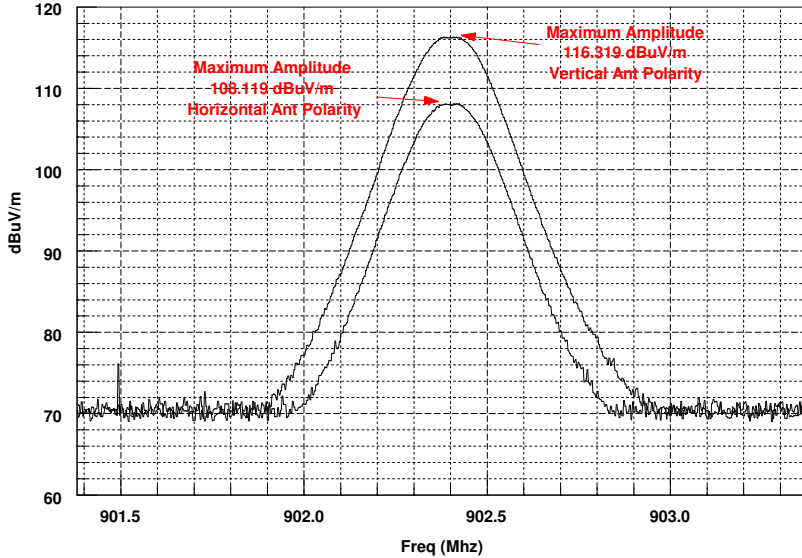
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# **Sprague Unit: FM150 Output Amplitude 27 dBm FCC 15.247 (b)(2) / RSS 247 5.4 (1)**

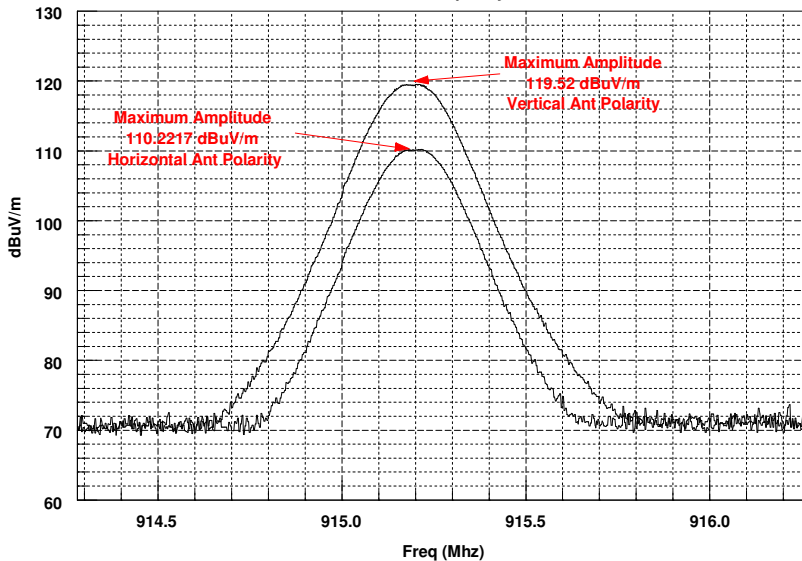
ITRON, Inc.  
 Sprague Unit Model: 500S FM 150 27 dBm  
 Maximum Amplitude FCC 15.247 (b) (2) and RSS 247 5.4 (1)  
 Low Frequency



International Certification Services, Inc.

June 08, 2016

ITRON, Inc.  
 Sprague Unit Model: 500S FM 150 27 dBm  
 Maximum Amplitude FCC 15.247 (b) (2) and RSS 247 5.4 (1)  
 Middle Frequency



International Certification Services, Inc.

June 08, 2016

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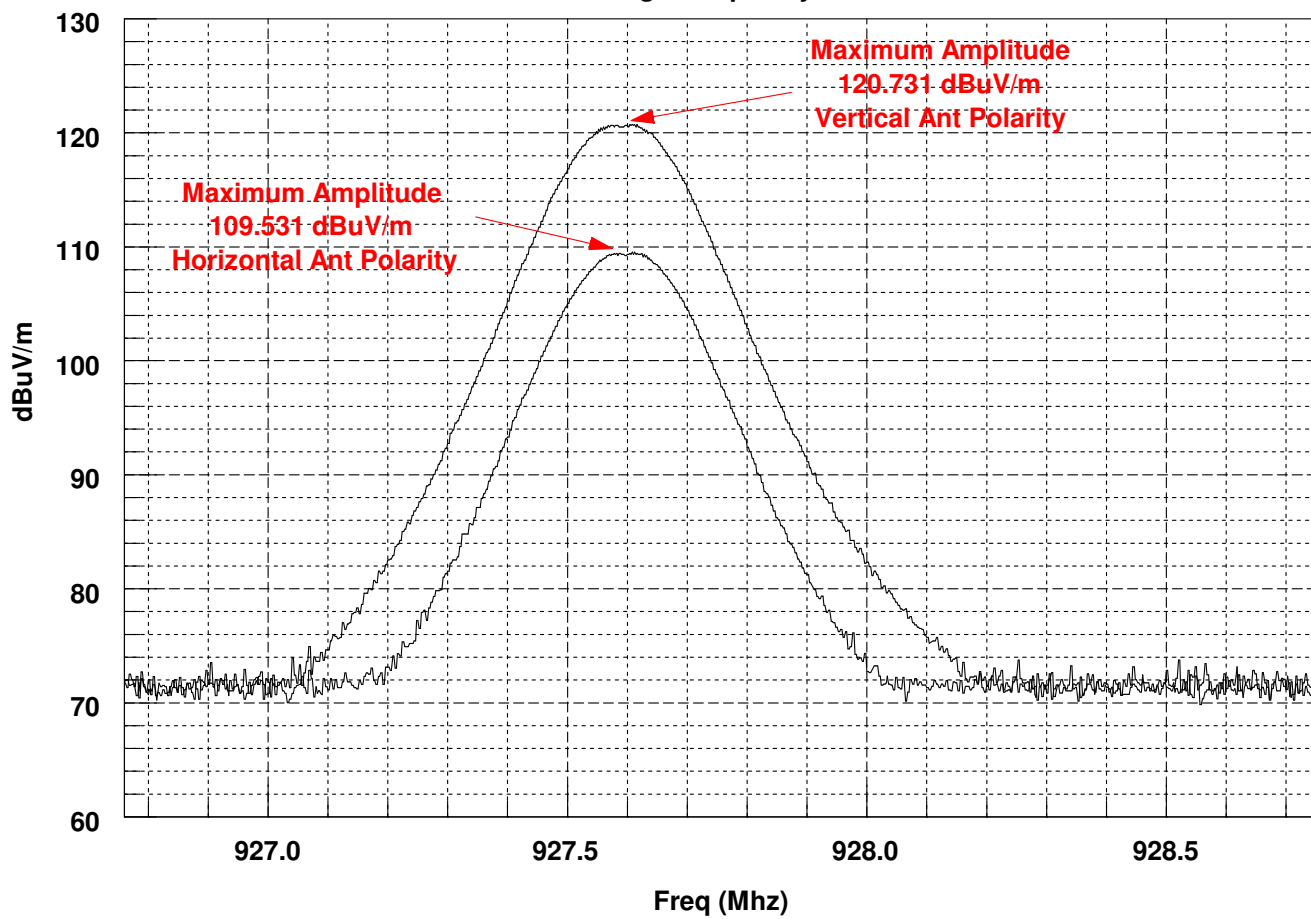
**Sprague Unit: FM150 Output Amplitude 27 dBm FCC 15.247 (b)(2) / RSS 247 5.4 (1)**

ITRON, Inc.

Sprague Unit Model: 500S FM 150 27 dBm

Maximum Amplitude FCC 15.247 (b) (2) and RSS 247 5.4 (1)

High Frequency

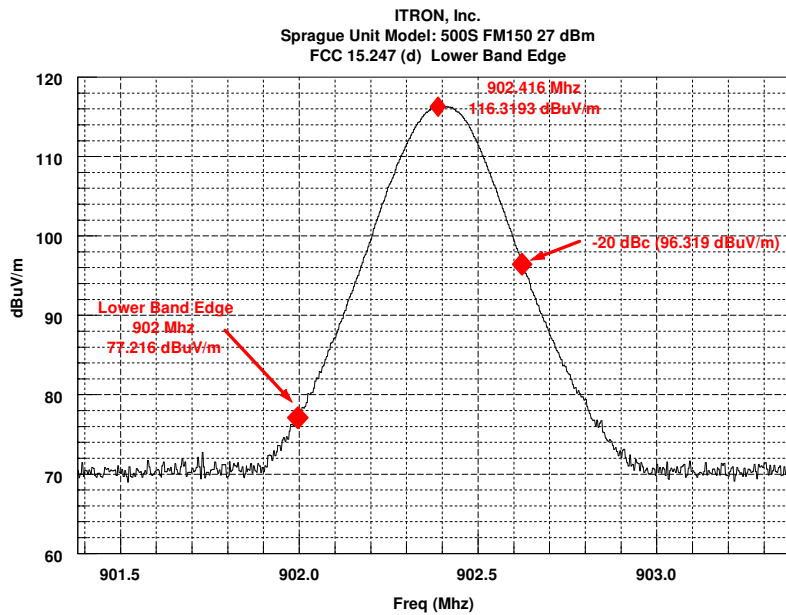


International Certification Services, Inc.

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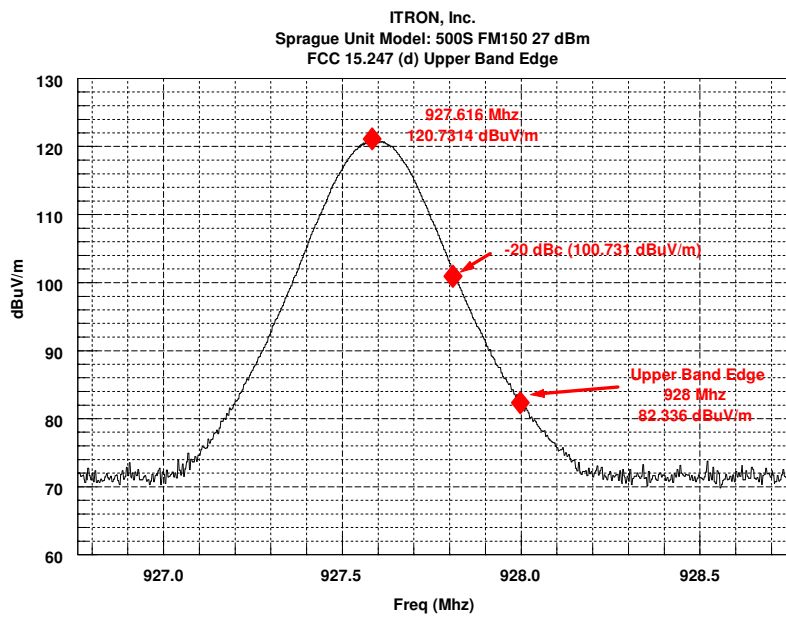


## Sprague Unit: FM150 Band Edges FCC 15.247 (d) / RSS 247 5.4 (1)



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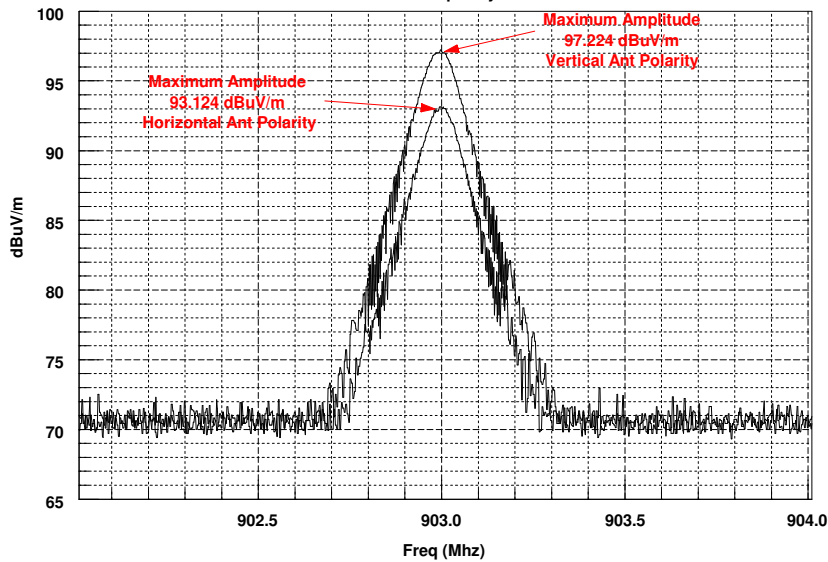
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# **Sprague Unit: AM OOK Output Amplitude 10 dBm FCC 15.247 (b)(2) / RSS 247 5.4 (1)**

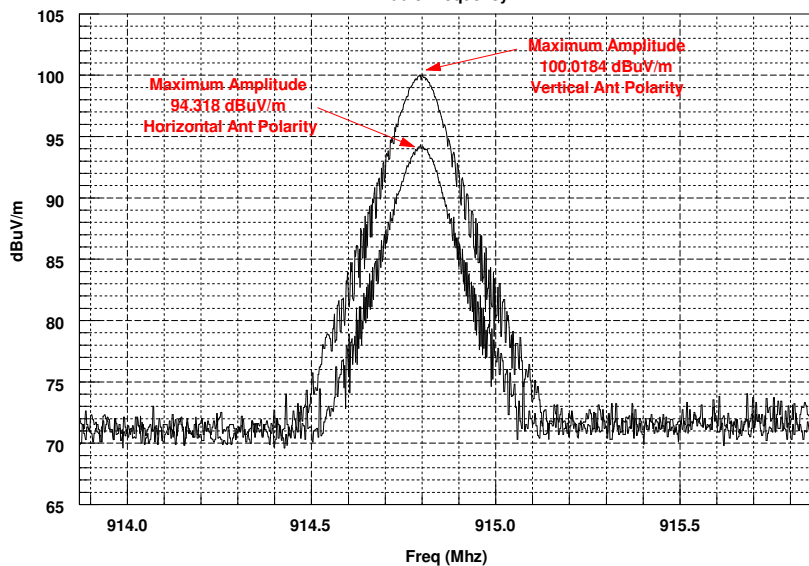
ITRON, Inc.  
 Sprague Unit Model: 500S AM OOK 10 dBm  
 Maximum Amplitude FCC 15.247 (b) (2) and RSS 247 5.4 (1)  
 Low Frequency



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ITRON, Inc.  
 Sprague Unit Model: 500S AM OOK 10 dBm  
 Maximum Amplitude FCC 15.247 (b) (2) and RSS 247 5.4 (1)  
 Middle Frequency



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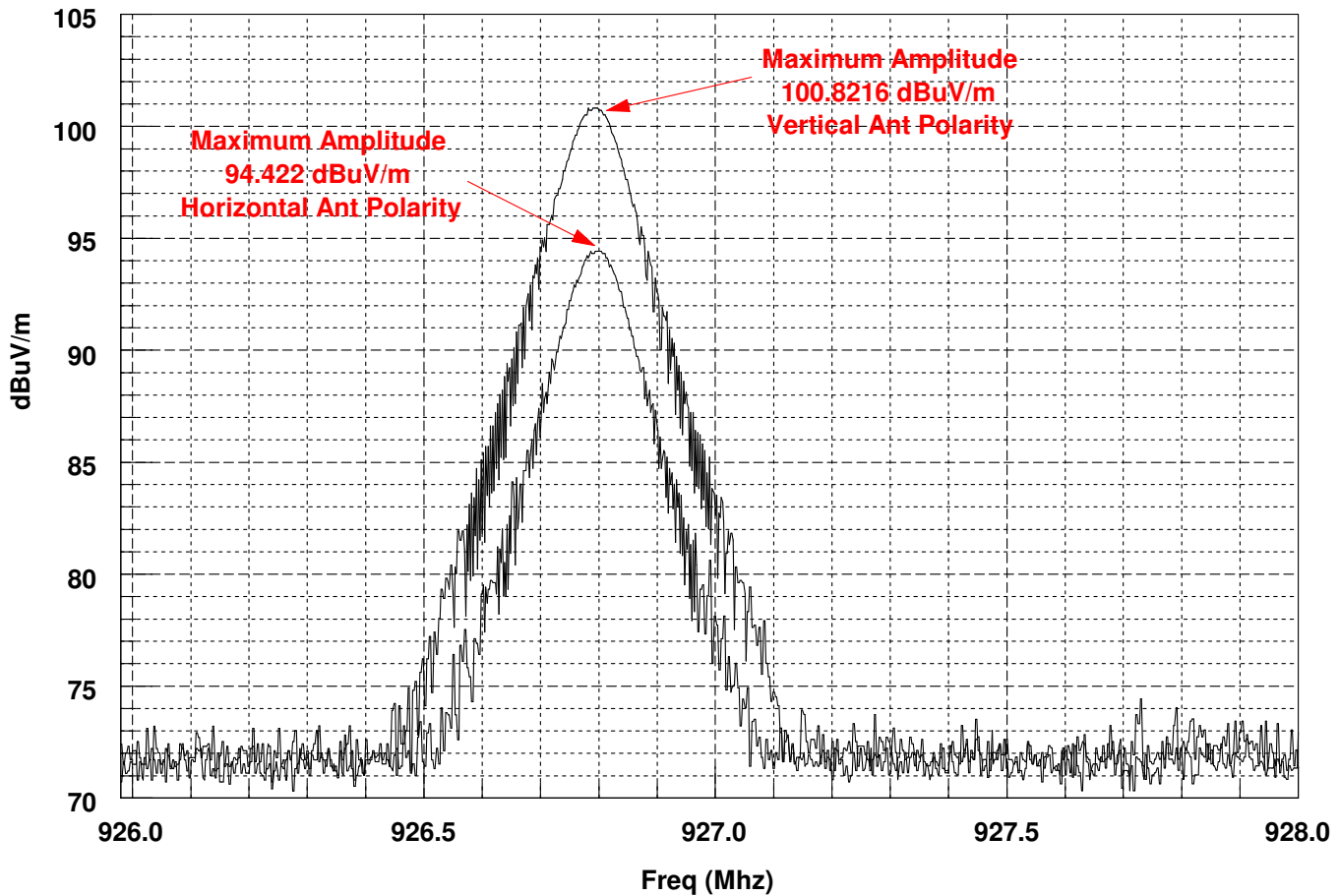
**Sprague Unit: AM OOK Output Amplitude 10 dBm FCC 15.247 (b)(2) / RSS 247 5.4 (1)**

ITRON, Inc.

Sprague Unit Model: 500S AM OOK 10 dBm

Maximum Amplitude FCC 15.247 (b) (2) and RSS 247 5.4 (1)

High Frequency



International Certification Services, Inc.

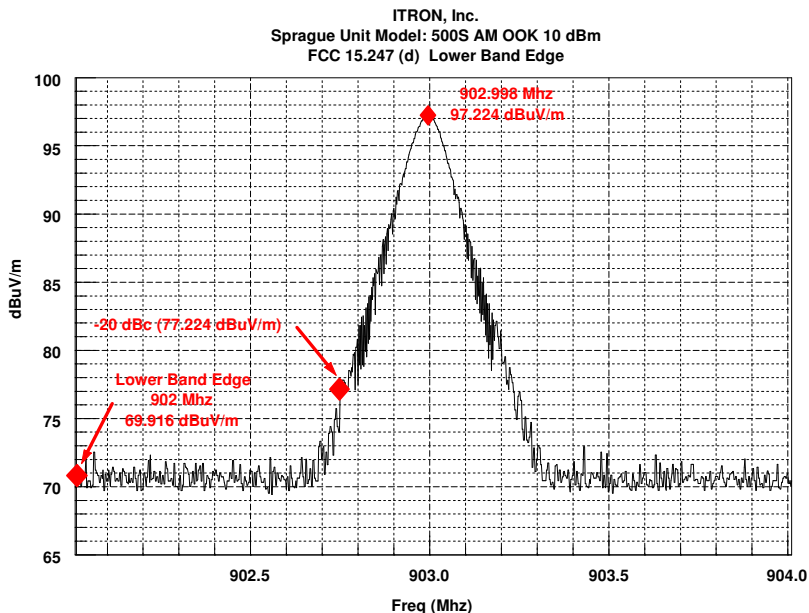
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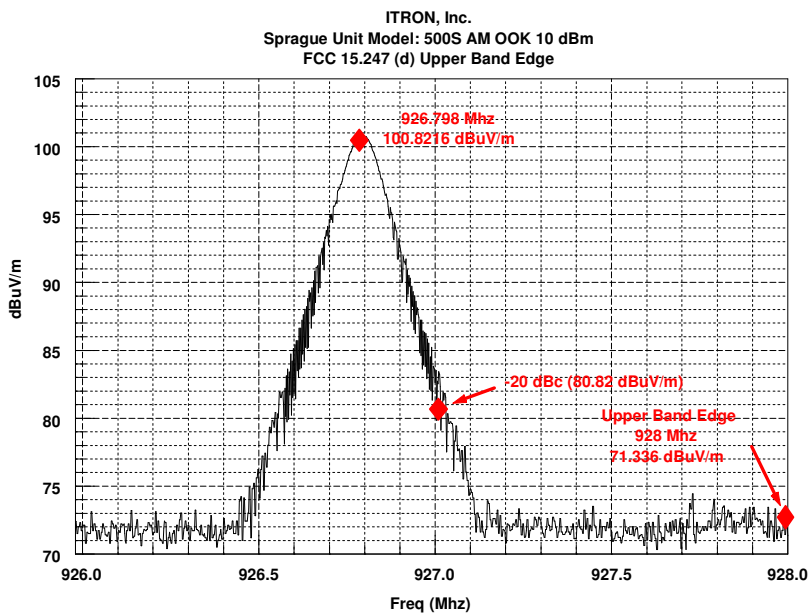
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# **Sprague Unit: AM OOK 10 dBm Band Edges FCC 15.247 (d) / RSS 247 5.4 (1)**



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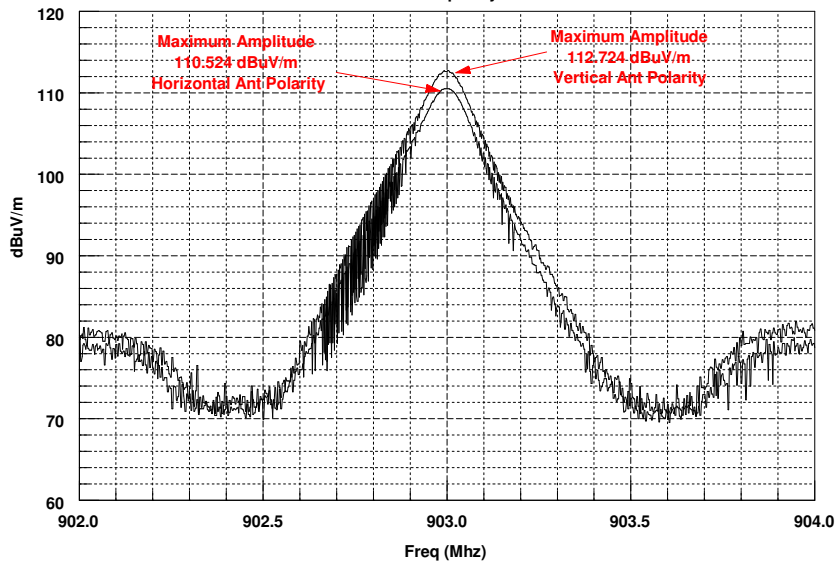
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## Sprague Unit: AM OOK Output Amplitude 24 dBm FCC 15.247 (b)(2) / RSS 247 5.4 (1)

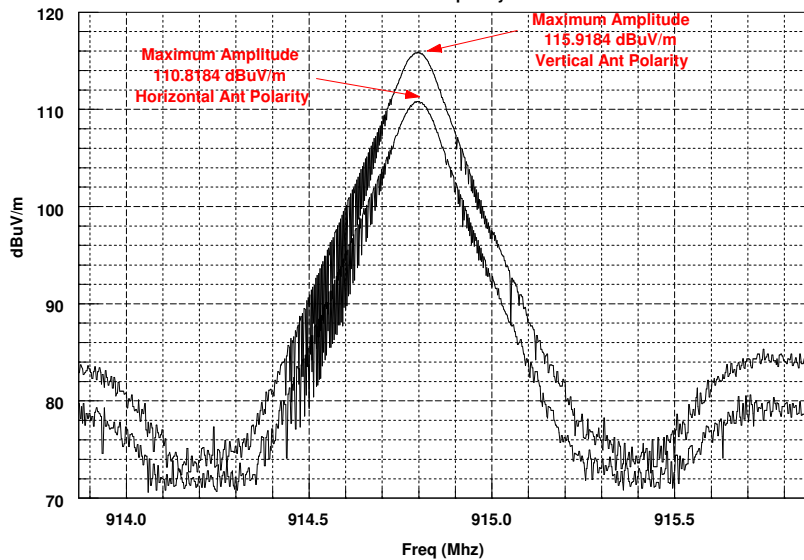
ITRON, Inc.  
Sprague Unit Model: 500S AM OOK 24 dBm  
Maximum Amplitude FCC 15.247 (b) (2) and RSS 247 5.4 (1)  
Low Frequency



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ITRON, Inc.  
Sprague Unit Model: 500S AM OOK 24 dBm  
Maximum Amplitude FCC 15.247 (b) (2) and RSS 247 5.4 (1)  
Middle Frequency



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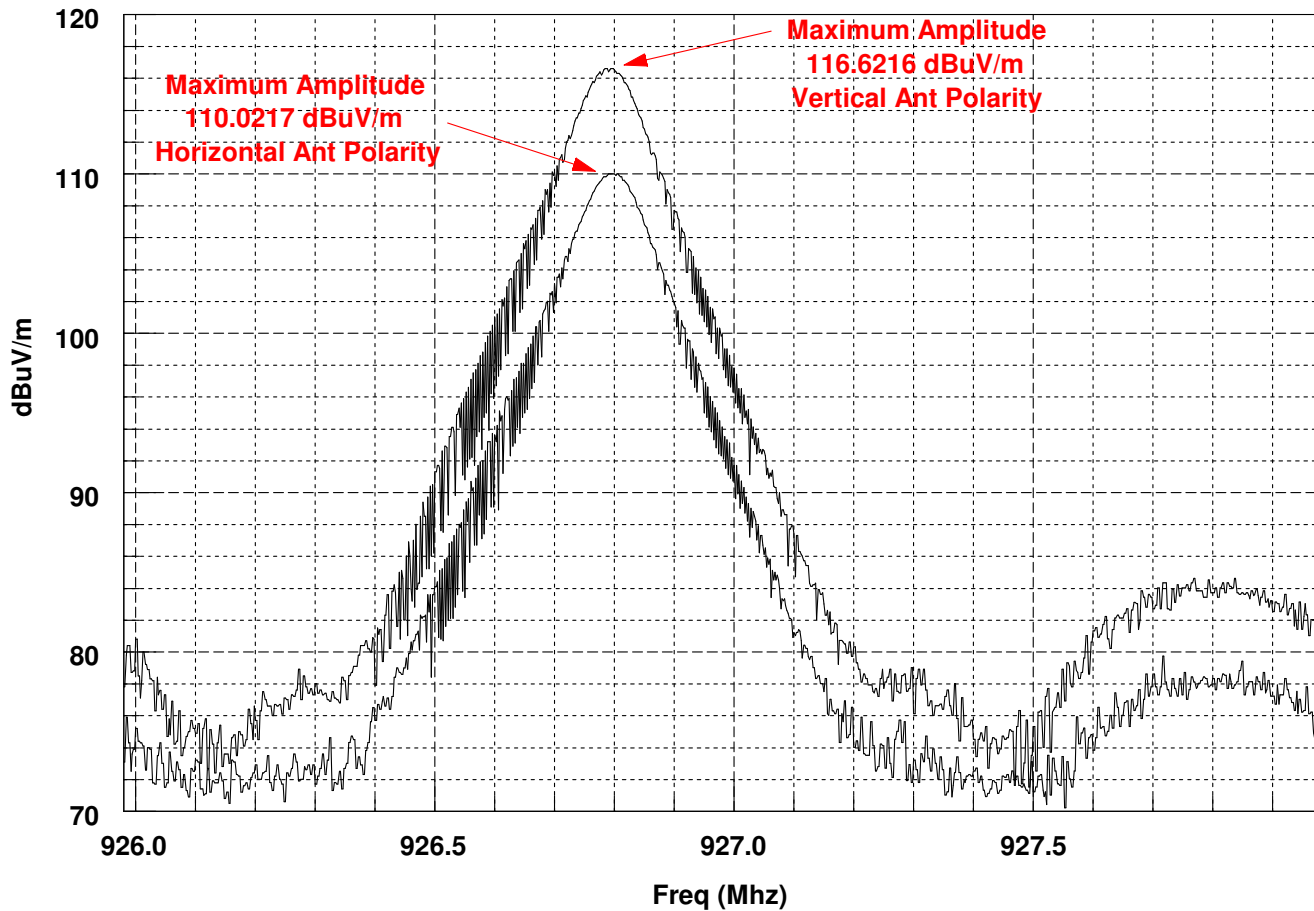
**Sprague Unit: AM OOK Output Amplitude 24 dBm FCC 15.247 (b)(2) / RSS 247 5.4 (1)**

ITRON, Inc.

Sprague Unit Model: 500S AM OOK 24 dBm

Maximum Amplitude FCC 15.247 (b) (2) and RSS 247 5.4 (1)

High Frequency



International Certification Services, Inc.

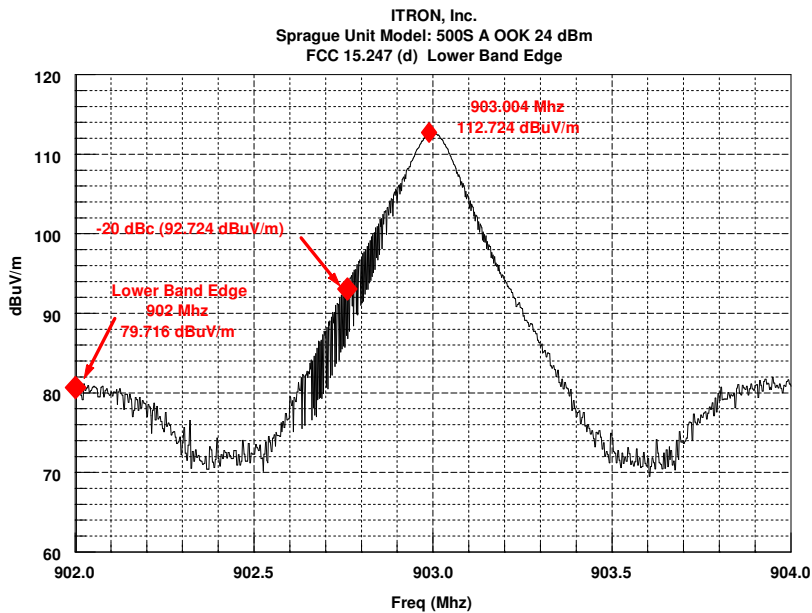
June 08, 2016

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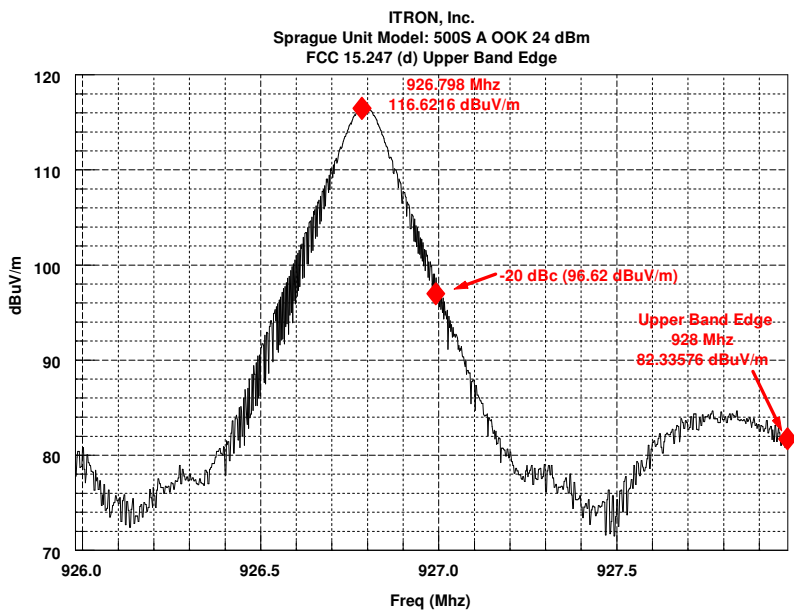
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**Sprague Unit: AM OOK 24 dBm Band Edges FCC 15.247 (d) / RSS 247 5.4 (1)**



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June 06, 2016

## **ATTACHMENT C**

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

**COMPANY NAME:** ITRON, Inc.

**CUSTOMER REPRESENTATIVE:** International Certification Services, Inc.

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

**MODEL NUMBER:** Sprague 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