GenX Hardware Development Kit

Includes Global and Gen5 NICs

GenX Hardware Development Kit
March 19, 2025
REV 004

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Contents

New in this document

Revision	Date	Description
REV 004	March 19, 2025	■ Added appendix for Global NIC (eNIC 55x series) FCC/ISED regulatory integration instructions on page 42.
REV 003	July 9, 2024	■ Added support for Global NIC (eNIC 55*x* series). ■ Added appendix for Gen5 Meter NIC (NIC 513-0403) European Union Conformity on page 38.
REV 002	October 31, 2023	Corrected NIC FCC and IC ID values in Gen5 NIC FCC/ISED regulatory integration instructions on page 1.
REV 001	October 31, 2023	■ Renamed several sections, including: – Gen5 Meter NIC (NIC 510 series) FCC/ISED regulatory integration instructions on page 29 – NIC 510-06 external antenna integration on page 31 ■ Improved English to French translation in Exigences d'Industrie Canada on page 43 ■ Added Gen5 NIC FCC/ISED regulatory integration instructions on page 1
REV 000	June 20, 2023	First date of publication.

1 Introduction

This document describes Itron's Network Interface Card (NIC) family, which in this document's context includes the Global NIC (model numbers listed in Table 1) and Gen5 NIC (model numbers listed inTable 2).

Table 1 Global NIC models and antenna support

Model No.	900 MHz	Internal Antenna	Off-Board Antenna	GPS support (internal antenna)	GPS support (external antenna)
eNIC 55*x*-0101*	x	x			
eNIC 55*x*-0102*	x		x		
eNIC 55*x*-0121-05*	x	x	x	x	
eNIC 55*x*-0142-05*	x		x		x
eNIC 510-0103	x	x	x		
eNIC 510-0102	x		x		
eNIC 510-0101	x	x			

Note: *The eNIC 55*x* model number indicates streetlight-compatible NICs (the eNIC 510 model number indicates standard series). The definition of *x* indicates which region the Global NIC is compatible with. If 0, then the Global NIC is globally compatible, if 1, then North America or Asia Pacific, and if 3, Europe, Middle East, and Africa.

Table 2 Gen5 NIC models and antenna support

Model No.	2.4GHz	900 MHz	Internal Antenna	Off-Board Antenna
NIC 511-0603	x	x	x	x
NIC 511-0602	x	x		x
NIC 511-0601	x	x	x	
NIC 511-0403		x	x	x
NIC 511-0402		x		x
NIC 511-0401		x	x	

> **Note:** From here forward, this document refers to the NIC family and its defined products as "NIC," except where explicitly noted.

The NIC is based on Itron's System on Chip (SoC) platform as configured for energy meters and other devices to be used in Itron Smart Energy Networks (SEN).

Gen5 NIC (NIC 510 series) block diagram on page 7, Figure 2 on page 8, and Figure 3 on page 9 illustrate examples of integrated systems for the NIC 510, eNIC 55x, and eNIC 510 series.

Figure 1 Gen5 NIC (NIC 510 series) block diagram

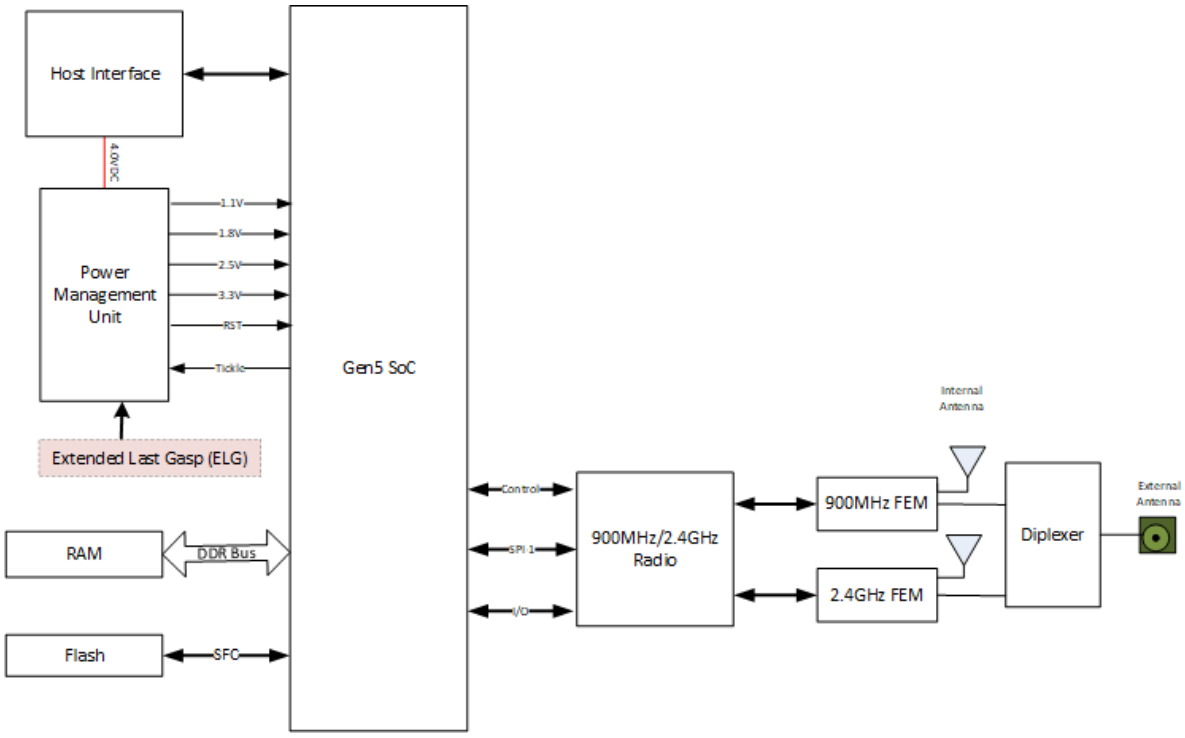


Figure 2 Global NIC (eNIC 55*x* series) block diagram

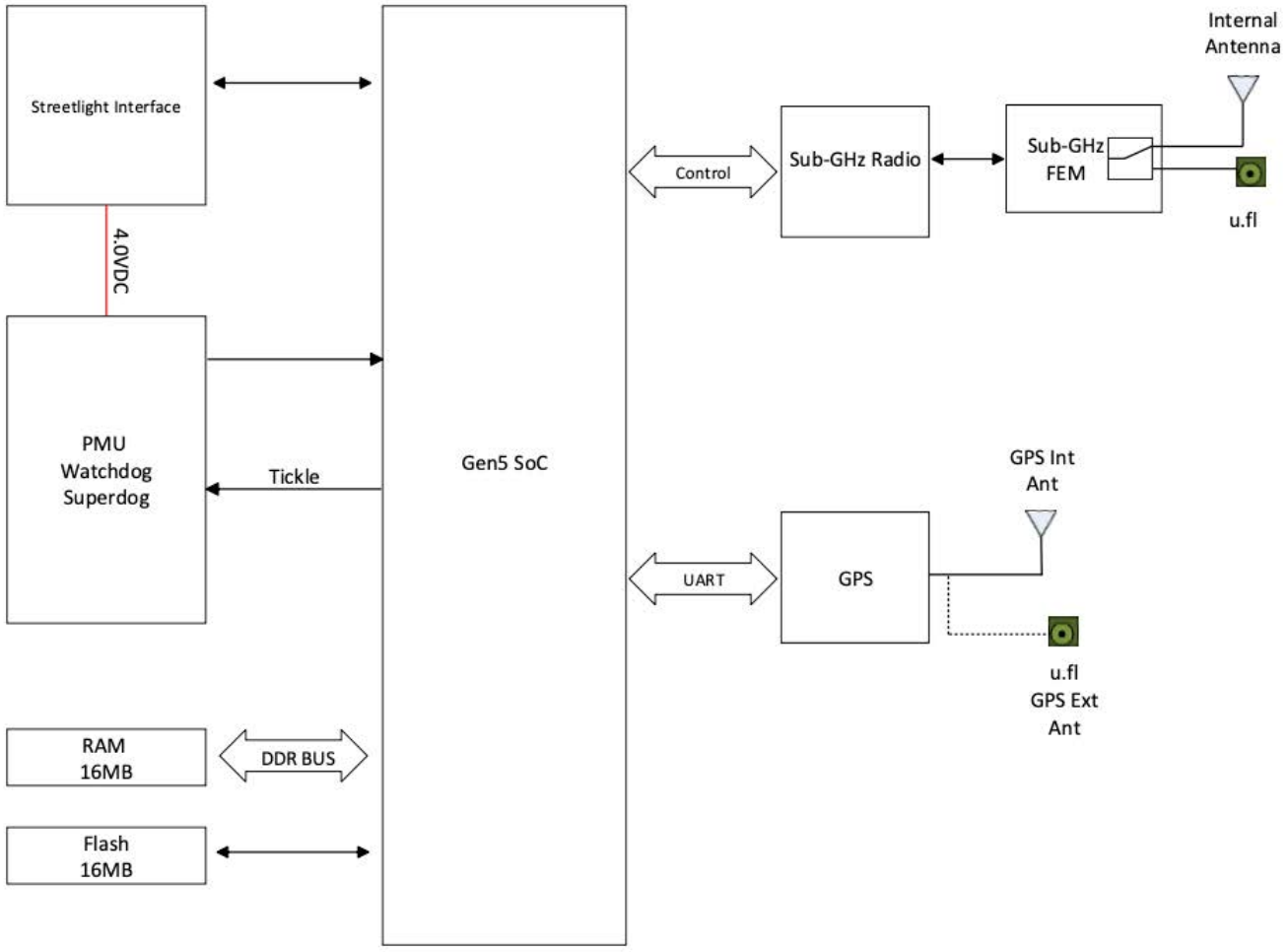
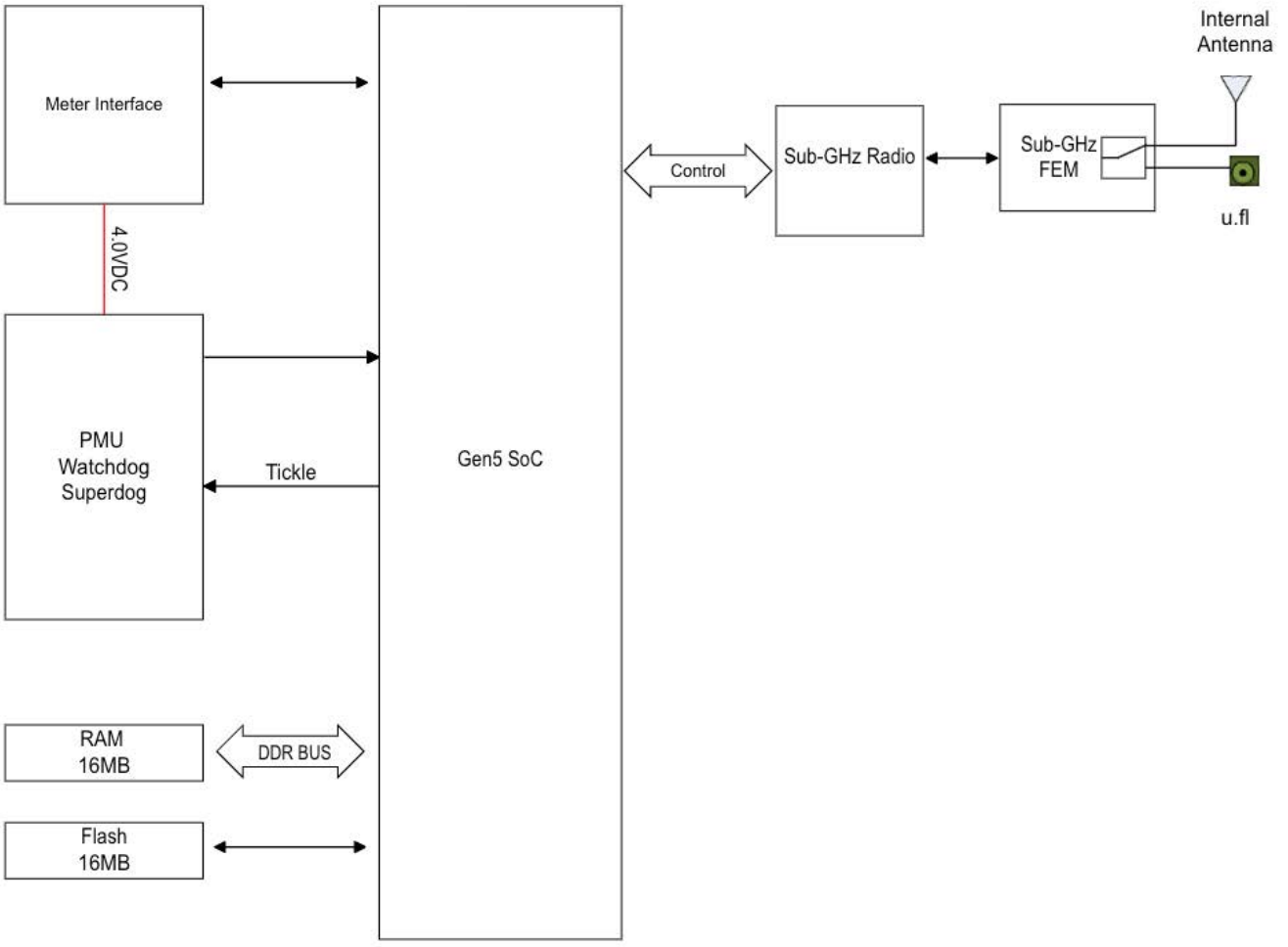


Figure 3 Global NIC (eNIC 510 series)



The NIC supports communication over the 870/900MHz bands, assuming proper pairing between the required application and appropriate NIC model. Additionally, the NIC supports certain configurations of spread-spectrum technologies for communication between various Itron products.

For more specifications, see Key features and properties on page 10.

2 Key features and properties

The list below describes key features that may be available depending on the NIC version being used:

- **Microprocessor**
  - Interfaces to electric meter metrology circuitry and conditions data to be transported via Itron communication protocol and other IEEE802.15.4g neighborhood area networks (NAN) and home area networks (HAN)
- **Memory**
  - Double data rate (DDR) memory and random-access memory (RAM) provides additional capacity to store firmware images and data
- **900MHz and 2.4 GHz transceiver**
  - Fully integrated direct sequence spread spectrum (DSSS) /frequency-hopping spread spectrum (FHSS) transceiver
  - Fully integrated voltage-controlled oscillator (VCO)
  - Data filters at radio frequency (RF) and base band
  - Upconvert and downconvert mixers
  - Data slicer
  - Transceiver configuration registers
  - Received signal strength indication (RSSI) output
  - RF switch and power amplifier control outputs
  - Three wire serial configuration interface
  - Digital transmit (TX) and receive (RX) data interface
  - Operates from a reference oscillator frequency of 26MHz
- **900 MHz and 2.4 GHz front end**
  - Power amplifier boosts the transmitted RF signal out of the transceiver to reach optimum output power of up to one watt (+30 dBm) for 900Mhz front end and 0.5 Watt (+27 dBm) for 2.4 GHz front end
    - Regulated by voltage control circuitry that limits the maximum output power according to the set level

  - Low noise amplifier (LNA) is used to boost receive signals
  - Transmit/receive (multiplexing) switch between transmission and reception
- **Antenna options**
  - Integral antenna for 900MHz and 2.4GHz bands
  - External antenna connector (MMCX) for 900 MHz and 2.4 GHz bands
- **GPS support**
  - A satellite-based system that provides positioning and navigation information.

Environmental properties

The NIC operates in temperatures ranging from -40°C (-40°F) to +85°C (+185°F) and in humidity up to 95%, non-condensing.

3 Interface options

The NIC supports a variety of interface options, including:

- Generic host interface
- Typical meter interface
- Streetlight 12-pin interface
- NAN interface
- Light-emitting diode (LED) interface

Generic host interface

Generic 12-pin interface definition on page 12 defines the control signals between the Global NIC (510 series) and the host device. All non-power signals are 3.3V LVTTL compatible and can be configured depending on the application. When reading the table, note the following:

- The RXD/TXD (serial interface) refers to serial communications (supports up to 115,200 bps, 8-N-1).
- General purpose input output (GPIO) signals can be defined as inputs or outputs per the application.

Table 3 Generic 12-pin interface definition

NIC Dir.	Signal	Connector	Connector	Signal	NIC Dir.
I/O	GPIO	2	1	ADC	Input
Power in	VCC(4V)	4	3	GPIO	I/O
GND	GND	6	5	GPIO	I/O
I/O	GPIO	8	7	TXD	Output
I/O	GPIO	10	9	RXD	Input
I/O	GPIO	12	11[1]	GPIO	I/O

[1] Pin 11 may also be configured as a Schmitt trigger input or a fast interrupt request input to the processor. This pin is the preferred input for a digital signal indicating AC power supply zero-crossings, which is used by the NIC to detect AC power failure.

Typical meter interface

Typical meter 12-pin interface definition on page 13 defines the signals between the Global NIC (510 series) and a typical electric meter. All non-power signals are 3.3V LVTTL compatible.

Table 4 Typical meter 12-pin interface definition

Pin number	Signal	Signal definition	NIC direction
1	NC	No connection	N/A
2	NC	No connection	N/A
3	MTR_BUSY	Meter busy: When this logic high signal is asserted, the meter optical port is engaged and the meter does not respond to serial interface communications.	Input
4	VCC (4V)	Voltage common collector	Power in
5	PF-	Power fail: This signal is a power fail indicator. The power fail signal is a logic high signal under normal conditions. When a brown-out condition or loss-of-power condition is detected, the meter asserts this logic low signal and remains asserted until normal AC power input is resumed. Upon assertion of this signal, and after appropriate time-outs, the NIC issues a last gasp transmission. Specific functionality and timing of this signal may depend on customer specifications.	Input
6	GND	Ground	Ground
7	TXD	Serial interface: Serial communications (9600 bps, 8-N-1)	Output
8	MODEM_BUSY	Modem busy: When this logic high signal is asserted, the NIC does not respond to serial interface communications from the meter.	Output
9	RXD	Serial interface: Serial communications (9600 bps, 8-N-1)	Input
10	MTR_SRVC	Meter service: When this signal is asserted (logic high), the NIC queries the meter for the interrupt message and takes appropriate action.	Input

Table 4 Typical meter 12-pin interface definition (continued)

Pin number	Signal	Signal definition	NIC direction
11	ZERO_CROSS	Zero cross: This signal is a pulse for every zero crossing of the AC line voltage (30Hz pulse rate, nominal). When zero crossings stop, the NIC begins the process that leads to transmission of a last gasp message to the network.	Input
12	NC	No connection.	N/A

Streetlight 12-pin interface

Table 5 defines the control signals between the Global NIC (eNIC 55*x* series) and the host device. All non-power signals are 3.3V LVTTL compatible and can be configured depending on the application. When reading the table, note the following:

- The RXD/TXD (serial interface) refers to serial communications (supports up to 115,200 bps, 8-N-1).
- General purpose input output (GPIO) signals can be defined as inputs or outputs per the application.

Table 5 NIC pin details

NIC header pin	Signal	NIC direction	Level	Usage
Pin 1	3.3V reference	Output	3.3V Analog	3.3V reference. Not to be loaded.
Pin 2	PWM_CLK	Output	0 - 3.3V Analog	Street dimming
Pin 3	MCU_TXD_1	Output	3.3V LVTTL	UART1 Tx communications to Streetlight controller
Pin 4	4V0	Input	4.0V	Primary power for NIC
Pin 5	MCU_RXD_1	Input	202V LVTTL	UART1 Rx communications to Streetlight controller
Pin 6	GRND	Output	Ground	Ground
Pin 7*	HEADER_GPIO_1/PF	Output	3.3V LVTTL	GPIO/PF
Pin 8	ZC	Input	3.3V LVTTL	Zero crossing
Pin 9*	MCU_CTS_1	Input	3.3V LVTTL	GPIO
Pin 10	MCU_DTR_1	Input/Output	3.3V LVTTL	GPIO

Table 5 NIC pin details (continued)

NIC header pin	Signal	NIC direction	Level	Usage
Pin 11	XCAP_A	Input/Output	3.3V LVTTL	GPIO
Pin 12	DSR_1	Input/Output	3.3V LVTTL	GPIO

Area network interfaces

This section describes how the NAN and HAN interfaces are implemented on the NIC.

900 MHz mesh NAN

The NAN interface is implemented using the 900MHz radio and ITRON MAC to implement the mesh network. The radio is capable of FSK, QPSK or OFDM modulation at 50-2400kbps. The number of available channels differs in marketplaces.

2400 MHz HAN interface

This section applies only to Gen5 NICs with supportive hardware.

The HAN interface is supported by a 2.4GHz, IEEE 802.15.4 radio.

The HAN interface implements an IEEE 802.15.4 MAC and ZigBee PRO Network Stack and supports Smart Energy Profiles. The PHY interface is 2.4GHz DSSS with 16 channels.

LED interface

An LED located on the NIC communicates operational status. The NIC status after powering on depends on whether the NIC has been deployed, and is communicated using a series of blink sequences, as defined in this section.

NIC LED sequences pre-integration

- **Fast blink (two blinks per second).** The NIC is in contract manufacturer (CM) mode. This is the default ship mode from Itron.
- **Slow blink (one blink per second).** NIC is in manufacturer utility test tool (MUTT) mode. After successful MUTT operations, the NIC restarts and is ready for deployment.

NIC LED sequences post-integration

- **Off-on-off.** After power has been applied, NIC is executing its power up sequence.
- **Fast blink (two blinks per second).** The NIC is searching for a neighboring node. The NIC is not part of the NAN at this point.

- **Slow blink (one blink per second).** The NIC has found a neighboring node and is registering with an Access Point (AP).
- **Off.** The NIC has successfully registered with an AP.

4 Power requirements

This section describes power requirements for the standard-issue NIC. Use this information as reference when determining your module's environment.

- Voltage: 4.0V
- Regulation: +5%
- Ripple: +75mV
- Transient response: +200mV
- Duty cycle: See Power supply duty cycle on page 17
- RMS peak power: 8W

This section describes the power requirements for the Global NIC (eNIC 55x series). Use this information as reference when determining your module's environment.

- Voltage: 4.0V

  The minimum voltage to the Global NIC (eNIC 55x series) is based on regulation and transient response is 3.6V.
- Regulation: +5%
- Ripple: +75mV
- Low-power mode: 60, 120, 180 mA
- High-power mode: 400, 500, 600, 800, 900, 1000, 1100, 1200, 1400 mA
- Transient response: +200mV
- Duty cycle: See Power supply duty cycle on page 17
- RMS peak power: 5W

> **Note:** When considering the use of other products, note that the power requirements will be different. For more information, contact your Itron Technical Representative.

Power supply duty cycle

The NIC is generally a low-duty cycle device. However, due to application needs and features, there are periods of high-duty cycle usage on individual NICs. Itron suggests that all host supplies be able to provide four to eight watts continuously (100% duty cycle) to enable any future applications. However, if this is not possible, Gen5 NIC power supply duty cycle on page 18and Global NIC (510 series) power supply duty cycle on page 18

describe the minimum duty cycle that the host supply must support (depending on NIC type).

> **Note:** A maximum of four watts must be supplied to the Global NIC, six watts for the single-band Gen5 NIC, and eight watts for the dual-band Gen5 NIC.

The NIC consumes up to five watts during transmit (TX) mode and up to 0.98 W during receive (RX) mode. This is the highest average power demand for the NIC.

Table 6 Gen5 NIC power supply duty cycle

Duty-cycle[2]	Transaction time[3]	Period[4]	Average power
100%	2 s	8 s	2.24 W
90%	60 s	220 s	2.35 W
70%	300 s	900 s	2.65 W

Table 7 Global NIC (510 series) power supply duty cycle

Duty-cycle[2]	Transaction time[2]	Period[3]	Average power
100%	2 s	8 s	1.6 W
90%	60 s	220 s	1.6 W
70%	300 s	900 s	1.5 W

Table 8 Global NIC (55*x* series) power supply duty cycle

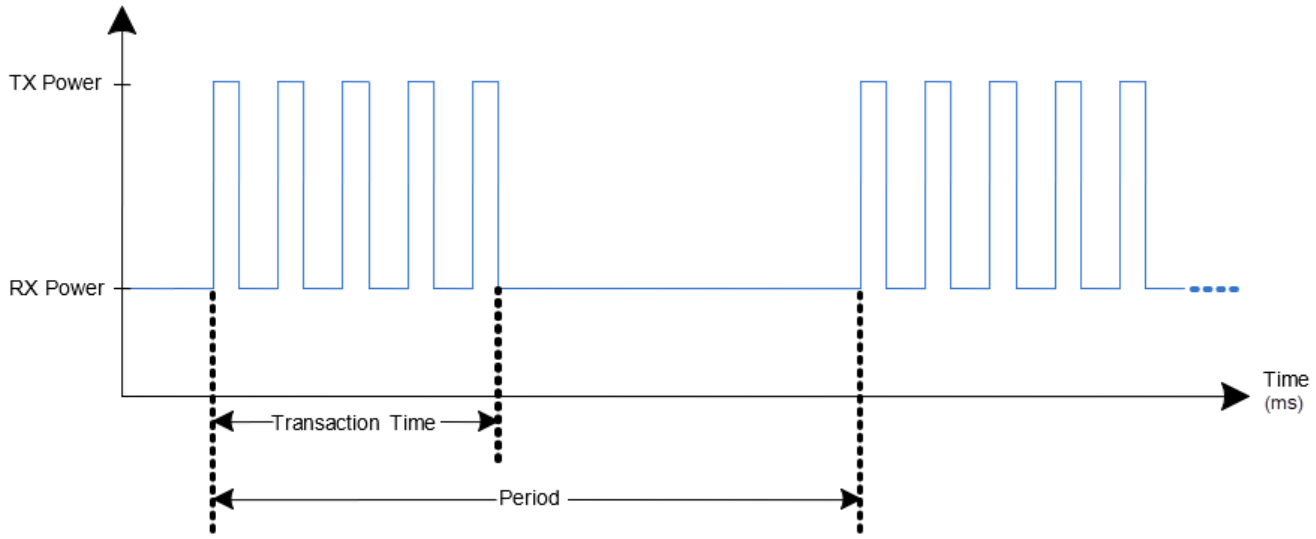
Duty-cycle[2]	Transaction time[2]	Period[3]	Average power
100%	2 s	8 s	2.00 W
90%	60 s	220 s	1.98 W
70%	300 s	900 s	1.92 W

2 The duty cycle of the TX line during the transaction.

3 The duration of a transaction.

4 The approximate interval between the start of two transactions. It includes the transaction followed by an interval where the NIC is drawing RX power.

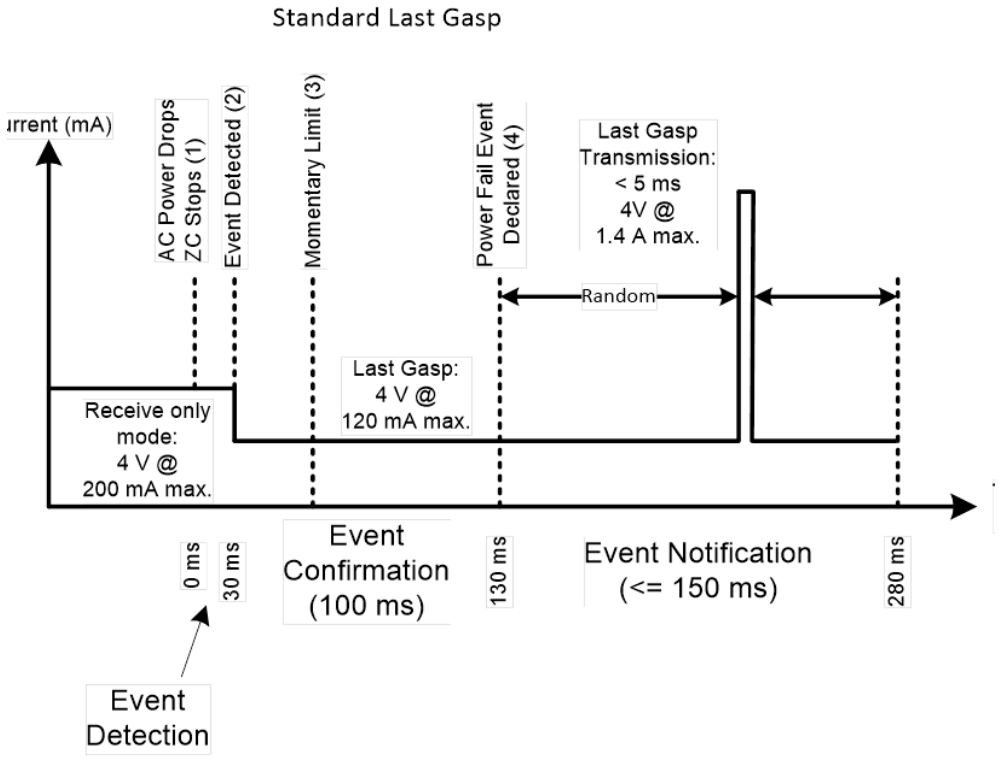
Figure 4 Power supply duty cycle



Standard last gasp

A "last gasp" is a transmission sent by a NIC that is operating in mesh-only mode over the NAN interface to notify of a power failure. Power fail notification cycle (last gasp) on page 20 illustrates the power fail notification cycle and the energy reservoir requirements needed from the meter host power supply to complete a successful transmission.

Figure 5 Power fail notification cycle (last gasp)



The NIC progresses through the following phases when transmitting a last gasp:

1. Event detected
2. Event confirmation
3. Power fail event declared

Event detection

Event detection starts when alternating current (AC) power is lost at time = 0 milliseconds. The NIC continuously monitors zero cross (ZC) transitions. After 30 milliseconds with no ZC activity, a possible power failure event is detected. The power fail signal is immediately recognized, and the NIC switches to low-power mode. The energy required during this phase depends on whether power fail or ZC is used to detect the outage:

- **ZC**: If ZC is used to detect the outage, the NIC switches to low-power mode within 1½ AC cycles from the last zero cross transition. (1.5 cycles at 50hz = 30 milliseconds.)
- **Power fail**: If power fail is used to detect the outage, the NIC switches to low-power mode immediately after power fail is asserted.

> **Note:** The host designer must take into account the energy required for the period between the loss of AC power and the assertion of the power fail signal.

Event confirmation

After an event is detected, the NIC enters the event confirmation phase. This phase starts at 30 ms (event 2) as shown in Power fail notification cycle (last gasp) on page 20. The customer can configure the event confirmation window, but the default setting is 100 milliseconds. If power is restored and detected before the configurable momentary limit (default = 30 milliseconds), no event is recorded (event 3). If power is restored between the momentary limit value and the end of the event confirmation phase (event 4), the NIC logs the momentary failure and resumes normal operation. In both cases, a return of power is indicated by a resumption of zero cross signals or the power fail signal no longer being asserted.

Power fail event declared

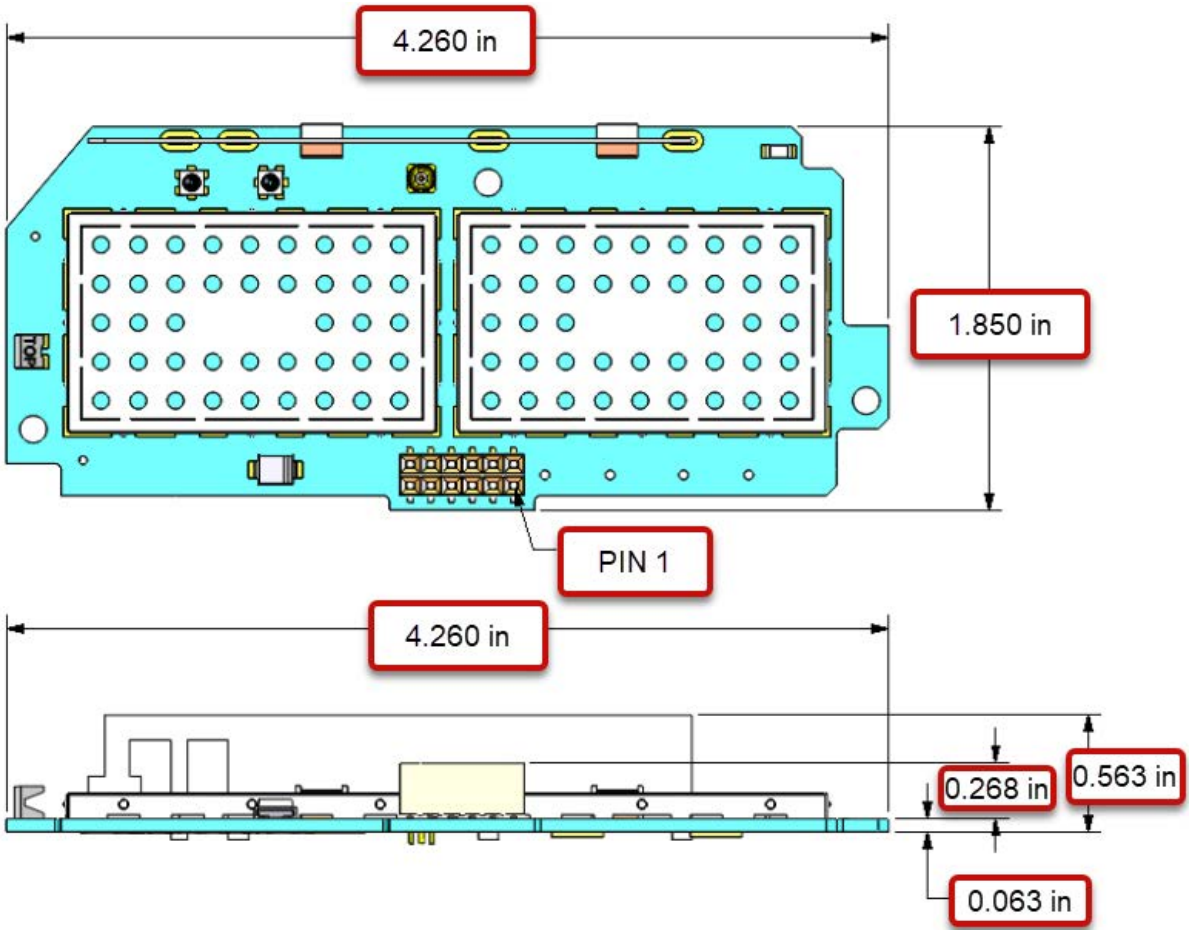
If the event confirmation period expires, a power fail event is declared, the NIC stores all vital events and statistics to non-volatile memory, and transmits a last gasp packet.

The timing for the transmission of the last gasp packet is randomized over a configurable period (default 150 milliseconds) after the power fail event is declared. The randomization is to minimize packet collision on the mesh network, thereby increasing the probability that the last gasp transmission reaches the back office system. Each randomized window is roughly five milliseconds in duration, thereby randomizing over a default of approximately 30 windows.

5 Dimensions

Gen5 NIC (NIC 510 series) dimensions on page 22 shows the basic mechanical dimensions of the Gen5 NIC (NIC 510 series) and general locations and reference designators for critical connections.

Figure 6 Gen5 NIC (NIC 510 series) dimensions



Global NIC (eNIC 510 series) dimensions (millimeters) on page 23shows the basic mechanical dimensions of the Global NIC (eNIC 510 series) and general locations and reference designators for critical connections.

Figure 7 Global NIC (eNIC 510 series) dimensions (millimeters)

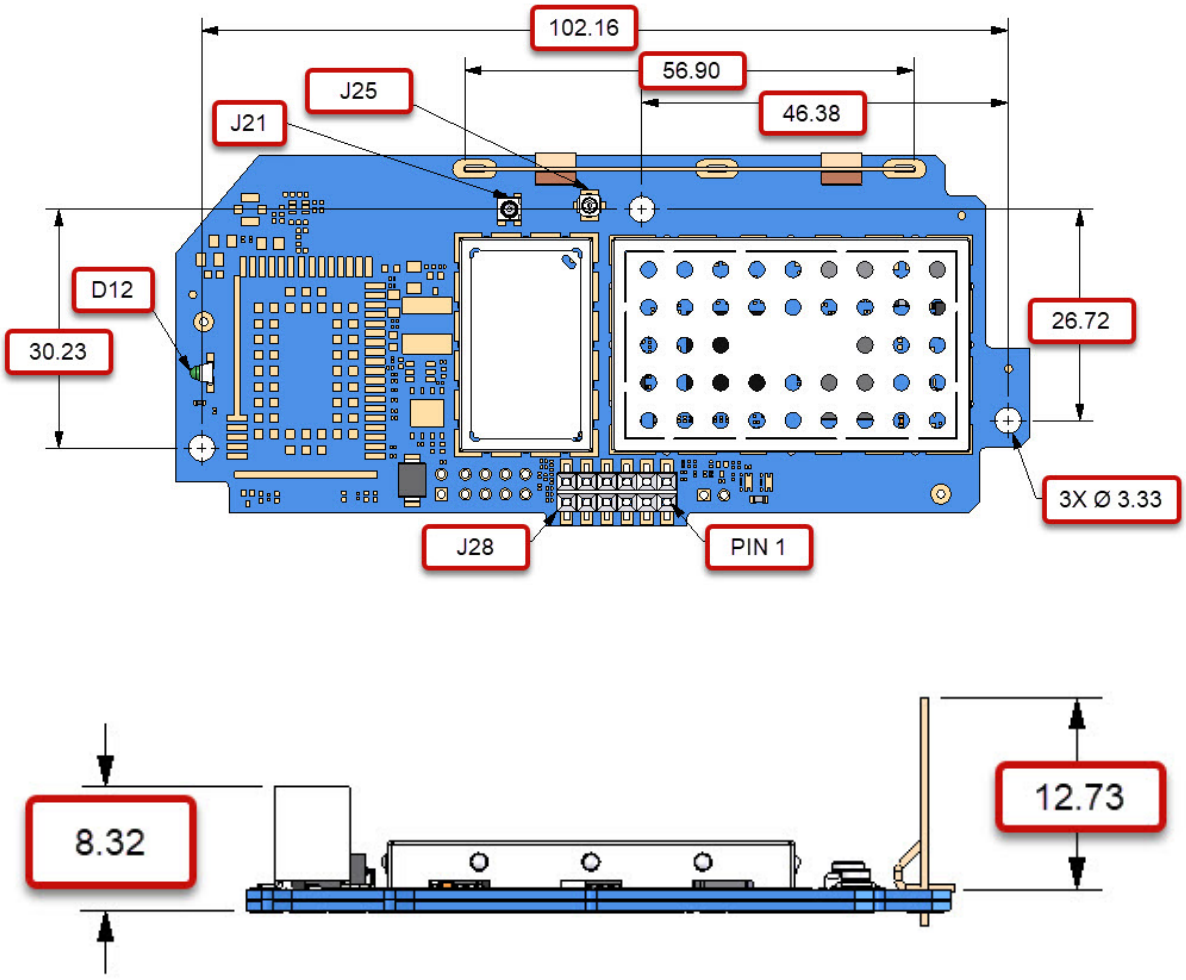
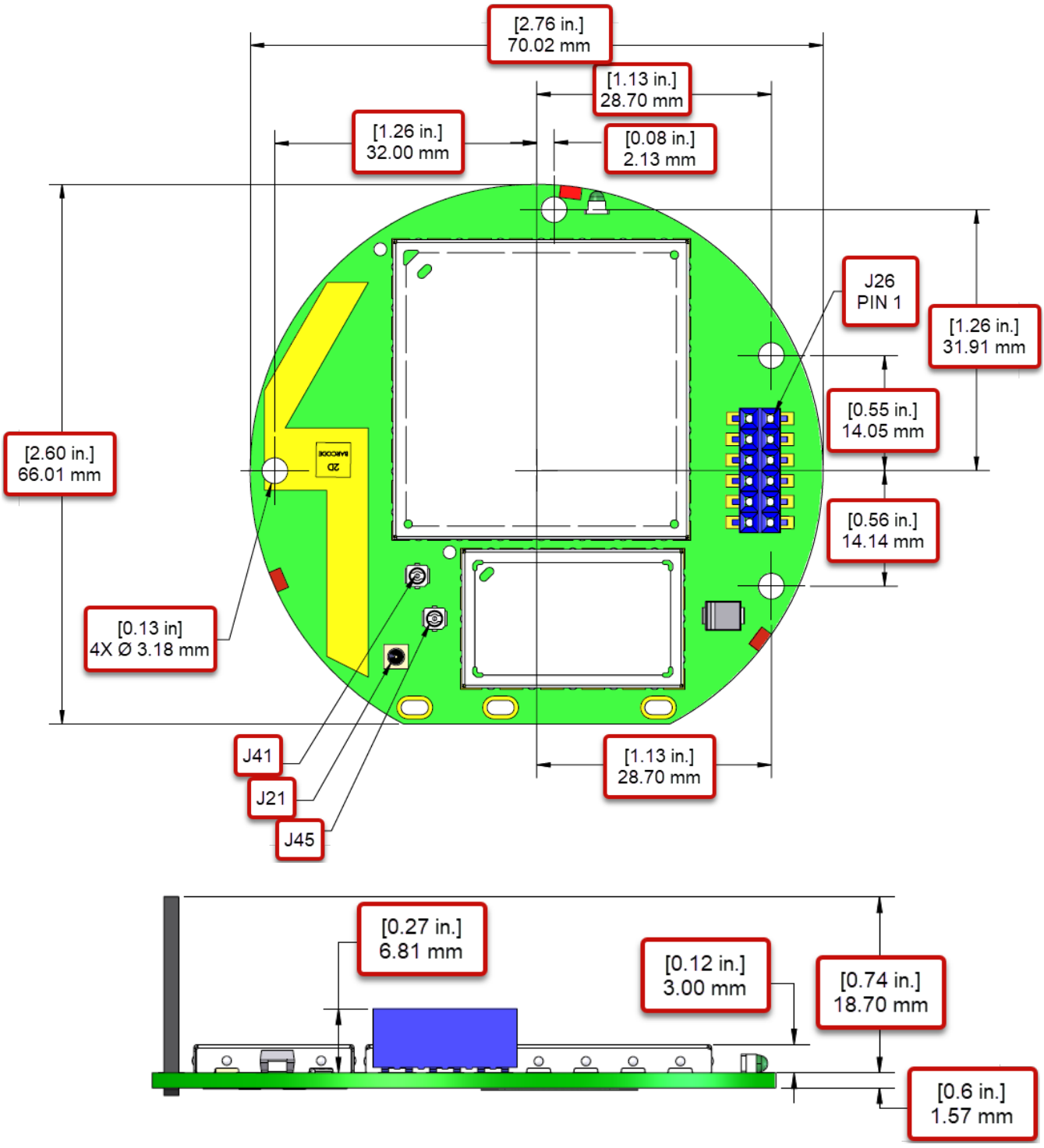


Figure 8 describes dimensions on the Global NIC (eNIC 55x series).

Figure 8 Global NIC (eNIC 55x series) dimensions - component side view and side view



6 Labeling

The NIC features a number of labels, including the following:

- **MAC address:** A 16-digit, alphanumeric MAC identifier that includes an alphanumeric (hexadecimal) number and a Code 128 bar code.
- **Part number:** The Itron internal part number identifier that includes a numeric number and revision with a Code 128 bar code.
- **Catalog number:** The Itron catalog number that includes the numeric customer catalog ordering number with a Code 128 bar code, the FCC ID, and the Industry Canada Certification Number.
- **Human readable etch:** The ITRON 174- part number, 16-digit alphanumeric MAC address, and IMEI/MEID identification numbers that are laser etched in human-readable format onto the PCB.
- **Barcode etch:** A 2D barcode containing the ITRON 174- part number, 16-digit alphanumeric MAC address, and IMEI/MEID number that is laser-etched onto the PCB.
- **Human readable label:** A human-readable adhesive label containing the ITRON catalog number, the FCC ID, and the Industry Canada certification number that is attached to the PCB.

Figure 9 describes the Gen5 NIC label locations, component side, and solder side on one variation of the Gen5 NIC.

Figure 9 Gen5 NIC (NIC 510 series) label locations

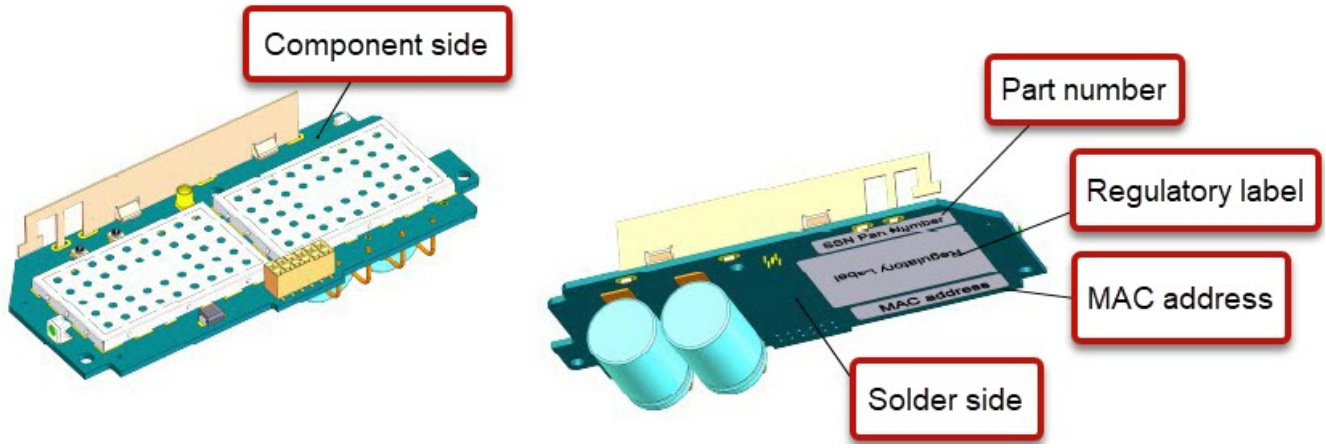


Figure 10 describes the Global NIC (510 series) label locations and component side.

Figure 10 Global NIC (510 series) regulatory label location and component side

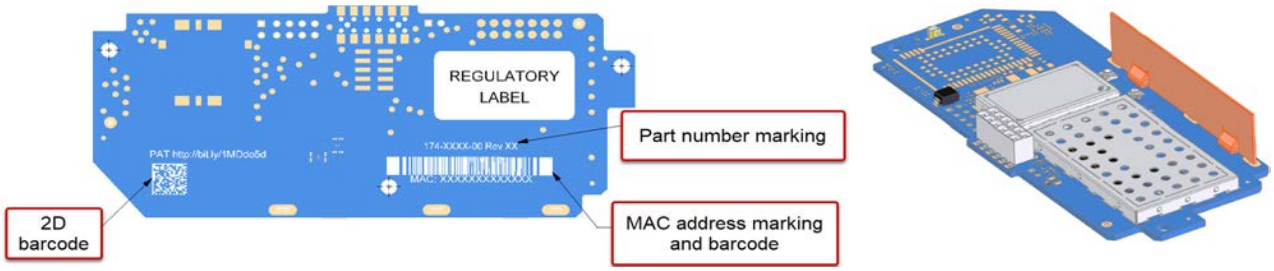
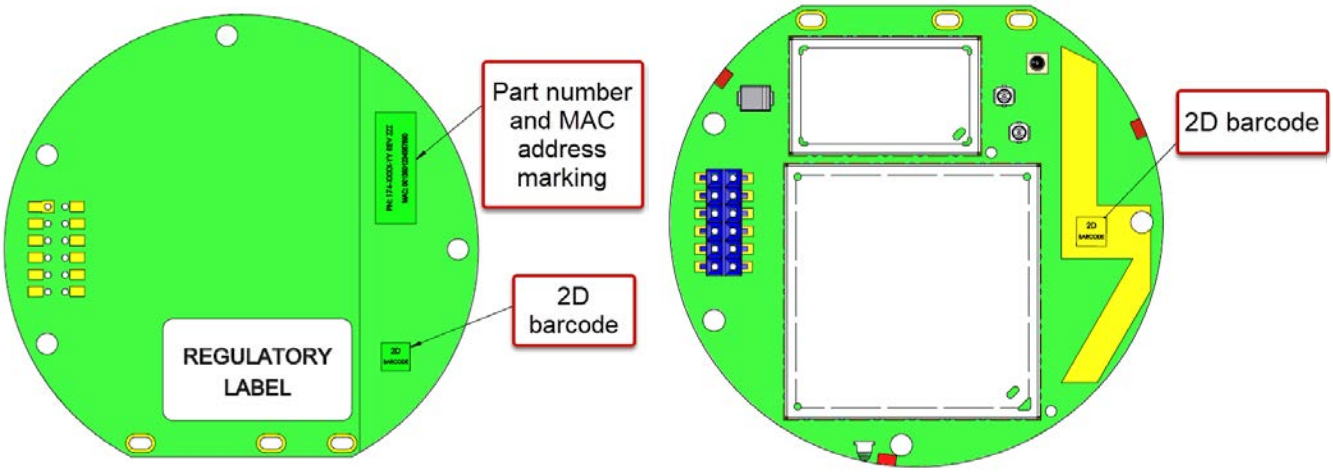


Figure 11 describes the location for the regulatory label on the Global NIC (eNIC 55x series).

Figure 11 Global NIC (eNIC 55x series) regulatory label location and component side



7 Antenna

The NIC supports several antenna types.

- **Onboard/internal**

  The onboard antenna is soldered to the NIC PCB. It is a stamped metal antenna that indicates support for either 900Mhz, 2.4Ghz, and GPS bands.

- **Offboard**
  - **Gen5 NIC.** The offboard antennas connect to the NIC through RF connectors on the NIC (MMCX for NAN/HAN). The offboard antenna is located inside the host enclosure.
    - For ANSI AMI, the host enclosure provides a safety barrier, which means that the NIC power supply generally does not need to be isolated from the mains voltage.
  - **Global NIC.** The offboard antennas connect to the NIC through RF connectors on the NIC (u.FI for NAN). The offboard antenna is located inside the host enclosure.
    - For ANSI AMI, the host enclosure provides a safety barrier, which means that the NIC power supply generally does not need to be isolated from the mains voltage.

- **External**

  External antennas connect to the NIC via the same RF connectors as the offboard antenna. Typically, the external antenna cables are routed to a bulkhead SMA connector on the outside of the host enclosure. An external antenna solution requires safety isolation from the AC mains voltage. This isolation can be accomplished with an isolated NIC power supply or an in-line RF isolator card.

Considerations

The following considerations must be made when integrating the NIC into a host application.

- The antenna requires that there is a minimum of two millimeters spacing from the antenna to any other components inside the host, including the host enclosure. It is recommended that all surfaces are greater than four millimeters from the antenna.
- Proper on-board antenna use requires a plastic or glass enclosure. Other metal material within the enclosure affects the radiation patterns. Place the antenna with no interfering metal between it and the front of the enclosure. All enclosures must be fully tested to guarantee operation of the NIC module.

For further recommended placement factors, contact your Itron technical representative.

The NIC also supports an external or off-board antenna option for cases where the on-board antenna is obstructed. Other antenna solutions may be employed using this option.

Important! The antenna matching and patterns vary depending on the enclosure and other host specifics. Therefore, to ensure efficient product integration, Itron strongly recommends that the antenna's characteristics be tested early in the development process.

Selection

The radios for the NAN and HAN systems have the flexibility to utilize either an onboard or external/offboard antenna. The hardware configuration can be customized to support solely the onboard antenna, solely the external antenna, or both options. In cases where both antennas are utilized, the NIC firmware is capable of switching between the two antennas as needed in the field.

Note: The Global NIC (eNIC 55x) series supports only an integral antenna or off-board antenna type.

A Gen5 Meter NIC (NIC 510 series) FCC/ISED regulatory integration instructions

FCC = OWS-NIC511-06

IC = 5975A-NIC51106

Table 9 Gen5 Meter NIC (NIC 510 series) models and antenna support

Model No.	2.4GHz	900 MHz	Internal antenna	Off-Board antenna	Extended last gasp	USB	FCC ID	IC ID
NIC 511-0603	x	x	x	x			OWS-NIC511-06	5975A-NIC51106
NIC 511-0602	x	x		x			OWS-NIC511-06	5975A-NIC51106
NIC 511-0601	x	x	x				OWS-NIC511-06	5975A-NIC51106
NIC 511-0601-13	x	x	x		75 seconds		OWS-NIC511-06	5975A-NIC51106
NIC 511-0602-13	x	x		x	75 seconds		OWS-NIC511-06	5975A-NIC51106
NIC 511-0601-14	x	x		x		x	OWS-NIC511-06	5975A-NIC51106

Standards compliance

- FCC CFR Title 47 Part 15.247, Subpart C
- ISED RSS-247

Modifications (15.21)

Changes or modifications not expressly approved by Itron, Inc. could void the user's authority to operate the equipment.

Part 15 Certification Notice (15.19(a)(3)) and RSS-GEN

The Network Interface Card (NIC) is REQUIRED to be professionally installed by a properly trained technician. Improper installation could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules and Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

Co-location of this module with other transmitters that operate simultaneously are required to be evaluated using the FCC multi-transmitter procedures of KDB 447498 and 996369 for RF exposure, and KDB 996369 D04 for EMC.

This device complies with FCC and ISED radiation exposure requirements for General Population/Uncontrolled Exposure to a fixed device. The device should be installed so that people will not come within the specified distance of the antenna as listed below:

US installations (FCC): 20 cm (8 in.) of the antenna.

Canada installations (IC): 20 cm (8 in.) of the antenna.

Host product manuals will need to detail RF exposure details to end users, "The device should be installed so that people will not come within 20 cm (8 in.) of the antenna."

Exigences d'Industrie Canada

La carte d'interface réseau (NIC) DOIT être installée par un technicien ayant reçu une formation adéquate. Une installation incorrecte peut annuler l'autorisation de l'utilisateur à se servir de l'équipement.

Les changements ou modifications apportés sans l'approbation expresse de l'autorité responsable de la conformité pourront entraîner l'annulation de l'autorisation d'utilisation de cet équipement.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

1. l'appareil ne doit pas produire de brouillage, et.
2. l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Cet appareil est conforme aux exigences de la ISED en matière d'exposition aux rayonnements pour la population générale / exposition non contrôlée. L'appareil doit être installé de manière à ce que personne ne s'approche à moins de 20 cm (8 po) de l'antenne.

L’antenne de cet émetteur ne doit pas se trouver à proximité de ou fonctionner en association avec une autre antenne ou un autre émetteur. La co-localisation de ce module avec d’autres émetteurs fonctionnant simultanément doit être évaluée.

Labeling requirements for host device (DA 00-1407, RSS-GEN)

The host device shall be properly labeled to identify the module within the host device. This is done by labeling, in a visible location, the FCC ID and ISED, preceded by the words “Contains transmitter module” or the word “Contains,” as follows:

Model eNIC 551-0101, eNIC 551-0121-05

Contains FCC ID: OWS-ENIC551-01

Contains IC: 5975A-ENIC55101

Le périphérique hôte doit être correctement étiqueté pour identifier le module dans le périphérique hôte. Pour ce faire, vous devez identifier, dans un endroit visible, les identifiants FCC et ISED, précédés des mots “Contains transmitter module” ou du mot “Contains,” comme suit:

Model eNIC 551-0101, eNIC 551-0121-05

Contains FCC ID: OWS-ENIC551-01

Contains IC: 5975A-ENIC55101

Figure 12 Example of address label for Global NIC (55x series)

NIC 510-06 external antenna integration

This radio transmitter 5975A-NIC51106 has been approved by Industry Canada to operate with the antenna types listed in the table below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included

in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Cet émetteur radio 5975A-NIC51106 a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés dans le tableau 1 ci-dessous avec le gain maximal admissible et l'impédance d'antenne requise pour chaque type d'antenne indiqué. Les types d'antennes ne figurant pas dans cette liste, ayant un gain supérieur au gain maximum indiqué pour ce type, sont strictement interdits pour une utilisation avec cet appareil.

Table 10 Antenna types

Antenna type	900 MhHz gain (dBi)	2.4 GHz Gain (dBi)	Antenna impedance
Omni directional	3	4.5	50
Wrap around	1	3.5	50

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

FCC/ISED integration instructions

This module is only approved for use in Itron meters, is not for resale. Each integration of limited module must be verified against CFR 47 Part 15.209 rules.

To test against FCC 15.209 limits on additional host control nodes, follow steps identified in Itron Confluence's Hardware Test Plan.

The module uses a 1W transmitter in the 902-928 MHz band. Care should be taken to ensure appropriate filtering is used at the FCC approved test lab to limit any damage to test equipment.

FCC Subpart B disclaimer

This FCC/ISED limited module is only FCC authorized for the specific rule parts (i.e., FCC transmitter rules) listed on the grant. Any host integration of this limited module will need to be further assessed for compliance to any other FCC rules that apply to the host not

covered by the modular transmitter grant of certification. The module contains unintentional-radiator digital circuitry, the final host product is still required to meet Part 15 Subpart B compliance testing with the modular transmitter installed.

To test against FCC Subpart B limits on additional host meters, follow steps identified in Itron Confluence's Hardware Test Plan.

B Global NIC (eNIC 55x series) European Union Conformity

Table 11 Global NIC (eNIC 55*x* series) European Union Conformity

CC, Alpha	Cat. No	Description
EU873	341-999910	eNIC 553-0101, HW3, ANT: INT NAN, GPS:NONE, EU873
EU876	341-999916	eNIC 553-0101, HW3, ANT: INT NAN, GPS:NONE, EU876
EUA02	341-999913	eNIC 553-0101, HW3, ANT: INT NAN, GPS:NONE, EUA02
EUB10	341-999904	eNIC 553-0101, HW3, ANT: INT NAN, GPS:NONE, EUB10
EUB14	341-999907	eNIC 553-0101, HW3, ANT: INT NAN, GPS:NONE, EUB14
EU873	341-999911	eNIC 553-0102, HW3, ANT: INT NAN, GPS:NONE, EU873
EU876	341-999917	eNIC 553-0102, HW3, ANT: INT NAN, GPS:NONE, EU876
EUA02	341-999914	eNIC 553-0102, HW3, ANT: INT NAN, GPS:NONE, EUA02
EUB10	341-999905	eNIC 553-0102, HW3, ANT: INT NAN, GPS:NONE, EUB10
EUB14	341-999908	eNIC 553-0102, HW3, ANT: INT NAN, GPS:NONE, EUB14
EU873	341-999912	eNIC 553-0121-05, HW3, ANT: INT NAN, GPS:INT, EU873
EU876	341-999918	eNIC 553-0121-05, HW3, ANT: INT NAN, GPS:INT, EU876
EUA02	341-999915	eNIC 553-0121-05, HW3, ANT: INT NAN, GPS:INT, EUA02
EUB10	341-999906	eNIC 553-0121-05, HW3, ANT: INT NAN, GPS:INT, EUB10
EUB14	341-999909	eNIC 553-0121-05, HW3, ANT: INT NAN, GPS:INT, EUB14

Any changes or modifications to the equipment not expressly approved by Itron is strictly prohibited.

Installation of all antenna-radiating elements shall have a minimum separation distance of 20 cm from all persons and must not be co-located or operating in conjunction with any other transmitter.

The end user shall ensure that Country Codes (CC) implemented with the product may be used in the country of operation (see Table 12 on page 35).

This module is only approved for use in Itron NLC, is not for resale. Each integration of the module must be assessed against its relevant European Regulation, including RED Directive 2014/53/EU.

To test against European standards on additional host NLC, follow the steps identified in Itron Confluence's Hardware Test Plan.

The module uses a 500 mW ERP transmitter in the 865-876 MHz band. Care should be taken to ensure appropriate filtering is used at the RED approved test lab to limit any damage to test equipment.

Table 12 Mesh radio operation

	EU BAND	**EUB10**	**EUB14**	**EU873**	**EUA02**	**EU876**
	Frequency band (MHz)	**865-868, 869.4**	**865-868, 869.4, 874-874.4**	**870-873**	**870-874.4**	**870-875.6**
	Power (mW)	**500**	**500**	**500**	**500**	**500**
Country	**RED GUIDE 2018 EU 2017/1354 Member states**					
Austria	AT	Y	Y	Y	Y	
Belgium	BE	Y		Y		
Bulgaria	BG	Y	Y	Y	Y	
Cyprus	CY	Y	Y	Y	Y	Y
Czech Republic	CZ	Y	Y	Y	Y	
Germany	DE	Y				
Denmark	DK	Y	Y	Y	Y	Y
Spain	ES	Y	Y	Y	Y	
Estonia	EE	Y	Y	Y	Y	Y
France	FR	Y	Y			
Finland	FI	Y	Y	Y		
United Kingdom	UK(NI)	Y	Y	Y	Y	
Greece	EL	Y				

Table 12 Mesh radio operation (continued)

	EU BAND	EUB10	EUB14	EU873	EUA02	EU876
	Frequency band (MHz)	865-868, 869.4	865-868, 869.4, 874-874.4	870-873	870-874.4	870-875.6
	Power (mW)	500	500	500	500	500
Country	**RED GUIDE 2018 EU 2017/1354 Member states**					
Hungary	HU	Y	Y	Y	Y	
Netherlands	NL	Y				
Croatia	HR	Y	Y	Y	Y	
Italy	IT	Y				
Ireland	IE	Y	Y	Y	Y	
Iceland	IS	Y	Y	Y	Y	
Lichtenstein	LI	Y		Y		
Lithuania	LT	Y	Y			
Luxemburg	LU	Y	Y	Y	Y	
Latvia	LV	Y	Y			
Malta	MT	Y	Y			
Norway	NO	Y	Y	Y	Y	Y
Poland	PL	Y				
Portugal	PT	Y	Y	Y	Y	
Romania	RO	Y	Y			
Sweden	SE	Y	Y	Y	Y	
Switzerland	CH	Y		Y		
Slovak Republic	SK	Y	Y	Y	Y	Y
Slovenia	SI	Y	Y	Y	Y	
Turkey	TR	Y				

Hereby, Itron declares that Global NIC models eNIC 553-0101 EUXXX, eNIC 553-0102 EUXXX, and eNIC 553-0121-05 EUXXX (where EUXXX is the EU Band) are in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU.

A copy of the Declaration of Conformity may be obtained with formal request to:

Itron France

Immeuble Les Montalets

2, rue de Paris

92190 Meudon

France

Gen5 Meter NIC (NIC 513-0403) European Union Conformity

Table 13 Gen5 Meter NIC (NIC 513-0403) European Union Conformity

CC, Alpha	Cat. No	Description
EU873	361-010110	NIC 513-0403, EM600 3PH CT, MESH:800, HAN:NONE, 16MB, EU873 [C]

Any changes or modifications to the equipment not expressly approved by Itron is strictly prohibited.

Installation of all antenna-radiating elements shall have a minimum separation distance of 20 cm from all persons and must not be co-located or operating in conjunction with any other transmitter.

The end user shall ensure that Country Codes (CC) implemented with the product may be used in the country of operation (see Table 14 on page 39).

This module is only approved for use in Itron meters, is not for resale. Each integration of the module must be assessed against its relevant European Regulation, including RED Directive 2014/53/EU.

To test against European standards on additional host meters, follow steps identified in Itron Confluence's Hardware Test Plan.

The module uses a 500 mW ERP transmitter in the 865-876 MHz band. Care should be taken to ensure appropriate filtering is used at the RED approved test lab to limit any damage to test equipment.

Table 14 Mesh radio operation

	EU band	EUB10	EUB14	EU873	EUA02	EU876
	Frequency Band (MHz)	865-868, 869.4	865-868, 869.4, 874-874.4	870-873	870-874.4	870-875.6
	Power (mW)	500	500	500	500	500
Country	RED GUIDE 2018 EU 2017/1354 Member States					
Austria	AT	Y	Y	Y	Y	
Belgium	BE	Y		Y		
Bulgaria	BG	Y	Y	Y	Y	
Cyprus	CY	Y	Y	Y	Y	Y
Czech Republic	CZ	Y	Y	Y	Y	
Germany	DE	Y				
Denmark	DK	Y	Y	Y	Y	Y
Spain	ES	Y	Y	Y	Y	
Estonia	EE	Y	Y	Y	Y	Y
France	FR	Y	Y			
Finland	FI	Y	Y	Y		
United Kingdom	UK(NI)	Y	Y	Y	Y	
Greece	EL	Y				
Hungary	HU	Y	Y	Y	Y	
Netherlands	NL	Y				
Croatia	HR	Y	Y	Y	Y	
Italy	IT	Y				

Table 14 Mesh radio operation (continued)

	EU band	EUB10	EUB14	EU873	EUA02	EU876
	Frequency Band (MHz)	865-868, 869.4	865-868, 869.4, 874-874.4	870-873	870-874.4	870-875.6
	Power (mW)	500	500	500	500	500
Country	RED GUIDE 2018 EU 2017/1354 Member States					
Ireland	IE	Y	Y	Y	Y	
Iceland	IS	Y	Y	Y	Y	
Lichtenstein	LI	Y		Y		
Lithuania	LT	Y	Y			
Luxemburg	LU	Y	Y	Y	Y	
Latvia	LV	Y	Y			
Malta	MT	Y	Y			
Norway	NO	Y	Y	Y	Y	Y
Poland	PL	Y				
Portugal	PT	Y	Y	Y	Y	
Romania	RO	Y	Y			
Sweden	SE	Y	Y	Y	Y	
Switzerland	CH	Y		Y		
Slovak Republic	SK	Y	Y	Y	Y	Y
Slovenia	SI	Y	Y	Y	Y	
Turkey	TR	Y				

Hereby, Itron declares that GEN5 Meter NIC models NIC 513-0403 EUXXX, (where EUXXX is the EU Band) are in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU.

A copy of the Declaration of Conformity may be obtained with formal request to:

Itron France

Immeuble Les Montalets

2, rue de Paris

92190 Meudon

France

Global NIC (eNIC 55x series) FCC/ISED regulatory integration instructions

Table 15 Global NIC (eNIC 55x series) models and antenna support

Model No.	900 MHz	NAN internal Antenna	GPS support (internal antenna)	FCC ID	IC ID
eNIC 551-0101	x	x		OWS-ENIC551-01	5975A-ENIC55101
eNIC 551-0121-05	x	x	x	OWS-ENIC551-01	5975A-ENIC55101

Standards compliance

- FCC CFR Title 47 Part 15.247, Subpart C
- ISED RSS-247

Modifications (15.21)

Changes or modifications not expressly approved by Itron, Inc. could void the user's authority to operate the equipment.

Part 15 Certification Notice (15.19(a)(3)) and RSS-GEN

The Network Interface Card (NIC) is REQUIRED to be professionally installed by a properly trained technician. Improper installation could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules and Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

Co-location of this module with other transmitters that operate simultaneously are required to be evaluated using the FCC multi-transmitter procedures of KDB 447498 and 996369 for RF exposure, and KDB 996369 D04 for EMC.

This device complies with FCC and ISED radiation exposure requirements for General Population/Uncontrolled Exposure to a fixed device. The device should be installed so that people will not come within the specified distance of the antenna as listed below:

US installations (FCC): 20 cm (8 in.) of the antenna.

Canada installations (IC): 20 cm (8 in.) of the antenna.

Host product manuals will need to detail RF exposure details to end users, “The device should be installed so that people will not come within 20 cm (8 in.) of the antenna.”

Exigences d'Industrie Canada

La carte d’interface réseau (NIC) DOIT être installée par un technicien ayant reçu une formation adéquate. Une installation incorrecte peut annuler l’autorisation de l’utilisateur à se servir de l’équipement.

Les changements ou modifications apportés sans l’approbation expresse de l’autorité responsable de la conformité pourront entraîner l’annulation de l’autorisation d’utilisation de cet équipement.

Le présent appareil est conforme aux CNR d’Industrie Canada applicables aux appareils radio exempts de licence. L’exploitation est autorisée aux deux conditions suivantes:

1. l’appareil ne doit pas produire de brouillage, et.
2. l’utilisateur de l’appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d’en compromettre le fonctionnement.

Cet appareil est conforme aux exigences de la ISED en matière d'exposition aux rayonnements pour la population générale / exposition non contrôlée. L'appareil doit être installé de manière à ce que personne ne s'approche à moins de 20 cm (8 po) de l'antenne.

L’antenne de cet émetteur ne doit pas se trouver à proximité de ou fonctionner en association avec une autre antenne ou un autre émetteur. La co-localisation de ce module avec d’autres émetteurs fonctionnant simultanément doit être évaluée.

Labeling requirements for host device (DA 00-1407, RSS-GEN)

The host device shall be properly labeled to identify the module within the host device. This is done by labeling, in a visible location, the FCC ID and ISED, preceded by the words “Contains transmitter module” or the word “Contains,” as follows:

Model eNIC 551-0101, eNIC 551-0121-05

Contains FCC ID: OWS-ENIC551-01

Contains IC: 5975A-ENIC55101

Le périphérique hôte doit être correctement étiqueté pour identifier le module dans le périphérique hôte. Pour ce faire, vous devez identifier, dans un endroit visible, les identifiants FCC et ISED, précédés des mots “Contains transmitter module” ou du mot “Contains,” comme suit:

Model eNIC 551-0101, eNIC 551-0121-05

Contains FCC ID: OWS-ENIC551-01

Contains IC: 5975A-ENIC55101

Figure 13 Example of address label for Global NIC (55x series)

FCC/ISED integration instructions

This module is only approved for use in Itron meters, is not for resale. Each integration of limited module must be verified against CFR 47 Part 15.209 rules.

To test against FCC 15.209 limits on additional host control nodes, follow steps identified in Itron Confluence's Hardware Test Plan.

The module uses a 1W transmitter in the 902-928 MHz band. Care should be taken to ensure appropriate filtering is used at the FCC approved test lab to limit any damage to test equipment.

FCC Subpart B disclaimer

This FCC/ISED limited module is only FCC authorized for the specific rule parts (i.e., FCC transmitter rules) listed on the grant. Any host integration of this limited module will need to be further assessed for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. The module contains unintentional-radiator digital circuitry, the final host product is still required to meet Part 15 Subpart B compliance testing with the modular transmitter installed.

To test against FCC Subpart B limits on additional host meters, follow steps identified in Itron Confluence's Hardware Test Plan.

E Safety information

Warning! Severe shock and explosion hazard! Touching energized parts can result in massive equipment damage, and severe injury or death. Short-circuiting energized parts will result in blinding flash and explosion. Opening and closing electrical circuits can also produce dangerous and explosive arc flashes. Involuntary muscular reactions associated with electrical shock may result in other injuries. Observe the following safety guidelines.

Careful planning of every job is essential. Nothing should be taken for granted. Do not take chances!

- Read and follow all approved policies and procedures provided by your employer associated with the procedures in this manual.
- The procedures in this manual must only be performed by qualified workers in accordance with local utility safety practices, utility requirements, and applicable OSHA and NFPA standards.
- The information contained in this document is intended to aid qualified personnel, and is not a replacement for the proper training required to make a person qualified.
- Itron assumes no liability for the customer's failure to follow these safety guidelines.

General electrical safety

- Perform the procedures in this manual in accordance with applicable workplace standards established by the following agencies:
  - Occupational Safety and Health Act (OSHA).
  - The National Electrical Code published by the National Fire Protection Association (NFPA).
  - National Electrical Manufacturers Association (NEMA).
  - Electronics Industries Association (EIA).
  - Insulated Power Cable Engineers Association (IPCEA).
- American National Standards Institute (ANSI). Whenever possible, deenergize all circuits or equipment before working on them.
- Maintain a minimum clearance of 10 feet (3 meters) between line potential and all unqualified persons at all times.
- Keep unauthorized people out of the work area. Be especially cautious of children, who tend to be drawn to work activity.

- Determining if a circuit is OFF can be difficult in some instances. Check for circuit voltage with an appropriate voltmeter before working on equipment presumed to have been deenergized. Tiebreakers, double throw disconnect switches, automatic transfer switches and emergency generators can supply power through an alternate circuit or from another source.
- 120V current can be just a lethal as higher voltages because current flow through a body depends upon the body's resistance.
- Do not trust insulation and/or weatherproofing on a wire as protection from shock.
- Use electrically insulated tools. Inspect portable electrical equipment or tools for defects and remove any defective devices from service immediately. All portable electrical equipment must have Ground Fault Circuit Interrupter (GFCI) protection.
- Select the right tool for the job. Use tools properly. Keep tools in good working order.
- Make sure the work area is free of any flammable material. Flammable vapors can be ignited by an arc flash.
- Keep the work area clean and dry. Cluttered work areas cause accidents and injuries.
- Provide good lighting in the work area. You cannot work safely if you cannot see what you are doing.
- Report unsafe conditions or defective equipment to your immediate supervisor.
- Handle material carefully. Lift and carry properly.