Operation Quick Start Guide

Bently Nevada™ Asset Condition Monitoring

wSIM™ Field Application Engineer WiTry™ Kit

imagination at work

Part Number XXXXXX-XX
Rev. 0 (03/08)

Contact Information

The following contact information is provided for those times when you cannot contact your local representative:

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Additional Information

Notice:

This manual does not contain all the information required to operate and maintain the product. Refer to the following manuals for other required information.

Reference Manual 1 Title (Part Number XXXXXX-XX)

- Content description 1
- Content description 2
- Etc.

Reference Manual 2 Titles (Part Number XXXXXX-XX)

- Content description 1
- Content description 2
- Etc.

Product Disposal Statement

Customers and third parties, who are not member states of the European Union, who are in control of the product at the end of its life or at the end of its use, are solely responsible for the proper disposal of the product. No person, firm, corporation, association or agency that is in control of product shall dispose of it in a manner that is in violation of any applicable federal, state, local or international law. Bently Nevada LLC is not responsible for the disposal of the product at the end of its life or at the end of its use.

Product Operational Note

This device complies with Part 15 of the FCC Rules. 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.

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

The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

Contents

1. WiTry™ System Components

The WiTry™ Kit provides the field application engineer with a portable demonstration of the Bently Nevada™ Wireless Condition Monitoring system. The WiTry Kit includes the following:

- Three (3) wSIM™ Processing/Communication Modules, each capable of monitoring vibration and temperature at individual points
- One (1) wSIM™ Mesh Network Gateway pre-configured for the particular WiTry™ kit (including power adapter and antenna)
- One (1) Ethernet cross-over cable to connect Mesh Network Gateway to your System1®-equipped computer
- Three (3) Accelerometers and cables
- Three (3) Thermocouples, mounts, and cables
- One (1) 512 MB USB Memory Stick with required software and configuration files
- One WiTry™ Kit Configuration Checklist Card
- One (1) CD-ROM with backup of required software and documentation
- Three (3) Spare batteries in enclosures
- One (1) Spare Parts Bin (empty)
- One (1) Operation Quick Start Guide (this document)

The following sections will describe the proper steps, in order, to most efficiently set-up the system for the first time from your System1®-equipped computer. After the system is set-up for the first time and software/files are installed and configured, the system requires very little setup; the process is described in Sections 3 and 4.

1.1 Unpacking the components

1.1.1 Processing/Communication Modules

Remove the three wSIM Processing/Communication Modules from the case. Place them approximately 1m apart, oriented vertically (for best antenna performance). The modules have magnets in the bottom for attachment to ferrous surfaces.

NOTE
The switch should remain in the OFF position for now.

1.1.2 wSIM™ Mesh Network Gateway

Remove the Mesh Network Gateway and Power Adapter. Place the gateway on a flat surface near your computer and approximately in the center of the wSIM Processing/Communication Modules. Attach the power adapter to the gateway only.

NOTE
The power adapter should remain UNPLUGGED for now.

Remove the Ethernet Crossover Cable from the case. Plug one end into the gateway Ethernet port and the other into an Ethernet port on your computer.

1.1.3 Accelerometers and Thermocouples

Remove the three accelerometers and thermocouples and their associated cables from the case. Connect one accelerometer and one thermocouple to the appropriate connector on each wSIM Processing/Communication Module. The connectors are different and will allow only the accelerometer to connect to the accelerometer connector and the thermocouple to the thermocouple connector. If you have access to a vibrating source (shaker table, air vent, motor, etc.) attaching the accelerometer(s) to it will provide some excitation to the channel.

2. Install WiTry™ System Software

The required software and configuration is stored on the enclosed USB Memory Stick. There is a backup copy on the enclosed CD.

Application Advisory
This WiTry™ software, wSIM, and wSIM Mesh Network Gateways are pre-configured for each individual kit. Please Do NOT interchange components between WiTry™ Kits.

2.1 Loading Software

The WiTry System requires four software applications to be installed on your System1® computer. The applications that will be installed include the following:

- Smart Mesh Console: Manages all communications on the mesh network and provides a dynamically updated graphical display of network status and performance parameters.
- wSIM Configuration Editor: Provides a graphical user interface to modify the configuration of the wSIM.
- RLW S^{5}NAP™Connector: Runs in the background as a Windows service. Converts binary data from the mesh network into a standard XML file that is read by the RLW S^{5}NAP™System 1® Exchange application.
- RLW S^{5}NAP™System 1 ® Exchange Service: Runs in the background as a Windows service. Converts the standard XML data file and maps to System1® MODBUS registers.

The first step in the software installation process is to plug the memory stick into a USB port on your computer and allow it to register. It should automatically appear as a removable drive on your Windows™ File Explorer. If the Windows™ File Explorer does not appear automatically, Open My Computer, you should see a removable drive named WSIM WITRY.

NOTE
The USB Drive is named WSIM WITRY and is assigned an arbitrary drive letter depending on how many drives are registered on your computer.

1. Open the WSIM WITRY Drive, see Figure 2-1.

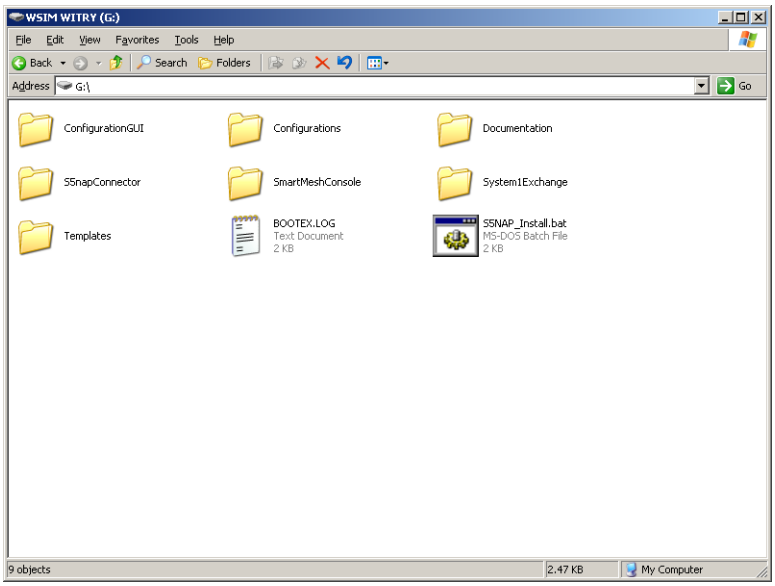

Figure 2-1: WSIM WITRY USB Drive

2. Double click on S5NAP_Install.bat

Application Advisory
Do NOT close the command window that opens after double clicking the S5NAP_Install.bat. This application guides the WiTry™ installation; it will close automatically after all necessary installation steps have been completed.

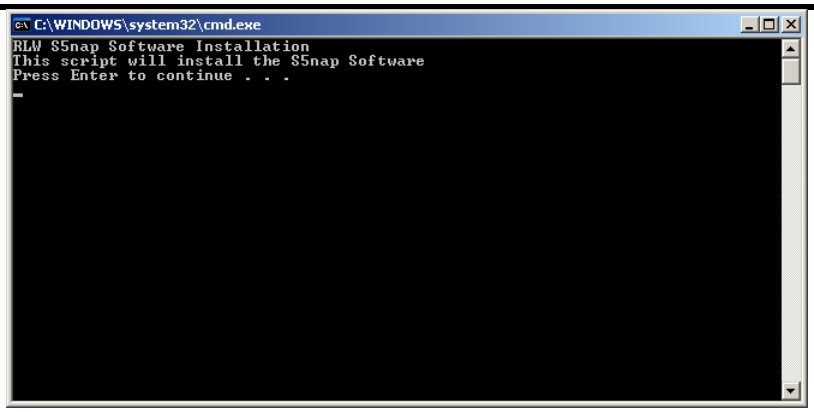

Figure 2-2: RLW S5NAP Software Installation Console Window

3. When the S5NAP Software Installation window appears, press <Enter> to begin installation, see Figure 2-2.

2.1.1 wSim Configuration Editor

wSIM Configuration Editor is a custom application that provides a user-friendly interface to modify all the adjustable parameters in the wSIM.

1. wSIM Configuration Editor Setup Wizard starts, see Figure 2-3.

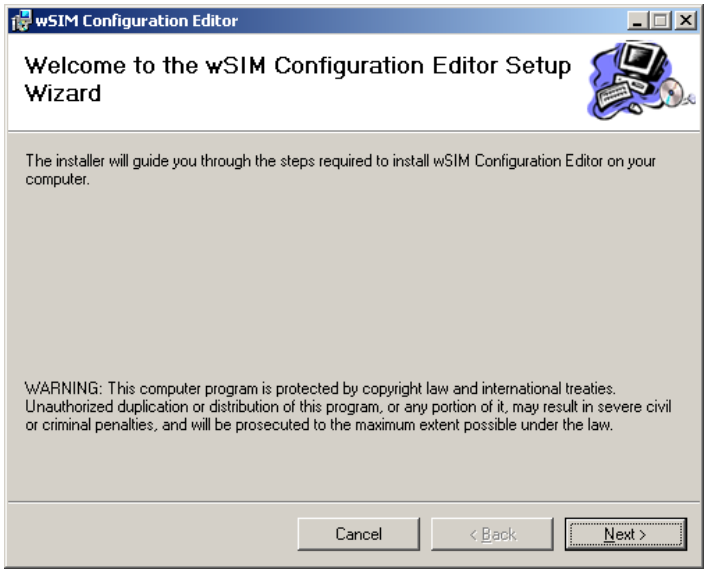

Figure 2-3: wSIM Configuration Editor Setup Wizard

Application Advisory
Modifying the file locations from the defaults during set-up of the WiTry™ software installations may cause unpredictable behavior.

2. Press <Next> to continue
3. Accept all defaults by pressing <Next> on each upcoming screen.
4. After the software has completed installation, the installation wizard displays a message indicating wSIM Configuration Editor Installation Complete, see Figure 2-4.

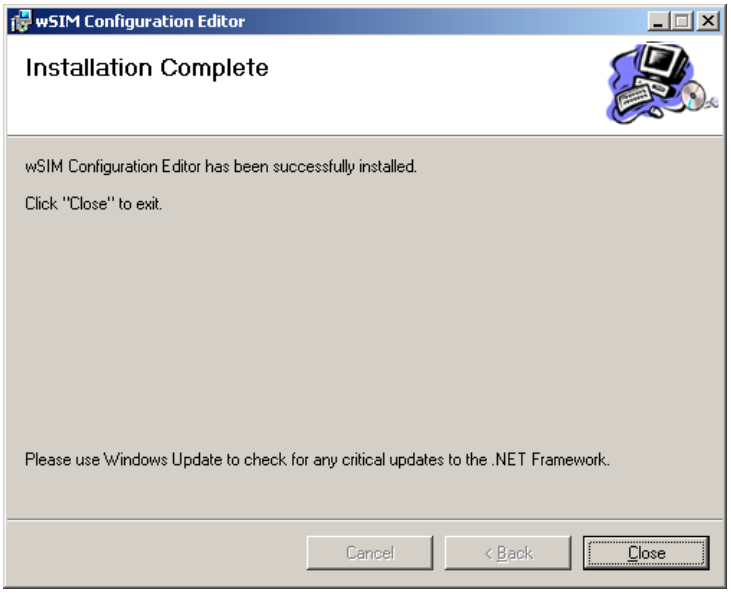

Figure 2-4: wSIM Configuration Editor Installation Complete

5. Click <Close>

2.1.2 RLW S5NAP™ Connector

The RLW S5NAP™ Connector is a custom application that receives data from each wSIM on the network, coverts this data into XML files, and places the XML file in file system location for further processing. This application is also responsible for all communication with each wSIM, allows the user to update wSIM configuration files in conjunction with the wSIM Configuration Editor, retrieve wSIM firmware status, and provides the wireless firmware upload capability in the WiTry™ System.

1. RLW S5NAP Connector Setup Wizard Starts Automatically

2. Press <Next> to continue
3. Accept all defaults by pressing <Next> on each upcoming screen.
4. After the software has completed installation, the installation wizard displays a message indicating RLW S5NAP Connector Installation Complete.
5. Click <Close>

2.1.3 RLW S5NAP™ System 1® Exchange

The RLW S5NAP™ System 1® Exchange is a custom application responsible for translating wSIM XML data files into the appropriate Modbus registers for communication with System 1®.

1. RLW S5NAP™ System 1® Exchange Setup Wizard Starts Automatically
2. Press <Next> to continue
3. Accept all defaults by pressing <Next> on each upcoming screen.
4. After the software has completed installation, the installation wizard displays a message indicating RLW S5NAP System 1® Exchange Installation Complete.
5. Click <Close>

2.1.4 Install Required Java Application

The Dust Smart Mesh Console installed in the next step requires Java Runtime Environment 1.4.2_16 as a prerequisite for installation.

1. Java Runtime Environment Setup Wizard Starts Automatically
2. Select I accept the terms in the license agreement, see Figure 2-5.

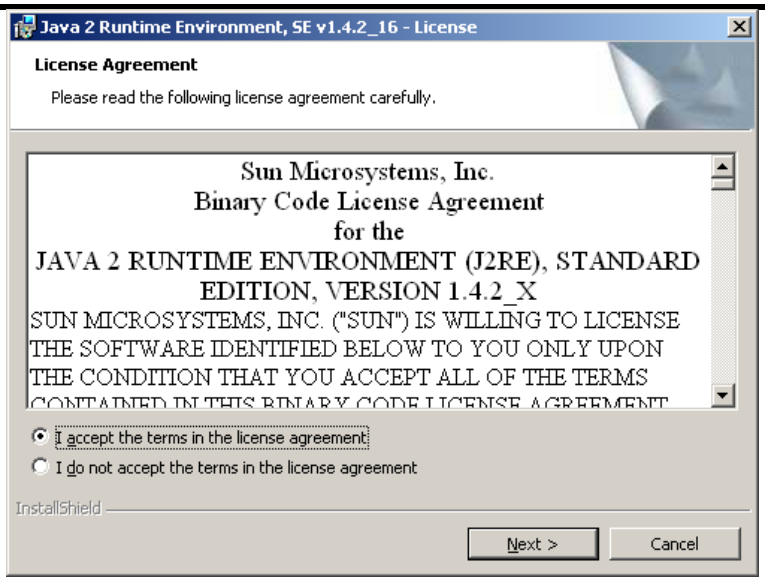

Figure 2-5: Java 2 Runtime Environment EULA

3. Click <Next>
4. On the please select a setup type screen >>select Typical
5. Click <Next>
6. When the Java Runtime application has been installed, the wizard displays an InstallShield Wizard Complete message see Figure 2-6.

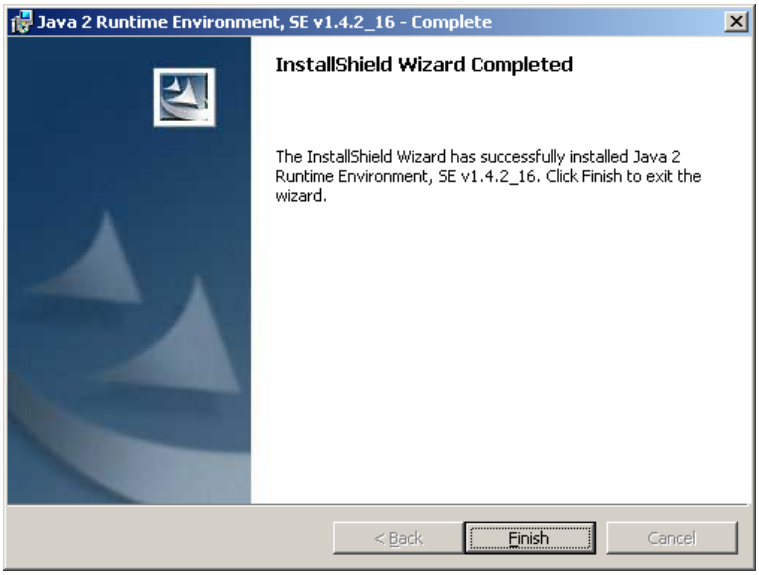

Figure 2-6: Java 2 Runtime Environment Installation Complete

7. Click <Finish>
8. If prompted to restart computer, select <No>. Computer will be restarted at the end of WiTry™ System software installation.

2.1.5 Dust Smart Mesh Console

The Smart Mesh Console is responsible for managing communications between the Mesh Network Gateway and each wSIM node on the network.

1. Smart Mesh Console Installer starts Automatically, see Figure 2-7.

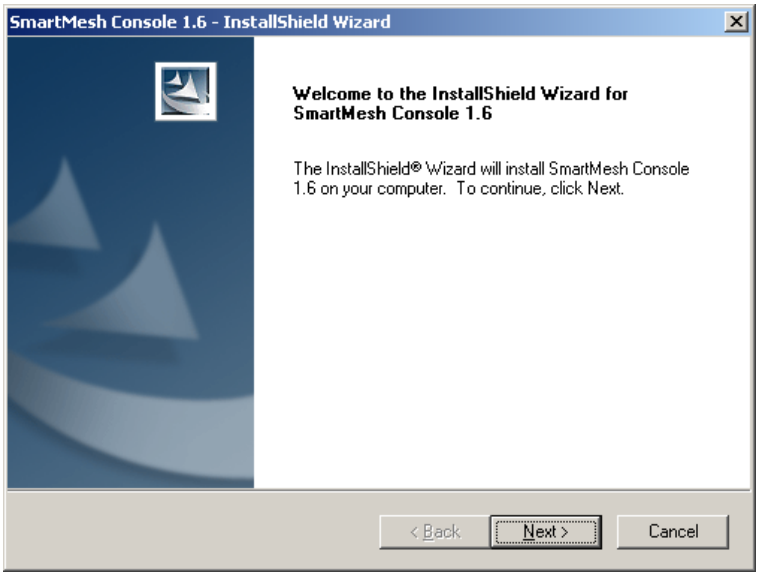

Figure 2-7: SmartMesh Console 1.6 Installation Wizard

2. Click <Next>
3. Accept the Smart Mesh Console End User License Agreement
4. Accept all defaults by pressing <Next> on each upcoming screen
5. Ready to Install screen appears >> Click Install
6. When the Smart Mesh Console application has been installed, the wizard displays an InstallShield Wizard Complete message, see Figure 2-8.

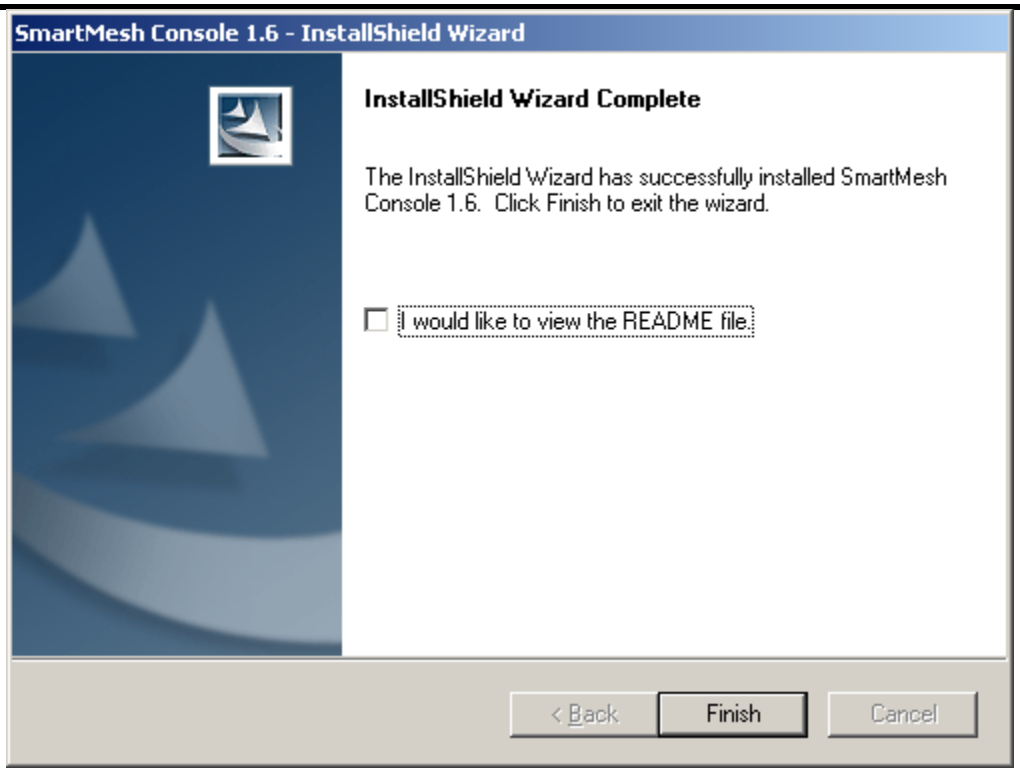

Figure 2-8: SmartMesh Console 1.6 Installation Complete

7. Deselect option to display the Readme File
8. Click <Finish>
9. Wait approximately 20 seconds for the S5NAP Software Installation command window / console to disappear.
10. Restart the System 1® PC the WiTry™ System was just installed on.

Installation of the WiTry™ System software components is complete.

3. Configure WiTry™ Kit Components

3.1 Network Setup

The WiTry™ System's network is comprised of the following components.

- wSIM Node – Data acquisition device responsible for collecting and reporting temperature measurements and static and dynamic vibration measurements to System 1®.
- wSIM Mesh Network Gateway – 802.15.4 access point responsible for controlling communication to and from the Mesh network as well as communicating with each wSIM on the network. The Gateway interfaces with the System 1® PC over the Ethernet connection.

- System 1 ® PC – PC running System 1® application that collects and stores the measurement data collected and reported by the wSIM.

3.1.1 Set IP Address of System 1 Laptop

Follow these instructions to configure the System 1 PC with a static IP address.

Application Advisory
To ensure proper functionality of the WiTry system, the user must configure the System 1 PC with a static IP address.

Application Advisory
When the WiTry System is not in use, the static IP address settings should be removed from the System 1 PC.

1. Navigate to Start >> Settings >> Control Panel >> Network Connections
2. Right click on the Local Area Connection the crossover cable is plugged into >> select Properties
3. Double Click the Internet Protocol (TCP/IP), see Figure 3-1.

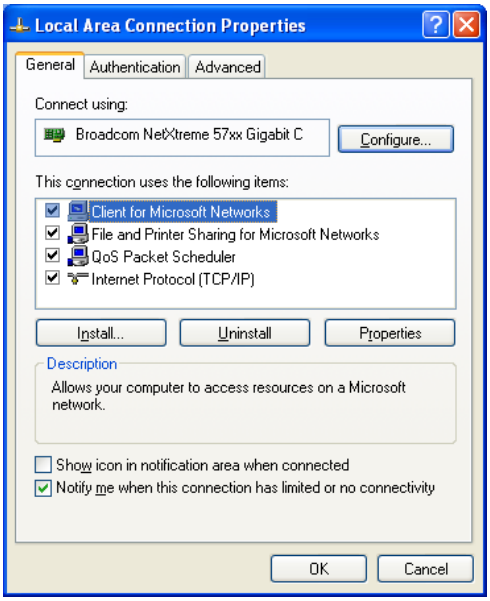

Figure 3-1: Setting a static IP address

4. Select Use the following IP Address Option

5. Enter the following configuration, see Figure 3-2.
    i. IP address: 192.168.99.101
    ii. Subnet mask: 255.255.255.0
    iii. Default gateway: 192.168.99.1

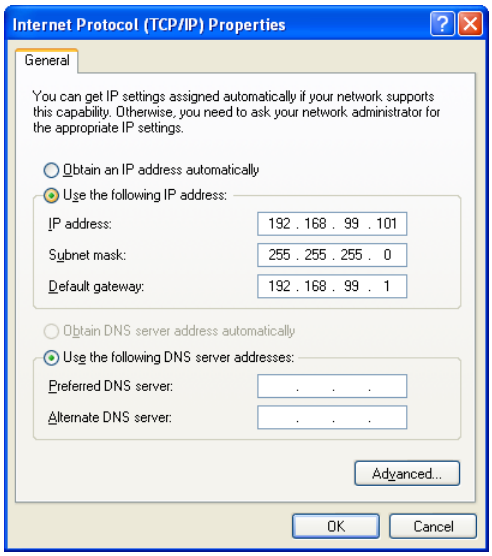

Figure 3-2: Configuring the static IP address

6. Click OK to exit the Internet Protocol (TCP/IP) Properties window
7. Click OK to exit the Local Area Connection Properties window

The System 1 PC is now properly configured to interact with the WiTry System.

3.1.2 wSIM Mesh Network Gateway Configuration

To establish the 802.15.4 network, configure the wSIM Mesh Network Gateway.

1. Power on the Gateway – Wait 1 minute while the wSIM Mesh Network Gateway runs its startup procedure (software on the Gateway).
2. On the System 1® PC, double click the Smart Mesh Console 1.6 Icon on the Desktop
3. Power on each wSIM by flipping the switch from Off to On.
4. After the Smart Mesh Console starts >> Click the Console Menu >> Discover Managers
5. In the Discover Managers window >> Click the Discover Icon, see Figure 3-3.

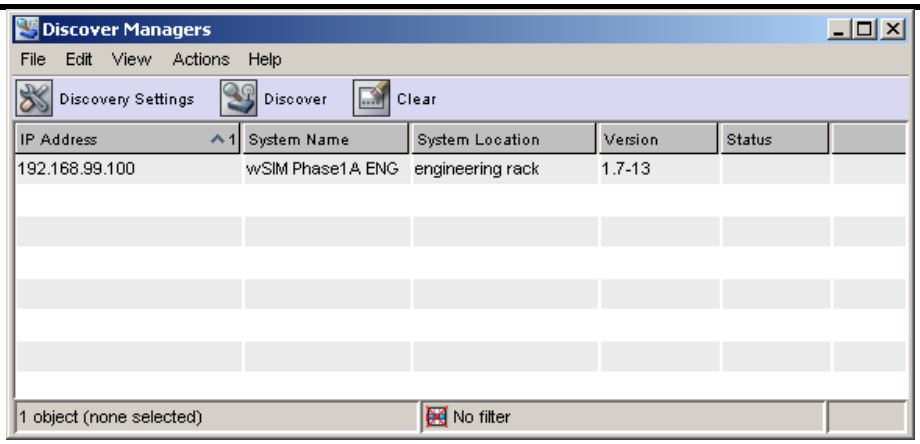

Figure 3-3: wSIM Mesh Network Gateway

The Smart Mesh Manager scans the network for connected wSIM Mesh Network Gateways. The Discover Managers window returns one (1) wSIM Mesh Network Gateway with an IP Address of 192.168.99.100.

6. Right Click on 192.168.99.100 >> Select Connect to Manager
7. On the Connect : 192.168.99.100 window enter the following:
    a. User Name: admin
    b. User Password: admin
    c. Port 4445
    d. Set as Default >> should be checked.
8. Click <Connect>

NOTE
Smart Mesh Console warning will appear. This is normal and should be ignored. Select <Yes> to close the warning window

9. Observe the wSIMs appearing in the Smart Mesh Console labeled with their respective serial numbers, see Figure 3-4.

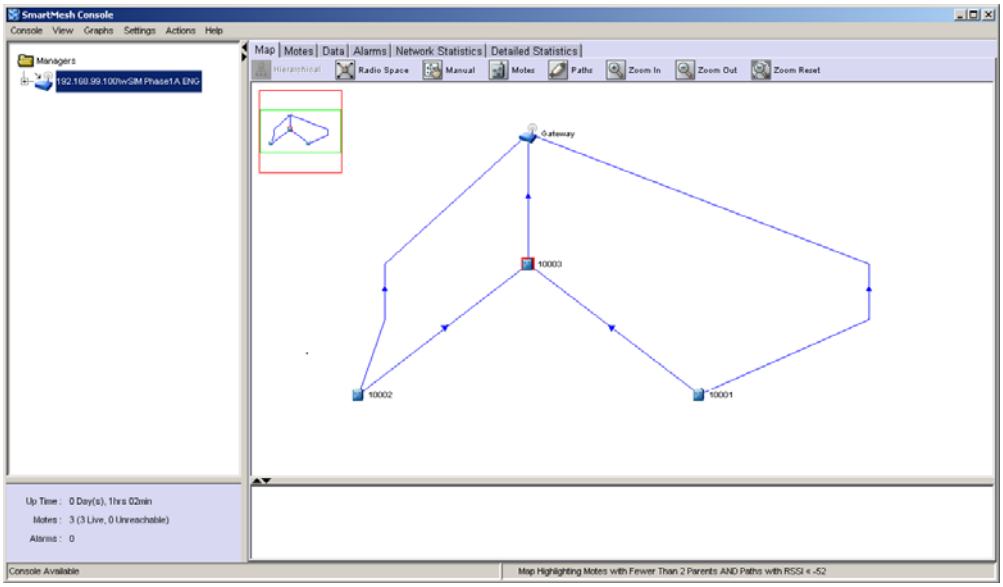

Figure 3-4: 802.15.4 Mesh Network Verification

10. When all three (3) wSIM show up in the Smart Mesh Console with lines connecting them to the Gateway, proceed to Section 4.

NOTE
If all three (3) wSIM do not join the network with 3 minutes, please power cycle the wSIM that have NOT joined and disconnect and reconnect to the wSIM Mesh Network Gateway.

4. System 1® WiTry™ Configuration

4.1.1 Install WiTry™ System 1® Templates

Before wSIM data can be displayed in System 1®, users must configure each wSIM as Modbus device in the System 1® Configuration Utility.

1. Open System 1® Configuration Utility
2. Select >> Enterprise >> Open

a. Select the existing Enterprise you want to configure for the WiTry™ demonstration, or create a new one.

3. Click <<Connect>>
4. After the Enterprise opens >>From the Tools Menu >> select Template Import / Export
5. In the Template Import / Export Window >> Click the Import Radio Button
6. Click <Browse>
7. In the Open window >> Navigate to USB:\WSIM WITRY\Templates
8. Select wSIM Released Templates, see Figure 4-1.

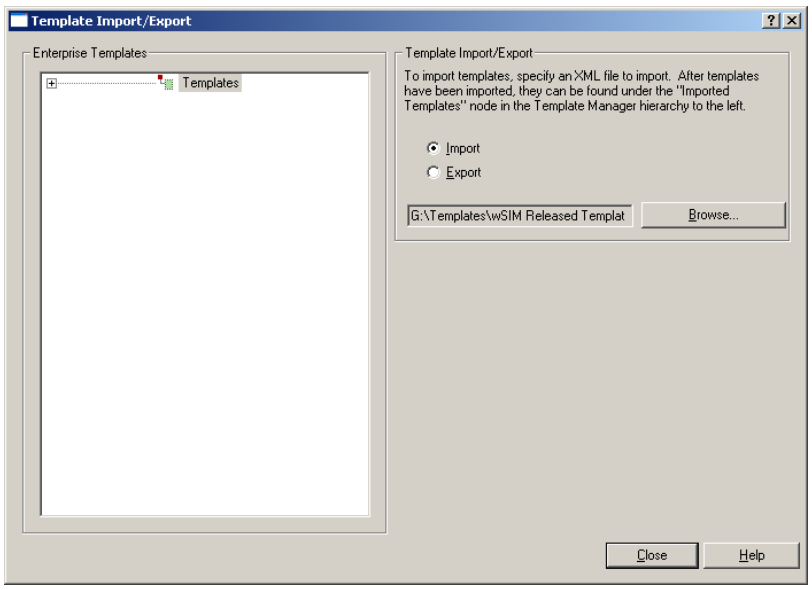

Figure 4-1: wSIM System 1® Template Installation

9. Click <Open> to load the templates into System 1®
10. In the Do you wish to continue pop-up, click <Yes>
11. Wait while changes to the Enterprise are saved.
12. Close Template Import / Export Window by clicking <Close>

4.1.2 Create Modbus Devices in System 1®

To enable wSIM data to be entered into System 1®, four (4) Modbus Devices must be created in the System 1® Configuration application. Three (3) devices will be configured using the wSIM Node Template and one (1) device will be configured using the wSIM Network Statistics template.

NOTE

The wSIM examples provided in Section 4.1.2 (wSIM 10001, wSIM 10002, and wSIM 10003) are not necessarily the same as the wSIM provided in the WiTry™ Kit.

Please replace the examples shown here with the actual serial numbers of the wSIM included with the WiTry™ Kit you are configuring.

1. In the System 1® Configuration application, expand the Instruments Segment
2. Expand the DAQ Segment
3. Right click on Modbus Devices >> select Add wSIM >> select wSIM Node Template, see Figure 4-2.

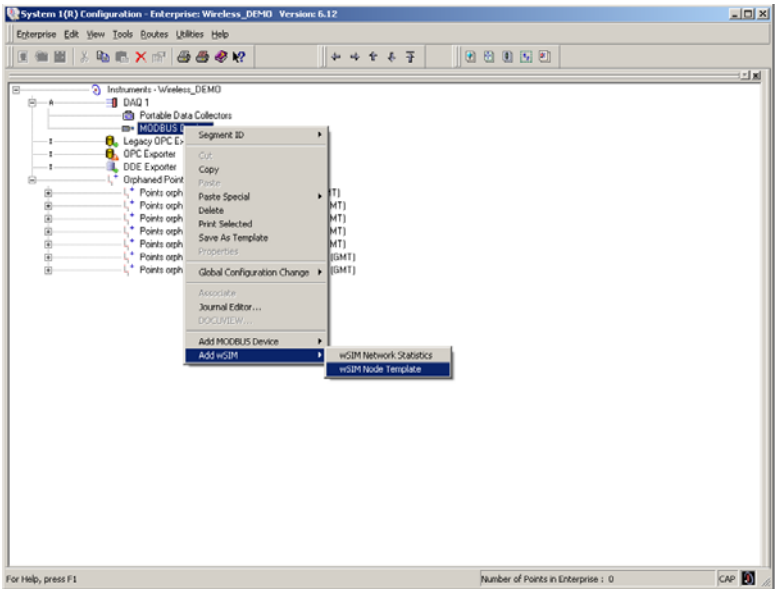

Figure 4-2: Set-Up wSIM Modbus Devices

4. In the Properties of wSIM 00000 window
    a. Enter the following information on the General Tab, see Figure 4-3.
        i. User Name: wSIM 10001
        ii. Tag Name: wSIM 10001

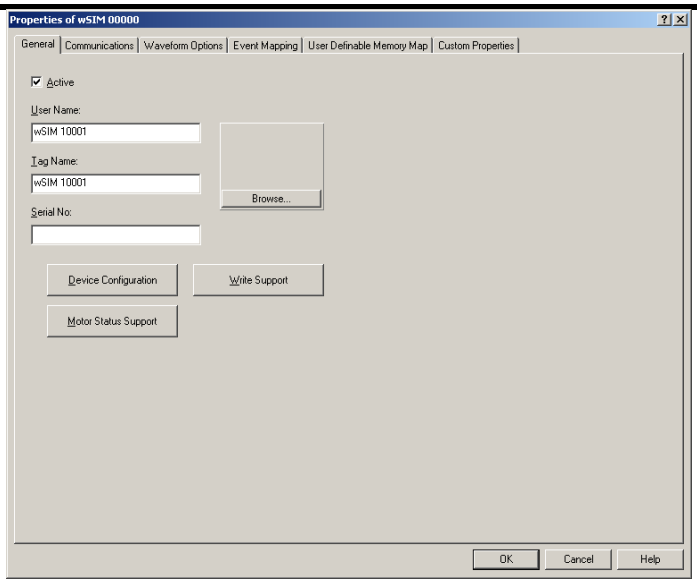

Figure 4-3: Name wSIM Modbus Device

b. Enter the following information on the Communications Tab, see Figure 4-4.

   i. Protocol: TCP /IP

   ii. Slave Address: 2

   iii. Max Data Byte Size: 250

   iv. IP Address: 127.0.0.1

   v. Port Number: 502

   vi. Timeout (Frames): 15000

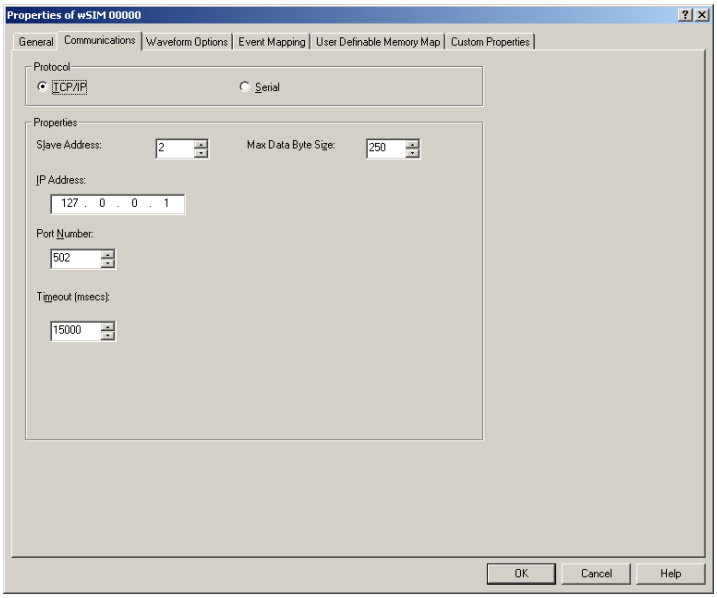

Figure 4-4: wSIM Modbus Settings

c. Click <OK>

d. In the Continue configuring? Window

i. Select the Do not show this dialog again during the current operation radio button

ii. Click <No>

You should now see wSIM 10001 show up under the Modbus Devices segment in the System 1® Configuration application.

5. Right click on Modbus Devices >> select Add wSIM >> select wSIM Node Template

6. In the Properties of wSIM 00000 window

a. Enter the following information on the General Tab

i. User Name: wSIM 10002

ii. Tag Name: wSIM 10002

b. Enter the following information on the Communications Tab

i. Protocol: TCP /IP

ii. Slave Address: 3

iii. Max Data Byte Size: 250

iv. IP Address: 127.0.0.1

v. Port Number: 502

vi. Timeout (Frames): 15000

c. Click <OK>

d. In the Continue configuring? Window

i. Select the “Do not show this dialog again during the current operation” radio button

ii. Click <No>

You should now see wSIM 10002 show up under the Modbus Devices segment in the System 1® Configuration application.

7. Right click on Modbus Devices >> select Add wSIM >> select wSIM Node Template

8. In the Properties of wSIM 00000 window

a. Enter the following information on the General Tab

i. User Name: wSIM 10003

ii. Tag Name: wSIM 10003

b. Enter the following information on the Communications Tab

i. Protocol: TCP /IP

ii. Slave Address: 4

iii. Max Data Byte Size: 250

iv. IP Address: 127.0.0.1

v. Port Number: 502

vi. Timeout (Frames): 15000

c. Click <OK>

d. In the Continue configuring? Window

i. Select the Do not show this dialog again during the current operation radio button

ii. Click <No>

You should now see wSIM 10003 show up under the Modbus Devices segment in the System 1® Configuration application.

9. Right click on Modbus Devices >> select Add wSIM >> select wSIM Network Statistics

10. In the Properties of wSIM Network Statistics window

a. Leave the defaults on the General Tab.

b. Enter the following information on the Communications Tab

i. Protocol: TCP /IP

ii. Slave Address: 1

iii. Max Data Byte Size: 250

iv. IP Address: 127.0.0.1

v. Port Number: 502

vi. Timeout (Frames): 15000

c. Click <OK>

d. In the Continue configuring? Window

i. Select the Do not show this dialog again during the current operation radio button

ii. Click <No>

You should now see wSIM Network Statistics show up under the Modbus Devices segment in the System 1® Configuration application. System 1® has now been properly configured to accept data from the WiTry™ System.

e. Click <Save Enterprise> to save the configuration in the System 1® Configuration application.

4.1.3 Start System 1® Data Acquisition

After configuring the WiTry™ Modbus devices in the System 1® Configuration application, the System 1® Data Acquisition Connection Manager application must be restarted.

1. Open the System 1® Data Acquisition Connection Manager
2. Expand Data Acquisition Servers. You should see a Red Dot overtop the DAQ associated with the WiTry™ System.

NOTE
If the DAQ has a green dot indicating it is already running, right click and select Close DAQ. Then proceed to step #3 below.

3. Right click on the Data Acquisition Server associated with the WiTry™ System
4. Select Initiate DAQ, see Figure 4-5.

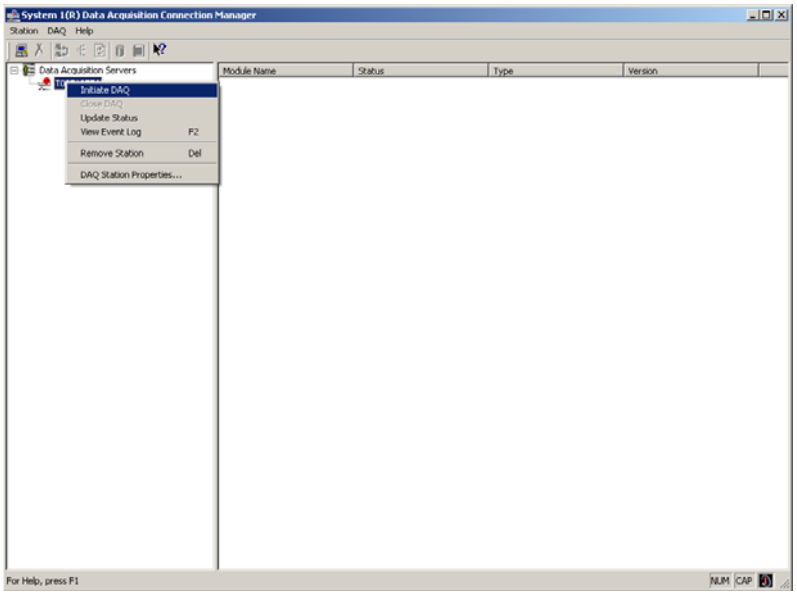

Figure 4-5: Starting System 1® DAQ

5. When the DAQ has started, you will see a green dot above the DAQ associated with the WiTry™ System.

6. Verify settings by Expanding the DAQ segment, see Figure 4-6.

    a. Expanding the Modbus DCM segment

        i. The three (3) wSIM and one (1) Network Statistics Modbus devices just installed are shown.

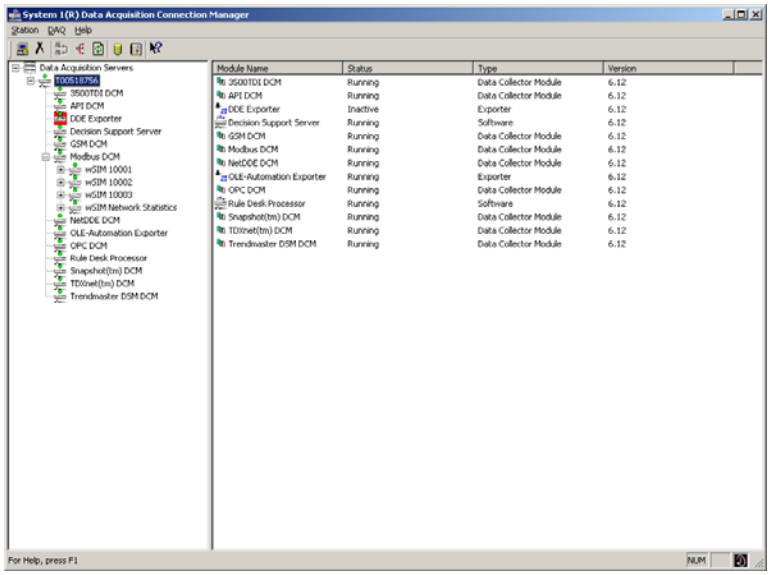

Figure 4-6: Running System 1® DAQ

4.1.4 Start System 1® Display

After starting the System 1® DAQ associated with the WiTry™ System, open up the System 1 Display to view wSIM data.

1. Open System 1 Display
2. Select Enterprise >> Open >> Enterprise
3. Select the appropriate Enterprise for the WiTry™ System
4. Click <Connect>
5. Expand Instruments
6. Expand DAQ1 (or the appropriate DAQ Instrument if you have others configured)
7. Expand Modbus Devices. You should see three (3) wSIM devices and one (1) network statistics device.
8. If the system is configured properly, the four (4) Modbus devices configured for the WiTry™ System should be blinking green, see Figure 4-7.

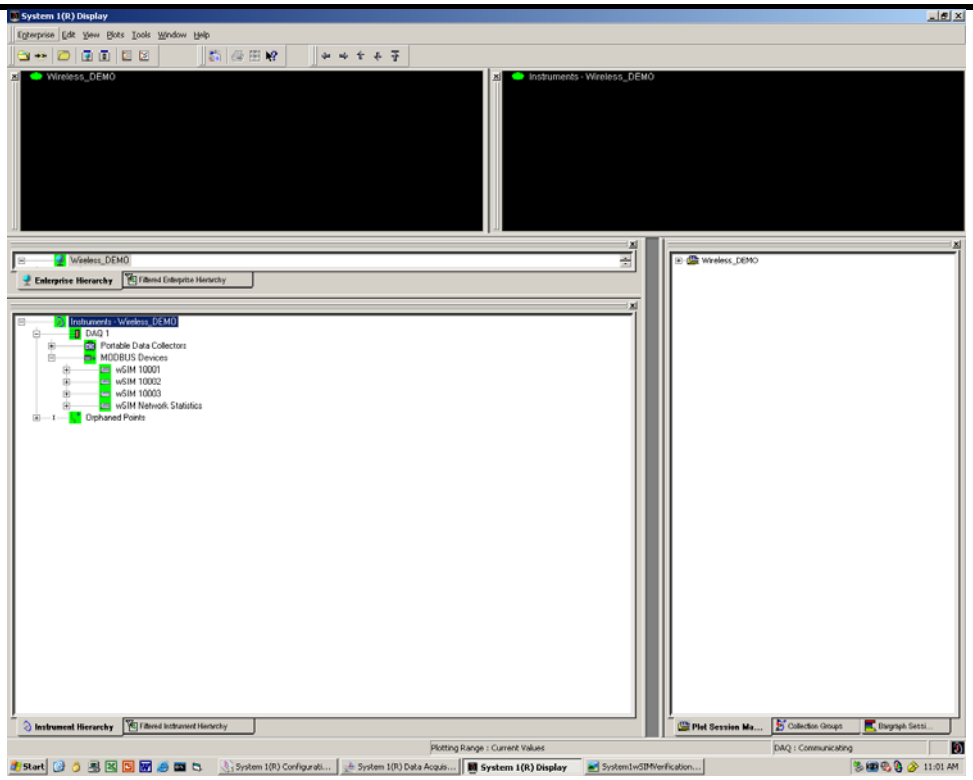

Figure 4-7: System 1® Display

9. Drill into the Network Statistics of each wSIM and make certain the Node State = 3.

    a. Expand wSIM 10001

    b. Expand Network Statistics

    c. Double Click Node State to view data

10. A graph of the data reported is displayed. The current value should be 3, see Figure 4-8.

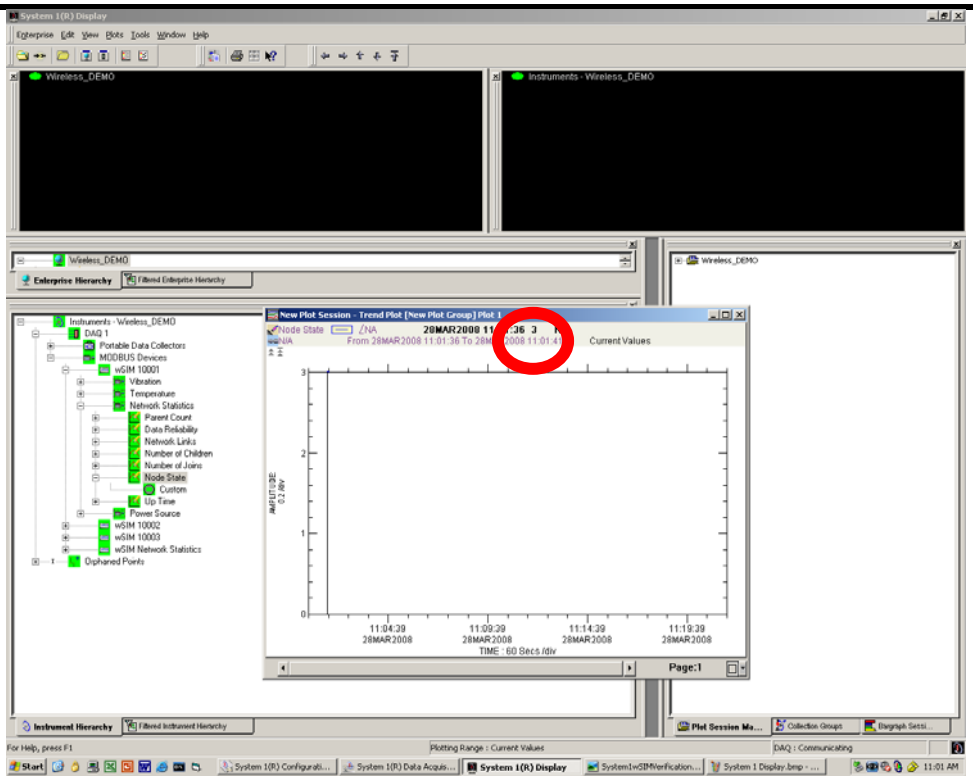

Figure 4-8: wSIM verification in System 1® Display

11. Repeat Step #8 for wSIM 10002
12. Repeat Step #8 for wSIM 10003
13. Drill into the wSIM Network Statistics Device
    a. Expand wSIM Network Statistics
    b. Expand Statistics
    c. Double Click Node Count to view data
    d. A graph of the data reported is displayed. The current value should be 3 indicating three wSIM are present on the network (10001, 10002, 10003), see

At this point, the WiTry™ System has been properly configured.