**..thinkRF™**

A Wesley Clover International Affiliate

# SXM Local Control Application

## User Guide

Version 1.1.1

# Table of Contents

# Preface

The intended audience, document organization, and conventions used herein are described. Related documentation is identified, as are instructions for accessing other electronic product documentation.

## Audience

This document is intended for technical users who have a basic level of understanding, familiarity and experience with spectrum monitoring and mobile network usage.

## Conventions

The following conventions are used in this document.

| Convention | Description |
|---|---|
| Grayed-out Font | Indicates a command or a feature is not available in the current release. |
| Courier Font | Illustrates an example command or a concept. |
| Light Blue Font | A clickable hyperlink to a referenced source. |
| **Normal Bold Font** | A concept or idea important enough that the reader's attention is being explicitly focused. |
| Red Font | Additional information on the topic. |

**Note**: This symbol means **take note**. Notes contain helpful suggestions or references for additional information and material.

**Caution**: This symbol means **be careful**. In this situation, you might do something that could result in loss of settings, data or unintended data behavior.

## Obtaining Latest Documentation and Software

Please visit https://support.thinkrf.com/support/solutions to obtain the latest product documentation, software and firmware releases where applicable.

## Document Feedback

Please send any comments regarding thinkRF documentation to SXMfeedback@thinkrf.com. We appreciate your feedback.

## Product Feedback

thinkRF's SXM is constantly evolving to better serve your needs, with new features and enhancements deployed to your network and this dashboard regularly. Submit your input to SXMfeedback@thinkrf.com or use the Dashboard's Feedback box on the Help page.

## Obtaining Technical Assistance

For all customers who hold a valid end-user license, thinkRF provides technical assistance 9 AM to 5 PM Eastern Time, Monday to Friday. Contact us at https://support.thinkrf.com/ or by calling **+1.613.271.5451**.

Before contacting support, please have the following information available:

- Application version
- The Serial Number of the issue SXM node
- LEDs blinking pattern if applicable
- Date and time when the issue occurred, with pictures of the issue if applicable
- Maintenance log information, if applicable
- Phone number to reach you, if applicable

# Overview

thinkRF's Spectrum eXperience Management (SXM) node is the IoT hardware of the SXM solution, a real-time wireless network monitoring and intelligence platform, providing analytics and insights at the users' fingertips.

The node operates 24/7 continuously and autonomously to perform spectrum analysis and send data and metrics to the SXM Cloud when there is internet. The data can then be consumed by the users via SXM API for users' own application or with thinkRF's SXM Dashboard. The solution architecture is illustrated in the following picture. Refer to the latest "*thinkRF - SXM Edge Node - User's Manual*" (or see under Help of this application) for more information about the SXM node.
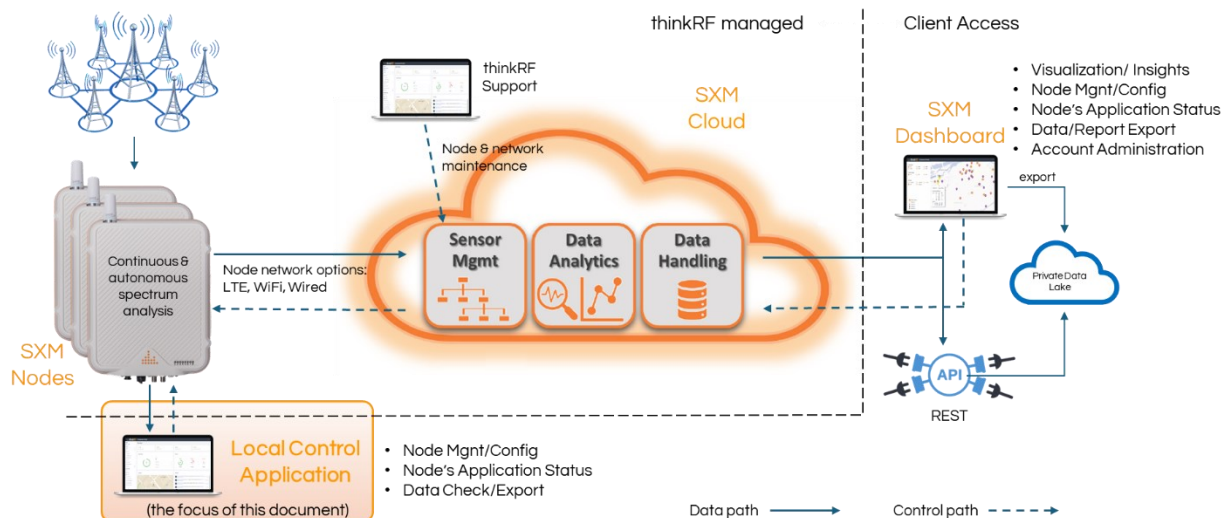


In the absence of a network connection, a powered-on node will continue to perform the preprogrammed configuration and store the captured data in the local storage. In this scenario, to aid the users with more visibility to the node's operation, status, and analysis application progress in real time, the Local Control Application software is provided.

## User Interface

The software is based off the SXM Dashboard, hence, maintaining the same look-and-feel and usage familiarity for users of SXM Dashboard. It, however, provides only limited functionalities for the purposes mentioned above. There is no map view included to keep the software package small and efficient.

This document explains the usage of this Local Control Application software (LCA for short), assuming users' knowledge of SXM Dashboard. Refer to *"thinkRF SXM Dashboard User's Guide"* (also available under Help of this application) for more details.

# Get Started

To use the Dashboard, you must have a valid account first, whether provided by thinkRF or by your corporate account's administrator.

**Important Note:** Before heading out to a remote location without a network connection, we highly recommend that users successfully get this application running first to ensure that the connection or the network system, where the node is connected to, works properly.

## System Requirements

Before running Local Control Application (LCA), ensure that your computer meets the following minimum system requirements:

- **Ethernet Port:** Minimally 100 Mbit/sec. AutoIP APIPA connection type is required if direct node to computer connection is needed.
- **Browser Support:** Edge, Firefox, Chrome (and its variant).

This application has not been tested on a Mac system.

## Obtaining the Node's IP

To access the LCA dashboard, the powered-on node must first be connected to a network via a switch/router/modem or connect directly to the computer that will run the application. The following sections will explain the two connection methods and how to obtain the IP.

**Important Note**: Once you finish using the ethernet port of the node, ensure to put the cover cap back on properly and tighten. This is to ensure no moisture will permeate the node.

### Connecting via A Network

1. Connect the node to a router, switch, or modem.
2. Connect the computer to the same network that the node is on.
3. If the node has internet connection, expand the node's view under the Node Management of the SXM Dashboard to view the IP and MAC information, as shown in the following figure.

4.  With the MAC address provided by thinkRF for the node, use the administrative access of the router/switch/modem to obtain the assigned IP to that MAC address.

**Note:** You might need the help of your organization's IT administrator for this step if you don't have permission or access to the network's IP assignment.

### Connecting Directly

This method will require the computer to support AutoIP APIPA connection access. Windows computers typically come with this connection type supported readily.

**Note:** Before using the following steps, if the node has internet connection, expand the node's view under the Node Management of the SXM Dashboard to view the IP and MAC information, as shown in the previous figure.

1.  Connect the node to your computer using a direct ethernet connection.
2.  Open a command prompt window and run `ipconfig` command. The ethernet port used should report IP starting with 169.254.X.Y.
    The computer might take up to 2 minutes to assign itself an AutoIP address.
3.  With this IP, run this command:
    ```
    arp -g -N 169.254.X.Y
    ```
    replace X & Y with the correct numbers.
    Another 169.254.**A.B** (that's not 169.254.255.255) should be seen in the list.

**Note:** The connection method might take up to 4 minutes to properly establish communication and to get a node's IP.

4.  To verify the IP is working, do:
    ```
    ping 169.254.A.B
    ```
    replace X & Y with the correct numbers.
    You should see no packet loss or time out from the command prompt.

5. If 169.254.**A.B** is not seen, your computer has not been able to establish the connection with the node. Refer to the Troubleshooting section for help.

## Running the Application

When you have successfully obtained the node's IP, you can now follow the following steps to use the application.

**Note:** If a reboot is issued, the application will be logged out.

1. Type its IP address on the URL of your browser:
   `https://<node's ip>`
   Note that you would need to type "https", not "http" even though the LCA webpage is http.
2. You might be prompted that the page is not secure. Please proceed to accept the prompts.
3. You should then see the log-in page as shown below.
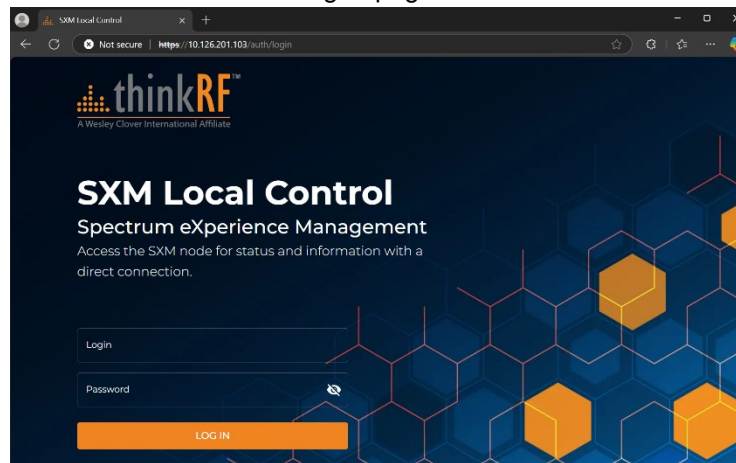


4. If you see the following screen, your browser's security is likely restricted to not allowing 'http' website usage. Refer to online help for how to enable your browser to accept 'http'.
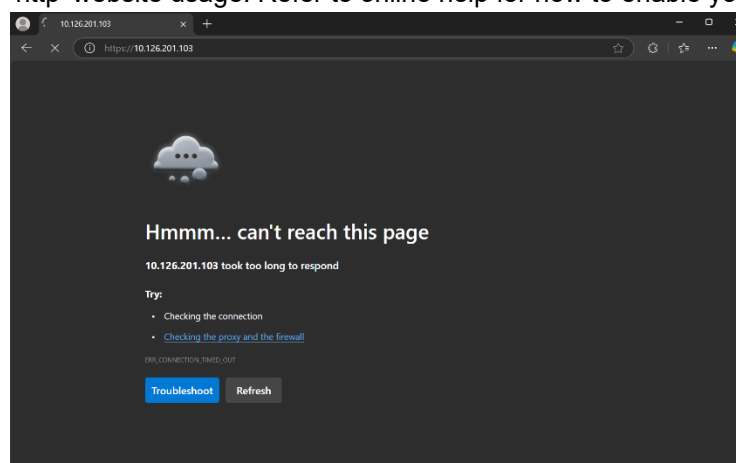


5. The default login information is:
   - **User:** node.control
   - **Password:** sxm@1control

> **Note**: This information should not be shared outside the organization. Refer to Changing the Access Password section for how to change this default password for a node.

6. Upon successfully logged in, the Home page will be seen as shown in the next section.

> **Note**: Only one user can access the LCA at a time.

## Changing the Access Password

SXM System provides the option for the owners of the nodes to maintain their own LCA's access password for security reasons. This can be done through the Node Management feature of the main SXM Dashboard.

> **Note:** The password change option is only applicable to LCA v1.1.1 or higher. Ensure your nodes have been updated first before performing the change. The LCA version can be seen in the Summary page of the LCA or from the SXM Dashboard's Node Management.

To make the password change,

1. The node needs to be powered on and has access to the internet.
2. The user will need the SXM Dashboard access.
3. Then refer to the "Managing Local Control Application's Password" section of the *"thinkRF SXM Dashboard User's Guide"* (also available under Help of this application) for how to make the change.

# Using Local Control Application

This section goes over the Local Control Application usage and the explanation of the information provided. The application is designed to be user friendly and intuitive.

## Homepage View and Statuses

As LCA is a limited version of the SXM Dashboard, the Homepage view has been repurposed to show the Node's information readily, removing the needs of the "Node Management" page that is available with the SXM Dashboard.

The following image shows the node's information reported, along with the buttons for running BIST (Built-In Self Test) or node's Reset.

- **Node's Status** indicates its status, the current network connection method (Ethernet, WIFI, or SIM), and its current time.
  - o **GNSS Info** provides location information (when there is a successful GNSS lock), as well as the GNSS module's configured mode (or Dynamic Mode).

- **Current Application Information** shows the running application and configuration, with the last data status.

  - o The Channel Occupancy application might not be available to all users. As the node does not store the corporate's application latest subscription information, this application *might* show by default.

# Check Signal Analysis Data

Besides the node's operation and statuses, the LCA also allows users to verify that the signal analysis application is running and collecting data.

The application's Sites Data, as shown in the following picture, shows a **copy** of the data stored on the local hard drive. If the node has no network connection, this data will remain in the hard drive until the next internet connection availability. In the presence of a network connection, the LCA might show data that has been loaded to the cloud already so that users can verify the functioning of the signal analysis application.

| Node ID | Record Time (UTC) | Operator | Frequency (MHZ) | Band | nodeB ID | Cell ID |
|---|---|---|---|---|---|---|
| 230320-100 | 2025-01-24T23:23:34 | [302]-[720] | 1977.5 | 2 | 40286 | 22 |
| | 2025-01-24T23:23:27 | [302]-[720] | 872.5 | 5 | 36123 | 52 |
| | 2025-01-24T23:23:18 | [302]-[720] | 734 | 12 | 36123 | 9 |
| | 2025-01-24T23:23:17 | [302]-[720] | 622 | 71 | 3510606 | 6102 |
| | 2025-01-24T23:23:16 | [302]-[720] | 622 | 71 | 40286 | 62 |
| | | [-1]-[-1] | 621.85 | 71 | -1 | -1 |
| | 2025-01-24T23:22:52 | [302]-[220] | 2630 | 7 | 219037 | 121 |
| | 2025-01-24T23:22:37 | [302]-[220] | 2147.5 | 4 | 219037 | 1 |
| | | [302]-[720] | 2117.5 | 4 | 36123 | 3 |
| | 2025-01-24T23:22:36 | [302]-[220] | 1960 | 2 | 219037 | 41 |
| | 2025-01-24T23:22:27 | [302]-[220] | 885 | 5 | 219037 | 71 |
| | 2025-01-24T23:22:26 | [302]-[720] | 734 | 12 | 36123 | 9 |
| | 2025-01-24T23:22:06 | [302]-[720] | 2117.5 | 4 | 36123 | 3 |
| | 2025-01-24T23:22:03 | [302]-[720] | 872.5 | 5 | 36123 | 52 |
| | 2025-01-24T23:21:55 | [302]-[720] | 734 | 12 | 36123 | 9 |
| | | [-1]-[-1] | 723 | 29 | -1 | -1 |
| | | [302]-[220] | 723 | 29 | 219133 | 32 |
| | 2025-01-24T23:21:33 | [302]-[220] | 2680 | 7 | 219037 | 111 |
| | 2025-01-24T23:21:32 | [302]-[220] | 2147.5 | 4 | 219037 | 1 |
| | 2025-01-24T23:21:20 | [302]-[220] | 1960 | 2 | 219037 | 41 |
| | | [302]-[720] | 1937.5 | 2 | 3510606 | 2102 |
| | 2025-01-24T23:21:13 | [-1]-[-1] | 885 | 5 | -1 | -1 |
| | 2025-01-24T23:21:11 | [302]-[720] | 872.5 | 5 | 36123 | 52 |
| | 2025-01-24T23:21:03 | [302]-[220] | 742.5 | 17 | 219037 | 11 |
| | | [-1]-[-1] | 734 | 12 | -1 | -1 |
| | 2025-01-24T23:21:02 | [-1]-[-1] | 723 | 29 | -1 | -1 |
| | | [302]-[720] | 622 | 71 | 3510606 | 6102 |
| | | | | | 40286 | 62 |
| | 2025-01-24T23:20:41 | [302]-[720] | 1977.5 | 2 | 40293 | 21 |
| | 2025-01-24T23:20:29 | [302]-[720] | 734 | 12 | 36123 | 9 |
| | | [302]-[220] | 723 | 29 | 219133 | 32 |
| | 2025-01-24T23:20:28 | [302]-[720] | 622 | 71 | 3510606 | 6102 |
| | | | | | 40286 | 62 |
| | 2025-01-24T23:20:11 | [302]-[720] | 872.5 | 5 | 36123 | 52 |
| | 2025-01-24T23:20:10 | [302]-[720] | 872.5 | 5 | 36123 | 52 |
| | 2025-01-24T23:20:02 | [302]-[720] | 734 | 12 | 36123 | 9 |
| | 2025-01-24T23:19:38 | [302]-[220] | 2147.5 | 4 | 219037 | 1 |
| | 2025-01-24T23:19:29 | [302]-[220] | 885 | 5 | 219037 | 71 |
| | 2025-01-24T23:19:27 | [302]-[720] | 872.5 | 5 | 36123 | 52 |

Rows per page: 100 ▾   |< <   1 ⌄  of 20  > >|

The LCA uses the same table view and functions of the SXM Dashboard. The data, thus, can be filtered and sorted. Refer to "Data Tables" section and the "3GPP Network Analytics" chapter of the *"thinkRF SXM Dashboard User's Guide"* (available under Help of this application) for more usage details.

## Run BIST and Reboot

The Homepage provides quick access to the Built-in-Seft-Test (BIST) and Reboot buttons as shown below.

**Node Functions**

Run BIST    Reset Node
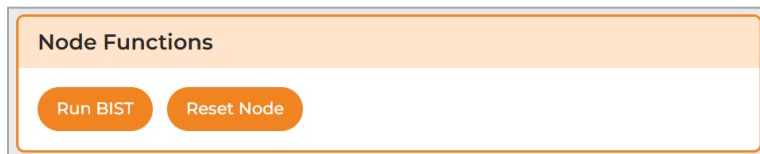
**Run BIST** provides information on the last BIST request runs or to start a new test run. After initiating a new BIST run, results will not be available immediately as the tool performs a series of checks on the node's various components and services, which could take some minutes. Thus, at the submission, a pop-up window will inform you to "Run BIST" again to see the results later.

When the **Reset Node** button is issued, users will be logged out of the application and wait until the LEDs 2, 3, 4 and 5 are up and running. See the "LEDs Status" section of the "*thinkRF - SXM Edge Node - User's Manual*" for the details (available under Help of this application).

Once the LEDs are ready, follow the Running the Application section to run the application again as needed.

## Configuring Node's Application

Users of the LCA can configure the signal analysis application of the node as needed. The configuration process is similar to that of the SXM Dashboard, so please refer to the *"thinkRF SXM Dashboard User's Guide"* (available under Help of this application) for the usage details, including when data will be available for submission.

Use the Homepage to view the status of the application after submitted.

## Help Menu and Documentation

The Help view provides convenient access to user's documents for the LCA, SXM Dashboard and the node. It also shows the About information for this application and for getting help.

# Troubleshooting

The successful running of the LCA depends on the proper connection or user's device supporting AutoIP APIPA for IP address assigning, and the device's operation.

Should the LCA not function normally, see the following steps to resolve or narrow down the issue. If the issue persists, reach out to thinkRF support along with the information as indicated in Obtaining Technical Assistance section.

Refer also to the "Node Troubleshooting" section of the "*thinkRF - SXM Edge Node - User's Manual*" (also available under Help of this application) for additional troubleshooting information.

| Issue | Action |
|---|---|
| Could not establish the direct connection method | - If this happens on very first usage, check if "Windows network discovery" is enabled (use Google to search for the steps for your windows version).<br><br>- Check the LEDs 2 (SBC STS) and 3 (SBC PWR) are up and running. |
| Homepage or any page view goes blank | - If the node is not working properly or the connection is lost, the information will not be available for display. In this case, log-out of the application, check that the connection is working, and the log-in page is shown.<br><br>- If the Site Data is not showing data but the Homepage works fine, this means there is no data from the device. Check the Homepage for the Application status and the LED #4 (APP health). |
| Not sure what to do | Please contact thinkRF support. |

# Revision History

This section summarizes document revision history.

| Document Version | Release Date | Revisions and Notes |
|---|---|---|
| v1.0.0 | 10/30/2024 | First release version. |
| v1.1.0 | 01/24/2025 | Update through the document regarding:<br><br>• Connection methods and obtaining the IP<br>• New Homepage<br>• Removed "Node Management" section<br>• Added all User Guides/Manuals with PDF files to the Help section. |
| v1.1.1 | 03/14/2025 | • Added Changing the Access Password section for LCA release v1.1.1.<br>• Added Help Menu and Documentation section.<br>• Updated the support's phone number.<br>• Updated Obtaining the Node's IP section regarding getting MAC/IP from SXM Dashboard's Node Management. |