
Site Survey Kit User Manual

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Site Survey Kit for Wireless Monitoring Devices

Getting Started Guide

Overview

The Site Survey Kit for Wireless Monitoring Devices is used to determine the range of NI wireless products by providing a portable system that reports and logs wireless signal strength at various physical locations or sites. Use the information to help determine the best place to deploy new gateways.



Note Read the *Portable Gateway for Wireless Site Survey Kit Safety, Environmental, and Regulatory Information* document on ni.com/manuals before installing.

Related information:

- ni.com/manuals

Verifying the Kit Contents

Verify the following components are in your kit.

- Portable Gateway for Wireless Site Survey Kit
- Antenna for the Portable Gateway
- Dell Power Supply with 6-Foot Power Cord (US Only)
- Magnetic Tablet Mounting Pads
- Shoulder Strap
- Microsoft Surface Go
- MON-10411 Wireless Vibration Node
- MH112-1A Multi-Purpose Magnetic Base for Wireless Sensors
- Site Survey Kit for Wireless Monitoring Devices User Manual
- Portable Gateway for Wireless Site Survey Kit Safety, Environmental, and Regulatory Information

- MON-10411 Safety, Environmental, and Regulatory Information

Unpacking and Setting Up the Kit

Remove the devices from the kit and inspect them for loose components or any other signs of damage. Notify NI if the devices appear damaged in any way. Do not turn on a damaged device.

Complete the following steps to set up the devices in the kit.

1. Plug the power supply into the portable gateway to charge the battery. Unplug the charger when the battery finishes charging. The battery-status lights turn on indicating the charge status of the battery.



Note The portable gateway cannot be powered on while the battery is charging.

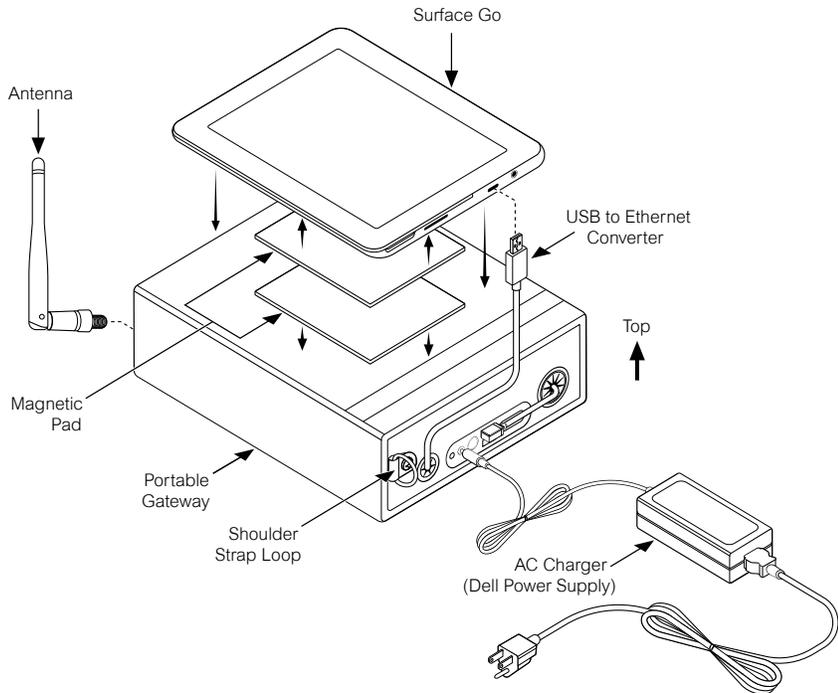
2. Charge and set up the Surface Go by following the manufacturer's instructions, included in the kit.
3. Configure the Surface Go to use the following IP address: 192 . 168 . 1 . x, where x is any number except 33.
4. Use the magnetic pads by following the manufacturer's instructions, included in the kit, to attach the Surface Go to the portable gateway.



Tip Center the magnetic pads on their respective surfaces when positioning them.

5. Plug the portable gateway into the Surface Go.

Figure 1. Kit Devices Setup Diagram



Turning On Devices

Turn on the MON-10411 and portable gateway while they are in range of each other. Always turn on your endpoint before turning on the portable gateway to ensure the portable gateway detects the endpoint.

1. To turn on the MON-10411, press and hold the button on the MON-10411 for five to ten seconds. Do not hold the button for longer than ten seconds.
2. To turn on the portable gateway, flip the power switch on.

Bonding the Portable Gateway to the Endpoint

Complete the following steps to bond the portable gateway to the endpoint.

Before you begin, ensure the endpoint and portable gateway are turned on.

1. On the Surface Go, launch a web browser and go to `http://192.168.1.33:8002/survey` to access the Wireless Site Survey Software.
2. In the Discover tab, find your endpoint in the **Wireless Endpoints** list. Endpoints are identified by the device serial number.



Note The software may take up to one minute for the portable gateway to identify the endpoint. Select **Discover** if your endpoint is not detected, which may happen if the portable gateway is turned on before the endpoint is turned on or if the endpoint is not in range during initial discovery.

3. In the **Endpoint** pull-down menu, select your endpoint.



Note The software may update the firmware on the endpoint if the firmware is out of date. Updating the firmware may take up to five minutes.

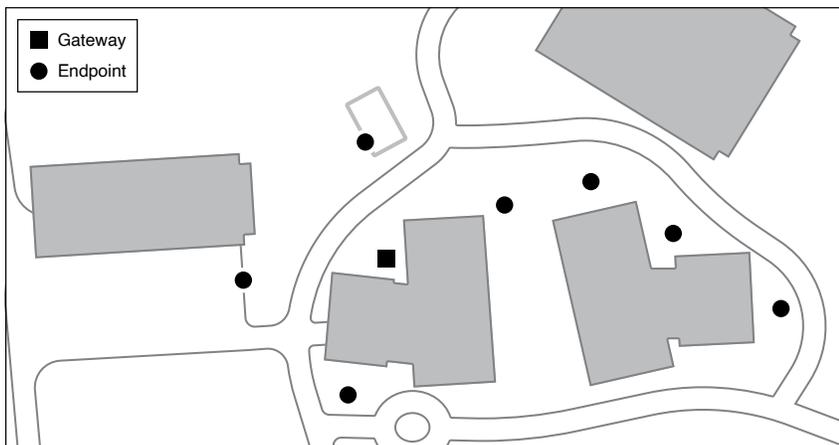
4. Select **Bond** to start bonding the portable gateway to your endpoint.
The status bar displays `Connected to endpoint` when the portable gateway is bonded to the endpoint.

Creating a Site Survey Plan

A site survey plan defines the site, or area, to cover, the gateway and endpoint locations you want to measure and record, and the number of people to perform the survey.

Obtain a map of the site, which covers the area to survey. For example, print an aerial view of the site that includes the locations you plan to measure.

Figure 2. Example of a Site Survey Map



Endpoints are wireless devices and wireless sensors that communicate data to the portable gateway. **Endpoint locations** are at or near assets, such as pumps, fans, and so on, that you want to monitor. NI recommends that you orient a wireless sensor to mimic the final installation. If you plan to use a wireless device, place the sensor where you will mount the antenna.

Gateway locations are the locations you want to deploy a wireless access point. Choose locations that are close to power and network connectivity sources while being centrally located within the area to be monitored by wireless monitoring systems.

You can perform a survey with one or two people.

Two-Person Site Survey (Typical)

When performing a two-person site survey, determine how the two people communicate with each other because they will be out of speaking range for most of the site survey.

Person A is in charge of the portable gateway and uses the Wireless Site Survey Software, connected to the portable gateway, to measure signal strength. Person B moves the endpoint to different locations and takes note of the locations on the site survey map.

One-Person Site Survey

If only one person performs the site survey, place the endpoint in a fixed location to represent the gateway location. Move the portable gateway, which represents the endpoint, to different locations according to the site survey map, and use the Wireless Site Survey Software to measure signal strength.

Carrying the Kit

Before carrying the kit, disconnect the AC charger from the devices.

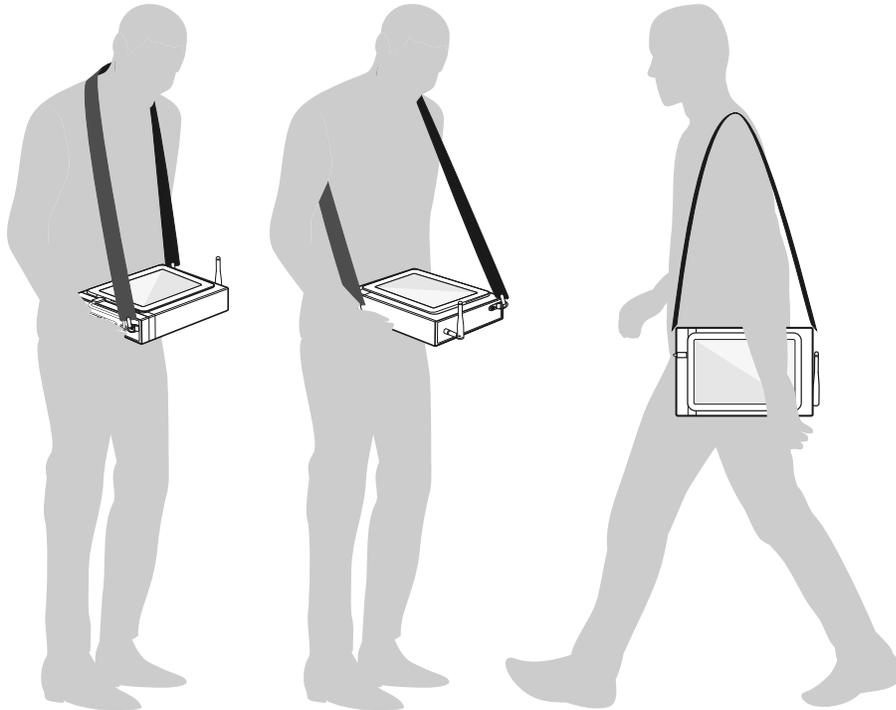
Complete the following steps to carry the kit.

1. Connect the shoulder strap to the shoulder strap loop.
2. Adjust the shoulder strap.
3. Carry the kit safely as shown in the following figure.



Notice When operating or walking with the kit, ensure that the Surface Go does not get pulled down by external force stronger than the magnetic force that the magnetic pads provide.

Figure 3. Examples of Carrying the Kit



Performing a Survey

A survey collects signal strength measurements between the portable gateway and endpoint at different locations.

Before you begin, create a site survey plan, turn on the portable gateway and endpoint, and bond the portable gateway to the endpoint.

Complete the following steps to begin performing a survey.

1. Move the endpoint and portable gateway to their respective locations according to your site survey plan. Refer to the **Carrying the Kit** section for more information about carrying instructions.

2. On the Surface Go, launch a web browser and go to `http://192.168.1.33:8002/survey` to access the Wireless Site Survey Software.
3. In the Discover tab, verify that the portable gateway is bonded to the endpoint. Refer to the ***Bonding the Portable Gateway to the Endpoint*** section for how to bond the portable gateway to the endpoint. In the Live tab, you can observe the signal strength between the portable gateway and endpoint.
4. In the Survey tab, enter values for **Site**, **Gateway Location**, and **Endpoint Location**.



Tip Use a naming scheme to facilitate reading the survey results. For example, use capital letters for gateway locations and numbers for endpoint locations, such that gateway-endpoint location pairs are A1, A2, A3, and so on.

5. Select **Record Location** to begin recording signal data.



Note NI recommends that you record the signal strength at a location for 30-60 seconds and acquire at least two waveforms.

6. Select **Stop** to stop recording signal data. The **Survey Results** table displays the recorded signal data.
7. Repeat the survey process for each endpoint location according to your site survey plan.

The **Survey Results** table collects all data you have measured during this process. Select **Save** to save the data displayed in the **Survey Results** table to a tab-delimited spreadsheet file (.tsv).

Related tasks:

- [Bonding the Portable Gateway to the Endpoint](#)
- [Carrying the Kit](#)

Using the Wireless Site Survey Software

Use the Wireless Site Survey Software to discover and bond the portable gateway to your endpoint, view signal strength between the portable gateway and endpoint, and

take measurements. The Wireless Site Survey Software is pre-installed on the portable gateway.

On the Surface Go, launch a web browser and go to `http://192.168.1.33:8002/survey` to access the Wireless Site Survey Software.

Discover Tab

Use the **Discover** tab to find endpoints detected by the portable gateway and to select the endpoint for performing a survey.

Discover | Live | Survey | About

Wireless Endpoints

Type	Serial Number	RSSI
MON-10411	1E69058	-27
MON-10467	0	-33
MON-10411	1E27DC3	-37
MON-10411	1E27DA9	-39
MON-10467	1D22C6C	-40
MON-10411	1E27DB3	-43
MON-10411	1E27E25	-45
MON-10411	1E27DB4	-45
MON-10411	1E27DCB	-46
MON-10467	1E5B3DA	-80

Endpoint: 1E69058

Bond

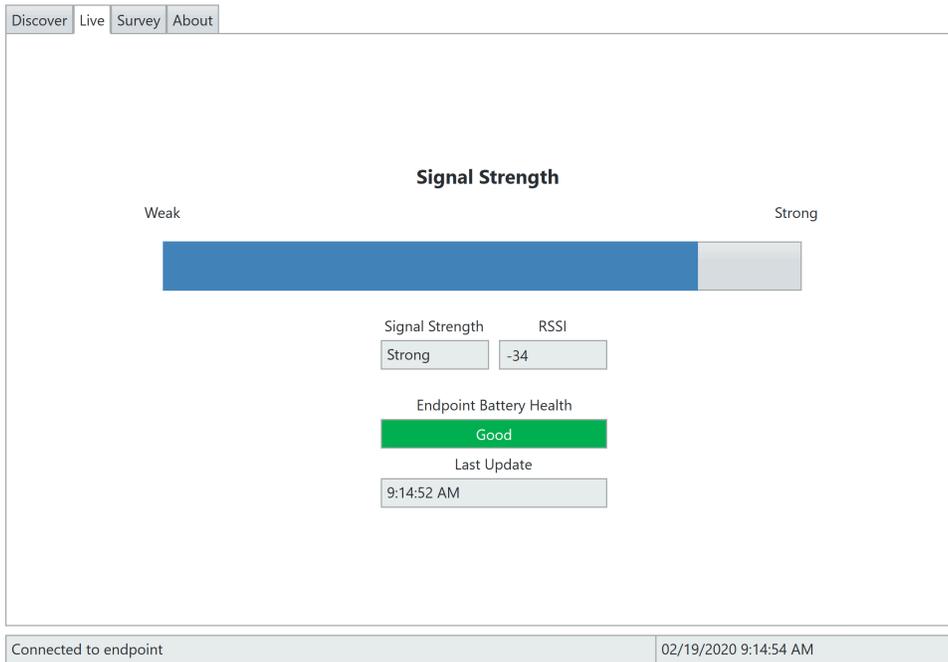
Discover

Connected to endpoint | 02/19/2020 8:22:46 AM

1. **Wireless Endpoints**—Endpoints detected by the portable gateway.
2. **Discover**—Finds endpoints within the range of the portable gateway.
3. **Endpoint**—Wireless device or sensor to bond with the portable gateway.
4. **Bond**—Bonds the portable gateway to the endpoint you select.
5. **Status bar**—Displays the status of the Wireless Site Survey Software.

Live Tab

Use the **Live** tab to view the live signal strength between the portable gateway and the endpoint before you perform a survey. The signal strength updates every five seconds.



1. Signal Strength Bar—Bar reading of the signal strength.
2. Signal Strength—Status of the signal strength.
3. RSSI—Received signal strength indicator.
4. Endpoint Battery Health—Condition of the endpoint battery.
5. Last Update—Time of the last update.

Survey Tab

Use the **Survey** tab to specify site and location names, record measurements, and save measurement data. Indicators update as the portable gateway measures signal strength and measurements are returned.

Discover Live Survey About

Record Location

Site
 Floor 1
 Gateway Location
 A
 Endpoint Location
 2

Average RSSI -24.7
 Number of Waveforms Acquired 3
 Average Waveform Time (sec) 9.0
 Test Duration (sec) 53
 Last Update 8:27:08 AM

Survey Results

Clear

Save

Gateway Location	Endpoint Location	Signal Strength	Avg RSSI	# Wfm	Avg Wfm Time	Duration
A	1	Strong	-26	4	10.0	70
A	2	Strong	-31	4	8.9	67
A	2	Strong	-25	3	9.0	54

Connected to endpoint 02/19/2020 8:27:22 AM

1. Site—Name of the site.
2. Gateway Location—Location name of the portable gateway.
3. Endpoint Location—Location name of the endpoint.
4. Survey Results—Displays the recorded signal data.
5. Record Location/Stop—Starts and stops a waveform test.
6. Clear—Removes the results displayed in the Survey Results table.
7. Save—Saves the results displayed in the Survey Results table to a file.
8. Average RSSI—Average received signal strength indicator (RSSI) that measures signal strength. This indicator does not update while taking measurements.
9. Number of Waveforms Acquired—Number of waveforms the portable gateway acquires in the waveform test.
10. Average Waveform Time (sec)—Average time, in seconds, to acquire one waveform in the waveform test.
11. Test Duration (sec)—Time, in seconds, of the waveform test.
12. Last Update—Time of the last update.

Updating the Software

Update the Wireless Site Survey Software by deploying the latest version of the application image from a PC to the portable gateway.

To access application images for the portable gateway, go to ni.com/info and enter the

Info Code `wirelessitesurveydownload`. You can find application images for the portable gateway in the `appImages` folder.

Before you begin, you need a PC on which you can install the Replication and Deployment (RAD) Utility. To download the RAD utility and access the installation instructions, go to `ni.com/info` and enter the Info Code `ex5rfd`.

Complete the following steps to deploy the application image from a PC to the portable gateway.



Note You must connect the PC and portable gateway to the same network.



Note Read the *Portable Gateway for Wireless Site Survey Kit Safety, Environmental, and Regulatory Information* document on `ni.com/manuals` before opening the portable gateway.

1. With the portable gateway and Surface Go powered off, remove the screws on the back of the portable gateway.
2. Gently remove the cover of the portable gateway.
3. Connect a network cable to the unused network port and power on the portable gateway. This network port is configured for DHCP or dynamic addressing.
4. On the PC, run the RAD utility and discover the portable gateway, listed as `sbRIO-9607`, on the main UI of the utility.
5. Click **Settings** to configure the directory where the application image is stored locally on the PC.
6. Select the portable gateway `sbRIO-9607` in the **Deployment Targets** table, and select the application image in the **Application Images** table.



Note If the portable gateway `sbRIO-9607` is not detected, go to `ni.com/info` and enter the Info Code `exuybp`, and follow the instructions in the KnowledgeBase article. Although written for Measurement & Automation Explorer (MAX), you can apply the article to the RAD utility.

7. Click **Deploy** and follow the prompts to complete the deployment process.
8. When deployment is complete, disconnect the network cable from the portable gateway and screw the cover back into place.

9. Power on the Surface Go and launch the Wireless Site Survey Software.

Related information:

- ni.com/manuals
- ni.com/info

Turning Off Devices (Packing Up)

After you finish performing a site survey, complete the following steps to turn off and pack up your devices.

1. To turn off the portable gateway, flip the power switch off.
2. Shut down the Surface Go.
3. Pack your devices into the carrying case.

Troubleshooting Network Communication

If the Wireless Site Survey Software hangs or crashes, try to power cycle the portable gateway by flipping the power on and off and then wait to reconnect through the web page.

Related Documentation

For following documents contain information about the MON-10411. To view them, go to ni.com/manuals.

- ***MON-10411 Safety, Environmental, and Regulatory Information***
- ***MON-10411 User Guide***
- ***MON-10411 Specifications***

Related information:

- ni.com/manuals

Product Certifications and Declarations

Refer to the product Declaration of Conformity (DoC) for additional regulatory compliance information. To obtain product certifications and the DoC for NI products, visit ni.com/product-certifications, search by model number, and click the appropriate link.

Related information:

- ni.com/product-certifications

NI Services

Visit ni.com/support to find support resources including documentation, downloads, and troubleshooting and application development self-help such as tutorials and examples.

Visit ni.com/services to learn about NI service offerings such as calibration options, repair, and replacement.

Visit ni.com/register to register your NI product. Product registration facilitates technical support and ensures that you receive important information updates from NI.

NI corporate headquarters is located at 11500 N Mopac Expwy, Austin, TX, 78759-3504, USA.

Related information:

- ni.com/support
- ni.com/services
- ni.com/register