Certification Test Report

FCC ID: SK9SNIC1
IC: 864G-SNIC1

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

Report Number: AT72124916-4C2

Manufacturer: Itron, Inc.
Model: SNIC1

Test Begin Date: March 1, 2017
Test End Date: April 10, 2017

Report Issue Date: July 11, 2017

FOR THE SCOPE OF ACCREDITATION UNDER Certificate Number: AT-2021

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

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This report contains 12 pages

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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 Smart Network Interface Card (model: SNIC1) module is built on Itron's IPv6 OpenWay platform, and includes the Adaptive Communications Technology (ACT). It can process, analyze, communicate and react in real-time. Adaptive communications enable devices to interact with each other while dynamically switching between Radio Frequency (RF) and Power Line Carrier (PLC) to ensure the fastest and most reliable communications path. The communication module utilizes 900 MHz radio frequency (RF), power line carrier (carrier current system) and 2.4 GHz Wi-Fi operation bands.

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

2.4GHz WiFi Technical Information:

Detail	Description
Frequency Range	2412 – 2462 MHz
Number of Channels	802.11b/g/n (HT 20): 11 802.11n (HT 40): 9
Modulation Format	802.11b: DSSS (DBPSK / DQPSK / CCK) 802.11g/n (HT 20/40): OFDM (BPSK / QPSK / 16QAM / 64QAM)
Data Rates	802.11b: 1 – 11 Mbps 802.11g: 6 – 54 Mbps 802.11n (HT 20): 6.5 – 72 Mbps 802.11n (HT 40): 13.5 – 150 Mbps
Number of Inputs/Outputs	1T1R
Operating Voltage	24 Vdc
Antenna Type / Gain	Micro Strip Patch Antenna / 3 dBi

900MHz FHSS Radio Technical Information:

Detail	Description
Frequency Range	902.4 – 927.6 MHz
Number of Channels	64
Modulation Format	FSK, OFDM, DSSS
Data Rates	FSK: 50kbps, 150kbps OFDM: 200kbps, 600kbps DSSS: 6.25kbps, 12.5kbps
Operating Voltage	24Vdc
Antenna Type(s) / Gain(s)	Micro Strip Patch Antenna / 2.5 dBi

900MHz Hybrid Radio Technical Information

Detail	Description
Frequency Range	902.8 – 926.8 MHz
Number of Channels	31
Modulation Format	OFDM
Data Rates	1200kbps
Operating Voltage	24Vdc
Antenna Type / Gain	Micro Strip Patch Antenna / 2.5 dBi

Test Sample Serial Number: #1

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 2.4GHz WiFi radio was 802.11b mode at 5.5 MBPS. The worst-case data rate for the 900MHz radio was OFDM at 200kbps. The EUT is not capable of operating in frequency hopping mode and the Hybrid mode simultaneously.

The EUT was evaluated for maximum permissible exposure in three orthogonal orientations. The data presented in this report represents the worst-case mode of operation.

2 TEST FACILITIES

2.1 Location

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

TÜV SÜD America, Inc.
5015 B.U. Bowman Drive
Buford, GA 30518
Phone: (770) 831-8048
Fax: (770) 831-8598

2.2 Laboratory Accreditations/Recognitions/Certifications

TÜV SÜD America, Inc. is accredited to ISO/IEC 17025 by the ANSI-ASQ National Accreditation Board/ANAB accreditation program, and has been issued certificate number AT-2021 in recognition of this accreditation. Unless otherwise specified, all tests methods described within this report are covered under the ISO/IEC 17025 scope of accreditation.

The Semi-Anechoic Chamber Test Site, Open Area Test Site (OATS) and Conducted Emissions Site 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: 391271
ISED Canada Lab Code: IC 4175A
VCCI Member Number: 1831

- VCCI OATS Registration Number R-1526
- VCCI Conducted Emissions Site Registration Number: C-1608

2.3 Radiated Emissions Test Site Description

2.3.1 Semi-Anechoic Chamber Test Site

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 150cm in diameter and is located 160cm 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 table 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 chases from the turntable to the pit that allow 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.

A diagram of the Semi-Anechoic Chamber Test Site is shown in Figure 2.3-1 below:

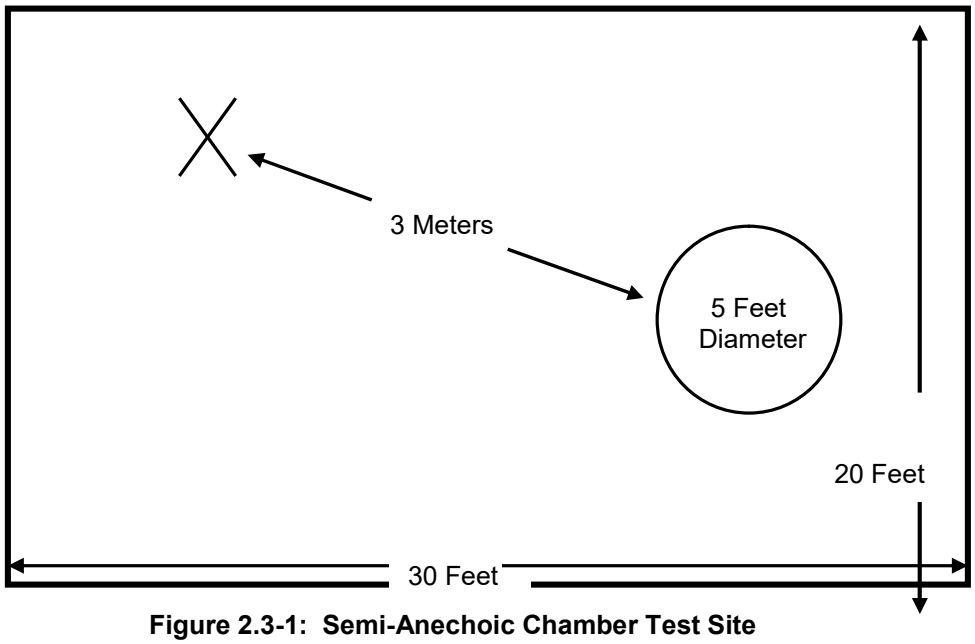

Figure 2.3-1: Semi-Anechoic Chamber Test Site

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, 2017
- 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

AssetID	Manufacturer	Model #	Equipment Type	Serial #	Last Calibration Date	Calibration Due Date
RE137	ETS-Lindgren	HI-6005	Probes	23667	8/31/2016	8/31/2017

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

5 SUPPORT EQUIPMENT

Table 5-1: Support Equipment – Radiated Emissions

Item	Equipment Type	Manufacturer	Model/Part Number	Serial Number
1	Power Supply	Itron, Inc.	574294-BRD7	9370057241

Table 5-2: Cable Description – Radiated Emissions

Cable	Cable Type	Length	Shield	Termination
A	DC Power Cable (Twisted)	1.9 m	No	EUT to Power Supply
B	AC Power Cable	1.75 m	No	Power Supply to AC Mains

6 EQUIPMENT UNDER TEST SETUP BLOCK DIAGRAM

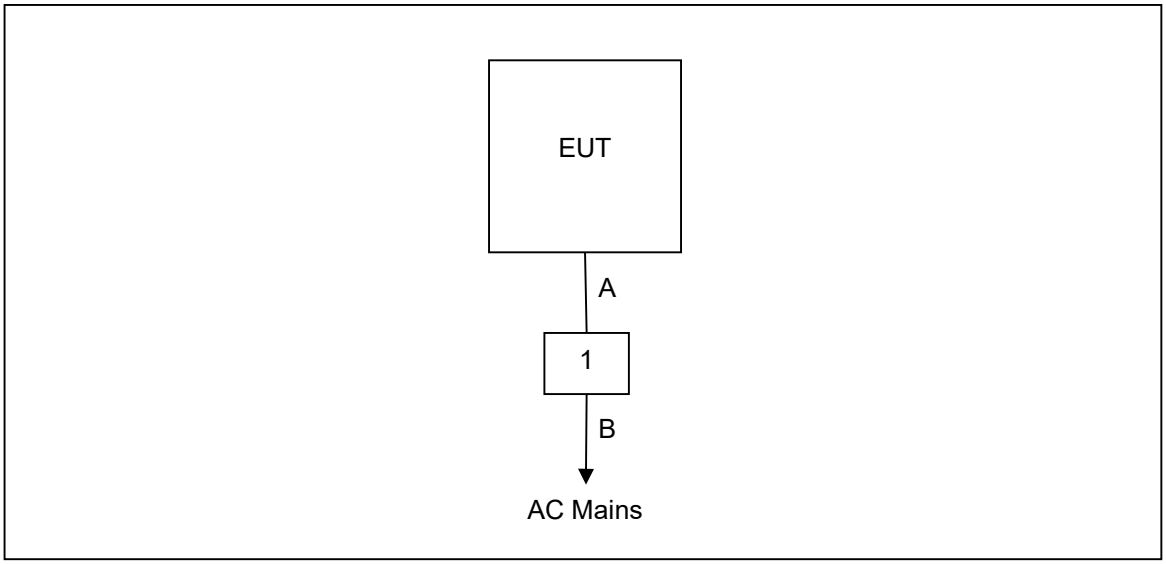

Figure 6-1: Test Setup Block Diagram – Radiated Emissions

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 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: Ryan McGann

Table 7.1.2-1: Maximum Permissible Exposure – 900MHz Radio – X-orientation

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
915.2	20	0	150	8.457	1.02	8.626	0.020	0.610	0.277	PASS
915.2	20	45	149	6.764	1.02	6.899	0.013	0.610	0.277	PASS
915.2	20	90	142	5.469	1.02	5.578	0.008	0.610	0.277	PASS
915.2	20	135	143	6.991	1.02	7.131	0.013	0.610	0.277	PASS
915.2	20	180	144	6.489	1.02	6.619	0.012	0.610	0.277	PASS
915.2	20	225	125	5.059	1.02	5.160	0.007	0.610	0.277	PASS
915.2	20	270	158	5.171	1.02	5.274	0.007	0.610	0.277	PASS
915.2	20	315	151	7.186	1.02	7.330	0.014	0.610	0.277	PASS

Table 7.1.2-2: Maximum Permissible Exposure – 900MHz Radio – Y-orientation

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
915.2	20	0	156	11.137	1.02	11.360	0.034	0.610	0.277	PASS
915.2	20	45	156	9.450	1.02	9.639	0.025	0.610	0.277	PASS
915.2	20	90	157	7.228	1.02	7.373	0.014	0.610	0.277	PASS
915.2	20	135	162	7.169	1.02	7.312	0.014	0.610	0.277	PASS
915.2	20	180	160	7.109	1.02	7.251	0.014	0.610	0.277	PASS
915.2	20	225	161	7.538	1.02	7.689	0.016	0.610	0.277	PASS
915.2	20	270	155	7.899	1.02	8.057	0.017	0.610	0.277	PASS
915.2	20	315	155	9.915	1.02	10.113	0.027	0.610	0.277	PASS

Table 7.1.2-3: Maximum Permissible Exposure – 900MHz Radio – Z-orientation

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
915.2	20	0	145	7.826	1.02	7.983	0.017	0.610	0.277	PASS
915.2	20	45	145	7.107	1.02	7.249	0.014	0.610	0.277	PASS
915.2	20	90	145	6.492	1.02	6.622	0.012	0.610	0.277	PASS
915.2	20	135	145	6.992	1.02	7.132	0.013	0.610	0.277	PASS
915.2	20	180	145	5.551	1.02	5.662	0.009	0.610	0.277	PASS
915.2	20	225	145	4.258	1.11	4.726	0.006	0.610	0.277	PASS
915.2	20	270	145	4.477	1.11	4.969	0.007	0.610	0.277	PASS
915.2	20	315	145	6.183	1.02	6.307	0.011	0.610	0.277	PASS

Table 7.1.2-4: Maximum Permissible Exposure – 802.11 Radio – X-orientation

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
2412	20	0	151	4.286	1.48	6.343	0.011	1.000	0.537	PASS
2412	20	45	151	3.139	1.48	4.646	0.006	1.000	0.537	PASS
2412	20	90	151	1.574	1.48	2.330	0.001	1.000	0.537	PASS
2412	20	135	156	1.379	1.48	2.041	0.001	1.000	0.537	PASS
2412	20	180	165	1.204	1.48	1.782	0.001	1.000	0.537	PASS
2412	20	225	137	1.341	1.48	1.985	0.001	1.000	0.537	PASS
2412	20	270	151	2.056	1.48	3.043	0.002	1.000	0.537	PASS
2412	20	315	151	3.401	1.48	5.033	0.007	1.000	0.537	PASS

Table 7.1.2-5: Maximum Permissible Exposure – 802.11 Radio – Y-orientation

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
2412	20	0	179	3.466	1.48	5.130	0.007	1.000	0.537	PASS
2412	20	45	180	2.885	1.48	4.270	0.005	1.000	0.537	PASS
2412	20	90	180	2.063	1.48	3.053	0.002	1.000	0.537	PASS
2412	20	135	184	1.52	1.48	2.250	0.001	1.000	0.537	PASS
2412	20	180	157	1.674	1.48	2.478	0.002	1.000	0.537	PASS
2412	20	225	188	1.51	1.48	2.235	0.001	1.000	0.537	PASS
2412	20	270	186	1.834	1.48	2.714	0.002	1.000	0.537	PASS
2412	20	315	181	2.895	1.48	4.285	0.005	1.000	0.537	PASS

Table 7.1.2-6: Maximum Permissible Exposure – 802.11 Radio – Z-orientation

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
2412	20	0	140	2.492	1.48	3.688	0.004	1.000	0.537	PASS
2412	20	45	140	1.914	1.48	2.833	0.002	1.000	0.537	PASS
2412	20	90	140	1.552	1.48	2.297	0.001	1.000	0.537	PASS
2412	20	135	140	1.205	1.48	1.783	0.001	1.000	0.537	PASS
2412	20	180	140	1.529	1.48	2.263	0.001	1.000	0.537	PASS
2412	20	225	140	2.276	1.48	3.368	0.003	1.000	0.537	PASS
2412	20	270	140	2.405	1.48	3.559	0.003	1.000	0.537	PASS
2412	20	315	140	2.233	1.48	3.305	0.003	1.000	0.537	PASS

7.1.3 Summation of MPE Ratios – Simultaneous Transmissions

Performed by: Ryan McGann

This device contains multiple transmitters which can operate simultaneously; therefore, the maximum RF exposure is determined by the summation of MPE ratios. The limit is such that the summation of MPE ratios is ≤ 1.0.

Table 7.1.3-1: Summation of MPE Ratios – FCC

	Scenario 1
900MHz ISM	x
2.4GHz ISM	x
900MHz ISM MPE Ratio	0.056
2.4GHz ISM MPE Ratio	0.011
MPE Ratio Summation:	0.067

Table 7.1.3-2: Summation of MPE Ratios – ISED Canada

	Scenario 1
900MHz ISM	x
2.4GHz ISM	x
900MHz ISM MPE Ratio	0.122
2.4GHz ISM MPE Ratio	0.020
MPE Ratio Summation:	0.142

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 SNIC1, 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