SIEMENS

SIMATIC NET

Industrial Wireless LAN SCALANCE W780 / W740 according to IEEE 802.11n Web Based Management V6.5

Configuration Manual

04/2022

C79000-G8976-C267-17

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

⚠ DANGER
indicates that death or severe personal injury **will** result if proper precautions are not taken.

⚠ WARNING
indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠ CAUTION
indicates that minor personal injury can result if proper precautions are not taken.

NOTICE
indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

⚠ WARNING
Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

Trademarks

All names identified by ® are registered trademarks of Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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Table of contents

Introduction 1

1.1 Information on the Configuration Manual

Validity of the configuration manual

This Configuration Manual covers the following products:

- SCALANCE W748-1 M12
- SCALANCE W748-1 RJ-45
- SCALANCE W788-1 M12
- SCALANCE W788-2 M12
- SCALANCE W788-2 M12 EEC
- SCALANCE W788-1 RJ-45
- SCALANCE W788-2 RJ-45
- SCALANCE W786-1 RJ-45
- SCALANCE W786-2 RJ-45
- SCALANCE W786-2IA RJ-45
- SCALANCE W786-2 SFP

This Configuration Manual applies to the following software version:

- SCALANCE W700 firmware as of version V 6.5

Purpose of the Configuration Manual

This Configuration Manual is intended to provide you with the information you require to commission and operate SCALANCE W700 devices correctly. It explains how to configure the SCALANCE W700 devices and how to integrate them in a WLAN network.

How you install and connect up the device correctly is described in the operating instructions of the device.

Orientation in the documentation

Apart from the Configuration Manual you are currently reading, the following documentation is also available from SIMATIC NET on the topic of Industrial Wireless LANs:

- Configuration Manual: SCALANCE W780/W740 Command Line Interface
  This document contains the CLI commands that are supported by SCALANCE W700 devices.
- Performance data 802.11abgn PCIe Minicard MPCIE-R1-ABGN-U3
  This document contains information about the frequency, modulation, transmit power and receiver sensitivity of the wireless card.

- SCALANCE W788-x / W748-1 Operating Instructions
  This document contains information on installing and connecting up the following products and their approvals:
  - SCALANCE W788-1 RJ-45
  - SCALANCE W788-1 M12
  - SCALANCE W788-2 RJ-45
  - SCALANCE W788-2 M12
  - SCALANCE W788-2 M12 EEC
  - SCALANCE W748-1 RJ-45
  - SCALANCE W748-1 M12
- Operating Instructions SCALANCE W786-x
  This document contains information on installing and connecting up the following products and their approvals:
  - SCALANCE W786-1 RJ-45
  - SCALANCE W786-2 RJ-45
  - SCALANCE W786-2IA RJ-45
  - SCALANCE W786-2 SFP
- System Manual Structure of an Industrial Wireless LAN
  Apart from the description of the physical basics and a presentation of the main IEEE standards, this also contains information on data security and a description of the industrial applications of wireless LAN.
  You should read this manual if you want to set up WLAN networks with a more complex structure (not simply a connection between two devices).
- System manual RCoax
  This system manual contains both an explanation of the fundamental technical aspects as well as a description of the individual RCoax components and their functionality. Installation/commissioning and connection of RCoax components and their operating principle are explained. The possible applications of the various SIMATIC NET components are described.
- System manual - Passive Network Components IWLAN
  This system manual explains the entire IWLAN cabling that you require for your IWLAN application. For a flexible combination and installation of the individual IWLAN components both indoors and outdoors, a wide ranging selection of compatible coaxial accessories are available. The system manual also covers connecting cables as well as a variety of plug-in connectors, lightning protectors, a power splitter and an attenuator.

Terms used

The designation . . .	stands for . . .
IPv4 address	IPv4 address
IPv6 address	IPv6 address
IP address	IPv4/IPv6 address
IPv4 interface	Interface that supports IPv4.

The designation . . .	stands for . . .
IPv6 interface	Interface that supports IPv6. The interface can have more than one IPv6 address The IPv6 addresses have different ranges (scope), e.g. link local
IP interface	Interface that supports both IPv4 and IPv6. As default the IPv4 support is already activated. The IPv6 support needs to be activated extra.

SIMATIC NET manuals

You will find SIMATIC NET manuals on the Internet pages of Siemens Industry Online Support:

- Using the search function:
  Siemens Industry Online Support (https://support.industry.siemens.com/cs/ww/en/)
  Enter the entry ID of the relevant manual as the search item.
- In the navigation panel on the left-hand side in the area "Industrial Communication":
  Industrial communication (https://support.industry.siemens.com/cs/ww/en/ps/15247/man)
  Go to the required product group and make the following settings:
  tab "Entry list", Entry type "Manuals"

Further documentation

The "SIMATIC NET Industrial Ethernet Network Manual" contains information on other SIMATIC NET products that you can operate along with the devices of this product line in an Industrial Ethernet network. There, you will find among other things optical performance data of the communications partners that you require for the installation.

The "SIMATIC NET Industrial Ethernet Network Manual" can be found on the Internet pages of Siemens Industry Online Support under the following entry ID:
27069465 (https://support.industry.siemens.com/cs/ww/en/view/27069465)

Training, Service & Support

You will find information on Training, Service & Support in the multi--language document "DC_support_99.pdf" on the data medium supplied with the documentation.

Security information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens’ products and solutions constitute one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

For additional information on industrial security measures that may be implemented, please visit
https://www.siemens.com/industrialsecurity (https://www.siemens.com/industrialsecurity).

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends that product updates are applied as soon as they are available and that the latest product versions are used. Use of product versions that are no longer supported, and failure to apply the latest updates may increase customer's exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed under
https://www.siemens.com/cert (https://www.siemens.com/cert).

Firmware

The firmware is signed and encrypted. This ensures that only firmware created by Siemens can be downloaded to the device.

The firmware is available on the Internet pages of the Siemens Industry Online Support: (https://support.industry.siemens.com/cs/de/en/ps/15860/dl)

Note on firmware/software support

Check regularly for new firmware/software versions or security updates and apply them. After the release of a new version, previous versions are no longer supported and are not maintained.

Decommissioning

Shut down the device properly to prevent unauthorized persons from accessing confidential data in the device memory.

To do this, restore the factory settings on the device.

Also restore the factory settings on the storage medium.

Recycling and disposal

The products are low in pollutants, can be recycled and meet the requirements of the WEEE directive 2012/19/EU for the disposal of electrical and electronic equipment.

Do not dispose of the products at public disposal sites.

For environmentally friendly recycling and the disposal of your old device contact a certified disposal company for electronic scrap or your Siemens contact (Product return (https://support.industry.siemens.com/cs/ww/en/view/109479891)).

Note the different national regulations.

Trademarks

The following and possibly other names not identified by the registered trademark sign ® are registered trademarks of Siemens AG:

SCALANCE, C-PLUG, RCoax

SIMATIC NET glossary

Explanations of many of the specialist terms used in this documentation can be found in the SIMATIC NET glossary.

You will find the SIMATIC NET glossary here:

- SIMATIC NET Manual Collection or product DVD
  The DVD ships with certain SIMATIC NET products.
- On the Internet under the following address:
  50305045 (https://support.industry.siemens.com/cs/ww/en/view/50305045)

License conditions

Note

Open source software

Read the license conditions for open source software carefully before using the product.

You will find license conditions in the following documents on the supplied data medium:

- OSS_Scalance-W700_86.pdf

1.2 Type designations

Abbreviations used

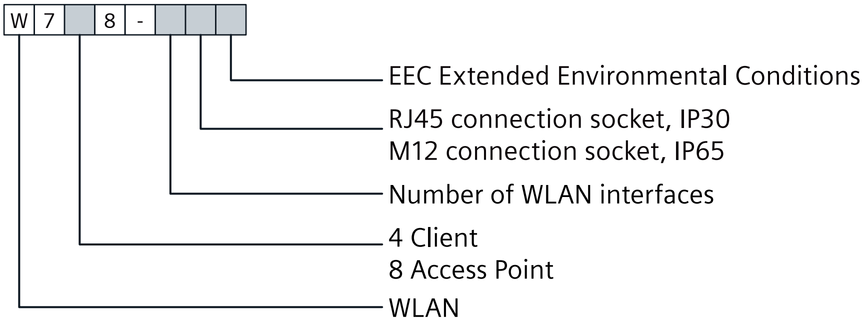
The information in the manuals for the SCALANCE W700 product family often applies to more than one product variant. In such situations, the designations of the products are shortened to avoid having to list all the type designations. The following table shows how the abbreviations relate to the product variants.

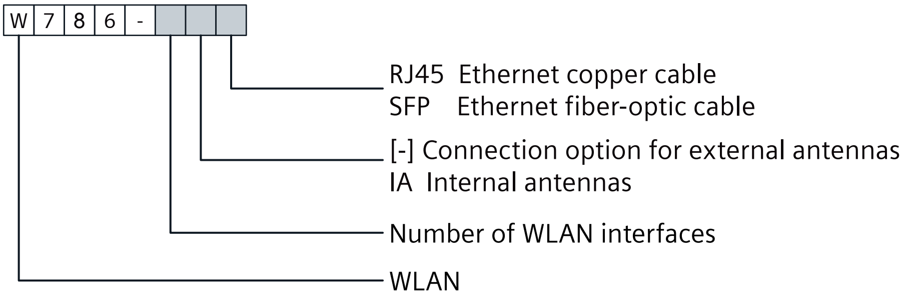
Product group	The designation . . . stands for . . .	Product name
Clients (IP30 and IP65)	W748-1	SCALANCE W748-1 RJ-45 SCALANCE W748-1 M12
Access points (IP30 and IP65)	W788-x	SCALANCE W788-1 M12 SCALANCE W788-2 M12 SCALANCE W788-2 M12 EEC SCALANCE W788-1 RJ-45 SCALANCE W788-2 RJ-45
Access points (IP65)	W786-x	SCALANCE W786-1 RJ-45 SCALANCE W786-2 RJ-45 SCALANCE W786-2IA RJ-45 SCALANCE W786-2 SFP

Product group	The designation . . . stands for . . .	Product name
All SCALANCE W access points	W78x	SCALANCE W788-1 M12 SCALANCE W788-2 M12 SCALANCE W788-2 M12 EEC SCALANCE W788-1 RJ-45 SCALANCE W788-2 RJ-45 SCALANCE W786-1 RJ-45 SCALANCE W786-2 RJ-45 SCALANCE W786-2IA RJ-45 SCALANCE W786-2 SFP
SCALANCE W without W786-x	W7x8	SCALANCE W788-1 RJ-45 SCALANCE W788-1 M12 SCALANCE W788-2 RJ-45 SCALANCE W788-2 M12 SCALANCE W748-1 RJ-45 SCALANCE W748-1 M12
All SCALANCE W devices	W700	SCALANCE W748-1 M12 SCALANCE W748-1 M12 SCALANCE W788-1 M12 SCALANCE W788-2 M12 SCALANCE W788-2 M12 EEC SCALANCE W788-1 RJ-45 SCALANCE W788-2 RJ-45 SCALANCE W786-1 RJ-45 SCALANCE W786-2 RJ-45 SCALANCE W786-2IA RJ-45 SCALANCE W786-2 SFP

1.3 Structure of the type designation

The type designation of a SCALANCE W700 is made up of several parts that have the following meaning:


W
7
8
-
EEC Extended Environmental Conditions
RJ45 connection socket, IP30
M12 connection socket, IP65
Number of WLAN interfaces
4 Client
8 Access Point
WLAN


W 7 8 6 -
RJ45 Ethernet copper cable
SFP Ethernet fiber-optic cable
[-] Connection option for external antennas
IA Internal antennas
Number of WLAN interfaces
WLAN

Security recommendations 2

To prevent unauthorized access to the device and/or network, observe the following security recommendations.

General

- Check the device regularly to ensure that these recommendations and/or other internal security policies are complied with.
- Evaluate the security of your location and use a cell protection concept with suitable products (https://www.siemens.com/industrialsecurity).
- When the internal and external network are disconnected, an attacker cannot access internal data from the outside. Therefore operate the device only within a protected network area.
- No product liability will be accepted for operation in a non-secure infrastructure.
- Use VPN to encrypt and authenticate communication from and to the devices.
- For data transmission via a non-secure network, use an encrypted VPN tunnel (IPsec, OpenVPN).
- Separate connections correctly (WBM, SSH etc.).
- Check the user documentation of other Siemens products that are used together with the device for additional security recommendations.
- Using remote logging, ensure that the system protocols are forwarded to a central logging server. Make sure that the server is within the protected network and check the protocols regularly for potential security violations or vulnerabilities.

WLAN

- We recommend that you ensure redundant coverage for WLAN clients.
- More information on data security and data encryption for SCALANCE W is available in SCALANCE W: Setup of a Wireless LAN in the Industrial Environment (https://support.industry.siemens.com/cs/ww/en/view/22681042)

Authentication

Note

Accessibility risk - Risk of data loss

Do not lose the passwords for the device. Access to the device can only be restored by resetting the device to factory settings which completely removes all configuration data.

- Replace the default passwords for all user accounts, access modes and applications (if applicable) before you use the device.
- Define rules for the assignment of passwords.
- Use passwords with a high password strength. Avoid weak passwords, (e.g. password1, 123456789, abcdefgh) or recurring characters (e.g. abcabc).
  This recommendation also applies to symmetrical passwords/keys configured on the device.
- Make sure that passwords are protected and only disclosed to authorized personnel.
- Do not use the same passwords for multiple user names and systems.
- Store the passwords in a safe location (not online) to have them available if they are lost.
- Regularly change your passwords to increase security.
- A password must be changed if it is known or suspected to be known by unauthorized persons.
- When user authentication is performed via RADIUS, make sure that all communication takes place within the security environment or is protected by a secure channel.
- Watch out for link layer protocols that do not offer their own authentication between endpoints, such as ARP or IPv4. An attacker could use vulnerabilities in these protocols to attack hosts, switches and routers connected to your layer 2 network, for example, through manipulation (poisoning) of the ARP caches of systems in the subnet and subsequent interception of the data traffic. Appropriate security measures must be taken for non-secure layer 2 protocols to prevent unauthorized access to the network. Physical access to the local network can be secured or secure, higher layer protocols can be used, among other things.

Certificates and keys

- There is a preset SSL/TLS (RSA) certificate with 2048 bit key length in the device. Replace this certificate with a user-generated, high-quality certificate with key. Use a certificate signed by a reliable external or internal certification authority. You can install the certificate via the WBM ("System > Load and Save").
- Use certificates with a key length of 4096 bits.
- Use the certification authority including key revocation and management to sign the certificates.
- Make sure that user-defined private keys are protected and inaccessible to unauthorized persons.
- If there is a suspected security violation, change all certificates and keys immediately.
- Use password-protected certificates in the format "PKCS #12".
- Verify certificates based on the fingerprint on the server and client side to prevent "man in the middle" attacks. Use a second, secure transmission path for this.
- Before sending the device to Siemens for repair, replace the current certificates and keys with temporary disposable certificates and keys, which can be destroyed when the device is returned.

Physical/remote access

- Operate the devices only within a protected network area. Attackers cannot access internal data from the outside when the internal and the external network are separate from each other.
- Limit physical access to the device exclusively to trusted personnel.
  The memory card or the PLUG (C-PLUG, KEY-PLUG, CLP) contains sensitive data such as certificates and keys that can be read out and modified. An attacker with control of the device's removable media could extract critical information such as certificates, keys, etc. or reprogram the media.
- Lock unused physical ports on the device. Unused ports can be used to access the system without authorization.
- For communication via non-secure networks, use additional devices with VPN functionality to encrypt and authenticate communication.
- When you establish a secure connection to a server (for example for an upgrade), make sure that strong encryption methods and protocols are configured for the server.
- Terminate the management connections (e.g. HTTP, HTTPS, SSH) properly.
- Make sure that the device has been powered down completely before you decommission it. For more information, refer to "Decommissioning (Page 12)".
- We recommend formatting a PLUG that is not being used.

Hardware / Software

- Use VLANs whenever possible as protection against denial-of-service (DoS) attacks and unauthorized access.
- Restrict access to the device by setting firewall rules or rules in an access control list (ACL).
- Selected services are enabled by default in the firmware. It is recommended to enable only the services that are absolutely necessary for your installation.
  For more information on available services, see "List of available services (Page 21)".
- To ensure you are using the most secure encryption methods available, use the latest web browser version compatible with the product. Also, the latest web browser versions of Mozilla Firefox, Google Chrome, and Microsoft Edge have 1/n-1 record splitting enabled, which reduces the risk of attacks such as SSL/TLS Protocol Initialization Vector Implementation Information Disclosure Vulnerability (for example, BEAST).
- Ensure that the latest firmware version is installed, including all security-related patches.
  You can find the latest information on security patches for Siemens products at the Industrial Security (https://www.siemens.com/industrialsecurity) or ProductCERT Security Advisories (https://www.siemens.com/cert) website.
  For updates on Siemens product security advisories, subscribe to the RSS feed on the ProductCERT Security Advisories website or follow @ProductCert on Twitter.
- Enable only those services that are used on the device, including physical ports. Free physical ports can potentially be used to gain access to the network behind the device.
- Use the authentication and encryption mechanisms of SNMPv3 if possible. Use strong passwords.

- Configuration files can be downloaded from the device. Ensure that configuration files are adequately protected.
  Configuration files can be password protected during download. You enter passwords on the WBM page "System > Load & Save > Passwords (Page 185)".
- When using SNMP (Simple Network Management Protocol):
  - Configure SNMP to generate a notification when authentication errors occur.
    For more information, see WBM "System > SNMP > Notifications (Page 215)".
  - Ensure that the default community strings are changed to unique values.
  - Use SNMPv3 whenever possible. SNMPv1 and SNMPv2c are considered non-secure and should only be used when absolutely necessary.
  - If possible, prevent write access.
- Use the security functions such as address translation with NAT (Network Address Translation) or NAPT (Network Address Port Translation) to protect receiving ports from access by third parties.
- Use WPA2/ WPA2-PSK with AES to protect the WLAN. You can find additional information in the configuration manual Web Based Management "Security menu (Page 349)".

Secure/ non-secure protocols

- Use secure protocols if access to the device is not prevented by physical protection measures.
- Disable or restrict the use of non-secure protocols. While some protocols are secure (e.g. HTTPS, SSH, 802.1X, etc.), others were not designed for the purpose of securing applications (e.g. SNMPv1/v2c, RSTP, etc.).
  Therefore, take appropriate security measures against non-secure protocols to prevent unauthorized access to the device/network. Use non-secure protocols on the device using a secure connection (e.g. SINEMA RC).
- If non-secure protocols and services are required, ensure that the device is operated in a protected network area.
- Check whether use of the following protocols and services is necessary:
  - Non-authenticated and unencrypted ports
  - LLDP
  - Syslog
  - DHCP options 66/67
  - TFTP
  - Telnet
  - HTTP
  - SNMP v1/2c
  - Syslog
  - SNTP

- The following protocols provide secure alternatives:
  - SNMPv1/v2c → SNMPv3
Check whether use of SNMPv1/v2c is necessary. SNMPv1/v2c is classified as non-secure. Use the option of preventing write access. The product provides you with suitable setting options.
    If SNMP is enabled, change the community names. If no unrestricted access is necessary, restrict access with SNMP.
    Use SNMPv3 in conjunction with passwords.
  - HTTP → HTTPS
  - Telnet → SSH
  - TFTP → SFTP
  - Syslog Client → Syslog Client TLS
- Using a firewall, restrict the services and protocols available to the outside to a minimum.
- For the DCP function, enable the "Read Only" mode after commissioning.

List of available services

The following is a list of all available services and their ports through which the device can be accessed.

The table includes the following columns:

- **Service**
  The services that the device supports
- **Default port status**
  This is the status of the port in the delivery state (factory setting).
- **Configurable port/service**
  Indicates whether the port number or the service can be configured via WBM / CLI.
- **Authentication**
  Specifies whether the communication partner is authenticated.
  If optional, the authentication can be configured as required.
- **Encryption**
  Specifies whether the transfer is encrypted.
  If optional, the encryption can be configured as required.

Service	Protocol / Port number	Default port status	Configurable		Authentication	Encryption
			Port	Service		
DHCP Client IPv4	UDP/68	Outgoing only	--	✓	--	--
DHCP Client IPv6	UDP/546	Outgoing only	--	✓	--	--
DHCP Server	UDP/67	Closed	--	✓	--	--
DNS Client	TCP/53 UDP/53	Outgoing only	--	✓	--	--
EthernetIP	TCP/44818 UDP/2222 UDP/44818	Closed	--	✓	--	--

Service	Protocol / Port number	Default port status	Configurable		Authentication	Encryption
			Port	Service		
HTTP	TCP/80	Open	✓	✓	✓	--
HTTPS	TCP/443	Open	✓	✓	✓	✓
NTP Client	UDP/123	Outgoing only	✓	✓	--	--
PROFINET	UDP/34964 UDP/49154 UDP/49155	Open	--	✓	--	--
RADIUS Client	UDP/1812	Outgoing only	✓	✓	✓	--
Remote Capture	TCP/2002	Closed	--	✓	--	--
SFTP Client	TCP/22	Closed	✓	✓	✓	✓
SMTP Client	TCP/25	Closed	✓	✓	--	--
SMTP Client (secure) 1)	TCP/465	Closed	✓	✓	✓	✓
SNMPv1/v2c	UDP/161	Open	✓	✓	--	--
SNMPv3	UDP/161	Open	✓	✓	Optional	Optional
SNMP Traps	UDP/162	Outgoing only	--	✓	--	--
SNTP Client	UDP/123	Outgoing only	✓	✓	--	--
SSH	TCP/22	Open	✓	✓	✓	✓
Syslog Client	UDP/514	Closed	✓	✓	--	--
Syslog (secure) Client	TCP/6514	Closed	✓	✓	--	✓
Telnet	TCP/23	Closed 1) / Open 2)	✓	✓	✓	--
TFTP Client	UDP/69	Outgoing only	✓	✓	--	--

1) Only for SCALANCE W1700ac

2) Only for SCALANCE W700n

The following is a list of all available Layer 2 services through which the device can be accessed.

The table includes the following columns:

- **Layer 2 service**
  The Layer 2 services that the device supports**.**
- **Default status**
  The default status of the service (open or closed).
- **Service configurable**
  Indicates whether the service can be configured via WBM / CLI.

Layer 2 service	Default status	Service configurable
DCP	Open	✓
LLDP	Open	✓
RSTP	Open	✓
iPRP	Open	✓

Layer 2 service	Default status	Service configurable
MSTP	Closed	✓
SIMATIC NET TIME	Closed	✓

Description 3

Note

Interruption of the WLAN communication

The WLAN communication can be influenced by high frequency interference signals and can be totally interrupted.

Remember this and take suitable action.

3.1 Network structures

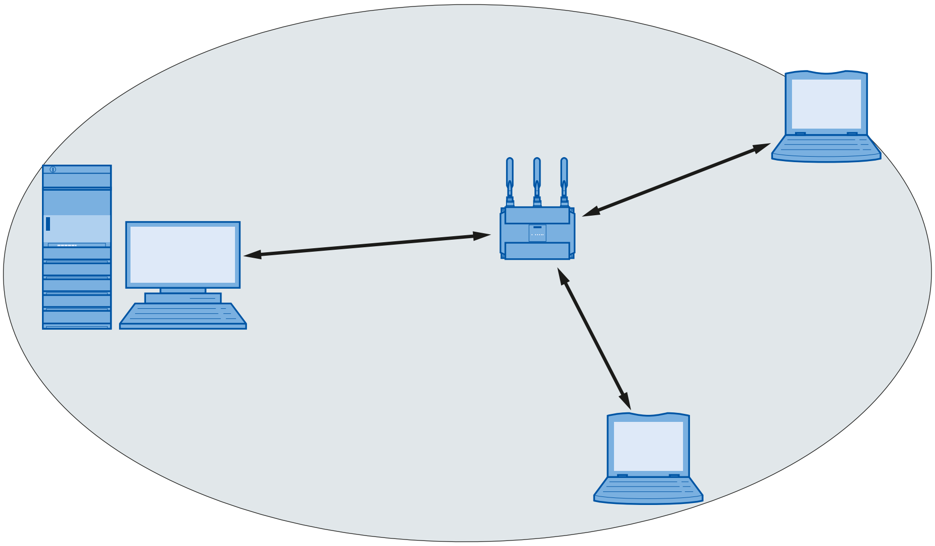
The following article deals with the setting up of various network structures using access points and clients. A client is also an access point in client mode.

Standalone configuration with access point

This configuration does not require a server and the access point does not have a connection to a wired Ethernet. Within its transmission range, the access point forwards data from one WLAN node to another.

The wireless network has a unique name. All the SCALANCE W700 devices exchanging data within this network must be configured with this name.

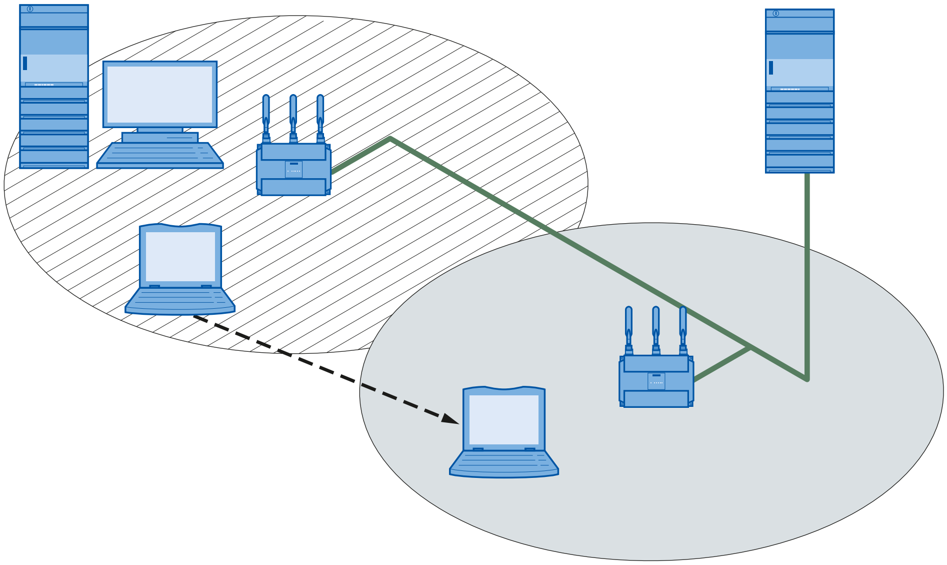
The gray area in the graphic symbolizes the wireless range of the access point.



Wireless access to a wired Ethernet network

If one (or more) access points have access to wired Ethernet, the following applications are possible:

- A single device as gateway:
  A wireless network can be connected to a wired network via an access point.
- Span of wireless coverage for the wireless network with several access points:
  The access points are all configured with the same unique SSID (network name). All nodes that want to communicate over this network must also be configured with this SSID.
  If a mobile station moves from the area covered by one access point to the area covered by another access point, the wireless link is maintained (roaming).
  The following graphic shows the wireless connection of a mobile station over two wireless cells (roaming).



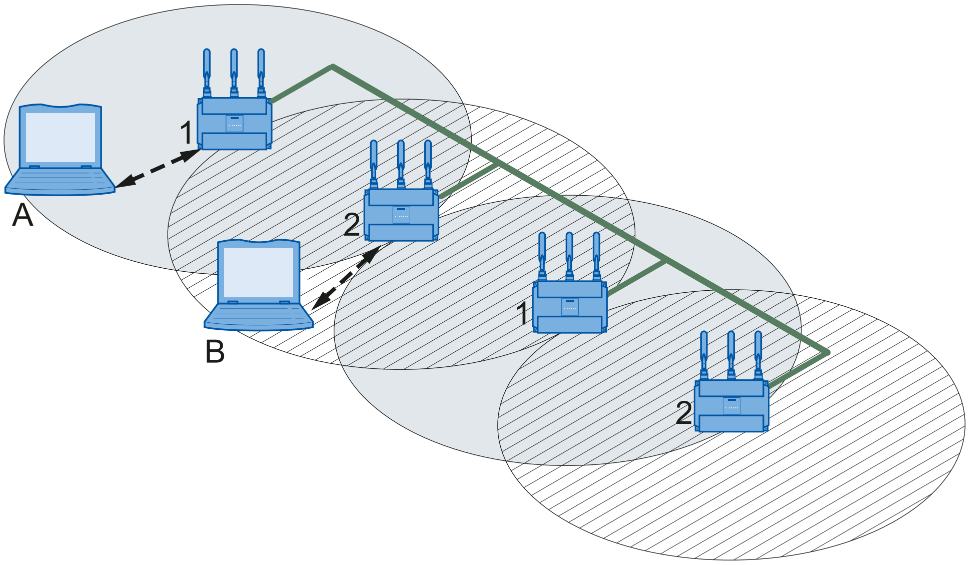
Multichannel configuration

If neighboring access points use the same frequency channel, this can lead to longer response times due to any collisions that may occur. If the configuration shown in the figure is implemented as a single-channel system, computers A and B cannot communicate at the same time with the access points in their wireless cells.

If neighboring access points are set up for different frequencies, this leads to a considerable improvement in performance. As a result, neighboring wireless cells each have their own medium available and the delays resulting from time-offset transmission no longer occur.

The channel spacing should be as large as possible; a practical value is 25 MHz. Even in a multichannel configuration, all access points can be configured with the same network name.

The following graphic shows a multichannel configuration on channels 1 and 2 with four access points.

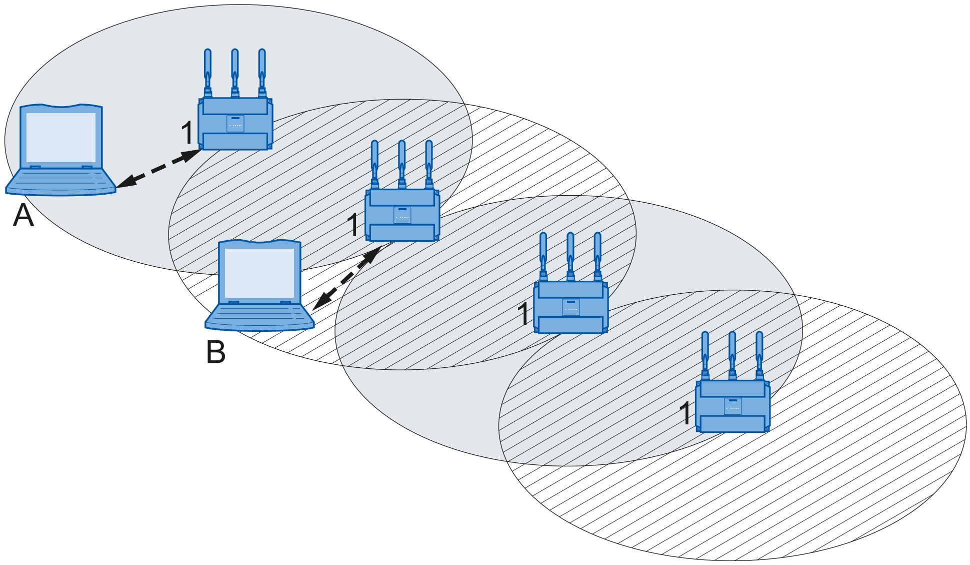


Wireless Distribution System (WDS)

WDS allows direct links between access points and or between access points and other WDS-compliant devices. These are used to create a wireless backbone or to connect an individual access point to a network that cannot be connected directly to the cable infrastructure due to its location.

Two alternative configurations are possible. The WDS partner can be configured using the WDS ID or using its MAC address.

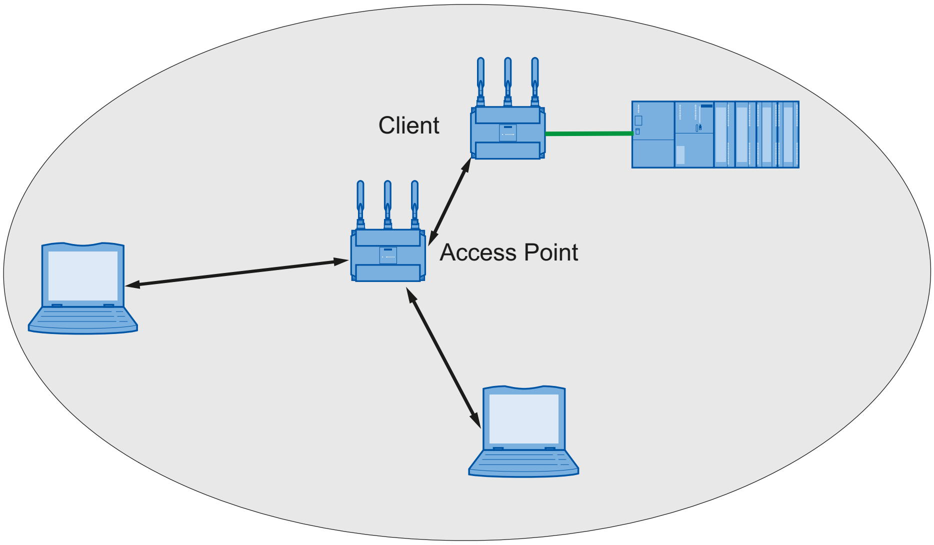
The following graphic shows the implementation of WDS with four access points.



Network access with a client or an access point in client mode

The SCALANCE W700 device can be used to integrate wired Ethernet devices (for example SIMATIC S7 PLC) in a wireless network.

The following graphic shows the connection of a SIMATIC S7 PLC to a wireless LAN.



3.2 Possible applications of SCALANCE W700 devices

Note

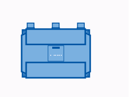
The SIMATIC NET WLAN products use OpenSSL.

This is open source code with license conditions (BSD).

Please refer to the current license conditions.

Since the driver includes encryption software, you should also adhere to the appropriate regulations for your specific country.

Possible applications of the SCALANCE W788

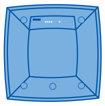


The SCALANCE W788 is equipped with an Ethernet interface and one or two WLAN interfaces. This makes the device suitable for the following applications:

- The SCALANCE W788 forwards data within its transmission range from one node to another without a connection to wired Ethernet being necessary.
- The SCALANCE W788 can be used as a gateway from a wired to a wireless network.
- The SCALANCE W788 can be used as a wireless bridge between two networks.
- The SCALANCE W788 can be used as a bridge between two different frequencies.
- The SCALANCE W788 supports the protection class IP65 and the protection class IP30. The access points are available in two versions:
  - M12 for degree of protection IP65
  - RJ-45 for the degree of protection IP30

With a SCALANCE W788 with two WLAN interfaces, you can also implement a redundant wireless connection to a SCALANCE W78x with two WLAN interfaces.

Possible applications of the SCALANCE W786



The SCALANCE W786 is equipped with up to two Ethernet interfaces and up to two WLAN interfaces. This makes the device suitable for the following applications:

- Due to its extended temperature range, the SCALANCE W786 can be recommended in particular for outdoor applications.
- The SCALANCE W786 forwards data within its transmission range from one node to another without a connection to wired Ethernet being necessary.
- The SCALANCE W786 can be used as a gateway from a wired to a wireless network.
- The SCALANCE W786 can be used as a wireless bridge between two networks.
- The SCALANCE W786 can be used as a bridge between two cells operating at different frequencies.

With a SCALANCE W786 with more than one WLAN interface, you can also implement a redundant wireless connection to a SCALANCE W78x with a maximum of two WLAN interfaces.

Possible applications of the SCALANCE W748

The SCALANCE W748 is equipped with an Ethernet interface and a WLAN interface. This makes the device suitable for the following applications:

- The SCALANCE W748 forwards data within its transmission range from one node to another without a connection to wired Ethernet being necessary.
- The SCALANCE W748 can be used as a gateway from a wired to a wireless network.
- The SCALANCE W748 can be used as a wireless bridge between two networks.

The device can also connect up to 8 stations with IP communication on the Ethernet port to a wireless cell.

3.3 Product characteristics

Properties of the SCALANCE W700 devices

- The Ethernet interface supports the following:
  - 10 Mbps and 100 Mbps both in full and half duplex
  - 1000 Mbps full duplex
  - Autocrossing
  - Autopolarity
- Operating the WLAN interface in the frequency bands 2.4 GHz and 5 GHz.
- The WLAN interface is compatible with the standards IEEE 802.11a, IEEE 802.11b, and IEEE 802.11g. In the 802.11a and 802.11g mode, the gross transmission rate is up to 54 Mbps.
- IEEE 802.11n
  High-speed WLAN standard (wireless LAN) up to 450 Mbps and can operate in the 2.4 GHz and in the 5 GHz range.
- IEEE 802.11h - Supplement to IEEE 802.11a
  In the 802.11h mode, the methods "Transmit Power Control (TPC)" as well as "Dynamic Frequency Selection (DFS)" are used in the range 5.25 - 5.35 and 5.47 - 5.75 GHz. In some countries, this allows the frequency subband of 5.47 - 5.725 GHz to be used in the outdoor area even with higher transmit powers.
  TPC is a method of adapting the transmit power.
  With DFS, the access point searches for primary users for 60 seconds before starting communication on the selected channel. During this time the access point does not send beacons. If signals are found on the channel, the channel is blocked for 30 minutes, the access point changes channel and repeats the check. Primary users are also searched for during operation.
- Support of the authentication standards WPA, WPA-PSK, WPA2, WPA2-PSK and IEEE 802.1x and the encryption methods WEP, AES and TKIP.

Note

The transmission standard IEEE 802.11 n with the setting "802.11n" or "802.11 n only" only supports WPA2/ WPA2-PSK with AES in the security settings.

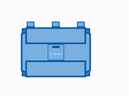
- For better transmission via WLAN, the function WMM (wireless multimedia) is enabled. The frames are evaluated according to their priority and sent prioritized via the WLAN interface.
- Suitable for inclusion of a RADIUS server for authentication.
- Device-related and application-related monitoring of the wireless connection.
- The interoperability of the devices with Wi-Fi devices of other vendors was tested thoroughly.
- Before commissioning the SCALANCE W700, check the wireless conditions on site. If you intend to use Industrial Wireless LAN systems and WirelessHART systems in the 2.4 GHz band, you will need to plan the use of the channels. At all costs, avoid parallel use of overlapping frequency ranges. The following overlaps exist with Industrial Wireless LAN and WirelessHART:

IWLAN channel **IEEE 802.11 b/g/n**	**WHART channel** **IEEE 802.15.4**
1	11 - 16
6	15 - 20
7	16 - 21
11	20 - 25
13	21 - 25

Note

All SCALANCE W700 access points can be reconfigured for client mode.

Features of the SCALANCE W700



Type	Number of WLAN ports	Antennas	Number and type of Ethernet interface	Degree of protection	Article number
SCALANCE W748-1 M12	1	external	1 x gigabit Ethernet (copper)	IP65	6GK5748-1GD00-0AA0 6GK5748-1GD00-0AB0 [1]
SCALANCE W748-1 RJ-45	1	external	1 x gigabit Ethernet (copper)	IP30	6GK5748-1FC00-0AA0 6GK5748-1FC00-0AB0 [1]
SCALANCE W786-1 RJ-45	1	external	1 x gigabit Ethernet (copper)	IP65	6GK5786-1FC00-0AA0 6GK5786-1FC00-0AB0 [1]
SCALANCE W786-2 RJ-45	2	external	1 x gigabit Ethernet (copper)	IP65	6GK5786-2FC00-0AA0 6GK5786-2FC00-0AA0 [1] 6GK5786-2FC00-0AC0 [2]
SCALANCE W786-2IA RJ-45	2	Internal	1 x gigabit Ethernet (copper)	IP65	6GK5786-2HC00-0AA0 6GK5786-2HC00-0AB0 [1]
SCALANCE W786-2 SFP	2	external	2 x SFP slots	IP65	6GK5786-2FE00-0AA0 6GK5 786-2FE00-0AB0 [1]

Type	Number of WLAN ports	Antennas	Number and type of Ethernet interface	Degree of protection	Article number
SCALANCE W788-1 M12	1	external	1 x gigabit Ethernet (copper)	IP65	6GK5788-1GD00-0AA0 6GK5788-1GD00-0AB0 (1)
SCALANCE W788-2 M12	2	external	1 x gigabit Ethernet (copper)	IP65	6GK5788-2GD00-0AA0 6GK5788-2GD00-0AB0 (1)
SCALANCE W788-2 M12 EEC	2	external	1 x gigabit Ethernet (copper)	IP65	6GK5788-2GD00-0TA0 6GK5788-2GD00-0TB0 (1) 6GK5 788-2GD00-0TC0 (2)
SCALANCE W788-1 RJ-45	1	external	1 x gigabit Ethernet (copper)	IP30	6GK5788-1FC00-0AA0 6GK5788-1FC00-0AB0 (1)
SCALANCE W788-2 RJ-45	2	external	1 x gigabit Ethernet (copper)	IP30	6GK5788-2FC00-0AA0 6GK5788-2FC00-0AB0 (1) 6GK5788-2FC00-0AC0 (2)

(1) US variant

(2) Israel variant

3.4 IEEE 802.11n

Overview

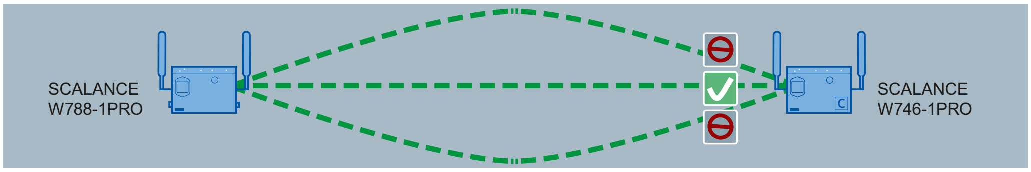
The standard IEEE 802.11n is an expansion of the 802.11 standard and was approved in 2009. Previous standards worked either in the 2.4 GHz frequency band (IEEE 802.11g /b) or in the 5 GHz frequency band (IEEE 802.11a). IEEE 802.11n can operate in both frequency band.
In the IEEE 802.11n standard, there are mechanisms implemented in PHY and MAC layers that increase the data throughput and improve the wireless coverage.

- MIMO antenna technology
- Maximum ratio combining (MRC)
- Spatial multiplexing
- Channel bonding
- Frame aggregation
- Accelerated guard interval
- Modulation and coding scheme
- Data throughput rates up to 450 Mbps (gross)
  This is not possible on all SCALANCE W700 devices.

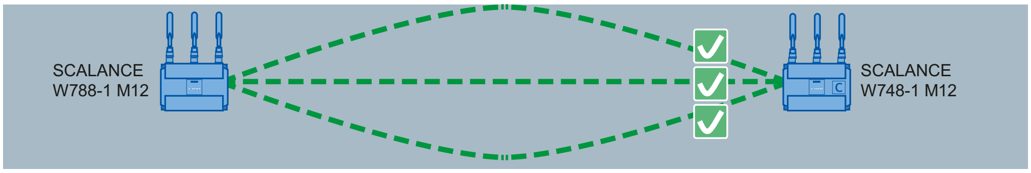
MIMO antenna technology

MIMO (Multiple Input - Multiple Output) is based on an intelligent multiple antenna system. The transmitter and the receiver have several spatially separate antennas. The spatially separate antennas transmit the data streams at the same time. Up to four data streams are possible. The data streams are transmitted over spatially separate paths and return over different paths due to diffraction, refraction, fading and reflection (multipath propagation). The multipath propagation means that at the point of reception a complex, space- and time-dependent pattern results as a total signal made up of the individual signals sent. MIMO uses this unique pattern by detecting the spatial position of characteristic signals. Here, each spatial position is different from the neighboring position. By characterizing the individual senders, the recipient is capable of separating several signals from each other.

Multipath propagation with IEEE 802.11a/b/g



Multipath propagation IEEE 802.11n (MIMO)



Maximum ratio combining (MRC)

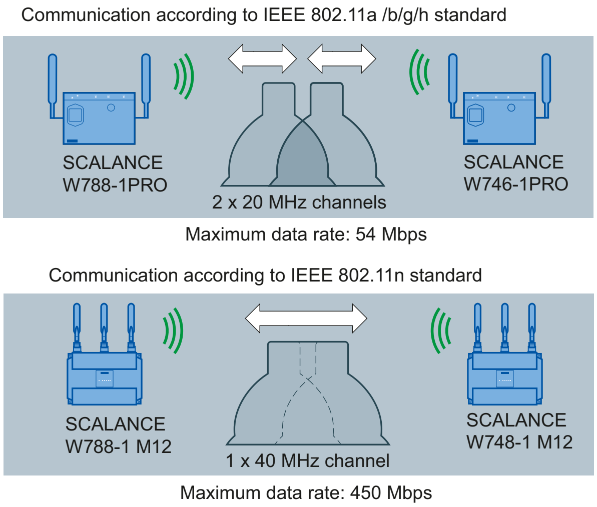
In a multiple antenna system, the wireless signals are received by the individual antennas and combined to form one signal. The MRC method is used to combine the wireless signals. The MRC method weights the wireless signals according to their signal-to-noise ratio and combines the wireless signals to form one signal. The signal-to-noise ratio is improved and the error rate is reduced.

Spatial mutliplexing

With spatial multiplexing, different information is sent using the same frequency. The data stream is distributed over n transmitting antennas; in other words, each antenna sends only 1/n of the data stream. The division of the data stream is restricted by the number of antennas. At the receiver end, the signal is reconstructed.
Due to the spatial multiplexing, there is a higher signal-to-noise ratio and a higher data throughput.

Channel bonding

With IEEE 802.11n, data can be transferred via two directly neighboring channels. The two 20 MHz channels are put together to form one channel with 40 MHz. This allows the channel bandwidth to be doubled and the data throughput to be increased.
To be able to use channel bonding, the recipient must support 40 MHz transmissions. If the recipient does not support 40 MHz transmissions, the band is automatically reduced to 20 MHz. This means that IEEE 802.11n can also communicate with IEEE 802.11a/b/g devices.
The channel bundling is set on the "AP (Page 273)" WBM page with the "HT Channel Width [MHz]" parameter.


Communication according to IEEE 802.11a /b/g/h standard
SCALANCE W788-1PRO
2 x 20 MHz channels
SCALANCE W746-1PRO
Maximum data rate: 54 Mbps
Communication according to IEEE 802.11n standard
SCALANCE W788-1 M12
1 x 40 MHz channel
SCALANCE W748-1 M12
Maximum data rate: 450 Mbps

Frame aggregation

With IEEE 802.11n, it is possible to group together individual data packets to form a single larger packet; this is known as frame aggregation. There are two types of frame aggregation:

- Aggregated MAC Protocol Data Unit (A-MPDU)
  With A-MPDU, multiple MPDU data packets with the same destination address are bundled and sent as one large A-MPDU.
- Aggregated Mac Service Data Unit (A-MSDU)
  With A-MSDU, multiple MSDU data packets with the same destination address are chained together and sent.

The SCALANCE W devices support both types of frame aggregation. You make the settings on the WBM page "AP 802.11n (Page 272)".

Accelerated guard interval

The guard interval prevents different transmissions being mixed together. In telecommunications, this mixing is also known as intersymbol interference (ISI).
When the send time has elapsed, a send pause (guard interval) must be kept to before the next transmission begins.

The guard interval of IEEE 802.11a /b/g is 800 ns. IEEE 802.11n can use the reduced guard interval of 400 ns. You specify the guard interval on the WBM page "AP 802.11n (Page 272)".

Modulation and coding schemes

The IEEE 802.11n standard supports different data rates. The data rates are based on the number of spatial streams, the modulation method and the channel coding. The various combinations are described in modulation and coding schemes.

3.5 Requirements for installation and operation of SCALANCE W devices

A PG/PC with network connection must be available in order to configure the SCALANCE W devices. If no DHCP server is available, a PC on which the SINEC PNI is installed is necessary for the initial assignment of an IP address to the SCALANCE W devices. For the other configuration settings, a computer with Telnet or a Web browser is necessary.

3.6 C-PLUG and KEY-PLUG

The PLUG is a removable medium and is used to transfer the configuration of the old device to the new device when a device is replaced.

The PLUG is available in the following variants:

- C-PLUG: The exchangeable storage medium only saves the configuration data of the device.
- KEY-PLUG: In addition to the configuration data, the exchangeable storage medium contains a license with which specific functions can be enabled, e.g. iFeatures.

How it works

NOTICE

Do not remove or insert a C-PLUG / KEY-PLUG during operation!

A PLUG may only be removed or inserted when the device is turned off.
The device checks whether or not a PLUG is present at one second intervals. If it is detected that the PLUG was removed, there is a restart.

If a valid KEY-PLUG was inserted in the device, the device changes to a defined error state following the restart. With SCALANCE W, the available wireless interfaces are deactivated in this case.

If the device was configured at some time with a PLUG, the device can no longer be used without this PLUG. To be able to use the device again, reset the device to the factory settings.

The device supports the following modes of operation:

- Without PLUG
  The device saves the configuration data in the internal memory. This mode is active when no PLUG is inserted.
- With PLUG
  If an unwritten PLUG (factory status or deleted with Clean function) is used, the local configuration already existing on the device is automatically stored on the inserted PLUG. If the PLUG contains a license, additional functions are also enabled.
  A device with a written and accepted PLUG ("ACCEPTED" status) uses the configuration data of the PLUG automatically when it starts up. Acceptance is possible only when the data was written by a compatible device type.
  One exception to this can be the IP configuration if it is set using DHCP and the DHCP server has not been reconfigured accordingly. A reconfiguration is necessary if you use functions based on MAC addresses.
  The configuration stored on the PLUG is displayed over the user interfaces.
  If changes are made to the configuration, the device stores the configuration directly on the PLUG, if this is in the "ACCEPTED" status. The internal memory is neither read nor written.

Response to errors

Inserting a PLUG that does not contain the configuration of a compatible device type, accidentally removing the PLUG/KEY-PLUG or general malfunctions of the PLUG are signaled by the diagnostics mechanisms of the device (LEDs, Web-Based Management (WBM), SNMP, Command Line Interface (CLI) and PROFINET diagnostics). The user then has the choice of either removing the PLUG again or selecting the option to reformat the PLUG.

Note

Incompatibility with previous versions with PLUG inserted

During the installation of a previous version of the firmware, the configuration data can be lost. In this case, the device starts up with the factory settings after the firmware has been installed. In this situation, if a PLUG is inserted in the device, following the restart, this has the status "NOT ACCEPTED" since the PLUG still has the configuration data of the previous more up-to-date firmware. This allows you to return to the previous, more up-to-date firmware without any loss of configuration data. If the original configuration on the PLUG is no longer required, the PLUG can be deleted or rewritten manually using "System > PLUG".

License information on the KEY-PLUG

In addition to the configuration, the KEY-PLUG also contains a license that allows the use of the iFeatures.

PLUG with preset function (PRESET-PLUG)

With PRESET-PLUG it is possible to install the same configuration and the firmware belonging to it on several devices.

Note

Using configurations with DHCP

Create a PRESET-PLUG only from device configurations that use DHCP. Otherwise disruptions will occur in network operation due to multiple identical IP addresses.

You assign fixed IP addresses extra following the basic installation.

In a PLUG that was configured as a PRESET-PLUG, the device configuration, user accounts, certificates and the firmware are stored.

Note

Restore factory defaults and restart with a PRESET PLUG inserted

If you reset a device to the factory defaults, when the device restarts an inserted PRESET PLUG is formatted and the PRESET PLUG functionality is lost. You then need to create a new PRESET PLUG.

We recommend that you remove the PRESET PLUG before you reset the device to the factory settings.

For more detailed information on creating and using a PRESET PLUG refer to the section Upkeep and maintenance (Page 401).

3.7 Digital input / output

Introduction

The SCALANCE W788-x/W748-x devices in the RJ-45 variant have a digital input/output.

The connection is made using a 4-pin terminal block. You will find information about the pin assignment in the operating instructions of the devices.

Application example

- Digital input to signal one item of information, for example "door open", "door closed".
- Digital output, for example for "go to sleep" for devices on an automated guided transport system.

Control of the digital output

Using CLI and using the private MIB variable snMspsDigitalOutputLevel, you can control the digital output (DO/1L).

Note

You cannot configure the digital output with Web Based Management (WBM).

If the digital input changes the status, an entry is made in the event protocol table.

- OID of the private MIB variable snMspsDigitalOutputLevel:
  `iso(1).org(3).dod(6).internet(1).private(4).enterprises(1).siemens(4329).industrialComProducts(20).iComPlatforms(1).simaticNet(1).snMsps(1).snMspsCommon(1).snMspsDigitalIO(39).snMspsDigitalIOObjects(1).snMspsDigitalOutputTable(3).snMspsDigitalOutputEntry(1).snMspsDigitalOutputLevel(6)`
- values of the MIB variable
  - 1: Digital output is open (DO and 1L are interrupted).
  - 2: Digital output is closed (DO and 1L are jumpered).

Digital input

Using the private MIB variable snMspsDigitalInputLevel, you can read out the status of the digital input.

Note

If the digital output changes status, an entry is made in the event protocol table.

- OID of the private MIB variable snMspsDigitalInputLevel:
  `iso(1).org(3).dod(6).internet(1).private(4).enterprises(1).siemens(4329).industrialComProducts(20).iComPlatforms(1).simaticNet(1).snMsps(1).snMspsCommon(1).snMspsDigitalIO(39).snMspsDigitalIOObjects(1).snMspsDigitalInputTable(2).snMspsDigitalInputEntry(1).snMspsDigitalInputLevel(6)`
- values of the MIB variable
  - 1: Signal 0 at the digital input (DI)
  - 2: Signal 1 at the digital input (DI)

MIB file

The MIB variables can be found in the file "SN-MSPS-DIGITAL-IO-MIB" that is part of the private MIB file "snMspsWlan.mib". You will find more detailed information in "Private MIB variables of the SCALANCE W device (Page 419)".

3.8 Power over Ethernet (PoE)

General

"Power over Ethernet" (PoE) is a power supply technique for network components according to IEEE 802.3af or IEEE 802.3at. The power is supplied over the Ethernet cables that connect the individual network components together. This makes an additional power cable unnecessary. PoE can be used with all PoE-compliant network components that require little power (max. 12.95 W).

Which Ethernet connectors of a device are capable of PoE can be found in the operating instructions of the relevant device.

Cable used for the power supply

- **Variant 1 (redundant wires)**
  In Fast Ethernet, the wire pairs 1, 2 and 3, 6 are used to transfer data. Pairs 4, 5 and 7, 8 are then used to supply power. If there are only four wires available, the voltage is modulated onto the wires 1, 2 and 3, 6 (see variant 2). This alternative is suitable for a data transmission rate of 10/100 Mbps. This type of power supply is not suitable for 1 Gbps since with gigabit all 8 wires are used for data transfer.
- **Variant 2 (phantom power)**
  With phantom power, the power is supplied over the pairs that are used for data transfer, in other words, all eight (1 Gbps) or four (10/100 Mbps) wires are used both for the data transfer and the power supply.

Whether a device supports variant 1 and variant 2 or only variant 2 can be found in the operating instructions of the relevant device.

A PoE-compliant switch can supply the end device either using:

- Variant 1 or
- Variant 2 or
- Variant 1 and variant 2.

Endspan

With endspan, the power is supplied via a switch that can reach a device over an Ethernet cable. The switch must be capable of PoE, for example a SCALANCE X108PoE, SCALANCE X308-2M POE, SCALANCE XR552-12M.

Midspan

Midspan is used when the switch is not PoE-compliant. The power is supplied by an additional device between the switch and end device. In this case, only data rates of 10/100 Mbps can be achieved because the power is supplied on redundant wires.

A Siemens power insert can also be used as the interface for the power input. Since a power insert supports a power supply of 24 VDC, it does not conform with 802.3af or IEEE 802.3at. The following restrictions relating to the use of power inserts should be noted:

⚠ **WARNING**

Operate the power insert only when the following conditions apply:

- with extra low voltages SELV, PELV complying with IEC 60364-4-41
- in USA/CAN with power supplies complying with NEC class 2
- in USA/CAN, the cabling must meet the requirements of NEC/CEC
- Power load maximum 0.5 A.

Cable lengths

Table 3-1 Permitted cable lengths (copper cable - Fast Ethernet)

Cable type	Accessory (plug, outlet, TP cord)	Permitted cable length
IE TP torsion cable	with IE FC Outlet RJ-45 + 10 m TP cord	0 to 45 m + 10 m TP cord
	with IE FC RJ-45 Plug 180	0 to 55 m
IE FC TP Marine Cable IE FC TP Trailing Cable IE FC TP Flexible Cable	with IE FC Outlet RJ-45 + 10 m TP cord	0 to 75 m + 10 m TP cord
	with IE FC RJ-45 Plug 180	0 to 85 m
IE FC TP standard cable	with IE FC Outlet RJ-45 + 10 m TP cord	0 to 90 m + 10 m TP cord
	with IE FC RJ-45 Plug 180	0 to 100 m

Table 3-2 Permitted cable lengths (copper cable - gigabit Ethernet)

Cable type	Accessory (plug, outlet, TP cord)	Permitted cable length
IE FC standard cable, 4×2, 24 AWG	with IE FC RJ-45 Plug 180, 4x2	0 to 90 m
IE FC flexible cable, 4×2, 24 AWG	with IE FC RJ-45 Plug 180, 4x2	0 to 60 m
IE FC standard cable, 4×2, 22 AWG	with IE FC Outlet RJ-45 + 10 m TP cord	0 to 100 m + 10 m TP cord

Table 3-3 Fitting connectors

PIN	Color of the wire CAT5	Color of the wire CAT6a	Use	
			Power over unused wires (10/100 Mbps only)	Phantom power
1	Yellow	Green/white	Data	Data/power
2	Orange	Green	Data	Data/power
3	White	Orange/white	Data	Data/power
6	Blue	Orange	Data	Data/power
4		Blue	Power	unused at 10/100 Mbps
5		Blue/white	Power	unused at 10/100 Mbps
7		Brown/white	Power	unused at 10/100 Mbps
8		Brown	Power	unused at 10/100 Mbps

LEDs for PoE on the SCALANCE W700 device

When the SCALANCE W700 device is supplied by PoE, the green "PoE" LED is lit on the SCALANCE W700 device.

Technical basics

4

4.1 Configuration limits for WBM and CLI

Configuration limits of the device

The following table lists the configuration limits for Web Based Management and the Command Line Interface of the device.

Depending on your device, some functions are not available.

	Configurable function		**Maximum number**
System	Syslog server		3
	DNS server	manual (IPv4/IPv6)	3
		learned (IPv4/IPv6)	2
		in total	7
	SMTP server		2
	SNMPv1 trap recipient		10
	SNMP queries		50
	SNTP server		2
	NTP server		1
	DHCP pools		1
	IPv4 addresses managed by the DHCP server (dynamic + static)		100
	DHCP static assignments per DHCP pool		20
	DHCP options		20
Interfaces	Force destination addresses for roaming		10
	Connected clients per VAP		100
Layer 2	Virtual LANs (port-based, including VLAN 1)		24
	Multiple Spanning Tree instances		16

	Configurable function	Maximum number
Security	IP addresses from RADIUS servers	• AAA: 4 • WLAN: 2
	Management ACLs (access rules for management)	10
	MAC ACL rule configuration	20
	Ingress and egress rules for MAC ACL (total)	40 per interface (20 ingress rules / 20 egress rules) • Client: 80 (P1, WLAN) • Access point: 680 (P1, WDS 1,Y, VAP 1,Y) • Dual access point: 1320 (P1, WDS X,Y, VAP X,Y)
	IP ACL rule configuration	20
	Ingress and egress rules for port ACL IP (total)	40 per interface (20 ingress rules / 20 egress rules) • Client: 120 (P1, WLAN, management VLAN) • Access point: 720 (P1, WDS 1,Y, VAP 1,Y, management VLAN) • Dual access point: 1360 (P1, WDS X,Y, VAP X,Y, management VLAN)
	User roles	28
	User groups	32
	Users	28

4.2 Interfaces and system functions

Availability of the interfaces

The following table shows the availability of the physical and logical interfaces. Note that in this table all interfaces are listed. Depending on the system function, some interfaces are not available. On the WBM pages you can only select the available interfaces.

We reserve the right to make technical changes.

	Client device **W748-1 M12** **W748-1 RJ-45**	**Access points** **W786-1 RJ-45** **W788-1 M12** **W788-1 RJ-45**	**Access points** **W786-2 RJ-45** **W786-2IA RJ-45** **W786-2 SFP** **W788-2 M12** **W788-2 M12 EEC** **W788-1 RJ-45** **W788-2 RJ-45**
Wireless interface (WLAN)	WLAN 1	WLAN 1	• WLAN 1 (in client mode only one WLAN interface is available) • WLAN 2
IP interface: LAN interface VLAN	 P1 ManagementVLAN	 P1 ManagementVLAN	 P1 ManagementVLAN

VAP interface [1]	-	VAP 1.Y
		Y = 1 ... 8
			VAP X.Y
			X = 1 ... 2
			Y = 1 ... 8

WDS interface [1]	–	WDS 1.Y
		Y = 1 ... 8
			WDS X.Y
			X = 1 ... 2
			Y = 1 ... 8

VLAN	24	24	24

[1] only in access point mode

Availability of the system functions

The following table shows the availability of the system functions on the devices. Note that all functions are described in this configuration manual and in the online help. Depending on the mode and the KEY-PLUG, some functions are not available.

We reserve the right to make technical changes.

			Access point mode	Access points in client mode. Client device
Information	**Security**	Inter AP blocking	✓ W780 iFeatures (MLFB 6GK5 907-8PA00) W700 Security (MLFB 6GK5907-0PA00)	-
	WLAN	AP overview	✓	-
		Client list	✓	-
		WDS list	✓	-
		AP overlap	✓	-
		Force roaming	✓	✓
		Client overview	-	✓
		Available APs	-	✓
		IP assignment	-	✓
		Background noise	✓	✓
	WLAN statistics	Error	✓	✓
		Management sent	✓	✓
		Management received	✓	✓
		Data sent	✓	✓
		Data received	✓	✓
	WLAN iFeatures	iREF client list	✓ W780 iFeatures (MLFB 6GK5 907-8PA00)	-
		iREF WDS list	✓ W780 iFeatures (MLFB 6GK5 907-8PA00)	-
		AeroScout	✓ W780 iFeatures (MLFB 6GK5 907-8PA00)	-
System		PROFINET	✓	-✓
		EtherNet/IP	✓	✓

			Access point mode	**Access points in client mode.** **Client device**
Interfaces	**WLAN**	Basic	✓	-✓
		Expansions	✓	✓
		Antennas	✓	✓
		Permitted channels	✓	✓
		802.11n	✓	✓
		AP	✓	-
		AP WDS	✓	-
		AP 802.11a/b/g data rates	✓	-
		AP 802.11n data rates	✓	-
		Client 802.11a/b/g data rates	-	✓
		Client 802.11n data rates	-	✓
		Force roaming	✓	✓
		Signal recorder	-	✓
		Spectrum analyzer	✓	-
Layer 3	**NAT**	Basic	-	✓
		NAPT	-	✓

			Access point mode	Access points in client mode. Client device
Security	**WLAN**	Basic	✓	✓
		AP communication	✓	-
		AP RADIUS authenticator	✓	-
		Client RADIUS supplicant	-	✓
		Key	✓	✓
	Inter AP Blocking	Basic	✓ W780 iFeatures (MLFB 6GK5 907-8PA00) W700 Security (MLFB 6GK5907-0PA00)	-
		Allowed IP addresses	✓ W780 iFeatures (MLFB 6GK5 907-8PA00) W700 Security (MLFB 6GK5907-0PA00)	-
iFeatures	**iPCF**		✓ W780 iFeatures (MLFB 6GK5 907-8PA00)	✓ Access point in client mode: W780 iFeatures (MLFB 6GK5 907-8PA00 Client: W740 iFeatures (MLFB 6GK5 907-4PA00)
	iPCF-MC		✓ Only dual APs W780 iFeatures (MLFB 6GK5 907-8PA00)	✓ Access point in client mode: W780 iFeatures (MLFB 6GK5 907-8PA00 Client: W740 iFeatures (MLFB 6GK5 907-4PA00)
	iPRP		✓ W780 iFeatures (MLFB 6GK5 907-8PA00)	✓ Access point in client mode: W780 iFeatures (MLFB 6GK5 907-8PA00 Client: W740 iFeatures (MLFB 6GK5 907-4PA00)
	iREF		✓ W780 iFeatures (MLFB 6GK5 907-8PA00)	-
	AeroScout		✓ W780 iFeatures (MLFB 6GK5 907-8PA00)	-

Support of IPv6

The following system functions do not support IPv6 addresses:

- Inter AP blocking
- Force roaming

4.3 EtherNet/IP

EtherNet/IP

EtherNet/IP (Ethernet/Industrial Protocol) is an open industry standard for industrial real-time Ethernet based on TCP/IP and UDP/IP. With EtherNet/IP, Ethernet is expanded by the Common Industrial Protocol (CIP) at the application layer. In EtherNet/IP, the lower layers of the OSI reference model are adopted by Ethernet with the physical, network and transport functions.

You configure EtherNet/IP in "System > EtherNet/IP (Page 244)".

Common Industrial Protocol

The Common Industrial Protocol (CIP) is an application protocol for automation that supports transition of the field buses in Industrial Ethernet and in IP networks. This industry protocol is used by field buses/industrial networks such as DeviceNet, ControlNet and EtherNet/IP at the application layer as an interface between the deterministic fieldbus world and the automation application (controller, I/O, HMI, OPC, ...). The CIP is located above the transport layer and expands the pure transport services with communications services for automation engineering. These include services for cyclic, time-critical and event-controlled data traffic. CIP distinguishes between time-critical I/O messages (implicit messages) and individual query/response frames for configuration and data acquisition (explicit messages). CIP is object-oriented; all data "visible" from the outside is accessible in the form of objects. CIP has a common configuration basis: EDS (Electronic Data Sheet).

Electronic Data Sheet

Electronic Data Sheet (EDS) is an electronic datasheet for describing devices.

The EDS required for EtherNet/IP operation can be found in "System > Load&Save (Page 185)".

4.4 PROFINET

PROFINET

PROFINET is an open standard (IEC 61158/61784) for industrial automation based on Industrial Ethernet. PROFINET uses existing IT standards and allows end-to-end communication from the field level to the management level as well as plant-wide engineering. PROFINET also has the following features:

- Use of TCP/IP
- Automation of applications with real-time requirements
  - Real-Time (RT) communication
  - Isochronous Real-Time (IRT) communication
- Seamless integration of fieldbus systems

You configure PROFINET in "System > PROFINET (Page 242)".

PROFINET IO

Within the framework of PROFINET, PROFINET IO is a communications concept for implementing modular, distributed applications. PROFINET IO is implemented by the PROFINET standard for programmable controllers (IEC 61158-x-10).

4.5 VLAN

Network definition regardless of the spatial location of the nodes

VLAN (Virtual Local Area Network) divides a physical network into several logical networks that are shielded from each other. Here, devices are grouped together to form logical groups. Only nodes of the same VLAN can address each other. Since multicast and broadcast frames are only forwarded within the particular VLAN, they are also known as broadcast domains.

The particular advantage of VLANs is the reduced network load for the nodes and network segments of other VLANs.

For the identifier which frame is assigned to which VLAN, the frame is expanded by 4 bytes (VLAN tagging). Apart from the VLAN-ID this expansion also includes priority information.

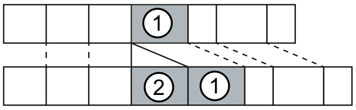
Options for the VLAN assignment

There are various options for the assignment to VLANs:

- Port-based VLAN
  Each port of a device is assigned a VLAN ID. You configure port-based VLAN in "Layer 2 > VLAN (Page 313)".
- Protocol-based VLAN
  Each port of a device is assigned a protocol group.
- Subnet-based VLAN
  The IP address of the device is assigned a VLAN ID.

Doubly tagged frame (Q-in-Q)

There are devices e.g. SCALANCE XR500 that support the Q-in-Q function. With the Q-in-Q function the incoming data traffic is treated as if it were untagged. With frames that are already tagged ①, this means they are expanded by a second VLAN tag, the outer VLAN tag ②.



When a SCALANCE W device receives a doubly tagged frame, it uses the VLAN ID from the outer VLAN tag ② and the priority information from the inner VLAN tag ①. The frame is then forwarded to the relevant VLAN.

4.6 MAC-based communication

Frames sent by the client to the access point always have the MAC address of the WLAN client as the source MAC address. In the "learning table" of the access point there is therefore only the MAC address of the WLAN client.

MAC mode "Automatic", "Manual" and "Own"

If the MAC address of a device connected to the client is adopted (Automatic) or is set manually (Manual), both the MAC-based and the IP-based frames find their destination for precisely this device. If the MAC address of the Ethernet interface of the WLAN client is used (Own), the MAC-based and IP-based frames only reach the WLAN client.

The access point checks whether the destination MAC address matches the MAC addresses of the connected clients. Since a WLAN client can only use a MAC address, communication at the MAC address level (ISO/OSI layer 2) can be to a maximum of one node downstream from the client or the client itself.

With IP Mapping, several nodes downstream from a client can be addressed based on the IP protocol. The IP packets are broken down according to an internal table and forwarded to the connected devices.

Maximum possible number of Ethernet nodes with layer 2 communication downstream from the client: 1

Notes on the "Automatic" setting:

- As long as there is no link on the Ethernet interface, the device uses the MAC address of the Ethernet interface so that it can be reached in this status. In this status, the device can be found using SINEC PNI and configured with WBM or CLI.
- As soon as there is a link on the Ethernet interface, the device adopts the source MAC address of the first received frame.

Note

From the moment that the device adopts another MAC address (manually or automatically), the device no longer responds to queries of the SINEC PNI when the query is received over the WLAN interface. Queries of the SINEC PNI over the Ethernet interface continue to be replied to.

MAC mode "Layer 2 Tunnel"

The WLAN client uses the MAC address of the Ethernet interface for the WLAN interface.

The access point is also informed of the MAC addresses connected to the Ethernet interface of the WLAN client. This makes it possible to enter the MAC addresses of these devices in the "learning table" of the access point. The access point can forward MAC-based frames for the devices downstream from the client to the appropriate client.

In much the same way as with WDS, a separate port is created for the L2T client over which the Ethernet frames are sent without changing the destination MAC address.

Maximum possible number of Ethernet nodes downstream from the client: 8

4.7 iPCF / iPCF-HT / iPCF-MC

The wireless range of an IWLAN system can be expanded by using multiple access points. If a client moves from the area covered by one access point to the area covered by another access point, the wireless link is maintained after a short interruption (roaming).

If very fast update times are required, for example for PROFINET communication, access points and client modules need to be used that use the proprietary methods iPCF / iPCF-HT or iPCF-MC for fast roaming and deterministic data traffic.

iPCF / iPCF-HT / iPCF-MC can only be operated alone. A combination with each other is not possible, e.g. iPCF with iPCF-HT or iPCF-MC.

How it works

iPCF

With iPCF the access point checks all nodes in the wireless cell cyclically. At the same time, the scan includes the downlink traffic for this node. In the reply, the node sends the uplink data. The access point scans a new node at least every 5 ms.

The scan of a node is seen by all other nodes in the cell. This allows a client to detect the quality of the wireless link to the access point even when it is not communicating with the access point itself. If the client does not receive any frames from the access point for a certain time, it starts to search for a new access point.

In iPCF mode, both the search for a new access point and the registration with this access point have been optimized in terms of time. Handover times significantly below 50 ms are achieved.

The "Legacy Free (iPCF-LF)" setting is available to prevent the performance from being slowed down by the IEEE 802.11 a/b/g device generation. When enabled, only the devices that communicate with the IEEE 802.11n standard and have the "Legacy Free (iPCF-LF)" setting enabled are accepted. WLAN mode IEEE 802.11n need not be enabled for this, however.

Stable PROFINET communication is only possible when a WLAN client is in a wireless cell with more than 60 % or -65 dBm signal strength at all times. This can be checked by activating and deactivating the various wireless cells.

This does not mean that the client needs to change when there is a signal strength < 60 % (< -65 dBm). Make sure that access points are available with adequate signal strength.

You configure iPCF in "iFeatures > iPCF > iPCF".

iPCF-HT

If a higher data throughput is required for iPCF, iPCF-HT is used. With this you can, for example, alongside PROFINET also transfer video data. This is achieved by more effective transfer of data packets using frame-bursting (A-MPDU). The individual data packets are grouped together that are intended for the same receiver station (client) and that have the same prioritization.

You configure iPCF-HT in "iFeatures > iPCF > iPCF-HT".

iPCF-MC

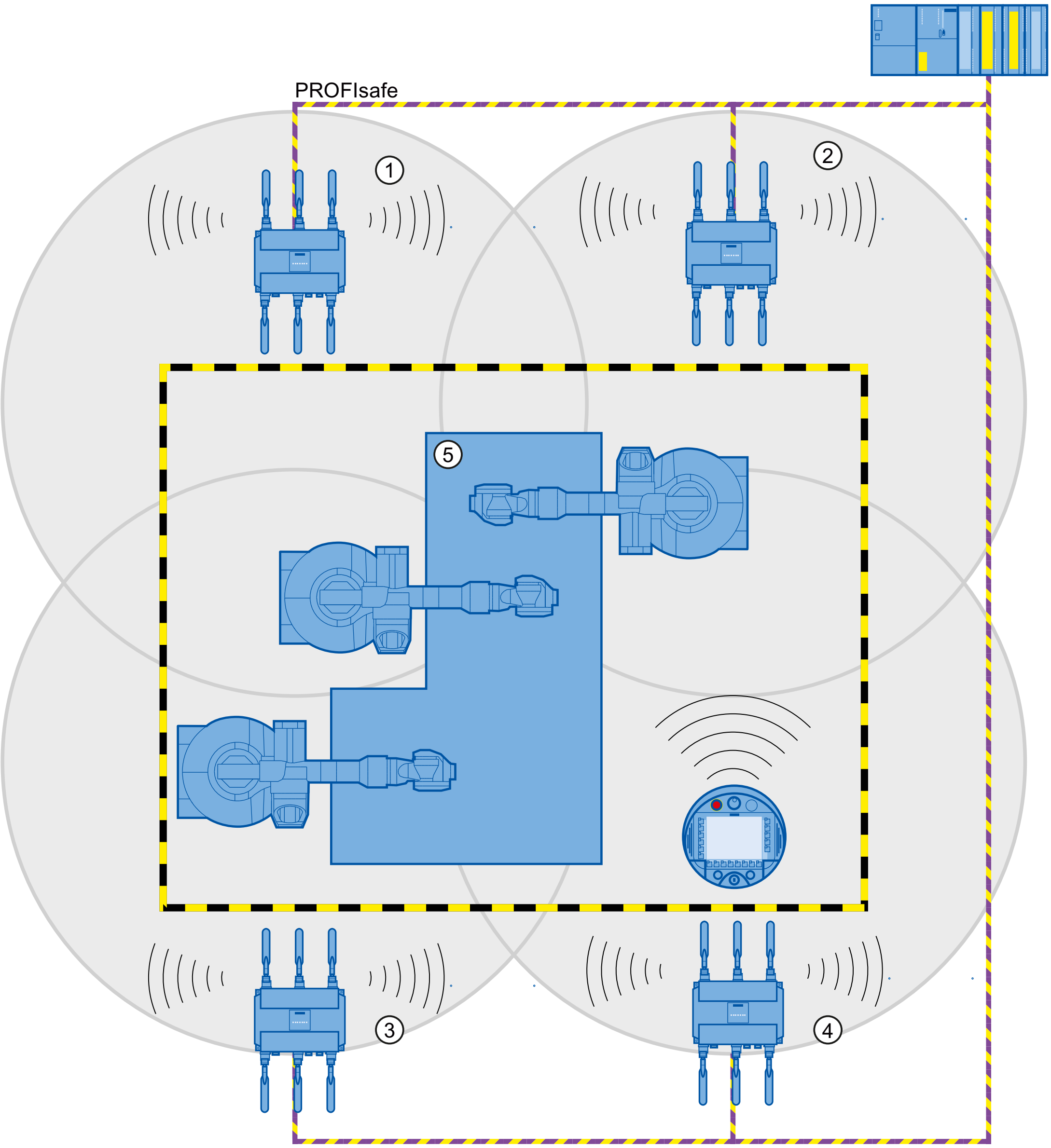
For freely moving nodes that communicate independently of a RCoax cable or directional antennas, iPCF-MC should be used. With iPCF-MC, the client also searches for potentially suitable access points when it receives iPCF queries from the access point and the existing connection to an access point is working problem-free. This means that if a change to a different access point is necessary, this is achieved extremely quickly. In contrast to iPCF, the handover times for iPCF-MC are not dependent on the number of wireless channels being used.

It is necessary to use an access point with two wireless interfaces a so-called dual access point. The one interface operates as management channel and sends short frames (beacons) with administrative information (e.g. channel setting of the data channel and SSID). The other interface (data channel) exclusively transfers the user data.

The "Legacy Free (iPCF-LF)" setting is available to prevent the performance from being slowed down by the IEEE 802.11 a/b/g device generation. When enabled, only the devices that communicate with the IEEE 802.11n standard and have the "Legacy Free (iPCF-LF)" setting enabled are accepted. WLAN mode IEEE 802.11n need not be enabled for this, however.

You configure iPCF-MC in "iFeatures > iPCF > iPCF-MC".

The following graphic shows a configuration example for iPCF-MC.



① Wireless cell of access point 1

② Wireless cell of access point 2

③ Wireless cell of access point 3

④ Wireless cell of access point 4

⑤ Plant

Restrictions

- iPCF / iPCF-HT and iPCF-MC are developments of Siemens AG and function only with nodes on which iPCF / iPCFv2 / iPCF-MC is implemented.
- With an access point with several WLAN interfaces, it is possible to use both iPCF / iPCF-HT as well as standard WLAN at the same time. Parallel operation of iPCF on both interfaces is not recommended.

- Access points with a WLAN interface cannot take part in the iPCF-MC procedures, iPCF is, however, possible.
- iPCF-HT is available only on WLAN interface 1 and can only be used in the 5 GHz band with WLAN mode "(only) IEEE 802.11n".

Note

If both interfaces are operated in the same frequency range for access points with two WLAN interfaces:

- The distance between the antennas connected to R1A1, R1A2, R1A3 and those connected to R2A1, R2A2, R2A3 must be at least 1 m.
- There may be wireless interference on one or both WLAN interfaces if the transmit power is higher than 15 dB.

Note

SCAANCE SCALANCE W788-2 and SCALANCE W786-2

During real-time communication, the access points with two WLAN interfaces make it possible to use a management channel with IPCF-MC. Use of the remaining WLAN interfaces is not recommended when using iPCF.

Requirements for iPCF-MC

iPCF-MC uses the two wireless interface of the access point in different ways: One interface works as the management interface and sends a beacon every five milliseconds. The other interface transfers the user data.

The following requirements must be met before you can use iPCF-MC:

- Only SCALANCE W700 devices with two WLAN interfaces can be used as access points
- The data interface (WLAN1) and management interface (WLAN2) must be operated in the same frequency band and must match in terms of their wireless coverage. iPCF-MC will not work if the two wireless interfaces are equipped with directional antennas that cover different areas.
- The management interfaces of all access points to which a client can change must use the same channel. A client scans only this one channel to find accessible access points.
- Transmission based on IEEE 802.11h (DFS) cannot be used for the management interface. 802.11h (DFS) is possible for the data interface.
- A client must support this feature on its WLAN interface.

4.8 iREF

How it works

If an access point has several activated antennas, the transmit power is distributed equally on these antennas. The transmit power is subject to country-specific legal restrictions. The maximum permitted power depends on the gain of the connected antennas. If the connected antennas have different gains, the maximum antenna gain effectively restricts the permitted transmit power.

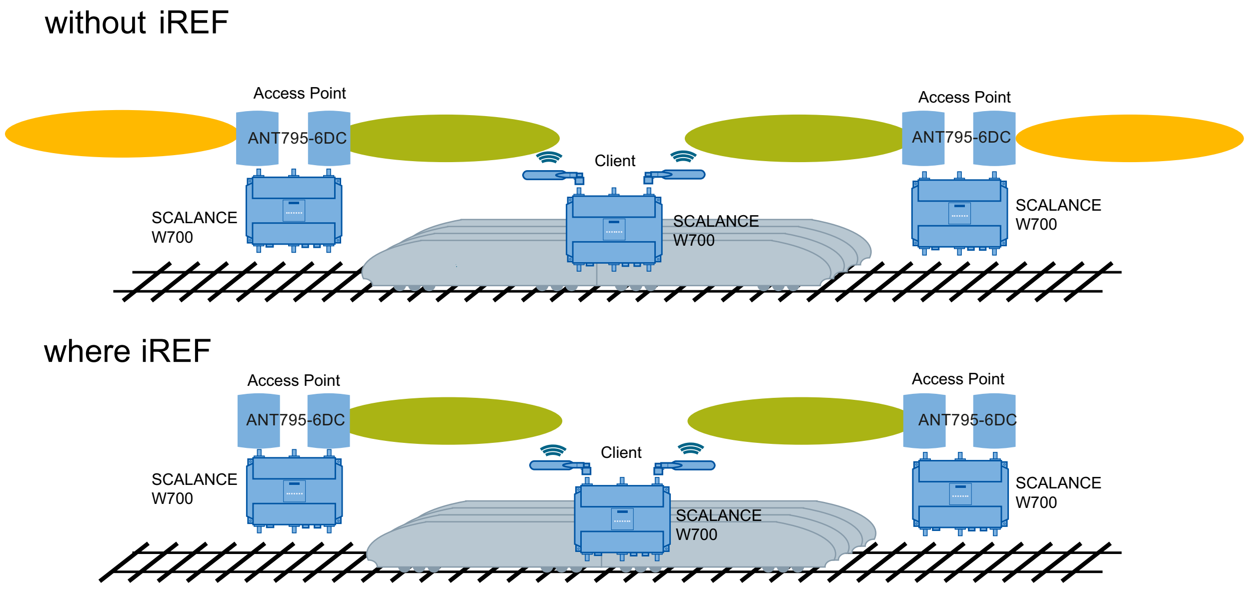
iREF (industrial Range Extension Function) ensures that the data traffic from the access point to each individual client is handled via the most suitable antenna. Which antenna is most suitable is determined by the access point based on the RSSI values of received packets.

Taking into account antenna gain and possible cable losses, packets are only sent via the antennas with which the maximum signal strength at the client end can be expected.

During this time the other antennas are inactive and the legally permitted transmit power is available for the selected antenna. The inactive antennas do not restrict the permitted transmit power.

In particular in applications in which MIMO cannot be used or brings no advantage, this allows data to be transmitted at the highest possible data transmission rate.

You configure iREF in "iFeatures > iREF (Page 398)"



Requirement

- To be able to use iREF, the SCALANCE W700 device must have at least 2 activated antennas.

Restrictions

- A maximum data rate of only up to 150 Mbps (MCS 0 - 7 or 1 x spatial stream) is possible
- iREF cannot be used along with other iFeatures (for example iPCF or iPCF-MC)

Advantages

- Due to the directional data transmission and dynamic deactivation of antennas that do not radiate in the direction of the particular client, interference can be reduced.
- The signal strength is improved because the active antenna always has the maximum permitted transmit power available.

4.9 iPRP

The "Parallel Redundancy Protocol" (PRP) is a redundancy protocol for cabled networks. It is defined in Part 3 of the IEC 62439 standard.

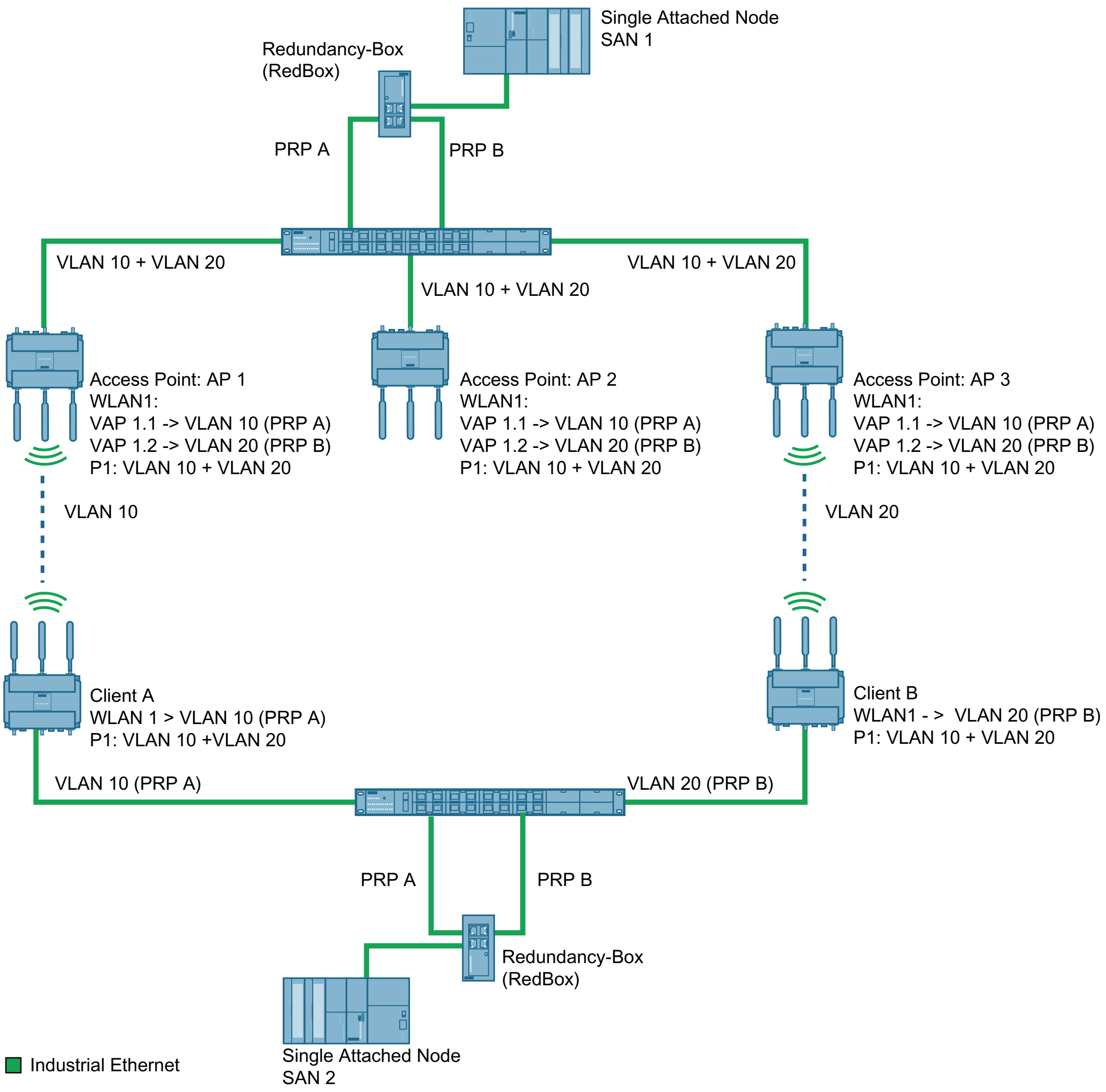
With the "industrial Parallel Redundancy Protocol" (iPRP) the PRP technology can be used in wireless networks. This improves the availability of wireless communication.

How it works

A PRP network consists of two completely independent networks. If one network is disrupted, the frames are sent without interruption/reconfiguration via the parallel redundant network. To achieve this the Ethernet frames are sent to the recipient in duplicate via both networks. Devices capable of PRP have at least two separate Ethernet interfaces that are connected to independent networks.

With devices not capable of PRP a redundancy box (RedBox) is connected upstream. This allows access for so-called Single Attached Nodes (SAN) to PRP networks. The RedBox duplicates every Ethernet frame to be sent and adds a PRP trailer to the frame that among other things contains a sequence number. The RedBox simultaneously sends a copy of the frame to the PRP A and PRP B network. At the receiving end the duplicate frame is discarded by the RedBox. For this the RedBox requires certain transfer times designed for Ethernet networks. For this reason using PRP in WLAN networks results in duplicate and delayed frames.

With iPRP this problem is solved and the use of PRP in WLAN with SCALANCE W700 devices becomes possible



The access points (AP 1, AP 2 and AP 3) and the RedBox at the AP end are connected to each other via a switch. PRP network A und B are separated from each other via VLANs.

If SAN1 sends a frame to SAN2, the frame is duplicated by the RedBox at the AP end and the two redundant frames are transferred via the switch to the access points. Via the two different wireless paths the redundant PRP frames are transferred to the RedBox at the client end. The clients are also connected to their RedBox via a switch. This forwards the first PRP frame to arrive to SAN2 and discards the second one.

Note

On the interfaces of the switches to the SCALANCE W700 devices, only the VLANs that are also set on the VAP or WLAN interfaces of the SCALANCE W700 devices may be configured.

With iPRP the redundant partners (here: AP1 and AP3 or client A and client B) communicate with each other via a switch to prevent the two redundant PRP frames from arriving at the RedBox with too great a time difference.

If for example the communication between AP1 and client A is very slow, the slower frame is discarded at the receiving end.

You configure iPRP in "iFeatures > iPRP (Page 396)".

Requirement

- The base bridge mode "802.1Q VLAN Bridge" is set.
- The VLANs have been created.
- Access point mode: The VAP interface is enabled.
- In client mode:
  - For "MAC Mode", "Layer 2 Tunnel" is set.
  - For "Background Scan mode", either "Always", "Deactivated" or "Current channel" is set.
- Depending on the configuration the clients can communicate with every access point.

4.10 AeroScout

AeroScout tags

SCALANCE W700 devices support tags of the AeroScout company. Tags are battery-operated RFID sensors that send their data cyclically as multicast frames.

Among other things, AeroScout tags have the following features:

- **Ambient temperature**
  If a tag is fitted to a SCALANCE W700 device or material, it is possible to monitor whether a selected ambient temperature is being maintained.
- **Motion**
  Here, a tag can also supply information indicating whether it is in motion or stationary. The areas of material flow and material handling engineering represent possible applications for this function.
- **Button**
  Regardless of the frames sent cyclically, a user can also send a message by pressing a button.
- **LED**
  This provides information on the operating status of the tag.

Note

For more detailed information, please refer to the AeroScout documentation (www.aeroscout.com).

How it works

The tag sends its data as AeroScout frames. The tags and the access points communicate in the 2.4 GHz band.

If the WLAN interface of the access point receives the AeroScout frame, this is converted into a UDP datagram. The SCALANCE W700 device forwards the UDP datagram along with the information about the signal strength (RSSI) to a PC. The AeroScout Engine runs on the PC and evaluates the received information.

Note

It is **not** advisable to use PROFINET communication and AeroScout together on one wireless interface.

Accuracy of localization

To achieve optimum precision in the localization of AeroScout Tags,

- we recommend the use of antennas with omnidirectional characteristics
- if the signals should be received by at least three access points.

4.11 NAT/NAPT

What is NAT?

NAT (Network Address Translation) is a simplified source NAT and is also referred to as IP masquerading. With each outgoing data packet sent via this interface, the source IP address is replaced by the IP address of the interface. The adapted data packet is sent to the destination IP address. For the destination host it appears as if the queries always came from the same sender. The internal nodes cannot be reached directly from the external network.

You configure NAT under "Layer 3 > NAT > Basic" (Page 331).

What is NAPT?

NAPT (Network Address and Port Translation) is a form of destination NAT and is also referred to as port forwarding. The device replaces the external IP address of the terminal device with the internal IP address of the device. The device also exchanges the port number.

The assignment IP address and port number is stored in the NAT table. If the device receives data packages on a certain port, it searches for the corresponding entry in the NAT table. If an entry exists, it adds the IP address and the port number as the destination and forwards the data packet.

Note

NAT/NAPT is possible only on layer 3 of the ISO/OSI reference model. To use the NAT function, the networks must use the IP protocol.

When using the ISO protocol that operates at layer 2, it is not possible to use NAT.

You configure the NAT table under "Layer 3 > NAT > NAPT" (Page 334).

4.12 SNMP

Introduction

With the aid of the Simple Network Management Protocol (SNMP), you monitor and control network components from a central station, for example routers or switches. SNMP controls the communication between the monitored devices and the monitoring station.

Tasks of SNMP:

- Monitoring of network components
- Remote control and remote parameter assignment of network components
- Error detection and error notification

In versions v1 and v2c, SNMP has no security mechanisms. Each user in the network can access data and also change parameter assignments using suitable software.

For the simple control of access rights without security aspects, community strings are used.

The community string is transferred along with the query. If the community string is correct, the SNMP agent responds and sends the requested data. If the community string is not correct, the SNMP agent discards the query. Define different community strings for read and write permissions. The community strings are transferred in plain text.

Standard values of the community strings:

- public
  has only read permissions
- private
  has read and write permissions

Note

Because the SNMP community strings are used for access protection, do not use the standard values "public" or "private". Change these values following the initial commissioning.

Further simple protection mechanisms at the device level:

- Allowed Host
  The IP addresses of the monitoring systems are known to the monitored system.
- Read Only
  If you assign "Read Only" to a monitored device, monitoring stations can only read out data but cannot modify it.

SNMP data packets are not encrypted and can easily be read by others.

The central station is also known as the management station. An SNMP agent is installed on the devices to be monitored with which the management station exchanges data.

The management station sends data packets of the following type:

- GET
  Request a data record from the SNMP agent
- GETNEXT
  Calls up the next data record.

- GETBULK (available as of SNMPv2c)
  Requests multiple data records at once, for example several rows of a table.
- SET
  Contains parameter assignment data for the relevant device.

The SNMP agent sends data packets of the following type:

- RESPONSE
  The SNMP agent returns the data requested by the manager.
- TRAP
  If a certain event occurs, the SNMP agent itself sends traps.
- INFORM
  Like a trap except that it is acknowledged by the receiver.

SNMPv1/v2c/v3 use UDP (User Datagram Protocol) and use the UDP ports 161 and 162. The data is described in a Management Information Base (MIB).

SNMPv3

Compared with the previous versions SNMPv1 and SNMPv2c, SNMPv3 introduces an extensive security concept.

SNMPv3 supports:

- Fully encrypted user authentication
- Encryption of the entire data traffic
- Access control of the MIB objects at the user/group level

With the introduction of SNMPv3 you can no longer transfer user configurations to other devices without taking special action, e.g. by loading a configuration file or replacing the C-PLUG.

According to the standard, the SNMPv3 protocol uses a unique SNMP engine ID as an internal identifier for an SNMP agent. This ID must be unique in the network. It is used to authenticate access data of SNMPv3 users and to encrypt it.

Depending on whether you have enabled or disabled the “SNMPv3 User Migration” function, the SNMP engine ID is generated differently.

Restriction when using the function

Use the "SNMPv3 User Migration" function only to transfer configured SNMPv3 users to a substitute device when replacing a device.
Do not use the function to transfer configured SNMPv3 users to multiple devices. If you load a configuration with created SNMPv3 users on several devices, these devices use the same SNMP engine ID. If you use these devices in the same network, your configuration contradicts the SNMP standard.

Compatibility with predecessor products

You can only transfer SNMPv3 users to a different device if you have created the users as migratable users. To create a migratable user the "SNMPv3 User Migration" function must be activated when you create the user.

4.13 Spanning Tree

Avoiding loops

The Spanning Tree algorithm detects redundant physical network structures and prevents the formation of loops by disabling redundant paths. It evaluates the distance and performance of a connection or bases the decisions on settings made by the user. Data is then exchanged only over the remaining connection paths.

If the preferred data path fails, the Spanning Tree algorithm then searches for the most efficient path possible with the remaining nodes.

Root bridge and bridge priority

The identification of the most efficient connection is always related to the root bridge, a network component that can be considered as a root element of a tree-like network structure. With the "Bridge Priority" parameter, you can influence the selection of the root bridge. The computer with the lowest value set for this parameter automatically becomes the root bridge. If two computers have the same priority value, the computer with the lower MAC address becomes the root bridge.

Response to changes in the network topology

If nodes are added to a network or drop out of the network, this may affect the optimum path selection for data packets. To be able to respond to such changes, the root bridge sends configuration messages (BPDUs) at regular intervals. You can set the interval between two configuration messages with the "Hello Time" parameter.

Keeping configuration information up to date

With the "Max Age" parameter, you set the maximum age of configuration information. If a bridge has information that is older than the time set in Max Age, it discards the message and initiates recalculation of the paths.

New configuration data is not used immediately by a bridge but only after the period specified in the "Forward Delay" parameter. This ensures that operation is started with the new topology only after all the bridges have the required information.

4.13.1 RSTP, MSTP, CIST

Rapid Spanning Tree Protocol (RSTP)

One disadvantage of STP is that if there is a disruption or a device fails, the network needs to reconfigure itself: The devices start to negotiate new paths only when the interruption occurs. This can take up to 30 seconds. Fur this reason, STP was expanded to create the "Rapid Spanning Tree Protocol" (RSTP, IEEE 802.1w). This differs from STP essentially in that the devices are already collecting information about alternative routes during normal operation and do not need to gather this information after a disruption has occurred. This means that the reconfiguration time for an RSTP controlled network can be reduced to a few seconds.
This is achieved by using the following functions:

- Edge ports (end node port)
  Edge ports are ports connected to an end device.
  A port that is defined as an edge port is activated immediately after connection establishment. If a spanning tree BPDU is received at an edge port, the port loses its role as edge port and it takes part in (R)STP again. If no further BPDU is received after a certain time has elapsed (3 x hello time), the port returns to the edge port status.
- Point-to-point (direct communication between two neighboring devices)

  By directly linking the devices, a status change (reconfiguration of the ports) can be made without any delays.
- Alternate port (substitute for the root port)

  A substitute for the root port is configured. If the connection to the root bridge is lost, the device can establish a connection over the alternate port without any delay due to reconfiguration.
- Reaction to events

  Rapid spanning tree reacts to events, for example an aborted connection, without delay. There is no waiting for timers as in spanning tree.
- Counter for the maximum bridge hops
  The number of bridge hops a package is allowed to make before it automatically becomes invalid.

In principle, therefore with rapid spanning tree, alternatives for many parameters are preconfigured and certain properties of the network structure taken into account to reduce the reconfiguration time.

Multiple Spanning Tree Protocol (MSTP)

The Multiple Spanning Tree Protocol (MSTP) is a further development of the Rapid Spanning Tree Protocol. Among other things, it provides the option of operating several RSTP instances within different VLANs or VLAN groups and, for example, making paths available within the individual VLANs that the single Rapid Spanning Tree Protocol would globally block.

Common and Internal Spanning Tree (CIST)

CIST identifies the internal instance used by the switch that is comparable in principle with an internal RSTP instance.

4.14 User management

Overview of user management

Access to the device is managed by configurable user settings. Set up users with a password for authentication. Assign a role with suitable rights to the users.

The authentication of users can either be performed locally by the device or by an external RADIUS server. You configure how the authentication is handled on the "Security > AAA > General" page.

Local logon

The local logging on of users by the device runs as follows:

1. The user logs on with user name and password on the device.
2. The device checks whether an entry exists for the user.
   → If an entry exists, the user is logged in with the rights of the associated role.
   → If no corresponding entry exists, the user is denied access.

Login via an external RADIUS server

RADIUS (Remote Authentication Dial-In User Service) is a protocol for authenticating and authorizing users by servers on which user data can be stored centrally.

Depending on the RADIUS authorization mode you have selected on the "Security > AAA > RADIUS Client" page, the device evaluates different information of the RADIUS server.

RADIUS authorization mode "Standard"

If you have set the authorization mode "conventional", the authentication of users via a RADIUS server runs as follows:

1. The user logs on with user name and password on the device.
2. The device sends an authentication request with the login data to the RADIUS server.
3. The RADIUS server runs a check and signals the result back to the device.
   - The RADIUS server reports a successful authentication and returns the value "Administrative User" to the device for the attribute "Service Type".
     → The user is logged in with administrator rights.
   - The RADIUS server reports a successful authentication and returns a different or even no value to the device for the attribute "Service Type".
     → The user is logged in with read rights.
   - The RADIUS server reports a failed authentication to the device:
     → The user is denied access.

RADIUS authorization mode "SiemensVSA"

Requirement

For the RADIUS authorization mode "Siemens VSA" the following needs to be set on the RADIUS server:

- Manufacturer code: 4196
- Attribute number: 1
- Attribute format: Character string (group name)

Procedure

If you have set the authorization mode "SiemensVSA", the authentication of users via a RADIUS server runs as follows:

1. The user logs on with user name and password on the device.
2. The device sends an authentication request with the login data to the RADIUS server.
3. The RADIUS server runs a check and signals the result back to the device.
   Case A: The RADIUS server reports a successful authentication and returns the group assigned to the user to the device.
   - The group is known on the device and the user is not entered in the table "External User Accounts"
     → The user is logged in with the rights of the assigned group.
   - The group is known on the device and the user is entered in the table "External User Accounts"
     → The user is assigned the role with the higher rights and logged in with these rights.
   - The group is not known on the device and the user is entered in the table "External User Accounts"
     → The user is logged in with the rights of the role linked to the user account.
   - The group is not known on the device and the user is not entered in the table "External User Accounts"
     → The user is logged in with the rights of the role "Default".

   Case B: The RADIUS server reports a successful authentication but does not return a group to the device.
   - The user is entered in the table "External User Accounts":
     → The user is logged in with the rights of the linked role "".
   - The user is not entered in the table "External User Accounts":
     → The user is logged in with the rights of the role "Default".

   Case C: The RADIUS server reports a failed authentication to the device:
   - The user is denied access.

IP addresses 5

5.1 IPv4 / IPv6

What are the essential differences?

	IPv4	IPv6
IP configuration	• DHCP server • Manual	• Stateless Address Autoconfiguration (SLAAC): Stateless autoconfiguration using NDP (Neighbor Discovery Protocol) – Creates a link local address for every interface that does not require a router on the link. – Checks the uniqueness of the address on the link that requires no router on the link. – Specifies whether the global addresses are obtained via a stateless mechanism, a stateful mechanism or via both mechanisms. (Requires a router on the link.) • Manual • DHCPv6 (stateful)
Available IP addresses	32-bit: 4, 29 * 10^9 addresses	128-bit: 3, 4 * 10^{38} addresses
Address format	Decimal: 192.168.1.1 with port: 192.168.1.1:20	Hexadecimal: 2a00:ad80::0123 with port: [2a00:ad80::0123]:20
Loopback	127.0.0.1	::1
IP addresses of the interface	5 IP addresses	Multiple IP addresses • LLA: A link local address (formed automatically) fe80::/128 per interface • ULA: Several unique local unicast addresses per interface • GUA: Several global unicast addresses per interface
Header	• Checksum • Variable length • Fragmentation in the header • No security	• Checking at a higher layer • Fixed size • Fragmentation in the extension header
Fragmentation	Host and router	Only endpoint of the communication
Quality of service	Type of Service (ToS) for prioritization	The prioritization is specified in the header field "Traffic Class".
Types of frame	Broadcast, multicast, unicast	Multicast, unicast, anycast

	IPv4	IPv6
Identification of DHCP clients/ server	Client ID: • MAC address • DHCP client ID • System name • PROFINET station name • IAID and DUID	DUID + IAID(s) = exactly one interface of the host DUID = DHCP unique identifier Unique identifier of server and clients IAID = Identity Association Identifier At least one per interface is generated by the client and remains unchanged when the DHCP client restarts Three methods of obtaining the DUID • DUID-LLT • DUID-EN • DUID-LL
DHCP	via UDP with broadcast	via UDP with unicast RFC 3315, RFC 3363 **Stateful DHCPv6** Stateful configuration in which the IPv6 address and the configuration settings are transferred. Four DHVPv6 messages are exchanged between client and server: 1. SOLICIT: Sent by the DHCPv6 client to localize DHCPv6 servers. 2. ADVERTISE The available DHCPv6 servers reply to this. 3. REQUEST The DHCPv6 client requests an IPv6 address and the configuration settings from the DHCPv6 server. 4. REPLY The DHCPv6 server sends the IPv6 address and the configuration settings. If the client and server support the function "Rapid commit" the procedure is shortened to two DHCPv6 messages SOLICIT and REPLY . **Stateless DHCPv6** In stateless DHCPv6, only the configuration settings are transferred. **Prefix delegation** The DHCPv6 server delegates the distribution of IPv6 prefixes to the DHCPv6 client. The DHCPv6 client is also known as PD router.
Resolution of IP addresses in hardware addresses	ARP (Address Resolution Protocol)	NDP (Neighbor Discovery Protocol)

5.2 IPv4 address

5.2.1 Structure of an IPv4 address

The IPv4 address consists of 4 decimal numbers separated by a dot. Each decimal number can have a value from 0 to 255.

Example: 192.168.16.2

The IPv4 address is composed of:

- Address of the (sub)network
- The address of the node (generally also called end node, host or network node)

Subnet mask

The subnet mask consists of four decimal numbers with the range from 0 to 255, each number separated by a period; example: 255.255.0.0

The binary representation of the 4 subnet mask decimal numbers must contain a series of consecutive 1s from the left and a series of consecutive 0s from the right.

The "1" values determine the network address within the IPv4 address. The "0" values determine the device address within the IPv4 address.

Example:

Correct values

255.255.0.0 D = 1111 1111.1111 1111.0000 0000.0000 0000 B

255.255.128.0 D = 1111 1111.1111 1111.1000 0000.0000 0000 B

255.254.0.0 D = 1111 1111.1111 1110.0000 0000.0000.0000 B

Incorrect value:

255.255.1.0 D = 1111 1111.1111 1111.0000 0001.0000 0000 B

In the example for the IP address mentioned above, the subnet mask shown here has the following meaning:

The first 2 bytes of the IP address determine the subnet - i.e. 192.168. The last two bytes address the device, i.e. 16.2.

The following applies in general:

- The network address results from the AND combination of IPv4 address and subnet mask.
- The device address results from the AND-NOT combination of IPv4 address and subnet mask.

Classless Inter-Domain Routing (CIDR)

CIDR is a method that groups several IPv4 addresses into an address range by representing an IPv4 address combined with its subnet mask. To do this, a suffix is appended to the IPv4 address that specifies the number of bits of the network mask set to 1. Using the CIDR notation, routing tables can be reduced in size and the available address ranges put to better use.

Example:

IPv4 address 192.168.0.0 with subnet mask 255.255.255.0

The network part of the address covers 3 x 8 bits in binary representation; in other words 24 bits.

This results in the CIDR notation 192.168.0.0/24.
The host part covers 1 x 8 bits in binary notation. This results in an address range of 2 to the power 8, in other words 256 possible addresses.

Masking additional subnets

Using the subnet mask, you can further structure a subnet assigned to one of the address classes A, B or C and form "private" subnets by setting further lower-level digits of the subnet mask to "1". For each bit set to "1", the number of "private" networks doubles and the number of nodes contained in them is halved. Externally, the network still looks like a single network.

Example:

You change the default subnet mask for a subnet of address class B (e.g. IP address 129.80.xxx.xxx) as follows:

Masks	Decimal	Binary
Default subnet mask	255.255.0.0	11111111.11111111.00000000.00000000
Subnet mask	255.255.128.0	11111111.11111111.10000000.00000000

Result:

All devices with addresses from 129.80.1.xxx to 129.80.127.xxx are on one IP subnet, all devices with addresses from 129.80.128.xxx to 129.80.255.xxx are on another IP subnet.

Network gateway (router)

The task of the network gateways (routers) is to connect the IP subnets. If an IP datagram is to be sent to another network, it must first be sent to a router. For make this possible, you need to enter the router address for each member of the IP subnet.

The IP address of a device in the subnet and the IP address of the network gateway (router) may only be different at the points where the subnet mask is set to "0".

5.2.2 Initial assignment of an IPv4 address

Configuration options

An initial IP address for a SCALANCE W device cannot be assigned using Web Based Management (WBM) or the Command Line Interface (CLI) over Telnet because these configuration tools require that an IP address already exists.

The following options are available to assign an IP address to an unconfigured device currently without an IP address:

- DHCP (default)
- SINEC PNI
- STEP 7
- SINEC NMS

Note

When the product ships and following "Restore Memory Defaults and Restart", DHCP is enabled.

If a DHCP server is available in the local area network, and this responds to the DHCP request of a SCALANCE W device, the IP address, subnet mask and gateway are assigned automatically when the device first starts up. "Restore Factory Defaults and Restart" does not delete an IP address assigned either by DHCP or by the user.

5.2.3 Address assignment via DHCPv4

Properties of DHCP

DHCP (Dynamic Host Configuration Protocol) is a method for automatic assignment of IP addresses. It has the following characteristics:

- DHCP can be used both when starting up a device and during ongoing operation.
- The assigned IP address remains valid only for a limited time known as the lease time. When half the period of validity has elapsed. the DHCP client can extend the period of the assigned IPv4 address. When the entire time has elapsed, the DHCP client needs to request a new IPv4 address.

- There is normally no fixed address assignment; in other words, when a client requests an IP address again, it normally receives a different address from the previous address. It is possible to configure the DHCP server so that the DHCP client always receives the same fixed address in response to its request. The parameter with which the DHCP client is identified for the fixed address assignment is set on the DHCP client. The address can be assigned via the MAC address, the DHCP client ID, PROFINET device name or the device name. You configure the parameter in "System > DHCP Client".
- The following DHCP options are supported:
  - DHCP option 3: Assignment of a router address
  - DHCP option 6: Assignment of a DNS server address
  - DHCP option 66: Assignment of a dynamic TFTP server name
  - DHCP option 67: Assignment of a dynamic boot file name

Note

DHCP uses a mechanism with which the IP address is assigned for only a short time (lease time). If the device does not reach the DHCP server with a new request on expiry of the lease time, the assigned IP address, the subnet mask and the gateway continue to be used.

The device therefore remains accessible under the last assigned IP address even without a DHCP server. This is not the standard behavior of office devices but is necessary for problem-free operation of the plant.

5.2.4 Address assignment with SINEC PNI

Introduction

The SINEC PNI is capable of assigning such an address to unconfigured devices that do not yet have an IP address.

SINEC PNI

- To be able to assign an IP address to the device with SINEC PNI, it must be possible to reach the device via Ethernet.
- You can find SINEC PNI on the Internet pages of Siemens Industry Online Support at the following Link: (https://support.industry.siemens.com/cs/ww/en/ps/26672/dl)
- For additional information about assigning the IP address with SINEC PNI, refer to the online help or the "SINEC PNI network management" operating instructions.

5.2.5 Address assignment with STEP 7

In STEP 7, you can configure the topology, the device name and the IP address; in other words, an IP address is specified for the MAC address of the device. If you connect the unconfigured device to the controller, the controller assigns the configured device name and the IP address to the device automatically.

STEP 7 V5.x and earlier

For further information on the assignment of the IP address using STEP 7 V5.x and earlier, refer to the documentation "Configuring Hardware and Communication Connections STEP 7", in the section "Steps for Configuring a PROFINET IO System".

STEP 7 as of V13

For additional information on assigning the IP address using STEP 7 as of V13, refer to the online help "Information system", section "Addressing PROFINET devices".

5.3 IPv6 address

5.3.1 IPv6 terms

Network node

A network node is a device that is connected to one or more networks via one or more interfaces.

Router

A network node that forwards IPv6 packets.

Host

A network node that represents an end point for IPv6 communication relations.

Link

A link is, according to IPv6 terminology, a direct layer 3 connection within an IPv6 network.

Neighbor

Two network nodes are called neighbors when they are located on the same link.

IPv6 interface

Physical or logical interface on which IPv6 is activated.

Path MTU

Maximum permitted packet size on a path from a sender to a recipient.

Path MTU discovery

Mechanism for determining the maximum permitted packet size along the entire path from a sender to a recipient.

LLA

Link local address FE80::/10

As soon as IPv6 is activated on the interface, a link local address is formed automatically. Can only be reached by nodes located on the same link.

ULA

Unique Local Address

Defined in RFC 4193. The IPv6 interface can be reached via this address in the LAN.

GUA

Global unicast address

The IPv6 interface can be reached through this address, for example, via the Internet.

Interface ID

The interface ID is formed with the EUI-64 method or manually.

EUI-64

Extended Unique Identifier (RFC 4291); process for forming the interface ID. In Ethernet, the interface ID is formed from the MAC address of the interface. Divides the MAC address into the manufacturer-specific part (OUI) and the network-specific part (NIC) and inserts FFFE between the two parts.

Example:

MAC address = AA:BB:CC:DD:EE:FF

OUI = AA:BB:CC

NIC = DD:EE:FF

EUI-64 = OUI + **FFFE** + NIC = AA:BB:CC:**FF:FE**:DD:EE:FF

Scope

Defines the range of the IPv6 address.

5.3.2 Structure of an IPv6 address

IPv6 address format - notation

IPv6 addresses consist of 8 fields each with four-character hexadecimal numbers (128 bits in total). The fields are separated by a colon.

Example:

fd00:0000:0000:ffff:02d1:7d01:0000:8f21

Rules / simplifications:

- If one or more fields have the value 0, a shortened notation is possible.
  The address fd00:**0000:0000**:ffff:02d1:7d01:0000:8f21 can also be shortened and written as follows:
  fd00**::**ffff:02d1:7d01:0000:8f21
  To ensure uniqueness, this shortened form can only be used once within the entire address.
- Leading zeros within a field can be omitted.
  The address fd00:0000:0000:ffff:**02d1**:7d01:0000:8f21 can also be shortened and written as follows:
  fd00**::**ffff:**2d1**:7d01:0000:8f21
- Decimal notation with periods
  The last 2 fields or 4 bytes can be written in the normal decimal notation with periods.
  Example: The IPv6 address fd00::ffff.125.1.0.1 is equivalent to fd00::ffff:7d01:1

Structure of the IPv6 address

The IPv6 protocol distinguishes between three types of address: Unicast, Anycast and Multicast. The following section describes the structure of the global unicast addresses.

IPv6 prefix		**Suffix**
Global prefix: n bits	Subnet ID m bits	Interface ID 128 - n - m bits
Assigned address range	Description of the location, also subnet prefix or subnet	Unique assignment of the host in the network. The ID is generated from the MAC address.

The prefix for the link local address is always fe80:0000:0000:0000. The prefix is shortened and noted as follows: fe80::

IPv6 prefix

Specified in: RFC 4291

The IPv6 prefix represents the subnet identifier.

Prefixes and IPv6 addresses are specified in the same way as with the CIDR notation (Classless Inter-Domain Routing) for IPv4.

Design

IPv6 address / prefix length

Example

IPv6 address: 2001:0db8:1234::1111/48

Prefix: 2001:0db8:1234::/48

Interface ID: ::1111

Entry and appearance

The entry of IPv6 addresses is possible in the notations described above. IPv6 addresses are always shown in the hexadecimal notation.

Configuring with Web Based Management 6

6.1 Web Based Management

How it works

The device has an integrated HTTP server for Web Based Management (WBM). If a device is addressed with a Web browser, it returns HTML pages to the client PC depending on the user input.

The user enters the configuration data in the HTML pages sent by the device. The device evaluates this information and generates reply pages dynamically.

The advantage of this method is that only a Web browser is required on the client.

Note

Secure connection

WBM also allows you to establish a secure connection via HTTPS.

Use HTTPS for protected data transmission. If you wish to access WBM only via a secure connection, activate only the HTTPS server under "System > Configuration".

Requirements

WBM display

- The device has an IP address
- There is a connection between the device and the client device. With the Windows ping command, you can check whether or not a connection exists.
- Access via HTTPS is enabled.
- JavaScript is activated in the Web browser.

- The Web browser must not be set so that it reloads the page from the server each time the page is accessed. The updating of the dynamic content of the page is ensured by other mechanisms. In the Internet Explorer, you can make the appropriate setting in the "Options > Internet Options > General" menu in the section "Browsing history" with the "Settings" button. Under "Check for newer versions of stored pages:", select "Automatically".
- If a firewall is used, the relevant ports must be opened.
  - For access using HTTP: Standard port 80 or configured port
  - For access using HTTPS: Standard port 443 or configured port

  The display of the WBM was tested with the following desktop Web browsers:
  - Mozilla Firefox 91 ESR
  - Google Chrome 93
  - Microsoft Edge Chromium 93

Display of the WBM on mobile devices

For mobile devices, the following minimum requirements must be met:

Resolution	Operating system	Internet browser
960 x 640 pixels	Android as of version 4.2.1 iOS as of version 6.0.2	Chrome as of version 18 on Android Safari as of version 6 on iOS

- Tested with the following Internet browsers for mobile devices:
  - Safari as of version 8 on iOS as of V8.1.3 (iPad Mini Model A1432)
  - Chrome as of version 46 on Android as of version 5.0.2 (Nexus 7C Asus)
  - Firefox as of version 35 on Android as of version 5.0.2

Note

Display of the WBM and working with it on mobile devices

The display and operation of the WBM pages on mobile devices may differ compared with the same pages on desktop devices. Some pages also have an optimized display for mobile devices.

6.2 Login

Establishing a connection to a device

Follow the steps below to establish a connection to a device using an Internet browser:

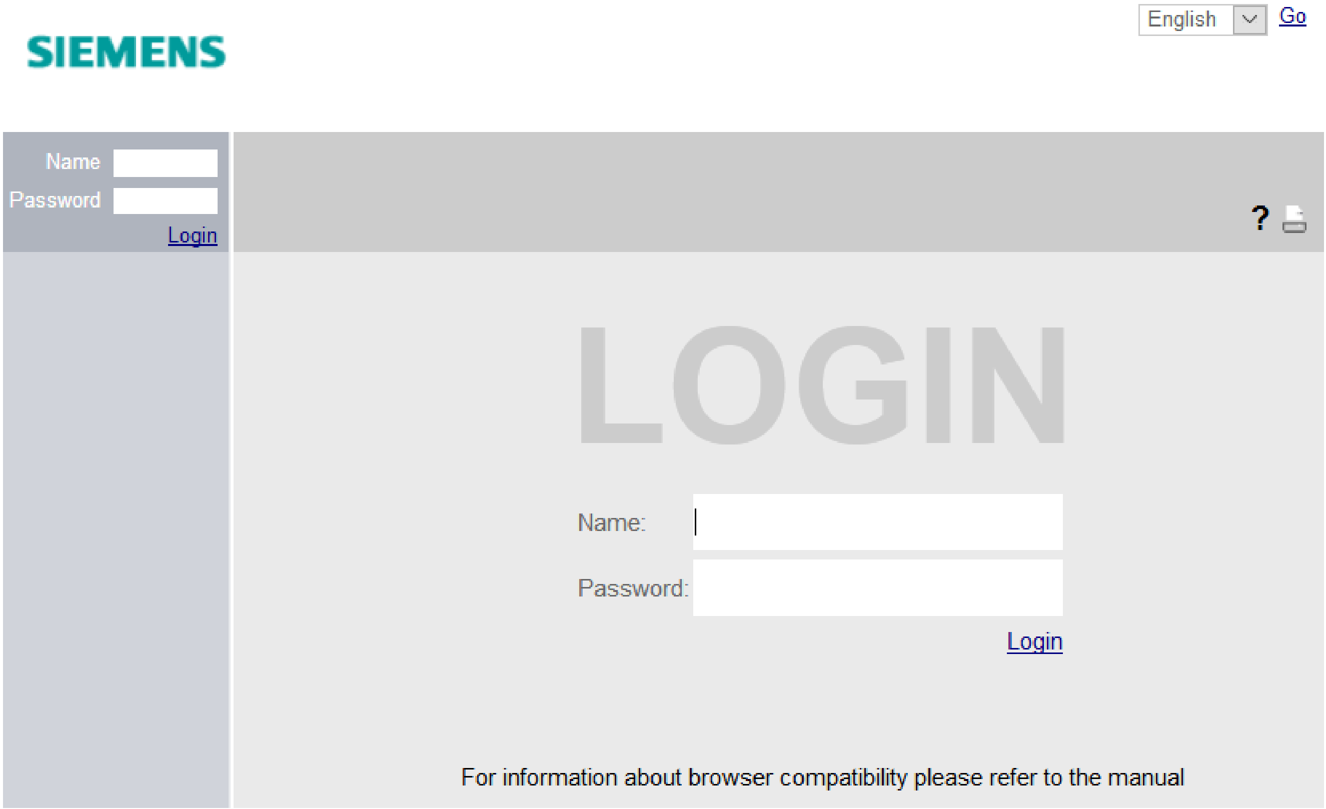
1. There is a connection between the device and the PC. With the ping command, you can check whether or not a device can be reached.
2. In the address box of the Internet browser, enter the IP address or the URL of the device. Access via HTTPS is enabled as default. If you access the device via HTTP, the address is automatically diverted to HTTPS.

   Note

   Information on the security certificate

   Because the device can only be administered using encrypted access, it is delivered with a self-signed certificate. If certificates with signatures that the operating system does not know are used, a security message is displayed. You can display the certificate.

   A message relating to the security certificate appears. Acknowledge this message and continue loading the page.
   If you use a port other than the standard port, enter a colon ":" as separator between the IP address and the port number.
   Example: https://192.168.16.178:49152
   You change the port in "System > Configuration".
3. If there is a connection to the device, the login page of Web Based Management (WBM) is displayed.
   If you wish to access the WBM via an HTTP connection, configure "HTTP & HTTPS" for "HTTP Services" in "System > Configuration".



For information about browser compatibility please refer to the manual

Changing language

1. From the drop-down list at the top right, select the language version of the WBM pages.
2. Click the "Go" button to change to the selected language.

Note

Available languages

English and German are available as languages. Other languages will follow in a later version.

Logging in to WBM

1. "Name" input box:
   - When you log in for the first time or following a "Restore Factory Defaults and Restart", enter the user preset in the factory "admin".
     With this user account, you can change the settings of the device (read and write access to the configuration data).
   - Enter the user name of the created user account. You configure local user accounts and roles in "Security > Users".
2. "Password" input box:
   - When you log in for the first time or following a "Restore Factory Defaults and Restart", enter the password of the default user preset in the factory "admin": "admin".

     Note

     The password for the "admin" user has been changed for devices with the US version. Specialist personnel for professional WLAN installations can obtain the password from Siemens support.

   - Enter the password of the relevant user account.
3. Click the "Login" button or confirm your input with "Enter".

   Note

   When you log in for the first time or following a "Restore Factory Defaults and Restart", you can rename the "admin" user preset in the factory once. Afterwards, renaming "admin" is no longer possible. Enter the new name in the corresponding text box.

   When you log in for the first time or following a "Restore Factory Defaults and Restart", you are prompted to change the password.
   The new password must meet the password policy "High":
   - Password length: At least 8 characters, maximum 128 characters
   - At least 1 uppercase letter
   - At least 1 special character
   - At least 1 number
   - It must not contain the following characters: ; : ' ? ß § " ² ³ ° | € µ ä ö ü Ä Ö Ü
   - The characters for Space and Delete also cannot be contained.
4. You need to repeat the password as confirmation. The password entries must match.
5. Click the "Set Values" button to complete the action. The changes take immediate effect.

Once you have logged in successfully, the start page appears.

Protection from brute force attacks

To protect against brute force attacks, login to the device is denied for a user or for the IP address of a user after 11 failed login attempts.

Service technician login

The device has a service technician login for servicing purposes. This is only available after activation by an administrator and may only be used by Siemens Support.

6.3 "Wizard" menu

6.3.1 Basic Wizard

Introduction

With the Basic Wizard, menus guide you through the configuration of the most important parameters.

On the Basic Wizard pages, you can only configure the parameters important for the basic functionality. You make further settings when you have finished with the Basic Wizard.

Requirement

- The device is in the status it was when it was shipped and can be reached via the Ethernet interface.
- You have assigned an IP address to the device. For more detailed information, refer to the section "IP addresses (Page 67)".
- You are logged in to the WBM as a user with administrator rights. For more detailed information, refer to the section "Login (Page 79)".

Starting the Basic Wizard

Click on "Wizard > Basic Wizard" in the navigation area to start the Basic Wizard.

When you log in for the first time or following a "Restore Factory Defaults", the Basic wizard is started automatically after you have changed the default password.

Buttons you require often

The WBM pages of the Basic Wizard contain the following buttons:

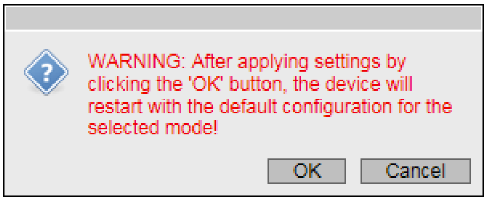
Button	Description
Next	Goes to the next page
Previous	Goes back to the previous page
Abort	The Basic Wizard is closed without adopting the settings.
Set Values	Saves the configuration and exits the Wizard.

Navigation within the pages of the Basic Wizard is possible only with the "Previous" and "Next" buttons.

6.3.1.1 System Settings

Introduction

On this Basic Wizard page, you specify the mode of the device. After changing the mode, a message is displayed.

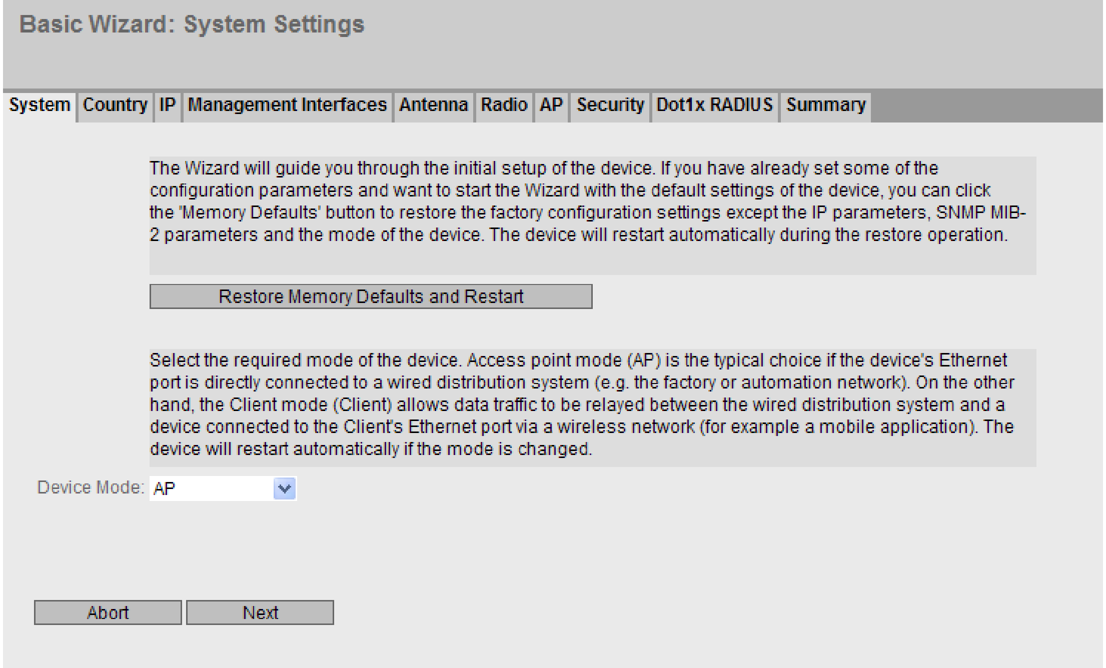


WARNING: After applying settings by clicking the 'OK' button, the device will restart with the default configuration for the selected mode!

If you confirm the message with "OK", the device restarts with the factory-set configuration settings. Log in again and start the Basic Wizard to continue the configuration of the device for the selected mode.

Note

Because only access points can work in client mode as well, the mode can only be selected for these devices.



Basic Wizard: System Settings

The Wizard will guide you through the initial setup of the device. If you have already set some of the configuration parameters and want to start the Wizard with the default settings of the device, you can click the 'Memory Defaults' button to restore the factory configuration settings except the IP parameters, SNMP MIB-2 parameters and the mode of the device. The device will restart automatically during the restore operation.

Select the required mode of the device. Access point mode (AP) is the typical choice if the device's Ethernet port is directly connected to a wired distribution system (e.g. the factory or automation network). On the other hand, the Client mode (Client) allows data traffic to be relayed between the wired distribution system and a device connected to the Client's Ethernet port via a wireless network (for example a mobile application). The device will restart automatically if the mode is changed.

Device Mode: AP

Description

The Basic Wizard page contains the following boxes:

- **Restore Memory Defaults and Restart**
  If you click this button, the factory configuration settings are restored with the exception of the parameters below followed by a restart.
  - IP address
  - Subnet mask
  - IP address of the default gateway.
  - DHCP client ID
  - DHCP
  - System name
  - System location
  - System contact
  - User names and passwords
  - Mode of the device

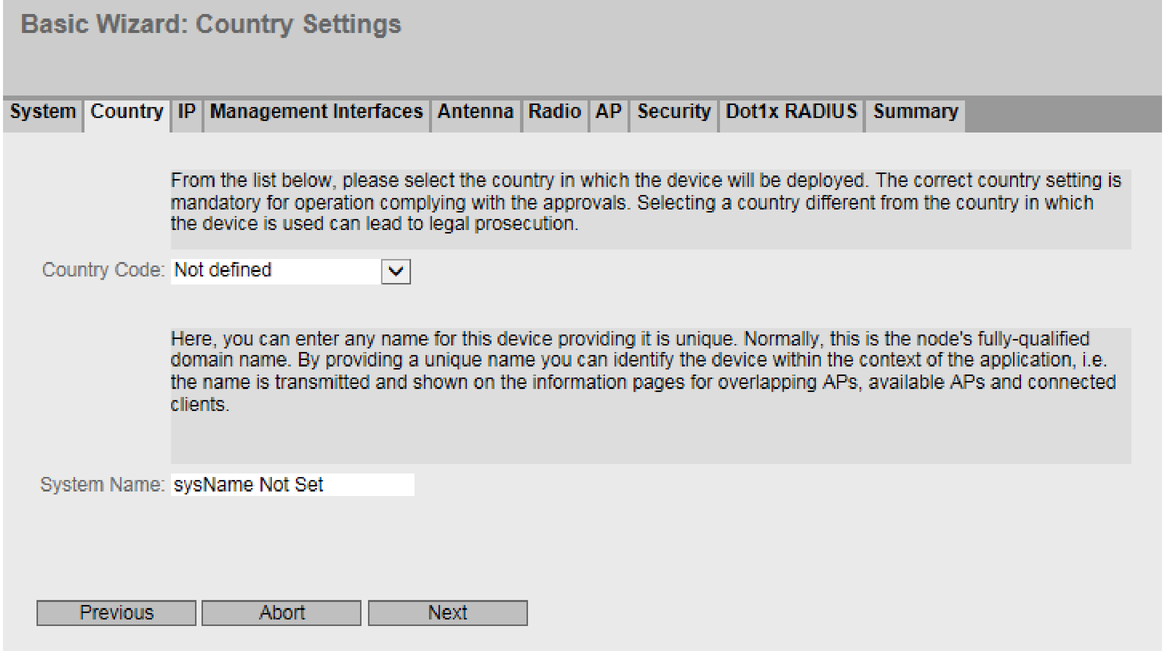
After restarting the device, you will need to log in again and start the Basic wizard again to configure the device.

- **Device Mode**
  Select the mode of the device. This selection is available only for access points.
  The following operating modes are possible:
  - AP: Access point mode
  - Client: Client mode

6.3.1.2 Country Settings

Introduction

On this Basic Wizard page, you configure the country and the system name.



From the list below, please select the country in which the device will be deployed. The correct country setting is mandatory for operation complying with the approvals. Selecting a country different from the country in which the device is used can lead to legal prosecution.

Country Code: Not defined

Here, you can enter any name for this device providing it is unique. Normally, this is the node's fully-qualified domain name. By providing a unique name you can identify the device within the context of the application, i.e. the name is transmitted and shown on the information pages for overlapping APs, available APs and connected clients.

System Name: sysName Not Set

Description

The Basic Wizard page contains the following boxes

- **Country Code**
  From this drop-down list, select the country in which the device will be deployed. You do not need to know the data for the specific country, the channel division and output power are set by the device according to the country you select.

  Note

  Locale setting

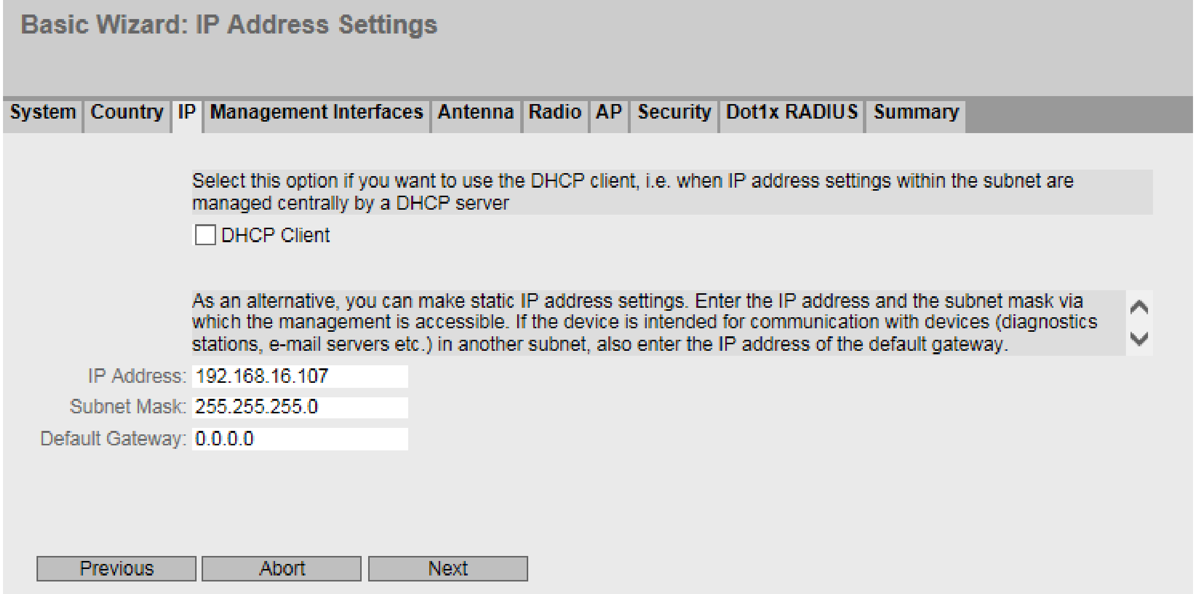
  The correct country setting is mandatory for operation complying with the approvals. Selecting a country different from the country of use can lead to legal prosecution.

- **System Name**
  You can enter the name of the device. If you configure this box, this configuration is adopted and displayed in the selection area. A maximum of 255 characters are possible.
  The system name is also displayed in the CLI input prompt. The number of characters in the CLI input prompt is limited. The system name is truncated after 16 characters.

6.3.1.3 IP Address Settings

Introduction

One of the basic steps in configuration of a device is setting the IP address. The IP address identifies a device in the network uniquely.



Basic Wizard: IP Address Settings

Select this option if you want to use the DHCP client, i.e. when IP address settings within the subnet are managed centrally by a DHCP server

□ DHCP Client

As an alternative, you can make static IP address settings. Enter the IP address and the subnet mask via which the management is accessible. If the device is intended for communication with devices (diagnostics stations, e-mail servers etc.) in another subnet, also enter the IP address of the default gateway.

IP Address: 192.168.16.107
Subnet Mask: 255.255.255.0
Default Gateway: 0.0.0.0

Description

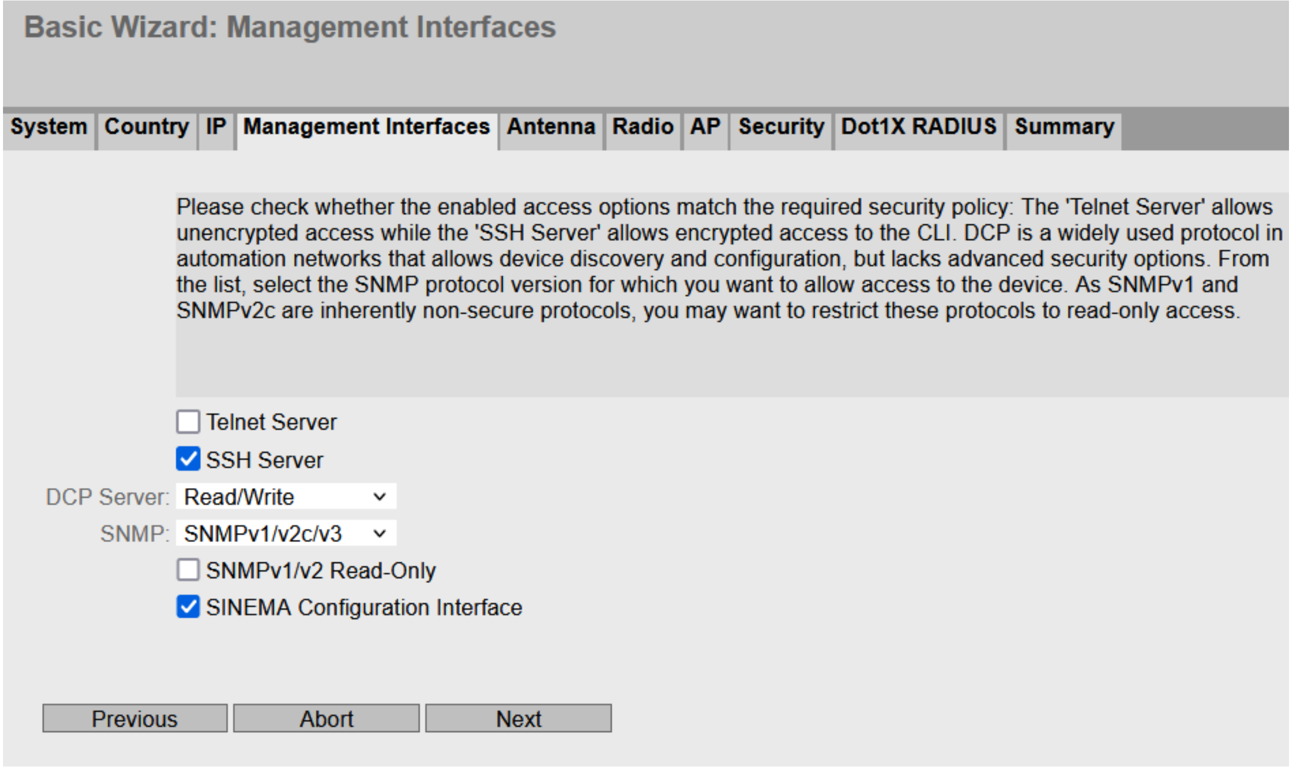
The Basic Wizard page contains the following boxes:

- **DHCP Client**
  Specify how the IP address will be assigned. There are two methods of assigning IP addresses.
  - Enabled
    The device obtains a dynamic IP address from a DHCP server.
  - Disabled
    You enter the IP settings in the input boxes "IP Address" and "Subnet Mask".
- **IP Address**
  Enter an IP address that is unique within your network.
- **Subnet Mask**
  Enter the subnet mask of the device.
- **Default gateway**
  Enter the IP address of the default gateway so that the device can communicate with devices in other subnets, for example diagnostics stations, e-mail server.

6.3.1.4 Management Interfaces

System configuration

On this Basic Wizard page, you specify the services with which the device can be accessed. With some services, there are further configuration pages on which more detailed settings can be made. Configure these services after completing the Basic Wizard.


Basic Wizard: Management Interfaces

Please check whether the enabled access options match the required security policy: The 'Telnet Server' allows unencrypted access while the 'SSH Server' allows encrypted access to the CLI. DCP is a widely used protocol in automation networks that allows device discovery and configuration, but lacks advanced security options. From the list, select the SNMP protocol version for which you want to allow access to the device. As SNMPv1 and SNMPv2c are inherently non-secure protocols, you may want to restrict these protocols to read-only access.

□ Telnet Server
☑ SSH Server
DCP Server: Read/Write
SNMP: SNMPv1/v2c/v3
□ SNMPv1/v2 Read-Only
☑ SINEMA Configuration Interface

Description

The page contains the following boxes:

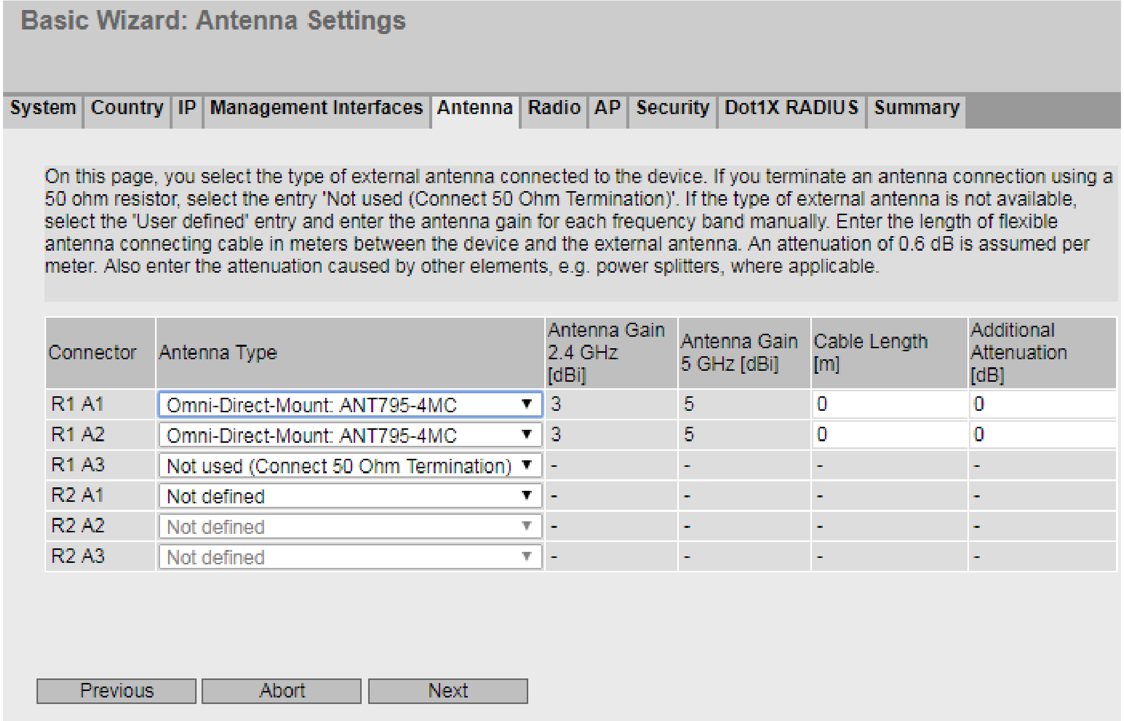
- **Telnet Server**
  Enable or disable the "Telnet Server" service for unencrypted access to the CLI.
- **SSH Server**
  Enable or disable the "SSH Server" service for encrypted access to the CLI.

- **DCP Server**
  Specify whether or not the device can be accessed with DCP (Discovery and Configuration Protocol):
  - "-" (disabled)
    DCP is disabled. Device parameters can neither be read nor modified.
  - Read/Write
    With DCP, device parameters can be both read and modified.
  - Read-Only
    With DCP, device parameters can be read but cannot be modified.
- **SNMP**
  Select the protocol from the drop-down list. The following settings are possible:
  - "-" (SNMP disabled)
    Access to device parameters via SNMP is not possible.
  - SNMPv1/v2c/v3
    Access to device parameters is possible with SNMP versions 1, 2c or 3. You can configure other settings in "System > SNMP > General".
  - SNMPv3
    Access to device parameters is possible with SNMP version 3. You can configure other settings in " System > SNMP > General".
- **SNMPv1/v2 Read-Only**
  Enable or disable write access to SNMP variables with SNMPv1/v2c.
- **SINEMA configuration interface**
  If the SINEMA configuration interface is enabled, you can download configurations to the device via the TIA Portal.

6.3.1.5 Antenna Settings

Introduction

On this Basic Wizard page, you configure the settings for the external antennas.



Basic Wizard: Antenna Settings

On this page, you select the type of external antenna connected to the device. If you terminate an antenna connection using a 50 ohm resistor, select the entry 'Not used (Connect 50 Ohm Termination)'. If the type of external antenna is not available, select the 'User defined' entry and enter the antenna gain for each frequency band manually. Enter the length of flexible antenna connecting cable in meters between the device and the external antenna. An attenuation of 0.6 dB is assumed per meter. Also enter the attenuation caused by other elements, e.g. power splitters, where applicable.

Connector	Antenna Type	Antenna Gain 2.4 GHz [dBi]	Antenna Gain 5 GHz [dBi]	Cable Length [m]	Additional Attenuation [dB]
R1 A1	Omni-Direct-Mount: ANT795-4MC	3	5	0	0
R1 A2	Omni-Direct-Mount: ANT795-4MC	3	5	0	0
R1 A3	Not used (Connect 50 Ohm Termination)	-	-	-	-
R2 A1	Not defined	-	-	-	-
R2 A2	Not defined	-	-	-	-
R2 A3	Not defined	-	-	-	-

Description

The table contains the following columns:

- **Connector**
  Shows the name of the relevant antenna connector.
- **Antenna Type**
  Select the type of external antenna connected to the device. If the type of your antenna is not available, select the entry "User defined".
  Connectors that are not used must have a 50 Ω terminating resistor fitted. Select the entry "Not used (Connect 50 Ohm Termination)".

Note

50 Ω terminating resistor

Each WLAN interface has three antenna connectors. The antennas R1A1 and R2A1 must be always be connected as soon as the associated WLAN Interface is turned on. If no antenna is connected, the relevant interface must also be disabled for RX and TX. Otherwise, there may be transmission disruptions.

- **Antenna Gain [dBi]**
  If you select the "User defined" entry for the "Antenna Type", enter the antenna gain manually in the "dBi" unit.
  - Antenna Gain 2.4 GHz [dBi]
    Enter the antenna gain the antenna has in the 2.4 GHz frequency band.
  - Antenna Gain 5 GHz [dBi]
    Enter the antenna gain the antenna has in the 5 GHz frequency band.
- **Cable length [m]**
  Enter the length of the flexible antenna connecting cable in meters between the device and the external antenna.
- **Additional Attenuation [dB]**
  Here, specify the additional attenuation caused, for example, by an additional splitter.

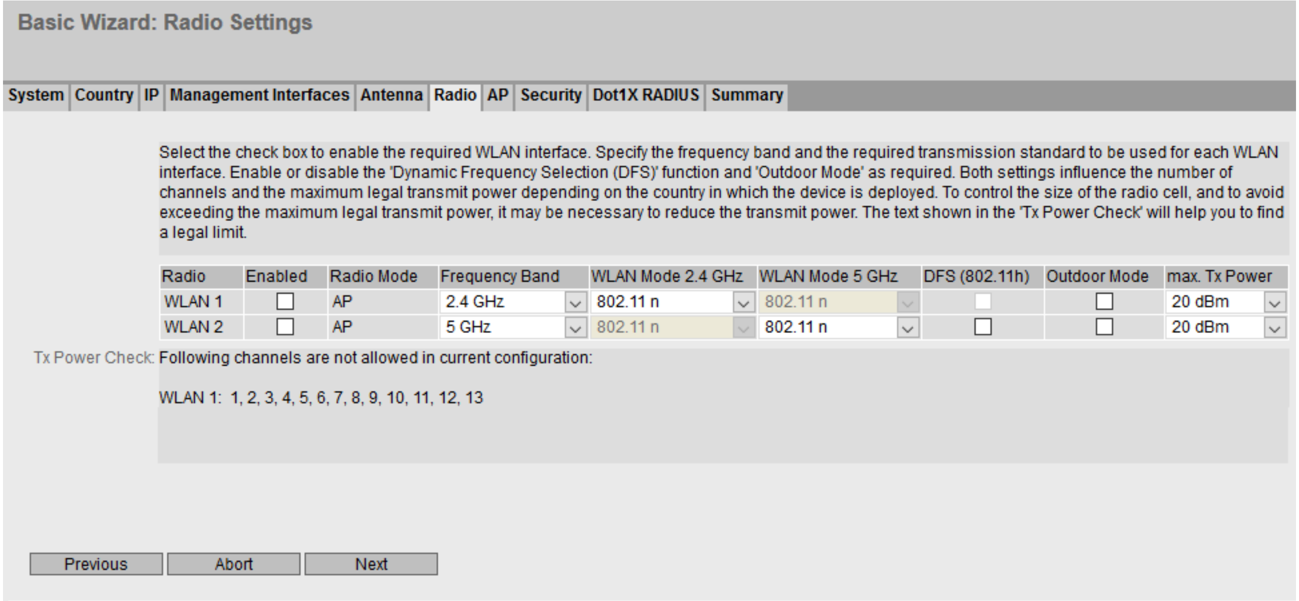
Note

If you use other WLAN interfaces, make sure that you have adequate channel spacing.

6.3.1.6 Radio Settings

Introduction

On this Basic Wizard page, you specify the configuration for the WLAN interfaces.



Select the check box to enable the required WLAN interface. Specify the frequency band and the required transmission standard to be used for each WLAN interface. Enable or disable the 'Dynamic Frequency Selection (DFS)' function and 'Outdoor Mode' as required. Both settings influence the number of channels and the maximum legal transmit power depending on the country in which the device is deployed. To control the size of the radio cell, and to avoid exceeding the maximum legal transmit power, it may be necessary to reduce the transmit power. The text shown in the 'Tx Power Check' will help you to find a legal limit.

Radio	Enabled	Radio Mode	Frequency Band	WLAN Mode 2.4 GHz	WLAN Mode 5 GHz	DFS (802.11h)	Outdoor Mode	max. Tx Power
WLAN 1	□	AP	2.4 GHz	802.11 n	802.11 n	□	□	20 dBm
WLAN 2	□	AP	5 GHz	802.11 n	802.11 n	□	□	20 dBm

Tx Power Check: Following channels are not allowed in current configuration:

WLAN 1: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13

Description

This table contains the following columns:

- **Radio**
  Shows the available WLAN interfaces.
- **Enabled**
  Enable or disable the WLAN interface. The WLAN interfaces are disabled when the device is supplied.
- **Radio Mode**
  Shows the mode of the WLAN interface.
- **Frequency Band**
  Specify the frequency band. In client mode, dual-frequency operation is also possible.

  Note

  Configuring WLAN interfaces of the W786-2IA RJ-45 for different frequency bands

  If both WLAN interfaces are configured for the same frequency band on this device, there may be mutual influence or interference. This applies in particular when there is a high data throughput.

- **WLAN Mode**
  Select the required transmission standard for the configured frequency band.
  - WLAN Mode 2.4 GHz
    Specify the transmission standard for the 2.4 GHz frequency band. The selection depends on the country setting.
  - WLAN Mode 5 GHz
    Specify the transmission standard for the 5 GHz frequency band. The selection depends on the country setting.
- **DFS (802.11h)**
  - Activated
    With the DFS function, it is possible to also use the higher 5 Ghz channels. These channels are country-specific and subject to specific DFS specifications. You can find additional information on this in the country-specific DFS documentation.
    Before the access point transmits over one of these channels, it checks for competing radar signals for 60 seconds according to the CAC (Channel Availability Check). The access point also does not send any beacons for the duration of the search. With weather radar channels (5.6 - 5.65 GHz), the duration of the search is 10 minutes. If no radar signals are detected after the search period has elapsed, the access point transmits on the channel. Otherwise, the access point changes channel and repeats the check. The access point also searches for radar signals continuously during operation.
    If the access point discovers a radar signal on the current channel, it notifies the clients of the channel change. It then automatically switches to an alternative DFS channel and the current channel is blocked for 30 minutes.
  - Disabled
    The DFS function is not used.

- **Outdoor Mode**
  - Enabled
    In outdoor mode, the selection of country-dependent channels and the transmit power for operation are extended for outdoor use.
  - Disabled
    The device is being operated in indoor mode. In indoor mode, the selection of country-dependent channels and the transmit power for operation in a building are restricted.
- **max. Tx Power**
  Specify the transmit power of the device. It may be necessary to reduce the transmit power when using antennas to avoid exceeding the maximum legal transmit power. Reducing the transmit power effectively reduces cell size.

  Note

  The maximum possible transmit power varies depending on the channel and data rate. For more detailed information on transmit power, refer to the documentation "Characteristics radio interface".

  Note

  If both interfaces of access points with two WLAN interfaces are operated in the same frequency range, this may cause wireless interference on one or both interfaces at a transmit power higher than 15 dBm.
- **Tx power check**
  Indicates whether the settings that have been made will violate the permitted transmit power restrictions of the selected country. The calculated value of "max. EIRP" is checked to determine whether this value violates the transmit power restriction of specific channels in the set country. If "Use Allowed Channels only" is set, only the channels selected there are checked.
  - -
    The channels can be used with the current settings.
  - Channel numbers
    Indicates the channels on which the current transmit power exceeds the maximum permitted transmit power.

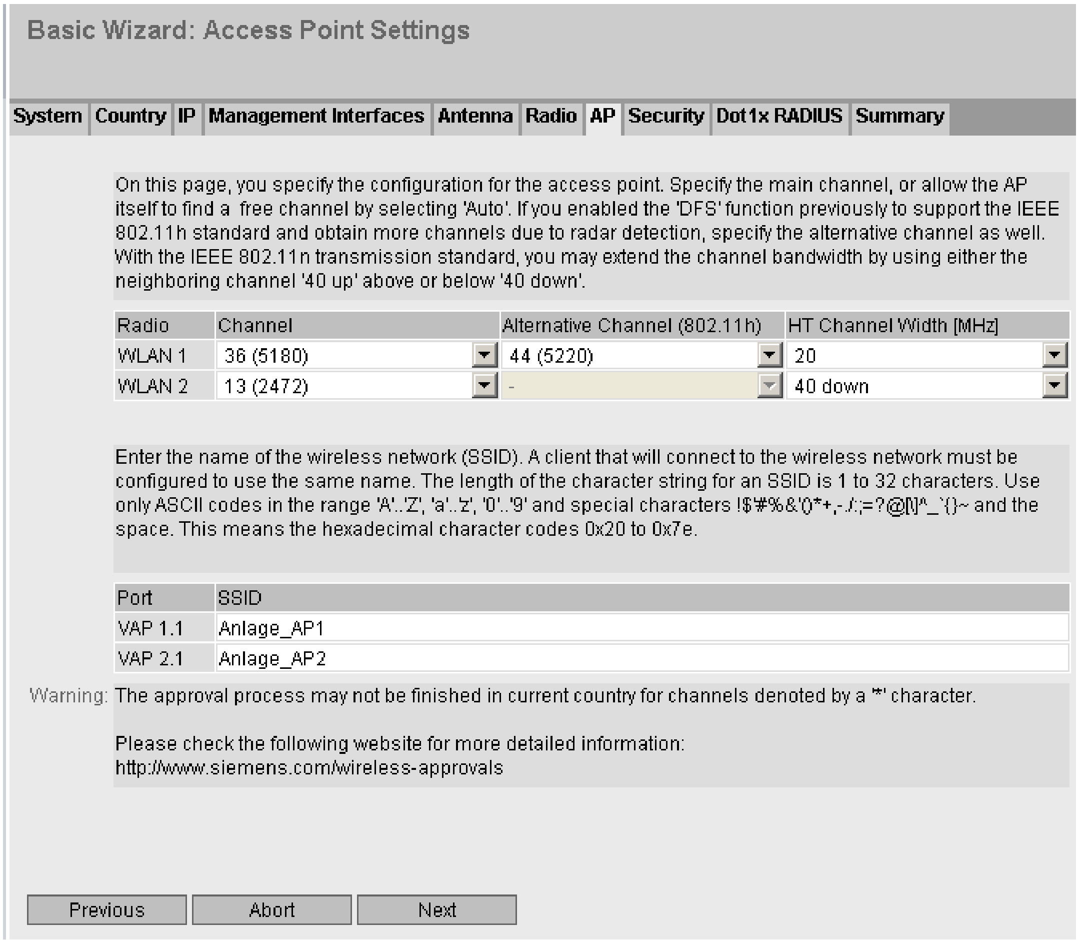
6.3.1.7 Access Point Settings

Introduction

On this Basic Wizard page, you specify the configuration for the Access Point.

Note

This page is available only in access point mode.



Basic Wizard: Access Point Settings

On this page, you specify the configuration for the access point. Specify the main channel, or allow the AP itself to find a free channel by selecting 'Auto'. If you enabled the 'DFS' function previously to support the IEEE 802.11h standard and obtain more channels due to radar detection, specify the alternative channel as well. With the IEEE 802.11n transmission standard, you may extend the channel bandwidth by using either the neighboring channel '40 up' above or below '40 down'.

Radio	Channel	Alternative Channel (802.11h)	HT Channel Width [MHz]
WLAN 1	36 (5180)	44 (5220)	20
WLAN 2	13 (2472)	-	40 down

Enter the name of the wireless network (SSID). A client that will connect to the wireless network must be configured to use the same name. The length of the character string for an SSID is 1 to 32 characters. Use only ASCII codes in the range 'A'..'Z', 'a'..'z', '0'..'9' and special characters !$'#%&'()*+,-./:;=?@[\]^_`{}~ and the space. This means the hexadecimal character codes 0x20 to 0x7e.

Port	SSID
VAP 1.1	Anlage_AP1
VAP 2.1	Anlage_AP2

Warning: The approval process may not be finished in current country for channels denoted by a '*' character.

Please check the following website for more detailed information:
http://www.siemens.com/wireless-approvals

Description

Table 1 contains the following columns:

- **Radio**
  Shows the available WLAN interfaces.
- **Channel**
  Specify the main channel. If you want the access point to search for a free channel itself, use "Auto". If you want to use a fixed channel, select the required channel from the drop-down list.

- **Alternative DFS Channel**
  If you have enabled the "DFS" function on the Basic Wizard page "Radio Settings", specify the alternative channel here. If you want the access point to search for a free channel itself, use "Auto". If you want to use a fixed channel, select the required channel from the drop-down list.
- **HT Channel Width [MHz]**
  You can specify the channel bandwidth with the IEEE 802.11n transmission standard.
  The following settings are possible.
  - 20
    Channel bandwidth 20 MHz
  - 40 up
    Channel bandwidth 40 MHz. The configured channel and the neighboring channel above it are used.
  - 40 down
    Channel bandwidth 40 MHz. The configured channel and the neighboring channel below it are used.

Table 2 contains the following columns:

- **Port**
  Shows the first VAP interface per WLAN interface.
- **SSID**
  Enter the SSID. The length of the character string for SSID it is 1 to 32 characters.
  The ASCII code 0x20 to 0x7e is used for the SSID.
  After completing the Basic Wizard, you can define further SSIDs with "Interfaces > WLAN > Access Point Settings".

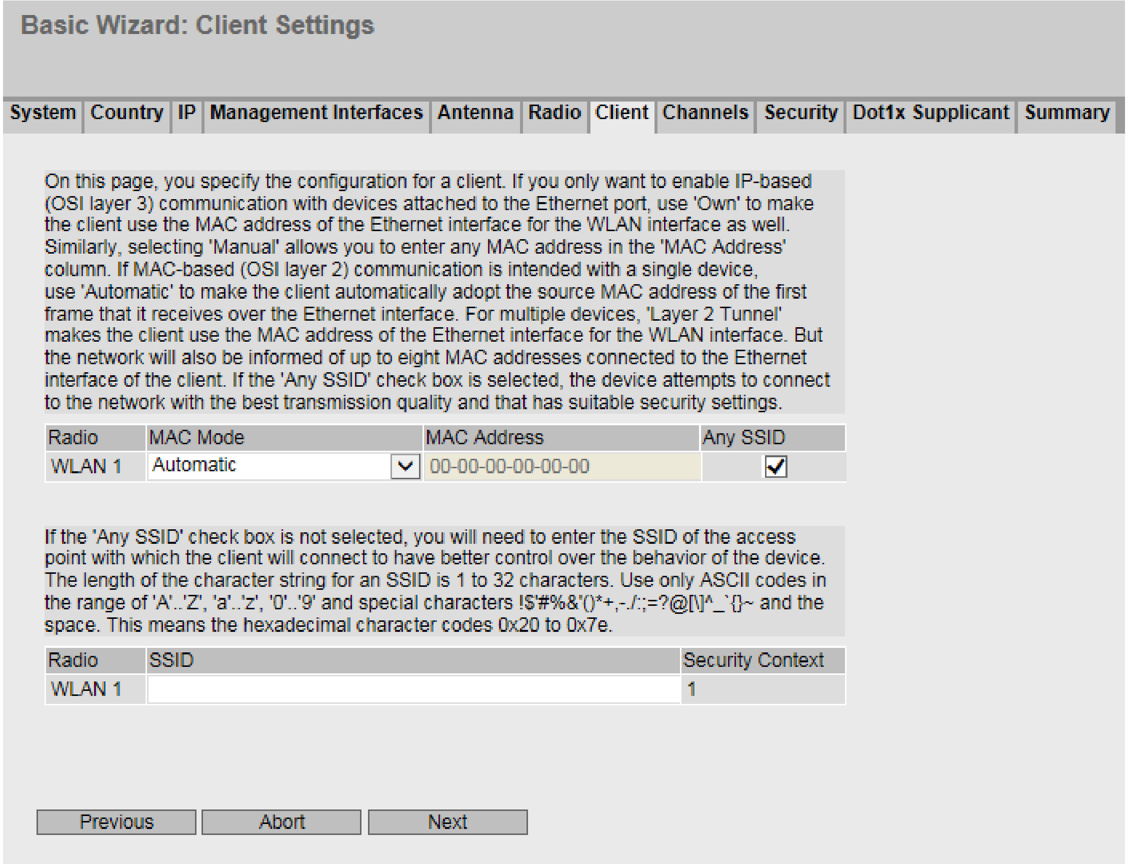
6.3.1.8 Client Settings

Introduction

On this Basic Wizard page, you specify the configuration for clients, for example the assignment of the MAC address.

Note

This page is only available in client mode.



Basic Wizard: Client Settings

On this page, you specify the configuration for a client. If you only want to enable IP-based (OSI layer 3) communication with devices attached to the Ethernet port, use 'Own' to make the client use the MAC address of the Ethernet interface for the WLAN interface as well. Similarly, selecting 'Manual' allows you to enter any MAC address in the 'MAC Address' column. If MAC-based (OSI layer 2) communication is intended with a single device, use 'Automatic' to make the client automatically adopt the source MAC address of the first frame that it receives over the Ethernet interface. For multiple devices, 'Layer 2 Tunnel' makes the client use the MAC address of the Ethernet interface for the WLAN interface. But the network will also be informed of up to eight MAC addresses connected to the Ethernet interface of the client. If the 'Any SSID' check box is selected, the device attempts to connect to the network with the best transmission quality and that has suitable security settings.

Radio	MAC Mode	MAC Address	Any SSID
WLAN 1	Automatic	00-00-00-00-00-00	☑

If the 'Any SSID' check box is not selected, you will need to enter the SSID of the access point with which the client will connect to have better control over the behavior of the device. The length of the character string for an SSID is 1 to 32 characters. Use only ASCII codes in the range of 'A'..'Z', 'a'..'z', '0'..'9' and special characters !$'#%&'()*+,-./:;=?@[\]^_`{}~ and the space. This means the hexadecimal character codes 0x20 to 0x7e.

Radio	SSID	Security Context
WLAN 1		1

Description

Table 1 contains the following columns:

- **Radio**
  Shows the available WLAN interfaces.
- **MAC mode**
  Specify how the MAC address is assigned to the client. The following are possible:
  - Automatic
    The client automatically adopts the source MAC address of the first frame that it receives over the Ethernet interface.
  - Manual
    If you select "Manual", enter the MAC address in the "MAC Address" column.
  - Own
    The client uses the MAC address of the Ethernet interface for the WLAN interface.
  - Layer 2 Tunnel
    The client uses the MAC address of the Ethernet interface for the WLAN interface. The network is also informed of the MAC addresses connected to the Ethernet interface of the client. Up to eight MAC addresses can be used.

- **MAC Address**
  Enter the MAC address of the client. The input box can only be edited if you have set "Manual" for the "MAC Mode".
- **Any SSID**
  - Enabled
    In client mode, the device attempts to connect to the network with the best transmission quality and that has suitable security settings.
  - Disabled
    The client attempts to connect to the network from the SSID list that has the best transmission quality.

Table 2 contains the following columns:

- **Radio**
  Shows the available WLAN interfaces.
- **SSID**
  Enter the SSID of the access point with which the client connects. In the Basic Wizard, you can only specify one SSID. After completing the Basic Wizard, you can define further SSIDs with "Interfaces > WLAN > Client".
- **Security Context**
  Shows the assigned security context. In the Basic Wizard only one security context is available. After completing the Basic Wizard, you can create and configure further security contexts in "Security > WLAN > Basic".

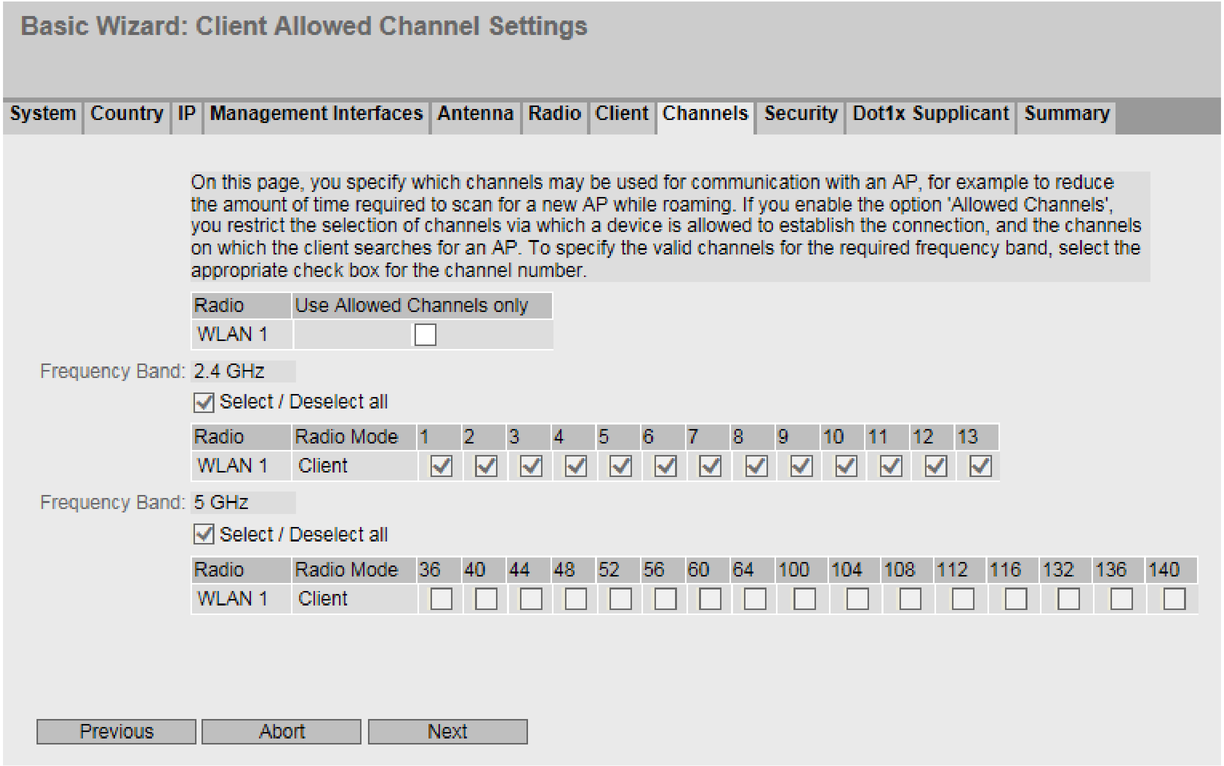
6.3.1.9 Client Allowed Channel Settings

Introduction

For communication, a specific channel within a frequency band is used. On this page, you can either set this channel specifically or configure so that the channel is selected automatically.

Note

This page is only available for clients or access points in client mode.



Basic Wizard: Client Allowed Channel Settings

System | Country | IP | Management Interfaces | Antenna | Radio | Client | Channels | Security | Dot1x Supplicant | Summary

On this page, you specify which channels may be used for communication with an AP, for example to reduce the amount of time required to scan for a new AP while roaming. If you enable the option 'Allowed Channels', you restrict the selection of channels via which a device is allowed to establish the connection, and the channels on which the client searches for an AP. To specify the valid channels for the required frequency band, select the appropriate check box for the channel number.

Radio	Use Allowed Channels only
WLAN 1	□

Frequency Band: 2.4 GHz

☑ Select / Deselect all

Radio	Radio Mode	1	2	3	4	5	6	7	8	9	10	11	12	13
WLAN 1	Client	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑

Frequency Band: 5 GHz

☑ Select / Deselect all

Radio	Radio Mode	36	40	44	48	52	56	60	64	100	104	108	112	116	132	136	140
WLAN 1	Client	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□

Description

Table 1 contains the following columns:

- **Radio**
  Shows the available WLAN interfaces.
- **Use Allowed Channels only**
  If you enable the option, you restrict the selection of channels via which the client is allowed to establish the connection.
  In the following tables, you define the channels on which the client searches for an AP.
  The tables are divided up according to frequency bands.
  If the option is disabled, the channels available based on the settings (country code, antennas, transmit power etc.) are used.

Above the tables for the frequency bands, you will find the following check box:

- **Select / Deselect all**
  - Enabled
    If you enable the check box, all channels are selected.
  - Disabled
    If you deselect the check box, only the first valid channel of the frequency band remains enabled.

The tables of the frequency bands have the following columns:

- **Radio**
  Shows the available WLAN interfaces.
- **Radio Mode**
  Shows the operating mode of the device.
- **Channel number**
  To specify the valid channels for the required frequency band, select the appropriate check box for the channel number.
  The table displays the permitted channels of the country. Only the valid channels can be enabled. Invalid channels are grayed out and cannot be enabled.

  Note

  To specify the channels, the setting "Use Allowed Channels only" must be enabled.

6.3.1.10 Security Settings

Introduction

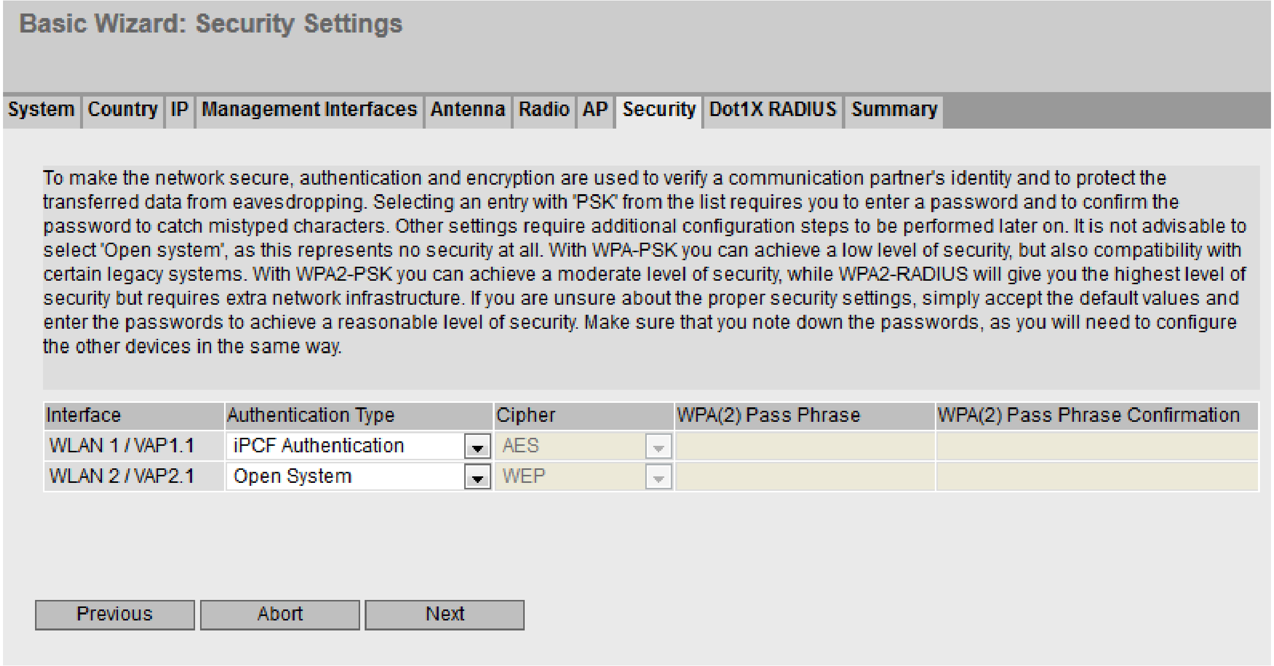
To make the network secure, authentication and encryption are used. You specify the security levels with the type of authentication and the encryption procedure.

Use WPA2/AES, to prevent misuse of a password WPA2 (RADIUS) / WPA2-PSK with AES provides the greatest security. You will find further information on security in the configuration manual under "Instructions for secure network design".

The security settings on both devices must match to allow a client to communicate with an access point.

Note

This page has different columns in access point and in client mode.



Basic Wizard: Security Settings

To make the network secure, authentication and encryption are used to verify a communication partner's identity and to protect the transferred data from eavesdropping. Selecting an entry with 'PSK' from the list requires you to enter a password and to confirm the password to catch mistyped characters. Other settings require additional configuration steps to be performed later on. It is not advisable to select 'Open system', as this represents no security at all. With WPA-PSK you can achieve a low level of security, but also compatibility with certain legacy systems. With WPA2-PSK you can achieve a moderate level of security, while WPA2-RADIUS will give you the highest level of security but requires extra network infrastructure. If you are unsure about the proper security settings, simply accept the default values and enter the passwords to achieve a reasonable level of security. Make sure that you note down the passwords, as you will need to configure the other devices in the same way.

Interface	Authentication Type	Cipher	WPA(2) Pass Phrase	WPA(2) Pass Phrase Confirmation
WLAN 1 / VAP1.1	iPCF Authentication	AES		
WLAN 2 / VAP2.1	Open System	WEP		

Description

This table contains the following columns:

- **Interface** (only in Access Point mode)
  Shows the interface to which the settings relate.
- **Security Context** (in client mode only)
  Shows the security context to which the settings relate.

- **Authentication Type**
  Select the type of authentication.

  Note

  WLAN mode IEEE 802.11 n

  With devices operated in WLAN mode IEEE8002.11n only WPA2 (WPA2-PSK and WPA2 Radius) encryption is possible.

  – Open System
    Without authentication

  – **WEP**

  – WPA-PSK
    WPA authentication with WPA key. Enter the WPA key in ""WPA(2) Pass Phrase.

  – WPA (RADIUS)
    WPA authentication with RADIUS server. You configure the access data on the next Basic Wizard page.

  – WPA2-PSK
    WPA2 authentication with WPA2 key. Enter the WPA2 key in ""WPA(2) Pass Phrase.

  – WPA2 (RADIUS)
    WPA2 authentication with RADIUS server. You configure the access data on the next Basic Wizard page.

  – iPCF authentication
    This authentication type is shown when iPCF, iPCF-HT or iPCF-MC mode is enabled at the corresponding WLAN interface.
    You can enable iPCF authentication in the "iFeatures (Page 385)" menu.

- **Cipher**
  Select the encryption method.

  – AUTO
    AES or TKIP is used depending on the capability of the other station.

  – TKIP (Temporal Key Integrity Protocol)
    A symmetrical encryption method with the RC4 algorithm (Ron’s Code 4). In contrast to the weak WEP encryption, TKIP uses changing keys derived from a main key. TKIP can also recognize corrupted data frames.

  – AES
    (Advanced Encryption Standard)
    Strong symmetrical block encryption method based on the Rijndael algorithm that further improves the functions of TKIP.

- **WPA(2) Pass Phrase**
  Enter a WPA(2) key. The key can be 8 to 63 ASCII characters or exactly 64 hexadecimal characters long. This WPA(2) key must be known on both the client and the access point and is entered by the user at both ends.

  Note

  The WPA(2) key can be 8 to 63 ASCII characters or exactly 64 hexadecimal characters long. It should be selected so that is complex for example consisting of random numbers, letters (upper-/lowercase), have few repetitions and special characters. Do not use known names, words or terms that could be guessed. If a device is lost or if the key becomes known, change the key on all devices to maintain security.

- **WPA(2) Pass Phrase Confirmation**
  Confirm the entered WPA(2) pass phrase.

6.3.1.11 Dot1x Supplicant Settings

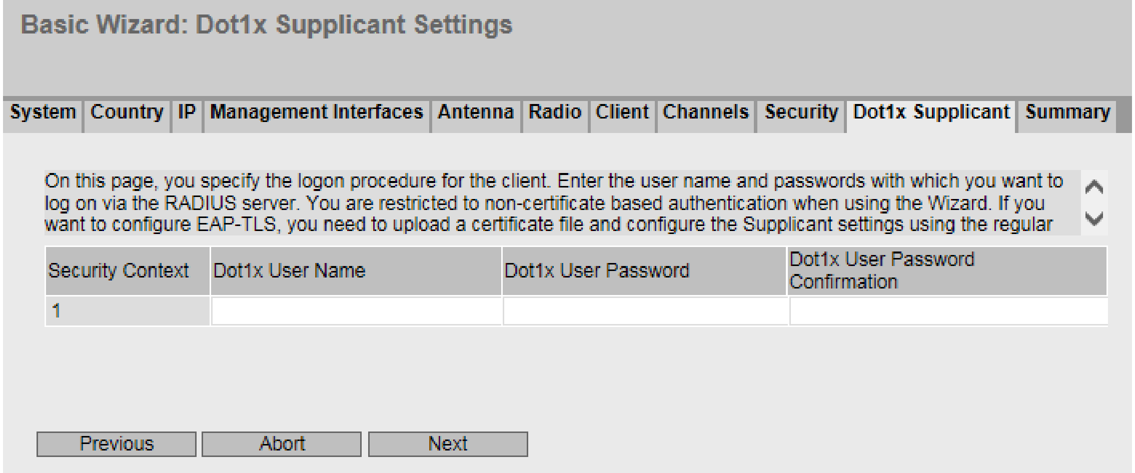
Introduction

On this Basic Wizard page, you configure the user name and the password with which the client will be logged on with the RADIUS server.

If you require additional authentication methods, you can configure them after completing the Basic Wizard with "Security > WLAN > Client Radius Supplicant".

Note

This page is only available for clients or access points in client mode.



On this page, you specify the logon procedure for the client. Enter the user name and passwords with which you want to log on via the RADIUS server. You are restricted to non-certificate based authentication when using the Wizard. If you want to configure EAP-TLS, you need to upload a certificate file and configure the Supplicant settings using the regular

Security Context	Dot1x User Name	Dot1x User Password	Dot1x User Password Confirmation
1			

Description

Table 1 contains the following columns:

- **Security Context**
  Shows Security Context 1.
- **Dot1x User Name**
  Enter the user name with which the client will log on with the RADIUS server.
- **Dot1x User Password**
  Enter the password for the user name selected above. The client is logged on with the RADIUS server using this combination.
  For password assignment, ASCII code 0x20 to 0x7e is used.
- **Dot1x User Password Confirmation**
  Enter the password again in this input box.

6.3.1.12 Dot1x RADIUS Server Settings

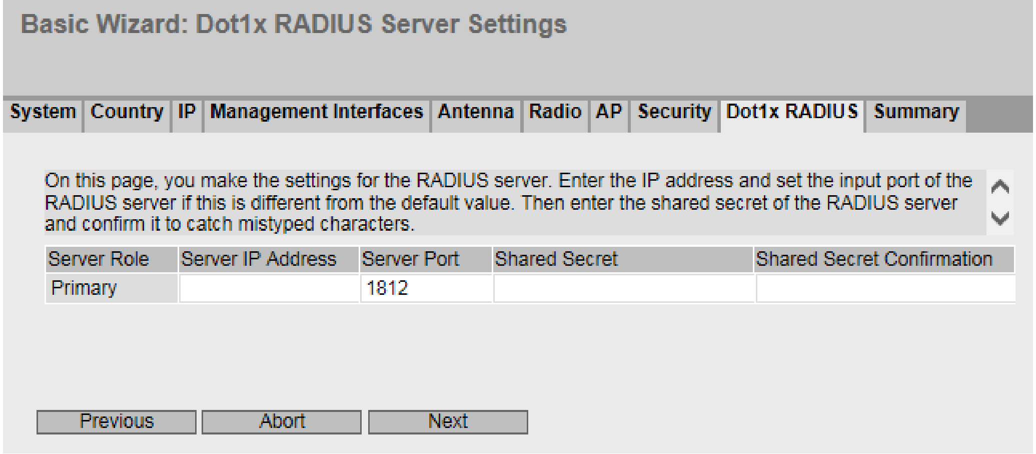
Introduction

On this Basic Wizard page, you configure the settings for the primary RADIUS Server.

After completing the Basic Wizard, you can configure a backup server and other settings, for example the number of logon attempts with "Security> WLAN > AP Radius Authenticator.

Note

This page is available only in access point mode.



Basic Wizard: Dot1x RADIUS Server Settings

On this page, you make the settings for the RADIUS server. Enter the IP address and set the input port of the RADIUS server if this is different from the default value. Then enter the shared secret of the RADIUS server and confirm it to catch mistyped characters.

Server Role	Server IP Address	Server Port	Shared Secret	Shared Secret Confirmation
Primary		1812		

Description

This table contains the following columns:

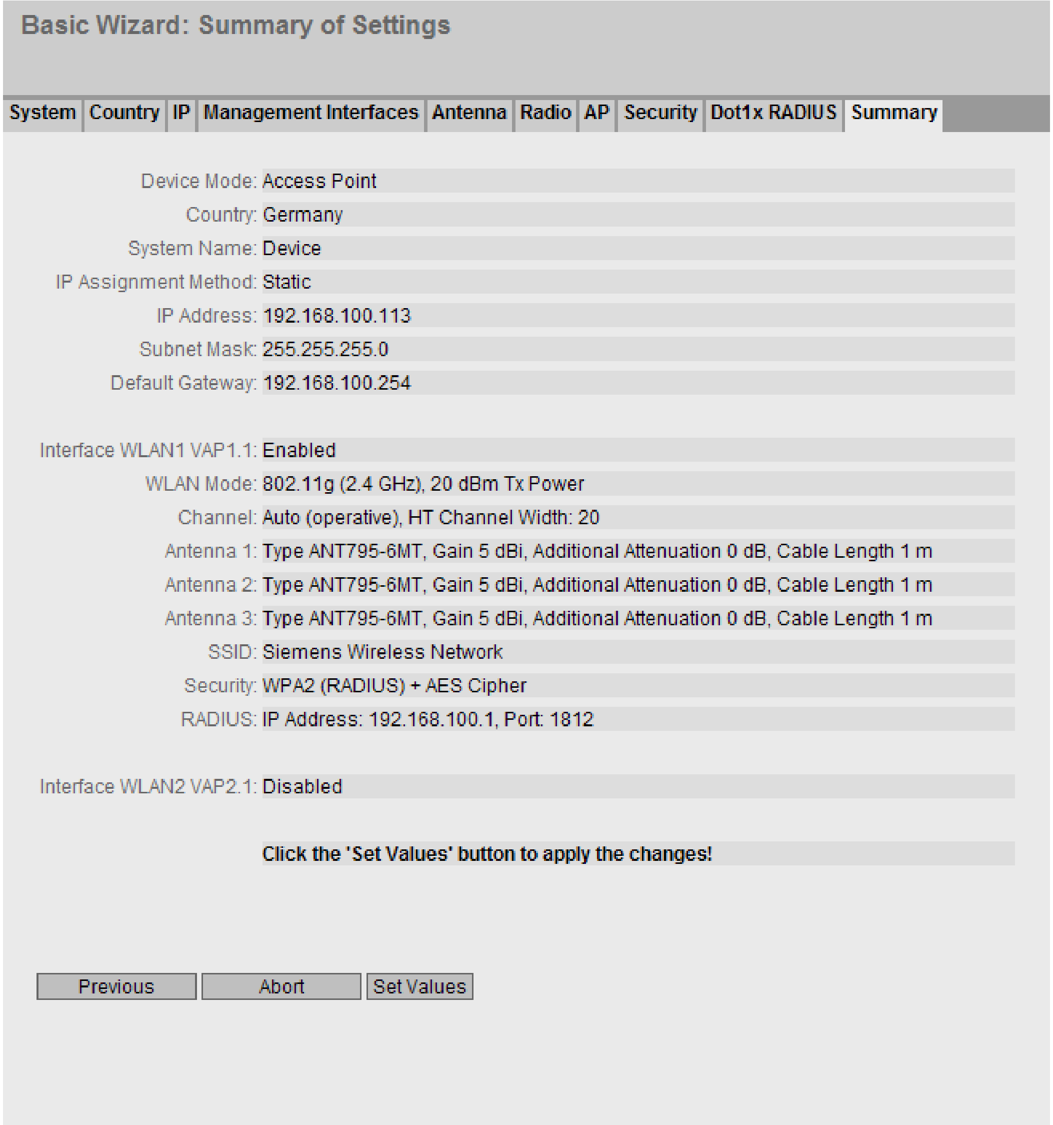
- **Server Role**
  Shows the role of the server.
- **Server IP Address**
  Enter the IP address of the RADIUS server. The use of the computer name (name resolution using DNS) instead of the IP address is not supported.
- **Server Port**
  Enter the port of the RADIUS server.
- **Shared Secret**
  Enter the password of the RADIUS server.
- **Shared Secret Conf**
  Enter the password again in this input box.

6.3.1.13 Summary of Settings

Introduction

The settings are summarized on this page. The content of the page depends on the set parameters and the mode of the device.

Check the settings before you exit the Basic Wizard with the "Set Values" button. If settings are incorrect, go back using the "Prev" button and change the settings to the required ones.



Device Mode: Access Point
Country: Germany
System Name: Device
IP Assignment Method: Static
IP Address: 192.168.100.113
Subnet Mask: 255.255.255.0
Default Gateway: 192.168.100.254

Interface WLAN1 VAP1.1: Enabled
WLAN Mode: 802.11g (2.4 GHz), 20 dBm Tx Power
Channel: Auto (operative), HT Channel Width: 20
Antenna 1: Type ANT795-6MT, Gain 5 dBi, Additional Attenuation 0 dB, Cable Length 1 m
Antenna 2: Type ANT795-6MT, Gain 5 dBi, Additional Attenuation 0 dB, Cable Length 1 m
Antenna 3: Type ANT795-6MT, Gain 5 dBi, Additional Attenuation 0 dB, Cable Length 1 m
SSID: Siemens Wireless Network
Security: WPA2 (RADIUS) + AES Cipher
RADIUS: IP Address: 192.168.100.1, Port: 1812

Interface WLAN2 VAP2.1: Disabled

Click the 'Set Values' button to apply the changes!

Set Values

Click the "Set Values" button to exit the Basic Wizard. The WLAN settings are adopted.

6.4 "Information" menu

6.4.1 Start page

View of the Start page

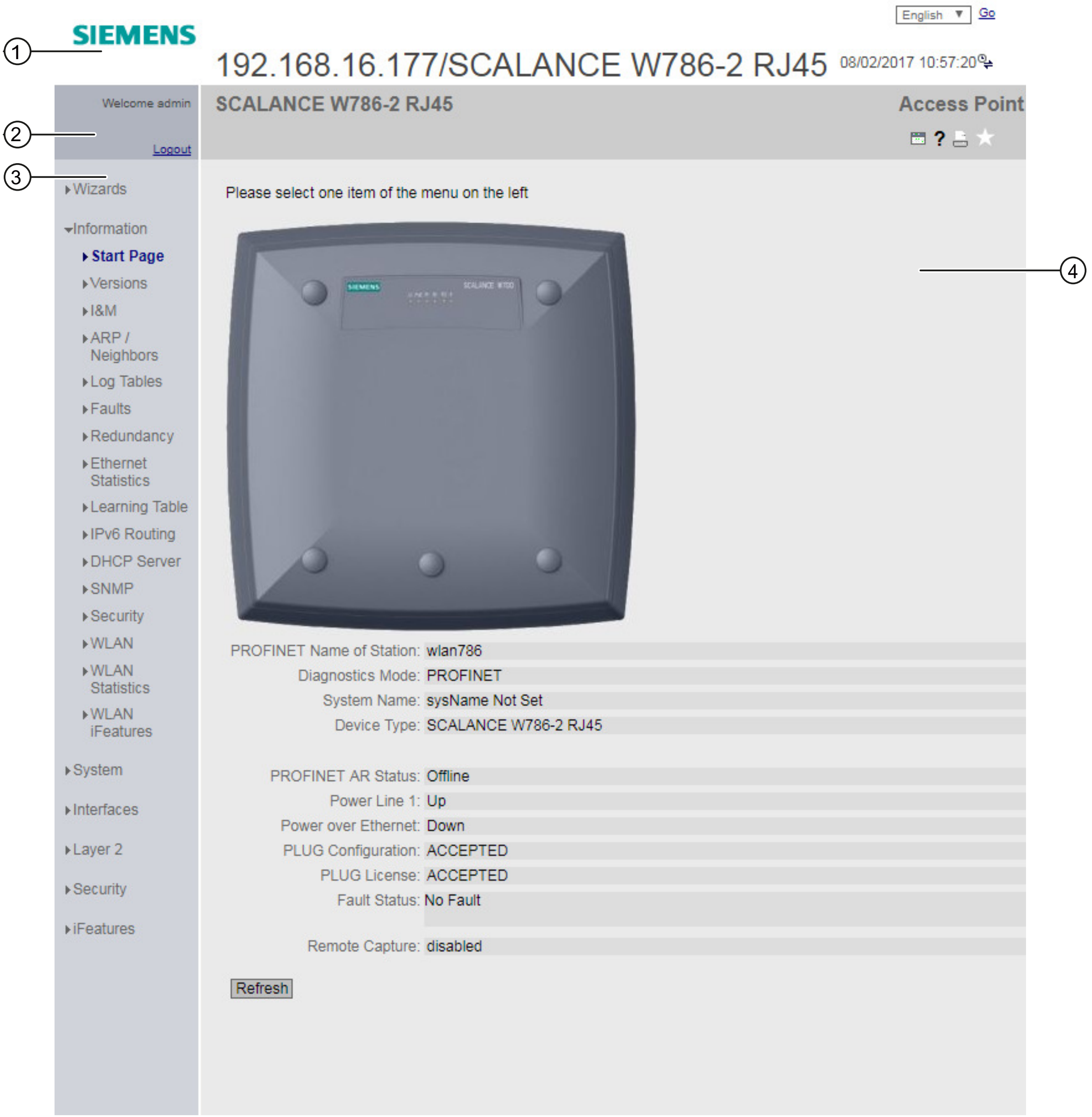
When you enter the IP address of the device, the start page is displayed after a successful login. You cannot configure anything on this page.

General layout of the WBM pages

The following areas are generally available on every WBM page:

- Selection area (1): Top area
- Display area (2): Top area

- Navigation area (3): Left-hand area
- Content area (4): Middle area



Please select one item of the menu on the left

PROFINET Name of Station: wlan786
Diagnostics Mode: PROFINET
System Name: sysName Not Set
Device Type: SCALANCE W786-2 RJ45

PROFINET AR Status: Offline
Power Line 1: Up
Power over Ethernet: Down
PLUG Configuration: ACCEPTED
PLUG License: ACCEPTED
Fault Status: No Fault

Remote Capture: disabled

Selection area (1)

The following is available in the selection area:

- Logo of Siemens AG
- Display of: "System Location/System Name".
  - "System Location" contains the location of the device.
    With the settings when the device ships, the IP address of the Ethernet interface is displayed.
  - "System Name" is the device name. With the settings when the device ships, the device type is displayed.

  You can change the content of this display with "System > General > Device.
- Drop-down list for language selection
- System time and date
  You can change the content of this display with "System > System Time.
  If the system time is not set, the status is. If the system time is configured, but the system time cannot be synchronized, a yellow warning triangle ⚠ can be seen. Check whether the time server can be reached. If necessary adapt your configuration. If the system time is set and/or can be synchronized, the status is.

Display area (2)

In the upper part of the display area, you can see name of the currently logged in user and the full title of the currently selected menu item.

In the lower part of the display area, you will find:

- **Logout**
  You can log out from any WBM page by clicking the "Logout" link.
- **Device name**
  Shows the name of the device.
- **Mode**
  Shows whether the device is an access point or a client.
- **LED simulation**
  Each device has one or more LEDs that provide information on the operating state of the device. Depending on its location, direct access to the device may not always be possible. Web Based Management therefore displays simulated LEDs. Unused connectors are displayed as gray LEDs. The meaning of the LED displays is described in the operating instructions.
  If you click this button, you open the window for the LED simulation. You can show this window during a change of menu and move it as necessary. To close the LED simulation, click the close button in the LED simulation window.
- **Help** ?
  When you click this button, the help page of the currently selected menu item is opened in a new browser window.
  On every help page, there is an input box for the search function at the top edge. In this input box, enter a term for which you need additional information and start the search by pressing Enter. A dialog box displays a list of WBM pages that contain the term searched for. The corresponding WBM page is opened in a new tab of the browser after clicking a list element.

- **Printer** 🖨
  If you click this button, a popup window opens. The popup window contains a view of the page content optimized for printers.

  Note

  Printing larger tables

  If you want to print large tables, please use the "Print preview" function of your Internet browser.

- **Favorites**
  When the product ships, the button is disabled on all pages ☆.
  If you click this button, the symbol ★ changes and the currently open page or currently open tab is marked as favorite. Once you have enabled the button once, the navigation area is divided into two tabs. The first tab "Menu" contains all the available menus as previously. The second tab "Favorites" contains all the pages/tabs that you selected as favorites. On the "Favorites" tab the pages/tabs are arranged according to the structure in the "Menu" tab.
  If you disable all the favorites you have created, the "Favorites" tab is removed again. To do this, click the ★ button on the relevant pages/tabs.
  You can save, upload and delete the favorites configuration of a device on the "System > Load&Save" page using HTTP or TFTP.

- **Update on** On / **Update off** Off
  WBM pages with overview lists can also have the additional "Update" button.
  With this button, you can enable or disable updating of the content area. If updating is turned on, the display is updated every 2 seconds. To disable the update, click "On". Instead of "On", "Off" is displayed. As default, updating is always enabled on the WBM page.

Navigation area (3)

In the navigation area, you have various menus available. Click the individual menus to display the submenus. The submenus contain pages on which information is available or with which you can create configurations. These pages are always displayed in the content area.

Content area (4)

The content area shows a graphic of the device. The graphic always shows the device whose WBM you have called up.

The following is displayed below the picture of the device:

- **PROFINET Name of Station**
  Shows the PROFINET device name.
- **Diagnostics Mode**
  Shows whether EtherNet/IP or PROFINET is enabled.
- **System Name**
  Shows the name of the device.
- **Device Type**
  Shows the type designation of the device.

- **PROFINET AR Status**
  Shows the PROFINET application relation status.
  - Online
    There is a connection to a PROFINET controller. The PROFINET controller has downloaded its configuration data to the device. The device can send status data to the PROFINET controller.
    In this status, the parameters set by the PROFINET controller cannot be configured on the device.
  - Offline
    There is no connection to a PROFINET controller.
- **Power Line 1 / Power Line 2 / Power over Ethernet**
  Status of the power supplies 1 and 2 or power over Ethernet. The power line 2 and Power over Ethernet are only displayed if they are supported by the hardware. You will find further information on this in the operating instructions.
- **PLUG Configuration**
  Shows the status of the configuration data on the PLUG, refer to the section "System > PLUG > Configuration".
- **Fault Status**
  Shows the fault status of the device.
- **Remote Capture**
  Shows whether or not the function is enabled.

Buttons you require often

The pages of the WBM contain the following standard buttons:

- **Refresh the display with "Refresh"**
  Web Based Management pages that display current parameters have a "Refresh" button at the lower edge of the page. Click this button to request up-to-date information from the device for the current page.

  Note

  If you click the "Refresh" button, before you have transferred your configuration changes to the device using the "Set Values" button, your changes will be deleted and the previous configuration will be loaded from the device and displayed here.

- **Save entries with "Set Values"**
  Pages in which you can make configuration settings have a "Set Values" button at the lower edge. The button only becomes active if you change at least one value on the page. Click this button to save the configuration data you have entered on the device. Once you have saved, the button becomes inactive again.

  Note

  Changing configuration data is possible only with the "admin" login.

- **Create entries with "Create"**
  Pages in which you can make new entries have a "Create" button at the lower edge. Click this button to create a new entry.

- **Delete entries with "Delete"**
  Pages in which you can delete entries have a "Delete" button at the lower edge. Click this button to delete the previously selected entries from the device memory. Deleting also results in an update of the page in the WBM.
- **Cancel with "Cancel"**
  The Basic Wizard pages have the "Cancel" button at the lower edge of the page. Click this button to close the Basic Wizard without applying the settings.
- **Page down with "Next"**
  The number of data records that can be displayed on a page is limited. Click the "Next" button to page down through the data records.
- **Page back with "Prev"**
  The number of data records that can be displayed on a page is limited. Click the "Prev" button to page back through the data records.
- **Delete the display with "Clear**"
  In pages with sequence logs, you can delete all table entries at the same time regardless of whether filters are selected. The display is cleared in this process. The restart counter is only reset after you have restored the device to the factory settings and restarted the device. Click the "Clear" button to completely delete the data record.
- **Button "Show all"**
  You can show all entries in pages with a large number of data records. Click "Show all" to display all entries on the page. Note that displaying all messages can take some time.
- **Drop-down list for page change**
  In pages with a large number of data records, you can navigate to the desired page. From the drop-down list, select the affected page to display it.
- **"Reset Counters" button**
  Click "Reset Counters" to reset all counters. The counters are reset by a restart.

Messages

If you have enabled the "Automatic Save" mode and you change a parameter the following message appears in the display area "Changes will be saved automatically in x seconds. Press 'Write Startup Config' to save the changes immediately.

Note

Interrupting the save

Saving starts only after the timer in the message has elapsed. How long saving takes depends on the device.

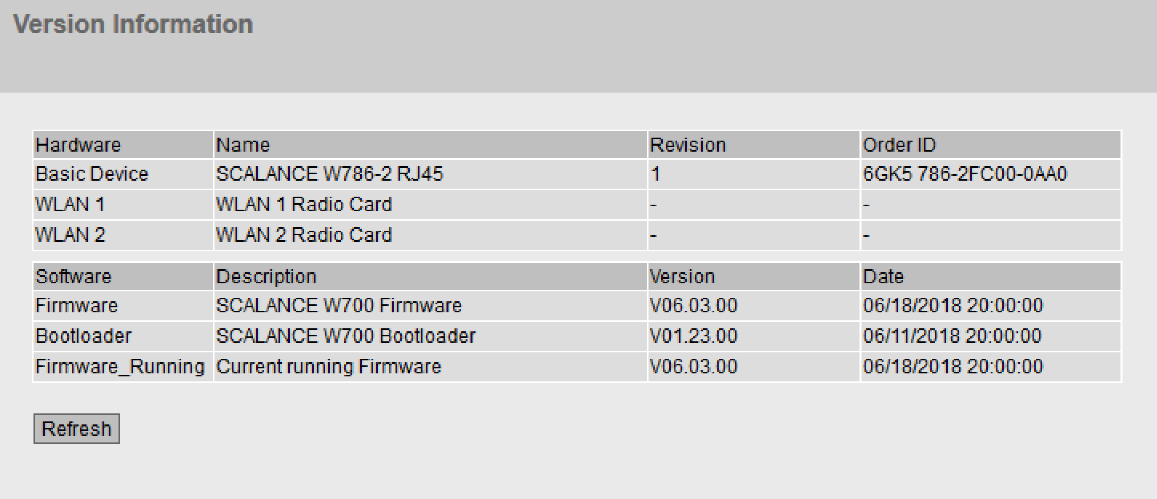
During the save, the message "Saving configuration data in progress. Please do not switch off the device" is displayed.

- Do not switch off the device immediately after the timer has elapsed.

6.4.2 Versions

Versions of hardware and software

This page shows the versions of the hardware and software of the device. You cannot configure anything on this page.



Version Information

Hardware	Name	Revision	Order ID
Basic Device	SCALANCE W786-2 RJ45	1	6GK5 786-2FC00-0AA0
WLAN 1	WLAN 1 Radio Card	-	-
WLAN 2	WLAN 2 Radio Card	-	-

Software	Description	Version	Date
Firmware	SCALANCE W700 Firmware	V06.03.00	06/18/2018 20:00:00
Bootloader	SCALANCE W700 Bootloader	V01.23.00	06/11/2018 20:00:00
Firmware_Running	Current running Firmware	V06.03.00	06/18/2018 20:00:00

Description

Table 1 has the following columns:

- **Hardware**
  - Basic Device
    Shows the basic device
  - WLAN1 / WLAN 2
    Shows the available wireless card
- **Name**
  Shows the name of the device or module.
- **Revision**
  Shows the hardware version of the device. For the wireless card, only one version is then displayed if the WLAN interface is enabled.
- **Article number**
  Shows the article number of the device or described module.

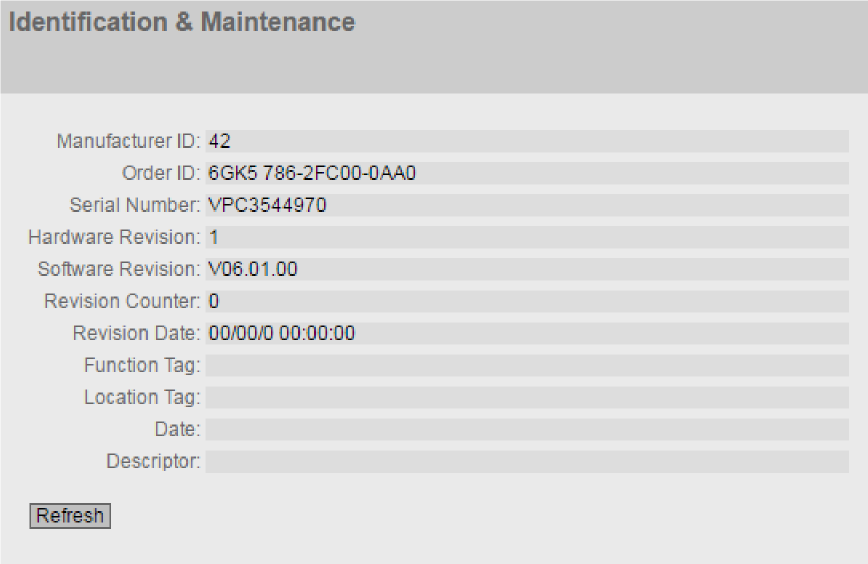
Table 2 has the following columns:

- **Software**
  - Firmware
    Shows the current firmware version. If a new firmware file was downloaded and the device has not yet restarted, the firmware version of the downloaded firmware file is displayed here. After the next restart, the downloaded firmware is activated and used.
  - Bootloader
    Shows the version of the boot software stored on the device.
  - Firmware_Running
    Shows the firmware version currently being used on the device.
- **Description**
  Shows the short description of the software.
- **Version**
  Shows the version number of the software version.
- **Date**
  Shows the date on which the software version was created.

6.4.3 I&M

Identification and maintenance data

This page contains information about device-specific vendor and maintenance data such as the article number, serial number, version numbers etc. You cannot configure anything on this page.



Identification & Maintenance

Manufacturer ID:	42
Order ID:	6GK5 786-2FC00-0AA0
Serial Number:	VPC3544970
Hardware Revision:	1
Software Revision:	V06.01.00
Revision Counter:	0
Revision Date:	00/00/0 00:00:00
Function Tag:	
Location Tag:	
Date:	
Descriptor:	

Description of the displayed values

The table has the following rows:

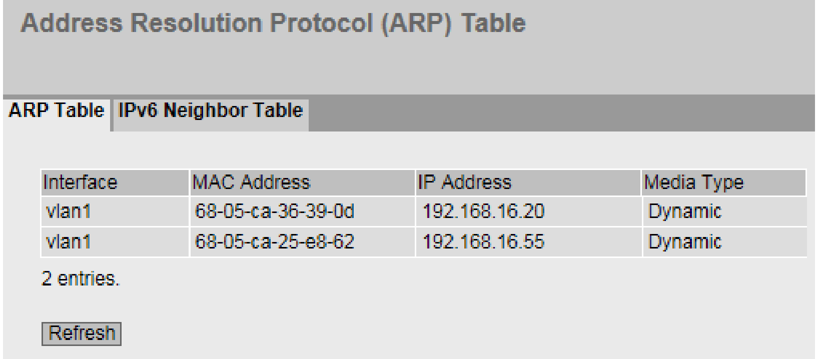
- **Manufacturer ID**
  Shows the manufacturer ID.
- **Article number**
  Shows the article number.
- **Serial Number**
  Shows the serial number.
- **Hardware Revision**
  Shows the hardware version.
- **Software Revision**
  Shows the software version.
- **Revision Counter**
  As of firmware version 4.0, the value "0" is always shown here regardless of the version change.
- **Revision Date**
  Date of the revision: Date and time of the last revision
- **Function tag**
  Shows the function tag (plant designation) of the device. The plant designation (HID) is created during configuration of the device with HW Config of STEP 7.
- **Location tag**
  Shows the location tag of the device. The location identifier (LID) is created during configuration of the device with HW Config of STEP 7.
- **Date**
  Shows the date created during configuration of the device with HW Config of STEP 7.
- **Descriptor**
  Shows the description created during configuration of the device with HW Config of STEP 7.

6.4.4 ARP / neighbors

6.4.4.1 ARP Table

Assignment of MAC address and IPv4 address

With the Address Resolution Protocol (ARP), there is a unique assignment of MAC address to IPv4 address. This assignment is kept by each network node in its own separate ARP table. The WBM page shows the ARP table of the device.



Address Resolution Protocol (ARP) Table

Interface	MAC Address	IP Address	Media Type
vlan1	68-05-ca-36-39-0d	192.168.16.20	Dynamic
vlan1	68-05-ca-25-e8-62	192.168.16.55	Dynamic

2 entries.

Description of the displayed values

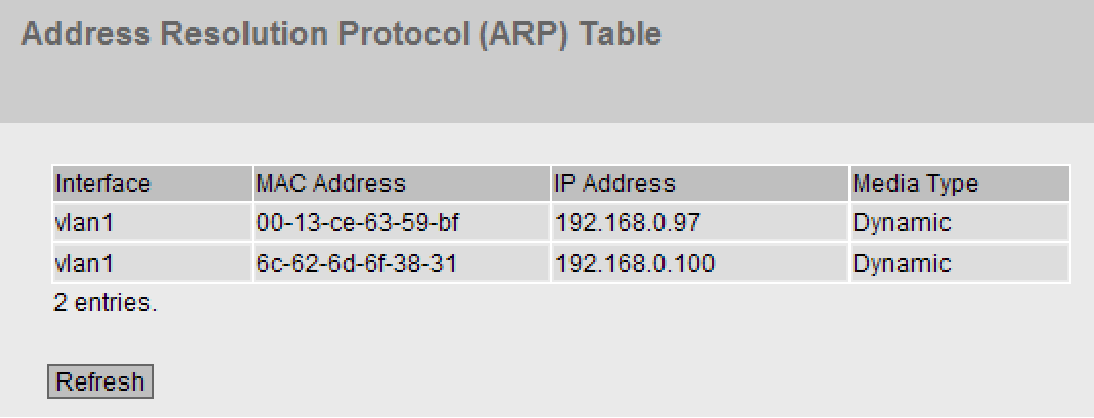
The table has the following columns:

- **Interface**
  Shows the interface via which the row entry was learnt.
- **MAC Address**
  Shows the MAC address of the destination or source device.
- **IP Address**
  Shows the IPv4 address of the destination device.
- **Media Type**
  Shows the type of connection.
  - Dynamic
    The device recognized the address data automatically.
  - Static
    The addresses were entered as static addresses.

6.4.4.2 IPv6 Neighbor Table

Assignment of MAC address and IPv6 address

Via the IPv6 neighbor table, there is a unique assignment of MAC address to IPv6 address. This assignment is kept by each network node in its own separate neighbor table.



Address Resolution Protocol (ARP) Table

Interface	MAC Address	IP Address	Media Type
vlan1	00-13-ce-63-59-bf	192.168.0.97	Dynamic
vlan1	6c-62-6d-6f-38-31	192.168.0.100	Dynamic

2 entries.

Description of the displayed values

The table has the following columns:

- **Interface**
  Displays the interface via which the row entry was learnt.
- **MAC Address**
  Shows the MAC address of the destination or source device.
- **IP Address**
  Shows the IPv6 address of the destination device.
- **Media Type**
  Shows the type of connection.
  - Dynamic
    The device recognized the address data automatically.
  - Static
    The addresses were entered as static addresses.

6.4.5 Log Tables

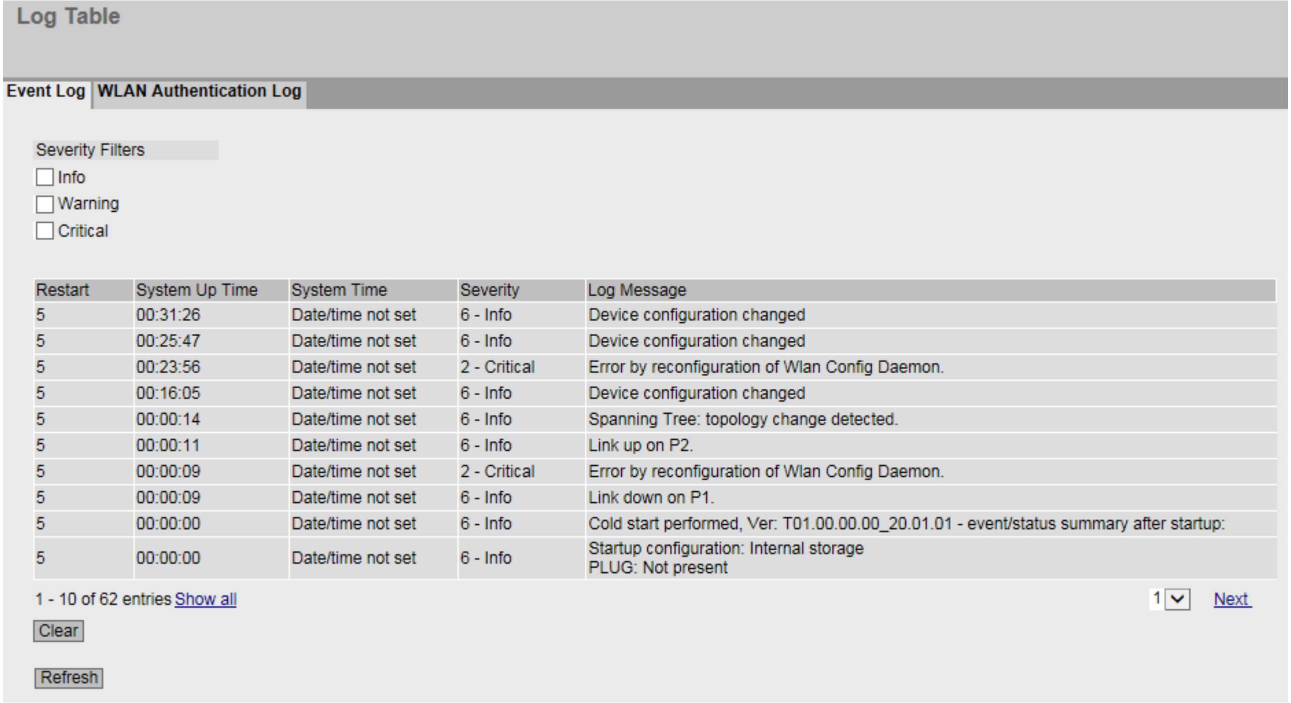
6.4.5.1 Event log

Logging events

The device allows you to log occurring events, some of which you can specify on the page of the System > Events menu. This, for example, allows you to record when an authentication attempt failed or when the connection status of a port has changed.

The content of the events log table is retained even when the device is turned off.

You cannot configure anything on this page.



Restart	System Up Time	System Time	Severity	Log Message
5	00:31:26	Date/time not set	6 - Info	Device configuration changed
5	00:25:47	Date/time not set	6 - Info	Device configuration changed
5	00:23:56	Date/time not set	2 - Critical	Error by reconfiguration of Wlan Config Daemon.
5	00:16:05	Date/time not set	6 - Info	Device configuration changed
5	00:00:14	Date/time not set	6 - Info	Spanning Tree: topology change detected.
5	00:00:11	Date/time not set	6 - Info	Link up on P2.
5	00:00:09	Date/time not set	2 - Critical	Error by reconfiguration of Wlan Config Daemon.
5	00:00:09	Date/time not set	6 - Info	Link down on P1.
5	00:00:00	Date/time not set	6 - Info	Cold start performed, Ver: T01.00.00.00_20.01.01 - event/status summary after startup:
5	00:00:00	Date/time not set	6 - Info	Startup configuration: Internal storage PLUG: Not present

Description

- **Severity Filters**
  You can filter the entries in the table according to severity. To display all the entries, enable or disable all parameters.

  Note

  For each severity, a maximum of 400 entries in the table are possible. If the maximum number of entries is reached for a severity, the oldest entries of this severity are overwritten in the table. The table remains permanently in the memory.

  – Info
    Information
    When this parameter is enabled, all entries of the category "Info" are displayed.

  – Warning
    Warnings
    When this parameter is enabled, all entries of the category "Warning" are displayed.

  – Critical
    Critical
    When this parameter is enabled, all entries of the category "Critical" are displayed.

The table has the following columns:

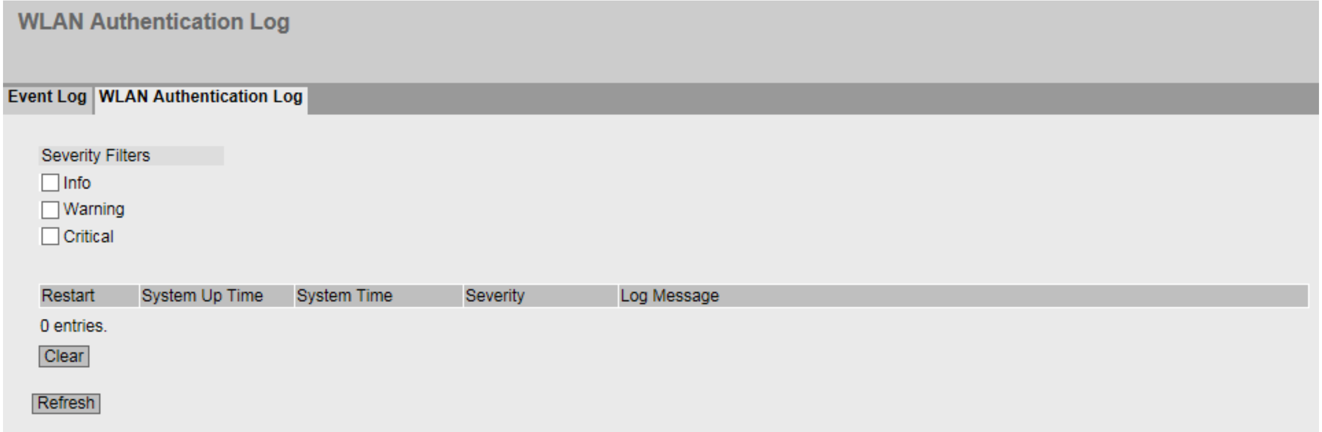
- **Restart**
  Counts the number of restarts since you last reset to factory settings and shows the device restart after which the corresponding event occurred.
- **System Up Time**
  Shows the time the device has been running since the last restart when the described event occurred.
- **System Time**
  Shows the date and time when the described event occurred.
- **Severity**
  Shows the severity of the message.
- **Log Message**
  Displays a brief description of the event that has occurred. You will find the list of possible messages in Appendix D (Page 423) of the configuration manual.

If the system time is set, the time is also displayed at which the event occurred.

6.4.5.2 WLAN authentication log

Logging authentication attempts

This page shows a table with information on successful or failed authentication attempts.



Restart	System Up Time	System Time	Severity	Log Message

0 entries.

You cannot configure anything on this page.

Description

- **Severity Filters**
  You can filter the entries in the table according to severity. To display all the entries, enable or disable all parameters.

  Note

  For each severity, a maximum of 400 entries in the table are possible. If the maximum number of entries is reached for a severity, the oldest entries of this severity are overwritten in the table. The table remains permanently in the memory.

  – Info
    Information
    When this parameter is enabled, all entries of the category "Info" are displayed.

  – Warning
    Warnings
    When this parameter is enabled, all entries of the category "Warning" are displayed.

  – Critical
    Critical
    When this parameter is enabled, all entries of the category "Critical" are displayed.

The table has the following columns:

- **Restart**
  Counts the number of restarts since you last reset to factory settings and shows the device restart after which the corresponding event occurred.
- **System Up Time**
  Shows the time the device has been running since the last restart when the described event occurred.
- **System Time**
  Shows the date and time when the described event occurred.
- **Severity**
  Shows the severity of the message.
- **Log Message**
  Displays a brief description of the event that has occurred. You will find the list of possible messages in Appendix D (Page 423) of the configuration manual.

If the system time is set, the time is also displayed at which the event occurred.

6.4.6 Faults

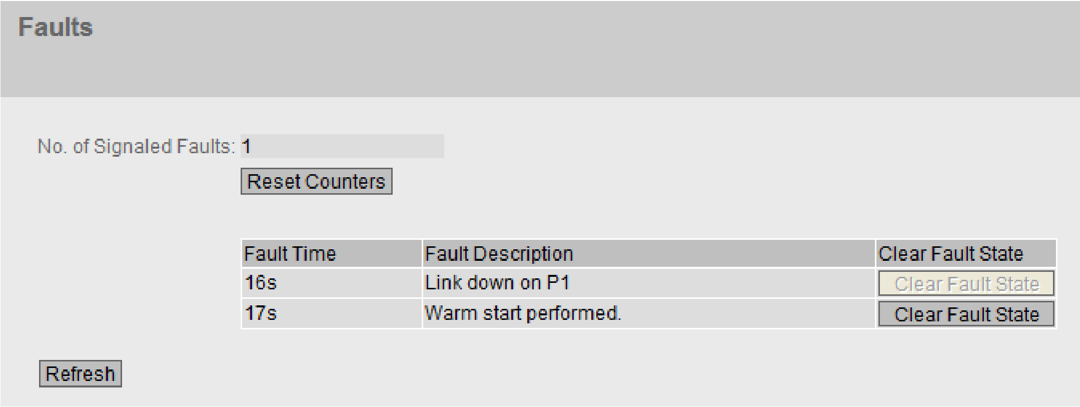
Error status

If a fault occurs, it is shown on this page. On the device, faults are indicated by the red fault LED lighting up.

Internal faults of the device and faults that you configure on the following pages are indicated:

- "System > Events"
- "System > Fault Monitoring"

The calculation of the time of a fault always begins after the last system start. If there are no faults present, the fault LED switches off.



No. of Signaled Faults: 1

Fault Time	Fault Description	Clear Fault State
16s	Link down on P1	Clear Fault State
17s	Warm start performed.	Clear Fault State

Description

The page contains the following boxes:

- **No. of Signaled Faults**
  Indicates how often the fault LED lit up and not how many faults occurred.
- **"Reset Counters" button**
  The number is reset with this button. The counter is reset when there is a restart.

The table contains the following columns:

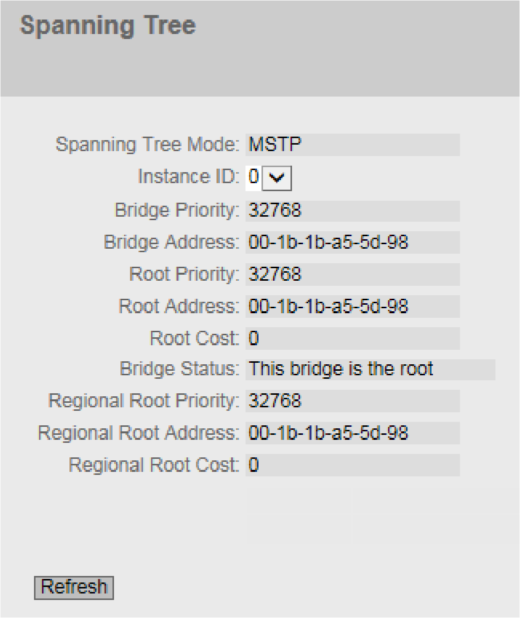
- **Fault Time**
  Shows the time the device has been running since the last restart when the described fault occurred.
- **Fault Description**
  Displays a brief description of the error/fault that has occurred.
- **Clear Fault State**
  Some faults can be acknowledged and thus removed from the fault list, e.g. a fault of the event "Cold/Warm Start". You can acknowledge these faults or remove them from the fault list with the "Clear Fault State" button.

6.4.7 Redundancy

Introduction

The page shows the current information about the Spanning Tree and the settings of the root bridge.

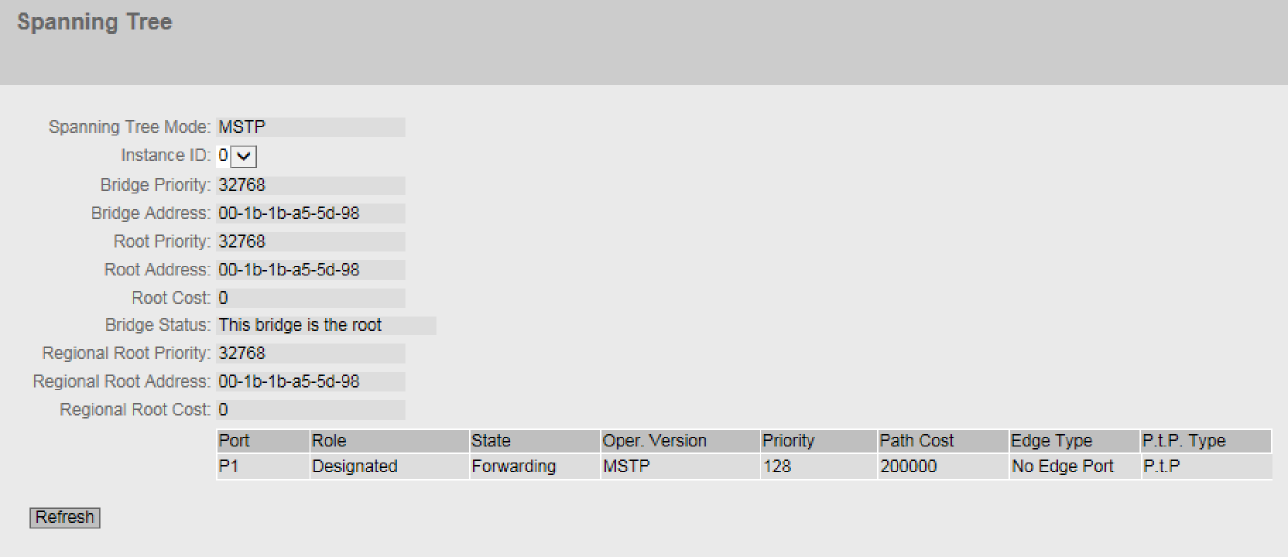
If Spanning Tree is turned off, only the basic information about this device is displayed.



Spanning Tree

Spanning Tree Mode: MSTP
Instance ID: 0
Bridge Priority: 32768
Bridge Address: 00-1b-1b-a5-5d-98
Root Priority: 32768
Root Address: 00-1b-1b-a5-5d-98
Root Cost: 0
Bridge Status: This bridge is the root
Regional Root Priority: 32768
Regional Root Address: 00-1b-1b-a5-5d-98
Regional Root Cost: 0

If Spanning Tree is turned on, the information about the status of the instance selected in the "Instance ID" drop-down list is displayed and the information about the configured ports is shown in the table. The information shown depends on the Spanning Tree mode.



Spanning Tree

Spanning Tree Mode:	MSTP
Instance ID:	0
Bridge Priority:	32768
Bridge Address:	00-1b-1b-a5-5d-98
Root Priority:	32768
Root Address:	00-1b-1b-a5-5d-98
Root Cost:	0
Bridge Status:	This bridge is the root
Regional Root Priority:	32768
Regional Root Address:	00-1b-1b-a5-5d-98
Regional Root Cost:	0

Port	Role	State	Oper. Version	Priority	Path Cost	Edge Type	P.t.P. Type
P1	Designated	Forwarding	MSTP	128	200000	No Edge Port	P.t.P

Description

The page contains the following boxes:

- **Spanning Tree Mode**
  Shows the set mode. You specify the mode in "Layer 2 > Configuration" and in "Layer 2 > MSTP > General".
  The following values are possible:
  - '-'
  - STP
  - RSTP
  - MSTP
- **Instance ID**
  Shows the number of the instance. The parameter depends on the configured mode.
- **Bridge Priority / Root Priority**
  Which device becomes the root bridge is decided based on the bridge priority. The bridge with the highest priority (in other words, with the lowest value for this parameter) becomes the root bridge. If several devices in a network have the same priority, the device whose MAC address has the lowest numeric value will become the root bridge. Both parameters, bridge priority and MAC address together form the bridge identifier. Since the root bridge manages all path changes, it should be located as centrally as possible due to the delay of the frames. The value for the bridge priority is a whole multiple of 4096 with a range of values from 0 to 32768.

- **Bridge Address / Root Address**
  The bridge address shows the MAC address of the device and the root address shows the MAC address of the root bridge.
- **Root Cost**
  The path costs from this device to the root bridge.
- **Bridge Status**
  Shows the status of the bridge, e.g. whether or not the device is the root bridge.
- **Regional root priority** (available only with MSTP)
  For a description, see Bridge priority / Root priority
- **Regional root address** (available only with MSTP)
  Shows the MAC address of the regional root bridge.
- **Regional Root Cost** (available only with MSTP)
  Shows the path costs from this device to the regional root bridge.

The table contains the following boxes:

- **Port**
  Shows the port via which the device communicates.
- **Role**
  Shows the status of the port. The following values are possible:
  - Disabled
    The port was removed manually from the spanning tree and will no longer be taken into account by the spanning tree.
  - Designated
    The ports leading away from the root bridge.
  - Alternate
    The port with an alternative route to a network segment
  - Backup
    If a switch has several ports to the same network segment, the "poorer" Port becomes the backup port.
  - Root
    The port that provides the best route to the root bridge.
  - Master
    This port points to a root bridge located outside the MST region.

- **State**
  Displays the current state of the port. The values are only displayed. The parameter depends on the configured protocol. The following statuses are possible:
  - Discarding
    The port receives BPDU frames. Other incoming or outgoing frames are discarded.
  - Listening
    The port receives and sends BPDU frames. The port is involved in the spanning tree algorithm. Other outgoing and incoming frames are discarded.
  - Learning
    The port actively learns the topology; in other words, the node addresses. Other outgoing and incoming frames are discarded.
  - Forwarding
    Following the reconfiguration time, the port is active in the network. The port receives and sends data frames.
- **Oper. Version**
  Describes the type of spanning tree in which the port operates
- **Priority**
  If the path calculated by the spanning tree is possible over several ports of a device, the port with the highest priority (in other words the lowest value for this parameter) is selected. A value between 0 and 240 can be entered for the priority in steps of 16. If you enter a value that cannot be divided by 16, the value is automatically adapted. The default is 128.
- **Path Cost**
  This parameter is used to calculate the path that will be selected. The path with the lowest value is selected as the route. If several ports of a device have the same value, the port with the lowest port number will be selected.
  If the value "Cost Calc." box is "0", the automatically calculated value is shown. Otherwise, the value of the "Cost Calc." box is displayed.
  The calculation of the path costs is largely based on the transmission speed. The higher the achievable transmission speed is, the lower the value of the path costs.
  Typical values for path costs with rapid spanning tree:
  - 10,000 Mbps = 2,000
  - 1000 Mbps = 20,000
  - 100 Mbps = 200,000
  - 10 Mbps = 2,000,000.

- **Edge Type**
  Shows the type of the connection. The following values are possible:
  – Edge Port

    An edge port is connected to this port.
  – No Edge Port
    There is a spanning tree or rapid spanning tree device at this port.
- **P.t.P. Type**
  Shows the type of the point-to-point link. The following values are possible:
  – P.t.P.
    With half duplex, a point-to-point link is assumed.
  – Shared Media

    With a full duplex connection, a point-to-point link is not assumed.

Note

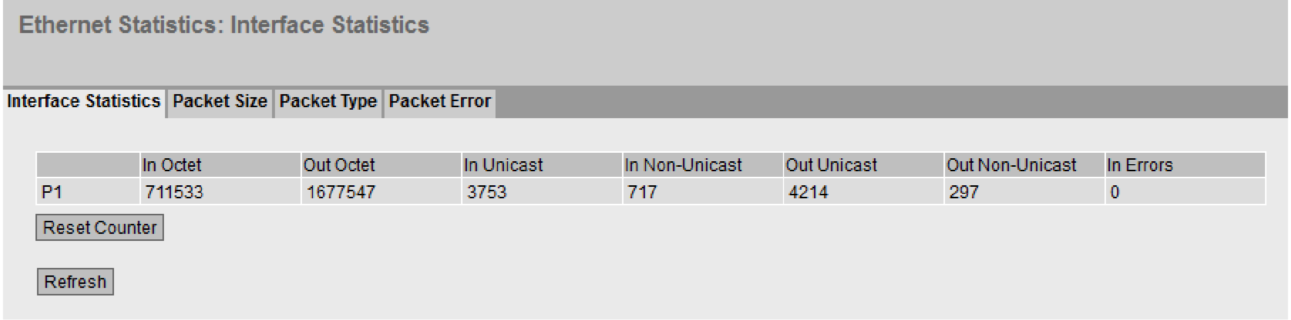
Point-to-point link means a direct connection between two devices. A shared media connection is, for example, a connection to a hub.

6.4.8 Ethernet Statistics

6.4.8.1 Interface Statistics

Interface statistics

The page shows the statistics from the interface table of the Management Information Base (MIB).


Ethernet Statistics: Interface Statistics

	In Octet	Out Octet	In Unicast	In Non-Unicast	Out Unicast	Out Non-Unicast	In Errors
P1	711533	1677547	3753	717	4214	297	0

Displayed values

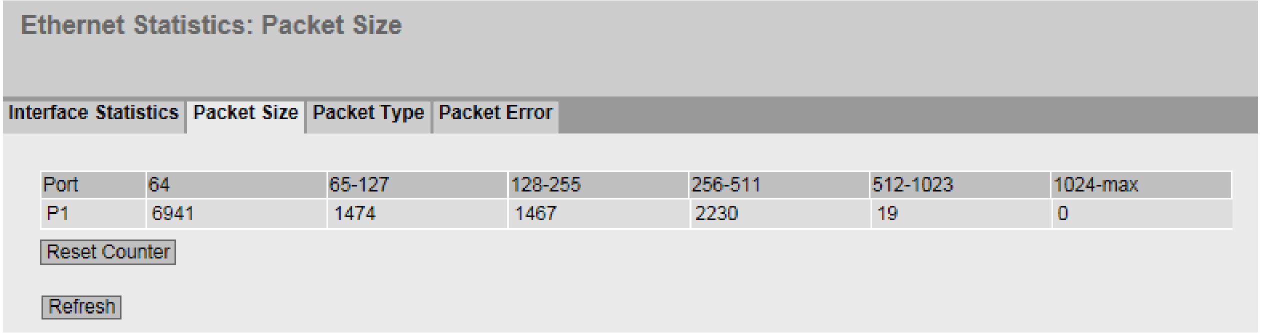
The table has the following columns:

- **In Octet**
  Shows the number of received bytes.
- **Out Octet**
  Shows the number of sent bytes.
- **In Unicast**
  Shows the number of received unicast frames.
- **In Non Unicast**
  Shows the number of received frames that are not of the type unicast.
- **Out Unicast**
  Shows the number of sent unicast frames.
- **Out Non Unicast**
  Shows the number of sent frames that are not of the type unicast.
- **In Errors**
  Shows the number of all possible RX errors, refer to the "Packet Error" tab.

6.4.8.2 Packet Size

Frames sorted by length

This page displays how many frames of which size were received at each port. You cannot configure anything on this page.



Ethernet Statistics: Packet Size

Port	64	65-127	128-255	256-511	512-1023	1024-max
P1	6941	1474	1467	2230	19	0

Description

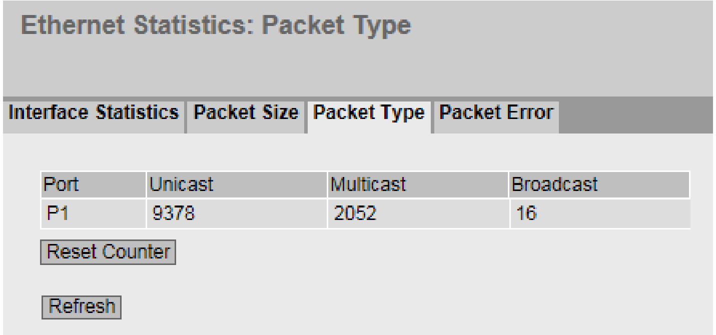
The table has the following columns:

- **Port**
  Shows the available ports.
- **Frame lengths**
  The other columns after the port number contain the absolute numbers of incoming frames according to their frame length.
  The following frame lengths are distinguished:
  - 64 bytes
  - 65 - 127 bytes
  - 128 - 255 bytes
  - 256 - 511 bytes
  - 512 - 1023 bytes
  - 1024 - max.

6.4.8.3 Frame Type

Received frames sorted by type

This page displays how many frames of the type "Unicast", "Multicast", and "Broadcast" were received at each port. You cannot configure anything on this page.



Ethernet Statistics: Packet Type

Port	Unicast	Multicast	Broadcast
P1	9378	2052	16

Description

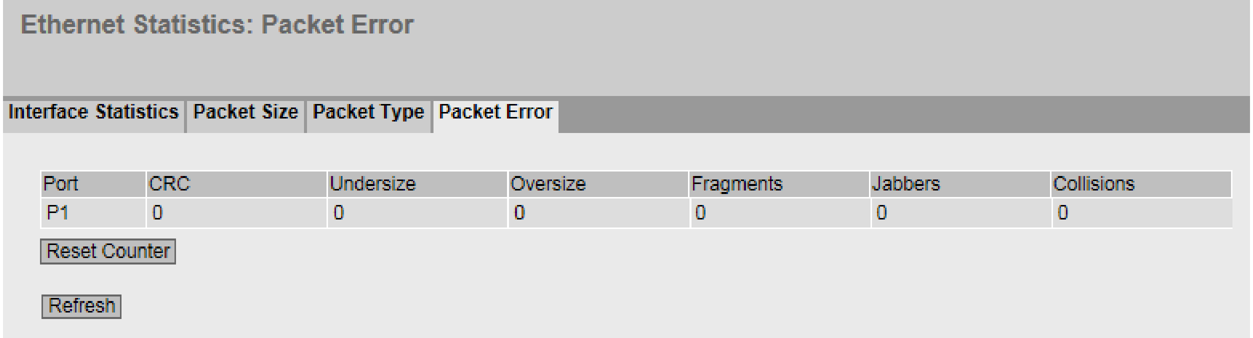
The table has the following columns:

- **Port**
  Shows the available ports.
- **Unicast/Multicast /Broadcast**
  The other columns after the port number contain the absolute numbers of the incoming frames according to their frame type "Unicast", "Multicast" and "Broadcast"

6.4.8.4 Packet Error

Bad received frames

This page shows how many bad frames were received per port. You cannot configure anything on this page.



Ethernet Statistics: Packet Error

Port	CRC	Undersize	Oversize	Fragments	Jabbers	Collisions
P1	0	0	0	0	0	0

Description

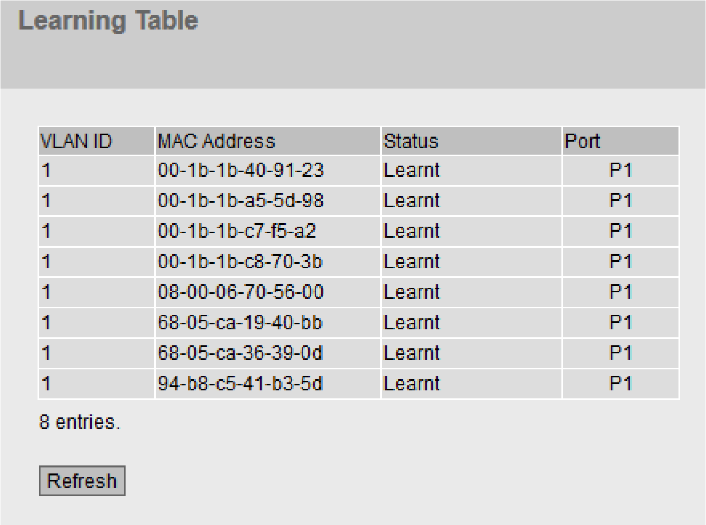
The table has the following columns:

- **Port**
  Shows the available ports.
- **Error types**
  The other columns after the port number contain the absolute numbers of the incoming frames according to their error type.
  In the columns of the table, a distinction is made according to the following error types:
  - CRC (Cyclic Redundancy Code)
    The packet length is between 64 and 1518 bytes. The CRC of the packet is invalid.
  - Undersize
    The packet length is less than 64 bytes. The CRC of the packet is valid.
  - Oversize
    The packet length is more than 1518 bytes. The CRC of the packet is valid.
  - Fragments
    The packet length is less than 64 bytes. The CRC of the packet is invalid.
  - Jabbers
    The frame length is more than 1518 bytes. The CRC of the packet is invalid.
  - Collisions
    Frames in which a collision event was detected.

6.4.9 Learning Table

Address filtering

This WBM page shows the current content of the learning table. This table lists the source addresses of unicast address frames.



Learning Table

VLAN ID	MAC Address	Status	Port
1	00-1b-1b-40-91-23	Learnt	P1
1	00-1b-1b-a5-5d-98	Learnt	P1
1	00-1b-1b-c7-f5-a2	Learnt	P1
1	00-1b-1b-c8-70-3b	Learnt	P1
1	08-00-06-70-56-00	Learnt	P1
1	68-05-ca-19-40-bb	Learnt	P1
1	68-05-ca-36-39-0d	Learnt	P1
1	94-b8-c5-41-b3-5d	Learnt	P1

8 entries.

Description

This table contains the following columns:

- **VLAN ID**
  Shows the VLAN ID of the node.

  Note

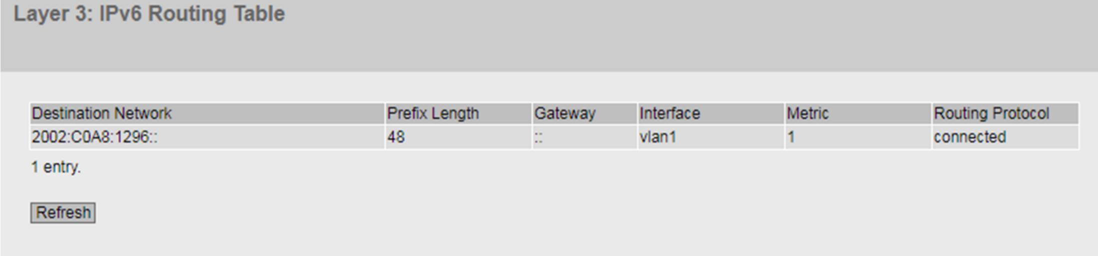
  This column appears in the table only if a VLAN is configured.

- **MAC Address**
  Shows the MAC address of the node.
- **State**
  Shows the status of each address entry:
  - Learnt
    The specified address was learned by receiving a frame from this node and will be deleted when the aging time expires if no further packets are received from this node.
  - Invalid
    These values are not evaluated.
- **Port**
  Shows the port via which the node with the specified address can be reached. Frames received by the device whose destination address matches this address will be forwarded to this port.

6.4.10 IPv6 routing

Introduction

This page shows the IPv6 routes currently being used.



Layer 3: IPv6 Routing Table

Destination Network	Prefix Length	Gateway	Interface	Metric	Routing Protocol
2002:C0A8:1296::	48	::	vlan1	1	connected

1 entry.

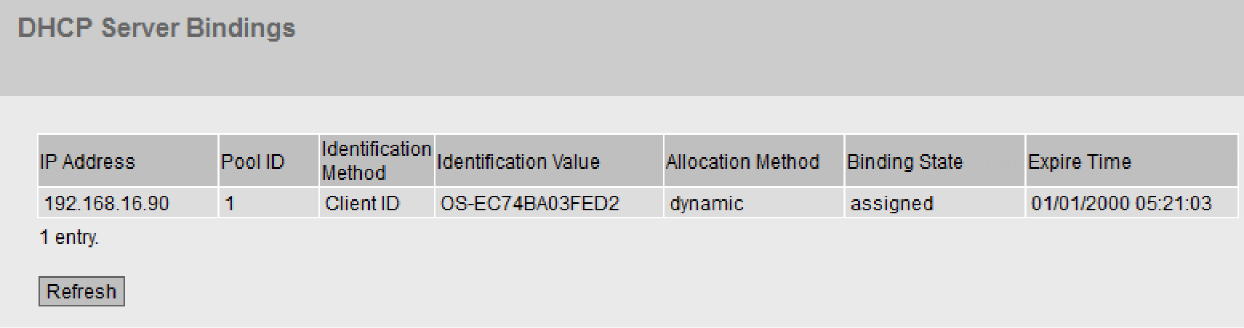
Description

The table has the following columns:

- **Destination Network**
  Shows the destination address of this route.
- **Prefix Length**
  Shows the prefix length of this route.
- **Gateway**
  Shows the gateway for this route.
- **Interface**
  Shows the interface for this route.
- **Metric**
  Shows the metric of the route. The higher value, the longer packets require to their destination.
- **Routing Protocol**
  Shows the routing protocol from which the entry in the routing table originates. The following entries are possible:
  – Connected: Connected routes
  – Static: Static routes
  – RIPng: Routes via RIPng
  – OSPFv3: Routes via OSPFv3
  – Other: Other routes

6.4.11 DHCP-Server

This page shows which IPv4 addresses were assigned to the devices by the DHCP server.



DHCP Server Bindings

IP Address	Pool ID	Identification Method	Identification Value	Allocation Method	Binding State	Expire Time
192.168.16.90	1	Client ID	OS-EC74BA03FED2	dynamic	assigned	01/01/2000 05:21:03

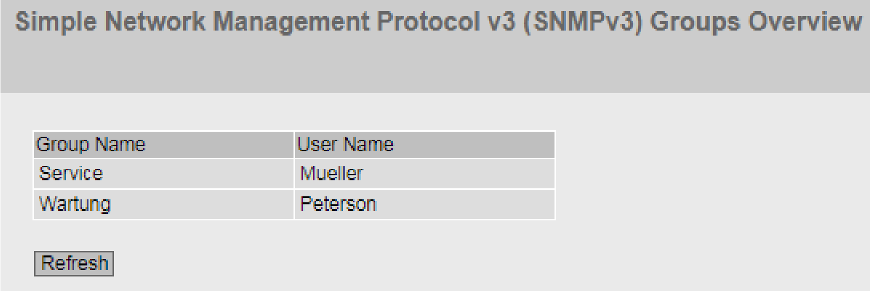
1 entry.

Description

- **IP Address**
  Shows the IPv4 address assigned to the DHCP client.
- **Pool ID**
  Shows the number of the IPv4 address band.
- **Identification Method**
  Shows the method according to which the DHCP client is identified.
- **Identification value**
  Shows the MAC address or the client ID of the DHCP client.
- **Allocation Method**
  Shows whether the IPv4 address was assigned statically or dynamically. You configure the static entries in "System > DHCP > Static Leases".
- **Binding State**
  Shows the status of the assignment.
  - Assigned
    The assignment is used.
  - Not used
    The assignment is not used.
  - Probing
    The assignment is being checked.
  - Unknown
    The status of the assignment is unknown.
- **Expire Time**
  Shows until when the assigned IPv4 address is still valid. Up to this time, the DHCP client must either request a new IPv4 address or extend the lease time of the assigned IPv4 address.

6.4.12 SNMP

This page displays the created SNMPv3 groups. You configure the SNMPv3 groups in "System > SNMP".



Simple Network Management Protocol v3 (SNMPv3) Groups Overview

Group Name	User Name
Service	Mueller
Wartung	Peterson

Description

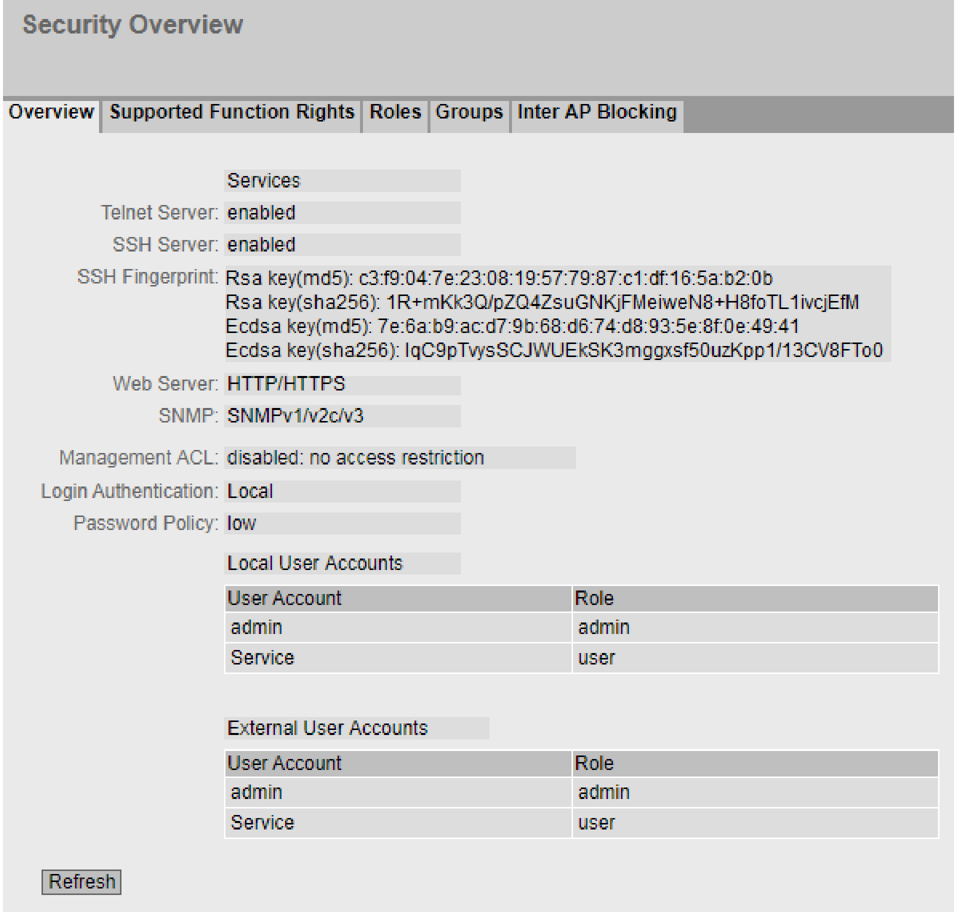
The table has the following columns:

- **Group Name**
  Shows the group name.
- **User Name**
  Shows the user that is assigned to the group.

6.4.13 Security

6.4.13.1 Overview

This page shows the security settings and the local and external user accounts.



Services

Telnet Server: enabled

SSH Server: enabled

SSH Fingerprint: Rsa key(md5): c3:f9:04:7e:23:08:19:57:79:87:c1:df:16:5a:b2:0b
Rsa key(sha256): 1R+mKk3Q/pZQ4ZsuGNKjFMeiweN8+H8foTL1ivcjEfM
Ecdsa key(md5): 7e:6a:b9:ac:d7:9b:68:d6:74:d8:93:5e:8f:0e:49:41
Ecdsa key(sha256): IqC9pTvysSCJWUEkSK3mggxsf50uzKpp1/13CV8FTo0

Web Server: HTTP/HTTPS

SNMP: SNMPv1/v2c/v3

Management ACL: disabled: no access restriction

Login Authentication: Local

Password Policy: low

Local User Accounts

User Account	Role
admin	admin
Service	user

External User Accounts

User Account	Role
admin	admin
Service	user

Description

Services

The "**Services**" list shows the security settings.

- **Telnet Server**
  You configure the setting in "System > Configuration".
  - Enabled: Unencrypted access to the CLI.
  - Disabled: No unencrypted access to the CLI.
- **SSH Server**
  You configure the setting in "System > Configuration".
  - Enabled: Encrypted access to the CLI.
  - Disabled: No encrypted access to the CLI.
- **SSH fingerprint**
  This field shows the SSH fingerprint.
- **Web Server**
  You configure the setting in "System > Configuration".
  - HTTP/HTTPS: Access to the WBM is possible with HTTP and HTTPS.
  - HTTPS: Access to the WBM is now only possible with HTTPS.
- **SNMP**
  You can configure the setting in "System > SNMP > General".
  - "-" (SNMP disabled)
    Access to device parameters via SNMP is not possible.
  - SNMPv1/v2c/v3
    Access to device parameters is possible with SNMP versions 1, 2c or 3.
  - SNMPv3
    Access to device parameters is possible only with SNMP version 3.
- **Management ACL**
  You configure the setting in "Security > Management ACL".
  - Enabled: Restricted access only: Access is restricted using an Access Control List (ACL).
  - Disabled: No access restriction: Management ACL is not enabled.

- **Login Authentication**
  Configure the setting under "Security > AAA > General".
  - Local
    Authentication must take place locally on the device.
  - RADIUS
    Authentication must be handled via a RADIUS server.
  - Local and RADIUS
    Authentication is possible both with the users that exist on the device (user name and password) and via a RADIUS server.
    The user is first searched for in the local database. If the user does not exist there, a RADIUS query is sent.
  - RADIUS and fallback Local
    Authentication must be handled via a RADIUS server.
    Local authentication is performed only when the RADIUS server cannot be reached in the network.
- **Password Policy**
  Shows which password policy is currently being used.

Local and external user accounts

Configure local user accounts and roles under "Security > Users".

When you create a local user account, an external user account is generated automatically.

Local user accounts involve users each with a password for logging in on the device.

In the table "External User Accounts", a user is linked to a role. In this example, the user "Service" is linked to the role "user". The user is defined on a RADIUS server. The roll is defined locally on the device. When a RADIUS server authenticates a user, but the corresponding group is unknown or does not exist, the device checks whether there is an entry for the user in the table "External User Accounts". If an entry exists, the user is logged in with the rights of the associated role. If the corresponding group is known on the device, both tables are evaluated. The user is assigned the role with the higher rights.

Note

The table "External User Accounts" is only evaluated if you have set "Vendor Specific" in the RADIUS Authorization Mode.

You can access external user accounts with CLI.

The "Local User Accounts" and "External User Accounts" tables have the following columns:

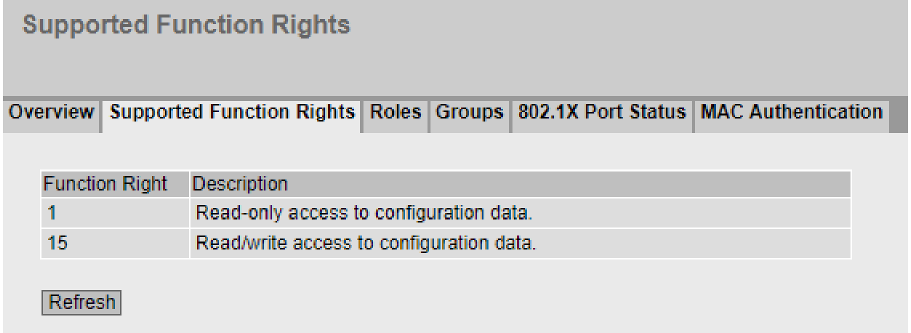
- **User Account**
  Shows the name of the local user.
- **Role**
  Shows the role of the user. You can obtain more information on the function rights of the role in "Information > Security > Roles".

6.4.13.2 Supported Function Rights

Note

The values displayed depend on the role of the logged-on user.

The page shows the function rights available locally on the device.



Function Right	Description
1	Read-only access to configuration data.
15	Read/write access to configuration data.

Description of the displayed values

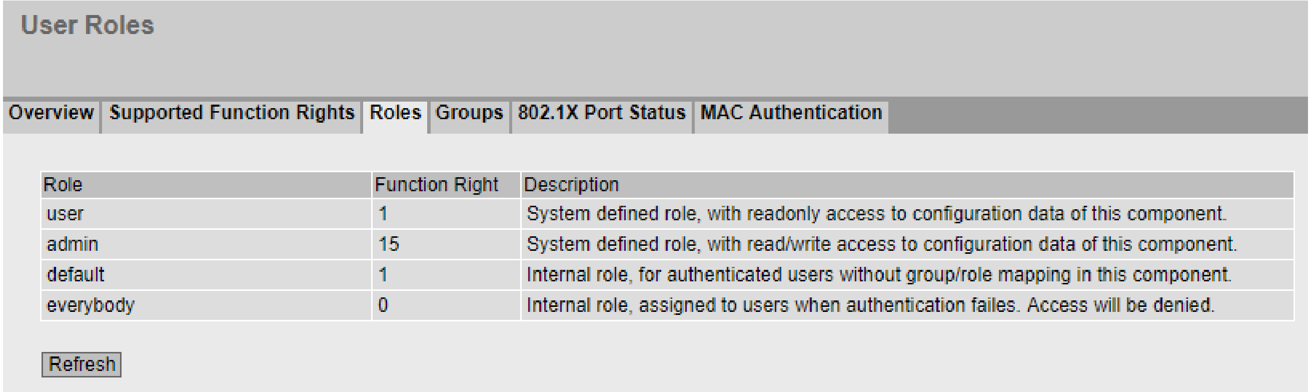
- **Function Right**
  Shows the number of the function right. Different rights relating to the device parameters are assigned to the numbers.
- **Description**
  Shows the description of the function right.

6.4.13.3 Roles

Note

The values displayed depend on the role of the logged-in user.

The page shows the roles valid locally on the device.



Role	Function Right	Description
user	1	System defined role, with readonly access to configuration data of this component.
admin	15	System defined role, with read/write access to configuration data of this component.
default	1	Internal role, for authenticated users without group/role mapping in this component.
everybody	0	Internal role, assigned to users when authentication failes. Access will be denied.

Description

The table contains the following columns:

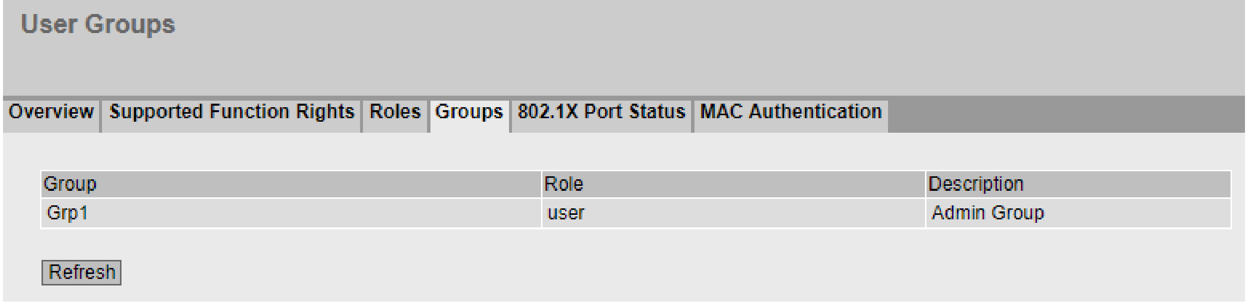
- **Role**
  Shows the name of the role.
- **Function Right**
  Shows the function right of the role:
  - 1
    Users with this role can read device parameters but cannot change them.
  - 15
    Users with this role can both read and change device parameters.
  - 0
    This is a role that the device assigns internally when a user could not be authenticated. The user is denied access to the device.
- **Description**
  Shows a description of the role.

6.4.13.4 Groups

Note

The values displayed depend on the role of the logged-on user.

This page shows which group is linked to which role. The group is defined on a RADIUS server. The role is defined locally on the device.



Group	Role	Description
Grp1	user	Admin Group

Description of the displayed values

The table has the following columns:

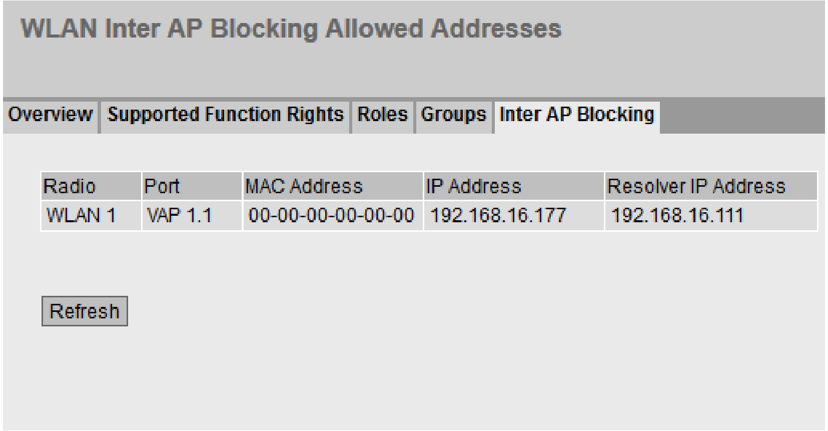
- **Group**
  Shows the name of the group. The name matches the group on the RADIUS server.
- **Role**
  Shows the name of the role. Users who are authenticated with the linked group on the RADIUS server receive the rights of this role locally on the device.
- **Description**
  Shows a description for the link.

6.4.13.5 Inter AP blocking

Note

- This WBM page is only available in access point mode.
- This WBM page is enabled with the following KEY-PLUGs:
  - W780 iFeatures (MLFB 6GK5 907-8PA00)
  - W700 Security (MLFB 6GK5907-0PA00)

The WBM page shows a list of devices with which the clients are allowed to communicate.



WLAN Inter AP Blocking Allowed Addresses

Radio	Port	MAC Address	IP Address	Resolver IP Address
WLAN 1	VAP 1.1	00-00-00-00-00-00	192.168.16.177	192.168.16.111

Description

The table has the following columns:

- **Radio**
  Shows the available WLAN interfaces to which the settings relate.
- **Port**
- Shows the VAP interface to which the settings relate.
- **MAC Address**
  Shows the MAC address of the device with which the client may communicate.

- **IP Address**
  Shows the IPv4 address of the device with which the client may communicate.
- **Resolver IP Address**
  Shows the IPv4 address with which the access point resolves the permitted IPv4 address.

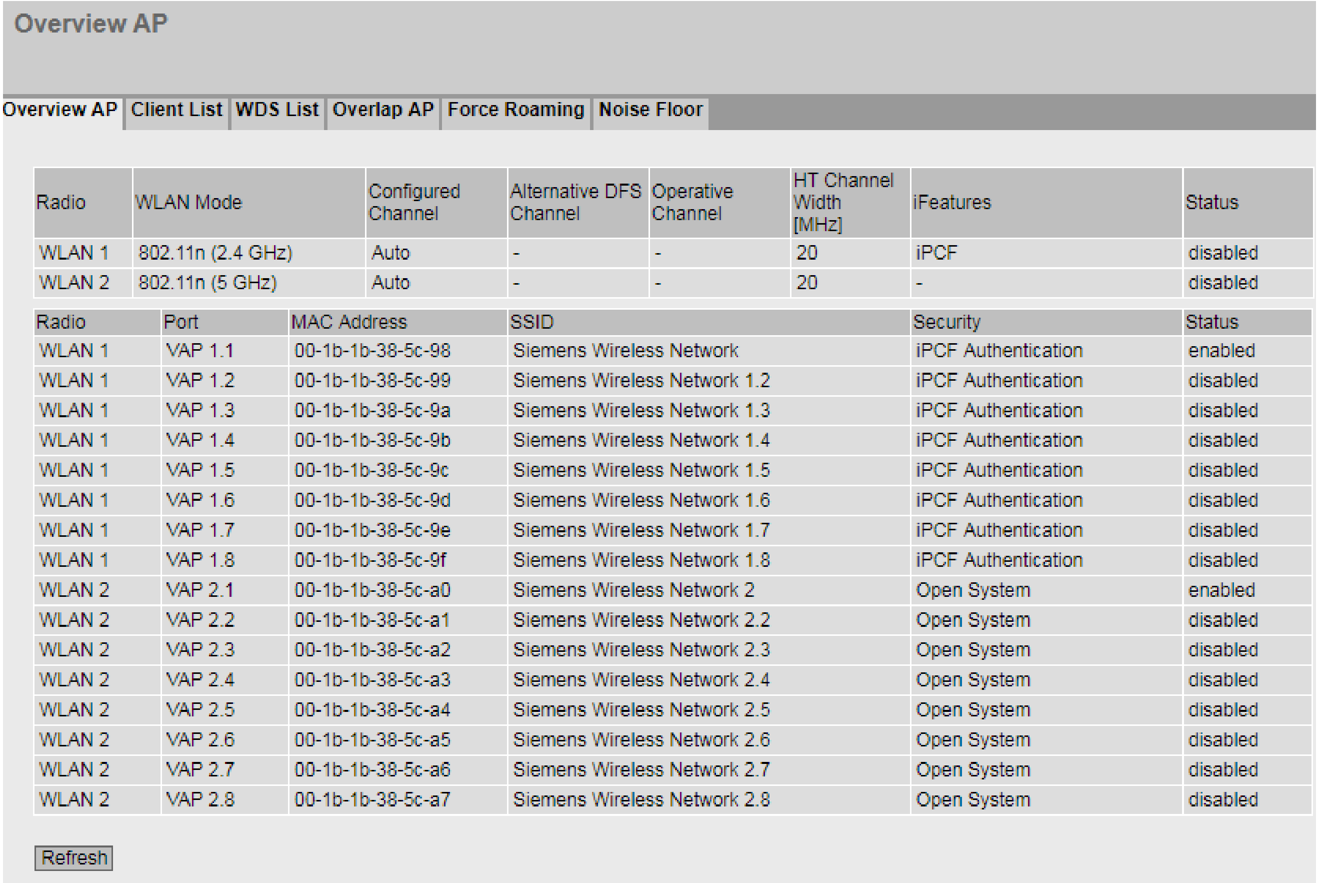
6.4.14 WLAN

6.4.14.1 Overview AP

Overview of the configuration

This page shows these settings/properties of the WLAN or the WLAN interface.

> **Note**
>
> This WBM page is only available in access point mode.



Radio	WLAN Mode	Configured Channel	Alternative DFS Channel	Operative Channel	HT Channel Width [MHz]	iFeatures	Status
WLAN 1	802.11n (2.4 GHz)	Auto	-	-	20	iPCF	disabled
WLAN 2	802.11n (5 GHz)	Auto	-	-	20	-	disabled

Radio	Port	MAC Address	SSID	Security	Status
WLAN 1	VAP 1.1	00-1b-1b-38-5c-98	Siemens Wireless Network	iPCF Authentication	enabled
WLAN 1	VAP 1.2	00-1b-1b-38-5c-99	Siemens Wireless Network 1.2	iPCF Authentication	disabled
WLAN 1	VAP 1.3	00-1b-1b-38-5c-9a	Siemens Wireless Network 1.3	iPCF Authentication	disabled
WLAN 1	VAP 1.4	00-1b-1b-38-5c-9b	Siemens Wireless Network 1.4	iPCF Authentication	disabled
WLAN 1	VAP 1.5	00-1b-1b-38-5c-9c	Siemens Wireless Network 1.5	iPCF Authentication	disabled
WLAN 1	VAP 1.6	00-1b-1b-38-5c-9d	Siemens Wireless Network 1.6	iPCF Authentication	disabled
WLAN 1	VAP 1.7	00-1b-1b-38-5c-9e	Siemens Wireless Network 1.7	iPCF Authentication	disabled
WLAN 1	VAP 1.8	00-1b-1b-38-5c-9f	Siemens Wireless Network 1.8	iPCF Authentication	disabled
WLAN 2	VAP 2.1	00-1b-1b-38-5c-a0	Siemens Wireless Network 2	Open System	enabled
WLAN 2	VAP 2.2	00-1b-1b-38-5c-a1	Siemens Wireless Network 2.2	Open System	disabled
WLAN 2	VAP 2.3	00-1b-1b-38-5c-a2	Siemens Wireless Network 2.3	Open System	disabled
WLAN 2	VAP 2.4	00-1b-1b-38-5c-a3	Siemens Wireless Network 2.4	Open System	disabled
WLAN 2	VAP 2.5	00-1b-1b-38-5c-a4	Siemens Wireless Network 2.5	Open System	disabled
WLAN 2	VAP 2.6	00-1b-1b-38-5c-a5	Siemens Wireless Network 2.6	Open System	disabled
WLAN 2	VAP 2.7	00-1b-1b-38-5c-a6	Siemens Wireless Network 2.7	Open System	disabled
WLAN 2	VAP 2.8	00-1b-1b-38-5c-a7	Siemens Wireless Network 2.8	Open System	disabled

Description

Table 1 has the following columns:

- **Radio**
  Shows the available WLAN interfaces.
- **Port**
  Shows the available VAP interfaces.
- **WLAN Mode**
  Shows the transmission standard. If DFS is activated, the transmission standard "802.11h" is not shown additionally but only the configured transmission standard "802.11a".
- **Configured Channel**
  Shows the configured channel. If "Auto" is displayed, the access point searches for a free channel itself.
- **Alternative DFS Channel**
  If the DFS function is enabled, the configured alternative channel of the access point is displayed.
  If "Auto" is displayed, the access point searches for an alternative channel itself.
  If the DFS function is activated and the access point browses for primary users for 60 seconds before starting communication with the selected channel, the text "scanning ..." is displayed instead of the channel.
- **Operational channel**
  Shows the channel of the access point via which the access point communicates.
- **HT Channel Width [MHz]**
  Shows the channel bandwidth.
  - 20
    Channel bandwidth 20 MHz
  - 40 up
    Channel bandwidth 40 MHz. The configured channel and the neighboring channel above it are used.
  - 40 down
    Channel bandwidth 40 MHz. The configured channel and the neighboring channel below it are used.

  Note

  Channel bandwidth 40 MHz and frequency band 2.4 GHz

  If the access point detects another access point on the configured channel or on neighboring channels, the access point changes the channel bandwidth from 40 MHz to 20 MHz. If you set a "free" channel on the access point, the access point uses the channel bandwidth 40 MHz.

- **iFeatures**
  Shows which iFeatures are used.
  - -
    iFeatures are not used.
  - iPCF
  - iPCF-HT
  - iPCF-MC
  - iPRP
  - iREF
  - AeroScout
- **State**
  Shows the status of the WLAN interface.
  - enabled
    The WLAN interface is enabled.
  - disabled
    The WLAN interface is disabled.

Table 2 has the following columns:

- **Radio**
  Shows the available WLAN interfaces in this column.
- **Port**
  Shows the port of the virtual access point.
- **MAC Address**
  Shows the MAC address of the virtual access point.
- **SSID**
  Shows the SSID.
- **Security**
  Shows which authentication method is used.
  - If the authentication method "Open System + Encryption" or "Shared Key" is used, the "Encrypted (WEP/AES)" is displayed for both authentication methods.
  - If iPCF, iPCF-HT or iPCF-MC mode is enabled on a WLAN interface, the following is displayed depending on the encryption status:
    iPCF Encrypted (AES): Encryption is enabled.
    iPCF authentication: Encryption is disabled.
- **State**
  Shows the status of the WLAN interface.
  - enabled
    The WLAN interface is enabled.
  - disabled
    The WLAN interface is disabled.

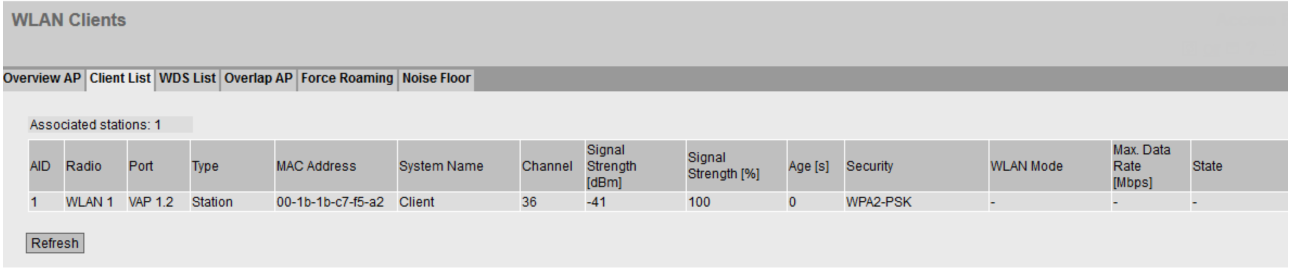
6.4.14.2 Client list

Logged-on clients

The WBM page shows the clients logged on to the access point as well as additional information, for example status, signal strength, MAC address.

Note

This WBM page is only available in access point mode.



Associated stations: 1

AID	Radio	Port	Type	MAC Address	System Name	Channel	Signal Strength [dBm]	Signal Strength [%]	Age [s]	Security	WLAN Mode	Max. Data Rate [Mbps]	State
1	WLAN 1	VAP 1.2	Station	00-1b-1b-c7-f5-a2	Client	36	-41	100	0	WPA2-PSK	-	-	-

Description

- **Logged-on clients**
  Shows the number of clients logged on to the access point.

The table has the following columns:

- **AID** (Associated ID)
  Shows the connection ID of the client. If the client connects to the access point via the VAP interface, the client is assigned a connection ID. The connection ID is unique within a VAP interface. If two clients log on at different VAP interfaces, both clients can receive the same ID.
- **Radio**
  Shows the available WLAN interfaces.
- **Port**
  Shows the VAP interface.
- **Type**
  Shows the client type, for example "Sta" stands for IEEE 802.11 standard client.
- **MAC Address**
  Shows the MAC address of the client.
- **System Name**
  Shows the system name of the client if the client communicates this to the access point. Not all clients support this parameter.
- **Channel**
  Shows the channel over which the client communicates with the access point.
- **Signal Strength [dBm]**
  Shows the signal strength of the connected client in decibel milliwatts.

- **Signal strength [%]**
  Shows the signal strength of the connected client as a percentage.
- **Age [s]**
  Shows the time that has elapsed since the last client activity.
- **Security**
  Shows which authentication method is used.
  - If the authentication method "Open System + Encryption" or "Shared Key" is used, the "Encrypted (WEP/AES)" is displayed for both authentication methods.
  - If iPCF, iPCF-HT or iPCF-MC mode is enabled on a WLAN interface, the following is displayed depending on the encryption status:
    iPCF Encrypted (AES): Encryption is enabled.
    iPCF authentication: Encryption is disabled.
- **WLAN Mode**
  Shows the transmission standard. If DFS is activated, the transmission standard "802.11h" is not shown additionally but only the configured transmission standard "802.11a".
- **Max. Data Rate (Mbps)**
  Shows the maximum data transmission speed in megabits per second.
- **State**
  Shows the current status of the connection, for example connected means that the client is connected to the access point and is ready to communicate with the AP.

6.4.14.3 WDS List

Communication between access points

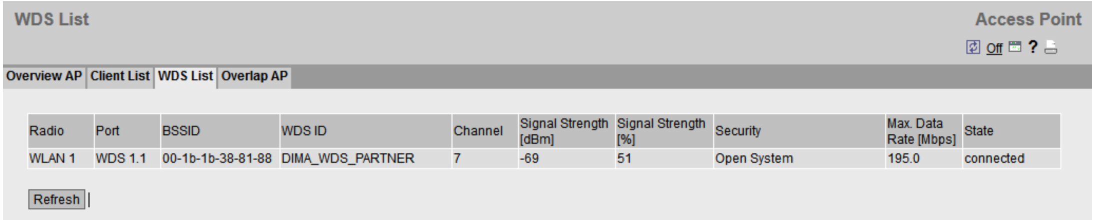
In normal operation, the access point is used as an interface to a network and communicates with clients. There are, however, situations in which several access points need to communicate with each other, for example to extend wireless coverage or to set up a wireless backbone. This mode is possible with WDS (Wireless Distributed System).

As default, the list is updated every 2 seconds. To disable the update, click "On". Instead of "On", "Off" is displayed. As default, updating is always enabled on the WBM page.

Note

This WBM page is only available in access point mode.

This page shows information about the WDS connections of the access point.



Radio	Port	BSSID	WDS ID	Channel	Signal Strength [dBm]	Signal Strength [%]	Security	Max. Data Rate [Mbps]	State
WLAN 1	WDS 1.1	00-1b-1b-38-81-88	DIMA_WDS_PARTNER	7	-69	51	Open System	195.0	connected

Description

The table has the following columns:

- **Radio**
  Shows the available WLAN interfaces.
- **Port**
  Shows the port.
- **BSSID**
- Shows the MAC address of the WDS partner.
- **WDS ID**
  Shows the name of the WDS partner.
- **Channel**
  Shows the channel over which the access point communicates with the WDS partner.
- **Signal Strength [dBm]**
  Shows the signal strength of the connected access point in bBm.
- **Signal strength [%]**
  Shows the signal strength of the connected access point as a percentage.
- **Security**
  Shows which authentication method is used.
  - If the authentication method "Open System + Encryption" or "Shared Key" is used, the "Encrypted (WEP/AES)" is displayed for both authentication methods.
  - If iPCF, iPCF-HT or iPCF-MC mode is enabled on a WLAN interface, the following is displayed depending on the encryption status:
    iPCF Encrypted (AES): Encryption is enabled.
    iPCF authentication: Encryption is disabled.
- **Max. Data Rate (Mbps)**
  Shows the maximum data transmission speed for the relevant WDS partner.
- **State**
  Shows the current status of the WDS connection.

6.4.14.4 Overlap AP

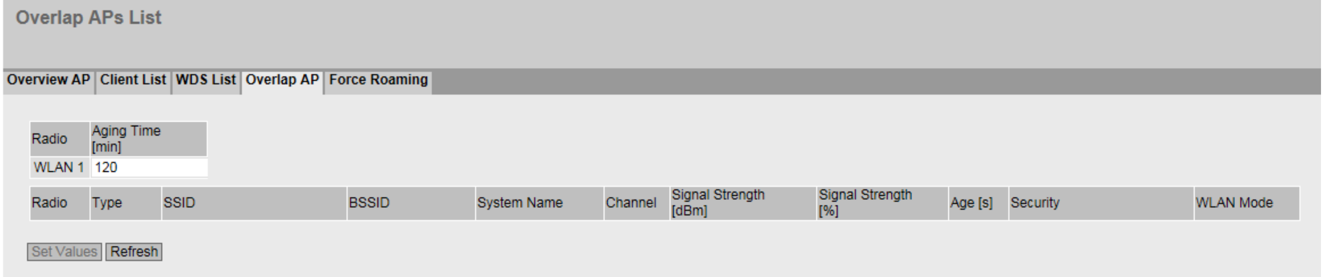
Overlapping channels

Note

This WBM page is only available in access point mode.

For optimum data throughput, it is important that the set wireless channel is not used by other access points. In the 2.4 GHz band (802.11b or 802.11g), there is overlapping of the channels so that an access point occupies not only the set channel but also the two or three adjacent channels. You should therefore make sure that there is adequate channel spacing to neighboring access points. For the 5 GHz band, ensure that you use the correct channel planning and do not inadvertently use the same channels.

This WBM page shows all access points that are visible on the set or adjacent channels (at 2.4 GHz or at 5 GHz). If entries exist here, the maximum data throughput of the access point and the availability of the communication link to the access point is potentially impaired. The displayed channel is read out from the beacon of the respective access point which is operated on the same channel as the SCALANCE W device.



Radio	Aging Time [min]
WLAN 1	120

Radio	Type	SSID	BSSID	System Name	Channel	Signal Strength [dBm]	Signal Strength [%]	Age [s]	Security	WLAN Mode

Description

Table 1 has the following columns:

- **Radio**
  Shows the available WLAN interfaces.
- **Aging Time [min]**
  Specify the life time of the entries in the list. If an access point is inactive for longer than the set time, it is removed from the list.

Note

Changing the aging time

The aging time is a WLAN setting. For this reason, if a change is made, the WLAN connection is briefly interrupted to accept the new value.

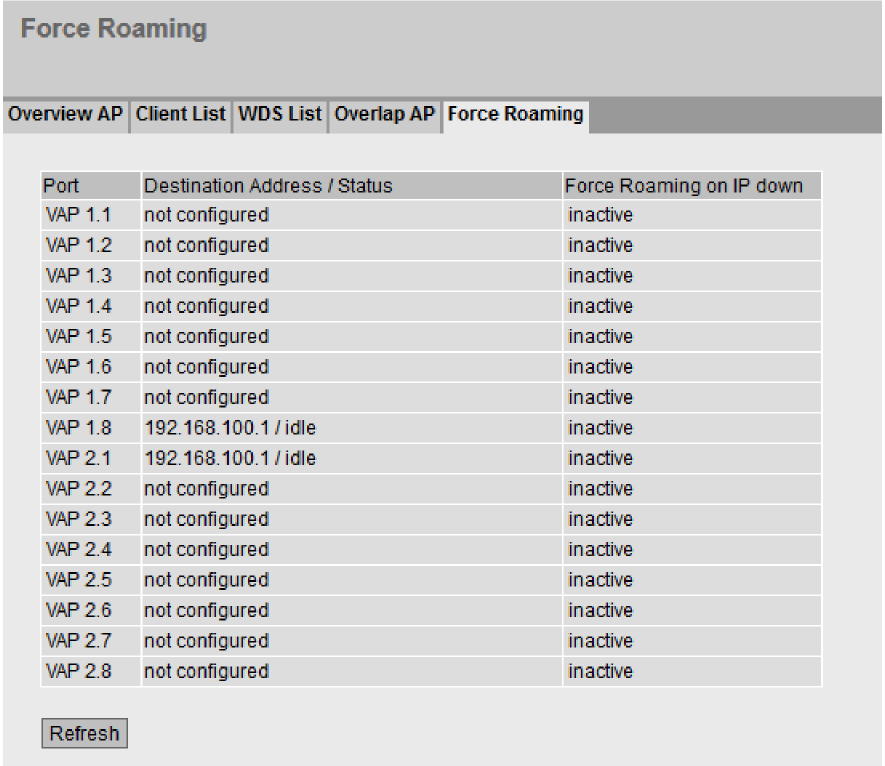
The table has the following columns:

- **Radio**
  Shows the available WLAN interfaces in this column.
- **Type**
  Shows the mode of the WLAN interface.
- **SSID**
  Shows the SSID of the access point.
- **BSSID**
  Shows the MAC address of the access point.
- **System Name**
  Shows the system name of the SCALANCE W700-Geräts. The entry depends on the access point. Not all access points support this parameter.
- **Channel**
  Shows the channel over which the client communicates with the access point.
- **Signal Strength [dBm]**
  Shows the signal strength of the access point in dBm.

- **Signal strength [%]**
  Shows the signal strength of the access point as a percentage.
- **Age [s]**
  Shows the time that has elapsed since the last access point activity.
- **Security**
  Shows which authentication method is used.
  - If the authentication method "Open System + Encryption" or "Shared Key" is used, the "Encrypted (WEP/AES)" is displayed for both authentication methods.
  - If iPCF, iPCF-HT or iPCF-MC mode is enabled on the WLAN interface, the following is displayed depending on the encryption status:
    iPCF Encrypted (AES): Encryption is enabled.
    iPCF authentication: Encryption is disabled.
- **WLAN Mode**
  Shows the transmission standard. If DFS is activated, the transmission standard "802.11h" is not shown additionally but only the configured transmission standard "802.11a" or "802.11n".

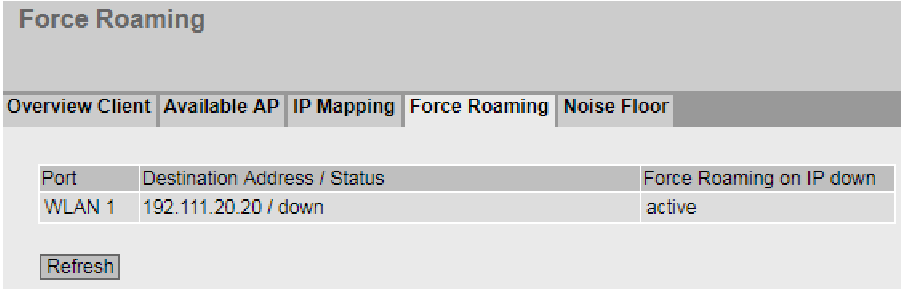
6.4.14.5 Force roaming

In access point mode:


Force Roaming

Port	Destination Address / Status	Force Roaming on IP down
VAP 1.1	not configured	inactive
VAP 1.2	not configured	inactive
VAP 1.3	not configured	inactive
VAP 1.4	not configured	inactive
VAP 1.5	not configured	inactive
VAP 1.6	not configured	inactive
VAP 1.7	not configured	inactive
VAP 1.8	192.168.100.1 / idle	inactive
VAP 2.1	192.168.100.1 / idle	inactive
VAP 2.2	not configured	inactive
VAP 2.3	not configured	inactive
VAP 2.4	not configured	inactive
VAP 2.5	not configured	inactive
VAP 2.6	not configured	inactive
VAP 2.7	not configured	inactive
VAP 2.8	not configured	inactive

In client mode:



Port	Destination Address / Status	Force Roaming on IP down
WLAN 1	192.111.20.20 / down	active

This WBM page shows the current status of the connection. It also shows whether there is roaming.

The device monitors the connection to certain addresses cyclically. To achieve this, the device sends echo messages (pings) to the configured destination addresses at regular intervals.

Description

The table has the following columns:

- **Port**
  Shows the available interfaces.
  - VAP X.Y (in access point mode)
  - WLAN 0/X (in client mode)
- **Destination Address / State**
  Shows which destination address is monitored and the status of the connection. You configure the destination address in "Interfaces > WLAN > Force Roaming".
  - not configured: No destination address is configured.
  - idle: The configuration is incomplete.
  - up: The destination address is reachable.
  - down: The destination address is unreachable.
- **Force Roaming on IP down**
  Indicates whether roaming is currently being performed.
  - Inactive: No roaming is being performed. No change to the WLAN interface.
  - Active: None of the destination addresses is reachable. To force the logged on clients / connected access points to roam, the device has disabled the corresponding interface.

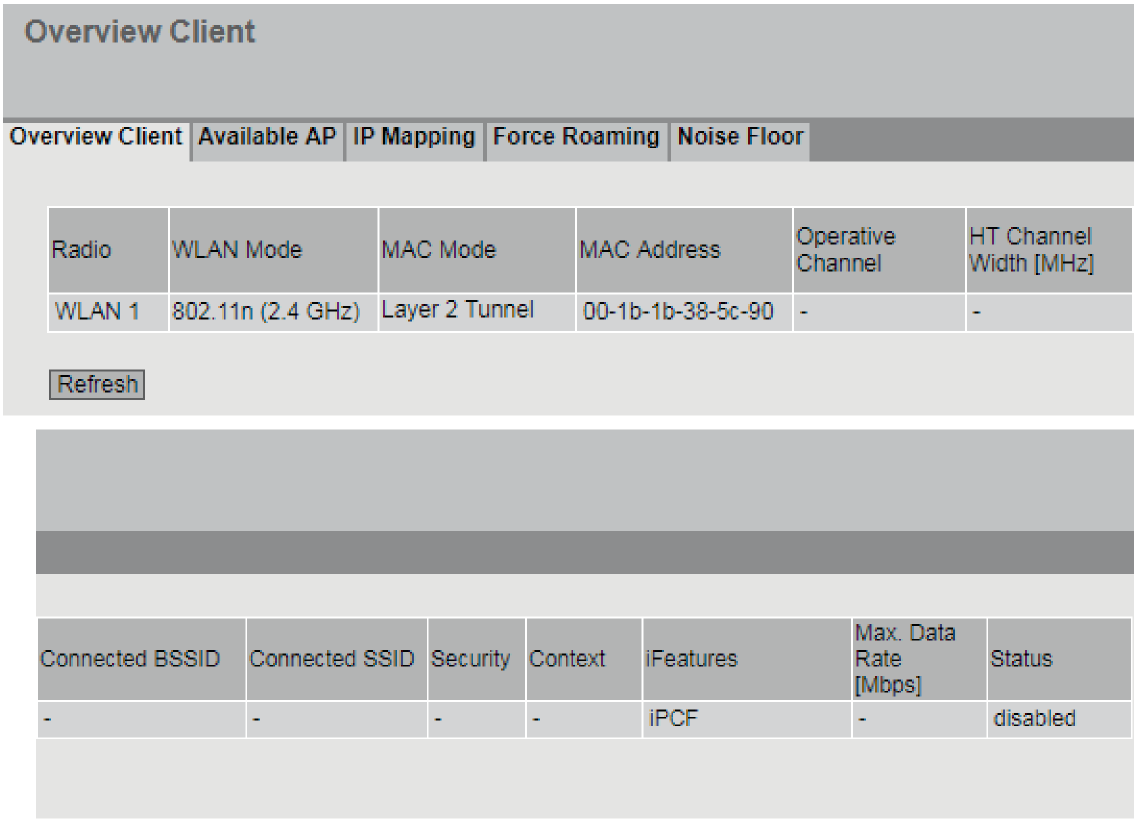
6.4.14.6 Overview Client

Overview of the configuration

Note

This page is only available for clients or access points in client mode.

The page shows an overview of the existing clients and their configuration.



Overview Client

Radio	WLAN Mode	MAC Mode	MAC Address	Operative Channel	HT Channel Width [MHz]
WLAN 1	802.11n (2.4 GHz)	Layer 2 Tunnel	00-1b-1b-38-5c-90	-	-

Connected BSSID	Connected SSID	Security	Context	iFeatures	Max. Data Rate [Mbps]	Status
-	-	-	-	iPCF	-	disabled

Description

- **Radio**
  Shows the available WLAN interfaces.
- **WLAN Mode**
  Shows the transmission standard.

- **MAC Mode**
  Shows how the MAC address is assigned to the interface.
  - Automatic
    The client automatically adopts the source MAC address of the first frame that it receives over the Ethernet interface.
  - Manual
    The address was entered manually.
  - Own
    The client uses the MAC address of the Ethernet interface for the WLAN interface.
  - Layer 2 Tunnel
    The client uses the MAC address of the Ethernet interface for the WLAN interface. The network is also informed of the MAC addresses connected to the Ethernet interface of the client. Up to eight MAC addresses can be used.
- **MAC Address**
  Shows the MAC address of the WLAN interface.
- **Operational channel**
  Shows the channel of the access point to which the client is connected.
- **HT Channel Width [MHz]**
  Shows the channel bandwidth.
  - 20
    Channel bandwidth 20 MHz
  - 40up
    Channel bandwidth 40 MHz. The configured channel and the neighboring channel above it are used.
  - 40down
    Channel bandwidth 40 MHz. The configured channel and the neighboring channel below it are used.

  Note

  Channel bandwidth 40 MHz and frequency band 2.4 GHz

  If the access point detects another access point on the configured channel or on neighboring channels, the access point changes the channel bandwidth from 40 MHz to 20 MHz. If you set a "free" channel on the access point, the access point uses the channel bandwidth 40 MHz.

- **Connected BSSID**
  Shows the MAC address of the access point to which the client is connected.
- **Connected SSID**
  Shows the SSID of the access point to which the client is connected.

- **Security**
  Shows which authentication method is used.
  - If the authentication method "Open System + Encryption" or "Shared Key" is used, the "Encrypted (WEP/AES)" is displayed for both authentication methods.
  - If iPCF, iPCF-HT or iPCF-MC mode is enabled, the following is displayed depending on the encryption status:
    iPCF Encrypted (AES): Encryption is enabled.
    iPCF authentication: Encryption is disabled.
- **Context**
  Shows which security context is used.
- **iFeatures**
  Shows which iFeatures are used.
  - -
    iFeatures are not used.
  - iPCF
  - iPCF-HT
  - iPCF-MC
  - iPRP
  - iREF
  - AeroScout
- **State**
  Shows the status of the WLAN interface.
  - enabled
    The WLAN interface is enabled.
  - disabled
    The WLAN interface is disabled.

6.4.14.7 Available APs

Available access points

Note

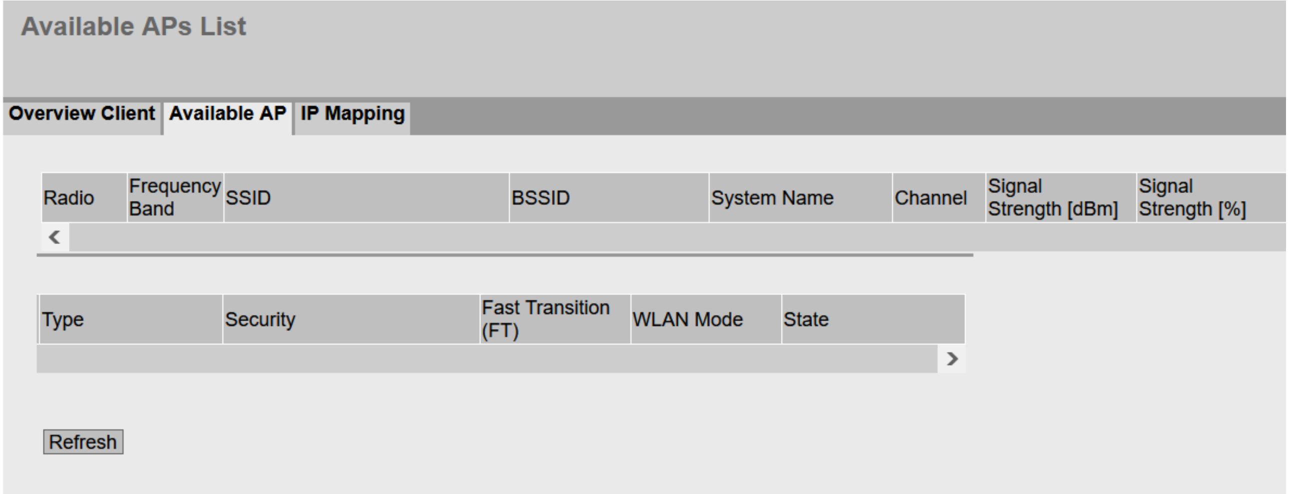
This page is only available for clients or access points in client mode.

This page shows all the access points visible to the client. The list also includes the access points to which the client cannot connect due to its configuration.

Note

Display when iPCF mode is activated

If the iPCF mode is active with a SCALANCE W700, the display is different. Since the client does not run a background scan in this case, only the access point with which the client is currently connected is displayed.



Radio	Frequency Band	SSID	BSSID	System Name	Channel	Signal Strength [dBm]	Signal Strength [%]

Type	Security	Fast Transition (FT)	WLAN Mode	State

Description

The table has the following columns:

- **Radio**
  Shows the WLAN interface visible to the access point.
- **SSID**
  Shows the SSID of the access point.
- **BSSID**
  Shows the MAC address of the access point.
- **System Name**
  Shows the system name of the access point. The entry depends on the access point. Not all access points support this parameter.
- **Channel**
  Shows the channel on which the access point transmits or communicates.
- **Signal Strength [dBm]**
  Shows the signal strength of the access point in bBm.
- **Signal strength [%]**
  Shows the signal strength of the access point as a percentage.
- **Type**
  Shows the mode of the WLAN interface.

- **Security**
  Shows which authentication method is used.
  – If the authentication method "Open System + Encryption" or "Shared Key" is used, the "Encrypted (WEP/AES)" is displayed for both authentication methods.
  – If iPCF, iPCF-HT or iPCF-MC mode is enabled on a WLAN interface, the following is displayed depending on the encryption status:
  iPCF Encrypted (AES): Encryption is enabled.
  iPCF authentication: Encryption is disabled.
- **WLAN Mode**
  Shows the transmission standard. If DFS is activated, the transmission standard "802.11h" is not shown additionally but only the configured transmission standard "802.11a" or "802.11n".
- **State**
  Shows the status of the access point, for example whether or not the access point is available.

6.4.14.8 IP mapping table

WLAN access by several devices over a client

Note

This WBM page is only available for clients or access points in client mode.

You can make WLAN access available for several devices with one client if you use IP mapping. This means that you do not need to equip every device with its own WLAN client. This is possible only if the connected devices are addressed only by IP frames. Communication at MAC address level (ISO/OSI layer 2) can

- be established with one component whose MAC address is configured on the client,
- be established with a maximum of eight components if the "Layer 2 Tunnel" function is selected.

The "Layer 2 Tunnel" setting meets the requirements of industrial applications in which MAC address-based communication takes place with several devices downstream from the client. Clients with this setting cannot connect on standard Wifi access points.

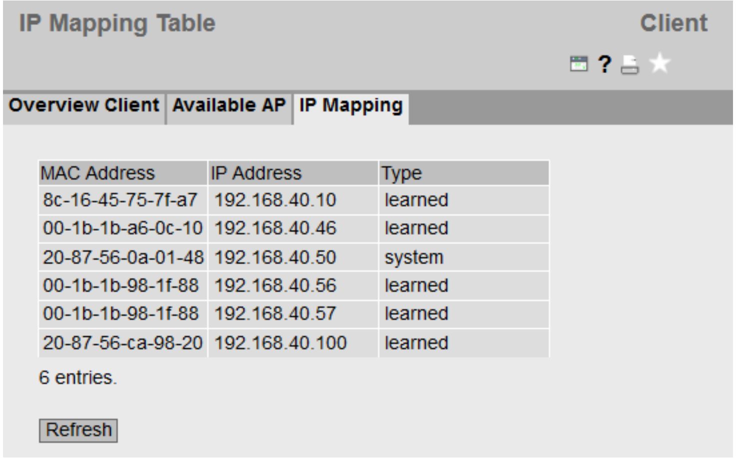
MAC address/IPv4 address assignment

The client maintains a table with the assignment of MAC address and IPv4 address to send incoming IP frames to the correct MAC address. This WBM page shows this table.

Note

IP mapping table

If "Layer 2 Tunnel" is configured for a client, the IP mapping table is not displayed.



IP Mapping Table
Client

MAC Address	IP Address	Type
8c-16-45-75-7f-a7	192.168.40.10	learned
00-1b-1b-a6-0c-10	192.168.40.46	learned
20-87-56-0a-01-48	192.168.40.50	system
00-1b-1b-98-1f-88	192.168.40.56	learned
00-1b-1b-98-1f-88	192.168.40.57	learned
20-87-56-ca-98-20	192.168.40.100	learned

6 entries.

MAC mode

IP frames sent by the client to the access point always have the MAC address of the WLAN client as the source MAC address. In the "learning table" of the access point there is therefore only the MAC address of the WLAN client.

If there are further devices downstream from the client, the "Automatic" option should not be enabled. In this case, the MAC address would be assigned indiscriminately to the first device that signals over Ethernet. If there is only IP communication between the access point and the client, the default setting "Own" can be retained. If MAC address-based frames are also to be sent by devices downstream from the client, you need to select the settings "Manual", "Automatic" or "Layer 2 Tunnel".

Description

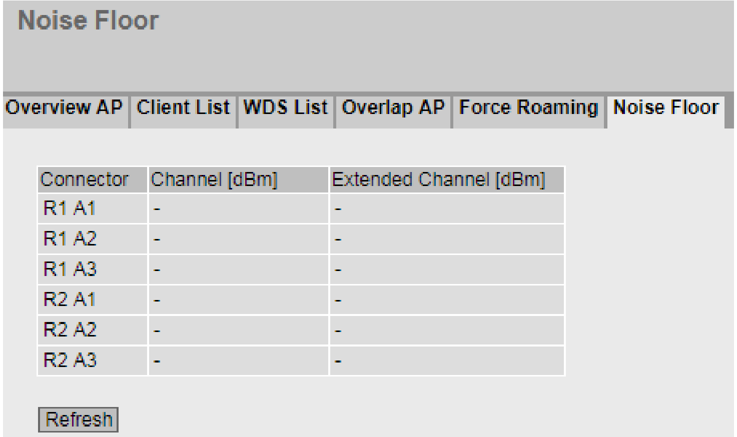
The table has the following columns

- **MAC Address**
  The MAC address of a device located downstream from the WLAN client from the perspective of the access point.
- **IP Address**
  The IP address managed for this device by the WLAN client.
- **Type**
  There are two options for the type:
  – system
    The information relates to the WLAN client itself.
  – learned
    The information relates to a device downstream from the WLAN client.

6.4.14.9 Background noise

Note

This WBM page is only available in access point mode.



Noise Floor

Connector	Channel [dBm]	Extended Channel [dBm]
R1 A1	-	-
R1 A2	-	-
R1 A3	-	-
R2 A1	-	-
R2 A2	-	-
R2 A3	-	-

The page displays the background noise of the channel.

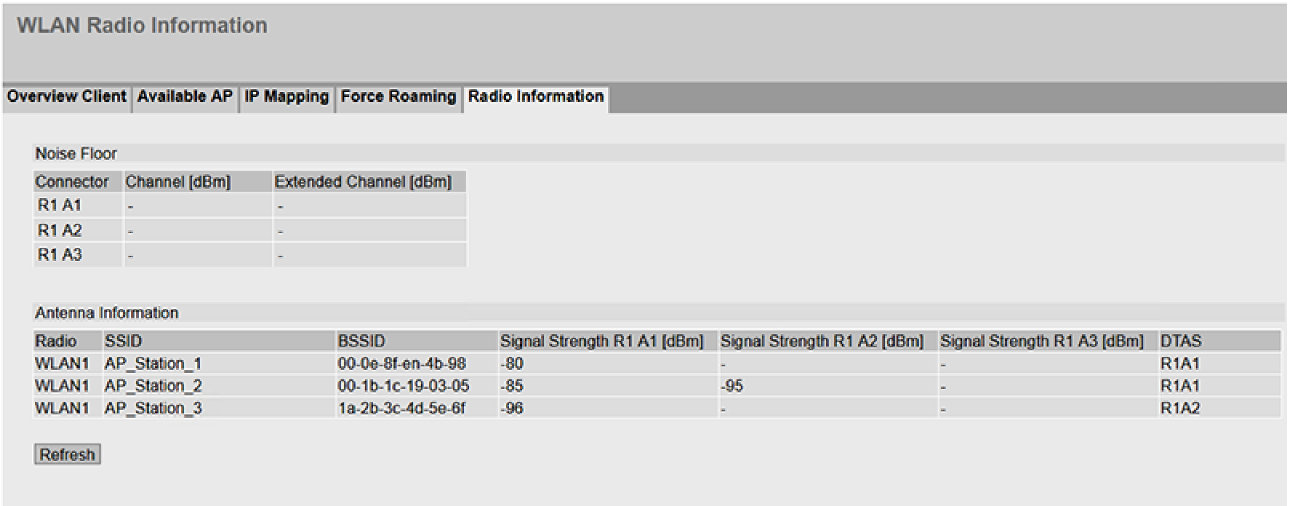
Description

- **Connector**
  Shows the name of the relevant antenna connector.
- **Channel [dBm]**
  Shows the background noise of the set channel.
- **Extended Channel [dBm]**
  Shows the background noise of the extended channel (HT-40).

6.4.14.10 Radio interfaces information

Note

This page is only available for clients or access points in client mode.



Noise Floor

Connector	Channel [dBm]	Extended Channel [dBm]
R1 A1	-	-
R1 A2	-	-
R1 A3	-	-

Antenna Information

Radio	SSID	BSSID	Signal Strength R1 A1 [dBm]	Signal Strength R1 A2 [dBm]	Signal Strength R1 A3 [dBm]	DTAS
WLAN1	AP_Station_1	00-0e-8f-en-4b-98	-80	-	-	R1A1
WLAN1	AP_Station_2	00-1b-1c-19-03-05	-85	-95	-	R1A1
WLAN1	AP_Station_3	1a-2b-3c-4d-5e-6f	-96	-	-	R1A2

The page contains information on background noise of the channel and antenna.

Description

The "Background noise" table contains the following columns:

- Connector
  Shows the name of the relevant antenna connector.
- Channel [dBm]
  Shows the background noise of the set channel.
- Extended Channel [dBm]
  Shows the background noise of the extended channel (HT-40).

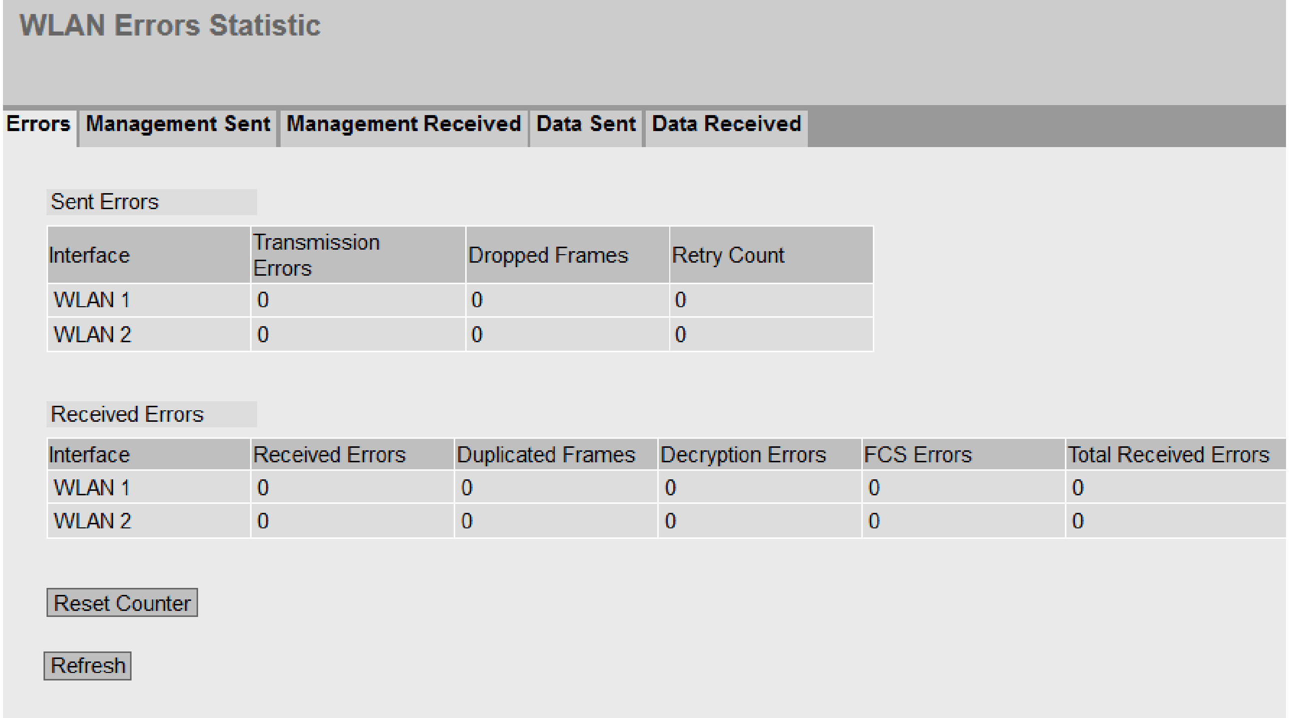
The "Antenna information" table contains the following columns:

- Radio interface
  Shows the available WLAN interfaces.
- SSID
  Shows the network name of the access point.
- BSSID
  Shows the MAC address of the access point.
- Signal strength R1Ax
  Shows the signal strength in dBm for each antenna.
- DTAS
  Shows which transmitting antenna is being used.

6.4.15 WLAN statistics

6.4.15.1 Errors

The WBM page show how many bad frames were received or sent per WLAN interface. If an increased number of errors occurs, you should check the settings for the WLAN interface(s), the setup of the SCALANCE W devices and the connection quality.



WLAN Errors Statistic

Sent Errors

Interface	Transmission Errors	Dropped Frames	Retry Count
WLAN 1	0	0	0
WLAN 2	0	0	0

Received Errors

Interface	Received Errors	Duplicated Frames	Decryption Errors	FCS Errors	Total Received Errors
WLAN 1	0	0	0	0	0
WLAN 2	0	0	0	0	0

Description

The Sent Errors table has the following columns:

- **Interface**
  Shows the WLAN interface to which the entries apply.
- **Error types**
  The other columns after the WLAN interface contain the absolute numbers of the frames sent according to their error type.
  The columns of the table distinguish the following error types:
  - Transmission Errors
    Shows the number and percentage of bad frames that were sent.
  - Dropped Frames
    Shows the number and percentage of frames that were discarded.
    Despite all the retries, the frame could not be successfully sent.
    The frame has not yet been sent and the recipient has logged off in the meantime.
  - Send Retries
    Shows the number and percentage of frames sent successfully that required one or more retries.

The Receive Errors table has the following columns:

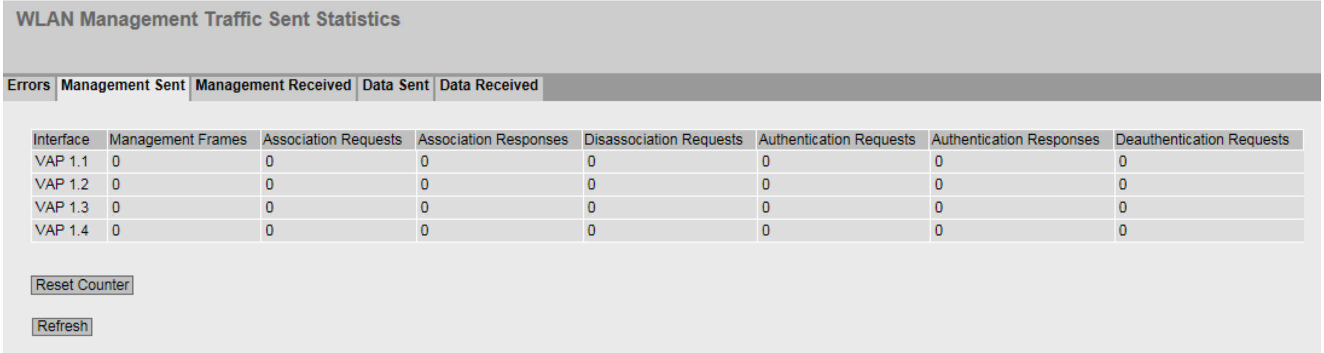
- **Interface**
  Shows the WLAN interface to which the entries apply.
- **Error types**
  The other columns after the WLAN interface contain the absolute numbers of the frames received according to their error type.
  The columns of the table distinguish the following error types:
  - Receive errors
    Shows only the number and percentage of bad frames that were received during the existing connection.
  - Duplicated Frames
    Shows the number and percentage of frames that were received twice.
  - Decryption Errors
    Shows the number and percentage of incorrectly encrypted frames.
  - FCS Errors
    Shows the number and percentage of frames in which the checksum was incorrect.
  - Total receive errors
    Shows the number and percentage of all bad frames that were received in total.

6.4.15.2 Management Sent

The WBM page shows how many frames in response to logging on or logging off were counted per interface.

Note

This WBM page is only available in access point mode.



WLAN Management Traffic Sent Statistics

Interface	Management Frames	Association Requests	Association Responses	Disassociation Requests	Authentication Requests	Authentication Responses	Deauthentication Requests
VAP 1.1	0	0	0	0	0	0	0
VAP 1.2	0	0	0	0	0	0	0
VAP 1.3	0	0	0	0	0	0	0
VAP 1.4	0	0	0	0	0	0	0

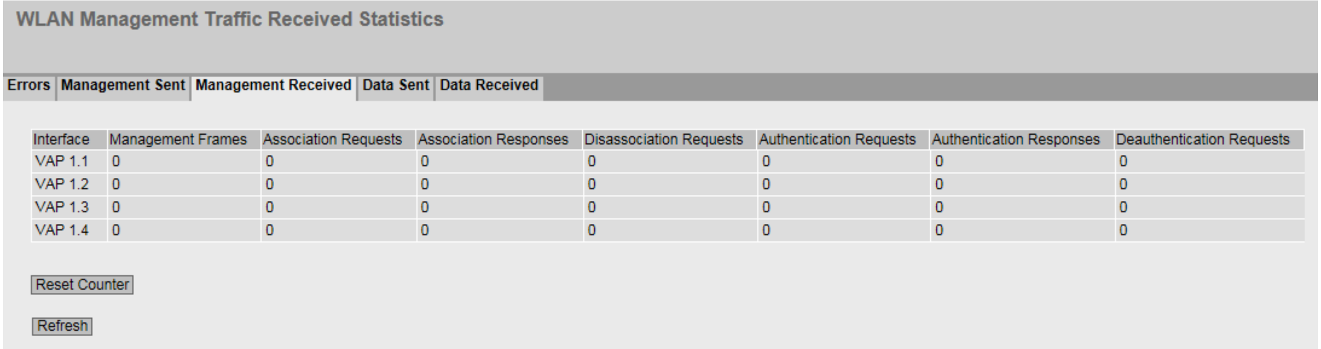
Description

The table has the following columns:

- **Interface**
  Shows the interface to which the entries apply.
- **Frame**
  - Management Frames
    Shows the number of management frames
  - Association Requests
    Shows the number of requesting association frames relevant for a logon.
  - Association Responses
    Shows the number of responding association frames relevant for a logon.
  - Disassociation Requests
    Shows the number of requesting disassociation frames relevant for a logoff.
  - Authentication Requests
    Shows the number of requesting authentication frames relevant for a logon.
  - Authentication Responses
    Shows the number of responding authentication frames relevant for a logon.
  - Deauthentication Requests
    Shows the number of deauthentication frames relevant for a logoff.

6.4.15.3 Management Received

The WBM page shows how many frames in response to logging on or logging off were counted per interface.



WLAN Management Traffic Received Statistics

Interface	Management Frames	Association Requests	Association Responses	Disassociation Requests	Authentication Requests	Authentication Responses	Deauthentication Requests
VAP 1.1	0	0	0	0	0	0	0
VAP 1.2	0	0	0	0	0	0	0
VAP 1.3	0	0	0	0	0	0	0
VAP 1.4	0	0	0	0	0	0	0

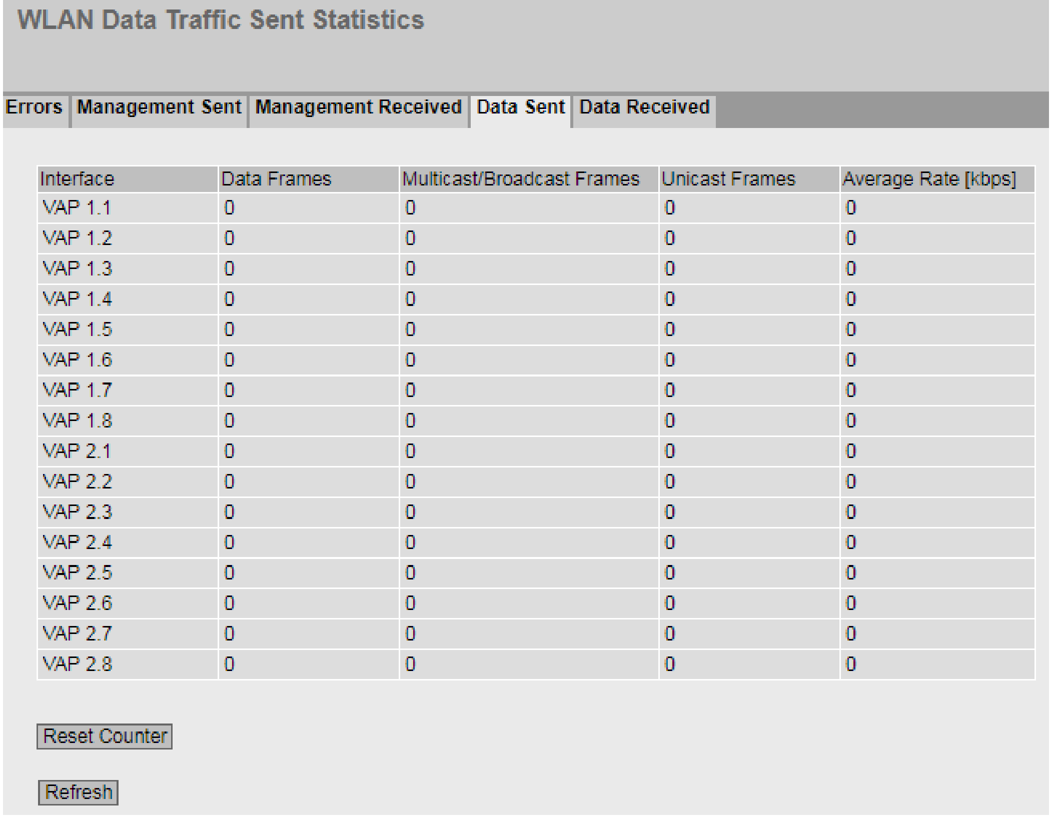
Description

The table has the following columns:

- **Interface**
  Shows the interface to which the entries apply.
- **Frame**
  - Management Frames
    Shows the number of management frames
  - Association Requests
    Shows the number of requesting association frames relevant for a logon.
  - Association Responses
    Shows the number of responding association frames relevant for a logon.
  - Disassociation Requests
    Shows the number of requesting disassociation frames relevant for a logoff.
  - Authentication Requests
    Shows the number of requesting authentication frames relevant for a logon.
  - Authentication Responses
    Shows the number of responding authentication frames relevant for a logon.
  - Deauthentication Requests
    Shows the number of deauthentication frames relevant for a logoff.

6.4.15.4 Data Sent

The WBM page shows how many frames were sent per interface.



WLAN Data Traffic Sent Statistics

Interface	Data Frames	Multicast/Broadcast Frames	Unicast Frames	Average Rate [kbps]
VAP 1.1	0	0	0	0
VAP 1.2	0	0	0	0
VAP 1.3	0	0	0	0
VAP 1.4	0	0	0	0
VAP 1.5	0	0	0	0
VAP 1.6	0	0	0	0
VAP 1.7	0	0	0	0
VAP 1.8	0	0	0	0
VAP 2.1	0	0	0	0
VAP 2.2	0	0	0	0
VAP 2.3	0	0	0	0
VAP 2.4	0	0	0	0
VAP 2.5	0	0	0	0
VAP 2.6	0	0	0	0
VAP 2.7	0	0	0	0
VAP 2.8	0	0	0	0

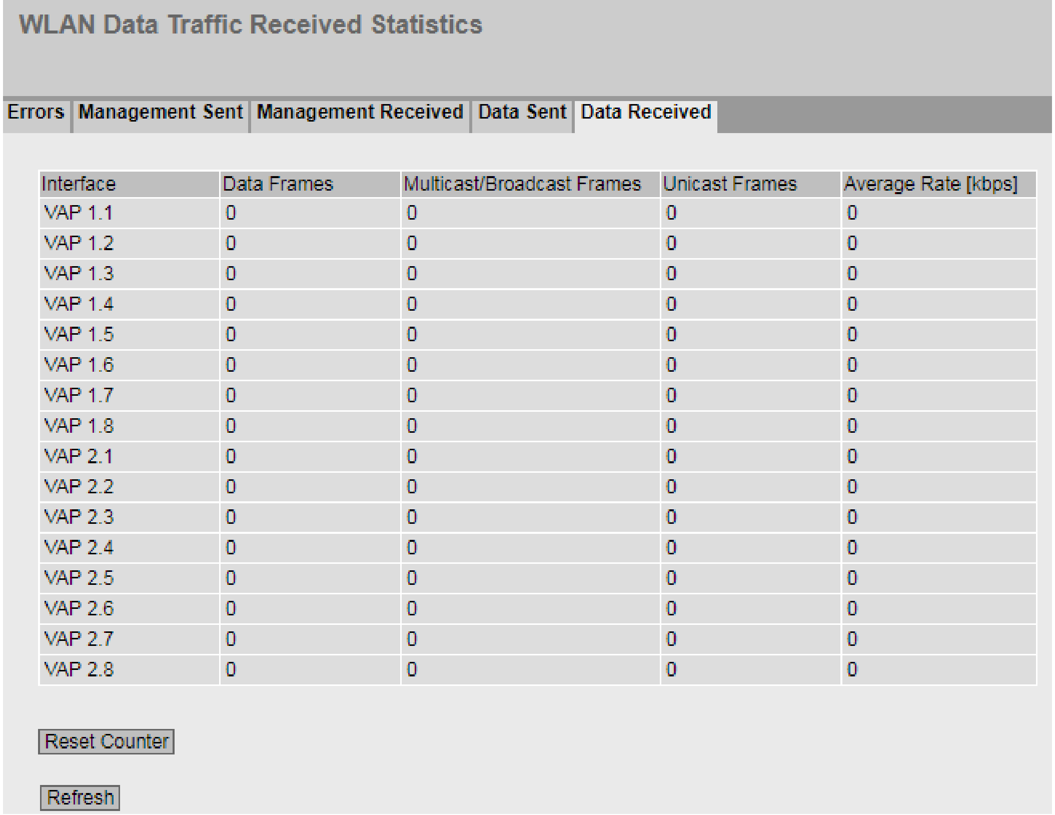
Description

The table has the following columns:

- **Interface**
  Shows the interface to which the entries apply.
- **Frame types**
  The other columns after the interface contain the absolute numbers of the sent frames according to the frame types.
  In the columns of the table, a distinction is made according to the following frame types:
  - Data Frames
    Shows the number of sent data frames.
  - Multicast/Broadcast Frames
    Shows the number of sent multicast and broadcast frames.
  - Unicast Frames
    Shows the number of sent unicast frames.
  - Average Data Rate
    Shows the average data rate of the last data frames sent.

6.4.15.5 Data Received

The WBM page shows how many frames were received per interface.



WLAN Data Traffic Received Statistics

Interface	Data Frames	Multicast/Broadcast Frames	Unicast Frames	Average Rate [kbps]
VAP 1.1	0	0	0	0
VAP 1.2	0	0	0	0
VAP 1.3	0	0	0	0
VAP 1.4	0	0	0	0
VAP 1.5	0	0	0	0
VAP 1.6	0	0	0	0
VAP 1.7	0	0	0	0
VAP 1.8	0	0	0	0
VAP 2.1	0	0	0	0
VAP 2.2	0	0	0	0
VAP 2.3	0	0	0	0
VAP 2.4	0	0	0	0
VAP 2.5	0	0	0	0
VAP 2.6	0	0	0	0
VAP 2.7	0	0	0	0
VAP 2.8	0	0	0	0

Description

The table has the following columns:

- **Interface**
  Shows the interface to which the entries apply.
- **Frame types**
  The other columns after the interface contain the absolute numbers of the received frames according to the frame types.
  In the columns of the table, a distinction is made according to the following frame types:
  - Data Frames
    Shows the number of sent data frames.
  - Multicast/Broadcast Frames
    Shows the number of sent multicast and broadcast frames.
  - Unicast Frames
    Shows the number of sent unicast frames.
  - Average Data Rate
    Shows the average data rate of the last data frames sent.

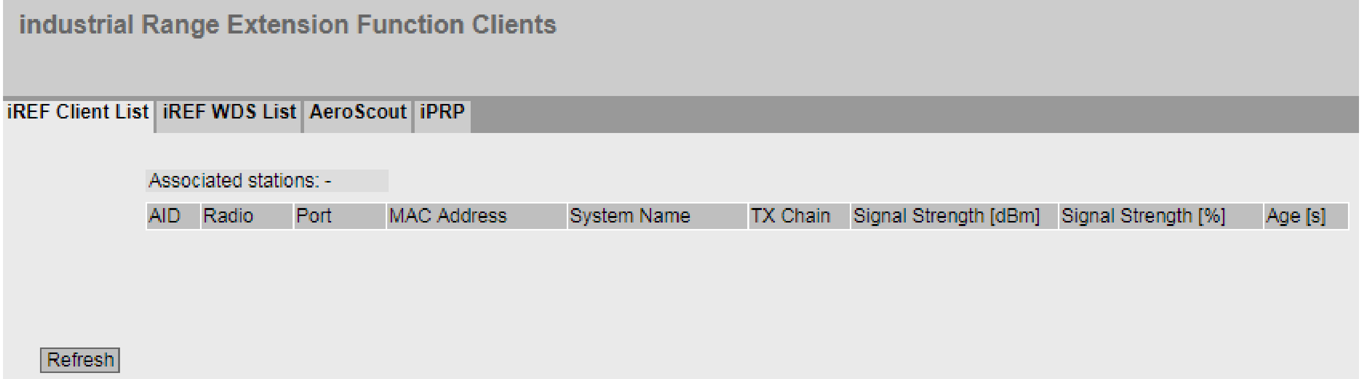
6.4.16 WLAN iFeatures

6.4.16.1 iREF Client List

The WBM page shows the antenna connector via which the clients logged on to the access point communicate. Other information such as the signal strength and the MAC address of the WLAN interface is also shown.

Note

- This WBM page is only available in access point mode.
- This WBM page can only be configured with the following KEY-PLUG:
  - Access point: W780 iFeatures (MLFB 6GK5 907-8PA00)



industrial Range Extension Function Clients

Associated stations: -

AID	Radio	Port	MAC Address	System Name	TX Chain	Signal Strength [dBm]	Signal Strength [%]	Age [s]

Description

The page contains the following box:

- **Logged-on Clients**
  Shows the number of clients logged on to the access point

The table has the following columns:

- **AID** (Associated ID)
  Shows the connection ID of the client. If the client connects to the access point via the VAP interface, the client is assigned a connection ID. The connection ID is unique within a VAP interface. If two clients log on at different VAP interfaces, both clients can receive the same ID.
- **Radio**
  Shows the available WLAN interfaces.
- **Port**
  Shows the VAP interface.
- **MAC Address**
  Shows the MAC address of the client.

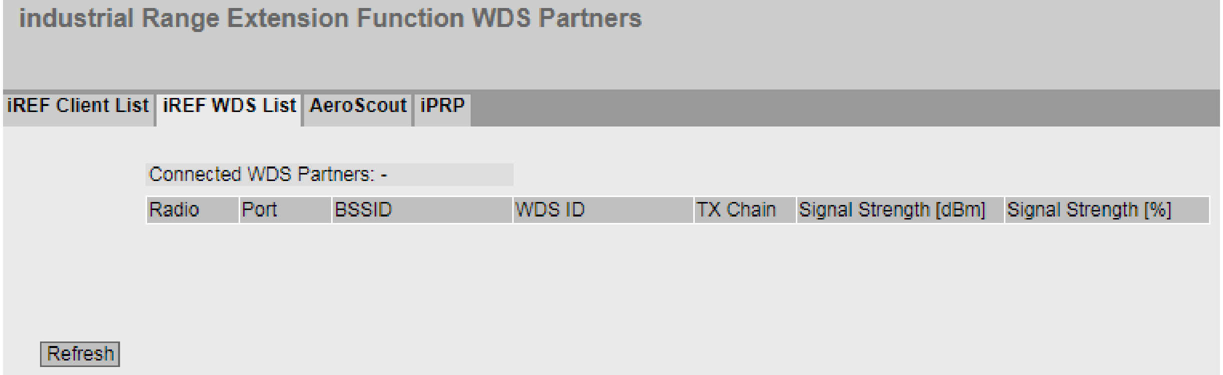
- **System Name**
  Shows the system name of the client if the client communicates this to the access point. Not all clients support this parameter.
- **Tx Chain**
  Shows the antenna connector over which the client communicates with the access point.
- **Signal Strength [dBm]**
  Shows the signal strength of the connected client in decibel milliwatts.
- **Signal strength [%]**
  Shows the signal strength of the connected client as a percentage.
- **Age [s]**
- Shows the age of the listed client.

6.4.16.2 iREF WDS List

The WBM page shows the access points logged on to the access point via a WDS link. This page shows information such as the antenna used and the signal strength of the WLAN interface.

Note

- This WBM page is only available in access point mode.
- This WBM page can only be configured with the following KEY-PLUG:
  - Access point: W780 iFeatures (MLFB 6GK5 907-8PA00)



industrial Range Extension Function WDS Partners

Connected WDS Partners: -

Radio	Port	BSSID	WDS ID	TX Chain	Signal Strength [dBm]	Signal Strength [%]

Description

The page contains the following box:

- **Connected WDS partners**
  Shows the number of access points logged on to the access point

The table has the following columns:

- **Radio**
  Shows the available WLAN interfaces.
- **Port**
  Shows the WDS interface.
- **BSSID**
  Shows the MAC address of the WDS partner.
- **WDS ID**
  Shows the name of the WDS partner.
- **Tx Chain**
  Shows the antenna connector over which the two access points communicate with each other.
- **Signal Strength [dBm]**
  Shows the signal strength of the connected access point in decibel milliwatts.
- **Signal strength [%]**
  Shows the signal strength of the connected access point as a percentage.

6.4.16.3 AeroScout

This page shows information on forwarding AeroScout frames.

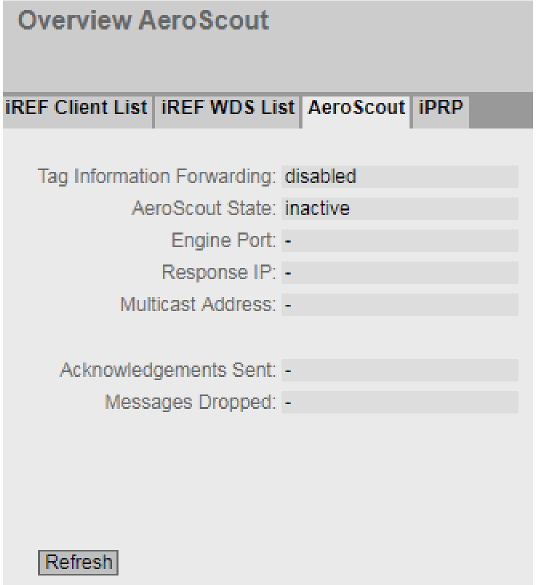
Note

- This WBM page is only available in access point mode.
- This WBM page can only be configured with the following KEY-PLUG:
  Access point: W780 iFeatures (MLFB 6GK5 907-8PA00)

Note

The AeroScout function cannot be combined with other iFeatures (iPCF, iPCF-MC,, iREF). AeroScout can only be used in the 2.4 GHz band according to IEEE 802.11g, IEEE 802.11n and IEEE 802.11n-only.

For more detailed information, please refer to the documentation of the AeroScout company (www.aeroscout.com).



Overview AeroScout

Tag Information Forwarding: disabled
AeroScout State: inactive
Engine Port: -
Response IP: -
Multicast Address: -

Acknowledgements Sent: -
Messages Dropped: -

Description

- **Tag Information Forwarding**
  In the management program that evaluates the AeroScout frames, you can specify whether or not a SCALANCE W700 device will forward frames. Here, you can see which setting was made in the management program.

  Note

  With a suitable configuration, the SCALANCE W700 forwards AeroScout frames but does not process or evaluate them itself. This is done only in the "AeroScout System Manager" program.

- **AeroScout status**
  Shows whether AeroScout is enabled or disabled.
- **Engine port**
  The SCALANCE W700 device expects UDP packets from the management program at port 1144.
- **Response IP**
  The IP address of the computer on which the management program for evaluation of the AeroScout frames is running.
- **Multicast address**
  The tag sends frames as multicast. This multicast address is configured in the management program and displayed here.

- **Sent confirmations**
  The number of confirmations sent by the SCALANCE W700 device to the management program as a result of cyclic queries or manual configuration changes in the management program (UDP packets).
- **Discarded messages**
  The number of frames not forwarded. If, for example, an AeroScout tag is configured so that it sends on channel 1, the SCALANCE W700 device does not forward a frame received on channel 6.

6.4.16.4 iPRP

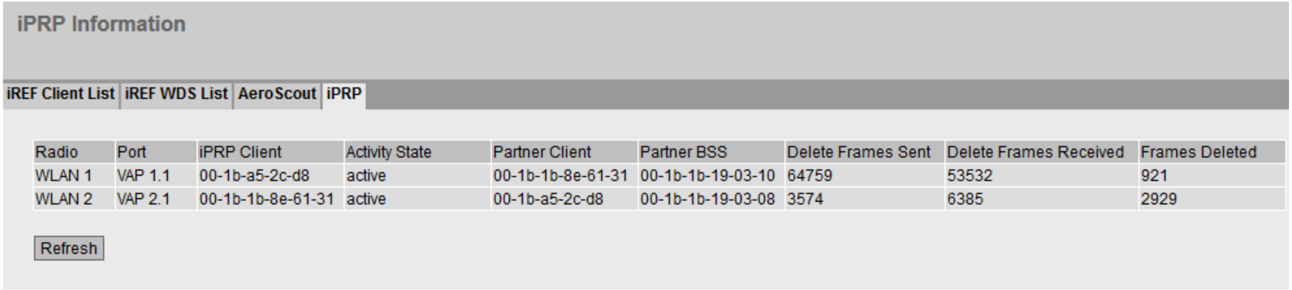
On this WBM page you can check whether the settings for iPRP are correct. You can, for example, see which device is the partner client.

Note

This WBM page can only be configured with the following KEY-PLUGs:

- Access point: W780 iFeatures (MLFB 6GK5 907-8PA00)
- Client: W740 iFeatures (MLFB 6GK5 907-4PA00)

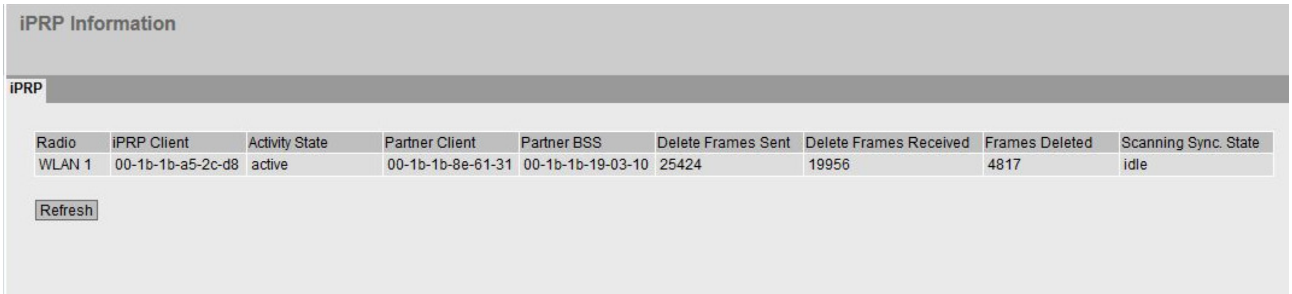
Display in access point mode



iPRP Information

Radio	Port	iPRP Client	Activity State	Partner Client	Partner BSS	Delete Frames Sent	Delete Frames Received	Frames Deleted
WLAN 1	VAP 1.1	00-1b-a5-2c-d8	active	00-1b-1b-8e-61-31	00-1b-1b-19-03-10	64759	53532	921
WLAN 2	VAP 2.1	00-1b-1b-8e-61-31	active	00-1b-a5-2c-d8	00-1b-1b-19-03-08	3574	6385	2929

Display in client mode



iPRP Information

Radio	iPRP Client	Activity State	Partner Client	Partner BSS	Delete Frames Sent	Delete Frames Received	Frames Deleted	Scanning Sync. State
WLAN 1	00-1b-1b-a5-2c-d8	active	00-1b-1b-8e-61-31	00-1b-1b-19-03-10	25424	19956	4817	idle

Description

The table has the following columns:

- **Radio**
  Shows the WLAN interfaces via which the client is connected to the access point
- **Port** (only in access point mode)
  Shows the VAP interface on which the iPRP clients are logged on.
- **iPRP Client**
  Shows the MAC address of the iPRP client.
- **ActivationState**
  Shows whether or not iPRP is enabled.
- **Partner Client**
  Shows the MAC address of the partner client.
- **Partner BSS**
  Shows the MAC address of the access point to which the partner client is connected.
- **Delete Frames Sent**
  Shows the number of iPRP delete frames that the device (access point / client) has sent to its partner device.
- **Delete Frames Received**
  Shows the number of iPRP delete frames that the device (access point / client) has received from its partner device.
- **Frames Deleted**
  Shows the number of frames not yet sent that were deleted from the queue due to the iPRP delete frame.
- **Scanning Sync State** (in client mode only)
  So that both clients do not search for an access point and change to the scan mode at he same time they synchronize with each other.
  Synchronization can have the following statuses:
  - idle: Idling No scanning
  - requested: Query to the partner client whether scanning is possible.
  - pending: Scanning is possible. Waits for the start of scanning and then changes to the status "foreground" or "background".
  - background: Background scan is performed.
  - foreground: The client has, for example, just started up and is running a foreground scan.

6.5 "System" menu

6.5.1 Configuration

System configuration

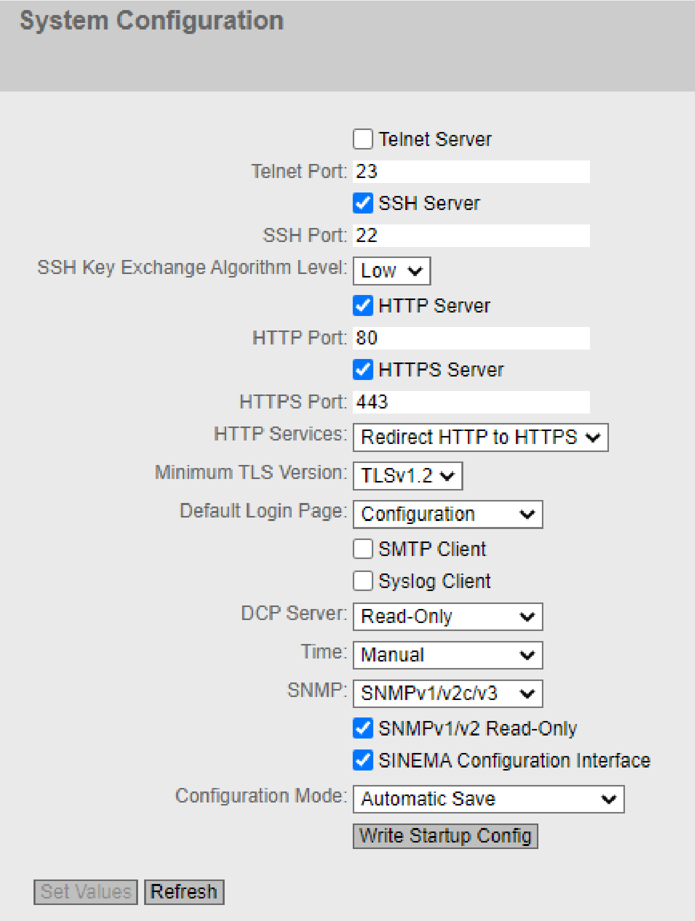
The WBM page contains the configuration overview of the access options of the device.

Specify the services that access the device. With some services, there are further configuration pages on which more detailed settings can be made.

Note

Legacy ciphers enabled by default

For compatibility reasons, outdated encryption mechanisms (legacy ciphers) are also active by default. You can disable them when configuring the services, e.g. for HTTPS.



System Configuration

☐ Telnet Server
Telnet Port: 23
☑ SSH Server
SSH Port: 22
SSH Key Exchange Algorithm Level: Low
☑ HTTP Server
HTTP Port: 80
☑ HTTPS Server
HTTPS Port: 443
HTTP Services: Redirect HTTP to HTTPS
Minimum TLS Version: TLSv1.2
Default Login Page: Configuration
☐ SMTP Client
☐ Syslog Client
DCP Server: Read-Only
Time: Manual
SNMP: SNMPv1/v2c/v3
☑ SNMPv1/v2 Read-Only
☑ SINEMA Configuration Interface
Configuration Mode: Automatic Save

Description

The page contains the following boxes:

- **Telnet Server**
  Enable or disable the "Telnet Server" service for unencrypted access to the CLI.
- **Telnet Port**
  Standard port 23 is the default. You can optionally enter a port number in the range 1024 ... 49151 or 49500 ... 65535.
- **SSH Server**
  Enable or disable the "SSH Server" service for encrypted access to the CLI.
- **SSH Port**
  Standard port 22 is the default. You can optionally enter a port number in the range 1024 ... 49151 or 49500 ... 65535.
- **SSH Key Exchange Algorithm Level**
  From the drop-down list, select the level of the SSH key exchange algorithm for SSH access to the CLI. The settings options are "Low" and "High".
- **HTTP Server**
  Enable or disable HTTP access to the WBM.
- **HTTP Port**
  Standard port 80 is the default. You can optionally enter a port number in the range 1024 ... 49151 or 49500 ... 65535.
- **HTTPS Server**
  Enable or disable HTTPS access to the WBM.
- **HTTPS Port**
  Standard port 443 is the default. You can optionally enter a port number in the range 1024 ... 49151 or 49500 ... 65535.
- **HTTP Services**
  Specify how the WBM is accessed:
  - HTTPS
    Access to the WBM is only possible with HTTPS.
  - HTTP/HTTPS
    Access to the WBM is possible with HTTP and HTTPS.
  - Redirect HTTP to HTTPS
    Access via HTTP is automatically diverted to HTTPS.
- **Minimum TLS version**
  Select the minimum TLS version to be used for the encryption from the drop-down list. Communication is not possible with devices that do not support the required TLS version.
- **DNS Client**
  Enable or disable the DNS client. You can configure other settings in "System > DNS".
- **SMTP Client**
  Enable or disable the SMTP client. You can configure other settings in "System > SMTP Client".
- **Syslog Client**
  Enable or disable the Syslog client. You can configure other settings in "System > Syslog Client".

- **DCP Server**
  Specify whether or not the device can be accessed with DCP (Discovery and Configuration Protocol):
  - "-" (disabled)
    DCP is disabled. Device parameters can neither be read nor modified.
  - Read/Write
    With DCP, device parameters can be both read and modified.
  - Read Only
    With DCP, device parameters can be read but cannot be modified.
- **Time**
  Select the setting from the drop-down list. The following settings are possible:
  - Manual
    The system time is set manually. You can configure other settings in "System > System Time > Manual Setting".
  - SIMATIC Time
    The system time is set using a SIMATIC time transmitter. You can configure other settings in "System > System Time > SIMATIC Time Client".
  - SNTP Client
    The system time is set via an SNTP server. You can configure other settings in "System > System Time > SNTP Client".
  - NTP Client
    The system time is set via an NTP server. You can configure other settings in "System > System Time > NTP Client".
- **SNMP**
  Select the protocol from the drop-down list. The following settings are possible:
  - "-" (SNMP disabled)
    Access to device parameters via SNMP is not possible.
  - SNMPv1/v2c/v3
    Access to device parameters is possible with SNMP versions 1, 2c or 3. You can configure other settings in "System > SNMP > General".
  - SNMPv3
    Access to device parameters is possible only with SNMP version 3. You can configure other settings in "System > SNMP > General".
- **SNMPv1/v2 Read-Only**
  Enable or disable write access to SNMP variables with SNMPv1/v2c.

- **SINEMA configuration interface**
  If the SINEMA configuration interface is enabled, you can download configurations to the device via the TIA Portal.
- **Configuration Mode**
  Select the mode from the drop-down list. The following modes are possible:
  - Automatic Save
    Automatic backup mode. Approximately 1 minute after the last parameter change or when you restart the device, the configuration is automatically saved. In addition to this, the following message appears in the display area "Changes will be saved automatically in x seconds. Press 'Write Startup Config' to save immediately.

    Note

    Interrupting the save

    Saving starts only after the timer in the message has elapsed. How long saving takes depends on the device.

    During the save, the message "Saving configuration data in progress. Please do not switch off the device" is displayed.

    - Do not switch off the device immediately after the timer has elapsed.

  - Trial
    Trial mode. In Trial mode, although changes are adopted, they are not saved in the configuration file (startup configuration).
    To save changes in the configuration file, use the "Write startup config" button. The display area also shows the message "Trial Mode Active – Press "Write Startup Config" button to make your settings persistent" as soon as there are unsaved modifications. This message can be seen on every WBM page until the changes made have either been saved or the device has been restarted.

Procedure

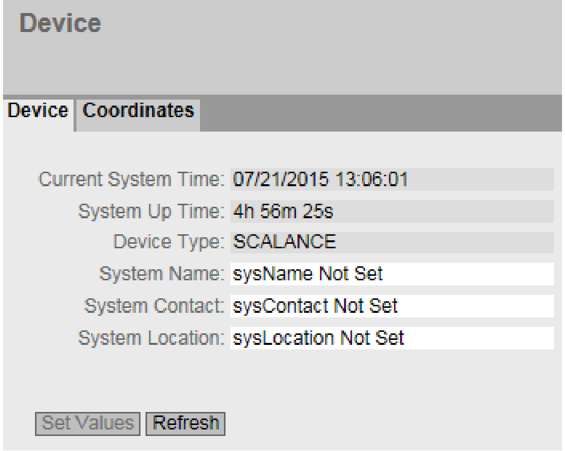
1. To use the required function, select the corresponding check box.
2. Select the options you require from the drop-down lists.
3. Click the "Set Values" button.

6.5.2 General

6.5.2.1 Device

General device information

This page contains the general device information.



Current System Time: 07/21/2015 13:06:01
System Up Time: 4h 56m 25s
Device Type: SCALANCE
System Name: sysName Not Set
System Contact: sysContact Not Set
System Location: sysLocation Not Set

The boxes "Current System Time", "System Up Time" and "Device Type" cannot be changed.

Description

The page contains the following boxes:

- **Current System Time**
  Shows the current system time. The system time is either set by the user or by a time-of-day frame: either SINEC H1 time-of-day frame, NTP or SNTP. (readonly)
- **System Up Time**
  Shows the operating time of the device since the last restart. (readonly)
- **Device Type**
  Shows the type designation of the device. (readonly)
- **System Name**
  You can enter the name of the device. The entered name is displayed in the selection area. A maximum of 255 characters are possible.
  The system name is also displayed in the CLI input prompt. The number of characters in the CLI input prompt is limited. The system name is truncated after 16 characters.
- **System Contact**
  You can enter the name of a contact person responsible for managing the device. A maximum of 255 characters are possible.
- **System Location**
  You can enter the location where the device is installed. The entered installation location is displayed in the selection area. A maximum of 255 characters are possible.

Note

The ASCII code 0x20 to 0x7e is used in the input boxes.

Procedure

1. Enter the contact person responsible for the device in the "System Contact" input box.
2. Enter the identifier for the location at which the device is installed in the "System Location" input box.
3. Enter the name of the device in the "System Name" input box.
4. Click the "Set Values" button.

6.5.2.2 Coordinates

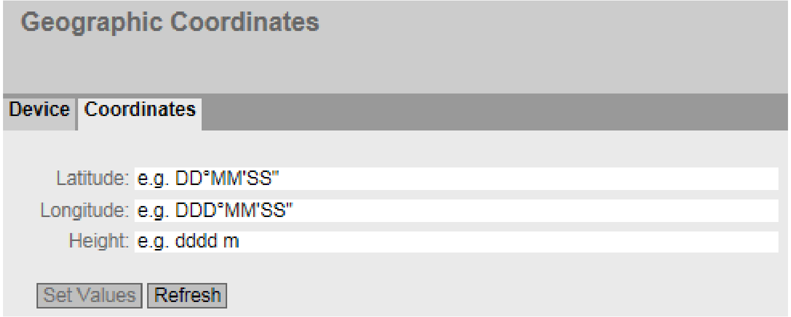
Information on geographic coordinates

In the "Geographic Coordinates" window, you can enter information on the geographic coordinates. The parameters of the geographic coordinates (latitude, longitude and the height above the ellipsoid according to WGS84) are entered directly in the input boxes of the "Geographic Coordinates" window.

Getting the coordinates

Use suitable maps for obtaining the geographic coordinates of the device.

The geographic coordinates can also be obtained using a GPS receiver. The geographic coordinates of these devices are normally displayed directly and only need to be entered in the input boxes of this page.



Geographic Coordinates

Latitude:	e.g. DD°MM'SS"
Longitude:	e.g. DDD°MM'SS"
Height:	e.g. dddd m

Description

The page contains the following input boxes with a maximum length of 32 characters.

- **"Latitude" input box**
  Geographical latitude: Here, enter the value for the northerly or southerly latitude of the location of the device.
  For example, the value +49° 1´31.67" means that the device is located at 49 degrees, 1 arc minute and 31.67 arc seconds northerly latitude.
  A southerly latitude is shown by a preceding minus character.
  You can also append the letters N (northerly latitude) or S (southerly latitude) to the numeric information (49° 1´31.67" N).
- **"Longitude" input box**
  Geographic longitude: Here, you enter the value of the eastern or western longitude of the location of the device.
  The value +8° 20´58.73" means that the device is located at 8 degrees, 20 minutes and 58.73 seconds east.
  A western longitude is indicated by a preceding minus sign.
  You can also add the letter E (easterly longitude) or W (westerly longitude) to the numeric information (8° 20´58.73" E).
- **Input box: "Height"**
  Height Here, you enter the value of the geographic height above sea level in meters.
  For example, 158 m means that the device is located at a height of 158 m above sea level.
  Heights below sea level (for example the Dead Sea) are indicated by a preceding minus sign.

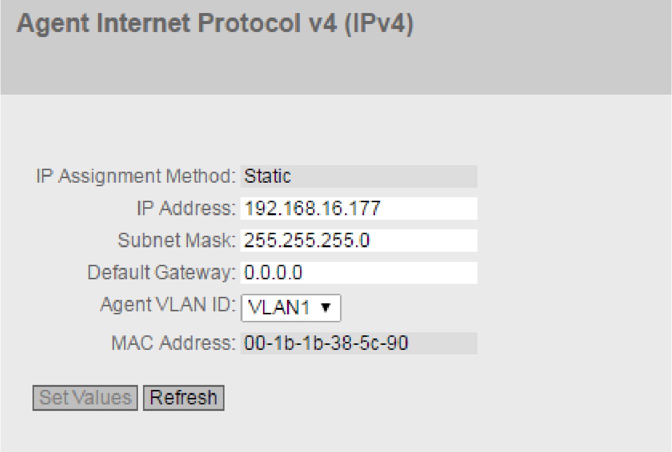
Procedure

1. Enter the calculated latitude in the "Latitude" input box.
2. Enter the calculated longitude in the "Longitude" input box.
3. Enter the height above sea level in the "Height" input box.
4. Click the "Set Values" button.

6.5.3 Agent IPv4

Configuration of the IP addresses

On this WBM page, you configure the IPv4 address for the device.



Agent Internet Protocol v4 (IPv4)

IP Assignment Method: Static

IP Address: 192.168.16.177

Subnet Mask: 255.255.255.0

Default Gateway: 0.0.0.0

Agent VLAN ID: VLAN1 ▾

MAC Address: 00-1b-1b-38-5c-90

Description

The page contains the following boxes:

- **IP Assgn. Method**
- Shows how the IPv4 address is assigned.
  - Static
    The IPv4 address is static. You enter the IP settings in the input boxes "IP Address" and "Subnet Mask".
  - Dynamic (DHCP)
    The device obtains a dynamic IPv4 address from a DHCP server.
- **IP Address**
  Enter the IPv4 address of the device.
  After clicking the "Set Values" button, this IPv4 address is also displayed in the address bar of the Web browser. If this does not take place automatically, you will need to enter the IPv4 address in the address bar of the Web browser manually.
- **Subnet Mask**
  Enter the subnet mask of the device.
- **Default Gateway**
  Enter the IPv4 address of the default gateway to be able to communicate with devices in another subnet, for example diagnostics stations, e-mail server.

- **Agent VLAN ID**
  Select the VLAN ID from the drop-down list. The drop-down list is available only if the "Base Bridge Mode" parameter is set to "802.1 Q VLAN Bridge". You configure the parameter in "Layer 2 > VLAN > General". You can only select VLANs that have already been configured.

Note

Changing the Agent VLAN ID

If the configuration PC is connected directly to the device via Ethernet and you change the agent VLAN ID, the device is no longer reachable via Ethernet following the change.

- **MAC Address**
  Shows the MAC address of the device. The MAC address is linked to the hardware and cannot be modified.

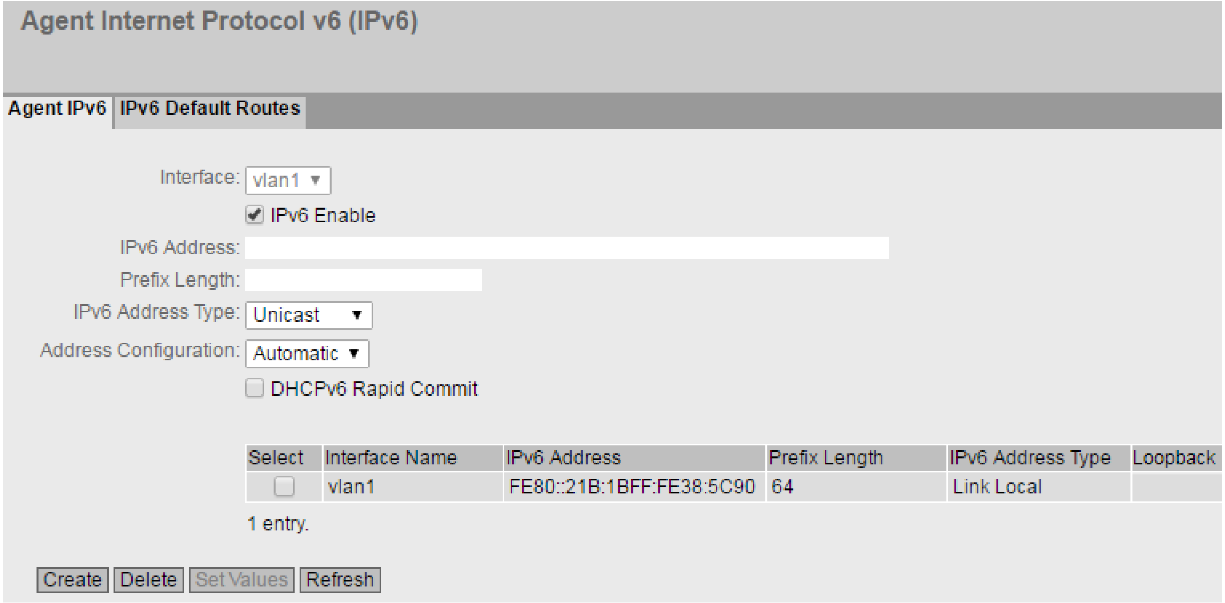
Procedure

1. In the input boxes, enter the IP address, subnet mask and the default gateway.
2. Select the assigned VLAN ID from the "Agent VLAN ID" drop-down list. If the drop-down list cannot be enabled, check whether the "Base Bridge Mode" parameter is set to "802.1 Q VLAN Bridge". You configure the parameter in "Layer 2 > VLAN > General".
3. Click the "Set Values" button.

6.5.4 Agent IPv6

Configuration of the IP addresses

On this page, enable IPv6 on the management VAN. This VLAN interface is also called an IPv6 interface. An IPv6 interface can have several IPv6 addresses.



Interface: vlan1 ▾
☑ IPv6 Enable
IPv6 Address:
Prefix Length:
IPv6 Address Type: Unicast ▾
Address Configuration: Automatic ▾
□ DHCPv6 Rapid Commit

Select	Interface Name	IPv6 Address	Prefix Length	IPv6 Address Type	Loopback
□	vlan1	FE80::21B:1BFF:FE38:5C90	64	Link Local	

1 entry.

Description

The page contains the following:

- **Interface**
  Shows the VLAN interface on which IPv6 will be enabled.
- **IPv6 Enable**
  Enable or disable IPv6 on the interface. When you enable the setting and accept it, the link local address is created automatically.
- **IPv6 Address**
  Enter the IPv6 address. The entry depends on the selected address type.
- **Prefix Length**
  Enter the number of left-hand bits belonging to the prefix
- **IPv6 Address Type**
  Select the address type:
  - Unicast
  - Link Local: IPv6 address is only valid on the link.

- **Address Configuration**
  Specify the mechanism for the address configuration:
  - Automatic (default)
    The IPv6 address is created using a stateless mechanism or a stateful mechanism.
  - DHCPv6
    Status dependent: Obtains the IPv6 address and the configuration file from the DHCPv6 server.
  - SLAAC (Stateless Address Auto Configuration)
    Stateless autoconfiguration using NDP (Neighbor Discovery Protocol)
  - Static
    Enter a static IPv6 address.
- **DHCPv6 Rapid Commit**
  When enabled the procedure for the IPv6 address assignment is shortened. Instead of 4 DHCPv6 messages (SOLICIT, ADVERTISE, REQUEST, REPLY), only 2 DHCPv6 messages (SOLICIT, REPLY) are used. You will find further information on the messages in RFC 3315.

The table has the following columns:

- **Select**
  Select the check box in the row to be deleted.
- **Interface Name**
  Shows the name of the VLAN interface.
- **IPv6 Address**
  Shows the IPv6 address.
- **Prefix Length**
  Shows the prefix length.
- **IPv6 Address Type**
  Displays the address type. The following values are possible:
  - Unicast
  - Link Local
- **Loopback**
  Shows whether or not the "loopback" property is enabled.

Procedure

Forming a link local address automatically

1. Enable IPv6.
2. Click the "Create" button. In the table an entry with the interface is created and the automatically formed link local IPv6 address is displayed.

Assigning link local address

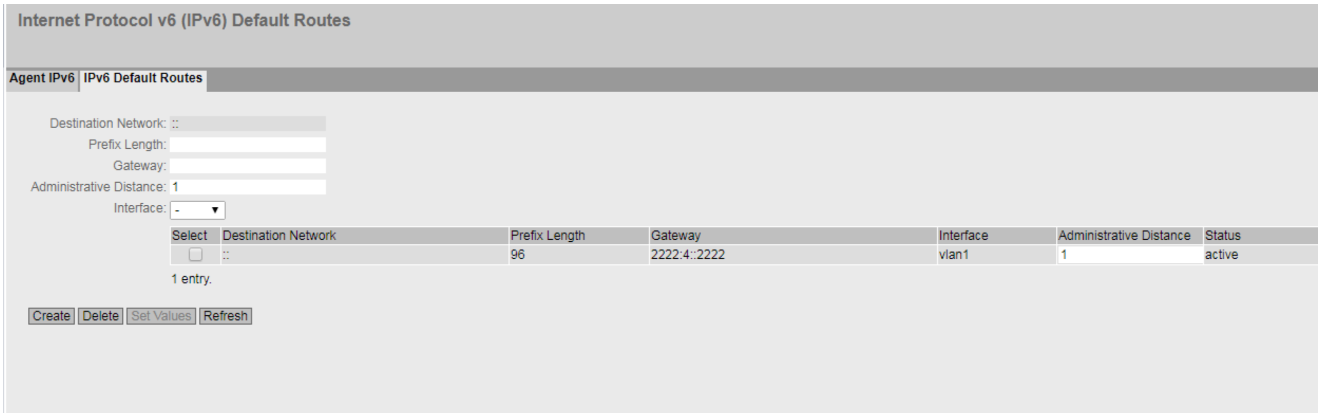
1. Enable IPv6.
2. In "IPv6 Address" enter the link local address, e.g. FE80::21B:1BFF:FE40:9155
3. Enter "128" in "Prefix Length".

4. For "IPv6 Address Type" select the entry "Link Local".
5. For "Address Configuration" select the entry "Static".
6. Click the "Create" button. In the table an entry with the interface is created and the IPv6 address is displayed.
   The automatically created local address is overwritten.

6.5.4.1 IPv6 Default Routes

On this page, you configure the IPv6 default route. The IPv6 default route is an IPv6 route, that applies to all IPv6 addresses. The device only needs to know the default gateway and sends all IPv6 packets to it.

The default gateway either knows all routes itself or has a default route to another default gateway.



Internet Protocol v6 (IPv6) Default Routes

Destination Network:	::
Prefix Length:	
Gateway:	
Administrative Distance:	1
Interface:	- ▼

Select	Destination Network	Prefix Length	Gateway	Interface	Administrative Distance	Status
□	::	96	2222:4::2222	vlan1	1	active

1 entry.

Description

The page contains the following:

- **Destination Network**
  Destination Network (:: or 0:0:0:0:0:0:0:0:0:0:0:0:0:0:0:0) applies to all IPv6 addresses.
- **Prefix Length**
  Enter the number of left-hand bits belonging to the prefix
- **Gateway**
  Enter the IPv6 address of the gateway to which the IPv6 packets will be sent.
- **Administrative Distance**
  Enter the metric for the route. The metric corresponds to the quality of a connection, based for example on speed or costs. If there are several equal routes, the route with the lowest metric value is used.
  Range of values: 1 - 254
- **Interface**
  Specify the interface via which the network address of the destination is reached.

This table contains the following columns:

- **Select**
  Select the check box in the row to be deleted.
- **Destination Network**
  Shows the network address of the destination.
- **Prefix Length**
  Shows the prefix length.
- **Gateway**
  Shows the IPv6 address of the next gateway.
- **Interface**
  Shows the Interface of the route.
- **Administrative Distance**
  Enter the metric for the route. When creating the route, "not used" is entered automatically. The metric corresponds to the quality of a connection, based for example on speed or costs. If there are several equal routes, the route with the lowest metric value is used.
  Range of values: 1 - 254
- **Status**
  Shows whether or not the route is active.

Steps in configuration

1. Enter the prefix length.
2. Enter the IPv6 address of the gateway.
3. Select the required interface.
4. Enter the metric of the route.
5. Click the "Create" button. A new entry is generated in the table.
6. Click the "Set Values" button.

6.5.5 DNS

On this page, you can manually configure up to 3 DNS servers with IPv4 or IPv6 addresses. Manually configured DNS servers are each assigned an index from 1 to 3. Using DHCP, the device can learn 2 DNS servers with IPv4 addresses. An index from 4 to 7 is automatically assigned to learned DNS servers.

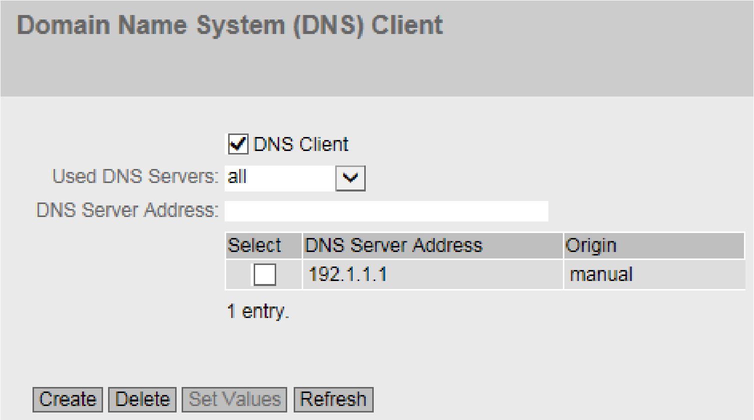
If there is more than one DNS server, the order in the table specifies the order in which the servers are queried. The top server is queried first. A total of 7 DNS servers can be configured on the device. Manually configured DNS servers are given preference.

The DNS server (Domain Name System) assigns a domain name to an IP address so that a device can be uniquely identified.

If this function is enabled, the device can communicate with a DNS server as a DNS client. You have the option of entering names in IP address boxes.

Note

The "DNS client" function can only be used if there is a DNS server in the network.



Domain Name System (DNS) Client

☑ DNS Client

Used DNS Servers: all

DNS Server Address:

Select	DNS Server Address	Origin
□	192.1.1.1	manual

1 entry.

Description

The page contains the following boxes:

- **DNS client**
  If the check box is enabled, the "DNS client" function is enabled.
- **Used DNS Servers**
  Here you specify which DNS server the device uses:
  - learned only
    The device uses only the DNS servers assigned by DHCP.
  - manual only
    The device uses only the manually configured DNS servers. The DNS servers must be connected to the Internet. A maximum of three DNS servers can be configured.
  - all
    The device uses all available DNS servers.
- **DNS Server Address**
  Enter the IP address of the DNS server.

The table for the DNS servers with the following columns:

- **Select**
  Select the check box in the row to be deleted.
- **DNS Server Address**
  Shows the IP address of the DNS server.
- **Origin**
  This shows whether the DNS server was configured manually or was assigned by DHCP.

Procedure

Activating DNS

1. Enable the "DNS Client" check box.
2. Click the "Set Values" button.

Creating a DNS server

1. In the "DNS Server Address" box, enter the IP address of the DNS server.
2. Click the "Create" button.

Filtering DNS servers

1. In the "Used DNS Servers" drop-down list, select which DNS servers are to be used.
2. Click the "Set Values" button.

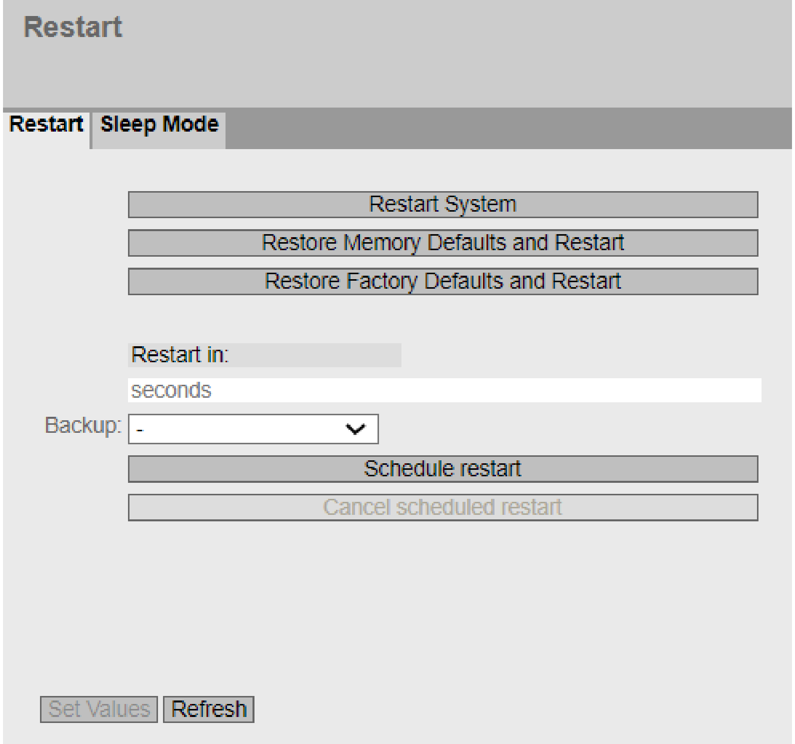
Deleting a DNS server

1. Enable "Select" in the row to be deleted.
2. Click the "Delete" button. The entry is deleted.

6.5.6 Restart

Resetting to the defaults

Using the WBM page, you can restart the device based on a schedule or manually. In addition, there are various options for resetting to the device defaults.



Restart in:

seconds

Backup: -

Restart

Note the following points about restarting a device:

- You can only restart the device with administrator privileges.
- A device should only be restarted with the buttons of this menu or with the appropriate CLI commands and not by a power cycle on the device.
- If the device is in "Trial" mode, configuration modifications must be saved manually before a restart. Any modifications you have made only become active on the device after clicking the "Set values" button on the relevant WBM page.
- If the device is in "Automatic Save" mode, the last changes are saved automatically before a restart.

Description

To restart the device, the buttons on this page provide you with the following options:

- **Restart**
  Click this button to restart the system. You must confirm the restart in a dialog box. During a restart, the device is reinitialized, the internal firmware is reloaded, and the device runs a self-test. The settings of the start configuration are retained, e.g. the IP address of the device. The learned entries in the address table are deleted. You can leave the browser window open while the device restarts. After the restart you will need to log in again.
- **Restore Memory Defaults and Restart**
  Click this button to restore the factory defaults of the device with the exception of the following parameters and to restart the device:
  - IP addresses
  - Subnet mask
  - IP address of the default gateway
  - DHCP client ID
  - DHCP
  - System name
  - System location
  - System contact
  - User names and passwords
  - Mode of the device
  - DHCPv6 Rapid Commit
- **Restore Factory Defaults and Restart**
  Click this button to restore the factory configuration settings and to restart the device. You must confirm the restart in a dialog box.

  Note

  By resetting all the defaults to the factory configuration settings, the IP address is also lost. The device can then only be addressed via SINEC PNI or via DHCP.

  With the appropriate connection, a previously correctly configured device can cause circulating frames and therefore the failure of the data traffic.
- **Restart in: seconds**
  This field is used to set the timer. The field can no longer be edited when the timer is running. Specify the amount of time in seconds after which the device restarts.
  Value range 300 ... 86400 seconds
- **Backup**
  The configuration backups under "System > Configuration Backup" are available for selection. Before the scheduled restart, the device applies the configurations of the selected backup and continues working with them after the restart.
  All configurations made up to this point that have not been saved in a backup are lost.

- **Scheduled restart**
  When you click this button, a timer starts and runs backwards with the defined time. When the timer has expired, the device restarts.
  The following message is also displayed in the display area: "The automatic restart starts in [..] minutes. Click 'Cancel scheduled restart' to cancel the restart". This message can be seen on every WBM page until you cancel the restart or the SCALANCE W device is restarted.

  Note

  Unsaved configuration is lost after reboot

  The scheduled restart is performed after the time has elapsed without any further message. Unsaved configuration changes are lost.

  Save the current configuration via "System > Backup of configuration" before setting the timer for the restart.

- **Cancel scheduled restart**
  With this button, you disable the timer for the scheduled restart.

6.5.7 Commit Control

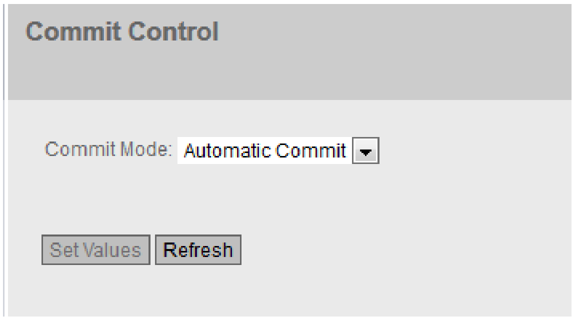
Change management

On this page, you specify when the WLAN settings become effective on the SCALANCE W device. If you change a WLAN setting and confirm the change with "Set Values", this change is adopted and takes effect immediately. To do this, the WLAN connection is briefly interrupted. This means that you can lose the WLAN connection to your SCALANCE W device before it is fully configured.

With the "Manual Commit" setting, you have the opportunity of first fully configuring the SCALANCE W device. The changes are accepted, but are not active immediately. The changes only take effect when you confirm the changes with the "Commit Changes" button.

Note

If you configure the SCALANCE W device via the WLAN interface, we recommend that you use the "Manual Commit" setting. Check the parameters again before you confirm the changes with the "Commit Changes" button.


Commit Control

Commit Mode: Automatic Commit

Description

The page contains the following boxes:

- **Commit Mode**
  Select the required setting from the drop-down list.
  - Automatic Commit
    Each change in the WLAN settings is adopted and is immediately effective when you click the "Set Values" button. In the default setting, the SCALANCE W device is set to "Automatic Commit".
  - Manual Commit
    The changes are accepted, but are not effective immediately. The changes only take effect when you click the "Commit Changes" button. The "Commit Changes" button is displayed when you set "Manual Commit".
    The following message is also displayed in the display area when there are WLAN changes: "Manual Commit Mode active - Press 'Commit Changes' button to provide current configuration to driver". This message can be seen on every WBM page until either the changes made have taken effect or the SCALANCE W device has been restarted.

    Note

    When the changes take effect, the WLAN connections to all WLAN interfaces will be interrupted for a short time. The WLAN driver is started with the new settings.

6.5.8 Load & Save

Note

The files that can be loaded from the device depends on the role of the logged-on.

Overview of the file types

Table 6-1 HTTP

File type	Description	Download	Save	Delete
Config	This file contains the start configuration. Among other things, this file contains the definitions of the users, roles, groups and function rights. The passwords are stored in the "Users" file.	X	X	--
ConfigPack	Detailed configuration information. for example, start configuration, users, certificates, favorites, firmware of the device (if saved as well). For more detailed information on creating and using the ConfigPack incl. firmware, refer to the section "Maintenance (Page 401)".	X	X	--

File type	Description	Download	Save	Delete
CountryList	The zip file contains the country list as a csv and as a pdf file.	--	X	--
Debug	This file contains information for Siemens Support. It is encrypted and can be sent by e-mail to Siemens Support without any security risk.	--	X	X
EDS	Electronic Data Sheet (EDS) Electronic data sheets for describing devices in the EtherNet/IP mode	--	X	--
Firmware	The firmware is signed and encrypted. This ensures that only firmware created by Siemens can be downloaded to the device.	X	X	--
GSDML	Information on the device properties (PROFINET)	--	X	--
HTTPS Cert	Default HTTPS certificates including key The preset and automatically created HTTPS certificates are self-signed. We strongly recommend that you create your own HTTPS certificates and make them available. We recommend that you use HTTPS certificates signed either by a reliable external or by an internal certificate authority. The HTTPS certificate checks the identity of the device and controls the encrypted data exchange. The following file types can be loaded into the device: • .pem To successfully load an HTTPS certificate with this data type into the device, the certificate must include the unencrypted private key. • .p12 For HTTPS certificates with this file type, the private key is encrypted and secured with a password. To successfully load a certificate with this file type into the device, configure the password specified for the certificate on the WBM page "System > Load & Save > Passwords". Certificates with a different format cannot be imported. Maximum file size: 8192 bits	X	X	X
LogFile	File with entries from the event log table	--	X	--
LoginWelcomeMessage	The txt file contains the desired text or the ASCII type. Only pure text files in ASCII format are supported.	X	X	X
MIB	Private MSPS MIB file "Scalance_w_msps.mib"	--	X	--
RunningCLI	Text file with CLI commands This file contains an overview of the current configuration in the form of CLI commands. Passwords are masked in this file as follows: [PASSWORD] You can download the text file. The file is not intended to be uploaded again unchanged.	--	X	--

File type	Description	Download	Save	Delete
RunningSINEMAConfig	You save the current device configuration in this file type for transfer to STEP 7 Basic/Professional. The file can be imported in STEP 7 Basic/Professional and installed on a device with the same article number and firmware version. Before you can save a file, you must assign a password for the "RunningSINEMAConfig" in the WBM under "System > Load&Save > Passwords". You also need this password to import the file into STEP7 Basic/Professional. See also "SINEMAConfig"	--	X	--
Script	Text file with CLI commands You can upload a script file in a device. The CLI commands it contains are executed accordingly. CLI commands for saving and loading files cannot be executed with the CLI script file.	X	--	--
SINEMAConfig	You load configuration data that was exported via STEP 7 Basic/Professional for transfer to the WBM with this file type. To load a file, you must assign a password for the "SINEMAConfig" under "System > Load&Save > Passwords". You also need this password to export the file from STEP 7 Basic/Professional. See also "RunningSINEMAConfig"	X	--	--
StartupInfo	Startup log file This file contains the messages that were entered in the log file during the last startup.	--	X	--
Users	File with user names and passwords	X	X	--
WBMFav	WBM favorites This file contains the favorites that you created in the WBM. You can download this file and upload it to other devices.	X	X	X
WLANAuthlog	File with entries from the WLAN Authentication Log (information on successful or failed authentication attempts)	--	X	--
WLANCert (in client mode only)	User certificate. You can specify a password for the user certificate on the WBM page "Load&Save > Password". Maximum file size: 8192 bits	X	X	X

File type	Description	Download	Save	Delete
WLANServ-Cert (in client mode only)	Server certificate Maximum file size: 8192 bits	X	X	X
WLANSigRec (in client mode only)	The zip file contains the following: • csv file with the measured values of the signal recorder • pdf file with the measured values and an additional graphic representation of the measured values. You will find information about the measured values and their graphic representation in the section "Signal recorder (Page 290)".	--	X	X

Table 6-2 TFTP/SFTP

File type	Description	Save	Download
Config	This file contains the start configuration. Among other things, this file contains the definitions of the users, roles, groups and function rights. The passwords are stored in the "Users" file.	X	X
ConfigPack	Detailed configuration information. for example, start configuration, users, certificates, firmware of the device (if saved as well). For more detailed information on creating and using the ConfigPack incl. firmware, refer to the section "Maintenance (Page 401)".	X	X
CountryList	The zip file contains the country list as a csv and as a pdf file.	X	--
Debug	This file contains information for Siemens Support. It is encrypted and can be sent by e-mail to Siemens Support without any security risk.	X	--
EDS	Electronic Data Sheet (EDS) Electronic data sheets for describing devices in the EtherNet/IP mode	X	--
Firmware	The firmware is signed and encrypted. This ensures that only firmware created by Siemens can be downloaded to the device.	X	X
GSDML	Information on the device properties (PROFINET)	X	--

File type	Description	Save	Download
HTTPS Cert	Default HTTPS certificates including key The preset and automatically created HTTPS certificates are self-signed. We strongly recommend that you create your own HTTPS certificates and make them available. We recommend that you use HTTPS certificates signed either by a reliable external or by an internal certificate authority. The HTTPS certificate checks the identity of the device and controls the encrypted data exchange. The following file types can be loaded into the device: • .pem To successfully load an HTTPS certificate with this data type into the device, the certificate must include the unencrypted private key. • .p12 For HTTPS certificates with this file type, the private key is encrypted and secured with a password. To successfully load a certificate with this file type into the device, configure the password specified for the certificate on the WBM page "System > Load & Save > Passwords". Certificates with a different format cannot be imported. Maximum file size: 8192 bits	X	X
LogFile	File with entries from the event log table	X	--
LoginWelcomeMessage	The txt file contains the desired text or the ASCII type. Only pure text files in ASCII format are supported.	X	X
MIB	Private MSPS MIB file "Scalance_w_msps.mib"	X	--
RunningCLI	Text file with CLI commands This file contains an overview of the current configuration in the form of CLI commands. Passwords are masked in this file as follows: [PASSWORD] You can download the text file. The file is not intended to be uploaded again unchanged.	X	--
RunningSINEMA-Config	You save the current device configuration in this file type for transfer to STEP7 Basic/Professional. The file can be imported in STEP 7 Basic/Professional and installed on a device with the same article number and firmware version. Before you can save a file, you must assign a password for the "RunningSINEMAConfig" in the WBM under "System > Load&Save > Passwords". You also need this password to import the file into STEP 7 Basic/Professional; see also "SINEMAConfig".	--	X
Script	Text file with CLI commands You can upload a script file in a device. The CLI commands it contains are executed accordingly. CLI commands for saving and loading files cannot be executed with the CLI script file.	--	X

File type	Description	Save	Download
SINEMAConfig	You load configuration data that was exported via STEP 7 Basic/Professional for transfer to the WBM with this file type. To load a file, you must assign a password for the "SINEMAConfig" under "System > Load&Save > Passwords". You also need this password to export the file from STEP 7 Basic/Professional; see also "RunningSINEMAConfig".	X	--
StartupInfo	Startup log file This file contains the messages that were entered in the log file during the last startup.	X	--
Users	File with user names and passwords	X	X
WBMFav	WBM favorites This file contains the favorites that you created in the WBM. You can download this file and upload it to other devices.	X	X
WLANAuthlog	File with entries from the WLAN Authentication Log (information on successful or failed authentication attempts)	X	--
WLANCert (in client mode only)	User certificate. You can specify a password for the user certificate on the WBM page "Load&Save > Password". Maximum file size: 8192 bits	X	X
WLANServerCert (in client mode only)	Server certificate Maximum file size: 8192 bits	X	X
WLANSigRec (in client mode only)	The zip file contains the following: • csv file with the measured values of the signal recorder • pdf file with the measured values and an additional graphic representation of the measured values. You will find information about the measured values and their graphic representation in the section "Signal recorder (Page 290)".	X	--

See also

Spectrum analyzer (Page 300)

Passwords (Page 342)

6.5.8.1 HTTP

Loading and saving data via HTTP

The WBM allows you to store device data in an external file on your client PC or to load such data from an external file from the PC to the devices. This means, for example, that you can also load new firmware from a file located on your client PC.

Note

This WBM page is available both for connections using HTTP and for connections using HTTPS.

Firmware

The firmware is signed and encrypted. This ensures that only firmware created by Siemens can be downloaded to the device.

Note

Incompatibility with predecessor versions

During the installation of a previous version, the configuration data and log files can be lost. In this case, the device starts up with the factory settings after the firmware has been installed.

Incompatibility with previous versions with PLUG inserted

During the installation of a previous version, the configuration data and log files can be lost. In this case, the device starts up with the factory settings after the firmware has been installed. In this situation, if a PLUG is inserted in the device, following the restart, this has the status "Not Accepted" since the PLUG still has the configuration data of the previous more up-to-date firmware. This allows you to return to the previous, more up-to-date firmware without any loss of configuration data. If the original configuration on the PLUG is no longer required, the PLUG can be deleted or rewritten manually using the WBM page "System > PLUG".

Configuration files

Note

Configuration files and trial mode/Automatic Save mode

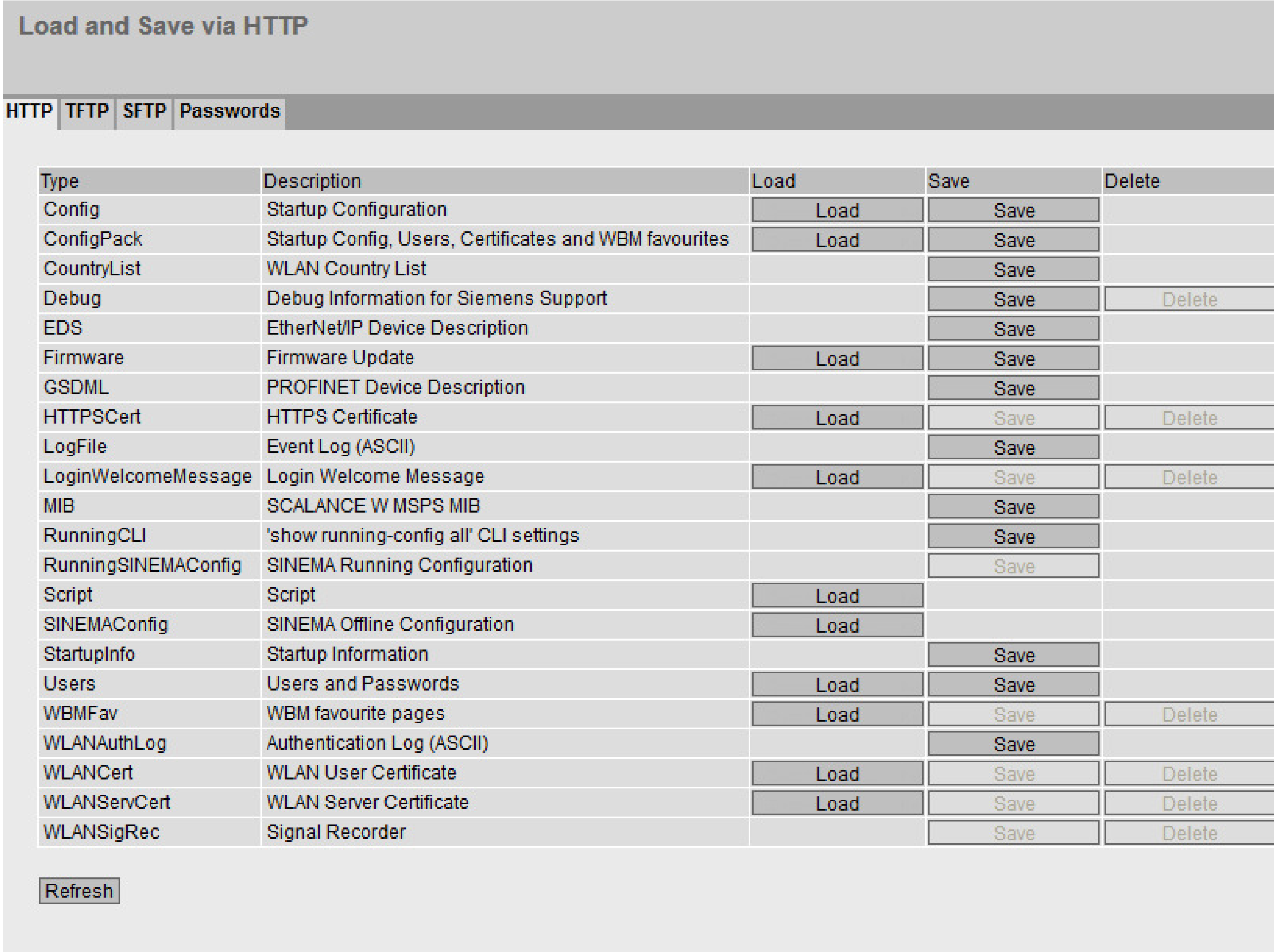
In Automatic Save mode, the data is saved automatically before the configuration files (ConfigPack and Config) are transferred.
In Trial mode, although the changes are adopted, they are not saved in the configuration files (ConfigPack and Config). Use the "Write Startup Config" button on the "System > Configuration" WBM page to save changes in the configuration files.

CLI script file

You can download existing CLI configurations (RunningCLI) and upload your own CLI scripts (Script).

Note

The downloadable CLI script (RunningCLI) is not intended to be uploaded again unchanged.



Type	Description	Load	Save	Delete
Config	Startup Configuration	Load	Save	
ConfigPack	Startup Config, Users, Certificates and WBM favourites	Load	Save	
CountryList	WLAN Country List		Save	
Debug	Debug Information for Siemens Support		Save	Delete
EDS	EtherNet/IP Device Description		Save	
Firmware	Firmware Update	Load	Save	
GSDML	PROFINET Device Description		Save	
HTTPSCert	HTTPS Certificate	Load	Save	Delete
LogFile	Event Log (ASCII)		Save	
LoginWelcomeMessage	Login Welcome Message	Load	Save	Delete
MIB	SCALANCE W MSPS MIB		Save	
RunningCLI	'show running-config all' CLI settings		Save	
RunningSINEMAConfig	SINEMA Running Configuration		Save	
Script	Script	Load		
SINEMAConfig	SINEMA Offline Configuration	Load		
StartupInfo	Startup Information		Save	
Users	Users and Passwords	Load	Save	
WBMFav	WBM favourite pages	Load	Save	Delete
WLANAuthLog	Authentication Log (ASCII)		Save	
WLANCert	WLAN User Certificate	Load	Save	Delete
WLANServCert	WLAN Server Certificate	Load	Save	Delete
WLANSigRec	Signal Recorder		Save	Delete

Example of a device in client mode

Description

The table has the following columns:

- **File type**
  Shows the name of the file.

Note

Size of certificate files

With certificate files only certificates with a maximum of 8192 bits are supported.

- **Description**
  Shows the short description of the file type.
- **Load**
  With this button, you can load files on the device. The button can be enabled, if this function is supported by the file type.

- **Save**
  With this button, you can save files from the device. The button can only be enabled if this function is supported by the file type and the file exists on the device.
- **Delete**
  With this button, you can delete files from the device. The button can only be enabled if this function is supported by the file type and the file exists on the device.

Note

Following a firmware update, delete the cache of the Web browser.

Procedure

Loading files using HTTP

1. Start the load function by clicking the one of the "Load" buttons.
   The dialog for loading a file opens.
2. Go to the file you want to load.
3. Click the "Open" button in the dialog.
   The file is now loaded.

Whether or not a restart is necessary, depends on the loaded file. If a restart is necessary, a message to this effect will be output. Other files are executed immediately, for example the CLI script file and new settings are applied without a restart.

Saving files using HTTP

1. Start the save function by clicking the one of the "Save" buttons. Depending on the size of the file this may take some time.
2. Depending on your browser configuration you will be prompted to select a storage location and a name for the file. Or you accept the proposed file name. To make the selection, use the dialog in your browser. After making your selection, click the "Save" button.

Deleting files using HTTP

1. Start the delete function by clicking the one of the "Delete" buttons.
   The file will be deleted.

Reusing configuration data

If several devices are to receive the same configuration and the IP addresses are assigned using DHCP, the effort for configuration can be reduced by saving and reading in the configuration data.

Follow the steps below to reuse configuration data:

1. Save the configuration data of a configured device on your PC.
2. Download this configuration file to all other devices you want to configure.
3. If individual settings are necessary for specific devices, these must be made online on the relevant device.

Note

Configuration data has a checksum. If you edit the files, you can no longer upload them to the device.

6.5.8.2 TFTP

Loading and saving data via a TFTP server

On this page, you can configure the TFTP server and the file names. The WBM also allows you to store device data in an external file on your client PC or to load such data from an external file from the PC to the devices. This means, for example, that you can also load new firmware from a file located on your client PC.

Firmware

The firmware is signed and encrypted. This ensures that only firmware created by Siemens can be downloaded to the device.

Note

Incompatibility with predecessor versions

During the installation of a previous version, the configuration data and log files can be lost. In this case, the device starts up with the factory settings after the firmware has been installed.

Incompatibility with previous versions with PLUG inserted

During the installation of a previous version, the configuration data and log files can be lost. In this case, the device starts up with the factory settings after the firmware has been installed. In this situation, if a PLUG is inserted in the device, following the restart, this has the status "Not Accepted" since the PLUG still has the configuration data of the previous more up-to-date firmware. This allows you to return to the previous, more up-to-date firmware without any loss of configuration data. If the original configuration on the PLUG is no longer required, the PLUG can be deleted or rewritten manually using the WBM page "System > PLUG".

Configuration files

Note

Configuration files and trial mode/Automatic Save mode

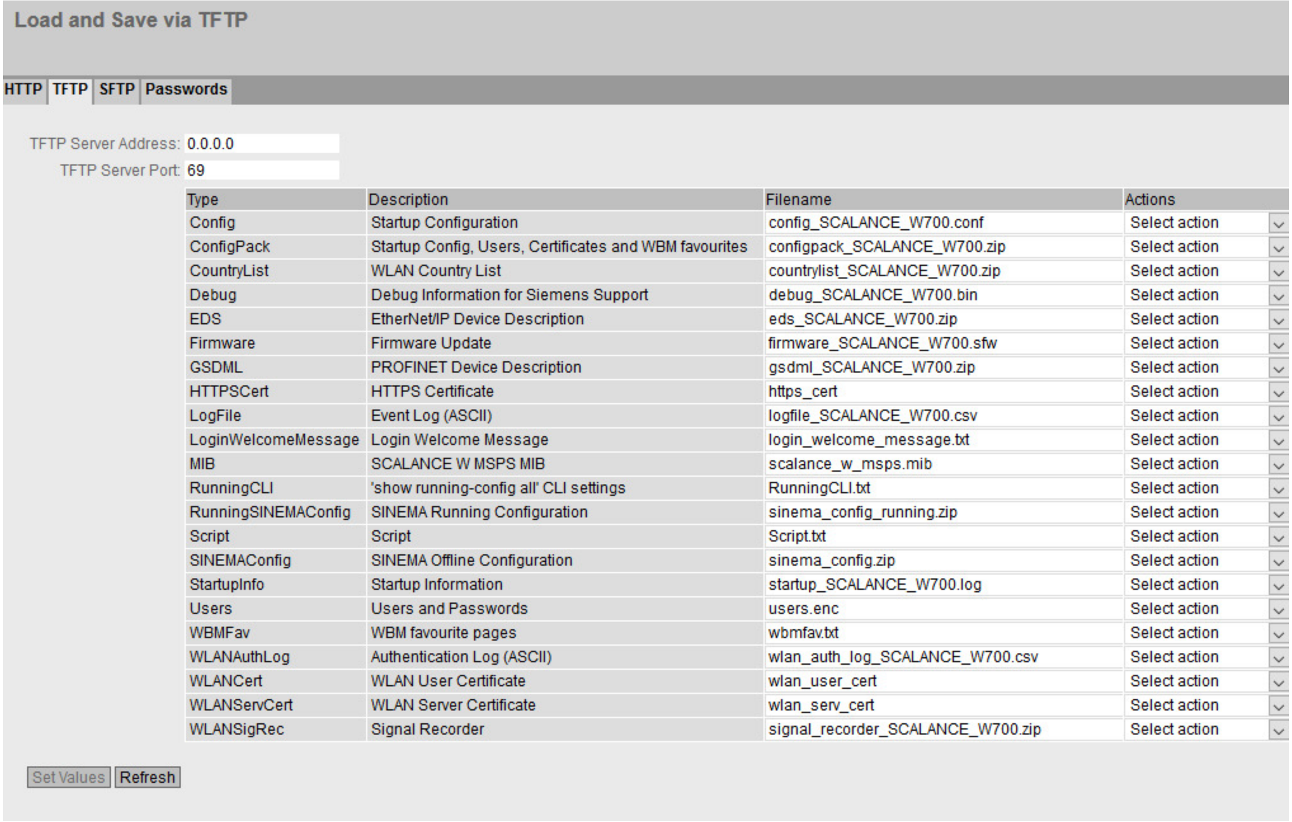
In Automatic Save mode, the data is saved automatically before the configuration files (ConfigPack and Config) are transferred.
In Trial mode, although the changes are adopted, they are not saved in the configuration files (ConfigPack and Config). Use the "Write Startup Config" button on the "System > Configuration" WBM page to save changes in the configuration files.

CLI script file

You can download existing CLI configurations (RunningCLI) and upload your own CLI scripts (Script).

Note

The downloadable CLI script (RunningCLI) is not intended to be uploaded again unchanged.



TFTP Server Address: 0.0.0.0

TFTP Server Port: 69

Type	Description	Filename	Actions
Config	Startup Configuration	config_SCALANCE_W700.conf	Select action
ConfigPack	Startup Config, Users, Certificates and WBM favourites	configpack_SCALANCE_W700.zip	Select action
CountryList	WLAN Country List	countrylist_SCALANCE_W700.zip	Select action
Debug	Debug Information for Siemens Support	debug_SCALANCE_W700.bin	Select action
EDS	EtherNet/IP Device Description	eds_SCALANCE_W700.zip	Select action
Firmware	Firmware Update	firmware_SCALANCE_W700.sfw	Select action
GSDML	PROFINET Device Description	gsdml_SCALANCE_W700.zip	Select action
HTTPSCert	HTTPS Certificate	https_cert	Select action
LogFile	Event Log (ASCII)	logfile_SCALANCE_W700.csv	Select action
LoginWelcomeMessage	Login Welcome Message	login_welcome_message.txt	Select action
MIB	SCALANCE W MSPS MIB	scalance_w_msps.mib	Select action
RunningCLI	'show running-config all' CLI settings	RunningCLI.txt	Select action
RunningSINEMAConfig	SINEMA Running Configuration	sinema_config_running.zip	Select action
Script	Script	Script.txt	Select action
SINEMAConfig	SINEMA Offline Configuration	sinema_config.zip	Select action
StartupInfo	Startup Information	startup_SCALANCE_W700.log	Select action
Users	Users and Passwords	users.enc	Select action
WBMFav	WBM favourite pages	wbmfav.txt	Select action
WLANAuthLog	Authentication Log (ASCII)	wlan_auth_log_SCALANCE_W700.csv	Select action
WLANCert	WLAN User Certificate	wlan_user_cert	Select action
WLANServCert	WLAN Server Certificate	wlan_serv_cert	Select action
WLANSigRec	Signal Recorder	signal_recorder_SCALANCE_W700.zip	Select action

Example of a device in client mode

Description

The page contains the following boxes:

- **TFTP Server Address**
  Here, enter the IP address or the FQDN (Fully Qualified Domain Name) of the TFTP server with which you exchange data.
- **TFTP Server Port**
  Here, enter the port of the TFTP server via which data exchange will be handled. If necessary, you can change the default value 69 to your own requirements.

The table has the following columns:

- **Type**
  Shows the name of the file.

  Note

  Size of certificate files

  With certificate files only certificates with a maximum of 8192 bits are supported.

- **Description**
  Shows the short description of the file type.
- **Filename**
  Enter a file name.
- **Actions**
  Select the action from the drop-down list. The selection depends on the selected file type, for example the log file can only be saved.
  The following actions are possible:
  - **Save file**
    With this selection, you save a file on the TFTP server.
  - **Load file**
    With this selection, you load a file from the TFTP server.

Procedure

Loading or saving data using TFTP

1. Enter the IP address or the FQDN of the TFTP server in the "TFTP Server Address" input box.
2. Enter the server port to be used in the in the "TFTP server port" input box.
3. Enter the name of a file in which you want to save the data or take the data from in the "File name" input box.
4. Select the action you want to execute from the "Actions" drop-down list.
5. Click the "Set Values" button to start the selected actions. Depending on the size of the file this may take some time.
6. After loading the configuration and the SSL certificate, restart the device. The changes only take effect a restart.

Reusing configuration data

If several devices are to receive the same configuration and the IP addresses are assigned using DHCP, the effort for configuration can be reduced by saving and reading in the configuration data.

Follow the steps below to reuse configuration data:

1. Save the configuration data of a configured device on your PC.
2. Download this configuration file to all other devices you want to configure.
3. If individual settings are necessary for specific devices, these must be made online on the relevant device.

Note that the configuration data is coded when it is saved. This means that you cannot edit the files with a text editor.

6.5.8.3 SFTP

Loading and saving data via an SFTP server

SFTP (SSH File Transfer Protocol) transfers the files encrypted. On this page, you configure the access data for the SFTP server.

The WBM also allows you to store device data in an external file on your client PC or to load such data from an external file from the PC to the devices. This means, for example, that you can also load new firmware from a file located on your Admin PC.

On this page, the certificates required to establish a secure VPN connection can also be loaded.

Firmware

The firmware is signed and encrypted. This ensures that only firmware created by Siemens can be downloaded to the device.

Configuration files

Note

Configuration files and Trial mode /Automatic Save

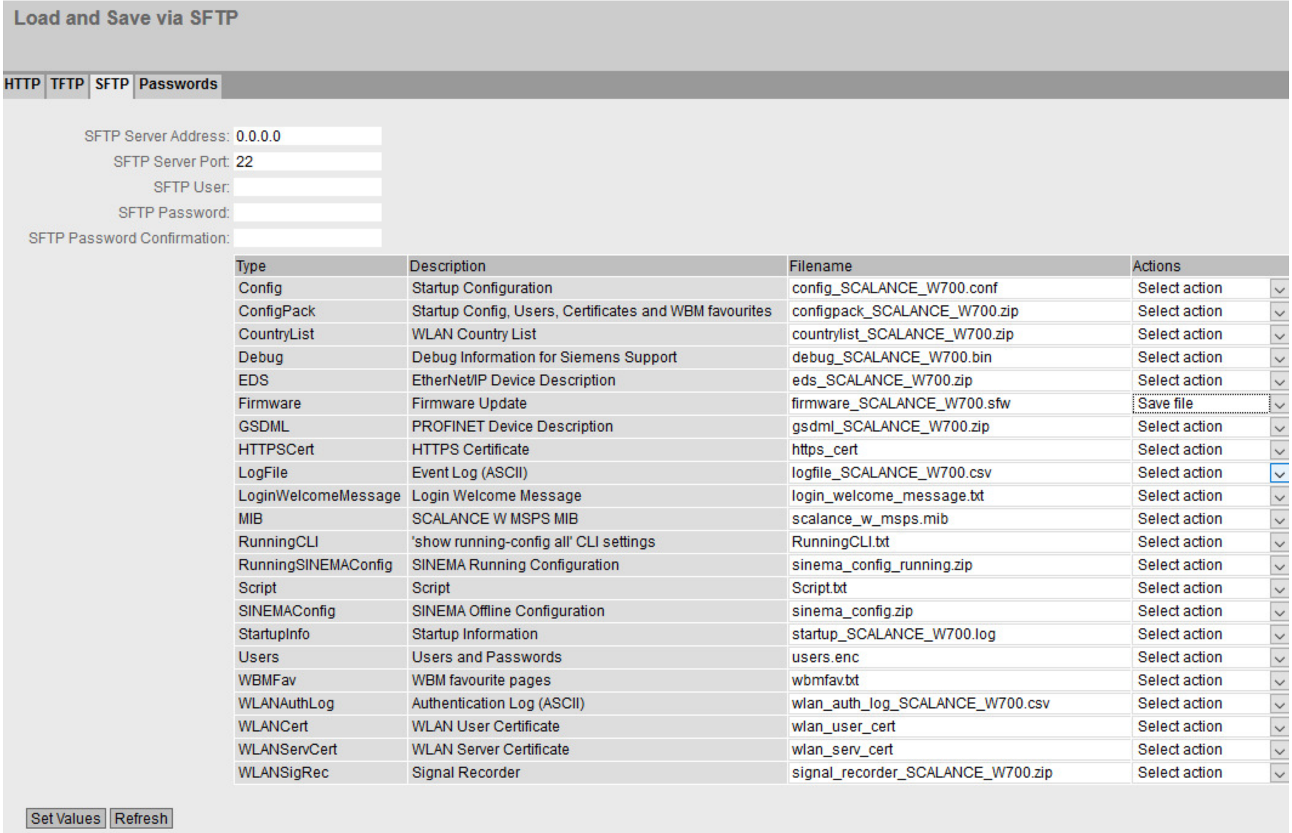
In "Automatic Save" mode, the data is saved automatically before the configuration files (ConfigPack and Config) are transferred.
In "Trial" mode, although the changes are adopted, they are not saved in the configuration files (ConfigPack and Config). Use the "Write Startup Config" button on the "System > Configuration" WBM page to save changes in the configuration files.

CLI script file

You can download existing CLI configurations (RunningCLI) and upload your own CLI scripts (Script).

Note

The downloadable CLI script is not intended to be uploaded again unchanged.



Load and Save via SFTP

SFTP Server Address: 0.0.0.0
SFTP Server Port: 22
SFTP User:
SFTP Password:
SFTP Password Confirmation:

Type	Description	Filename	Actions
Config	Startup Configuration	config_SCALANCE_W700.conf	Select action
ConfigPack	Startup Config, Users, Certificates and WBM favourites	configpack_SCALANCE_W700.zip	Select action
CountryList	WLAN Country List	countrylist_SCALANCE_W700.zip	Select action
Debug	Debug Information for Siemens Support	debug_SCALANCE_W700.bin	Select action
EDS	EtherNet/IP Device Description	eds_SCALANCE_W700.zip	Select action
Firmware	Firmware Update	firmware_SCALANCE_W700.sfw	Save file
GSDML	PROFINET Device Description	gsdml_SCALANCE_W700.zip	Select action
HTTPSCert	HTTPS Certificate	https_cert	Select action
LogFile	Event Log (ASCII)	logfile_SCALANCE_W700.csv	Select action
LoginWelcomeMessage	Login Welcome Message	login_welcome_message.txt	Select action
MIB	SCALANCE W MSPS MIB	scalance_w_msps.mib	Select action
RunningCLI	'show running-config all' CLI settings	RunningCLI.txt	Select action
RunningSINEMAConfig	SINEMA Running Configuration	sinema_config_running.zip	Select action
Script	Script	Script.txt	Select action
SINEMAConfig	SINEMA Offline Configuration	sinema_config.zip	Select action
StartupInfo	Startup Information	startup_SCALANCE_W700.log	Select action
Users	Users and Passwords	users.enc	Select action
WBMFav	WBM favourite pages	wbmfav.txt	Select action
WLANAuthLog	Authentication Log (ASCII)	wlan_auth_log_SCALANCE_W700.csv	Select action
WLANCert	WLAN User Certificate	wlan_user_cert	Select action
WLANServCert	WLAN Server Certificate	wlan_serv_cert	Select action
WLANSigRec	Signal Recorder	signal_recorder_SCALANCE_W700.zip	Select action

Example of a device in client mode

Description

The page contains the following boxes:

- **SFTP Server Address**
  Enter the IP address or the FQDN of the SFTP server with which you exchange data.
- **SFTP Server Port**
  Enter the port of the SFTP server via which data exchange will be handled. If necessary, you can change the default value 22 to your own requirements.
- **SFTP User**
  Enter the user for access to the SFTP server. This assumes that a user with the corresponding rights has been created on the SFTP server.
- **SFTP Password**
  Enter the password for the user
- **SFTP Password Confirmation**
  Confirm the password.

The table has the following columns:

- **Type**
  Shows the file type.
- **Description**
  Shows the short description of the file type.
- **Filename**
  A file name is preset here for every file type.

  Note

  Changing the file name

  You can change the file name preset in this column. After clicking the "Set Values" button, the changed name is saved on the device and can also be used with the Command Line Interface.

- **Actions**
  Select the action from the drop-down list. The selection depends on the selected file type, for example you can only save the log file.
  The following actions are possible:
  - **Save file**
    With this selection, you save a file on the SFTP server.
  - **Load file**
    With this selection, you load a file from the SFTP server.

Procedure

Loading or saving data using SFTP

1. Enter the address of the SFTP server in "SFTP Server Address".
2. Enter the port of the SFTP server to be used in "SFTP Server Port".
3. Enter the user data (user name and password) required for access to the SFTP server.
4. If applicable, enter the name of a file in which you want to save the data or take the data from in "Filename".

   Note

   Files whose access is password protected

   To be able to load these files on the device successfully, you need to enter the password specified for the file in "System" > "Load&Save" > "Passwords".

5. Select the action you want to execute from the "Actions" drop-down list.
6. Click "Set Values" to start the selected action.
7. If a restart is necessary, a message to this effect will be output. Click the "OK" button to run the restart. If you click the "Abort" button, there is no device restart. The changes only take effect after a restart.

Reusing configuration data

If several identical devices are to receive the same configuration and the IP addresses are assigned using DHCP, the effort for reconfiguration can be reduced by saving and reading in the configuration data.

Follow the steps below to reuse configuration data:

1. Save the configuration data of a configured device on your PC.
2. Load these configuration files on all other devices you want to configure in this way.
3. If individual settings are necessary for specific devices, these must be made online on the relevant device.

Note

Configuration data has a checksum. If you change the data, you can no longer upload it to the IE switch.

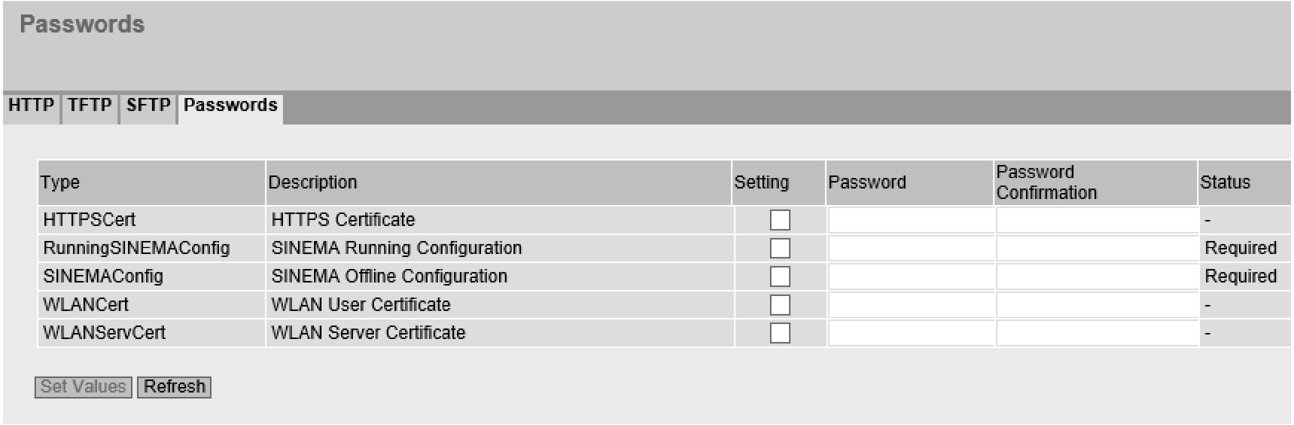
6.5.8.4 Passwords

There are files to which access is password protected. For example to be able to use the HTTPS certificate, you need to specify the corresponding password on this WBM page.

Note

User and server certificate in one file

If the user and the server certificate are located in the same file, load this file on the device as the user certificate and as the server certificate.



Type	Description	Setting	Password	Password Confirmation	Status
HTTPSCert	HTTPS Certificate	□			-
RunningSINEMAConfig	SINEMA Running Configuration	□			Required
SINEMAConfig	SINEMA Offline Configuration	□			Required
WLANCert	WLAN User Certificate	□			-
WLANServCert	WLAN Server Certificate	□			-

Description

The table has the following columns:

- **Type**
  Shows the file type.
- **Description**
  Shows a brief description of the file.
- **Setting**
  Can only be enabled if a password is configured.
  When enabled, a check is made during loading to ensure that the password matches the password set for the file.
- **Password**
  Enter the password set for the file.

  Note

  When assigning the password, you can only use the following readable ASCII characters: 0x20 - 0x7e.

- **Password Confirmation**
  Confirm the password.
- **Status**
  - **"-"**
    No password is specified or the password is enabled but no file is loaded yet.
  - Valid
    The password is used and matches the file.
  - Invalid
    The password is used, but the password does not match the file.
  - Required
    A password is required for loading or saving.

Procedure

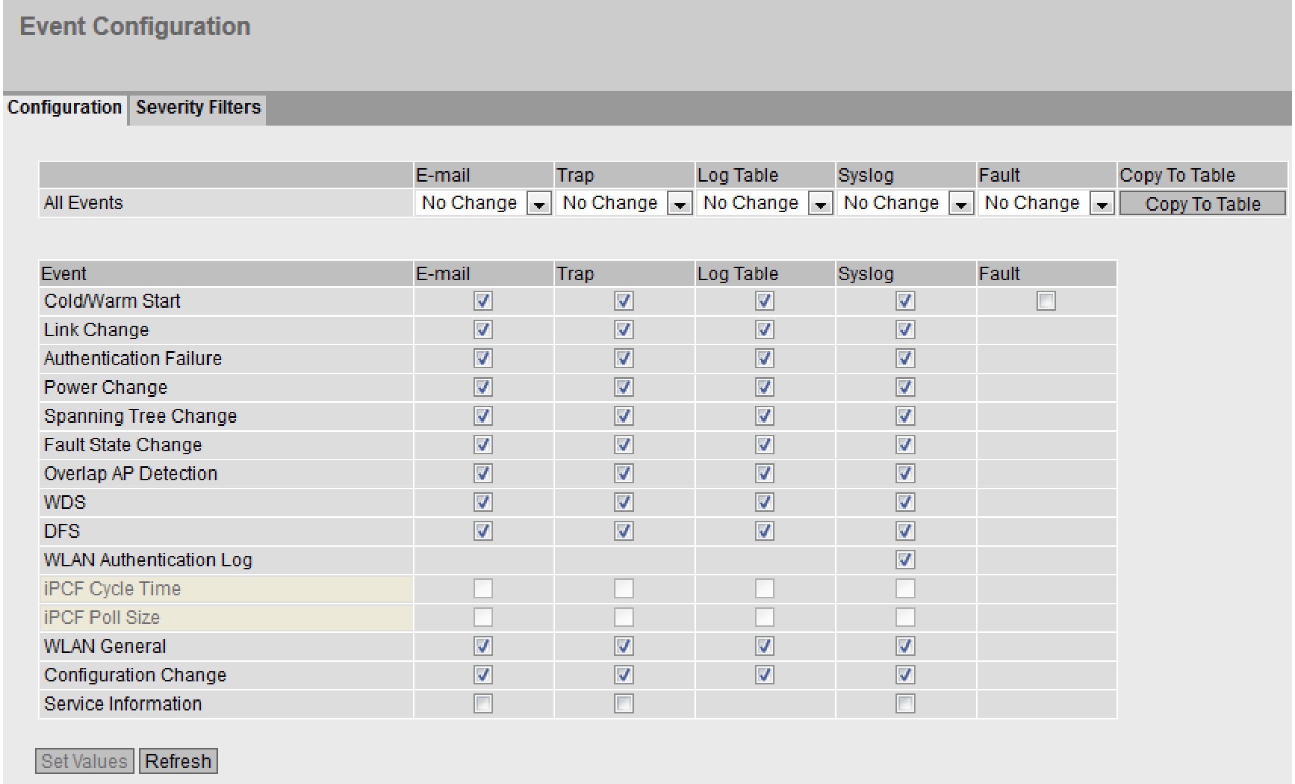
1. Enter the password in "Password".
2. To confirm the password, enter the password again in "Password Confirmation".
3. Select the "Enabled" option.
4. Click the "Set Values" button.

6.5.9 Events

6.5.9.1 Configuration

Selecting system events

On this page, you specify how a device reacts to system events. To enable or disable the options, click the relevant check boxes of the columns.



	E-mail	Trap	Log Table	Syslog	Fault	Copy To Table
All Events	No Change ▾	No Change ▾	No Change ▾	No Change ▾	No Change ▾	Copy To Table

Event	E-mail	Trap	Log Table	Syslog	Fault
Cold/Warm Start	☑	☑	☑	☑	☐
Link Change	☑	☑	☑	☑	
Authentication Failure	☑	☑	☑	☑	
Power Change	☑	☑	☑	☑	
Spanning Tree Change	☑	☑	☑	☑	
Fault State Change	☑	☑	☑	☑	
Overlap AP Detection	☑	☑	☑	☑	
WDS	☑	☑	☑	☑	
DFS	☑	☑	☑	☑	
WLAN Authentication Log				☑	
iPCF Cycle Time	☐	☐	☐	☐	
iPCF Poll Size	☐	☐	☐	☐	
WLAN General	☑	☑	☑	☑	
Configuration Change	☑	☑	☑	☑	
Service Information	☐	☐		☐	

Description

With Table 1, you can enable or disable all check boxes of a column of Table 2 at once. Table 1 has the following columns:

- **All Events**
  Shows that the settings are valid for all events of table 2.
- **E-mail / Trap / Log Table / Syslog / Faults**
  Enable or disable the required type of notification for all events. If "No Change" is selected, the entries of the corresponding column in table 2 remain unchanged.
- **Copy to table**
  If you click the button, the setting is adopted for all events of table 2.

Table 2 has the following columns:

- **Event**
  The column contains the following values:
  - **Cold/Warm Start**
    The device was turned on or restarted by the user.
  - **Link Change**
    This event occurs only when the port status is monitored and has changed, see "System > Fault Monitoring > Link Change".
  - **Authentication error**
    This event occurs when attempting access with a bad password.
  - Power Change
    This event occurs only when power supply lines 1 and 2 are monitored. It indicates that there was a change to line 1 or line 2. The event occurs when the PoE power supply has failed, see "System > Fault Monitoring > Power Supply".
  - Spanning Tree Change
    The STP or RSTP or MSTP topology has changed.
  - Fault State Change
    The fault status has changed. The fault status can relate to the activated port monitoring, the response of the signaling contact or the power supply monitoring.
  - Overlap AP Detection (only in access point mode)
    This event is triggered when there is an entry in the Overlap AP list.
  - WDS (Only in access point mode)
    The connection status of a WDS link has changed.
  - DFS (Only in access point mode)
    This event occurs if a radar signal was received or the DFS scan was started or stopped.
  - WLAN Authentication Log
    Forwarding of the entries from the WLAN authentication log to the system protocol server.
  - WLAN De/Authentication (Only in client mode)
    With successful or failed WLAN authentication attempts.
  - iPCF Cycle Time (Only in access point mode)
    Only available when the KEY-PLUG is inserted.
    This event occurs if too many clients are logged on for the set iPCF cycle time or if some clients were not reached in one cycle.
  - iPCF Poll Size
    Only available when the KEY-PLUG is inserted.
    This event occurs if the PROFINET data size is too large for transfer.
  - WLAN General (Only in access point mode)
    This event occurs if the channel bandwidth has changed.
  - Configuration Change
    This event occurs when the configuration of the device has changed.

  - Service Information
    Some system events that occurred are entered in the event log table without configuration. For these events, you can configure additional types of notification.

- **E-Mail**
  The device sends an e-mail. This is only possible if the SMTP server is set up and the "SMTP client" function is enabled.

- **Trap**
  The device sends an SNMP trap. This is only possible if "SNMPv1 Traps" is enabled in "System > Configuration".

- **Log Table**
  The device writes an entry in the event log table.

- **Syslog**
  The device writes an entry to the system log server. This is only possible if the system log server is set up and the "Syslog client" function is enabled.

- **Faults**
  The device triggers an error. The error LED lights up

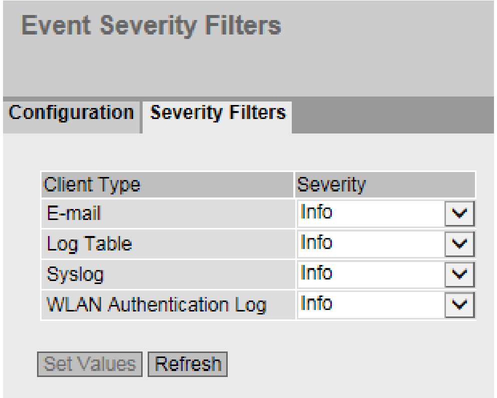
Procedure

Follow the steps below to change entries:

1. Select the check box in the row of the required event. Select the event in the column under the following actions:
   - E-mail
   - Trap
   - Log table
   - Syslog
   - Error
2. Click the "Set Values" button.

6.5.9.2 Severity Filters

On this page, you configure the severity for the sending of system event notifications.



Client Type	Severity
E-mail	Info
Log Table	Info
Syslog	Info
WLAN Authentication Log	Info

Description

The table has the following columns:

- **Client Type**
  Select the client type for which you want to make settings:
  - **E-mail**
    Sending system event messages by e-mail
  - **Log Table**
    Entry of system events in the log table
  - **Syslog**
    Entry of system events in the Syslog file
  - **WLAN Authentication Log**
    Entry of system events in the WLAN authentication log
- **Severity**
  Select the required level. The following settings are possible:
  - **Critical**
    System events are processed as of the severity level "Critical".
  - **Warning**
    System events are processed as of the severity level "Warning".
  - **Info**
    System events are processed as of the severity level "Info".

Procedure

Follow the steps below to configure the required level:

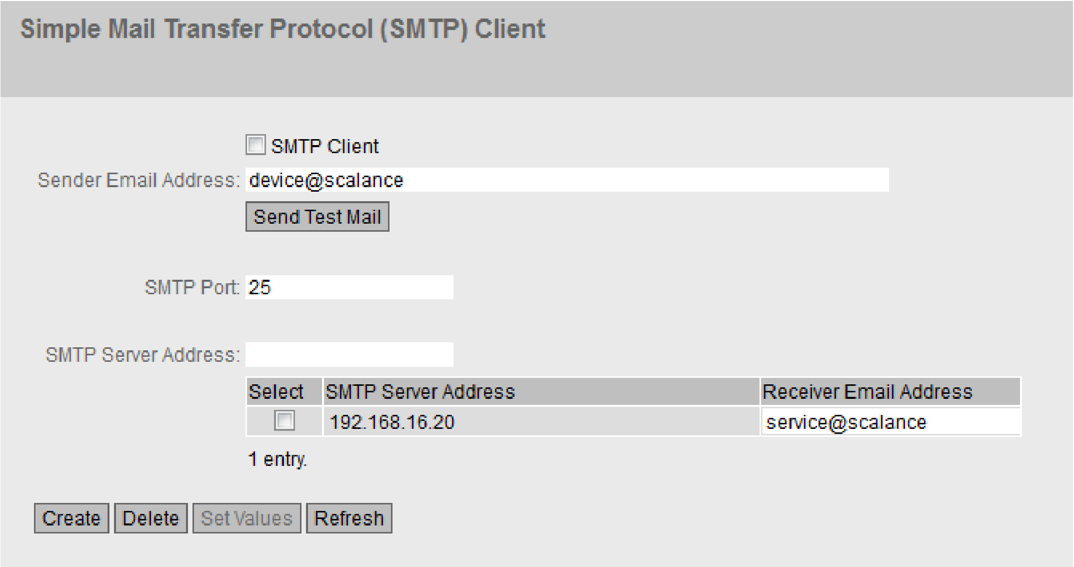
1. Select the required values from the drop-down lists of the second table column after the client types.
2. Click the "Set Values" button.

6.5.10 SMTP Client

Network monitoring with e-mails

The device provides the option of automatically sending an e-mail if an alarm event occurs (for example to the network administrator). The e-mail contains the identification of the sending device, a description of the cause of the alarm in plain language, and a time stamp. This allows centralized network monitoring to be set up for networks with few nodes based on an e-mail system. When an e-mail error message is received, the WBM can be started by the Internet browser using the identification of the sender to read out further diagnostics information.

On this page, you can configure up to three SMTP servers and the corresponding e-mail addresses.



Simple Mail Transfer Protocol (SMTP) Client

□ SMTP Client

Sender Email Address: device@scalance

SMTP Port: 25

SMTP Server Address:

Select	SMTP Server Address	Receiver Email Address
□	192.168.16.20	service@scalance

1 entry.

Description

The page contains the following boxes:

- **SMTP Client**
  Enable or disable the SMTP client.
- **Sender Email Address**
  Enter the name of the sender to be included in the e-mail, for example the device name. This setting applies to all configured SMTP servers.
- **Send Test Mail**
  Send a test e-mail to check your configuration.

- **SMTP Port**
  Enter the port via which your SMTP server can be reached.
  Factory settings: 25
  This setting applies to all configured SMTP servers.
- **SMTP Server Address**
  Enter the IP address, the FQDN (Fully Qualified Domain Name) or the host name of the SMTP server.

The table contains the following columns:

- **Select**
  Select the check box in a row to be deleted.
- **SMTP Server Address**
  Shows the IP address, the FQDN (Fully Qualified Domain Name) or the host name of the SMTP server.
- **Receiver Email Address**
  Enter the e-mail address to which the device sends an e-mail if a fault occurs.

Procedure

1. Enable the "SMTP Client" option.
2. Enter the IP address, the FQDN or the host name of the SMTP server in the "SMTP Server Address" input box.
3. Click the "Create" button. A new entry is generated in the table.
4. In the "Receiver Email Address" input box, enter the e-mail address to which the device sends an e-mail if a fault occurs.
5. Click the "Set Values" button.

Note

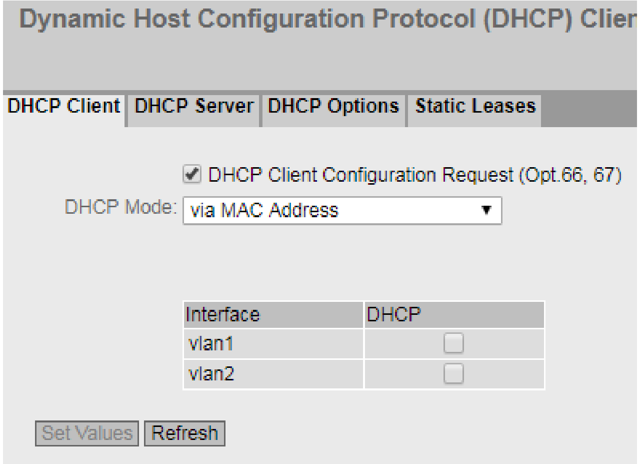
Depending on the properties and configuration of the SMTP server, it may be necessary to adapt the "Sender E-Mail Address” input box for the e-mails. Check with the administrator of the SMTP server.

6.5.11 DHCPv4

6.5.11.1 DHCP client

Setting of the DHCP mode

If the device is configured as a DHCP client, it starts a DHCP query. As the reply to the query the device receives an IPv4 address from the DHCP server. The server manages an address range from which it assigns IPv4 addresses. It is also possible to configure the server so that the client always receives the same IPv4 address in response to its request.



Dynamic Host Configuration Protocol (DHCP) Clier

☑ DHCP Client Configuration Request (Opt.66, 67)

DHCP Mode: via MAC Address ▼

Interface	DHCP
vlan1	□
vlan2	□

Description

The page contains the following boxes:

- **DHCP client configuration file request (opt. 66, 67)**
  Select this option if you want the DHCP client to use options 66 and 67 to download and then enable a configuration file.
- **DHCP Mode**
  Select the DHCP mode from the drop-down list. The following modes are possible:
  - via MAC Address
    Identification is based on the MAC address.
  - via DHCP Client ID
    Identification is based on a freely defined DHCP client ID.
  - via System Name
    Identification is based on the system name. If the system name is 255 characters long, the last character is not used for identification.
  - via PROFINET Name of Station
    The identification is made using the PROFINET device name.

The table has the following columns:

- **Interface**
  Interface to which the setting relates.
- **DHCP**
  Enable or disable the DHCP client for the relevant interface.

Procedure

1. Select the required mode from the "DHCP Mode" drop-down list. If you select the DHCP mode "via DHCP Client ID" an input box appears.
   – In the enabled input box "DHCP client ID" enter a string to identify the device. This is then evaluated by the DHCP server.
2. Select the "DHCP Client Configuration Request (Opt. 66, 67)", if you want the DHCP client to use options 66 and 67 to download and then enable a configuration file.
3. Enable the "DHCP" option in the table.
4. Click the "Set Values" button.

Note

If a configuration file is downloaded, this can trigger a system restart. If the currently running configuration and the configuration in the downloaded configuration file differ, the system is restarted.

Make sure that the option "DHCP Client Configuration Request (Opt. 66, 67)" is no longer set.

6.5.11.2 DHCP Server

You can operate the device as a DHCP server. This allows IPv4 addresses to be assigned automatically to the connected devices. The IPv4 addresses are either distributed dynamically from an address band you have specified or a specific IPv4 address (static) can be assigned to a particular device.

On this page, specify the IPv4 address band from which the device receives any IPv4 address.

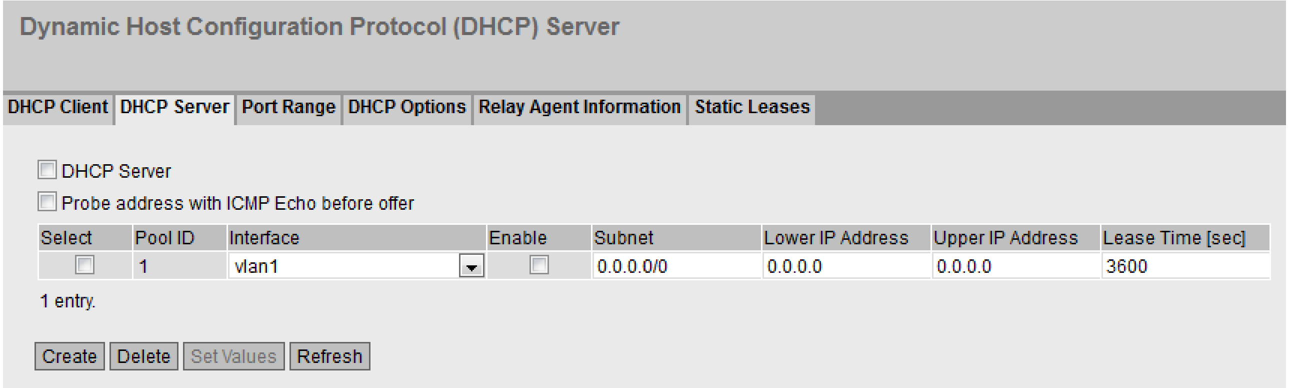
You configure the static assignment of the IPv4 addresses in "Static Leases".

Note

Maximum number of IP addresses

The maximum number of IPv4 addresses that the DHCP server supports is 100. In other words, a total of 100 IPv4 addresses (dynamic + static).

With the static assignments, you can create a maximum of 20 entries.


Dynamic Host Configuration Protocol (DHCP) Server

□ DHCP Server

□ Probe address with ICMP Echo before offer

Select	Pool ID	Interface	Enable	Subnet	Lower IP Address	Upper IP Address	Lease Time [sec]
□	1	vlan1	□	0.0.0.0/0	0.0.0.0	0.0.0.0	3600

1 entry.

Requirements for the DHCP server

- In access point mode
  - The connected devices are configured so that they obtain the IPv4 address from a DHCP server.
- In client mode
  - The connected devices are configured so that they obtain the IPv4 address from a DHCP server.
  - NAT is enabled. You enable NAT in "Layer 3 > NAT"

Description

The page contains the following boxes:

- **DHCP Server**
  Enable or disable the DHCP server on the device.

  Note

  To avoid conflicts with IPv4 addresses, only one device may be configured as a DHCP server in the network.

  Note

  Access point

  With an access point, the "DHCP Server" function is only possible on the VLAN assigned to the management (agent VLAN ID).

- **Probe address with ICMP Echo before offer**
  When selected, the DHCP server checks whether or not the IP address has already been assigned. To do this the DHCP server sends ICMP echo messages (ping) to the IPv4 address. If no reply is received, the DHCP server can assign the IPv4 address.

  Note

  If there are devices in your network on which the echo service is disabled as default, there may be conflicts with the IPv4 addresses. To avoid this, assign these devices an IPv4 address outside the IPv4 address band.

The table has the following columns:

- **Select**
  Select the check box in the row to be deleted.
- **Pool ID**
  Shows the number of the IPv4 address band. If you click the "Create" button, a new row with a unique number is created (pool ID).

  Note

  Only one Pool ID (ID = 1) can be created.

- **Interface**
  Specify the interface via which the IPv4 addresses are dynamically assigned.
  The requirement for the assignment is that the IPv4 address of the interface is located within the IPv4 address band. If this is not the case, the interface does not assign any IPv4 addresses.
- **Enable**
  Specify whether or not this IPv4 address band will be used.

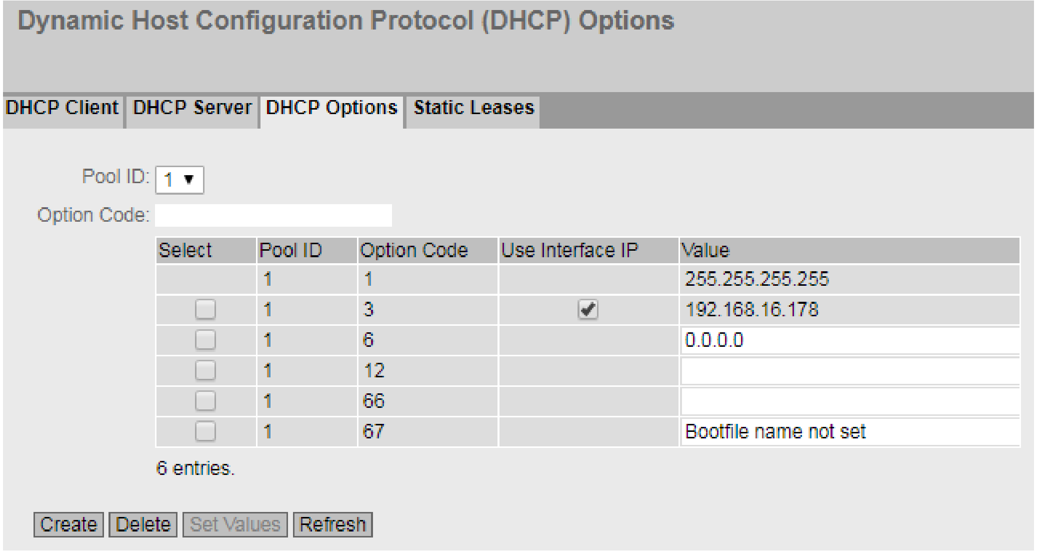
  Note

  If you enable the IPv4 address band. the settings in this and the other DHCP tabs ate grayed out and can no longer be edited.

- **Subnet**
  Enter the network address range that will be assigned to the devices. Use the CIDR notation.
- **Lower IP address**
  Enter the IPv4 address that specifies the start of the dynamic IPv4 address band. The IPv4 address must be within the network address range you configured for "Subnet".
- **Upper IP address**
  Enter the IPv4 address that specifies the end of the dynamic IPv4 address band. The IPv4 address must be within the network address range you configured for "Subnet".
- **Lease Time (sec)**
  Specify for how many seconds the assigned IPv4 address remains valid. When half the lease time has elapsed. the DHCP client can extend the period of the assigned IPv4 address. When the entire time has elapsed, the DHCP client needs to request a new IPv4 address.

6.5.11.3 DHCP Options

On this page you specify which DHCP options the DHCP server supports. The various DHCP options are defined in RFC 2132.



Dynamic Host Configuration Protocol (DHCP) Options

Pool ID: 1

Option Code:

Select	Pool ID	Option Code	Use Interface IP	Value
	1	1		255.255.255.255
☐	1	3	☑	192.168.16.178
☐	1	6		0.0.0.0
☐	1	12		
☐	1	66		
☐	1	67		Bootfile name not set

6 entries.

Description

The page contains the following boxes:

- **Pool ID**
  Select the required IPv4 address band.
- **Option Code**
  Enter the number of the required DHCP option. A maximum of 20 DHCP options are possible. The various DHCP options are defined in RFC 2132. The DHCP options 1, 3, 6, 12, 66 and 67 are created automatically when the IPv4 address band is created. With the exception of option 1, the options can be deleted.
  With the DHCP option 3, the internal IPv4 address of the device is automatically set as a DHCP parameter

Note

DHCP options not supported

The DHCP options 50 - 60 and 255 are not supported.

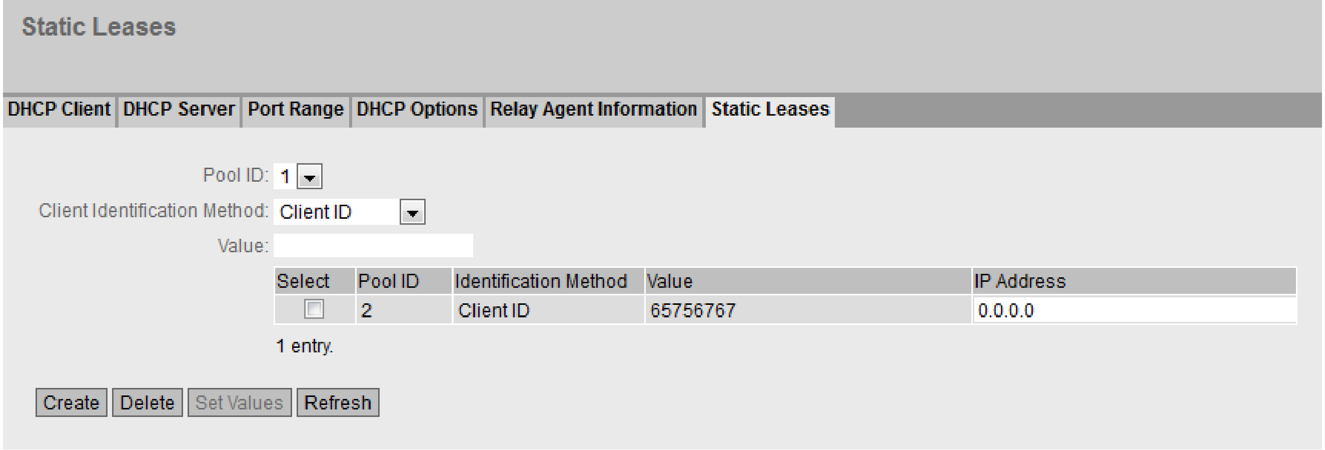
The table has the following columns:

- **Select**
  Select the check box in the row to be deleted.
- **Pool ID**
  Shows the number of the IPv4 address band.
- **Option Code**
  Shows the number of the DHCP option.

- **Use Interface IP**
  Specify whether or not the internal IPv4 address of the device will be used.
- **Value**
  Enter the DHCP parameter that is transferred to the DHCP client. The content depends on the DHCP option.
  - DHCP option 67 (boot file name)
    Enter the name of the boot file in the string format.
  - DHCP options 3 (Router) and 6 (DNS):
    Enter the DHCP parameter as an IPv4 address, e.g. 192.168.100.2. With DHCP option 6, you can specify several IPv4 addresses separated by commas.
  - DHCP option 12 (host name):
    Enter the host name in the string format.
  - DHCP option 66 (TFTP Server):
    Enter the TFTP server as an IPv4 address, e.g. 192.168.100.2 or the FQDN name.
  - All other DHCP options
    Enter the DHCP parameter in hexadecimal, e.g. the IPv4 address 192.168.100.2 corresponds to "C0A86402".

6.5.11.4 Static Leases

On this page you specify that devices with a certain MAC address are assigned to the selected IPv4 address.



Static Leases

Pool ID: 1

Client Identification Method: Client ID

Value:

Select	Pool ID	Identification Method	Value	IP Address
□	2	Client ID	65756767	0.0.0.0

1 entry.

Description

The page contains the following boxes:

- **Pool ID**
  From the drop-down list, select the required IPv4 address band.
- **Hardware Type**
  Select the method according to which a client is identified.
  - Ethernet MAC
    The client is identified by its MAC address.
  - Client ID
    The client is identified by a freely defined DHCP client ID. The client ID can be up to a maximum of 254 characters long.
- **Value**
  Enter the MAC address or the client ID and click the "Create" button to create the entry.

Note

A maximum of 20 entries are possible.

The table has the following columns:

- **Select**
  Select the check box in the row to be deleted.
- **Pool ID**
  Shows the number of the IPv4 address band.

Note

Only Pool ID = 1 is supported.

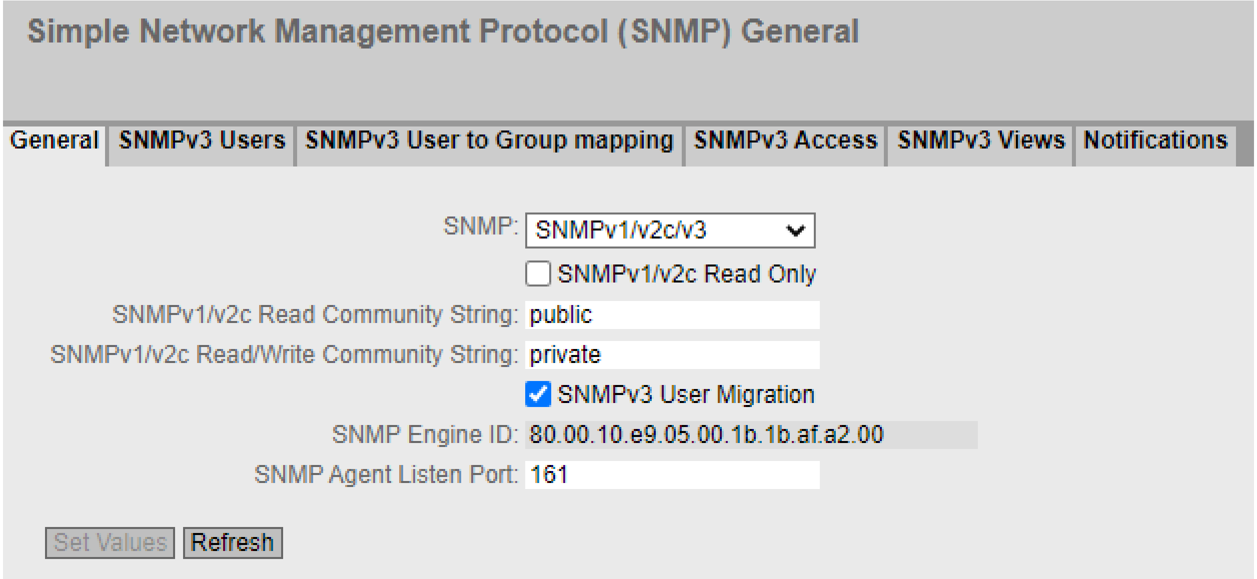
- **Hardware Type**
  Shows whether the client is identified by its MAC address or the client ID.
- **Value**
  Shows the MAC address to which the IPv4 address is assigned.
- **IP Address**
  Specify the IPv4 address. The IPv4 address must match the subnet of the IPv4 address band.

6.5.12 SNMP

6.5.12.1 General

Configuration of SNMP

On this page, you make the basic settings for SNMP. Enable the check boxes according to the function you want to use.



Simple Network Management Protocol (SNMP) General

SNMP: SNMPv1/v2c/v3

☐ SNMPv1/v2c Read Only

SNMPv1/v2c Read Community String: public

SNMPv1/v2c Read/Write Community String: private

☑ SNMPv3 User Migration

SNMP Engine ID: 80.00.10.e9.05.00.1b.1b.af.a2.00

SNMP Agent Listen Port: 161

Description

The page contains the following boxes:

- **SNMP**
  Select the SNMP protocol from the drop-down list. The following settings are possible:
  - "-" (Disabled)
    SNMP is disabled.
  - SNMPv1/v2c/v3
    SNMPv1/v2c/v3 is supported.

    Note

    Note that SNMP in versions 1 and 2c does not have any security mechanisms.
  - SNMPv3
    Only SNMPv3 is supported.
- **SNMPv1/v2c Read-Only**
  If you enable this option, SNMPv1/v2c can only read the SNMP variables.

  Note

  Community String

  For security reasons, do not use the standard values "public" or "private". Change the community strings following the initial installation.

  The recommended minimum length for community strings is 6 characters.

  For security reasons, only limited access to objects of the SNMPCommunityMIB is possible with the SNMPv1/v2c Read Community String. With the SNMPv1/v2c Read/Write Community String, you have full access to the SNMPCommunityMIB.
- **SNMPv1/v2c Read Community String**
  Enter the community string for read access of the SNMP protocol.
- **SNMPv1/v2c Read/Write Community String**
  Enter the community string for read and write access of the SNMP protocol.
- **SNMPv3 User Migration**
  - **Enabled**
    If the function is enabled, an SNMP engine ID is generated that can be migrated. You can transfer configured SNMPv3 users to a different device.
    If you enable this function and load the configuration of the device on another device, configured SNMPv3 users are retained.
  - **Disabled**
    If the function is disabled, a device-specific SNMP engine ID is generated. To generate the ID, the agent MAC address of the device is used. You cannot transfer this SNMP user configuration to other devices.
    If you load the configuration of the device on another device, all configured SNMPv3 users are deleted.

- **SNMP Engine ID**
  Shows the SNMP engine ID.
- **SNMP Agent Listen Port**
  Specify the port at which the SNMP agent waits for the SNMP queries. Standard port 161 is the default.
  You can optionally enter the standard port 162 or a port number in the range 1024 ... 49151 or 49500 ... 65535.

Procedure

1. Select the required option from the "SNMP" drop-down list:
   - "-" (disabled)
   - SNMPv1/v2c/v3
   - SNMPv3
2. Enable the "SNMPv1/v2c Read Only" check box if you only want read access to SNMP variables with SNMPv1/v2c.
3. Enter the required character string in the "SNMPv1/v2c Read Community String" input box.
4. Enter the required character string in the "SNMPv1/v2c Read/Write Community String" input box.
5. If necessary, enable the SNMPv3 User Migration.
6. Click the "Set Values" button.

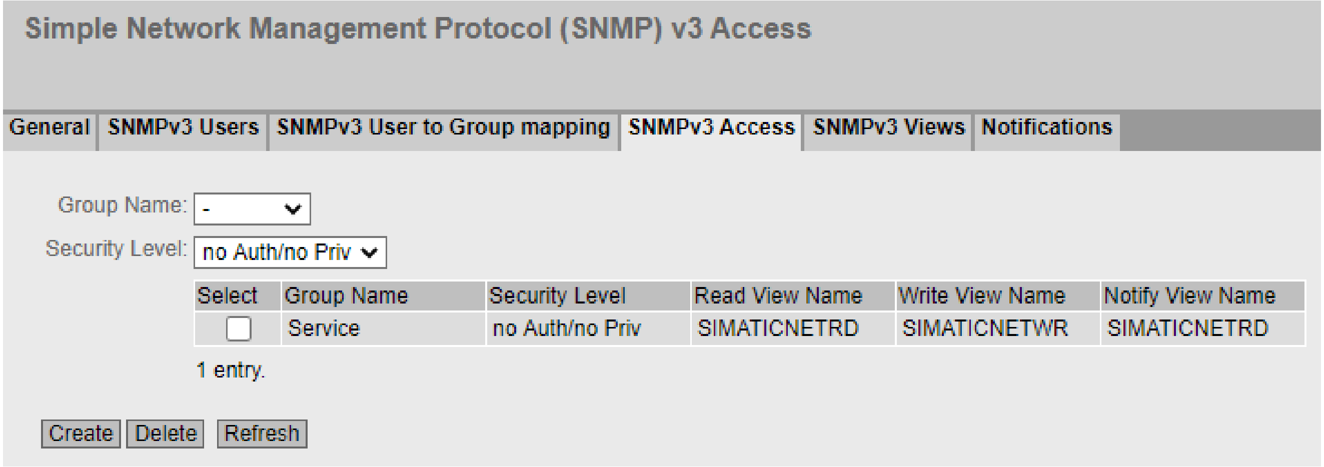
6.5.12.2 v3 Groups

Security settings and assigning permissions

SNMP version 3 allows permissions to be assigned, authentication, and encryption at protocol level. The security level and read/write permissions are assigned according to groups. The settings automatically apply to every member of a group.

Note

Different access permissions for different security levels can be assigned to a group. If no access permission is defined for a security level, no access to the device is possible for members of the group using this security level.



Simple Network Management Protocol (SNMP) v3 Access

Group Name: -

Security Level: no Auth/no Priv

Select	Group Name	Security Level	Read View Name	Write View Name	Notify View Name
☐	Service	no Auth/no Priv	SIMATICNETRD	SIMATICNETWR	SIMATICNETRD

1 entry.

Description

The page contains the following boxes:

- **Group Name**
  Select the name of the group.
- **Security Level**
  Select the security level (authentication, encryption) for which you want to define the access permissions of the group:
  - **No Auth/no Priv**
    No authentication enabled/no encryption enabled.
  - **Auth/no Priv**
    Authentication enabled/no encryption enabled.
  - **Auth/Priv**
    Authentication enabled/encryption enabled.

The table has the following columns:

- **Select**
  Select the row you want to delete.
- **Group Name**
  Shows the name of the SNMPv3 group.
- **Security Level**
  Shows the security level to which this access permission applies.
- **Read View Name**
  Enter an SNMPv3 view to be used for read SNMP access by members of the group with the defined security level.

- **Write View Name**
  Enter an SNMPv3 view to be used for write SNMP access by members of the group with the defined security level.

  Note

  For write access to work, you also need to enable read access.

- **Notification View Name**
  Enter an SNMPv3 view for which SNMP notification to members of the group with the defined security level should be used.

Procedure

Creating a new group

1. Select the name of the group for which you are configuring SNMP access.
2. Select the required security level from the "Security Level" drop-down list.
3. Click the "Create" button to create a new entry.
4. In the "Read View Name" field, enter the SNMPv3 view for read access.
5. In the "Write View Name" field, enter the SNMPv3 view for write access.
6. In the "Notification View Name" field, enter the SNMPv3 view for notifications.
7. Click the "Set Values" button.

Modifying a group

Once a group name and the security level have been specified, they can no longer be modified after the group is created. If you want to change the group name or the security level, you will need to delete the group and create it and configure it with the new name.

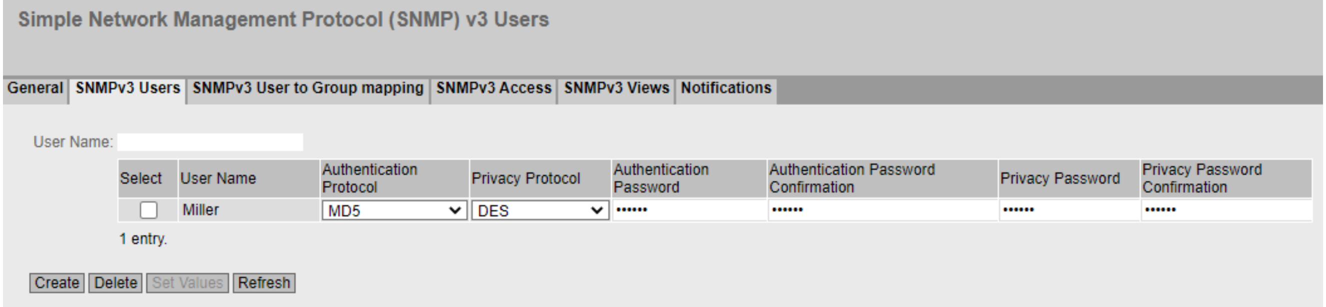
Deleting a group

1. Enable "Select" in the row to be deleted.
   Repeat this for all groups you want to delete.
2. Click the "Delete" button. The entries are deleted.

6.5.12.3 v3 users

User-specific security settings

On the WBM page, you can create new SNMPv3 users and modify or delete existing users. The user-based security model works with the concept of the user name; in other words, a user ID is added to every frame. This user name and the applicable security settings are checked by both the sender and recipient.



User Name:

Select	User Name	Authentication Protocol	Privacy Protocol	Authentication Password	Authentication Password Confirmation	Privacy Password	Privacy Password Confirmation
□	Miller	MD5	DES	••••••	••••••	••••••	••••••

1 entry.

Description

The page contains the following boxes:

- **User Name**
  Enter a freely selectable user name. After you have entered the data, you can no longer modify the name.

The table has the following columns:

- **Select**
  Select the row you want to delete.
- **User Name**
  Shows the created users.
- **Authentication Protocol**
  Specify the authentication protocol for which a password will be stored.
  The following settings are available:
  - None
  - MD5
  - SHA
- **Privacy Protocol**
  Specify the encryption protocol for which a password will be stored. This drop-down list is only enabled when an authentication protocol has been selected.
  The following settings are available:
  - None
  - DES
  - AES

- **Authentication Password**
  Enter the authentication password in the first input box. This password must have at least 1 character, the maximum length is 32 characters.

  Note

  Length of the password

  As an important measure to maximize security, we recommend that the password has a minimum length of 6 characters and that it contains special characters, uppercase/lowercase letters, numbers.

- **Authentication Password Confirmation**
  Confirm the password by repeating the entry.

- **Privacy Password**
  Enter your encryption password. This password must have at least 1 character, the maximum length is 32 characters.

  Note

  Length of the password

  As an important measure to maximize security, we recommend that the password has a minimum length of 6 characters and that it contains special characters, uppercase/lowercase letters, numbers.

- **Privacy Password Confirmation**
  Confirm the encryption password by repeating the entry.

Procedure

Create a new user

1. Enter the name of the new user in the "User Name" input box.
2. Click the "Create" button. A new entry is generated in the table.
3. Select the authentication algorithm for "Authentication Protocol". In the relevant input boxes, enter the authentication password and the confirmation.
4. Select the algorithm in "Privacy Protocol". In the relevant input boxes, enter the encryption password and the confirmation.
5. Click the "Set Values" button.

Delete user

1. Enable "Select" in the row to be deleted.
   Repeat this for all users you want to delete.
2. Click the "Delete" button. The entry is deleted.

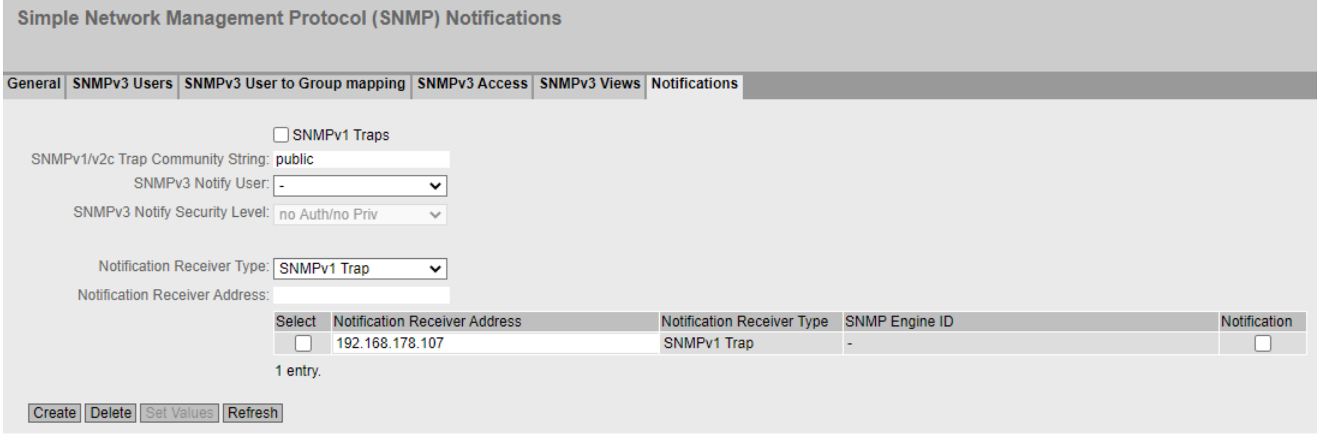
6.5.12.4 Traps

SNMP traps for alarm events

If an alarm event occurs, a device can send SNMP traps (alarm frames) to up to ten different management stations at the same time. Traps are only sent if the events specified in the "Events" menu occur.

Note

Traps are only sent if you have enabled the option "SNMPv1 Traps" in the "General" tab or in "System > Configuration".


Simple Network Management Protocol (SNMP) Notifications

□ SNMPv1 Traps

SNMPv1/v2c Trap Community String: public

SNMPv3 Notify User: -

SNMPv3 Notify Security Level: no Auth/no Priv

Notification Receiver Type: SNMPv1 Trap

Notification Receiver Address:

Select	Notification Receiver Address	Notification Receiver Type	SNMP Engine ID	Notification
□	192.168.178.107	SNMPv1 Trap	-	□

1 entry.

Description

- **Trap Receiver Address**
  Enter the IP address or the FQDN (Fully Qualified Domain Name) of the station to which the device sends SNMP traps. You can specify up to ten different recipients servers.

The table has the following columns:

- **Select**
  Select the row you want to delete.
- **Trap Receiver Address**
  If necessary, change the IP address or the FQDN (Fully Qualified Domain Name) of the stations.
- **Trap**
  Enable or disable the sending of traps. Stations that are entered but not selected do not receive SNMP traps.

Procedure

Creating a trap entry

1. In "Trap Receiver Address", enter the IP address or the FQDN of the station to which the device will send traps.
2. Click the "Create" button to create a new trap entry.
3. Select the check box in the required row "Trap".
4. Click the "Set Values" button.

Deleting a trap entry

1. Enable "Select" in the row to be deleted.
2. Click the "Delete" button. The entry is deleted.

6.5.13 System Time

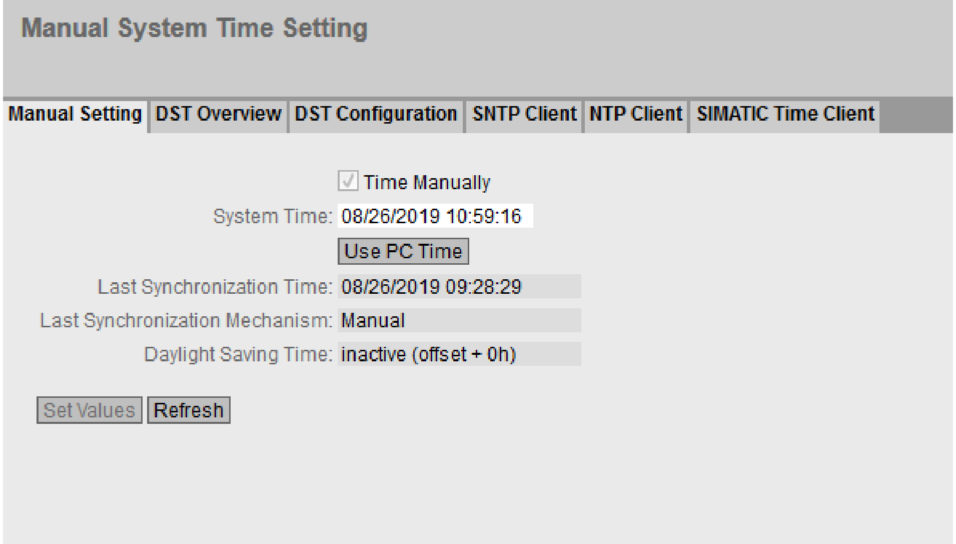
There are different methods that can be used to set the system time of the device. Only one method can be active at any one time.

If one method is activated, the previously activated method is automatically deactivated.

6.5.13.1 Manual Setting

Manual setting of the system time

On this page, you set the date and time of the system yourself. For this setting to be used, enable "Time Manually".



☑ Time Manually

System Time: 08/26/2019 10:59:16

Last Synchronization Time: 08/26/2019 09:28:29

Last Synchronization Mechanism: Manual

Daylight Saving Time: inactive (offset + 0h)

Description

The page contains the following boxes:

- **Time Manually**
  Enable the manual time setting. If you enable the option, the "System Time" input box can be edited.
- **System Time**
  Enter the date and time in the format "MM/DD/YYYY HH:MM:SS".
  After a restart, the time of day begins at 01/01/2000 00:00:00.
- **Use PC Time**
  Click the button to use the time setting of the PC.
- **Last Synchronization Time**
  Shows when the last time-of-day synchronization took place. If no time-of-day synchronization was possible, the box displays "Date/time not set".
- **Last Synchronization Mechanism**
  Shows how the last time synchronization was performed.
  - Not set
    The time was not set.
  - Manual
    Manual time setting
  - SNTP
    Automatic time-of-day synchronization with SNTP
  - NTP
    Automatic time-of-day synchronization with NTP
  - SIMATIC
    Automatic time-of-day synchronization using the SIMATIC time frame
- **Daylight Saving Time (DST)**
  Shows whether the daylight saving time changeover is active.
  - active (offset +1 h)
    The system time was changed to daylight saving time; in other words an hour was added. You can see the current system time at the top right in the selection area of the WBM. The current time including daylight saving time is displayed in the "System Time" box.
  - inactive (offset +0 h)
    The current system time is not changed.

Procedure

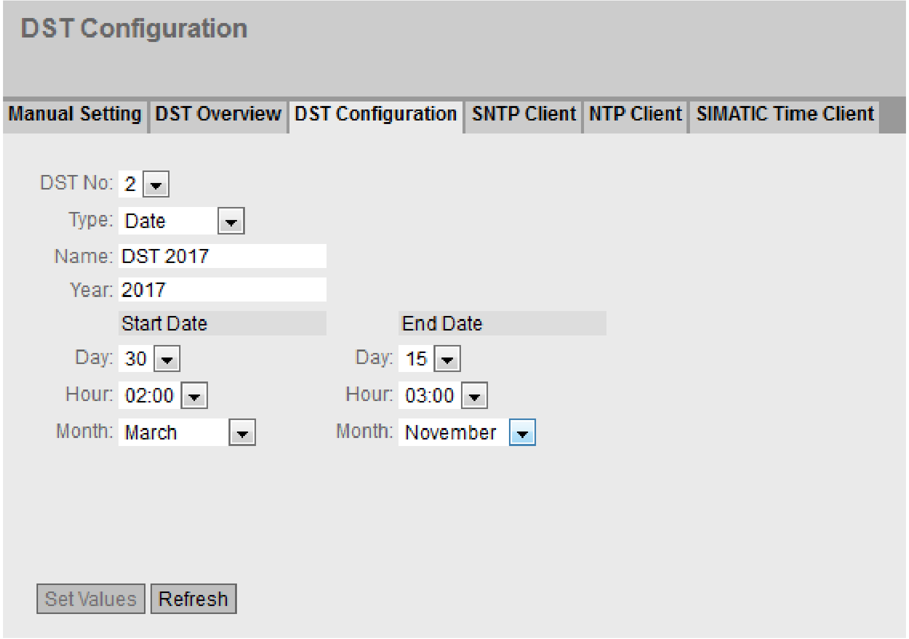
1. Enable the "Time Manually" option.
2. In the "System Time" input box, enter the date and time in the format "MM/DD/YYYY HH:MM:SS".
3. Click the "Set Values" button.
   The date and time are adopted and "Manual" is entered in "Last Synchronization Mechanism" box.

6.5.13.2 DST Overview

On this page, you can create new entries for the daylight saving time changeover.

The table provides an overview of the existing entries.

Settings



DST No: 2
Type: Date
Name: DST 2017
Year: 2017

	Start Date		End Date
Day:	30	Day:	15
Hour:	02:00	Hour:	03:00
Month:	March	Month:	November

- **Select**
  Select the row you want to delete.
- **DST No.**
  Shows the number of the entry.
  If you create a new entry, a new line with a unique number is created.
- **Name**
  Shows the name of the entry.
- **Year**
  Shows the year for which the entry was created.
- **Start Date**
  Shows the month, day and time for the start of daylight saving time.
- **End Date**
  Shows the month, day and time for the end of daylight saving time.
- **Recurring Date**
  With an entry of the type "Rule", the period in which daylight saving time is active is displayed consisting of week, day, month and time of day.
  With an entry of the type "Date" a "-" is displayed.

- **State**
  Shows the status of the entry:
  - Enabled
    The entry was created correctly.
  - Invalid
    The entry was created new and the start and end date are identical.
- **Type**
  Shows how the daylight saving time changeover is made:
  - Date
    A fixed date is entered for the daylight saving time changeover.
  - Rule
    A rule was defined for the daylight saving time changeover.

Procedure

Creating an entry

1. Click the "Create" button.
   A new entry is created in the table.
2. Click on the required entry in the "DST No." column.
   You change to the "DST Configuration" page.
3. Select the required type in the "Type" drop-down list.
   Depending on the selected type, various settings are available.
4. Enter a name in the "Name" box.
5. If you have selected the type "Date", fill in the following boxes.
   - Year
   - Day (for start and end date)
   - Hour (for start and end date)
   - Month (for start and end date)
6. If you have selected the type "Rule", fill in the following boxes.
   - Hour (for start and end date)
   - Month (for start and end date)
   - Week (for start and end date)
   - Day (for start and end date)
7. Click the "Set Values" button.

Deleting an entry

1. Enable "Select" in the row to be deleted.
2. Click the "Delete" button. The entry is deleted.

6.5.13.3 DST Configuration

On this page, you can configure the entries for the daylight saving time changeover. As result of the changeover to daylight saving or standard time, the system time for the local time zone is correctly set.

You can define a rule for the daylight saving time changeover or specify a fixed date.

Settings

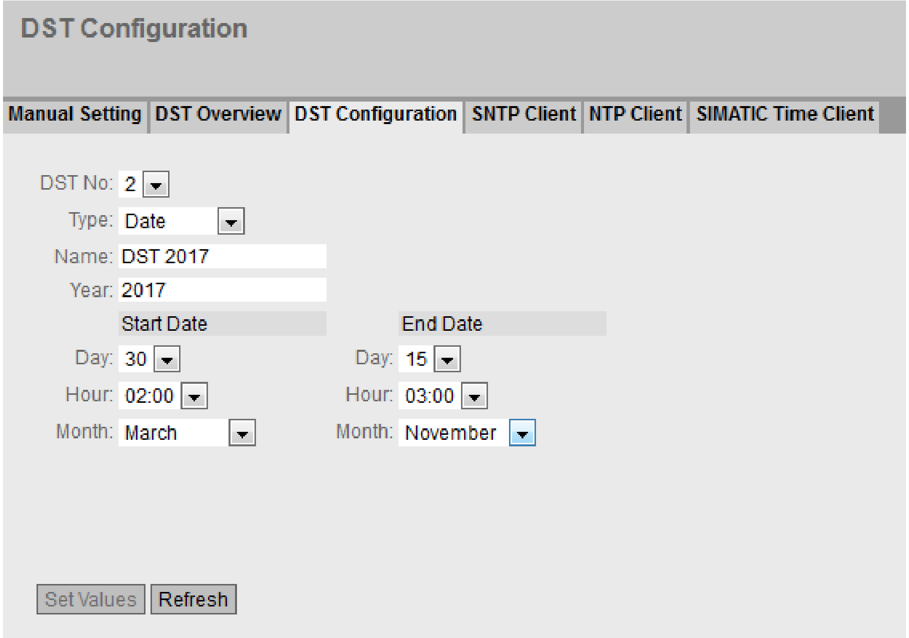
Note

The content of this page depends on the selection in the "Type" box.

The boxes "DST No.", "Type" and "Name" are always shown.

- **DST No.**
  Select the type of the entry.
- **Type**
  Select how the daylight saving time changeover is made:
  - Date
    You can set a fixed date for the daylight saving time changeover.
    This setting is suitable for regions in which the daylight saving time changeover is not governed by rules.
  - Rule
    You can define a rule for the daylight saving time changeover.
    This setting is suitable for regions in which the daylight saving time always begins or ends on a certain weekday.
- **Name**
  Enter a name for the entry.
  The name can be a maximum of 16 characters long.

Settings with "Date" selected


DST Configuration

DST No: 2

Type: Date

Name: DST 2017

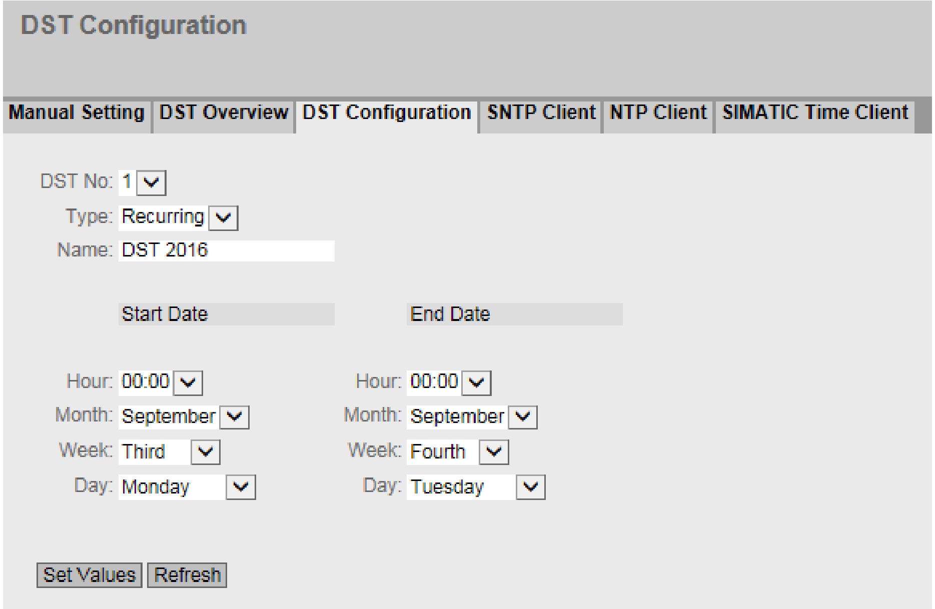
Year: 2017

	Start Date		End Date
Day:	30	Day:	15
Hour:	02:00	Hour:	03:00
Month:	March	Month:	November

You can set a fixed date for the start and end of daylight saving time.

- **Year**
  Enter the year for the daylight saving time changeover.
- **Start Date**
  Enter the following values for the start of daylight saving time:
  - Day
    Specify the day.
  - Hour
    Specify the hour.
  - Month
    Specify the month.
- **End Date**
  Enter the following values for the end of daylight saving time:
  - Day
    Specify the day.
  - Hour
    Specify the hour.
  - Month
    Specify the month.

Settings with "Rule" selected



DST No: 1
Type: Recurring
Name: DST 2016

Start Date

Hour: 00:00
Month: September
Week: Third
Day: Monday

End Date

Hour: 00:00
Month: September
Week: Fourth
Day: Tuesday

You can create a rule for the daylight saving time changeover.

- **Start Date**
  Enter the following values for the start of daylight saving time:
  - Hour
    Specify the hour.
  - Month
    Specify the month.
  - Week
    Specify the week.
    You can select the first to fifth or the last week of the month.
  - Day
    Specify the weekday.
- **End Date**
  Enter the following values for the end of daylight saving time:
  - Hour
    Specify the hour.
  - Month
    Specify the month.
  - Week
    Specify the week.
    You can select the first to fifth or the last week of the month.
  - Day
    Specify the weekday.

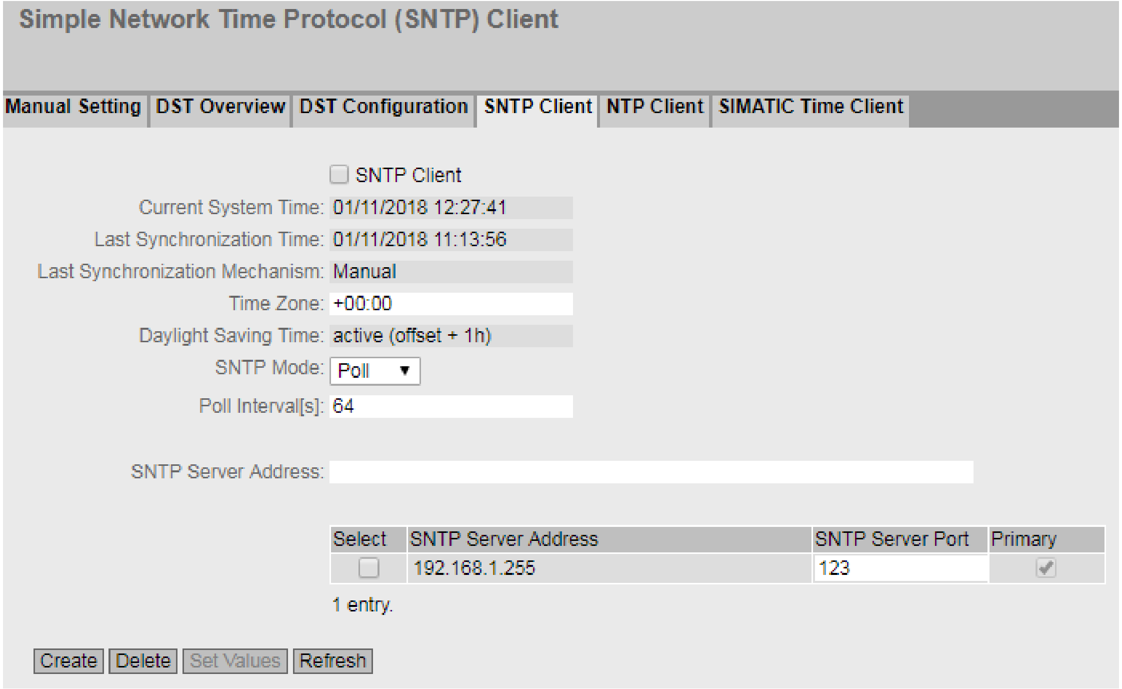
6.5.13.4 SNTP Client

Time-of-day synchronization in the network

SNTP (Simple Network Time Protocol) is used for synchronizing the time in the network. The appropriate frames are sent by an SNTP server in the network.

Note

To avoid time jumps, make sure that there is only one time server in the network.



Simple Network Time Protocol (SNTP) Client

☐ SNTP Client

Current System Time:	01/11/2018 12:27:41
Last Synchronization Time:	01/11/2018 11:13:56
Last Synchronization Mechanism:	Manual
Time Zone:	+00:00
Daylight Saving Time:	active (offset + 1h)
SNTP Mode:	Poll ▼
Poll Interval[s]:	64
SNTP Server Address:	

Select	SNTP Server Address	SNTP Server Port	Primary
☐	192.168.1.255	123	☑

1 entry.

Description

The page contains the following boxes:

- **SNTP Client**
  Enable or disable automatic time-of-day synchronization using SNTP.
- **Current System Time**
  Shows the current date and current normal time received by the device. If you specify a time zone, the time information is adapted accordingly.
- **Last Synchronization Time**
  Shows when the last time-of-day synchronization took place.

- **Last Synchronization Mechanism**
  Shows how the last time synchronization was performed. The following methods are possible:
  - Not set
    The time was not set.
  - Manual
    Manual time setting
  - SNTP
    Automatic time-of-day synchronization with SNTP
  - NTP
    Automatic time-of-day synchronization with NTP
  - SIMATIC
    Automatic time-of-day synchronization using the SIMATIC time frame
- **Time Zone**
  In this box, enter the time zone you are using in the format "+/- HH:MM". The time zone relates to UTC standard world time.
  The time in the "Current System Time" box is adapted accordingly.
- **Daylight Saving Time (DST)**
  Shows whether the daylight saving time changeover is active.
  - active (offset +1 h)
    The system time was changed to daylight saving time; in other words an hour was added. You can see the current system time at the top right in the selection area of the WBM. The current time including daylight saving time is displayed in the "System Time" box.
  - inactive (offset +0 h)
    The current system time is not changed.
- **SNTP Mode**
  Select the synchronization mode from the drop-down list. The following types of synchronization are possible:
  - Listen
    With this mode, the device is passive and receives SNTP frames that deliver the time of day. Settings in the input boxes "SNTP Server Address" and "SNTP Server Port" have no effect in this mode.
    In this mode, only IPv4 addresses are supported.
  - Poll
    If you select this mode, the input box "Poll Interval[s]" is displayed to allow further configuration. In this mode, the settings in the input boxes "SNTP Server Address" and "SNTP Server Port" are taken into account. With this type of synchronization, the device is active and sends a time query to the SNTP server.
    In this mode, IPv4 and IPv6 addresses are supported.
- **Poll Interval[s]**
  Here, enter the interval between two time queries. In this box, you enter the query interval in seconds. Possible values are 16 to 16284 seconds.
- **SNTP Server Address**
  Enter the IP address or the FQDN (Fully Qualified Domain Name) of the SNTP server.

- **SNTP Server Port**
  Enter the port of the SNTP server.
  The following ports are possible:
  - 123 (standard port)
  - 1025 to 36564
- **Primary**
  The check mark is set for the SNTP server that you create first. If several SNTP servers have been created, the primary server is queried first.

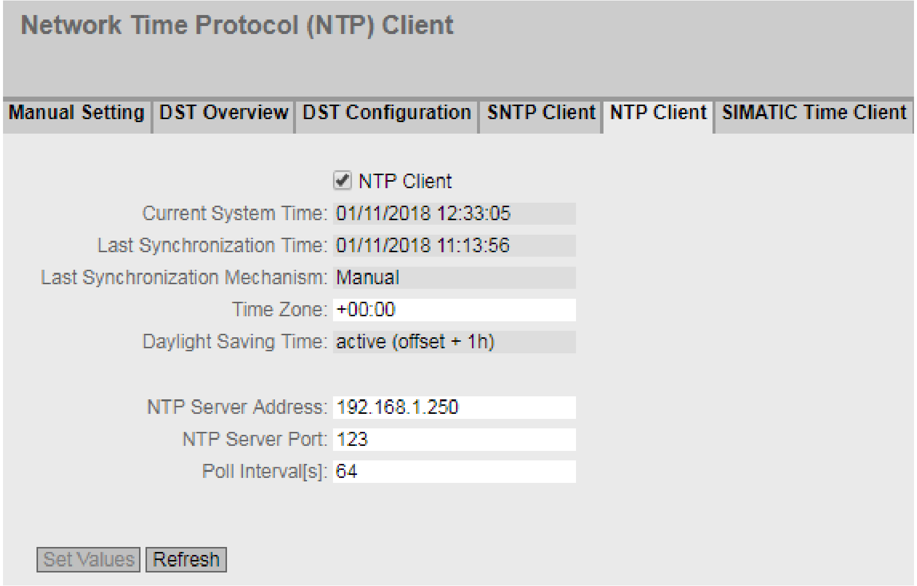
Procedure

1. Click the "SNTP Client" check box to enable the automatic time setting.
2. In the "Time Zone" input box, enter the local time difference to world time (UTC). The input format is "+/-HH:MM" (for example +02:00 for CEST), because the SNTP server always sends the UTC time. This time is then recalculated and displayed as the local time based on the specified time zone. You configure the daylight saving time switchover on the pages "System > System Time > DST Overview" and "System > System Time > DST Configuration". You also need to take this into account when completing the "Time Zone" input box.
3. Select one of the following options from the "SNTP Mode" drop-down list:
   - Poll
     For this mode, you need to configure the following:
     - Time zone difference (step 2)
     - Query interval (step 4)
     - Time server (step 5)
     - Port (step 7)
     - Complete the configuration with step 8.
   - Listen
     For this mode, you need to configure the following:
     - Time difference to the time sent by the server (step 2)
     - Complete the configuration with step 8.
4. In the "Poll Interval[s]" input box, enter the time in seconds after which a new time query is sent to the time server.
5. In the "SNTP Server Address" input box, enter the IP address or the FQDN of the SNTP server whose frames will be used to synchronize the time of day.
6. Click the "Create" button.
   A new row is inserted in the table for the SNTP server.
7. In the "SNTP Server Port" column, enter the port via which the SNTP server is available. The port can only be modified if the IPv4 address or the FQDN name of the SNTP server is entered.
8. Click the "Set Values" button to transfer your changes to the device.

6.5.13.5 NTP Client

Automatic time-of-day setting with NTP

If you require time-of-day synchronization using NTP, you can make the relevant settings here.



Network Time Protocol (NTP) Client

☑ NTP Client

Current System Time: 01/11/2018 12:33:05

Last Synchronization Time: 01/11/2018 11:13:56

Last Synchronization Mechanism: Manual

Time Zone: +00:00

Daylight Saving Time: active (offset + 1h)

NTP Server Address: 192.168.1.250

NTP Server Port: 123

Poll Interval[s]: 64

Description

The page contains the following boxes:

- **NTP Client**
  Select this check box to enable automatic time-of-day synchronization with NTP.
- **Current System Time**
  Shows the current date and current normal time received by the device. If you specify a time zone, the time information is adapted accordingly.
- **Last Synchronization Time**
  Shows when the last time-of-day synchronization took place.

- **Last Synchronization Mechanism**
  Shows how the last time synchronization was performed. The following methods are possible:
  - Not set
    The time was not set.
  - Manual
    Manual time setting
  - SNTP
    Automatic time-of-day synchronization with SNTP
  - NTP
    Automatic time-of-day synchronization with NTP
  - SIMATIC
    Automatic time-of-day synchronization using the SIMATIC time frame
- **Time Zone**
  In this box, enter the time zone you are using in the format "+/- HH:MM". The time zone relates to UTC standard world time.
  The time in the "Current System Time" box is adapted accordingly.
- **Daylight Saving Time (DST)**
  Shows whether the daylight saving time changeover is active.
  - active (offset +1 h)
    The system time was changed to daylight saving time; in other words an hour was added. You can see the current system time at the top right in the selection area of the WBM. The current time including daylight saving time is displayed in the "System Time" box.
  - inactive (offset +0 h)
    The current system time is not changed.
- **NTP Server Address**
  Enter the IP address or the FQDN (Fully Qualified Domain Name) of the NTP server.
- **NTP Server Port**
  Enter the port of the NTP server.
  The following ports are possible:
  - 123 (standard port)
  - 1025 to 36564
- **Poll Interval[s]**
  In this field, enter the interval between two time queries (query interval) in seconds. Possible values are 64 to 1024 seconds.

Procedure

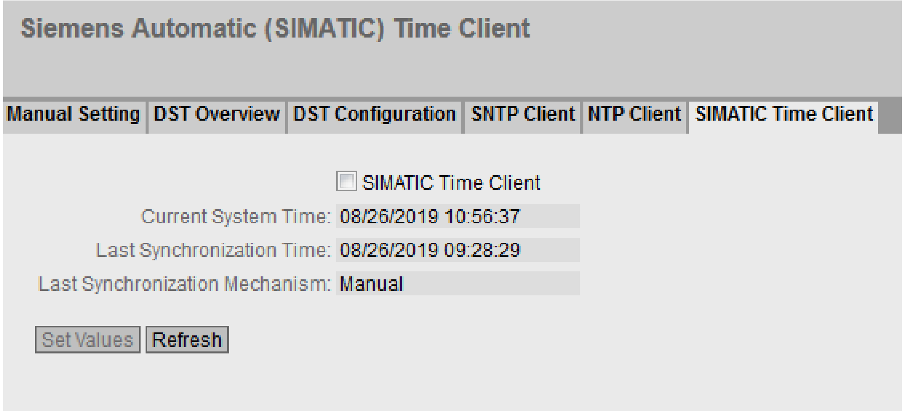
1. Click the "NTP Client" check box to enable the automatic time setting using NTP.
2. Enter the necessary values in the following boxes:
   - Time zone
   - IP address or FQDN of the NTP server
   - NTP Server Port
   - Query interval
3. Click the "Set Values" button.

6.5.13.6 SIMATIC Time Client

Time setting via SIMATIC time client

Note

To avoid time jumps, make sure that there is only one time server in the network.



Siemens Automatic (SIMATIC) Time Client

□ SIMATIC Time Client

Current System Time: 08/26/2019 10:56:37

Last Synchronization Time: 08/26/2019 09:28:29

Last Synchronization Mechanism: Manual

Description

The page contains the following boxes:

- **SIMATIC Time Client**
  Select this check box to enable the device as a SIMATIC time client.
- **Current System Time**
  Shows the current system time.

- **Last Synchronization Time**
  Shows when the last time-of-day synchronization took place.
- **Last Synchronization Mechanism**
  Shows how the last time synchronization was performed. The following methods are possible:
  - Not set
    The time was not set.
  - Manual
    Manual time setting
  - SNTP
    Automatic time-of-day synchronization with SNTP
  - NTP
    Automatic time-of-day synchronization with NTP
  - SIMATIC
    Automatic time-of-day synchronization using the SIMATIC time frame

Procedure

1. Click the "SIMATIC Time Client" check box to enable the SIMATIC Time Client.
2. Click the "Set Values" button.

6.5.14 Auto Logout

Setting the automatic logout

On this page, set the times after which there is an automatic logout from the WBM or the CLI following user inactivity.

If you have been logged out automatically, you will need to log in again.

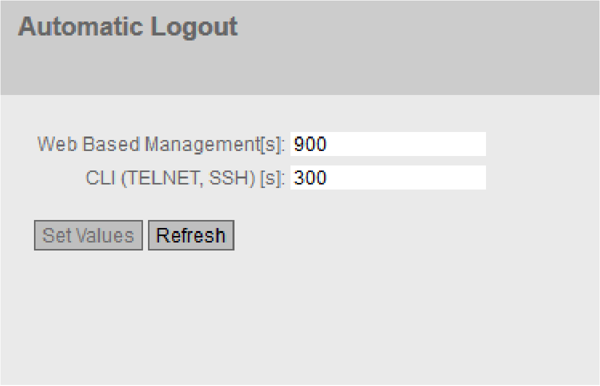
Note

No automatic logout from the CLI

If the connection is not terminated after the set time, check the "Keep alive" setting on the Telnet client.

If the interval for "Keep alive" is shorter than the configured time, the connection is maintained although no user data is transferred. You have set, for example, 300 seconds for the automatic logoff and the "Keep alive" function is set to 120 seconds. In this case, a packet is sent every 120 seconds that keeps the connection uninterrupted.

- Turn off the "Keep alive" (interval time=0)
  or
- Set the interval high enough so that the underlying connection is terminated when there is inactivity.



Web Based Management[s]: 900
CLI (TELNET, SSH) [s]: 300

Procedure

1. Enter a value of 60-3600 seconds in the "Web Base Management [s]" input box. If you enter the value 0, the automatic logout is disabled.
2. Enter a value of 60-600 seconds in the "CLI (TELNET, SSH) [s]" input box. If you enter the value 0, the automatic logout is disabled.
3. Click the "Set Values" button.

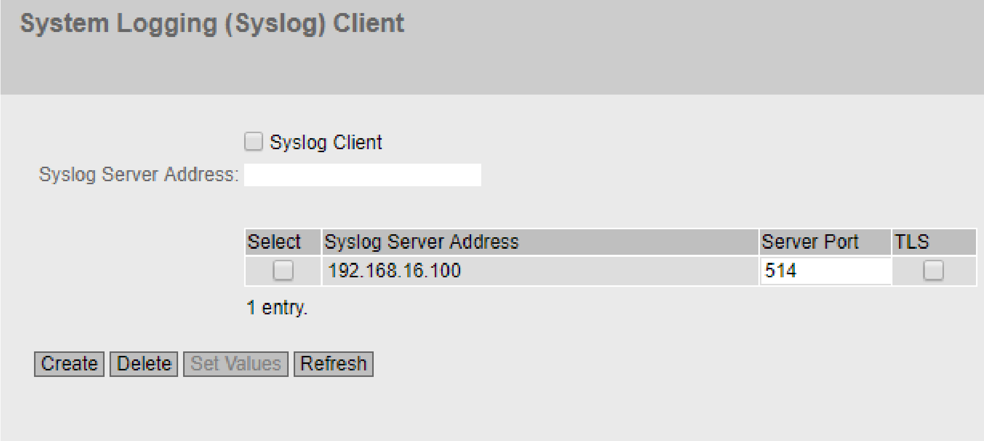
6.5.15 Syslog client

On this page, you configure the Syslog client. The Syslog messages can be sent to the Syslog server unencrypted or encrypted.

Requirements for sending Syslog messages

- The Syslog client is enabled.
- In "System > Events > Configuration", "Syslog" is activated for the relevant event.

- There is a Syslog server in your network that receives the Syslog messages.
- The IP address or the FQDN (Fully Qualified Domain Name) of the Syslog server is entered in the device.



System Logging (Syslog) Client

□ Syslog Client

Syslog Server Address:

Select	Syslog Server Address	Server Port	TLS
□	192.168.16.100	514	□

1 entry.

Description

The page contains the following boxes:

- **Syslog Client**
  Enable or disable the Syslog client on the device.
- **Syslog Server Address**
  Enter the IP address, the FQDN (Fully Qualified Domain Name) or the host name of the Syslog server.

This table contains the following columns

- **Select**
  Select the row you want to delete.
- **Syslog Server Address**
  Shows the IP address, the FQDN (Fully Qualified Domain Name) or the host name of the Syslog server.
- **Server Port**
  Enter the port of the Syslog server being used.
- **TLS**
  - Enabled
    The syslog messages are sent using TLS encryption over TCP.
  - Disabled
    Syslog messages are sent unencrypted over UDP.

Procedure

Enabling function

1. Select the "Syslog Client" check box.
2. Click the "Set Values" button.

Creating a new entry

1. In the "Syslog Server Address" input box, enter the address of the Syslog server to which the Syslog messages are sent.
2. Click the "Create" button. A new row is inserted in the table.
3. In the "Server Port" input box, enter the number of the server port.
4. Click the "Set Values" button.

Note

The default setting of the server port is 514.

Changing the entry

1. Delete the entry.
2. Create a new entry.

Deleting an entry

1. Select the check box in the row to be deleted.
2. Click the "Delete" button. All selected entries are deleted and the display is refreshed.

6.5.16 Fault Monitoring

6.5.16.1 Power Supply

Settings for monitoring the power supply

Configure whether or not the power supply should be monitored by the messaging system. Depending on the hardware variant, there are one or two power connectors (Supply 1 / Supply 2) and a PoE power supply. With a redundant power supply, configure the monitoring separately for each individual feed-in line.

A fault is then signaled by the message system when there is no power on a monitored connection (Power Line 1, Power Line 2 or PoE) or when the applied voltage is too low.

Note

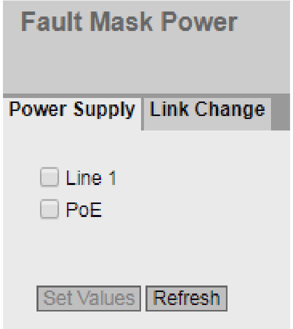
You will find the permitted operating voltage limits in the operating instructions of the device.

If a fault occurs, the error LED lights up on the device. The currently pending error is displayed under "Information > Errors".

In addition, the corresponding error message is entered in the result log table. The content of the event log table is displayed in "Information > Log Tables > Event Log".

Note

This WBM page is not available on the SCALANCE W786-2 SFP.



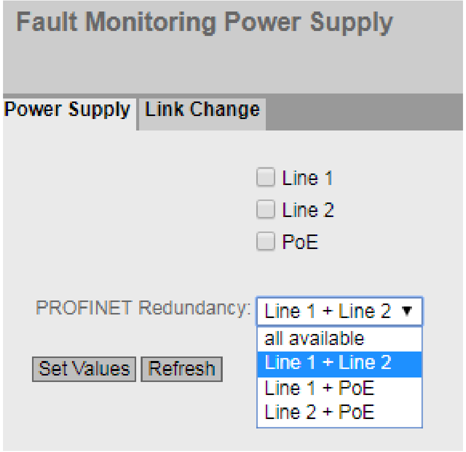
Procedure

1. Click the check box in front of the line name you want to monitor to enable or disable the monitoring function.
2. Click the "Set Values" button.

Monitoring of the redundant power supply by PROFINET

With the following devices, you can also configure which power supply will be monitored by PROFINET:

- SCALANCE W788-x (RJ-45 variants)
- SCALANCE W748-1 RJ-45
- SCALANCE W774-1 (RJ-45 and M12 variant)
- SCALANCE W734-1 RJ-45


PROFINET Redundancy: Line 1 + Line 2

Procedure

1. Click the check box in front of the line name you want to monitor to enable or disable the monitoring function.
2. From the "PROFINET Redundancy" drop-down list, select the desired entry for redundant power supply to be monitored by PROFINET.
3. Click the "Set Values" button.

6.5.16.2 Link Change

Configuration of fault monitoring of status changes on connections

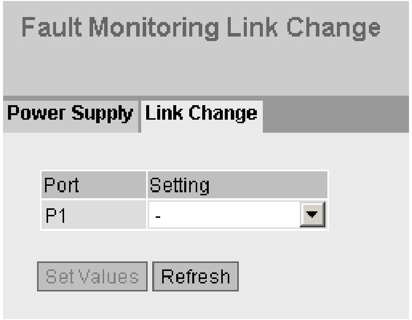
On this page, you configure whether or not an error message is triggered if there is a status change on a network connection.

If connection monitoring is enabled, an error is signaled

- when there should be a link on a port and this is missing.
- or when there should not be a link on a port and a link is detected.

If a fault occurs, the error LED lights up on the device. The currently pending error is displayed under "Information > Errors".

In addition, the corresponding error message is entered in the result log table. The content of the event log table is displayed in "Information > Log Tables > Event Log".



Fault Monitoring Link Change

Port	Setting
P1	-

Description

The table has the following columns:

- **Port**
  Shows the available ports.
- **Setting**
  Select the setting from the drop-down list. You have the following options:
  - Up
    Error handling is triggered when the port changes to the active status.
    (From "Link down" to "Link up")
  - Down
    Error handling is triggered when the port changes to the inactive status.
    (From "Link up" to "Link down")
  - "-" (disabled)
    The error handling is not triggered.

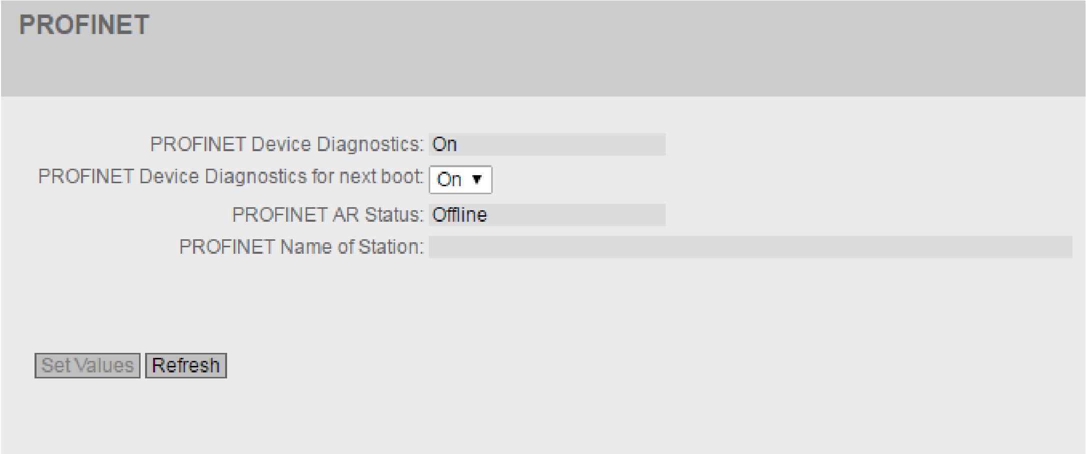
Procedure

1. From the relevant drop-down list, select the options of the slots / ports whose connection status you want to monitor.
2. Click the "Set Values" button.

6.5.17 PROFINET

Settings for PROFINET

This page shows the PROFINET AR status and the device name.



PROFINET

PROFINET Device Diagnostics: On

PROFINET Device Diagnostics for next boot: On ▾

PROFINET AR Status: Offline

PROFINET Name of Station:

Description of the displayed boxes

The page contains the following boxes:

- **PROFINET Device Diagnostics**
  Shows whether PROFINET is enabled ("On") or disabled ("Off").
- **PROFINET runtime mode for next boot**
  Set whether PROFINET will be enabled ("On") or disabled ("Off") after the next device restart.

Note

PROFINET and EtherNet/IP

When PROFINET is turned on, EtherNet/IP is turned off. The switchover from PROFINET and EtherNet/IP has no effect on DCP.

Note

PROFINET AR Status

If a PROFINET connection is established; in other words the PROFINET AR status is "Online", you cannot disable PROFINET.

- **PROFINET AR Status**
  This box shows the status of the PROFINET connection; in other words whether the device is connected to a PROFINET controller "Online" or "Offline".
  Here, online means that a connection to a PROFINET IO controller exists, that this has downloaded its configuration data to the device and that the device can send status data to the PROFINET IO controller. In this status known as "in data exchange", the parameters set via the PROFINET controller cannot be configured.
- **PROFINET Name of Station**
  This box displays the PROFINET device name according to the configuration in HW Config of STEP 7.

Note

Devices with two Ethernet ports

With devices that have two Ethernet interfaces, only interface P1 should be used for the PROFINET configuration because LLPD frames can only be sent and received via interface 1. They are blocked at interface P2 and are also not forwarded between the interfaces.

This applies to the following devices:

- SCALANCE W786-2 SFP
- SCALANCE W774-1 RJ45
- SCALANCE W774-1 M12 EEC
- SCALANCE W778-1 M12
- SCALANCE W778-1 M12 EEC
- SCALANCE W734-1 RJ-45
- SCALANCE W738-1 M12

SCALANCE W700 and STEP 7

The Ethernet interface can be configured in STEP 7 if the following requirements are met:

- STEP 7 V13 Update 3 with HSP0107 or
- STEP7 version 5.5.4 with GSDML version 2.31

The diagnostics functions can also be used. The WLAN interface cannot be configured with STEP 7.

PROFINET for client devices

If a client is to be used as a PROFINET device, the MAC address of the client must be specified as follows (MAC Mode):

- Own
  In the network beyond the device, only IP communication and no PROFINET is possible.
- Layer 2 Tunnel
  The client and the devices downstream from it can be used as PROFINET devices.

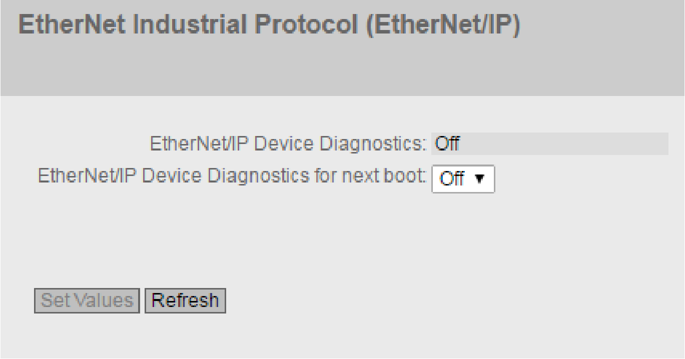
Note

If "Automatic" or "Manual" is configured as the MAC mode for a client, this device cannot be used as a PROFINET device.

6.5.18 EtherNet/IP

EtherNet/IP

On this page, you configure the mode of EtherNet/IP.



EtherNet Industrial Protocol (EtherNet/IP)

EtherNet/IP Device Diagnostics: Off

EtherNet/IP Device Diagnostics for next boot: Off ▾

Note

Devices with two Ethernet ports

On devices with two Ethernet interfaces only one of the interfaces (P1 or P2) may be used for the Ethernet configuration.

This applies to the following devices:

- SCALANCE W786-2 SFP
- SCALANCE W774-1 RJ45
- SCALANCE W774-1 M12 EEC
- SCALANCE W778-1 M12
- SCALANCE W778-1 M12 EEC
- SCALANCE W734-1 RJ-45
- SCALANCE W738-1 M12

Description

The page contains the following boxes:

- **EtherNet/IP Device Diagnostics**
  Shows whether EtherNet/IP is enabled ("On") or disabled ("Off").
- **EtherNet/IP Device Diagnostics for next boot**
  Set whether EtherNet/IP will be enabled ("On") or disabled ("Off") after the next device restart.

  Note

  EtherNet/IP and PROFINET

  When EtherNet/IP is turned on, PROFINET is turned off. The switchover from EtherNet/IP and PROFINET has no effect on DCP.

  Note

  PROFINET AR Status

  If a PROFINET connection is established; in other words the PROFINET AR status is "Online", you cannot enable EtherNet/IP.

6.5.19 PLUG

6.5.19.1 Configuration

NOTICE

Do not remove or insert a C-PLUG / KEY-PLUG during operation!

A PLUG may only be removed or inserted when the device is turned off.

The device checks whether or not a PLUG is inserted at one second intervals. If it is detected that the PLUG was removed, there is a restart. If a valid KEY-PLUG was inserted in the device, the device changes to a defined error state following the restart. With SCALANCE W, the available wireless interfaces are deactivated in this case.

If the device was configured at some time with a PLUG, the device can no longer be used without this PLUG. To be able to use the device again, reset the device to the factory settings.

Information about the configuration of the C-PLUG / KEY-PLUG

This page provides detailed information about the configuration stored on the C-PLUG or KEY-PLUG. It is also possible to reset the PLUG to "factory defaults" or to load it with new contents.

Note

The action is only executed after you click the "Set Values" button.

The action cannot be undone.

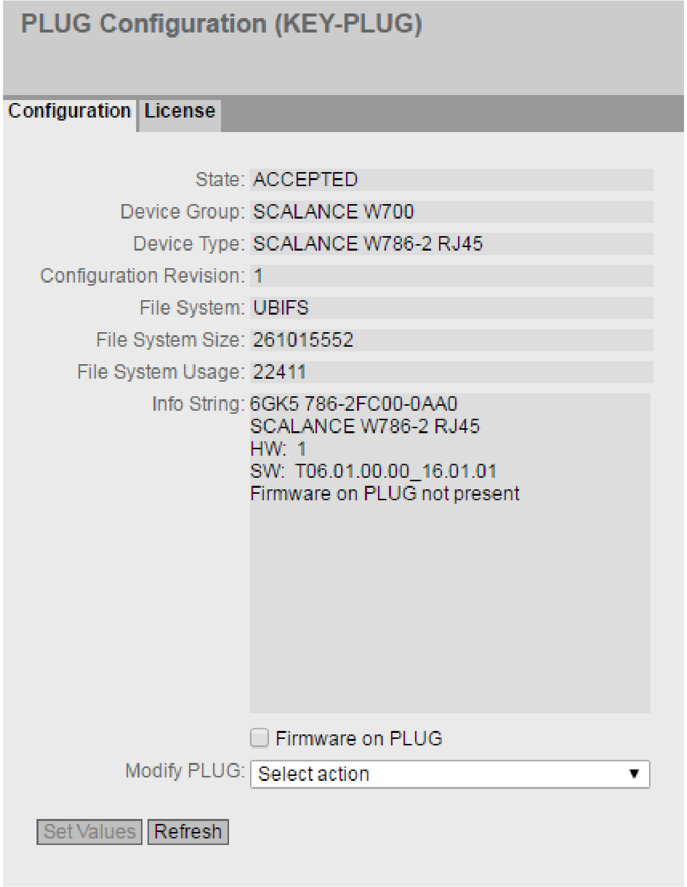
If you decide against executing the function after making your selection, click the "Refresh" button. As a result the data of this page is read from the device again and the selection is canceled.

Note

Incompatibility with previous versions with PLUG inserted

During the installation of a previous version, the configuration data can be lost. In this case, the device starts up with the factory settings after the firmware has been installed. In this situation, if a PLUG is inserted in the device, following the restart, this has the status "NOT ACCEPTED" since the PLUG still has the configuration data of the previous more up-to-date firmware. This allows you to return to the previous, more up-to-date firmware without any loss of configuration data.

If the original configuration on the PLUG is no longer required, the PLUG can be deleted or rewritten manually using "System > PLUG".



PLUG Configuration (KEY-PLUG)

State: ACCEPTED
Device Group: SCALANCE W700
Device Type: SCALANCE W786-2 RJ45
Configuration Revision: 1
File System: UBIFS
File System Size: 261015552
File System Usage: 22411
Info String: 6GK5 786-2FC00-0AA0
SCALANCE W786-2 RJ45
HW: 1
SW: T06.01.00.00_16.01.01
Firmware on PLUG not present

□ Firmware on PLUG

Modify PLUG: Select action

Description

The table has the following rows:

- **State**
  Shows the status of the C-PLUG. The following are possible:
  – ACCEPTED
    There is a C-PLUG with a valid and suitable configuration in the device.
  – NOT ACCEPTED
    Invalid or incompatible configuration on the inserted C-PLUG.
  – NOT PRESENT
    No C-PLUG is inserted in the device.
  – FACTORY
    C-PLUG is inserted and does not contain a configuration. This status is also displayed when the C-PLUG was formatted during operation.
  – MISSING
    No C-PLUG is inserted. Functions are configured on the device for which a license is required.
- **Device Group**
  Shows the SIMATIC NET product line that used the C-PLUG or KEY-PLUG previously.

- **Device Type**
  Shows the device type within the product line that used the C-PLUG or KEY-PLUG previously.
- **Configuration Revision**
  The version of the configuration structure. This information relates to the configuration options supported by the device and has nothing to do with the concrete hardware configuration. This revision information does not therefore change if you add or remove additional components (modules or extenders), it can, however, change if you update the firmware.
- **File System**
  Displays the type of file system on the PLUG.

NOTICE
New file system UBI
As of SCALANCE W firmware version 2.0, UBI is the standard file system for the C-PLUG or KEY-PLUG. If a C-PLUG with the previous file system IECP is detected in such a device, this C-PLUG will be formatted for the UBI file system and the data will be rewritten to the C-PLUG. The file system is also changed following a firmware update to V2.0 with SCALANCE W. A downgrade to the previous version of the corresponding software is then a problem. The firmware can neither read nor write the C-PLUG or KEY-PLUG and it is not even possible to "Restore factory defaults".

NOTICE
Replacing a device with C-PLUG with firmware V1.0
The device in the plant has firmware V1.0. The C-PLUG was created with this firmware. The device in this plant is defective and will be replaced by a new device. The defective device can only be replaced by a device with firmware V6.0 or older. When required, after the replacement, the device can be updated to the current firmware version.

- **File System Size [bytes]**
  Displays the maximum storage capacity of the file system on the PLUG.
- **File System Usage [bytes]**
  Displays the memory utilization of the file system of the PLUG.
- **Info String**
  Shows additional information about the device that used the PLUG previously, for example, article number, type designation, and the versions of the hardware and software. The displayed software version corresponds to the version in which the configuration was last changed. With the "NOT ACCEPTED" status, further information on the cause of the problem is displayed.
  If a PLUG was configured as a PRESET PLUG, this is shown here as additional information in the first row. For more detailed information on creating and using a PRESET PLUG refer to the section "Maintenance (Page 401)".

- **Firmware on PLUG**
  This function is enabled by default.
  When enabled, the firmware is stored on the PLUG. This means that automatic firmware updates/downgrades can be made with the PLUG.
- **"Modify PLUG"**
  Select the required setting from the drop-down list. You have the following options for changing the configuration on the C-PLUG or KEY-PLUG:
  - Write Current Configuration to the PLUG
    This option is available only if the status of the PLUG is "NOT ACCEPTED" or "FACTORY". The configuration in the internal flash memory of the device is copied to the PLUG.
  - Erase PLUG to factory default
    Deletes all data from the PLUG and triggers low-level formatting.

Procedure

1. You can only make settings in this box if you are logged on as "Administrator". Here, you decide how you want to change the content of the PLUG.
2. Select the required option from the "Modify PLUG" drop-down list.
3. Click the "Make Settings" button.

6.5.19.2 License

NOTICE

Do not remove or insert a C-PLUG / KEY-PLUG during operation!

A PLUG may only be removed or inserted when the device is turned off.
The device checks whether or not a PLUG is present at one second intervals. If it is detected that the PLUG was removed, there is a restart. If a valid KEY-PLUG was inserted in the device, the device changes to a defined error state following the restart. With SCALANCE W, the available wireless interfaces are deactivated in this case.

If the device was configured at some time with a PLUG, the device can no longer be used without this PLUG. To be able to use the device again, reset the device to the factory settings.

Note

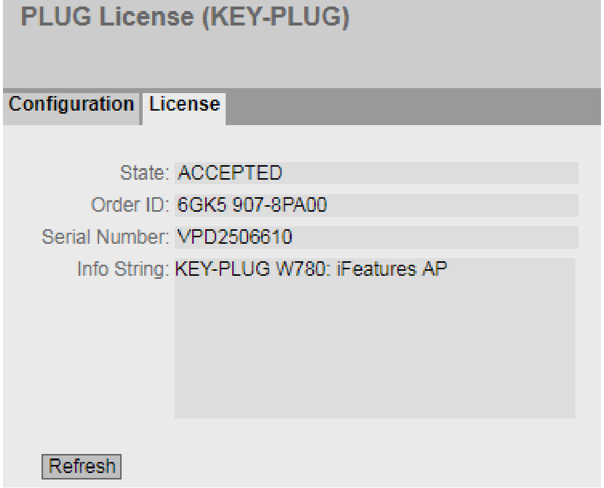
Incompatibility with previous versions with PLUG inserted

During the installation of a previous version, the configuration data can be lost. In this case, the device starts up with the factory settings after the firmware has been installed. In this situation, if a PLUG is inserted in the device, following the restart, this has the status "NOT ACCEPTED" since the PLUG still has the configuration data of the previous more up-to-date firmware. This allows you to return to the previous, more up-to-date firmware without any loss of configuration data.

If the original configuration on the PLUG is no longer required, the PLUG can be deleted or rewritten manually using "System > PLUG".

Information about the license of the KEY-PLUG

A C-PLUG can only store the configuration of a device. In addition to the configuration, a KEY-PLUG also contains a license that enables certain functions of your SIMATIC NET device.



State: ACCEPTED
Order ID: 6GK5 907-8PA00
Serial Number: VPD2506610
Info String: KEY-PLUG W780: iFeatures AP

Description of the displayed boxes

- **State**
  Shows the status of the KEY-PLUG. The following are possible:
  – ACCEPTED
    There is a KEY-PLUG with a valid and suitable configuration in the device.
  – NOT ACCEPTED
    Invalid or incompatible configuration on the inserted KEY PLUG.
  – NOT PRESENT
    No KEY-PLUG is inserted in the device.
  – MISSING
    A KEY-PLUG is inserted. Functions are configured on the device for which a license is required.
  – WRONG
    The inserted KEY-PLUG is not suitable for the device.
  – UNKNOWN
    Unknown content of the KEY-PLUG.
  – DEFECTIVE
    The content of the KEY-PLUG contains errors.
- **Article number**
- Shows the article number of the KEY-PLUG. The KEY-PLUG is available for various functional enhancements and for various target systems.

- **Serial number**
  Shows the serial number of the KEY-PLUG.
- **Info String**
  Shows additional information about the device that used the KEY-PLUG previously, for example, article number, type designation, and the versions of the hardware and software. The displayed software version corresponds to the version in which the configuration was last changed. With the "NOT ACCEPTED" status, further information on the cause of the problem is displayed.

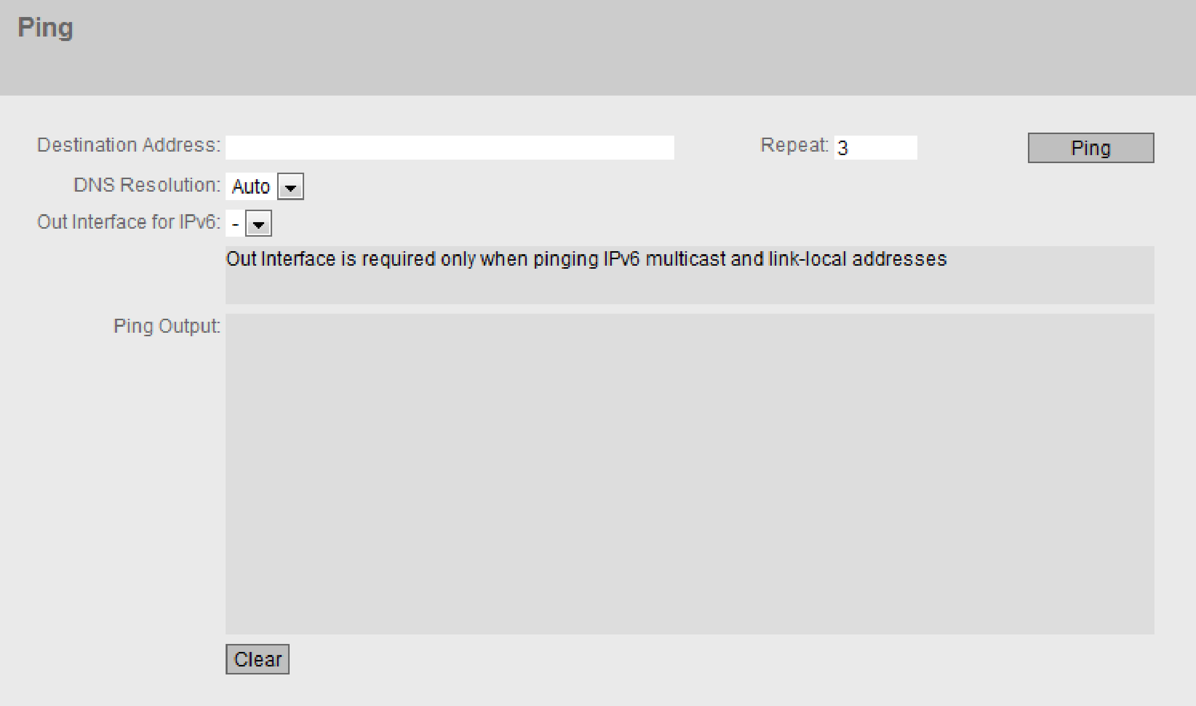
Note

When you save the configuration, the information about whether or not a KEY-PLUG was inserted in the device at the time is also saved. This configuration can then only work if a KEY-PLUG with the same article number / license is inserted. This applies regardless of whether or not iFeatures are configured.

6.5.20 Ping

Reachability of an address in an IP network

With the Ping function, you can check whether a certain IP address is reachable in the network.



Ping

Destination Address:

Repeat: 3

DNS Resolution: Auto

Out Interface for IPv6: -

Out Interface is required only when pinging IPv6 multicast and link-local addresses

Ping Output:

Description

The page contains the following boxes:

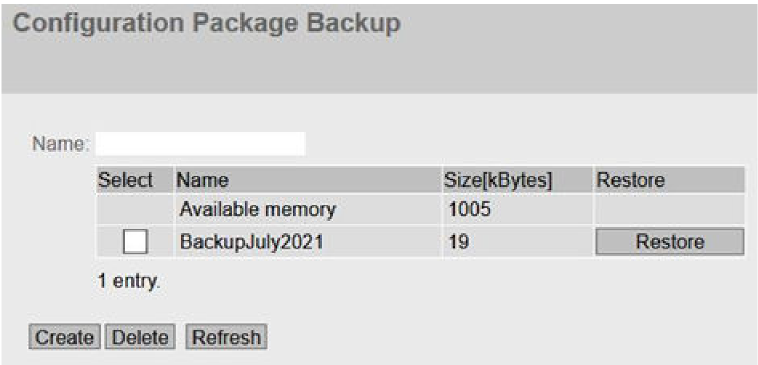
- **Destination Address**
  Enter the IPv4, IPv6 address or the FQDN (Fully Qualified Domain Name) of the device.
- **Repeat**
  Enter the number of Ping requests.
- **DNS Resolution**
  Select the IP address type in which an entered FQDN will be resolved.
  - Auto
    In this mode, the IP address type is selected automatically.
  - IPv4
    The entered FQDN will be resolved in an IPv4 address.
  - IPv6
    The entered FQDN will be resolved in an IPv6 address.
- **Out Interface for IPv6**
  This selection is only required when the destination address is a multicast or a link local address.
  - "-" (factory setting)
  - Select the relevant IPv6 interface.
- **Ping**
  Click this button to start the Ping function.
- **Ping Output**
  This box shows the output of the Ping function.
- **Clear**
  Click this button to delete the ping output.

6.5.21 Configuration Backup

Backup

On this page, you can create backups of the configuration. The maximum number depends on the size of the backup and the available memory space.

The created backups are saved under the "ConfigPackBackup" file type. On the "System > Load&Save > HTTP/TFTP/SFTP" page, you can save configuration backups in ZIP format on your client PC or load them from there.



Configuration Package Backup

Name:

Select	Name	Size[kBytes]	Restore
	Available memory	1005	
□	BackupJuly2021	19	Restore

1 entry.

Description

The page contains the following boxes:

- **Name**
  Enter a name for the backup.

The table contains the following columns:

- **Select**
  Select the row you want to delete.
- **Name**
  Shows the name of the backup.
- **Size [KB]**
  The first row "Available memory" shows how much memory is available for backups on the device. When you create a backup, the available memory space is reduced accordingly.
  The other rows show the size of each backup.
- **Restore**
  Click the "Restore" button to load the relevant backup on the device.

Procedure

1. Enter the required name.
2. Click the "Create" button.
   The current configuration is saved as a configuration backup.
   Saving the backup may take some time. A new row is created for the backup. The size of the backup is displayed and subtracted from the available memory space.

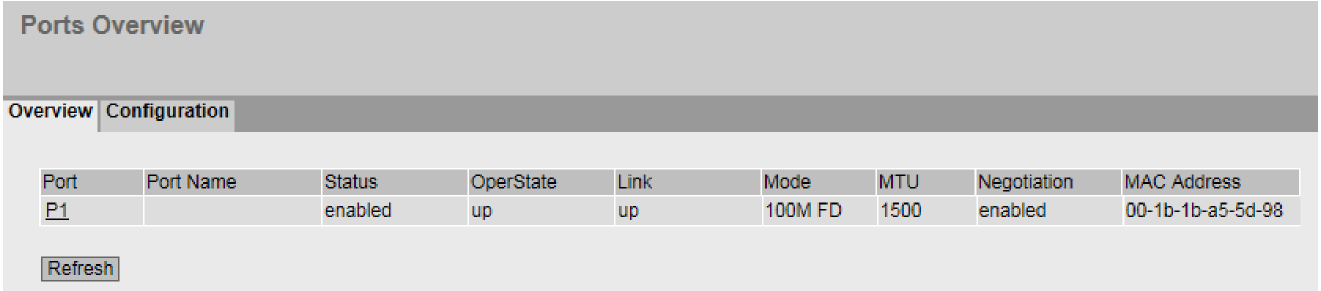
6.6 "Interfaces" menu

6.6.1 Ethernet

6.6.1.1 Overview

Overview of the port configuration

The page shows the configuration for the data transfer for all ports of the device. You cannot configure anything on this page.



Port	Port Name	Status	OperState	Link	Mode	MTU	Negotiation	MAC Address
P1		enabled	up	up	100M FD	1500	enabled	00-1b-1b-a5-5d-98

Description

The table has the following columns:

- **Port**
  Shows the configurable ports. If you click on the link, the corresponding configuration page is opened.
- **Port name**
  Shows the name of the port.
- **State**
  Shows whether the port is on or off. Data traffic is possible only over an enabled port.
- **OperState**
  Displays the current operational status. The operational status depends on the configured "Status" and the "Link". The available options are as follows:
  - up
    You have configured the status "enabled" for the port and the port has a valid connection to the network.
  - down
    You have configured the status "disabled" or "Link down" for the port or the port has no connection.

- **Link**
  Shows the connection status to the network. With the connection status, the following is possible:
  - up
    The port has a valid link to the network, a link integrity signal is being received.
  - down
    The link is down, for example because the connected device is turned off.
- **Mode**
  Shows the transmission speed and the transmission method of the port.
- **MTU (Maximum Transmission Unit)**
  Shows the packet size.
- **Negotiation**
  Shows whether the automatic configuration is enabled or disabled.
- **MAC Address**
  Shows the MAC address of the port.

6.6.1.2 Configuration

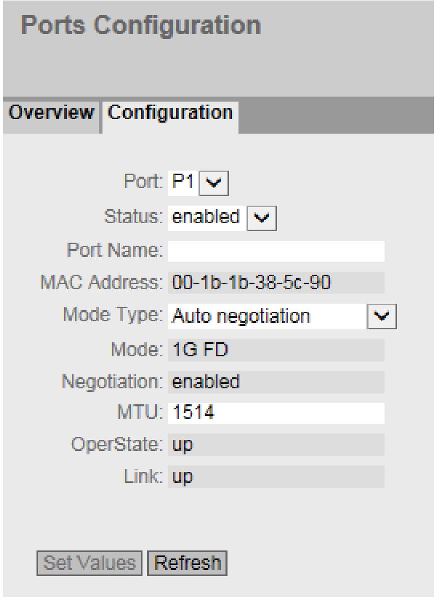
Configuring ports

With this page, you configure the Ethernet ports of the device.

Note

SCALANCE W786-2 SFP

The two SFP ports of the SCALANCE W786-2 SFP cannot be assigned parameters or diagnosed individually.



Ports Configuration

Port: P1
Status: enabled
Port Name:
MAC Address: 00-1b-1b-38-5c-90
Mode Type: Auto negotiation
Mode: 1G FD
Negotiation: enabled
MTU: 1514
OperState: up
Link: up

Description

The table has the following rows:

- **Port**
  Select the port to be configured from the drop-down list.
- **State**
  Specify whether the port is enabled or disabled.
  - enabled
    The port is enabled. Data traffic is possible only over an enabled port.
  - disabled
    The port is disabled.
- **Port name**
  Enter a name for the port.
- **MAC Address**
  Shows the MAC address of the port.
- **Mode Type**

  Note

  The parameter cannot be configured on the SCALANCE W786-2 SFP.

  Select the transmission speed and the transmission method of the port from this drop-down list. The transmission speed can be 10 Mbps, 100 Mbps or 1000 Mbps. As the transmission mode, you can configure full duplex (FD) or half duplex (HD). If you set the mode to "Auto negotiation", these parameters are automatically negotiated with the connected end device. This must also be in the "Autonegotiation" mode.

  Note

  Before the port and partner port can communicate with each other, the settings must match at both ends.

  Note

  If 10 Mbps is configured as the transmission speed or half duplex (HD) as the transmission mode, this can lead to restrictions in PROFINET communication. Always select at least 100 Mbps and full duplex (FD) or "Autonegotiation" if you want the device to handle PROFINET communication.

- **Mode**
  Shows the transmission speed and the transmission method of the port.
- **Negotiation**
  Shows whether the automatic configuration of the connection to the partner port is enabled or disabled.
- **MTU (Maximum Transmission Unit)**
  Enter the packet size above which packets are fragmented.

- **OperState**
  Displays the current operational status. The operational status depends on the configured "Status" and the "Link". The available options are as follows:
  – up
    You have configured the status "enabled" for the port and the port has a valid connection to the network.
  – down
    You have configured the status "disabled" or "Link down" for the port or the port has no connection.
- **Link**
  Shows the connection status to the network. The available options are as follows:
  – Up
    The port has a valid link to the network, a link integrity signal is being received.
  – Down
    The link is down, for example because the connected device is turned off.

Procedure

Note

Changing the port configuration

With various automatic functions, the device prevents or reduces the effect on other ports and priority classes (Class of Service) if a port is overloaded. This can mean that frames are discarded even when flow control is enabled.

Port overload occurs when the device receives more frames than it can send, for example as the result of different transmission speeds.

To change the configuration of a port, follow these steps:

1. Click the appropriate box to change the configuration.
2. Click the "Set Values" button.

6.6.2 WLAN

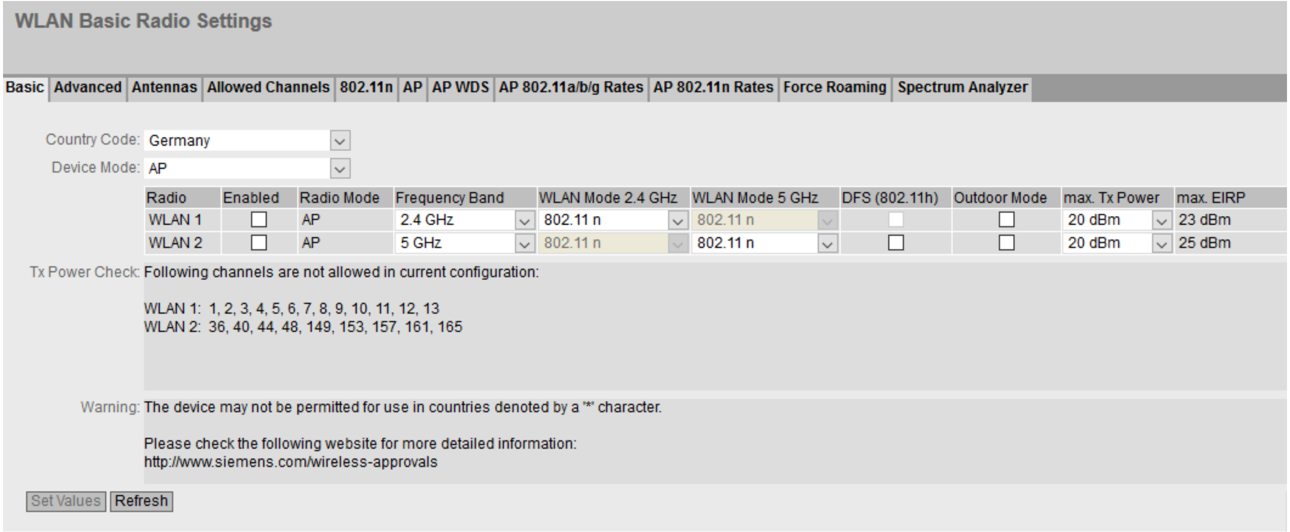
6.6.2.1 Basic

Basic settings

On this page, you make several basic settings for the device, for example the country setting and mode.

Note

To configure the WLAN interface, you must always specify the country code first. Some parameters are dependent on the country setting, for example the transmission standard.



Country Code: Germany

Device Mode: AP

Radio	Enabled	Radio Mode	Frequency Band	WLAN Mode 2.4 GHz	WLAN Mode 5 GHz	DFS (802.11h)	Outdoor Mode	max. Tx Power	max. EIRP
WLAN 1	□	AP	2.4 GHz	802.11 n	802.11 n	□	□	20 dBm	23 dBm
WLAN 2	□	AP	5 GHz	802.11 n	802.11 n	□	□	20 dBm	25 dBm

Tx Power Check: Following channels are not allowed in current configuration:

WLAN 1: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
WLAN 2: 36, 40, 44, 48, 149, 153, 157, 161, 165

Warning: The device may not be permitted for use in countries denoted by a '*' character.

Please check the following website for more detailed information:
http://www.siemens.com/wireless-approvals

Description

- **Country Code**
  Select the country in which the device will be operated from the drop-down list.
  You do not need to know the data for the specific country, the channel division and output power are set by the device according to the country you select.

  Note

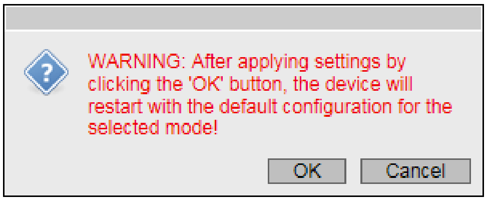
  Locale setting

  The correct country setting is mandatory for operation complying with the approvals. Selecting a country different from the country of use can lead to legal prosecution.

- **Device Mode**
  Select the mode of the device. This selection is available only for access points.
  The following operating modes are possible:
  - AP: Access point mode
  - Client: Client mode

  Note

  After changing the mode, a message is displayed. If you confirm the message with "OK", the device restarts in the changed mode with the factory-set configuration settings.



WARNING: After applying settings by clicking the 'OK' button, the device will restart with the default configuration for the selected mode!

If you have restarted the device after changing the mode, you will need to log on again to be able to continue the configuration.

The table has the following columns:

- **Radio**
  Shows the available WLAN interfaces.

  Note

  On the devices with two wireless interfaces (W78x-2) both interfaces can be used in access point mode. In client mode only one WLAN interface is available.

- **Enabled**
  Status of the WLAN interface. To enable the WLAN interface, select the check box.

  Note

  Enabling the WLAN interface

  The WLAN interfaces are disabled when the device is supplied. The WLAN interfaces are can be enabled once the country and the antenna settings are configured.

- **Radio Mode**
  Shows the mode of the WLAN interface.
- **Frequency Band**
  Specify the frequency band. In client mode, dual-frequency operation is also possible.
  - 2.4 GHz
  - 5 GHz
  - 2.4 GHz + 5 GHz (only in client mode)

Note

Configuring WLAN interfaces of the W786-2IA RJ-45 for different frequency bands

If both WLAN interfaces are configured for the same frequency band on this device, there may be mutual influence or interference. This applies in particular when there is a high data throughput.

- **WLAN Mode 2.4 GHz/WLAN Mode 5 GHz**
  Select the required transmission standard for the configured frequency band. The selection depends on the country setting.
  - Auto (in client mode only)
    The transmission standard is determined automatically (2.4 GHz, 5 GHz and 2.4 GHz + 5 GHz).
  - 802.11a
    The transmission standard IEEE 802.11a (5 GHz) is set.
  - 802.11g
    The transmission standard IEEE 802.11g (2.4 GHz) is set. This transmission standard is downwards compatible with IEEE 802.11b.
  - 802.11n
    The transmission standard IEEE 802.11n (2.4 GHz and 5 GHz) is set. This transmission standard is downwards compatible with IEEE 802.11a and IEEE 802.11g.
  - 802.11 only
    The transmission standard IEEE 802.11n (2.4 GHz and 5 GHz) is set. This transmission standard is downwards compatible with IEEE 802.11a and IEEE 802.11g.

Note

If you select the transmission standard "802.11n", "802.11n only" or "Auto" (only in client mode), you cannot set the threshold value of the fragmentation length see "Fragmentation Length Threshold" in "Interfaces > WLAN > Advanced".

- **DFS (802.11h)**
  Enables or disables the "Dynamic Frequency Selection (DFS)" function.
  - Enabled
    With the DFS function, it is possible to also use the higher 5 Ghz channels.
    These channels are country-specific and are subject to certain DFS regulations. You can find additional information on this in the country-specific DFS documentation.
    Before the access point transmits over one of these channels, it checks for competing radar signals for 60 seconds according to the CAC (Channel Availability Check). The access point also does not send any beacons for the duration of the search. With weather radar channels (5.6 - 5.65 GHz), the duration of the search is 10 minutes.
    If no radar signals are detected after the search period has elapsed, the access point transmits on the channel. Otherwise, the access point changes channel and repeats the check.
    The access point also searches for radar signals continuously during operation.
    If the access point discovers a radar signal on the current channel, it notifies the clients of the channel change. It then automatically switches to an alternative DFS channel and the current channel is blocked for 30 minutes.
  - Disabled
    The DFS function is not used.

Note

RCoax 5 GHz and DFS

In the USA and in countries that follow the FCC (Federal Communication Commission) when operating with DFS (Dynamic Frequency Selection), the IWLAN RCoax Cable 5 GHz may not be used. The current status of the approvals can be found on the Internet at:
http://www.siemens.com/wireless-approvals

- **Outdoor Mode**
  - Enabled
    If you have enabled the outdoor mode, you only have the channels available that are permitted for outdoor operation.
  - Disabled
    If you have disabled the outdoor mode, you only have the channels available that are permitted for operation in a building.

- **max. Tx Power**
  Specify the maximum possible transmit power of the device.
  If the transmit power is set too high the received signal at the client may be overmodulated. Check the received signal strength at the client (dBm).
  It may be necessary to reduce the transmit power depending on the antennas being used to avoid exceeding the maximum legal transmit power. Reducing the transmit power effectively reduces cell size.

  Note

  The maximum possible transmit power varies depending on the channel and data rate. For more detailed information on transmit power, refer to the documentation "Characteristics radio interface".

  Note

  If both interfaces of access points with two WLAN interfaces are operated in the same frequency range, this may cause wireless interference on one or both interfaces at a transmit power higher than 15 dBm.

- **max. EIRP (Effective Isotropic Radiated Power)**
  Shows the current radiated power of the antenna, in relation to a non-directional antenna (isotrop). Product of antenna gain, number of antenna connectors, cable length, additional attenuation and set Tx power.
- **Tx power check**
  Indicates whether the settings that have been made will violate the permitted transmit power restrictions of the selected country. The calculated value of "max. EIRP" is checked to determine whether this value violates the transmit power restriction of specific channels in the set country. If "Use Allowed Channels only" is set, only the channels selected there are checked.
  - -
    The channels can be used with the current settings.
  - Channel numbers
    Indicates the channels on which the current transmit power exceeds the maximum permitted transmit power.

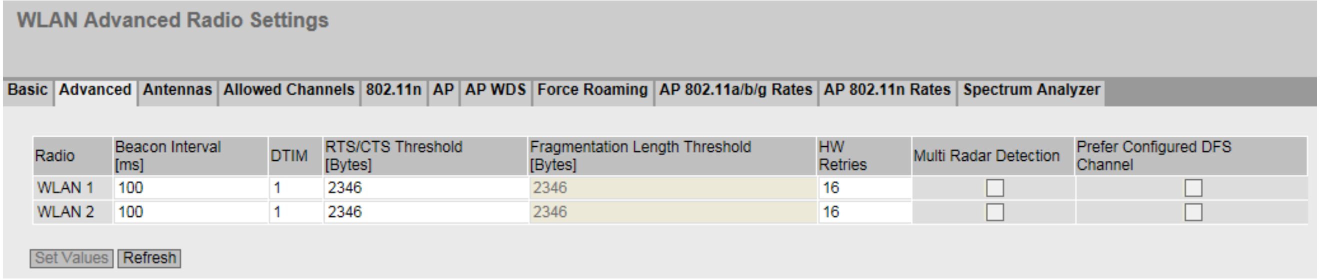
Procedure

1. To configure the WLAN interface, you must always specify the country first. Select the country in which the device will be operated from the "Country Code" drop-down list.
2. Select the required frequency band from the "Frequency Band" drop-down list.
3. From the "WLAN Mode" drop down list, select the required transmission standard for the configured frequency band.
4. Click the "Set Values" button.

6.6.2.2 Advanced

Further possible settings

On this page, you can specify details of the transmission characteristics. You only need to adapt the parameters on this page if the SCALANCE W700 device cannot be used as it is intended with the default settings.



Radio	Beacon Interval [ms]	DTIM	RTS/CTS Threshold [Bytes]	Fragmentation Length Threshold [Bytes]	HW Retries	Multi Radar Detection	Prefer Configured DFS Channel
WLAN 1	100	1	2346	2346	16	□	□
WLAN 2	100	1	2346	2346	16	□	□

Description

The table has the following columns:

- **Radio**
  Shows the available WLAN interfaces in this column.
- **Beacon Interval [ms] (only in access point mode)**
  Specify the interval (40 - 1000 ms) at which the access point sends beacons. Beacons are packets that are sent cyclically by an access point to inform clients of its existence.
- **DTIM (only in access point mode)**
  The DTIM interval (1-15) specifies the number of beacons to be sent before the access point sends the collected packets (broadcast, unicast, multicast) to the client.
  - If you enter a "1" in this box, the access point transmits broadcast, unicast and multicast packets directly after each beacon (recommended setting for normal network environments).
  - If you entered a "5" in this field, this would mean that the access point collects the packets and sends them after every fifth beacon.

  Increasing this value allows a longer sleep mode for the clients but means a greater delay for packets.
- **RTS/CTS Threshold [Bytes]**
  RTS/CTS (Request To Send/Clear To Send) is a method for avoiding collisions. The method is based on the exchange of status information prior to sending the actual data (hidden node problem). To minimize the network load due to additional protocol traffic, this method is used only as of a certain packet size. You specify the packet size with the "RTS/CTS Threshold" parameter.

- **Fragmentation Length Threshold [Bytes]**
  Specify the maximum packet size transferred on the wireless link. Large packets are divided up into small packets prior to transmission and then reassembled into the original size after they have been received. This can be beneficial if the transmission quality is poor because larger packets are more difficult to transmit. However fragmentation into smaller packets means a poorer throughput.

  Note

  You can only edit this value if the you have set the transmission standard "802.11g" (2.4 GHz) or "802.11 a" (5 GHz), see "WLAN Mode" in "Interfaces > WLAN > Basic".

- **HW Retries**
  Specify the number of hardware retries. The hardware repetition is performed by the WLAN chip itself when it tries to repeat an unacknowledged packet immediately.
  If all hardware repetitions were unsuccessful, the packet is deleted.

- **Multi Radar Detection (only in access point mode)**
  - Enabled
    This function is only available if you have enabled the "DFS" function on the "Basic" page. This function is suitable for systems with several access points connected via an Ethernet network and that send on the same channel.
    When an access point detects a radar signal it distributes this information to all connected access points. If at least one further access point verifies the radar signal within 40 ms, all connected access points are informed. All the devices sending on this channel change to a different channel. The channel is blocked for 30 minutes for their access points in the network.
    If you have configured "Auto" for the channel on the "Interfaces > WLAN > AP" page, the function cannot be used reliably. In this case the verification of the radar signals is only possible when at least two connected access points happen to transmit on the same channel. If only one access point detects a signal on a channel, it treats this as a valid radar signal.
  - Disabled
    The function is not used. When an access point detects a radar signal it changes to another channel. The configured channel is no longer taken into account.

- **Prefer Configured DFS Channel (only in access point mode)**
  - Enabled
    This function is only available if you have enabled the "DFS" function on the "Basic" page. If the configured channel of a WLAN interface was blocked due to radar detection and is released again after 30 minutes the access point changes automatically to the configured channel.
    Before the access point starts the communication on the configured channel it searches 60 seconds for primary users on the channel. During this time the access point does not send beacons. If signals are found on the channel, the access point changes channel and repeats the check. Only when no signals from primary users are detected after 60 seconds does the access point send on the channel.
    If you have configured "Auto" for the channel on the "Interfaces > WLAN > AP" page, the device does not have a configured channel to which it can return.
  - Disabled
    The function is not used.

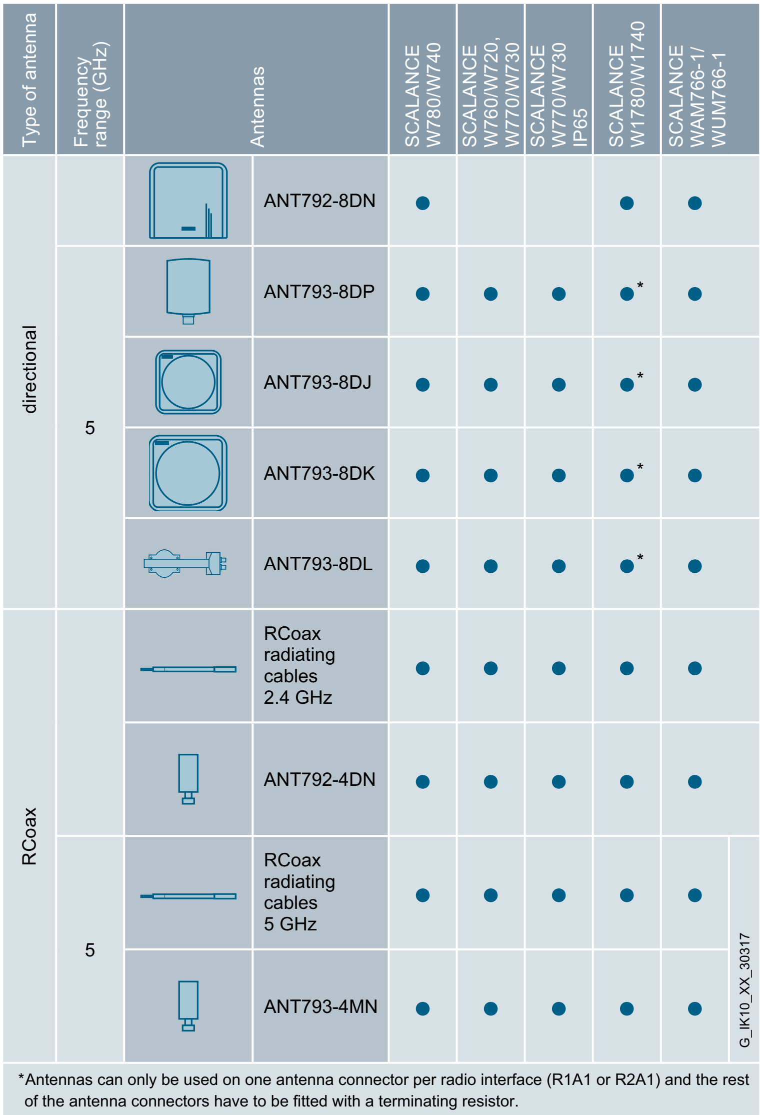
Procedure

1. Enter the values to be set in the input boxes as follows.
2. Select the option checkmark of the required functions.
3. Click the "Set Values" button.

6.6.2.3 Antennas

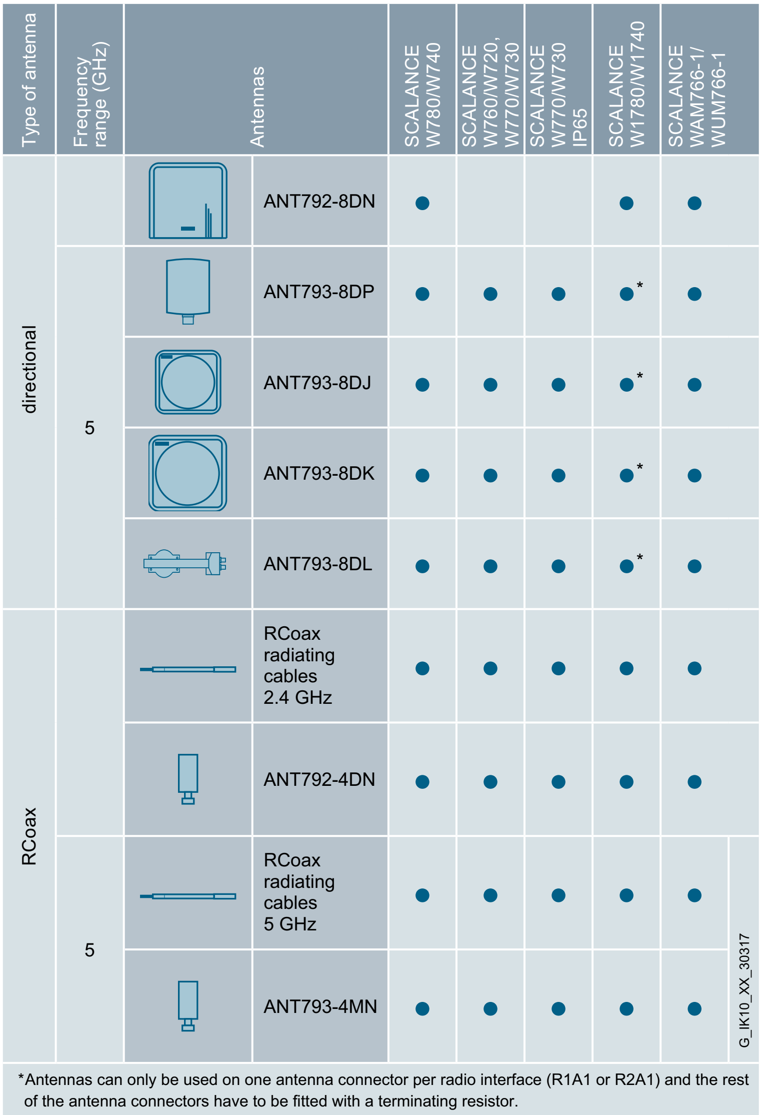
Overview

The following figures provide an overview of the IWLAN antennas that are suitable for use with SCALANCE W devices.



Type of antenna	Frequency range (GHz)	Antennas	SCALANCE W780/W740	SCALANCE W760/W720, W770/W730	SCALANCE W770/W730 IP65	SCALANCE W1780/W1740	SCALANCE WAM766-1/WUM766-1
directional		ANT792-8DN	●			●	●
	5	ANT793-8DP	●	●	●	●*	●
		ANT793-8DJ	●	●	●	●*	●
		ANT793-8DK	●	●	●	●*	●
		ANT793-8DL	●	●	●	●*	●
RCoax		RCoax radiating cables 2.4 GHz	●	●	●	●	●
		ANT792-4DN	●	●	●	●	●
	5	RCoax radiating cables 5 GHz	●	●	●	●	●
		ANT793-4MN	●	●	●	●	●

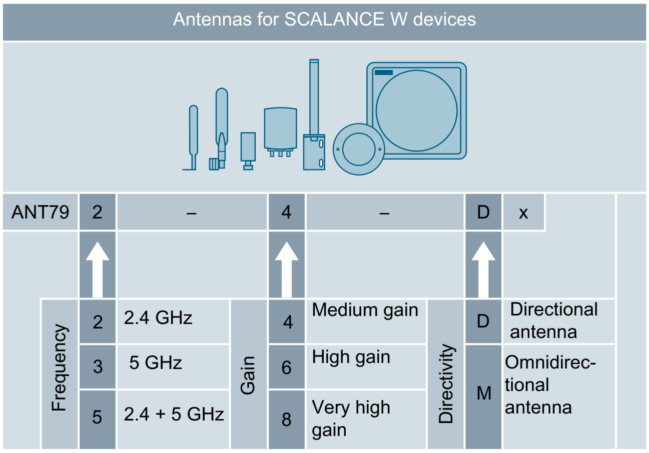
*Antennas can only be used on one antenna connector per radio interface (R1A1 or R2A1) and the rest of the antenna connectors have to be fitted with a terminating resistor.



Type of antenna	Frequency range (GHz)	Antennas	SCALANCE W780/W740	SCALANCE W760/W720, W770/W730	SCALANCE W770/W730 IP65	SCALANCE W1780/W1740	SCALANCE WAM766-1/ WUM766-1
directional		ANT792-8DN	●			●	●
	5	ANT793-8DP	●	●	●	●*	●
		ANT793-8DJ	●	●	●	●*	●
		ANT793-8DK	●	●	●	●*	●
		ANT793-8DL	●	●	●	●*	●
RCoax		RCoax radiating cables 2.4 GHz	●	●	●	●	●
		ANT792-4DN	●	●	●	●	●
	5	RCoax radiating cables 5 GHz	●	●	●	●	●
		ANT793-4MN	●	●	●	●	●

*Antennas can only be used on one antenna connector per radio interface (R1A1 or R2A1) and the rest of the antenna connectors have to be fitted with a terminating resistor.

The antenna name provides information about the properties of the antennas listed in the IWLAN antenna overview:



Configuration of external antennas

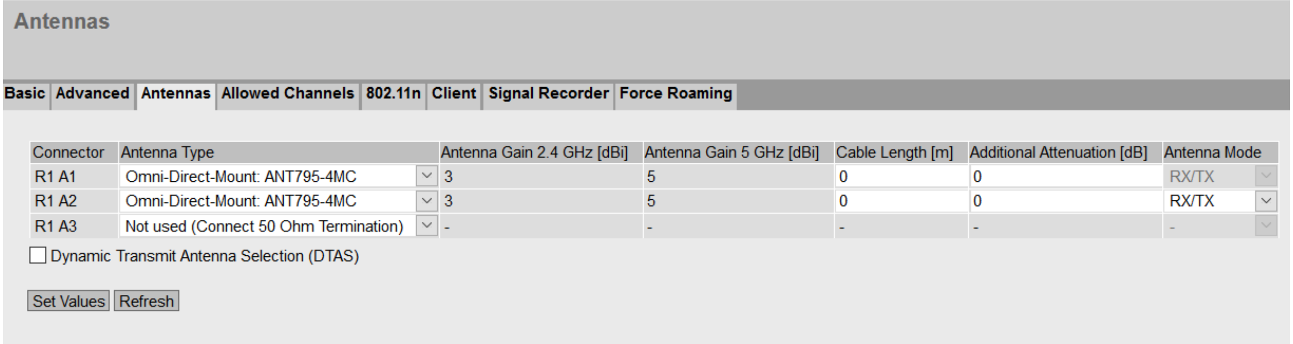
On this page, you configure the settings for the connected external antennas.

Only the antenna mode can be configured for internal antennas.

Note

50 Ω-terminating resistor

Each WLAN interface has three antenna connectors. Connectors that are not used must have a 50 Ω terminating resistor fitted.
The antennas R1A1 and R2A1 must be always be connected as soon as the associated WLAN interface is turned on. If no antenna is connected, the relevant interface must also be disabled for Rx and Tx. Otherwise, there may be transmission disruptions.



Antennas

Connector	Antenna Type	Antenna Gain 2.4 GHz [dBi]	Antenna Gain 5 GHz [dBi]	Cable Length [m]	Additional Attenuation [dB]	Antenna Mode
R1 A1	Omni-Direct-Mount: ANT795-4MC	3	5	0	0	RX/TX
R1 A2	Omni-Direct-Mount: ANT795-4MC	3	5	0	0	RX/TX
R1 A3	Not used (Connect 50 Ohm Termination)	-	-	-	-	-

☐ Dynamic Transmit Antenna Selection (DTAS)

Description

The table has the following columns:

- **Connector**
  Shows the name of the relevant antenna connector.
- **Antenna Type**
  Select the type of external antenna connected to the device. If the type of your external antenna is not available, select the entry "User defined".
  If you terminate an antenna connection using a 50 Ω terminating resistor, select the entry "Not used (Connect 50 Ohm Termination)".
- **Antenna Gain**
  If you select the "User defined" entry for the "Antenna Type", enter the antenna gain manually in the "dBi" unit.
  - **Antenna Gain 2.4 GHz [dBi]**
    Here, enter the antenna gain the antenna has in the 2.4 GHz frequency band.
  - **Antenna Gain 5 GHz [dBi]**
    Here, enter the antenna gain the antenna has in the 5 GHz frequency band.
- **Cable Length [m]**
  Enter the length of the flexible antenna connecting cable in meters between the device and the external antenna.
- **Additional Attenuation [dB]**
  Here, specify the additional attenuation caused, for example, by an additional splitter.

- **Antenna Mode**
  Specify the use of the antenna. For antenna connector 1 (R1 A1 and R2 A1), the entry cannot be changed.
  - Tx
    For sending only
  - Rx
    For receiving only
  - Rx\Tx
    For receiving and sending

  The following table shows which combinations are possible:

Index1 **R1 A1** **R2 A1**	**Index2** **R1 A2** **R2 A2**	**Index3** **R1 A3** **R2 A3**	**Index4** **R1 A4** **R2 A4**
Rx\Tx	Rx\Tx	Rx\Tx	Rx\Tx
Rx\Tx	Rx\Tx	Rx\Tx	Rx
Rx\Tx	Rx\Tx	Rx	Rx
Rx\Tx	Rx	Rx	Rx
Rx\Tx	Rx\Tx	Rx\Tx	Tx
Rx\Tx	Rx\Tx	Tx	Tx
Rx\Tx	Tx	Tx	Tx
Rx\Tx	Rx\Tx	Rx\Tx	--[1]
Rx\Tx	Rx\Tx	Rx	--[1]
Rx\Tx	Rx\Tx	Tx	--[1]
Rx\Tx	Tx	Tx	--[1]
Rx\Tx	Rx	Rx	--[1]
Rx\Tx	Rx\Tx	--[1]	--[1]
Rx\Tx	Tx	--[1]	--[1]
Rx\Tx	Rx	--[1]	--[1]
Rx\Tx	--[1]	--[1]	--[1]

  1) Antenna type "Not used (Connect 50 Ohm Termination)"

- **Dynamic transmitting antenna selection (DTAS) (in client mode only)**
  When enabled, the antenna that offers the better signal to the access point is automatically selected for the transmission.
  The signal strengths of the two antennas are displayed under "Information > WLAN > Radio interfaces information".
  Requirements for DTAS:
  - MCS < = 7 is set at the access point.
  - Two antennas configured with the antenna mode "RX/TX".
  - If three antennas are available, the "Antenna Type" "Not used (50 Ohm terminating resistor)" must be set for the third antenna.

Procedure

To configure two antennas, follow the steps below:

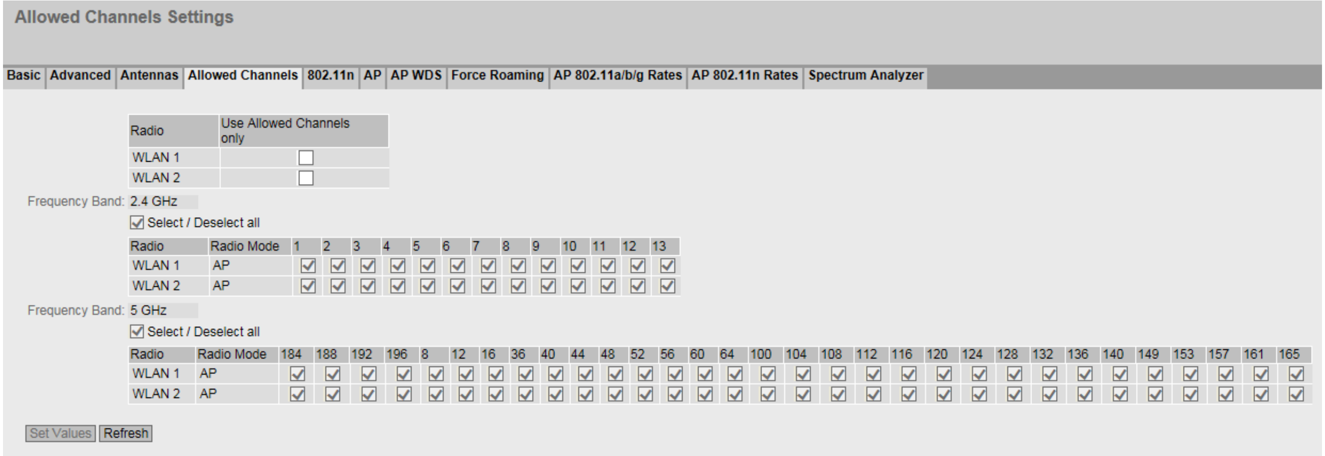
1. For the first antenna connector (R1 A1) in the "Antenna Type" drop-down list, select the type of antenna.
2. In the "Cable Length" input box, enter the length of the connecting cable you are using in meters. For antenna connector 1 (R1 A1 and R2 A1), the entry "Antenna Mode" cannot be changed.
3. For the second antenna connector (R1 A2) in the "Antenna Type" drop-down list, select the type of antenna.
4. In the "Cable Length" input box, enter the length of the connecting cable you are using in meters.
5. Select the use of the antenna from the "Antenna Mode" drop-down list.
6. Click the "Set Values" button.

6.6.2.4 Allowed Channels

Channel settings

For communication, a specific channel within a frequency band is used. You can either set this channel specifically or configure so that the channel is selected automatically.

On this page, you specify which channels may be used for communication.



Radio	Use Allowed Channels only
WLAN 1	□
WLAN 2	□

Frequency Band: 2.4 GHz

☑ Select / Deselect all

Radio	Radio Mode	1	2	3	4	5	6	7	8	9	10	11	12	13
WLAN 1	AP	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
WLAN 2	AP	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑

Frequency Band: 5 GHz

☑ Select / Deselect all

Radio	Radio Mode	184	188	192	196	8	12	16	36	40	44	48	52	56	60	64	100	104	108	112	116	120	124	128	132	136	140	149	153	157	161	165
WLAN 1	AP	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
WLAN 2	AP	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑

Description

Table 1 contains the following columns:

- **Radio**
  Shows the available WLAN interfaces.
- **Use Allowed Channels only**
  If you enable the option, you restrict the selection of channels via which the AP or the client is allowed to establish the connection.
  In the following tables, you define the
  - channels that the AP can use to establish a wireless cell when the "Auto" channel setting is enabled.
  - the channels on which the client searches for an AP.

  The tables are divided up according to frequency bands.
  If the option is disabled, the channels available based on the settings (country code, antennas, transmit power etc.) are used.

Above the tables for the frequency bands, you will find the following check box:

- **Select / Deselect all**
  - Enabled
    If you enable the check box, all channels are selected.
  - Disabled
    If you deselect the check box, the first valid channel of the frequency band remains enabled. Enable the required channel.

The tables of the frequency bands have the following columns:

- **Radio**
  Shows the available WLAN interfaces.
- **Radio Mode**
  Shows the mode.
- **Channel number**
  To specify the valid channels for the required frequency band, select the appropriate check box for the channel number.
  The table displays the permitted channels of the country. Only the valid channels can be enabled. Invalid channels are grayed out and cannot be enabled.

  Note

  To specify the channels, the setting "Use Allowed Channels only" must be enabled.

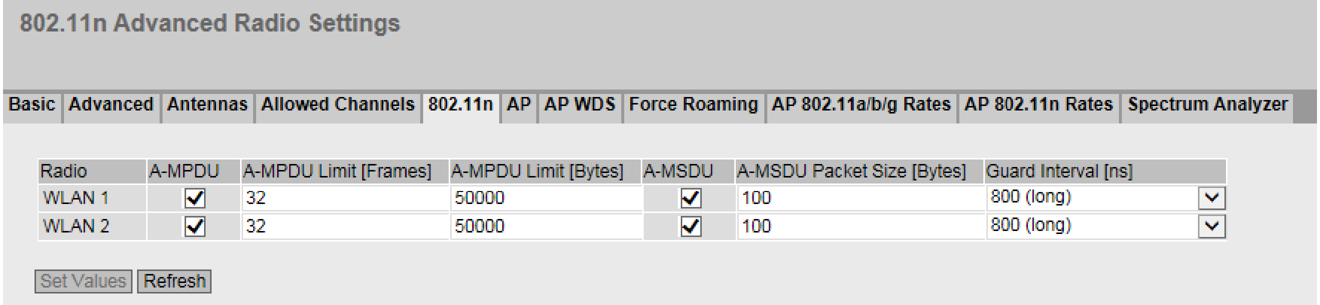
Procedure

1. Select the "Use Allowed Channels only option for the required WLAN interface.
2. Deselect the check box "Select / Deselect all".
3. Select the relevant check box for the required channel number.
4. Click the "Set Values" button.

6.6.2.5 802.11n

Properties of 802.11n

With the IEEE 802.11n standard, it is possible to put together individual data packets in one larger data packet, the A-MPDU and A-MSDU data packets. This achieves a higher data throughput.
On this page, you make the settings for the A-MPDU and A-MSDU data packets. Some of the settings depend on the set transmission standard and the selected channel width.



802.11n Advanced Radio Settings

Radio	A-MPDU	A-MPDU Limit [Frames]	A-MPDU Limit [Bytes]	A-MSDU	A-MSDU Packet Size [Bytes]	Guard Interval [ns]
WLAN 1	☑	32	50000	☑	100	800 (long)
WLAN 2	☑	32	50000	☑	100	800 (long)

Description

The table has the following columns:

- **Radio**
  Shows the available WLAN interfaces.
- **A-MPDU**
  Aggregated MAC Protocol Data Unit (A-MPDU)
  Enables or disables that several MPDUs with the same destination address are sent as a large A-MPDU. This allows the total throughput to be increased.
  If this check box is disabled, A-MPDU data packets are received but not sent.
- **A-MPDU Limit [Frames]**
  Specify the number of individual data packets grouped together in one A-MPDU data packet.
  Range of values: 2 - 64 frames
- **A-MPDU Limit [Bytes]**
  Specify the maximum size of the A-MPDU data packet.
  Range of values: 1024 - 65535 bytes
  Default: 50000 bytes
- **A-MSDU**
  Aggregated MAC Service Data Unit (A-MSDU)
  Enables or disables that several MSDUs with the same destination address are bundled into an A-MSDU and are sent together. This reduces the network load. Due to their shorter maximum length A-MSDUs are more suitable for the bundling of several shorter frames.
  If this check box is disabled, A-MSDU data packets are received but not sent.

- **A-MSDU Packet Size [Bytes]**
  Specify the maximum size of the A-MSDU data packet.
  Range of values: 50 - 200 bytes
  Default: 100 Bytes
- **Guard Interval [ns] (only in Access Point mode)**
  Select the send pause that must be kept to between two transmitted OFDM symbols.
  The following settings are possible. The selection depends on the selected transmission standard.
  - 400 (short)/800 (long): The setting 400 ns is optional. Depending on the signal quality, packets can be sent with a send pause of 400 ns or 800 ns.
  - 800 (long): The send pause is 800 ns.

Procedure

Configure 802.11n settings on the access point

1. Enable the "A-MPDU" option.
2. Enter the required values in the "A-MPDU Limit [Frames]" and "A-MPDU Limit [Bytes]" input boxes.
3. Enable the option "A-MSDU".
4. Enter the required value in the "A-MSDU Packet Size" input box.
5. Select the required value from the "Guard Interval [ns]" drop-down list.
6. Click the "Set Values" button.

Configure 802.11n settings on the client

1. Enable the "A-MPDU" option.
2. Enter the required values in the "A-MPDU Limit [Frames]" and "A-MPDU Limit [Bytes]" input boxes.
3. Enable the option "A-MSDU".
4. Enter the required value in the "A-MSDU Packet Size" input box.
5. Click the "Set Values" button.

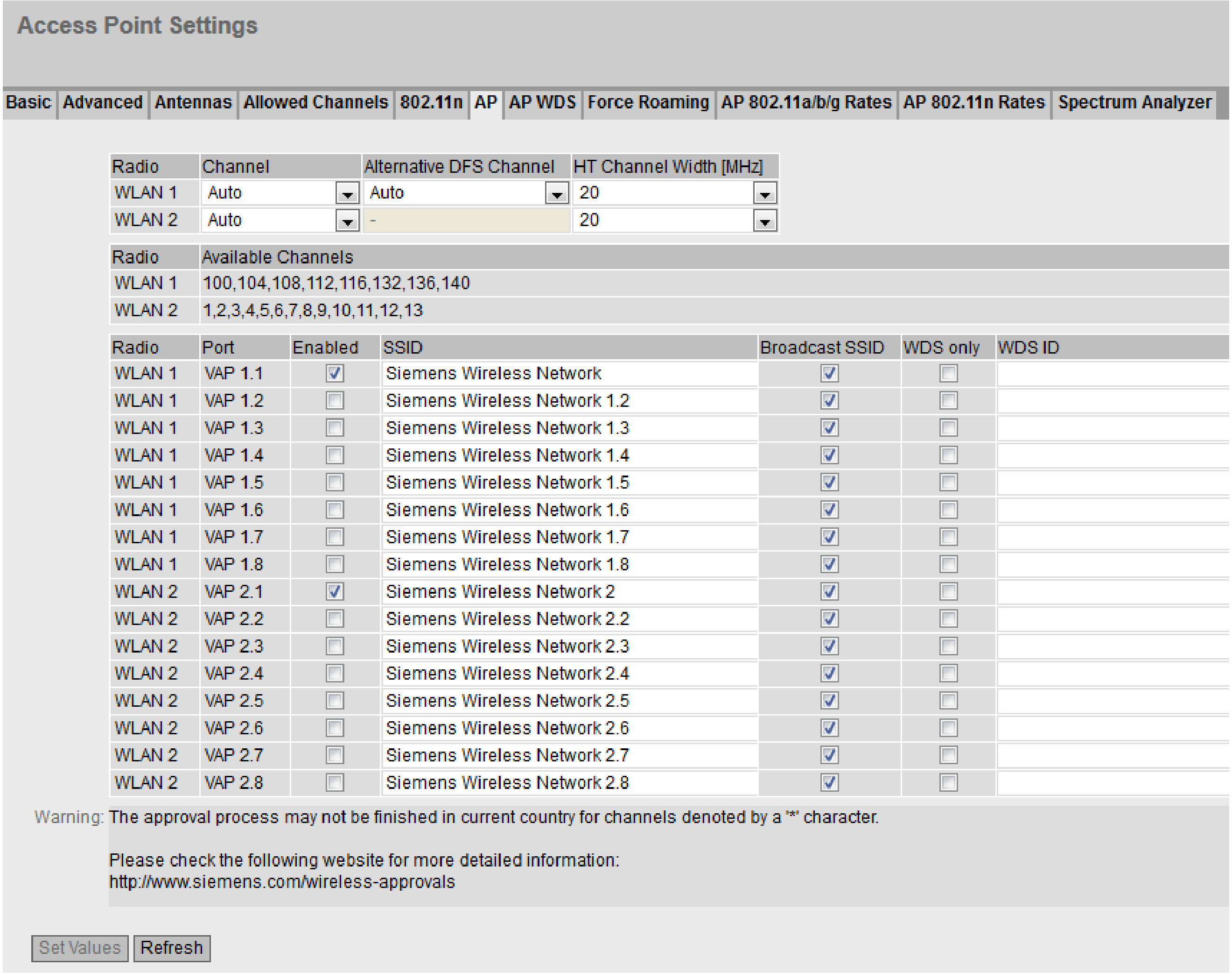
6.6.2.6 AP

Configuration

On this WBM page, you specify the configuration for the access point.

Note

This WBM page is only available in access point mode.



Access Point Settings

Radio	Channel	Alternative DFS Channel	HT Channel Width [MHz]
WLAN 1	Auto	Auto	20
WLAN 2	Auto	-	20

Radio	Available Channels
WLAN 1	100,104,108,112,116,132,136,140
WLAN 2	1,2,3,4,5,6,7,8,9,10,11,12,13

Radio	Port	Enabled	SSID	Broadcast SSID	WDS only	WDS ID
WLAN 1	VAP 1.1	☑	Siemens Wireless Network	☑	☐	
WLAN 1	VAP 1.2	☐	Siemens Wireless Network 1.2	☑	☐	
WLAN 1	VAP 1.3	☐	Siemens Wireless Network 1.3	☑	☐	
WLAN 1	VAP 1.4	☐	Siemens Wireless Network 1.4	☑	☐	
WLAN 1	VAP 1.5	☐	Siemens Wireless Network 1.5	☑	☐	
WLAN 1	VAP 1.6	☐	Siemens Wireless Network 1.6	☑	☐	
WLAN 1	VAP 1.7	☐	Siemens Wireless Network 1.7	☑	☐	
WLAN 1	VAP 1.8	☐	Siemens Wireless Network 1.8	☑	☐	
WLAN 2	VAP 2.1	☑	Siemens Wireless Network 2	☑	☐	
WLAN 2	VAP 2.2	☐	Siemens Wireless Network 2.2	☑	☐	
WLAN 2	VAP 2.3	☐	Siemens Wireless Network 2.3	☑	☐	
WLAN 2	VAP 2.4	☐	Siemens Wireless Network 2.4	☑	☐	
WLAN 2	VAP 2.5	☐	Siemens Wireless Network 2.5	☑	☐	
WLAN 2	VAP 2.6	☐	Siemens Wireless Network 2.6	☑	☐	
WLAN 2	VAP 2.7	☐	Siemens Wireless Network 2.7	☑	☐	
WLAN 2	VAP 2.8	☐	Siemens Wireless Network 2.8	☑	☐	

Warning: The approval process may not be finished in current country for channels denoted by a '*' character.

Please check the following website for more detailed information:
http://www.siemens.com/wireless-approvals

Description

Table 1 has the following columns:

- **Radio**
  Shows the available WLAN interfaces.
- **Channel**
  Specify the main channel.
  If you want the access point to search for a free channel itself, use "Auto". The selection of channels used by an access point when establishing a wireless cell can be restricted. To do this, select the "Use Allowed Channels only" check box on the "Allowed Channels" page. .If you want to use a fixed channel, select the required channel from the drop-down list.

Note

Channel spacing with WLAN interfaces

If you use a second WLAN interface, make sure that you have adequate channel spacing.

- **Alternative DFS Channel**
  If you have enabled the "DFS" function, on the "Basic" page, specify the alternative channel here. If you want the access point to search for a free channel itself, use "Auto".
  If a primary user was detected both on the main and alternative channel, the access point automatically searches for a free channel.
  If you want to use a fixed channel, select the required channel from the drop-down list.
- **HT Channel Width [MHz]**
  You can specify the channel bandwidth only with the IEEE 802.11n transmission standard. The following settings are possible.
  - 20
    Channel bandwidth 20 MHz
  - 40 up
    Channel bandwidth 40 MHz. The configured channel and the neighboring channel above it are used.
  - 40 down
    Channel bandwidth 40 MHz. The configured channel and the neighboring channel below it are used.

Note

Channel bandwidth 40 MHz and frequency band 2.4 GHz

If the access point detects another access point on the configured channel or on neighboring channels, the access point changes the channel bandwidth from 40 MHz to 20 MHz. If you set a "free" channel on the access point, the access point uses the channel bandwidth 40 MHz.

Table 2 has the following columns:

- **Radio**
  Shows the available WLAN interfaces.
- **Available Channels**
  This box displays the permitted channels. The display depends on the wireless approvals of the currently selected country and the settings on the "Allowed Channels" page.

Table 3 has the following columns:

- **Radio**
  Shows the WLAN interface.
- **Port**
  Shows the VAP interface.
- **Enabled**
  To use the required VAP interface, select this check box.
- **SSID**
  Enter the SSID of the WLAN. The length of the character string for SSID it is 1 to 32 characters. The ASCII code 0x20 to 0x7e is used for the SSID.

- **Broadcast SSID**
  - deactivated
    The SSID is no longer sent in the beacon frame of the access point. This means that the SSID is not visible for other devices. Only clients that know the SSID of the access point and that are configured with it can connect to the access point. The "Any SSID" option must be disabled on these clients.
  - activated
    The SSID is sent in the Beacon frame of the access point and is visible for other devices. This means that clients on which the "Any SSID" option is enabled can also connect to the access point.

Note

Since no encryption is used for the SSID transfer, this function can only provide basic protection against unauthorized access. The use of an authentication method (for example, WPA2 (RADIUS) or WPA2-PSK if this is not possible) provides higher security. You must also expect that certain end devices may have problems with access to a hidden SSID.

- **WDS only**
  If you enable this option, the access point only supports communication via WDS. In WDS mode, all access points must use the same channel.
- **WDS ID**
  Enter the WDS ID. The WDS ID can be a maximum of 32 characters long.
  To establish a WDS connection, enter this WDS ID on the WDS Partner.
  ASCII code 0x20 to 0x7e is used for the WDS ID.

Procedure

1. Select the required channel from the "Channel" drop-down list.
2. Enter network name in the "SSID" input box for the corresponding WLAN interface and port.
3. For the relevant WLAN interface and the port, select the "Enabled" check box.
4. Click the "Set Values" button.

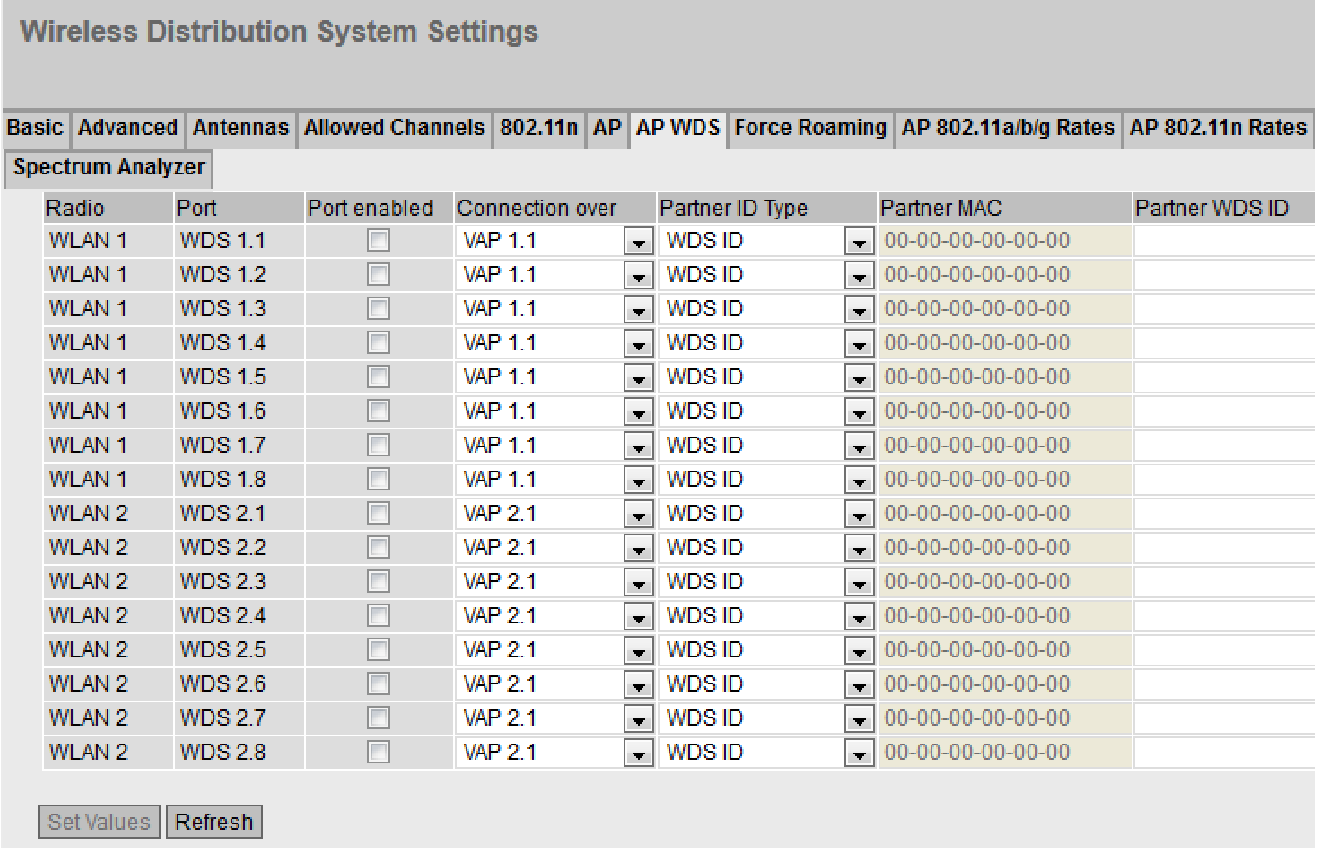
6.6.2.7 AP WDS

Communication

In normal operation, the access point is used as an interface to a network and communicates with clients. There are, however, situations in which several access points need to communicate with each other, for example to extend wireless coverage or to set up a wireless backbone. This mode is possible with WDS (Wireless Distributed System).

Note

This WBM page is only available in access point mode.



Wireless Distribution System Settings

Radio	Port	Port enabled	Connection over	Partner ID Type	Partner MAC	Partner WDS ID
WLAN 1	WDS 1.1	□	VAP 1.1	WDS ID	00-00-00-00-00-00	
WLAN 1	WDS 1.2	□	VAP 1.1	WDS ID	00-00-00-00-00-00	
WLAN 1	WDS 1.3	□	VAP 1.1	WDS ID	00-00-00-00-00-00	
WLAN 1	WDS 1.4	□	VAP 1.1	WDS ID	00-00-00-00-00-00	
WLAN 1	WDS 1.5	□	VAP 1.1	WDS ID	00-00-00-00-00-00	
WLAN 1	WDS 1.6	□	VAP 1.1	WDS ID	00-00-00-00-00-00	
WLAN 1	WDS 1.7	□	VAP 1.1	WDS ID	00-00-00-00-00-00	
WLAN 1	WDS 1.8	□	VAP 1.1	WDS ID	00-00-00-00-00-00	
WLAN 2	WDS 2.1	□	VAP 2.1	WDS ID	00-00-00-00-00-00	
WLAN 2	WDS 2.2	□	VAP 2.1	WDS ID	00-00-00-00-00-00	
WLAN 2	WDS 2.3	□	VAP 2.1	WDS ID	00-00-00-00-00-00	
WLAN 2	WDS 2.4	□	VAP 2.1	WDS ID	00-00-00-00-00-00	
WLAN 2	WDS 2.5	□	VAP 2.1	WDS ID	00-00-00-00-00-00	
WLAN 2	WDS 2.6	□	VAP 2.1	WDS ID	00-00-00-00-00-00	
WLAN 2	WDS 2.7	□	VAP 2.1	WDS ID	00-00-00-00-00-00	
WLAN 2	WDS 2.8	□	VAP 2.1	WDS ID	00-00-00-00-00-00	

Description

The table has the following columns:

- **Radio**
  Shows the available WLAN interfaces.
- **Port**
  Shows the WDS interfaces.
- **Port enabled**
  Enables the WDS interface.
- **Connection over**
  Specify the VAP interface via which the WDS connection is established. Both the MAC address of the VAP as well as security settings for example WPA2 used.

- **Partner ID Type**
  Specify the type of WDS communication.
  - MAC Address
    The MAC address is used. The "Partner WDS ID" input box is grayed out. For "Partner MAC", enter the MAC address of the WDS partner.
  - WDS ID
    The WDS ID is used. The "Partner MAC" input box is grayed out. For "Partner WDS ID" enter the WDS ID od the WDS partner. Use this option if you want to replace the access point later using the C-PLUG or KEY-PLUG.
- **Partner MAC**
  Enter the MAC address of the WDS partner.
- **Partner WDS ID**
  Enter the WDS ID of the WDS partner. For the WDS ID, the ASCII characters 0x20 to 0x7e are permitted.

Note

Matching security settings in WDS mode

In WDS mode, make sure that the security settings match up for all devices involved. If settings are incorrect or not compatible on the individual devices, no data exchange is possible due to incorrect authentication. Avoid the setting "Auto" on the basic wizard page "Security Settings2. With this setting, synchronization of the security settings between the access points is not possible.

Note

In WDS operation, the following restrictions apply to all access points involved:

- All access points that will communicate with each other must use the same channel, the same transmission procedure and the same data rate.
- You can select either WEP or WPA(2)-PSK as the encryption method.
  You configure the security settings in the assigned VAP interface: "Security > WLAN > Basic"
  You cannot use authentication with a RADIUS server for a WDS connection.
- In the IEEE 802.11h transmission mode, it is not practical to select the WDS mode. In WDS mode, all access points must use the same channel. If a signal from a primary user is detected by an access point, the channel is changed automatically and the existing connection is then terminated.

Procedure

1. Select the required VAP interface from the "Connection over" drop-down list.
2. Select the entry "WDS ID" in the "Partner ID Type" drop-down list.
3. Enter the WDS ID of the WDS partner in the "Partner WDS ID" input box. The "MAC Address" input box is grayed out.
4. Click the "Set Values" button.

6.6.2.8 AP 802.11a/b/g data rates

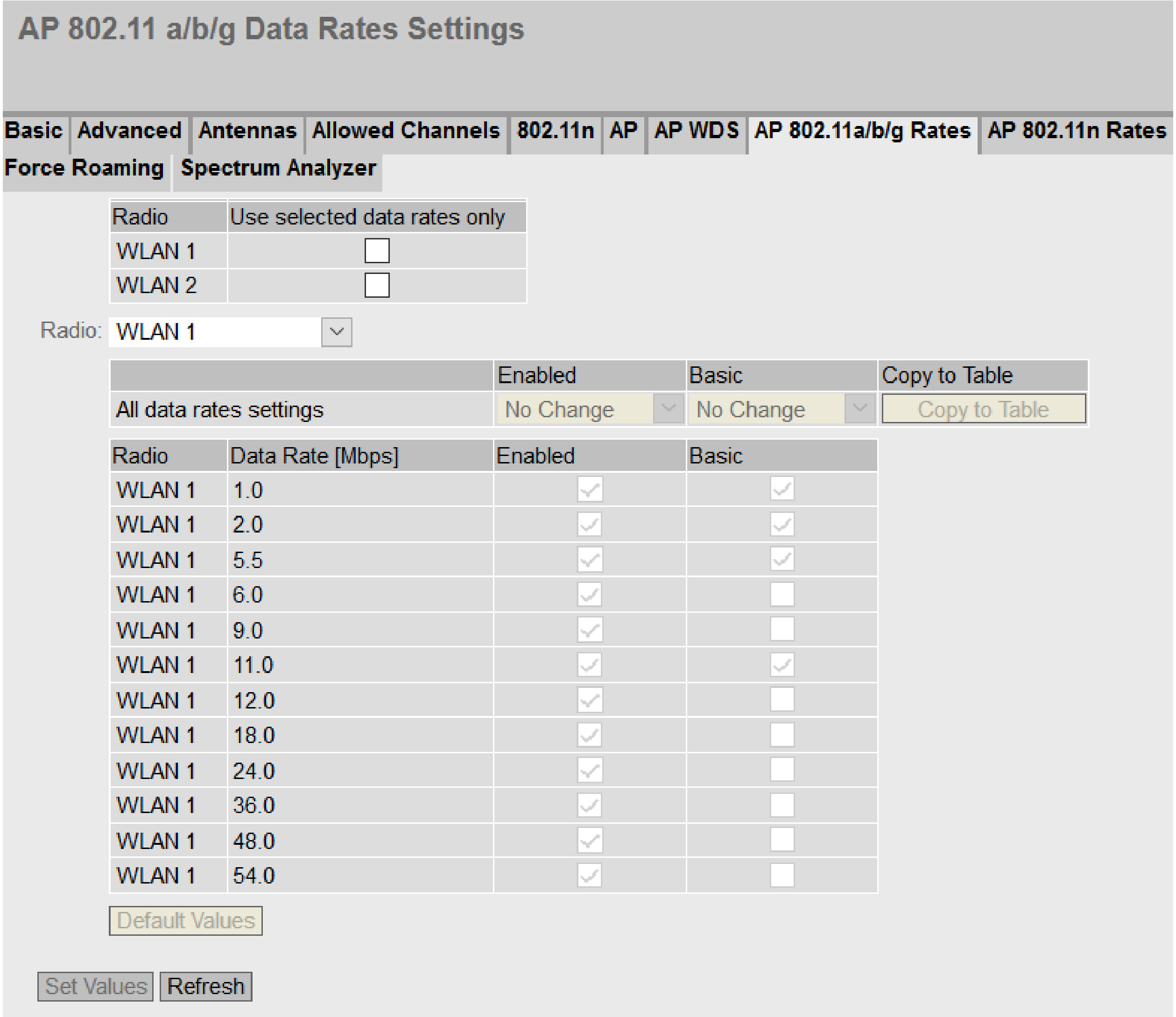
Data transmission speeds with IEEE 802.11a/b/g

Note

The WBM page is only available in access point mode.

The WBM page can only be configured if "802.11a", "802.11g" or "802.11n" is set for WLAN mode.

The WBM page shows the available data transmission speeds for the WLAN mode 802.11a/b/g. If necessary, you can change the data transmission speeds. Otherwise, we recommend that you retain the default setting for data transmission speeds. The access point will then use only the selected data transmission speeds for communication with the clients.



AP 802.11 a/b/g Data Rates Settings

Radio	Use selected data rates only
WLAN 1	□
WLAN 2	□

Radio: WLAN 1

	Enabled	Basic	Copy to Table
All data rates settings	No Change	No Change	Copy to Table

Radio	Data Rate [Mbps]	Enabled	Basic
WLAN 1	1.0	☑	☑
WLAN 1	2.0	☑	☑
WLAN 1	5.5	☑	☑
WLAN 1	6.0	☑	□
WLAN 1	9.0	☑	□
WLAN 1	11.0	☑	☑
WLAN 1	12.0	☑	□
WLAN 1	18.0	☑	□
WLAN 1	24.0	☑	□
WLAN 1	36.0	☑	□
WLAN 1	48.0	☑	□
WLAN 1	54.0	☑	□

Description

Table 1 has the following columns:

- **Radio**
  Specifies the WLAN interface to which the information relates.
- **"Use selected data rates only"**.
  If you enable this option, you can specify the data transmission speeds for the required WLAN interface.
  If this option is disabled, the default values are used. As default, this option is disabled.

Drop-down list "Radio"

In this drop-down list, select the WLAN interfaces displayed in Table 3 (Data Rate).

With Table 2, you can enable or disable all check boxes of a column of Table 3 (Data Rate) at once. Table 2 has the following columns:

- **All data rates settings**
  Shows that the setting is valid for all entries of Table 3.
- **Enabled / Basic**
  In the drop-down list, select the setting for all entries. If "No Change" is selected, the entry in table 3 remains unchanged.
- **Copy to table**
  If you click the button, the setting is adopted for all entries of Table 3.

Table 3 (Data Rate) consists of the following columns:

- **Radio**
  Specifies the WLAN interface to which the information relates.
- **Data Rate [Mbps]**
  Shows the supported data transmission speeds in megabits per second.
- **Enabled**
  Enable the option to assign the required data transmission speed to the WLAN interface.

  Note

  You need to enable at least one data transmission speed.

- **Basic**
  Enable the option to declare the required data transmission speed as "Basic". The "Basic" parameter specifies that a client must be capable of this speed to be able to connect to the access point. The "Basic" option can only be enabled if an available data transmission speed has been selected.

  Note

  At least one data transmission speed needs to be specified as "Basic".

Procedure

To configure a certain data transmission speed on WLAN 1:

1. Enable the "Use selected data rates only'" option for "WLAN 1".
2. From the "Radio" drop-down list, select the entry "WLAN 1".
3. Select the appropriate check box in the "Enabled" column and in the "Basic" column for the required data transmission speed.
4. Click the "Set Values" button.

To reset the selection:

1. Click the "Default Values" button. The selection is reset to the default setting.

6.6.2.9 AP 802.11n data rates

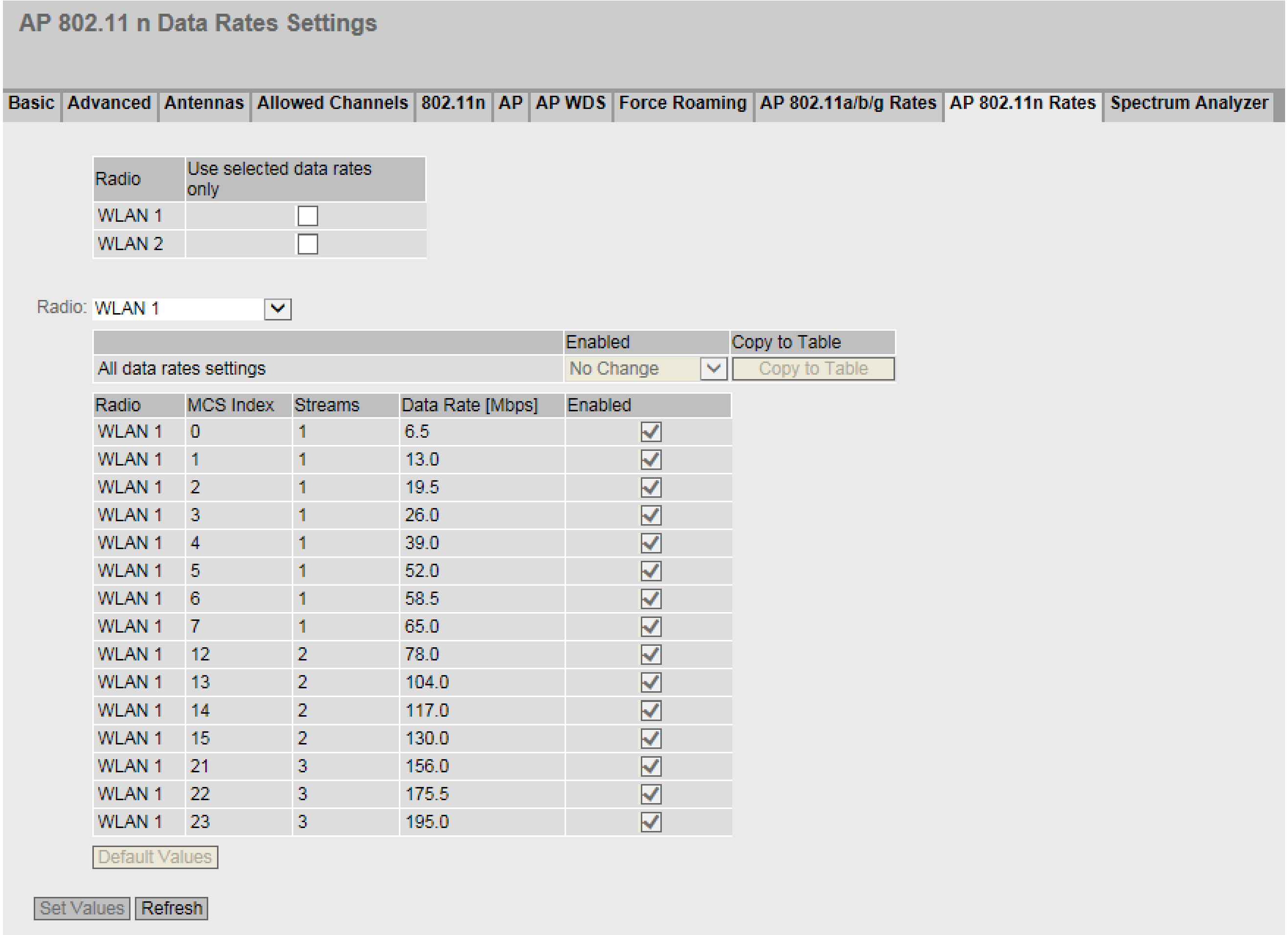
Data transmission speeds in IEEE 802.11n

Note

This WBM page is only available in access point mode.

The WBM page can only be configured if "802.11n only" or 802.11n is set for WLAN mode.

The WBM page shows the available data transmission speeds (MCS = Modulation and Coding Schemes) for the WLAN mode 802.11n. You can select any combination of these data transmission speeds. The access point will then use only the selected data transmission speeds for communication with the clients.



AP 802.11 n Data Rates Settings

Radio	Use selected data rates only
WLAN 1	□
WLAN 2	□

Radio: WLAN 1

	Enabled	Copy to Table
All data rates settings	No Change	Copy to Table

Radio	MCS Index	Streams	Data Rate [Mbps]	Enabled
WLAN 1	0	1	6.5	☑
WLAN 1	1	1	13.0	☑
WLAN 1	2	1	19.5	☑
WLAN 1	3	1	26.0	☑
WLAN 1	4	1	39.0	☑
WLAN 1	5	1	52.0	☑
WLAN 1	6	1	58.5	☑
WLAN 1	7	1	65.0	☑
WLAN 1	12	2	78.0	☑
WLAN 1	13	2	104.0	☑
WLAN 1	14	2	117.0	☑
WLAN 1	15	2	130.0	☑
WLAN 1	21	3	156.0	☑
WLAN 1	22	3	175.5	☑
WLAN 1	23	3	195.0	☑

Description

Table 1 has the following columns:

- **Radio**
  Specifies the WLAN interface to which the information relates.
- **Use selected data rates only**
  If you enable this option, you can specify the data transmission speeds for the required WLAN interface.
  If this option is disabled, the default values are used. As default, this option is disabled.

"Radio" drop-down list
In this drop-down list, select the WLAN interfaces displayed in Table 3 (MCS Index).

With Table 2, you can enable or disable all check boxes of a column of Table 3 (MCS Index) at once. Table 2 has the following columns:

- **All data rates settings**
  Shows that the setting is valid for all entries of Table 3.
- **Enabled**
  In the drop-down list, select the setting for all entries. If "No Change" is selected, the entry in table 3 remains unchanged.
- **Copy to table**
  If you click the button, the setting is adopted for all entries of Table 3.

Table 3 (MCS Index) consists of the following columns:

- **Radio**
  Specifies the WLAN interface to which the information relates.
- **MCS Index**
  Shows the supported MCS indexes. The displayed MCS indexes depend on the settings "Antenna Type" and "Antenna Mode". You will find the settings in "Interfaces > WLAN > Antennas". If, for example, you only use one antenna, only the MCS 0 to 7 are displayed.
- **Streams**
  Shows the maximum possible number of parallel data streams that can be transmitted with the selected MCS index.
- **Data Rate [Mbps]**
  Shows the supported data transmission speeds in megabits per second. The displayed data transmission speeds depend on the settings "Guard Interval" and "HT Channel Width". You will find the setting "HT Channel Width" in "Interfaces > WLAN > AP". The "Guard Interval" setting can be found in "Interfaces > WLAN > 802.11n"
- **Enabled**
  Enable the option to assign the required data transmission speed to the WLAN interface.

Note

You need to enable at least one MCS index.

Procedure

To configure a certain data transmission speed on WLAN 1:

1. Enable the "Use selected data rates only" option for "WLAN 1".
2. From the "Radio" drop-down list, select the entry "WLAN 1".
3. Select the corresponding check box in the "Enabled" column for the selected MCS index.
4. Click the "Set Values" button.

To reset the selection:

1. Click the "Default Values" button. The selection is reset to the default setting.

Or

1. Disable the "Use selected data rates only" option in Table 1.
2. Click the "Set Values" button.

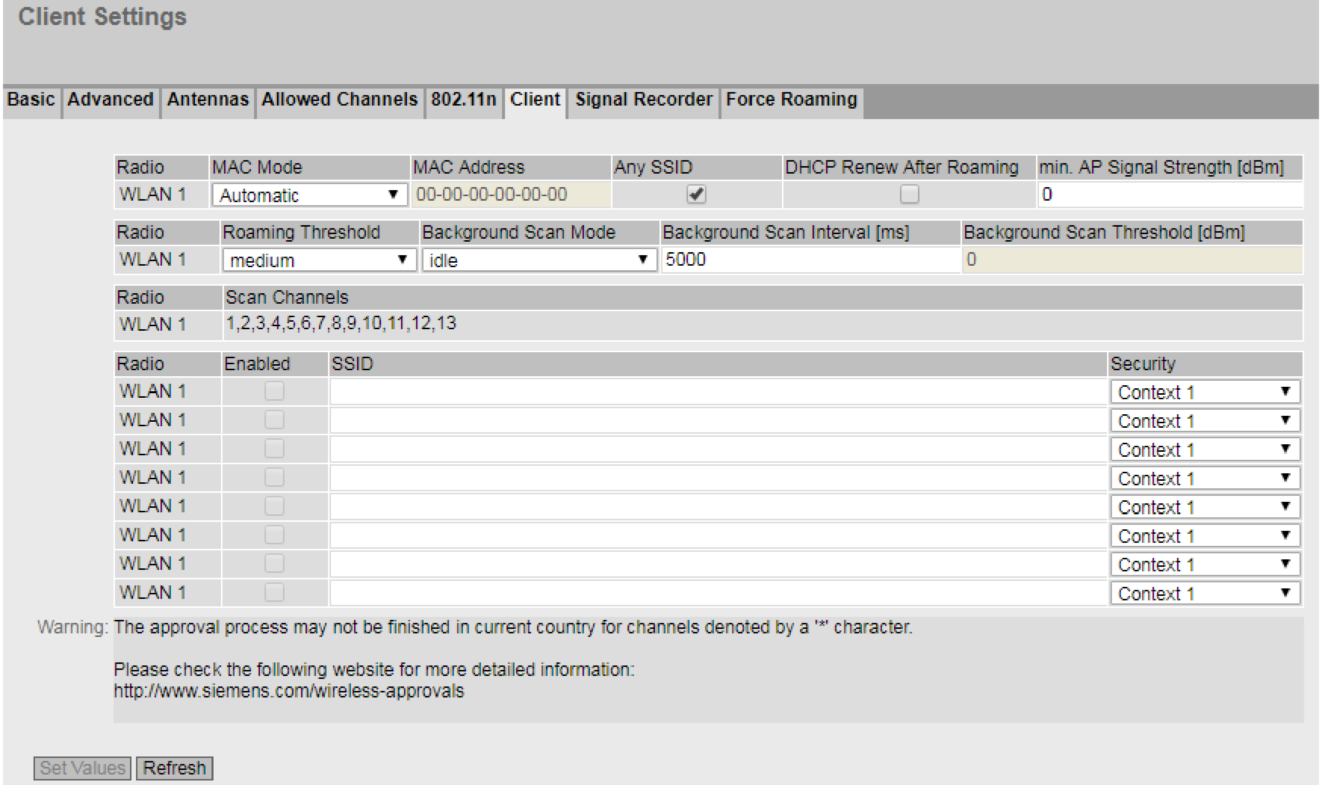
6.6.2.10 Client

Connecting to a network

On this WBM page, you can specify how the device connects to a network as client.

Note

This WBM page is only available in client mode.



Radio	MAC Mode	MAC Address	Any SSID	DHCP Renew After Roaming	min. AP Signal Strength [dBm]
WLAN 1	Automatic	00-00-00-00-00-00	☑	□	0

Radio	Roaming Threshold	Background Scan Mode	Background Scan Interval [ms]	Background Scan Threshold [dBm]
WLAN 1	medium	idle	5000	0

Radio	Scan Channels
WLAN 1	1,2,3,4,5,6,7,8,9,10,11,12,13

Radio	Enabled	SSID	Security
WLAN 1	□		Context 1
WLAN 1	□		Context 1
WLAN 1	□		Context 1
WLAN 1	□		Context 1
WLAN 1	□		Context 1
WLAN 1	□		Context 1
WLAN 1	□		Context 1
WLAN 1	□		Context 1

Warning: The approval process may not be finished in current country for channels denoted by a '*' character.

Please check the following website for more detailed information:
http://www.siemens.com/wireless-approvals

Note

WLAN interface disabled

The WLAN interface will be disabled unless at least one SSID is configured or the setting "Any SSID" is enabled.

Description

Table 1 has the following columns:

- **Radio**
  Shows the available WLAN interfaces.
- **MAC Mode**
  Specify how the MAC address is assigned to the client. The following are possible:
  - Automatic
    The client automatically adopts the source MAC address of the first frame that it receives over the Ethernet interface.
  - Manual
    If you select "Manual", enter the MAC address in the "MAC Address" column.
  - Own
    The client uses the MAC address of the Ethernet interface for the WLAN interface.
  - Layer 2 Tunnel
    The client uses the MAC address of the Ethernet interface for the WLAN interface. The network is also informed of the MAC addresses connected to the Ethernet interface of the client. Up to eight MAC addresses can be used.
- **MAC Address**
  If you have selected "Manual" for "MAC Mode", enter the MAC address of the client.
- **Any SSID**
  - Enabled
    In client mode, the SCALANCE W device attempts to connect to the access point that corresponds to the security settings of security context 1. The clients can only connect to the access point on which the "Broadcast SSID" option is enabled.
  - Disabled
    The client attempts to connect to the access point from the SSID list whose security settings match one of the defined security contexts.
- **DHCP Renew After Roaming**
  - Enabled
    After changing to a different access point, a check is made to find out whether the IPv4 address of the client is still valid. If he IPv4 address is invalid, a new IPv4 address is requested from the DHCP server.
  - Disabled
    If the client changes to a different access point the IPv4 address is not checked.

- **min. AP signal strength**
  The client has a signal strength set.

  Note

  iPCF / iPCF-HT / IPCF-MC enabled

  When iPCF / iPCF-HT / IPCF-MC is enabled, the signal strength cannot be set.

  The client must receive the signal coming from the access point with at least the specified signal strength to be able to connect to this access point.
  The signal strength can fluctuate briefly, e.g. due to the client moving or other disruptive factors. To filter out fluctuations of the signal a hysteresis is used to specify a range around this value, in which the client does not change access points before this range is undershot. If the signal coming from the access point falls below this range, the client disconnects from the connected access point and searches for a new access point.

- **Roaming Threshold**
  Specify the threshold after which the client roams to the new access point.
  - High
    Changes only at a significantly higher field strength to the AP with the stronger signal.
  - Medium
    Changes at a moderately higher field strength to the AP with the stronger signal.
  - Low
    Changes at a slightly higher field strength to the AP with the stronger signal.

- **Background Scan Mode**
  While the client is connected to an access point, it scans for other access points in the background with which it can connect when necessary. Specify the mode for the scan. The following options are available:
  - Always
    If the background scan threshold is undershot, the client searches continuously for access points.
  - Idle
    If there is no data transfer for a certain time, a scan is started for further access points.
  - Disabled
    As long as the client is connected, there is no scan for further access points.
  - Current channel
    The client updates its scan list based on the beacons (management frames) that it has received on the current channel. The scan list is evaluated within the background scan interval. If beacons from a better access point are included, the client switches to that access point after evaluation without changing the current channel.

    Note

    iPRP enabled

    When iPRP is enabled, the client sends special roaming advertisement frames to its redundant partner for each roaming operation. The redundant partner may not perform roaming itself for 500 ms after receiving this.

- **Background Scan Interval [ms]**
  Specify the interval at which further access points are scanned.
- **Background Scan Threshold [dBm]**
  Specify the threshold. If the threshold is undershot, the client searches for further access points.

Table 2 has the following columns:

- **Radio**
  Shows the WLAN interface.
- **Scan Channels**
  Shows the channels on which the client searches for an access point. The display depends on the wireless approvals of the selected country and the settings for "Allowed Channels".

Table 3 has the following columns:

- **Radio**
  Shows the WLAN interface.
- **Enabled**
  Enables or disables the relevant SSID.
- **SSID**
  Enter the SSID of the access point with which the client will connect.
  For the SSID, ASCII code 0x20 to 0x7e is used.
- **Security**
  Select a security context. You create and configure a security context in "Security > WLAN > Basic".
  Default setting: Context 1

Note

iPCF / iPCF-HT / IPCF-MC enabled

If the iPCF, iPCF-HT or iPCF-MC mode is enabled, you can only select security context 1.

Procedure

1. From the "MAC Mode" drop-down list, select the required assignment of the MAC address.
2. In table 3, enter an SSID for "SSID".
3. Select a security context.
4. Enable the required SSID.
   The "Any SSID" function is disabled.
5. Click the "Set Values" button.

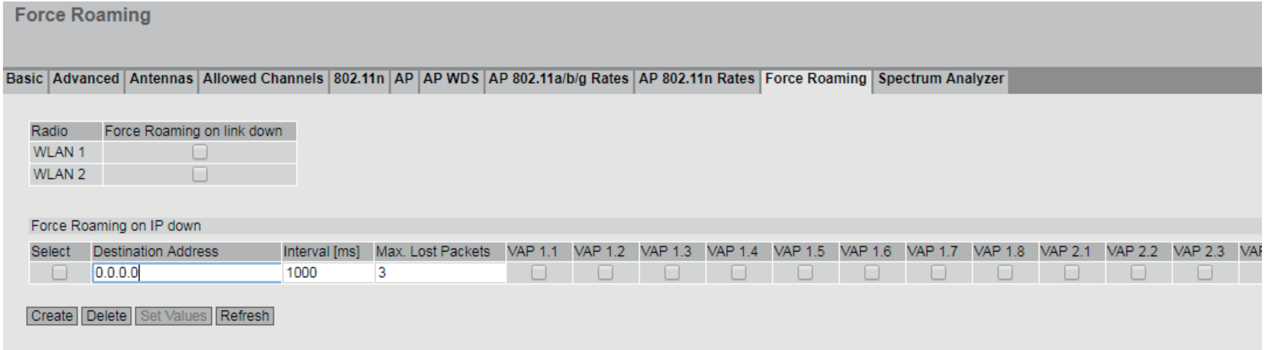
6.6.2.11 Force Roaming

On this page you specify when roaming is performed.

- **On connection termination (only in access point mode)**
  If the connection over the Ethernet interface is terminated, a client logged in over the wireless network will not notice anything. Possible causes for connection termination include, for example, wire break, failed network components, pulled plug. The access point can force the logged-in clients to roam by deactivating the relevant WLAN interface on connection termination. The clients roam and then connect to a different access point. As soon as the Ethernet interface is available again, the access point switches on its WLAN interfaces once again.
- **When the target address is not reached**
  To monitor the device sends pings to the configured destination addresses at regular intervals.
  - The interface is monitored by one target address
    When this target address does not send a ping response, the access point turns off the corresponding VAP interface or the client restarts the WLAN interface.
  - The interface is monitored by multiple target addresses
    Only if none of the configured target addresses sends a ping response does the access point turn off the corresponding VAP interface or the client restart the WLAN interface. As long as at least one destination address can be reached, the interface remains active. The access point, for example, sends a disassociation frame to the WLAN clients connected via this VAP interface. The WLAN clients roam and connect to a different VAP interface. If the address becomes reachable again, the connection can be established again via this VAP interface.

The possible settings differ for access point and client.

In access point mode

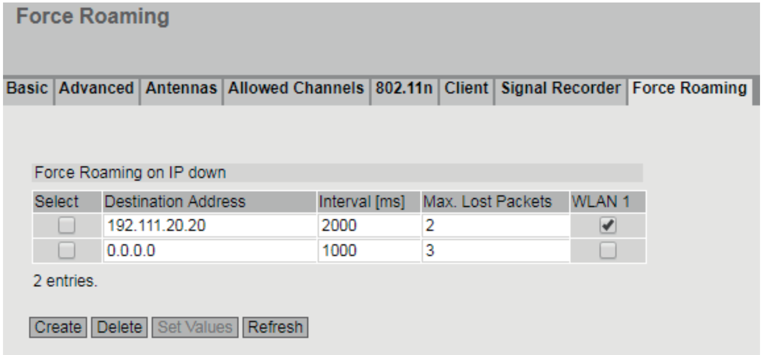


Radio	Force Roaming on link down
WLAN 1	□
WLAN 2	□

Force Roaming on IP down

Select	Destination Address	Interval [ms]	Max. Lost Packets	VAP 1.1	VAP 1.2	VAP 1.3	VAP 1.4	VAP 1.5	VAP 1.6	VAP 1.7	VAP 1.8	VAP 2.1	VAP 2.2	VAP 2.3	VA
□	0.0.0.0	1000	3	□	□	□	□	□	□	□	□	□	□	□	

In client mode



Force Roaming on IP down

Select	Destination Address	Interval [ms]	Max. Lost Packets	WLAN 1
□	192.111.20.20	2000	2	☑
□	0.0.0.0	1000	3	□

2 entries.

Description

Table 1 is only available in access point mode and is divided into the following columns:

- **Radio**
  Shows the available WLAN interfaces.
- **Force roaming on link down**
  When enabled, the WLAN interface is turned off if there is a connection abort via the Ethernet interface.

The table "Force Roaming on IP down" has the following columns:

- **Select**
  Select the check box in the row to be deleted.
- **Destination Address**
  Enter the IPv4 address or the FQDN (Fully Qualified Domain Name) of the destination whose reachability will be checked.

Note

Destination address not in the agent IP subnet

If the destination address is not in the agent IP subnet, a gateway must be entered for "Layer 2 > Agent IP".

The Base Bridge mode "802.1Q VLAN Bridge"

If you have configured the "Based Bridge Mode" "802.1Q VLAN Bridge" in "Layer 2 > VLAN", pings are sent into the management VLAN.

- **Interval [ms]**
  Specify the interval at which pings are sent.
- **Max. Lost Packets**
  Specify the maximum number of consecutive lost ping responses. When this number is reached for a destination address, this destination address counts as being unreachable (down).
- **VAP X.Y** (in access point mode)
  Specify which VAP interface will be monitored.
- **WLAN** 0/X (in client mode)
  Specify which WLAN interface will be monitored.

Procedure

Creating force roaming

1. Click the "Create" button.
2. Make the following settings:
   - Destination address
   - Interval
   - Max. Lost Packets
3. Specify through which destination address the following interface will be monitored:
   - VAP interface (in access point mode)
   - WLAN interface (in client mode)
4. Click the "Set Values" button.

Deleting force Roaming

1. Select the check box in the row to be deleted.
2. Click the "Delete" button. The entries are deleted and the page is updated.

6.6.2.12 Signal recorder

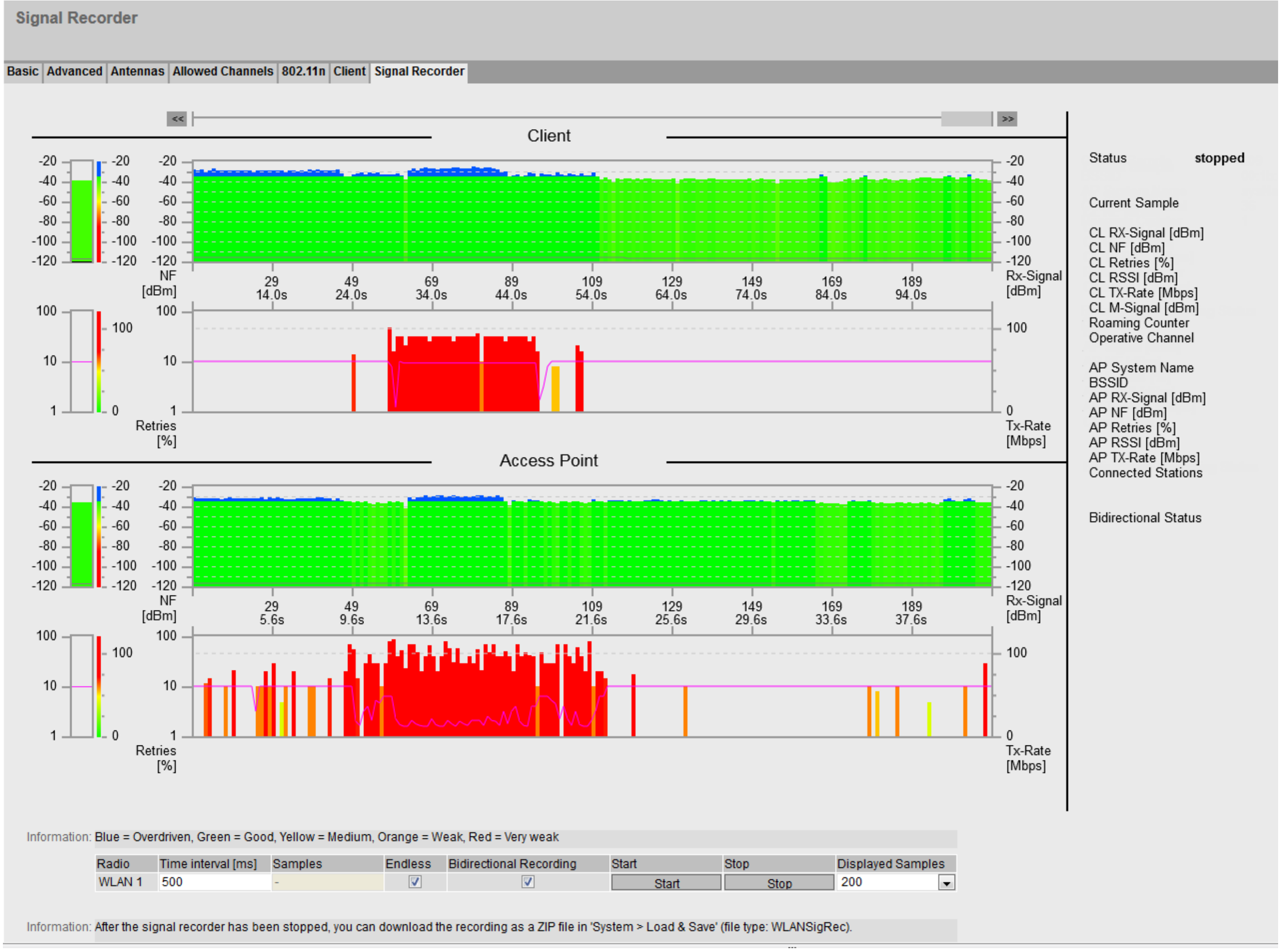
Recording the effective user signal

The signal recorder is used to record the effective user signal between access point and client. Using this data, you can locate areas with an inadequate user signal. The signal recorder can be particularly useful when the client moves along a fixed path.

Note

This WBM page is only available in client mode.

The WLAN interface of the SCALANCE W700 device must be enabled, otherwise no recording is possible.



Status stopped

Information: Blue = Overdriven, Green = Good, Yellow = Medium, Orange = Weak, Red = Very weak

Radio	Time interval [ms]	Samples	Endless	Bidirectional Recording	Start	Stop	Displayed Samples
WLAN 1	500	-	☑	☑	Start	Stop	200

Information: After the signal recorder has been stopped, you can download the recording as a ZIP file in 'System > Load & Save' (file type: WLANSigRec).

Description

The display is divided into two areas.

- Client
  Represents the measurement of the client.
- Access point
  Displays the measurement of the access point with which the client is currently connected. This requires that the setting "Bidirectional Recording" is enabled and that a firmware version > 6.1 is installed on the access point. The access point sends its data to a maximum of 3 clients on which signal recorders are running. The access point data is not displayed on other clients.

Both areas each contain two graphics.

The first graphic contains the following elements:

- Scroll bar
  With the scroll bar, you can look through the entire measurement. To do this you can use the "<<" and ">>" buttons or the arrow keys on the keyboard.
- Bar (left)
  In the bar on the left-hand side the user signal of the client / access point is displayed in real time according to the color scheme. The gray line shows the background noise.
  If the client has an iPCF-MC connection, the user signal of the management channel is shown with a black line.
- Color scheme
  The range > -35 dBm (blue) is the overmodulation range, in other words the WLAN signal is too strong and is received overmodulated. As of approximately -60 dBm (yellow) the WLAN signal is weaker.
- x axis
  The x axis shows the course of the measurement in random samples and seconds.
- Measurement data
  - Client
    The measurement data shows the value of the effective user signal according to the color scheme shown. The gray line shows the background noise.
    If the client changes access points during a measurement (roaming) or reconnects, this is displayed by a vertical black line. On the line the new AP system name and the BSSID are shown.
    If during a measurement the client has no connection to an access point, no user signal is displayed. To make it clear that there is no connection to an access point, the BSSID is set to 00:00:00:00:00:00 and shown in red.
    If the client has an iPCF-MC connection, the user signal of the management channel is shown with an additional black line.
  - Access point
    The measurement data shows the value of the effective user signal according to the color scheme shown. The gray line shows the background noise.
    If the client changes access points during a measurement (roaming) or reconnects, this is displayed by a vertical black line.
    If the access point does not support the setting "Bidirectional Recording" no user signal is displayed

The second graphic contains the following elements:

- Bar (left)
  In the bar on the left-hand side the transfer attempts and the data rate of the client / access point are displayed according to the color scheme.
- Color scheme
  The range > -35 dBm (blue) is the overmodulation range, in other words the WLAN signal is too strong and is received overmodulated. As of approximately -60 dBm (yellow) the WLAN signal is weaker. The individual colors are described again under the graphic.

- x axis
  The x axis shows the course of the measurement in random samples and seconds.
- Measurement data
  - Client
    The measurement data shows the transfer attempts according to the color scheme shown. The transfer attempts are shown as a bar. The data rate of the sent data packets is represented as a line. If the client changes access points during a measurement (roaming) or reconnects, this is displayed by a vertical black line.
  - Access point
    The measurement data shows the transfer attempts according to the color scheme shown. The transfer attempts are shown as a bar. The data rate of the sent data packets is represented as a line.
    If the client changes access points during a measurement (roaming) or reconnects, this is displayed by a vertical black line. If the access point does not support the setting "Bidirectional Recording" no data is displayed.

Beside the graphics the following values are displayed:

- Status
  Shows whether or not the signal recorder is recording values.
- Current Sample
  The number of the current measurement
- CL RX-Signal [dBm] / AP RX-Signal [dBm]
  The effective user signal of the client / access point in dBm
- CL NF [dBm] / AP NF [dBm]
  The background noise of the client / access point in dBm
- CL Retries [%] / AP Retries [%]
  The transfer repetitions of the client / access point as a percentage.
- CL RSSI / AP RSSI
  The raw value of the RSSI (Received Signal Strength Indication) of the client / access point
- CL TX-Rate [Mbps] / AP TX-Rate [Mbps]
  The average data rate of the sent data packets during the current random test
- CL M-Signal [dBm]
  If the client has an iPCF-MC connection, the user signal of the management channel is displayed.
- Roaming Counter
  The roaming counter shows how often the client has changed access points during the recording. After 4 294 967 295 changes the counter is reset.
- Operative Channel
  The current channel or the channel on which the client is connected to the access point
- AP System Name
  The system name of the access point
- BSSID
  The BSSID (Basic Service Set Identification) of the access point.

- Connected Stations
  Number of clients connected to the access point over the same VAP interface.
- Bidirectional Status
  Shows whether the data of the access point are also being recorded.

The table below the graphic contains the following columns:

- **Radio**
  Shows the WLAN interface to which the information applies. Since a client has a WLAN interface, there is only ever one row for "WLAN 1" in this table.
- **Interval [ms]**
  Specify the time interval between acquiring two measured values in milliseconds. The first measured value is displayed only after the set time interval has elapsed.
- **Samples**
  Specify how many measurements should be made.
- **Endless**
  If you enable the option check mark, the number of measurements is unlimited. The "Samples" box is grayed out. The signal recorder runs until it is stopped manually or the device is reconfigured.
  You can only select this option starting at a time interval ≥ 100 milliseconds.
  If the recording contains more than 8000 measurements, the last 8000 measurements are listed in the csv file and the PDF file.
- **Bidirectional Recording**
  If you enable the setting the values of the access point as of a time interval of ≥ 10 milliseconds.
  The setting is supported by access points with the following versions: SCALANCE W700 11n > V6.1 and SCALANCE W1700 11ac > V1.0.
- **Start**
  Click the button in this column to start recording the wanted signal.

  Note

  - If you start a new recording, the previous recording will be overwritten.
  - If the recording has lasted less than 10 minutes and has not yet been completed (e.g. due to a restart or power down), the measured values are deleted.

  The signal recorder saves the recorded data automatically every 10 minutes. Following a restart, the recording contains all the values up to the last save action.
- **Stop**
  Click the button in this column to stop recording the wanted signal prematurely. If the specified number of measurements has been made, recording of the user data signal stops automatically.
- **Displayed Samples**
  Select how many measurements will be shown in the graphic.

Notes on usage

Note the following tips that will help you to obtain useful measurements with the signal recorder:

- Set a fixed data rate on the access point.
- If you have activated iPCF, set as low a cycle time on the access point as possible for the measurements.
- Make sure that there is enough data communication during the measurement because the statistics functions evaluate incoming data frames.
- The measurement path should be traveled 2 to 3 times with the same parameters to find out whether losses of the user data signal always occur at the same position.
- Selective measurements at a fixed position should be made over a longer period of time.

Procedure

1. Enter the time interval between two measurements.
2. In "Samples" enter the number of measurements.
3. In "Displayed Samples" select how many measurements will be shown in the graphic.
4. Click the "Start" button.
   The status (to the right of the graphic) indicates whether the signal recorder is running. The first measured value is displayed only after the set time interval has elapsed.
5. To stop the recording, click the "Stop" button.
6. Change to one of the following menu items to call up the result of the recording:
   - System > Load&Save > HTTP
     Click the "Save" button in the "WLANSigRec" table row to save the file "signal_recorder_SCALANCE_W700.zip" in the file system of the connected PC.
   - System > Load&Save > TFTP
     If necessary, change the file name "signal_recorder_SCALANCE_W700.zip" in the "WLANSigRec" table row. In the table row "WLANSigRec", select the "Save file" entry from the drop-down list of the last column and click the "Save Values" button.
7. The ZIP file contains two files with the results of the recording:
   - A PDF file: The output is limited to 300 pages.
   - A CSV file: Complete listing of the recording.

   Note

   Number of stored measurements

   The last 8000 measuring points are saved in the exported files.

Measurement results

PDF file

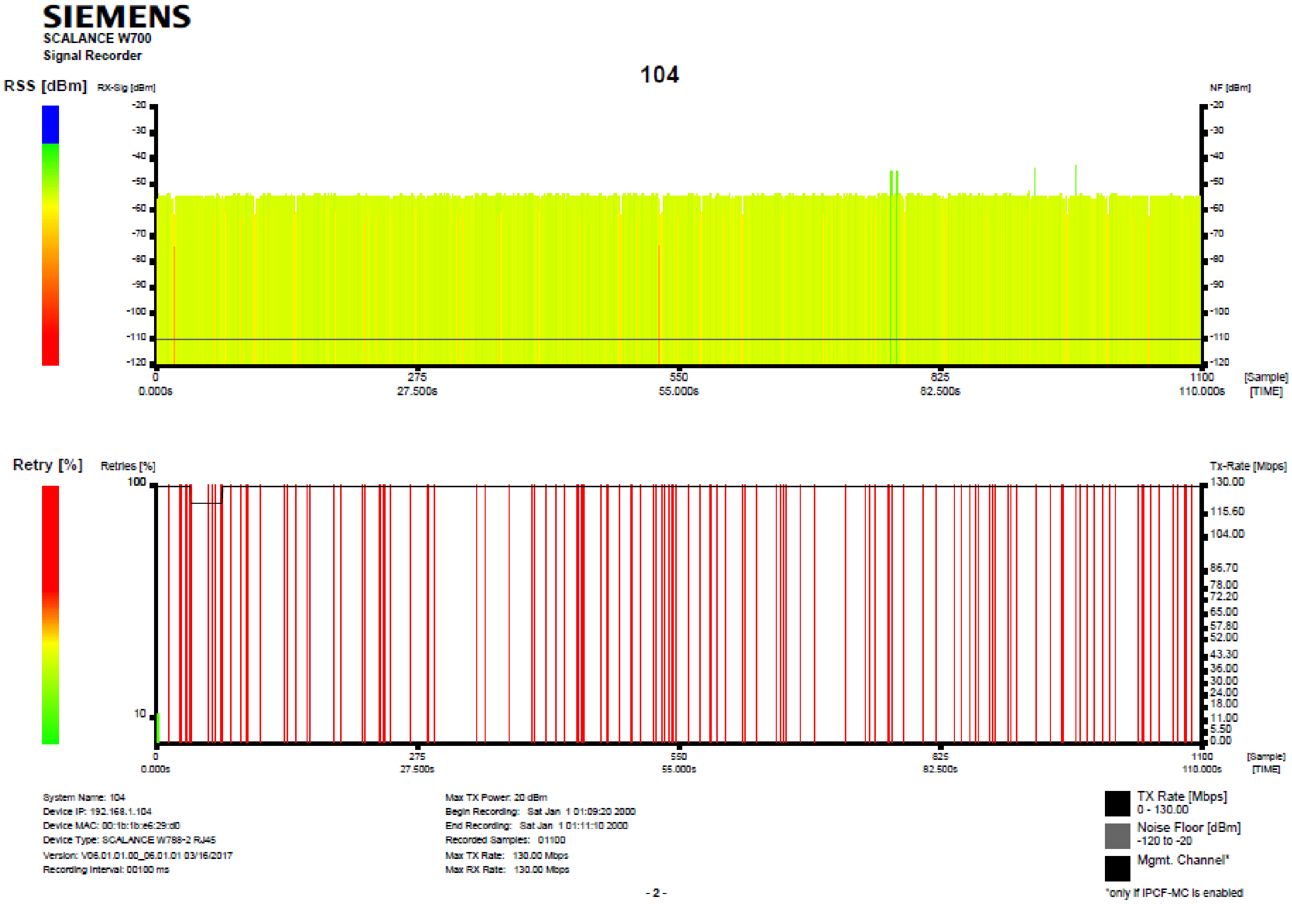
The PDF file contains a graphic representation of the course of the effective user data signal in dBm and the course of the data rate in Mbps. In terms of color, the graphic corresponds to the appearance in the Web Based Management. If the client changes the access point (roaming) during the measurement, this is indicated by vertical black bars with a black square at the tip.

The display is divided into two areas:

- Client
  Represents the measurement of the client.
- Access point
  Displays the measurement of the access point with which the client is currently connected. This requires that the setting "Bidirectional Recording" is enabled and that a firmware version > 6.1 is installed on the access point. The access point sends its data to a maximum of 3 clients on which signal recorders are running. The access point data is not displayed on other clients.

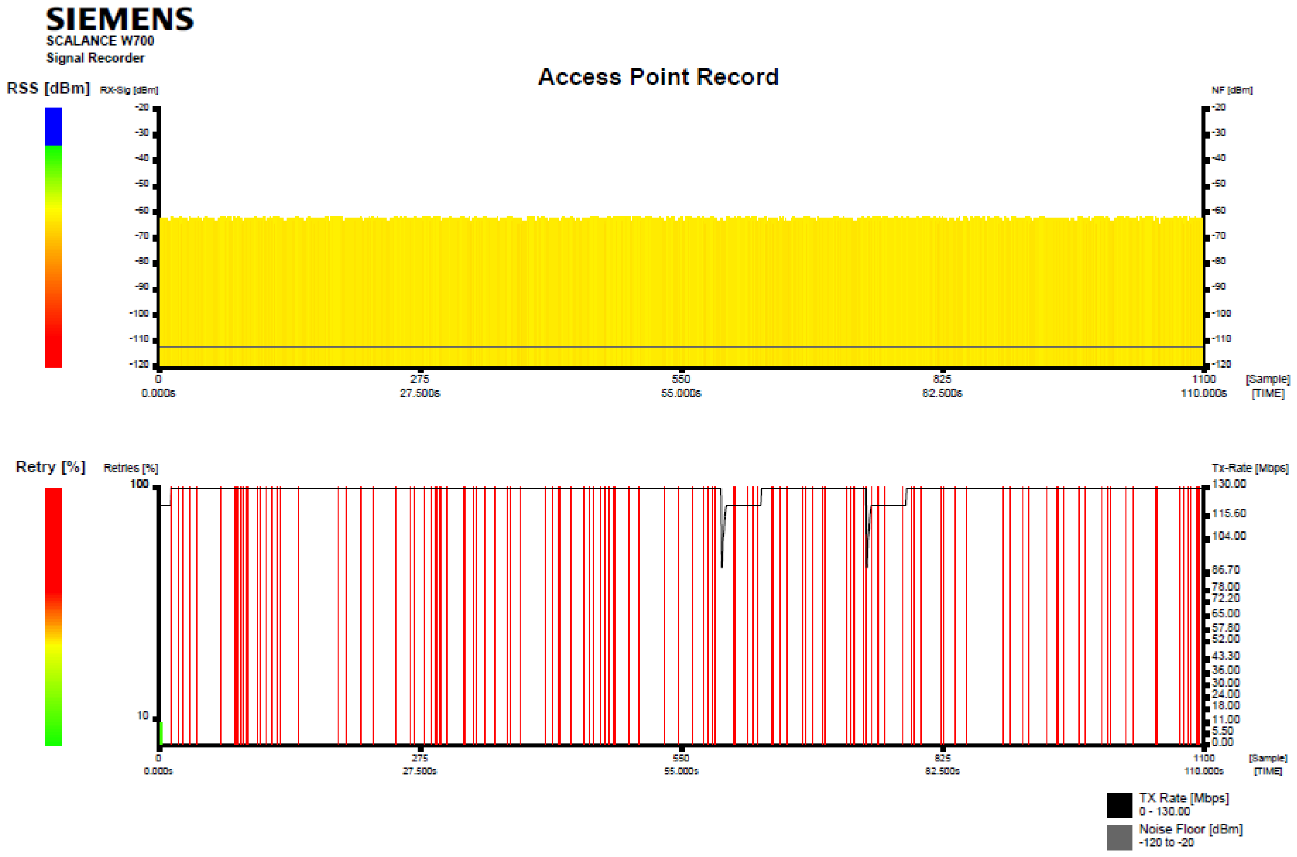
If the client has an iPCF-MC connection, the user signal of the management channel is shown with an additional black line.

Below the graphic, the configuration data of the client is displayed.



System Name: 104
Device IP: 192.168.1.104
Device MAC: 00:1b:1b:e6:29:d0
Device Type: SCALANCE W788-2 RJ45
Version: V06.01.01.00_06.01.01 03/16/2017
Recording Interval: 00100 ms

Max TX Power: 20 dBm
Begin Recording: Sat Jan 1 01:09:20 2000
End Recording: Sat Jan 1 01:11:10 2000
Recorded Samples: 01100
Max TX Rate: 130.00 Mbps
Max RX Rate: 130.00 Mbps



Example of a generated PDF file

The following pages contain the detailed information of all individual measurements in the form of a table.

The header row shows the IP address of the client and the BSSID and system name of the access point.

Per measurement the table contains two rows. The data of the client is in the first row and the data belonging to the access point in the second.

Sample	Timestamp	Sig%	dBm	NF	RSSI	Roam	Ch	Retry%	HT-40	TX-Rate	RX-Rate	Con-St	M-Sig	M-Ch	M-NF
1	01:09:20:090	76	-56	-110	39	0	161	11	-	130.00	121.50	1	---	---	---
		63	-63	-112	32			8							

Page 2 shows a legend of the abbreviations in the table. The data starts on a new page when the client changes access points.

Note

Note the description of the individual columns in the CSV file. These also apply to the columns of the PDF file.

CSV file

The CSV file contains information on the configuration of the SCALANCE W700 device and detailed information on all individual measurements and is divided into two areas. The first area contains the configured settings:

- System Name
  The system name of the client
- Device IP
  The IP address of the client
- Device MAC
  The MAC address of the client
- Recording Interval
  The interval between acquisition of two measured values
- Max TX Power
  Maximum transmit power of the device
- Begin Recording
  Start of the recording
- End Recording
  End of the recording
- Recorded Samples
  The total number of measurements
- Max. TX Rate
  The maximum data rate of the sent data packets.
- Max. RX Rate
  The maximum data rate of the received data packets.
- Rx Antenna x type
  The setting of the external antennas

The second area is a table. The table contains the following for each measured value:

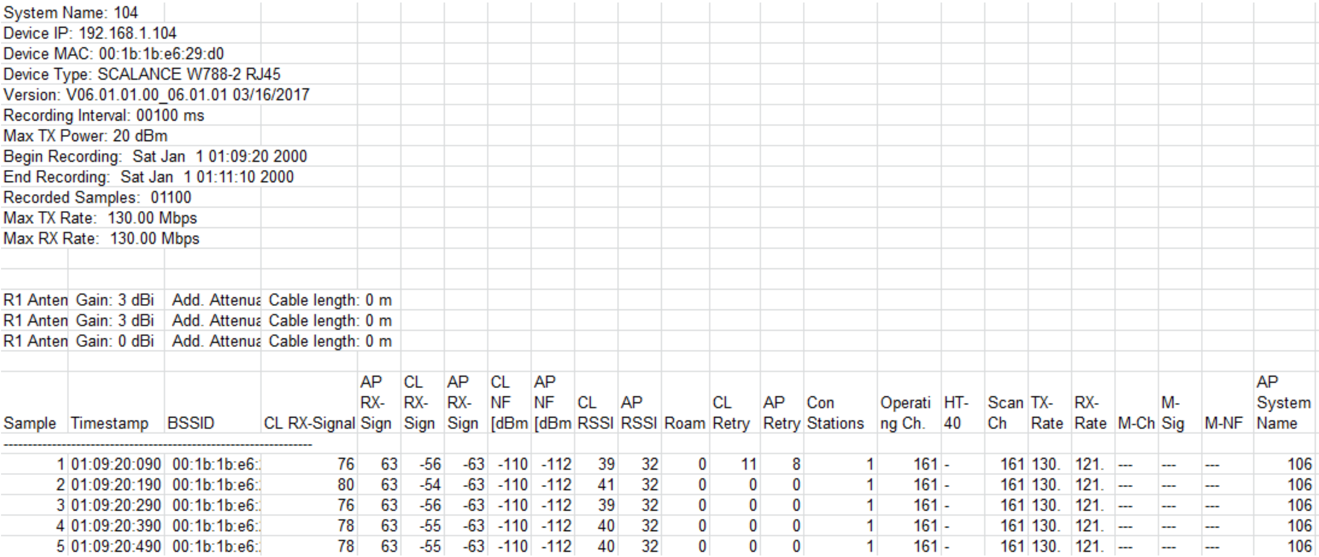
- Sample
  The current number of the measurement on the client (CL) / on the access point (AP)
- Timestamp
  The time stamp
- BSSID
  The BSSID (Basic Service Set Identification) of the access point
- CL / AP RX-Signal [%]
  The effective user data signal of the client (CL) / access point (AP) in %
- CL / AP RX-Signal [dBm]
  The effective user data signal of the client (CL) / access point (AP) in dBm
- CL / AP NF [dBm]
  The background noise in dBm
- CL / AP RSSI
  The raw value of the RSSI (Received Signal Strength Indication)

- Roam
  The roaming counter shows how often the client has changed access points during the recording. After 4 294 967 295 changes the counter is reset.
- CL / AP Retry
  The transfer repetitions of the client (CL) / access point (AP)
- Con Stations
  Number of clients connected to the access point.
- Operating Ch.
  The current channel or the channel on which the client is connected to the access point
- HT-40
  The channel bandwidth 40 MHz
- Scan CH
  The channel on which the client is currently scanning.
- TX-Rate
  The average data rate of the sent data packets
- RX-Rate
  The average data rate of the received data packets

Note

The columns that relate to the management channel only contain a value if there is an iPCF-MC connection.

- M-Ch
  The management channel
- M-Sig
  The effective user data signal of the management channel
- M-NF
  The background noise of the management channel
- AP System Name
  The system name of the access point



System Name: 104
Device IP: 192.168.1.104
Device MAC: 00:1b:1b:e6:29:d0
Device Type: SCALANCE W788-2 RJ45
Version: V06.01.01.00_06.01.01 03/16/2017
Recording Interval: 00100 ms
Max TX Power: 20 dBm
Begin Recording: Sat Jan 1 01:09:20 2000
End Recording: Sat Jan 1 01:11:10 2000
Recorded Samples: 01100
Max TX Rate: 130.00 Mbps
Max RX Rate: 130.00 Mbps

R1 Anten	Gain: 3 dBi	Add. Attenua	Cable length: 0 m
R1 Anten	Gain: 3 dBi	Add. Attenua	Cable length: 0 m
R1 Anten	Gain: 0 dBi	Add. Attenua	Cable length: 0 m

Sample	Timestamp	BSSID	CL RX-Signal	AP RX-Sign	CL RX-Sign	AP RX-Sign	CL NF [dBm	AP NF [dBm	CL RSSI	AP RSSI	Roam	CL Retry	AP Retry	Con Stations	Operating Ch.	HT-40	Scan Ch	TX-Rate	RX-Rate	M-Ch	M-Sig	M-NF	AP System Name
--																							
1	01:09:20:090	00:1b:1b:e6:	76	63	-56	-63	-110	-112	39	32	0	11	8	1	161	-	161	130.	121.	---	---	---	106
2	01:09:20:190	00:1b:1b:e6:	80	63	-54	-63	-110	-112	41	32	0	0	0	1	161	-	161	130.	121.	---	---	---	106
3	01:09:20:290	00:1b:1b:e6:	76	63	-56	-63	-110	-112	39	32	0	0	0	1	161	-	161	130.	121.	---	---	---	106
4	01:09:20:390	00:1b:1b:e6:	78	63	-55	-63	-110	-112	40	32	0	0	0	1	161	-	161	130.	121.	---	---	---	106
5	01:09:20:490	00:1b:1b:e6:	78	63	-55	-63	-110	-112	40	32	0	0	0	1	161	-	161	130.	121.	---	---	---	106

Example of a generated CSV file

6.6.2.13 Spectrum analyzer

Technical information

The frequency range depends on the configuration.

Parameters		Value
Amplitude accuracy	In 2.4 GHz	3 dBm
	In 5 GHz	7 dBm
Resolution bandwidth		330 KHz
Min. signal strength		-100 dBm
Max. signal strength		0 dBm
Analysis time	At 40 MHz	120 ms
	At 20 MHz	95 ms
Update time		1 s.

Representing signals of the frequency range

With the spectrum analyzer you can recognize and represent the electromagnetic signals of a frequency range. You can measure the strength of all signals located in the environment of the access point.

Note

This WBM page is only available in access point mode.

The WLAN interface of the device must be enabled, otherwise the frequency ranges cannot be scanned.

Note

We recommend that you do not use the spectrum analyzer in the change mode "Manual Commit".

Note

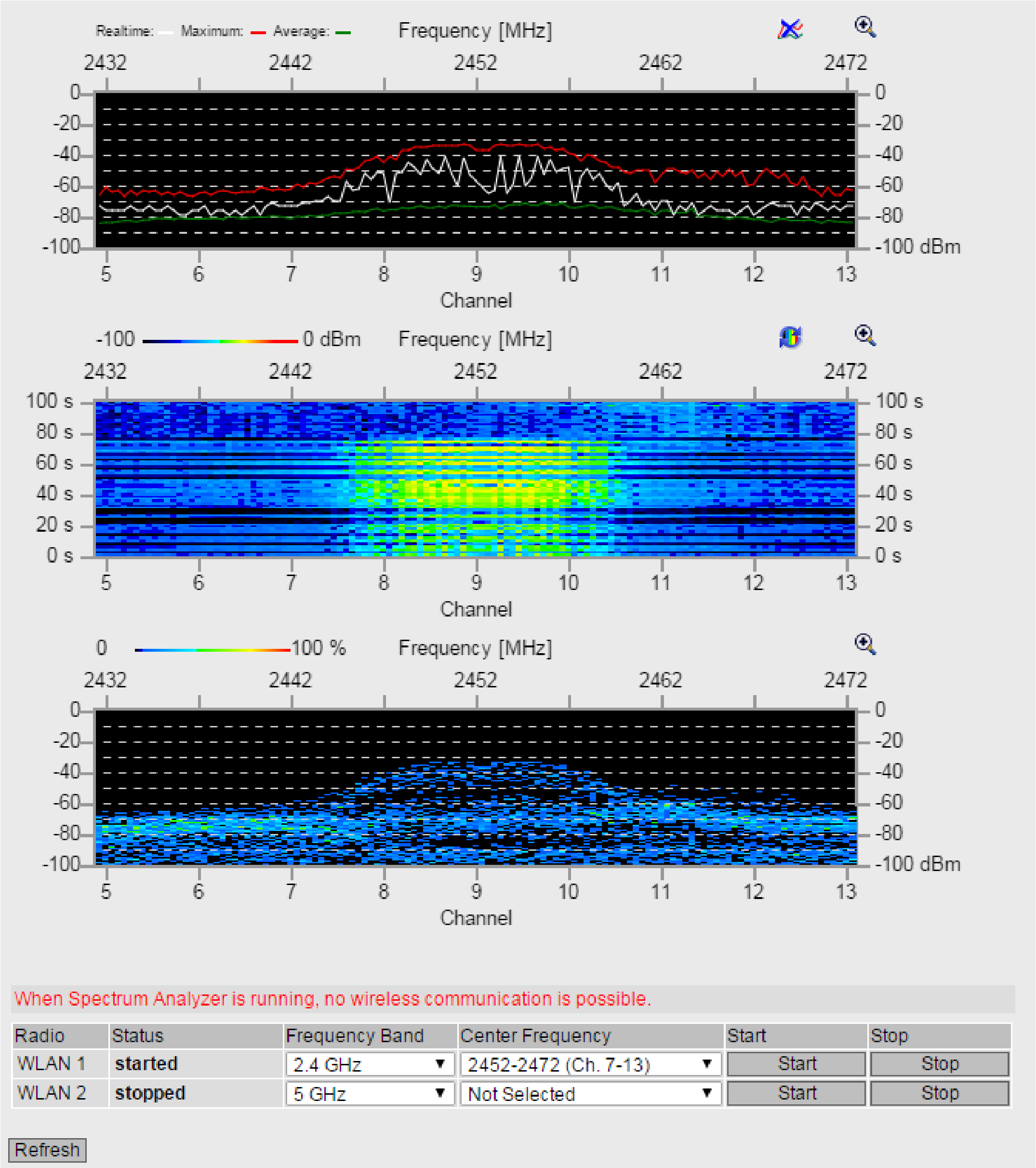
When the spectrum analyzer is started, all WLAN connections are terminated on both WLAN interfaces. The access point then also does not send any beacons.

Note

Do not enable the spectrum analyzer if the device is operating productively. This can influence the performance of the device.

Note

The functionality of the spectrum analyzer does not replace a dedicated spectrum analyzer.



When Spectrum Analyzer is running, no wireless communication is possible.

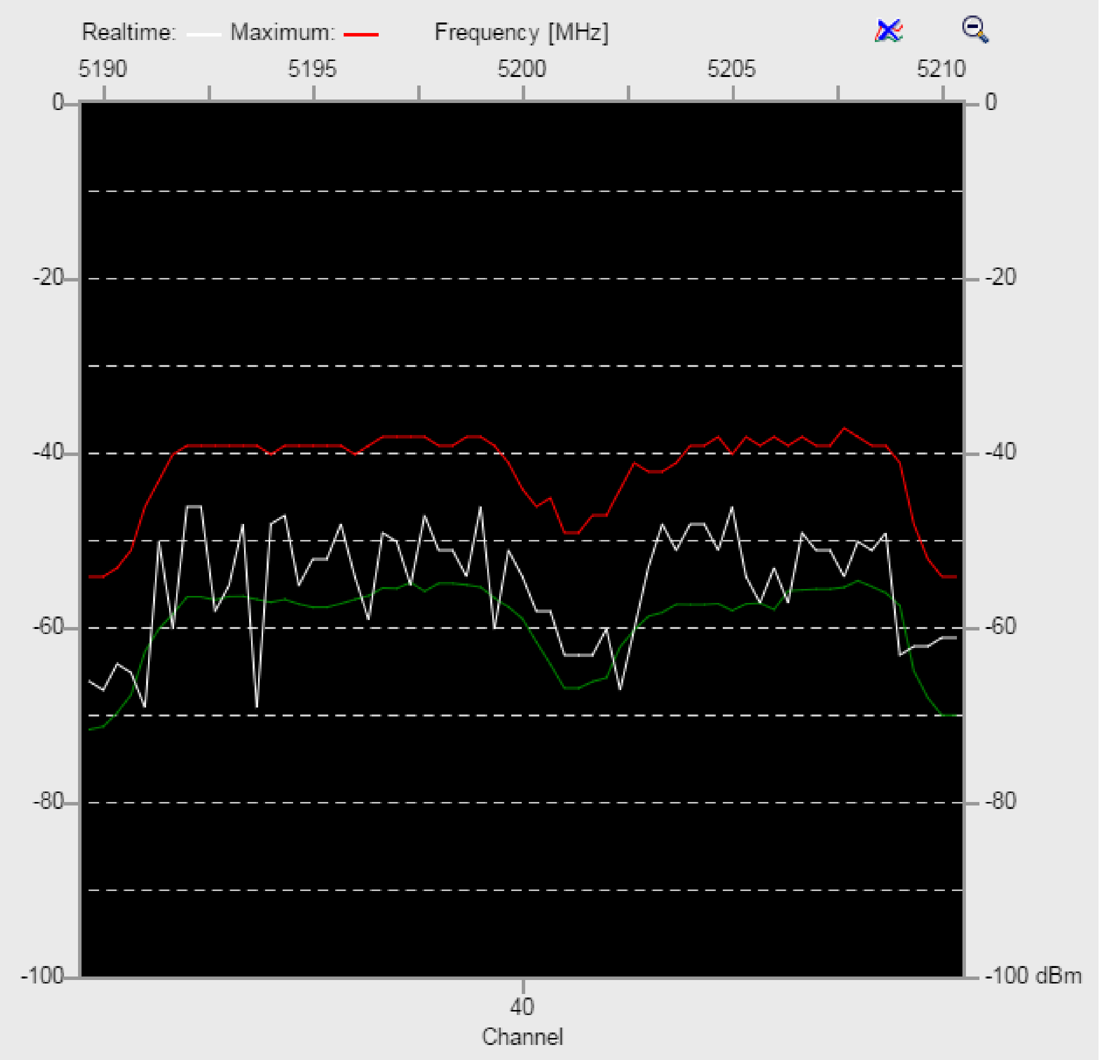
Radio	Status	Frequency Band	Center Frequency	Start	Stop
WLAN 1	**started**	2.4 GHz ▼	2452-2472 (Ch. 7-13) ▼	Start	Stop
WLAN 2	**stopped**	5 GHz ▼	Not Selected ▼	Start	Stop

Description

The page contains the following graphics:

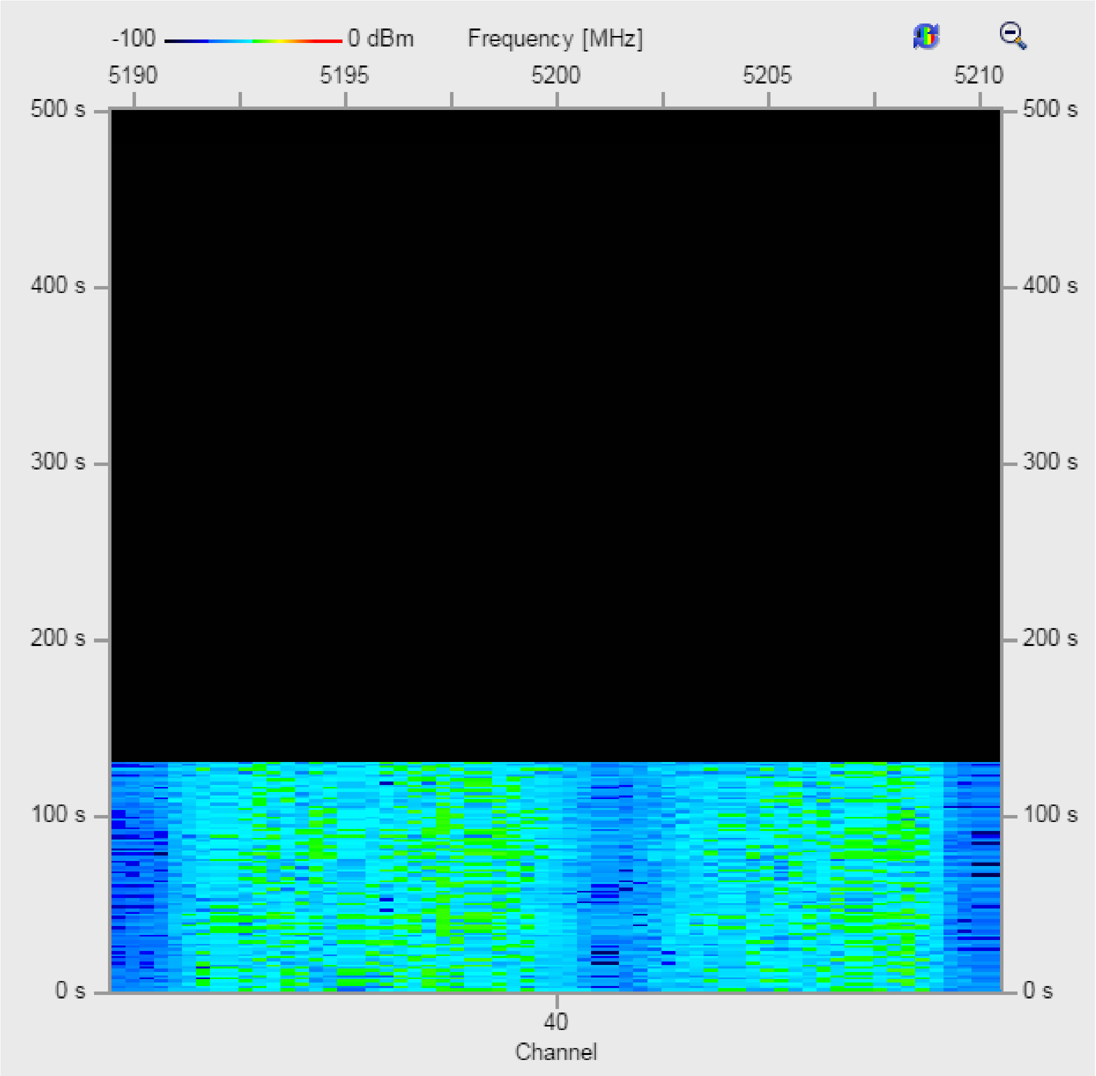
In all graphics, the lower x axis shows the channels around the selected center frequency for which the measurements are made. The upper x axis shows the frequency range. The display of the y axis depends on the selected graphic.

- Realtime



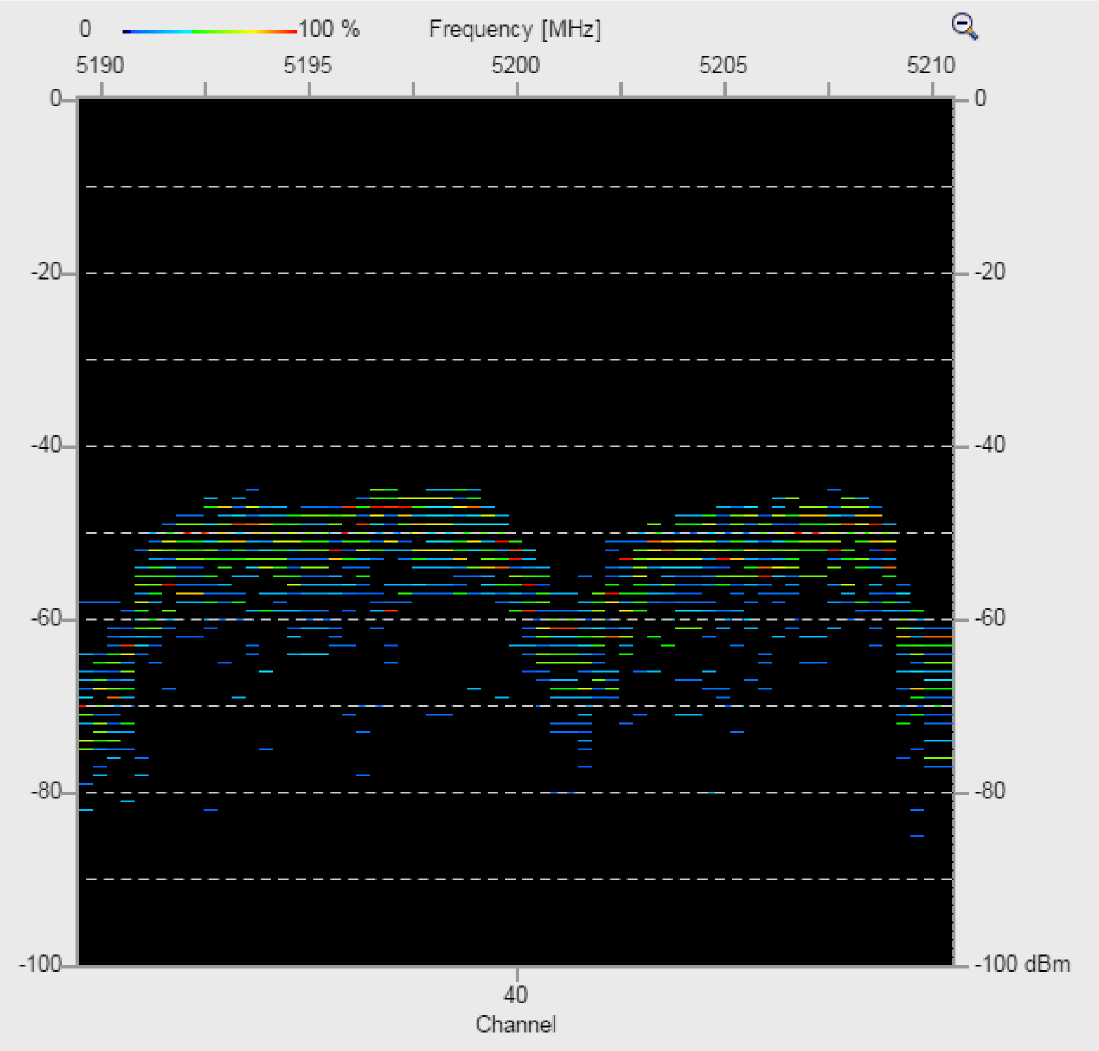
The y axis shows the signal strength in dBm.
The graphic shows the strength of all signals that the access point receives in its environment in the configured frequency range.
The red line shows the maximum values since the start of the measurement. The white line shows the current values. The green line shows the average values.

- Spectrogram



The y axis shows the course of the measured values over time from current (0 s) to the values received before 500 s.
The graphic shows the strength of all signals that the access point receives in its environment in the configured frequency range.
The color depends on the setting for "Color Scheme".

- Density Chart



The y axis shows the signal strength in dBm.
The graphic shows how often signals occur with a certain strength in the configured frequency range.
The color goes from the lowest value (0%) in black to the highest value (100%) in red.

The page contains the following buttons:

- Zoom in 🔍
  With this icon you only show one graphic type in large format on the page.
- Zoom out 🔍
  With this icon you return to the view with all three graphic types.

- Color Scheme
  With this icon, you change the color scheme for the graphic type "Spectrogram":
  - The color goes from the lowest value (-100 dBm) in black to the highest value (0 dBm) in red.
  - The color goes from the lowest value (-100 dBm) in red to the highest value (0 dBm) in black.
- Reset
  With this icon you reset the maximum and average values of the graphic type "Realtime".

This table contains the following columns:

- **Radio**
  Shows the WLAN interface to which the information applies.
- **State**
  Shows the status of the measurement. The following values are possible:
  - Stopped
    The measurement was stopped.
  - Started
    The measurement is running.
- **Frequency Band**
  Specify the frequency band.
- **Center Frequency**
  Select the center frequency.
- **Start**
  Click the button in this column to start the measurement.
- **Stop**
  Click the button in this column to end the measurement.

Procedure

1. Select the required frequency band from the "Frequency Band" drop-down list.
2. Select the required center frequency from the "Center Frequency" drop-down list.
3. Click the "Start" button.
4. To stop the measurement, click the "Stop" button.
5. You can adapt the settings in the second table during the measurement.

6. Change to one of the following menu items to call up the result of the measurement:
   - System > Load&Save > HTTP
     Click the "Save" button in the "WLANSpectrumAnalyzer" table row to save the file "wlan_spectrum_analyzer_SCALANCE_W700.zip" in the file system of the connected PC.
   - System > Load&Save > TFTP
     If necessary, change the file name "wlan_spectrum_analyzer_SCALANCE_W700.zip" in the "WLANSpectrumAnalyzer" table row. In the table row "WLANSpectrumAnalyzer", select the "Save file" entry from the drop-down list of the last column and click the "Save Values" button.
7. The ZIP file contains a CSV file with the results of the measurement.

Measurement results

CSV file

The CSV file contains information on the configuration of the device and detailed information on all individual measurements and is divided into two areas. The first area contains the configured settings:

- System Name
  The system name of the access point
- Device IP
  The IP address of the device
- Device MAC
  The MAC address of the device
- Recording Interval
  The interval between acquisition of two measured values

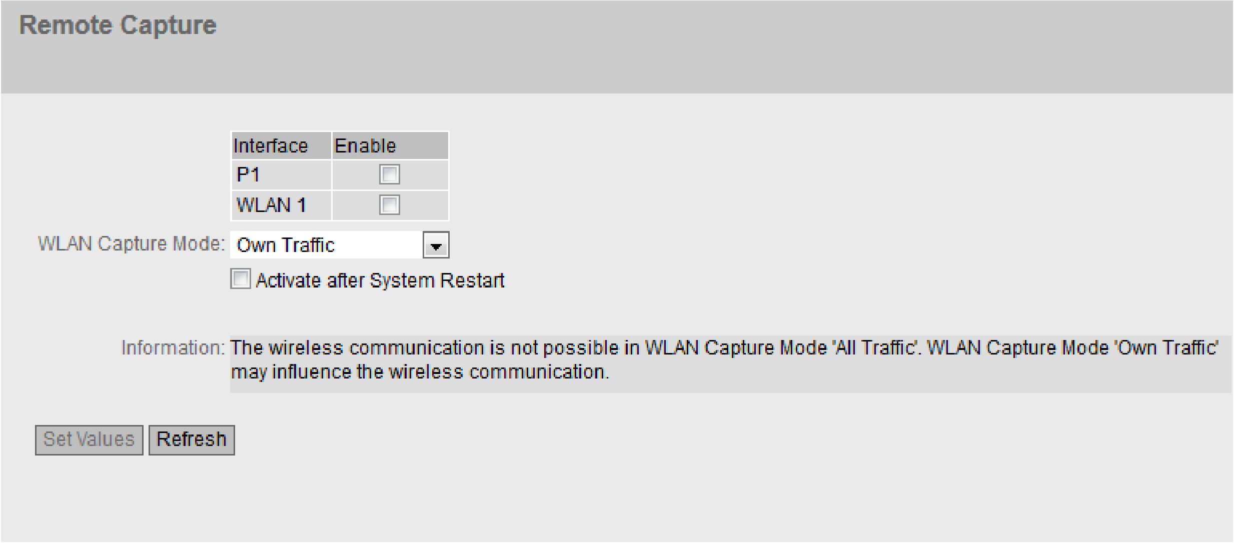
The second area is a table. The table contains the following for each measured value:

- Sample
  The consecutive number of the measurement
- Timestamp
  The time stamp
- The following columns show all frequencies of the selected frequency band. The cells are only filled for the frequencies for which a value was measured. The measured values show the signal strength in dBm.

6.6.3 Remote Capture

On this WBM page activate the function "Remote Capture" on the interface (Ethernet, WLAN). The function is for network diagnostics via a connected PC, e.g. to detect transfer errors.

You can also enable the function on several interfaces at the same time. When the function is enabled the interface can be linked in Wireshark. For a period Wireshark record the data traffic over the interface. Afterwards from the recording you can see the content of the frames or filter according to certain contents.



Remote Capture

Interface	Enable
P1	□
WLAN 1	□

WLAN Capture Mode: Own Traffic

□ Activate after System Restart

Information: The wireless communication is not possible in WLAN Capture Mode 'All Traffic'. WLAN Capture Mode 'Own Traffic' may influence the wireless communication.

Description

The table contains the following columns:

- **Interface**
  The interface to which the entry relates.
- **Enable**
  Enable or disable the "Remote Capture" function. As default, the function is disabled.

Note

Performance

Enable the function only for diagnostics purposes. The increased data traffic could influence the performance of the device.

The page contains the following boxes:

- **WLAN Capture Mode (only in access point mode)**
  Specify the recording mode for the WLAN interface:
  - Own Traffic
    In this case, the frames are recorded that were received and sent by the device. Exception: The data packets dealt with directly by the hardware are not displayed, for example hardware repetitions, acknowledgment frames.
  - All Traffic
    The access point sends no more frames but records all incoming data packets.

  Note

  No WLAN communication between access point and clients

  If the setting "All Traffic" is used, the access point is no longer reachable for other nodes and loses the connected clients.

- **Activate after System Restart**
  - Disabled
    After a restart the configuration is rest to the default settings.
  - Enabled
    The configuration is saved and retained after a restart.

Linking in the interface in Wireshark

Requirement:

- Wireshark V2.0.0 is installed on the PC.
- The PC and device must be reachable via IP (layer 3).

Procedure

To analyze the data traffic e.g. of the WLAN interface 1 in Wireshark, follow the steps below:

1. Activate the function "Remote Capture" on the device on the WLAN interface.
2. As the receive mode, select "Own Traffic".
3. Click "Set Values" to enable the function.
4. Start Wireshark.
5. Click "Options" in the "Capture" menu. The window "Wireshark - Capture Interfaces" opens.
6. Click the "Manage Interfaces..." button on the "Input" tab. In the following dialog, click on the "Remote Interfaces" tab.
7. To add the interface click on the Plus character in the "Remote Interfaces" tab.
8. In the following dialog for "Host" enter the IPv4 address of the device and for "Port" 2002.
9. Enable "Null authentication" for "Authentication" and click the "OK" button.
10. On the "Remote Interfaces" tab, the host and the interfaces on which the function "Remote Capture" was previously enabled are displayed.

11. Select the interface and click the "OK" button.
12. To start the recording click "Start". You can obtain additional information about handling the program from Wireshark.

If you analyze several interfaces you can use a Wireshark instance for each interface.

6.7 "Layer 2" menu

6.7.1 VLAN

6.7.1.1 General

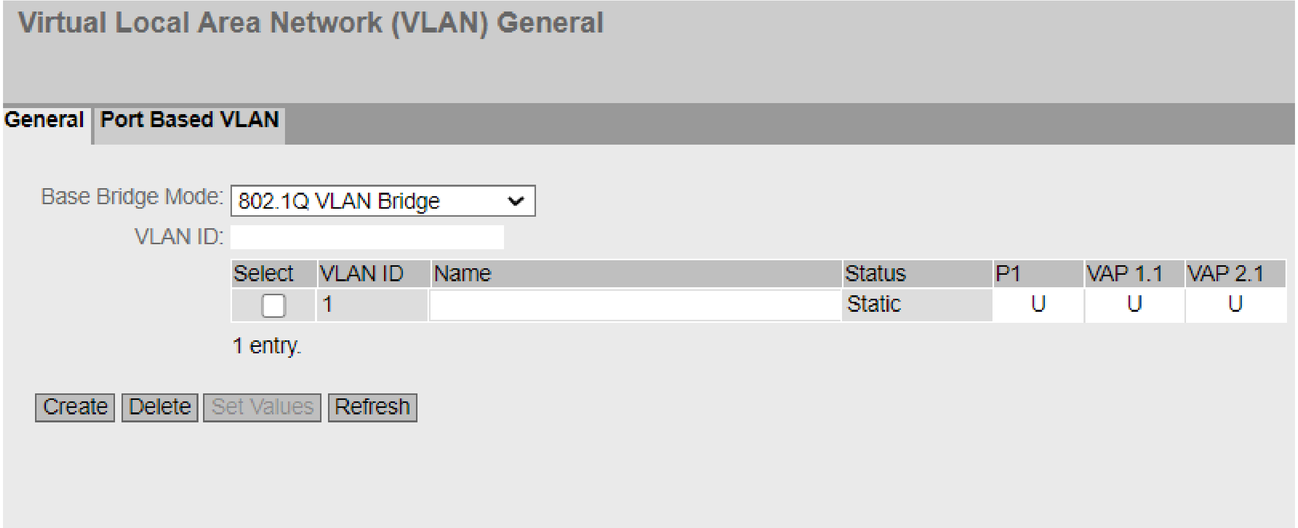
VLAN configuration page

On this page you specify whether or not the device forwards frames with VLAN tags transparently (IEEE 802.1D/VLAN-unaware mode) or takes VLAN information into account (IEEE 802.1Q/VLAN-aware mode). If the device is in the "802.1Q VLAN Bridge" mode, you can define VLANs and specify the use of the ports.

Note

Changing the agent VLAN ID

If the configuration PC is connected directly to the device via Ethernet and you change the agent VLAN ID, the device is no longer reachable via Ethernet following the change.


Virtual Local Area Network (VLAN) General

Base Bridge Mode: 802.1Q VLAN Bridge
VLAN ID:

Select	VLAN ID	Name	Status	P1	VAP 1.1	VAP 2.1
□	1		Static	U	U	U

1 entry.

Description

The page contains the following boxes:

- **Base Bridge mode**
  Select the required mode from the drop-down list. The following modes are possible:

  Note

  Changing Base bridge mode

  Note the section "Changing Base bridge mode". This section describes how a change affects the existing configuration.

  – 802.1Q VLAN Bridge
    Sets the mode "VLAN-aware" for the device. In this mode, VLAN information is taken into account. In this mode, you can create additional VLANs.

  – 802.1D Transparent Bridge
    Sets the mode "VLAN-unaware" for the device. In this mode, VLAN tags are not changed but are forwarded transparently. The VLAN priority is evaluated for CoS. In this mode, you cannot create any VLANs. Only a management VLAN is available: VLAN 1.

- **VLAN ID**
  Enter the VLAN ID in the "VLAN ID" input box.
  Range of values: 1 ... 4094

The table has the following columns:

- **Select**
  Select the check box in the row to be deleted.

- **VLAN ID**
  Shows the VLAN ID. The VLAN ID (a number between 1 and 4094) can only be assigned once when creating a new data record and can then no longer be changed. To make a change, the entire data record must be deleted and created again. Up to 8 VLANs can be defined.

- **Name**
  Enter a name for the VLAN. The name only provides information and has no effect on the configuration. The length is a maximum of 32 characters.

- **Status**
  Shows the status type of the entry in the port filter table. Here, static means that the address was entered as a static address by the user.
- **List of ports**
  Specify the use of the port. The following options are available:
  - "-"
    The port is not a member of the specified VLAN.
    With a new definition, all ports have the identifier "-".
  - M
    The port is a member of the VLAN. Frames sent in this VLAN are forwarded with the corresponding VLAN tag.
  - U (uppercase)
    The port is an untagged member of the VLAN. Frames sent in this VLAN are forwarded without the VLAN tag. Frames without a VLAN tag are sent from this port.
  - u (lowercase)
    The port is an untagged member of the VLAN, but the VLAN is not configured as a port VLAN. Frames sent in this VLAN are forwarded without the VLAN tag.
  - F
    The port is not a member of the specified VLAN. You can configure other settings in "Layer 2 > VLAN > Port Based VLAN".
  - T
    This option is only displayed and cannot be selected in the WBM.
    This port is a trunk port, making it a member in all VLANs.
    You configure this function in the CLI (Command Line Interface) using the "`switchport mode trunk`" command.

Changing Base bridge mode

VLAN-unaware (802.1D transparent bridge) → VLAN-aware (802.1Q VLAN bridge)

If you change the Base Bridge mode from VLAN-unaware to VLAN aware, this has the following effects:

- All static and dynamic unicast entries are deleted.

VLAN-aware (802.1Q VLAN bridge) → VLAN-unaware (802.1D transparent bridge)

If you change the Base Bridge mode from VLAN-aware to VLAN-unaware, this has the following effects:

- All VLAN configurations are deleted.
- A management VLAN is created: VLAN 1.
- All static and dynamic unicast entries are deleted.

802.1Q VLAN Bridge: Important rules for VLANs

Make sure you keep to the following rules when configuring and operating your VLANs:

- Frames with the VLAN ID "0" are handled as untagged frames but retain their priority value.
- As default, all ports on the device send frames without a VLAN tag to ensure that the end node can receive these frames.
- With SCALANCE W devices, the VLAN ID "1" is the default on all ports.
- If an end node is connected to a port, outgoing frames should be sent without a tag (static access port). If, however, there is a further switch at this port, the frame should have a tag added (trunk port).
- With a trunk port, the VLAN assignment is dynamic. Static configurations can only be created if, in addition to the trunk port property, the port is also entered statically as a member in the VLANs involved. An example of a static configuration is the assignment of multicast groups in certain VLANs.

Procedure

Requirement:

In Base Bridge mode "802.1Q VLAN Bridge" is set.

Creating a new VLAN

1. Enter an ID in the "VLAN ID" input box.
2. Click the "Create" button. A new entry is generated in the table. As default, the boxes have "-" entered.
3. Enter a name for the VLAN under Name.
4. Specify the use of the port in the VLAN. If, for example you select M, the port is a member of the VLAN. The frame sent in this VLAN is forwarded with the corresponding VLAN tag.
5. Specify the mode of the device.
6. Click the "Set Values" button.

6.7.1.2 Port-based VLAN

Processing received frames

On this page, you specify the configuration of the port properties for receiving frames.

Requirement:

- On the "General" page, "802.1Q VLAN Bridge" is set for "Base Bridge Mode".

Description

Table 1 has the following columns:

Note

Table 1 is only available if at least one VLAN is configured.

- **Port**
  Shows that the settings are valid for all ports of table 2.
- **Priority / Port VID / Acceptable Frames / Ingress Filtering**
  In the drop-down list, select the setting for all ports. If "No Change" is selected, the entries of the corresponding column in table 2 remain unchanged.
- **Copy to Table**
  If you click the button, the setting is adopted for all ports of table 2.

Table 2 has the following columns:

- **Port**
  Shows the available ports and interfaces.
- **Priority**
  From the drop-down list, select the priority given to untagged frames.
  The CoS priority (Class of Service) used in the VLAN tag. If a frame is received without a tag, it will be assigned this priority. This priority specifies how the frame is further processed compared with other frames.
  There are a total of eight priorities with values 0 to 7, where 7 represents the highest priority (IEEE 802.1p Port Priority).
- **Port VID**
  Select the VLAN ID from the drop-down list. Only VLAN IDs defined on the "VLAN > General" page can be selected.
  If a received frame does not have a VLAN tag, it has a tag with the VLAN ID specified here added to it and is sent according to the rules at the port.

- **Acceptable Frames**
  Specify which types of frames will be accepted. The following alternatives are possible:
  - Tagged Frames Only
    The device discards all untagged frames. Otherwise, the forwarding rules apply according to the configuration. Frames tagged with "0" are treated like untagged frames. The device forwards all tagged frames. Otherwise, the forwarding rules apply according to the configuration.
  - All
    The device forwards all frames.
  - Untagged and Priority Tagged Only
    The device discards all tagged frames. The device forwards all untagged frames as well as frames with VLAN = 0 and a priority (Priority Tagged Frames). Otherwise, the forwarding rules apply according to the configuration.
- **Ingress Filtering**
  Specify whether the VID of received frames is evaluated.
  You have the following options:
  - Enabled
    The VLAN ID of received frames decides whether they are forwarded: To forward a VLAN tagged frame, the receiving port must be a member in the same VLAN. Frames from unknown VLANs are discarded at the receiving port.
  - Disabled
    All frames are forwarded.

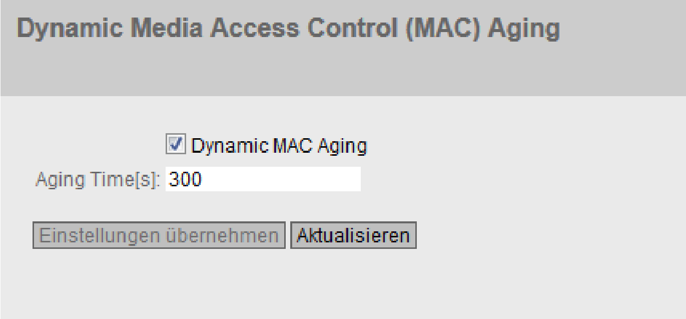
Procedure

1. In the row of the port to be configured, click on the relevant cell in the table to configure it.
2. Enter the values to be set in the input boxes as follows.
3. Select the values to be set from the drop-down lists.
4. Click the "Set Values" button.

6.7.2 Dynamic MAC Aging

Protocol settings and switch functionality

The device automatically learns the source addresses of the connected nodes. This information is used to forward frames to the nodes specifically involved. This reduces the network load for the other nodes.
If a device does not receive a frame whose source address matches a learnt address within a certain time, it deletes the learnt address. This mechanism is known as "Aging". Aging prevents frames being forwarded incorrectly, for example when an end device (for example a programming device) is connected to a different port.
If the check box is not enabled, a device does not delete learnt addresses automatically.



Dynamic Media Access Control (MAC) Aging

☑ Dynamic MAC Aging

Aging Time[s]: 300

Description

The page contains the following boxes:

- **Dynamic MAC Aging**
  Enable or disable the function for automatic aging of learned MAC addresses:
- **Aging Time [s]**
  Enter the time in seconds. After this time, a learned address is deleted if the device does not receive any further frames from this sender address. The range of values is from 10 seconds to 630 seconds

Procedure

1. Select the "Dynamic MAC Aging" check box.
2. Enter the time in seconds in the "Aging Time [s]" input box.
3. Click the "Set Values" button.

6.7.3 Spanning Tree

6.7.3.1 General

General settings of spanning tree

This is the basic page for spanning tree. Select the compatibility mode from the drop-down list. As default, Multiple Spanning Tree is enabled.

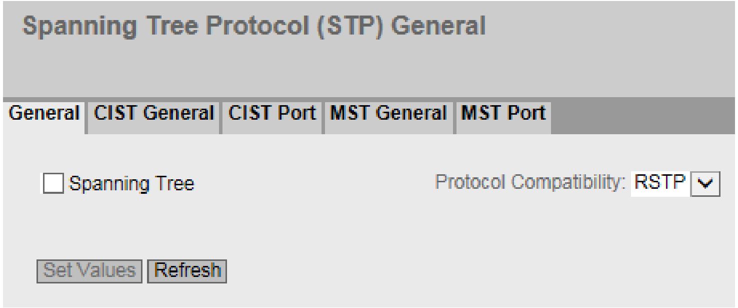
On the configuration pages of these functions, you can make detailed settings.

Depending on the compatibility mode, you can configure the corresponding function on the relevant configuration page.

Note

Client device not as root

Using the configuration of priorities and path costs, make sure that a client device can never become the root node. If a client device becomes the root node the Rapid Spanning Tree function no longer works.



Spanning Tree Protocol (STP) General

□ Spanning Tree

Protocol Compatibility: RSTP

Description

The page contains the following boxes:

- **Spanning Tree**
  Enable or disable Spanning Tree.
- **Protocol Compatibility**
  Select the compatibility mode of Spanning Tree. For example if you select RSTP, Spanning Tree behaves like RSTP.
  The following settings are available:
  - STP
  - RSTP
  - MSTP

Note

If iPCF mode is enabled, only the compatibility modes STP and RSTP are supported.

Procedure

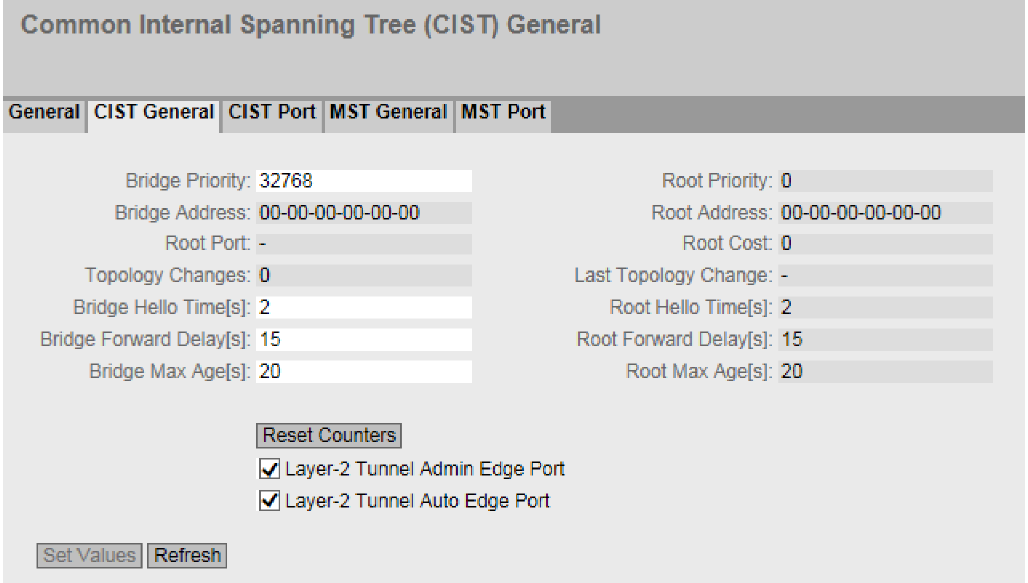
1. Select the "Spanning Tree" check box.
2. Select the compatibility mode from the "Protocol Compatibility" drop-down list.
3. Click the "Set Values" button.

6.7.3.2 CIST General

MSTP-CIST configuration

The page consists of the following parts.

- The left-hand side of the page shows the configuration of the device.
- The central part shows the configuration of the root bridge that can be derived from the spanning tree frames received by a device.
- The right-hand side shows the configuration of the regional root bridge that can be derived from the MSTP frames received by a device. The displayed data is only visible if you have enabled "Spanning Tree" on the "General" page and when "Protocol Compatibility" is set to "MSTP". This also applies to the "Bridge Max Hop Count" parameter. If the device is a root bridge, the information on the left and right matches.



Bridge Priority: 32768
Bridge Address: 00-00-00-00-00-00
Root Port: -
Topology Changes: 0
Bridge Hello Time[s]: 2
Bridge Forward Delay[s]: 15
Bridge Max Age[s]: 20

Root Priority: 0
Root Address: 00-00-00-00-00-00
Root Cost: 0
Last Topology Change: -
Root Hello Time[s]: 2
Root Forward Delay[s]: 15
Root Max Age[s]: 20

☑ Layer-2 Tunnel Admin Edge Port
☑ Layer-2 Tunnel Auto Edge Port

Description

The page contains the following boxes:

- **Bridge Priority / Root Priority**
  Which device becomes the root bridge is decided based on the bridge priority. The bridge with the highest priority becomes the root bridge. The lower the value, the higher the priority. If several devices in a network have the same priority, the device whose MAC address has the lowest numeric value will become the root bridge. Both parameters, bridge priority and MAC address together form the bridge identifier. Since the root bridge manages all path changes, it should be located as centrally as possible due to the delay of the frames. The value for the bridge priority is a whole multiple of 4096 with a range of values from 0 to 61440.
- **Bridge Address / Root Address**
  The bridge address shows the MAC address of the device and the root address shows the MAC address of the root bridge.

- **Root port**
  Shows the port via which the switch communicates with the root bridge.
- **Root Cost**
  The path costs from this device to the root bridge.
- **Topology Changes / Last Topology Change**
  The entry for the device shows the number of reconfiguration actions due to the spanning tree mechanism since the last startup. For the root bridge, the time since the last reconfiguration is displayed as follows:
  - Seconds: sec unit after the number
  - Minutes: min unit after the number
  - Hour: hr unit after the number
- **Topology Changes / Last Topology Change**
  Each bridge regularly sends configuration frames (BPDUs). The interval between two such frames is the Hello time. The default for this parameter is 2 seconds.
- **Bridge Forward Delay[s] / Root Forward Delay[s]**
- New configuration data is not used immediately by a bridge but only after the period specified in the forward delay parameter. This ensures that operation is started with the new topology only after all the bridges have the required information. The default for this parameter is 15 seconds.
- **Bridge Max Age / Root Max Age**
  Bridge Max Age defines the maximum "age" of a received BPDU for it to be accepted as valid by the switch. The default for this parameter is 20.
- **Bridge Max Hop Count**
  This parameter specifies how many MSTP nodes a BPDU may pass through. If an MSTP BPDU is received and has a hop count that exceeds the value configured here, it is discarded. The default for this parameter is 20.
- **Regional root priority**
  For a description of the displayed values, see Bridge priority / Root priority
- **Regional root address**
  Shows the MAC address of the regional root bridge.
- **Regional Root Cost**
  Shows the path costs from this device to the regional root bridge.
- **Region Name**
  Enter the name of the MSTP region to which this device belongs. As default, the MAC address of the device is entered here. This value must be the same on all devices that belong to the same MSTP region.
- **Region Version**
  Enter the version number of the MSTP region in which the device is located. This value must be the same on all devices that belong to the same MSTP region.
- **Reset Counters**
  Click this button to reset the counters on this page.

- **Layer-2 Tunnel Admin Edge Port (Only available in access point mode)**
  Select this check box if there can be an end device on a layer 2 tunnel port. Otherwise a reconfiguration of the network will be triggered whenever a link to this port is modified. The L2T clients should be interconnected.
- **Layer-2 Tunnel Auto Edge Port (Only available in access point mode)**
  Select this check box if you want to detect automatically whether or not an end device is connected at all layer 2 tunnel ports.

Procedure

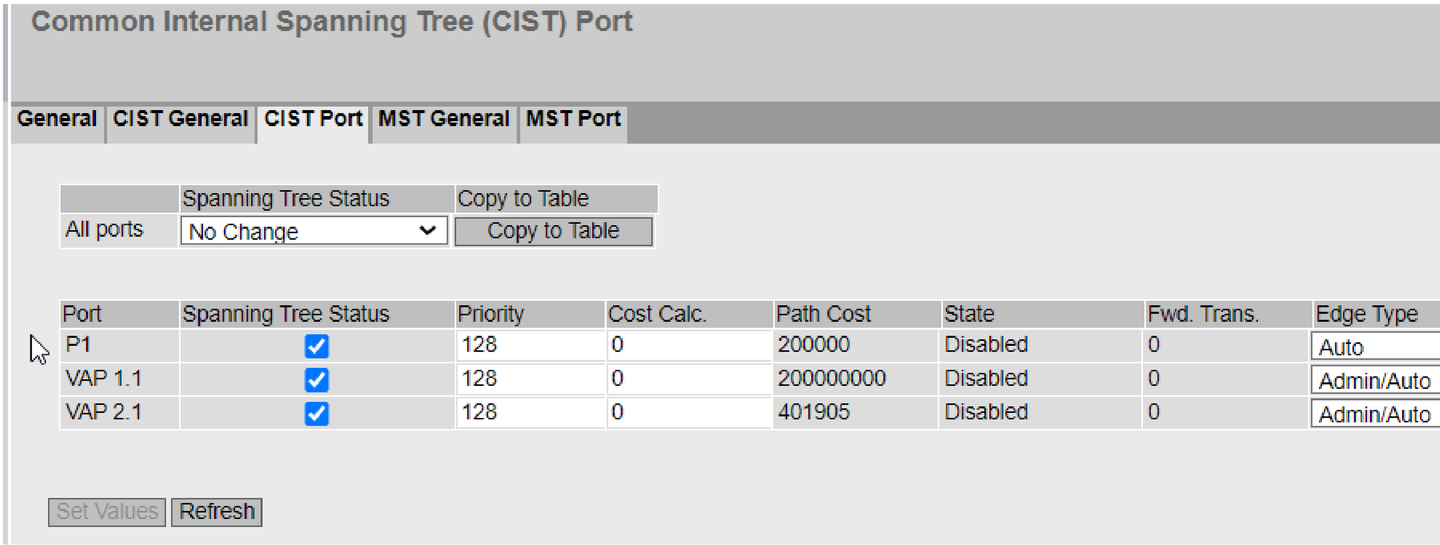
1. Enter the data required for the configuration in the input boxes.
2. Click the "Set Values" button.

6.7.3.3 CIST Port

MSTP-CIST port configuration

When the page is called, the table displays the current status of the configuration of the port parameters.

To configure them, click the relevant cells in the port table.



Common Internal Spanning Tree (CIST) Port

	Spanning Tree Status	Copy to Table
All ports	No Change	Copy to Table

Port	Spanning Tree Status	Priority	Cost Calc.	Path Cost	State	Fwd. Trans.	Edge Type
P1	☑	128	0	200000	Disabled	0	Auto
VAP 1.1	☑	128	0	200000000	Disabled	0	Admin/Auto
VAP 2.1	☑	128	0	401905	Disabled	0	Admin/Auto

Description

Table 1 has the following columns:

- **Column 1**
  Shows that the settings are valid for all ports of table 2.
- **Spanning Tree Status**
  In the drop-down list, select the setting for all ports. If "No Change" is selected, the entries of the corresponding column in table 2 remain unchanged.
- **Copy to table**
  If you click the button, the settings are adopted for all ports of table 2.

Table 2 has the following columns:

- **Port**
  Shows the available ports and interfaces.
- **Spanning Tree Status**
  Specify whether the port is integrated in the spanning tree or not.

  Note

  If you disable the "Spanning Tree Status" option for a port, this may cause the formation of loops. The topology must be kept in mind.

- **Priority**
  Enter the priority of the port. The priority is only evaluated when the path costs are the same.
  The value must be divisible by 16. If the value that cannot be divided by 16, the value is automatically adapted.
  Range of values: 0 - 240.
  The default is 128.
- **Cost Calc**
  Enter the path cost calculation. If you enter the value "0" here, the automatically calculated value is displayed in the "Path Cost" box.
- **Path Cost**
  The path costs from this port to the root bridge. The path with the lowest value is selected as the path. If several ports of a device have the same value, the port with the lowest port number will be selected.
  If the "Cost Calc." box has the value "0", the automatically calculated value is shown.
  Otherwise, the value of the "Cost Calc." box is displayed.
  The calculation of the path costs is largely based on the transmission speed. The higher the achievable transmission speed is, the lower the value of the path costs.
  Typical values for path costs with rapid spanning tree:
  - 1000 Mbps = 20,000
  - 100 Mbps = 200,000
  - 10 Mbps = 2,000,000

  The values can, however, also be set individually.

- **State**
  Displays the current state of the port. The values are only displayed and cannot be configured. The "State" parameter depends on the configured protocol. The following is possible for status:
  - Disabled

    The port only receives and is not involved in STP, MSTP and RSTP.
  - Discarding
    In the "Discarding" mode, BPDU frames are received. Other incoming or outgoing frames are discarded.
  - Listening

    In this status, BPDUs are both received and sent. The port is involved in the spanning tree algorithm.
  - Learning

    Stage prior to the forwarding status, the port is actively learning the topology (in other words, the node addresses).
  - Forwarding

    Following the reconfiguration time, the port is active in the network; it receives and forwards data frames.
- **Fwd. Trans**
  Specifies the number of changes from the "Discarding" status to the "Forwarding" status.
- **Edge Type**
  Specify the type of edge port. You have the following options:
  - "-"
    Edge port is disabled. The port is treated as a "no EdgePort".
  - Admin
    Select this option when there is always an end device on this port. Otherwise a reconfiguration of the network will be triggered each time a connection is changed.
  - Auto
    Select this option if you want a connected end device to be detected automatically at this port. When the connection is established the first time, the port is treated as a "no Edge Port".
  - Admin/Auto
    Select these options if you operate a combination of both on this port. When the connection is established the first time, the port is treated as an Edge Port.

- **Edge**
  Shows the status of the port.
  - Enabled

    An end device is connected to this port.
  - Disabled
    There is a spanning tree or rapid spanning tree device at this port.

  With an end device, a switch can change over the port faster without taking into account spanning tree frames. If a spanning tree frame is received despite this setting, the port automatically changes to the "Disabled" setting for switches.
- **P.t.P. type**
  Select the required option from the drop-down list. The selection depends on the port that is set.
  - P.t.P.

    Even with half duplex, a point-to-point link is assumed.
  - Shared Media

    Even with a full duplex connection, a point-to-point link is not assumed.

    Note

    Point-to-point link means a direct connection between two devices. A shared media connection is, for example, a connection to a hub.
  - "-"
    Point to point is determined automatically. If the port is set to half duplex, a point-to-point link is not assumed.
- **P.t.P.**
  - Enabled
    Shows that a point-to-point link exists.
  - Disabled
    Shows that no point-to-point link exists
- **Hello Time**
  Enter the interval after which the bridge sends configuration BPDUs. As default, 2 seconds is set.
  Range of values: 1-2 seconds

  Note

  The port-specific setting of the Hello time is only possible in MSTP compatible mode.

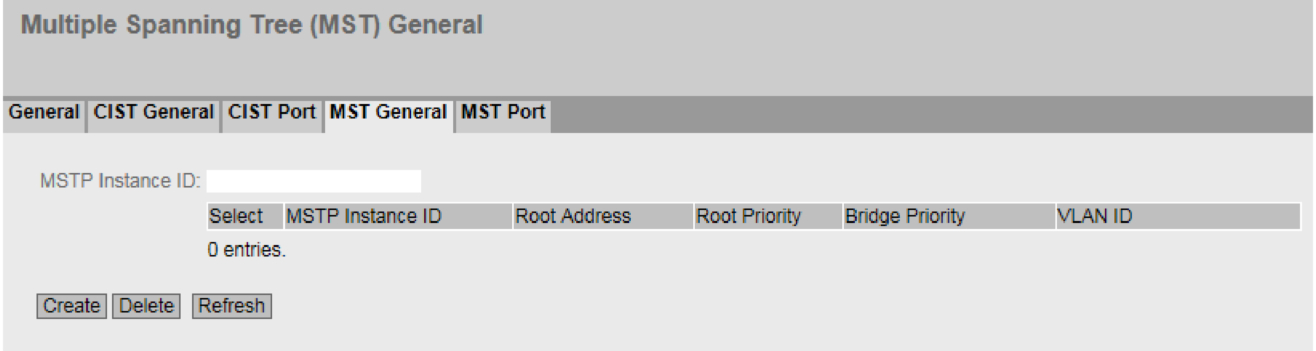
Procedure

1. In the input cells of the table row, enter the values of the port you are configuring.
2. From the drop-down lists of the cells of the table row, select the values of the port you are configuring.
3. Click the "Set Values" button.

6.7.3.4 MST General

Multiple Spanning Tree configuration

With MSTP, in addition to RSTP, several VLANs can be managed in a LAN with separate RSTP trees.



Multiple Spanning Tree (MST) General

MSTP Instance ID:

Select	MSTP Instance ID	Root Address	Root Priority	Bridge Priority	VLAN ID

0 entries.

Description

The page contains the following box:

- **MSTP Instance ID**
  Enter the number of the MSTP instance.
  Permitted values: 1 - 64
  You can define up to 16 MSTP instances.

The table has the following columns:

- **Select**
  Select the row you want to delete.
- **MSTP Instance ID**
  Shows the number of the MSTP instance.
- **Root Address**
  Shows the MAC address of the root bridge
- **Root Priority**
  Shows the priority of the root bridge.

- **Bridge Priority**
  Enter the bridge priority in this box. The value for the bridge priority is a whole multiple of 4096 with a range of values from 0 to 61440.
- **VLAN ID**
  Enter the VLAN ID. Here, you can also specify ranges with Start ID, "-", End ID. Several ranges or IDs are separated by ",".
  Permitted values: 1- 4094

Procedure

Creating a new entry

1. Enter the number of the MSTP instance in the "MSTP Instance ID" box.
2. Click the "Create" button.
3. Enter the identifier of the virtual LAN in the "VLAN ID" input box.
4. Enter the priority of the bridge in the "Bridge Priority" box.
5. Click the "Set Values" button.

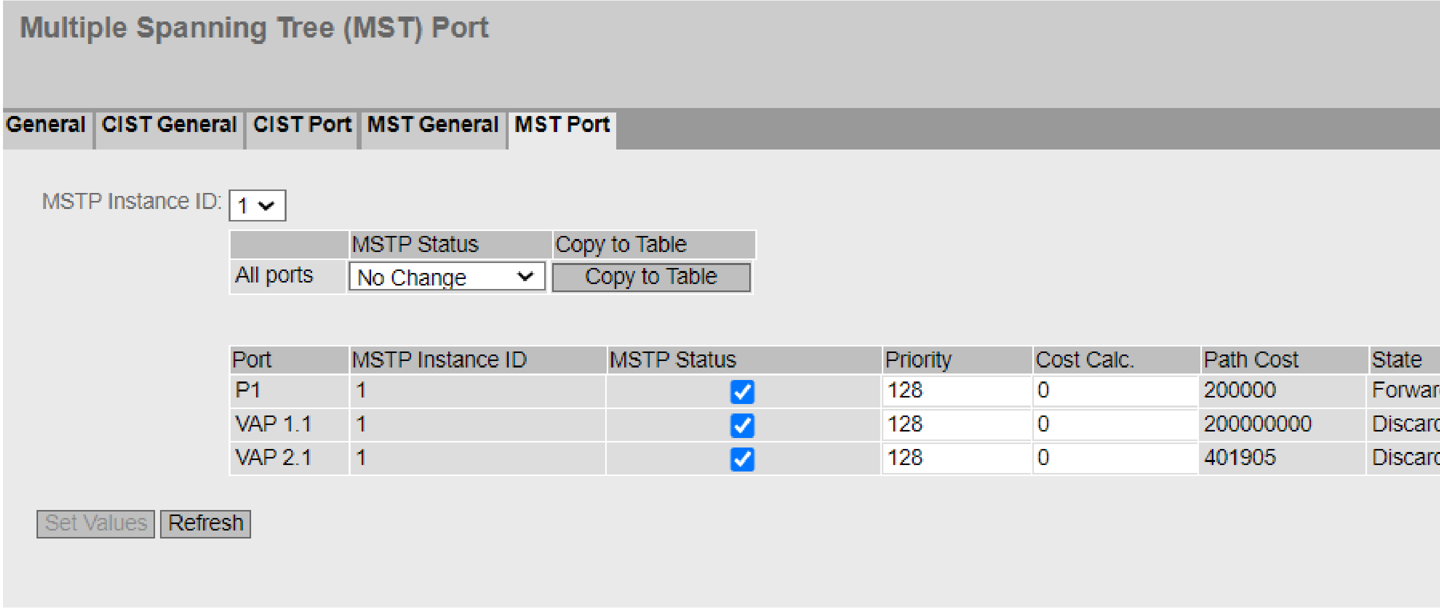
Deleting entries

1. Use the check box at the beginning of the relevant row to select the entries to be deleted.
2. Click the "Delete" button to delete the selected entries from memory. The entries are deleted from the memory of the device and the display on this page is updated.

6.7.3.5 MST Port

Configuration of the Multiple Spanning Tree port parameters

On this page, you set the parameters for the ports of the configured multiple spanning tree instances.



MSTP Instance ID: 1

	MSTP Status	Copy to Table
All ports	No Change	Copy to Table

Port	MSTP Instance ID	MSTP Status	Priority	Cost Calc.	Path Cost	State
P1	1	☑	128	0	200000	Forwar
VAP 1.1	1	☑	128	0	200000000	Discarc
VAP 2.1	1	☑	128	0	401905	Discarc

Description

The page contains the following box:

- **MSTP Instance ID**
  In the drop-down list, select the ID of the MSTP instance.

Table 1 has the following columns:

- **Column 1**
  Shows that the settings are valid for all ports of table 2.
- **MSTP Status**
  In the drop-down list, select the setting for all ports. If "No Change" is selected, the entries of the corresponding column in table 2 remain unchanged.
- **Copy to table**
- If you click the button, the setting is adopted for all ports of table 2.

Table 2 has the following columns:

- **Port**
  Shows all available ports and interfaces.
- **MSTP instance ID**
  Shows the ID of the MSTP instance.

- **MSTP Status**
  Click the check box to enable or disable this option.
- **Priority**
  Enter the priority of the port. The priority is only evaluated when the path costs are the same. The value must be divisible by 16. If the value that cannot be divided by 16, the value is automatically adapted.
  Range of values: 0 - 240.
  The default is 128.
- **Cost Calc.**
  Enter the path cost calculation in the input box. If you enter the value "0" here, the automatically calculated value is displayed in the next box "Path Costs".
- **Path Cost**
  The path costs from this port to the root bridge. The path with the lowest value is selected as the path. If several ports of a device have the same value, the port with the lowest port number will be selected.
  If the "Cost Calc." box has the value "0", the automatically calculated value is shown. Otherwise, the value of the "Cost Calc." box is displayed.
  The calculation of the path costs is largely based on the transmission speed. The higher the achievable transmission rate, the lower the value for the path costs will be.
  Typical values for rapid spanning tree are as follows:
  - 1000 Mbps = 20,000
  - 100 Mbps = 200,000
  - 10 Mbps = 2,000,000

  The values can, however, also be set individually.
- **Status**
  Displays the current status of the port. The values are only displayed and cannot be configured. The following is possible for status:
  - Discarding
    The port exchanges MSTP information but is not involved in the data traffic.
  - Blocked
    In the blocking mode, BPDU frames are received.
  - Forwarding
    The port receives and sends data frames.
- **Fwd. Trans.**
  Specifies the number of status changes Discarding - Forwarding or Forwarding - Discarding.

Procedure

1. In the input cells of the table row, enter the values of the port you are configuring.
2. From the drop-down lists of the cells of the table row, select the values of the port you are configuring.
3. Click the "Set Values" button.

6.7.4 DCP Forwarding

Applications

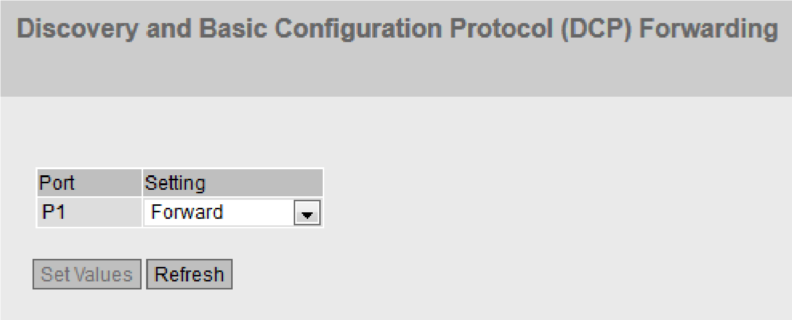
The DCP protocol is used by STEP 7 and SINEC PNI for configuration and diagnostics. When shipped, DCP is enabled on all ports; in other words, DCP frames are forwarded at all ports. With this option, you can disable the sending of frames for individual ports, for example to prevent individual parts of the network from being configured with SINEC PNI or to divide the full network into smaller parts for configuration and diagnostics.

All the ports of the device are displayed on this WBM page.

Note

Empty table

If you have enabled NAT on the device, the table is empty or will be emptied.


Discovery and Basic Configuration Protocol (DCP) Forwarding

Port	Setting
P1	Forward

Description

The table has the following columns:

- **Port**
  Shows the available Ethernet ports.
- **Setting**
  Specify whether the port should block or forward outgoing DCP frames. You have the following options available:
  - Block
    No outgoing DCP frames are forwarded via this port. It is nevertheless still possible to receive via this port.
  - Forward
    The DCP frames are forwarded via this port.

Procedure

1. Specify whether the port blocks or forwards the DCP frames.
2. Click the "Set Values" button.

6.7.5 LLDP

Identifying the network topology

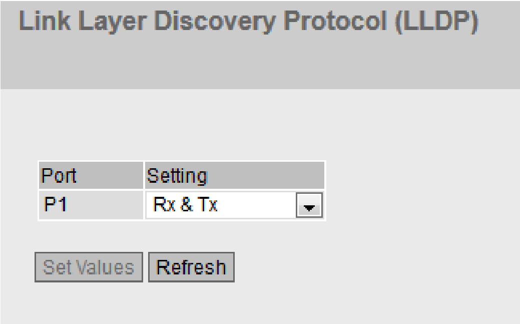
LLDP (Link Layer Discovery Protocol) is defined in the IEEE 802.AB standard.

LLDP is a method used to discover the network topology. Network components exchange information with their neighbor devices using LLDP.

Network components that support LLDP have an LLDP agent. The LLDP agent sends information about itself and receives information from connected devices at periodic intervals. The received information is stored in the MIB.

Applications

PROFINET uses LLDP for topology diagnostics. In the default setting, LLDP is enabled for all ports; in other words, LLDP frames are sent and received on all ports. With this function, you have the option of enabling or disabling sending and/or receiving per port.



Link Layer Discovery Protocol (LLDP)

Port	Setting
P1	Rx & Tx

Description

The table has the following columns:

- **Port**
  Shows the port.
- **Setting**
  Specify the LLDP functionality. The following options are available:
  – Tx
    This port can only send LLDP frames.
  – Rx
    This port can only receive LLDP frames.
  – Rx & Tx
    This port can receive and send LLDP frames.
  – "-" (Disabled)
    This port can neither receive nor send LLDP frames.

Procedure

1. Select the required LLDP functionality from the drop-down list.
2. Click the "Set Values" button.

6.8 "Layer 3 (IPv4)" menu

6.8.1 NAT

6.8.1.1 Basic

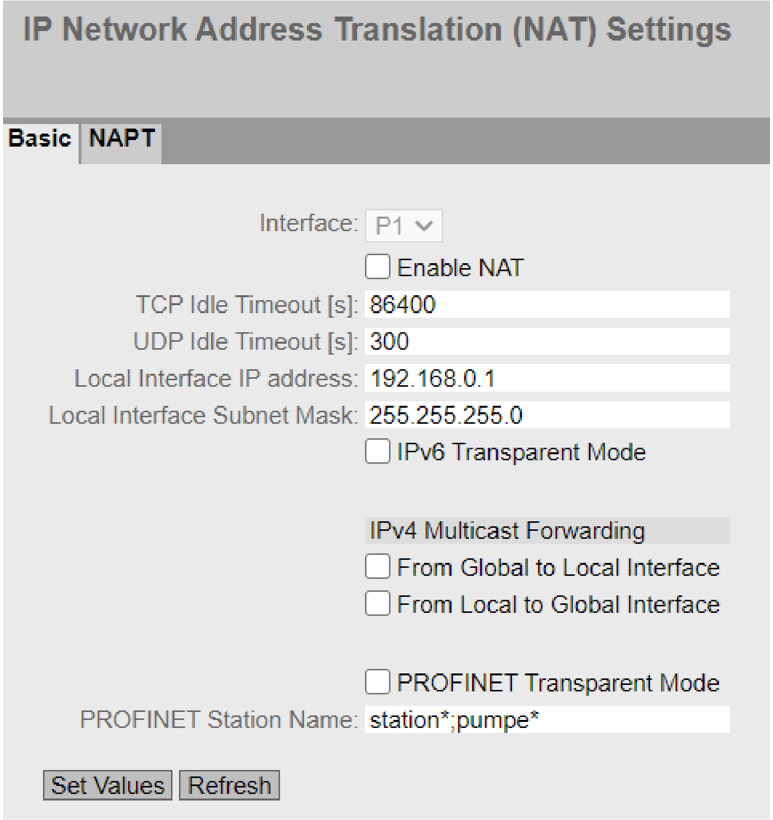
Note

This WBM page is only available for clients or access points in client mode.

On this page, you specify the basic settings for NAT.

Note

You can find an application example for NAT and NAPT at the following address:
https://support.industry.siemens.com/cs/ww/en/view/37593580



IP Network Address Translation (NAT) Settings

Interface: P1

□ Enable NAT

TCP Idle Timeout [s]: 86400

UDP Idle Timeout [s]: 300

Local Interface IP address: 192.168.0.1

Local Interface Subnet Mask: 255.255.255.0

□ IPv6 Transparent Mode

IPv4 Multicast Forwarding

□ From Global to Local Interface

□ From Local to Global Interface

□ PROFINET Transparent Mode

PROFINET Station Name: station*;pumpe*

Description

The page contains the following boxes:

- **Interface**
  Select the required Ethernet interface from the drop-down list.
- **Enable NAT**
  Enable or disable NAT for the Ethernet interface.
- **TCP Idle Timeout [s]**
  Enter the required time in seconds. If no data exchange takes place, the TCP connection is deleted from the translation table when this time has elapsed.
  The range of values is 1 to 2147483.
  Default setting: 86400 seconds
- **UDP Idle Timeout [s]**
  Enter the required time in seconds. If no data exchange takes place, the UDP connection is deleted from the translation table when this time has elapsed.
  The range of values is 1 to 2147483.
  Default setting: 300 seconds
- **Local Interface IP address**
  Enter the local IP address of the Ethernet interface. This IP address is the gateway address of the local device.
- **Local Interface Subnet Mask**
  Enter the subnet mask for the local Ethernet.

- **IPv6 Transparent Mode**
  When enabled, IPv6 frames are forwarded unchanged between Ethernet and WLAN.
  This requires that "Own" is not set for MAC mode and IPv6 is turned off.
  If you have set "Manual" for the MAC mode, you need to enter the MAC address of the IPv6 device that receives or sends the IPv6 frames.
- **IPv4 Multicast Forwarding**
  Specify whether or not the incoming multicast frames will be forwarded.
  - From Global to Local Interface
    The multicast frames incoming on the WLAN interface are forwarded via the Ethernet interface into the internal network.
  - From Local to Global Interface
    The multicast frames incoming on the local Ethernet interface are forwarded via the WLAN interface into the external network.
- **PROFINET Transparent Mode**
  Only available when the KEY-PLUG iFeatures is inserted.
  With NAT, communication with connected PROFINET devices via WLAN is not possible because they are not visible to the outside.
  If you select this setting, you can make individual PROFINET devices visible again. Frames are also forwarded transparently. The exceptions are made with the PROFINET device names.
  "Layer 2 tunnel" must be set in MAC mode for PROFINET transparent mode.

Note

PROFINET devices

When PROFINET transparent mode is activated, the connected PROFINET devices cannot obtain the IP address from a DHCP server. Use a fixed IP address for these devices.

- **PROFINET device name**
  The PROFINET device name determines which PROFINET devices are allowed to communicate with the outside world despite NAT.
  Maximum length: 240 characters. The box must not be empty.
  The following characters are permitted: [a ... z] [0 ... 9] and [. ; - *]. Uppercase letters are not allowed.
  For device names, you can replace any number of characters with the wildcard asterisk (*). The asterisk can be anywhere, but may occur only once per device name.
  You can specify multiple device names separated by a semicolon.
  Examples:
  - * (asterisk)
    Communication is possible with all connected PROFINET devices.
  - pump1
    Communication is only possible with this PROFINET device.
  - pump*
    Stands for the device names that begin with "pump" e.g. pump1, pump2.
    There are two pumping stations in a plant, for example. Station 1 contains "pump1" and station 2 contains "pump2". If you use this input, you can import the configuration on both WLAN clients.
  - pump*;controller*
    Stands for all device names that begin with "pump" or "controller".

Procedure

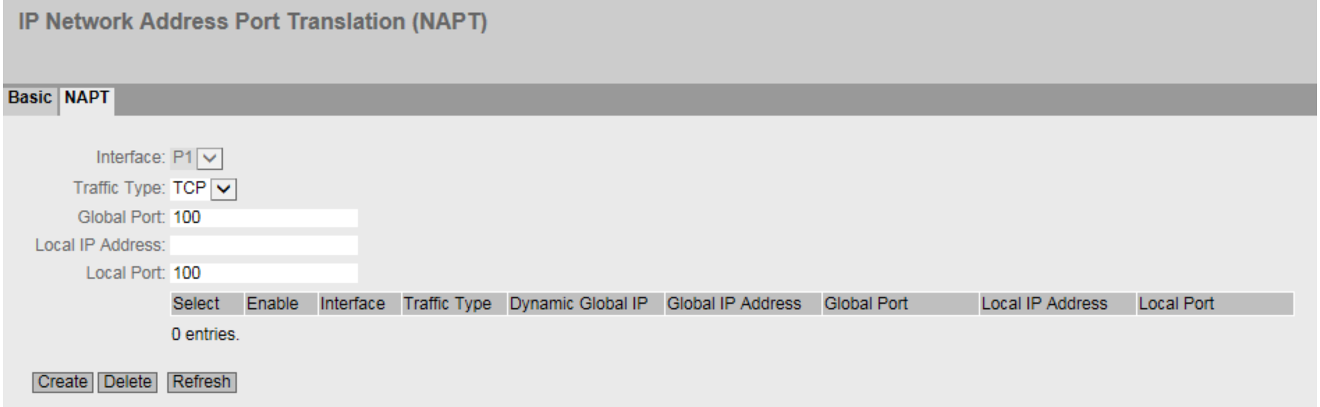
1. In the "Local Interface IP address" input box, enter the local IP address of the Ethernet interface.
2. In the "Local Interface Subnet Mask" input box, enter the subnet mask for the local Ethernet.
3. Enable NAT for the Ethernet interface.
4. Enter the PROFINET device name.
5. Click the "Set Values" button.

6.8.1.2 NAPT

Note

This WBM page is only available for clients or access points in client mode.

On this WBM page, you define the translation list for communication from the global to the local network. Per WLAN client (NAT gateway), 60 entries are possible.



IP Network Address Port Translation (NAPT)

Interface: P1

Traffic Type: TCP

Global Port: 100

Local IP Address:

Local Port: 100

Select	Enable	Interface	Traffic Type	Dynamic Global IP	Global IP Address	Global Port	Local IP Address	Local Port

0 entries.

Description

The page contains the following boxes:

- **Interface**
  Interface to which the settings relate. Can only be selected if the device has several interfaces.
- **Traffic Type**
  Specify the protocol for which the address assignment is valid. TCP and UDP frames must have parameters set separately.

- **Global Port**
  Enter the global port. Incoming frames with this port as the destination port are forwarded. If the setting is intended to apply to a port range, enter the range with start port "-" end port, for example 30 - 40.

  Note

  If the port is already occupied by a local service, for example Telnet, a warning is displayed. In this case, avoid using TCP port 23 (Telnet), port 22 (SSH), ports 80/443 (http/https: reachability of the client with the WBM) and UDP port 161 (SNMP) as global port.

- **Local IP Address**
  Enter the IP address of the node in the local network.
- **Local Port**
  Enter the number of the port. This is the new destination port to which the incoming frame will be forwarded. If the setting is intended to apply to a port range, enter the range with start port "-" end port, for example 30 - 40.
  If the local port and global port are the same, the frames will be forwarded without port translation.

The table has the following columns:

- **Select**
  Select the check box in the row to be deleted.
- **Activate**
  Select the check box in the required row. The entry is used for the address assignment
- **Interface**
  Shows the interface to which the settings relate.
- **Dynamic Global IP**
  Shows whether or not dynamic address translation is used.
- **Traffic Type**
  Shows whether UDP or TCP frames are assigned to the global port.
- **Global IP Address**
  Shows the global IP address to which the local IP address will be translated.
- **Global Port**
  Shows the global port.
- **Local IP Address**
  Shows the IP address of the node in the local network.
- **Local Port**
  Shows the number of the local port.

Procedure

1. From the "Traffic Type" drop-down list, select the protocol for which the address assignment is valid.
2. Enter the number of the global port or a port range in "Global Port".
3. Enter the IP address of the node in the local network in "Local IP Address".

4. Enter the number of the local port or a port range in "Local Port".
5. Click the "Create" button. A new entry is generated in the table.
6. Click the "Set Values" button. The device is restarted.

6.9 "Security" menu

6.9.1 Users

6.9.1.1 Local Users

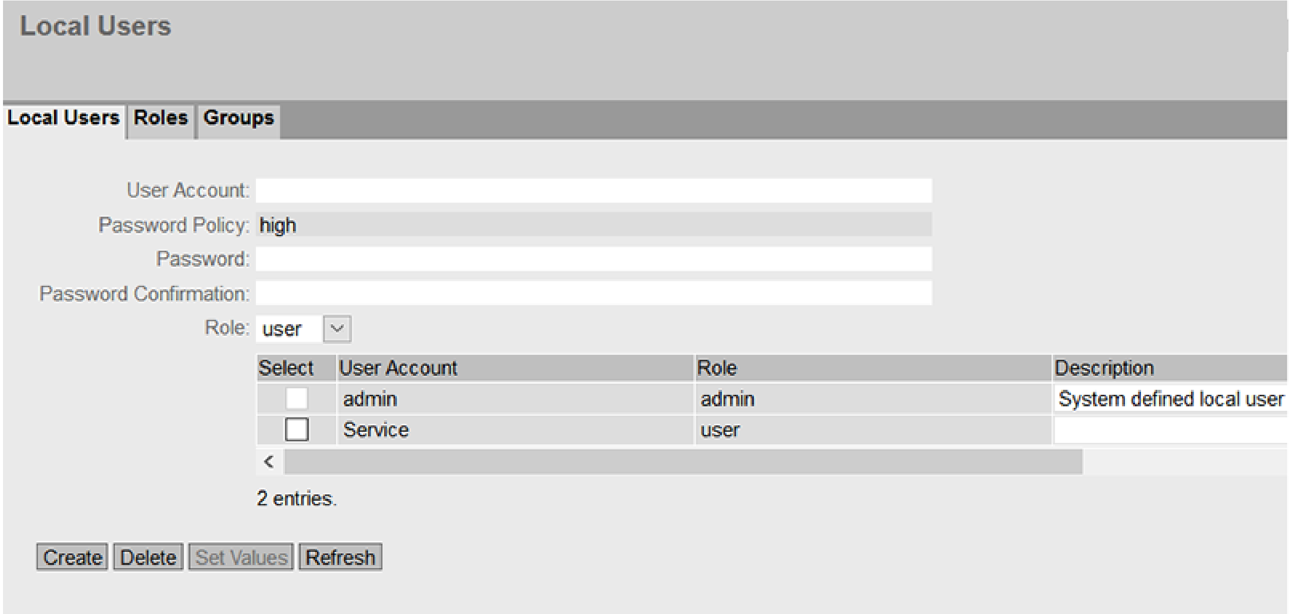
Local users

On this page, you create local users with the corresponding rights.

When you create or delete a local user this change is also made automatically in the table "External User Accounts". If you want to make change explicitly for the internal or external user table, use the CLI commands.

Note

The values displayed depend on the rights of the logged-in user.



User Account:
Password Policy: high
Password:
Password Confirmation:
Role: user

Select	User Account	Role	Description
□	admin	admin	System defined local user
□	Service	user	

2 entries.

Description

The page contains the following:

- **User Account**
  Enter the name for the user. The name must meet the following conditions:
  - It must be unique.
  - It must be between 1 and 250 characters long.
  - The following characters must not be included: **| ? " ; :**
    The characters for Space and Delete must also not be included.

  Note

  User name cannot be changed

  After creating a user, the user name can no longer be modified.

  If a user name needs to be changed, the user must be deleted and a new user created.

  Note

  User names: admin

  You can configure the device with this user name.

  When you log in for the first time or log in after a "Restore Factory Defaults and Restart", you are prompted to change the pre-defined password "admin". You can also rename the "admin" user preset in the factory once. Afterwards, renaming "admin" is no longer possible.

  Note

  Default user "user" set in the factory

  As of firmware version 6.0 the default user set in the factory "user" is no longer available when the product ships.

  If you update a device to the firmware V6.0 the default user set in the factory "user" is initially still available. If you reset the device to the factory settings ("Restore Factory Defaults and Restart") the default user set in the factory "user" is deleted.

  You can create new users with the role "user".

- **Password Policy**
  Shows which password policy is being used.
  - High
    Password length: at least 8 characters, maximum 128 characters
    At least 1 uppercase letter
    At least 1 special character
    At least 1 number
  - Low
    Password length: at least 6 characters, maximum 128 characters

  You configure the password policy on the page "Security > Passwords > Options".

- **Password**
  Enter the password. The strength of the password depends on its length and complexity.

- **Password Confirmation**
  Enter the password again to confirm it.
- **Role**
  Select a role.
  You can choose between system-defined and self-defined roles, refer to the page "Security > Users > Roles.".

The table contains the following columns:

- **Select**
  Select the check box in the row to be deleted.

  Note

  The preset users as well as logged in users cannot be deleted or changed.

- **User Account**
  Shows the user name.
- **Role**
  Shows the role of the user.
- **Description**
  Displays a description of the user account. The description text can be up to 100 characters long.

Procedure

Note

Changes in "Trial" mode

Even if the device is in "Trial" mode, changes that you carry out on this page are saved immediately.

Creating users

1. Enter the name for the user.
2. Enter the password for the user.
3. Enter the password again to confirm it.
4. Select the role of the user.
5. Click the "Create" button.
6. Enter a description of the user.
7. Click the "Set Values" button.

Deleting users

1. Select the check box in the row to be deleted.
2. Click the "Delete" button. The entries are deleted and the page is updated.

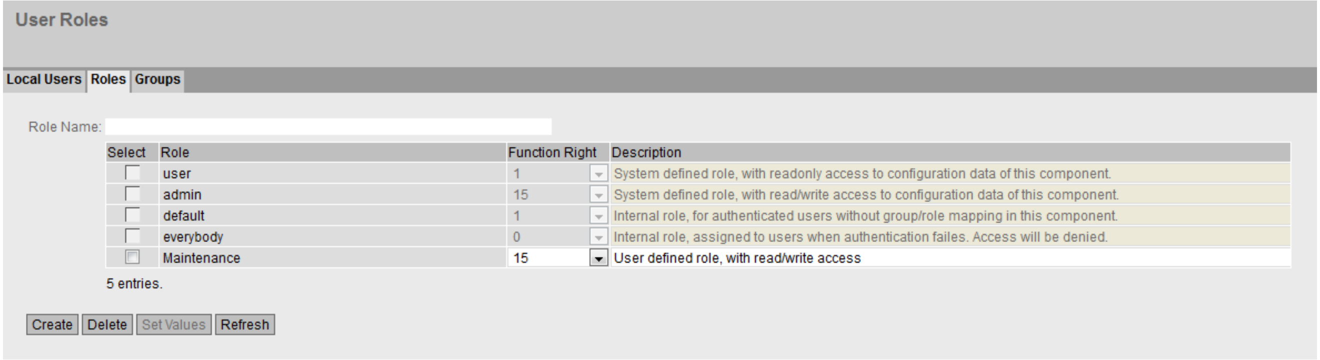
6.9.1.2 Roles

Roles

On this page, you create roles that are valid locally on the device.

Note

The values displayed depend on the rights of the logged-in user.



User Roles

Role Name:

Select	Role	Function Right	Description
□	user	1	System defined role, with readonly access to configuration data of this component.
□	admin	15	System defined role, with read/write access to configuration data of this component.
□	default	1	Internal role, for authenticated users without group/role mapping in this component.
□	everybody	0	Internal role, assigned to users when authentication failes. Access will be denied.
□	Maintenance	15	User defined role, with read/write access

5 entries.

Description

The page contains the following:

- **Role Name**
  Enter the name for the role. The name must meet the following conditions:
  – It must be unique.
  – It must be between 1 and 64 characters long.

  Note

  Role name cannot be changed

  After creating a role, the name of the role can no longer be changed.

  If a name of a role needs to be changed, the role must be deleted and a new role created.

The table contains the following columns:

- **Select**
  Select the check box in the row to be deleted.

  Note

  Predefined roles and assigned roles cannot be deleted or modified.

- **Role**
  Shows the name of the role.

- **Function Right**
  Select the function rights of the role:
  - **0**
    If authentication fails, the user is assigned the role. Access to the device is not possible.
  - **1**
    Users with this role can read device parameters but cannot change them. Users with this role can change their own password.
  - **15**
    Users with this role can both read and change device parameters.

  Note

  Function right cannot be changed

  If you have assigned a role, you can no longer change the function right of the role.

  If you want to change the function right of a role, follow the steps outlined below:
  1. Delete all assigned users.
  2. Change the function right of the role:
  3. Assign the role again.

- **Description**
  Enter a description for the role. With predefined roles a description is displayed. The description text can be up to 100 characters long.

Procedure

Creating a role

1. Enter the name for the role.
2. Click the "Create" button.
3. Select the function rights of the role.
4. Enter a description for the role.
5. Click the "Set Values" button.

Deleting a role

1. Select the check box in the row to be deleted.
2. Click the "Delete" button. The entries are deleted and the page is updated.

6.9.1.3 Groups

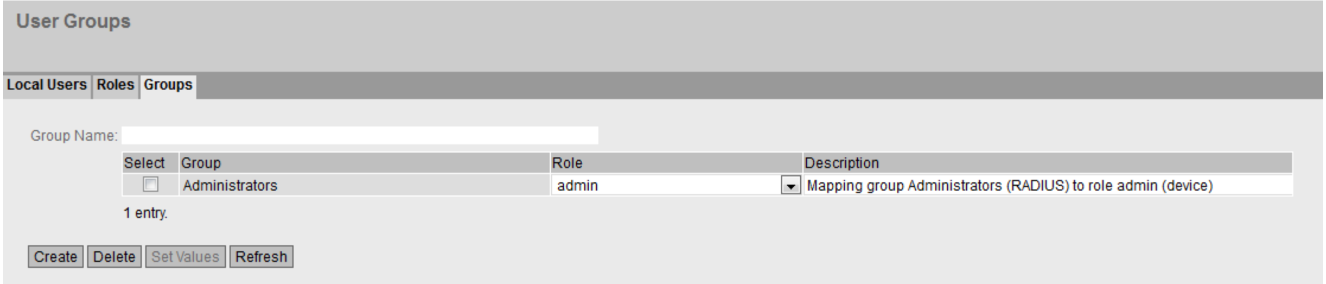
User groups

On this page you link a group with a role.

In this example the group "Administrators" is linked to the "admin" role: The group is defined on a RADIUS server. The role is defined locally on the device. When a RADIUS server authenticates a user and assigns the user to the "Administrators" group, this user is given rights of the "admin" role.

Note

The values displayed depend on the rights of the logged-in user.



User Groups

Group Name:

Select	Group	Role	Description
☐	Administrators	admin	Mapping group Administrators (RADIUS) to role admin (device)

1 entry.

Description

The page contains the following:

- **Group Name**
  Enter the name of the group. The name must match the group on the RADIUS server.
  The name must meet the following conditions:
  – It must be unique.
  – It must be between 1 and 64 characters long.
  – The following are not permitted: § ? " ; :

The table contains the following columns:

- **Select**
  Select the check box in the row to be deleted.
- **Group**
  Shows the name of the group.
- **Role**
  Select a role. Users who are authenticated with the linked group on the RADIUS server receive the rights of this role locally on the device.
  You can choose between system-defined and self-defined roles, refer to the page "Security > Users > Roles.".
- **Description**
  Enter a description for the link of the group.to a role. The description text can be up to 100 characters long.

Procedure

Linking a group to a role.

1. Enter the name of a group.
2. Click the "Create" button.

3. Select a role.
4. Enter a description for the link of a group.to a role.
5. Click the "Set Values" button.

Deleting the link between a group and a role

1. Select the check box in the row to be deleted.
2. Click the "Delete" button. The entries are deleted and the page is updated.

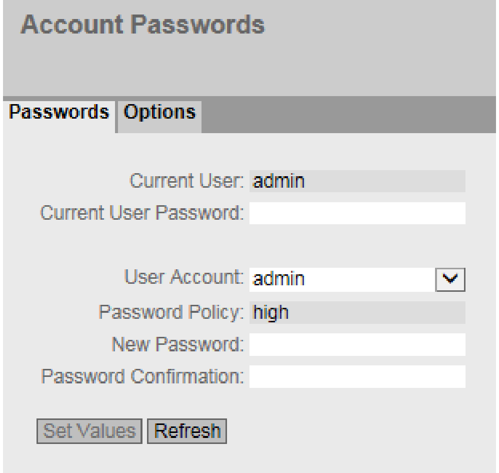
6.9.2 Passwords

Configuration of the passwords of users

Note

If you are logged in via a RADIUS server, you cannot change any passwords.

On this page, you can change passwords of users. If you are logged in with the right to change device parameters, you can change the passwords for all user accounts. If you are logged on as user, you can only change your own password.



Current User: admin
Current User Password:
User Account: admin
Password Policy: high
New Password:
Password Confirmation:

Description

- **Current User**
  Shows the user that is currently logged in.
- **Current User Password**
  Enter the password for the currently logged in user.
- **User Account**
  Select the user whose password you want to change.

- **Password Policy**
  Shows which password policy is being used when assigning new passwords.
  - High
    Password length: at least 8 characters, maximum 128 characters
    At least 1 uppercase letter
    At least 1 special character
    At least 1 number
  - Low
    Password length: at least 6 characters, maximum 128 characters
- **New Password**
  Enter the new password for the selected user.
  It cannot contain the following characters:
  - § ? " ; :
  - The characters for Space and Delete also cannot be contained.
- **Password Confirmation**
  Enter the new password again to confirm it.

Procedure

1. Enter the valid password for the currently logged in user in the "Current User Password" input box.
2. From the "User Account" drop-down list, select the user whose password you want to change.
3. Enter the new password for the selected user in the "New Password" input box.
4. Repeat the new password in the "Password Confirmation" input box.
5. Click the "Set Values" button.

Note

The factory settings for the passwords when the devices ship are as follows:

- admin: admin

When you log in for the first time or following a "Restore Factory Defaults and Restart", with the preset user "admin" you will be prompted to change the password.

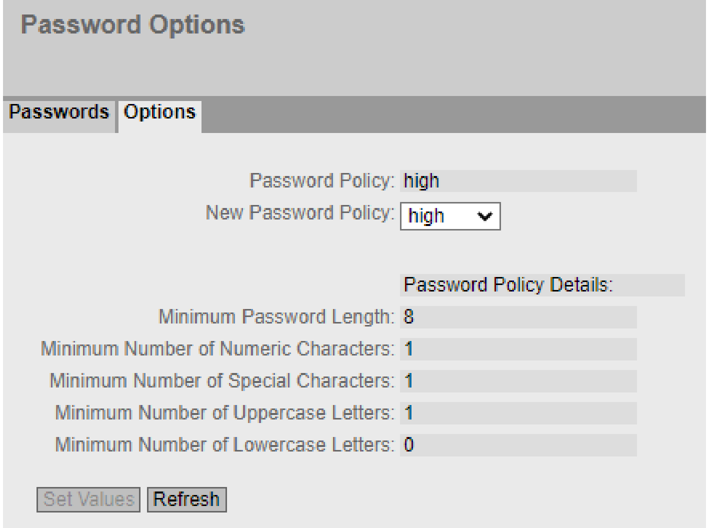
Note

Changing the password in Trial mode

Even if you change the password in Trial mode, this change is saved immediately.

6.9.2.1 Options

On this page, you specify which password policy will be used when assigning new passwords.



Password Options

Password Policy: high

New Password Policy: high

Password Policy Details:

Minimum Password Length: 8

Minimum Number of Numeric Characters: 1

Minimum Number of Special Characters: 1

Minimum Number of Uppercase Letters: 1

Minimum Number of Lowercase Letters: 0

Description

- **Password Policy**
  Shows which password policy is currently being used.
- **New Password Policy**
  Select the required setting from the drop-down list.
  - High
    Password length: at least 8 characters, maximum 128 characters
    At least 1 number
    At least 1 special character
    At least 1 uppercase letter
  - Low
    Password length: at least 6 characters, maximum 128 characters
  - User-defined
    Configure the desired password requirements under "Password Policy Details".
- **Password Policy Details**
  When you have selected the "High" or "Low" password policy, the relevant password requirements are displayed.
  When you have selected the "User-defined" password policy, you can configure the relevant password requirements.
  - Minimum Password Length
    Specifies the minimum length of a password.
  - Minimum Number of Numeric Characters
    Specifies the minimum number of numeric characters in a password.
  - Minimum Number of Special Characters
    Specifies the minimum number of special characters in a password.
  - Minimum Number of Uppercase Letters
    Specifies the minimum number of uppercase characters in a password.
  - Minimum Number of Lowercase Letters
    Specifies the minimum number of lowercase characters in a password.

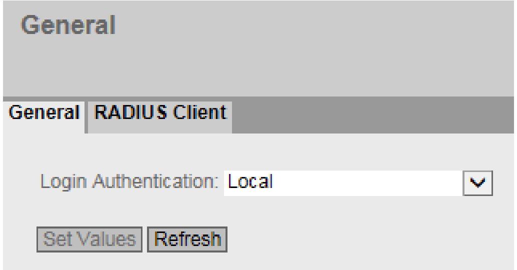
6.9.3 AAA

6.9.3.1 General

Login of network nodes

The designation "AAA" stands for "Authentication, Authorization, Accounting". This feature is used to identify and allow network nodes, to make the corresponding services available to them and to specify the range of use.

On this page, you configure the login.



Login Authentication: Local

Description

The page contains the following boxes:

Note

To be able to use the login authentication "RADIUS", "Local and RADIUS" or "RADIUS and fallback Local", a RADIUS server must be stored and configured for user authentication.

- **Login Authentication**
  Specify how the login is made:
  - Local
    The authentication must be made locally on the device.
  - RADIUS
    The authentication must be handled via a RADIUS server.
  - Local and RADIUS
    The authentication is possible both with the users that exist on the device (user name and password) and via a RADIUS server.
    The user is first searched for in the local database. If the user does not exist there, a RADIUS request is sent.
  - RADIUS and fallback Local
    The authentication must be handled via a RADIUS server.
    A local authentication is performed only when the RADIUS server cannot be reached in the network.

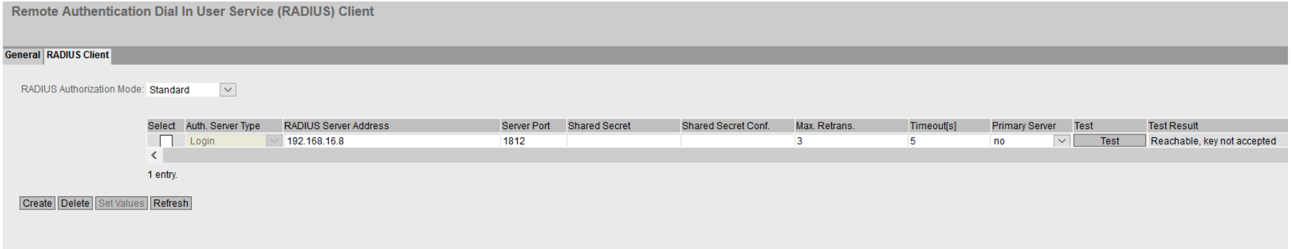
6.9.3.2 RADIUS client

Authentication over an external server

The concept of RADIUS is based on an external authentication server.

Each row of the table contains access data for one server. In the search order, the primary server is queried first. If the primary server cannot be reached, secondary servers are queried in the order in which they are entered.

If no server responds, there is no authentication.



Remote Authentication Dial In User Service (RADIUS) Client

RADIUS Authorization Mode: Standard

Select	Auth. Server Type	RADIUS Server Address	Server Port	Shared Secret	Shared Secret Conf.	Max. Retrans.	Timeout[s]	Primary Server	Test	Test Result
□	Login	192.168.16.8	1812			3	5	no	Test	Reachable, key not accepted

1 entry.

Description

The page contains the following boxes:

- **RADIUS Authorization Mode**
  For the login authentication, the RADIUS authorization mode specifies how the rights are assigned to the user with a successful authentication.
  - Standard
    In this mode the user is logged in with administrator rights if the server returns the value "Administrative User" to the device for the attribute "Service Type". In all other cases the user is logged in with read rights.
  - Vendor Specific
    In this mode the assignment of rights depends on whether and which group the server returns for the user and whether or not there is an entry for the user in the table "External User Accounts".

The table has the following columns:

- **Select**
  Select the row you want to delete.
- **RADIUS Server Address**
  Enter the IP address or the FQDN (Fully Qualified Domain Name) of the RADIUS server.
- **Server Port**
  Here, enter the input port on the RADIUS server. As default, input port 1812 is set. The range of values is 1 to 65535.
- **Shared Secret**
  Enter your access ID here. The range of values is 1...128 characters
- **Shared Secret Conf.**
  Enter your access ID again as confirmation.
- **Max. Retrans.**
  Enter the maximum number of retries for an attempted query.
  The initial connection attempt is repeated the number of times specified here before another configured RADIUS server is queried or the login counts as having failed. As default 3 retries are set, this means 4 connection attempts. The range of values is 1 to 5.
- **Timeout[s]**
  Specify how long the RADIUS client waits for a response from the RADIUS server before attempting login again.
- **Primary Server**
  Using the options in the drop-down list, specify whether or not this server is the primary server. You can select one of the options "yes" or "no".

- **Test**
  With this button, you can test whether or not the specified RADIUS server is available. The test is performed once and not repeated cyclically.
- **Test Result**
  Shows whether or not the RADIUS server is available:
  - Not reachable
    The IP address is not reachable.
    The IP address is reachable, the RADIUS server is, however, not running.
  - Reachable, key not accepted
    The IP address is reachable, the RADIUS server does not, however accept the shared secret.
  - Reachable, key accepted
    The IP address is reachable, the RADIUS server accepts the specified shared secret.

Steps in configuration

Entering a new server

1. Click the "Create" button. A new entry is generated in the table.
   The following default values are entered in the table:
   - RADIUS Server Address: 0.0.0.0
   - Server Port: 1812
   - Max. Retrans.: 3
   - Primary server: No
2. In the relevant row, enter the following data in the input boxes:
   - RADIUS Server Address
   - Server Port
   - Shared Secret
   - Shared Secret Conf
   - Max. Retrans.: 3
   - Primary server: No
3. If necessary check the reachability of the RADIUS server.
4. Click the "Set Values" button.

Repeat this procedure for every server you want to enter.

Modifying servers

1. In the relevant row, enter the following data in the input boxes:
   - RADIUS Server Address
   - Server Port
   - Shared Secret
   - Shared Secret Conf
   - Max. Retrans.
   - Primary Server
2. If necessary check the reachability of the RADIUS server.
3. Click the "Set Values" button.

Repeat this procedure for every server whose entry you want to modify

Deleting servers

1. Click the check box in the first column before the row you want to delete to select the entry for deletion.
   Repeat this for all entries you want to delete.
2. Click the "Delete" button. The data is deleted from the memory of the device and the page is updated.

6.9.4 WLAN

6.9.4.1 Basic (Access Point)

Safety levels

To make the network secure, authentication and encryption are used. On this page, you specify the security settings.

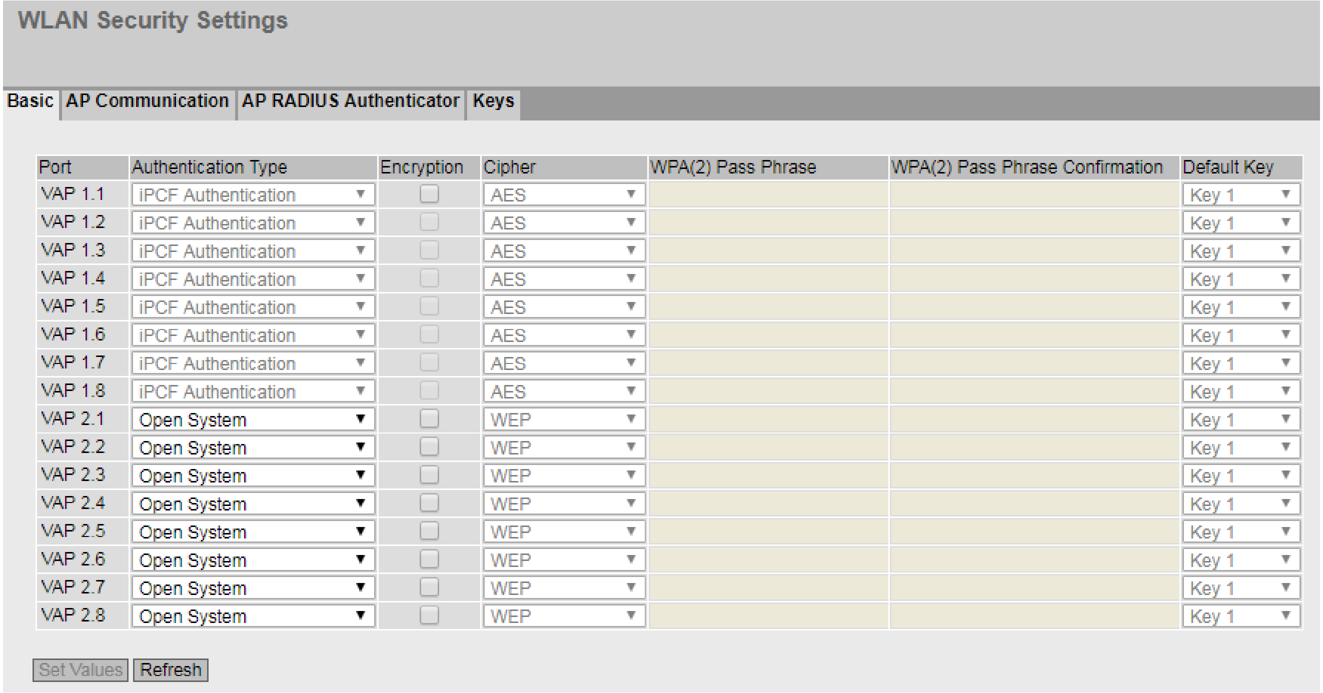
Note

WLAN mode IEEE 802.11 n

With devices operated in WLAN mode IEEE8002.11n, only WPA2 (WPA2-PSK and WPA2 Radius) encryption is possible.

iPCF, iPCF-HT or iPCF-MC mode activated

If iPCF, iPCF-HT or iPCF-MC mode is enabled, only "iPCF authentication" with or without the AES encryption is supported with security context 1.



WLAN Security Settings

Port	Authentication Type	Encryption	Cipher	WPA(2) Pass Phrase	WPA(2) Pass Phrase Confirmation	Default Key
VAP 1.1	iPCF Authentication	□	AES			Key 1
VAP 1.2	iPCF Authentication	□	AES			Key 1
VAP 1.3	iPCF Authentication	□	AES			Key 1
VAP 1.4	iPCF Authentication	□	AES			Key 1
VAP 1.5	iPCF Authentication	□	AES			Key 1
VAP 1.6	iPCF Authentication	□	AES			Key 1
VAP 1.7	iPCF Authentication	□	AES			Key 1
VAP 1.8	iPCF Authentication	□	AES			Key 1
VAP 2.1	Open System	□	WEP			Key 1
VAP 2.2	Open System	□	WEP			Key 1
VAP 2.3	Open System	□	WEP			Key 1
VAP 2.4	Open System	□	WEP			Key 1
VAP 2.5	Open System	□	WEP			Key 1
VAP 2.6	Open System	□	WEP			Key 1
VAP 2.7	Open System	□	WEP			Key 1
VAP 2.8	Open System	□	WEP			Key 1

Description

The table has the following columns:

- **Port**
  Shows the available ports.
- **Authentication Type**
  Select the type of authentication. The selection depends on the operating mode and the transmission standard.
  - Open System
    There is no authentication. Encryption with a fixed (unchanging) WEP key can be selected as an option. To use the key, enable "Encryption". You define the WEP key on the "Keys" page.
  - Shared Key
    In Shared Key authentication, a fixed key is stored on the client and access point. This WEP key is then used for authentication and encryption. You define the WEP key on the "Keys" page.

    Note

    If you use "Open System" with "Encryption" or "Shared Key", Key 1 must always be set on the "Keys" page.
  - WPA (RADIUS)
    Wi-Fi Protected Access (WPA) is a method specified by the Wi-Fi Alliance to close security gaps in WEP. Authentication using a server is stipulated (802.1x). The dynamic exchange of keys at each data frame introduces further security.
  - WPA-PSK
    WPA Pre Shared Key (WPA-PSK) is a weakened form of WPA. In this method, authentication is not established by a server but is based on a password. This password is configured manually on the client and server.
  - WPA2 (RADIUS)
    WPA2 (Wi-Fi Protected Access 2) is a further development of WPA and implements the functions of the IEEE 802.11i security standard. WPA authentication works, however, without the RADIUS server.
  - WPA2-PSK
    WPA2-PSK is based on the 802.11i standard. WPA authentication works, however, without a RADIUS server. Instead of this, a WPA(2) key (WPA(2) Pass phrase) is stored on each client and access point. The WPA(2) Pass phrase is used for authentication and further encryption.
  - WPA/WPA2-Auto-PSK
    Setting with which an access point can process both the "WPA-PSK" and the "WPA2-PSK" type of authentication. This is necessary when the access point communicates with different clients, some using "WPA-PSK" and others "WPA2-PSK". The same encryption method is set on the clients.
  - WPA/WPA2-Auto
    Setting with which an access point can process both the "WPA" and the "WPA2" type of authentication. This is necessary when the access point communicates with different clients, some using "WPA" and others "WPA2". The same encryption method is set on the clients

  - **iPCF authentication**
    Authentication with optional AES encryption. Authentication is set automatically if iPCF, iPCF-HT or iPCF-MC mode is enabled on the WLAN interface. If you want encryption with AES, only keys with a 128 bit key length are supported.

- **Encryption**
  Encryption protects the transferred data from eavesdropping and corruption. You can only disable encryption if you have selected "Open System" for authentication. All other security methods include both authentication and encryption.

- **Cipher**
  Select the encryption method. The selection depends on the transmission standard.

  - AUTO
    AES or TKIP is used selected automatically depending on the capability of the other station.

  - WEP
    WEP (Wired Equivalent Privacy)
    A symmetrical stream encryption method with only 40- or 104-bit long keys based on the RC4 algorithm (Ron’s Code 4).

  - TKIP (Temporal Key Integrity Protocol)
    A symmetrical encryption method with the RC4 algorithm (Ron’s Code 4). In contrast to the weak WEP encryption, TKIP uses changing keys derived from a main key. TKIP can also recognize corrupted data frames.

  - AES (Advanced Encryption Standard)

    Strong symmetrical block encryption method based on the Rijndael algorithm that further improves the functions of TKIP.

  Note

  To provide better protection of your data against attacks, use WPA2/ WPA2-PSK with AES.

- **WPA(2) Pass Phrase**
  Enter a WPA(2) key here. This WPA(2) key must be known on both the client and the access point and is entered by the user at both ends.
  For a key with 8 to 63 characters, you can only use the following readable ASCII characters: 0x20 - 0x7e.
  For a key with precisely 64 characters, you can use the following ASCII characters: 0 - 9, a - f and A - F.

- **WPA(2) Pass Phrase Confirmation**
  Confirm the entered WPA(2) pass phrase.

- **Default Key**
  Specify the WEP key used to encrypt the data. You define the WEP key on the "Keys" page.

Procedure

1. Select the required security settings. The settings that are possible depend on the "Authentication Type" you have selected.

Authentication Type	Encryption	Cipher	Encryption key source
Open System	disabled	--	--
Open System	Enabled	WEP	Default Key
Shared Key	Enabled	WEP	Default Key
WPA (RADIUS)	Enabled	Auto/TKIP/AES	RADIUS Server
WPA-PSK	Enabled	Auto/TKIP/AES	WPA(2) Pass Phrase
WPA2 (RADIUS)	Enabled	Auto/TKIP/AES	RADIUS Server
WPA2-PSK	Enabled	Auto/TKIP/AES	WPA(2) Pass Phrase
WPA/WPA2-AutoPSK	Enabled	Auto/TKIP/AES	WPA(2) Pass Phrase
WPA/WPA2-Auto (RADIUS)	Enabled	Auto/TKIP/AES	RADIUS Server
iPCF authentication [1)]	enabled	AES	Default Key (128-bit)

[1)] only when iPCF with iPCF-HT or with iPCF-MC is selected: Preset authentication with optional encryption

2. Click the "Set Values" button.

6.9.4.2 Basic (Client)

Safety levels

To make the network secure, authentication and encryption are used. On this page, you specify the security settings.

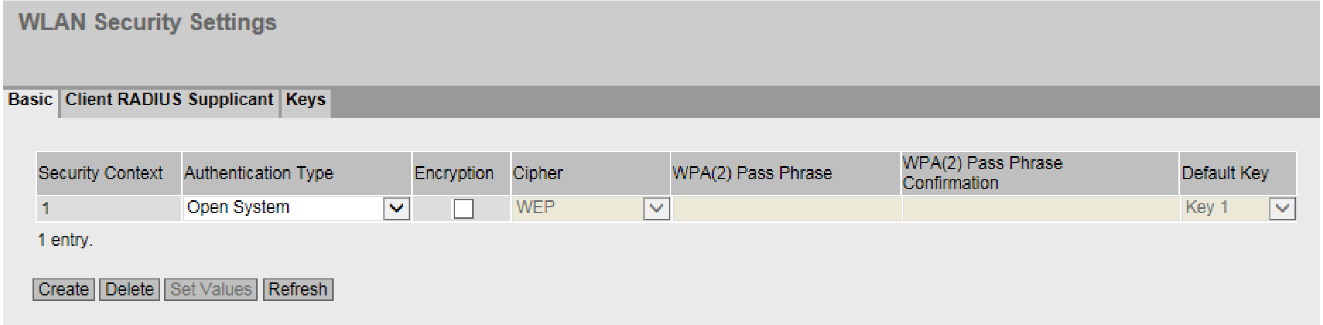
Note

WLAN mode IEEE 802.11 n

With devices operated in WLAN mode IEEE8002.11n only WPA2 (WPA2-PSK and WPA2 Radius) encryption is possible.

iPCF, iPCF-HT or iPCF-MC mode activated

If iPCF, iPCF-HT or iPCF-MC mode is enabled, only "iPCF authentication" with or without the AES encryption is supported with security context 1.



Security Context	Authentication Type	Encryption	Cipher	WPA(2) Pass Phrase	WPA(2) Pass Phrase Confirmation	Default Key
1	Open System	☐	WEP			Key 1

1 entry.

Description

The table has the following columns:

- **Select**
  Select the row you want to delete. Select a check box in this column and click the "Delete" button to delete an entry in the list.
- **Security Context**
  Shows the number of the entry. If you create a new entry, a new line with a unique number is created.
  You can create up to 8 security contexts. The security context 1 cannot be deleted.

- **Authentication Type**
  Select the type of authentication. The selection depends on the operating mode and the transmission standard.
  - **Open System**
    There is no authentication. Encryption with a fixed (unchanging) WEP key can be selected as an option. To use the key, enable "Encryption". You define the WEP key on the "Keys" page.
  - **Shared Key**
    In Shared Key authentication, a fixed key is stored on the client and access point. This WEP key is then used for authentication and encryption. You define the WEP key on the "Keys" page.
  - **WPA (RADIUS)**
    Wi-Fi Protected Access is a method specified by the Wi-Fi Alliance to close security gaps in WEP. Authentication using a server is stipulated (802.1x). The dynamic exchange of keys at each data frame introduces further security.

    Note

    Make the relevant RADIUS settings initially on the page "Security > WLAN > Client Radius Supplicant".
  - **WPA-PSK**
    WPA Pre Shared Key (WPA-PSK) is a weakened form of WPA. In this method, authentication is not established by a server but is based on a password. This password is configured manually on the client and server.
  - **WPA2 (RADIUS)**
    WPA2 (Wi-Fi Protected Access 2) is a further development of WPA and implements the functions of the IEEE 802.11i security standard. WPA authentication works, however, without the RADIUS server.

    Note

    Make the relevant RADIUS settings initially on the page "Security > WLAN > Client Radius Supplicant".
  - **WPA2-PSK**
    WPA2-PSK is based on the 802.11i standard. WPA authentication works, however, without a RADIUS server. Instead of this, a WPA(2) key (WPA(2) pass phrase) is stored on each client and access point. The WPA(2) pass phrase is used for authentication and further encryption.
  - **WPA/WPA2-Auto-PSK**
    Setting with which an access point can process both the "WPA-PSK" as well as the "WPA2-PSK" type of authentication. This is necessary when the access point communicates with different clients, some using "WPA-PSK" and others "WPA2-PSK". The same encryption method is set on the clients.
  - **WPA/WPA2-Auto**
    Setting with which an access point can process both the "WPA" as well as the "WPA2" type of authentication. This is necessary when the access point communicates with different clients, some using "WPA" and others "WPA2". The same encryption method is set on the clients.

  - **iPCF authentication**
    Authentication with optional AES encryption. Authentication is set automatically if iPCF, iPCF-HT or iPCF-MC mode is enabled on the WLAN interface. If you want encryption with AES, only keys with a 128 bit key length are supported.

- **Encryption**
  Encryption protects the transferred data from eavesdropping and corruption. You can only disable encryption if you have selected "Open System" for authentication. All other security methods include both authentication and encryption.

- **Cipher**
  Select the encryption method. The selection depends on the transmission standard.

  - **AUTO**
    AES or TKIP is selected automatically depending on the capability of the other station.

  - **WEP**
    WEP (Wired Equivalent Privacy)
    A symmetrical stream encryption method with only 40- or 104-bit long keys based on the RC4 algorithm (Ron's Code 4).

  - **TKIP (Temporal Key Integrity Protocol)**
    A symmetrical encryption method with the RC4 algorithm (Ron's Code 4). In contrast to the weak WEP encryption, TKIP uses changing keys derived from a main key. TKIP can also recognize corrupted data frames.

  - **AES (Advanced Encryption Standard)**

    Strong symmetrical block encryption method based on the Rijndael algorithm that further improves the functions of TKIP.

  Note

  To provide better protection of your data against attacks, use WPA2/ WPA2-PSK with AES.

- **WPA(2) Pass Phrase**
  Enter a WPA(2) key here. This WPA(2) key must be known on both the client and the access point and is entered by the user at both ends.
  For a key with 8 to 63 characters, you can only use the following readable ASCII characters: 0x20 - 0x7e.
  For a key with precisely 64 characters, you can use the following ASCII characters: 0 - 9, a - f and A - F.

- **WPA(2) Pass Phrase Confirmation**
  Confirm the entered WPA(2) pass phrase.

- **Default Key**
  Specify the WEP key used to encrypt the data. You define the WEP key on the "Keys" page.

Procedure

1. To create a new security context, click the "Create" button.
2. Select the required security settings. The settings that are possible depend on the "Authentication Type" you have selected.
   When iPCF, iPCF-HT or iPCF-MC mode is enabled, it is not possible to select the "Authentication Type".
3. Click the "Set Values" button.

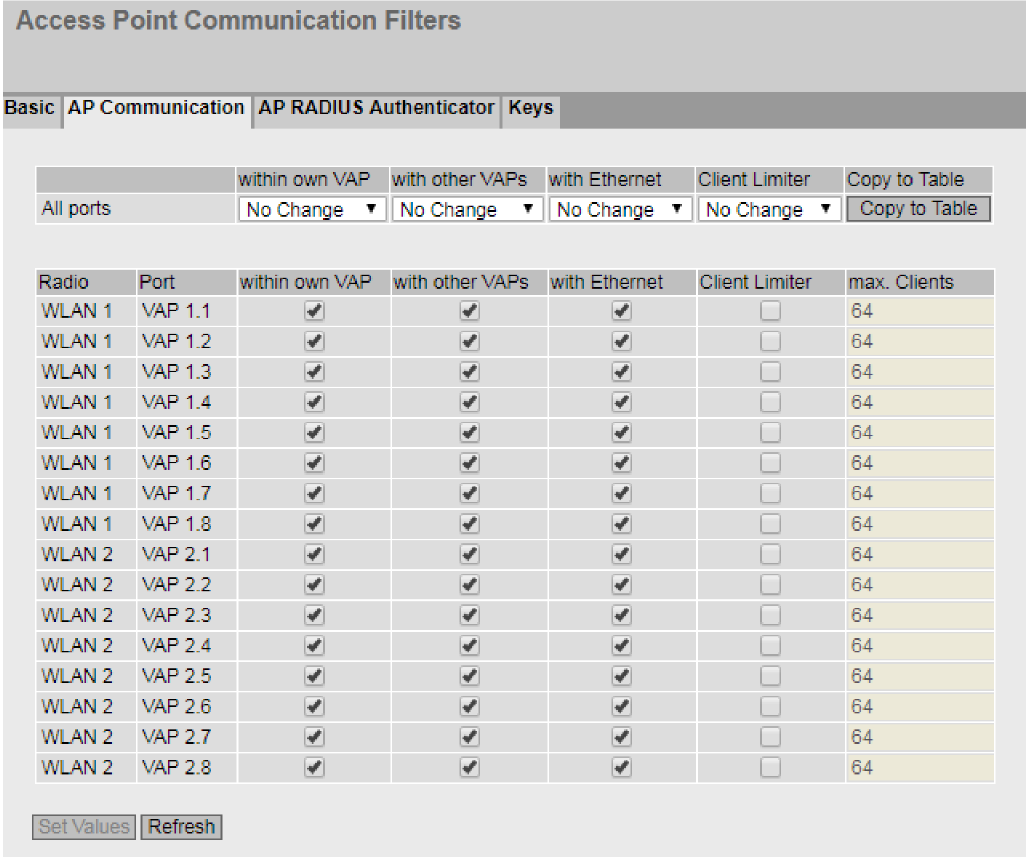
6.9.4.3 AP communication

Communications options

On this WBM page, you specify the type of communication allowed by the access point.

Note

This WBM page is only available in access point mode.



	within own VAP	with other VAPs	with Ethernet	Client Limiter	Copy to Table
All ports	No Change ▼	No Change ▼	No Change ▼	No Change ▼	Copy to Table

Radio	Port	within own VAP	with other VAPs	with Ethernet	Client Limiter	max. Clients
WLAN 1	VAP 1.1	☑	☑	☑	☐	64
WLAN 1	VAP 1.2	☑	☑	☑	☐	64
WLAN 1	VAP 1.3	☑	☑	☑	☐	64
WLAN 1	VAP 1.4	☑	☑	☑	☐	64
WLAN 1	VAP 1.5	☑	☑	☑	☐	64
WLAN 1	VAP 1.6	☑	☑	☑	☐	64
WLAN 1	VAP 1.7	☑	☑	☑	☐	64
WLAN 1	VAP 1.8	☑	☑	☑	☐	64
WLAN 2	VAP 2.1	☑	☑	☑	☐	64
WLAN 2	VAP 2.2	☑	☑	☑	☐	64
WLAN 2	VAP 2.3	☑	☑	☑	☐	64
WLAN 2	VAP 2.4	☑	☑	☑	☐	64
WLAN 2	VAP 2.5	☑	☑	☑	☐	64
WLAN 2	VAP 2.6	☑	☑	☑	☐	64
WLAN 2	VAP 2.7	☑	☑	☑	☐	64
WLAN 2	VAP 2.8	☑	☑	☑	☐	64

Description

Table 1 has the following columns:

- **Column 1**
  Shows that the settings are valid for all ports of table 2.
- **within own VAP / with other VAPs / with Ethernet / Client Limiter**
  In the drop-down list, select the setting for all ports. If "No Change" is selected, the entry in table 2 remains unchanged.
- **Copy to Table**
  If you click the button, the setting is adopted for all ports of table 2.

Table 2 has the following columns:

- **Radio**
  Shows the available WLAN interfaces.
- **Port**
  Shows the VAP interface.
- **within own VAP**
  - Enabled
    Clients logged on to the same VAP interface of an access point can communicate with each other.
  - Disabled
    Option is disabled.
- **with other VAPs**
  - Enabled
    Clients logged on to different VAP interfaces of an access point can communicate with each other.

    Note

    For an access point, "with other VAPs" needs to be enabled on all WLAN interfaces or on all VAP interfaces to allow communication between clients logged on at different VAP interfaces of the access point.
  - Disabled
    Option is disabled.

  Note

  "within own VAP" or "with other VAPs" function disabled

  If the "within own VAP" or "with other VAPs" function is disabled the various WLAN clients can no longer see each other. This means that Address Collision Detection (ACD) also no longer works reliably.
- **with Ethernet**
  - Enabled
    Clients can communicate via the Ethernet interface of the access point.
  - Disabled
    Option is disabled.

- **Client limiter**
  - Enabled
    The number of WLAN clients that can be logged on simultaneously is limited.
  - Disabled
    Option is disabled.
- **Max. clients**
  Set the maximum number of clients that can connect to this interface at the same time. If the number is exceeded, additional clients are rejected.

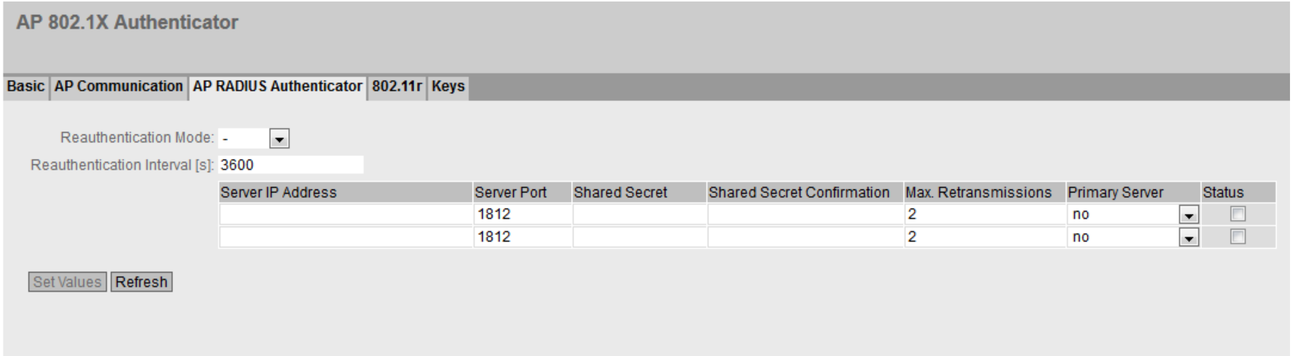
6.9.4.4 AP RADIUS Authenticator

Configuration of the RADIUS server

On this WBM page, you define the RADIUS servers and the RADIUS authentication of the access point. You can enter data for two RADIUS servers.

Note

This WBM page is only available in access point mode.



AP 802.1X Authenticator

Reauthentication Mode: -

Reauthentication Interval [s]: 3600

Server IP Address	Server Port	Shared Secret	Shared Secret Confirmation	Max. Retransmissions	Primary Server	Status
	1812			2	no	□
	1812			2	no	□

Description

The page contains the following boxes:

- **Reauthentication Mode**
  Specify who sets the time after which the clients are forced to reauthenticate.
  - - (disabled)
    Reauthentication mode is disabled.
  - Server
    Enables time management on the server.
  - Local
    Enables local time management. In "Reauthentication Interval", specify the time of validity.
- **Reauthentication Interval [s]**
  If time management is local, enter the period of validity of the authentication in seconds. The minimum time is 1 minute (enter 60), the maximum time is 12 hours (enter 43200). The default is one hour (3,600 seconds).

The table has the following columns:

- **Server IP Address**
  Here, enter the IP address or the FQDN name of the RADIUS server.
- **Server Port**
  Here, enter the input port on the RADIUS server.
- **Shared Secret**
  Enter the password of the RADIUS server.
  For the password, ASCII code 0x20 to 0x7e is used.
- **Shared Secret Conf**
  Confirm the password.
- **Max. Retransmissions**
  Enter the maximum number of connection attempts.
- **Primary Server**
  Specify whether or not this server is the primary server.
  - Yes: Primary server
  - No: Backup server.
- **State**
  With this check box, you can enable or disable the RADIUS server

Procedure

Entering a new server

To display a new server, follow the steps below:

1. In the relevant row, enter the following data in the input boxes:
   - IP address or FQDN name of the RADIUS server.
   - Port number of the input port
   - Password
   - Confirmation of the password
   - Maximum number of transmission retries
   - Primary server
2. Click the "Set Values" button.

Modifying servers

1. In the relevant row, enter the following data in the input boxes:
   - Server IP address
   - Port number of the input port
   - Password
   - Confirmation of the password
   - Maximum number of transmission retries
   - Primary server
2. Click the "Set Values" button.

Repeat this procedure for every server whose entry you want to modify.

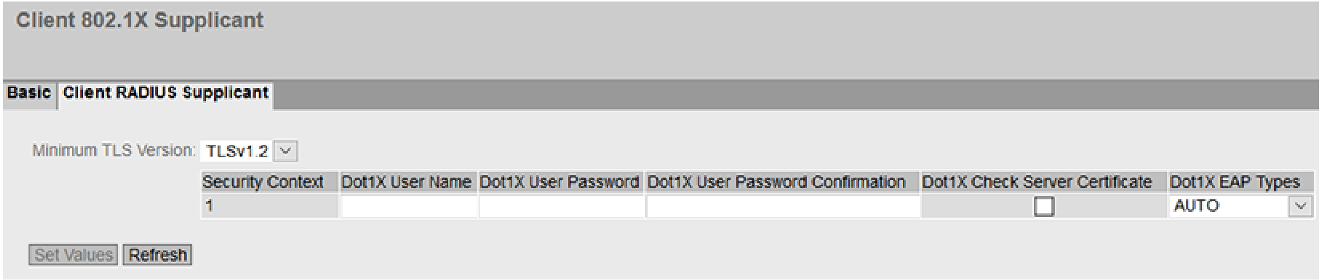
6.9.4.5 Client RADIUS Supplicant

Client Supplicant

On this WBM page, you configure the settings for the RADIUS authorization of the client.

Note

This page is only available for clients or access points in client mode.



Minimum TLS Version: TLSv1.2

Security Context	Dot1X User Name	Dot1X User Password	Dot1X User Password Confirmation	Dot1X Check Server Certificate	Dot1X EAP Types
1				□	AUTO

Description

- **Minimum TLS Version**
  Specify the minimum TLS version to be used for WLAN RADIUS authentication.

  Note

  RADIUS Server

  This is only possible when the RADIUS Server supports the TLS version.

The table has the following columns:

- **Security Context**
  Shows the security context.
- **Dot1x User Name**
  Enter the user name with which you want to log in to the RADIUS server.
- **Dot1x User Password**
  Enter the password for the user name selected above. The client logs on with the RADIUS server using this combination.
  For password assignment, ASCII code 0x20 to 0x7e is used.
- **Dot1x User Password Confirmation**
  Confirm the password.

Note

Dot1X user name and Dot1X user password

With WPA (RADIUS), WPA2 (RADIUS), EAP-TLS, EAP-TTLS and PEAP the Dot1X user name and the Dot1X user password must be configured.

With the setting "Auto" either the certificate must be loaded or the Dot1X user name and the Dot1X user passport must be configured.

- **Verifying tghe Dot1X server certifcate**
  Specify whether or not the RADIUS server identifies itself to the client using a certificate.

  Note

  Using certificates

  Renew the certificate before it expires. If you do not renew the certificate in time, it will not be possible to establish a connection after expiry.

- **Dot1x EAP Types**
  Specify the authentication methods. The following methods exist:
  - Auto
    Client offers RADIUS server all methods.
  - EAP-TLS
    Extensible Authentication Protocol - Transport Layer Security
    Uses certificates for authentication.
  - EAP-TTLS
    Extensible Authentication Protocol - Tunnel Transport Layer Security
    After setting up the TLS tunnel, MS-CHAPv2 is used for internal authentication.
  - PEAP
    Protected Extensible Authentication Protocol
    Alternative draft protocol of IETF for EAP-TTLS

Procedure

1. Enter the necessary values in the input boxes.
2. Select the required entry in the "Dot1x EAP Types" drop-down list.
3. Click the "Set Values" button.

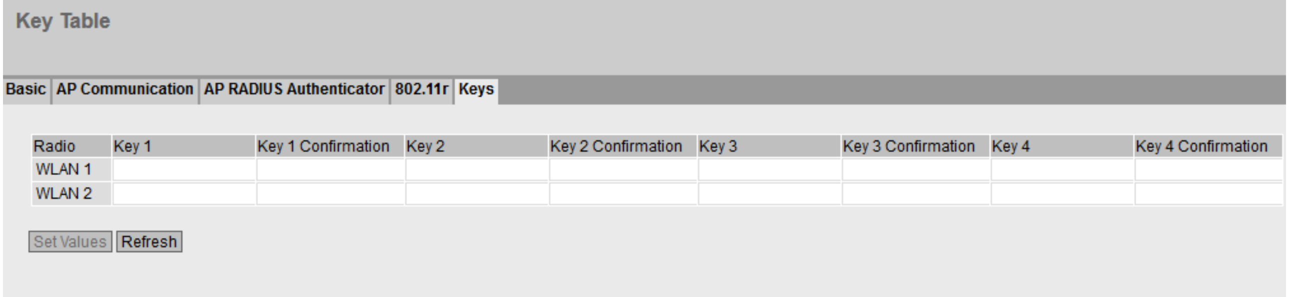
See also

Security mechanisms supported for RADIUS authentication. (Page 439)

6.9.4.6 Key

Specifying the WEP key

To allow you to enable the encryption for the "Open System" and "Shared Key" authentication methods, you must first enter at least one key in the key table.



Radio	Key 1	Key 1 Confirmation	Key 2	Key 2 Confirmation	Key 3	Key 3 Confirmation	Key 4	Key 4 Confirmation
WLAN 1								
WLAN 2								

Description

The table has the following columns:

- **Radio**
  Shows the available WLAN interfaces.
- **Key 1 - 4**
  Enter the WEP key or the AES key.
  For the WEP key, characters of the ASCII code from 0x20 to 0x7E or hexadecimal characters from 0x00 to 0xFF are permitted.
  If iPCF or iPCF-MC mode is enabled, only the encryption method AES with 128-bit key length is supported.
  You can choose between the following key lengths:
  - 5 or 13 ASCII or 10 or 26 hexadecimal characters (40/104 bits)
  - 16 ASCII or 32 hexadecimal characters (128 bits)

  Note

  The hexadecimal characters are entered without being preceded by "0x". One hexadecimal character codes four bits. The entries "ABCDE" (ASCII characters) and "4142434445" (hexadecimal characters) are therefore the same because the ASCII character "A" has hexadecimal code "0x41".

- **Key 1 - 4 Confirmation**
  Confirm the WEP key.

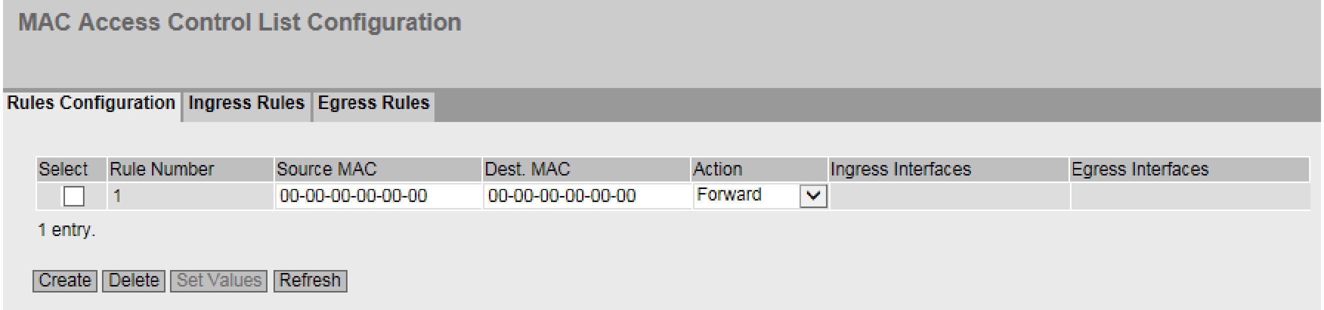
Procedure

1. Enter at least one WEP key.
2. Click the "Set Values" button.

6.9.5 MAC ACL

6.9.5.1 Rules Configuration

On this page, you specify the access rules for the MAC-based Access Control List. Using the MAC-based ACL, you can specify whether frames of certain MAC addresses are forwarded or discarded.



MAC Access Control List Configuration

Select	Rule Number	Source MAC	Dest. MAC	Action	Ingress Interfaces	Egress Interfaces
□	1	00-00-00-00-00-00	00-00-00-00-00-00	Forward		

1 entry.

Description

The table has the following columns:

- **Select**
  Select the row you want to delete. If this entry is used, this is grayed out and you cannot delete it.
- **Rule Number**
  Shows the number of the ACL rule. If you create a new entry, a new line with a unique number is created.
- **Source MAC Address**
  Enter the MAC address of the source.
- **Dest. MAC Address**
  Enter the MAC address of the destination.
- **Action**
  Select whether the frame is forwarded or rejected when it corresponds to the ACL rule.
  - Forward
    If the frame complies with the ACL rule, the frame is forwarded.
  - Discard
    If the frame complies with the ACL rule, the frame is not forwarded.
- **Ingress Interfaces**
  Shows a list of all ingress interfaces to which this rule applies.
- **Egress Interfaces**
  Shows a list of all egress interfaces to which this rule applies.

Note

Entering the MAC addresses

You can configure access rules for MAC addresses.

Only if you enter the address "00-00-00-00-00-00" for the source and/or destination MAC address, the rule created in this way applies to all source or destination MAC addresses.

Note

No ACL rules for locally supported protocols

ACL rules are not applied to packets from locally supported protocols. This restriction applies to the following protocols:

- DCP
- LLDP
- RSTP

Make the specifications for receiving and sending packets for these protocols directly on the configuration page of the respective protocol.

Configuration procedure

1. Click the "Create" button. A new row with a unique number (rule number) is created in the table.
2. Enter the MAC address of the source in "Source MAC Address".
3. Enter the MAC address of the destination in "Dest. MAC Address".
4. In the "Action" drop-down list select whether the frame is forwarded or rejected when it corresponds to the ACL rule.
5. Click the "Set Values" button.

Deleting an entry

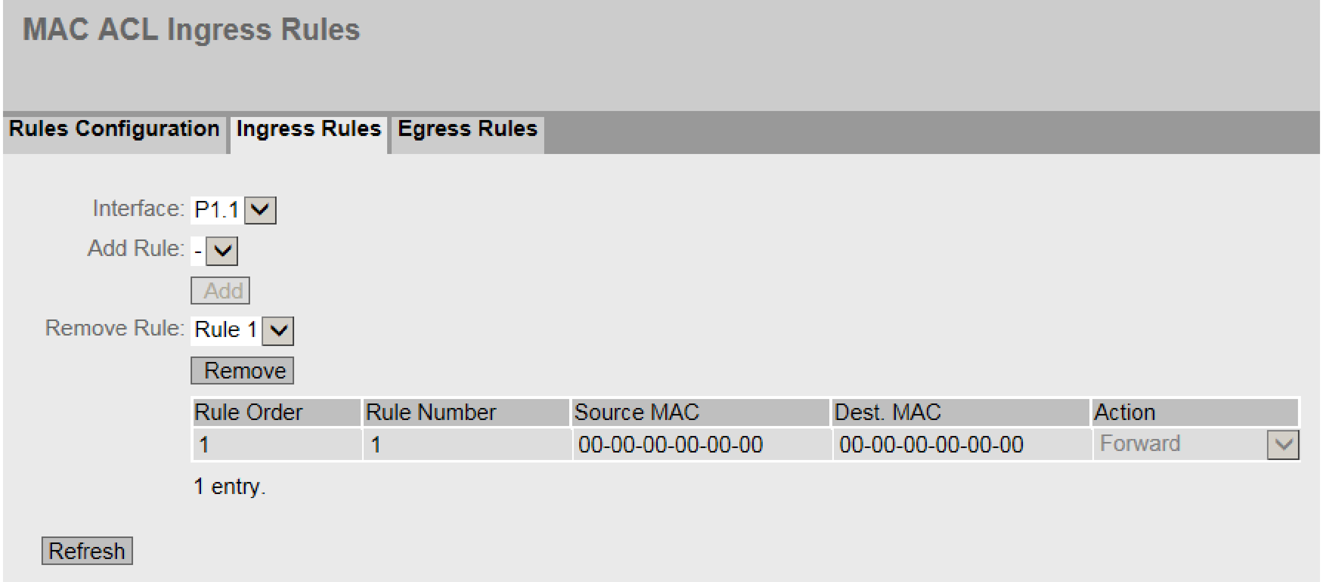
You cannot delete active entries.

1. Enable "Select" in the row to be deleted.
2. Click the "Delete" button. The entry is deleted.

6.9.5.2 Ingress Rules

Introduction

On this page, you specify the ACL rule according to which incoming frames are filtered at interfaces. You specify the ACL rules in the "Rules Configuration" tab.



MAC ACL Ingress Rules

Interface: P1.1

Add Rule: -

Remove Rule: Rule 1

Rule Order	Rule Number	Source MAC	Dest. MAC	Action
1	1	00-00-00-00-00-00	00-00-00-00-00-00	Forward

1 entry.

Description of the displayed boxes

The page contains the following boxes:

- **Interface**
  Select the required interface from the drop-down list. The available interfaces (Page 44) depend on your device.
- **Add Rule**
  In the drop-down list select the ACL rule to be assigned to the interface.
- **Add**
  To assign the ACL rule to the interface, click the "Add" button. The configuration is shown in the table.
- **Remove Rule**
  From the "Remove rule" drop-down list, select the ACL rule to be deleted.
- **Remove**
  To remove the ACL rule from the interface, click the "Remove" button.

The table has the following columns:

- **Rule Order**
  Shows the order of the ACL rules.
- **Rule Number**
  Shows the number of the ACL rule.

- **Source MAC address**
  Shows the MAC address of the source.
- **Dest. MAC Address**
  Shows the MAC address of the destination.
- **Action**
  Shows the action.
  - Forward
    If the frame complies with the ACL rule, the frame is forwarded.
  - Discard
    If the frame complies with the ACL rule, the frame is not forwarded.

Configuration procedure

Follow the steps below to assign an ACL rule to an interface:

1. Select the interface from the "Interface" drop-down list.
2. Select the ACL rule in the "Add Rule" drop-down list.
3. Click the "Add" button. A new entry is generated in the table.

Follow the steps below to remove an ACL rule from an interface:

Note

active rules

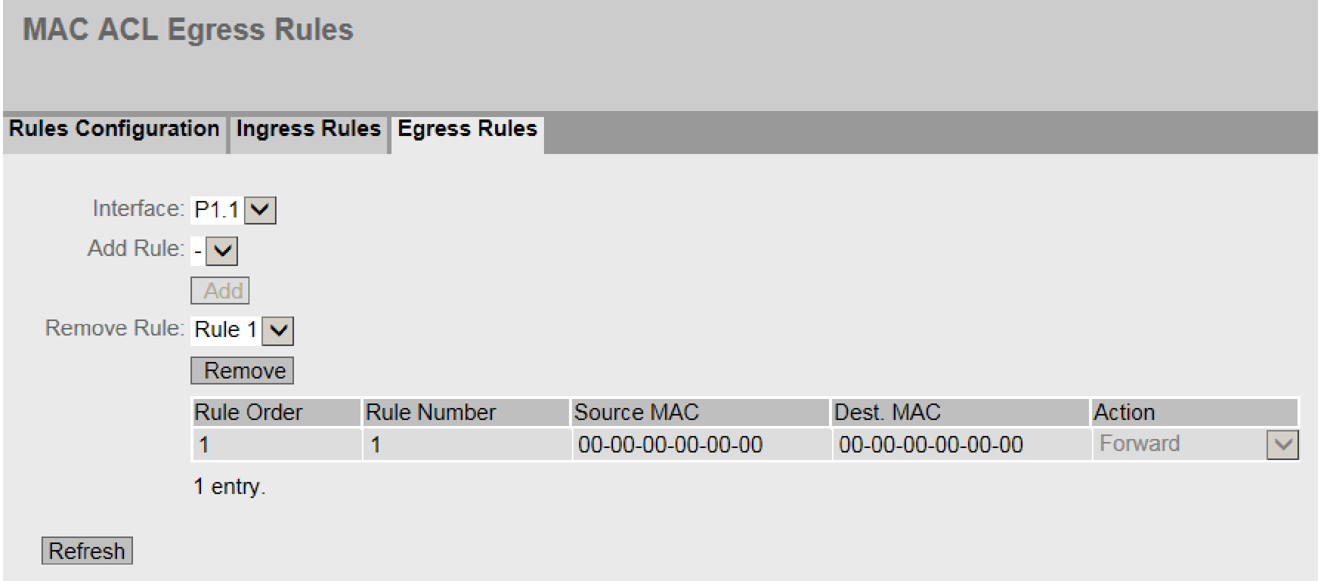
You cannot delete active rules.

1. Select the interface from the "Interface" drop-down list.
2. Select the ACL rule in the "Remove Rule" drop-down list.
3. Click the "Remove" button. The corresponding entry is removed in the table.

6.9.5.3 Egress Rules

Introduction

On this page, you specify the ACL rule according to which outgoing frames are filtered at interfaces. You specify the ACL rule in the "Rules Configuration" tab.



MAC ACL Egress Rules

Interface: P1.1

Add Rule: -

Remove Rule: Rule 1

Rule Order	Rule Number	Source MAC	Dest. MAC	Action
1	1	00-00-00-00-00-00	00-00-00-00-00-00	Forward

1 entry.

Description of the displayed boxes

The page contains the following boxes:

- **Interface**
  Select the required interface from the drop-down list. The available interfaces (Page 44) depend on your device.
- **Add Rule**
  In the drop-down list select the ACL rule to be assigned to the interface.
- **Add**
  To assign the ACL rule to the interface, click the "Add" button. The configuration is shown in the table.
- **Remove Rule**
  From the "Remove rule" drop-down list, select the ACL rule to be deleted.
- **Remove**
  To remove the ACL rule from the interface, click the "Remove" button.

The table has the following columns:

- **Rule Order**
  Shows the order of the ACL rules.
- **Rule Number**
  Shows the number of the ACL rule.

- **Source MAC address**
  Shows the MAC address of the source.
- **Dest. MAC Address**
  Shows the MAC address of the destination.
- **Action**
  Shows the action.
  - Forward
    If the frame complies with the ACL rule, the frame is forwarded.
  - Discard
    If the frame complies with the ACL rule, the frame is not forwarded.

Configuration procedure

Follow the steps below to assign an ACL rule to an interface:

1. Select the interface from the "Interface" drop-down list.
2. Select the ACL rule in the "Add Rule" drop-down list.
3. Click the "Add" button. A new entry is generated in the table.

Follow the steps below to remove an ACL rule from an interface:

Note

active rules

You cannot delete active rules.

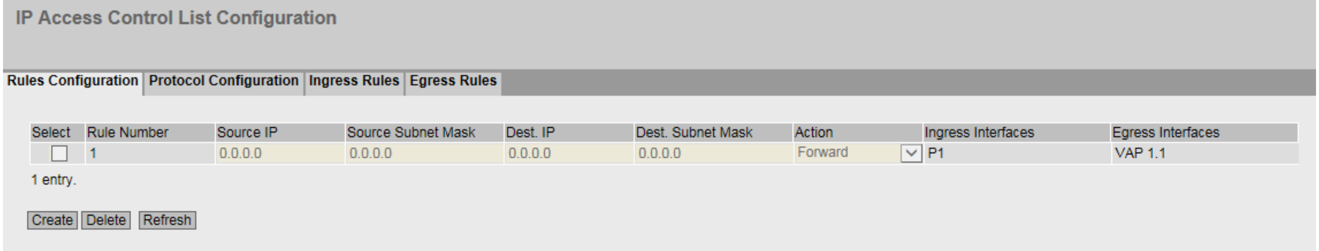
1. Select the interface from the "Interface" drop-down list.
2. Select the ACL rule in the "Remove Rule" drop-down list.
3. Click the "Remove" button. The corresponding entry is removed in the table.

6.9.6 IP ACL

6.9.6.1 Rules Configuration

Introduction

On this page, you specify the rules for the IP-based Access Control List. Using the IP-based ACL, you can specify whether frames of certain IPv4 addresses are forwarded or discarded. The maximum number of ACL rules can be found in the section "Configuration limits".



IP Access Control List Configuration

Select	Rule Number	Source IP	Source Subnet Mask	Dest. IP	Dest. Subnet Mask	Action	Ingress Interfaces	Egress Interfaces
□	1	0.0.0.0	0.0.0.0	0.0.0.0	0.0.0.0	Forward	P1	VAP 1.1

1 entry.

Description of the displayed boxes

The table has the following columns:

- **Select**
  Select the row you want to delete. If this entry is used, this is grayed out and you cannot delete it.
- **Rule Number**
  Shows the number of the ACL rule. If you create a new entry, a new line with a unique number is created.
- **Source IP**
  Enter the IPv4 address of the source.
- **Source Subnet Mask**
  Enter the subnet mask of the source.
- **Dest. IP**
  Enter the IPv4 address of the destination.
- **Dest. Subnet Mask**
  Enter the subnet mask of the destination.
- **Action**
  Select whether the frame is forwarded or rejected when it corresponds to the ACL rule.
  - Forward
    If the frame complies with the ACL rule, the frame is forwarded.
  - Discard
    If the frame complies with the ACL rule, the frame is not forwarded.

- **Ingress Interfaces**
  Shows a list of all ingress interfaces to which this rule applies.
- **Egress Interfaces**
  Shows a list of all egress interfaces to which this rule applies.

Note

Subnet mask for individual hosts

If you create the rule for a single system (one IPv4 address), specify the subnet mask "255.255.255.255".

Configuration procedure

1. Click the "Create" button. A new row with a unique number (rule number) is created in the table.
2. Enter the data of the source in "Source IP" and in "Source Subnet Mask".
3. Enter the data of the destination in "Dest. IP" and in "Dest. Subnet Mask".
4. In the "Action" drop-down list select whether the frame is forwarded or rejected when the frame corresponds to the ACL rule.
5. Click the "Set Values" button.

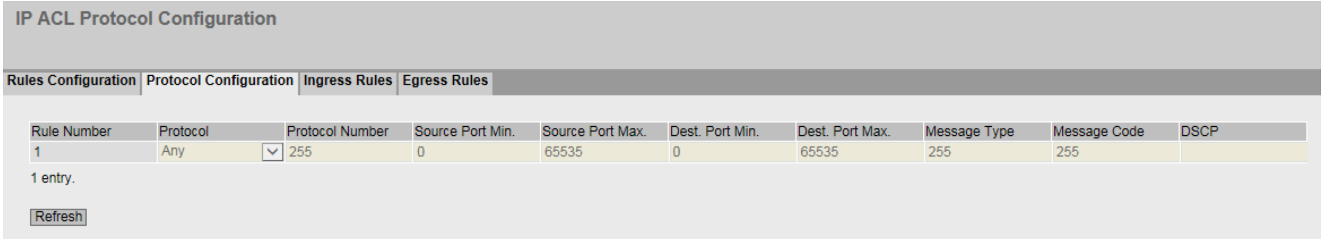
Deleting an entry

You cannot delete active entries.

1. Enable "Select" in the row to be deleted.
2. Click the "Delete" button. The entry is deleted.

6.9.6.2 Protocol Configuration

On this page, you specify the rules for protocols.



IP ACL Protocol Configuration

Rule Number	Protocol	Protocol Number	Source Port Min.	Source Port Max.	Dest. Port Min.	Dest. Port Max.	Message Type	Message Code	DSCP
1	Any	255	0	65535	0	65535	255	255	

1 entry.

Description

The table has the following columns:

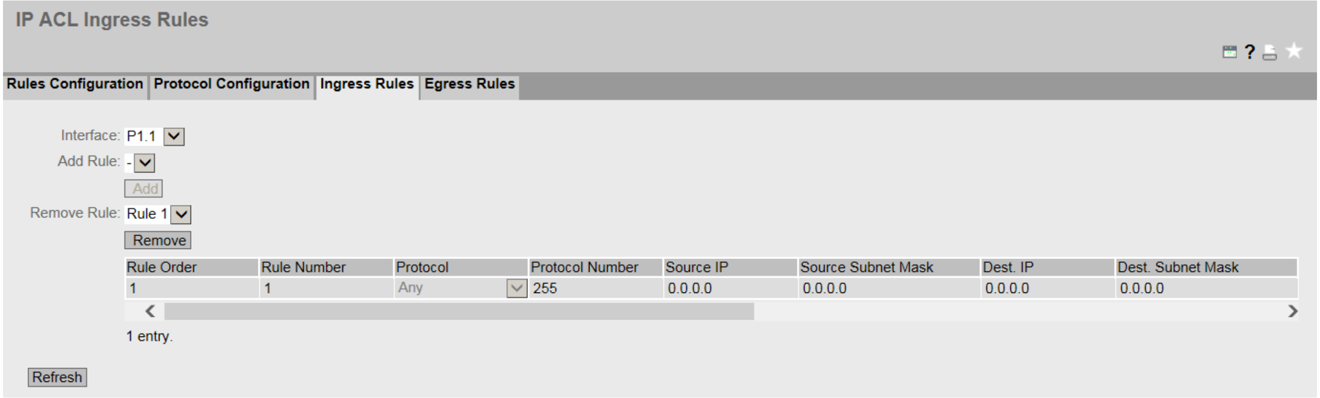
- **Rule Number**
  Shows the number of the protocol rule. When you create a rule, a new row with a unique number is created.
- **Protocol**
  Select the protocol for which this rule is valid.
- **Protocol Number**
  Enter a protocol number to define further protocols.
  This box can only be edited if you have set "Other Protocol" for the protocol.
- **Source Port Min.**
  Enter the lowest possible port number of the source port.
  This box can only be edited if you have set "TCP" or "UDP" for the protocol.
- **Source Port Max.**
  Enter the highest possible port number of the source port.
  This box can only be edited if you have set "TCP" or "UDP" for the protocol.
- **Dest. Port Min.**
  Enter the lowest possible port number of the destination port.
  This box can only be edited if you have set "TCP" or "UDP" for the protocol.
- **Dest. Port Max.**
  Enter the highest possible port number of the destination port.
  This box can only be edited if you have set "TCP" or "UDP" for the protocol.
- **Message Type**
  Enter a message type to decide the format of the message.
  This box can only be edited if you have set "ICMP" for the protocol.
- **Message Code**
  Enter a message code to specify the function of the message.
  This box can only be edited if you have set "ICMP" for the protocol.
- **DSCP**
  Enter a value for classifying the priority.
  This box cannot be edited if you have set "ICMP" for the protocol.

6.9.6.3 Ingress Rules

Introduction

On this page, you specify the ACL rules according to which incoming frames are handled by interfaces. You specify the ACL rules in the "Rules Configuration" tab.

IP ACL ingress rules - first part of the table:

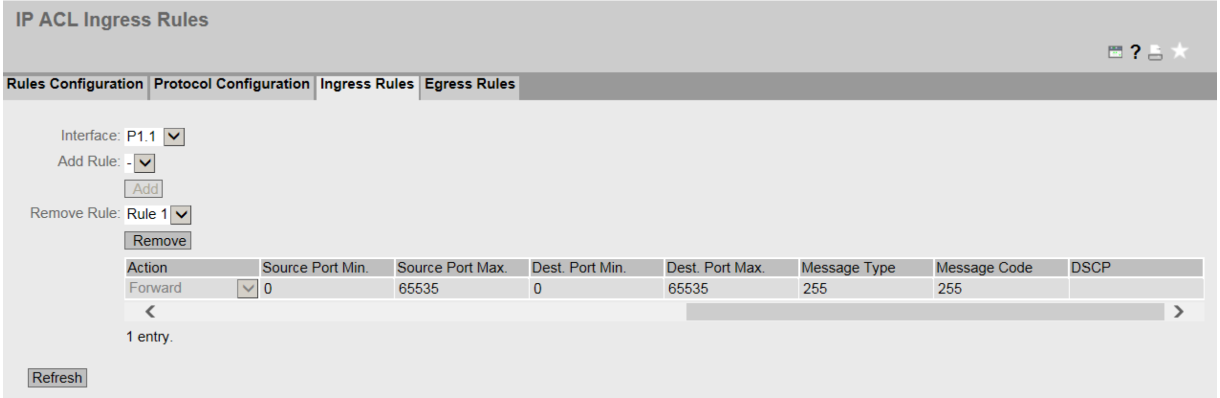


Interface: P1.1
Add Rule: -
Remove Rule: Rule 1

Rule Order	Rule Number	Protocol	Protocol Number	Source IP	Source Subnet Mask	Dest. IP	Dest. Subnet Mask
1	1	Any	255	0.0.0.0	0.0.0.0	0.0.0.0	0.0.0.0

1 entry.

IP ACL ingress rules - second part of the table:



Interface: P1.1
Add Rule: -
Remove Rule: Rule 1

Action	Source Port Min.	Source Port Max.	Dest. Port Min.	Dest. Port Max.	Message Type	Message Code	DSCP
Forward	0	65535	0	65535	255	255	

1 entry.

Description of the displayed boxes

The page contains the following boxes:

- **Interface**
  Select the required interface from the drop-down list. The available interfaces (Page 44) depend on your device.
  To select a VLAN interface, an IP interface must be configured.

  Note

  If you use a VLAN interface, the ACL rule applies to all ports that belong to the VLAN.

- **Add Rule**
  In the drop-down list select the ACL rule to be assigned to the interface.
- **Add**
  To permanently assign the ACL rule to the interface, click the "Add" button. The configuration is shown in the table.
- **Remove Rule**
  From the "Remove rule" drop-down list, select the ACL rule to be deleted.
- **Remove**
  To remove the ACL rule from the interface, click the "Remove" button.

The table has the following columns:

- **Rule Order**
  Shows the order of the ACL rules.
- **Rule Number**
  Shows the number of the ACL rule.
- **Protocol**
  Shows the protocol for which this rule is valid.
- **Protocol Number**
  Shows the protocol number.
- **Source IP**
  Shows the IPv4 address of the source.
- **Source Subnet Mask**
  Shows the subnet mask of the source.
- **Dest IP**
  Shows the IP address of the destination.
- **Dest. Subnet Mask**
  Shows the subnet mask of the destination.
- **Action**
  Select whether the frame is forwarded or rejected when it corresponds to the ACL rule.
  - Forward
    If the frame complies with the ACL rule, the frame is forwarded.
  - Discard
    If the frame complies with the ACL rule, the frame is not forwarded.
- **Source Port Min.**
  Shows the lowest possible port number of the source port.
- **Source Port Max.**
  Shows the highest possible port number of the source port.
- **Dest. Port Min.**
  Shows the lowest possible port number of the destination port.
- **Dest. Port Max.**
  Shows the highest possible port number of the destination port.
- **Message Type**
  Shows a message type to decide the format of the message.
- **Message Code**
  Shows a message code to specify the function of the message.
- **DSCP**
  Shows a value for classifying the priority.

Steps in configuration

Follow the steps below to assign an ACL rule to an interface:

1. Select the interface from the "Interface" drop-down list.
2. Select the ACL rule in the "Add Rule" drop-down list.
3. Click the "Add" button. A new entry is generated in the table.

Follow the steps below to assign an ACL rule to an interface:

Note

active rules

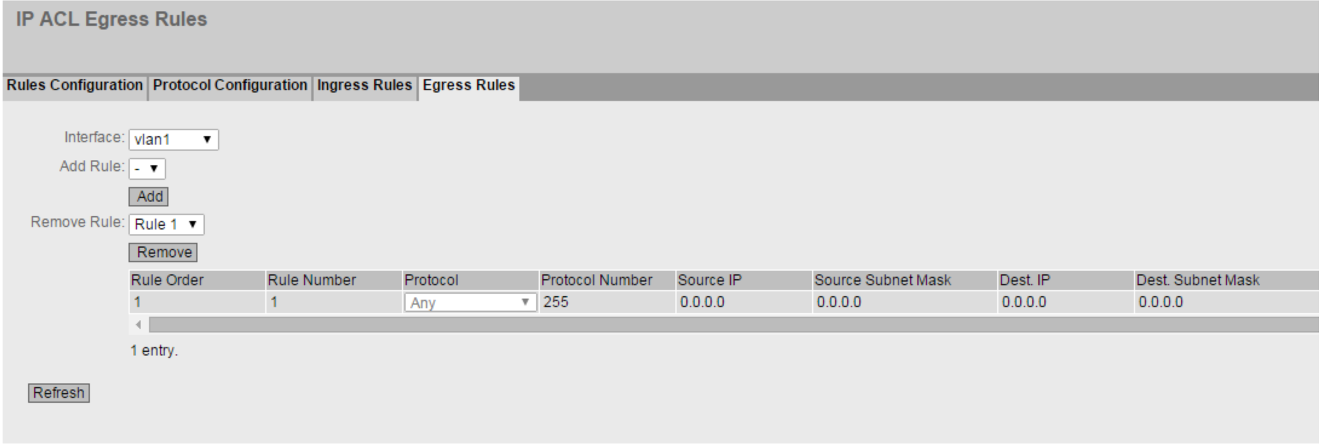
You cannot delete active rules.

1. Select the interface from the "Interface" drop-down list.
2. Select the ACL rule in the "Remove Rule" drop-down list.
3. Click the "Remove" button. The corresponding entry is deleted.

6.9.6.4 Egress Rules

Introduction

On this page, you specify the ACL rules according to which outgoing frames are handled by interfaces. You specify the ACL rules in the "Rules Configuration" tab.



IP ACL Egress Rules

Interface: vlan1

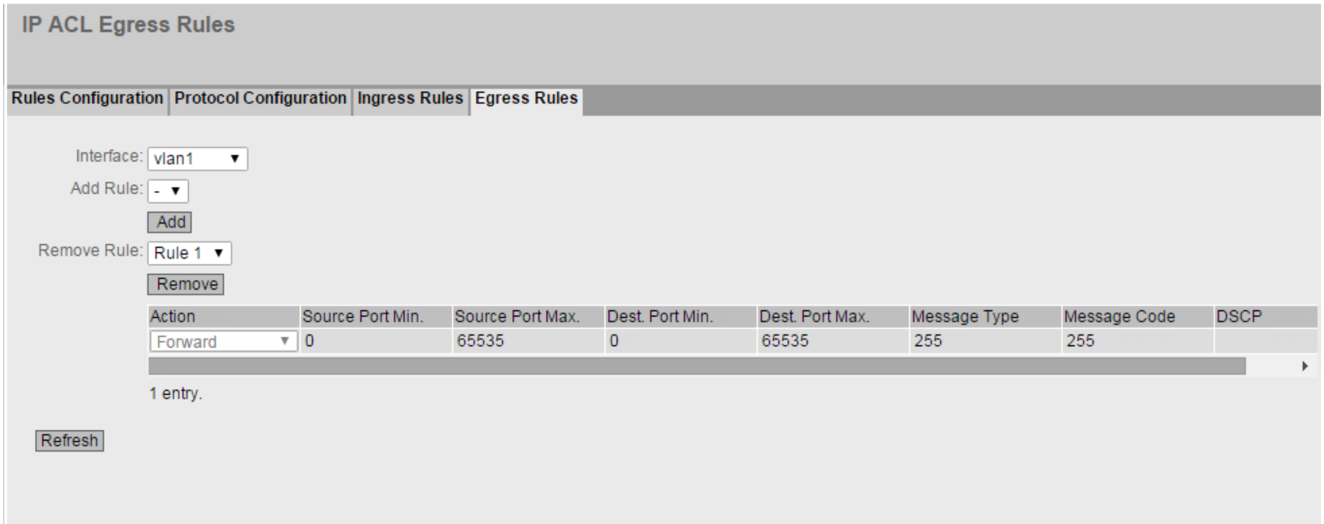
Add Rule: -

Remove Rule: Rule 1

Rule Order	Rule Number	Protocol	Protocol Number	Source IP	Source Subnet Mask	Dest. IP	Dest. Subnet Mask
1	1	Any	255	0.0.0.0	0.0.0.0	0.0.0.0	0.0.0.0

1 entry.

IP ACL egress rules - first part of the table



IP ACL Egress Rules

Interface: vlan1

Add Rule: -

Remove Rule: Rule 1

Action	Source Port Min.	Source Port Max.	Dest. Port Min.	Dest. Port Max.	Message Type	Message Code	DSCP
Forward	0	65535	0	65535	255	255	

1 entry.

IP ACL egress rules - second part of the table

Description of the displayed boxes

The page contains the following boxes:

- **Interface**
  Select the required interface from the drop-down list. The available interfaces (Page 44) depend on the device.
  To select a VLAN interface, an IP interface must be configured.

  Note

  If you use a VLAN interface, the ACL rule applies to all ports that belong to the VLAN.

- **Add Rule**
  In the drop-down list select the ACL rule to be assigned to the interface.
- **Add**
  To assign the ACL rule to the interface, click the "Add" button. The configuration is shown in the table.

  Note

  An ACL rule with the content "deny any" must not be applied to outgoing frames.

- **Remove Rule**
  From the "Remove rule" drop-down list, select the ACL rule to be deleted.
- **Remove**
  To remove the ACL rule from the interface, click the "Remove" button.

The table has the following columns:

- **Rule Order**
  Shows the order of the ACL rules.
- **Rule Number**
  Shows the number of the ACL rule.
- **Protocol**
  Shows the protocol for which this rule is valid.
- **Protocol Number**
  Shows the protocol number.
- **Source IP**
  Shows the IPv4 address of the source.
- **Source Subnet Mask**
  Shows the subnet mask of the source.
- **Dest IP**
  Shows the IP address of the destination.
- **Dest. Subnet Mask**
  Shows the subnet mask of the destination.

- **Action**
  Select whether the frame is forwarded or rejected when it corresponds to the ACL rule.
  - Forward
    If the frame complies with the ACL rule, the frame is forwarded.
  - Discard
    If the frame complies with the ACL rule, the frame is not forwarded.
- **Source Port Min.**
  Shows the lowest possible port number of the source port.
- **Source Port Max.**
  Shows the highest possible port number of the source port.
- **Dest. Port Min.**
  Shows the lowest possible port number of the destination port.
- **Dest. Port Max.**
  Shows the highest possible port number of the destination port.
- **Message Type**
  Shows a message type to decide the format of the message.
- **Message Code**
  Shows a message code to specify the function of the message.
- **DSCP**
  Shows a value for classifying the priority.

Configuration procedure

Follow the steps below to assign an ACL rule to an interface:

1. Select the interface from the "Interface" drop-down list.
2. Select the ACL rule in the "Add Rule" drop-down list.
3. Click the "Add" button. A new entry is generated in the table.

Follow the steps below to remove an ACL rule from an interface:

Note

active rules

You cannot delete active rules.

1. Select the interface from the "Interface" drop-down list.
2. Select the ACL rule in the "Remove Rule" drop-down list.
3. Click the "Remove" button. The corresponding entry is removed in the table.

6.9.7 Management ACL

Description of configuration

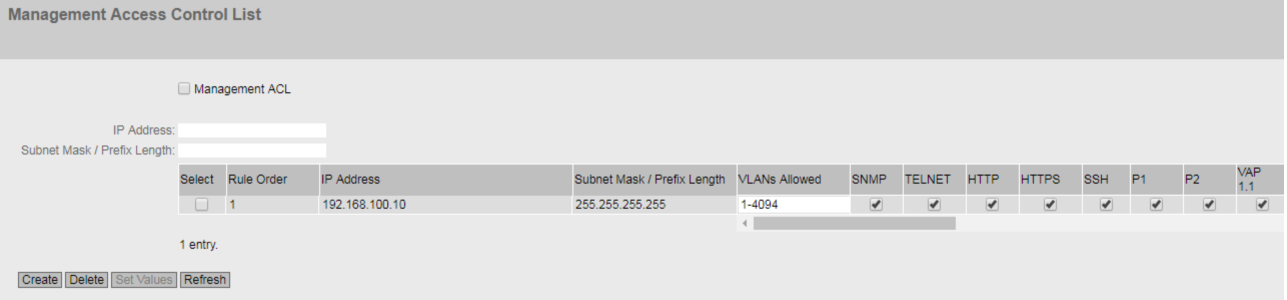
On this page, you can increase the security of your device. To specify which station with which IP address is allowed to access your device, configure the IP address or an entire address range.

You can select the protocols and the ports of the station with which it is allowed to access the device. You define the VLAN in which the station may be located. This ensures that only certain stations within a VLAN have access to the device.

Note

If you enable this function, note the following

A bad configuration on the "Management Access Control List" page can result in you being unable to access the device. You should therefore configure an access rule that allows access to the management before you enable the function.



Management Access Control List

□ Management ACL

IP Address:
Subnet Mask / Prefix Length:

Select	Rule Order	IP Address	Subnet Mask / Prefix Length	VLANs Allowed	SNMP	TELNET	HTTP	HTTPS	SSH	P1	P2	VAP 1.1
□	1	192.168.100.10	255.255.255.255	1-4094	☑	☑	☑	☑	☑	☑	☑	☑

1 entry.

Description

The page contains the following boxes:

- **Management ACL**
  Enable or disable the function.

  Note

  If the function is disabled, there is unrestricted access to the management of the device. The configured access rules are only taken into account when the function is enabled.

- **IP Address**
  Enter the IP address or the network address to which the rule will apply.
  - If you use the IPv4 address 0.0.0.0, the settings apply to all IPv4 addresses.
  - If you use the IPv6 address :: the settings apply to all IPv6 addresses.
- **Subnet Mask / Prefix Length**
  Enter the subnet mask or the prefix length.
  The subnet mask 255.255.255.255 is for a specific IPv4 address. If you want to allow a subnet, for example a C subnet, enter 255.255.255.0. The subnet mask 0.0.0.0 applies to all subnets.

The table has the following columns:

- **Select**
  Select the check box in the row to be deleted.
- **Rule Order**
  Shows the number of the rule. If you click the "Create" button, a new row with a unique number is created.
- **IP Address**
  Shows the IP address.
- **Subnet Mask / Prefix Length**
  Shows the subnet mask or the prefix length.
- **VLANs Allowed**
  Only available if 802.1Q VLAN Bridge is set for "Layer 2 > VLAN > General".
  Enter the number of the VLAN in which the device is located. The station can only access the device if it is located in this configured VLAN. If this input box remains empty, there is no restriction relating to the VLANs.
- **SNMP**
  Specify whether the station (or the IP address) accesses the device using the SNMP protocol.
- **TELNET**
  Specify whether the station (or the IP address) accesses the device using the TELNET protocol.
- **HTTP**
  Specify whether the station (or the IP address) accesses the device using the HTTP protocol.
- **HTTPS**
  Specify whether the station (or the IP address) accesses the device using the HTTPS protocol.
- **SSH**
  Specify whether the station (or the IP address) accesses the device using the SSH protocol.
- **Px**
  Specify whether the station (or the IP address) accesses the device via this port.
- **VAP X.Y**
  Specify whether the station (or the IP address) accesses the device via the VAP interface.
- **WDS X.Y**
  Specify whether the station (or the IP address) accesses the device via the WDS interface.

Procedure

Note

Note that a bad configuration may mean that you can no longer access the device.

You can then only remedy this by resetting the device to the factory defaults and then reconfiguring.

Changing the entry

1. Configure the data of the entry you want to modify.
2. Click the "Set Values" button to transfer the changes to the device.

Creating new entry

1. In the "IP Address" input box, enter the IP address of the device and in the "Subnet Mask / Prefix Length" input box the corresponding subnet mask.
2. Click the "Create" button to create a new row in the table.
3. Configure the entries of the new row.
4. Click the "Set Values" button to transfer the new entry to the device.

Deleting entries

1. Select the check box in the row to be deleted.
2. Repeat this procedure for every entry you want to delete.
3. Click the "Delete" button. The entries are deleted and the page is updated.

6.9.8 Inter AP blocking

6.9.8.1 Basic

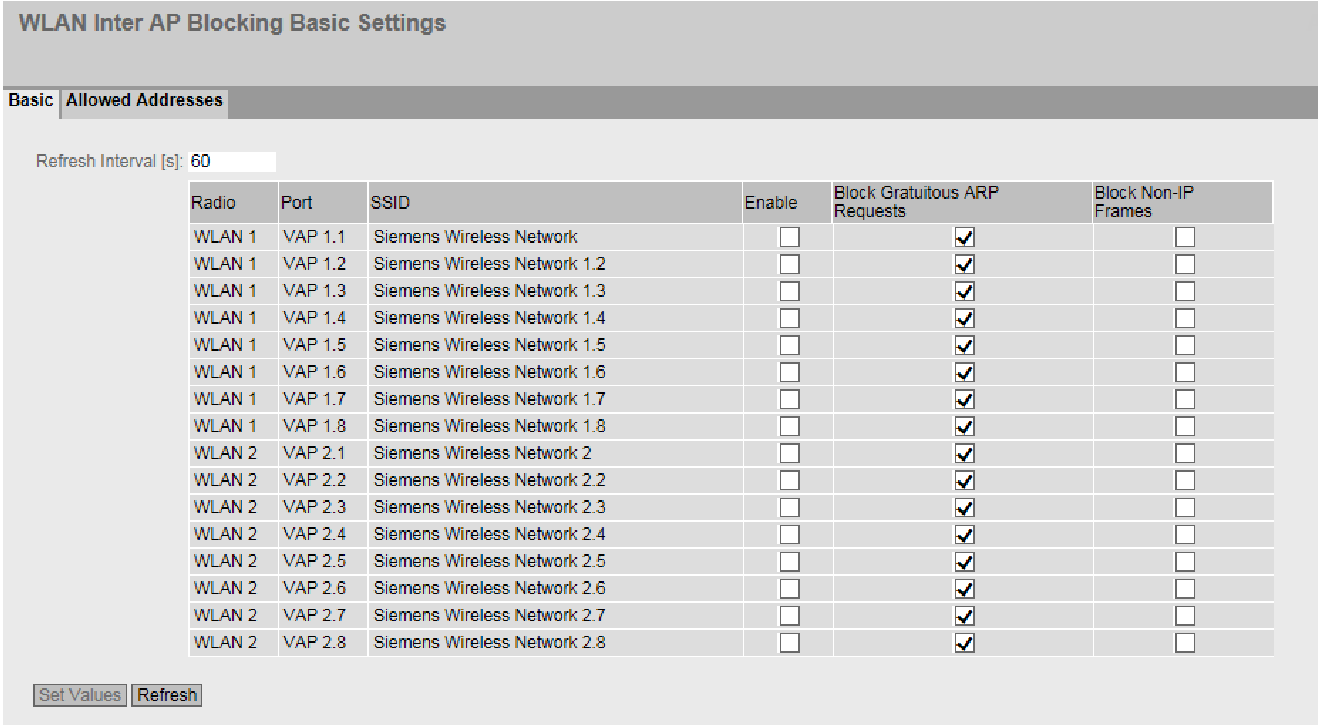
Note

- This WBM page is only available in access point mode.
- This WBM page can only be configured with the following KEY-PLUGs:
  - W780 iFeatures (MLFB 6GK5 907-8PA00)
  - W700 Security (MLFB 6GK5907-0PA00)

When should Inter AP blocking be used?

The clients connected to an access point can normally communicate with all devices of the cabled layer 2 network.

With inter AP blocking, the communication of the clients connected to the access point can be restricted. Only the devices whose IP addresses are configured in "Allowed Addresses" on the access point are accessible to the clients. Communication with other nodes in the network is therefore prevented.



WLAN Inter AP Blocking Basic Settings

Refresh Interval [s]: 60

Radio	Port	SSID	Enable	Block Gratuitous ARP Requests	Block Non-IP Frames
WLAN 1	VAP 1.1	Siemens Wireless Network	☐	☑	☐
WLAN 1	VAP 1.2	Siemens Wireless Network 1.2	☐	☑	☐
WLAN 1	VAP 1.3	Siemens Wireless Network 1.3	☐	☑	☐
WLAN 1	VAP 1.4	Siemens Wireless Network 1.4	☐	☑	☐
WLAN 1	VAP 1.5	Siemens Wireless Network 1.5	☐	☑	☐
WLAN 1	VAP 1.6	Siemens Wireless Network 1.6	☐	☑	☐
WLAN 1	VAP 1.7	Siemens Wireless Network 1.7	☐	☑	☐
WLAN 1	VAP 1.8	Siemens Wireless Network 1.8	☐	☑	☐
WLAN 2	VAP 2.1	Siemens Wireless Network 2	☐	☑	☐
WLAN 2	VAP 2.2	Siemens Wireless Network 2.2	☐	☑	☐
WLAN 2	VAP 2.3	Siemens Wireless Network 2.3	☐	☑	☐
WLAN 2	VAP 2.4	Siemens Wireless Network 2.4	☐	☑	☐
WLAN 2	VAP 2.5	Siemens Wireless Network 2.5	☐	☑	☐
WLAN 2	VAP 2.6	Siemens Wireless Network 2.6	☐	☑	☐
WLAN 2	VAP 2.7	Siemens Wireless Network 2.7	☐	☑	☐
WLAN 2	VAP 2.8	Siemens Wireless Network 2.8	☐	☑	☐

Description

The page contains the following box:

- **Update interval [s]**
  Enter the update interval for the ARP resolution of the allowed IP addresses.
  The resolved MAC addresses are displayed under "Information > Security > Inter AP Blocking".

The table has the following columns:

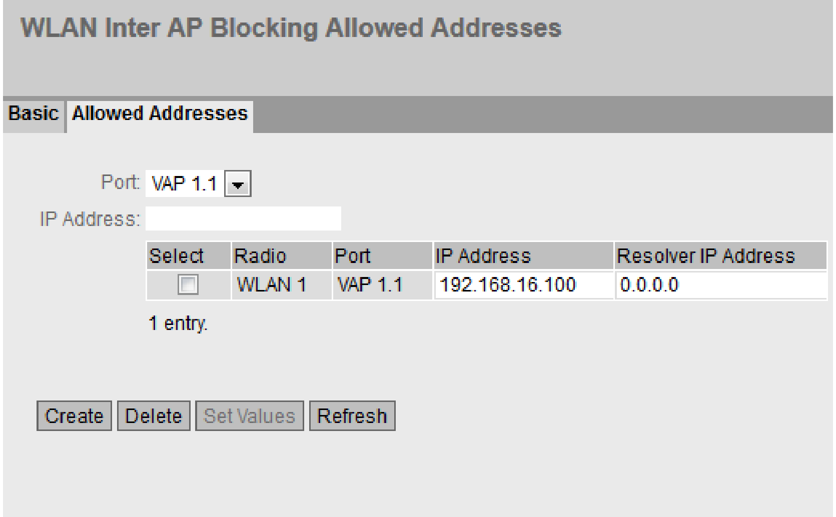
- **Radio**
  Specifies the WLAN interface to which the settings relate.
- **Port**
  Specifies the VAP interface to which the settings relate.
- **SSID**
  Specifies the SSID to which the settings relate.
- **Activate**
  When enabled, the access restriction is used. You configure which devices are accessible to the clients in "Security > Inter AP Blocking > Allowed Addresses".
- **Block Gratuitous ARP Requests**
  When enabled, unsolicited ARP packets from this VAP interface are not forwarded to Ethernet.
- **Block Non-IP Frames**
  When enabled, there is no exchange of non-IP packets, for example layer 2 packets between the client and the devices configured on the access point as permitted communications partners.

6.9.8.2 Allowed Addresses

Note

- This WBM page is only available in access point mode.
- This WBM page can only be configured with the following KEY-PLUGs:
  - W780 iFeatures (MLFB 6GK5 907-8PA00)
  - W700 Security (MLFB 6GK5907-0PA00)

On this WBM page, you specify which devices are accessible to the clients.



WLAN Inter AP Blocking Allowed Addresses

Port: VAP 1.1

IP Address:

Select	Radio	Port	IP Address	Resolver IP Address
□	WLAN 1	VAP 1.1	192.168.16.100	0.0.0.0

1 entry.

Description

The page contains the following boxes:

- **Port**
  Select the required port from the drop-down list.
- **IP Address**
  Enter the IP address of the devices accessible to the client.

The table has the following columns:

- **Select**
  Select the check box in the row to be deleted
- **Radio**
  Specifies the WLAN interface to which the settings relate
- **Port**
  Specifies the VAP interface to which the settings relate

- **IP Address**
  The IP Address of the devices accessible to the client. If necessary, you can change the IP address.
- **Resolver IP Address**
  The IP address that the access point uses to resolve the allowed IP address. The entry is necessary when the management IP address of the access point is located in a different subnet.
  If the IP address "0.0.0.0" is configured for "Resolver IP Address", the management IP address is used for resolution.

Procedure

Creating an entry

1. Select a port from the "Port" drop-down list.
2. In the "IP Address" box, enter the IP address accessible for the client.
3. Click the "Create" button. A new entry is created in the table.

Deleting an entry

1. Enable "Select" in the row to be deleted.
2. Click the "Delete" button. The entry is deleted.

6.10 "iFeatures" menu

6.10.1 iPCF

Note

This WBM page can only be configured with the following KEY-PLUGs:

- Access point: W780 iFeatures (MLFB 6GK5 907-8PA00)
- Client: W740 iFeatures (MLFB 6GK5 907-4PA00)

When should iPCF be used?

Note

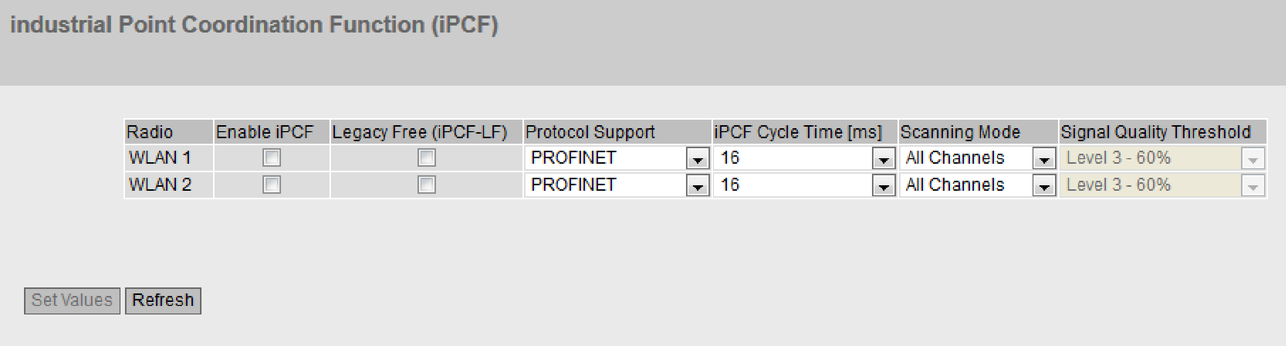
Use of iPCF with other iFeatures

iPCF and other iFeatures (e.g. iPCF-MC, iPCF-HT, iPRP) are not compatible with each other and cannot be used at the same time on one device.

The use of iPCF is advisable particularly if you have a large number of nodes and want to implement highly deterministic operation. This is necessary, for example with PROFINET or other cyclic protocols. You will find a more detailed description of iPCF in the section "Technical basics" in the section "iPCF / iPCF-HT / iPCF-MC".

The possible settings differ for access point and client. Both are described below:

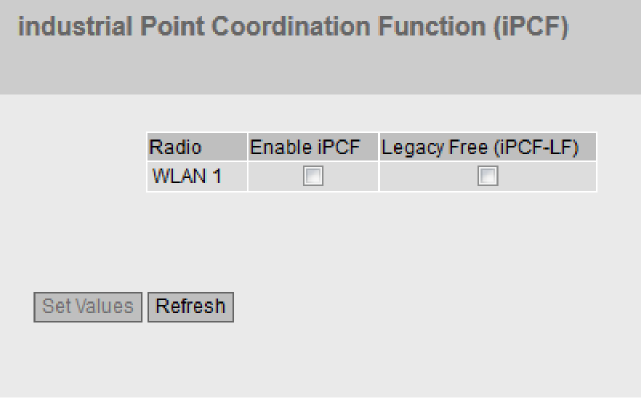
In access point mode



industrial Point Coordination Function (iPCF)

Radio	Enable iPCF	Legacy Free (iPCF-LF)	Protocol Support	iPCF Cycle Time [ms]	Scanning Mode	Signal Quality Threshold
WLAN 1	□	□	PROFINET	16	All Channels	Level 3 - 60%
WLAN 2	□	□	PROFINET	16	All Channels	Level 3 - 60%

In client mode



industrial Point Coordination Function (iPCF)

Radio	Enable iPCF	Legacy Free (iPCF-LF)
WLAN 1	□	□

Description

In both modes, the table has the following columns:

- **Radio**
  Specifies the WLAN interface to which the settings relate.
- **Enable iPCF**
  Enable or disable the iPCF mode. For PROFINET communication, we recommend that you enable the iPCF mode. By enabling iPCF, the data rates provided by the access point are adapted. We strongly recommend that you retain the default setting for the data rates (802.11 a/b/g = 12 Mbps and 802.11n = MCS 2).
- **Legacy Free (iPCF-LF)**
  This setting determines which device generations can establish a connection to this device.
  - Enabled
    Only the devices that communicate with the IEEE 802.11n standard and have the "Legacy Free (iPCF-LF)" setting enabled are accepted. WLAN mode IEEE 802.11n need not be enabled for this, however.
    This setting prevents performance from being slowed down by the IEEE 802.11 a/b/g device generation.
  - Disabled
    All device generations (IEEE 802.11 a/b/g/n) are accepted.

In access point mode, the table has the following additional columns:

- **Protocol Support**
  Specify which protocol is handled with priority by the WLAN interface.
  - PROFINET
    If you set PROFINET, there must be no central PROFINET controller downstream from the client.
  - EtherNet/IP
    If you set EtherNet/IP, there must be no scanner downstream from the client.
  - Disabled
    The function is disabled.
- **iPCF Cycle Time [ms]**
  Select the required cycle time from the drop-down list.
  The following points need to be taken into account when setting the cycle time. Otherwise it may not be possible to establish stable communication.
  - There is only one access point in the system; in other words, the clients move only in one wireless cell. In this case, update times >= 16 ms are supported.
  - There are several access points in the system that communicate over different channels. The clients roam between the access points. In this case, select update times >= 32 ms.

  In addition to the guide values shown above, remember that the shortest cycle time to be set is calculated according to the formula "2 ms * max. number of nodes".

- **Scanning Mode**
  The selected setting affects the scanning of the logged-on clients.
  The following settings are available:
  – All Channels
    The client scans all permitted channels and selects the access point with the best signal strength and connects to it.
  – Next Channel
    The client scans the next channel from its permitted channel list. If an access point is there, it connects to it. If it does not find an access point on this channel, it scans the next channel.
- **Signal Quality Threshold**
  Can only be configured if "Next Channel" is set for "Scanning Mode".
  The access point specifies a signal quality for the client. When scanning, the client must receive the signal coming from the access point with at least the specified signal quality. Only then is a connection established.
  The signal quality is determined by the client based on the RSSI values (Received Signal Strength Indicator) of received packets. The RSSI value indicates how strong the arriving signal is and is displayed in the signal recorder.
  The following threshold values apply to the signal strength:

Range	Signal quality in %	Signal quality in RSSI
1	40	20
2	50	25
3	60	30
4	70	35
5	80	40

Procedure

In access point mode

1. Select the "Enable iPCF" option for the required WLAN interface.
2. Enable the option "Legacy Free (iPCF-LF)" if desired.
3. Select the required cycle time for the access point from the "iPCF Cycle Time [ms]" drop-down list.
4. Select for example "All Channels" from the "Scanning Mode" drop-down list.
5. Click the "Set Values" button. You configure the security settings in "Security > WLAN > Basic".

In client mode

1. Select the "Enable iPCF" option for the required WLAN interface.
2. If needed, enable the option "Legacy Free (iPCF-LF)".
3. Click the "Set Values" button.

You configure the security settings in "Security > WLAN > Basic". You configure the security settings in "Security > WLAN > Basic".

6.10.2 iPCF-HT

Note

This WBM page can only be configured with the following KEY-PLUGs:

- Access point: W780 iFeatures (MLFB 6GK5 907-8PA00)
- Client: W740 iFeatures (MLFB 6GK5 907-4PA00)

When should iPCF-HT (High Throughput) be used?

Note

Use of iPCF-HT

The function iPCF-HT

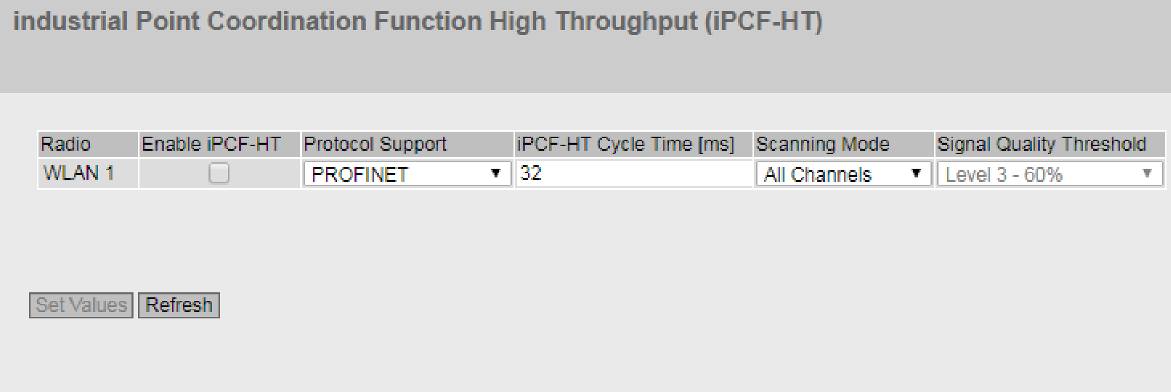
- and other iFeatures (e.g. iPCF, iPCF-MC, iPRP) are not compatible with each other and cannot be used at the same time on a device.
- Can only be used in the frequency band 5 GHz and with WLAN mode "(only) IEEE 802.11n".
- Is available only on the WLAN interface 1.

It is advisable only to use one MCS index.

The use of iPCF-HT is particularly advisable when a higher data throughput is required. If, for example, alongside PROFINET you also want to transfer video data. The real-time behavior for PROFINET is retained.

The possible settings differ for access point and client.

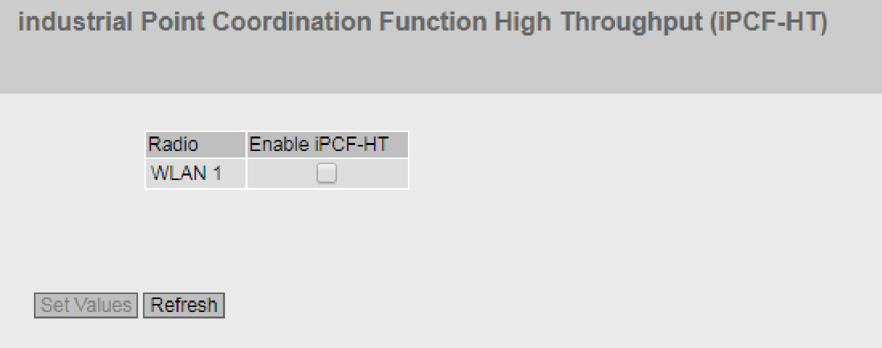
Display in access point mode



industrial Point Coordination Function High Throughput (iPCF-HT)

Radio	Enable iPCF-HT	Protocol Support	iPCF-HT Cycle Time [ms]	Scanning Mode	Signal Quality Threshold
WLAN 1	□	PROFINET ▼	32	All Channels ▼	Level 3 - 60% ▼

Display in client mode



industrial Point Coordination Function High Throughput (iPCF-HT)

Radio	Enable iPCF-HT
WLAN 1	□

Description

In both modes, the table has the following columns:

- **Radio**
  Specifies the WLAN interface to which the settings relate.
- **Enable iPCF-HT**
  Enable or disable iPCF-HT. When enabled, the data rates provided by the access point are adapted. We strongly recommend that you retain the default setting for the data rates (802.11n = MCS 2).

In access point mode, the table has the following additional columns:

- **Protocol Support**
  Specify which protocol is handled with priority by the WLAN interface.
  - PROFINET
    If you set PROFINET, there must be no central PROFINET controller downstream from the client.
  - EtherNet/IP
    If you set EtherNet/IP, there must be no scanner downstream from the client.
  - Disabled
    The function is disabled.
- **iPCF-HT Cycle Time [ms]**
  Specify the cycle time.
  The following points need to be taken into account when setting the cycle time. Otherwise it may not be possible to establish stable communication.
  - The range of values is 16 - 512. The set value should correspond the cycle time of PROFINET or EtherNet/IP.
  - There is only one access point in the system; in other words, the clients move only in one wireless cell. In this case, update times >= 16 ms are supported.
  - There are several access points in the system that communicate over different channels. The clients roam between the access points. In this case, select update times >= 32 ms.

  In addition to the guide values shown above, remember that the shortest cycle time to be set is calculated according to the formula "4 ms * max. number of nodes".

- **Scanning Mode**
  The selected setting affects the scanning of the logged-on clients.
  The following settings are available:
  - All Channels
    The client scans all permitted channels and selects the access point with the best signal strength and connects to it.
  - Next Channel
    The client scans the next channel from its permitted channel list. If an access point is there, it connects to it. If it does not find an access point on this channel, it scans the next channel.
- **Signal Quality Threshold**
  Can only be configured if "Next Channel" is set for "Scanning Mode".
  The access point specifies a signal quality for the client. When scanning the client must receive the signal coming from the access point with at least the specified signal quality. Only then is a connection established.
  The signal quality is determined by the client based on the RSSI values (Received Signal Strength Indicator) of received packets. The RSSI value indicates how strong the arriving signal is and is displayed in the signal recorder.
  The following threshold values apply to the signal strength:

Range	Signal quality in RSSI	Signal quality in %
1	20	40
2	25	50
3	30	60
4	35	70
5	40	80

Procedure

In access point mode

1. Select the "Enable iPCF-HT" option for the required WLAN interface.
2. For "iPCF-HT Cycle Time [ms]" enter the required cycle time.
3. Select for example "All Channels" from the "Scanning Mode" drop-down list.
4. Click the "Set Values" button. You configure the security settings in "Security > WLAN > Basic".

In client mode

1. Select the "Enable iPCF-HT" option for the required WLAN interface.
2. Click the "Set Values" button.

You configure the security settings in "Security > WLAN > Basic".

6.10.3 iPCF-MC

Note

Use of iPCF with other iFeatures

The function iPCF-MC and other iFeatures (e.g. iPCF, iPCF-HT, iPRP) are not compatible with each other and cannot be used at the same time on a device.

Assignment of the interfaces

With 11n devices, remember that the assignment of the WLAN interfaces is fixed for iPCF-MC.

- WLAN1: Data interface
- WLAN2: Management interface

Requirements to be able to use iPCF-MC:

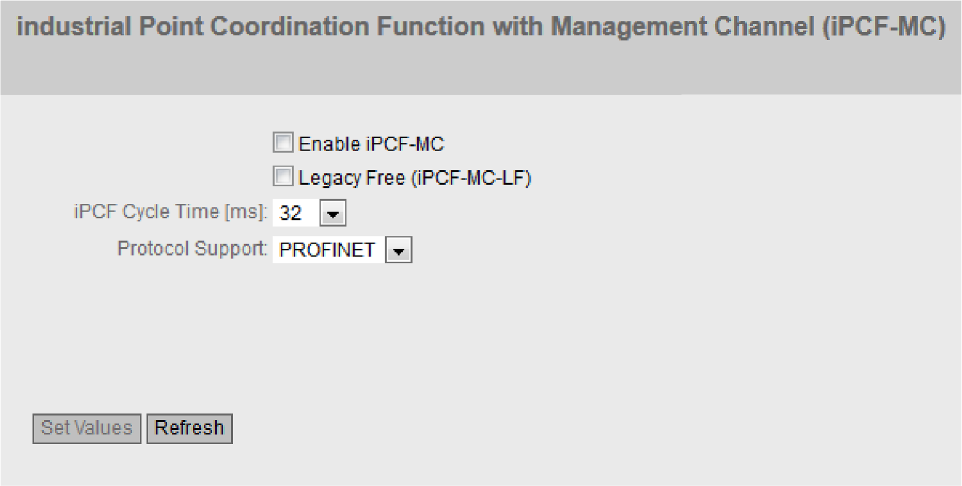
- The access point has at least two WLAN interfaces (dual AP).
- Access point mode: Only dual APs with KEY-PLUG W780 iFeatures (MLFB 6GK5 907-8PA00)
- Client mode: Client with KEY-PLUG W740 iFeatures (MLFB 6GK5 907-4PA00)
- The management interface and data interface must be operated in the same frequency band and mode and must match in terms of their wireless coverage. iPCF-MC will not work if both wireless interfaces are equipped with directional antennas that cover different areas.
- The management interfaces of all access points to which a client can change must use the same channel. A client scans only this one channel to find accessible access points.
- Transmission based on IEEE801.11h (DFS) cannot be used for the management interface. For the data interface 801.11h (DFS) is possible.
- The client cannot be operated with "Use Allowed Channels only".
- "Force roaming on link down" is automatically mirrored on the second interface.
- The following applies to clients: All configured and active SSIDs must be assigned security context 1. An SSID is active when the corresponding check box "Enabled" is selected on the "Interfaces > WLAN > Client" page.
- In Japan, iPCF-MC cannot be enabled if the data or management interface uses a frequency of the 4920 MHz - 5080 MH frequency band.

When should iPCF-MC be used?

iPCF was developed to achieve short handover times when roaming between cells. The iPCF-MC technique allows short handover times even for freely mobile clients and when a lot of cells are involved or a large number of channels is being used.

The possible settings differ for access point and client. Both are described below:

In access point mode



industrial Point Coordination Function with Management Channel (iPCF-MC)

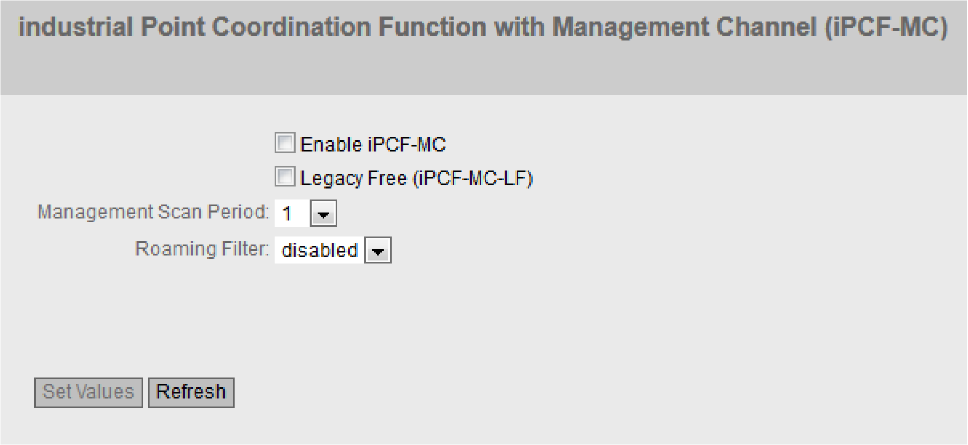
□ Enable iPCF-MC

□ Legacy Free (iPCF-MC-LF)

iPCF Cycle Time [ms]: 32

Protocol Support: PROFINET

In client mode



industrial Point Coordination Function with Management Channel (iPCF-MC)

□ Enable iPCF-MC

□ Legacy Free (iPCF-MC-LF)

Management Scan Period: 1

Roaming Filter: disabled

Description

The page contains the following boxes:

- **Enable iPCF-MC activated**
  Enable or disable the iPCF-MC mode of the SCALANCE W700 device.
  For PROFINET communication, we recommend enabling the iPCF-MC mode. By enabling iPCF-MC, the data rates provided by the access point are adapted.
  We strongly recommend that you retain the default setting for the data rates (802.11 a/b/g = 6, 9 and 12 Mbps and 802.11n = MCS 2).
- **Legacy Free (iPCF-MC-LF)**
  This setting determines which device generations can establish a connection to this device.
  - Enabled
    Only the devices that communicate with the IEEE 802.11n standard and have the "Legacy Free (iPCF-MC-LF)" setting enabled are accepted. WLAN mode IEEE 802.11n need not be enabled for this, however.
    This setting prevents performance from being slowed down by the IEEE 802.11 a/b/g device generation.
  - Disabled
    All device generations (IEEE 802.11 a/b/g/n) are accepted.
- **iPCF Cycle Time** (only in access point mode)
  Select the PROFINET update time configured for the network to which the access point is connected. The lowest value for the update time is 32 ms.
- **Protocol Support** (only in access point mode)
  Specify which protocol is handled with priority.
  - PROFINET
    If you set PROFINET, there must be no central PROFINET controller downstream from the client.
  - EtherNet/IP
    If you set EtherNet/IP, there must be no scanner downstream from the client.
- **Management Scan Period** (in client mode only)
  This parameter specifies the time between two management channel scans (specified in iPCF cycles). If, for example, you select two, the client runs a management channel scan only in every second iPCF cycle.
  A lower value for the scan interval provides the basis for fast roaming, however this means that no high data throughput can be achieved. A higher value should be selected for a high data throughput.
- **Roaming Filter** (in client mode only)
  With this setting you specify the number of RSSI single measurements from which the median is determined. With 5, the last 5 measured RSSI values are considered.
  - Median with an odd number of measurements
    The values are arranged in ascending order. The value exactly in the middle is the median.
  - Median with an even number of measurements
    The values are arranged in ascending order. The median is calculated from the average of the two middle numbers.

  If occasionally there are extreme outliers of the incoming signal, you can filter out the worst fluctuations with this roaming filter. This prevents premature roaming of the client.

6.10.4 iPRP

Note

This WBM page can only be configured with the following KEY-PLUGs:

- Access point: W780 iFeatures (MLFB 6GK5 907-8PA00)
- Client: W740 iFeatures (MLFB 6GK5 907-4PA00)

Requirements for using iPRP

- The Base Bridge mode "802.1Q VLAN Bridge" is set.
- The VLANs have been created.
- Access point mode: The VAP interface is enabled.
- Client mode:
  - For "MAC Mode", "Layer 2 Tunnel" is set.
  - For "Background Scan mode", either "Always", "Deactivated" or "Current channel" is set.

When should iPRP be used?

Note

Use of iPRP with other iFeatures

IPRP and other iFeatures (e.g. iPCF. iPCF-HT, iPCF-MC) are not compatible with each other and cannot be used at the same time on a device.

iPRP with oversize frames (jumbo frames)

To be able to use oversize frames, oversize frames (jumbo frames) must be configured for all devices in the network.

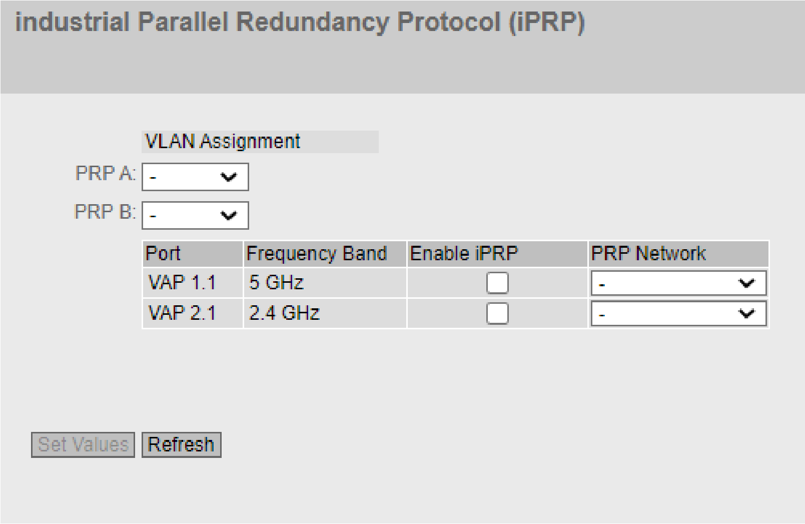
Agent VLAN (management VLAN) with iPRP

The iPRP VLAN can be used as the agent VLAN. This depends where the device is located.

- If the device is located in the PRP network A or PRP network B, as the agent VLAN use the VLAN that PRPA or PRPB is assigned to.
- If the access points are located in both PRP networks, you can use one of the two VLANs as the agent VLAN. As an alternative you can also use other VLANs as agent VLANs. The division into PRP networks A and B must remain. A single management VLAN for all devices in network A and B is not possible without further measures.

With the "industrial Parallel Redundancy Protocol" (iPRP) the PRP technology can be used in a wireless network. With IPRP the PRP frames are transferred parallel via two wireless links. The parallel transfer allows disruptions of the transfer on one wireless link to be compensated on the other.

Display in access point mode



industrial Parallel Redundancy Protocol (iPRP)

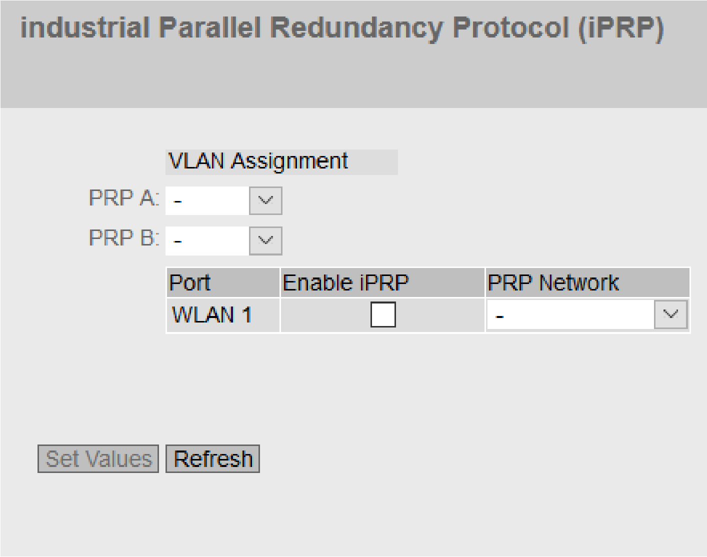
VLAN Assignment

PRP A: -

PRP B: -

Port	Frequency Band	Enable iPRP	PRP Network
VAP 1.1	5 GHz	□	-
VAP 2.1	2.4 GHz	□	-

Display in client mode



industrial Parallel Redundancy Protocol (iPRP)

VLAN Assignment

PRP A: -

PRP B: -

Port	Enable iPRP	PRP Network
WLAN 1	□	-

Description

The page contains the following:

- **PRP A**
  Select the VLAN assignment for PRP from the drop-down list.
- **PRP B**
  Select the VLAN assignment for PRP B from the drop-down list.

This table contains the following columns:

- **Port**
  Shows the available ports.
- **Enable iPRP**
  Enable or disable iPRP for the required port.
- **PRP Network**
  Specify the PRP network in which the port is a member.
- **AP Radio Redundancy (in client mode only)**
  - Radio
    Prevents the two clients of a client pair connecting on the same WLAN interface of the access point.
  - Disabled
    When the best access point for a client is the same access point (same WLAN interface) as that of the partner client, a check is made as to whether there is another access point whose signal strength is < 10 dB worse than that of the best access point. In this case the client connects to this access point, otherwise it connects to the same, best access point as the partner client.
  - Device
    Prevents the two clients of a client pair from connecting to the same access point no matter which interface is used.

Procedure

1. Select the VLAN assignment for PRP A from the "PRP A" drop-down list.
2. Select the VLAN assignment for PRP B from the "PRP B" drop-down list.
3. Specify the PRP network in which the port is a member.
4. Make the setting for "AP Radio Redundancy".
5. Select the "Enable iPRP" setting. Click the "Set Values" button.
   The appropriate VLAN settings are made automatically.

6.10.5 iREF

Note

- This WBM page is only available in access point mode.
- This WBM page can only be configured with the following KEY-PLUG:
  - Access point: W780 iFeatures (MLFB 6GK5 907-8PA00)

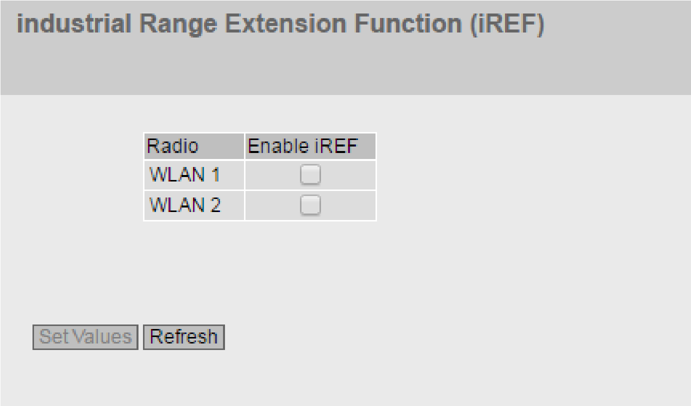
When should iREF be used?

Note

Use of iREF with other iFeatures

iREF and other iFeatures (e.g. iPCF, iPCF-HT, iPCF-MC, iPRP) are not mutually compatible and cannot be used at the same time with one device.

With iREF, the data can be sent with the highest possible transmit power. In particular in applications in which MIMO cannot be used or brings no advantage, this allows data to be transmitted at the highest possible data transmission rate.



industrial Range Extension Function (iREF)

Radio	Enable iREF
WLAN 1	□
WLAN 2	□

Description

The table has the following columns:

- **Radio**
  Specifies the WLAN interface to which the settings relate.
- **Enable iREF**
  Enable or disable iREF for the required WLAN interface. The result is shown in "Information > WLAN >iFeatures".

  Note

  To be able to use iREF, there must be at least two antennas.

  The antennas are automatically switched to Mode RX/TX as soon as iREF is enabled.

6.10.6 AeroScout

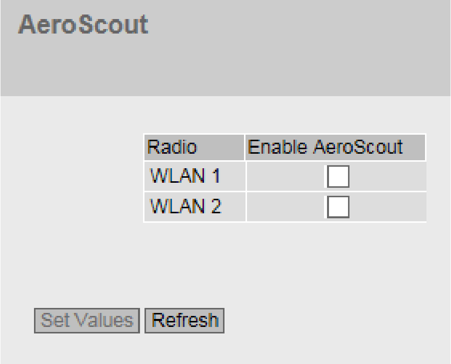
Note

- This WBM page is only available in access point mode.
- This WBM page can only be configured with the following KEY-PLUG:
  Access point: W780 iFeatures (MLFB 6GK5 907-8PA00)

Note

Using Aeroscout

- AeroScout and other iFeatures (e.g. iREF, iPCF, iPCF-HT, iPCF-MC, iPRP) are not mutually compatible and cannot be used at the same time with one device.
- AeroScout can only be used in the 2.4 GHz band according to IEEE 802.11g, IEEE 802.11n and IEEE 802.11n only.
  For more detailed information, please refer to the documentation of the AeroScout company (www.aeroscout.com).



AeroScout

Radio	Enable AeroScout
WLAN 1	□
WLAN 2	□

Description

The table has the following columns:

- **Radio**
  Specifies the WLAN interface to which the settings relate.
- **Enable AeroScout**
  Enable or disable AeroScout for the required WLAN interface. The result is shown in "Information > WLAN iFeatures > AeroScout".

Upkeep and maintenance

7

7.1 Firmware update - via WBM

Requirement

- The device has an IP address.
- The user is logged in with administrator rights.

Note

The device must have at least firmware version 5.1. A firmware update is not possible if the firmware on the device is older than version 5.1.

Firmware update via HTTP

1. Click "System > Load&Save" in the navigation area. Click the "HTTP" tab.
2. Click the "Load" button in the "Firmware" table row.
3. Go to the storage location of the firmware file.
4. Click the "Open" button in the dialog. The file is uploaded.

Firmware update - via TFTP

1. Click "System > Load&Save" in the navigation area. Click the "TFTP" tab.
2. Enter the IP address of the TFTP server in the "TFTP Server Address" input box.
3. Enter the port of the TFTP server in the "TFTP Server Port" input box.
4. Click the "Load file" button in the "Firmware" table row.
5. Go to the storage location of the firmware file.
6. Click the "Open" button in the dialog. The file is uploaded.

Firmware update via SFTP

1. Click "System > Load&Save" in the navigation area. Click the "SFTP" tab.
2. Enter the IP address of the SFTP server in the "SFTP Server Address" input box.
3. Enter the port of the SFTP server in the "SFTP Server Port" input box.
4. Click the "Load file" button in the "Firmware" table row.
5. Go to the storage location of the firmware file.
6. Click the "Open" button in the dialog. The file is uploaded.

Result

The firmware has been transferred completely to the device.

On the "Information > Versions" there are the entries "Firmware" and "Firmware Running". Firmware Runningshows the version of the current firmware. "Firmware" shows the firmware version stored after loading the firmware. To activate this firmware, restart the device with "System > Restart".

7.2 Device configuration with PRESET-PLUG

Note the additional information and security notes in the operating instructions of your device.

NOTICE
Do not remove or insert a PLUG during operation
A PLUG may only be removed or inserted when the device is turned off.

Note

Support as of V6.0

The PRESET-PLUG functionality is supported as of firmware version V6.0.

With the PRESET-PLUG, you can install the same device configuration (start configuration, user accounts, certificates) including the corresponding firmware on multiple devices.

The PRESET PLUG is write-protected.

You configure the PRESET PLUG using the Command Line Interface (CLI).

Creating a PRESET-PLUG

You create the PRESET PLUG using the Command Line Interface (CLI). You can create a PRESET-PLUG from any PLUG. To do this, follow the steps outlined below:

Note

Using configurations with DHCP

Create a PRESET-PLUG only from device configurations that use DHCP. Otherwise, disruptions will occur in network operation due to multiple identical IP addresses.

You assign fixed IP addresses extra following the basic installation.

Requirement

- A PLUG is inserted in the device on which you want to configure the PRESET-PLUG functionality.

Procedure

1. Start the remote configuration using Telnet (CLI) and log on with a user with the "admin" role.
2. Switch to the global configuration mode with the command "configure terminal".
3. You change to the PLUG configuration mode with the "plug" command.
4. Create the PRESET-PLUG with the "presetplug" command.
   The firmware version of the device and the current device configuration incl. user accounts and certificates are stored on the PLUG and the PLUG is then write protected.
5. Turn off the power to the device.
6. Remove the PRESET-PLUG.
7. Start the device either with a new PLUG inserted or with the internal configuration.

Procedure for installation with the aid of the PRESET-PLUG

1. Turn off the power to the device.
2. If it exists, remove the PLUG from the slot. You will find further information on this in the operating instructions of your device.
3. Insert the PRESET-PLUG correctly oriented into the slot. The PRESET-PLUG is correctly inserted when it is completely inside the device and does not jut out of the slot.
4. Turn on the power to the device again.
   If there is a different firmware version on the device to be installed compared with that on the PRESET-PLUG, an upgrade/downgrade of the firmware is performed. You can recognize this by the red F-LED flashing (flashing interval: 2 sec on/0.2 sec. off). Afterwards the device is restarted and the device configuration incl. users and certificates on the PRESET-PLUG is transferred to the device.
5. Wait until the device has fully started up.
   The red F-LED is off.
6. Turn off the power to the device after the installation.
7. Remove the PRESET-PLUG.
8. Start the device either with a new PLUG inserted or with the internal configuration.

Note

KEY-PLUG

If you have created the PRESET-PLUG from a KEY-PLUG, for operation with this configuration, you require an inserted KEY-PLUG.

IN this case before recommissioning the device you need to insert the relevant KEY-PLUG.

Note

Restore factory defaults and restart with a PRESET PLUG inserted

If you reset the device to the factory defaults, when the device restarts an inserted PRESET PLUG is formatted and the PRESET PLUG functionality is lost. You then need to create a new PRESET PLUG. The keys stored on the KEY-PLUG for releasing functions are retained.

We recommend that you remove the PRESET PLUG before you reset the device to the factory settings.

Formatting a PRESET-PLUG (resetting the preset function)

You format the PRESET PLUG using the Command Line Interface (CLI) to reset the preset function. To do this, follow the steps outlined below:

1. Start the remote configuration using Telnet (CLI) and log on with a user with the "admin" role.
2. Switch to the global configuration mode with the command "configure terminal".
3. You change to the PLUG configuration mode with the "plug" command.
4. Enter the command "factoryclean".
   The PRESET-PLUG is formatted and the preset function is reset.
5. Write the current configuration of the device with the "write" command.

7.3 Embedding firmware in ConfigPack.

Please not the additional information and security notes in the operating instructions of your device.

With the the ConfigPack with embedded firmware file you can install a device configuration including the firmware belonging to it on one or more devices.

Creating ConfigPack with embedded firmware

To embed the firmware in a ConfigPack, you need to make a setting in the Command Line Interface (CLI). To do this, follow the steps outlined below:

Note

Using configurations with DHCP

If you want to use the ConfigPack with embedded firmware to commission multiple devices with the same configuration and firmware, create a ConfigPack only from device configurations that use DHCP. Otherwise, disruptions will occur in network operation due to multiple identical IP addresses.

You assign fixed IP addresses extra following the basic installation.

1. Start the remote configuration using Telnet (CLI) and log on with a user with the "admin" role.
2. Change to the global configuration mode with the command "configure terminal".
3. You change to the loadsave configuration mode with the "loadsave" command.
4. Enter the "firmware-in-configpack" command without parameters.
   The firmware currently on this device is now included as a separate file in the ConfigPack when you save it.

Note

Embedding firmware in ConfigPack.

When the device is restarted this functionality is lost again and must be reactivated.

If you save a ConfigPack in the WBM or CLI, the firmware is embedded. The file can be supplied with a password before download. To load the file into the device successfully, use the specified password.

Refer to the information in the section Load & Save (Page 185).

Installing ConfigPack with embedded firmware

Note

Installing ConfigPack with DHCP options 66, 67

You can also install the ConfigPack using DHCP with options 66 and 67 activated.

You activate the options in the menu "System > DHCP > DHCP Client".

Password-protected ConfigPack and DHCP options 66.67

If the file is password-protected, you cannot install the file via DHCP with options 66 and 67.

If you install a ConfigPack using WBM or CLI, firmware stored there is also installed.

Procedure in the WBM

1. Connect to the WBM of the device on which you want to install the ConfigPack as administrator.
2. Go to the menu "System > Load&Save".
3. In the row "ConfigPack", click the "Load" button
4. Select the ConfigPack you want to install.
5. Restart the device with "System > Restart".
   If there is a different firmware version on the device to be installed compared with that in the ConfigPack, an upgrade/downgrade of the firmware is performed. You can recognize this by the red F-LED flashing (flashing interval; 2 sec on/0.2 sec off). Afterwards the device is restarted and the device configuration incl. users and certificates stored in the ConfigPack is transferred to the device.
6. Wait until the device has fully started up.
   (the red F-LED is off)
7. You can log on the device again or exit the WBM.

7.4 Restoring the factory settings

NOTICE
Previous settings
If you reset, all the settings you have made will be overwritten by factory defaults.

NOTICE
Inadvertent reset
An inadvertent reset can cause disturbances and failures in a configured network with further consequences.

With the reset button

When pressing the button, make sure you observe the information in the "Reset button" section in the operating instructions.

Follow the steps below to reset the device parameters to the factory settings:

1. Turn off the power to the device.
2. Loosen the screws of the cover.
3. Remove the cover.
4. Now press the Reset button and reconnect the power to the device while holding down the button.
5. Hold down the button until the red fault LED (F) stops flashing after approximately 10 seconds and is permanently lit.
6. Now release the button and wait until the fault LED (F) goes off again.
7. The device then starts automatically with the factory settings.

With SINEC PNI

Follow the steps below to reset the device parameters to the factory settings with the SINEC PNI:

1. Select the device whose parameters you want to reset.
2. Click the "Reset device" button.
3. Select the "Reset to factory settings" option in the following dialog.

Via the configuration

You will find detailed information on resetting the device parameters using the WBM and CLI in the configuration manuals:

- Web Based Management, section "Restart"
- Command Line Interface, section "Reset and Defaults"

Troubleshooting/FAQ 8

8.1 Firmware update via WBM or CLI not possible

Cause

If there is a power failure during the firmware update, it is possible that the device is no longer accessible using Web Based Management or the CLI.

When pressing the button, make sure you adhere to the instructions in the section "Reset button".

Solution

You can then also assign firmware to a SCALANCE W using TFTP.
Follow the steps below to load new firmware using TFTP:

1. Turn off the power to the device.
2. Now press the Reset button and reconnect the power to the device while holding down the button.
3. Hold down the button until the red fault LED (F) starts to flash after approximately 2 seconds.
4. Now release the button. The bootloader waits in this state for a new firmware file that you can download by TFTP.
5. Connect a PC to the SCALANCE W over the Ethernet interface.
6. Assign an IP address to the SCALANCE W with the SINEC PNI.
7. Open a DOS box and change to the directory where the file with the new firmware is located and then execute the command "tftp -i <ip address> PUT <firmware>". As an alternative, you can use a different TFTP client.
8. Close the cover to ensure that the device is closed and water and dust proof.

Note

Use of CLI and TFTP in Windows 10

If you want to access the CLI or TFTP in Windows 10, make sure that the relevant functions are enabled in Windows 10.

Result

The firmware is transferred to the device.

Note

Please note that the transfer of the firmware can take several minutes. During the transmission, the red error LED (F) flashes.

Once the firmware has been transferred completely to the device, the device is restarted automatically.

8.2 Disrupted data transmission due to the received power being too high

Causes and effects of excessive received power

If the received power at the input of a SCALANCE W device is too high, this overdrives the amplifier circuit. Overdrive can occur on clients and access points. If the received power on the SCALANCE W device is greater than -35 dBm, this can result in disrupted communication. Information about the signal strength [in dBm] is displayed in WBM in the following tabs:

Access point mode:

- Information > WLAN > Client List

Client mode:

- Information > WLAN > Available AP

The power of the input signal on the SCALANCE W device is influenced by the following factors:

- Distance between the WLAN partners
- Reflections of the electromagnetic waves by parts of the building
- Setting of the "max. Tx Power" and the antenna settings used (Interfaces > WLAN > Antennas & Power)

Solution

If communication is disrupted by an excessive signal strength (greater than -35 dBm), you can eliminate the problem in the following ways:

- Increase the distance between the transmitter and receiver.
- Reduce the transmit power of the IWLAN partner with suitable settings in WBM or CLI.

8.3 Compatibility with predecessor products

Mixed mode

Mixed operation with predecessor products (6GK57xx-xAA60-xAx0) is possible.

Further information about predecessor products can be found on the Internet at Siemens Industry Automation and Drives Service & Support, entry ID: 42784493 (https://support.industry.siemens.com/cs/ww/en/view/42784493)

Note the following points if you want to make mixed operation possible:

- Transmission standard IEEE 802.11a/b/g/n
  The transmission standards IEEE 802.11a/b/g/n are compatible with the predecessor products. The setting "802.11n only" is not compatible with the predecessor products. The transmission standards IEEE 802.11a/g/h Turbo of the predecessor products are not supported.
- Security settings
  The transmission standards IEEE 802.11a/b/g support the same security settings as the predecessor products.
  The transmission standard IEEE 802.11n with the setting "802.11n" or "802.11n only" only supports WPA2/ WPA2-PSK with AES in the security settings.
- SSID
  For SSID, use only the characters that were supported by the previous products.
- Management only over wired Ethernet interface
  In the previous products, there was a function "Management only over wired Ethernet interface". In the new devices this function is covered by the "Management ACL" function.
- iPCF / iPCF-MC
  The IEEE 802.11b transmission method is not supported together with iPCF.
  The SCALANCE W700-xRR devices must not be configured with the operating mode IEEE 802.11b in mixed operation.
- WDS ID
  With WDS ID, do not use the ASCII character 0x22 (").
- Key for WEP or AES
  With devices with firmware up to version 3.2, the keys for WEP or AES may only contain ASCII characters or hexadecimal characters from 0x20 to 0x7E.
- Key for WPA(2)-PSK
  For devices with firmware version ≤ 5.0, the keys for WPA(2)-PKS can only consist of ASCII characters or hexadecimal characters from 0x20 to 0x7E.
  For devices with firmware version ≥ 5.1, the following specifications apply to WPA(2)-PKS keys:
  - For a key with 8 to 63 characters, you can only use the following readable ASCII characters: 0x20 - 0x7e.
  - For a key with precisely 64 characters, you can use the following ASCII characters: 0 - 9, a - f and A - F.

8.4 Instructions for secure network design

Note the information below to protect your network against attacks:

- **Use a secure connection with HTTPS**
  In contrast to HTTP, HTTPS allows you secure access for configuring the WLAN clients and the access points using Web Based Management. For more detailed information, refer to the section "Load & Save (Page 185)".
- **Use WPA2/ WPA2-PSK with AES**
  Use only WPA2/AES to prevent password misuse. WPA2/ WPA2-PSK with AES provides the greatest security. For more detailed information, refer to the section "Basic (Access Point) (Page 349)".
- **Protect your network from man-in-the-middle attacks**
  To protect your network from man-in-the-middle attacks, a network setup is recommended that makes it more difficult for the attacker to access the communications path between two end devices.
  - You can, for example, protect devices by arranging so that the Agent IP is only accessible via a single management VLAN. For more detailed information, refer to the section "Agent IPv4 (Page 174)".
  - A further option is to install a separate HTTPS certificate on the WLAN client / access point. The HTTPS certificate checks the identity of the device and controls the encrypted data exchange. You can install the HTTPS certificate via HTTP. For more detailed information, refer to the section "HTTP (Page 191)".
- **Use SNMPv3**
  SNMPv3 provides you with highest possible security when accessing the devices via SNMP. For more detailed information, refer to the section "SNMP (Page 215)".

NOTICE
Changing the default password after configuring with STEP 7
If a device in the default status is configured only with STEP 7, it is not possible to change the default password. This change must be made directly on the device using WBM or CLI. Otherwise the default password is retained and any user could log in using the default password.

8.5 WLAN client Trigger handover via SNMP

If the other handover mechanisms such as Roaming threshold value, Background Scan threshold value are inadequate, a specific handover can be triggered by setting the MIB variable snMspsWlanForceHandover.

A WLAN client drives, for example along a stretch where there are several access points. When the WLAN client passes a certain point, the value of the MIB variable is changed from 0 to 1. The WLAN client logs off from the connected access point and searches for reachable access points. It logs on to the best reachable access point. The value of the MIB variable is reset to 0.

Trigger handover

Using the private MIB variable snMspsWlanForceHandover, you can force a handover.

Note

With Web Based Management (WBM) or using the Command Line Interface (CLI) you cannot configure this function.

OID of the private MIB variable snMspsWlanForceHandover:

```
iso(1).org(3).dod(6).internet(1).private(4).enterprises(1).siemens(4
329).industrialComProducts(20).iComPlatforms(1).simaticNet(1).snMsp
s(1).snMspsCommon(1).snMspsWlan(27).snMspsWlanObjects(1). snMspsWlan
Smt(1). snMspsWlanRoamingConfigTable(4). snMspsWlanRoamingConfigEntr
y(1). snMspsWlanForceHandover(14)
```

values of the MIB variable

- 0: Function is disabled.
- 1: Triggers handover.

MIB file

The MIB variable snMspsWlanForceHandover can be found in the private MIB file "Scalance_w_msps.mib".

8.6 Configuring the device using the TIA Portal.

Once you have inserted the network component, you can edit the properties and parameters offline, for example the device name. Offline means there is no connection to the device.

To be able to see the changes on the device, the change must first be compiled and then loaded on the device.

Compiling and loading can be started in different ways:

- with the shortcut menu "Download to device > Hardware configuration"
- with the "Download" button in the toolbar.

Requirement

- The network component has been created in the project.
- The hardware configuration of the network component matches the hardware configuration of the device. If this is not case, the download will be aborted due to errors.
- The firmware version of the network component matches the firmware version of the device.
- The IP address has been set up.
- The device is connected to the configuration PC.
- The required properties and parameters have been configured.

Note

Activating the SINEMA configuration interface

You can only configure a device using the TIA Portal if you have enabled "SINEMA configuration interface" in the WBM in the menu "System > Configuration".

Downloading properties and parameters to the device

To download the change properties and parameters to the device, follow these steps:

1. Select the required network component in the project tree.
2. In the shortcut menu of the network component select the command "Download to device > Hardware configuration".
3. When the "Extended download to device" dialog opens, configure the "Settings for the download".
   - Select the protocol you are using, e.g. HTTPS.
   - Configure the relevant interface parameters on the configuration PC. When necessary, make interface or protocol specific settings on the operator panel. Click "Start search" The network component is displayed in the "Compatible devices in target subnet" table with its detected IP address.
   - Select the address entry in the table and click the "Load" button.
4. The "Load preview" dialog opens. At the same time the hardware configurations compiled. In this dialog you see messages and proposed revisions necessary for loading, e.g. password required.
   Check the messages and if necessary enable the actions in the "Action" column.
   As soon as loading is possible the button becomes active.
5. Click the "Load" button.
   Loading is performed and the dialog "Load results" is displayed.
6. If the loading is completed error-free, select "Save configuration" in "Action".
7. Click the "Finish" button.

Result

After successful loading, the project can be run on the network component.

Updating the SCALANCE configuration of the network component

To update the SCALANCE configuration of the network component, follow these steps:

1. Open the "Devices & Networks" editor and set the network view.
2. Select the network component in the network view.
3. In the shortcut menu of the network component select the command "SCALANCE configuration > Upload to PG/PC".

Result

Once the connection to the device is established you will be prompted to log in to the device. If the login was successful, the SCALANCE configuration will be loaded from the device to the TIA Portal. Afterwards the properties and parameters are updated in the TIA Portal.

8.6.1 Message: SINEMA configuration not yet accepted

When the following message is displayed in the display area an error has occurred transferring the configuration from STEP 7 Basic / Professional as of V13 to the device:

"SINEMA Configuration not accepted yet. With restart of device, all configuration changes will be lost."

One possible cause is, for example, that during transfer the device was not reachable.

If you now change a parameter directly on the device (WBM/CLI/SNMP) these changes are lost when the device restarts.

Solution

1. Open the relevant STEP 7 project in STEP 7 Basic / Professional
2. Open the project view.
3. Select the device in the project tree.
4. Select the "Go to network view" command in the shortcut menu.
5. Select the device in the network view.
6. In the shortcut menu of the selected device select the command "SCALANCE configuration > Save as start configuration".

Result

The configuration is saved on the device. The message is no longer visible in the display area. A configuration change directly on the device is no longer lost due to a restart of the device.

Appendix A "Supported MIB Modules" A

A.1 MIB files supported by SCALANCE W device

MIB files available for the SCALANCE W device

The following table shows the MIB files available for a SCALANCE W device:

MIB	Root OID	Reference
AUTOMATION-SNTP (Siemens) [1] [2]	.1.3.6.1.4.1.4329.6.3.11	Vendor specific
AUTOMATION-SYSTEM-MIB (Siemens) [1] [2]	.1.3.6.1.4.1.4329.6.3.2	Vendor specific
AUTOMATION-TELNET (Siemens) [1] [2]	.1.3.6.1.4.1.4329.6.3.8	Vendor specific
AUTOMATION-TIME-MIB (Siemens) [1] [2]	.1.3.6.1.4.1.4329.6.3.3	Vendor specific
BRIDGE-MIB	.1.3.6.1.2.1.17	RFC1493
ENTITY-MIB	.1.3.6.1.2.1.47	
EtherLike-MIB	.1.3.6.1.2.1.10.7.2	
IANA-MAU-MIB	.1.3.6.1.2.1.26.1.1	
IEEE8021-PAE-MIB	.1.0.8802.1.1.1	IEEE 802.1X
IEEE802dot11-MIB	.1.2.840.10036	IEEE 802.11
IF-MIB:	.1.3.6.1.2.1.2	RFC2233
P-BRIDGE-MIB	.1.3.6.1.2.1.17.4.5	
Q-BRIDGE-MIB	.1.3.6.1.2.1.17.7	
RADIUS-ACC-CLIENT-MIB	.1.3.6.1.2.1.67.2.2	
RADIUS-AUTH-CLIENT-MIB	.1.3.6.1.2.1.67.1.2	
RFC1213-MIB	.1.3.6.1.2.1.4	
RMON-MIB	.1.3.6.1.2.1.16	
SNMP-COMMUNITY-MIB	.1.3.6.1.6.3.18	
SNMP-FRAMEWORK-MIB	.1.3.6.1.6.3.10.2.1	RFC2571
SNMP-NOTIFICATION-MIB	.1.3.6.1.6.3.13	RFC2573
SNMP-PROXY-MIB	.1.3.6.1.6.3.14	
SNMP-TARGET-MIB	.1.3.6.1.6.3.12	RFC2573
SNMP-USER-BASED-SM-MIB	.1.3.6.1.6.3.15	RFC2574
SNMPv2-MIB	.1.3.6.1.2.1.1	RFC1907
SNMP-VIEW-BASED-ACM-MIB	.1.3.6.1.6.3.16	RFC2575
SN-MSPS-ACL-MIB (Siemens) [2]	.1.3.6.1.4.1.4329.20.1.1.1.1.30	Vendor specific
SN-MSPS-CONFIG-MIB (Siemens) [2]	.1.3.6.1.4.1.4329.20.1.1.1.1.1	Vendor specific
SN-MSPS-CPLUG-MIB (Siemens) [2]	.1.3.6.1.4.1.4329.20.1.1.1.1.23	Vendor specific
SN-MSPS-DHCP-CLIENT-MIB (Siemens) [2]	.1.3.6.1.4.1.4329.20.1.1.1.1.17.1	Vendor specific
SN-MSPS-DIGITAL-IO-MIB (Siemens) [2] [3]	.1.3.6.1.4.1.4329.20.1.1.1.1.39	Vendor specific
SN-MSPS-GENERAL-MIB (Siemens) [2]	.1.3.6.1.4.1.4329.20.1.1.1.1.2	Vendor specific
SN-MSPS-HTTP-MIB (Siemens) [2]	.1.3.6.1.4.1.4329.20.1.1.1.1.20	Vendor specific

MIB	Root OID	Reference
SN-MSPS-IF-MIB (Siemens) 2)	.1.3.6.1.4.1.4329.20.1.1.1.1.34	Vendor specific
SN-MSPS-IP-MIB (Siemens) 2)	.1.3.6.1.4.1.4329.20.1.1.1.1.13	Vendor specific
SN-MSPS-KEY-PLUG-MIB (Siemens) 2)	.1.3.6.1.4.1.4329.20.1.1.1.1.35	Vendor specific
SN-MSPS-LOAD-SAVE-MIB (Siemens) 2)	.1.3.6.1.4.1.4329.20.1.1.1.1.26	Vendor specific
SN-MSPS-LOG-MIB (Siemens) 2)	.1.3.6.1.4.1.4329.20.1.1.1.1.31	Vendor specific
SN-MSPS-MSTP-MIB (Siemens) 2)	.1.3.6.1.4.1.4329.20.1.1.1.1.6	Vendor specific
SN-MSPS-NTP-MIB (Siemens)	.1.3.6.1.4.1.4329.20.1.1.1.1.33	Vendor specific
SN-MSPS-PNAC-MIB (Siemens) 2)	.1.3.6.1.4.1.4329.20.1.1.1.1.10	Vendor specific
SN-MSPS-PORT-MIB (Siemens) 2)	.1.3.6.1.4.1.4329.20.1.1.1.1.29	Vendor specific
SN-MSPS-RADIUS-SERVER-MIB (Siemens) 2)	.1.3.6.1.4.1.4329.20.1.1.1.1.11.2	Vendor specific
SN-MSPS-REPORT-MIB (Siemens) 2)	.1.3.6.1.4.1.4329.20.1.1.1.1.28	Vendor specific
SN-MSPS-RMON-MIB (Siemens) 2)	.1.3.6.1.4.1.4329.20.1.1.1.1.12	Vendor specific
SN-MSPS-SCW-MIB (Siemens) 1) 2)	.1.3.6.1.4.1.4329.20.1.1.1.1.1.100.10	Vendor specific
SN-MSPS-SINEMA-MIB (Siemens) 2)	.1.3.6.1.4.1.4329.20.1.1.1.1.25	Vendor specific
SN-MSPS-SNMP-MIB (Siemens) 2)	.1.3.6.1.4.1.4329.20.1.1.1.1.4	Vendor specific
SN-MSPS-SNTP-CLIENT-MIB (Siemens) 2)	.1.3.6.1.4.1.4329.20.1.1.1.1.19.1	Vendor specific
SN-MSPS-STP-L2T-MIB (Siemens)	.1.3.6.1.4.1.4329.20.1.1.1.1.40	Vendor specific
SN-MSPS-SYSLOG-CLIENT-MIB (Siemens) 2)	.1.3.6.1.4.1.4329.20.1.1.1.1.21.1	Vendor specific
SN-MSPS-VLAN-MIB (Siemens) 2)	.1.3.6.1.4.1.4329.20.1.1.1.1.3	Vendor specific
SN-MSPS-WLAN-MIB (Siemens) 2)	.1.3.6.1.4.1.4329.20.1.1.1.1.27	Vendor specific
SN-MSPS-NAT-MIB	1.3.6.1.4.1.4329.20.1.1.1.1.45	Vendor specific
TCP-MIB	.1.3.6.1.2.1.6	
UDP-MIB	.1.3.6.1.2.1.7	

1) Part of the AUTOMATION.MIB

You can download the AUTOMATION.MIB for SCALANCE W700 from Siemens Industry Automation and Drives Service & Support under the following entry ID 67637278 (https://support.industry.siemens.com/cs/ww/en/view/67637278)

2) Part of the private MIB file "Scalance_w_msps.mib". You can download the file in the WBM with the "Save" button under "System > Load & Save > HTTP > MIB".

3) This MIB is not supported on devices without a digital input/output.

Appendix B "Private MIBs" B

B.1 Private MIB variables of the SCALANCE W device

Downloading the MIB of the SCALANCE W via WBM

You can download the MIB of the SCALANCE W in WBM under "System > Load&Save > HTTP > MIB" using the "Save" button.

OID

The private MIB variables of the SCALANCE W have the following object identifier:

```
iso(1).org(3).dod(6).internet(1).private(4). enterprises(1)
siemens(4329) industrialComProducts(20) iComPlatforms(1)
simaticNet(1) snMsps(1) snMspsCommon(1)
```

WLAN-specific MIB variables

The WLAN-specific MIB variables can be found in "`snMspsWlan`". You will find further information about the settings and values in the MIB file.

Appendix C "Underlying Standards"

C

C.1 Underlying standards

Standards met by SCALANCE W700 devices completely or partly

The following table lists some of the standards for SCALANCE W700 devices.

Name of the standard	Topic
IEEE 802.1AB	Link Layer Discovery Protocol (LLDP)
IEEE 802.1D-1998	Media Access Control (MAC), bridges
IEEE 802.1Q	Virtual Bridged LANs (VLAN Tagging, Port Based VLANs)
IEEE 802.1W-2004	Rapid Spanning Tree Protocol (RSTP)
IEEE 802.1X	Port Based Network Access Control
IEEE 802.3-2002	Ethernet
IEEE 802.3af	Power over Ethernet (PoE)
IEEE 802.11	Wireless Local Area Network
IEEE 802.11a	Wireless standard for use of the 5 GHz frequency band
IEEE 802.11at	PoE +
IEEE 802.11b/g	Wireless standard for use of the 2.4 GHz frequency band
IEEE 802.11e	Quality of Service (QoS)
IEEE 802.11 h	Expansion of the spectrum and transmit power for use of the 5 GHz frequency range in Europe.
IEEE 802.11i	Encryption of WLANS
IEEE 802.11n	Standard for high transmission rates

Appendix D "Log Messages"

D

D.1 Messages in the event log

Messages during system startup (general)

Alarm	Description
Warm start performed, Ver: V02.00.00 - event/ status summary after startup	Type of startup and the loaded firmware version.
Power supply: • L1 is connected • L2 is not connected	Status of the power supplies line 1 and line 2.
No line is monitored	Information about monitoring the power supply from the signaling system.
MSTP disabled MSTP enabled	Information on the status of the Spanning Tree protocol.
No Fault states pending after startup	Fault state following system start.

Status of the power supply

You enable or disable the "Power Change" event in "System > Events".

Alarm	Description
Power up on line 1 / 2 / PoE.	Power supply exists on line 1, line 2 or PoE..
Power down on line 1 / 2 / PoE.	Power supply interrupted on line 1, line 2 or PoE.

Status of the Ethernet interface

You enable or disable the "Link Change" event in "System > Events".

Alarm	Description
Link up on P1.	A connection exists on the Ethernet interface.
Link down on P1.	No connection exists on the Ethernet interface.

Status of the WLAN interface (in access point mode only)

Messages	
Link down up VAP X.Y.	The VAP interface Y on the WLAN interface X is enabled.
Link down on VAP X.Y.	The VAP interface Y on the WLAN interface X is disabled.
WDS Y at WLAN X is up.	A link exists on the WDS interface Y of WLAN interface X.
WDS Y at WLAN X is down.	No link exists on the WDS interface Y of WLAN interface X.

Messages	
Overlap-AP found on WLAN X: AP <System Name> <MAC> found on channel <channel number.> <RSSI value>	A further access point was detected on the channel set for the WLAN interface X or on a neighboring channel.
Overlap-AP aged out on WLAN X: AP <System Name> <MAC> on channel <channel number.> <RSSI value>	The overlapping access point could not be detected during the configured aging time and was removed from the "Overlap AP" list.
DFS: Radar interference detected on WLAN X at channel <channel number.> (frequency <frequency> MHz). Changing to channel <channel number> (frequency <frequency> MHz)	A primary user (e.g. radar or weather station) was detected on the channel set for WLAN interface X or on a neighboring channel. The channel will be blocked for 30 min. The access point changes to the configured alternative channel or to the next free channel on which there is no primary user.
DFS: channel <channel number> (frequency <frequency> MHz) aged out from NOL at WLAN X and can be used again.	No primary user detected on the channel any longer. The channel was removed from the list of blocked channels and can be used again
DFS: Radar interference detected on WLAN X at channel <channel number> (frequency <frequency> MHz). No more free channels to use!!	A primary user was found on all available channels. There is no free channel available, the WLAN interface X will be deactivated until one of the channels becomes available.

Status of the WLAN interface (in client mode only)

Messages	Description
Link up on WLAN X.	The WLAN interface X is enabled.
Link down on WLAN X.	The WLAN interface X is disabled.

Messages on configuration

Messages	Description
WBM: Authentication failure.	When logging in with Web Based Management (WBM), the wrong password was entered. The event can be enabled or disabled in "System -> Events" (authentication failure).
Telnet: Authentication failure.	When logging in via Telnet, the wrong password was entered. The event can be enabled or disabled in "System -> Events" (authentication failure).
Restart requested	Restart due to a user request. The event can be enabled or disabled in "System -> Events" (Cold/Warm Start).

Messages about file upload or download

Messages	Description
File upload via HTTP(S): load of FileType <file type> OK → restart required	Loading the file via HTTP(S) was successful. A restart is required.
File upload via HTTP(S): load of FileType<file type> OK	Loading the file via HTTP(S) was successful.
File upload via HTTP(S): validation of FileType <file type> IDENTICAL	Loading the file via HTTP(S) was successful. The file is identical to the existing file.
File upload via HTTP(S): validation of FileType <file type> FAILED	Loading the file via HTTP(S) failed. The file contains errors or is invalid.
File upload via TFTP: load of FileType <file type> OK → restart required	Loading the file using TFTP was successful. A restart is required.
File upload via TFTP: load of FileType <file type> OK	Loading the file using TFTP was successful.

Messages	Description
File upload via TFTP: validation of FileType <file type> IDENTICAL	Loading the file using TFTP was successful. The file is identical to the existing file.
File upload via TFTP: validation of FileType <file type> FAILED	Loading the file using TFTP failed. The file contains errors or is invalid.
File upload via TFTP: file transfer of FileType <file type> FAILED	Loading the file using TFTP failed. The file name is incorrect or the file does not exist on the server.
File upload via TFTP: file transfer of FileType <file type> failed. Cannot connect to given IP address	Loading the file using TFTP failed. The TFTP server cannot be reached or the settings are incorrect.
File download via TFTP: file transfer of FileType <file type> failed. Cannot connect to given IP address	Saving the file using TFTP failed. The TFTP server cannot be reached or the settings are incorrect.

Messages error status

Messages	Description
	You configure the events in "System > Events". You configure the monitoring of the power supply and the link on the Ethernet port in "System > Fault Monitoring".
New Fault state:<fault description> <fault description>:"Warm start performed." "Cold start performed." "Link down on P1." "Link up on P1." "Power down on line L1 (L2)" "DFS: No channels are available at WLAN2"	Incoming fault. Not all events automatically lead to a fault. On the "Events" WBM page, you specify which events will be logged, for example device restart, changed link on the Ethernet port.
Fault state gone: <fault description> <fault description>:"Warm start performed." "Cold start performed." "Link down on P1." "Link up on P1." "Power down on line L1 (L2)" "DFS: No channels are available at WLAN2" "C-PLUG not accepted. See System C-PLUG mask for details."	Outgoing fault
New Fault state (reconfiguration): <fault description> <fault description>:"Link down on P1." "Link up on P1." "Power down on line L1 (L2)"	Incoming fault. The event was triggered due to a change in the configuration.
Fault state gone (reconfiguration): <fault description> <fault description>:"Link down on P1." "Link up on P1." "Power down on line L1 (L2)"	Outgoing fault. The event was triggered due to a change in the configuration.
Fault state: <fault description> cleared. <fault description>:"Warm start performed" "Cold start performed".	Fault was acknowledged by the user.

Messages about MSTP

Messages	Description
	You enable or disable the "Spanning Tree" event in "System > Events"
Spanning Tree: topology change detected.	The topology of the network has changed; the network will be reorganized.
Spanning Tree: new root bridge xx:xx:xx:xx:xx:xx detected.	The topology of the network has changed; there is a new root bridge with MAC address xx:xx:xx:xx:xx:xx in the network.

Messages about security

Messages	Description
RADIUS: Access accepted / rejected for client <MAC>.	The authentication of the client was successful or not successful.

Messages about message system

Messages	Description
Syslog-Server not reachable!	The configured Syslog server is not accessible.
Unable to send messages to syslog server. Please check syslog socket configuration.	The syslog server configuration is incomplete.
Unable to send e-mail(s) because of IP connection failure.	Sending of e-mail(s) failed. SMTP server cannot be reached (e.g. network connection interrupted).
Unable to send e-mail(s) because of SMTP authentication failure.	Sending of e-mail(s) failed. Authentication of the client on the SMTP server incorrect.
Unable to send e-mail(s) because SMTP message transfer failed.	Sending of e-mail(s) failed. SMTP server can be reached, configuration incomplete or contains errors (e.g. receiver e-mail address wrong / does not exist).
SNMP: Authentification failure.	Authentication of an SNMP client failed; access not possible (e.g. SNMPv1/v2 read-only configured or Read Community String incorrectly configured).
IP communication is possible. Remote logging activated.	IP communication is possible. Remote logging is activated.
IP communication is not possible. Remote logging deactivated. Please check IP configuration and network connectivity.	IP communication is not possible. Remote logging is deactivated. Check whether or not the device has an IP address.

Messages during system startup (PLUG)

Alarm	Description
Startup configuration: Internal storage PLUG: Not present	There is no PLUG inserted.
Startup configuration: Internal storage PLUG: Missing PLUG: License missing	There is no PLUG inserted. There are functions configured on the device for which a license (KEY-PLUG) is required.
Startup configuration: Internal storage PLUG: Configuration not accepted PLUG: License missing	Invalid or incompatible configuration on the inserted PLUG. There are functions configured on the device for which a license (KEY-PLUG) is required.
Startup configuration: Internal storage PLUG: Factory clean → filled with internal configuration PLUG: Configuration accepted PLUG: License accepted	The internal configuration was written successfully to an empty KEY-PLUG.
Startup configuration: Internal storage PLUG: Factory clean → filled with internal configuration PLUG: Configuration accepted	The internal configuration was written successfully to an empty C-PLUG.

Alarm	Description
Startup configuration: PLUG storage PLUG: Configuration accepted PLUG: License accepted	The configuration was loaded successfully from the KEY-PLUG.
Startup configuration: PLUG storage PLUG: Configuration accepted	The configuration was loaded successfully from the C-PLUG.

Messages about PLUG

Messages	Description
An empty PLUG was found.	There is an empty or formatted PLUG in the device.
PLUG: Filled PLUG was found. PLUG: Configuration Accepted	There is a valid PLUG with a valid configuration in the device.
PLUG: Removed at runtime.	The C-PLUG / KEY-PLUG was removed during operation.
PLUG accepted.	PLUG was accepted.

Messages about digital input/output

Messages	Description
Digital output is open / closed.	The digital output is open or closed (device dependent).
Value of digital input is 0 / 1.	A low or a high signal is applied to the digital input.

D.2 Messages in the WLAN Authentication Log

Messages in access point mode

Alarm	Description
Client <MAC address> <system name> associated successfully.	The client has logged in successfully on the access point.
Client <MAC address> <system name> disassociated with reason <reason description>	The client was logged off from the access point.
VAP<Num>: Client <MAC> failed to associated; status (<text>)	The connection of the client to the VAP has failed. The reason is displayed as text.
VAP<Num>: Client <MAC> disassociated with reason (<text>)	The client was successfully disconnected from the VAP. The reason is displayed as text.
VAP<Num>: Client <MAC>deauthenticated with reason (<text>)	The client was logged off from the AP. The reason is displayed as text.
VAP<number> Client <MAC> failed to authenticate; status (<status>)	The authentication of the client failed. The reason is displayed as text.
VAP<Num>: Client <MAC> failed to disassociated; status (<text>)	The connection of the client could not be terminated. The reason is displayed as text.
VAP<Num>: Client <MAC> associated successfully	The client has connected successfully to the VAP or the client has logged on successfully to the VAP.
RADIUS: Access rejected for client <MAC>	The RADIUS server denies the client access.

Alarm	Description
RADIUS: Access accepted for client <MAC>	The RADIUS server allows the client access.
WDS Connection is established to AP <MAC>	The WDS connection is successfully established to the access point.
WDS disconnect from AP <MAC>	The WDS connection to the access point is terminated.

Messages in client mode

Alarm	Description
Associated successfully to AP <MAC address> <system name> at channel <channel number> (frequency <frequency> MHz)	The client has logged in successfully on the access point.
Disassociated from AP <MAC address> <'sys name'> with reason (Disassociated because sending STA is leaving (or has left) BSS)	The client was logged off from the access point.
Failed to authenticate to AP <MAC>; status (<Text>)	The authentication of the client with the access point failed. The reason is displayed as text.
Failed to disassociate from AP <MAC>; status (<Text>)	The connection of the client to the access point could not be terminated. The reason is displayed as text.
Failed to associate to AP <MAC>; status (<Text>)	The connection of the client to the access point has failed. The reason is displayed as text.

Appendix "Syslog Messages"

E

E.1 Format of the syslog messages

The devices generate Syslog messages (UDP default port 514) according to RFC 5424 that contain the following boxes.

HEADER

- TIMESTAMP according to RFC 3339
- Host name
- APPNAME, PROCID and MSGID: If no information is known, the "-" character is output.

PRIORITY

PRIORITY contains the coded priority of the Syslog message broken down into a Severity and Facility box.

- Facility
- Severity

VERSION

- Set to 1.

HOSTNAME_CONTENT:

- IPv4 address according to RFC1035: Each byte is represented in decimal, with a dot separating it from the previous one. XXX.XXX.XXX.XXX
- IPv6 address according to RFC4291 Section 2.2

STRUCTURED DATA

- timeQuality block

MESSAGE:

- ASCII string in English

Note

Additional information about the meaning of the boxes is available in RFC 5424.

E.2 Parameters in Syslog messages

The Syslog messages can contain the following parameters:

Parameter	Description	Possible values or example
ip address	IPv4 or IPv6 address	IP address according to RFC1035 or RFC4291 Section 2.2
src port dest port	Port that is shown as decimal number. Format: %d	0 ... 65535
client mac dest mac src mac	MAC address Format: %02x:%02x:%02x;%02x:%02x:%02x	00:0C:29:2F:09:B3
protocol	Name of the service that has generated this event or of the Layer 4 protocol used. Format: %s	Possible entries of: UDP | TCP | WBM | Telnet | SSH | Console | TFTP |SFTP
group	String that identifies the group based on its name Format: %s	it-service
user name	String that identifies the authenticated user based on his/her name without spaces Format: %s	maier
action user name	Identifies the user based on his/her name This is not the authenticated user. Format: %s	Peter.Maier
role	Symbolic name for the group role Format: %s	Administrator
time minute timeout	Number of minutes Format: %d	44
time second	Number of seconds Format: %d	44
failed login count	Number of failed logins Format: %d	10
max sessions	Number of sessions Format: %d	10
vap	Symbolic name of the virtual access point interface Format: (%s) or (%s %s)	VAP1.1
status reason	Additional status information as legible string. It can contain multiple words. The string must start with " and end with " so that it can be analyzed.	(Invalid group cipher) (Unknown peer)
wlan interface	Symbolic name of the WLAN interface Format: %s	WLAN1
ssid	SSID in ASCII representation any number of spaces Format: %s	MyWLAN
channel	Name of the channel Format: %s	12

Parameter	Description	Possible values or example
signal strength	Signal strength Format: %d	12
version	Name of the version without spaces Format: %s	V1.0.3SP1
length	Length of the network packet (in bytes) Format: %d	52
network interface	Symbolic name of a network interface Format: %s	vlan 1

E.3 Syslog Messages

Identification and authentication of human users

Message text	{protocol}: User {User name} has logged in from {ip address}.
Example	WBM: User "Admin" has logged in from 192.168.0.1.
Explanation	Valid login information that is specified during remote login.
Severity	Info
Facility	local0
Standard	IEC 62443-3-3 Reference: SR 1.1

Message text	{protocol}: User {User name} failed to log in from {ip address}.
Example	WBM: User "Admin" has failed to log in from 192.168.0.1.
Explanation	Incorrect user name or incorrect password (login information) specified during remote login.
Severity	Warning
Facility	local0
Standard	IEC 62443-3-3 Reference: SR 1.1

Message text	{protocol}: User {User name} has logged out from {ip address}.
Example	SSH: User "Admin" has logged out from 192.168.0.1.
Explanation	User session completed - logged out.
Severity	Info
Facility	local0
Standard	IEC 62443-3-3 Reference: SR 1.1

Message text	{protocol}: Default user {user name} logged in from {ip address}.
Example	SSH: Default user admin logged in from 192.168.0.1.
Explanation	The default user is logged in via the IP address.
Severity	Info
Facility	local0
Standard	IEC 62443-3-3 Reference: n/a (NERC-CIP 007-R5)

Message text	{Protocol}: {IP address} - No response from the RADIUS server.
Example	WBM: 192.168.1.105 - No response from the RADIUS server.
Explanation	No access to the server or the server is not responding.
Severity	Warning
Facility	local0
Standard	IEC 62443-3-3 Reference: SR 1.1

User account management

Message text	{protocol}: User {user name} changed own password.
Example	WBM: User admin changed own password.
Explanation	User has changed own password.
Severity	Notice
Facility	local0
Standard	IEC 62443-3-3 Reference: SR1.3

Message text	{protocol}: User {user name} changed password of user {action user name}.
Example	Telnet: User admin changed password of user test.
Explanation	User has changed the password of another user.
Severity	Notice
Facility	local0
Standard	IEC 62443-3-3 Reference: SR1.3

Message text	{protocol}: User {user name} created user-account {action user name}.
Example	WBM: User admin created user-account service.
Explanation	The user has created an account.
Severity	Notice
Facility	local0
Standard	IEC 62443-3-3 Reference: SR1.3

Message text	{protocol}: User {user name} deleted user-account {action user name}.
Example	WBM: User admin deleted user-account service.
Explanation	The administrator deleted an existing account.
Severity	Notice
Facility	local0
Standard	IEC 62443-3-3 Reference: SR1.3

Management of the identifiers

Message text	{Protocol}: User {User name} created group {Group} and assigned to role {Role}.
Example	WBM: User admin created group it-service and assigned to role service.
Explanation	The administrator has created a group and assigned it to a role.
Severity	Notice
Facility	local0
Standard	IEC 62443-3-3 Reference: SR 1.4

Message text	{Protocol}: User {User name} deleted group {Group} and the role {Role} assignment.
Example	WBM: User maier deleted group it-service and the role service assignment.
Explanation	The administrator has deleted an existing group and the role assignment.
Severity	Notice
Facility	local0
Standard	IEC 62443-3-3 Reference: SR 1.4

Unsuccessful logon attempts

Message text	{User name} account is locked for {Time minute} minutes after {Failed login count} unsuccessful login attempts.
Example	User service account is locked for 44 minutes after 10 unsuccessful login attempts.
Explanation	If there are too many failed logins, the corresponding user account was locked for a specific period of time.
Severity	Warning
Facility	local0
Standard	IEC 62443-3-3 Reference: SR 1.11

Session lock

Message text	The session of user {user name} was closed after {time} seconds of inactivity.
Example	The session of user admin was closed after 60 seconds of inactivity.
Explanation	The current session was locked due to inactivity.
Severity	Warning
Facility	local0
Standard	IEC 62443-3-3 Reference: SR 2.5

Usage control of wireless links

Message text	{vap}: Client {SRC mac} associated successfully.
Example	VAP1.1: Client 00:0C:29:2F:09:B3 associated successfully.
Explanation	WLAN client connected to AP.
Severity	Info
Facility	local0
Standard	IEC 62443-3-3 Reference: SR 2.2

Message text	{vap}: Client {SRC mac} failed to associate, status {status}.
Example	VAP1.1: Client 00:0C:29:2F:09:B3 failed to associate, status (Invalid group cipher).
Explanation	WLAN client connection to AP denied.
Severity	Warning
Facility	local0
Standard	IEC 62443-3-3 Reference: SR 2.2

Message text	Overlap-AP found on {Wlan interface}: AP {ssid} {Src mac} found on channel {Channel} rssi {Signal strength}.
Example	Overlap-AP found on WLAN1: AP MyWLAN 00:0C:29:2F:09:B3 found on channel 12 rssi 12.
Explanation	Radio frequency is already in use.
Severity	Information
Facility	local0
Standard	IEC 62443-3-3 Reference: SR 2.2

Message text	Overlap-AP found on {Wlan interface}: AP {ssid_Hex} {Src mac} found on channel {Channel} rssi {Signal strength}.
Example	Overlap-AP found on WLAN1: AP 050E081234 00:0C:29:2F:09:B3 found on channel 12 rssi 12.
Explanation	Radio frequency is already in use.
Severity	Information
Facility	local0
Standard	IEC 62443-3-3 Reference: SR 2.2

Message text	{vap}: Client {SRC mac} disassociated with reason {reason}.
Example	VAP1.1: Client 00:0C:29:2F:09:B3 disassociated with reason (Unknown peer).
Explanation	WLAN client disconnected from AP.
Severity	Info
Facility	local0
Standard	IEC 62443-3-3 Reference: SR 2.2

Message text	{vap}: Client {SRC mac} failed to authenticate, status {status}.
Example	VAP1.1: Client 00:0C:29:2F:09:B3 failed to authenticate, status (Invalid group cipher).
Explanation	WLAN client connection to AP denied.
Severity	Warning
Facility	local0
Standard	IEC 62443-3-3 Reference: SR 2.2

Message text	{Protocol}: {IP address} - No response from the RADIUS server.
Example	WBM: 192.168.1.105 - No response from the RADIUS server.
Explanation	RADIUS server not found.
Severity	Warning
Facility	local0
Standard	IEC 62443-3-3 Reference: SR 2.2

Limiting the number of simultaneous sessions

Message text	{Protocol}: The maximum number of {Max sessions} concurrent login session exceeded.
Example	WBM: The maximum number of 10 concurrent login sessions exceeded.
Explanation	The maximum number of parallel connections is exceeded.

Severity	Warning
Facility	local0
Standard	IEC 62443-3-3 Reference: SR 2.7

Nonrepudiation

Message text	Device configuration changed.
Example	Device configuration changed.
Explanation	The device configuration has been changed permanently.
Severity	Info
Facility	local0
Standard	IEC 62443-3-3 Reference: SR2.12

Data backup in automation system

Log text	{protocol}: Saved file type ConfigPack.
Standard	IEC 62443-3-3 Reference: SR7.3
Description	The ConfigPack file was saved.
Example	TFTP: Saved file type ConfigPack
Severity	Notice
Facility	local0

Log text	{protocol}: User {user name} failed to save file type ConfigPack.
Standard	IEC 62443-3-3 Reference: SR7.3
Description	User failed to save the ConfigPack file.
Example	WBM: User admin failed to save file type ConfigPack.
Severity	Info
Facility	local0

Log text	{protocol}: User {user name} saved file type ConfigPack
Standard	IEC 62443-3-3 Reference: SR7.3
Description	User has saved the ConfigPack file.
Example	WBM: User admin saved file type ConfigPack..
Severity	Notice
Facility	local0

Log text	{protocol}: Failed to save file type ConfigPack.
Standard	IEC 62443-3-3 Reference: SR7.3
Description	The ConfigPack file could not be saved.
Example	TFTP: Failed to save file type ConfigPack.
Severity	Warning
Facility	local0

Restoration of the automation system

Message text	{protocol}: User {user name} loaded file type Config (restart required)..
Example	WBM: User admin loaded file type Config (restart required).
Explanation	The configuration is applied.
Severity	Info
Facility	local0
Standard	IEC 62443-3-3 Reference: SR 7.4

Message text	{protocol}: Loaded file type Config (restart required)..
Example	TFTP: Loaded file type Config (restart required).
Explanation	The configuration is applied.
Severity	Info
Facility	local0
Standard	IEC 62443-3-3 Reference: SR 7.4

Message text	{protocol}: User {user name} loaded file type ConfigPack (restart required)..
Example	WBM: User admin loaded file type ConfigPack (restart required).
Explanation	The configuration is applied.
Severity	Info
Facility	local0
Standard	IEC 62443-3-3 Reference: SR 7.4

Message text	{protocol}: Loaded file type ConfigPack (restart required)..
Example	TFTP: Loaded file type ConfigPack (restart required).
Explanation	The configuration is applied.
Severity	Info
Facility	local0
Standard	IEC 62443-3-3 Reference: SR 7.4

Message text	{protocol}: User {user name} loaded file type Firmware {version} (restart required).
Example	WBM: User admin loaded file type Firmware V02.00.00 (restart required).
Explanation	Firmware update was successfully uploaded.
Severity	Notice
Facility	local0
Standard	IEC 62443-3-3 Reference: SR 7.4

Message text	{protocol}: Loaded file type Firmware {version} (restart required).
Example	TFTP: Loaded file type Firmware V02.00.00 (restart required).
Explanation	Firmware update was successfully uploaded.
Severity	Info
Facility	local0
Standard	IEC 62443-3-3 Reference: SR 7.4

Message text	{protocol}: Failed to load file type Firmware.
Example	WBM: Failed to load file type Firmware.

Explanation	Firmware activation failed.
Severity	Warning
Facility	local0
Standard	IEC 62443-3-3 Reference: SR 7.4

Appendix F (Supported Security Mechanisms) F

F.1 WLAN security mechanisms

The following table shows the encryption methods and authentication that the SCALANCE W devices support.

Encryption method	
None	✓
WEP	✓
WPA-TKIP	-
WPA-AES	✓

Authentication	
Password / PSK	✓
IEEE 802.1X EAP PEAP	✓
IEEE 802.1X EAP TLS	✓
IEEE 802.1X EAP TTLS	✓
IEEE 802.1X EAP others	-
EAP protocol: MS-CHAPv2	✓
EAP protocol: TLS	✓
EAP protocol: GTC	✓

F.2 Security mechanisms supported for RADIUS authentication.

The following table shows cipher suites and signature algorithms that SCALANCE W devices support for RADIUS authentication.

Default setting TLS 1.0

Table F-1 WPA/WPA2 RADIUS authentication

Cipher suite	Signature algorithm
TLS 1.0/1.1	
AES256-GCM-SHA384	ECDSA with SHA224
AES128-GCM-SHA256	ECDSA with SHA1
AES256-SHA256	SHA224 with RSA
AES128-SHA256	SHA1 with RSA
ECDHE-ECDSA-AES256-SHA	DSA with SHA224
ECDHE-RSA-AES256-SHA	DSA with SHA1
DHE-RSA-AES256-SHA	ECDSA with SHA256
ECDHE-ECDSA-AES128-SHA	ECDSA with SHA384

Cipher suite	Signature algorithm
ECDHE-RSA-AES128-SHA	ECDSA with SHA512
DHE-RSA-AES128-SHA	EdDSA ed25519
AES256-SHA	EdDSA ed448
AES128-SHA	RSASSA-PSS with SHA256
TLS_AES_256_GCM_SHA384	RSASSA-PSS with SHA384
TLS_CHACHA20_POLY1305_SHA256	RSASSA-PSS with SHA512
TLS_AES_128_GCM_SHA256	RSASSA-PSS (rsaEncryption) with SHA256
ECDHE-ECDSA-AES256-GCM-SHA384	RSASSA-PSS (rsaEncryption) with SHA384
ECDHE-RSA-AES256-GCM-SHA384	RSASSA-PSS (rsaEncryption) with SHA512
DHE-RSA-AES256-GCM-SHA384	SHA256 with RSA
ECDHE-ECDSA-CHACHA20-POLY1305	SHA384 with RSA
ECDHE-RSA-CHACHA20-POLY1305	SHA512 with RSA
DHE-RSA-CHACHA20-POLY1305	DSA with SHA256
ECDHE-ECDSA-AES128-GCM-SHA256	DSA with SHA384
ECDHE-RSA-AES128-GCM-SHA256	DSA with SHA512
DHE-RSA-AES128-GCM-SHA256	
ECDHE-ECDSA-AES256-SHA384	
ECDHE-RSA-AES256-SHA384	
DHE-RSA-AES256-SHA256	
ECDHE-ECDSA-AES128-SHA256	
ECDHE-RSA-AES128-SHA256	
DHE-RSA-AES128-SHA256	
TLS 1.2	
TLS_AES_256_GCM_SHA384	ECDSA with SHA256
TLS_CHACHA20_POLY1305_SHA256	ECDSA with SHA384
TLS_AES_128_GCM_SHA256	ECDSA with SHA512
ECDHE-ECDSA-AES256-GCM-SHA384	EdDSA ed25519
ECDHE-RSA-AES256-GCM-SHA384	EdDSA ed448
DHE-RSA-AES256-GCM-SHA384	RSASSA-PSS with SHA256
ECDHE-ECDSA-CHACHA20-POLY1305	RSASSA-PSS with SHA384
ECDHE-RSA-CHACHA20-POLY1305	RSASSA-PSS with SHA512
DHE-RSA-CHACHA20-POLY1305	RSASSA-PSS (rsaEncryption) with SHA256
ECDHE-ECDSA-AES128-GCM-SHA256	RSASSA-PSS (rsaEncryption) with SHA384
ECDHE-RSA-AES128-GCM-SHA256	RSASSA-PSS (rsaEncryption) with SHA512
DHE-RSA-AES128-GCM-SHA256	SHA256 with RSA
ECDHE-ECDSA-AES256-SHA384	SHA384 with RSA
ECDHE-RSA-AES256-SHA384	SHA512 with RSA
DHE-RSA-AES256-SHA256	DSA with SHA256
ECDHE-ECDSA-AES128-SHA256	DSA with SHA384
ECDHE-RSA-AES128-SHA256	DSA with SHA512
DHE-RSA-AES128-SHA256	

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