

# Itron, Inc.

## TEST REPORT FOR

**500GC**

**Models: ERG-7000-007\***

\*(See Appendix A for Manufacturer's Declaration)

### Tested to The Following Standards:

**FCC Part 15 Subpart C Section(s)**

**15.247**

**(FHSS 902-928MHz)**

**Report No.: 107737-3**

**Date of issue: March 30, 2023**



**Test Certificate # 803.01**

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:**

Itron, Inc.  
2401 N, State Street  
Waseca, MN 56093

Representative: Dan Bomsta  
Customer Reference Number: 271751

**DATE OF EQUIPMENT RECEIPT:**

**DATE(S) OF TESTING:**

**REPORT PREPARED BY:**

Viviana Prado  
CKC Laboratories, Inc.  
5046 Sierra Pines Drive  
Mariposa, CA 95338

Project Number: 107737

February 10, 2023

February 10, 13, and 18, 2023

### 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.  
Canyon Park  
22116 23rd Drive S.E., Suite A  
Bothell, WA 98021

## Software Versions

| CKC Laboratories Proprietary Software | Version |
|---------------------------------------|---------|
| EMITest Emissions                     | 5.03.20 |

## Site Registration & Accreditation Information

| Location                 | *NIST CB # | FCC    | Canada | Japan  |
|--------------------------|------------|--------|--------|--------|
| Canyon Park, Bothell, WA | US0103     | US1024 | 3082C  | A-0136 |
| Brea, CA                 | US0103     | US1024 | 3082D  | A-0136 |
| Fremont, CA              | US0103     | US1024 | 3082B  | A-0136 |
| Mariposa, CA             | US0103     | US1024 | 3082A  | A-0136 |

\*CKC's list of NIST designated countries can be found at: <https://standards.gov/cabs/designations.html>

## 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         | NA            | Pass    |
| 15.247(d)       | Radiated Emissions & Band Edge | NA            | Pass    |
| 15.207          | AC Conducted Emissions         | NA            | NA1     |

NA = Not Applicable

NA1 = The manufacturer declares the EUT is battery powered.

NP = CKC Laboratories was not contracted to perform test.

#### 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              |
|--------|--------------|--------------|------------------|
| 500GC  | Itron, Inc.  | ERG-7000-007 | 112322-500G-cond |

#### Support Equipment:

| Device        | Manufacturer | Model #     | S/N            |
|---------------|--------------|-------------|----------------|
| Laptop        | HP           | 14-dq1033cl | 5CD941CCWS     |
| Laptop PSU    | HP           | TPN-CA14    | WHGRE0AVKCR55T |
| Adapter Board | Itron, Inc.  | None        | None           |

### Configuration 2

#### Equipment Tested:

| Device | Manufacturer | Model #      | S/N              |
|--------|--------------|--------------|------------------|
| 500GC  | Itron, Inc.  | ERG-7000-007 | 112922-500GC-rad |

#### Support Equipment:

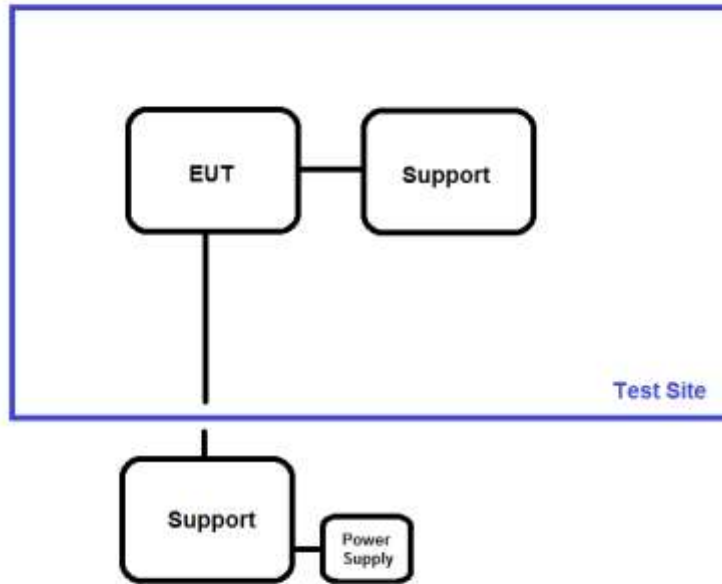
| Device        | Manufacturer | Model #     | S/N            |
|---------------|--------------|-------------|----------------|
| Laptop        | HP           | 14-dq1033cl | 5CD941CCWS     |
| Laptop PSU    | HP           | TPN-CA14    | WHGRE0AVKCR55T |
| Adapter Board | Itron, Inc.  | None        | None           |

## General Product Information:

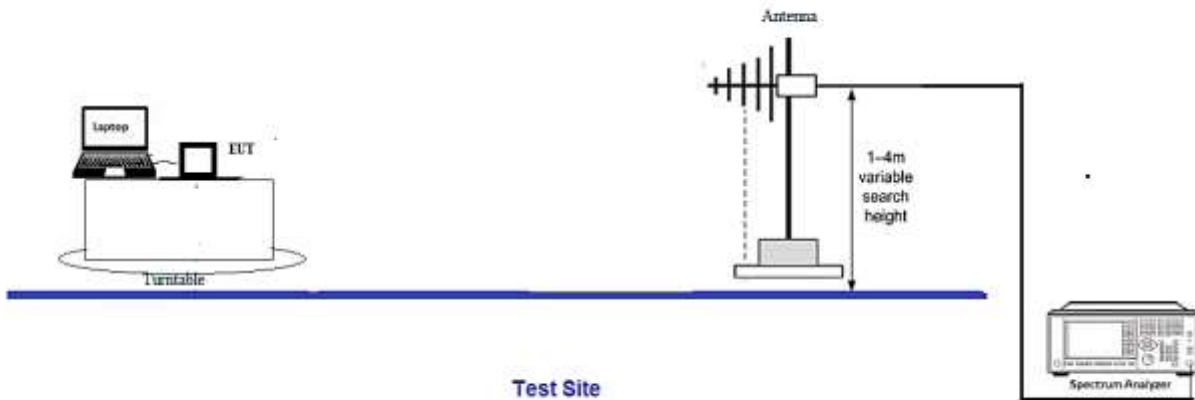
| Product Information   | Manufacturer-Provided Details   |
|---|---|
| Equipment Type:   | Stand-Alone Equipment   |
| Type of Wideband System:  | FHSS  |
| Operating Frequency Range:  | 902.4-927.6   |
| Number of Hopping Channels:   | 64  |
| Receiver Bandwidth and Synchronization:   | The manufacturer declares the receiver input bandwidth matches the transmit channel bandwidth and shifts frequencies in synchronization with the transmitter. |
| Modulation Type(s):   | GFSK 150kbps  |
| Maximum Duty Cycle:   | Tested at 100%  |
| Number of TX Chains:  | 1   |
| Antenna Type(s) and Gain:   | Meander / 2.7 dBi   |
| Beamforming Type:   | NA  |
| Antenna Connection Type:  | Integral (External connector provided to facilitate testing)  |
| Nominal Input Voltage:  | Battery (6VDC)  |
| Firmware / Software used for Test:  | CLI Tool App Version: 8.0.2.0, CSL Version 9.1.5.0 Hardware Rev. 5  |
| The validity of results is dependent on the stated product details, the accuracy of which the manufacturer assumes full responsibility. |   |

**Block Diagram of Test Setup(s)**

**Test Setup Block Diagram**



Radiated test setup





## FCC Part 15 Subpart C

### 15.247(a) Transmitter Characteristics

| Test Setup/Conditions |  |                |             |
|-----------------------|--|----------------|-------------|
| Test Location:        | Bothell Lab C3   | Test Engineer: | M. Harrison |
| Test Method:          | ANSI C63.10 (2013)   | Test Date(s):  | 2/13/2023   |
| Configuration:        | 1  |                |             |
| Test Setup:           | EUT is set up for conducted measurements. It is directly connected to the analyzer via cable and attenuator. |                |             |

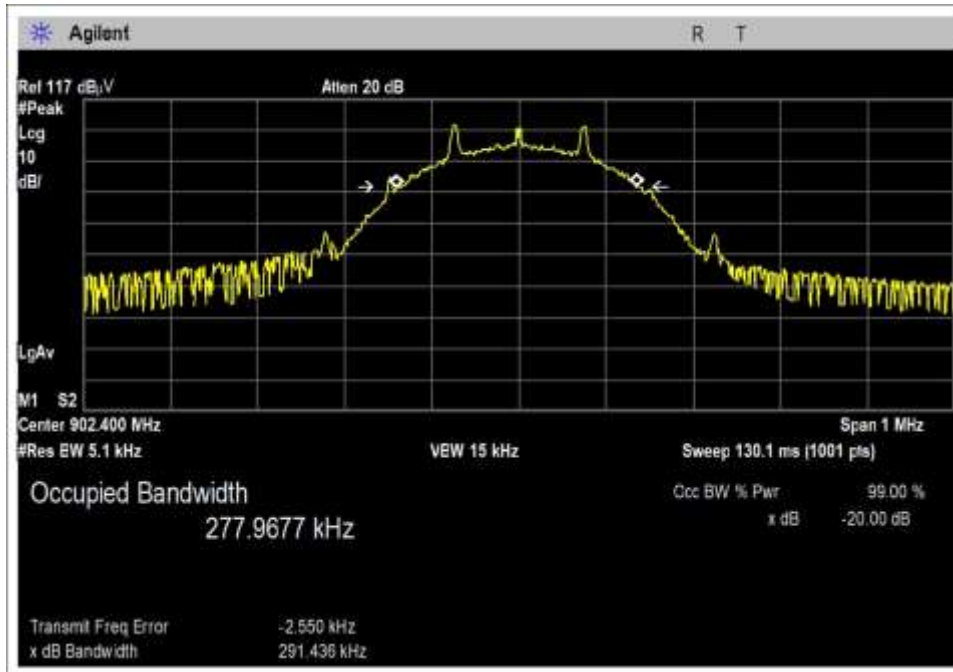
| Environmental Conditions |    |                        |    |
|--------------------------|----|------------------------|----|
| Temperature (°C)         | 20 | Relative Humidity (%): | 42 |

| Test Equipment |                   |              |        |           |           |
|----------------|-------------------|--------------|--------|-----------|-----------|
| Asset#         | Description       | Manufacturer | Model  | Cal Date  | Cal Due   |
| P05503         | Attenuator        | Narda        | 766-10 | 6/8/2021  | 6/8/2023  |
| P05353         | Cable             | Andrews      | Heliac | 2/23/2022 | 2/23/2024 |
| 03807          | Spectrum Analyzer | Agilent      | E4440A | 10/6/2022 | 10/6/2024 |

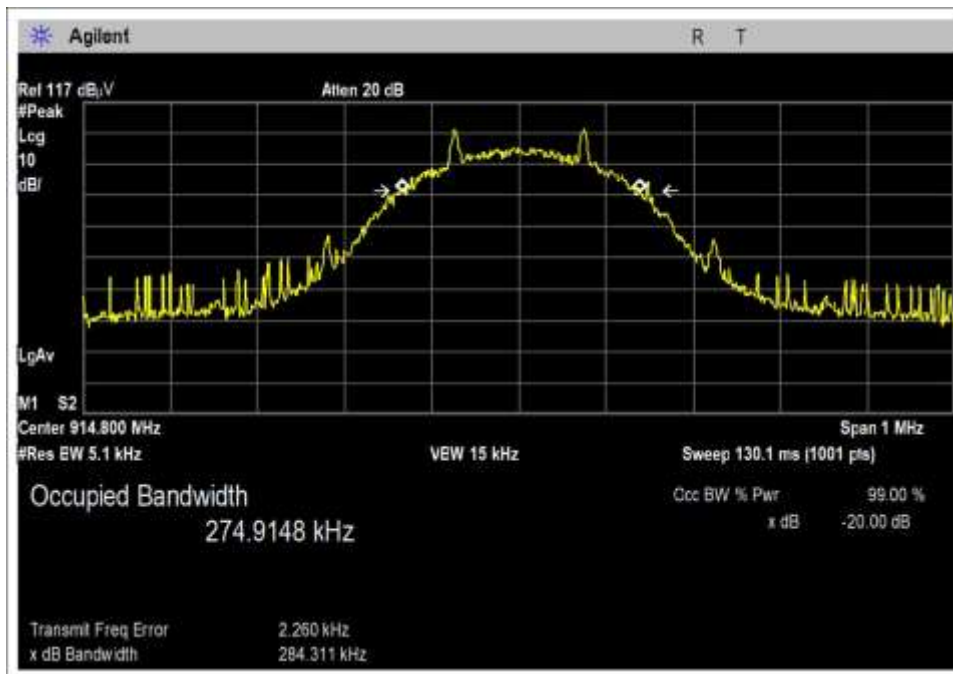
### 15.247(a)(1)(i) 20 dB Bandwidth

| Test Data Summary |              |            |                |             |         |
|-------------------|--------------|------------|----------------|-------------|---------|
| Frequency (MHz)   | Antenna Port | Modulation | Measured (kHz) | Limit (kHz) | Results |
| 902.4             | 1            | GFSK       | 291.4          | ≤500        | Pass    |
| 914.8             | 1            | GFSK       | 284.3          | ≤500        | Pass    |
| 927.6             | 1            | GFSK       | 306.3          | ≤500        | Pass    |

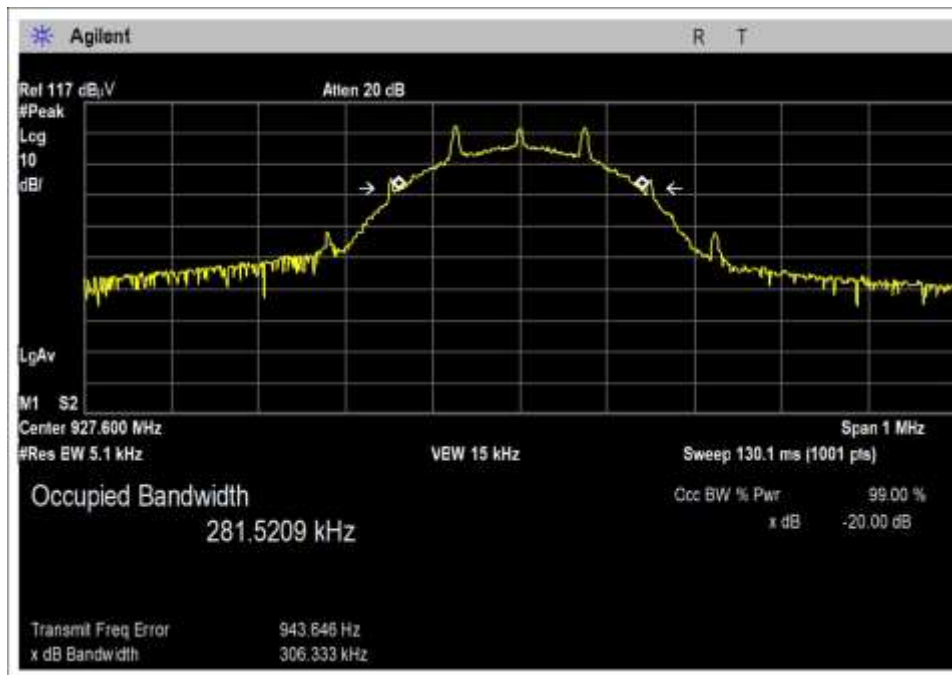
**Plot(s)**



Low Channel



Middle Channel

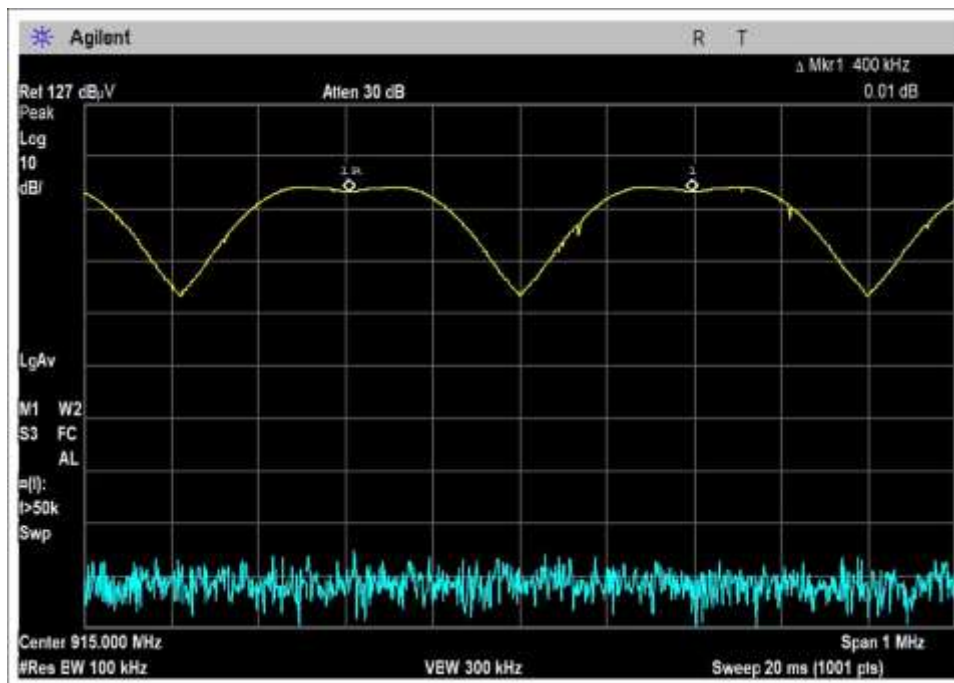


High Channel

### 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 |
| 1   | Hopping          | 400            | >306.3      | Pass    |

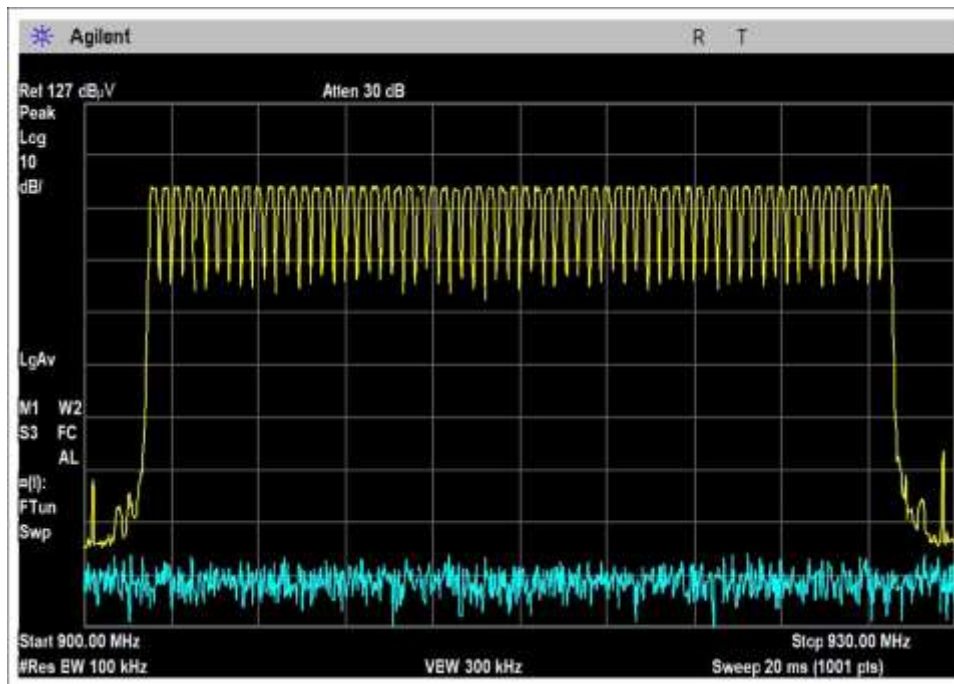
### Plot(s)



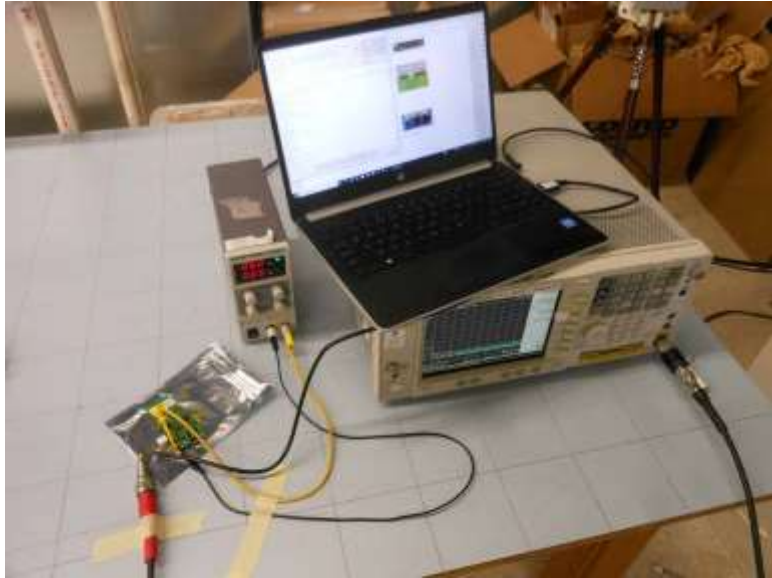
### 15.247(a)(1)(i) Number of Channels

| Test Data Summary   |                  |                     |                  |         |
|---|------------------|---------------------|------------------|---------|
| $Limit = \begin{cases} 50 \text{ Channels} & 20 \text{ dB BW} < 250\text{kHz} \\ 25 \text{ Channels} & 20 \text{ dB BW} \geq 250\text{kHz} \end{cases}$ |                  |                     |                  |         |
| Antenna Port  | Operational Mode | Measured (Channels) | Limit (Channels) | Results |
| 1   | Hopping          | 64                  | $\geq 25$        | Pass    |

### Plot(s)



**Test Setup Photo(s)**



## 15.247(b)(2) Output Power

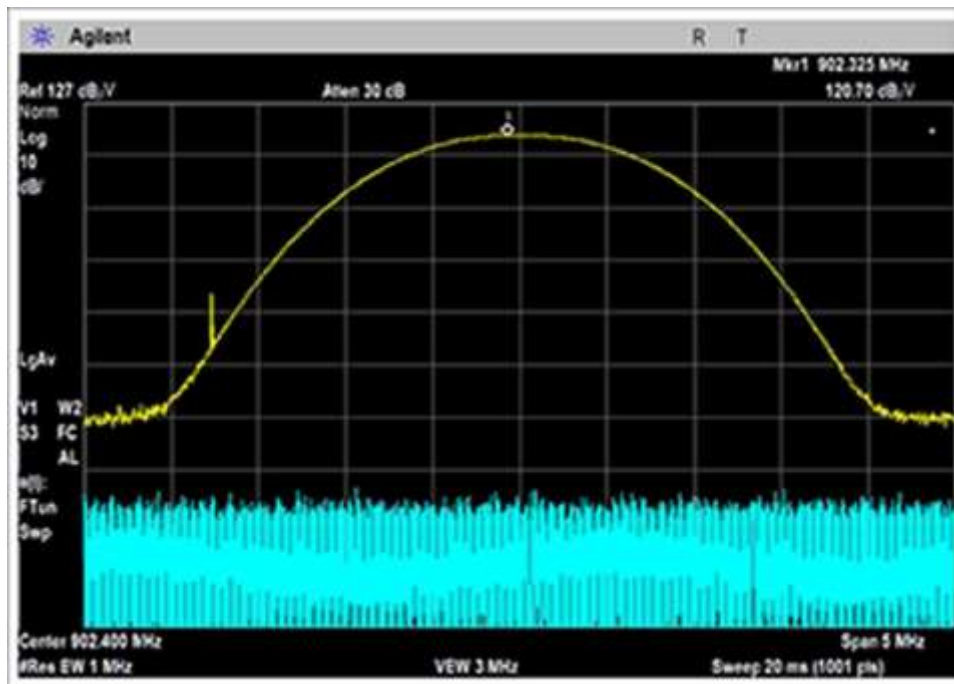
### Test Data Summary - Voltage Variations

This equipment is battery powered. Power output tests were performed using a fresh battery.

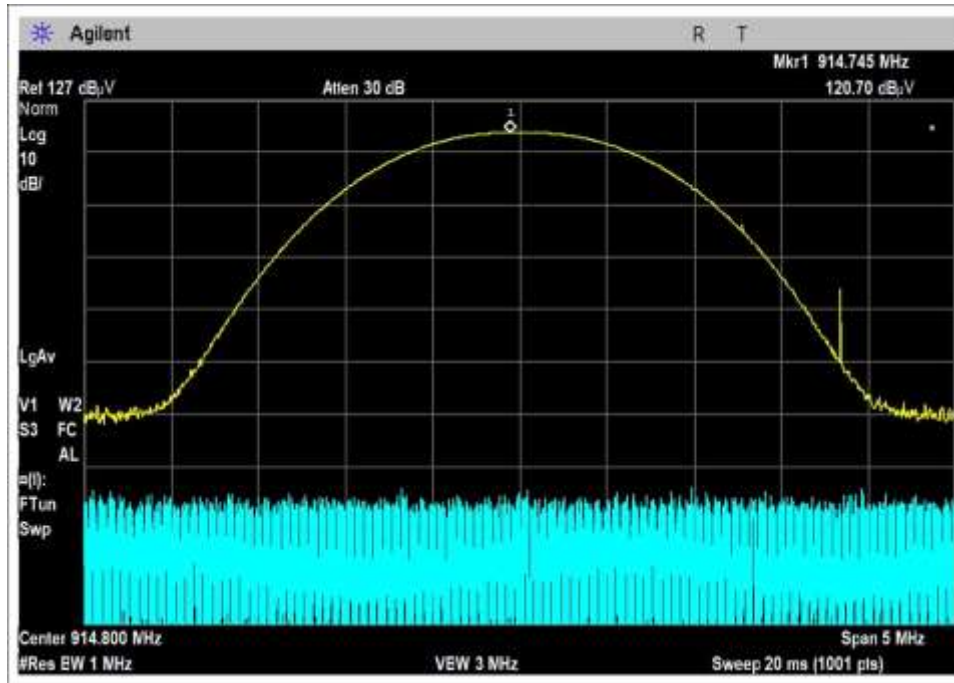
### Test Data Summary - RF Conducted Measurement

| Frequency (MHz) | Modulation | Ant. Type / Gain (dBi) | Measured (dBm) | Limit (dBm) | Results |
|-----------------|------------|------------------------|----------------|-------------|---------|
| 902.4           | GFSK       | Meander / 2.7          | 24.0           | ≤30         | Pass    |
| 914.8           | GFSK       | Meander / 2.7          | 24.0           | ≤30         | Pass    |
| 927.6           | GFSK       | Meander / 2.7          | 24.1           | ≤30         | Pass    |

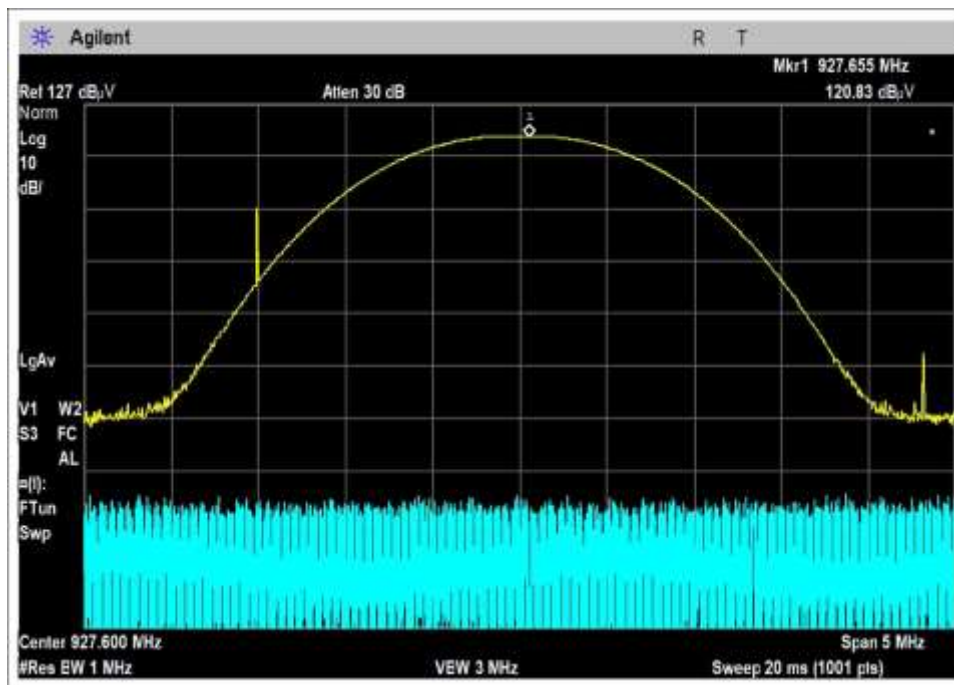
### Plots



Low Channel



Middle Channel



High Channel



**Test Setup / Conditions / Data**

Test Location: CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)  
 Customer: **Itron, Inc.**  
 Specification: **15.247(b) Power Output (902-928 MHz FHSS >50 Channels)**  
 Work Order #: **107737** Date: 2/13/2023  
 Test Type: **Conducted Emissions** Time: 07:31:05  
 Tested By: Matt Harrison Sequence#: 15  
 Software: EMITest 5.03.20 6VDC

**Equipment Tested:**

| Device          | Manufacturer | Model # | S/N |
|-----------------|--------------|---------|-----|
| Configuration 1 |              |         |     |

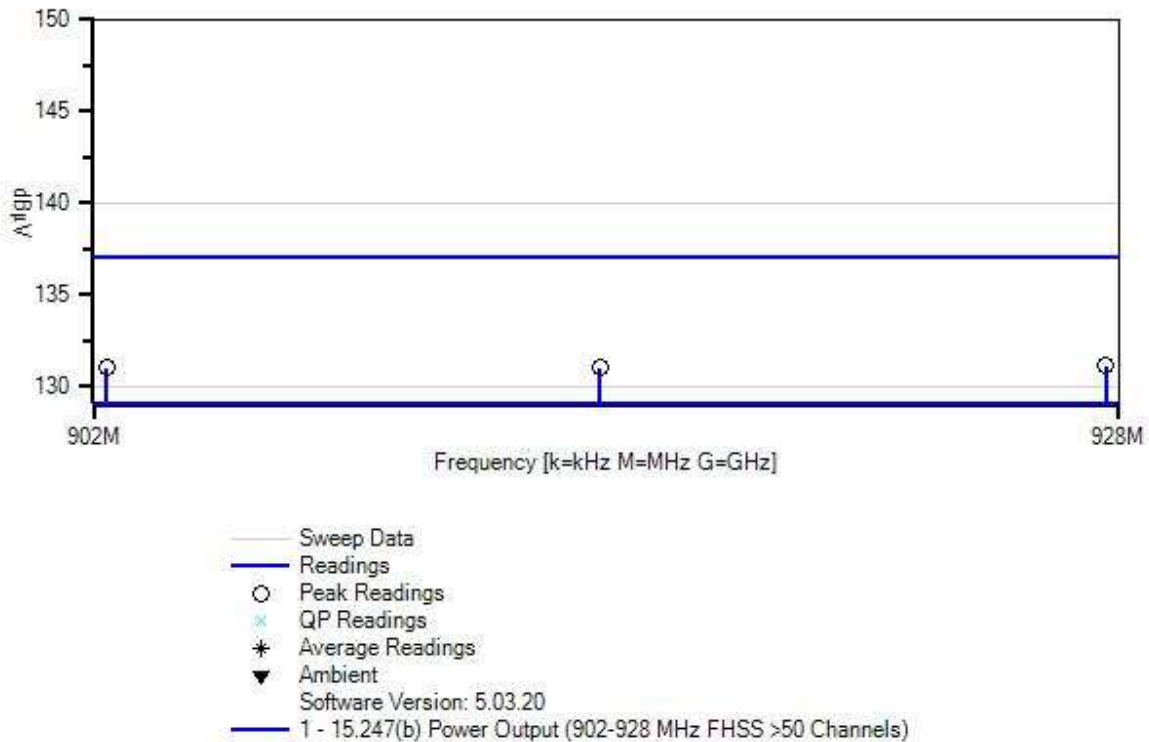
**Support Equipment:**

| Device          | Manufacturer | Model # | S/N |
|-----------------|--------------|---------|-----|
| Configuration 1 |              |         |     |

**Test Conditions / Notes:**

Test Environment Conditions:  
 Temperature: 18.6°C  
 Pressure: 100.9kPa  
 Humidity: 40%  
  
 Frequency Range: Fundamental  
 Frequency Tested: 902.4, 914.8, 927.6  
 Firmware Power Setting: Level 3  
 EUT Firmware:  
 Protocol /MCS/Modulation: GFSK, 150kbps  
  
 Test Method: ANSI C63.10 (2013)  
 Test Mode: Transmitting  
 Test Setup: EUT is set up for conducted measurement. It is directly connected to the Analyzer via cable and attenuator.  
 Modifications Added: None

Itron, Inc. WO#: 107737 Sequence#: 15 Date: 2/13/2023  
 15.247(b) Power Output (902-928 MHz FHSS >50 Channels) Test Lead: 6VDC RF Port



**Test Equipment:**

| ID | Asset #  | Description       | Model   | Calibration Date | Cal Due Date |
|----|----------|-------------------|---------|------------------|--------------|
| T1 | ANP05503 | Attenuator        | 766-10  | 6/8/2021         | 6/8/2023     |
| T2 | ANP05353 | Cable             | Heliacx | 2/23/2022        | 2/23/2024    |
|    | AN02872  | Spectrum Analyzer | E4440A  | 11/29/2021       | 11/29/2023   |

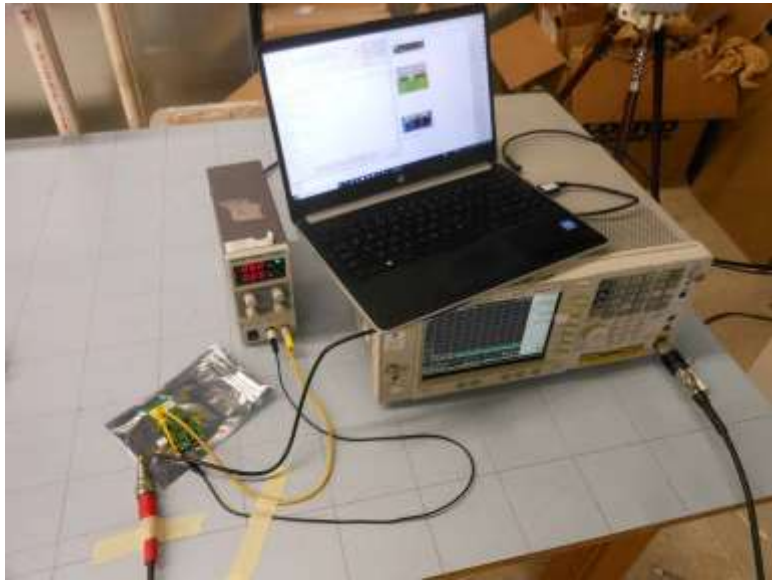
**Measurement Data:**

Reading listed by margin.

Test Lead: RF Port

| # | Freq<br>MHz | Rdng<br>dBμV | T1<br>dB | T2<br>dB | Dist<br>dB | Table | Corr<br>dBμV | Spec<br>dBμV | Margin<br>dB | Polar<br>Ant |
|---|-------------|--------------|----------|----------|------------|-------|--------------|--------------|--------------|--------------|
| 1 | 927.655M    | 120.8        | +10.1    | +0.2     |            | +0.0  | 131.1        | 137.0        | -5.9         | RF Po        |
| 2 | 902.325M    | 120.7        | +10.1    | +0.2     |            | +0.0  | 131.0        | 137.0        | -6.0         | RF Po        |
| 3 | 914.745M    | 120.7        | +10.1    | +0.2     |            | +0.0  | 131.0        | 137.0        | -6.0         | RF Po        |

**Test Setup Photo(s)**



## 15.247(d) RF Conducted Emissions

### Test Setup / Conditions / Data

Test Location: CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)  
 Customer: **Itron, Inc.**  
 Specification: **15.247(d) Conducted Spurious Emissions**  
 Work Order #: **107737** Date: 2/13/2023  
 Test Type: **Conducted Emissions** Time: 09:31:49  
 Tested By: Matt Harrison Sequence#: 19  
 Software: EMITest 5.03.20 6VDC

#### Equipment Tested:

| Device          | Manufacturer | Model # | S/N |
|-----------------|--------------|---------|-----|
| Configuration 1 |              |         |     |

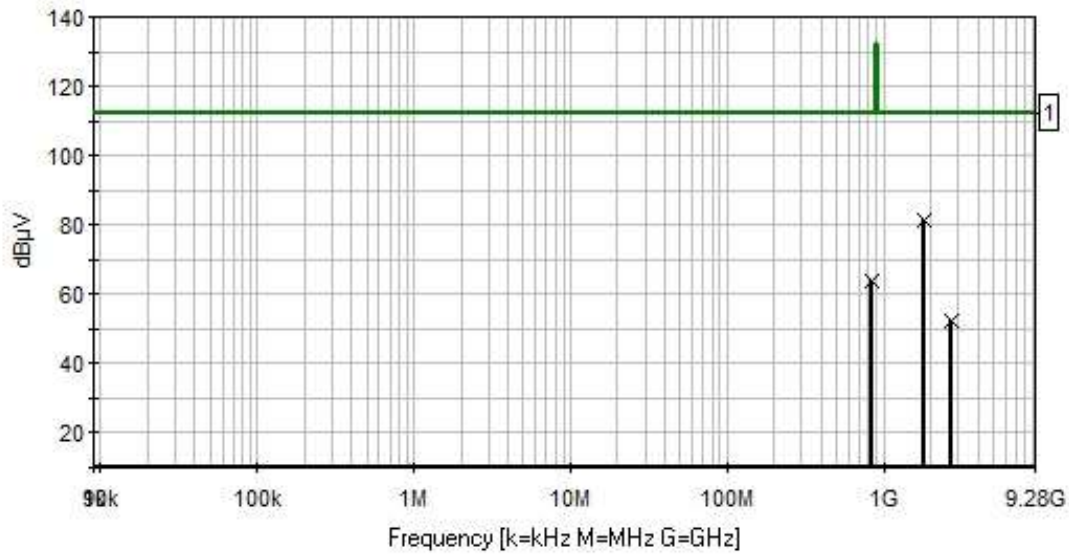
#### Support Equipment:

| Device          | Manufacturer | Model # | S/N |
|-----------------|--------------|---------|-----|
| Configuration 1 |              |         |     |

#### Test Conditions / Notes:

Test Environment Conditions:  
 Temperature: 18.6°C  
 Pressure: 100.9kPa  
 Humidity: 40%  
  
 Frequency Range: 30M-10GHz  
 Frequency Tested: 914.8 (Low, Middle, and High channels were investigated, and worst case is represented)  
 Firmware Power Setting: Level 3  
 EUT Firmware:  
 Protocol /MCS/Modulation: GFSK, 150kbps  
  
 Test Method: ANSI C63.10 (2013)  
 Test Mode: Transmitting  
 Test Setup: EUT is set up for conducted measurement. It is directly connected to the Analyzer via cable and attenuator.  
 Modifications Added: None

Iron, Inc. WO#: 107737 Sequence#: 19 Date: 2/13/2023  
 15.247(d) Conducted Spurious Emissions Test Lead: 6VDC RF Port



— Readings  
 — 1 - 15.247(d) Conducted Spurious Emissions  
 × Peak Readings  
 Software Version: 5.03.20

**Test Equipment:**

| ID | Asset #  | Description       | Model  | Calibration Date | Cal Due Date |
|----|----------|-------------------|--------|------------------|--------------|
| T1 | ANP05503 | Attenuator        | 766-10 | 6/8/2021         | 6/8/2023     |
| T2 | ANP05353 | Cable             | Heliac | 2/23/2022        | 2/23/2024    |
|    | AN02872  | Spectrum Analyzer | E4440A | 11/29/2021       | 11/29/2023   |

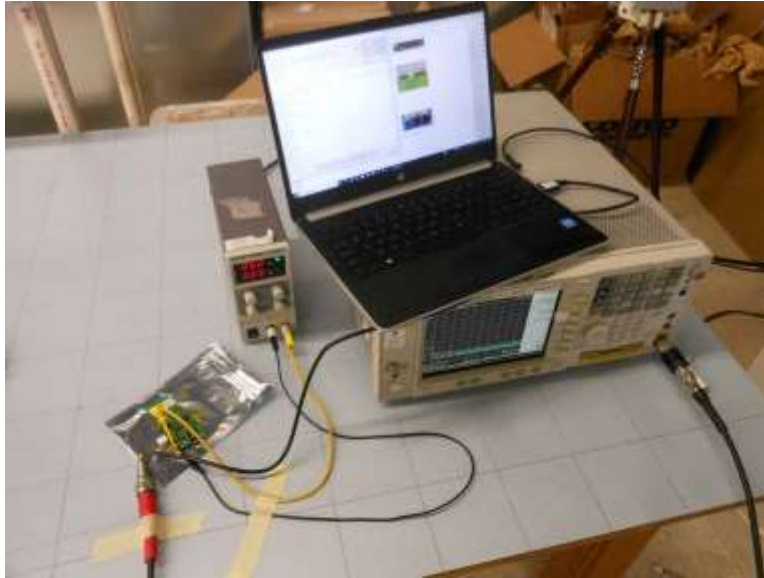
**Measurement Data:**

Reading listed by margin.

Test Lead: RF Port

| # | Freq<br>MHz | Rdng<br>dBµV | T1<br>dB | T2<br>dB | Dist<br>dB | Corr<br>dB | Spec<br>dBµV | Margin<br>dB | Polar<br>Ant |
|---|-------------|--------------|----------|----------|------------|------------|--------------|--------------|--------------|
| 1 | 1829.452M   | 70.6         | +10.2    | +0.3     | +0.0       | 81.1       | 112.3        | -31.2        | RF Po        |
| 2 | 849.600M    | 53.8         | +10.1    | +0.2     | +0.0       | 64.1       | 112.3        | -48.2        | RF Po        |
| 3 | 2744.626M   | 41.5         | +10.2    | +0.4     | +0.0       | 52.1       | 112.3        | -60.2        | RF Po        |

**Test Setup Photo(s)**



## 15.247(d) Radiated Emissions & Band Edge

### Test Setup / Conditions / Data

Test Location: CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)  
 Customer: **Itron, Inc.**  
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**  
 Work Order #: **107737** Date: 2/18/2023  
 Test Type: **Radiated Scan** Time: 10:11:25  
 Tested By: Matt Harrison Sequence#: 36  
 Software: EMITest 5.03.20

#### Equipment Tested:

| Device          | Manufacturer | Model # | S/N |
|-----------------|--------------|---------|-----|
| Configuration 2 |              |         |     |

#### Support Equipment:

| Device          | Manufacturer | Model # | S/N |
|-----------------|--------------|---------|-----|
| Configuration 2 |              |         |     |

#### Test Conditions / Notes:

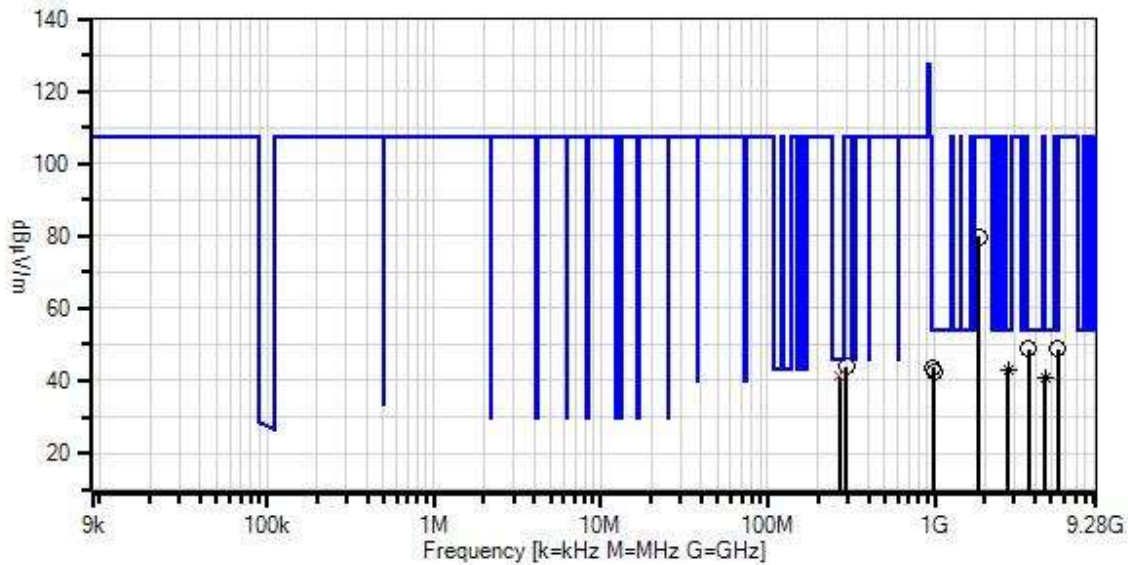
Test Environment Conditions:  
 Temperature: 18.6°C  
 Pressure: 100.9kPa  
 Humidity: 40%

Frequency Range: 9k-10GHz  
 Frequency Tested: 914.8 (Low, Middle, and High channels were investigated, and worst case is represented)  
 Firmware Power Setting: Level 3  
 EUT Firmware:  
 Protocol /MCS/Modulation: GFSK 150kbps

Test Method: ANSI C63.10 (2013)  
 Test Mode: Transmitting  
 Test Setup: EUT is setup in a tabletop configuration. It is 80cm high for below 1GHz and 150cm above 1GHz, on a Styrofoam table.  
 Modifications Added: None

Notes: No emissions found within 20dB of the limit below 30MHz.

Itron, Inc. WO#: 107737 Sequence#: 36 Date: 2/18/2023  
 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: 5.03.20

**Test Equipment:**

| ID | Asset #     | Description       | Model             | Calibration Date | Cal Due Date |
|----|-------------|-------------------|-------------------|------------------|--------------|
| T1 | AN03628     | Biconilog Antenna | 3142E             | 6/3/2021         | 6/3/2023     |
| T2 | ANP05360    | Cable             | RG214             | 2/4/2022         | 2/4/2024     |
| T3 | ANP06540    | Cable             | Heliac            | 1/17/2022        | 1/17/2024    |
|    | AN02872     | Spectrum Analyzer | E4440A            | 11/29/2021       | 11/29/2023   |
| T4 | ANP05333    | Cable             | Heliac            | 3/14/2022        | 3/14/2024    |
| T5 | AN02307     | Preamp            | 8447D             | 1/6/2022         | 1/6/2024     |
|    | AN00052     | Loop Antenna      | 6502              | 5/11/2022        | 5/11/2024    |
|    | AN03540     | Preamp            | 83017A            | 5/14/2021        | 5/14/2023    |
|    | AN02374ANSI | Horn Antenna      | RGA-60            | 5/25/2021        | 5/25/2023    |
|    | ANP07505    | Cable             | CLU40-KMKM-02.00F | 1/24/2023        | 1/24/2025    |
|    | AN03170     | High Pass Filter  | HM1155-11SS       | 9/16/2021        | 9/16/2023    |



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

| #  | Freq<br>MHz      | Rdng<br>dB $\mu$ V | T1<br>T5<br>dB | T2<br>dB | T3<br>dB | T4<br>dB | Dist<br>Table | Corr<br>dB $\mu$ V/m | Spec<br>dB $\mu$ V/m | Margin<br>dB | Polar<br>Ant |
|----|------------------|--------------------|----------------|----------|----------|----------|---------------|----------------------|----------------------|--------------|--------------|
| 1  | 270.289M<br>QP   | 46.7               | +19.3<br>-27.0 | +1.1     | +0.2     | +0.9     | +0.0          | 41.2                 | 46.0                 | -4.8         | Horiz        |
| ^  | 270.289M         | 53.9               | +19.3<br>-27.0 | +1.1     | +0.2     | +0.9     | +0.0          | 48.4                 | 46.0                 | +2.4         | Horiz        |
| 3  | 3659.250M        | 44.7               | +0.0<br>+0.0   | +0.0     | +0.6     | +3.5     | +0.0          | 48.8                 | 54.0                 | -5.2         | Horiz        |
| 4  | 979.450M         | 36.4               | +30.2<br>-27.2 | +2.5     | +0.3     | +1.6     | +0.0          | 43.8                 | 54.0                 | -10.2        | Horiz        |
| 5  | 2744.400M<br>Ave | 39.8               | +0.0<br>+0.0   | +0.0     | +0.5     | +2.8     | +0.0          | 43.1                 | 54.0                 | -10.9        | Horiz        |
| ^  | 2744.400M        | 53.5               | +0.0<br>+0.0   | +0.0     | +0.5     | +2.8     | +0.0          | 56.8                 | 54.0                 | +2.8         | Horiz        |
| 7  | 992.770M         | 35.3               | +29.9<br>-27.1 | +2.5     | +0.3     | +1.6     | +0.0          | 42.5                 | 54.0                 | -11.5        | Horiz        |
| 8  | 4574.000M<br>Ave | 35.9               | +0.0<br>+0.0   | +0.0     | +0.6     | +4.2     | +0.0          | 40.7                 | 54.0                 | -13.3        | Horiz        |
| ^  | 4574.000M        | 48.0               | +0.0<br>+0.0   | +0.0     | +0.6     | +4.2     | +0.0          | 52.8                 | 54.0                 | -1.2         | Horiz        |
| 10 | 1829.445M        | 77.1               | +0.0<br>+0.0   | +0.0     | +0.4     | +2.3     | +0.0          | 79.8                 | 107.4                | -27.6        | Horiz        |
| 11 | 5489.110M        | 43.9               | +0.0<br>+0.0   | +0.0     | +0.8     | +4.1     | +0.0          | 48.8                 | 107.4                | -58.6        | Horiz        |
| 12 | 293.189M         | 50.3               | +18.1<br>-27.0 | +1.2     | +0.2     | +1.0     | +0.0          | 43.8                 | 107.4                | -63.6        | Horiz        |

**Band Edge**

**Band Edge Summary Level 3**

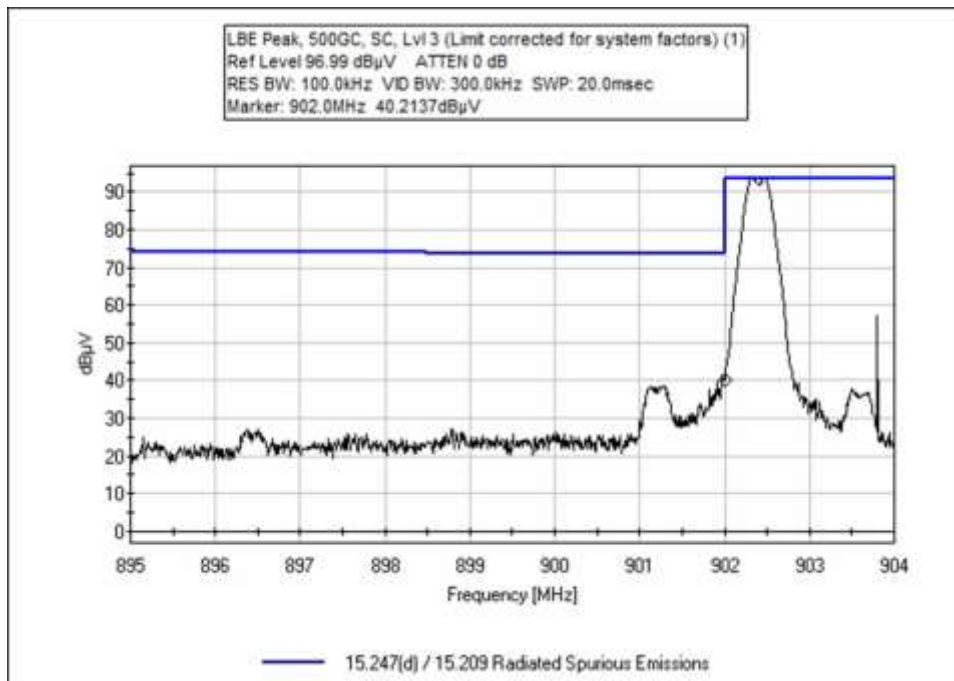
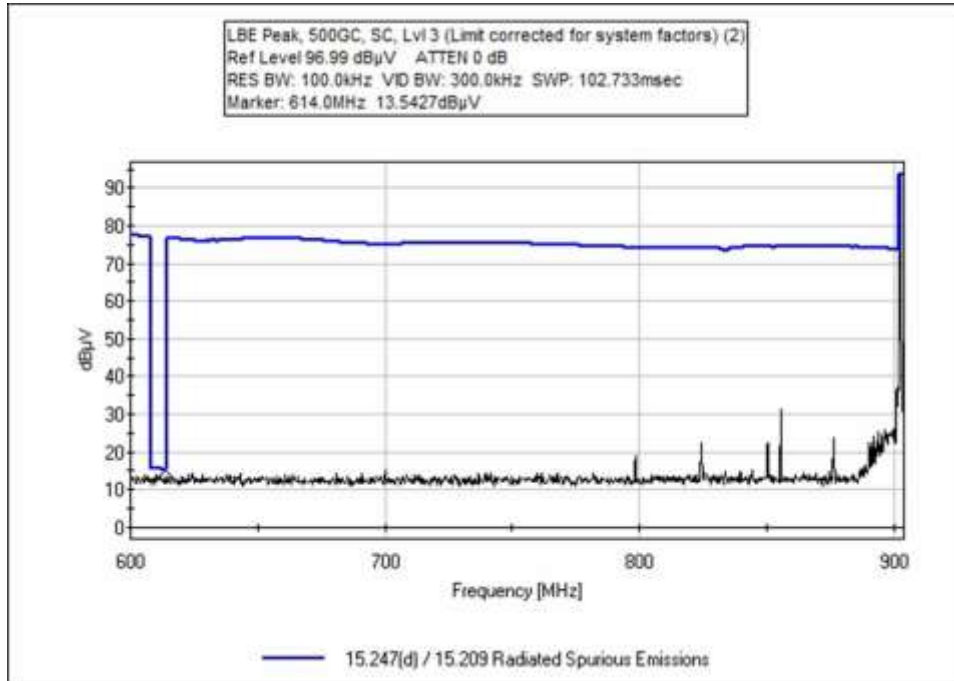
| Operating Mode: Single Channel (Low and High) |            |           |                             |                    |         |
|---|------------|-----------|-----------------------------|--------------------|---------|
| Frequency (MHz)                               | Modulation | Ant. Type | Field Strength (dBuV/m @3m) | Limit (dBuV/m @3m) | Results |
| 614   | GFSK       | Meander   | 40.0                        | <46                | Pass    |
| 902   | GFSK       | Meander   | 73.9                        | <107.4             | Pass    |
| 928   | GFSK       | Meander   | 76.3                        | <107.4             | Pass    |
| 960   | GFSK       | Meander   | 46.9                        | <54                | Pass    |

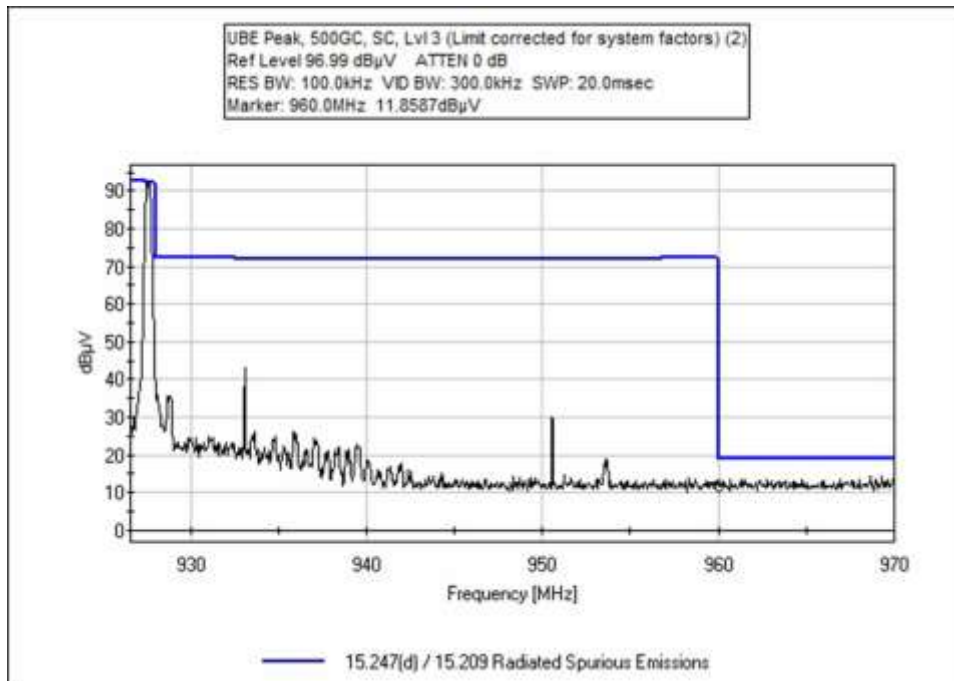
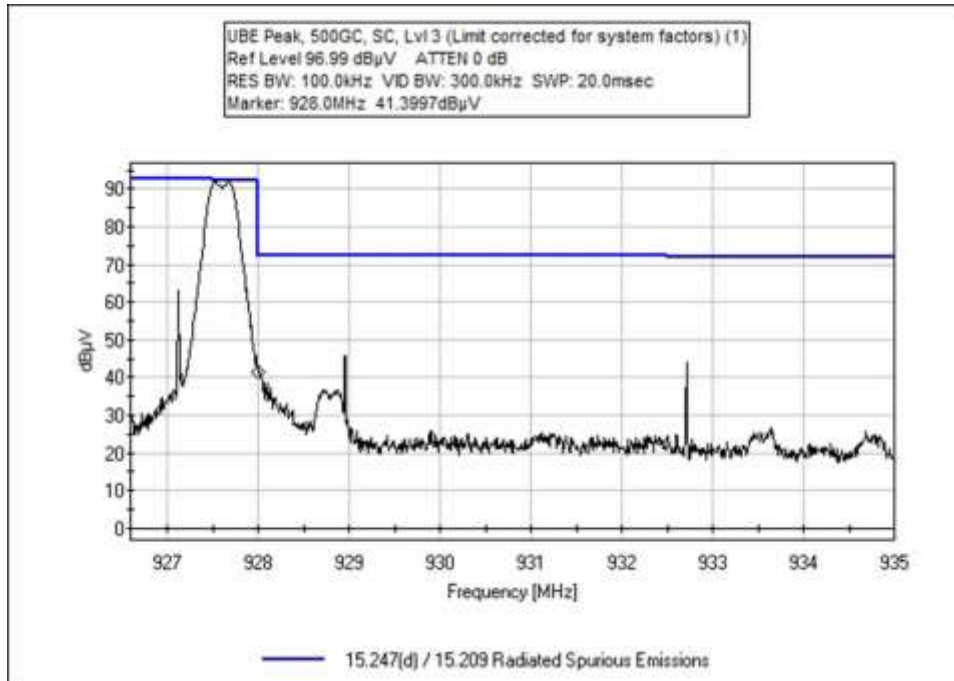
**Band Edge Summary Level 3**

| Operating Mode: Hopping |            |           |                             |                    |         |
|-------------------------|------------|-----------|-----------------------------|--------------------|---------|
| Frequency (MHz)         | Modulation | Ant. Type | Field Strength (dBuV/m @3m) | Limit (dBuV/m @3m) | Results |
| 614                     | GFSK       | Meander   | 40.0                        | <46                | Pass    |
| 902                     | GFSK       | Meander   | 77.7                        | <107.4             | Pass    |
| 928                     | GFSK       | Meander   | 74.1                        | <107.4             | Pass    |
| 960                     | GFSK       | Meander   | 46.7                        | <54                | Pass    |

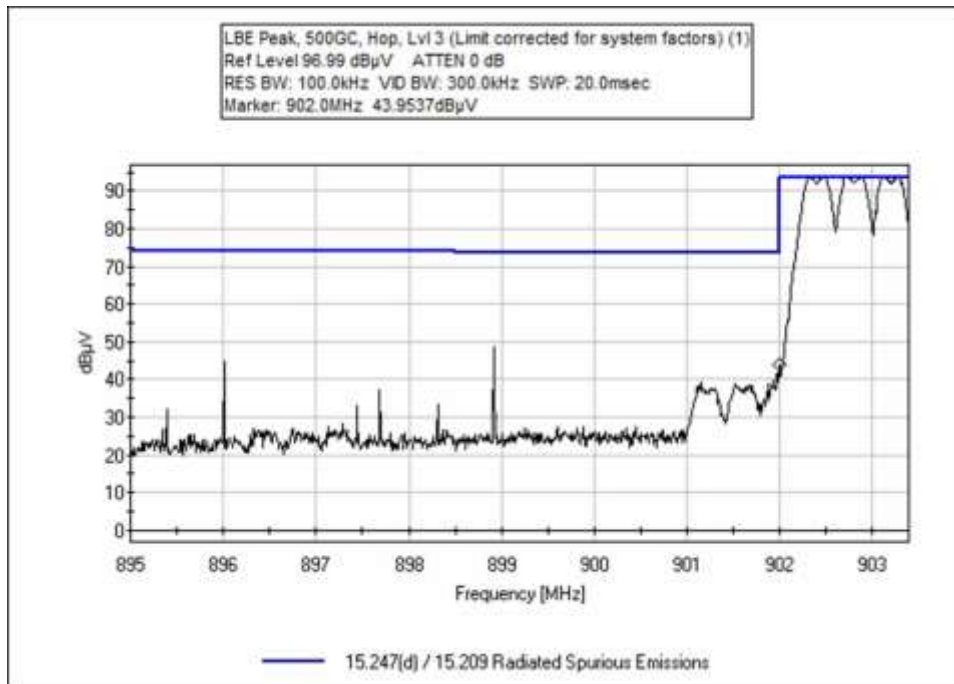
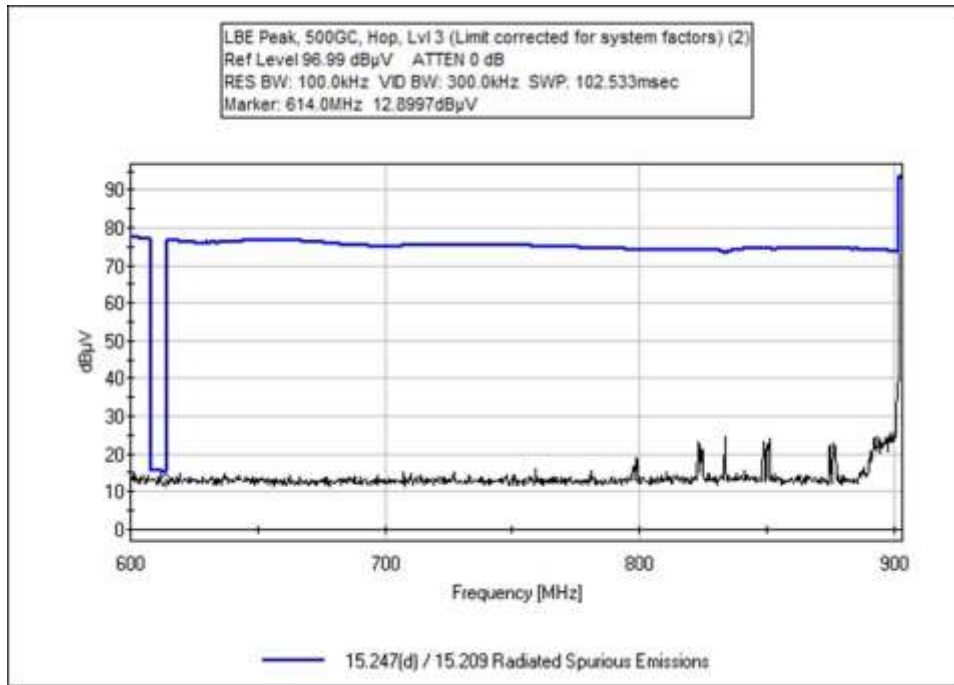
## Band Edge Plots

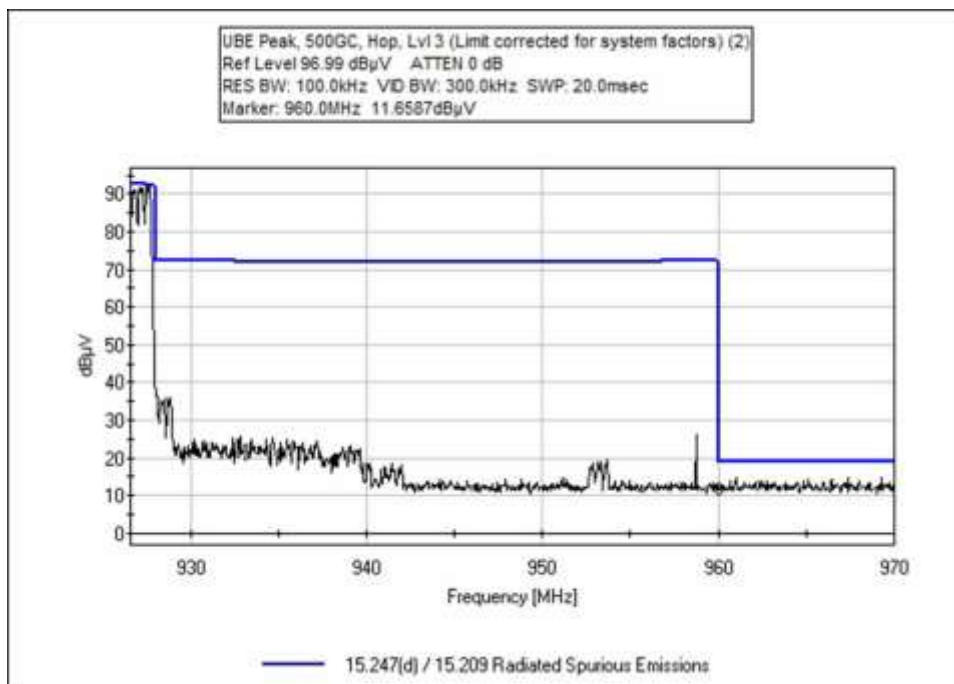
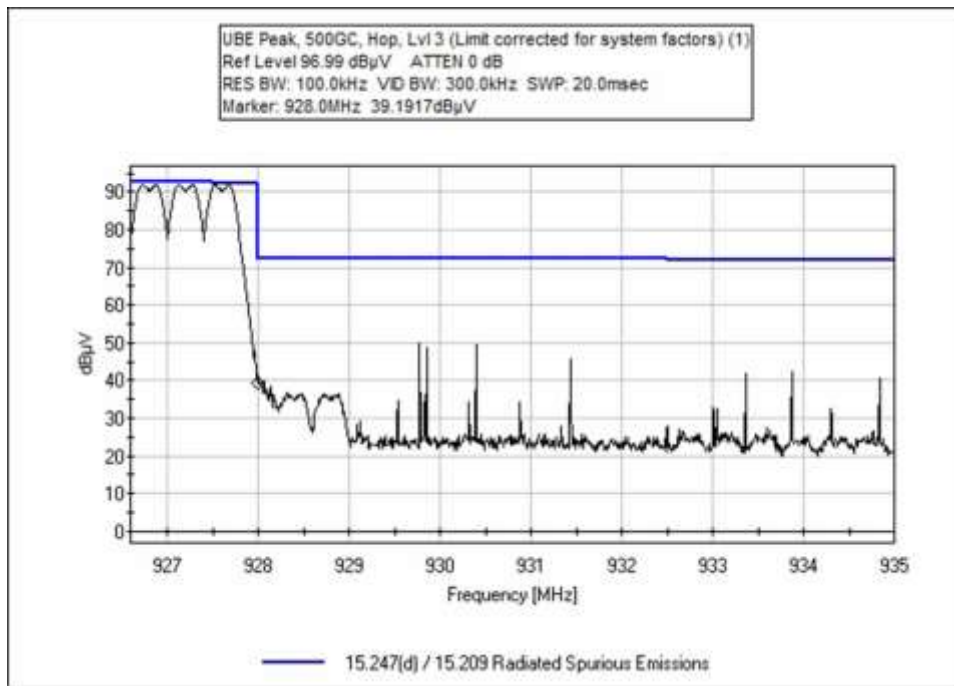
### Single Channel





### Hopping





**Test Setup / Conditions / Data**

Test Location: CKC Laboratories • 22116 23rd Drive SE, Suite A • Bothell, WA 98021 • 1-800-500-4EMC (4362)  
 Customer: **Itron, Inc.**  
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**  
 Work Order #: **107737** Date: 2/10/2023  
 Test Type: **Radiated Scan** Time: 08:01:35  
 Tested By: Matt Harrison Sequence#: 11  
 Software: EMITest 5.03.20

**Equipment Tested:**

| Device          | Manufacturer | Model # | S/N |
|-----------------|--------------|---------|-----|
| Configuration 2 |              |         |     |

**Support Equipment:**

| Device          | Manufacturer | Model # | S/N |
|-----------------|--------------|---------|-----|
| Configuration 2 |              |         |     |

**Test Conditions / Notes:**

Test Environment Conditions:  
 Temperature: 18.6°C  
 Pressure: 100.9kPa  
 Humidity: 40%  
  
 Frequency Range: 600-970MHz  
 Frequency Tested: 902.4, 927.6  
 Firmware Power Setting: Level 3  
 EUT Firmware:  
 Protocol /MCS/Modulation: GFSK 150kbps  
  
 Test Method: ANSI C63.10 (2013)  
 Test Mode: Transmitting  
 Test Setup: EUT is setup in a tabletop configuration. It is 80cm high on a Styrofoam table.  
 Modifications Added: None

**Test Equipment:**

| ID | Asset #  | Description       | Model  | Calibration Date | Cal Due Date |
|----|----------|-------------------|--------|------------------|--------------|
| T1 | AN03628  | Biconilog Antenna | 3142E  | 6/3/2021         | 6/3/2023     |
| T2 | ANP05360 | Cable             | RG214  | 2/4/2022         | 2/4/2024     |
| T3 | ANP06540 | Cable             | Heliac | 1/17/2022        | 1/17/2024    |
| T4 | AN02872  | Spectrum Analyzer | E4440A | 11/29/2021       | 11/29/2023   |
| T5 | ANP05333 | Cable             | Heliac | 3/14/2022        | 3/14/2024    |

**Measurement Data:**

Reading listed by margin.

Test Distance: 3 Meters

| #  | Freq           | Rdng | T1<br>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<br>QP | 9.3  | +27.2<br>+1.3 | +1.9 | +0.3 | +0.0 | +0.0  | 40.0   | 46.0<br>Hop  | -6.0   | Vert  |
| 2  | 614.000M<br>QP | 9.3  | +27.2<br>+1.3 | +1.9 | +0.3 | +0.0 | +0.0  | 40.0   | 46.0<br>SC   | -6.0   | Vert  |
| ^  | 614.000M       | 13.5 | +27.2<br>+1.3 | +1.9 | +0.3 | +0.0 | +0.0  | 44.2   | 46.0<br>SC   | -1.8   | Vert  |
| ^  | 614.000M       | 12.9 | +27.2<br>+1.3 | +1.9 | +0.3 | +0.0 | +0.0  | 43.6   | 46.0<br>Hop  | -2.4   | Vert  |
| 5  | 960.000M       | 11.9 | +30.7<br>+1.6 | +2.4 | +0.3 | +0.0 | +0.0  | 46.9   | 54.0<br>SC   | -7.1   | Vert  |
| 6  | 960.000M       | 11.7 | +30.7<br>+1.6 | +2.4 | +0.3 | +0.0 | +0.0  | 46.7   | 54.0<br>Hop  | -7.3   | Vert  |
| 7  | 902.000M       | 44.0 | +29.6<br>+1.5 | +2.3 | +0.3 | +0.0 | +0.0  | 77.7   | 107.4<br>Hop | -29.7  | Vert  |
| 8  | 928.000M       | 41.4 | +30.6<br>+1.6 | +2.4 | +0.3 | +0.0 | +0.0  | 76.3   | 107.4<br>SC  | -31.1  | Vert  |
| 9  | 928.000M       | 39.2 | +30.6<br>+1.6 | +2.4 | +0.3 | +0.0 | +0.0  | 74.1   | 107.4<br>Hop | -33.3  | Vert  |
| 10 | 902.000M       | 40.2 | +29.6<br>+1.5 | +2.3 | +0.3 | +0.0 | +0.0  | 73.9   | 107.4<br>SC  | -33.5  | Vert  |



Test Setup Photo(s)



Below 1GHz; 500GC



Below 1GHz; C4 View 1



Below 1GHz; C4 View 2



Above 1GHz; C4 View 1



Above 1GHz; C4 View 2

## Appendix A: Manufacturer Declaration

The following Models have been tested by CKC Laboratories:

**Models: ERG-7000-007**

The manufacturer declares that the following additional models are identical electrically or any differences between them do not affect their EMC characteristics, and therefore meets the level of testing equivalent to the tested models.

| Device | Manufacturer | Model #      | S/N |
|--------|--------------|--------------|-----|
| 500GC  | Itron, Inc.  | ERG-7000-008 |     |

## 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.