# Wireless Communication with EcoStruxure Panel Server

## Design Guide

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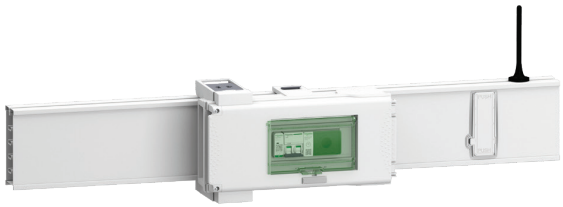

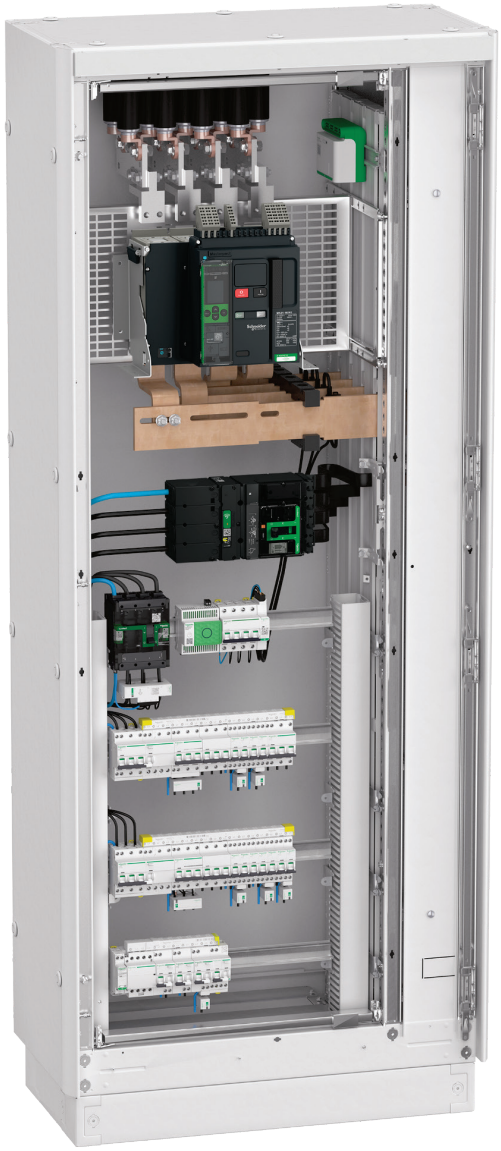

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# 1. Safety Information

## 1.1. Important Information

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it.
The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

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

**⚠ DANGER**

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

**⚠ WARNING**

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

**⚠ CAUTION**

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

***NOTICE***

***NOTICE*** is used to address practices not related to physical injury.

## 1.2. Please Note

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction, installation, and operation of electrical equipment and has received safety training to recognize and avoid hazards involved.

## 1.3. Safety Precaution

| ***NOTICE*** |
| --- |
| **THIS DOCUMENT IS INTENDED AS A DESIGN GUIDE ONLY.**<br>To ensure safe and proper installation, please refer to the official product User Manuals and Instruction Sheets.<br>**Failure to follow these instructions can result in equipment damage.** |

# 2. About the Document

## 2.1. Purpose and Scope

The EcoStruxure™ Panel Server gateway is designed to connect and digitize the electrical distribution installation and to perform energy management and monitoring from the incomer down to the load level.

In addition to traditional wired connectivity, the EcoStruxure Panel Server gateway offers wireless communication:

- IEEE 802.15.4 communication to connect Schneider Electric wireless devices downstream the Panel Server.
- Wi-Fi communication to connect the Panel Server to Ethernet network architecture on customer site.

This guide is intended to provide information and guidelines to help system designers, installers, and users to obtain wireless communication (IEEE 802.15.4 and Wi-Fi) for the Panel Server by:

- Defining the referential installations for an efficient wireless setup.
- Proposing a method for designing an IEEE 802.15.4 wireless channel assignment plan for a balanced wireless communication on the channels in case of concentrated wireless architecture.

For the switchboard guidelines, this guide is independent of panel type, although it only covers Form 1 and 2. (For guidelines specific to PrismaSeT, refer to **Wireless Communication with EcoStruxure™ Panel Server in PrismaSeT - Design Guide**, found in section **2.5 References**).

**Note:** Some Schneider Electric documents relative to specific enclosures can deliver less restrictive rules, based on additional tests made especially for the enclosures or targeted setup. In this case, these documents can replace this guide.

## 2.2. Scope of the Document

### 2.2.1. Architecture Principles

Ethernet and wireless communication are used in the architecture presented in this document.

### 2.2.2. Communication Protocols

Modbus TCP/IP, Wi-Fi and IEEE 802.15.4, including ZigBee Pro and ZigBee Green Power, communication protocols are used in the proposed architectures.

## 2.3. Validity

This document is valid for wireless architectures utilizing:

- EcoStruxure Panel Server Entry – Architectures without external antenna.
- EcoStruxure Panel Server Universal (Hardware V1 and V2).
- EcoStruxure Panel Server Advanced.

This document describes performances available with the following firmware versions of the devices and software:

| Device name | Part number | Firmware version |
|---|---|---|
| EcoStruxure Panel Server Entry | **PAS400** | > SV1.10.0 |
| EcoStruxure Panel Server Universal | **PAS600**, **PAS600L** | > SV1.10.0 |
| EcoStruxure Panel Server Advanced | **PAS800**, **PAS800L**, **PAS800P** | > SV1.10.0 |

Table 1: Firmware version

**Note:** The latest EcoStruxure Panel Server firmware versions are available on **https://www.se.com**.

## 2.4. Convention

A switchboard can also be referred to as a panel or enclosure.

## 2.5. References

The following table lists the documents which can be used to become familiar with the content of this guide.

| Document Name | Reference |
|---|---|
| EcoStruxure™ Panel Server - User Guide | DOCA0172EN |
| EcoStruxure™ Panel Server - External Antenna - Instruction Sheet | NNZ58425 |
| EcoStruxure™ Panel Server Entry - Firmware Release Notes | DOCA0249EN |
| EcoStruxure™ Panel Server Universal - Firmware Release Notes | DOCA0178EN |
| EcoStruxure™ Panel Server Advanced - Firmware Release Notes | DOCA0248EN |
| EcoStruxure™ Panel Server - Cybersecurity Guide | DOCA0211EN |
| EcoStruxure™ Panel Server - Modbus File | DOCA0241EN |
| EcoStruxure™ Panel Server - Catalog | PLSED310196EN |
| ComPacT NSX and NSXm Catalog | LVPED221001EN |
| MasterPacT™ MTZ with MicroLogic Active - Catalog | LVPED225010EN |
| Panel Builders Catalog | PNBCONTR0223EN |
| PowerLogic™ Power Monitoring and Control Catalog | PLSED309005EN_Web |
| Harmony Wireless and Batteryless Push buttons Catalog | DIA5ED2121214EN |
| EcoXpert Catalog | 998-22477001_ EcoXpert-catalog |
| Emergency Lighting Catalog | Exiway-Lighting |
| SpaceLogic Room Controllers SE8000 Product Catalog | 028-6155 |
| PowerLogic™ HeatTag Installation – Implementation and Commissioning Guide | DOCA0327EN |
| Wireless Communication with EcoStruxure™ Panel Server in PrismaSeT - Design Guide | DOCA0375EN |

Table 2: Reference documents

**Note:** All documents and software can be found on the Schneider Electric website: **https://www.se.com**.

## 2.6. Glossary

| Term | Description |
|---|---|
| **EPC** | EcoStruxure Power Commission |
| **IEEE 802.15.4** | Standard for Low-Rate Wireless Networks |
| **PAS** | EcoStruxure Panel Server |
| **PER** | Packet Error Rate |
| **PoE** | Power over Ethernet |
| **RF** | Radio Frequency |
| **RSSI** | Received Signal Strength Indicator |

Table 3: Glossary

## 2.7. Prerequisites

The following prerequisites are recommended to correctly implement the architectures covered in this guide. This applies to:

- The networks and communication protocols used in the architectures:
  - IEEE 802.15.4 communication.
  - Modbus TCP/IP or Wi-Fi network.
- The devices used in the architectures:
  - EcoStruxure Panel Server (Entry, Universal and Advanced).
  - Panel Server Antenna (needed in some architectures).
  - Power Supply.
  - PowerLogic PowerTag Energy Devices (PowerTag Rope, PowerTag M630/250, PowerTag F160, PowerTag M63, PowerTag P63, PowerTag F63).
  - PowerLogic HeatTag wireless sensor.
  - Acti9 Active.
  - Wireless Indication Auxiliary (for ComPacT NSX and ComPacT NSXm).
  - MasterPacT MicroLogic Active Control Unit.
  - PowerTag Ambient.
  - PowerLogic TH110 and CL110.
  - Exiway Light Activa-link, Exiway Trend Activa-link, and Exiway Light SATI LINK Emergency Lighting.
  - SpaceLogic Wireless TRH (Temperature and Relative Humidity) and $CO_2$ sensors.
  - Harmony Wireless and Batteryless Push Buttons.
- Software used for commissioning the solution:
  - EcoStruxure Power Commission (EPC).
  - Panel Server Embedded Web Page.

# 2.8. Device Descriptions

## 2.8.1. EcoStruxure Panel Server

PAS600L

The EcoStruxure Panel Server is a wireless concentrator and gateway (Ref**:** **PAS400**/**PAS600**/**PAS600L**/**PAS800**/**PAS800L**/**PAS800P**).

The Panel Server can provide connection to edge control software, such as EcoStruxure Power Monitoring Expert or EcoStruxure Building Operation, and to cloud applications, such as EcoStruxure Asset Advisor, EcoStruxure Energy Hub and EcoStruxure Resource Advisor.

- All-in-one gateway to retrieve data from both wireless sensors and Modbus devices and optimize energy management solutions.
- Ease of commissioning with the EcoStruxure Power Commission tool, or Panel Server embedded web pages, enabling device to plug and play and auto discovery features.
- Ease of operation with user friendly embedded web pages, and data contextualization for more relevant analytics.
- Enhanced Cybersecurity, designed through a development Life Cycle in accordance with IEC 62443-4-1.

Equipped with multiple communication protocols (including Ethernet, IEEE 802.15.4 wireless sensors and Wi-Fi), the Panel Server adapts to fast-evolving communication technologies.

For detailed information on this range of devices, refer to the **EcoStruxure Panel Server – Catalog** in section **2.5 References**.

## 2.8.2. EcoStruxure Panel Server – Antenna

PASA-ANT1

The Panel Server antenna (Ref: **PASA-ANT1**) can be used to extend the wireless networks:

- Wi-Fi network: it can be used with both the Universal and Advanced Panel Server. The antenna must be placed outside of the Panel.
- IEEE 802.15.4 network: it can be used with both the Universal (hardware V2 only) and Advanced Panel Server.

The antenna comes with a 3 m cable.

For detailed information concerning this device, refer to the **EcoStruxure Panel Server - External Antenna - Instruction Sheet** in section **2.5 References**.

**⚠ WARNING**

**UNINTENDED EQUIPMENT OPERATION OR ALERTED FEATURE OF PROTECTIVE DEVICES**

Do not install Wi-Fi antenna within the enclosure.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

### 2.8.3. PowerLogic PowerTag Energy

PowerTag Energy sensors allow for connecting and digitizing electrical systems and handle energy management with monitoring. These sensors connect wirelessly to a gateway and enable alarming in case of overload or voltage loss. The PowerTag Energy sensors used in these architectures include:

A9MEM1591

- PowerTag Rope
  With its flexible and openable current sensors, it can be installed easily on busbars and cables without having to disconnect the conductors and is suitable for 3P or 3P+N networks up to 2000 A.

LV434020

- PowerTag M630 and M250
  This PowerTag Energy is designed for Molded Case Circuit Breakers and Switches (ComPacT and TeSys) for 3P and 3P+N electrical networks up to 630 A. It is mounted directly on the bottom side of the circuit breaker, and it does not require any specific wiring.

A9MEM1580

- PowerTag F160
  With its flex design, this PowerTag Energy can be used on many products, or groups of loads, up to 160 A on 3P or 3P+N networks. Its removable spring connector for voltage picking makes it easy to install, and it features shapes for brackets to enable it to be mounted and kept in place where needed in a panel.

A9MEM1543

- PowerTag M63
  This PowerTag Energy is used for Acti9 and Multi9 Monoconnect offers: “Single-terminal” circuit breakers, RCDs and switches with a pitch of 18 mm between phase and neutral, rated less than or equal to 63 A.

A9MEM1563

- PowerTag P63
  This PowerTag Energy is used for Acti9 and Multi9 PhaseNeutral offers: “Single-terminal” circuit breakers, RCDs and switches with pitch of 9 mm between phase and neutral, rated less than or equal to 63 A.

A9MEM1570

- PowerTag F63
  PowerTag Flex is used for other devices and specific installations, rated less than or equal to 63 A. It is designed to fit the following devices: Vigi iDT40, Vigi iC40, Vigi iC60, iC60 double terminal, iID double terminal, and motor starters, such as GV2.

For detailed information on this range of devices, refer to the **PowerLogic Power Monitoring and Control Catalog** in section **2.5 References**.

### 2.8.4. Acti9 Active

A9TDFC640

Acti9 Active is a family of all-in-one protection devices with wireless connectivity. When connected to a gateway, it enables remote monitoring, diagnostics, pre-alarming, and alarming.

In addition to wireless connectivity, Acti9 Active integrates Residual Current protection, Arc Fault Detection Device and Overvoltage. It includes short-circuit and overload protection due to the associated Miniature Circuit Breaker.

For detailed information on this device, refer to the **Panel Builders Catalog** in section **2.5 References**.

### 2.8.5. Wireless Indication Auxiliary

LV429454

LV429453

Wireless indication auxiliary contacts are available for:

- ComPacT NSX (Ref: **LV429454**).
- ComPacT NSXm (Ref: **LV429453**).

The wireless device, which is installed in the breaker, communicates using IEEE 802.15.4 and can give the breaker status including:

- OF – Closed/Open.
- SD – Not tripped/Tripped.
- SDE – Not tripped/Tripped due to electrical fault (only for ComPacT NSX).

For detailed information on these devices, refer to the **ComPacT NSX and NSXm Catalog** in section **2.5 References**.

### 2.8.6. MasterPacT MicroLogic Active Control Unit

LV906402W

The MasterPacT MTZ's control unit, MicroLogic Active, monitors various breaker functions to provide vital, real-time information. Certain MasterPacT MTZ MicroLogic Active Control Units can be equipped with proprietary connectivity based on the IEEE 802.15.4 standard which enables connection with a Panel Server.

For detailed information on this range of devices, refer to the **MasterPacT MTZ with MicroLogic Active Catalog** in section **2.5 References**.

### 2.8.7. PowerTag Ambient

A9XST114

This product is a simple to install temperature sensor with IEEE 802.15.4 wireless communication. It is used for measuring the temperature of food storage and processing equipment and rooms to maintain the cold chain. It can be used in extreme temperature ranges: -30 °C to +55 °C. This reference (**A9XST114**) is an all-in-one product without accessories sold in sets of four pieces.

For detailed information on this device, refer to the **Harmony Wireless and Batteryless Push buttons Catalog** in section **2.5 References**.

### 2.8.8. PowerLogic TH110 and CL110

ZBRTT1

EMS59443

The PowerLogic TH110 and CL110 are wireless sensors which allow continuous monitoring. They use IEEE 802.15.4 wireless communication and require no additional power supply. TH110 offers continuous monitoring of the thermal status of all critical connections. CL110 offers continuous monitoring of both the temperature of the surface in contact with the device and the relative humidity.

For detailed information on these devices, refer to the **EcoXpert Catalog** in section **2.5 References**.

### 2.8.9. Exiway Activa-link and SATI LINK

OVA44210

OVA59130

The Exiway Light Activa-link and SATI LINK ranges are versatile and easy to install range of emergency blocks. These lights can communicate wirelessly to one another and to the Panel Server to be monitored remotely. They use IEEE 802.15.4 and create a mesh network, so that each unit works as a repeater. They offer real-time notifications in case of faults and digital reports downloadable at any time.

For detailed information on these devices, refer to the **Emergency Lighting Catalog** in section **2.5 References**.

### 2.8.10. SpaceLogic $CO_2$ and TRH Wireless Sensors

SED-TRH-G-5045

The SpaceLogic TRH (Temperature and Relative Humidity) sensors connect wirelessly to SE8000 Room Controllers or a Panel Server. There are two references, **SED-CO2-G-5045** and **SED-TRH-G-5045**. While they both measure TRH, **SED-CO2-G-5045** also measures $CO_2$.

For detailed information on these devices, refer to the **SpaceLogic Room Controllers Catalog** in section **2.5 References**.

### 2.8.11. PowerLogic PowerTag Control

A9XMC2D3

These wireless input/output modules allow circuit control and status monitoring. Designed for use in commercial and building applications, they quickly and easily turn a distribution board into a connected panel.

The PowerTag Control devices include:

- PowerTag Control 2DI.
  This PowerTag Control 2DI is a wireless-communication input module, specifically designed for monitoring applications such as OF/SD breaker status.
- PowerTag Control IO.
  This PowerTag Control IO is a wireless-communication input and output module, designed specifically for control and monitoring applications.

For detailed information on these devices, refer to the **PowerLogic Power Monitoring and Control Catalog** in section **2.5 References**.

## 2.8.12. Wireless and Batteryless Push Buttons

ZBRM22A0

ZBRT1

The Harmony wireless and batteryless push buttons are used for various building utilities (automatic doors, lighting, etc.) and industrial applications (conveying systems, automotive, MMM, logistics, food and beverage). There are two versions available:

- **ZBRT1:** one frame is sent when pushing the button.
- **ZBRT2:** one frame is sent when pushing the button and one frame is sent when releasing the button.

**Note:** An additional accessory (Ref: **ZBRZ1**) is mandatory to commission the push button to the Panel Server.

For detailed information on this device, refer to the **Harmony Wireless and Batteryless Push buttons Catalog** in section **2.5 References**.

# 3. Principle Guidelines for IEEE 802.15.4 Installations

## 3.1. Panel Server Principles

### 3.1.1. Panel Server Topology

The EcoStruxure Panel Server communicates natively upstream in Modbus TCP/IP and can be directly connected to any Ethernet network.

Two kinds of Ethernet topologies are possible, depending on the requirements of the communication architecture:

- A star communication network offers an architecture with high dependability.
- A daisy-chain architecture is a competitive option, but this is less robust in the event that a device in the chain fails.

Downstream, both the Universal and Advanced Panel servers offer Modbus TCP/IP and Modbus Serial Line communication. In addition to wired connectivity, the Panel Server gateway has wireless communication:

- IEEE 802.15.4 communication to connect Schneider Electric wireless devices downstream of the Panel Server.
- Wi-Fi communication to connect the Panel Server to the network architecture on the customer site.

The Panel Server also has an optional antenna which can be used to extend the:

- Wi-Fi network: it can be used with both the Universal and Advanced Panel Server. The antenna must be placed outside of the Panel. Refer to the safety message in section **2.8.2 EcoStruxure Panel Server – Antenna**.
- IEEE 802.15.4 network: it can be used with both the Universal (hardware V2 only) and Advanced Panel Server.

### 3.1.2. Radio Frequency Channel for Wireless Devices

The wireless channel is obtained automatically by the Panel Server when doing the pairing by choosing the best one (default setting). It is recommended to keep this setting. However, if the panel environment is changed, it is recommended to verify that no new wireless networks can disturb the system. Additionally, if other wireless devices are used in the same zone, the channel can be selected manually. See section **9 Wireless Channel Assignment** for more information on what to do in a situation with more than one gateway.

### 3.1.3. Power Supply

Panel Server power supply:

- 110-277 V AC/DC 50-60 Hz for **PAS400**, **PAS600** and **PAS800**.
- 24 V DC for **PAS600L** and **PAS800L**.
- PoE (Power over Ethernet) for **PAS800P**.

## 3.2. Wireless Quality Indicators for IEEE 802.15.4 Communication

Wireless communication quality in digital switchboards is primarily assessed using two metrics:

- RSSI (Received Signal Strength Indicator): Provides information about signal strength.
- PER (Packet Error Rate): Gives insights into the actual reliability of the transmitted data.

**Note:** Final tests have to be done when the panel is finalized (all separations, drawers, panel walls mounted) and installed. It is also advised to do some tests in the workshop during the commissioning when the enclosure is fulfilled and closed.

### 3.2.1. Received Signal Strength Indicator (RSSI)

The quality of the Radio Frequency (RF) communication between the Panel Server and each paired wireless device can be evaluated by using the RSSI.

RSSI measures the power level received by an antenna from a transmitter. It quantifies the strength of the received radio frequency (RF) signal, typically expressed in decibel milliwatts (dBm). RSSI is an indicator the receiver calculates to express how well it can “hear” a signal from a transmitter. If the signal is too weak, the receiver won’t be able to “hear” the message.

A higher RSSI value indicates a stronger and more reliable signal. However, a high RSSI is not sufficient to determine if the signal is strong enough. It is therefore important to also analyze the PER.

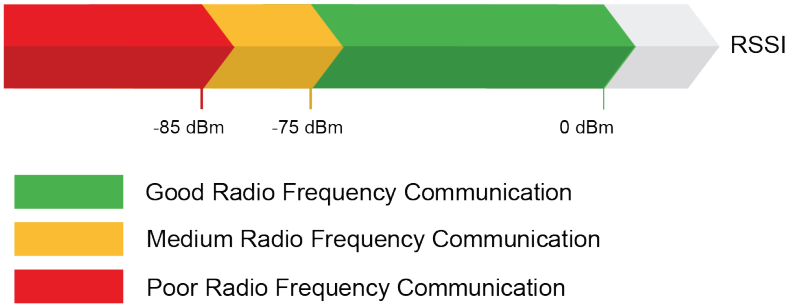



Illustration 1: RSSI levels

For robust communication, the RSSI should be greater than -75 dBm.

### 3.2.2. Packet Error Rate (PER)

PER measures the percentage of transmitted data packets received incorrectly at the destination. It is a crucial parameter for assessing the reliability and performance of a communication link.

In digital communication systems, data is sent in packets – discrete units of information. PER is calculated by comparing the number of packets sent with the number of packets lost. A low PER indicates a more reliable communication link, while a high PER suggests that a significant proportion of transmitted data is being corrupted or lost.

There are two types of PER measurements:

- **Panel Server Indicator PER:** The percentage of packets sent by the device and received incorrectly by the Panel Server.

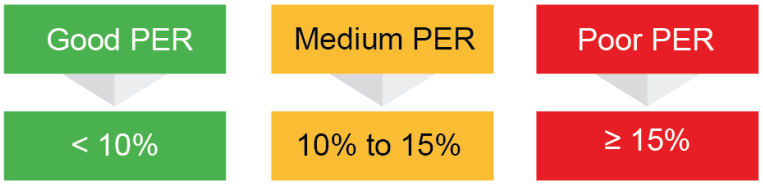



Illustration 2: Criteria for Panel Server PER

Recommended threshold: less than 10%.

- **Device Indicator PER**: The percentage of packets sent by the Panel Server and received incorrectly by the device.

**Note:** Not all devices support this metric. The Device PER is typically higher because it reflects the full round-trip communication, including acknowledgment from the Panel Server.

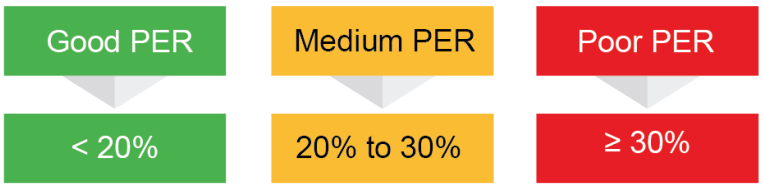



Illustration 3: Criteria for device PER

Recommended threshold: less than 20%.

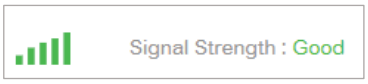
### 3.2.3. How to Monitor Quality Indicators

There are two ways to check the RSSI and PER:

- **EPC (EcoStruxure Power Commission):**

  Displays signal quality as Excellent, Good, Fair or Weak, based on a combination of RSSI and PER values.

  - From the EcoStruxure Panel Server icon, select **Wireless devices**; the signal strength is represented by the graphic and text, as in the following example:




**Note:** If the signal strength is fair or weak, consider checking the Panel Server embedded web page to verify the measured values.

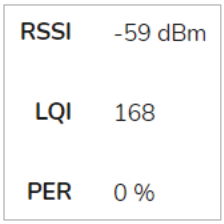
- **Panel Server Embedded Web Page:**

  From the home page, navigate to:

  **Maintenance > Device Communication > Wireless Devices > Wireless Network Indicator**

  This shows the current signal quality level using the same four categories (Excellent, Good, Fair, Weak).


  Just below, the measured value is given in text, as in the following example:




**Note:** The signal quality level shown in EPC software and web page (Excellent, Good, Fair, Weak) are based on a matrix that combines RSSI and PER.
It is necessary to recheck the RSSI and PER if any devices are added, removed, or change location.

# 4. Installation Guidelines for IEEE 802.15.4 Communication – Devices Inside the Switchboard(s)

## 4.1. Panel Forms of Separation

Panel separations are meant to facilitate access to a part of the panel while other parts remain energized and in service. The need for a specific form depends on the nature of tasks to be performed in the panel, the competency level and the protective gear worn by the personnel performing these tasks.

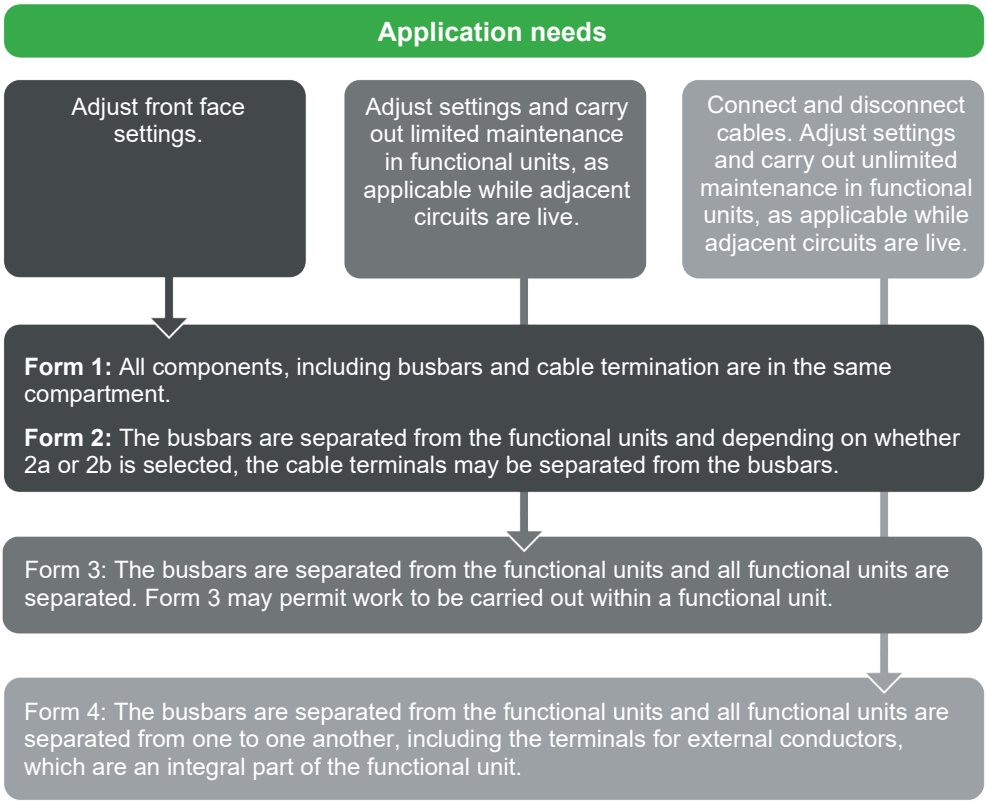



Illustration 4: Explanation of panel forms related to application needs

## 4.2. Devices

These recommendations cover one Panel Server (Entry, Universal, or Advanced) and several different wireless devices. These devices include:

- PowerTag Energy (Rope, M630/250, F160, M63, P63, F63).
- PowerLogic HeatTag.
- Acti9 Active.
- Wireless Indication Auxiliary (for ComPacT NSX and ComPacT NSXm).
- MasterPacT MicroLogic Active Control Unit.
- PowerLogic TH110 and CL110.
- PowerTag Control 2DI and IO.

It might be necessary to use more than one Panel Server if the number of wireless devices is higher than the maximum allowed for the Panel Server model (refer to Maximum Configuration in the **EcoStruxure Panel Server - User Guide**, found in section **2.5 References**).

## 4.3. Installation Guidelines Inside One Switchboard

The Panel Server can be installed with wireless devices inside one metal or plastic enclosure, and cover up to five columns in Forms 1, 2a, or 2b, with the specifications for installation outlined in this section. For PrismaSeT panels, it can be extended up to Form 4. Refer to the **Wireless Communication with EcoStruxure™ Panel Server in PrismaSeT - Design Guide** in section **2.5 References**.

### 4.3.1. Panel Server Settings

The Panel Server settings, available on the Panel Server web pages or EcoStruxure Power Commission software, shall be set accordingly:

- Antenna setting: **Internal**.
- Output power level: **Low level** (setting not editable when antenna is set to **Internal**).

### 4.3.2. Panel Server Positioning

Installing the Panel Server at the bottom of the column can help minimize the possibility of overheating. From a radio frequency standpoint, installing the Panel Server as close as possible to the central point of the enclosure can help to improve the signal. As a compromise, the Panel Server can be placed in the middle of the column if there are no high-heat-generating devices below it.

There can be one Panel Server to cover a five-column panel, if it is placed in the center column. This will allow one Panel Server to cover its maximum number of columns (the column it is in and up to two on each side). The number of columns refers to columns containing products, and there may also be one or more columns for cable connection, as shown in the illustration below. The illustration shows an example of an enclosure with five columns containing products, and two cable columns.

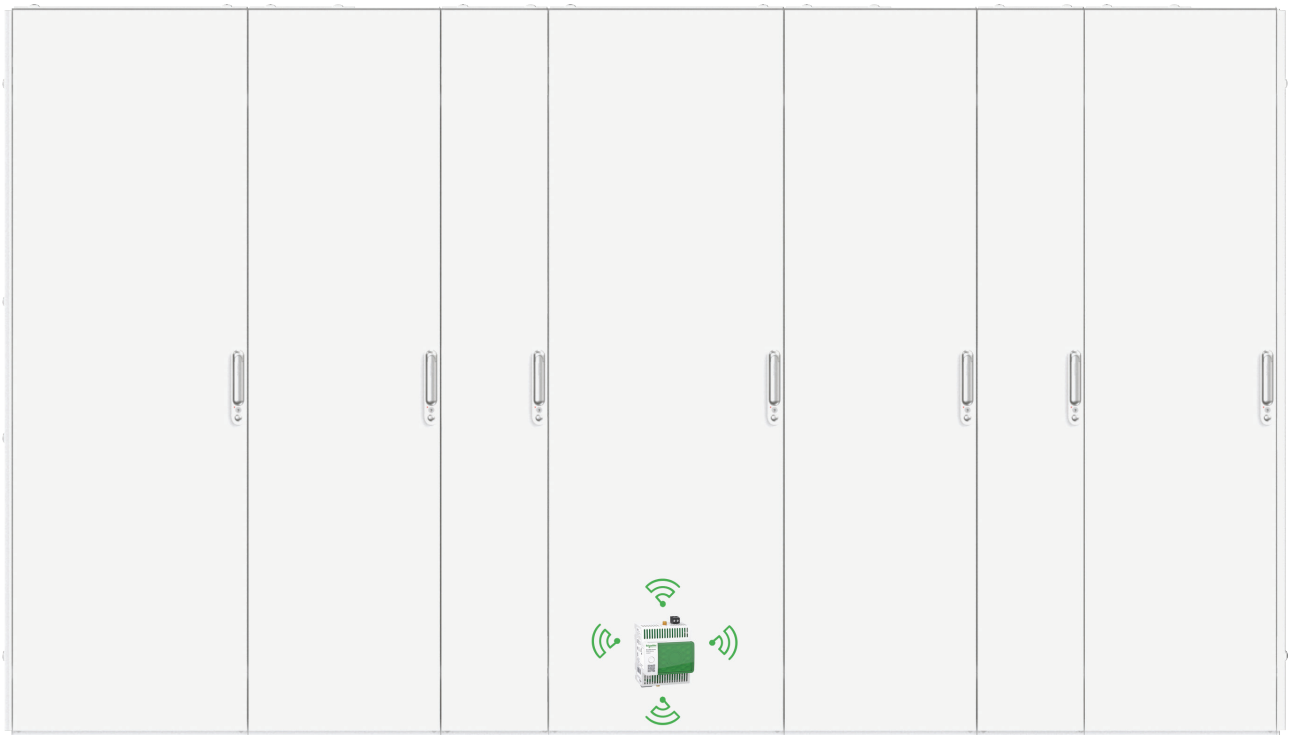


Illustration 5: Panel Server installation at the bottom of the column, covering five columns

## 4.4. Installation Guidelines Inside One Metal Switchboard with External Panel Server Antenna

When a Universal V2 Panel Server or Advanced Panel Server is used, the external antenna can be installed to extend the IEEE 802.15.4 range.

A Panel Server installed in a metal enclosure with an external antenna can cover up to seven columns in forms 1, 2a, or 2b, with the specifications for installation outlined in this section. For PrismaSeT panels, it can be extended up to Form 4. Refer to the **Wireless Communication with EcoStruxure™ Panel Server in PrismaSeT - Design Guide** in section **2.5 References**.

The external antenna can be used to extend the signal within the panel. Note that the output power of the antenna must be set to **Low level** when installed inside an enclosure. It is important to note that the antenna cable length is only 3 m, so this must be considered.

**⚠ WARNING**

**UNINTENDED EQUIPMENT OPERATION OR ALERTED FEATURE OF PROTECTIVE DEVICES**
Do not set IEEE 802.15.4 **External Antenna** parameter to **High Level** if the antenna is inside the panel.
**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

### 4.4.1. Panel Server Settings

The Panel Server settings, available on the Panel Server web pages or EcoStruxure Power Commission software, shall be set accordingly:

- Antenna setting: **Both**.
- Output power level: **Low level** (setting not editable when antenna is set to **Both**).

### 4.4.2. Panel Server and Antenna Positioning

Installing the Panel Server at the bottom of the column can help minimize the possibility of overheating. From a radio frequency standpoint, installing the Panel Server as close as possible to the central point of the enclosure can help to improve the signal. As a compromise, the Panel Server can be placed in the middle of the column if there are no high-heat-generating devices below it.

The antenna cable length is 3 m, and for each bend in the cable, the radius of curvature must be more than 100 mm. The cable must not be wound in a loop. The antenna can be installed at the top or the bottom of the column. Due to the length of the cable, the antenna may not reach the top of the column if the Panel Server is installed at the bottom. The minimum distance required between the antenna stem and surrounding metal barriers is 10 cm.

One Panel Server Universal or Advanced with one external antenna can cover up to seven columns.

The Panel Server and the antenna can each cover the column they are in, and up to two on each side. The number of columns refers to columns containing products, and there may also be one or more columns for cable connection, as shown in the illustration below. Due to the cable length limitation, the antenna can be approximately two columns away from the Panel Server.

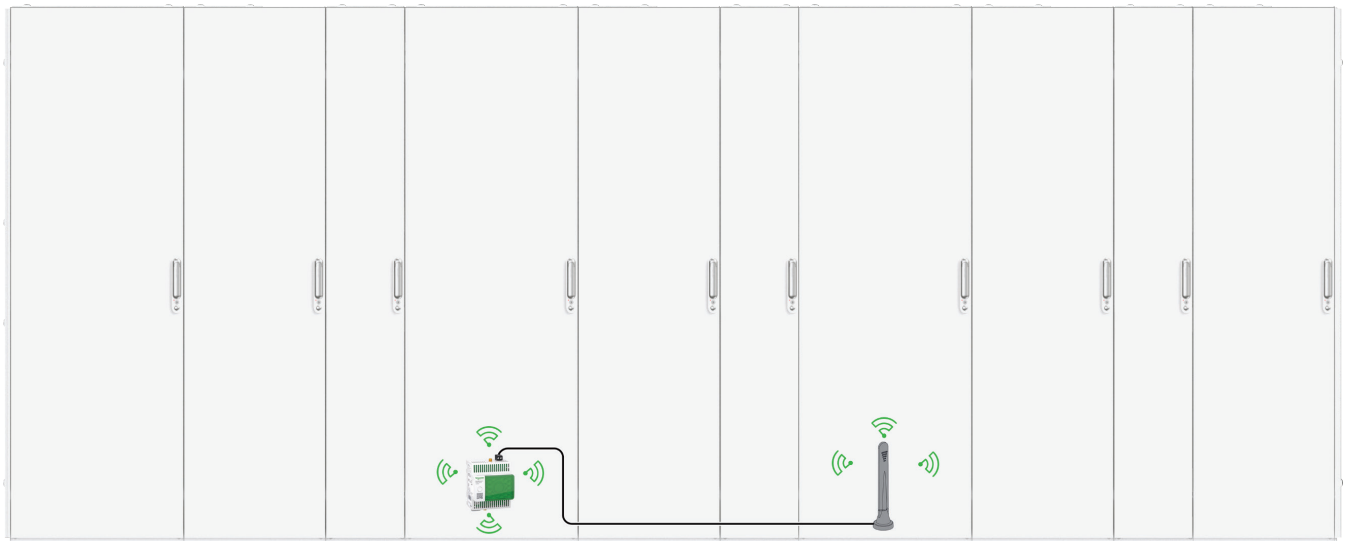


Illustration 6: Panel Server and antenna installation at the bottom of the column, covering seven columns

## 4.5. Installation Guidelines Inside Two Metal Switchboards with External Panel Server Antenna

When a Panel Server Universal V2 or Panel Server Advanced is used, the external antenna can be installed to extend the IEEE 802.15.4 range.

The Panel Server can be installed with wireless devices inside one metal enclosure, and other wireless devices and the external antenna installed in another metal enclosure, with the specifications for installation outlined in this section. Both Panel Server and external antenna can cover up to seven columns in Forms 1, 2a, or 2b. For PrismaSeT panels, it can be extended up to Form 4. Refer to the **Wireless Communication with EcoStruxure™ Panel Server in PrismaSeT - Design Guide** in section **2.5 References**. It is important to note that the antenna cable length is only 3 m, so this limits the distance between the two enclosures.

Note that the output power of the antenna must be set to **Low level** when installed inside an enclosure.

**⚠ WARNING**

**UNINTENDED EQUIPMENT OPERATION OR ALERTED FEATURE OF PROTECTIVE DEVICES**

Do not set IEEE 802.15.4 **External Antenna** parameter to **High Level** if the antenna is inside the panel.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

### 4.5.1. Panel Server Settings

The Panel Server settings, available on the Panel Server web pages or EcoStruxure Power Commission software, shall be set accordingly:

- Antenna setting: **Both**.
- Output power level: **Low level** (setting not editable when antenna is set to **Both**).

### 4.5.2. Panel Server and Antenna Positioning

Installing the Panel Server at the bottom of the column can help minimize the possibility of overheating. However, due to the antenna cable length, to reach another enclosure, it would likely need to be installed at least in the middle of the column. The Panel Server can be placed in the middle of the column if there are no high-heat-generating devices below it.

The antenna cable length is 3 m, and for each bend in the cable, the radius of curvature must be more than 100 mm. The cable must not be wound in a loop. The antenna can be installed at the top or the bottom of the column. The minimum distance required between the antenna stem and surrounding metal barriers is 10 cm. It is recommended to install the antenna directed downwards with its magnetic support placed on the upper part of the enclosure, as shown in illustration below.

There can be one Universal or Advanced Panel Server and one antenna to cover up to two enclosures, with the distance between the two restricted by the antenna cable length. The Panel Server and the antenna can each cover the column they are in, and up to two on each side. The number of columns refers to columns containing products, and there may also be one or more columns for cable connection. This architecture is typically used when two enclosures are mounted back-to-back.

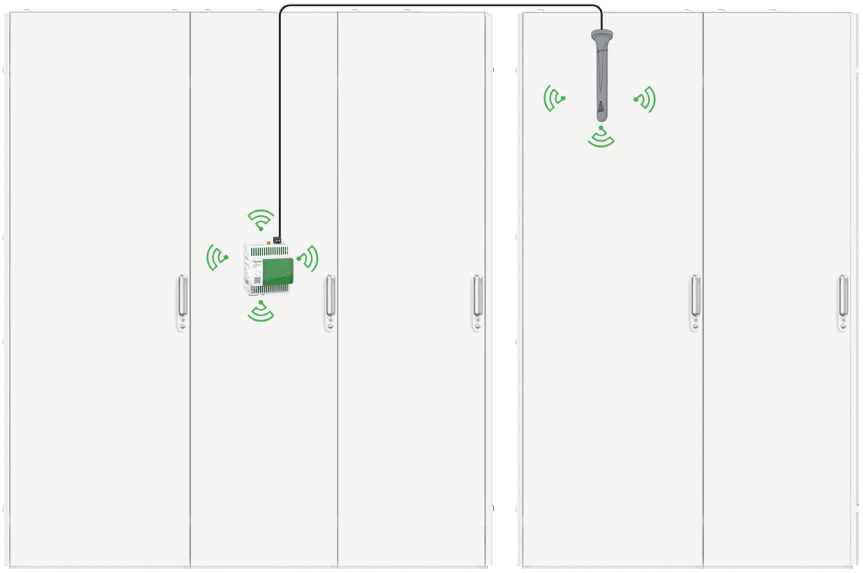


Illustration 7: Panel Server and antenna installation in two metal enclosures

# 5. Installation Guidelines for IEEE 802.15.4 Communication – Open-Field Architectures

When a Universal V2 or Advanced Panel Server is used, the external antenna can be installed to extend the IEEE 802.15.4 range.

The Panel Server can be installed in an enclosure and wireless devices installed outside of the enclosure in open field, with the specifications for installation outlined in this section. Devices installed in a plastic enclosure can be considered in open field for wireless communication (insignificant mitigation of radio frequency signal by plastic material).

Use of the external antenna is:

- Optional, but preferred, if the Panel Server is installed in a plastic enclosure.
- Mandatory if the Panel Server is installed in a metal enclosure.

## 5.1. Devices

These recommendations cover one Panel Server (Universal V2 or Advanced) and several different wireless devices. These devices include:

- PowerTag Energy.
- Acti9 Active.
- PowerLogic TH110 and CL110.
- Exiway Light Activa-link, Exiway Trend Activa-link, and Exiway Light SATI LINK Emergency Lighting.
- PowerTag Ambient.
- SpaceLogic Wireless Sensors.
- Harmony Wireless and Batteryless Push Buttons.

It might be necessary to use more than one Panel Server if the number of wireless devices is higher than the maximum allowed for the Panel Server model (refer to Maximum Configuration in the **EcoStruxure Panel Server - User Guide**, found in section **2.5 References**).

If there is more than one Panel Server, refer to section **9 Wireless Channel Assignment** to help ensure a balanced wireless communication on the channels.

## 5.2. Panel Server Settings

The Panel Server settings, available on the Panel Server web pages or EcoStruxure Power Commission software, shall be set accordingly:

- Antenna setting: **External**.
- Output power level: **Low level** or **High level**.

**⚠ WARNING**

**UNINTENDED EQUIPMENT OPERATION OR ALERTED FEATURE OF PROTECTIVE DEVICES**

Do not set IEEE 802.15.4 **External Antenna** parameter to **High Level** if the antenna is inside the panel.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

**Note:** Selecting high level only increases the strength of the wireless packets sent by the Panel Server, but not the strength of the packets sent by the wireless devices. Therefore, since the communication is two-way, the maximum distance does not increase when high level is selected.

## 5.3. Panel Server and Antenna Positioning

When installing the Panel Server inside a metal or plastic enclosure, ensure there are no high-heat-generating devices below it to help minimize the possibility of overheating.

The antenna cable length is 3 m, and for each bend in the cable, the radius of curvature must be more than 100 mm. The cable must not be wound in a loop. It is advised to put the antenna on the top of any enclosure in a way to limit obstacles between it and the wireless devices.

## 5.4. Device Positioning

Devices can be installed in an open space up to 25 meters from the antenna, unless otherwise specified below. The devices shall not be installed in another room or separated by walls from the enclosure and antenna.

If the devices are installed in an enclosure, it must be plastic, not metal.


Illustration 8: Panel Server Advanced in an enclosure and wireless devices in an open field

### 5.4.1. Exiway Emergency Lighting

Exiway Emergency Lights communicate with each other in radio frequency, creating a mesh network. Each unit works as a repeater, helping to ensure wide coverage. At least two devices must be within 5 meters of the antenna, then the maximum spacing between any two emergency lights is 10 meters. Refer to **Emergency Lighting Catalog** in section **2.5 References**.

### 5.4.2. PowerTag Ambient

In the case of the PowerTag Ambient, this device is often installed inside a refrigerator or cold room. In this case, the device can be up to 7 meters away from the antenna. Depending on the type of refrigerator, the thickness of the walls or the strength of the seal, it could be less. Always check the quality indicators.

# 6. Installation Guidelines for IEEE 802.15.4 Communication in Canalis Tap-Off Boxes

For this architecture, a Universal V2 or Advanced Panel Server must be used with its external antenna installed to extend the IEEE 802.15.4 range.

The Universal or Advanced Panel Server can be installed in a tap-off box, and wireless devices installed in plastic tap-off boxes in accordance with the specifications for installation outlined in this section. Devices installed in a plastic enclosure can be considered to be in an open field for wireless communication (as plastic materials cause negligible attenuation of radio-frequency signals).

## 6.1. Devices

These recommendations cover one Universal or Advanced Panel Server with external antenna and several different wireless devices. These devices include:

- PowerTag Energy (F160, M63, P63, F63).
- Acti9 Active.

It might be necessary to use more than one Panel Server if the number of wireless devices is higher than the maximum allowed for the Panel Server model (refer to Maximum Configuration in the **EcoStruxure Panel Server - User Guide**, found in section **2.5 References**).

If there is more than one Panel Server, refer to section **9 Wireless Channel Assignment** to help ensure a balanced wireless communication on the channels.

## 6.2. Panel Server Settings

The Panel Server settings, available on the Panel Server web pages or EcoStruxure Power Commission software, shall be set accordingly:

- Antenna setting: **Both**.
- Output power level: **Low level** (setting not editable when antenna is set to **Both**).

## 6.3. Panel Server and Antenna Positioning

When installing the Panel Server inside a tap-off box, ensure there are no high-heat-generating devices below it to help minimize the possibility of overheating.

The antenna cable length is 3 m, and for each bend in the cable, the radius of curvature must be more than 100 mm. The cable must not be wound in a loop. It is advised to put the antenna on the top of the Canalis, or in a way to limit obstacles between it and the wireless devices.

Install the tap-off box containing the Panel Server as central to the room and wireless devices. Use the external antenna to extend the range out towards the devices which are furthest from this box. When possible, install the box on the side of the Canalis which faces towards the majority of the wireless devices.

## 6.4. Device Positioning

This architecture is specific for when the Panel Server and wireless devices are installed inside plastic tap-off boxes on the Canalis.

The tap-off box containing wireless devices must be plastic, not metal. The devices shall not be installed in another room or separated by walls from the enclosure and antenna.

Devices can be installed in an open space up to 25 meters from the antenna if they are facing towards the external antenna of the Panel Server or they are in line on the same Canalis. When facing away, the distance between device and external antenna is reduced to 18 meters.

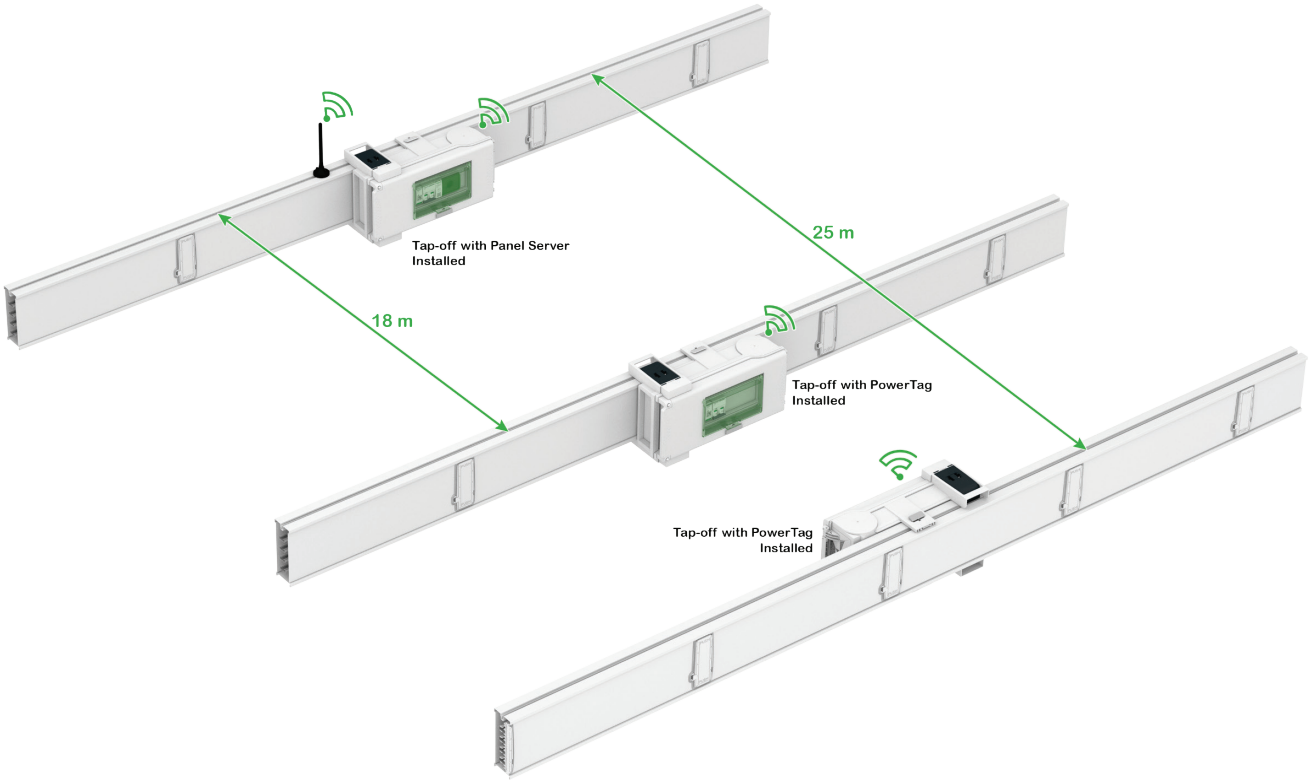



Illustration 9: Panel Server Advanced and wireless devices in plastic tap-off boxes on Canalis

# 7. Installation Guidelines for IEEE 802.15.4 Communication with a Mixed Architecture (Inside and Outside of Switchboard)

For this architecture, Panel Server Universal V2 or Advanced must be used with its external antenna installed to extend the IEEE 802.15.4 range.

The Panel Server Universal or Advanced is installed inside an enclosure (Form 1, 2a or 2b and for PrismaSeT up to Form 4) and its external antenna is installed outside of the enclosure.

Some wireless devices are installed inside the enclosure, and some other wireless devices are installed outside the enclosure in Canalis plastic tap-off boxes, in the field, or in plastic enclosures with the specifications outlined in this section.

Devices installed inside a plastic enclosure can be considered in open field for wireless communication (insignificant mitigation of radio frequency signal by plastic material).

## 7.1. Devices

These recommendations cover one Universal or Advanced Panel Server with external antenna and several different wireless devices. These devices include all of those listed in sections **4.2 Devices** and **5.1 Devices**.

It might be necessary to use more than one Panel Server if the number of wireless devices is higher than the maximum allowed for the Panel Server model (refer to Maximum Configuration in the **EcoStruxure Panel Server - User Guide**, found in section **2.5 References**).

If there is more than one Panel Server, refer to section **9 Wireless Channel Assignment** to help ensure a balanced wireless communication on the channels.

### 7.1.1. Panel Server Settings

The Panel Server settings, available on **the Panel Server web pages** or **EcoStruxure Power Commission software**, shall be set accordingly:

- Antenna setting: **Both**.
- Output power level: **Low level** (setting not editable when antenna is set to **Both**).

### 7.1.2. Panel Server and Antenna Positioning

Installing the Panel Server at the bottom of a column can help minimize the possibility of overheating. However, due to the antenna cable length, to reach the top of the enclosure, it would likely need to be installed at least in the middle of the column. The Panel Server can be placed in the middle if there are no high-heat-generating devices below it.

The antenna cable length is 3 m, and for each bend in the cable, the radius of curvature must be more than 100 mm. The cable must not be wound in a loop.

It is advised to put the antenna on the top of the panel, or in a way to limit obstacles between it and the wireless devices that are outside of the panel.

There can be one Panel Server Universal or Advanced and one antenna to cover up to five columns plus the surrounding devices outside of the enclosure. The Panel Server can cover the column that it is in, and up to two on each side. The number of columns refers to columns containing products, and there may also be one or more column for cable connection.

### 7.1.3. Device Positioning

Devices inside the enclosure must be installed in the columns covered by the Panel Server (see **section 4.3**).

Devices outside the enclosure must be positioned in accordance with rules defined in **section 5.4**.

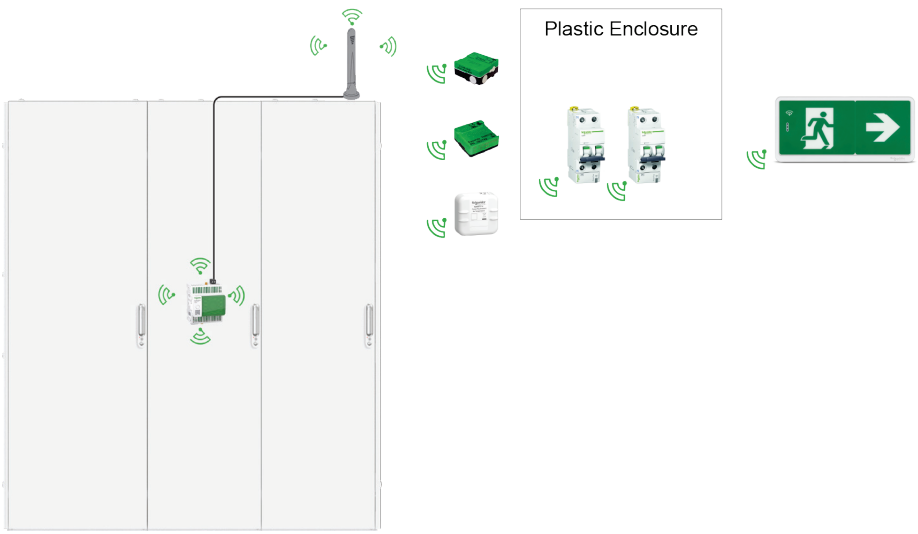



Illustration 10: Panel Server and devices in an enclosure and devices in an open field

# 8. Installation Guidelines for Wi-Fi Communication

The Panel Server supports Wi-Fi infrastructure, that is, the Panel Server can connect to a Wi-Fi router (access point). The Wi-Fi Antenna can be used on all Panel Server versions (except Panel Server Entry and Wired by Design models).

By default, Wi-Fi is not active in the Panel Server, so this section is meant to help with setting up the parameters for the installation with the internal or external antenna.

## 8.1. Installation Using Panel Server Internal Antenna

Panel Server can be installed in an enclosure with wireless devices and connected to Wi-Fi 2.4 GHz (or 5 GHz for Panel Server Advanced), compliant with the standard 802.11 a/b/g/n, through its internal antenna. It is advised to use internal Wi-Fi antenna only for commissioning. Due to its low power, the communication may be interrupted.

The following diagram shows an example of a Panel Server connected to Wi-Fi through the Panel Server internal Wi-Fi antenna.


Illustration 11: Panel Server connected to Wi-Fi using internal antenna

## 8.2. Installation Using Panel Server External Antenna

The Panel Server can be installed with wireless devices and connected to Wi-Fi 2.4 GHz (or 5 GHz for Panel Server Advanced), compliant with the standard 802.11 a/b/g/n, through its external antenna.

The external Wi-Fi antenna is an option for:

- Panel Server Universal (except Wired by Design models).
- Panel Server Advanced.

**⚠ WARNING**

**UNINTENDED EQUIPMENT OPERATION OR ALERTED FEATURE OF PROTECTIVE DEVICES**

Do not set Wi-Fi **Antenna** parameter to **External** Wi-Fi antenna if the external antenna is not connected to the Panel Server Universal or Advanced. Do not install Wi-Fi antenna within the enclosure.

**Failure to follow these instructions can result in death, serious injury, or equipment damage.**

For a reliable Wi-Fi connection, the external Wi-Fi antenna must be used. The output power settings for the external antenna are predefined and not editable.

The following diagram shows an example of a Panel Server Advanced connected to Wi-Fi through its external Wi-Fi antenna.

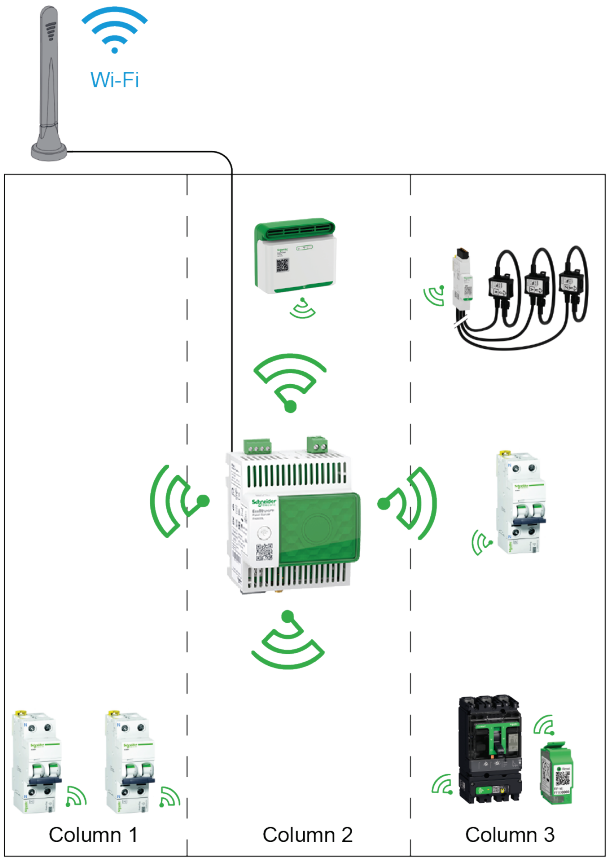



Illustration 12: Panel Server connected to Wi-Fi through connected external antenna

Additional recommendations and requirements:

- The antenna must be outside of the panel. Refer to the safety message in section **2.8.2 EcoStruxure Panel Server – Antenna**.
- The minimum distance required between the antenna stem and surrounding metal barriers is 10 cm (3.93 in).
- For architectures with two external antennas, the minimum distance required between both antennas is 10 cm (3.93 in).

# 8.3. Wi-Fi Signal and Wireless Channel Selection

## 8.3.1. Wi-Fi Signal Strength

Select a Wi-Fi signal with at least two power bars (strong or medium signal) in the Panel Server web page.

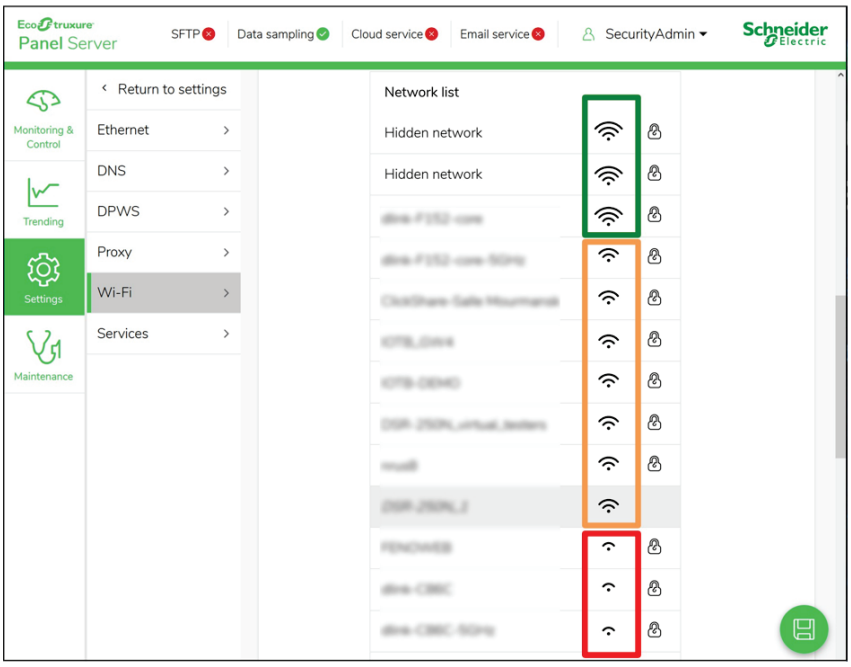



Illustration 13: Wi-Fi signal strength shown on Panel Server web pages

## 8.3.2. IEEE 802.15.4 Wireless Channel Selection

Select an IEEE 802.15.4 wireless channel that does not overlap with the selected Wi-Fi 2.4 GHz channel:

- Use a Wi-Fi scanner app on a smartphone (e.g. an open source Wi-Fi analyzer) to identify the channel used by the Wi-Fi network selected on the Panel Server.
- Select or change the IEEE 802.15.4 wireless channel to avoid overlapping.

# 9. Wireless Channel Assignment

This section shows how to design an IEEE 802.15.4 wireless channel assignment plan to establish balanced wireless communication on the channels.

Each Panel Server is assigned one wireless channel. A wireless channel has limited bandwidth that is impacted by:

- The number of associated Panel Server gateways and paired IEEE 802.15.4 devices.
- The wireless communication periods set in each gateway for each type of device.

**Note:** Exceeding bandwidth in a channel can lead to wireless communication disturbances and wireless communication issues.

## 9.1. Wireless Channel Assignment Design Plan

### 9.1.1. EcoStruxure System Wireless Architecture Ranking

There are two types of wireless architectures to consider:

- **Sparse wireless architecture:** One Panel Server and its external IEEE 802.15.4 antenna (if installed) communicates with Schneider Electric wireless devices that are within a radius of 20 m (65 ft).

**Note:** Default Panel Server wireless settings (communication periods and automatic channel selection) can be used.

- **Concentrated wireless architecture:** Two wireless gateways communicate with Schneider Electric wireless devices that are within a radius of 20 m (65 ft).

**Note:** The circumference of a circle with a 20 m (65 ft) radius is not the maximum distance for communication between the Panel Server gateway and paired wireless devices. It is the distance which helps ensure that two wireless Panel Server systems are independent.

The following figure shows examples of wireless architectures with Panel Server gateways:

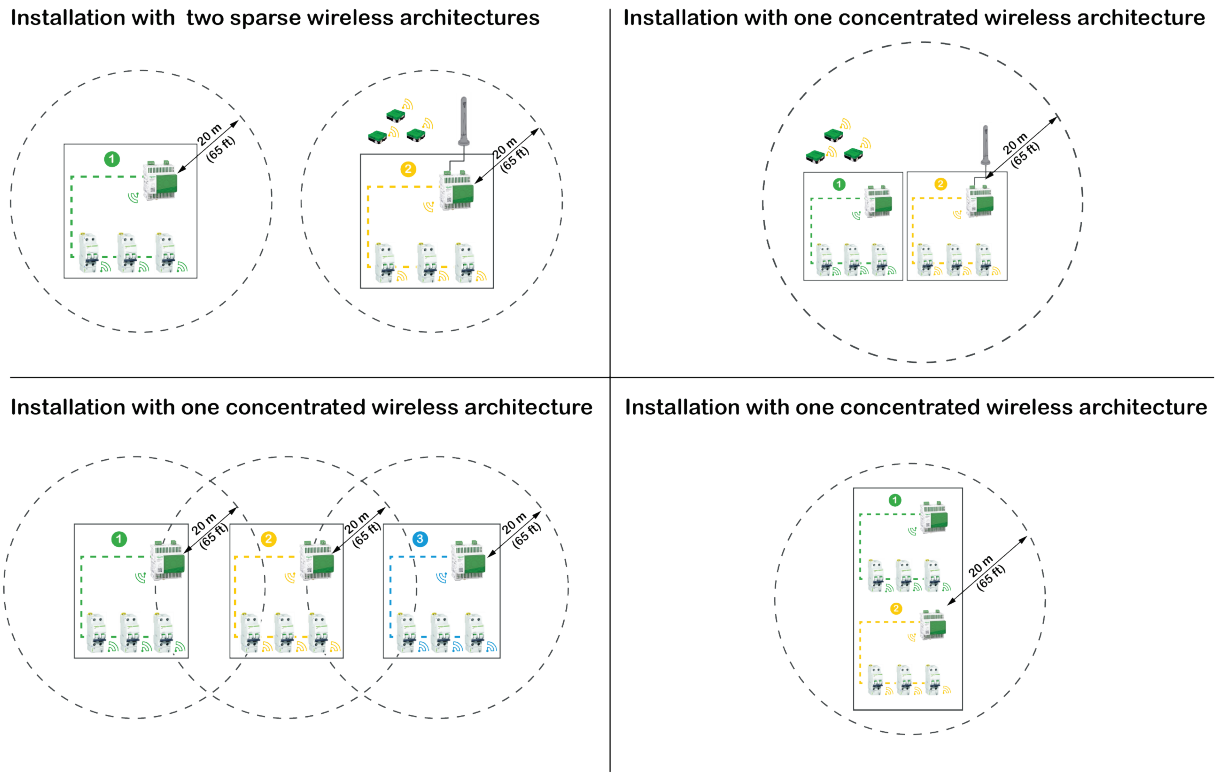



Illustration 14: Different installation examples of a sparse and concentrated architectures

### 9.1.2. Concentrated Architecture

For a concentrated wireless architecture, IEEE 802.15.4 wireless communication should be distributed across several channels to avoid wireless channel saturation. The system integrator needs to create a wireless channel assignment plan.

The wireless channel assignment plan must be defined in order to:

- Assign a channel (from 11 to 26) to each Panel Server by balancing communication loads.
- Define wireless communication periods for communication between each Panel Server and the paired wireless devices.

**Note:** If there is any Wi-Fi active in the area, select IEEE 802.15.4 wireless channels to avoid overlapping (see **section 8.3.2**).

The following figures show examples of wireless channel assignment plans:

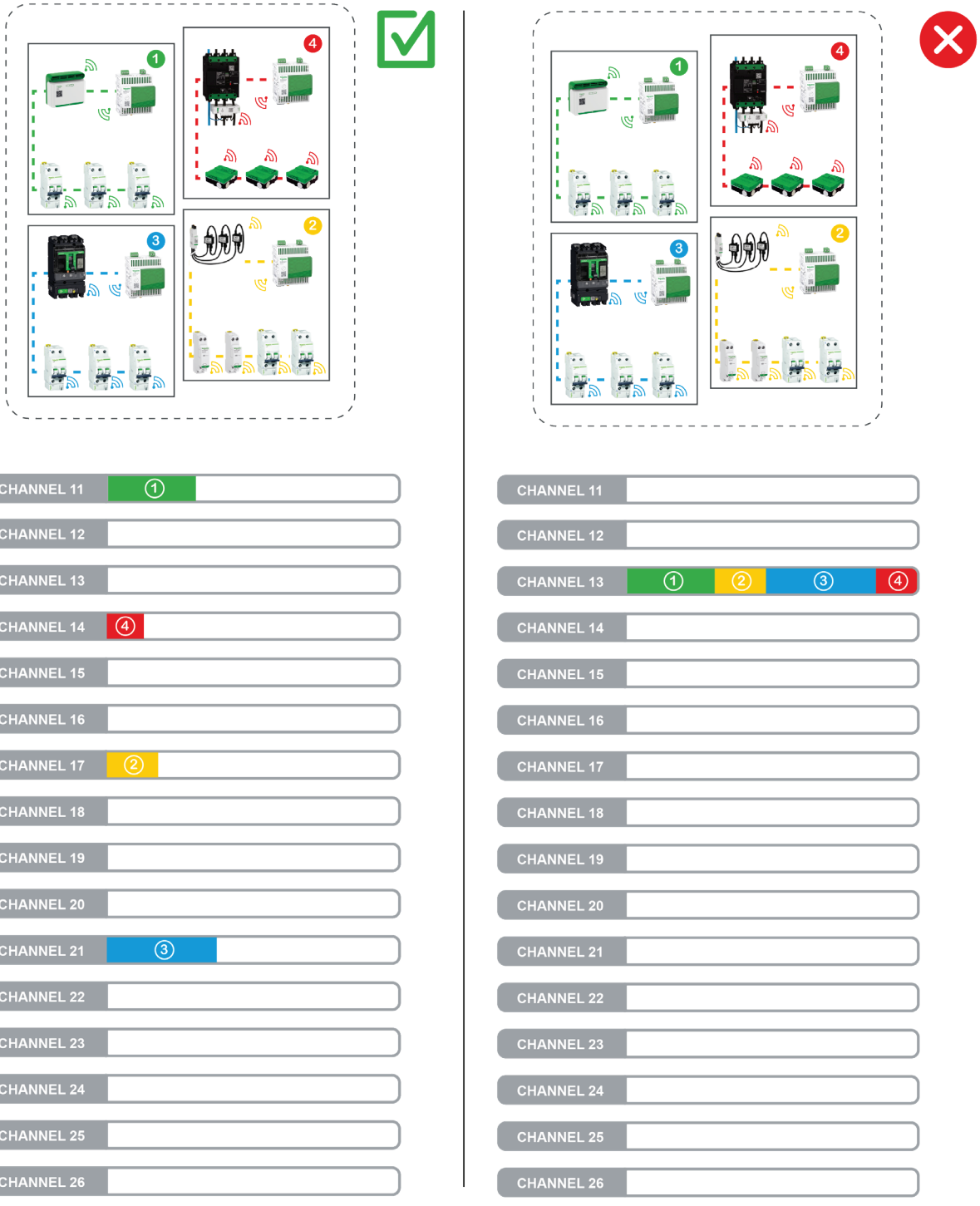



Illustration 15: Recommended and not recommended plans for wireless channel assignment

# 9.2. Wireless Channel Assignment Procedure

## 9.2.1. Prerequisites

The prerequisites for creating a wireless channel assignment plan are:

- The total number of Panel Server gateways for the architecture is defined.
- The panels/enclosures are pre-designed in accordance with design rules. Subsequently, the number of Panel Server gateways and the number and/or type of panel/enclosure is defined.
- The physical position of each panel/enclosure is defined.
- Wi-Fi configuration, if any.

## 9.2.2. Step 1: Define Position of Panel/Enclosure to Building Layout

For buildings with multiple floors, attenuation of a reinforced concrete floor can be considered to be high. Therefore, if needed, one wireless channel assignment plan should be created for each floor without dependency between the channel assignment plans of the building.

Add the panels/enclosures to the building layout (respecting scale) and label each panel/enclosure.

Reference each panel/enclosure so that the type of panel/enclosure can be identified immediately and easily associated with the type and number of paired wireless devices.

## 9.2.3. Step 2: Define Overlapped IEEE 802.15.4 Channels

Each IEEE 802.15.4 channel has a range of 2 MHz with 5 MHz spacing.

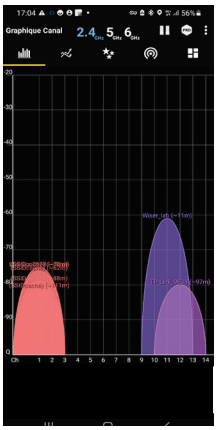


Illustration 16: Wi-Fi analyzer application example

The frequency range associated with an IEEE 802.15.4 channel selected in a Panel Server can also be used by other wireless systems (e.g. Wi-Fi 2.4 GHz network or third-party wireless equipment) around the Panel Server system. Even if two contiguous wireless systems (e.g. a wireless Panel Server system or a third- party radio frequency system such as a Wi-Fi network) are able to run on the same frequency bandwidth without issues, Schneider Electric recommends separating two different non-overlapped channels where possible.

To discover Wi-Fi channels around the installation, it is possible to use a channel scanner app, for example, an open-source Wi-Fi analyzer available on mobile devices.

Scan radio frequency occupation to determine which Wi-Fi channels are used and exclude overlapped IEEE 802.15.4 channels on the wireless channel assignment plan, as per the following table:

| Wi-Fi 2.4 GHz channel | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency band (MHz) | 2401-2423 | 2406-2428 | 2411-2433 | 2416-2438 | 2421-2443 | 2426-2448 | 2431-2453 | 2436-2458 | 2441-2463 | 2446-2468 | 2451-2473 | 2456-2478 | 2461-2483 | 2473-2495 |
| Overlapped IEEE 802.15.4 channel | 11-14 | 12-15 | 13-16 | 14-17 | 15-18 | 16-19 | 17-21 | 18-22 | 19-23 | 20-23 | 21-24 | 22-25 | 23-26 | 25-26 |

Table 4: Wi-Fi and IEEE 802.15.4 overlapping channels

The following figure shows the radio frequency bandwidth per IEEE 802.15.4 channel.

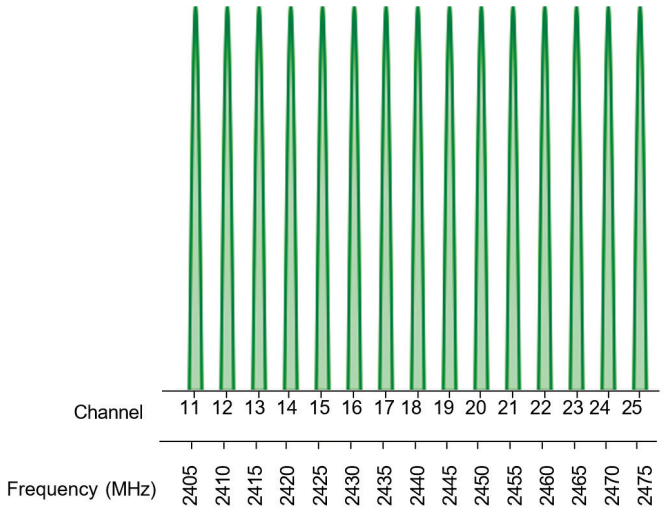



Illustration 17: Radio frequency bandwidth per IEEE 802.15.4 channel

The following figure shows the radio frequency bandwidth per Wi-Fi 2.4 GHz channel.

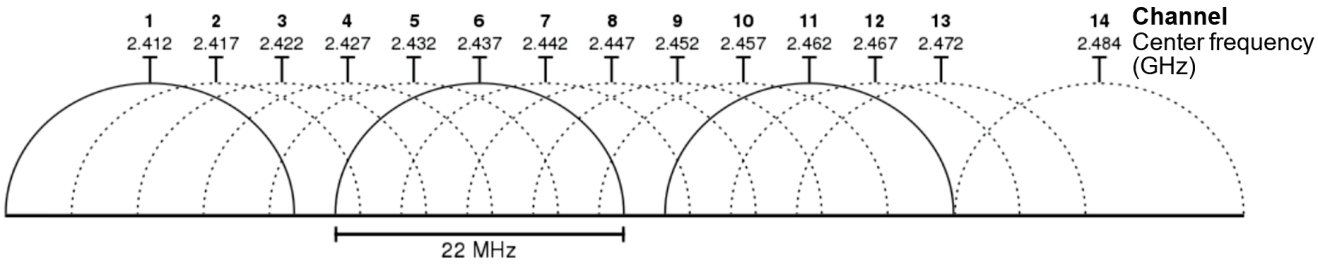



Illustration 18: Radio frequency bandwidth per Wi-Fi 2.4 GHz channel

### 9.2.4. Step 3: Reserve IEEE 802.15.4 Channels for Future Evolution

During the creation phase of a wireless channel assignment plan, it can be planned to add a third-party radio frequency system after the implementation of the plan. In this case, reserve a dedicated channel.

For future evolution, it is recommended to reserve channels on the wireless channel assignment plan depending on the density of Schneider Electric wireless devices that should be within a radius of 20 m (65 ft) from the Panel Server:

- Reserve one more channel if density should be lower than 1,200 Schneider Electric wireless devices.
- Reserve two more channels if density should be 1,200 or more Schneider Electric wireless devices.

### 9.2.5. Step 4: Define Panel Server IEEE 802.15.4 Channel

It is necessary to define the IEEE 802.15.4 channel for each Panel Server.

Use all the available channels to balance Panel Server and paired wireless devices by using the following formula:

Number of available channels = 16 - Number of overlapped channels - Number of reserved channels.

Maintain uniform usage of channels by respecting both priorities:

1. Maximize distance between the Panel Server gateways using the same channel.
2. Maximize distance between a Panel Server using channel X and a Panel Server using adjacent channels (channel X-1 and channel X+1).

The following guidelines should be considered when several Panel Server gateways are installed in one metal enclosure:

- Do not define the same channel for more than one Panel Server.
- Favor the definition of non-adjacent channels for each Panel Server.

To apply the wireless channel assignment plan, each Panel Server must be set to **Channel Mode > Manual** (not to **Auto**, default setting). In manual channel mode, the system integrator can select the channel number (from 11 to 26) in accordance with the definition of the plan.

The following figures show examples of wireless channel assignment plans, and the channel **Ch** associated to each Panel Server **PS**.


Illustration 19: Examples of wireless channel assignment plans and the channel associated to each Panel Server


Illustration 20: Examples of not recommended wireless channel assignment plans and the channel associated to each Panel Server

### 9.2.6. Step 5: Define Wireless Communication Periods

Define wireless communication period values for each type of device according to wireless device density:

- Enter identical communication period values for the Panel Server gateways in the area.
- Do not set communication periods to less than 15 seconds for concentrated wireless architectures.
- Set the Panel Server communication periods according to the number of wireless devices installed within a 20 m (65 ft) radius from the Panel Server:

| Number of wireless devices | Communication periods setting |
|---|---|
| < 100 | ≥ 15 seconds |
| 100–600 | ≥ 30 seconds |
| 600–1,200 | ≥ 60 seconds |
| ≥ 1,200 | Contact a Schneider Electric representative. |

Table 5: Panel Server communication periods according to number of wireless devices installed within a 20 m radius of the Panel Server

The screenshot shows the Panel Server web page to set communication periods.

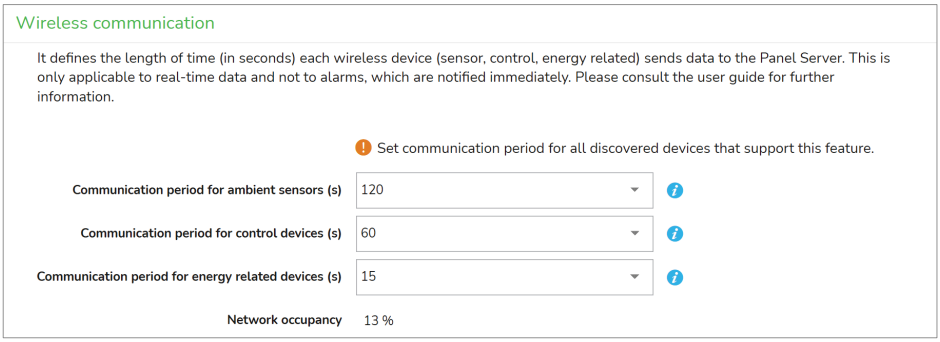



Illustration 21: Panel Server web page for defining communication periods

**Note:** The communication period of a wireless device can be set either at the family device level (e.g., for all sensors) or individually, device by device, for greater granularity. For energy-related wireless devices, it is possible to individually set 2 seconds as the communication period.

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