



## Network planning tool for Phoenix Contact wireless products

User manual



## User manual

# Network planning tool for Phoenix Contact wireless products

2013-12-17

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Revision: A

This user manual is valid for:

Designation	Version	Order No.
RAD...		

*This software is designated for all Phoenix Contact wireless products*

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## Please observe the following notes

### Explanation of symbols used and signal words



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety measures that follow this symbol to avoid possible injury or death.

There are three different categories of personal injury that are indicated with a signal word.

**DANGER** This indicates a hazardous situation which, if not avoided, will result in death or serious injury.

**WARNING** This indicates a hazardous situation which, if not avoided, could result in death or serious injury.

**CAUTION** This indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.



This symbol together with the signal word **NOTE** and the accompanying text alert the reader to a situation which may cause damage or malfunction to the device, hardware/software, or surrounding property.



This symbol and the accompanying text provide the reader with additional information or refer to detailed sources of information.

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# 1 Technology overview

## 1.1 Wireless Network Planner

The Wireless Network Planner (WNP) from Phoenix Contact is a tool to be used to assist with selection of a specific product line as well as a basic planning tool to allow a user or integrator to see if a specific wireless protocol is a possibility for a project. The WNP also allows for selection of different accessories, i.e., cables, antennas, expansion modules, adapter cables, etc., and uses the alterations in the link budget calculations.

This tool is not a substitute for a field site survey. It does not take path obstructions into account and only displays coverage based on free space path loss. It is intended to be used as a guideline in choosing preliminary equipment for a field test. There are no claims or guarantees implied.

## 1.2 Installation

### 1.2.1 System requirements

Windows® XP, Windows Vista® or Windows 7 operating systems

### 1.2.2 Installing and starting the program

The software is available for download at [www.phoenixcontact.com](http://www.phoenixcontact.com).

1. Search for “wireless network planner” to obtain a list of products from which the software can be downloaded.
2. Select one of the products from the list and click the “Downloads” tab.
3. In the “Category” field, select “Software” from the drop-down list box or scroll down the page to the “Software” category. Download the “Wireless\_Network\_Planner\_Setup” file.
4. Unzip the file and double-click the “Wireless\_Network\_Planner\_Setup\_v2.0.exe” file. Follow the prompts to install the software in your desired location.
5. Click the “Start” button and browse to the “All Programs, Phoenix Contact Wireless Network Planner” group and click the “WNP v2.0” application.

Alternatively, click the icon on the desktop.







## 2 New project selection guide

When WNP is first opened, you have the option to start a new project or to open an existing project.

### 2.1 New project

When a new project is selected, the software guides you through selecting basic parameters required to configure a wireless network. The “Back” and “Next” buttons step you through the selection process.



Figure 2-1 WNP welcome screen

1. Launch the program and click the “New Project” button on the splash screen.

2. The selector wizard opens at the “Region” tab.



Figure 2-2 “Region” selection screen

Click the appropriate control button to select the region where the installation will occur.

- Region 1: Europe/Middle East/Africa
- Region 2: Americas and Pacific/Australia/New Zealand
- Region 3: Asia



Not all frequencies are allowed in all countries. While the WNP software provides some guidelines, you are ultimately responsible for ensuring your wireless network is allowed to operate within the laws and regulations of the local, state and federal authorities.

3. Click the “Next” button to move to the “By Product Line” tab.

The screenshot shows a web application interface for 'Design New Network'. At the top, there is a header with the Phoenix Contact logo and the tagline 'INSPIRING INNOVATIONS'. Below the header, there are five navigation tabs: 'Region', 'By Product Line', 'By Parameters', 'Device Count', and 'Product Line'. The 'By Product Line' tab is currently selected. The main content area is titled 'Selection of Flow' and contains the question 'Do you know the product line which you would like to select?'. Below the question, there are two radio button options: 'Yes' and 'No'. At the bottom of the form, there are two buttons: 'Back' and 'Next 2/5'.

Figure 2-3 “By Product Line” selection screen

4. The network can be configured based on the products chosen or by operating parameters.
  - If the product line has not been selected, click the “No” button. This will guide you through a few simple questions to assist with the selection of the proper product line. If “No” is selected, continue to step 5.
  - If the product line is already decided on for the given application, click the “Yes” button, and then click the “Next” button. This will take you directly to the “Product Line” selection screen (see Figure 2-6).

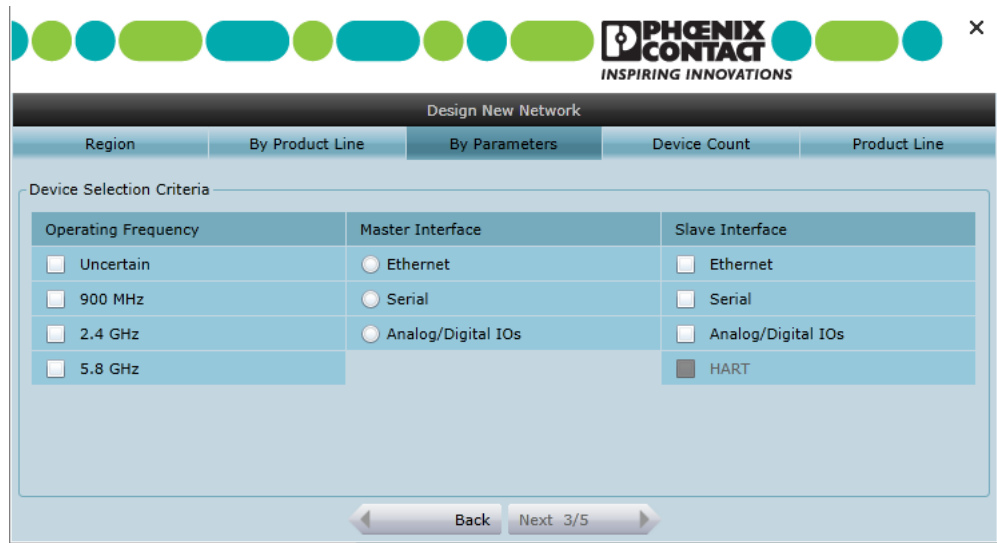


Figure 2-4 “By Parameters” selection screen

5. Select the criteria that you expect to use.
  - a) Select all applicable operating frequencies.
  - b) Select one master interface.
  - c) Select all slave interface options that will apply for the network.
6. When all selections are made, click the “Next” button. Selections in each group must be made before proceeding.

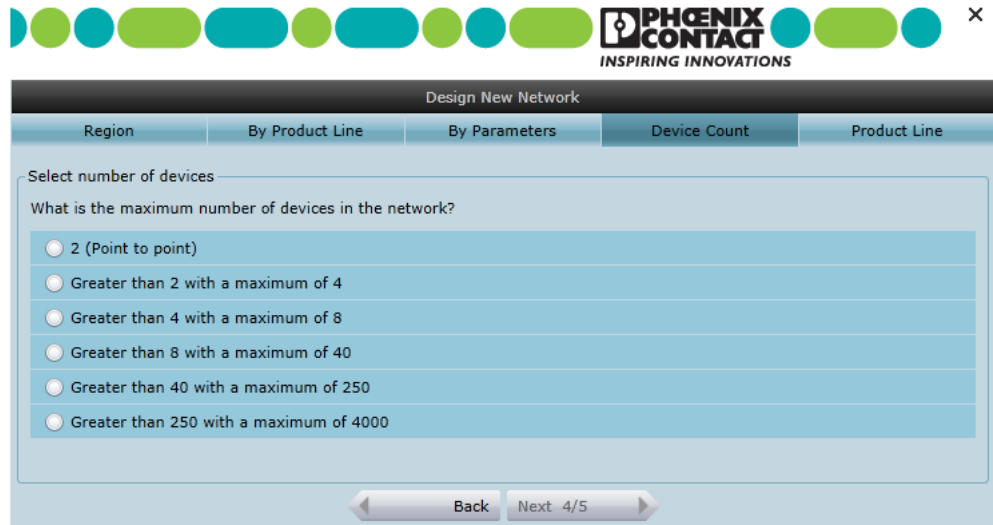


Figure 2-5 “Device Count” selection screen

7. Click the appropriate control button to select the approximate number of devices that will be on the network. Click the “Next” button to move to the next screen.



Figure 2-6 “Product Line” selection screen

8. Click the control button next to the desired product line. Only the products that meet the previously selected criteria are available.  
The full product line is:

WirelessHART®	HPWLAN
Trusted Wireless 900 MHz - UD	WLAN
Trusted Wireless 900 MHz - BD	Bluetooth® MUX - Omnidirectional antenna set
Trusted Wireless 900 MHz - Serial	Bluetooth MUX - Panel directional antenna set
Trusted Wireless 900 MHz - Ethernet	Bluetooth Fieldline
Radioline 2400	Bluetooth Serial
HPWLAN	Bluetooth Profibus set

9. Click the "Start" button to close the "New Product" selection guide and open the project. Click the "File, Save as" menu and name the project.

### 3 Creating a project

#### 3.1 User interface

The user interface of the Wireless Network Planner software allows the addition of maps or images, placement of devices, analysis of the layout and creation of a bill of materials. Icons along the bottom of the screen and drop-down menus across the top provide access to the available tools for the system.

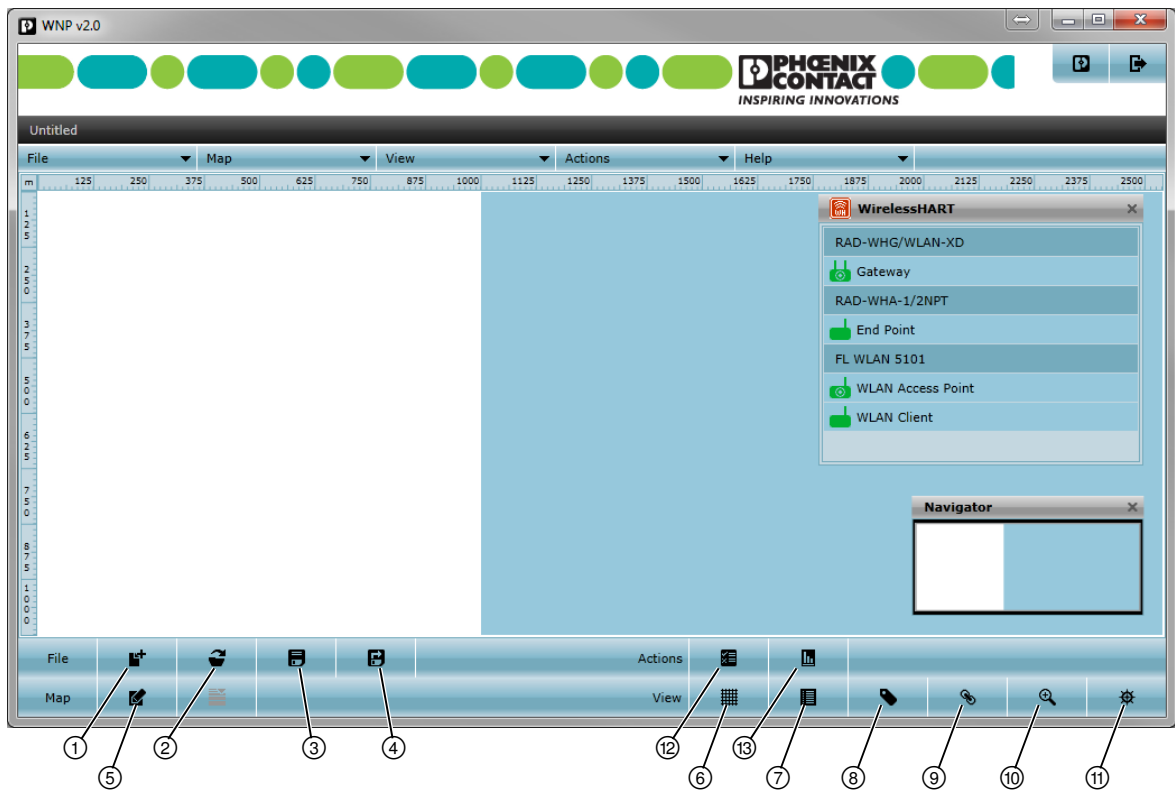


Figure 3-1 User interface

The items available are shown in

Table 3-1 User interface icons

Menu		
Icon	Name	Description
<b>File</b>		
1	New Project	Begins a new project (see “New project” on page 5).
2	Open Project	Opens a saved project.
3	Save Project	Saves the open project.
4	Save Project As	Saves the open project with a different location and name.
<b>Map</b>		
5	Edit Map	Opens the “Edit Map” dialog box (see “Map” on page 13).
	Opacity	Sets the opacity of the image. Only active if the “Use Floor Plan Image” box is checked.
<b>View</b>		
6	Show/Hide Grid Settings	Opens or closes the “Grid” dialog box.
7	Show/Hide Device List	Opens or closes the “Devices List” dialog box.
8	Show/Hide Device Tag	Opens or closes the “Device Tag” dialog box.
9	Hide Link View	Hides (or displays) the links between devices on the map.
10	Zoom	Allows magnification of the map. <ul style="list-style-type: none"> <li>– The list box allows selection of a magnification percentage.</li> <li>– The icon presents a vertical slider.</li> </ul>
11	Hide Navigator	Hides (or displays) the “Navigator” window.
<b>Actions</b>		
12	Network Report	Generates a report, in pdf format, that includes a bill of materials, device placement, a network map showing connectivity and a list of all the devices and their neighbors.
13	BOM Report	Generates a report, in csv or pdf format, that includes the bill of materials.
<b>Help</b>		
	About	Displays the version of the software and the database of products.
	Update Database	Allows updating of the product list when updates become available.
	Language	Allows selection of the user interface language.



### 3.1.1 Map

Click the “Map” drop-down menu. Click the “Edit Map” or “Opacity” selection.

#### Edit map

Click the “Map, Edit Map” menu to open the “Edit Map” dialog box. Alternatively, click the “Edit Map” icon (see Figure 3-1).

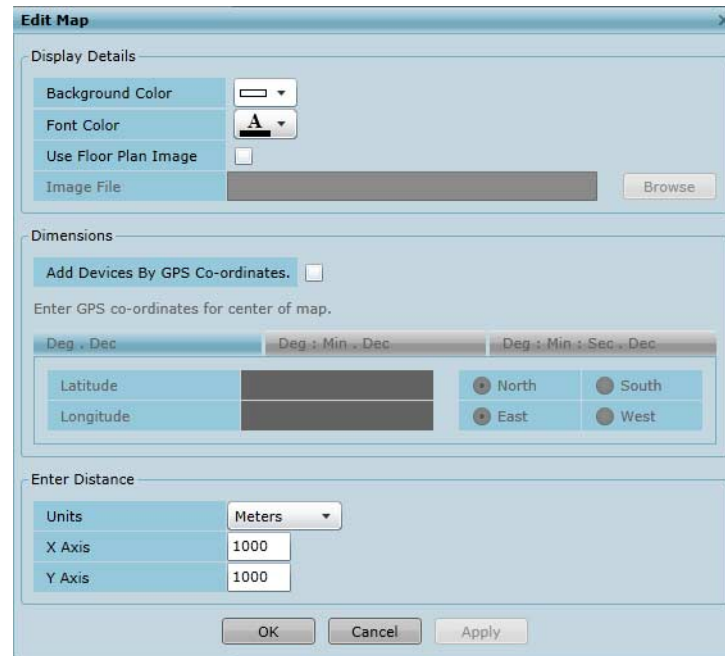


Figure 3-2 “Edit Map” dialog box

#### Display Details

The “Edit Map” dialog box allows configuration of the background color or image and text colors.

- **Background Color:** Click the drop-down arrow and then click the desired color of the background.
- **Font Color:** Click the drop-down arrow and then click the desired color of the text.
- **Use Floor Plan Image:** Check the box to use an image for the background. If this box is checked, a file must be entered in the “Image File” field.
- **Image File:** Click the “Browse” button to navigate to the desired image file. Acceptable image types are jpg, jpeg, jpe, jfif and png. The “Image File” field is only available if the “Use Floor Plan Image” box is checked.

#### Dimensions

The “Edit Map” dialog box allows positioning of devices by GPS coordinates.

- **Add Devices by GPS Coordinates:** Check the box to position devices by GPS values. If the box is not checked, the “Latitude” and “Longitude” fields are not active.
- The coordinates can be entered as degrees.decimal, degrees: minutes.decimal or degrees: minutes: seconds.decimals. Click the button for the desired unit type.
- **Latitude** and **Longitude:** Enter the desired value in the appropriate field. Click the “North”, “South”, “East” and “West” control buttons as necessary.

**Enter Distance**

- **Units:** Click the “Units” drop-down arrow and then click the desired units. The choices are meters, kilometers, feet, yards and miles. The default is meters.
- **X Axis and Y Axis:** Set the size of the overall field.

If the “Add Devices By GPS Co-ordinates” box is checked, the units are set to kilometers and cannot be changed. The X and Y axes can be set but do not make much difference since the GPS coordinates determine the size of the field.

The X and Y axes can be modified after devices are added but all devices must remain within the overall field. If a device will be outside of the field, a pop-up message appears warning that devices will be moved to the center of the map. Click the “Proceed” button to continue or the “Cancel” button to cancel the axis change.

**Opacity**

When an image file is loaded as the background, the opacity of the background color can be set from the menu. Move the slider to the right to set the opacity of the background color to 100%. Move it to the left to set the opacity of the background color to 0%. The slider can be positioned at any value between 0 and 100%.

**3.1.2 View**

Click the “View” drop-down menu to select the various view options.

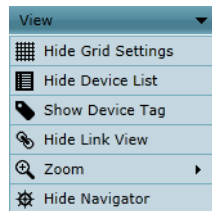


Figure 3-3 “View” drop-down menu

**Grid settings**

Click to show or hide the “Grid” dialog box. The menu option changes if the dialog box is open or closed. Alternatively, click the “View” icon (see Figure 3-1).

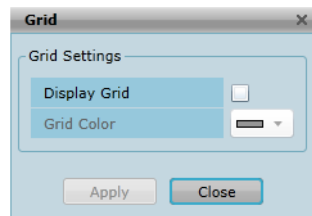


Figure 3-4 “Grid” dialog box

The settings within the dialog box:

- **Display Grid:** Check the box to turn the grid on. Remove the check to turn the grid off.
- **Grid Color:** Click the drop-down arrow and then click the desired color of the grid.

When the settings are as desired, click the “Apply” button.

Click the “Close” button to close the dialog box or click the “View, Hide Grid Settings” menu option.

**Device list**

Click to show or hide the list of devices. The device list shows the different devices available for the type of network and region previously selected. Depending on the device, different operating modes may be available, such as a master or slave. These appear under the device.

**Device tag**

Click to show or hide the “Device Tag” dialog box. The menu option changes if the dialog box is open or closed. Alternatively, click the “Device Tag” icon (see Figure 3-1).

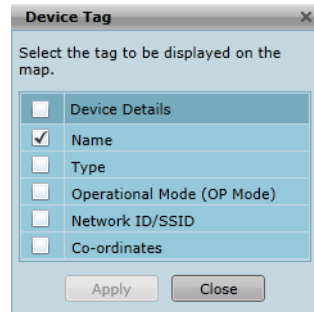


Figure 3-5 “Device Tag” dialog box

The “Device Tag” dialog box allows selection of the information displayed below the icons on the map. To select the information, check the appropriate box. To select all the tags, click the “Device Details” check box.

The information that can be displayed is:

- Name: Displays the name of the device as specified on the “Properties, Device” dialog box.
- Type: Displays the product type description.
- Operational Mode (OP Mode): Displays the operational mode of the device, i.e., master, repeater or slave.
- Network ID/SSID: Displays the network ID of the device as specified on the “Properties, Radio” dialog box.
- Coordinates: Displays the coordinates of the device in relation to the map. This may be GPS coordinates or the X, Y axes.

**Link view**

Click to show or hide the links between devices. Links are color-coded lines between devices. A green line indicates a likely good connection, yellow indicates a questionable connection and red indicates a poor or non-existent connection.



**NOTE:**

A green link indication is not a guarantee of a valid, working connection between devices. It is an estimate based on the parameters entered in the WNP. Phoenix Contact cannot be held responsible if a link within the WNP design software does not match or simulate the actual performance of the wireless transmission in the network.

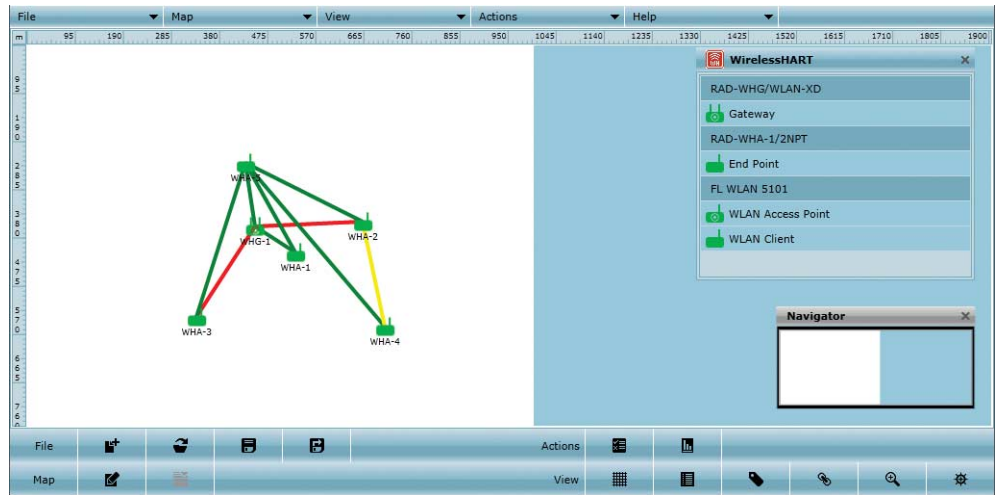


Figure 3-6 Link view on

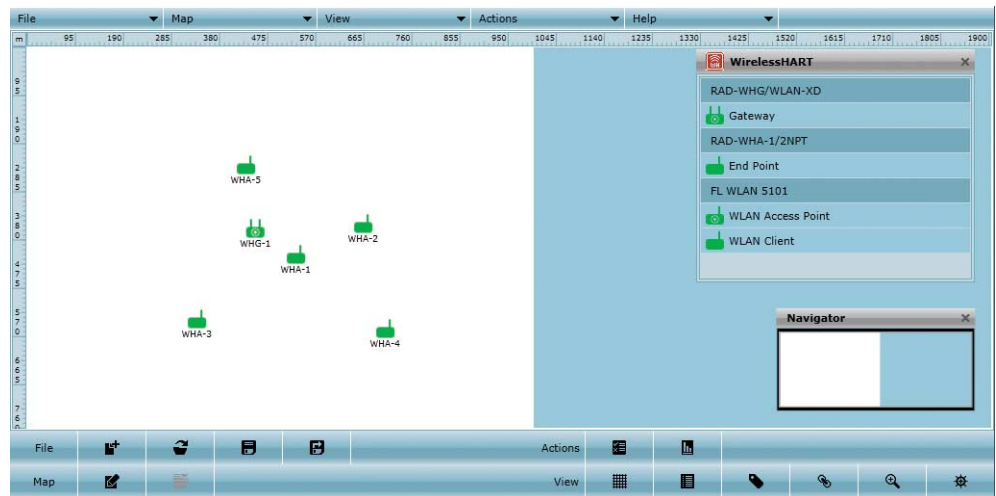


Figure 3-7 Link view off

**Zoom**

Click to change the magnification level of the map.

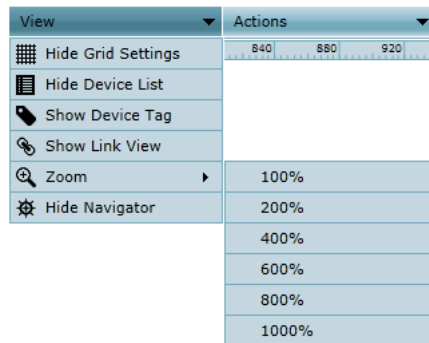


Figure 3-8 “View, Zoom” options

**Navigator**

Click to show or hide the “Navigator” pane. The “Navigator” pane is an overview of the map, allowing the user to see how much of the map you are looking at and also to move the view on the overall map.

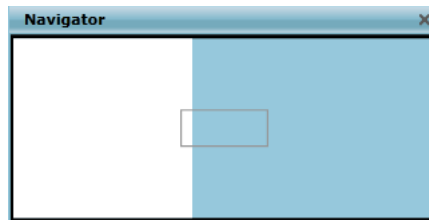


Figure 3-9 “Navigator” pane

**3.1.3 Actions**

Click the “Actions” drop-down menu to select the various action options.



Figure 3-10 “Actions” drop-down menu

### 3.2 Creating a project

To create a new project click the “New project” button that appears on the opening splash screen. Alternatively, you can click the “New Project” icon (see Figure 3-1). The selection wizard simplifies the initial selection of frequency and products.

Once the project is initially created, the map should be properly set up. This may include bringing in a plant or background image and setting the scale of the overall area. This can all be done in the “Edit Map” dialog box (see Figure 3-2).

#### 3.2.1 Selecting devices

Devices are selected from the device list.

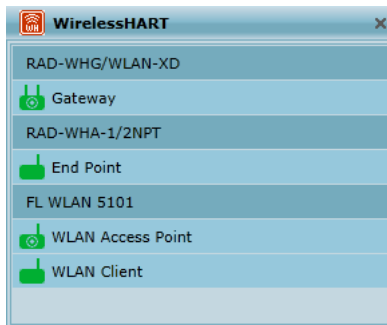


Figure 3-11 “Device list” screen

#### Placing devices on the map

To place a device on the map, drag it from the device list to the desired location of the map. Always select the correct operating mode as seen under the device name. Master devices should be assigned before other types of devices so the proper hierarchy can be maintained. Slave, client, end point and repeater devices will automatically connect to the most recent master device.



Slave, client, end point and repeater devices can be manually connected to master devices if added or changed later.

When a device is placed on the map, a dialog box appears. Enter an appropriate address in the “Network ID” field.

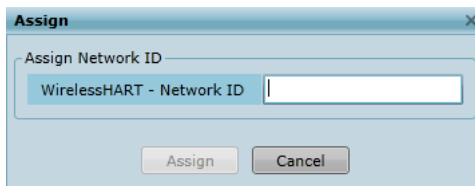


Figure 3-12 “Assign” dialog box

The software keeps track of the network IDs assigned to different devices and prevents assigning the same network ID to multiple devices.

### Changing a network ID

To change the network ID of an existing device, right-click the device and click the “Change Network ID” option.

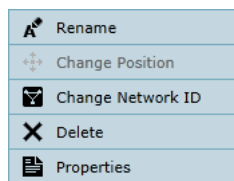


Figure 3-13 Right-click device menu

The “Assign” dialog box appears. Enter the new address in the “Network ID” field (see Figure 3-12). Click the “Assign” button when complete.

### 3.2.2 Configuring devices

The “Properties” dialog box allows review and modification of a selected device. Double-click or right-click the device and click the “Properties” option (see Figure 3-13).

Some products have multiple radios within the same device. The correct network must be selected before proceeding.

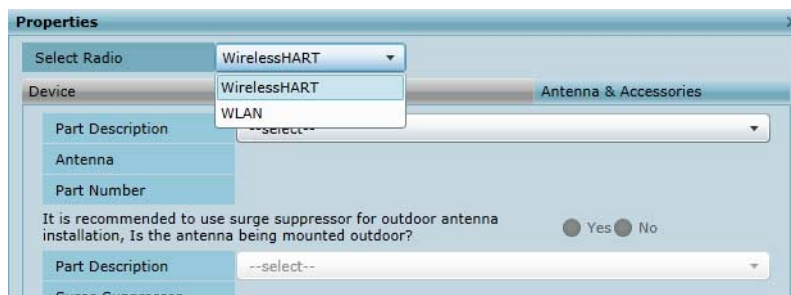


Figure 3-14 Network selection of the “Properties” dialog box

Only devices with multiple radios have this option. Other devices display the network that the device always operates on.

Adding accessories

The “Properties” dialog box opens with the “Antenna & Accessories” tab selected.

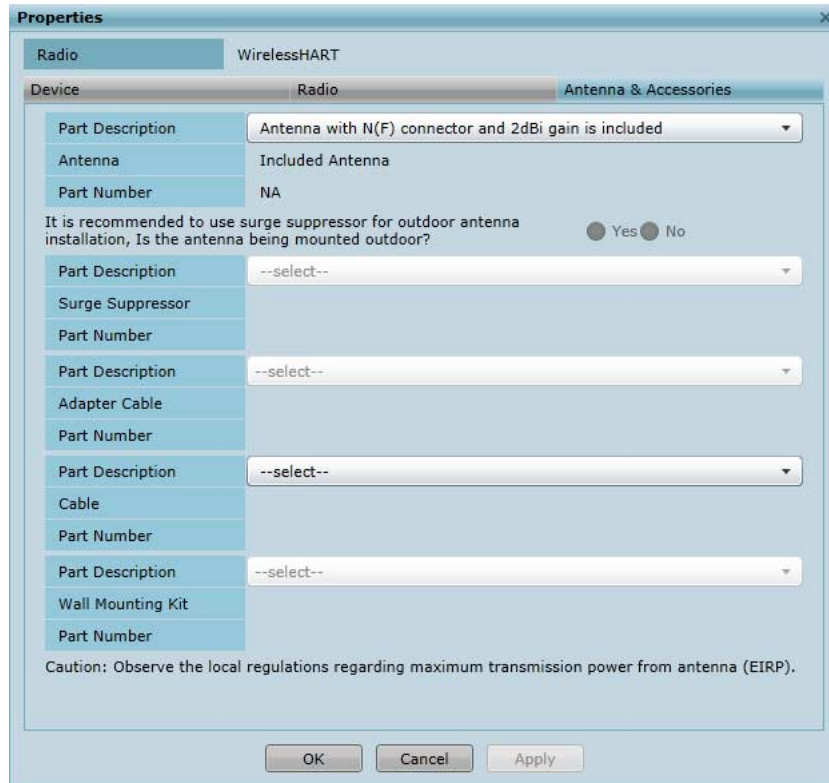


Figure 3-15 “Properties, Antenna & Accessories” dialog box

Accessories such as antennas, surge protection and cables can be associated with devices to customize and fine-tune the wireless network. Different devices will list only the accessories applicable for them. For instance, some radios include the antenna so it is listed, but there are no additional antenna options.

A control button allows selection of mounting the antenna indoors or outdoors. If the “No” button is selected, the surge protection options are not shown. If the “Yes” button is selected, applicable options are shown in the drop-down menu.



**NOTE:**

It is highly recommended that all outdoor antenna installations include surge protection.

After selecting the desired accessories, click the “Apply” button to close the dialog box.



**Changing the device name** The “Device” tab of the “Properties” dialog box provides information about the device.

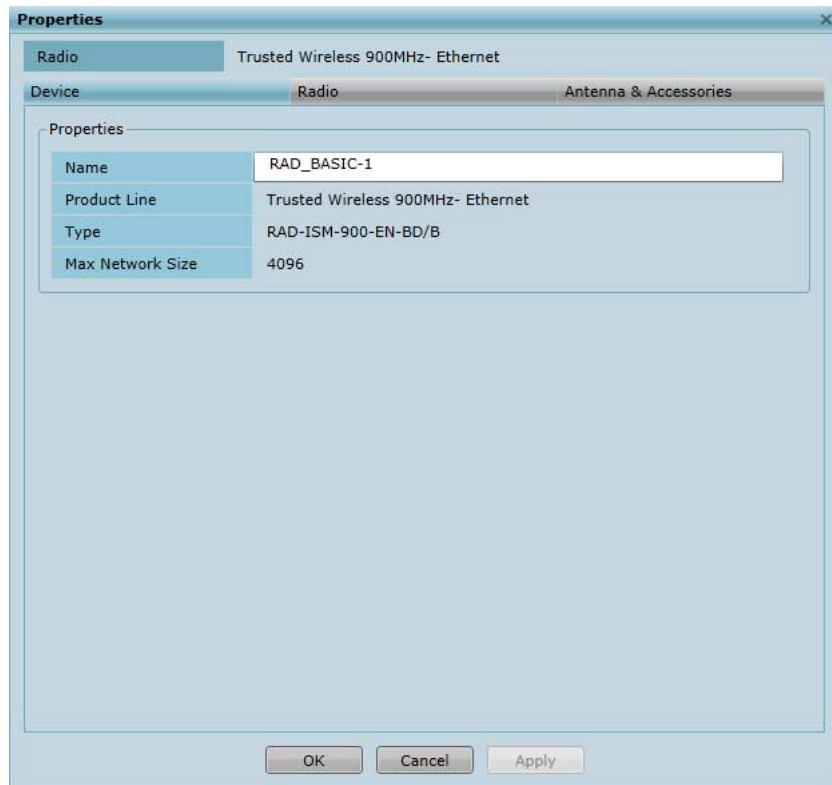


Figure 3-16 “Properties, Device” tab

- **Name:** Editable field that allows changing of the device name as displayed on the map. The field accepts up to 256 characters. This field can also be edited directly by right-clicking the device on the map and clicking the “Rename” option.
- **Product Line:** This displays the product line.
- **Type:** This displays the type descriptor of the device.
- **Max. Network Size:** This displays the maximum number of devices that can be placed on the network.

Configuring the radio

The “Radio” tab of the “Properties” dialog box provides information about how the device is configured.

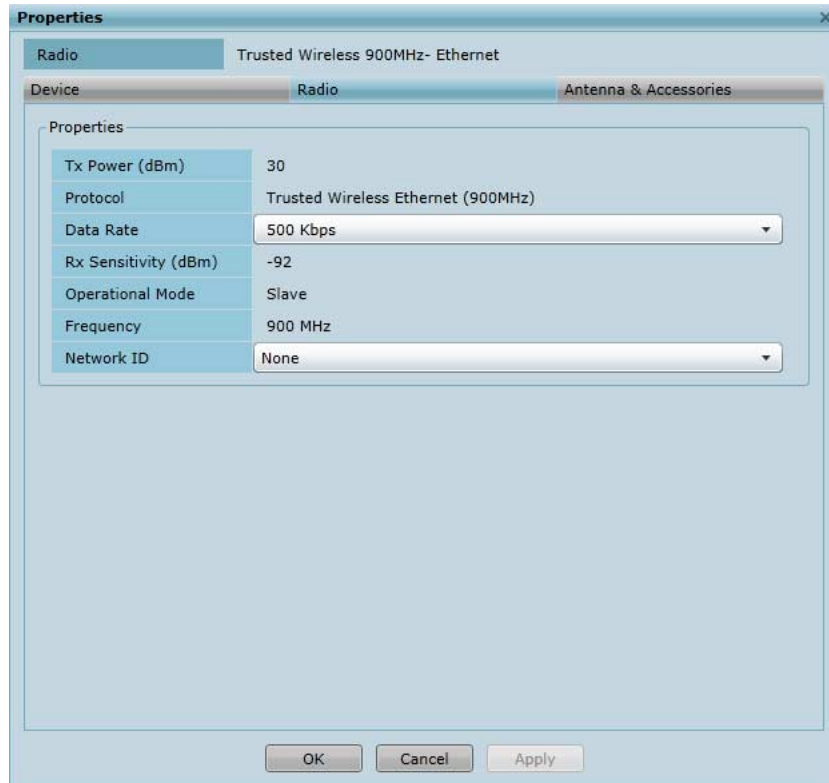


Figure 3-17 “Properties, Radio” tab

These settings display and set data that can affect the efficiency of the device. For instance, a faster data rate affects the receive sensitivity and reduces the range.



The capability of the radio determines if the field is editable or only viewable.

- **Tx Power:** Sets or displays the transmit power of the device.
- **Protocol:** Sets or displays the selected protocol of the device.
- **Data Rate:** Sets or displays the data transmission rate of the device. Click the drop-down arrow and then click the desired data rate from the list.
- **Rx Sensitivity (dBm):** Sets or displays the minimum input signal (dBm) that can be received by the radio at a specific data rate.
- **Operational Mode:** Sets or displays and sets the mode of the device. The operational mode is initially chosen when the device is selected from the device list. To change the operational mode, click the drop-down arrow and then click the desired mode from the list.
- **Frequency:** Displays the frequency of the device.
- **Network ID:** Sets or displays the network ID. The network ID is initially set when the device is placed on the map. To change the network ID, delete the existing number and then type the desired number in the “Network ID” field.

### 3.3 Generating reports

The Wireless Network Planner can generate two types of report.

The network report is typically used at the installation site by a system integrator while installing the network. It generates an A4 size pdf document.

The BOM report (Bill of Material) provides a list of the quantity of each device and accessory specified in the network. It can be provided to a supplier for purchasing the various devices and can be saved as either a pdf (A4) or csv file.



## 4 Maintenance and updates

As new products become available, the database within Wireless Network Planner can be updated. Database updates will be available from [www.phoenixcontact.com](http://www.phoenixcontact.com).

To update the database:

1. Save the current project.
2. Download and save the database update on the local hard drive.
3. Click the “Help” menu and then select the “Update Database” option to open the “WNP Database Updater” dialog box.

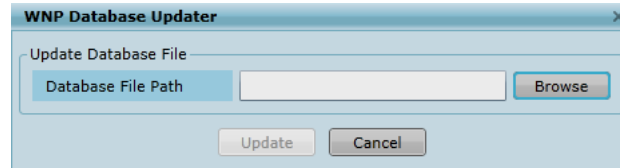


Figure 4-1 “WNP Database Updater” dialog box

4. Click the “Browse” button and browse to the location where the downloaded file is saved. Click the file.
5. Click the “Update” button to replace the existing database with the new database.
6. Close the Wireless Network Planner application and restart it.



# A Appendixes

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