

## 5.2 SIMATIC RF610R

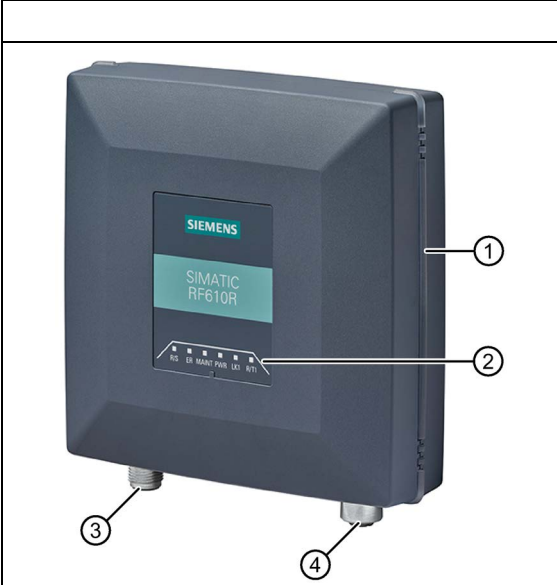
### 5.2.1 Description

#### 5.2.1.1 Overview

The SIMATIC RF610R is a stationary reader in the UHF frequency band with an integrated antenna.

The maximum transmit power is 400 mW, the radiant power of the internal antenna is 200 or 250 mW ERP / 400 mW EIRP. The interfaces (Ethernet, power supply) are located on the lower front edge. These interfaces can be used to connect the reader to the power supply and a PC for parameter assignment.

The degree of protection is IP67.

	Pos.	Description
	①	"PRESENCE" LED (PRE)
	②	LED operating display
	③	Interface to power supply (RS422), 24 V DC <sup>1)</sup> : X80 DC24V (M12, 8-pin)
	④	Ethernet interface, TCP/IP: X1 P1 (M12, 4-pin)

<sup>1</sup> ) Connection of the readers to the ASM 456 communications module via the RS-422 interface.

## 5.2.1.2 Ordering data

Table 5- 2 RF610R ordering data

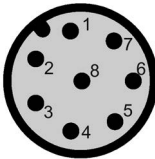
Product	Article number
RF610R (ETSI)	6GT2811-6BC10-0AA0
RF610R (FCC)	6GT2811-6BC10-1AA0
RF610R (CMIIT)	6GT2811-6BC10-2AA0

Table 5- 3 Ordering data accessories

Product	Article number
SIMATIC antenna holder for RF600 devices	6GT2890-2AB10
Connecting cable and connectors	
<ul style="list-style-type: none"> <li>Ethernet plug on the reader FastConnect M12 (IP65)</li> </ul>	6GK1901-0DB20-6AA0
<ul style="list-style-type: none"> <li>Ethernet plug Standard IE FastConnect RJ45 180 (IP20)</li> </ul>	6GK1901-1BB10-2AA0
<ul style="list-style-type: none"> <li>Industrial Ethernet cable M12 / M12</li> </ul>	5 m 6XV1870-8AH50
<ul style="list-style-type: none"> <li>Industrial Ethernet connecting cable M12-180 / RJ45</li> </ul>	2 m 6XV1871-5TH20
	3 m 6XV1871-5TH30
	5 m 6XV1871-5TH50
<ul style="list-style-type: none"> <li>Industrial Ethernet cable by the meter, green (minimum 20 m)</li> </ul>	6XV1840-2AH10
<ul style="list-style-type: none"> <li>Connecting cable reader ↔ CM M12-180 / M12-180</li> </ul>	2 m 6GT2891-4FH20
	5 m 6GT2891-4FH50
	10 m 6GT2891-4FN10
	20 m 6GT2891-4FN20
	50 m 6GT2891-4FN50
Wide-range power supply unit for SIMATIC RF systems	
<ul style="list-style-type: none"> <li>With EU plug</li> </ul>	6GT2898-0AC00
<ul style="list-style-type: none"> <li>With UK plug</li> </ul>	6GT2898-0AC10
<ul style="list-style-type: none"> <li>With US plug</li> </ul>	6GT2898-0AC20
24 V connecting cable reader ↔ wide-range power supply unit	
with plug, 5 m	6GT2891-0PH50
with open ends, 2 m	6GT2891-4EH20
with open ends, 5 m	6GT2891-4EH50
DVD "Ident Systems Software & Documentation"	6GT2080-2AA20

### 5.2.1.3 Pin assignment of the power supply interface (X80 24VDC)

Table 5- 4 Pin assignment of the RS422 interface (reader end)

View of interface (M12 socket, 8-pin)	Pin	Wire colors	Assignment
	1	White	+ 24 V
	2 <sup>1)</sup>	Brown	- Tx
	3	Green	0 V
	4 <sup>1)</sup>	Yellow	+ Tx
	5 <sup>1)</sup>	Gray	+ Rx
	6 <sup>1)</sup>	Pink	- Rx
	7	--	Unassigned
	8	--	Earth (shield)

<sup>1)</sup> These pins are not required if the reader is operated via Ethernet.

#### Note

##### Requirement for external power sources

The reader must only be supplied with power by power supply units that meet the requirements of LPS (Limited Power Source) and NEC Class 2.

##### Requirement for external power sources

The reader must only be supplied with power by power supply units that meet the requirements of limited power source (LPS) and NEC Class 2.

##### Spécification des sources de tension externes

L'alimentation du plot de lecture/écriture doit être exclusivement assurée par des blocs d'alimentation conformes aux spécifications des sources à puissance limitée (Limited Power Sources LPS) et de NEC class 2.

#### Notes on connectors and cables

The cables with open cable ends (6GT2891-4EH20, 6GT2891-4EH50) have an 8-pin M12 plug at one end, while the other end of the cable is "open". There are 8 color-coded single wires there for connecting to external devices.

The product range includes additional cables of the type 6GT2891-4Fxxx (2 to 50 m) with an M12 connector at both ends. These cables can be used as extension cables. Long cables can be shortened if necessary.

#### NOTICE

##### Insulate unused single wires

Unused single wires must be insulated individually to prevent unwanted connections of signal lines.

**NOTICE**

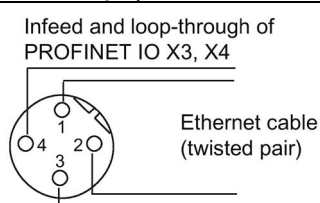
**For long cables: Adapt the power supply and transmission speed**

Note that even with long cables, the supply voltage of 24 VDC must always be guaranteed. Note also that the transmission speed on the serial interface must, if necessary, be reduced.

SIMATIC standard cables (e.g. 6GT2891-4FN10) have a loop resistance of 160 mOhm / meter. This results in a voltage drop of 0.8 volts on the 24 V cable for every 10 meters of connecting cable and with a power requirement of 500 mA. If the power requirement increases through the use of the digital inputs/outputs, the voltage drop increases accordingly.

**5.2.1.4 Pin assignment of the Industrial Ethernet interface (X1 P1)**

Table 5- 5 Pin assignment of the Industrial Ethernet interface (reader end)

View of interface (M12 socket, 4-pin)	Pin	Pin assignment
	1	Data line +Tx
	2	Data line +Rx
	3	Data line -Tx
	4	Data line -Rx

**5.2.1.5 Ground connection**

Due to the potential-free design of the reader, no earthing measures are required.

**5.2.2 Planning operation**

**5.2.2.1 Internal antenna**

**Minimum mounting clearances of two readers**

RF610R has an internal circular antenna. To prevent the antenna fields from overlapping, always observe the recommended minimum distances between two readers as described in the section "Reciprocal influence of read points (Page 47)".

## Dense Reader Mode (DRM)

The readers can also interfere with each other (secondary fields), if the channels (Reader TX, Transponder TX) overlap. In order to prevent a transponder channel overlapping with a reader channel, we recommend that the Dense Reader Mode (DRM) is used.

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### Note

#### Protective cap

If you only use the internal antenna of the reader, we recommend that you close the external, unused antenna connector on the reader using the protective cap.

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## Antenna diagram RF610R (ETSI)

The following radiation diagrams show the directional characteristics of the internal antenna of the RF610R (ETSI) reader. For the spatial presentation of the directional characteristics, the horizontal plane (azimuth section) as well as the vertical plane (elevation section) must be considered. This results in a spatial image of the directional radiation pattern of the antenna.

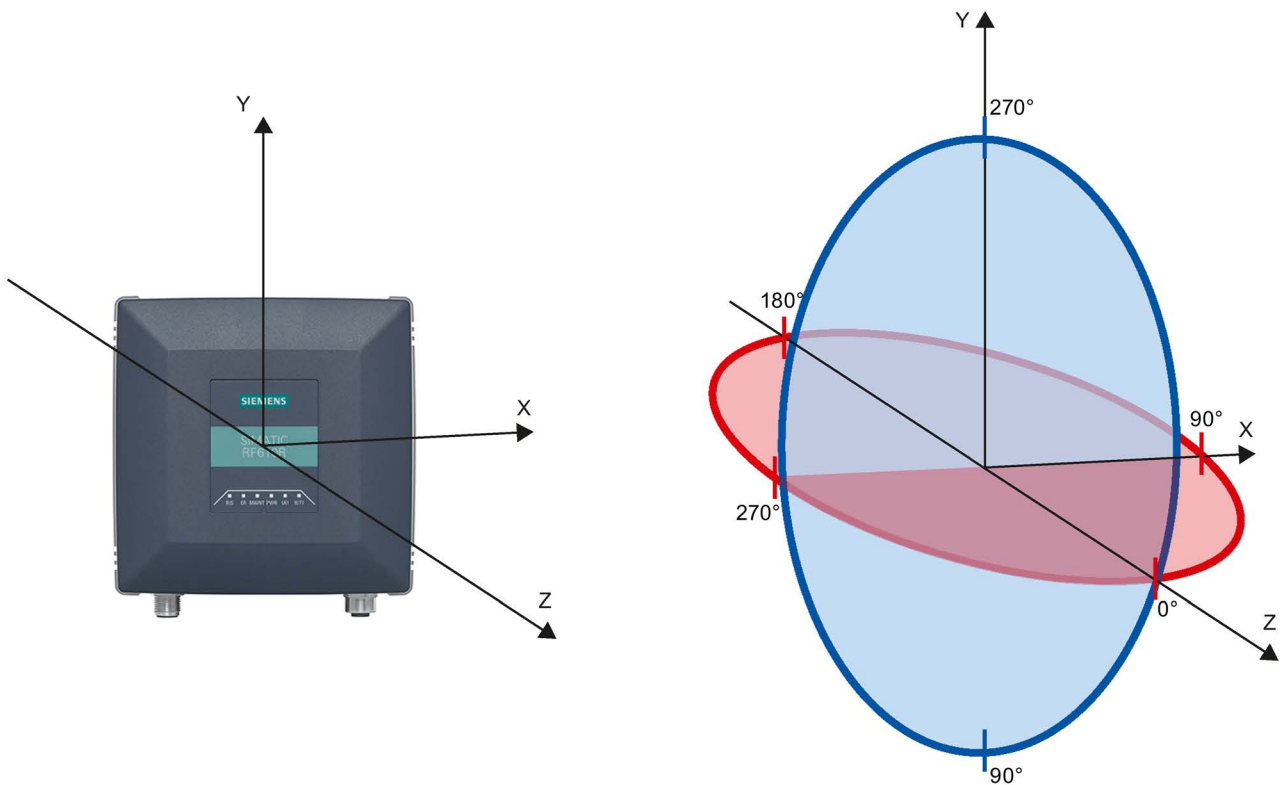


Figure 5-1 Reference system

Radiation diagram (ETSI)

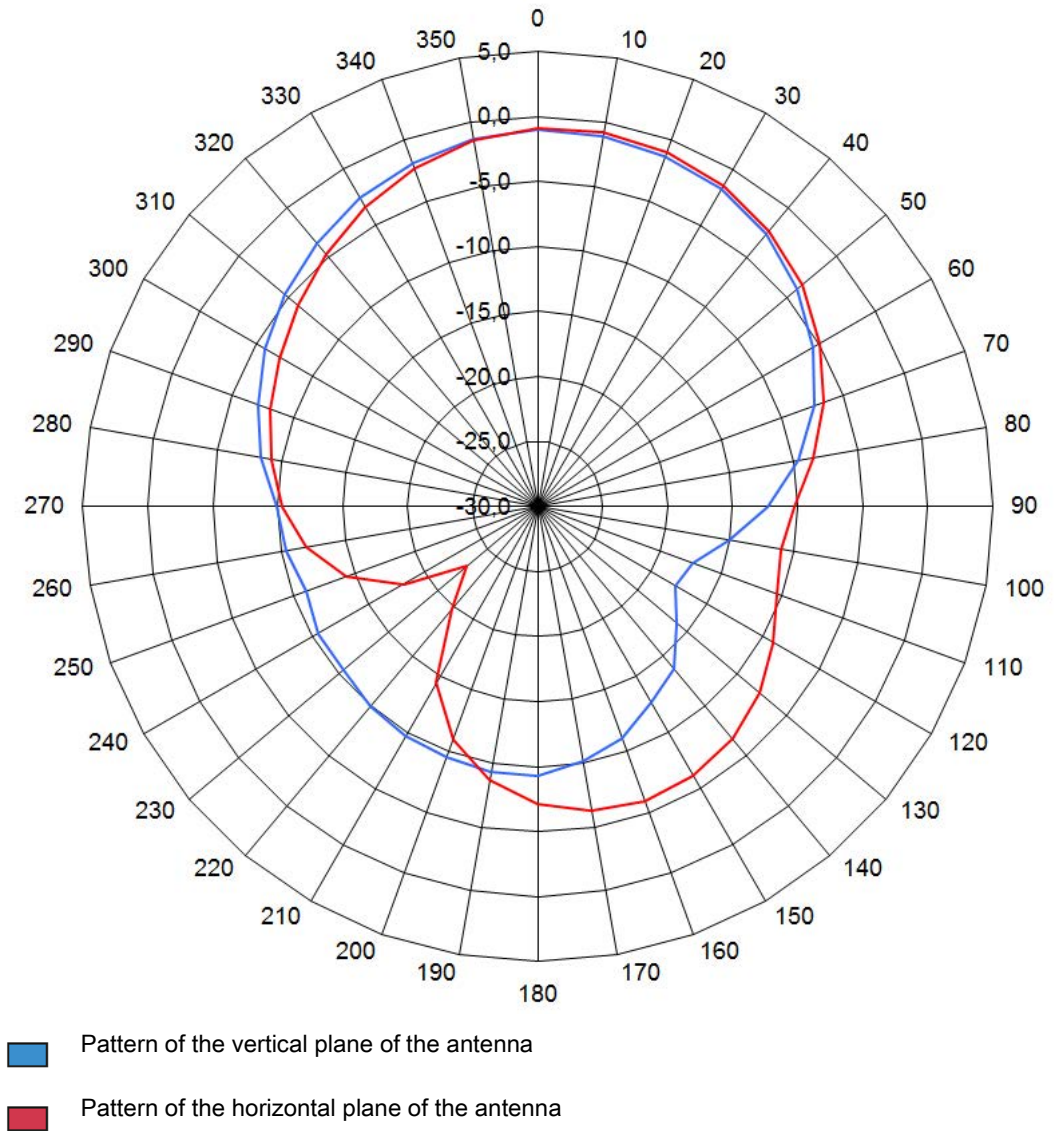


Figure 5-2 Directional radiation pattern of RF610R in the ETSI frequency band

## Overview of the antenna parameters

Table 5- 6 Maximum linear electrical aperture angle at 865 MHz:

	Polarization (circular)
Azimuth section	100°
Elevation section	100°
Typical antenna gain in the frequency band 865 to 868 MHz	-1 dBi
Antenna axis ratio	2 dB

You will find more information on the antennas in the section "Guidelines for selecting RFID UHF antennas (Page 51)".

## Antenna diagram for RF610R (FCC)

The following radiation diagrams show the directional characteristics of the internal antenna of the RF610R (FCC) reader. For the spatial presentation of the directional characteristics, the horizontal plane (azimuth section) as well as the vertical plane (elevation section) must be considered. This results in a spatial image of the directional radiation pattern of the antenna.

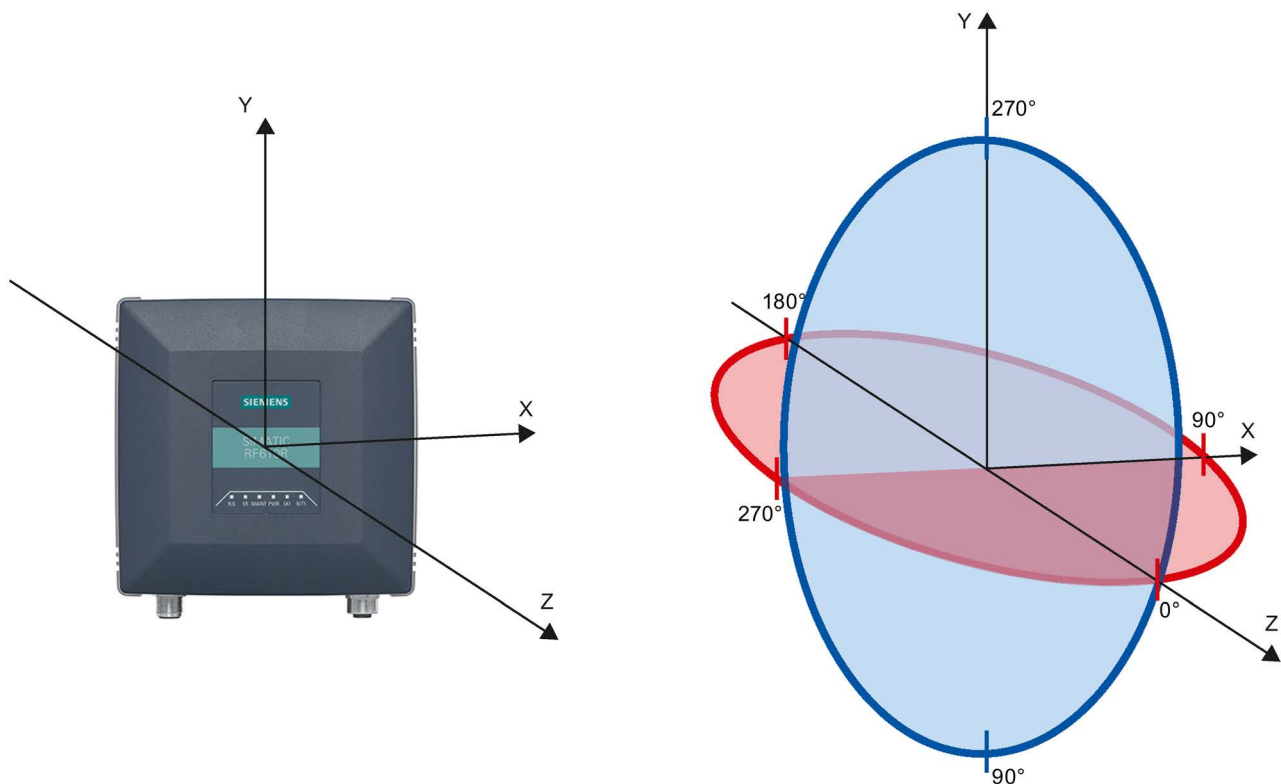


Figure 5-3 Reference system

Radiation diagram (FCC)

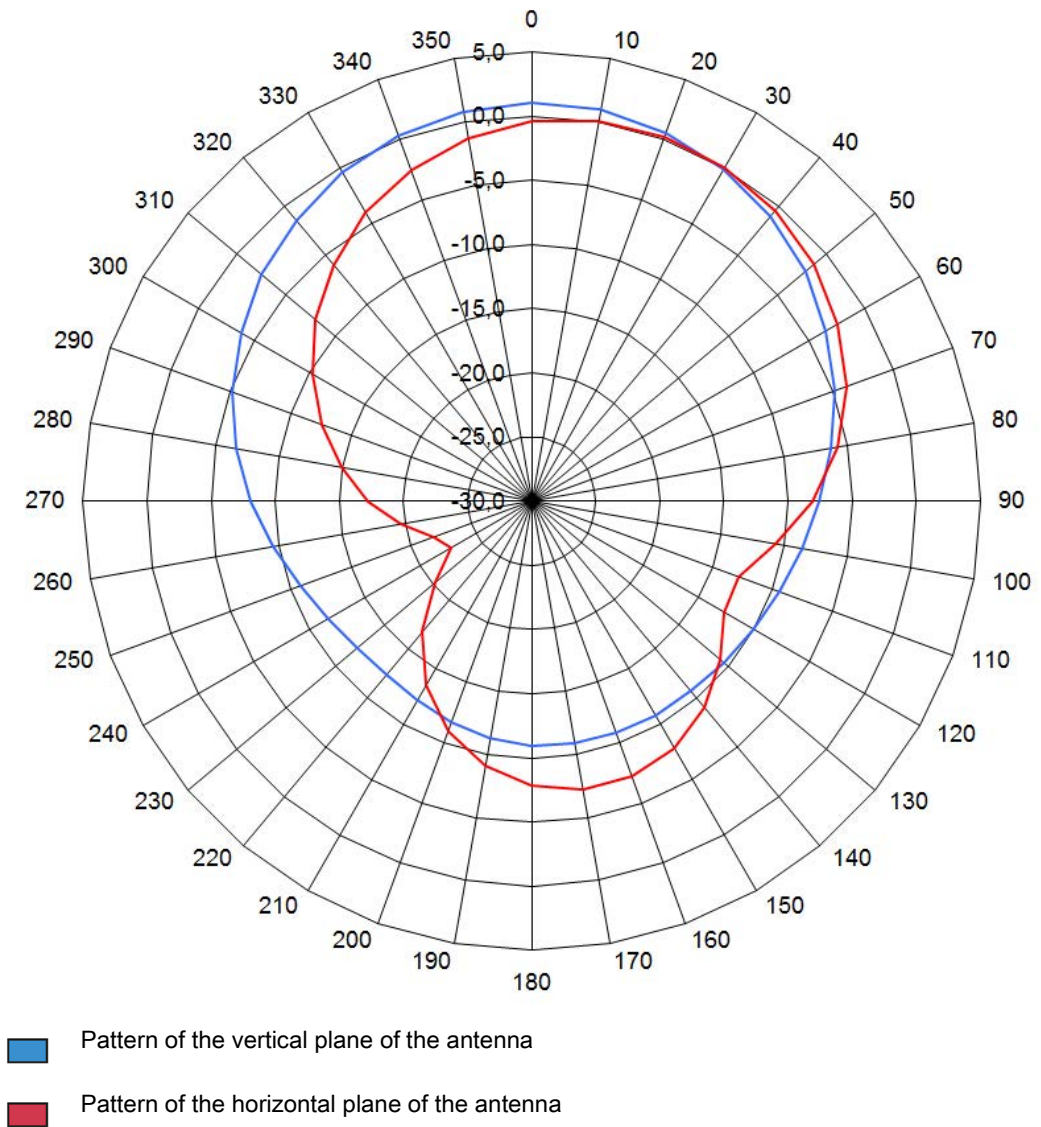


Figure 5-4 Directional radiation pattern of RF610R in the FCC frequency band



## Overview of the antenna parameters

Table 5- 7 Maximum linear electrical aperture angle at 915 MHz:

	Polarization (circular)
Azimuth section	100°
Elevation section	100°
Typical antenna gain in the frequency band 902 to 928 MHz	0 dBi
Antenna axis ratio	2 dB

You will find more information on the antennas in the section "Guidelines for selecting RFID UHF antennas (Page 51)".

### 5.2.2.2 Interpretation of radiation patterns

You can find detailed information on the interpretation in the section "Interpretation of radiation patterns (Page 215)".

## 5.2.3 Installation / mounting

### Requirement

#### NOTICE

##### Close unused connectors

Note that the readers only have the specified degree of protection when all connectors are in use or when unused connectors are closed with the protective caps.

#### CAUTION

##### Emitted radiation

The transmitter complies with the requirements of Health Canada and the FCC limit values for subjecting persons to HF radiation, provided that a minimum spacing of 26 cm exists between antenna and person. When the antennas are installed, you must therefore ensure that a minimum spacing of 26 cm is maintained between personnel and antennas.

## Mounting/installing the device

You can mount the reader in the following ways:

- directly on a flat surface using the VESA 100 mounting system (torque  $\approx$  1.5 Nm).

The positions of the mounting holes for the device are shown in the section Dimension drawing (Page 120).

### 5.2.4 Configuration/integration

An Ethernet interface is available for integrating the device into system environments/networks. RF610R can be configured via the Ethernet interface and with direct connection to the PC. You can configure and program the reader using the following tools:

- STEP 7 Basic/Professional (TIA Portal)
- or via EtherNet/IP
- Web Based Management (WBM)
- OPC UA or XML based user applications

Note that configuration in parallel is not possible using different tools. Simple process controls (e.g. a traffic signal) can be implemented directly using the reader via the digital input/output.

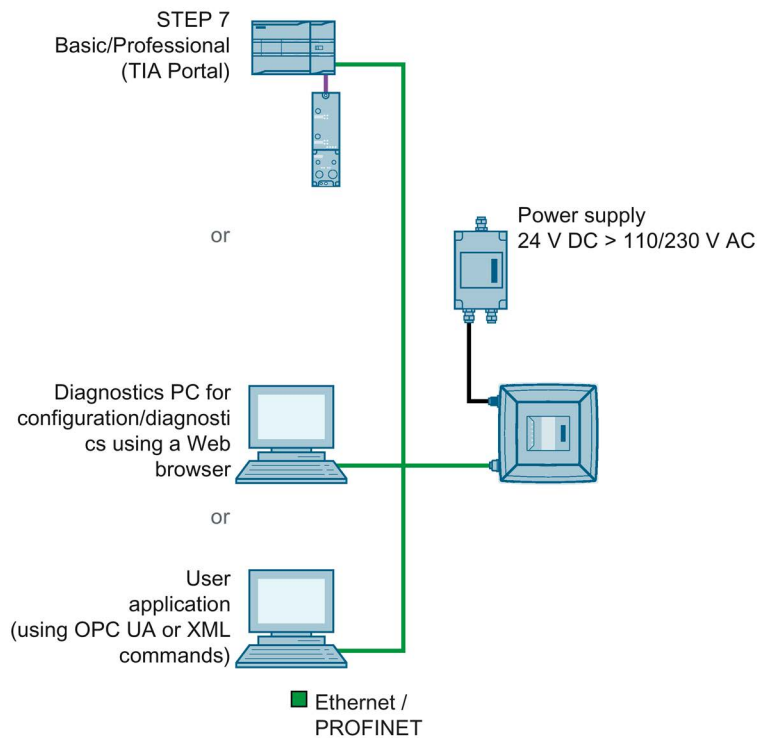


Figure 5-5 Overview: Configuration of RF610R readers

## 5.2.5 Technical specifications

Table 5- 8 Technical specifications of the RF610R reader

<b>6GT2811-6BC10-xAA0</b>	
Product type designation	SIMATIC RF610R
<b>Radio frequencies</b>	
Operating frequency	
• ETSI	• 865 to 868 MHz
• FCC	• 902 to 928 MHz
• CMIIT	• 920 to 925 MHz
Transmit power	
• ETSI	• 3 ... 400 mW
• FCC	• 3 ... 400 mW
• CMIIT	• 3 ... 400 mW
Maximum radiated power	
• ETSI	• 200 mW ERP
• FCC	• 400 mW EIRP
• CMIIT	• 250 mW ERP
<b>Electrical data</b>	
Range (internal antenna)	
• ETSI	• ≤ 1 m
• FCC	• ≤ 1 m
• CMIIT	• ≤ 1 m
Protocol	ISO 18000-62/-63
Transmission speed	≤ 300 kbps
Frequency accuracy	≤ ±10 ppm
Channel spacing	
• ETSI	• 600 kHz
• FCC	• 500 kHz
• CMIIT	• 250 kHz
Modulation methods	ASK: DSB modulation & PR-ASK modulation encoding, Manchester or Pulse Interval (PIE)
Multitag capability	Yes

<b>6GT2811-6BC10-xAA0</b>	
<b>Typical transmission time per byte</b>	
• Write access	• 2 ms
• Read access	• 0.15 ms
Supply voltage	24 VDC (20 ... 30 VDC) <sup>1)</sup>
Maximum permitted current consumption	0.3 A
<b>Current consumption (on standby), typical</b>	
• 20 V input voltage on the reader	• 200 mA / 4 W
• 24 V input voltage on the reader	• 170 mA / 4.1 W
• 30 V input voltage on the reader	• 150 mA / 4.2 W
<b>Current consumption (at 400 mW transmit power), typical</b>	
• 20 V input voltage on the reader	• 260 mA / 5.2 W
• 24 V input voltage on the reader	• 220 mA / 5.3 W
• 30 V input voltage on the reader	• 170 mA / 5.1 W
<b>Interfaces</b>	
Power supply	1x M12 (8-pin)
Ethernet interface	1x M12 (4-pin), 100 Mbps
<b>Mechanical specifications</b>	
Material	Pocan (silicone-free)
Color	TI-Grey
<b>Permitted ambient conditions</b>	
<b>Ambient temperature</b>	
• During operation	• -25 ... +55 °C
• During transportation and storage	• -40 ... +85 °C
Conditions relating to UL approval	<ul style="list-style-type: none"> <li>• for indoor use only (dry location)</li> <li>• Mounting height shall be equal or less than 2 m (MS1 classification according UL/IEC 62368-1). La hauteur de montage doit être égale ou inférieure à 2 m (classification MS1 selon CEI 62368-1).</li> </ul>
Degree of protection	IP67
Shock resistant to EN 60068-2-27	25.5 g <sup>2)</sup>
Vibration to EN 60068-2-6	3.1 g <sup>2)</sup>

**6GT2811-6BC10-xAA0****Design, dimensions and weight**

Dimensions (W × H × D)	140.5 × 133 × 45 mm
Weight	370 g
Type of mounting	VESA 100 4x screws M4 (≈ 1.5 Nm)
Operation indicator	6 LEDs
Status display	1 LED (enclosure, all-round)

**Standards, specifications, approvals**

Proof of suitability	EN 301 489-1 V2.2.0 / EN 301 489-3 V2.1.1 / EN 302 208 V3.1.1 FCC CFR 47, Part 15 section 15.247
MTBF	29 years

- <sup>1)</sup> All supply and signal voltages must be safety extra low voltage (SELV/PELV according to EN 60950). All voltage sources must meet the requirements of limited power sources (LPS) and NEC Class 2.  
Note that, depending on the power consumption, using extension cables > 20 m (6GT2891-4FN50) may lead to a voltage drop on the reader. This voltage drop can mean that the necessary minimum voltage on the reader is below the required 20 V.
- <sup>2)</sup> The values for shock and vibration are maximum values and must not be applied continuously. These values only apply to mounting using screws.

### 5.2.6 Dimension drawing

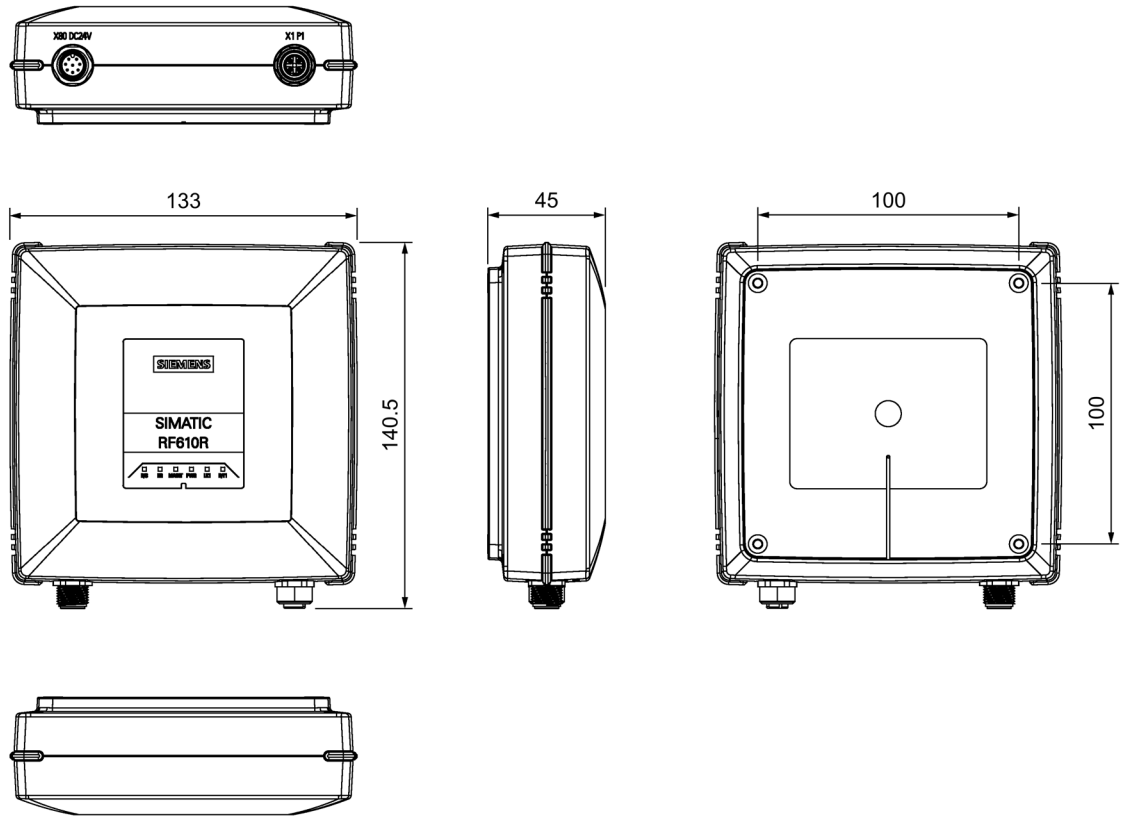


Figure 5-6 Dimension drawing RF610R

All dimensions in mm ( $\pm 0.5$  mm tolerance)

## 5.2.7 Certificates and approvals


### 5.2.7.1 CE mark

#### Note

#### Marking on the readers according to specific approval

The certificates and approvals listed here apply only if the corresponding mark is found on the readers.

Table 5- 9 6GT2811-6BC10-0AA0

Labeling	Description
	Conformity with the RED directive 2014/53/EU Conformity with the RoHS directive 2011/65/EU

### 5.2.7.2 Country-specific certifications

Table 5- 10 6GT2811-6BC10-1AA0



Labeling	Description
 Federal Communications Commission	FCC CFR 47, Part 15 section 15.247 Radio Frequency Interference Statement 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. FCC ID: NXW-RF610R
Industry Canada Radio Standards Specifications	RSS-247 Issue 2 IC: 267X-RF610R
	This product is UL-certified for the USA and Canada. It meets the following safety standard(s): UL/IEC 62368-1, 2nd Ed CAN/CSA C22.2 No. 62368-1-14, 2nd Ed Audio/video, information and communication technology equipment - Part 1: Safety requirements

Table 5- 11 6GT2811-6BC10-2AA0

Standard	
CMIIT Certification	China radio approval Marking on the reader: CMIIT ID: 2018DJxxxx

### 5.2.7.3 FCC information

#### **Siemens SIMATIC RF610R (FCC): 6GT2811-6BC10-1AA0**

FCC ID: NXW-RF610R

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 received, including interference that may cause undesired operation.

#### **Caution**

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

#### **Note**

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 when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

#### **FCC 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.

#### **FCC Exposure Information**

To comply with FCC RF exposure compliance requirements, the antennas used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.