

SIEMENS

SIMATIC

ET 200pro Interface module IM 154-6 PN HF IWLAN

Operating Instructions



The following supplement is part of this documentation:

No.	Product Information	Drawing number	Edition
1	Reference notes to approvals according to FCC and RSS-210	A5E02574910-01	05/2009

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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
with a safety alert symbol, indicates that minor personal injury can result if proper precautions are not taken.
CAUTION
without a safety alert symbol, indicates that property damage can result if proper precautions are not taken.
NOTICE
indicates that an unintended result or situation can occur if the corresponding information is not taken into account.

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 device/system may only be set up and used in conjunction with this documentation. Commissioning and operation of a device/system may only be performed by **qualified personnel**. Within the context of the safety notes in this documentation qualified persons are defined as persons who are authorized to commission, ground and label devices, systems and circuits in accordance with established safety practices and standards.

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 adhered to. The information in the relevant documentation must be observed.

Trademarks

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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.

Preface

Purpose of the operating instructions

These operating instructions are intended to supplement the ET 200pro Distributed I/O System operating instructions. The documentation provides a description of the IM 154-6 PN HF IWLAN interface module. A general description of the functionality of ET 200pro is not provided in these operating instructions. These are available in the ET 200pro Distributed I/O System operating instructions.

The information provided in these operating instructions and in the ET 200pro Distributed I/O System Operating Instructions allow you to commission ET 200pro with IM 154-6 PN HF IWLAN interface module and to operate it as an I/O device with WLAN interface on PROFINET.

Basic knowledge required

These operating instructions presume general knowledge of automation technology and of Wireless LAN.

Range of validity of these operating instructions

These operating instructions are valid for IM 154-6 PN HF IWLAN interface module, order number 6ES7154-6AB00-0AB0.

These operating instructions contain a description of the components that was valid at the time of publication. We reserve the right to issue a Product Information which contains up-to-date information about new components and new versions of components.

Scope of information

The following table provides an overview of the contents of the ET 200pro Distributed I/O System manuals. The manuals are available for download from the Internet (see Service & Support on the Internet).

Manual	Content
ET 200pro Distributed I/O System http://support.automation.siemens.com/WW/view/en/21210852	<ul style="list-style-type: none"> • Installing and connecting • Commissioning and diagnostics • Functions • Technical specifications <ul style="list-style-type: none"> – Interface modules – Power modules – Output module – Connection modules – Electronic modules
ET 200pro motor starter http://support.automation.siemens.com/WW/view/en/22332388	<ul style="list-style-type: none"> • Installing and connecting • Commissioning and diagnostics • Device functions • Technical specifications <ul style="list-style-type: none"> – Backplane bus module – Special modules – Motor starters
IM 154-8 CPU interface module http://support.automation.siemens.com/WW/view/en/24363739	<ul style="list-style-type: none"> • Communication • Memory concept • Installing and connecting • Addressing • Commissioning and diagnostics • Technical specifications
ET 200pro Distributed I/O System - Fail-Safe Modules http://support.automation.siemens.com/WW/view/en/22098524	<ul style="list-style-type: none"> • Configuring • Addressing and installing • Diagnostics • Technical specifications <ul style="list-style-type: none"> – Fail-safe connection modules – Fail-safe electronic modules
Operating instructions ET 200pro FC http://support.automation.siemens.com/WW/view/en/28561828	<ul style="list-style-type: none"> • Communication • Installing and connecting • Addressing • Commissioning and diagnostics • Technical specifications • Interrupt, error and system alarms
Operating instructions RFID systems, RF 170C http://support.automation.siemens.com/WW/view/en/32622825	<ul style="list-style-type: none"> • Installing and connecting • Parameterization • Service and maintenance • Functions • Technical specifications

Manual	Content
System Manual PROFINET System Description (http://support.automation.siemens.com/WW/view/en/19292127)	<ul style="list-style-type: none"> • Basics of PROFINET • Network components and structures • Data exchange and communication • PROFINET engineering
From PROFIBUS DP to PROFINET IO (http://support.automation.siemens.com/WW/view/en/19289930)	<ul style="list-style-type: none"> • Differences • Blocks • System status lists • Diagnostics
Operating instructions for SCALANCE W788-xPRO/RR / SCALANCE W74x-1PRO/RR (http://support.automation.siemens.com/WW/view/en/32816761)	<ul style="list-style-type: none"> • Communication • Installing and connecting • Addressing • Commissioning and diagnostics • Technical specifications • Service and maintenance • Planning and configuring
Operating instructions for SCALANCE W784-1xx / SCALANCE W74x-1 (http://support.automation.siemens.com/WW/view/en/32816761)	<ul style="list-style-type: none"> • Communication • Installing and connecting • Addressing • Commissioning and diagnostics • Technical specifications • Service and maintenance • Planning and configuring

Changes since the previous version

These operating instructions are the first version published.

Guide

The operating instructions contain the following guides which provide quick access to the specific information you need:

- A comprehensive table of contents and a list of all the tables and figures in the document are available at the beginning of the operating instructions.
- Important terms are explained in the glossary.
- Navigate to the most important topics in our documents using the index.
- Cross-references are shown as hypertext in the running text. By clicking a hyperlink, you can open the associated chapter in this manual, or access the download page on the Internet that contains this information.

Special notes

If you operate the IM 154-6 PN HF IWLAN interface module as I/O device on PROFINET IO you need these operating instructions, plus the manual for your I/O controller and for the Access Point (e.g. SCALANCE W788) used for the Wireless LAN.

Recycling and disposal

The IM 154-6 PN HF IWLAN interface module consists of low-pollutant components and can be recycled. For environmentally sustainable recycling and disposal of your old device, contact a certified disposal service for electronic scrap.

Further support

If you have any questions relating to the products described in these operating instructions, and do not find the answers in this document, please contact your Siemens partner at our local offices.

Find your contact partner on the Internet (<http://www.siemens.com/automation/partners>).

A guide to the technical documentation for the various SIMATIC products and systems is available on the Internet (<http://www.siemens.com/simatic-docu>).

The online catalog and online ordering system are available on the Internet (<http://www.siemens.com/automation/mall>).

Training Center

Siemens offers a series of courses which help you get started with ET 200pro and the SIMATIC S7 automation system. Please contact your regional training center or the central training center in D -90327, Nuremberg, Germany.

Internet (<http://www.siemens.com/sitrain>)

Technical Support

You can access technical support for all Industry Automation products in the Internet (http://www.siemens.com/automation/csi_en_WW/support_request)

Service & Support on the Internet

In addition to our documentation pool we offer our complete online knowledge base on the Internet (http://www.siemens.com/automation/csi_en_WW).

There you will find:

- The newsletter that provides up-to-date information on your products.
- The documents you need using our Search function in Service & Support.
- The Internet forum where users and specialists around the world can share their experience.
- Your local contact for Automation & Drives in our contact database.
- Information about on-site services, repairs, spare parts, and lots more.

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Description

1.1 What is Industrial Wireless LAN (IWLAN)?

Definition

The terms Wireless LAN (Wireless Local Area Network) denotes a local radio network for data transmission via electromagnetic waves, by contrast to cable-bound optical or electrical networks.

Industrial Wireless LAN is based on the transmission standards 802.11 a/b/g and 802.11h for handling the data transfer at different frequencies.

Industrial Wireless LAN is also characterized by the following I-Features:

- Redundant operation with two antennas in "problematic" radio-technological environments (antenna diversity)
- Monitoring of the wireless connection (Link Check)
- Monitoring of additional IP connections (IP Alive)
- Redundant radio connection of two Access Points via two different channels for increased availability.
- Reservation of fixed bandwidths and response times for critical clients (iQoS)
- iPCF (industrial Point Coordination Function) ensures collision-free communication for a large number of subscribers and allows the quick change of radio cells (Rapid Roaming)

1.1 What is Industrial Wireless LAN (IWLAN)?

Structure of an Industrial Wireless LAN

The following figure shows an example of the configuration of a Wireless LAN that is integrated in a PROFINET IO network.

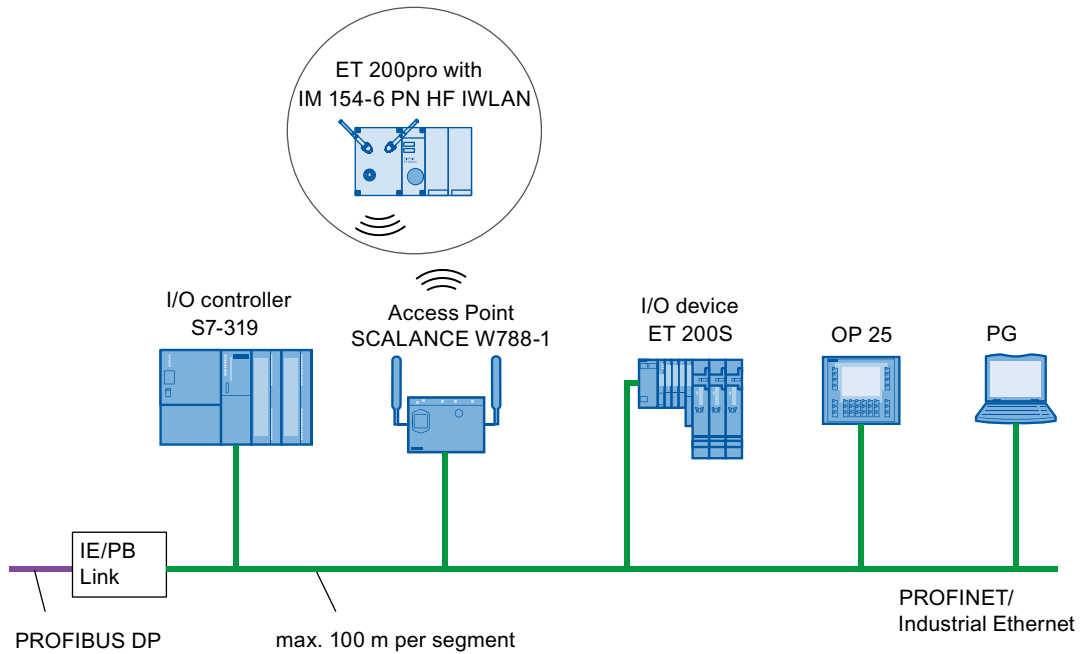


Figure 1-1 Structure of an IWLAN within a PROFINET network

See also

PROFINET System Description
(<http://support.automation.siemens.com/WW/view/en/19292127>)

1.2 Interface module IM 154-6 PN HF IWLAN with interface and connection unit

IM 154-6 PN HF IWLAN - Definition

The IM 154-6 PN HF IWLAN interface module consists of an interface element and a connection element with Wireless LAN interface. The interface and connection elements are only available as single unit and must be operated as such. The IM 154-6 PN HF IWLAN interface module expands the product range of interface modules of the ET 200pro Distributed I/O System with degree of protection IP 65, IP 66 and IP 67 with an additional interface variant.

Area of application

Interface module IM 154-6 PN HF IWLAN with Industrial Wireless LAN interface allows implementation of an ET 200pro for applications for which cable-bound solutions would incur enormous costs (wear, distances, rough terrain).

Possible fields of application:

- Transport systems without driver
- Escalators
- Warehouse logistics
- Goods transportation
- Electric suspension monorails
- Building management
- Service applications

The IM 154-6 PN HF IWLAN interface module communicates via Access Points with I/O controllers which conform to IEC 61158.

Configuration

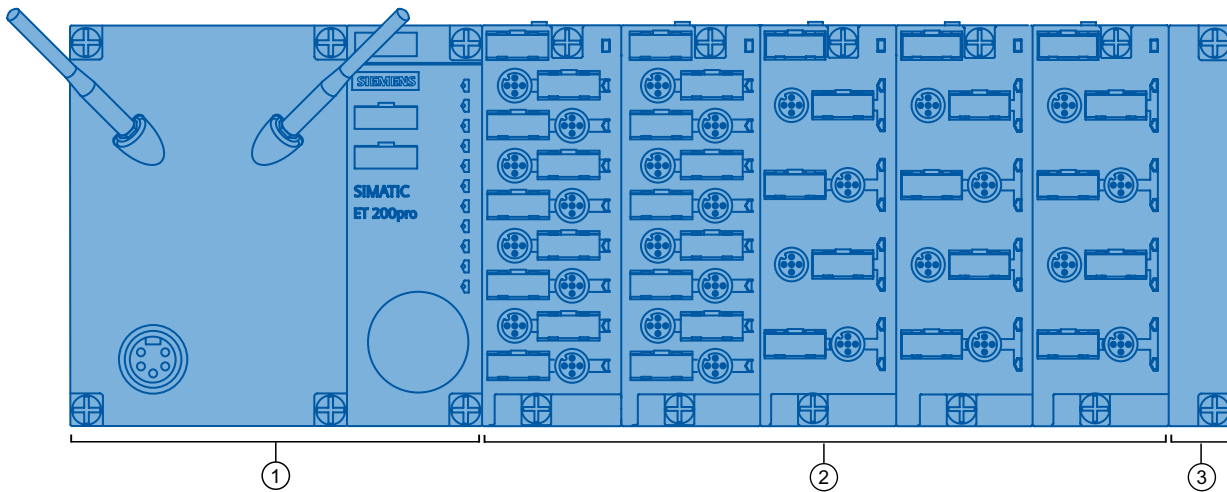
The configuration of an ET 200pro with the IM 154-6 PN HF IWLAN interface module does not differ compared to that of an ET 200pro with other interface modules, as described in the Configuration chapter of the ET 200pro Distributed I/O System (<http://support.automation.siemens.com/WW/view/en/21210852>) operating instructions.

How do I configure ET 200pro with IM 154-6 PN HF IWLAN?

For information about the procedures for configuring ET 200pro with IM 154-6 PN HF IWLAN, refer to the Configuring (Page 35) section these operating instructions.

Example configuration

The following figure shows an example of a configuration with ET 200pro with the IM 154-6 PN HF IWLAN interface module.



- ① Connection element and interface element (IM 154-6 PN HF IWLAN)
- ② Connection elements for the electronic modules
- ③ Termination module

Figure 1-2 View of the distributed I/O system ET 200pro with IM 154-6 PN HF IWLAN

See also

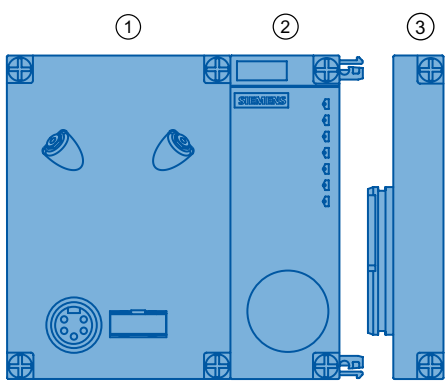
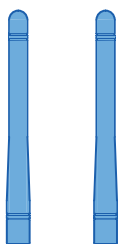

HSP 0165 (<http://support.automation.siemens.com/WW/view/en/4000024>)

1.3 Components of IM 154-6 PN HF IWLAN

Components in interaction with IM 154-6 PN HF IWLAN

The following table introduces the components of ET 200pro with the IM 154-6 PN HF IWLAN interface module.

Table 1- 1 Components of ET 200pro with IM 154-6 PN HF IWLAN

Components	Function	Figure
Interface element for PROFINET IO over Wireless LAN with bus module	<p>The interface module interconnects ET 200pro with the IO Controller via Access Point (AP) and prepares the data for the electronic modules.</p> <p>The following bundle consisting of the interface and connection unit is available for Wireless LAN:</p> <ul style="list-style-type: none"> IM 154-6 PN HF IWLAN (6ES7154-6AB00-0AB0) ①+② <p>The termination module ③, interface module ② and the connection unit ① are mounted on the bus module for shipment.</p>	
Standard antenna	<p>The antenna with R-SMA connector (6ES7194-4MA00-0AA0) is approved as standard for operation with the interface module and is used to send and receive electromagnetic wave signals.</p> <p>It is included in the package delivered and must be purchased separately. Go to the corresponding Mall on the Internet (https://mall.automation.siemens.com/WW/guest/).</p>	
Micro Memory Card (MMC)	<p>You can store user and configuration data, or the operating system on the SIMATIC Micro Memory Card.</p> <p>The Micro Memory Card is not included in the package delivered and must be purchased separately. Go to the corresponding Mall on the Internet.</p> <p>All Micro Memory Cards supported for use on IM 154-6 PN HF IWLAN are listed in chapter Order numbers for accessories (Page 134).</p> <p>The figure shows an example: Micro Memory Card (8 MB): 6ES7953-8LP20-0AA0</p>	

Additional components

A list of components that you can use with IM 154-6 PN HF IWLAN is provided in the Description chapter of the ET 200pro Distributed I/O System (<http://support.automation.siemens.com/WW/view/en/21210852>) Operating Instructions.

See also

Order numbers for accessories (Page 134)

Planning application

2.1 Content

Where can I find what information?

Comprehensive information pertaining to the planning of an ET 200pro application is available in the relevant chapters of the ET 200pro Distributed I/O System Operating Instructions.

The next chapters provide more detailed information about the properties of the WLAN interface of an ET 200pro with IM 154-6 PN HF IWLAN.

2.2 WLAN configuration with PROFINET IO

Industrial Wireless LAN and PROFINET IO

The example of an electric suspension monorail in the following figure shows how you can optimize your implementation of Industrial Wireless LAN in combination with PROFINET IO.

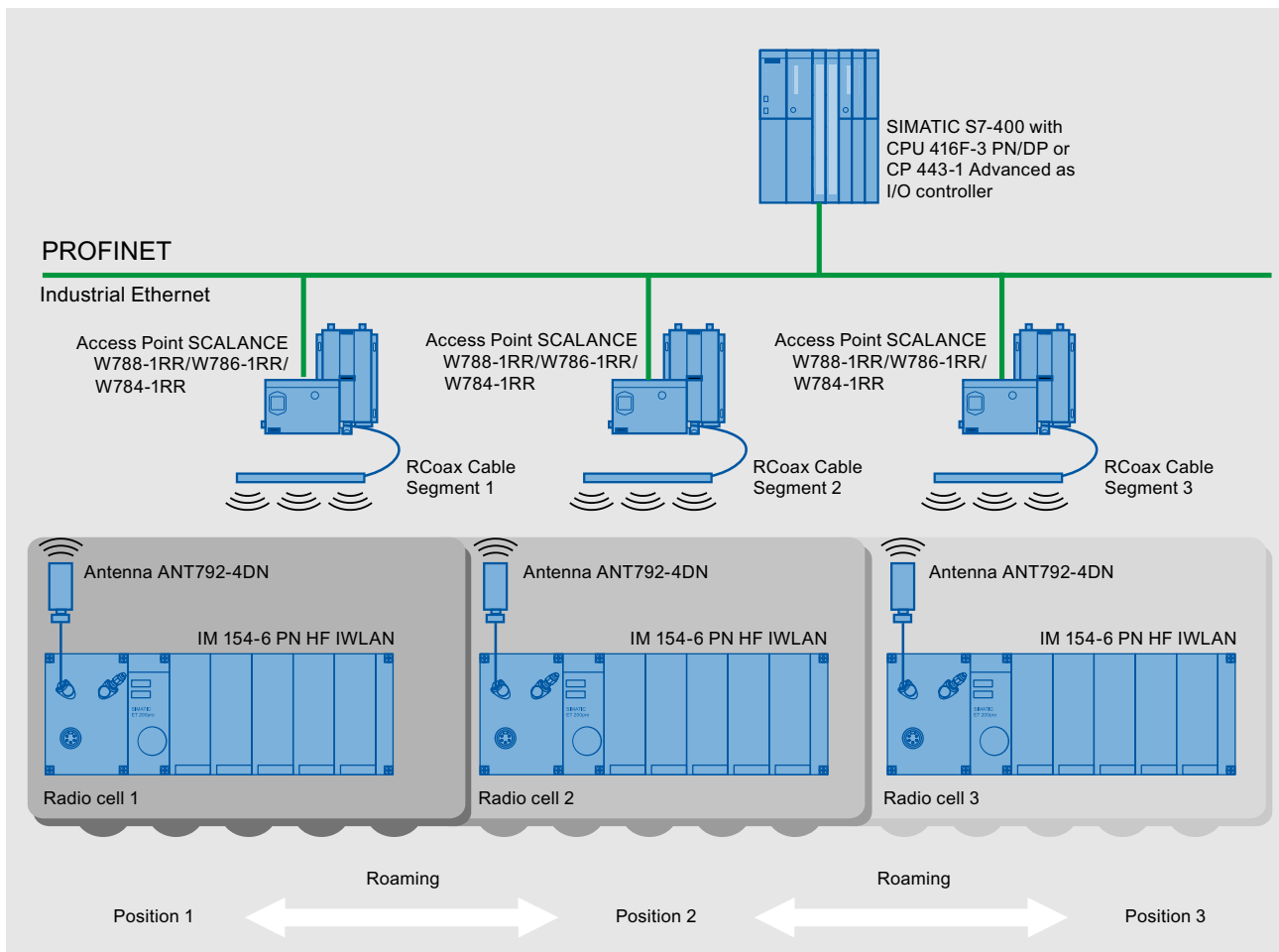


Figure 2-1 IWLAN and PROFINET IO based on the example of an electric suspension monorail

2.3 WLAN communication

Introduction

Industrial Wireless LAN is based on the international standards IEEE 802.11a/b/g/h and has been accepted in many fields of factory and process automation. Industrial Wireless LAN is a new solution for applications that could previously only be implemented at high-cost with time consuming cable-bound solutions.

Industrial fields of application

The enhanced WLAN standard IEEE 802.11 now supports demanding applications which meet special demands in terms of the real-time and deterministic property requirements of PROFINET.

Industrial Wireless LAN is preferably used in the following scenarios:

- Complex cabling.
- High demands in terms of flexibility.

Properties of the WLAN interface of IM 154-6 PN HF IWLAN interface module

The table below provides a summary of the properties of the Industrial Wireless LAN interface.

Table 2- 1 Properties of the WLAN interface

Property	Data	Comment
Max. transmission rate (gross data rate)	54 Mbps	
Transmission method (Physical Layer)	Direct Sequence Spread Spectrum (DSSS) Complementary Code Keying (CCK) Orthogonal Frequency Division Multiplexing (OFDM)	
Optimized media access / radio cell changes	Industrial Point Coordination Function (iPCF) / uninterruptable with Rapid Roaming (RR)	update times > 16 ms for PROFINET IO
Restriction in accordance with the max. gross data rate when using iPCF	IEEE 802.11a/h/g: 12 Mbps IEEE 802.11b: 11 Mbps	

Note

iPCF mode

You should always enable the iPCF mode for PROFINET communication. The signal strength must not drop below 60 % or -65 dBm in order to ensure reliable operation. Activate the iPCF mode in Web Based Management, **Wizards > iPCF** folder, by saving the settings in the Wizard iPCF.

Note

Disruption of data transfer due to excess received power

Excess received power at the input of the WLAN client overdrives its amplifier circuit. Any received power greater than -40 dBm at the WLAN client causes communication errors. You can view the corresponding actual received power value [in dBm] in Web Based Management by selecting **Information > "Available WLAN"**.

Input signal power at the WLAN client is determined by the following factors:

- "Transmit power" settings in the Web Based Management of the Access Point.
- Reflections of electromagnetic waves due to structural features of building
- Distance between the Access Point and the WLAN client
- Radiation characteristic and gain of the antenna used

NOTICE

iPCF mode and update time for PROFINET IO

Observe the following items when setting up the update time of the PROFINET IO system (<http://support.automation.siemens.com/WW/view/en/31938420>):

Requirements: Parameterize the "Background scan channel" as follows in order to maintain the specified update time:

For the Background Scan Channel, enter the channels of all radio cells to be used for AP/Client communication.

To set up a Background Scan Channel, click **INTERFACES > WLAN > ADVANCED > Background Scan Channels**

Case 1: ET 200pro with IM 154-6 PN HF IWLAN interface module is operated within a single radio segment and does not have to support roaming.

Select an update time of 32 ms or higher in STEP 7.

Case 2: ET 200pro with IM 154-6 PN HF IWLAN interface module is operated on several channels in more than one radio cell.

Select an update time of 64 ms or higher in STEP 7.

NOTICE

IWLAN for fail-safe communication

Communication at frequency bands above 5 GHz to IEEE 802.11 h radio standard is subject to the increased risk of failure caused by channel changes (DFS) triggered by the detection of radar patterns. In this case you would not meet safety-related communication (safety) requirements.

Do not use the IEEE 802.11 h standard if the IM 154-6 PN HF IWLAN interface module is to be used for fail-safe communication.

Dynamic Frequency Selection (DFS) and Transmission Power Control (TPC)

In addition to the original frequency band of 2.4 GHz to IEEE 802.11b/g standard, 802.11a and the derivative 802.11h standard operate at frequencies within the 5 GHz bandwidth. The 5 GHz band takes the advantage compared to the 2.4 GHz band as it transmits fewer applications. However, the 5 GHz wavelength does show disadvantages in terms of higher atmospheric attenuation.

In order to meet European conditions for use, the new IEEE 802.11h standard with additional mechanisms was developed as a preventive measure against the disruption of so-called primary users (e.g. radar). Those mechanisms include Dynamic Frequency Selection (DFS) and Transmission Power Control (TPC).

- DFS forces a controlled change to an alternative channel if a selected channel is busy.
- TPC restricts output power to a dimension required for error-free communication. This measure reduces interference on adjacent channels.

Operating with communications module RF 170C and RF-Identsystem MOBY U

Note the following information if operating the communication board with RF-Identsystem MOBY U.

Note

Reciprocal action between the IM 154-6 PN HF IWLAN and MOBY U radio links

To exclude malfunction, the Access Point (e.g. SCALANCE W78x) and IM 154-6 PN HF IWLAN must transfer data in the 5 GHz band if RF-Identsystem MOBY U is connected to the system.

Technical background: As RF-Identsystem MOBY U transmits data within the 2.4 GHz band, negative reciprocal action with other radio communication systems operating at the same bandwidth must be expected.

However, if you can waive this aspect and operate the IM 154-6 PN HF IWLAN interface module exclusively within the 2.4 GHz bandwidth, you should prevent any other WLAN system from transferring data within this bandwidth.

Additional information about the operation of RF-Identsystems MOBY U

The RF-Identsystem MOBY U Operating Instructions available at <http://support.automation.siemens.com/WW/view/de/12443728> (<http://support.automation.siemens.com/WW/view/en/12443728>) provide additional information for planning radio relay sections.

Installing

3.1 Installing IM 154-6 PN HF IWLAN

Introduction

The IM 154-6 PN HF IWLAN interface module interconnects ET 200pro with PROFINET via Industrial Wireless LAN and provides power to the electronic modules.

Requirements

- The termination module is removed from IM 154-6 PN HF IWLAN interface module .
- The SIMATIC Micro Memory Card is inserted.
- The rack has been mounted. For additional information, refer to the "ET 200pro Distributed I/O System (<http://support.automation.siemens.com/WW/view/en/21210852>)" Operating Instructions.

Required tools

Cross-tip screwdriver, size 2

Procedure

1. Snap-mount IM 154-6 PN HF IWLAN interface module onto the module carrier and then slide it into the required position.
2. Screw IM 154-6 PN HF IWLAN interface module onto the rack.
6 recessed head screws on the front: top and bottom, tightening torque 1.5 N/m
3. Install the I/O modules (electronics modules).
4. Install the termination module. For additional information, refer to the "ET 200pro Distributed I/O System (<http://support.automation.siemens.com/WW/view/en/21210852>)" Operating Instructions.

Wiring

4.1 Content

Where can I find what information?

Comprehensive information about the installation and layout rules of ET 200pro, including corresponding operating instructions are available in the ET 200pro Distributed I/O Device Operating Instructions (<http://support.automation.siemens.com/WW/view/en/21210852>).

The following chapters will show you the differences and special features concerning the connection of an ET 200pro with IM 154-6 PN HF IWLAN interface module.

4.2 Technical specifications of the lines

Influence of cable length on the supply voltage

- Always make allowances for the influence of cable lengths on the supply voltage of ET 200pro.

Example

On a cable with $\varnothing 1.5 \text{ mm}^2$ and a length of 10 m, the voltage drop is 2.5 V at a load of 10 A. This corresponds with 0.25 V at a load of 1 A.

- Max. input current of connection module IM 154-6 PN HF IWLAN Direct: 5 A on 1L+, and 8 A on 2L+.

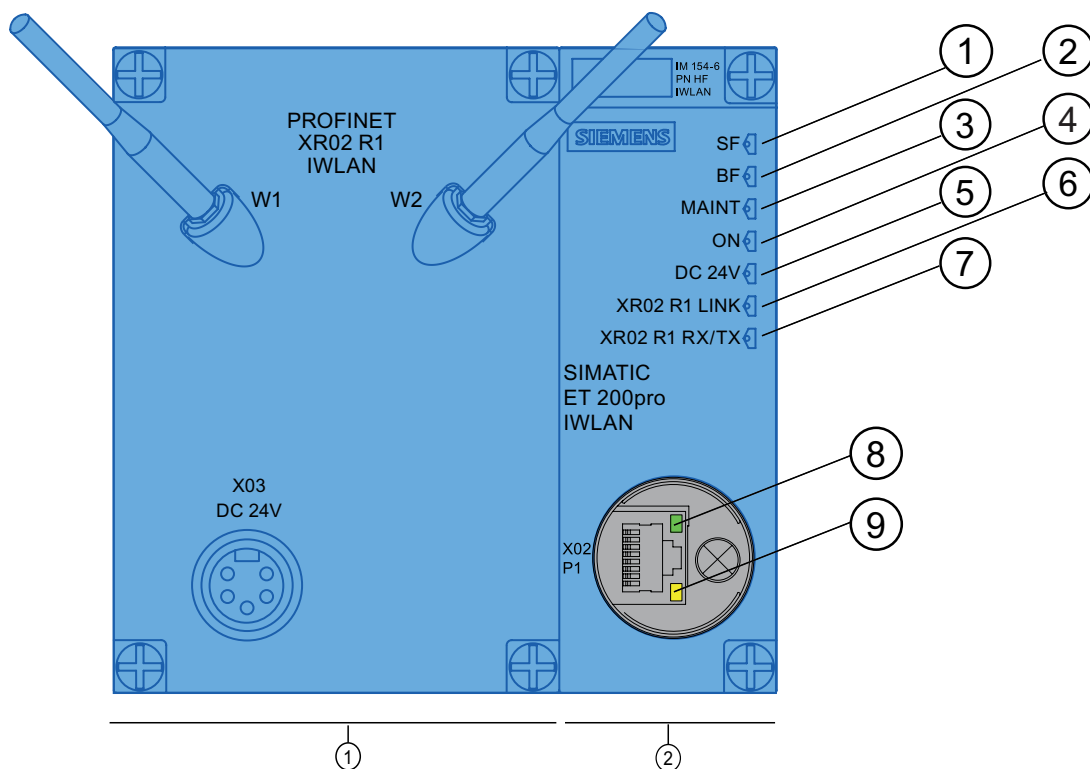
CAUTION

Always adapt the conductor cross-sections to the max. supply currents, for you would otherwise risk damage to the device as a result of excess heat on the cable insulation and on contacts.

4.3 Connecting the IM 154-6 PN HF IWLAN

Introduction

Connect the power supplies and antennas to the connection element of IM 154-6 PN HF IWLAN
 IWLAN ①: Connect the programming device to the RJ45 socket on the interface element ② of IM 154-6 PN HF IWLAN.



- X03 7/8" circular socket connector (with pin insert) for the 1L+ electronic/encoder supply and 2L+ load voltage supply
- X02 P1 RJ45 socket for connecting a programming device for setting the IP address (Ethernet port 1); this is not a PROFINET interface
- XR02 R1 W1 and W2 R-SMA antenna connector (see the chapter: Order numbers of accessories)

Figure 4-1 Connection element ① and interface element ② of IM 154-6 PN HF IWLAN

Requirements

The IM 154-6 PN HF IWLAN interface module (including the bus module) with the connection element are mounted on the rack.

Required tools

- Screwdriver
- Stripping tool for wiring the 7/8" and RJ45 connectors, if you choose to assemble the cables by yourself.
- 32 mm open-ended spanner

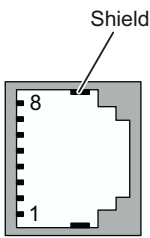
Required accessories

- Patch cable with 7/8" connector. The cable is available in various lengths from appropriate manufacturers.
- If you choose to assemble the power cords by yourself: 5-wire cable, core cross-section min. AWG 16/1.48 mm² and 7/8" connector, IP67, plastic to EN 61131-2:2007, chapters 11.5.2 and 11.5.3
- Patch cable with RJ45 connector. The cable is available in different lengths.
- If you choose to assemble the patch cable for connecting the programming device by yourself:
4-wire shielded bus cable and RJ45 connector

Pin assignment of the 7/8" connector

7/8" connectors (1L+ and 2L+ supply voltages)	Terminal	Assignment
<p>X03 24 VDC</p> <p>2L+</p> <p>1L+</p>		X03 DC 24V for supplying the
	1	Ground for load voltage supply 2M
	2	Ground for electronic/encoder supply 1M
	3	Functional ground
	4	1L+ electronic/encoder supply
5	2L+ load voltage supply	

Pin assignment of the RJ45 connector

View of the RJ45 jack	Terminal	Assignment
	1	TD (Transmit Data +)
	2	TD_N (Transmit Data -)
	3	RD (Receive Data +)
	4	Ground
	5	Ground
	6	RD_N (Receive Data -)
	7	Ground
	8	Ground

Connecting the 7/8" connectors

1. Insert the 7/8" connector into the mating circular socket on the connection element of IM 154-6 PN HF IWLAN. Ensure that the locking mechanism between the connector and socket is properly applied.
2. Tighten the knurled screws of the plug connectors (torque = 1.5 N/m).

CAUTION

It is not permitted to remove the 7/8" connectors while ET 200pro is in operation! Always switch off the 1L+ electronic/encoder supply and the 2L+ load voltage supply before you remove or insert the 7/8" connector.

Connecting the RJ45 jack

1. Remove the screw cap from the interface element of IM 154-6 PN HF IWLAN.
2. Press the RJ45 jack into the socket on the interface element until it engages.

Note

Closing the RJ45 socket

In order to retain degree of protection after having completed commissioning you must reinstall the cap onto the RJ45 socket of the interface element (torque: 1 N/m to 1.5 N/m).

Line protection

Line protection is mandatory according to DIN VDE 0100, i.e. you always need to provide external fusing for supply lines:

- Interface module:

Protection of the 1L+ electronic/encoder supply using a **24VDC/16A MCB**, tripping characteristic type B or C.

- Interface module / integrated power module, and power module:

Protection of the 2L+ load voltage supply using a **24VDC/16A MCB**, tripping characteristic type B or C.

Note

A 24 VDC/16A MCB with tripping characteristics type B trips **before** the equipment fuse has blown.

A 24 VDC/16A MCB with tripping characteristics type C trips **after** the equipment fuse has blown.

Equipment fusing

Replaceable equipment fuses for ET 200pro:

- Interface module:

The power bus module of the interface module is equipped with a fuse for electronic/encoder supply 1L+ (5x20; 12.5 A; fast-blow) and a fuse for load voltage supply 2L+ (5x20; 12.5 A; fast.blow). A spare fuse is attached at this location.

You can find the order number of the fuse in chapter Order numbers for accessories (Page 134).

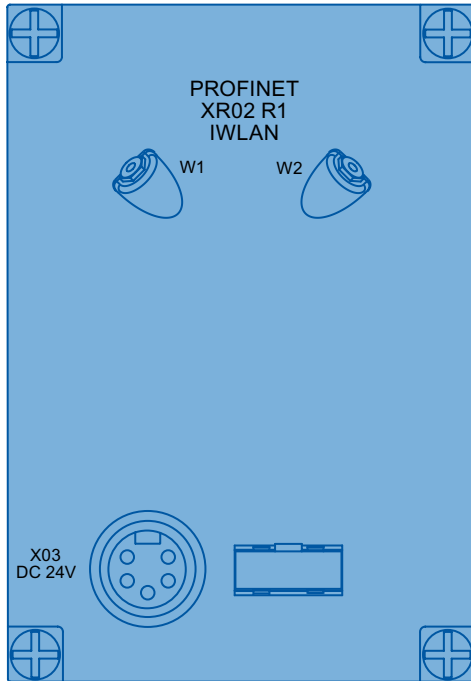
See also

Order numbers for accessories (Page 134)

4.4 Connecting an antenna to IM 154-6 PN HF IWLAN

Introduction

Connect the antennas to the connection module (see the following figure) of IM 154-6 PN HF IWLAN. In addition to the standard antenna you can also interconnect remote antennas using corresponding patch cables.



W1, W2 R-SMA for connecting the approved antennas with R-SMA jack

Connecting the antenna

1. Insert the antenna (6ES7194-4MA00-0AA0) into the R-SMA antenna connector without jamming it.
2. Secure the antenna.

Note

Optimum data transfer using two antennas

Connect both antennas to the connection element of IM 154-6 PN HF IWLAN to optimize data transmission between the AP and the IM 154-6 PN HF IWLAN interface module.

NOTICE

Malfunctions when operating only with one antenna

Communication could be disrupted if you only connect one antenna to the connection element of IM 154-6 PN HF IWLAN.

Check both R-SMA antenna jacks to make sure that

- either an antenna which is approved for operation with IM 154-6 PN HF IWLAN or a terminating resistor TI795-1R (6GK5795-1TR10-0AA6) which is approved for operation with

IM 154-6 PN HF IWLAN is connected.

For antenna order numbers, refer to the Appendix (Page 134) of this document.

Set up the corresponding antenna socket in the WBM, **Interfaces > WLAN > ADVANCED > Antenna** folder.

CAUTION

Use only original accessories

If using any accessories other than the original for the device, you run the risk of damage to the antenna jack.

Connecting remote antennas

You can optimize communication quality by selecting a suitable location for the antennas. Use one of the remote antennas which is approved for operation with interface module IM 154-6 PN HF IWLAN. You can determine the optimum location for the remote antennas and maximize radio signal quality within your rooms using a radio field planning tool (e.g. SINEMA E).

For information related to antenna installation and operation, refer to the relevant operating instructions. The operating instructions are available for download from the Support pages (<http://support.automation.siemens.com/WW/view/en/24043872/133300>) of SIEMENS AG. The N-Connect/R-SMA Male/Male Flexible Connection Cable is available as accessory for connecting the antenna.

Table 4- 1 Connecting cable N-Connect/R-SMA

Length in m	Order number
1	6XV 1875-5CH10
2	6XV 1875-5CH20
5	6XV 1875-5CH50
10	6XV 1875-5CN10

External antennas and antenna cables for IM 154-6 PN HF IWLAN

The following table provides a list of external antennas which are approved for operation with the IM 154-6 PN HF IWLAN interface module.

Table 4- 2 Antennas for RCoax systems

Designation	Radiation characteristics	MLFB	Comment/link to the manual
ANT792-4DN SIEMENS SIMATIC NET IWLAN RCoax N-Connect Female 2,4 GHz	directional	6GK5792-4DN00-0AA6	RCoax antenna for connection to ET 200pro with IM 154-6 PN HF IWLAN, SCALANCE W7xx and IWLAN/PB-Link, N-Connector Female 2.4 GHz via IWLAN RCoax N-Connect/R-SMA Male/Male Flexible Connection Cable, Preassembled Particularly suitable for use with the RCoax antenna system. The operating instructions for installation of the antenna are available on the Internet (http://support.automation.siemens.com/WW/view/en/27038494).
ANT793-4MN SIEMENS SIMATIC NET IWLAN RCoax N-Connect Female 5 GHz	directional	6GK5793-4MN00-0AA6	RCoax antenna for connection to ET 200pro with IM 154-6 PN HF IWLAN, SCALANCE W7xx and IWLAN/PB-Link, N-Connector Female 5 GHz via IWLAN RCoax N-Connect/R-SMA Male/Male Flexible Connection Cable, Preassembled Particularly suitable for use with the RCoax antenna system. The operating instructions for installation of the antenna are available on the Internet (http://support.automation.siemens.com/WW/view/en/21286952).

Table 4- 3 Mast antennas, single-band

Designation	Radiation characteristic	MLFB	Comment/link to the manual
ANT792-6MN SIEMENS SIMATIC NET IWLAN rod antenna N- Connect Female 2.4 GHz	Omnidirectional	6GK5792-6MN00-0AA6	Rod antenna for connection to ET 200pro with IM 154-6 PN HF IWLAN, SCALANCE W7xx and IWLAN/PB-Link, N-Connector Female 2.4 GHz via IWLAN RCoax N-Connect/R-SMA Male/Male Flexible Connection Cable, Preassembled For wall or pole mounting The operating instructions for installation of the antenna are available on the Internet (http://support.automation.siemens.com/W/view/en/26210199).
ANT793-6MN SIEMENS SIMATIC NET IWLAN Rod antenna N- Connect Female 5 GHz	Omnidirectional	6GK5793-6MN00-0AA6	Rod antenna for connection to ET 200pro with IM 154-6 PN HF IWLAN, SCALANCE W7xx and IWLAN/PB-Link, N-Connector Female 2.4 GHz via IWLAN RCoax N-Connect/R-SMA Male/Male Flexible Connection Cable, Preassembled For wall or pole mounting The operating instructions for installation of the antenna are available on the Internet (http://support.automation.siemens.com/W/view/en/26228205).

4.5 Lightning protection, power supply and grounding

Notes on lightning protection

 **WARNING**

Danger due to lightning strikes

There is a risk of lethal burns if you do not provide adequate protective measures against lightning strikes by grounding the antennas.

All outdoor antennas must be located within the range of a lightning arrester. Make sure that all conductive systems fed in from the outside can be adequately protected by a lightning protection potential equalization system.

Implementation of your lightning protection concept must strictly conform to VDE 0182 or IEC 62305 standards.

A suitable lightning protection element is available in the range of accessories of SIMATIC NET Industrial WLAN: Lightning protection element LP798-1N (order no. 6GK5798-2LP00-2AA6).

 **WARNING**

Danger due to lightning strikes

There is a risk of lethal burns if you do not provide adequate protective measures against lightning strikes by grounding the antennas.

Installing this lightning protector between an antenna and an IM 154-6 PN HF IWLAN interface module is not adequate protection against a lightning strike. The LP798-1N lightning protector only works within the framework of a comprehensive lightning protection concept. Contact a qualified specialist company if you have questions in this context.

Note

In addition, you should strictly follow the rules for operating the 24 VDC power supply on the ET 200pro Distributed I/O System and the general rules for grounding and for equipotential bonding of the ET 200pro Distributed I/O System specified in the operating instructions (<http://support.automation.siemens.com/WW/view/en/21210852>).

Configuring

5.1 Overview

Special features to note when configuring the IM 154-6 PN HF IWLAN interface module

The procedure for configuring the IM 154-6 PN HF IWLAN interface module differs only slightly compared to the procedure for cable-bound interface modules.

The IM 154-6 PN HF IWLAN interface module is deactivated by default for initial commissioning. For this reason, you must configure the IP address using a programming device or a PC that is interconnected directly via RJ45 interface with the IM 154-6 PN HF IWLAN interface module.

The configuration data of a STEP 7 project for a PROFINET IO system can be transferred via Access Point from the programming device or PC to the IM 154-6 PN HF IWLAN interface module.

Configuring sequence

The task for configuring the IM 154-6 PN HF IWLAN interface module is split into four steps.

Step 1: IP address assignment

Step 2: WLAN and Security parameterization for the interface element

Step 3: WLAN and Security parameterization for the Access Point

Step 4: Configuring the interface element in PROFINET IO using STEP 7

5.2 Assigning an IP address

5.2.1 Connecting a programming device/PC

Required tools

32 mm open end wrench for the cap.

Connecting the programming device/PC

1. Unscrew and remove the cap on the Ethernet port of the interface unit.
2. Interconnect the programming device/PC with the Ethernet port of IM 154-6 PN HF IWLAN using a suitable network patch cable. For information about network patch cables, refer to chapter Order numbers for accessories (Page 134).

5.2.2 Assigning the IP address in STEP 7

Prerequisites

- The IM 154-6 PN HF IWLAN interface module is equipped with a SIMATIC Micro Memory Card with a capacity of at least 64 KB. For information about memory cards, refer to chapter Order Numbers (Page 133).
- The Ethernet adapter of your programming device/PC has a valid IP address.

Note

Network parameters of the Ethernet adapter

To enable access to the Web server of the IM 154-6 PN HF IWLAN interface module after you assigned the IP address, the network address (first element of the IP address) of the IM 154-6 PN HF IWLAN interface module must correspond with that of the Ethernet adapter in your programming device /PC.

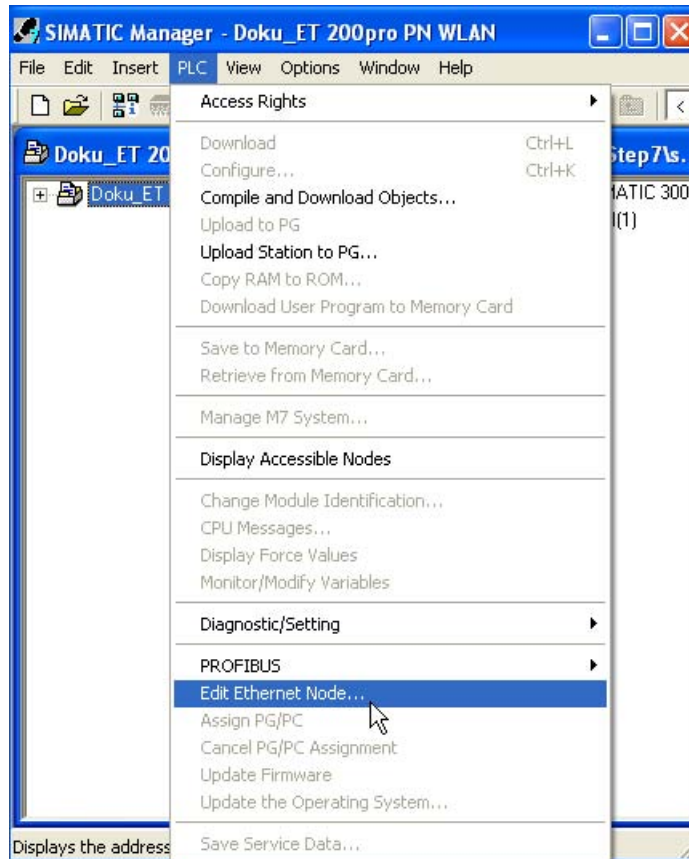
You can view the network parameters in the properties dialog of the connection of your programming device/PC. Select **Start > Settings > Network Connections** to open the properties dialog. Right-click the connection (e.g. LAN connection) to open the shortcut menu and then click "Properties". The properties dialog of the Ethernet adapter opens. Select "Internet Protocol (TCP/IP)" and then click "Properties" to display the IP address and subnet mask.

Change the settings as follows if the "Obtain an IP address automatically" option is set:

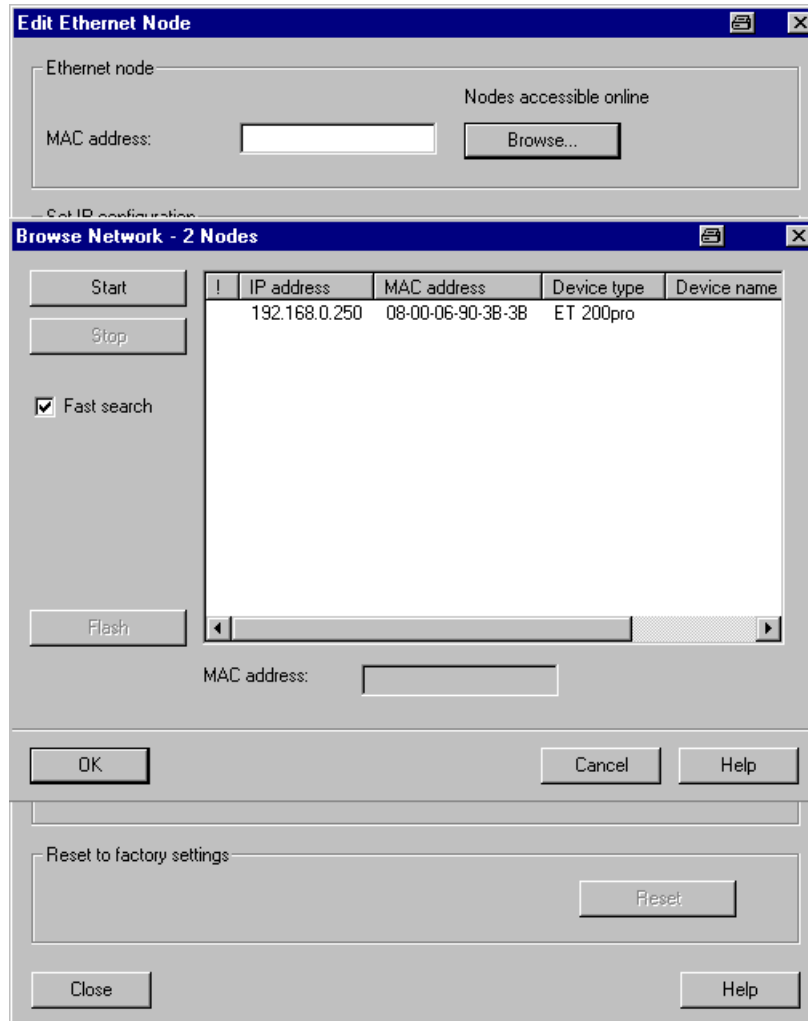
- Click the "Use the following IP address" option
 - Enter an IP address with the format XXX.XXX.XXX.XXX. Set a number between 0 and 254 for XXX (e.g. *192.168.0.150*).
 - Enter 255.255.255.0 in the "Subnet mask" input field.
-

Assigning IP addresses in STEP 7

1. Start SIMATIC Manager.
2. Open the "Edit Ethernet node" dialog box by selecting **PLC > Edit Ethernet node**



3. Click "Browse" in the "Ethernet node" field. The "Search in network" dialog box now displays the MAC address of the IM 154-6 PN HF IWLAN interface module.



4. Click "OK". The "MAC address" input field of the "Edit Ethernet node" dialog box now contains the MAC address of the IM 154-6 PN HF IWLAN interface module.
5. Select the option "Use IP parameters" in "Set IP configuration".
6. Enter an IP address with the format XXX.XXX.XXX.XXX in the "IP address" input field. If the network address (first three address elements) of the Ethernet adapter on your programming device/PC is **192.168.0.254**, for example, enter 192.168.0.250. The last byte in this example has the value 250 and identifies the node address. Enter a value between 0 and 254 for the last byte. Use a node address that is different to the address of your Ethernet adapter, which is 250 in this example.

7. Go to the "Subnet mask" input field and enter the subnet address of the Ethernet adapter of your programming device/PC with the format XXX.XXX.XXX.XXX, e.g. 255.255.255.0.

Edit Ethernet Node

Ethernet node

MAC address: 08-00-06-90-3B-3B Nodes accessible online Browse...

Set IP configuration

Use IP parameters

IP address: 192.168.0.250 Gateway

Subnet mask: 255.255.255.0 Do not use router

Use router

Address: 192.168.0.250

Obtain IP address from a DHCP server

Identified by

Client ID MAC address Device name

Client ID: _____

Assign IP Configuration

Assign device name

8. Click "Assign IP configuration" to save your setting to the IM 154-6 PN HF IWLAN interface module. The dialog confirms the successful transfer of parameters.
9. Close the dialog box with "OK".
10. Close the "Edit Ethernet node" dialog box by clicking "Close".

Result: The interface module has an IP address which is retained after "Power off".

Subnet mask

The bits of the node address can be used to create subnets. The leading bits represent the address of the subnet and the remaining bits the address of the PC on the subnet.

A subnet is defined by its subnet mask. The syntax of the subnet mask corresponds to that of an IP address. If a "1" is set at a bit position in the subnet mask, this bit belongs to the corresponding position in the IP address of the subnet address, otherwise to the address of the PC.

Example of a class B network:

The standard subnet mask for class B networks is 255.255.0.0, i.e. the last two bytes are available for subnetting. If 16 subnets are to be defined, the third byte of the subnet address must be set to 11110000 (binary notation). The result is a subnet mask 255.255.240.0.

To find out whether two IP addresses belong to the same subnet, the bits of both IP addresses and the subnet mask are logically linked by means of AND operation. If both logic operations return the same result, e.g. 141.120.246.210 and 141.120.252.108, then both IP addresses belong to the same subnet.

The segmentation of node addresses as described above has no significance beyond the LAN range because there only the IP address is globally relevant for data telegram transfers.

Note

In the bit notation of the subnet mask, the "ones" must be set left-justified and without any "zeros" between the "ones".

Primary Setup Tool on the Internet

In addition to STEP 7, you can fall back on the Primary Setup Tool (PST) freeware to assign the addresses of SIMATIC NET Industrial Ethernet devices of V3.2 or higher. A freeware version of the PST is available for download from the Support pages (<http://support.automation.siemens.com/WW/view/en/19440762>).

5.3 Assigning a device name to the I/O device

Introduction

All PROFINET IO devices are assigned a unique device ID (MAC address) by the manufacturer.

Each I/O device is addressed based on its device name during configuration and in the user program.

For more information on addressing in PROFINET IO, refer to the PROFINET System Description.

Requirements

- To assign a device name to the interface module, the programming device must be online on PROFINET to the I/O device.
- The I/O device is configured and assigned an IP address in STEP 7.
- The IM 154-6 PN HF IWLAN (6ES7154-6AB00-0AB0) interface module
 - SIMATIC Micro Memory Card 64 KB or higher
 - Cross-tip screwdriver size 2

Preparations

CAUTION
To prevent any damage to the IM 154-6 PN HF IWLAN, disconnect it from power before you remove the connection module.

1. Loosen the four screws of the connection module and then remove it from the interface module.
2. Insert the ("new") SIMATIC Micro Memory Card into the slot (bottom of the interface module) so that its beveled edge faces the ejector.
3. Slide the SIMATIC Micro Memory Card into the slot with slight pressure until the Memory Card clicks into place.
4. Reinstall the connection unit on the interface unit and secure it with the screws.

Assigning a device name

1. Switch on the power supplies of IM 154-6 PN HF IWLAN.
2. Open the "Properties - IM 154-6 PN HF IWLAN" window in HW Config. Enter the device name for the I/O device and confirm your entry with "OK".
3. Select **PLC > Ethernet > Assign Device Name** in HW Config.
4. Click "Assign Name" in the "Assign Device Name" window.

Result

IM 154-6 PN HF IWLAN: The device name is saved to the SIMATIC Micro Memory Card in the interface module.

Note

Assigning device names using the programming device/PC

If using an external programmer to assign the device name you must use a Micro Memory Card (MMC) which does not contain any data.

Transferring the device name after replacement of the interface module

The configuration data and device name of the I/O device are stored on the SIMATIC Micro Memory Card.

To transfer the configuration data after having replaced the IM 154-6 PN HF IWLAN interface module, you simply move the SIMATIC Micro Memory Card from the "old" interface module to the "new" one.

The I/O device accepts the device name from the SIMATIC Micro Memory Card after you cycled power off and on. The station can now be addressed again.

Node flash test

The "Search network" dialog always displays all I/O devices used in your system. Compare the MAC address of the device with the MAC address displayed and then select the correct I/O device.

Identification of the I/O devices in a plant is facilitated by a node flash test. Enable the flash test as follows:

1. Select one of the I/O devices from the "Search network" dialog.
2. Select the flash duration.
3. Click the "Flash" button.

Result

The LINK RJ45 and XR02 R1 LINK LEDs flash on the selected I/O device.

5.4 Setting parameter using Web Based Management

5.4.1 Introduction

Principle of Web Based Management

The IM 154-6 PN HF IWLAN interface module provides an integrated Web Server for Web Based Management. An IM 154-6 PN HF IWLAN interface module which is addressed via Web Browser returns HTML pages to the client PC, depending on user input.

The user enters his WLAN and security parameters in the HTML pages transferred via Web server. The IM 154-6 PN HF IWLAN interface module evaluates this information and dynamically generates response pages.

Use the standard web browser of your operating system for those operations. You do not need any additional software.

Prerequisites for Web Based Management

- To be able to address IM 154-6 PN HF IWLAN via Web Based Management, its network address (first element of the IP address) must match that of the Ethernet adapter on your programming device/PC.
- To be able to use Web Based Management, you should set up a cable-bound network connection between the IM 154-6 PN HF IWLAN interface module and the programming device/ PC. It is basically possible to run Web Based Management on via radio networks.
- The pages of Web Based Management require JavaScript. You should therefore make sure that JavaScript is enabled in the Web browser.
- If a firewall is active on your station you must enable access to port 80 for HTTP or port 443 for HTTPS to run Web Based Management.
- To ensure the proper display of the HTML pages of the Web Server you must disable any banner/pop-up blockers. Deactivate any banner blockers you might have installed.

Note**Web browser**

Use Microsoft Internet Explorer V6.0 or higher, or Mozilla Firefox V2.0 or higher.

Note**Layout of the screenshots**

The screenshots in this chapter were generated using Microsoft Internet Explorers V6.0. The layout of menus can differ slightly if you are using a different browser.

5.4.2 Basics of working with Web Based Management

Navigation bar

The top menu bar of Web Based Management (WBM) contains the following links:

- Console
After having clicked the link, a console window opens where you can log on and then enter CLI commands.
- Support
You can open a Support page of SIEMENS AG on the Internet by clicking those links.
- Logout
Close the current Web Based Management session by clicking this link. The logon dialog is then displayed again.
- Help
Click this link to open the online help of Web Based Management in a separate browser window.

Updating the display with Refresh

Web Based Management pages that display actual parameters feature a "Refresh" button on their bottom edge. Click this button to request up-to-date information from the device for the current page.

Saving entries with Set Values

Pages on which you can define configuration data feature a "Set Value" button at their lower edge. Click this button to save the configuration data entered to the device.

5.4.3 Starting Web Based Management and logging on

Web access to interface module IM 154-6 PN HF IWLAN

Follow the steps below to set up a connection to the IM 154-6 PN HF IWLAN interface module in a Web browser:

1. Open the Web browser and then enter the IP address of the IM 154-6 PN HF IWLAN interface module in the address field. A logon dialog opens as shown in the following screenshot.

2. Open the "User name" drop-down list box and select the "Admin" entry if you want to edit settings of the IM 154-6 PN HF IWLAN interface module (read and write access). By selecting the "User" entry you only have read access to the configuration data of the IM 154-6 PN HF IWLAN interface module.
3. Enter your password. The factory default passwords are valid if you have not yet specified a password: Enter the password "admin" if you selected the "User name" "Admin", or "user" if you selected "User".
4. Click "Log On" to start the logon, or press ENTER to close the input dialog.

Secure connection over HTTPS

Web Based Management also offers provides the option of settings up secure connections via HTTPS protocol with IM 154-6 PN HF IWLAN interface module.

Use the "Log on using a secure HTTPS connection" link in the logon dialog, or go to the address field of the Internet browser "https://XXX.XXX.XXX.XXX" and enter the IP address of the IM 154-6 PN HF IWLAN interface module for "XXX.XXX.XXX.XXX", e.g. "https://192.168.0.250". Confirm the security prompt in the dialog window with "Yes". The logon dialog Web Based Management opens.

5.4.4 Wizards in Web Based Management

5.4.4.1 The wizards and their functions

Basic Wizard, Security Wizard and iPCF Wizard

Web Based Management offers several wizards which facilitate commissioning tasks. A Wizard consists of a series of setup dialogs in which you enter basic configuration data.

The following Wizards are available:

- **Basic Wizard**

For general settings which ensure the basic functionality of the IM 154-6 PNHF IWLAN interface module.

- **Security Wizard**

Wizard that supports the setup of security-related parameters.

- **iPCF Wizard**

This wizard supports configuration of the iPCF procedure (**industrial Point Coordination Function**). For additional information about the iPCF-Wizard, refer to the SCALANCE W788-xPRO/RR and SCALANCE W74x-1PRO/RR

(<http://support.automation.siemens.com/WW/view/en/32816761>) operating instructions.

Wizard Status

You can select the "Wizards" menu in the Navigation bar on the left pane of the window to view the current processing state of all Wizards. The "Completed" status is displayed in green font after you completed editing in the corresponding Wizard. Moreover, the "Wizards" entry is moved to the bottom end of the navigation bar after you completed all Wizards.

The screenshot shows the Siemens Web Based Management interface. At the top, there is a navigation bar with tabs for Console, Support, Logout, and Help. The user is logged in as 'ET 200pro' with IP address '192.168.0.250'. The left sidebar shows a tree view of configuration categories: IM 154-6, Wizards (Basic, Security, iPCF), System, Interfaces, Security, I-Features, and Information. The main content area is titled 'Wizards: Status' and displays the following information:

Wizard Name	Status
Basic Wizard:	Not completed.
Security Wizard:	Not completed.
iPCF Wizard:	Not completed.

Note

Completeness of the settings in Web Based Management

It is not necessary to set up all available parameters to operate IM 154-6 PN HF IWLAN. Communication with the Access Point only requires parameterization of the wireless interface.

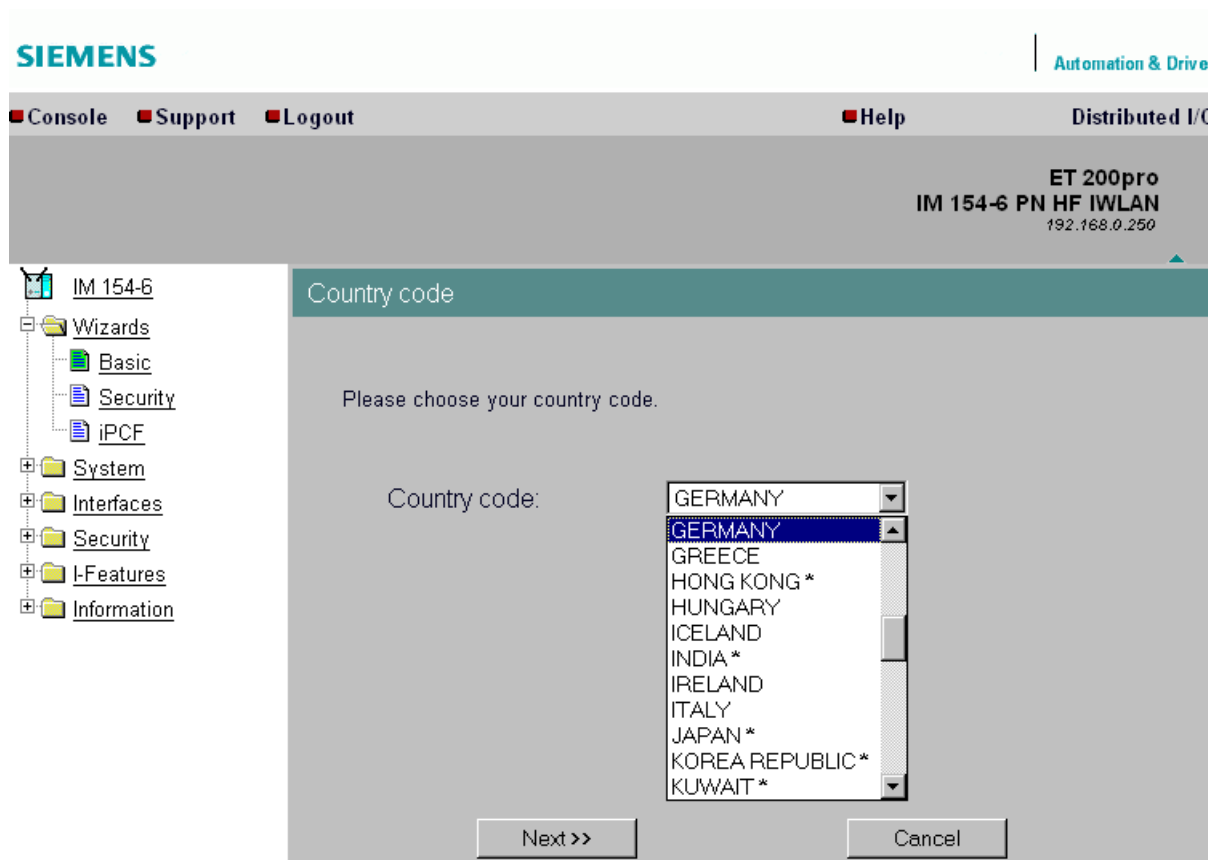
5.4.4.2 Basic Wizard

NOTICE

The proper regional settings are absolutely necessary for compliance with approvals. Selecting a country other than the country where the application is used can lead to prosecution!

Country Code

Regional regulations differ in terms of the specification of maximum transmit power within the relevant frequency bandwidths and their usage. You must specify the relevant local conditions of use when configuring the IM 154-6 PN HF IWLAN interface module. Define those settings at the "Country code" parameter.



"Country code" drop-down list box

Select the country in which the IM 154-6 PN HF IWLAN interface module is going to be operated from this list. You do not have to know the country-specific data, as the channels and transmit power which can be used are set up automatically by the IM 154-6 PN HF IWLAN interface module according to the country selected.

Settings of the Wireless-LAN interface

The configuration of the Wireless-LAN interface of the IM 154-6 PN HF IWLAN interface module is specified at the parameters listed on the next page. This includes the network name (optional) and the transmission mode.

The screenshot displays the Siemens Web Based Management interface for configuring the IM 154-6 PN HF IWLAN interface module. The interface includes a navigation menu on the left with categories like Wizards, System, Interfaces, Security, I-Features, and Information. The main content area is titled 'Wireless Settings' and contains the following configuration options:

- Connect to ANY SSID:** A checkbox that is currently unchecked.
- SSID:** A text input field containing the value 'ET200proIWLAN'.
- Wireless mode:** A dropdown menu with the following options:
 - 2.4 GHz 11 Mbps (802.11b)
 - 5 GHz 54 Mbps (802.11a)
 - 5 GHz 54 Mbps (802.11h)
 - 2.4 GHz 11 Mbps (802.11b)
 - 2.4 GHz 54 Mbps (802.11g)

At the bottom of the configuration area, there are three buttons: '<< Back', 'Next >>', and 'Cancel'. A message at the top of the main area reads 'Restart to apply changes.'

"Connect to ANY SSID" check box

If this check box is selected, the IM 154-6 PN HF IWLAN interface module sets up a connection to the Access Point which provides maximum data transfer performance and to which access is authenticated based on security settings.

Input field "SSID"

The term Service Set Identifier (SSID) denotes the identifier of a local radio network that is based on the IEEE 802.11 standard.

Enter the name of your network in this field. The IM 154-6 PN HF IWLAN interface module supports all characters for the SSID, with the exception of the percent character. However, in order to maintain compatibility with partner devices you should not use any special or language-specific characters (e.g. German mutated vowels). The SSID string has a maximum length of 32 characters.

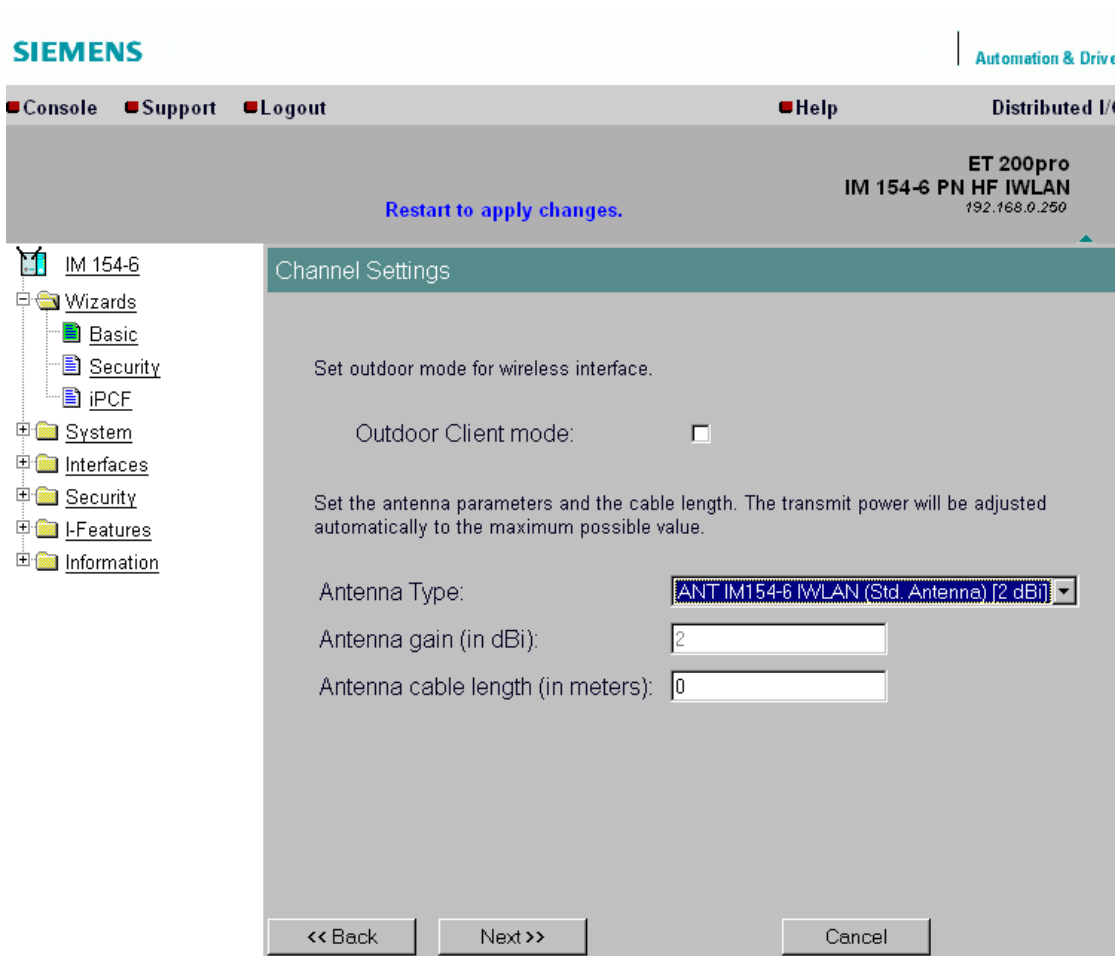
"Wireless mode" drop-down list box

From this list, select the standard which is to be used by the IM 154-6 PN HF IWLAN interface module on the WLAN for wireless communication with the Access Point.

The IEEE 802.11 standard also defines the bit rate and the frequency bands available for data transmission.

"Channel Settings"

Specify the antenna type, the antenna gain, the length of the antenna cable and the indoor/outdoor mode at the parameters listed on the next page.



Outdoor Client mode

The device can be operated either in the indoor or outdoor mode. In indoor mode, all the country-specific approved channels and transmit power settings are available for operation in a building. The outdoor mode only enables country-specific channels and transmit power settings required for outdoor operation. Select "Outdoor Client mode" to enable this mode.

NOTICE
Channels approved for operation in outdoor mode
You are only allowed to use channels which are approved accordingly for operation in outdoor mode. The correct outdoor mode setting is absolutely necessary for operation in compliance with approvals.

"Antenna type" drop-down list box

Select the type of antenna connected to the device.

Input field "Antenna gain (in dBi)"

You can enter the antenna gain manually in the unit "dBi" by selecting the "User defined" entry from the "Antenna type" drop-down list box.

Input field "Antenna cable length (in meters)"

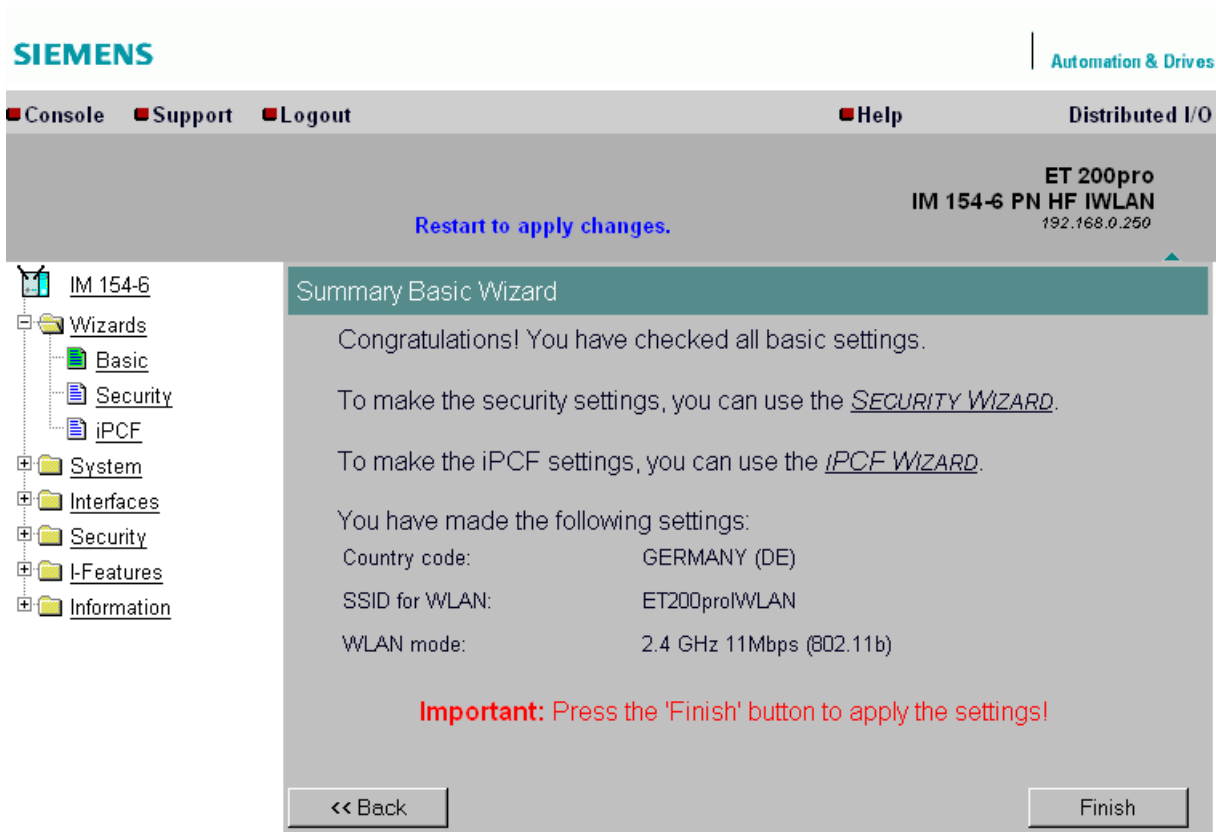
Enter the cable length in meters between the interface module and the remote antenna.

Note

The WLAN interfaces are disabled in default factory state. Those interfaces are available for use after you completed the relevant settings in the Basic Wizard.

Summary of settings

After you completed all settings for the basic configuration, this page displays the parameters you selected.



Closing the Wizard

Click "Finish" to close the Basic Wizard.

See also

SCALANCE W788-xPRO/RR and SCALANCE W74x-1PRO/RR (<http://support.automation.siemens.com/WW/view/en/32816761/>)

5.4.4.3 Security Wizard

Setting security parameters

The Security Wizard allows you to define security-related parameters without having detailed knowledge of security technology for local radio networks.

Note

ET 200pro with the IM 154-6 PN HF IWLAN interface module can be operated without configuration of the security-relevant parameters. However, this poses an increased risk of unauthorized access, depending on the properties of your network. It is therefore advisable to complete all pages of the Security Wizard in order to implement at least the basic security functions.

The screenshot shows the Siemens web-based management interface for an ET 200pro device. The top navigation bar includes 'SIEMENS' and 'Automation & Drives'. Below this is a secondary bar with 'Console', 'Support', 'Logout', 'Help', and 'Distributed I/O'. The main header area displays 'ET 200pro IM 154-6 PN HF IWLAN' and the IP address '192.168.0.250'. A blue message 'Restart to apply changes.' is visible. The left sidebar contains a tree view with folders for 'IM 154-6', 'Wizards', 'System', 'Interfaces', 'I-Features', and 'Information'. Under 'Wizards', there are sub-items for 'Basic', 'Security', and 'iPCF'. The main content area is titled 'Security Settings' and contains the following text: 'This wizard assists you in protecting the device and your data from unauthorized access. First, set a configuration password'. Below this are three password input fields: 'Current Admin Password:' (with 5 dots), 'New Password:' (with 10 dots), and 'Confirm new password:' (with 10 dots). At the bottom, there are 'Next >>' and 'Cancel' buttons.

Password

Start by assigning a new Admin password. Enter the string twice in the text fields on this page. The password has a maximum length of 31 characters.

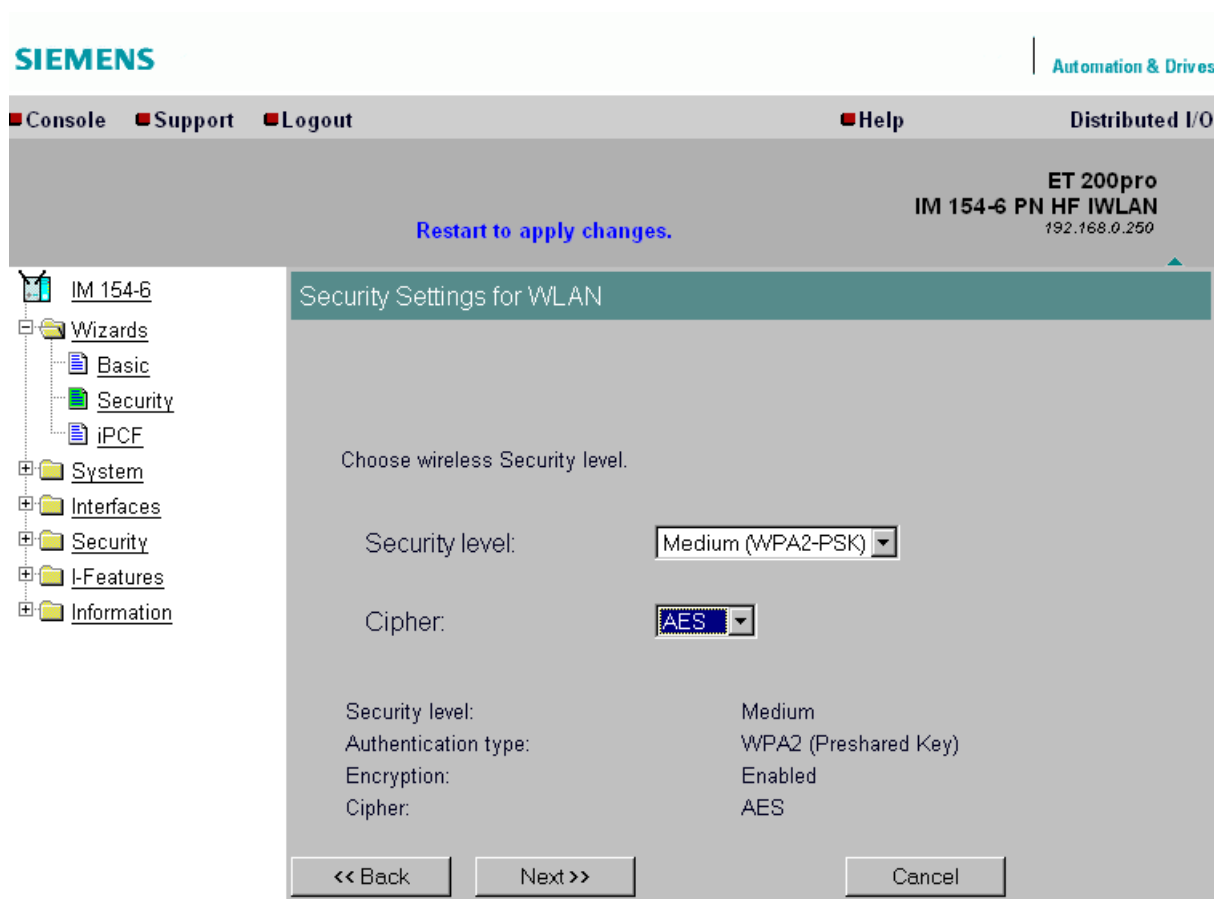
The password string is based on ASCII code 0x20 to 0x7e. The following characters are supported:

- The numbers 0 to 9
- The letters abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ
- The special characters !"#%&'()*+,-./:;<=>?@[^_`{|}~ and the blank character

The factory defaults are valid until the user has initially assigned a password. In default factory state the "Admin" user is assigned the password "admin". You must be logged on with administrator rights to use the Wizards.

Default security levels

Authentication and encryption are proven network security measures. Web Based Management provides four default security levels that specify corresponding methods.



"Security level" drop-down list box

Select a security level which is supported by all relevant Access Points and assign all clients and Access Points of an application to the same Security Level.

The parameters relevant to the selected security level are displayed below the drop-down list box.

The following table shows the features of the various security levels:

Visible in the Wizard	Security level	Authentication	Encryption	Encryption mode	Key source
X	None	Open System	disabled	none	n.a.
X	Low	Shared Key	enabled	WEP	local
X	Medium	WPA2-PSK (Wi-Fi Protected Access 2, Preshared Key)	enabled	AES / TKIP / AUTO	local
X	High	WPA2 (RADIUS)	enabled	AES / TKIP / AUTO	Server

Authentication ("Security level")

Authentication basically means that some form of identification is required. Authentication therefore protects the network from unauthorized access. You can select one of the following authentication modes in the "Security level" field:

- **None (Open System)**

No authentication.

- **Low (Shared key)**

In Shared Key authentication, a fixed key is stored on the client and access point. This key is used for authentication and encryption. For this scenario you must define and save a WEP key after having selected the "Low (Shared key)" mode.

- **Medium (WPA2-PSK)**

WPA2-PSK is based on the WPA2 standard, however, without RADIUS server for authentication. Instead, a key (Pass phrase) is stored on all clients and Access Point for authentication and further encryption. The encryption method is based on AES or TKIP, with AES representing the standard method.

- **High (WPA2)**

WPA2 (Wi-Fi Protected Access 2) is a further development of WPA for implementing the functionality of security standard IEEE 802.11i.

Clients are authenticated at the Access Point by means of RADIUS Server.

The authentication protocol is set to AUTO mode. The encryption method is based on AES or TKIP, with AES representing the standard method.

Encryption ("Cipher")

Encryption protects the data to be transferred against spy and hacking attacks and is based on different methods:

- **TKIP (Temporal Key Integrity Protocol)**

By contrast to weak WEP encryption, the symmetrical current encryption method with RC4 algorithm (Ron's Code 4) TKIP is based on dynamic keys which are derived from a master key. TKIP is also capable of detecting falsified data telegrams.

- **AES (Advanced Encryption Standard)**

Strong symmetrical block encryption method based on the Rijndael algorithm that enhances TKIP functionality.

- **AUTO**

TKIP or AES is used, depending on the capability of the partner station.

Key source

The key source indicates whether a fixed key was configured (locally), or whether it is negotiated by means of a higher-level protocol and authentication server (server).

Settings for security level Low

Define the value and length of the public key in the Wizard "Public Security Key for WLAN".

The screenshot shows the Siemens web-based management interface for configuring the Public Security Key for WLAN. The interface includes a navigation tree on the left with categories like Wizards, System, Interfaces, Security, I-Features, and Information. The main content area is titled "Public Security Key for WLAN" and contains the following elements:

- A message: "Restart to apply changes."
- Device information: "ET 200pro IM 154-6 PN HF IWLAN 192.168.0.250".
- Section title: "Public Security Key for WLAN".
- Instruction: "Set public security key."
- Default key: A dropdown menu showing "Key 1".
- Explanatory text: "A key value can be entered in ASCII (5, 13 or 16 symbols enclosed in ' or " characters) or in HEX (10, 26 or 32 hex symbols) encoding. A valid 40 Bits key would be e.g. either 'PassW' (ASCII) or 5061737357 (HEX)."
 - Example ASCII key: 'PassW'
 - Example HEX key: 5061737357
- Key input field: A text box containing "123456789".
- Length dropdown: A dropdown menu showing "Auto".
- Navigation buttons: "<< Back", "Next >>", and "Cancel".

"Default key" drop-down list box

Select the key from this list box.

Input field "Key"

Enter the key string in this field. You can enter the key string either in ASCII format, or in hexadecimal notation (0 – F). Keys entered in ASCII format must be enclosed by apostrophes (') or quotation marks (").

"Length" drop-down list box

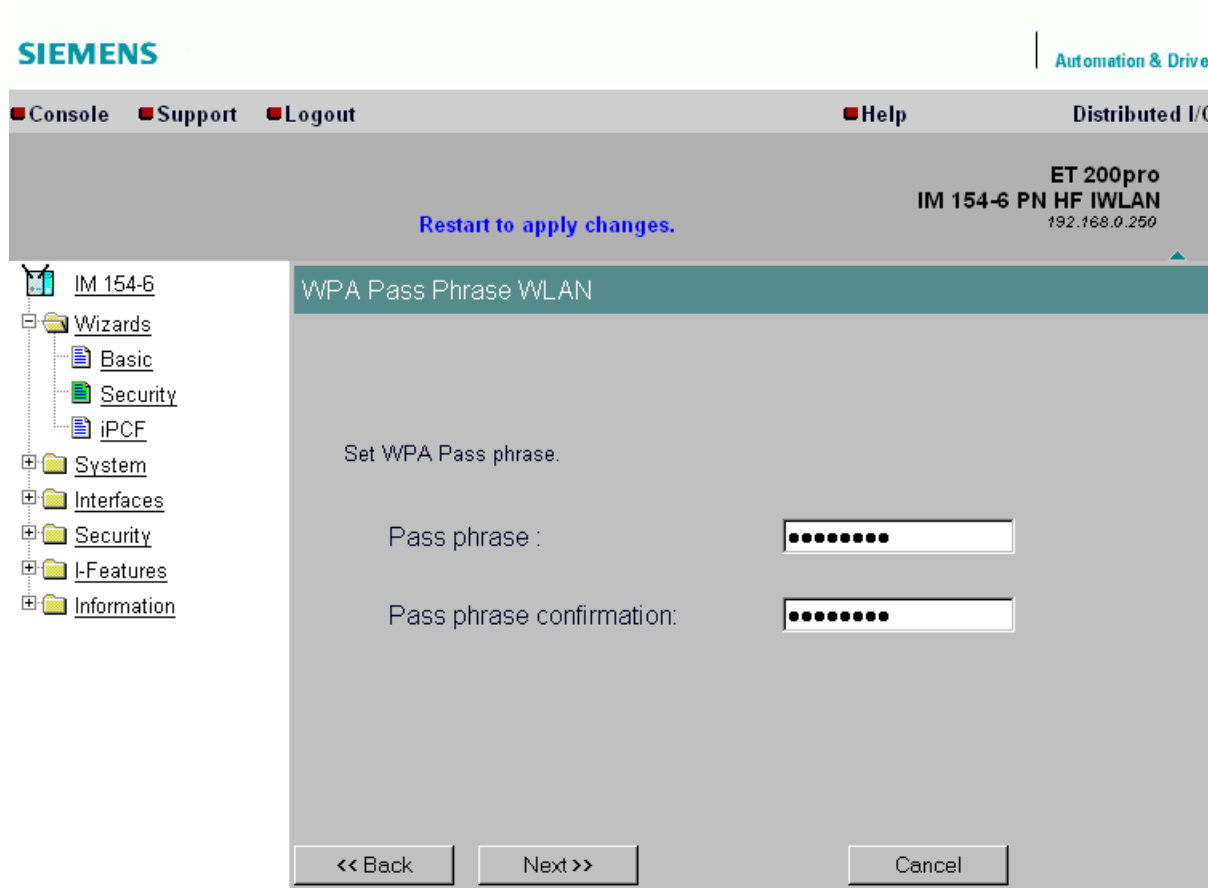
Select the key length from this list box. An error message is displayed if the string length entered in the Key input field does not equal the selected key length. The following key lengths are supported:

- 40-bit (5 ASCII characters, or 10 hexadecimal numbers)
- 104-bit (13 ASCII characters, or 26 hexadecimal numbers)
- 128-bit (16 ASCII characters, or 32 hexadecimal numbers)

With the "AUTO" setting, the maximum key length is also 128 bits.

Settings for the Medium security level

Define the key in the Wizard "WPA Pass Phrase WLAN".



Input field "Pass phrase"

Enter a WPA2 key in this field. The key string can have a length from 8 to 63 ASCII characters, or exactly 64 hexadecimal characters. The user must enter this initialization key both at the client and at the WLAN Access Point (e.g. SCALANCE W78x).

Input field "Pass phrase confirmation"

Confirm the WPA2 key you entered above in this field.

Note

The key string can have a length from 8 to 63 ASCII characters, or exactly 64 hexadecimal characters. The key should consist of a complex string, for example, of random numbers and letters (upper-/lowercase), with 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, the key should be changed on all devices in order to maintain security.

Settings for the High security level

Define a name and password in the Wizard "802.1x User Name and Password Configuration" for access to the RADIUS server.

SIEMENS | Automation & Drives

Console Support Logout Help Distributed I/O

ET 200pro
IM 154-6 PN HF IWLAN
192.168.0.250

Restart to apply changes.

IM 154-6

Wizards

- Basic
- Security
- iPCF

System

Interfaces

Security

I-Features

Information

802.1x User Name and Password Configuration

The Dot1x User Name and Password are required to communicate with 802.1x Server.

Dot1x user name:

Dot1x user password:

Password confirmation:

<< Back Next >> Cancel

Input field "Dot1x user name"

Enter a user name for logon to the RADIUS server in this field.

Input field "Dot1x user password"

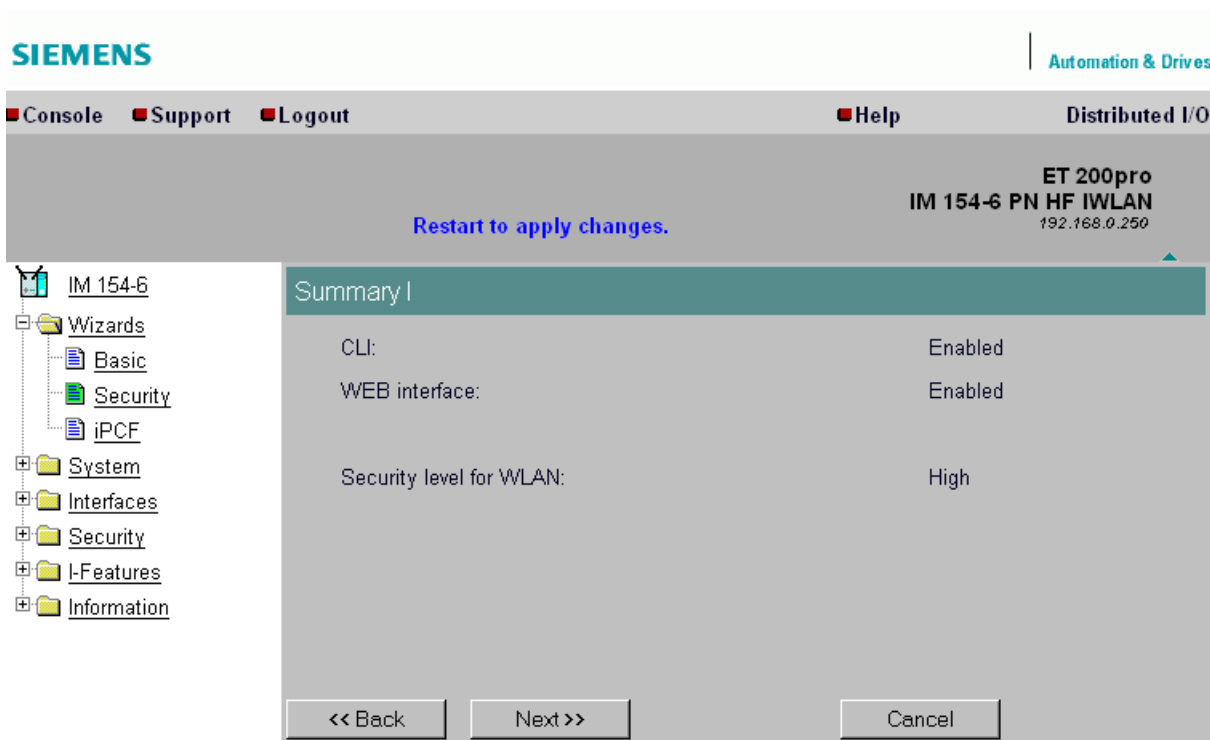
Enter the password for user name you specified above. Clients log on to the RADIUS server with this combination if logon using a certificate has failed.

Input field "Passwort confirmation"

Confirm the password in this field.

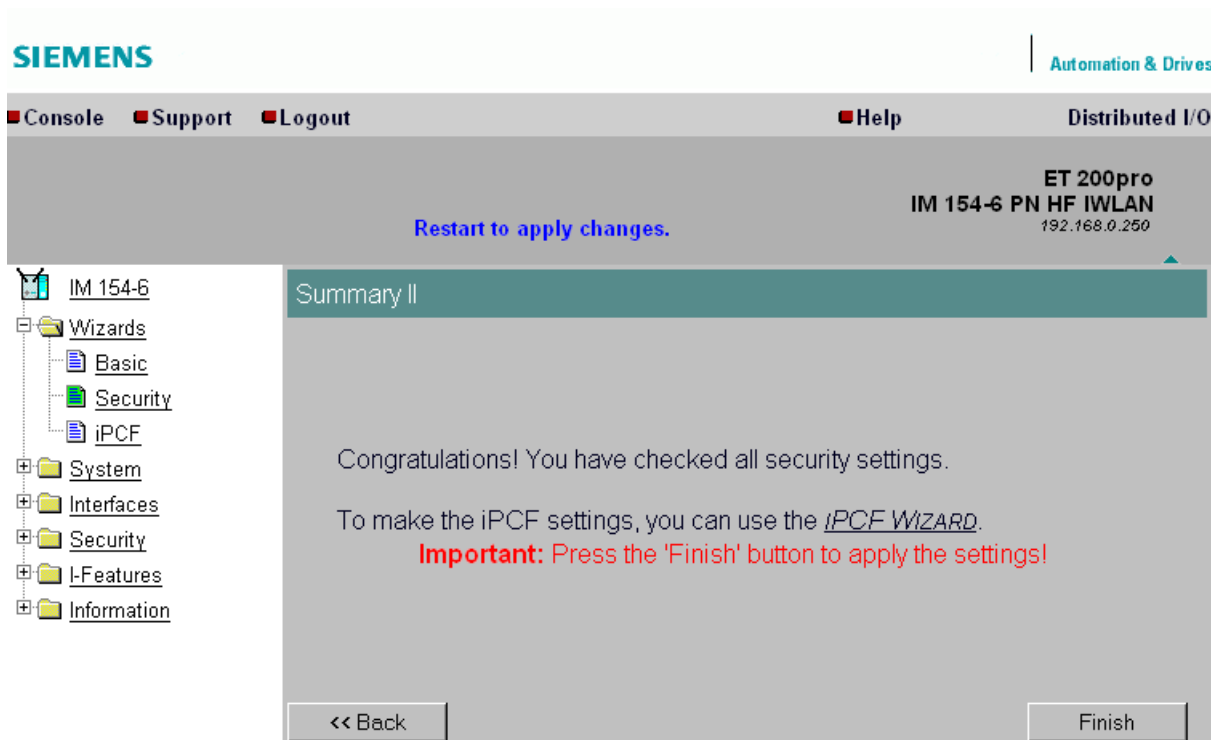
Result of the settings in the Security Wizard

This page provides an overview your security settings. To change a setting, click "Back" to return to one of the previous page where you can edit the value or change the selection.



Advanced security settings

The last page of the Wizard indicates advanced security settings.



"Finish" button

Click "Finish" to save the data and close the Wizard. You must perform a restart to activate the settings (**System > Restart** menu).

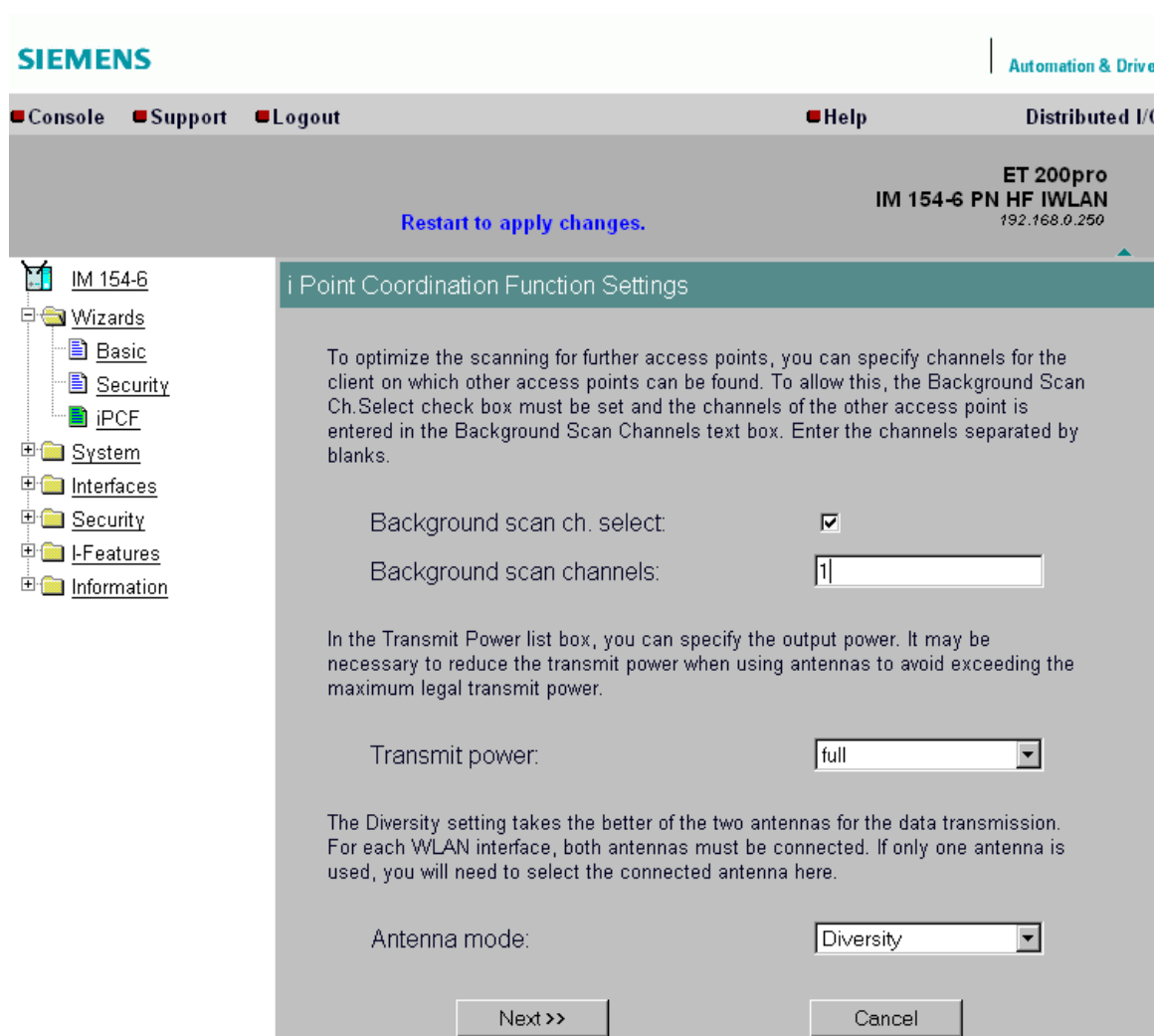
5.4.4.4 iPCF Wizard

Channel selection and transmit power

All settings required for iPCF are made on this page.

The industrial Point Coordination Function communication protocol is used to control the data traffic of a radio cell between the Access Point and the interconnected stations in order to avoid collisions.

Those functions are particularly suited for improving roaming times and to reduce perturbing radiation on other systems or segments.



Note

When using iPCF, observe the following maximum data rates when setting up the Access Point :

Radio standard with maximum data rate

IEEE 802.11a/h: 12 Mbps

IEEE 802.11b: 11 Mbps

IEEE 802.11g: 12 Mbps

"Background scan ch. select" option

Enable the "iPCF" function by selecting the "Background scan ch. select" option. This restricts the number of channels on which the client scans for an Access Point. This state reduces handover times and the risk of real-time violation.

After having set the "Background scan ch. select" option, go to the next field to enter the channels of the Access Points which can be addressed in iPCF mode.

Input field "Background scan channels"

In this field, enter the channels of the Access Points which operate in iPCF mode and are actually within the range of the IM 154-6 PN HF IWLAN interface module. If entering several channels, separate each channel entry with a space character.

Note that the node performs a time-consuming scan on the entire bandwidth if you do not define the channels. The probability of communication shutdown increases with a rising number of channels to be scanned. Such activities have a negative effect on the relevant PROFINET IO system.

"Transmit power" drop-down list box

When using remote antennas, it may be necessary to reduce the maximum transmit power in order to avoid non-compliance with statutory provisions. Select the corresponding transmit power from this box.

It can also be helpful to reduce transmit power in order to avoid interference on other cells (cross-talk), as lower transmit power reduces the cell range.

You can avoid interference caused by excess receive levels by reducing transmit power to the necessary minimum.

"Antenna mode" drop-down list box

This list box specifies the use of the antennas.

If "Diversity" is set, the IM 154-6 PN HF IWLAN interface module only uses the antenna that provides maximum data transmission performance. Both antennas must be connected accordingly. They should also be of the same type and cover approximately the same range.

Note

If only one antenna is connected you must set it up permanently. In addition, the second antenna socket must be provided a 50 Ω terminating resistor.

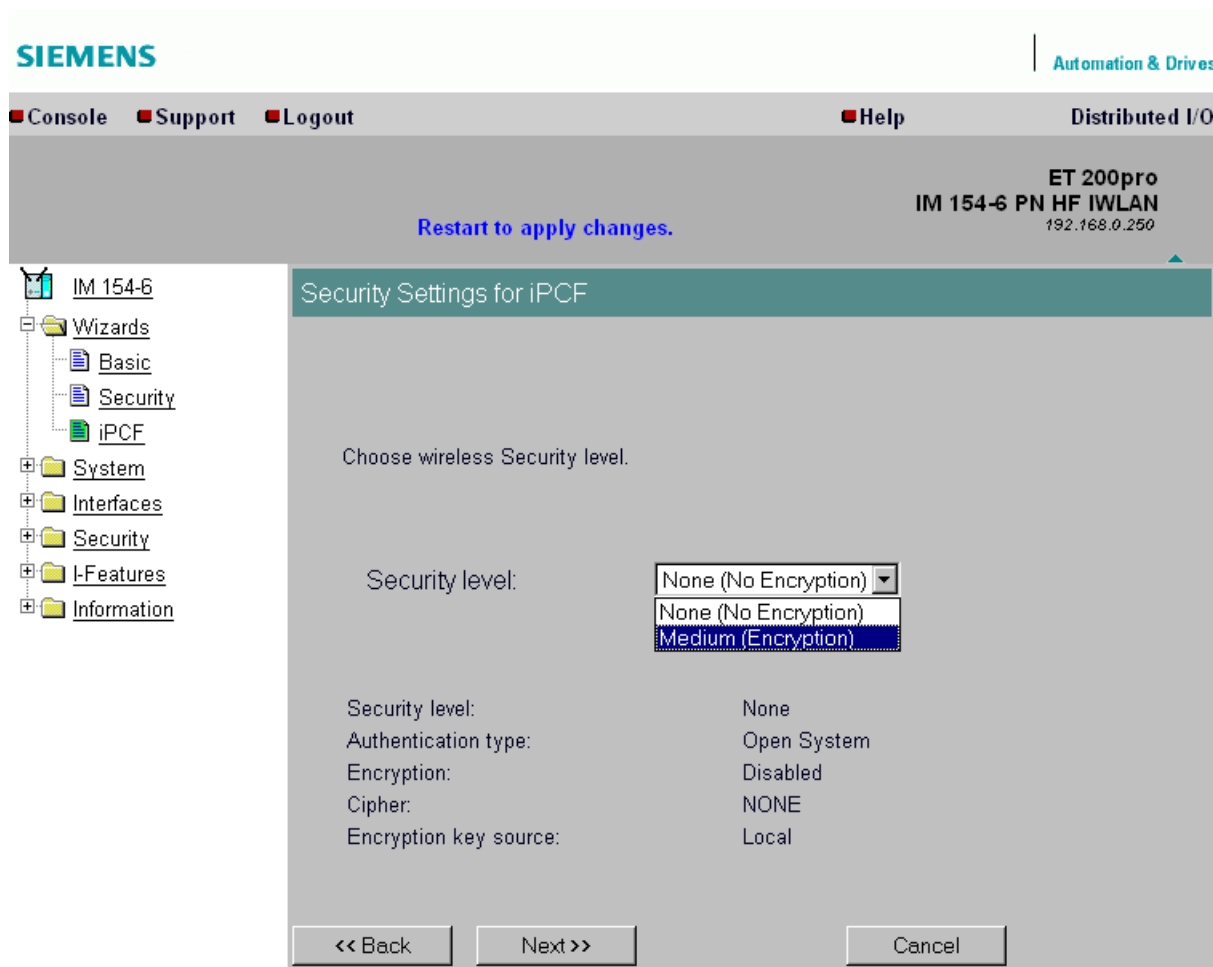
iPCF security settings

Define the security level for the IM 154-6 PN HF IWLAN interface module on this page. iPCF is a method which was optimized for high-speed Roaming and deterministic data transmission. The 802.1x and WPA security mechanisms for authentication and key handshakes are relatively time-consuming and are therefore no longer available for iPCF.

Note

No additional security settings in the Security Wizard

The iPCF Wizard also provides pages for defining security settings. That is, if using iPCF you do not have to edit the Security Wizard.



"Security level" drop-down list box

Select the security level for your radio network from this box. You have the following options:

- **None (No Encryption)**

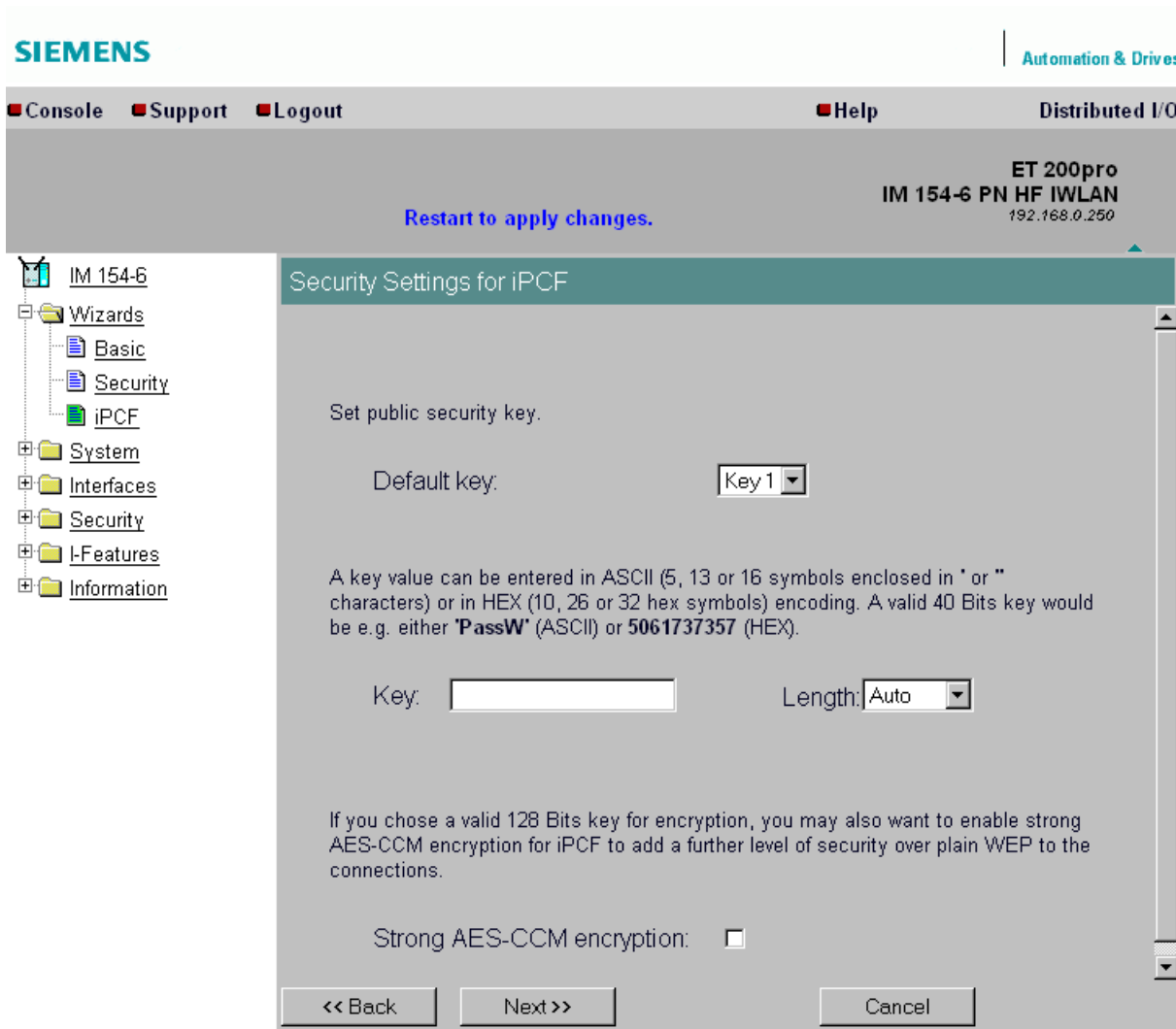
Open system without encryption.

- **Medium (Encryption)**

WEP encryption is based on a (Pre-) Shared Key. However, you can also use AES-CCM. You can make corresponding settings in the next window.

Specifying the key

If you selected security level "Medium", specify the corresponding key on the next page.



"Default key" drop-down list box

Select the key from this box.

Input field "Key"

Enter the key string in this field. You can enter the key string either in ASCII format, or in hexadecimal notation (0 – F). A key entered in ASCII format is displayed in single quotation marks.

Note

You can use ASCII code 0x20 to 0x7e for the key string. The list below shows all supported characters starting with a space character:

- !"#\$%&'()*+,-./0123456789:;<=>?@
 - ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`
 - abcdefghijklmnopqrstuvwxyz{|}~
-

"Length" drop-down list box

Select the key length to use from this box. An error message is displayed if the string length entered in the "Key" input field does not equal the selected key length. The following key lengths are supported:

- 40 bits (5 ASCII characters, or 10 hexadecimal numbers)
- 104 bits (13 ASCII characters, or 26 hexadecimal numbers)
- 128 bits (16 ASCII characters, or 32 hexadecimal numbers)

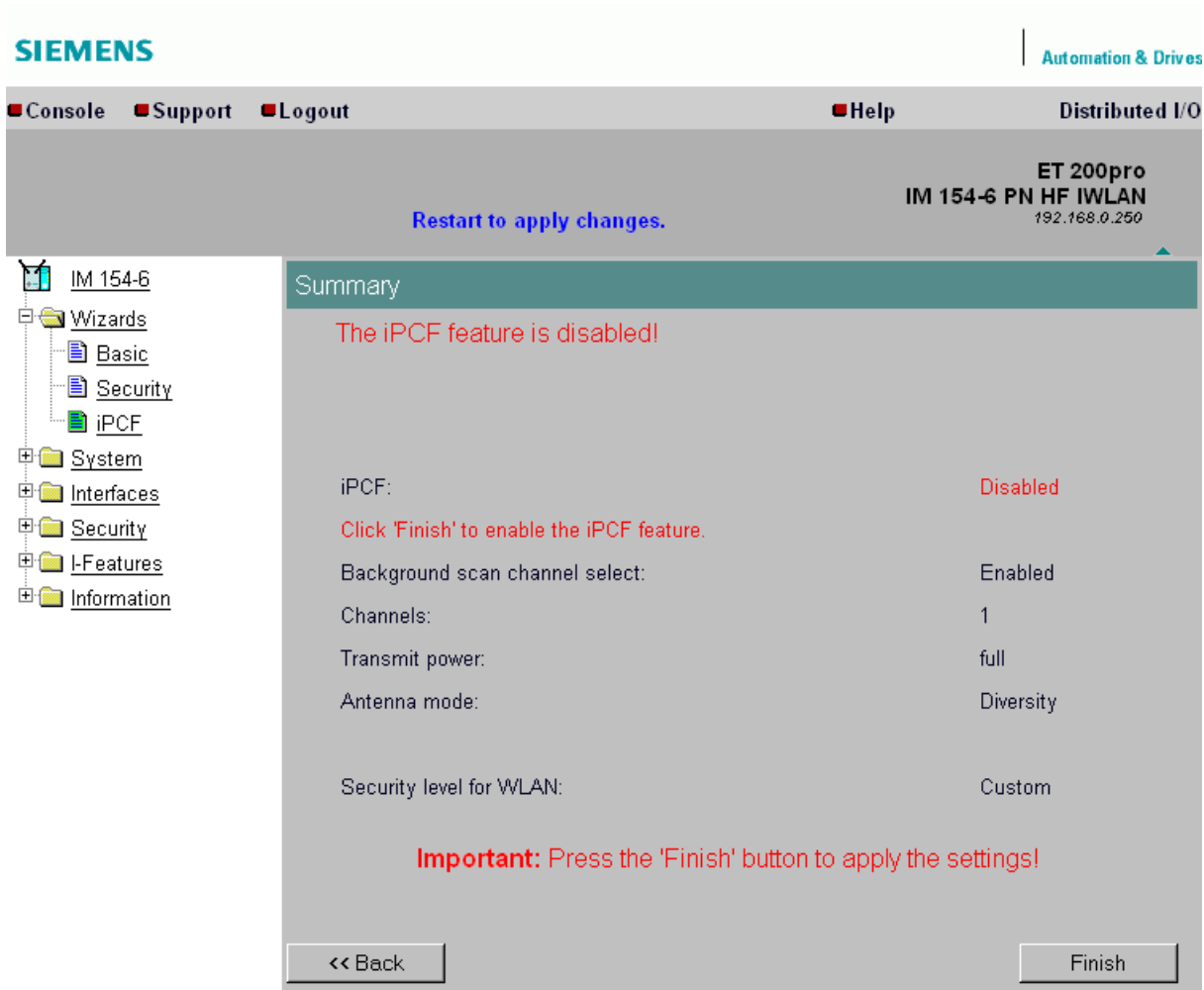
With the "Auto" setting, the maximum key length is also 128 bits.

"Strong AES-CCM encryption" check box

You can activate the "AES-CCM encryption" check box. Data transfer is secured by means of 128-bit encryption if you set this check box for operation with iPCF.

Closing the Wizard

All settings made are displayed on the last page of the iPCF Wizard for a conclusive check.



"Finish" button

Click "Finish" to close the iPCF Wizard. Perform a restart to activate your settings (**System > Restart** menu).

5.4.5 "System" menu

5.4.5.1 "System" menu overview

System Information

You can define the regional settings as follows after having selected the "System" menu from the navigation bar on the left side of the window:

- Country code

Select the country in which IM 154-6 PN HF IWLAN is going to be operated (refer to chapter Basic Wizard (Page 48)). By setting the country code you specify the frequency band and its corresponding transmit power in accordance with regional approvals.

You are also provided an overview of the following settings:

- System up time

The "System up time" informs you of the time that has elapsed since the last restart ("Restart").

- Description

Provides a description of the product family of the I/O device.

The screenshot displays the Siemens web-based management interface. At the top, the Siemens logo is on the left, and "Automation & Drives" is on the right. Below the logo, there are navigation links: Console, Support, Logout, Help, and Distributed I/O. The main header area shows "Restart to apply changes." and device information: "ET 200pro IM 154-6 PN HF IWLAN" with IP address "192.168.0.250".

The left navigation tree includes: IM 154-6, Wizards, System (expanded), Services, Restart, Passwords, Load&Save, HTTP, Interfaces, Security, I-Features, and Information.

The main content area is titled "System Information" and contains the following settings:

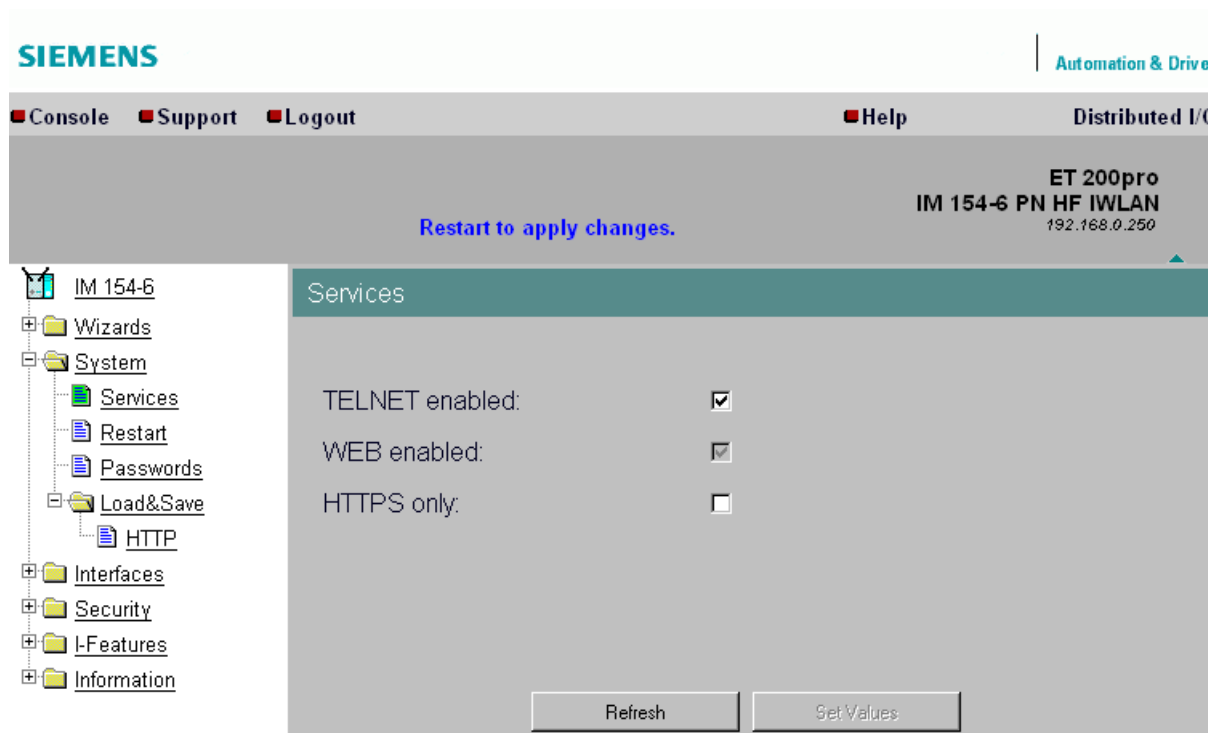
- Country code: A dropdown menu showing "GERMANY". Below it, a note states: "The device *may not* be certified for use in countries denoted by a '*' character, please check the [Siemens corporate support web site](#) for more information."
- System up time: A text input field showing "0 days, 3:10:00 (hr:min:sec)".
- Description: A text input field showing "ET 200pro".

At the bottom of the main content area, there are two buttons: "Refresh" and "Set Values".

5.4.5.2 "Services" menu

"Services" menu command

Set up the various modes for accessing the IM 154-6 PN HF IWLAN interface module in the "Services" menu.



"TELNET enabled" check box

Clear the check mark to disable access via TELNET.

"WEB enabled" check box

Access to WBM via WEB (Web browser) is always available and cannot be disabled.

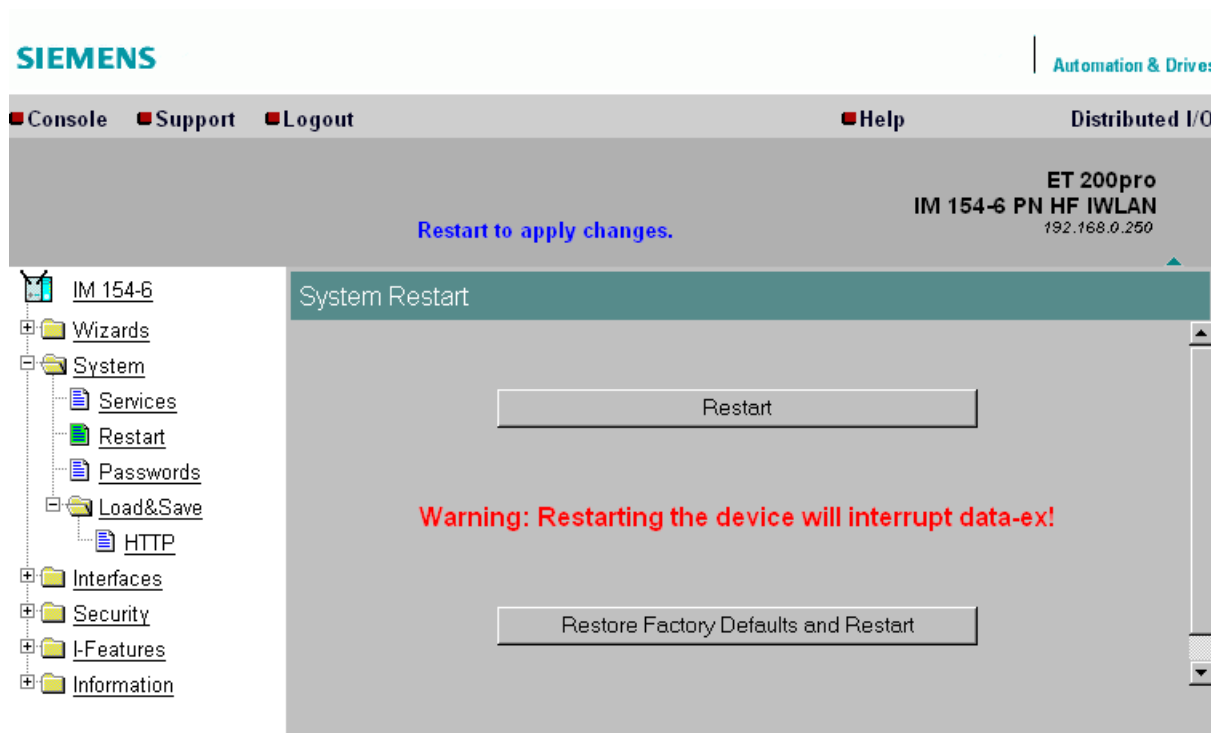
"HTTPS only" check box

Set this check mark to restrict access to WBM to secure connections. Secure connections are identified by the https://... entry leading the URL in the address bar of the Web browser. The padlock icon displayed in the status bar of the browser also indicates the secure SSL connection.

5.4.5.3 "Restart" menu

"Restart" menu command

You can reset the parameters using one of the two buttons of the window shown in the screenshot below.



"Restart" button

Click this button to restart the device. During a restart, the device is initialized and runs a self-test after the internal firmware was loaded. The connection to the Access Point is set up again with mutual authentication. You can leave the browser window open while the device restarts.

CAUTION
Interruption of data exchange during the restart
A restart of the interface module interrupts data exchange.

"Restore Factory Defaults and Restart" button

Click this button to restore the device to factory configuration settings. The protected defaults (see above) are also reset. The Micro Memory Card is initialized and formatted. An automatic restart is triggered.

Note

The IP address and configuration data are lost after you reset the default data. Now, the device can only be addressed using the Primary Setup Tool or STEP 7 and via RJ45 socket.

The "Restore Factory Defaults and Restart" button is hidden if you are logged on as user.

5.4.5.4 "Passwords" menu

"Passwords" menu command

Open this window to specify the passwords for access to WBM.

The screenshot shows the Siemens WBM interface for configuring passwords. The page title is "SIEMENS" and "Automation & Drives". The system information at the top right indicates "ET 200pro IM 154-6 PN HF IWLAN" with IP address "192.168.0.250". A message "Restart to apply changes." is displayed in blue. The left navigation pane shows a tree structure with "IM 154-6" selected, and "Passwords" is the active menu item. The main content area contains the following fields:

- Current admin password:
- User password:
- User password confirmation:
- Admin password:
- Admin password confirmation:

At the bottom of the form are two buttons: "Refresh" and "Set Values".

Password

Assign a new Admin or User password. Enter the string twice in the text fields on this page. The password has a maximum length of 31 characters.

The password string is based on ASCII code 0x20 to 0x7e. The following characters are supported:

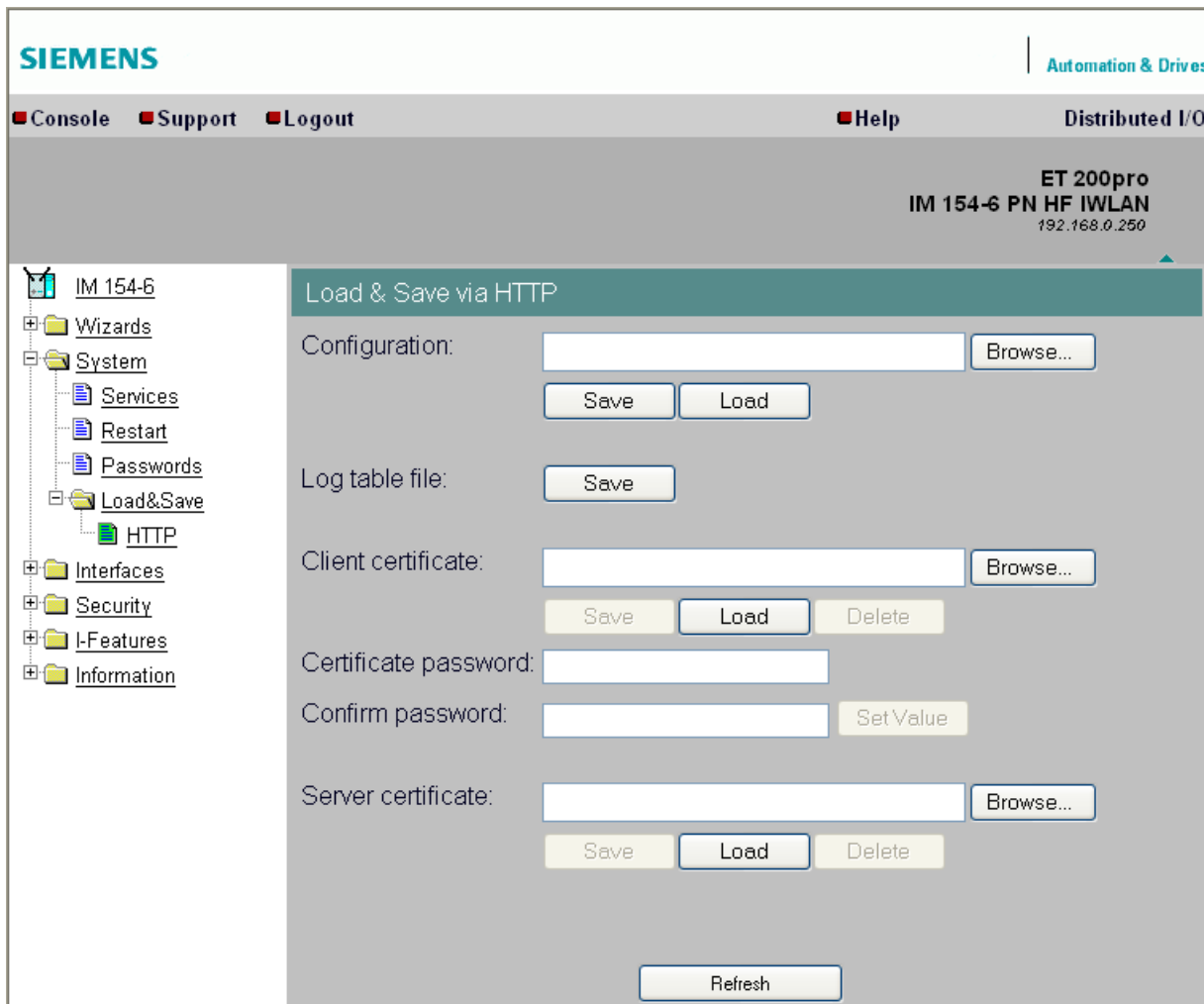
- The numbers 0 to 9
- The letters abcdefghijklmnopqrstuvwxyz ABCDEFGHIJKLMNOPQRSTUVWXYZ
- The special characters !"#%&'()*+,-./:;<=>?@[\\]^_`{|}~ and the space character

The factory defaults are valid until the user has initially assigned a password. In default factory state the admin user is assigned the password "admin". In default factory state the User is assigned the password "user".

5.4.5.5 "Load & Save" menu

"Load & Save" menu command

The "Load & Save" menu provides information about the current firmware version and contains the HTTP submenu.



"HTTP" menu command

The "HTTP" menu can be used to save configuration data to external files, or to transfer data from external files to the device. Configuration data is always saved to the Micro Memory Card from where it is loaded to work memory by the interface module.

You can save the following device data to external files:

- Device configuration data
- Log table contents
- The client certificate
- The server certificate

You can transfer the following data from external files to the device:

- Device configuration data
- The client certificate
- The server certificate

Note

After the download of configuration data, the device is restarted in order to activate the new data. The device is restarted automatically after the HTTP download.

How to load or save data via HTTP

1. Go to the corresponding input field to enter the name of the files used to save or retrieve the configuration data.
You can also open a file selection dialog by clicking "Browse...".
2. Start saving by clicking "Save". Start the load from file function by clicking "Load".

Configuration Package

Clients on which security certificates for client and/or server applications are installed provide the option of backing up the configuration file and certificates in a Configuration Package. The Configuration Package is a comfortable means of replicating clients, i.e. identical settings **and** certificates are transferred to the clients in a single pass. This transfer is followed by a restart, similar to the download of the configuration file.

See also

Basics - Industrial Wireless LAN
(<http://support.automation.siemens.com/WW/view/en/9975764>)

5.4.6 The "Interfaces" menu

5.4.6.1 "WLAN" menu overview

Enable interface

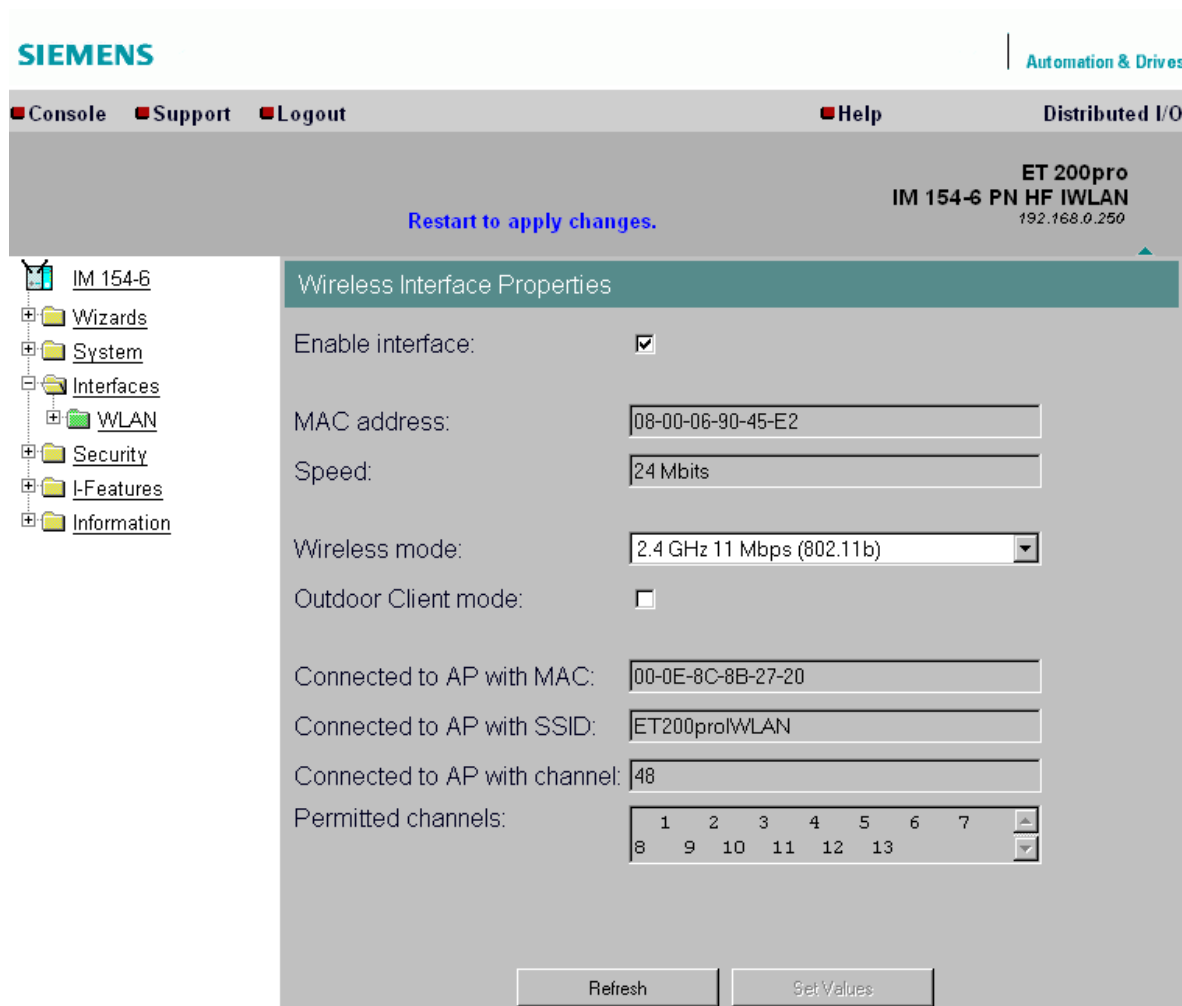
Enable the interface by selecting "Enable interface" check box.

Transmission mode

Specify the transmission mode in the "Wireless mode" drop-down list box. The box displays any value you might have already set in the Basic Wizard.

Outdoor Client mode

The device can be operated either in the indoor or outdoor mode. In indoor mode, all the country-specific approved channels and transmit power settings are available for operation in a building. The outdoor mode only enables country-specific channels and transmit power settings required for outdoor operation. Select "Outdoor Client mode" to enable this mode.



5.4.6.2 "Advanced" menu

Display of the "Advanced" menu command

The display of the "Advanced" menu command differs compared to the following if the iPCF mode is enabled.

Transmit power

You can specify the transmit power of the device in the "Transmit power" drop-down list box. It may be necessary to reduce transmit power when using antennae in order to avoid non-compliance with statutory limits. Reduction of the transmit power reduces the cell range.

RTS/CTS

RTS/CTS (Request To Send/Clear To Send) is a method deployed which is used to avoid collisions and is based on the exchange of status information prior to the actual transfer of data (Hidden node problem). This method is only applied if the length of the data telegram set in parameter "RTS/CTS threshold" is exceeded in order to minimize network load through protocol overhead.

Fragmentation

The "Fragmentation length threshold" parameter defines the maximum data telegram length transferred on the wireless link. Larger data telegrams are fragmented prior to transmission and are reassembled to their original size after having been received. As it is more difficult to transfer larger data telegrams, this fragmentation can be of advantage in case of poor transmission quality. However, the fragmentation of data telegrams also comes along with loss of throughput.

Repetitions

There are two situations in which data telegrams are repeated. The hardware repetition is performed by the WLAN chip itself by attempting to immediately repeat the transfer of an unacknowledged data telegram. The number of those attempts is defined at the "Hardware retry number" parameter.

If all hardware repetitions were unsuccessful, the data telegram is queued until all other data telegrams have been transferred from the buffer. The attempt to transfer the data telegram is then repeated. The number of those repetitions is defined at the "Software retry number" parameter.

The repetition mechanism of the software can be enabled or disabled by means of "Use software retry".

Short preamble for 802.11b

The 802.11b standard supports the use of short preambles for the transfer of data telegrams.

Antenna Gain

The "Antenna gain" parameter describes the gain (in dBi) of an antenna which is connected to the IM 154-6 PN HF IWLAN interface module.

You can define the following parameter values:

- "Antenna type"
- "Antenna gain (in dBi)"
- "Antenna cable length (in meters)"

If "Antenna type" is set to "User defined", you can enter any value for the antenna gain in the "Antenna gain (in dBi)" field. The default value of the selected "Antenna type" is displayed otherwise. Enter the length of the cable interconnecting the device with the antenna in the "Antenna cable length (in meters)" field.

You must define specific values in order to ensure compliance with country-specific provisions of regulatory authorities. The regulatory authorities, for example, specify all available channels and their corresponding maximum transmit power, and other conditions of use. For more detailed information about the regulations in your country, refer to the [countrylist.log](#).

To view this file, enter the IP address of the relevant interface module in the address bar of WBM and append the `"/countrylist.log"` entry to this address.

Based on the settings for antenna gain and transmit power, the I/O device automatically sets the approved channels. The available number of approved channels may be less for antennas with high gain compared to those for antennas with low gain.

Note

You can select the "User defined" value to enter integer dBi values for the antenna gain within the range from 0 to 30 dBi. Remember to make allowances for losses on the connecting cable of the antenna.

NOTICE

Correct antenna settings are imperative for compliance with approval requirements. Incorrect antenna gain entries can lead to criminal proceedings!

Antennas

The "Antenna mode" drop-down list box specifies the use of the antennas.

- The "Diversity" setting for the two antennas selects the antenna with maximum data transmission performance. Both antennas must be connected to the WLAN interfaces. Moreover, both antennas should be of the same type and cover approximately the same range.
- The "Tx on Antenna XR02 R1 W1, Rx on Antenna XR02 R1 W2" setting defines operation of antenna XR02 R1 W1 for transmission and operation of antenna XR02 R1 W2 for receiving.
- The "Tx on Antenna XR02 R1 W2, Rx on Antenna XR02 R1 W1" setting defines operation of antenna XR02 R1 W2 for transmission and operation of antenna XR02 R1 W1 for receiving.
- The "Antenna XR02 R1 W1" or "Antenna XR02 R1 W2" settings enable the corresponding antenna for wireless transmission.

With the "Diversity, Tx on Antenna XR02 R1 W1, Rx on Antenna XR02 R1 W2" and "Tx on Antenna XR02 R1 W2, Rx on Antenna XR02 R1 W1" settings, both antennae must be connected to the corresponding WLAN interface. If only one antenna is connected you must set it up permanently. In addition, the second antenna socket must be provided a 50 Ω terminating resistor.

Scanning for Access Points

While being connected to an Access Point, the client runs a background scan to locate other Access Points to which it can connect. The three modes for scanning for other Access Points can be selected from the "Background scan mode" drop-down list box.

If you set "Disable", the client never scans for other Access Points as long as it is connected.

If "Scan if Idle" is set, a scan for other Access Points is only initiated on expiration of a specific data bus idle time.

If "Scan Always" is set, the station runs a cyclic scan for other Access Points.

This cyclic interval is defined at parameter "Background scan interval".

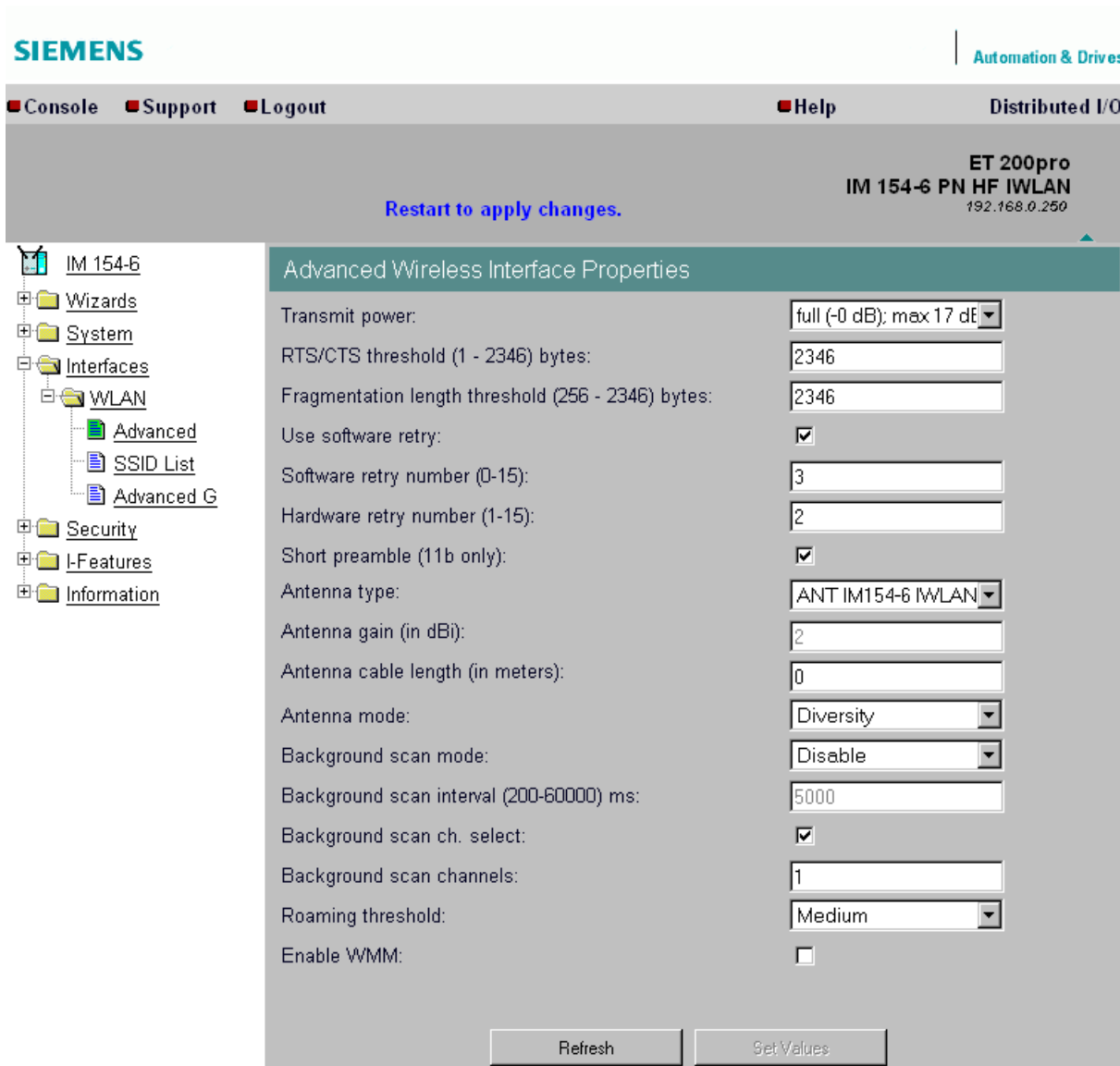
To improve on the time required for scanning for other Access Points, you can preset the channels on which the client can locate other Access Points. Set the "Background scan channels select" check box accordingly and enter the channels of the other Access Points in the "Background scan channels" input field. Enter the channels separated by space characters.

A client always initiates connections to Access Point with higher signal strength. The new signal strength must be higher than the current by a specific value. The threshold at which the client changes to the new Access Point can be specified at the "Roaming threshold" parameter.

Enable WMM

Wi-Fi Multimedia is used to transfer data telegrams of higher priority in accordance with the IEEE 802.11e standard.

To meet situations where data telegrams are evaluated based on their priority and transmitted via the WLAN interface according to their priority, select the "Enable WMM" option.



5.4.6.3 "SSID List" menu**5.4.6.4 "Advanced G" menu****Properties of the 802.11g standard**

The IEEE 802.11g standard is downwards compatible to IEEE 802.11b, i.e. both use the 2.4 GHz band. By contrast to the 802.11b radio mode that specifies data rates up to 11 Mbps, 802.11g offers data rates up to 54 Mbps and also deploys the OFDM modulation method.

Special setup options for 802.11g

The setup options of the "Advanced G" submenu relate to the way management and control data (RTS/CTS data telegrams, beacons) are to be sent in 802.11g mode.

Applications with RTS/CTS

The "802.11g CTS mode" drop-down list box is used to specify operation in "WLAN" menu overview (Page 76):

None	Do not use RTS/CTS
Always	Always us RTS/CTS for 802.11g data telegrams.
Auto	Use RTS/CTS only if 802.11b clients are within the range.

You can set the data rate for RTS/CTS data telegrams in the "802.11g CTS rate" drop-down list box.

The "802.11g CTS type" drop-down list box is used to define whether to transmit only a CTS, or whether to transmit a RTS/CTS frame.

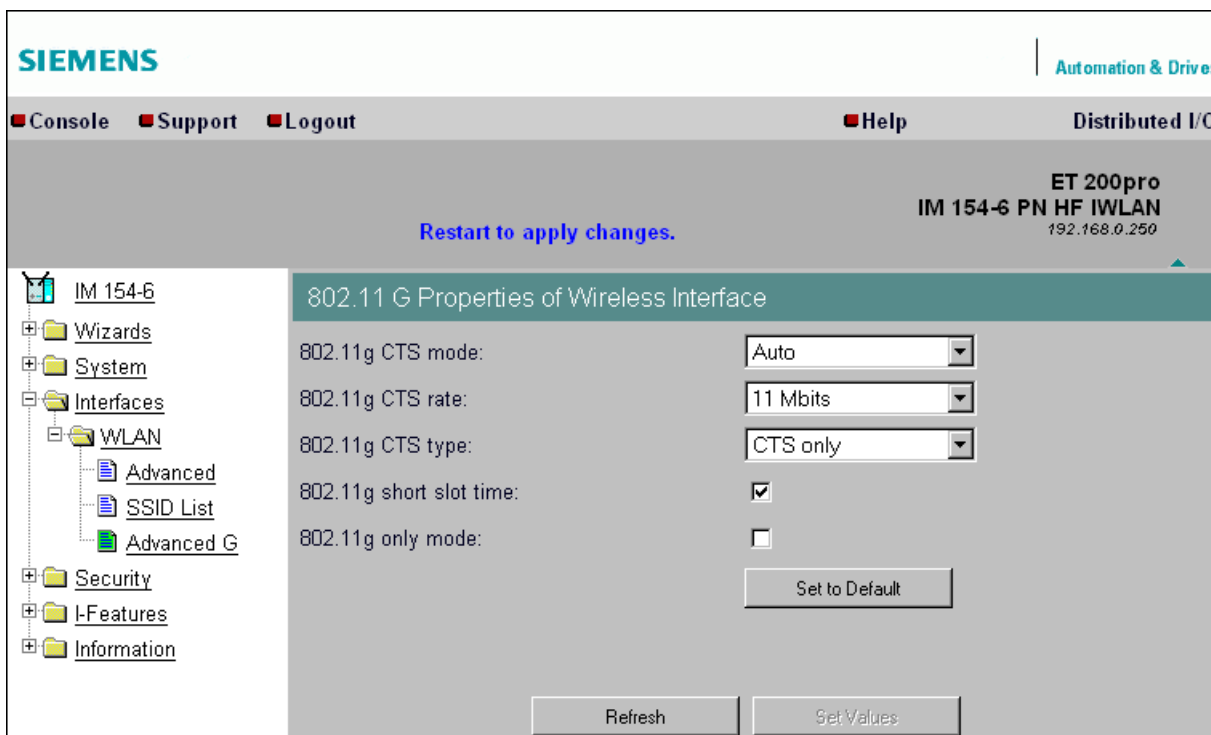
802.11g expansions

You can set the "802.11g short slot time" parameter to specify the use of the short slot time. This parameter setting increases the net data rate.

If the AP is operated with active "802.11g only mode" parameter you must enable this setting on the client.

The "802.11g only mode" parameter can be set so that only 802.11g clients are allowed to log on to the Access Point, and to permit only 802.11g data rates. Only the OFDM modulation method is used in this operating mode. This setup prevents 802.11b devices from logging on and enables higher data throughput.

If "802.11g only mode" is disabled, 802.11b and 802.11g devices are allowed to log on to the Access Point.



5.4.7 "Security" menu

5.4.7.1 Basic WLAN

"BASIC WLAN" menu command

The security settings of the WLAN interface are made in the "BASIC WLAN" menu.

The screenshot displays the Siemens web-based management interface. At the top, the Siemens logo is on the left, and 'Automation & Drives' is on the right. Below the logo, there are links for 'Console', 'Support', and 'Logout'. On the right side, there are links for 'Help' and 'Distributed I/O'. The main header area shows 'ET 200pro IM 154-6 PN HF IWLAN' and the IP address '192.168.0.250'. A blue message 'Restart to apply changes.' is displayed in the center. The left navigation menu includes 'IM 154-6', 'System', 'Interfaces', 'Security', 'Basic WLAN', 'Keys', 'I-Features', 'Information', and 'Wizards'. The main content area is titled 'Wireless Interface Security Properties' and contains the following settings:

- Authentication type: WPA2 (RADIUS)
- Encryption:
- Cipher: AUTO
- RADIUS authentication type: Auto
- Dot1x user name:
- Dot1x user password:
- Password confirmation:
- Check Dot1x server:
- Client certificate size: 0
- Server certificate size: 0

At the bottom of the configuration area, there are two buttons: 'Refresh' and 'Set Values'.

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.

Encryption methods

If you have selected "Open System" including encryption or "Shared Key" for authentication you must define a key in the "Keys" menu (refer to chapter "Keys" menu (Page 87)).

- TKIP (Temporal Key Integrity Protocol)

By contrast to WEP encryption, the symmetrical current encryption method with RC4 algorithm (Ron's Code 4) TKIP is based on dynamic keys which are derived from a master key. TKIP is also capable of detecting falsified data telegrams.

- AES (Advanced Encryption Standard)

Strong symmetrical block encryption method based on the Rijndael algorithm that enhances TKIP functionality.

- AUTO

AES or TKIP is selected automatically, depending on the capability of the partner station.

RADIUS-Authentication Method

If the authentication of an IM 154-6 PN HF IWLAN interface module is handled by means of external RADIUS server, you can specify a method for external authentication using the "RADIUS authentication type" selection list. The "Auto" value is selected by default so that the client offers all supported methods to a RADIUS server. Any other selection restricts the support by the IM 154-6 PN HF IWLAN interface module to this one method. This step may be necessary because certain RADIUS servers do not completely or correctly evaluate the response of the IM 154-6 PN HF IWLAN interface module.

The following options are available:

- EAP TLS - Extensible Authentication Protocol - Transport Layer Security. Uses certificates for authentication

You can load certificates by selecting the **System > Load & Save > HTTP** menu command.

- EAP TTLS - Extensible Authentication Protocol - Tunnel Transport Layer Security. After setup of the TLS tunnel, MS-CHAPv2 is used for internal authentication.
- PEAP - Protected Extensible Authentication Protocol Alternative protocol draft of IETF EAP-TTLS

Entries for WPA-PSK and WPA2-PSK

For the Pre-Shared Key variants, go to the "Pass Phrase" field and enter the string to be used by the IM 154-6 PN HF IWLAN interface module for authentication and for initialization of dynamic key generation.

The screenshot shows the Siemens web-based management interface for configuring wireless security properties. The interface includes a navigation menu on the left, a main content area, and a top status bar.

SIEMENS | Automation & Drives

Console Support Logout Help Distributed I/O

Restart to apply changes.

ET 200pro
IM 154-6 PN HF IWLAN
192.168.0.250

Wireless Interface Security Properties

IM 154-6

- Wizards
- System
- Interfaces
- Security
 - Basic WLAN
 - Keys
- I-Features
- Information

Authentication type: WPA2-PSK

Encryption:

Cipher: AUTO

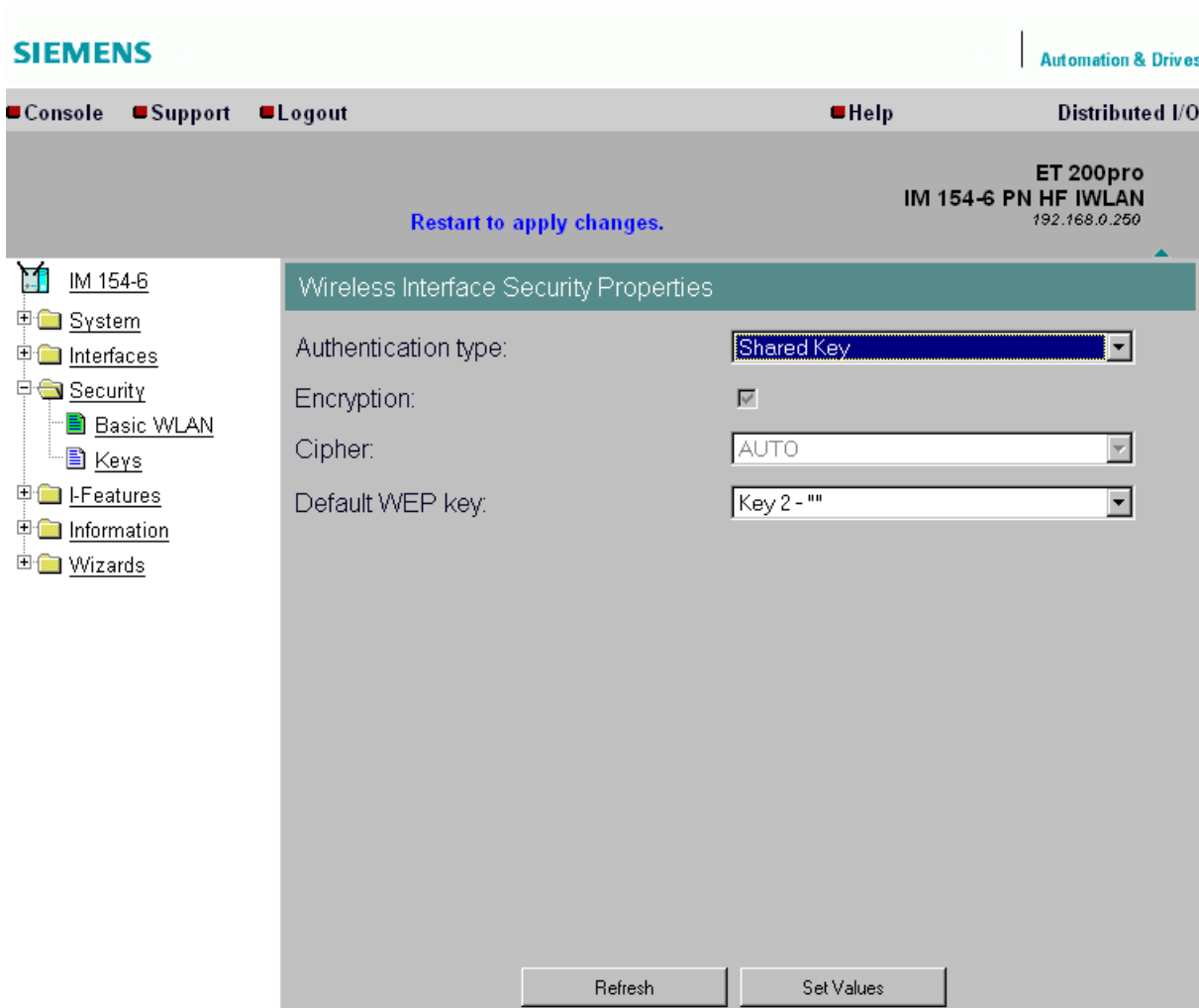
Pass phrase: [Redacted]

Pass phrase confirmation: [Redacted]

Refresh Set Values

Entries for "Shared Key"

Select a predefined key for the Shared Key variant from the "Default WEP key" field.



5.4.7.2 "Keys" menu

Defining the WEP key

You must enter at least one key in the key table to enable encryption for the Open System and Shared Key authentication methods. You can choose between several key lengths:

- 5 or 13 ASCII characters, or 10 or 26 hexadecimal characters specify a weaker key (40/104 bits).
- 16 ASCII characters, or 32 hexadecimal characters, however, define a strong key (128 bits).

Note

You can use ASCII code 0x20to 0x7e for the key string. Below, there is a list of all supported characters starting with a space:

```
!"#$%&'()*+,-./0123456789:;<=>?@
ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`
abcdefghijklmnopqrstuvwxyz{|}~
```

The screenshot shows the Siemens Web Management Interface for an ET 200pro IM 154-6 PN HF IWLAN module. The main content area is titled 'Key table for Wireless Interface' and contains a table with the following structure:

Name	Del	Length	Key	Used in
Public key 1	<input type="checkbox"/>	40 bit (WEP)	5061737357	DEF.KEY
Public key 2	<input type="checkbox"/>	0		
Public key 3	<input type="checkbox"/>	0		
Public key 4	<input type="checkbox"/>	0		
Private key 5	<input type="checkbox"/>	0		

At the bottom of the interface, there are two buttons: 'Refresh' and 'Set Values'. A message at the top of the main content area reads 'Restart to apply changes.'

5.4.8 "I-Features" menu

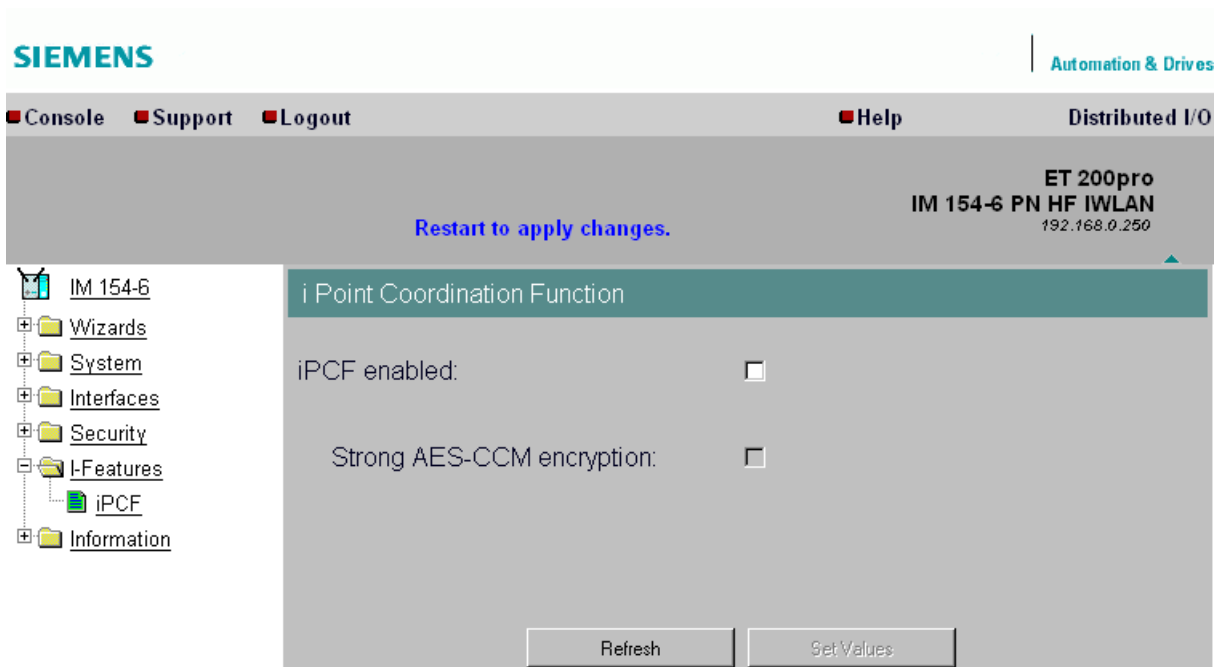
5.4.8.1 "iPCF" menu

Using iPCF

Select the "iPCF" check box if the IM 154-6 PN HF IWLAN interface module is to support this feature.

Encryption

Select the "Strong AES-CCM encryption" check box if the IM 154-6 PN HF IWLAN interface module is to support this feature. You can only enable this encryption if iPCF is enabled.



5.4.9 "Information" menu

5.4.9.1 "Information" menu overview

System events and information on the protocols

The "Information" menu provides information in tabular format about system events and on the operational behavior of the WLAN interface.

The screenshot displays the Siemens web-based management interface. At the top left is the 'SIEMENS' logo, and at the top right is 'Automation & Drives'. Below the logo is a navigation bar with 'Console', 'Support', and 'Logout' on the left, and 'Help' and 'Distributed I/O' on the right. A central banner area contains the text 'Restart to apply changes.' and 'ET 200pro IM 154-6 PN HF IWLAN 192.168.0.250'. On the left side, there is a tree view with the following items: 'IM 154-6', 'Wizards', 'System', 'Interfaces', 'Security', 'I-Features', and 'Information'. The 'Information' item is selected, and the main content area displays 'Information about Radio Client Module' with the following data:

Log entry count:	3
Visible AP count:	1
Auth log entry count:	44

5.4.9.2 "Log Table" menu

Logging system events

This page lists system events and their time of occurrence (relative to the system start).

The screenshot shows the Siemens web management interface for an ET 200pro IM 154-6 PN HF IWLAN module. The interface includes a navigation menu on the left with categories like Wizards, System, Interfaces, Security, I-Features, and Information. The main content area displays the 'System Event Log Table' with the following data:

Restart	Time	Event
75	0 days 00:00:08	Link up
74	0 days 00:00:00	Cold start performed
74	0 days 00:00:48	Link up

At the bottom of the table, there are 'Refresh' and 'Clear' buttons. The top of the interface shows the Siemens logo, 'Automation & Drives' branding, and a status bar with 'Restart to apply changes.' and 'Distributed I/O'.

5.4.9.3 "Auth Log" menu

Logging authentication

The pages of this menu display a table with information about successful or failed authentication attempts.

Use the "Filter" drop-down list box to define the error criteria for displaying the information.

The screenshot shows the Siemens web-based management interface for an ET 200pro IM 154-6 PN HF IWLAN module. The interface includes a navigation tree on the left with the following items: IM 154-6, Wizards, System, Interfaces, Security, I-Features, Information, Log Table, Auth Log (selected), Versions, Available WLAN, WLAN, and Signal. The main content area displays the 'Authentication Log' table with a filter set to 'All'. The table has the following data:

MAC address	Time	Event
00-0E-8C-8B-27-20	0 days 03:38:01	client associated
00-0E-8C-8B-27-20	0 days 03:38:01	client authenticated
00-0E-8C-8B-27-20	0 days 03:31:47	client associated
00-0E-8C-8B-27-20	0 days 03:31:47	client authenticated
00-0E-8C-8B-27-20	0 days 02:39:53	client associated
00-0E-8C-8B-27-20	0 days 02:39:53	client authenticated
00-0E-8C-8B-27-20	0 days 02:10:49	client associated
00-0E-8C-8B-27-20	0 days	

A 'Refresh' button is located at the bottom of the table.

5.4.9.4 "Versions" menu

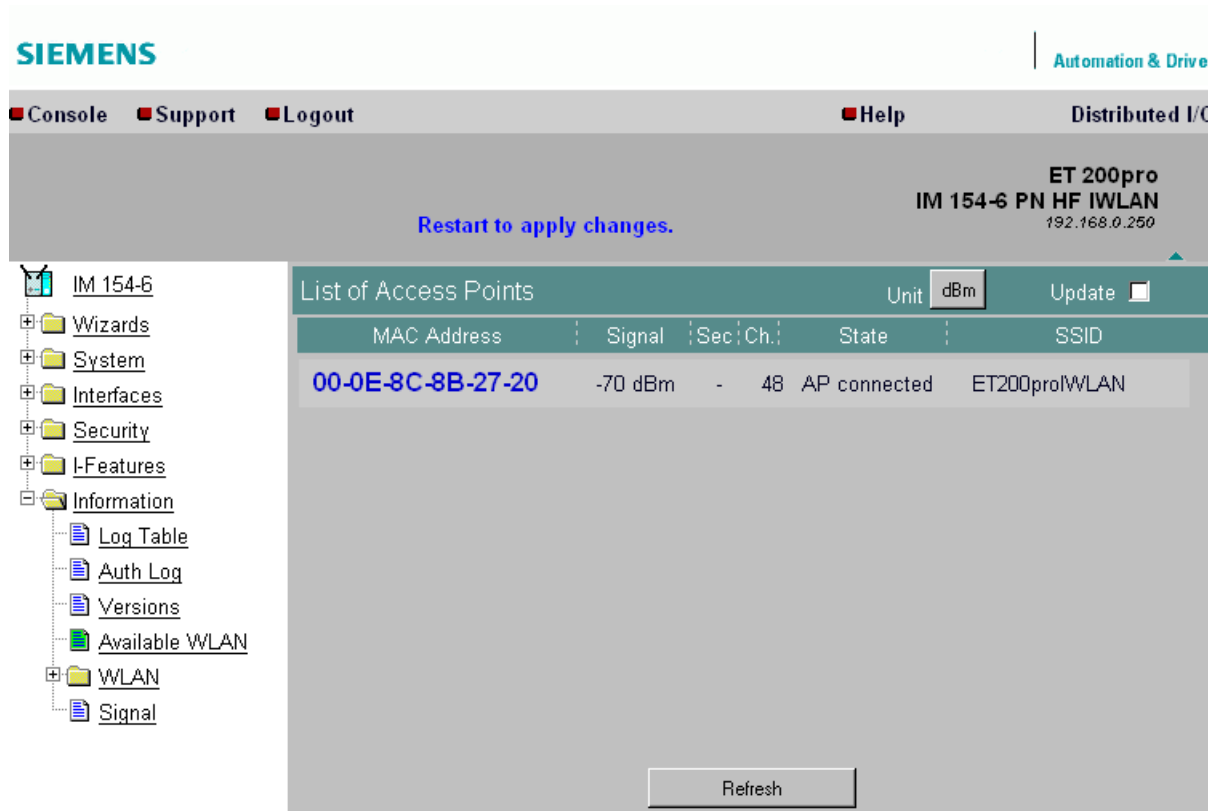
Current versions and order numbers

1. Hardware version
2. Order number (MLFB)
3. Boot software version
4. FW version
5. MAC address
6. Type of network connection
7. Antenna installation

5.4.9.5 "Available WLAN" menu

List of available Access Points

The "Available WLAN" menu contains all Access Points which are available to the IM 154-6 PN HF IWLAN interface module, including their receive signals and additional setup information.



Specifying power in dBm

A commonly used reference value in RF engineering is a power of 1 mW. That is, power can be specified in decibel units (dBm). The following conversion formula applies:

$$P \text{ [dBm]} = 10 * \log (P \text{ [mW]} / 1 \text{ mW})$$

Refreshing the display

Most of the pages provide a "Refresh" button on their bottom edge which can be used to refresh the display.

Select the "Update" check box to update the list automatically at cyclic intervals of two seconds. You can view additional information about an Access Point by clicking its MAC address of this Access Point.

AvailableAccess Points

This menu displays all Access Points to which the device can set up a wireless connection.

Note

The display differs if IM 154-3 PN HF IWLAN is operated with active iPCF mode. Since the client does not run a background scan in this case, the only APs displayed are those to which the client has set up a connection.

The APs to which the client can set up a connection are displayed after the background scan (iPCF mode disabled) was completed.

- **MAC Address**
MAC address of the Access Point.
- **Signal**
Signal strength of the Access Point. Higher values improve signal strength.
- **Sec**
Indicates whether encryption is enabled
- **Channel**
Channel currently used by the Access Point to communicate with the device.
- **State**
Current state of the Access Points. APconnected indicates an active connection this Access Point.
- **SSID**
The name of the relevant network is output to this field.

5.4.9.6 "WLAN" menu

Information about the WLAN interface

This menu provides information about the current setup of the WLAN interface. The menu also displays current operational data.

The screenshot shows the Siemens web management interface for an ET 200pro IM 154-6 PN HF IWLAN module. The interface includes a navigation menu on the left with options like WIZARDS, System, Interfaces, Security, I-Features, Information, Log Table, Auth Log, Versions, Available WLAN, WLAN, and Signal. The main content area displays 'Information on the Wireless Interface' with a table of parameters and their values. A 'Restart to apply changes.' message is visible at the top, and a 'Refresh' button is at the bottom of the table.

Information on the Wireless Interface	
Type:	ieee80211
Description:	wlc0
MAC address:	08-00-06-90-45-E2
Operational status:	Up
Admin status:	Up
Maximum packet size:	2346
Unknown protocols:	0
Output queue length:	256
State:	Joined
WLAN mode:	802.11b
Security:	OFF
Encryption type:	none
Power save mode:	OFF
Connected to MAC:	00-0E-8C-8B-27-20
Connected with SSID:	ET200proIWLAN
Connected on channel:	48

Traffic

Displays statistics of the data transferred.

The screenshot shows the Siemens web-based management interface for the ET 200pro IM 154-6 PN HF IWLAN interface. The interface includes a navigation tree on the left, a top status bar with 'Restart to apply changes.' and 'ET 200pro IM 154-6 PN HF IWLAN 192.168.0.250', and a main content area with a table of statistics and 'Refresh' and 'Reset Statistics' buttons.

Restart to apply changes.

**ET 200pro
IM 154-6 PN HF IWLAN
192.168.0.250**

Traffic statistics for the Wireless Interface

Associations:	22	Disassociations:	21
Authentications:	22	Deauthentications:	2

	Receive	Transmit
Signal strength:	-72 dBm (47 %)	N/A
Frame count:	674903	6467
Management frames:	133771	1298
RTS frames:	N/A	0

Data

Avg. Rate:	6.0 Mbits	48.0 Mbits
Data frame count:	541132	5169
Data bytes count:	47863695	3965111
Unicast:	3970	5168
Multicast:	531240	0
Broadcast:	5922	1

Refresh Reset Statistics

- Association / Authentication Frames
The function counts the data telegrams which are relevant to the logon. A distinction is made between the Association and Authentication logon data telegrams and the Disassociation and Deauthentication logoff data telegrams.
- Signal strength
Displays the signal strength based on the mean value derived from the last data telegrams received, or from the last acknowledge frames received at the transmitter station.
- Frame count
Counts all successfully received or transmitted data telegrams.
- Management frames
Counts all management frames received or transmitted.
- RTS frames
This value is incremented after a CTS data telegram was received for an RTS data telegram.
- Rate
Displays an average data rate of the most recently received or sent data telegrams.
- Data frame count
Counts all received or transmitted data telegrams.
- Data bytes count
Displays the total of all bytes received or sent in a data telegram.
- Unicast
Total of all received or sent data unicasts.
- Multicast
Total of all received or sent data multicasts.
- Broadcast
Total of all received or sent data broadcasts.

Errors

This page displays statistics about transmission error events. A high error rate is an indication of poor connection quality.

The screenshot shows the Siemens web-based management interface for an ET 200pro IM 154-6 PN HF IWLAN. The interface includes a navigation menu on the left with categories like Wizards, System, Interfaces, Security, I-Features, and Information. The main content area displays 'Error statistics on Wireless Interface' with a table of receive and transmit error metrics. A 'Restart to apply changes.' message is visible at the top of the main area. Buttons for 'Refresh' and 'Reset Statistics' are located at the bottom of the statistics table.

Receive		Transmit	
Fragmentation errors:	0 (0 %)	Transmission errors:	4 (0 %)
Encryption errors:	0 (0 %)	Dropped frames:	2 (0 %)
Duplicate frames:	0 (0 %)	ACK errors:	968 (14 %)
FCS errors:	1207 (0 %)	RTS errors:	4 (100 %)
Header CRC errors:	1009 (0 %)	Retry count:	295 (4 %)
Decrypt CRC errors:	0 (0 %)	One retry count:	291 (4 %)
		Multiple retry count:	4 (0 %)

Errors - Receive

- Fragmentation errors
Total of all failed fragmented transfers. One of the fragments was either received too late, not received at all.
- Encryption errors
This value is incremented after a data telegram with encryption identifier was received at a device operating without encryption, or vice versa, if a data telegram without encryption identifier was received and encryption is enabled.
- Duplicate frames
Total of all redundant data telegram receptions.
- FCS errors
Total of all data telegrams received with incorrect checksum.
- Header CRC error
Total of all data telegrams received with CRC error in the Header.
- Decrypt CRC error
Total of all data telegrams received with incorrect checksum of the encrypted data buffer.

Errors - Transmit

- **Transmission errors**
This value is incremented the transfer of a data telegram failed irrespective of hardware-based retries.
- **Dropped frames**
Total number of data telegrams discarded after their successful transfer failed irrespective of all retries.
- **Acknowledged errors**
Total of all transmitted data telegrams which were not acknowledged by the recipient.
- **RTS errors**
Total of all transmitted RTS frames which were not acknowledged by means of CTS response frame.
- **Retry count**
Total of all successfully transmitted data telegrams which required one or several retries (Retrys).
- **One retry count**
Total of all successfully transmitted data telegrams which required only one retry.
- **Multiple retry count**
Total of all successfully transmitted data telegrams which required several retries.

Note

The percentage values following the corresponding errors (errors) relate to the total number of received / transmitted data telegrams.

5.4.9.7 "Signal" menu

Displaying the signal strength

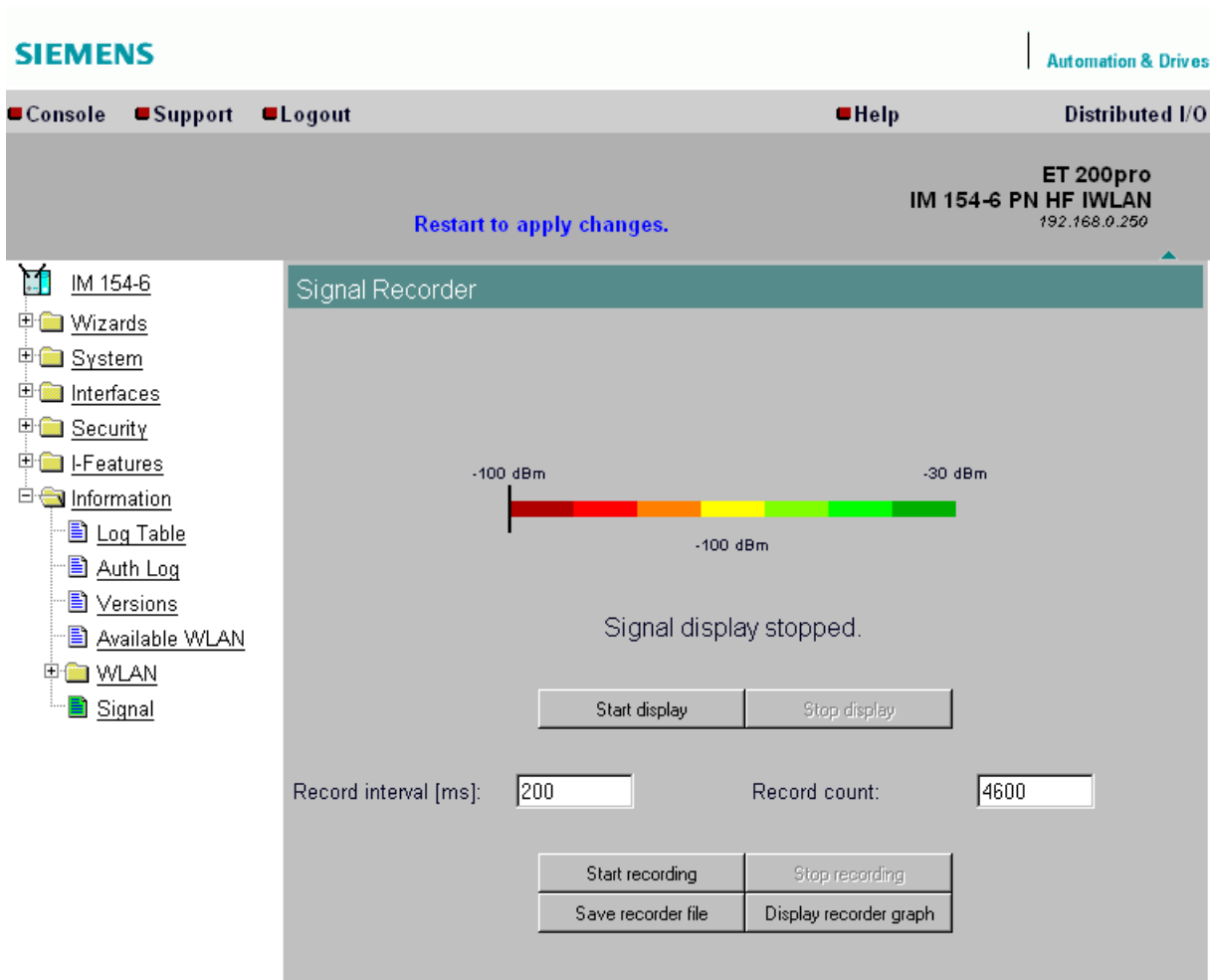
The Signal Recorder can be used to record or display the signal strength of connected Access Points. Using this data, you can disclose areas with insufficient signal strength. The Signal Recorder can be particularly useful in scenarios where clients move along a fixed path.

Procedure:

You can download the generated signal file as follows:

- Via the URL <http://<IP-Adresse>/Signal.txt>
- Via the URL <http://<IP-Adresse>/Signal.log>

If you are not logged on, the Login window prompts you to log on.



Displaying real-time values

The upper half of the window contains an instrument for displaying the graphic representation of the currently calculated dBm value in real time. Depending on your browser and on network load, the display is updated at cyclic intervals of approx. 500 ms. The actual dBm value is also displayed in plain language next to the graphic view. The MAC address of the AP with which the IM 154-6 PN HF IWLAN is currently connected along with the channel, frequency and data rate are also displayed and updated. You can start or stop the graphic display using the "Start display" and "Stop display" buttons

Note

Operation of the graphic display can cause considerable network load which is liable to disturb time-sensitive PROFINET communication.

Recording a series of measurements

In addition to the operator controls the graphic display of real-time values, the lower half of the window also contains the control elements for the signal recorder. You have the option of setting the the total number of measured values and a time interval between the acquisition of two measured values. The recorder is controlled by means of the "Start recording" or "Stop recording" buttons.

The "Save recorder file" and "Display recorder file" buttons are available as soon as measuring points have been recorded and after the recorder has been stopped. The measured values can be loaded directly from IM 154-6 PN HF IWLAN to a CSV file and be imported to a suitable evaluation program by clicking "Save".

The CSV file contains the time stamp for all measured values, the MAC address of the AP, the current number of the measurement, the signal strength in % and in dBm notation, the raw value of the RSSI (Received Signal Strength Indication), a roaming indicator, the channel and the data rate.

The "Display record file" button opens a pop-up window in which the profile of the measured values is available in graphic format. The window displays the profile of the dBm values. If IM 154-6 PN HF IWLAN changes the Access Point (roaming) during measurement, blue bars indicate the event. A tooltip showing the MAC addresses of both Access points is displayed by moving the mouse pointer over a roaming indicator bar, or over the flag at the top of the bar.

The "Print graph" button provides a simple means of printing the table after you made the following settings in the browser:

- Mozilla Firefox 2.0 and 3.0:
The "Print Background (colors & images)" check box must be set in the "Options" field of the **File > Page Setup...** dialog.
- Microsoft Internet Explorer 6.0:
The "Print background colors and images" option must be set in the "Printing" section of the **Tools > Internet Options > Advanced** tab.

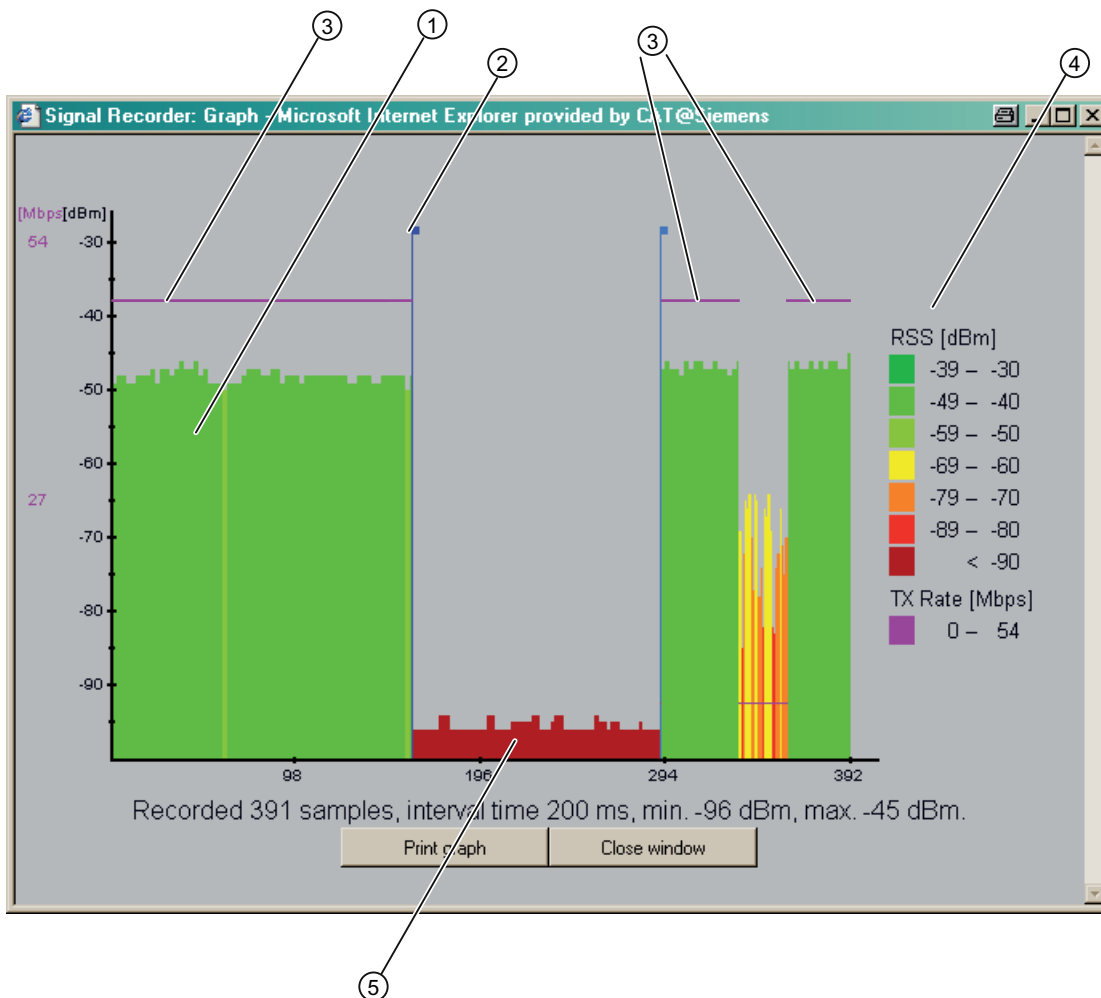
The signal recorder itself does not cause any significant network load that could impair other processes.

Both elements of the signal recorder can be operated independently.

Observe the following operating instructions to obtain expressive measurements with the signal recorder:

- Set up a fixed data rate at the Access Point.
- You should keep the update time in the iPCF mode to the necessary minimum for the measurements.
- Verify that you have sufficient resources for data communication during measurement, as the statistics function has to evaluate all incoming data telegrams.

- The measured section should be scanned two or three times using the same parameters in order to detect recurring signal strength drops at the same position.
- You should take measurements at a selected fixed position over an extended period of time.



- ① Signal level
- ② Roaming indicator
- ③ Data rate
- ④ Legend
- ⑤ Background noise level

Roaming indicator

This value is output if the client connects to a different or to no AP.

Bandwidth/Data rate)

Instead of a bar graph, a line is used to display the bandwidth/data rate in order to avoid signal level overlaps that may be generated at unfavorable conditions.

Background noise (noise floor)

The term noise floor denotes the noise limit up to which it is still possible to transmit data. That is, the data signal strength must exceed the noise floor level in order to enable data transfer. For this reason, the background noise level is only visible if the client is not connected to an AP.

5.5 Access Point parameters

Parameter settings at the Access Point

To ensure reliable communication between the Access Point and the IM 154-6 PN HF IWLAN interface module, your parameter settings must be identical at the AP and at the IM 154-6 PN HF IWLAN.

Use the Web Based Management (WBM) of the corresponding Access Point for the Access Points of the SCALANCE W product line of SIEMENS AG. Corresponding operating instructions are available on the Service&Support pages (http://www.siemens.com/automation/csi_en_WW/support).

Disruption of data transfer due to excess received power

Excess received power at the input of the WLAN client overdrives its amplifier circuit. Any received power greater than -40 dBm at the WLAN client causes communication errors. You can view the corresponding actual received power value [in dBm] in WBM by selecting **Information > "Available WLAN"**.

Input signal power at the WLAN client is determined by the following factors:

- Distance between the Access Point and the WLAN client
- Reflection of electromagnetic waves generated as a result of the building structure
- Radiation characteristic and gain of the antenna used
- "Transmit power" settings in the Web Based Management of the Access Point.

Eliminating data transfer errors caused by excess received power

You can troubleshoot communication errors developing due to excess received power (greater than -40 dBm) as follows:

- Increase the distance between the transmitter and receiver.
- Reduce the transmit power at the relevant WLAN client or Access Point in WBM.

5.6 PROFINET IO

Introduction

IM 154-6 PN HF IWLAN is included in the hardware catalog of HW Config after the start of STEP 7.

Prerequisites

- The IM 154-6 PN HF IWLAN interface module: 6ES7154-6AB00-0AB0
 - STEP 7, V5.4 + SP4 or higher
 - HSP for IM 154-6 PN HF IWLAN
 - Assigning a name to the IO device. See chapter Assigning a device name to the I/O device (Page 41).

Procedure

1. Start SIMATIC Manager.
2. Create a new project.
3. Configure ET200pro with IM 154-6 PN HF IWLAN in HW Config.
4. Drag-and-drop the modules from the hardware catalog to the configuration table.
5. Double-click the first module of ET 200pro in the configuration table and set its parameters.
6. Parameterize all other modules of ET 200pro.
7. Save the configuration, or download it to the I/O controller.

Configuring the update time

Note the following information when setting the update time for IM 154-6 PN HF IWLAN in STEP 7.

Note

Update time in STEP 7

Set the update time to the minimum value required.

The "Update time" parameter is available in STEP 7 / HW Config, in the object properties of the PROFINET IO system, or in the object properties of the I/O device at the I/O cycle entry.

Reference

For further information, refer to the STEP 7 Online Help.

See also

Assigning a device name to the I/O device (Page 41)

5.7 Configuration using a GSD file

Introduction

The GSD file can be used to configure ET 200pro in STEP 7 V5.4 + SP4 or higher. The GSD file must be installed accordingly in the configuration software.

Prerequisites

The GSD file required is available for download from the Internet (<http://support.automation.siemens.com/WW/view/en/19698639/133100>).

Configuring ET 200pro on PROFINET IO using STEP 7

1. Start STEP 7, open HW Config and then select **Options > Install new GSD file**.
2. Select the GSD file to install from the next dialog, and confirm with "OK". Result: ET 200pro is displayed in the hardware catalog, PROFINET IO folder.
3. The further procedure is similar to that described in chapter Configuring in STEP 7, ET 200pro Distributed I/O System (<http://support.automation.siemens.com/WW/view/en/21210852>) Operating Instructions.

Commissioning

6.1 Commissioning ET 200pro with IM 154-6 PN HF IWLAN

Introduction

The commissioning of your automation system depends on the relevant plant configuration. The section below provides a description of the procedure for commissioning an ET 200pro with the IM 154-6 PN HF IWLAN interface module using an I/O controller that is connected via Access Point. You can support commissioning by planning your channels and wireless links in a preliminary phase.

Requirements for ET 200pro with IM 154-6 PN HF IWLAN

Corresponding prerequisites for commissioning are listed in the table below.

Actions	Reference
ET 200pro with IM 154-6 PN HF IWLAN is mounted	Chapter Installing (Page 23)
ET 200pro with IM 154-6 PN HF IWLAN is wired	Chapter Wiring (Page 25)
The antennas are connected to ET 200pro with IM 154-6 PN HF IWLAN	Chapter Wiring (Page 25)
SIMATIC Micro Memory Card is inserted	Chapter Service and maintenance (Page 111)
ET 200pro with IM 154-6 PN HF IWLAN is configured	Chapter Configuring (Page 35)
The wireless interface of ET 200pro with IM 154-6 PN HF IWLAN is parameterized	Chapter Setting parameters using Web Based Management (Page 43)
Supply voltage to the Access Point is switched on	Access Point manual
The I/O controller is powered up	I/O Controller Manual
The I/O controller is set to RUN mode	I/O Controller Manual

Note

Operation only with covered RJ45 jack

During operation of IM 154-6 PN HF IWLAN, make sure that you have not connected a cable to the RJ45 jack. Remove the Ethernet cable from the RJ45 jack after having parameterized IM 154-6 PN HF IWLAN and after a wireless connection was set up. Screw the cap onto the RJ45 jack of the interface unit (torque: 1 to 1.5 N/m).

Commissioning ET 200pro with IM 154-6 PN HF IWLAN

1. Switch on the electronic / encoder supply 1L+ for IM 154-6 PN HF IWLAN.
2. Switch on the 2L+ load voltage supply (supplies).
3. Screw the cap onto the RJ45 jack after having successfully completed commissioning (torque: 1 to 1.5 N/m).

Note

Modifying the backplane bus

Always switch off power to the electronic / encoder supply 1L+ before you modify the backplane bus configuration (number of modules, removal of the terminating module).

A ring topology with IM 154-6 PN HF IWLAN is not allowed

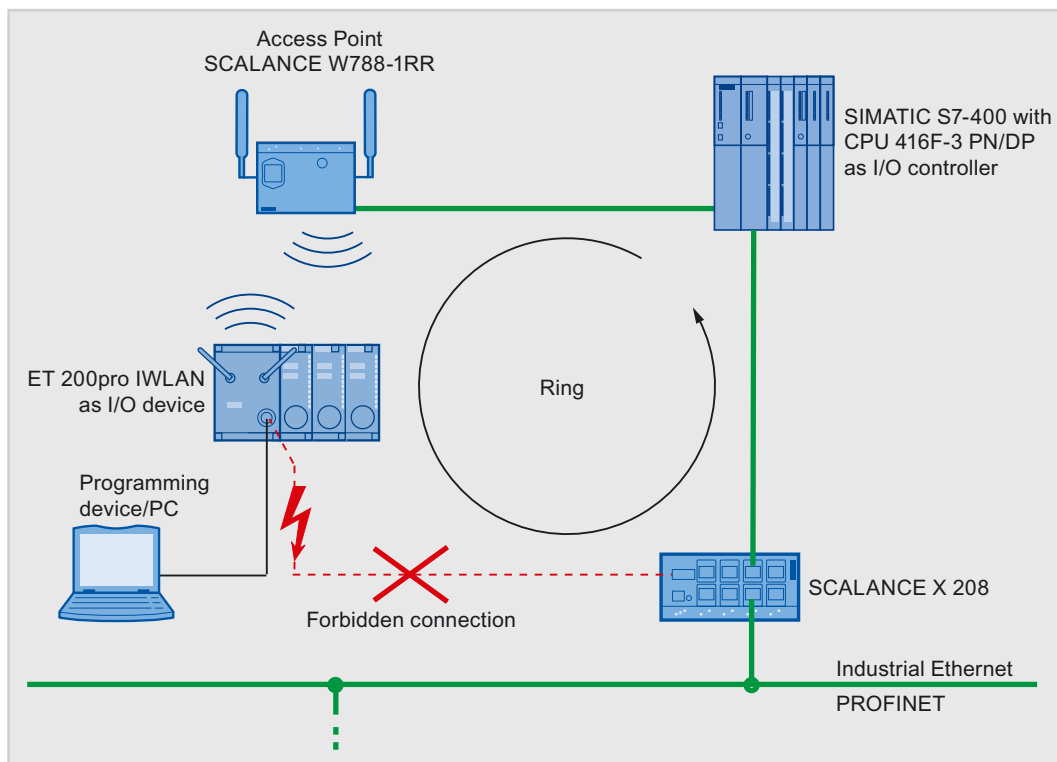


Figure 6-1 Forbidden ring topology with IM 154-6 PN HF IWLAN

 CAUTION**Risk of the crash of communication within a ring topology**

You risk the crash of communication if interconnecting IM 154-6 PN HF IWLAN with a ring topology.

If you decide to connect your programming device/PC to IM 154-6 PN HF IWLAN via external switch, you must not connect this switch to the I/O controller that has a network connection to an Access Point AP. That is, IM 154-6 PN HF IWLAN would be interconnected via AP with a ring topology after a wireless connection between the AP and IM 154-6 PN HF IWLAN was set up.

Technical background: The data telegrams in the I/O system could run into an endless loop within the ring topology and flood the network with data which can no longer be used. The result: Communication crashes because it is no longer possible to transmit data telegrams.

6.2 Startup of ET 200pro with IM 154-6 PN HF IWLAN

Principle of operation similar to ET 200pro

The startup of an ET 200pro with the IM 154-6 PN HF IWLAN interface module does not differ compared to the startup described in the chapter startup of ET 200pro on PROFINET IO of the operating instructions ET 200pro Distributed I/O System (<http://support.automation.siemens.com/WW/view/en/21210852>).

Service and maintenance

7.1 Content

Where can I find what information?

For comprehensive information relating to the maintenance and service of ET 200pro, refer to the corresponding chapter of the ET 200pro Distributed I/O System (<http://support.automation.siemens.com/WW/view/en/21210852>) Operating Instructions.

The next chapters in this document provide detailed information about firmware updates for the IM 154-6 PN HF IWLAN interface module and about the procedure for restoring the module to default settings.

7.2 Firmware update with SIMATIC Micro Memory Card

You should update the firmware of the IM 154-6 PN HF IWLAN interface module to the latest version after having implemented (compatible) functional expansions or enhancements for system performance.

Where do I get the latest firmware version?

You can order the latest firmware (as *.UPD files) from your Siemens partner, or download it from the Internet at our Homepage (<http://support.automation.siemens.com/WW/llisapi.dll?aktprim=99&lang=en&referer=%2fWW%2f&func=cslib.csinfo2&siteid=csius&extranet=standard&viewreg=WW>).

NOTICE

Unserviceable flash memory due to power failure during the update

Flash memory of IM 154-6 PN HF IWLAN is rendered unusable if the firmware update is interrupted. Provide an uninterruptible power supply for the duration of the firmware update (approx. 2 min).

Internal memory of the interface module is unable to save all data if power is interrupted. In this case, you must return the I/O device to the factory for servicing.

How to update the firmware

Table 7- 1 Firmware update via SIMATIC Micro Memory Card

Step	Action required:	This happens in IM 154-6 PN HF IWLAN:
1.	Transfer of the update files to a blank SIMATIC Micro Memory Card using <i>STEP 7</i> and your programming device. The memory of the SIMATIC Micro Memory Card must have a minimum capacity of 8 MB.	-
2.	Take IM 154-6 PN HF IWLAN off power and remove the connection unit. Replace the SIMATIC Micro Memory Card which contains the configuration data with a SIMATIC Micro Memory Card which contains the firmware update.	-
3.	Reinsert the connection module and secure it with the screws. Switch on the 1L+ voltage.	<ul style="list-style-type: none"> • IM 154-6 PN HF IWLAN automatically detects the SIMATIC Micro Memory Card with the firmware update and runs the update. • The SF, BF On and DC 24V LEDs are lit during the FW update. • The BF LED flashes and the SF LED goes dark after you completed the FW update.
4.	Take IM 154-6 PN HF IWLAN off power and remove the connection unit. Remove the SIMATIC Micro Memory Card which contains the firmware update. Reinsert the SIMATIC Micro Memory Card which contains the configuration data.	-

7.3 Restoring IM 154-6 PN HF IWLAN to factory defaults

Introduction

The IM 154-6 PN HF IWLAN interface module supports the "Reset to Factory" service (restore to factory defaults) which is used to restore all data in non-volatile memory to factory defaults.

Factory defaults of IM 154-6 PN HF IWLAN

The IM 154-6 PN HF IWLAN interface module is shipped with the following default property values:

Table 7- 2 Default factory settings of the IM 154-6 PN HF IWLAN properties

Properties		Value
Web Based Management	Passwords	admin, user
	Country Code	Germany
	Enable Interface	Not activated
	Wireless mode	2.4 GHz 54 Mbps (802.11g)
	Security level	None (Open System)
	Background channel select	Selected
	Transmit power	1/2 (-3 dB); max. 14 dBm
	Antenna mode	ANT 154-6 IWLAN (standard antenna)
	Security level for iPCF	None (No Encryption)
	Default Key	Key 1
	Length	Auto
	Key table	cleared
Content of the diagnostics buffer		cleared
IP address		none

Prerequisite for restoring to factory defaults in STEP 7

"Restore to factory defaults" is only possible while the IM 154-6 PN HF IWLAN interface module is not exchanging data.

The IM 154-6 PN HF IWLAN Interface module is interconnected with a programming device/PC with the Engineering-Tool STEP 7 .

Procedure in STEP 7

Proceed as follows to reset the IM 154-6 PN HF IWLAN interface module to factory defaults using STEP 7 (STEP 7 V5.4 SP4 or higher):

1. Start STEP 7 and open the relevant project.
2. Change to HW Config and select the "IM 154-6 PN HF IWLAN" icon.
3. Click "Reset" in the "Restore to factory defaults" dialog of HW Config, **PLC > Ethernet > Edit Ethernet node** menu.

Prerequisite for restoring to factory defaults in WBM

"Restore to factory defaults" is only possible while the IM 154-6 PN HF IWLAN interface module is not exchanging data.

You have access to Web Based Management of IM 154-6 PN HF IWLAN in a Web browser and are logged on to its Web sever.

Procedure in Web Based Management

Proceed as follows to restore the IM 154-6 PN HF IWLAN interface module to factory defaults using its Web Server:

Select the **System** menu and click "Restore Factory Defaults and Restart".

Procedure in the Primary Setup Tool (PST)

You can run a "restore to factory defaults" on IM 154-6 PN HF IWLAN by selecting the **Module > Restore** menu in the PST.

Result

The IM 154-6 PN HF IWLAN interface module is now restored to the factory defaults as shown in the table above. The wireless interface is disabled.

Note

Reset der Micro Memory Card

All data, with the exception of the device name is deleted from the Micro Memory Card in your I/O device when you restore the IM 154-6 PN HF IWLAN interface module to factory defaults.

Data in non-volatile memory

The following data is not deleted during the reset:

- The device name which is stored on the Micro Memory Card.
- The MAC address
- I&M data

The following data is deleted during the reset:

- Client certificate
- Server certificate
- IP address
- SNMP data
- Configuration data

7.4 Repairs/Services

Repair and service requirements

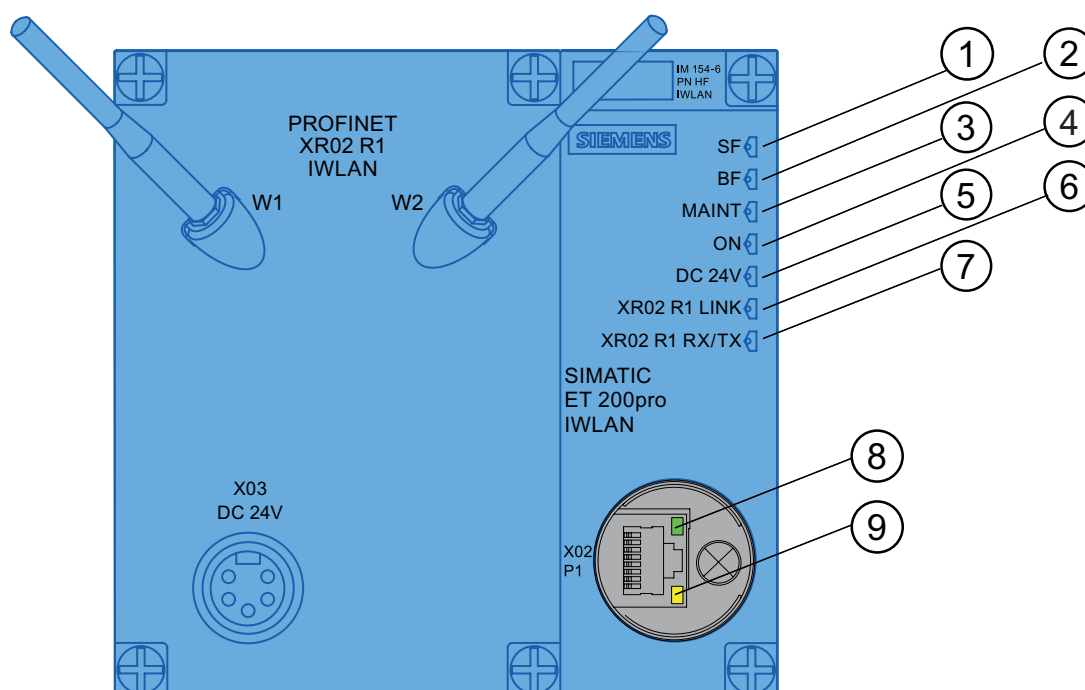
Always return the entire module, including the interface and connection units, for repairs to our service personnel. Your regional contact partner can be found at Regional contact partner for spare parts and repairs (<http://support.automation.siemens.com/WW/view/en/16610214>) on our Service & Support pages.

Interrupt, error and system alarms

8.1 LED display on IM 154-6 PN HF IWLAN

LED display

The figure below shows the position and arrangement of the LED display on the IM 154-6 PN HF IWLAN (6ES7154-6AB00-0AB0) interface module:



- ① SF: Group error (red LED)
- ② BF: Bus monitoring (red LED)
- ③ MAINT: Maintenance information (yellow LED)
- ④ ON: Electronic / sensor supply 1L+ (green LED)
- ⑤ DC 24V: Load voltage supply 2L+ (green LED)
- ⑥ XR02 R1 LINK: Connection to an Access Point (green LED)
- ⑦ XR02 R1 RX/TX: Data exchange (yellow LED)
- ⑧ RJ45 LINK: Connection to a programming device/PC
- ⑨ RJ45 RX/TX: Data exchange

Figure 8-1 LED displays on the IM 154-6 PN HF IWLAN interface module

Status and error displays SF, BF, ON

Table 8- 1 Status and error displays of the IM 154-6 PN HF IWLAN interface module

LEDs			Meaning	Remedy
SF	BF	ON		
Off	Off	On	The I/O device is busy exchanging data with the I/O controller. No errors. The interface unit is supplied with power (electronic/encoder supply).	---
Off	Off	Off	Electronic/encoder supply missing or too low at the interface unit.	Switch on the electronic/encoder supply to the I/O Device.
			Hardware failure.	Replace the I/O device.
*	Flashing	On	<p>The interface unit has the following errors:</p> <ul style="list-style-type: none"> • Incorrect or no connect data telegram received. • Received faulty parameter data records • No data exchange between the I/O controller and the interface unit (I/O device). <p>Causes:</p> <ul style="list-style-type: none"> • Incorrect device name • Configuration error • Parameterization error • 	<ul style="list-style-type: none"> • Check the interface unit. • Check the configuration and parameterization. • Check the device name.
*	On	On	<p>No I/O controller on the bus</p> <p>Causes:</p> <ul style="list-style-type: none"> • No bus communication <p>Inconsistency of parameters between the Access Point and interface unit</p>	<ul style="list-style-type: none"> • Connect to the I/O controller. • Assign a valid device name to the interface unit. • Check the bus configuration. • Check the quality of the wireless connection. • Check the configuration and parameterization. • Check whether the bus cable from the AP to the I/O controller is interrupted. <p>Compare the IWLAN and security parameters of the Access Point and interface unit.</p>
On	*	On	The offline configuration of ET 200pro does not correspond with the online configuration of ET 200pro.	Check the ET 200pro configuration to see whether a module missing or defective, or whether a non-configured module is inserted. Check the configuration (e.g. in STEP 7) and correct any parameterization errors.
			An I/O module has generated an error, or the interface unit has failed.	Replace the interface unit, or get in touch with your Siemens contact partner.
			A diagnostics message is available	Evaluate the diagnostics data.
On	On	On	FW update busy	

LEDs			Meaning	Remedy
SF	BF	ON		
Off	Flashes at 0.5 Hz	On	FW update completed	
On	Flashes at 0.5 Hz	On	External error during FW update (e.g. incorrect FW)	Use the correct FW update file.
On	Flashes at 2 Hz	On	Internal error during FW update (e.g. write/read fault)	Repeat the FW update.
On	Off	On	No Micro Memory Card in the I/O device	Insert a Micro Memory Card into the I/O device
*) irrelevant				

Status and error displays XR02 R1 LINK, XR02 R1 RX/TX

Table 8- 2 Status and error displays of the IM 154-6 PN HF IWLAN interface module

LEDs		Meaning
XR02 R1 LINK	XR02 R1 RX/TX	
Off	Off	The wireless interface of the I/O device is disabled (e.g. restored to factory defaults)
Flashes at 0.5 Hz	Flashes at 0.5 Hz	I/O device is scanning for an Access Point
On	Off	The I/O device is online to the Access Point
On	Sporadic flashing or flickering	Data traffic between the Access Point and I/O device

Node flash test

Table 8- 3 Node flash test of the IM 154-6 PN HF IWLAN interface module

LEDs				Meaning
RJ45		XR 02 R1		
LINK	RX/TX	LINK	RX/TX	
Flashes at 0.5 Hz	Off	Flashes at 0.5 Hz	Off	Node flash test

Maintenance information MAINT

The MAINT LED is lit yellow if maintenance information from PROFINET is available. Maintenance information might indicate maintenance demands or maintenance requests. An alarm message is generated in addition to the LED display.

Status display DC24V

The DC24V LED is lit in green color to indicate that you have connected the 2L+ load voltage supply. If the LED is not lit, check whether power is switched on, or whether the fuse is okay.

8.2 Diagnostics with STEP 7

Options for reading diagnostics data

Table 8- 4 Reading diagnostics data in STEP 7

Automation system with I/O controller	Block or register in STEP 7	Application	See also ...
SIMATIC S7	In HW Config by selecting "Station > Open online"	Device diagnostics in plain text on the STEP 7 interface (in the Quick View, Diagnostics View, or Module Status windows)	"Hardware diagnostics" in the STEP 7 Online Help
	SFB 52 "RDREC"	Reading data records from the I/O device	For information about SFB 52, refer to the STEP 7 Online Help (System Functions/ System Function Blocks).
	SFB 53 "WRREC"	Writing data records to the I/O device	For information about SFB 52, refer to the STEP 7 Online Help (System Functions/ System Function Blocks).
	SFB 54 "RALRM"	Receiving interrupts from the I/O device	For information about SFB 54, refer to the STEP 7 Online Help (System Functions/ System Function Blocks).

See also

ET 200pro Distributed I/O System Operating Instructions
<http://support.automation.siemens.com/WW/view/en/21210852>

Diagnostics data records in PROFINET IO
<http://support.automation.siemens.com/WW/view/en/19289930>

Technical data

9.1 Technical data of ET 200pro

Other technical data

The IM 154-6 PN HF IWLAN interface module complies with all conditions and properties of the ET 200pro distributed I/O system in terms of:

- Electromagnetic compatibility
- Transport and storage conditions
- Mechanical and climatic environmental conditions
- Specifications with regard to dielectric tests, protection class, degree of protection, and rated voltage

Information about the ET 200pro distributed I/O system

For more information about the technical data, refer to the ET 200pro distributed I/O system manual.

9.2 Interface module IM 154-6 PN HF IWLAN

9.2.1 Technical data of IM 154-6 PN HF IWLAN

Order number

6ES7154-6AB00-0AB0

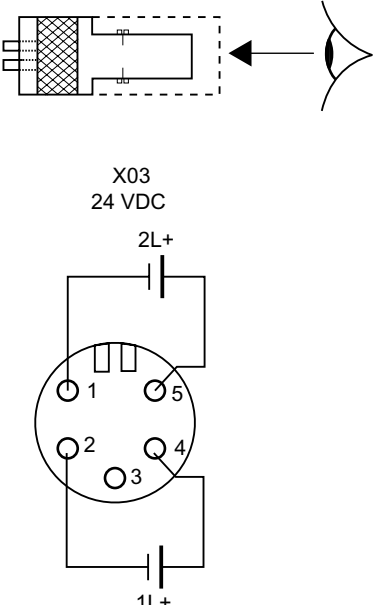
Properties

The IM 154-6 PN HF IWLAN interface module has the following properties:

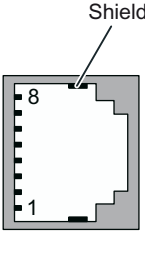
- The module is shipped with the interface unit mounted on the bus module.
- It interconnects ET 200pro with PROFINET IO via Access Point (e.g. SIMATIC NET - SCALANCE W788-1RR).
- It prepares the data for the connected electronic modules.
- It supplies the 1L+ encoder/electronic supply and the 2L+ load voltage supply to an ET 200pro station via the interface unit.
- The IM 154-6 PN HF IWLAN interface module can only be operated with inserted SIMATIC Micro Memory Card.

- Transfer of the device name and backup to a SIMATIC Micro Memory Card.
- Firmware update via SIMATIC Micro Memory Card
- The IM 154-6 PN HF IWLAN interface module provides a maximum I/O address space of 256 bytes or each input and output.
- Support of fail-safe modules
- Supported wireless LAN services:
 - Distributed Coordination Function (DCF)
 - Enhanced Distributed Channel Access (EDCA)
 - industrial Point Coordination Function (iPCF)
 - Transmit Power Control (TPC)
 - Dynamic Frequency Selection (DFS)
- Supported wireless LAN standards:
 - IEEE 802.11 a/h/b/g
 - IEEE 802.11 e/i
- Supported Ethernet services:
 - PROFINET IO
 - Network diagnostics (SNMP)
 - ping
 - arp
- Interrupts:
 - Diagnostic interrupts
 - Hardware interrupts
 - Removal/insertion interrupts
 - Maintenance interrupts
- The RJ45 jack features two integrated, separate status LEDs:
 - LINK - green LED
 - RX/TX - yellow LED
- You can operate up to 16 electronic modules on the IM 154-6 PN HF IWLAN interface module.

Pin assignment of the 7/8" connector

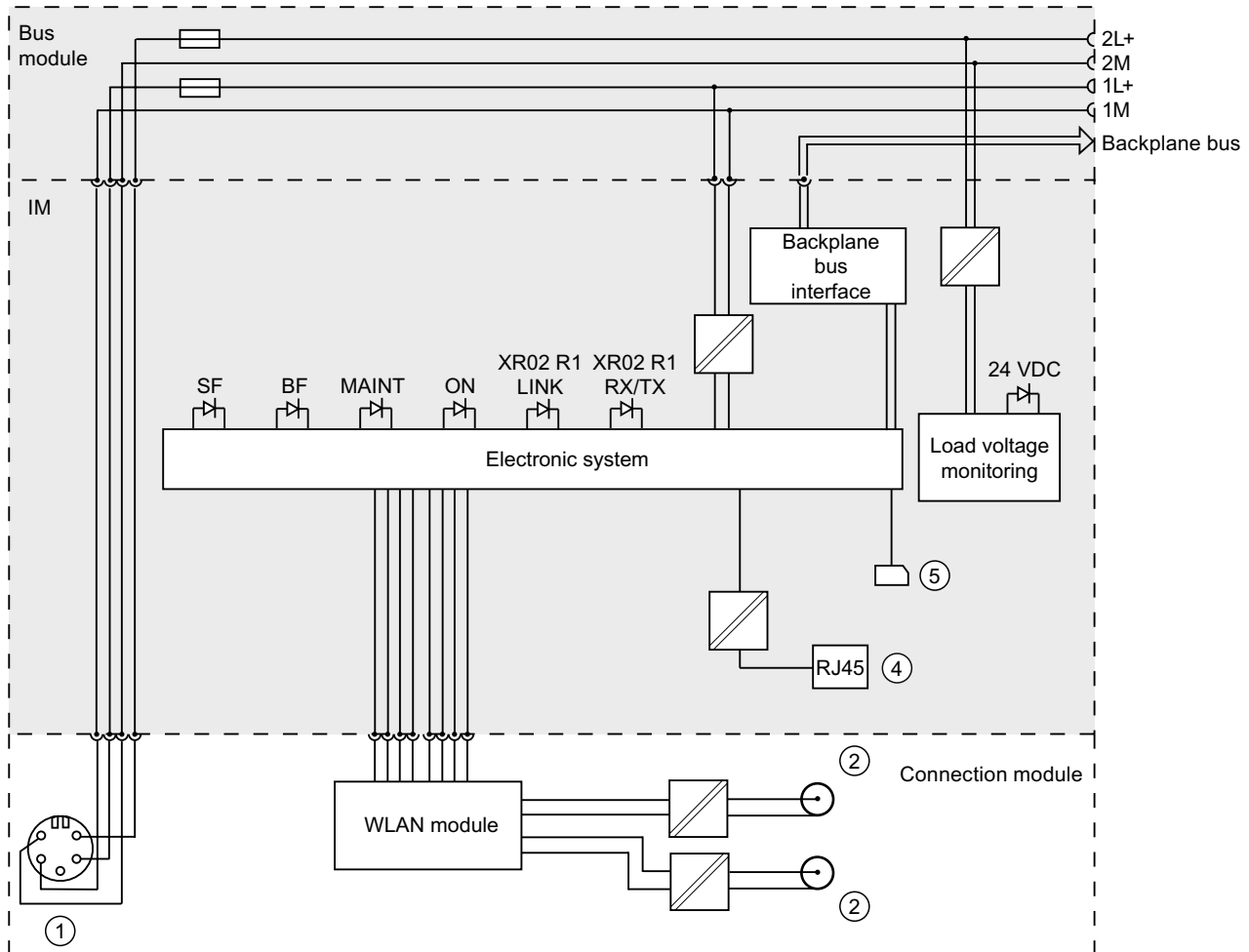
7/8" connectors (1L+ and 2L+ supply voltages)	Terminal	Assignment
	X03 DC 24V for feeding	
	1	Ground for load voltage supply 2M
	2	Ground for electronic/encoder supply 1M
	3	Functional ground
	4	1L+ electronic/encoder supply
5	2L+ load voltage supply	

Pin assignment of the RJ45 connector

View of the RJ45 jack	Terminal	Assignment
	1	TD (Transmit Data +)
	2	TD_N (Transmit Data -)
	3	RD (Receive Data +)
	4	Ground
	5	Ground
	6	RD_N (Receive Data -)
	7	Ground
	8	Ground

Block diagram

The following figure below shows the block diagram of the IM 154-6 PN HF IWLAN interface module with connection unit.



- ① Connection for the electronic / encoder / load voltage supplies (feed)
- ② Antenna connection
- ④ Connection for the programming device
- ⑤ SIMATIC Micro Memory Card

Figure 9-1 Block diagram of the IM 154-6 PN HF IWLAN interface module

Technical specifications

Technical specifications	
Dimensions and weight	
Dimensions W x H x D (mm)	135 x 130 x 60
Weight	Approx. 1085 g
Ambient temperature during operation	0 to 55°C
Module-specific data	
Gross data rate	Up to 54 Mbps
Transmission mode	Direct Sequence Spread Spectrum (DSSS) to IEEE 802.11 Complementary Code Keying (CCK) to IEEE 802.11 b Orthogonal Frequency Division Multiplexing (OFDM) to IEEE 802.11 a/g
Bus protocol	PROFINET IO
Supported communication protocols	Industrial Wireless LAN PROFINET IO (Device) TCP/IP Protocol Suite: <ul style="list-style-type: none"> • Network diagnostics (SNMP) • ping • arp
Manufacturer ID (vendor ID)	002A _H
Device ID (DeviceID)	0305 _H
Voltages and currents	
Rated electronic supply voltage (1L+)	24 VDC
• Reverse polarity protection	Yes
• Short-circuit protection	Yes; with replaceable fuses
• Feed current 1L+	Max. 5 A per ET 200pro
Rated load voltage 2L+	24 VDC (integrated power module)
• Reverse polarity protection	Yes; against destruction
• Short-circuit protection	Yes, for the potential group
• Feed current 2L+	Max. 8 A per ET 200pro
Current consumption	
From rated supply voltage (1L+)	335 mA, typical
Power dissipation of the module	8.5 W, typical
Insulation	
Insulation test voltage	500 VDC
Electrical isolation	
• Between the backplane bus and supply voltages (1L+, 2L+)	Yes
• Between Ethernet and the supply voltages (1L+, 2L+)	Yes

Technical specifications	
• Between the electronic circuit and supply voltages (1L+, 2L+)	Yes
Permissible potential difference	75 VDC / 60 VAC
Status, interrupts, diagnostics	
Interrupts	Yes
Diagnostic function	Yes
• Group error	Red LED "SF"
• Bus monitoring PROFINET IO	Red "BF" LED
• Maintenance information	Yellow "MAINT" LED
• Monitoring of the 1L+ electronic/encoder supply	Green "ON" LED
• Monitoring of the load voltage supply 2L+	Green "DC 24V" LED (integrated power module)
• Active connection to the AP	Green LED "XR02 LINK"
• Send/receive:	Yellow "XR02 RX/TX" LED
• Active connection to Industrial Ethernet	Green "LINK" LED (RJ45 jack)
• Send/receive:	Yellow "RX/TX" LED (RJ45 jack)

Compatibility with the controller

Note

Firmware version of the controller used

To enable data exchange between the IM 154-6 PN HF IWLAN interface module and a controller, the controller must be operated with one of the firmware versions listed in the following table.

The most recent firmware versions are available from your Siemens contact partner or for download from the Internet

(<http://support.automation.siemens.com/WW/llisapi.dll?aktprim=99&lang=en&referer=%2fWW%2f&func=cslib.csinfo2&siteid=csius&extranet=standard&viewreg=WW>).

The following firmware versions are required to operate failsafe I/O modules on the IM 154-6 PN HF IWLAN interface module:

	CPU	CP		SOFTNET PNIO
Controller	315-2 PN/DP 317-2 PN/DP	443-1	343-1 6GK7343-1EX21.. 6GK7343-1GX21..	SIMATIC NET-CD
Firmware version	≥ V2.3.2	≥ V2.2	≥ V1.1 ≥ V1.0	V 6.3 Hotfix 1

	CPU
Controller	ET 200pro Interface module IM 154-8 CPU
Firmware version	V2.5.0
Controller	ET 200S Interface module IM 151-7 CPU
Firmware version	V2.6

The following firmware versions are required to operate failsafe I/O modules on the IM 154-6 PN HF IWLAN interface module:

	CPU		CP
Controller	315F-2 PN/DP 317F-2 PN/DP 319-2 PN/DP	416-F3 PN/DP	443-1
Firmware version	≥ V2.3.3	≥ V4.1	≥ V2.3

9.2.2 Overview of the parameters for IM 154-6 PN HF IWLAN

Parameters for the IM 154-6 PN HF IWLAN interface module

You can find the representation and description of the parameters in the STEP 7 Online Help.

Parameters for the integrated power module

Parameters	Range of values	Effective range
Load voltage diagnostics	<ul style="list-style-type: none"> • Locking • Enabling 	ET 200pro

Parameter description - Load voltage diagnostics

If this parameter is enabled, a diagnostics report is generated if the 2L+ load voltage supply is missing.

9.3 Technical data of the ANT IM 154-6 IWLAN antenna

Dimensions of the standard antenna

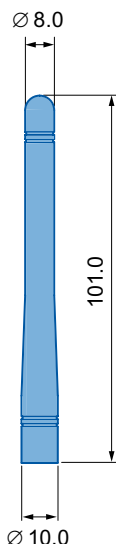


Figure 9-2 Antenna ANT IM 154-6 IWLAN

Mechanical properties

Table 9- 1 Mechanical properties of ANT IM 154-6 IWLAN

Property	Data
Mounting position	30° to the housing front
Connection	R-SMA male connection to ET 200pro with interface module IM 154-6 PN HF IWLAN
Height	101 mm
Exterior material	Polycarbonate
Ambient temperature	0 °C ... + 55 °C
Weight	9.5 g
Degree of protection	IP67
Diameter	Antenna tip: 8 mm Antenna base: 10 mm

Electrical properties

Table 9- 2 Electrical properties of ANT IM 154-6 IWLAN

Property	Data
Frequency band	2.4 to 2.4835 GHz 5.15 to 5.35 GHz 5.47 to 5.85 GHz
Characteristic	Omnidirectional
Radiation angle	360° horizontal 20° vertical
Polarization	Vertical
Impedance	50 ohm
Voltage standing wave ratio	≤ 2,0
Gain at 2.45 GHz and 5.25 GHz	2 dBi

Standards and approvals

10.1 Standards and approvals

Introduction

The standards and approvals chapter contains the standards and test values to which the ET 200pro distributed I/O system with the IM 154-6 PN HF IWLAN interface module conforms, or describes the criteria which formed the basis for testing the ET 200pro distributed I/O system with the IM 154-6 PN HF IWLAN interface module.

CE approval

The ET 200pro distributed I/O system with the IM 154-6 PN HF IWLAN interface module meets the requirements and protection objectives of the following EC directives and complies with the harmonized European Standards (EN) for programmable logic controllers published in the Official Gazettes of the European Community:

- 2006/95/EG "Electrical equipment for use within specific voltage limits" (Low-Voltage Directive)
- 2004/108/EG "Electromagnetic Compatibility" (EMC Directive)
- EN 300 328 (V1.7.1; 10/2006) Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband transmission systems; Data transmission equipment operating in the 2.4 GHz ISM band and using wide band modulation techniques;
- EN 301 893 (V1.4.1; 10/2007) Broadband Radio Access Networks (BRAN); 5 GHz high performance RLAN;
- EN 301 489-1 (V1.6.1; 09/2005) Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements
- EN 301 489-17 (V1.2.1; 08/2002) Electromagnetic Compatibility and Radio Spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment; Part 17: Specific conditions for 2,4 GHz wideband transmission systems, 5 GHz high performance RLAN equipment and 5.8 GHz Broadband Data Transmitting Systems
- EN 60950-1:2006 Electrical safety
- EN 50385:2002 Safety of persons in electromagnetic fields

The EC Declarations of Conformity are available to the relevant authorities at the following address:

Siemens Aktiengesellschaft
Sector Industry Division Industry Automation
I IA AS RD ST Type Test
PO Box 1963
D-92209 Amberg

Approval

Underwriters Laboratories Inc. according to

- UL 508 (Industrial Control Equipment)
- CSA C22.2 No. 142 (Process Control Equipment)

IEC 61131

The ET 200pro distributed I/O system with the IM 154-6 PN HF IWLAN interface module meets requirements and criteria according to IEC 61131-2 (Programmable Logic Controllers, Part 2: Equipment Requirements and Tests).

10.2 National approvals (radio approvals)

National approvals

The current status of the national approvals for IM 154-6 PN HF IWLAN is available on the Internet
(http://www.automation.siemens.com/net/html_00/ftp/support/lz_laenderliste_wlan_en.pdf).

A

Appendix

A.1 Order Numbers

A.1.1 Order numbers of the modules

Interface modules

Table A- 1 Interface module order numbers

Designation	Order number
Interface module IM 154-6 PN High Feature IWLAN with termination module, 1 unit	6ES7154-6AB00-0AB0

Digital electronic modules

Table A- 2 Order numbers of the digital electronic modules

Designation	Order number
8 DI DC 24V, 1 unit	6ES7141-4BF00-0AA0
4 DO DC 24V/2.0A, 1 unit	6ES7142-4BD00-0AA0
8 DI DC 24V High Feature, 1 unit	6ES7141-4BF00-0AB0
4 DO DC 24V/2.0A High Feature, 1 unit	6ES7142-4BD00-0AB0
8 DO DC 24V/0.5A, 1 unit	6ES7142-4BF00-0AA0

Analog electronic modules

Table A- 3 Order numbers of the analog electronic modules

Designation	Order number
4 AI U High Feature, 1 unit	6ES7144-4FF00-0AB0
4 AI I High Feature, 1 unit	6ES7144-4GF00-0AB0
4 AO U High Feature, 1 unit	6ES7145-4FF00-0AB0
4 AO I High Feature, 1 unit	6ES7145-4GF00-0AB0
4 AI RTD High Feature, 1 unit	6ES7144-4JF00-0AB0

Power module/outgoing modules

Table A- 4 Order number of the power module/of the outgoing modules

Designation	Order number
PM-E DC 24V, 1 unit	6ES7148-4CA00-0AA0
PM-O DC 2x24V, 1 unit	6ES7148-4CA60-0AA0

Pneumatic interface modules

Table A- 5 Order numbers of the pneumatic interface modules

Designation	Order number
16 DO DC24V CPV10, 1 unit	6ES7148-4EA00-0AA0
16 DO DC24V CPV14, 1 unit	6ES7148-4EB00-0AA0

A.1.2 Order numbers for accessories

ET 200pro accessories

Table A- 6 Order numbers for ET 200pro accessories

Designation	Order number
Rack, narrow type, length 500 mm (ready for installation), 1 unit	6ES7194-4GA00-0AA0
Rack, narrow type, length 1000 mm (ready for installation), 1 unit	6ES7194-4GA60-0AA0
Rack, narrow type, length 2000 mm, 1 unit	6ES7194-4GA20-0AA0
Rack, wide type, length 500 mm (ready for installation), 1 unit	6ES7194-4GB00-0AA0
Rack, wide type, length 1000 mm (ready for installation), 1 unit	6ES7194-4GB60-0AA0
Rack, wide type, length 2000 mm, 1 unit	6ES7194-4GB20-0AA0
Rack, compact-narrow type, length 500 mm (ready for installation), 1 unit	6ES7194-4GC70-0AA0
Rack, compact-narrow type, length 1000 mm (ready for installation), 1 unit	6ES7194-4GC60-0AA0
Rack, compact-narrow type, length 2000 mm, 1 unit	6ES7194-4GC20-0AA0
Rack, compact-wide type, length 500 mm (ready for installation), 1 unit	6ES7194-4GD00-0AA0
Rack, compact-wide type, length 1000 mm (ready for installation), 1 unit	6ES7194-4GD10-0AA0
Rack, compact-wide type, length 2000 mm, 1 unit	6ES7194-4GD20-0AA0
Labels 20 x 7 mm, pale turquoise, 340 items per pack	3RT1 900-1SB20
12.5 A fast-blow replacement fuse, 10 items per package, 1 unit	6ES7194-4HB00-0AA0

Accessories for the IM 154-6 PN HF IWLAN interface module and for the connection unit

Table A- 7 Order numbers for the accessories of the IM 154-6 PN HF IWLAN interface module

Designation	Order number	
7/8" power cord, suitable for cable carriers, 5 x 1.5 mm ² , <ul style="list-style-type: none"> Patch cable with 7/8" connectors 180 at both ends, fixed lengths, 1 unit: 	1.5 m	6XV1822-5BH15
	2.0 m	6XV1822-5BH20
	3.0 m	6XV1822-5BH30
	5.0 m	6XV1822-5BH50
	10.0 m	6XV1822-5BN10
	15.0 m	6XV1822-5BN15
7/8" power cord, suitable for cable carriers, 5 x 1.5 mm ² , <ul style="list-style-type: none"> Patch cable with 7/8" angled connectors at both ends, fixed lengths, 1 unit 	1.5 m	(on request)
	2.0 m	(on request)
	3.0 m	(on request)
	5.0 m	(on request)
	10.0 m	(on request)
	15.0 m	(on request)
Caps for RJ45 jacks, 5 units per pack, 1 unit		6ES7194-4JD50-0AA0
SIMATIC Micro Memory Card 64K		6ES7953-8LF20-0AA0
SIMATIC Micro Memory Card 128K		6ES7953-8LG11-0AA0
SIMATIC Micro Memory Card 512 KB		6ES7953-8LJ20-0AA0
SIMATIC Micro Memory Card 2 MB		6ES7953-8LL20-0AA0
SIMATIC Micro Memory Card 4 MB		6ES7953-8LM20-0AA0
Antennas		
Standard antenna: ANT IM 154-6 IWLAN (2 dBi omnidirectional antenna, 2.4 GHz and 5 GHz), 2 units		6ES7194-4MA00-0AA0
ANT792-6MN (6 dBi omnidirectional antenna, 2.4 GHz), 1 unit		6GK5792-6MN00-0AA6
ANT792-4DN (4 dBi RCoax antenna, 2.4 GHz), 1 unit		6GK5792-4DN00-0AA6
ANT793-6MN (5 dBi omnidirectional antenna, 5 GHz), 1 unit		6GK5793-6MN00-0AA6
ANT793-4MN (6 dBi RCoax antenna, 5 GHz), 1 unit		6GK5793-4MN00-0AA6
Antenna cables		
IWLAN RCoax N-Connect/R-SMA Male/Male Flexible Connection Cable, Preassembled (1 m), 1 unit		6XV1875-5CH10
IWLAN RCoax N-Connect/R-SMA Male/Male Flexible Connection Cable, Preassembled (2 m), 1 unit		6XV1875-5CH20
IWLAN RCoax N-Connect/R-SMA Male/Male Flexible Connection Cable, Preassembled (5 m), 1 unit		6XV1875-5CH50
IWLAN RCoax N-Connect/R-SMA Male/Male Flexible Connection Cable, Preassembled (10 m), 1 unit		6XV1875-5CN10
Terminating resistor		
Terminating resistor TI795-1R		6GK5795-1TR10-0AA6
Lightning protection		
Lighting protection element LP798-1N, 1 unit		6GK5798-2LP00-2AA6

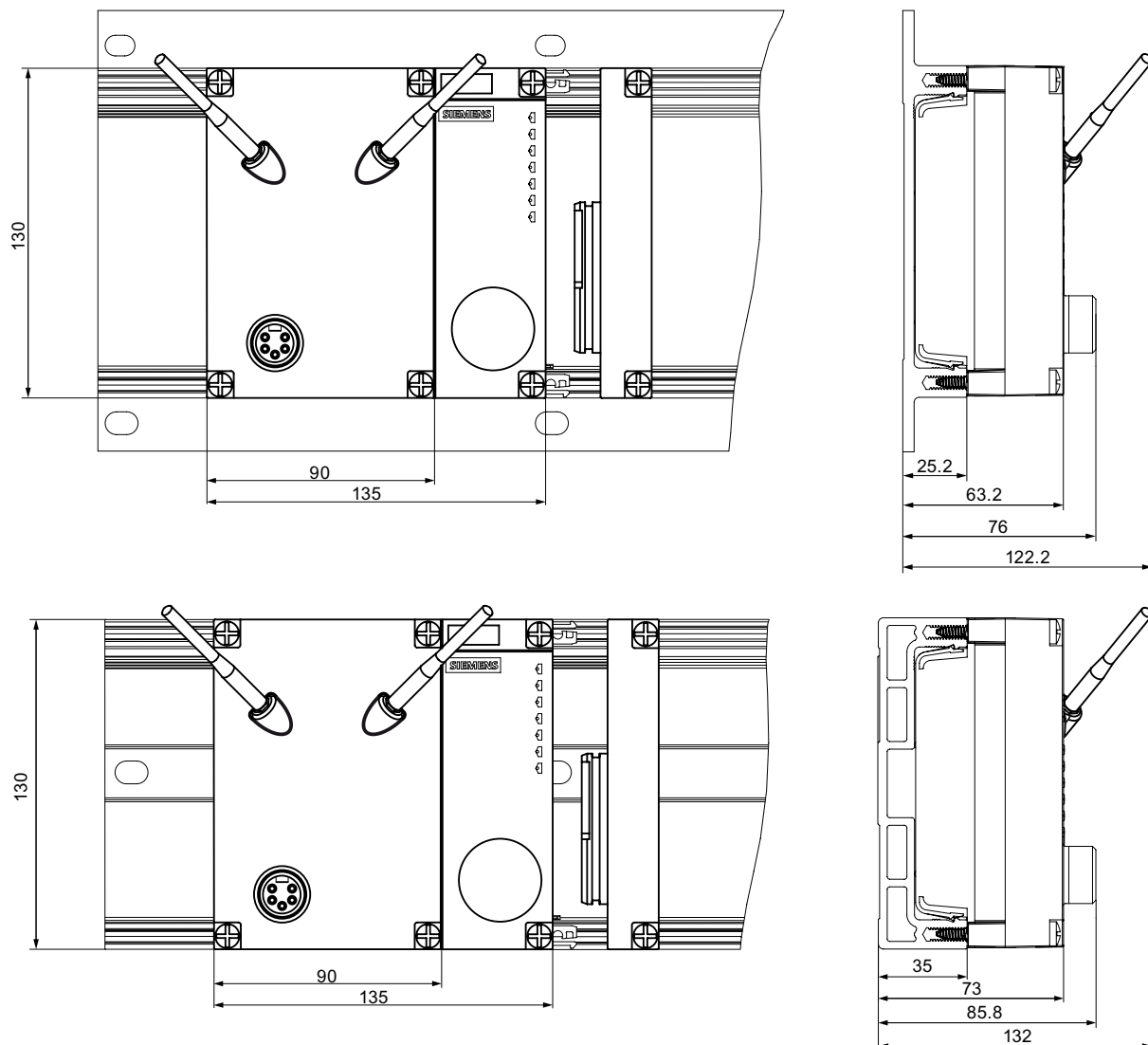
Designation	Order number
Twisted-pair 4x2 connecting cables, with RJ45 connectors	
0.5 m	6XV1870-3QE50
1.0 m	6XV1870-3QH10
2.0 m	6XV1870-3QH20
6.0 m	6XV1870-3QH60
10.0 m	6XV1870-3QN10
Twisted-pair 4x2 cross-link cables, with RJ45 connectors	
0.5 m	6XV1870-3RE50
1.0 m	6XV1870-3RH10
2.0 m	6XV1870-3RH20
6.0 m	6XV1870-3RH60
10.0 m	6XV1870-3RN10

A.2 Dimension drawings

A.2.1 Interface module IM 154-6 PN HF IWLAN

Interface module IM 154-6 PN HF IWLAN and connection module

Top: With narrow type rack. Bottom: With compact type rack.



A.2.2 ANT IM 154-6 IWLAN antenna

Standard antenna ANT IM 154-6 IWLAN

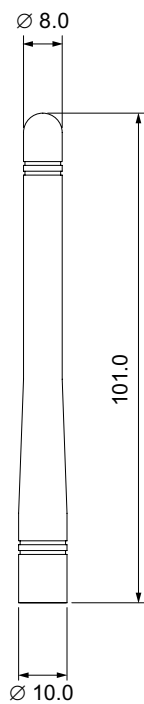


Figure A-1 Dimension drawing of antenna ANT IM 154-6 IWLAN

Glossary

Access Point (AP)

A **(Wireless) Access Point (WAP)** is an electronic device that interfaces a local wireless network with a cable-bound computer network. Terminal devices (clients) set up a wireless connection to the wireless access point via wireless adapter. The AP is connected with a cable to a permanently installed communication network.

Address Resolution Protocol

Address Resolution Protocol (ARP) is a Layer 3 network protocol that enables the linking of network addresses (IP address) with hardware addresses (MAC addresses). It is used primarily in the context of IP addressing on Ethernet networks.

Advanced Encryption Standard

Advanced Encryption Standard (AES) denotes encryption according to the Rijndael algorithm.

AES

Refer to Advanced Encryption Standard

AP

Refer to Access Point

ARP

Refer to Address Resolution Protocol

Bandwidth

Term used in communications to define the frequency range with reference to a specific data transmission system in which a transmission is actually possible.

Basic Service Set

A **Basic Service Set (BSS)** is formed by the combination of an Access Point with all of its available and associated clients.

Broadcast

A broadcast is similar to a group call. Broadcast data telegrams are used to address all nodes which are ready to receive broadcast data telegrams.

Broadcast address

A group calls, or broadcasts within a computer network denote messages which are transmitted in data telegrams from one node to all other nodes of a network. If a message is intended for all nodes in a network, a broadcast address is used as the destination address.

BSS

Refer to Basic Service Set

DFS

Refer to Dynamic Frequency Selection

DHCP

Refer to Dynamic Host Configuration Protocol

Distribution System

A **Distribution System (DS)** is a shared cable-bound network that is used to interconnect the distributed APs.

DS

Refer to Distribution System

Dynamic Frequency Selection

The term **Dynamic Frequency Selection (DFS)** denotes dynamic frequency selection. The Dynamic Frequency Selection function is an element of the 802.11h expansion that is activated for automatic channel switching if a different user or technical equipment is detected on a channel at runtime. This includes, for example, radar systems which also operate on the 5 GHz frequency band. Before a channel is used, it is checked to make sure that no other system is already using this channel or frequency band. The station must stop its data transfer on this channel and switch to a different channel if another user is detected.

Frequency changes are initiated by the Access Points. Clients switch to a different channel in accordance with their connected APs.

This measure is intended to avoid interference generated by WLAN systems which operate on the 5 GHz band according to 802.11h.

Dynamic Host Configuration Protocol

Dynamic Host Configuration Protocol (DHCP) is a technology for the dynamic assignment of IP addresses and additional configuration parameters to computers or devices on a network.

Electric suspension monorail

An Electric suspension monorail (ESM) is a rail-bound conveying system with separately driven vehicles. The vehicles move autonomously and independently on the rail system. The vehicles change to different tracks by means of switch points. Power is supplied to the vehicles by means of a contact line, whereas the control signals are transferred via the IWLAN (Industrial Wireless LAN).

ESM

Refer to Electric suspension monorail

ESS

Refer to Extended Service Set

Extended Service Set

The various Basic Service Sets (BSSs) can be expanded by means of Distribution System (DS) to form an **Extended Service Set (ESS)** which is capable of covering large areas.

Firewall

One or several devices that allow or prevent data access to interconnected networks according to given security restrictions.

HTTP

Refer to Hypertext Transfer Protocol

HTTPS

Refer to Hypertext Transfer Protocol Secure

Hypertext Transfer Protocol

The **HyperText Transfer Protocol (HTTP)** is used to transmit Web pages.

Hypertext Transfer Protocol Secure.

The **HyperText Transfer Protocol Secure (HTTPS)** is used to encrypt and authenticate communication between Web servers and Web browsers on the World Wide Web.

HTTPS is an expansion of HTTP for the secure transmission of confidential data with the help of SSL.

IEEE

Institute of **E**lectrical and **E**lectronics **E**ngineers

IEEE 802.11

Standard for local radio networks operating on the 2.4 GHz band with transmission rates up to 2 Mbps.

IEEE 802.11a

Standard for local radio networks operating on the 5 GHz band with transmission rates up to 54 Mbps.

IEEE 802.11b

Standard for local radio networks operating on the 2.4 GHz band with transmission rates up to 11 Mbps.

IEEE 802.11e

Enhancement of the WLAN standard that supports Quality of Service (QoS), implemented with WMM.

IEEE 802.11g

Standard for local radio networks operating on the 2.4 GHz band with transmission rates up to 54 Mbps.

IEEE 802.11h

The IEEE 802.11h standard specifies TPC and DFS.

IEEE 802.11i

The standard also describes the WPA2 mechanisms, the TKIP method and the use of the AES encryption algorithm. IEEE 802.11i introduces a security architecture which replaces those of WEP.

IEEE 802.1x

The core of this standard is the use of RADIUS for authentication. IEEE 802.1x also specifies encryption of the entire communication.

IM 154-6 PN HF IWLAN - Definition

The IM 154-6 PN HF IWLAN interface module consists of an interface element and a connection element with Wireless LAN interface. The interface and connection elements are only available as single unit and must be operated as such. The IM 154-6 PN HF IWLAN interface module expands the product range of interface modules of the ET 200pro Distributed I/O System with degree of protection IP 65, IP 66 and IP 67 with an additional interface variant.

Industrial Ethernet

Bus system to IEEE 802.3 (ISO 8802-2)

Industrial Point Coordination Function

The industrial **P**oint **C**oordination **F**unction (iPCF) communication protocol controls data traffic of a radio cell between the access point and connected clients. This functionality optimizes transmission times and throughput by avoiding collisions, even with a large number of nodes. It meets real-time data transmission requirements which are indispensable in the field of automation and production.

Industrial Quality of Service

The industrial **Q**uality of **S**ervice (iQoS) is a method that is used to guarantee the specific data rates and response times required by selected clients which are vital for operations. If the guaranteed data rate or response time are endangered due to the activities of other clients in the same radio cell, the AP cuts back communication of those clients in order to be able to maintain compliance with guaranteed values.

Industrial Wireless Local Area Network

Certain industrial applications require a deterministic response within a radio cell. To meet those requirements, WLAN was further developed and enhanced with methods such as iPCF and Rapid Roaming for Industrial **W**ireless **L**ocal **A**rea **N**etwork (IWLAN).

iPCF

Refer to Industrial Point Coordination Function

iQoS

Refer to Industrial Quality of Service

IWLAN

Refer to Industrial Wireless Local Area Network

Plant

Denotes all the electrical equipment of a system. A plant also includes, for example: PLCs, devices for operating and monitoring, bus systems, field devices, drives, supply lines.

Primary Setup Tool

The **P**rimary **S**etup **T**ool (PST) can be used (as an alternative to STEP 7) to assign IP addresses.

PROFINET IO

Within the framework of PROFINET, PROFINET IO represents a communication concept for implementation of modular, distributed applications.

PROFINET IO lets you create automation solutions using the known and familiar methods of PROFIBUS.

Implementation of PROFINET IO is effected on the one hand by means of the PROFINET standard for automation devices and on the other by means of the STEP 7 engineering tool. That is, you have the same application view in STEP 7, regardless of whether you configure PROFINET or PROFIBUS devices. Programming your user program is essentially the same for PROFINET IO and PROFIBUS DP if you use the extended blocks and system status lists for PROFINET IO.

PST

Refer to Primary Setup Tool

QoS

Refer to Quality of service

Quality of service

Quality of Service (QoS) denotes the quality of a communication service from the viewpoint of users. In general terms, QoS is a collection of quality requirements with regard to the common response or interaction of several objects.

RADIUS

Refer to Remote Authentication Dial In User Service

Rapid roaming

Rapid Roaming (RR) is based on the roaming method. It is optimized in terms of the time a client requires to switch to another radio cell. Nodes can switch between radio cells or channels without any interruption.

Remote Authentication Dial In User Service

The Remote Authentication Dial In User Service (RADIUS) is used to manage authentication via a server.

Roaming

Denotes the free transition of WLAN nodes even beyond the boundaries of the radio cell of an AP or channel switching. That is, nodes can switch between any available radio cells or channels.

Server

A server is a device or, generally speaking, an object that can provide specific services on client request.

Service Set Identifier

The term **Service Set Identifier** (SSID) denotes the identifier of a local wireless network that is based on IEEE 802.11.

Services

Services provided by a communication protocol or server.

Simple Network Management Protocol

Simple Network Management Protocol (SNMP) is a standardized protocol for the exchange of network management information.

SINEMA E

The planning, simulation and configuration software SINEMA E is used to plan and configure IWLAN applications. It can be used to visualize IWLAN networks, for example according to coverage, data rate, signal/noise ratio and overlapping taking into account environmental and device characteristics.

SSID

Refer to Service Set Identifier

Subnet mask

The subnet mask specifies which parts of an IP address are assigned to the network number. The bits in the IP address whose corresponding bits in the subnet mask have the value 1 are assigned to the network number.

TCP/IP

TCP = Transmission Connection Protocol; IP = Internet Protocol

Temporal Key Integrity Protocol

The **Temporary Key Integrity Protocol** (TKIP) is a method deployed for the cyclic exchange of keys on a WLAN.

TKIP

Refer to Temporal Key Integrity Protocol

TPC

Refer to Transmit Power Control

Transmit Power Control

The supplementary **Transmit Power Control** function (TPC) was introduced with the enhanced 802.11h standard for 5 GHz components to enable adaptation of the transmit power. Information pertaining to the attenuation values and expected margins for received power is taken into account. Attempts are now made via TPC to operate at minimum transmit power between the corresponding stations or between an AP and a station.

WAP

Refer to Access Point

WBM

Refer to Web Based Management

WDS

Refer to Wireless Distribution System

Web Based Management

Web Based Management (WBM) is a configuration method which is based on HTTP and on the use of an HTTP server in the corresponding device.

WEP

Refer to Wired Equivalence Privacy

Wi-Fi

Refer to Wi-Fi Alliance

Wi-Fi Alliance

The Wi-Fi Alliance is a manufacturer organization that is focused on expanding the market for WLAN products to IEEE 802.11 for office and home applications.

The alliance offers members the option of testing the interoperability of their devices and to produce proof thereof by means of Wi-Fi certificates.

Moreover, the aim is to close deficiencies in the IEEE standardization process with supplementary specifications in order to avoid incompatible manufacturer solutions. WPA and WMM represent examples which were published as manufacturer-independent Wi-Fi specifications in advance of the release of corresponding IEEE standards.

Wi-Fi Multimedia

The **Wi-Fi Multimedia (WMM)** specification is based on IEEE 802.11e and was developed by the Wi-Fi Alliance with the focus set on increased utilization of WLAN for multimedia applications. The standard supports the streaming of multimedia contents and optimizes the distribution of bandwidths to application programs running in parallel.

Wi-Fi Protected Access

Wi-Fi Protected Access (WPA) is a method specified by the Wi-Fi Alliance to amend the security holes of WEP. Authentication by means of a server is (802.1x) mandatory in this context. The dynamic exchange of keys in each data telegram introduces further security. Users can choose between TKIP (Temporal Key Integrity Protocol) and AES (Advanced Encryption Standard) encryption.

Wired Equivalence Privacy

Wired Equivalence Privacy is an optional component of the IEEE 802.11 standard. WEP specifies methods of authentication and encryption working with fixed keys stored on the device. All devices attempting access to a network in which WEP is used must first be provided the same keys. New keys can only be set manually.

Wireless Distribution System

The term **Wireless Distribution System (WDS)** denotes the line-of-sight radio links for coupling the Access Points for an Extended Service Set (ESS).

WMM

Refer to Wi-Fi Multimedia

WPA

Refer to Wi-Fi Protected Access

WPA-Pre-Shared Key

WPA-Pre-Shared Key (WPA-PSK) is the weakened version of WPA. With this method, authentication is based on a password instead of being handled by a server. This password must be configured manually on the client and server.

WPA-PSK

Refer to WPA-Pre-Shared Key

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SIMATIC

Product Information

05/2009

For the operating instructions manual "ET 200pro Interface module IM 154-6 PN HF IWLAN, Edition 02/2009, A5E01648493-02

This product information contains additional **reference notes to approvals according to FCC and RSS-210 of Industry Canada and is an extension of chapter 10.1 Standards and approvals**. The Product Information is part of the supplied product and the statements made therein are binding in case of doubt.

Approval according to FCC

This device complies with Part 15 of the FCC Rules

Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference, including interference that may cause undesired operation.

IEEE802.11b or g operation of this product in the USA is firmware-limited to channels 1 through 11.

Notice

Changes or modifications made to this equipment not expressly approved by SIEMENS may void the FCC authorization to operate this equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

Notice

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Professional Installation Notice:

To comply with FCC Part 15 rules in the United States, the system must be professionally installed to ensure compliance with the Part 15 certification. It is the responsibility of the operator and professional installer to ensure that only certified systems are deployed in the United States. The use of the system in any other combination (such as co-located antennas transmitting the same information) is expressly forbidden.

RSS-210 of Industry Canada

"Operation is subject to the following two conditions:

- (1) this device may not cause interference, and
- (2) this device must accept any interference, including interference that may cause undesired operation of the device."

"This device has been designed to operate with the antennas listed below, and having a maximum gain of 6 dBi. Antennas not included in this list or having a gain greater than 6 dBi are strictly prohibited for use with this device. The required antenna impedance is 50 ohms."

"To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that permitted for successful communication."

"That the device for the band 5150-5250 MHz is only for indoor usage to reduce potential for harmful interference to co-channel mobile satellite systems."

"Users should also be cautioned to take note that high power radars are allocated as primary users (meaning they have priority) of 5250-5350 MHz and 5650-5850 MHz and these radars could cause interference and/or damage to LE-LAN devices."