



RF Exposure Test Report

**FCC ID: SK9NIC
IC: 864G-NIC**

**FCC Rule Part: 1.1310
ISED Canada Radio Standards Specification: RSS-102**

Report Number: AT72147858-3C0

**Manufacturer: Itron, Inc.
Model: NIC**

**Test Begin Date: April 11, 2019
Test End Date: April 11, 2019**

Report Issue Date: May 2, 2019



FOR THE SCOPE OF ACCREDITATION UNDER Certificate Number: 2955.09

This report must not be used by the client to claim product certification, approval, or endorsement by A2LA, NIST, or any agency of the Federal Government.

Prepared By:

**Jeremy Pickens
Senior Wireless Engineer
TÜV SÜD America Inc.**

Reviewed by:

**Ryan McGann
Senior Engineer
TÜV SÜD America Inc.**

This test report shall not be reproduced except in full. This report may be reproduced in part with prior written consent of TÜV SÜD America Inc. The results contained in this report are representative of the sample(s) submitted for evaluation.

This report contains 10 pages

TABLE OF CONTENTS

1	GENERAL	3
1.1	PURPOSE	3
1.2	MANUFACTURER INFORMATION	3
1.3	PRODUCT DESCRIPTION	3
1.4	TEST METHODOLOGY AND CONSIDERATIONS	3
2	TEST FACILITIES	4
2.1	LOCATION	4
2.2	LABORATORY ACCREDITATIONS/RECOGNITIONS/CERTIFICATIONS	4
2.3	RADIATED EMISSIONS TEST SITE DESCRIPTION	5
2.3.1	<i>Semi-Anechoic Chamber Test Site – Chamber A</i>	5
2.3.2	<i>Semi-Anechoic Chamber Test Site – Chamber B</i>	6
3	APPLICABLE STANDARD REFERENCES	7
4	LIST OF TEST EQUIPMENT	7
5	SUPPORT EQUIPMENT	8
6	EQUIPMENT UNDER TEST SETUP BLOCK DIAGRAM	8
7	SUMMARY OF TESTS	9
7.1	MAXIMUM PERMISSIBLE EXPOSURE – FCC: SECTION 1.1310; ISED CANADA: RSS-102 SECTION 4.....	9
7.1.1	<i>Measurement Procedure</i>	9
7.1.2	<i>Measurement Results</i>	9
8	ESTIMATION OF MEASUREMENT UNCERTAINTY	10
9	CONCLUSION	10

1 GENERAL

1.1 Purpose

The purpose of this report is to demonstrate compliance with Part 1 Subpart I of the FCC's Code of Federal Regulations and Innovation, Science, and Economic Development Canada's Radio Standards Specification RSS-102 Certification for Maximum Permissible Exposure.

1.2 Manufacturer Information

Itron, Inc.
313 N Hwy 11
West Union, SC 29696

1.3 Product Description

The Itron NIC is an electricity metering module which includes a 902.4 MHz to 927.6 MHz transmitter. The module operates on AC as well as DC voltage which is supplied by a host device.

This test report documents the compliance of the maximum permissible exposure for uncontrolled exposure of a fixed device.

Detail	Description
Frequency Range	902.4 – 927.6 MHz 902.8 – 926.8 MHz ⁽¹⁾
Number of Channels	64
Channel Spacing	400kHz / 800kHz ⁽¹⁾
Modulation Format	FSK, OFDM, DSSS
Data Rates	FSK: 50kbps, 150kbps OFDM: 200kbps, 600kbps, 1200kbps DSSS: 12.5kbps
Operating Voltage	12Vdc
Antenna Type(s) / Gain(s)	1) External Omnidirectional / 3dBi (Laird, P/N: TRA9023P) 2) External Monopole / 2.8dBi (CISCO, P/N: ANT-MP-INT-OUT-M)

(1) OFDM 1200kbps DTS mode only

Test Sample Serial Number: 110900000671

Test Sample Condition: The test samples were provided in good working order with no visible defects.

1.4 Test Methodology and Considerations

The data presented in this report represents the worst case where applicable. The worst-case data rate for the 900MHz radio was DSSS at 12.5kbps configured on the middle channel (915.2MHz).

Software power setting during test: RFIC Attn: 9, DMCC Scale 0x3FFF

2 TEST FACILITIES**2.1 Location**

The radiated and conducted emissions test sites are located at the following addresses:

TÜV SÜD America, Inc.
5945 Cabot Pkwy, Suite 100
Alpharetta, GA 30005
Phone: (678) 341-5900

2.2 Laboratory Accreditations/Recognitions/Certifications

TÜV SÜD America, Inc. is accredited to ISO/IEC 17025 by the American Association for Laboratory Accreditation/A2LA accreditation program and has been issued certificate number 2955.09 in recognition of this accreditation.

Unless otherwise specified, all tests methods described within this report are covered under the ISO/IEC 17025 scopes of accreditation.

The Semi-Anechoic Chamber Test Sites and Conducted Emissions Sites have been fully described, submitted to, and accepted by the FCC, ISED Canada and the Japanese Voluntary Control Council for Interference by information technology equipment.

FCC Registration Number:	967699
ISED Canada Lab Code:	23932
VCCI Member Number:	1831
• VCCI Registration Number	A-0295

2.3 Radiated Emissions Test Site Description

2.3.1 Semi-Anechoic Chamber Test Site – Chamber A

The Semi-Anechoic Chamber Test Site consists of a 20' x 30' x 18' shielded enclosure. The chamber is lined with Toyo Ferrite Grid Absorber, model number FFG-1000. The ferrite tile grid is 101 x 101 x 19mm thick and weighs approximately 550 grams. These tiles are mounted on steel panels and installed directly on the inner walls of the chamber.

The turntable is 5' in diameter and is located 5'6" from the back wall of the chamber. The chamber is grounded via 1 - 8' copper ground rod, installed at the center of the back wall, it is bound to the ground plane using 3/4" stainless steel braided cable.

The turntable is all steel, flush mounted EMCO Model 1060 installed in an all steel frame. The table is remotely operated from inside the control room located 25' from the range. The turntable is electrically bonded to the surrounding ground plane via steel fingers installed on the edge of the turn table. The steel fingers make constant contact with the ground plane during operation.

Behind the turntable is a 3' x 6' x 4' deep shielded pit used for support equipment if necessary. The pit is equipped with 1 - 4" PVC chase from the turntable to the pit that allows for cabling to the EUT if necessary. The underside of the turntable can be accessed from the pit, so cables can be supplied to the EUT from the pit.

The chamber rear wall is covered with a mixture of Siepel pyramidal absorber. The side walls of the chamber are partially covered with Siepel pyramidal absorber.

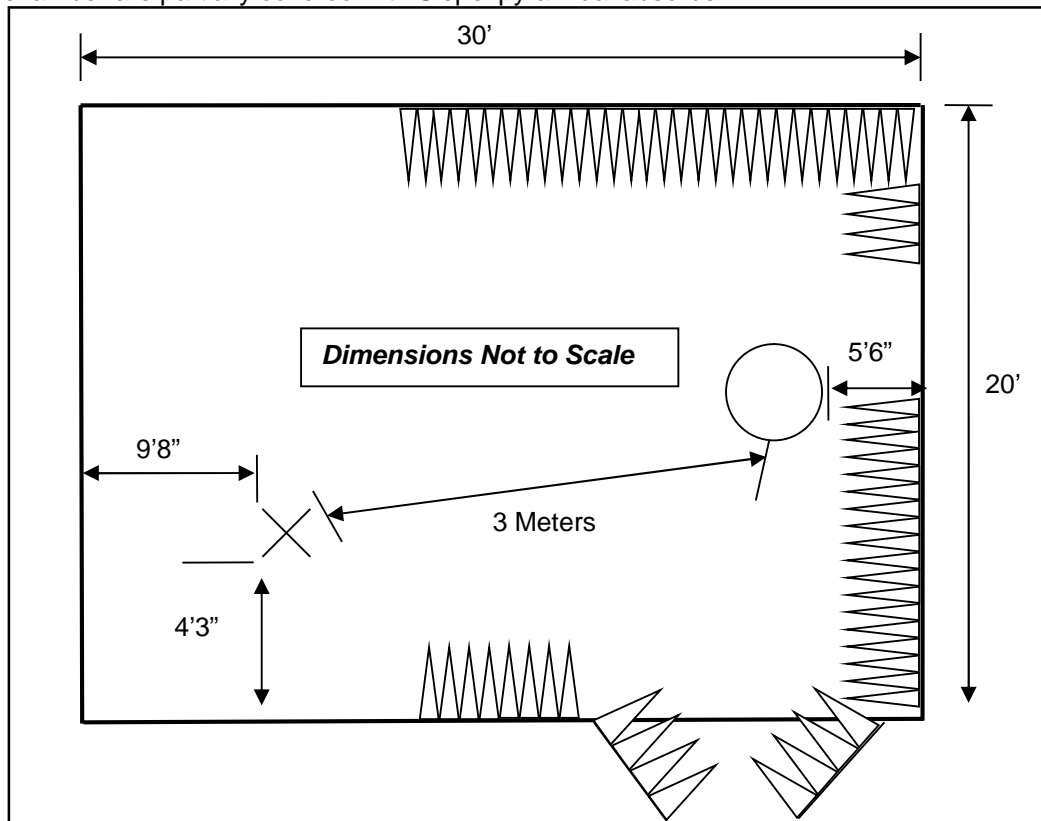


Figure 2.3.1-1: Semi-Anechoic Chamber Test Site – Chamber A

2.3.2 Semi-Anechoic Chamber Test Site – Chamber B

The Semi-Anechoic Chamber Test Site consists of a 20'W x 30'L x 20'H shielded enclosure. The chamber is lined with ETS-Lindgren Ferrite Absorber, model number FT-1500. The ferrite tile 600 mm x 600 mm (2.62 in x 23.62 in) panels and are mounted directly on the inner walls of the chamber shield.

The specular regions of the chamber are lined with additional ETS-Lindgren PS-600 hybrid absorber to extend its frequency range up to 18GHz and beyond.

The turntable is a 2m ETS-Lindgren Model 2170 and installed off the center axis is located 5'6" from the back wall of the chamber. The chamber is grounded via 1 - 8' copper ground rod, installed at the center of the back wall, it is bound to the shield using #8 solid copper wire.

The antenna mast is an EMCO 1060 and is remotely controlled from the control room for both antenna height and polarization.

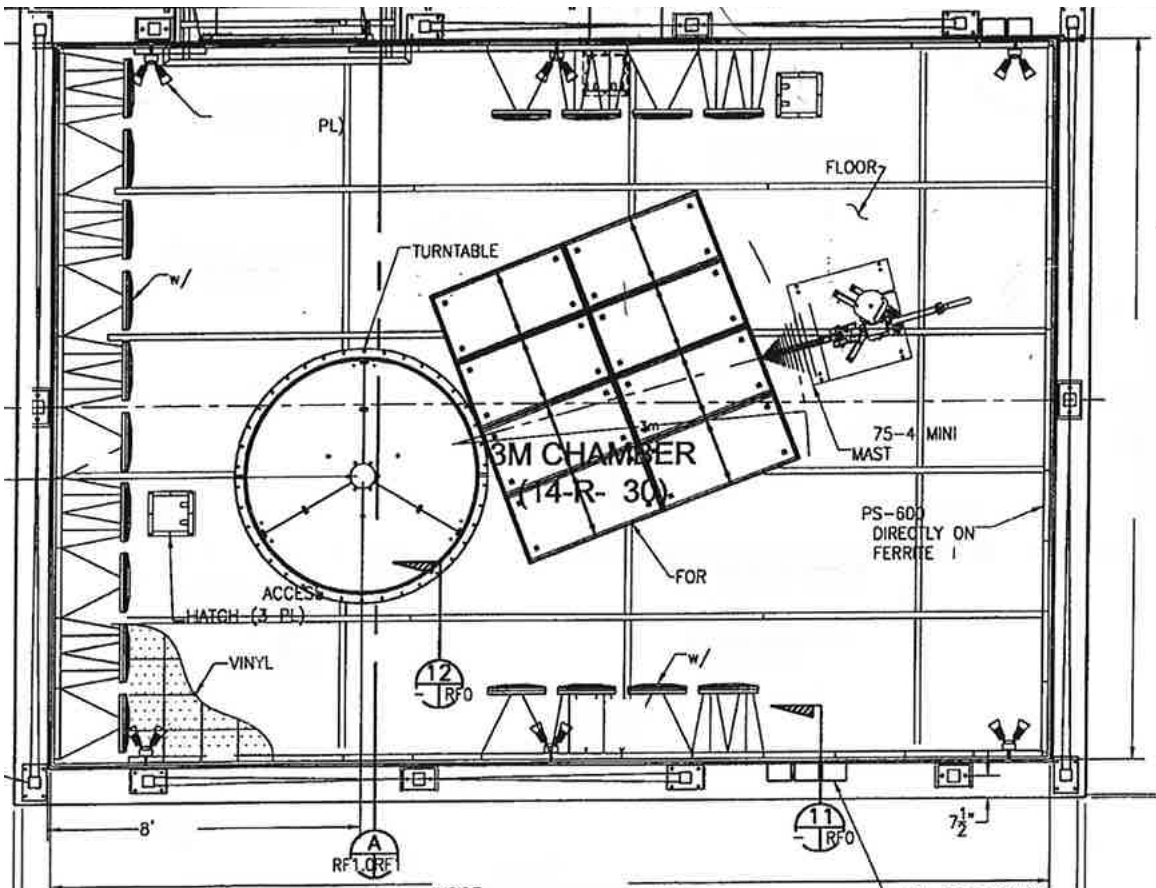


Figure 2.3.2-1: Semi-Anechoic Chamber Test Site – Chamber B

3 APPLICABLE STANDARD REFERENCES

The following standards were used:

- ❖ ANSI C63.4-2014: American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
- ❖ ANSI C63.10-2013: American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.
- ❖ IEEE C95.3-2002: IEEE Recommended Practice for Measurements and Computations of Radio Frequency Electromagnetic Fields with Respect to Human Exposure to Such Fields, 100 kHz to 300 GHz.
- ❖ US Code of Federal Regulations (CFR): Title 47, Part 1, Subpart I: Procedures Implementing the National Environmental Policy Act of 1969, 2019
- ❖ FCC KDB 447498 D01 General RF Exposure Guidance v06, Oct. 23, 2015.
- ❖ ISED Canada Radio Standards Specification: RSS-102 – Radio Frequency (RF) Exposure Compliance of Radiocommunications Apparatus (All Frequency Bands), Issue 5, March 2015.

4 LIST OF TEST EQUIPMENT

The calibration interval of test equipment is annually or the manufacturer's recommendations. Where the calibration interval deviates from the annual cycle based on the instrument manufacturer's recommendations, it shall be stated below.

Table 4-1: Test Equipment

Asset ID	Manufacturer	Model	Equipment Type	Serial Number	Last Calibration Date	Calibration Due Date
844	Holaday Industries	HI-4422	Field Probe	90309	06/01/2018	06/01/2019

NOTE: All test equipment was used only during active calibration cycles.

5 SUPPORT EQUIPMENT

Table 5-1: Support Equipment

Item	Equipment Type	Manufacturer	Model/Part Number	Serial Number
1	AC/DC Adapter	Triad Magnetics	WSU120-1000	N/A
2	Antenna	Laird	TRA9023P	N/A
		CISCO	ANT-MP-INT-OUT-M	N/A

Table 5-2: Cable Description

Cable	Cable Type	Length	Shield	Termination
A	DC Power Cable	1.75m	No	EUT to Power Supply
B	Coax	0.2m ¹ 0.3m ²	Coax	EUT to Antenna

- 1) Coax with Laird antenna
- 2) Coax with CISCO antenna

6 EQUIPMENT UNDER TEST SETUP BLOCK DIAGRAM

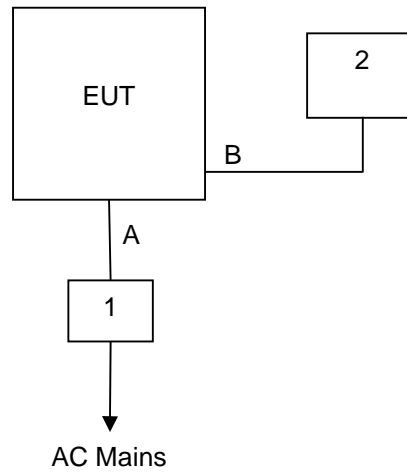


Figure 6-1: Test Setup Block Diagram

7 SUMMARY OF TESTS

Along with the tabular data shown below, plots were taken of all signals deemed important enough to document.

7.1 Maximum Permissible Exposure – FCC: Section 1.1310; ISED Canada: RSS-102 Section 4

7.1.1 Measurement Procedure

The EUT was placed on a non-conductive platform in the center of the turntable at a height of 1.5 meters above the ground plane. The measurement probe was located 20 centimeters away from the EUT on an adjustable antenna mast. The EUT was rotated through 360 degrees so that the maximum radiated emissions level would be detected. The mast was adjusted until the evaluated results are less than 10% of the applicable limit. Once a stable reading was obtained, the maximum was recorded. The azimuth and elevation leading to the direction of maximum exposure was identified. The evaluation points in the horizontal plane were along radials extending from the antenna axis 45 degrees apart starting from the direction of maximum exposure.

7.1.2 Measurement Results

Performed by: Jeremy Pickens

Table 7.1.2-1: Maximum Permissible Exposure – Laird Antenna

Mode	Frequency (MHz)	Distance cm	Azimuth degrees	Elevation cm	Probe Display V/m	Probe Factor	Field Strength V/m	Power Density mW/cm ²	FCC Limit mW/cm ²	ISED Canada Limit mW/cm ²	Result
LR12.5K	915.2	20	315	167	18.7	0.89	16.643	0.073472	0.61013333	0.27671681	PASS
LR12.5K	915.2	20	270	170	19.5	0.89	17.355	0.07989284	0.61013333	0.27671681	PASS
LR12.5K	915.2	20	225	153	25.9	0.89	23.051	0.14094127	0.61013333	0.27671681	PASS
LR12.5K	915.2	20	180	156	24.5	0.89	21.805	0.12611619	0.61013333	0.27671681	PASS
LR12.5K	915.2	20	135	149	15.2	0.89	13.528	0.04854291	0.61013333	0.27671681	PASS
LR12.5K	915.2	20	90	156	17.4	0.89	15.486	0.06361172	0.61013333	0.27671681	PASS
LR12.5K	915.2	20	45	165	17.6	0.89	15.664	0.06508247	0.61013333	0.27671681	PASS
LR12.5K	915.2	20	0	167	18.4	0.89	16.376	0.07113352	0.61013333	0.27671681	PASS

Table 7.1.2-2: Maximum Permissible Exposure – CISCO Antenna

Mode	Frequency (MHz)	Distance cm	Azimuth degrees	Elevation cm	Probe Display V/m	Probe Factor	Field Strength V/m	Power Density mW/cm ²	FCC Limit mW/cm ²	ISED Canada Limit mW/cm ²	Result
LR12.5K	915.2	20	315	160	20	0.89	17.8	0.08404244	0.61013333	0.27671681	PASS
LR12.5K	915.2	20	270	149	20.4	0.89	18.156	0.08743775	0.61013333	0.27671681	PASS
LR12.5K	915.2	20	225	152	24.4	0.89	21.716	0.12508877	0.61013333	0.27671681	PASS
LR12.5K	915.2	20	180	154	22.5	0.89	20.025	0.10636621	0.61013333	0.27671681	PASS
LR12.5K	915.2	20	135	154	20.6	0.89	18.334	0.08916062	0.61013333	0.27671681	PASS
LR12.5K	915.2	20	90	152	20	0.89	17.8	0.08404244	0.61013333	0.27671681	PASS
LR12.5K	915.2	20	45	168	20.7	0.89	18.423	0.09002836	0.61013333	0.27671681	PASS
LR12.5K	915.2	20	0	171	21.6	0.89	19.224	0.0980271	0.61013333	0.27671681	PASS

8 ESTIMATION OF MEASUREMENT UNCERTAINTY

The expanded laboratory measurement uncertainty figures (U_{Lab}) provided below correspond to an expansion factor (coverage factor) $k = 1.96$ which provide confidence levels of 95%.

Parameter	U_{lab}
Electric Field	39.12%

9 CONCLUSION

In the opinion of TÜV SÜD America, Inc. the NIC, manufactured by Itron, Inc. meets the requirements of FCC Part 1 subpart I and Innovation, Science, and Economic Development Canada's Radio Standards Specification RSS-102 for the tests documented in this test report.

END REPORT