RS123 Router

Installation Manual

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Warranty

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I Related Documents

Teldat Dm748-I Software Updating

Chapter 1 About this Guide

This installation guide for the **RS123** router family contains information on how to correctly install the device in a working environment.

1.1 Supported devices

The information provided in this installation guide only applies to the **RS123** router family: **RS123** Devices.

1.2 Who should read this manual?

This manual should be read by the support personnel who need to configure, maintain and monitor the device.

1.3 When should this manual be read?

Read this manual as soon as you are ready to familiarize yourself with the device and its components.

This manual will help you understand your new device in greater depth.

1.4 What is in this manual?

This installation manual contains the following information:

- A description of the available features in the **RS123** routers.
- Technical specifications.
- Power supply requirements.
- Elements that can be connected when the router is operating.
- How to install and uninstall the modules and power sources.
- A description of the device LEDs and connectors.
- Troubleshooting.

1.5 What is not in this manual?

This manual does not contain information relative to the device software or its configuration. To gather information on how to configure this device, please see the relevant protocol manuals found in the Teldat website: http://www.teldat.com

1.6 How is the information organized?

Each chapter focuses on a specific part of the hardware and its components. All descriptive and technical specifications on a component can be found in the relevant chapter.

1.7 Technical support

Teldat S.A. offers technical support. Device software can be upgraded on a regular basis for maintenance purposes and for new features.

Contact information:

Web: http://www.teldat.com

Tel.: +34 918 076 565

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Email: support@teldat.com

Chapter 2 RS123 Devices

2.1 Description

The **RS123 Router** is a powerful Gigabit Ethernet router that is mainly used in SMEs to provide connectivity to branch locations and home offices.

The **RS123** delivers advanced security, flexibility, and exceptional performance across a wide range of applications.

The **RS123 Router** is equipped with five Gigabit Ethernet ports that can be independently configured to be used in a LAN, WAN, or DMZ. The **RS123** also comes with an SFP slot for optical fibre expansion modules, e.g., for connecting to an optical fibre broadband connection, enabled by license.

The **RS123w and RS123w-4G** have a dual-band wireless module, which operates at 2.4 and 5 GHz. This module supports 802.11 a/b/g/n wireless standards. The MIMO 2x2 technology allows for maximum raw data rates of up to 300 Mbps. Furthermore, **RS123w-4G** incorporates an integrated LTE (4G) module that supports LTE at speeds of up to 100 Mbps for downloads and up to 50 Mbps for uploads, in addition to GPRS (EDGE), UMTS (3G+) and HSPA+.

It also includes a 19-inch rack-mount conversion bracket enabling installation in 19-inch server racks. Rack mounting is further simplified by the device's height, equivalent to one rack unit, and the integrated power supply.

The following figure shows a typical scenario for **RS123** operation:

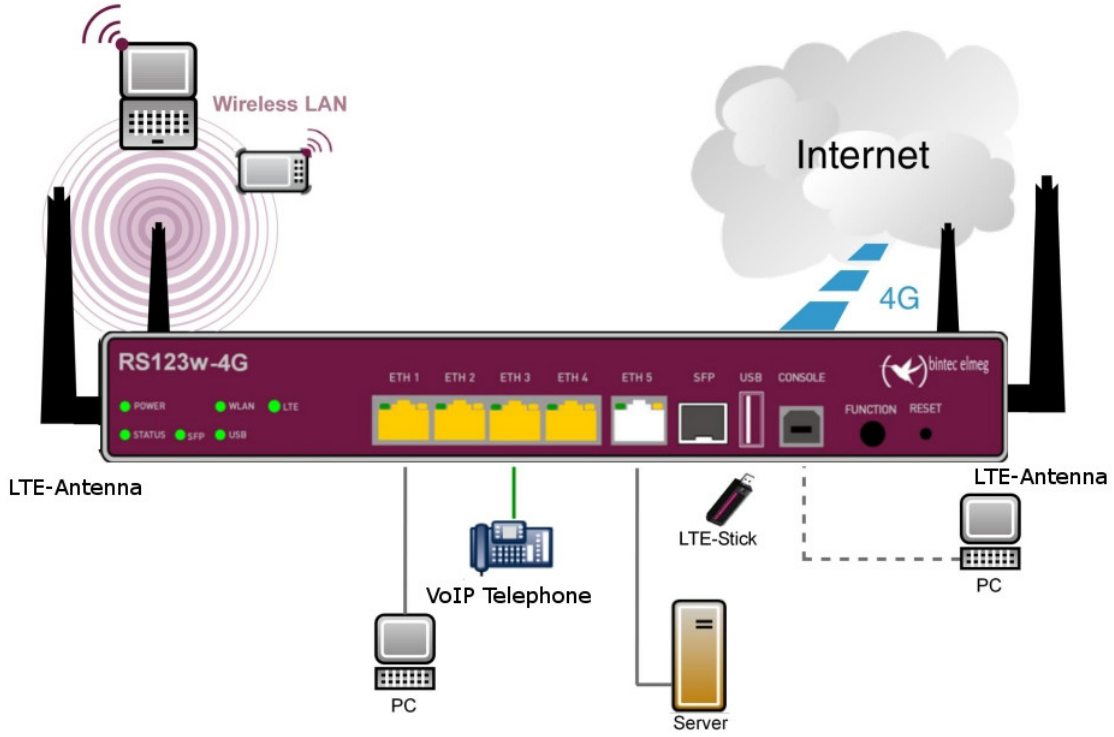


Fig. 1: **Scenario**

2.2 Characteristics

2.2.1 Power supply

For further information on the different **RS123** power supplies, please see *Components and Power Supply* on page 6 , under section *Connecting to the power source* on page 11 .

2.2.2 Hardware monitoring

The LEDs on the front panel are used to monitor the **RS123** hardware. These LEDs provide visual information on the state of the device and reference the condition of hardware components, indicating whether there is connectivity, data flow, etc.

For further information on the LED panel, please see *Components* on page 6.

Chapter 3 Components and Power Supply

The following chapter provides detailed information on the chassis of the **RS123** router family and its components. This information includes:

- Components.
- Information on assembly.
- Installing and uninstalling modules.
- Power supply.
- RST button.
- Data connection.
- SIM card installation.

3.1 Components

3.1.1 Front panel

The following figure shows the front panel:

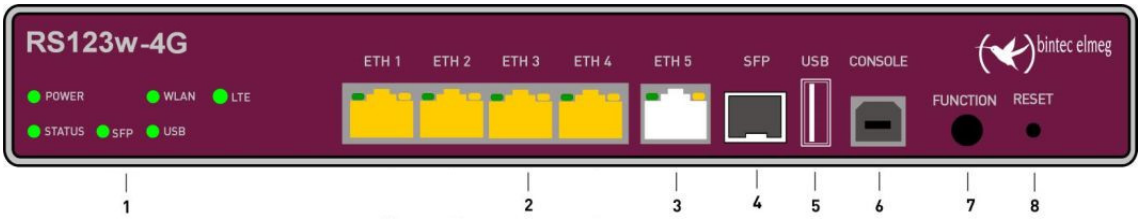


Fig. 2: **Frontal Panel**

The front panel components are as follows:
Front panel components

Item	Description
1	LED panel.
2	ETH1 to ETH4. 4-port Gigabit Ethernet Switch.
3	ETH5. WAN Gigabit Ethernet. RJ45 connector.
4	ETH5. WAN Gigabit Ethernet. SFP connector.
5	USB. Slot where you can insert a 3G USB modem.
6	Console. USB connector providing access to the device's local console for configuration and monitoring purposes.
7	FUNCTION. WPS (Wireless Protected Setup) button. This allows Wi-Fi network parameters to be configured easily and securely.
8	RESET. Reset button. For further information on how the reset button works, please see *RESET button* on page 12.

The LED panel provides information on the status of the components (whether they are active or not) and on the network activity.

Fig. 3: **LED panel**

LEDs

LED	Color	**Description**
POWER	Green	Off -> Power supply is not connected. On -> Power supply is connected.
STATUS	Green	Off -> System off. On -> Software is running. Blinking -> See *Default configuration* on page 12.
SFP	Green	Off -> Not used. On -> SFP is connected.
WLAN	Green	WLAN status LED. Only **RS123w and RS123w-4G**. This LED provides status information on the WLAN interface as follows: Off -> Interface down. On -> Interface up. Blinking -> Activity/maintenance.
USB	Green	USB status LED. When an external dongle is used, this LED provides status information as follows: Off -> Device is not detected or unavailable. On -> Connected. Blinking -> Connection data activity.
LTE	Green	LTE status LED. Only **RS123w-4G**. This LED provides status information on the LTE interface as follows: Off -> Interface down. On -> Interface up and connection established. Blinking -> Connection data activity.

In addition to the LEDs described in the above table, the front panel also has LEDs linked to the Switch Gigabit Ethernet interfaces and the WAN Gigabit Ethernet interface.

Fig. 4: **ETH LEDs**

Switch and WAN LED indicators

LED	Description
Yellow	OFF -> Interface is either unavailable, not installed or not registered. ON -> Connected to 10 M: - Steady: Not transferring data. - Blinking: Transferring data.
Yellow + Green	OFF -> Interface is either unavailable, not installed or not registered. ON -> Connected to 100 M: - Steady: Not transferring data. - Blinking: Transferring data.
Green	OFF -> Interface is either unavailable, not installed or not registered. ON -> Connected to 1000 M: - Steady: Not transferring data. - Blinking: Transferring data.

3.1.2 Rear panel

The following figure shows the rear panel. Here, you will find the majority of **RS123** connectors.

Fig. 5: **Rear panel**

The following table provides information on each connector, together with a description:

Rear panel components

Item	Description
9	ON/OFF switch.
10	Power cable connection.
11	WLAN ANT1 and ANT2 antenna connectors. Only on **RS123w and RS123w-4G**.

3.1.3 Side panels

On models **RS123w and RS123w-4G**, two 3G/4G antenna connectors are located on the side panels, one on each side:

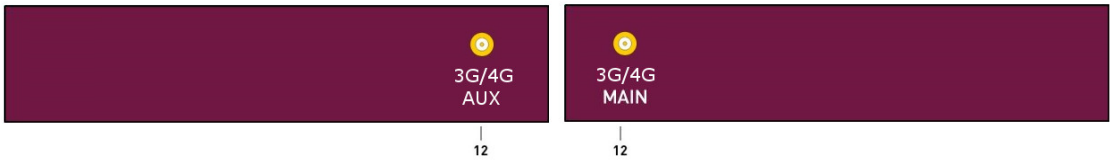


Fig. 6: Side panels

The connectors are as follows:

Side panel connectors

Item	Description
12	WWAN 3G/4G MAIN and AUX antenna connectors. Only on **RS123w-4G**.

3.1.4 Underside panel

The following components can be found on the underside panel:

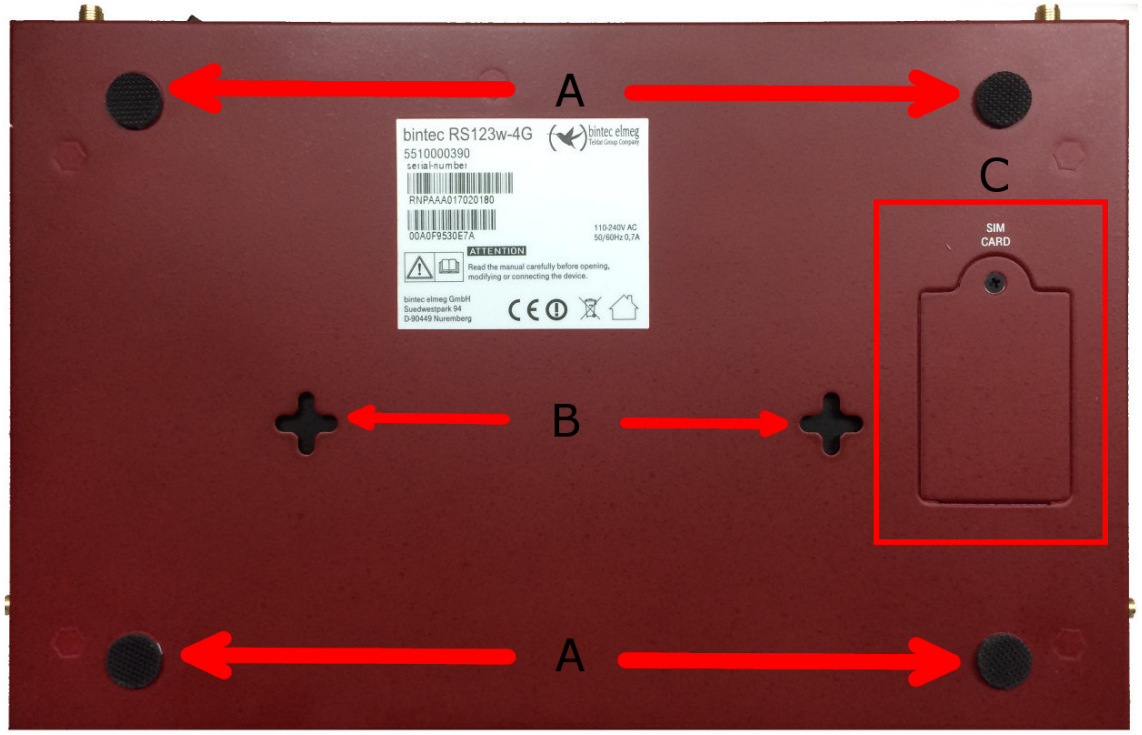


Fig. 7: **Underside panel**

The following table contains details on the significant components of the underside panel:

Underside panel components

Item	Description
A	Rubber feet.
B	Holes for wall mounting.
C	Internal module SIM tray.

3.2 Installation

3.2.1 Installation in a rack

The **RS123** can be installed in a 19” rack. The strips and screws needed are provided by default.

Both strips are attached to the device through 8 screws (4 on each side), as shown in the following figure:

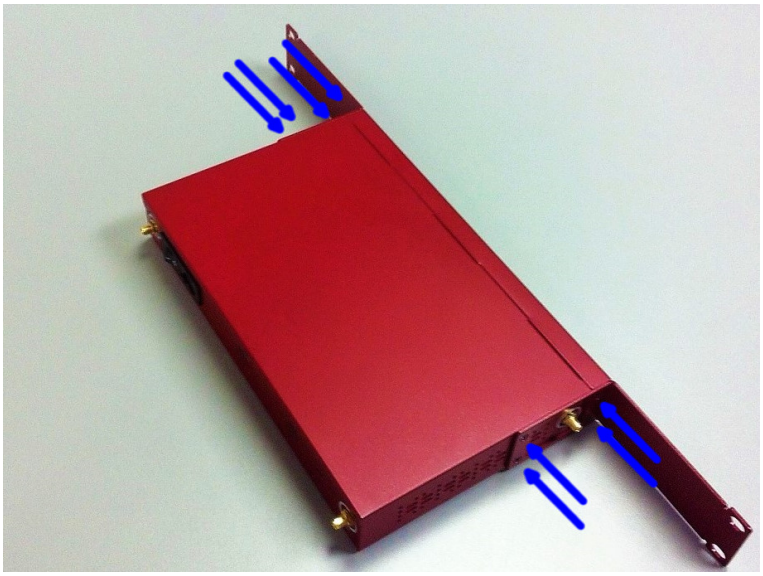


Fig. 8: **Anchor bolts for a rack**

3.2.2 Standalone

RS123 devices can be placed as a standalone on a flat, stable surface. The adhesive rubber feet must be stuck to the underside panel to prevent the router from sliding.

Make sure there is enough space around the router (for ventilation purposes) and check that the electricity cables can easily reach it.

3.2.3 Wall mounting

To attach the **RS123** on the wall, use the tabs on the back side of the housing.

Warning

The screws must go into wall studs (wood) or wall anchors that are appropriate for the type of wall. Screws into drywall are not strong enough to support the router.

(1) Install the two wall studs horizontally and separately in a wall, or in any other vertical surface.

Warning

If you are mounting the router on drywall, use hollow-wall anchors (8mm - 5/16 inch) to secure the screws. If the screws are not properly anchored, the strain of the cables connected to the router's back panel could pull the router from the wall.

(2) Place the router on the wall and attach it using the screws (3.5x30).

3.2.4 Kensington lock

A Kensington lock can be used to secure **RS123** devices.

The required notch is located at the rear of the housing.

3.3 Plug-in modules

The only devices that can be inserted in the USB connector are 3G USB modems and USB to RS232 converters to connect a control line to MTC devices.

To view the list of supported 3G modems, please visit the Teldat website: http://www.teldat.com.

The USB to RS232 converter is provided by Teldat.

Only the USB to RS232 adapter provided by Teldat should be used.

3.3.1 Installation

To install an USB device, simply insert it in the USB connector on the front panel (as shown in the following figure):

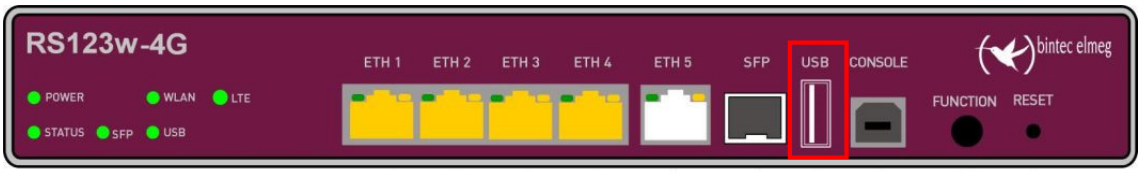


Fig. 9: **USB insertion connector**

3.3.2 Remove

To remove the device, simply extract it from the connector where it was inserted.

3.4 Power source

The **RS123** is powered by an internal power source.

Workplace Conditions. Main Characteristics

- Excessive cold and heat should be avoided, as should humidity and dust.
- Direct exposure to sunlight and other heat sources should be avoided. The device should not be placed amongst papers, magazines or other elements that could hinder natural air circulation.
- The device should not be placed very close to strong electromagnetic fields such as speakers, engines, etc.
- Knocks and/or strong vibrations should be avoided during transport, operation and storage.

Warning

The electric current in power cables, telephone lines and communication cables is dangerous. To prevent electric shocks, before installing, handling or opening the equipment covers, connect and disconnect the cables following the steps set out in *Connecting* on page 12 and *Disconnecting* on page 12.

3.4.1 Connecting to the power source

To connect the power cable to the device, follow the steps set out in *Connecting* on page 12.

Warning

To avoid electric shocks, residual current circulation and other unwanted effects, also affecting communications, the following is recommended:

All interconnected communication devices should be plugged to THE SAME GROUNDED POWER

OUTLET, which should at the same time be of good quality (lower than 10 ohms).

We recommend connecting all data devices to the same power source regardless of whether the work-place is provided with an uninterrupted power supply (UPS), a regulated supply or is independent of other power supplies (such as lighting, etc.). This will help to prevent malfunctions and premature aging of the drivers and other components.

3.4.2 Connecting

- Make sure the on/off power switch is in the OFF position.
- Connect all data cables.
- Connect the power supply to the device.
- Set the device's on/off power switch in the ON position.

3.4.3 Disconnecting

- Set the on/off power switch in the OFF position.
- Disconnect the power supply from the device.
- Disconnect the data cables.

To connect the power source to the device, follow the steps listed in the previous table: make sure the switch is OFF (0) and the power supply is NOT connected to the main electricity supply; find the POWER plug (located on the rear panel of the device) and plug it into the power source using the grounded cable that is supplied for this purpose.

3.5 RESET button

The different features of the RESET button are described below.

3.5.1 Rebooting the device

Once the device is operating normally, pressing the RESET button will force a restart.

3.5.2 Default configuration

The RESET button allows you to boot the device with its default configuration through the following steps:

- With the device switched off, keep the RESET button pressed and switch on the router through the ON/OFF switch (1).
- The POWER LED (green) will light up and the STATUS LED will begin to blink (green). This blinking will continue for 10 seconds.
- For the device to boot with the default configuration, stop pressing the RESET button while the STATUS LED is blinking, i.e., before the 10 second period expires.

The default configuration for the router sets the following access IP and mask addresses:

- IP address: 192.168.1.1
- IP mask: 255.255.255.0

Note

Some devices leave the factory with customized settings. As a result of this personalization, the default configuration may be different from the one shown above.

3.6 Connecting the data

The **RS123** has the following data connections.

3.6.1 4-port Ethernet switch

The **RS123** incorporates a 4-port 10/100/1000 BaseT switch with automatic MDI/MDIX to connect to a local area network (LAN).

Please pay careful attention to the labeling so you do not confuse this switch with other types of ports:

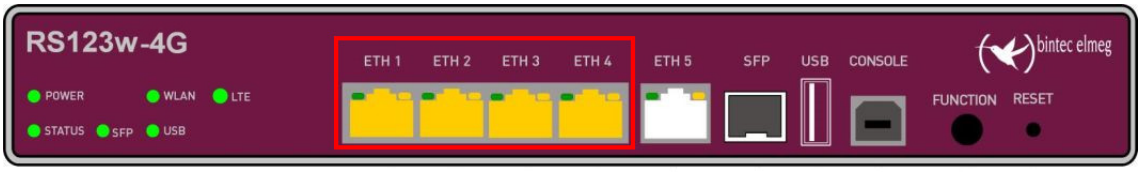


Fig. 10: **LAN switch PORTs**

Note

The only connector available during booting and in BIOS mode is the ETH 1 connector.

3.6.2 WAN connection

The **RS123** incorporates an Ethernet interface for WAN connection. This port has 2 connectors: SFP for optical link and RJ45 for 10/100/1000 Base-T link. However, they cannot work simultaneously.

Note

The SFP connector is enabled by purchasing a license. This connector is disabled by default.

This interface is totally independent from the switch and is treated as just another interface.

Please pay careful attention to the labeling to avoid confusing these ports with other port types:

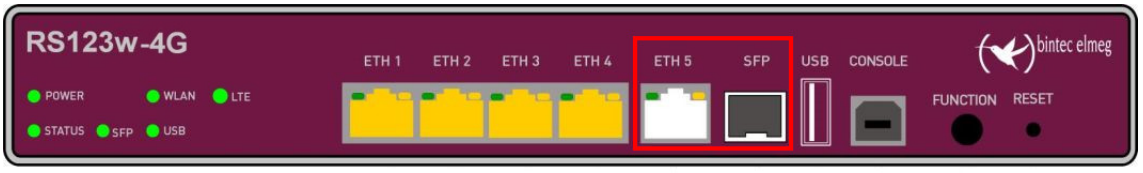


Fig. 11: **WAN PORT**

Note

The WAN connector does not work during booting and in BIOS mode.

3.6.2.1 SFP connector

Note

The SFP connector is enabled by purchasing a license. It is disabled by default.

The main characteristics of this port are as follows:

SFP Port Characteristics

Port	1 SFP Gigabit Ethernet port.
Standards	IEEE: • 802.1Q (VLAN). • 1000 BASE-X.
Types	• LX/LH (single-mode 1310 nm). • SX (multi-mode 850 nm). • ZX (single-mode 1550 nm).
Speed	• 1000 Mbps full duplex.

Warning

The SFP modules to be installed in the card socket should be IEC-60825-1 compliant Class 1 devices.

3.6.3 WWAN antenna connection (3G/4G connector)

The **RS123** has two connectors for WWAN antennas. To assemble and disassemble the antennas supplied, simply screw/unscrew them into the connectors labeled *3G/4G* (located on the router's side panels).

Note

This connector is only available on **RS123w-4G**.

Installing these antennas in the **RS123** is essential to improve the quality of the signal received and transmitted by the cellular model.

Note

To achieve high-quality performance, the router should always have the WWAN antennas installed.

The *Cellular* interface only works on model **RS123w-4G**.

Some cellular telephony technologies use the antenna diversity technique to improve the quality of the signal received (HSUPA, CDMA EV-DO, etc.). Because of this, the **RS123** incorporates several WWAN connectors:

Fig. 12: **3G/4G MAIN antenna** *and* **3G/4G AUX antenna**

When the MAIN and AUX antennas are connected via extension cables, rather than being directly screwed into the router, the minimum distance between the two must be 7 cm. The maximum recommended distance between them is 25 cm.

To achieve optimum performance, the radio frequency accessories installed (antennas and cables) should be those recommended by Teldat.

Teldat has a series of accessories (90º mount antennas, antennas for exterior installation, antennas for ceiling installation, extension cables, etc) that allow you to install the devices in different locations.

3.6.3.1 Placing the antenna

Antenna orientation and its location with respect to other wireless devices and radiation devices (such as communication devices, personal computers, etc.) can significantly influence device performance.

Antennas transmit and receive radio signals. Performance is also affected by environmental factors (such as the distance between the device and the base station), physical obstacles and other interferences caused by radiofrequencies (RF).

For optimum coverage, carry out the following instructions:

- Whenever possible, place the antenna where there are no physical obstacles. Obstacles between the antenna and the base station degrade the wireless signal. Place the antenna above ground level facing the nearest base station.
- Density of materials also affects the antennas. Place them away from any type of walls, metal screens, mirrors, etc.
- Do not place the antenna near columns, which may throw shadows and reduce the coverage area.
- Keep the antenna away from metal ducts such as those used for heating, air-conditioning, etc.
- Please bear in mind that other wireless devices such as telephones, microwaves, etc., can temporarily interfere with the quality of the radio signal.
- We do not recommend installing antennas near, or between, racks containing communication devices, computers, etc. Use an extension cable and place the device outside.

The following recommendations are applicable to all wireless devices:

- Do not touch or move the antenna while the device is transmitting or receiving.
- Do not touch any equipment containing devices that radiate, where the antenna is very close to or touching any exposed part of the body when it is transmitting (particularly the face and eyes).
- Do not install the device in areas where the atmosphere is potentially explosive.
- Wireless devices can cause interferences in other devices. Do not use the device in areas where medical equipment is installed.
- To ensure the R&TTE 1999/5/EC directive is complied with, the device must be at least 15 cm away from a person's body when operating.

3.6.4 Wireless LAN antenna connection (WLAN connectors)

The **RS123** has two RF antenna connectors to connect an external antenna to improve the quality of the signal received and transmitted by the Wireless LAN module.

Note

This connector is only available on **RS123w and RS123w-4G**.

This module is internal and can be activated only on **RS123w and RS123w-4G**. To assemble and disassemble the antennas provided with the device, just screw them into the WLAN connectors (located on the router's rear panel).

Fig. 13: **WLAN ANT1** *and* **WLAN ANT2**

3.6.5 Connecting a 3G USB device (USB connector)

The **RS123** has a USB HOST 2.0 Type A connector interface, which allows 3G USB modems to be connected. The interface can be activated by purchasing the corresponding software license.

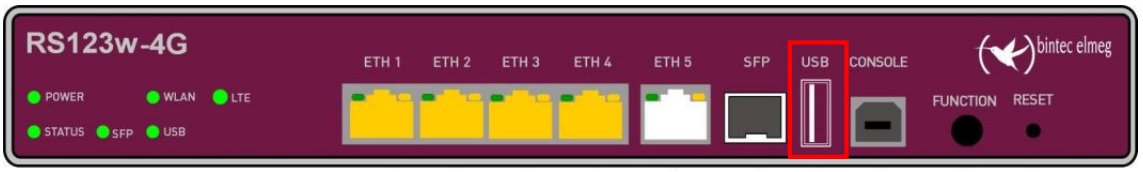


Fig. 14: **USB Connector**

3.6.6 Connecting for configuration

The **RS123** has an USB Type B connector on the front panel labeled *Console*, which provides access to the device local console.

For further information, please see *Connecting to the device* on page 24.

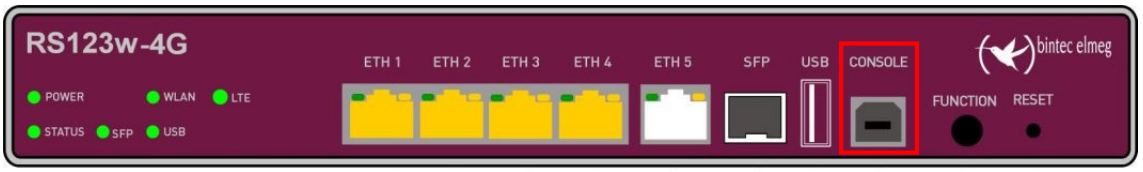


Fig. 15: **CONSOLE Connector**

3.7 Installing the SIM card

The **RS123** has a Wireless WAN interface that, in order to operate, may require a SIM card to be inserted into the device. Some carriers in certain countries provide services (CDMA) that do not require SIM cards.

The **RS123** has one internal SIM tray located on the underside of the router.

Warning

This device is compatible with 1.8 V and 3 V SIMs. Do not install SIMs that do not support these voltages.

Warning

Never install the SIM cards when the device is switched on.

Always disconnect the device from the main power supply before installing the SIM cards.

Always disconnect the device before removing the casing to access the trays.

When inserting the SIM cards, please protect yourself against electrostatic discharges (ESD).

Do not touch the SIM card connectors.

3.7.1 Procedure to install the internal SIM

To access the internal SIM, go to the underside of the router, open the flap (as shown in the following figure) and insert the SIM card.

Fig. 16: **Internal module SIM tray**

Proceed as follows in order to insert the SIM card:

(1) Use a Phillips PH1 screwdriver to loosen the screw of the card slot cover found on the bottom of the device and remove the cover.

(2) Open the card slot. To do this, push the card lock in the direction of the arrow and lift the card slot slightly.

(3) Make sure the contacts on the SIM card are facing downwards.

(4) Push the SIM card into the card slot so that the beveled edge of the card is facing upwards.

(5) Close the card slot. Press the card slot downwards again.

(6) Push the card lock in the direction of the arrow. You will hear a click as the card locks into place.

(7) Insert the card slot cover and tighten the screw.

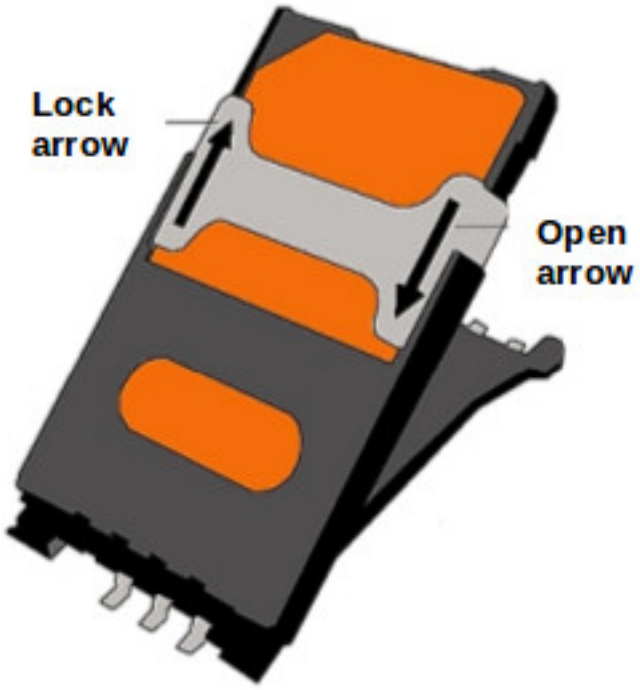


Fig. 17: Internal SIM try

Chapter 4 Compliance

4.1 Manufacturer information

Brand	Teldat
Manufacturer	Teldat S.A.
Country	Spain
Postal Address	Isacc Newton, 10 Parque Tecnológico de Madrid, 28760 Tres Cantos, Madid, Spain
International Phone	+34 91 807 65 65

4.2 Safety warnings

	The screws must go into a wall stud (wood) or a wall anchor of the appropriate type for the wall. Screws into drywall are not strong enough to support the router.
	Die Schrauben müssen in einen Dübel oder Wandanker geschraubt werden, der für die jeweilige Art der Wand geeignet ist. Schrauben in einer Trockenbauwand sind nicht stabil genug, um den Router zu halten.
	Los tornillos deben ir atornillados en un taco de pared (de madera) o del tipo adecuado según la clase de pared. Los tornillos que se montan directamente en los paneles de yeso no son lo bastante resistentes para soportar el router.
	If you install the screws in drywall, use hollow-wall anchors (8 mm – 5/16 inch) to secure the screws. If the screws are not properly anchored, the strain of the cables connected to the router's back panel could pull the router from the wall.
	Wenn Sie die Schrauben in eine Trockenbauwand schrauben wollen, verwenden Sie Hohlraumdübel (8 mm – 5/16 Zoll), um die Schrauben zu sichern. Wenn die Schrauben nicht angemessen verankert sind, kann Zug auf die Verkabelung an der Rückseite des Routers diesen aus der Wand reißen.
	Si instala los tornillos en paneles de yeso, utilice tacos de pared hueca (8 mm - 5/16 pulgadas) para fijar los tornillos. Si los tornillos no están bien anclados, la tensión de los cables conectados al panel posterior del router podría hacer que el router se cayera de la pared.
	The electric current in power cables, telephone lines and communication cables is dangerous. To prevent electric shocks, before installing, handling or opening the equipment covers, connect and disconnect the cables following the steps set forth in *Connecting* on page 12 and *Disconnecting* on page 12.
	Der elektrische Strom in Strom-, Telefon- und Datenkabeln ist gefährlich. Um Elektroschocks

	zu vermeiden, trennen Sie vor der Installation, der Bedienung oder dem Öffnen des Geräts die Kabel wie in den Abschnitten Verbinden und Trennen beschrieben.
	La tensión eléctrica de los cables de alimentación, de los cables de la línea telefónica y de los cables de comunicación es peligrosa. Para evitar descargas, antes de instalar, mover o abrir las cubiertas de este equipo, conecte y desconecte los cables siguiendo el orden que se detalla en los apartados “Conectar” y “Desconectar”.
	All interconnected communication devices should be plugged to THE SAME GROUNDED POWER OUTLET, which should at the same time be of good quality (lower than 10 ohms). It is highly recommended that all data devices be connected to the same power source regardless of whether the workplace is provided with an uninterrupted power supply (UPS), a regulated supply or is independent of other power supplies (such as lighting, etc.). This will help to prevent malfunctions and premature aging of the drivers and other components.
	Alle miteinander verbundenen Kommunikationsgeräte sollten mit der gleichen geerdeten Stromversorgung verbunden werden. Diese sollte von hoher Qualität sein (niedriger als 10 Ohm). Unabhängig davon, ob der Arbeitsplatz über eine unterbrechungsfreie Stromversorgung (UPS) oder eine geregelte Versorgung verfügt oder unabhängig von der weitere Installation (z. B. Licht) ist – es wird dringend empfohlen, alle Geräte an die gleiche Spannungsversorgung anzuschließen. Dies beugt Problemen im Betrieb sowie Problemen der vorzeitigen Alterung von Komponenten vor.
	Todos los equipos de comunicaciones interconectados deberán estar unidos a UNA MISMA TOMA DE TIERRA, a ser posible de buena calidad (inferior a 10 ohmios). Si la instalación está dotada de un Sistema de Alimentación Ininterrumpida (SAI), alimentación estabilizada, o bien es independiente del resto (alumbrado, etc.), conecte todos los equipos de comunicaciones a la misma fuente de alimentación. Así, se ahorrará problemas de funcionamiento y envejecimiento prematuro de drivers y demás componentes.
	The equipment is required to be connected to a socket-outlet with a protective earthing connection.
	Das Gerät muss an eine Steckdose mit Schutzerdung angeschlossen werden.
	Se recomienda que el equipo se conecte a una toma de corriente con conexión a tierra.
	This device is compatible with 1.8 V and 3 V SIMs. Do not install SIMs that do not support these voltages.
	Das Gerät ist mit 1,8V- und 3V-SIM-Karten kompatibel. Installieren Sie keine SIM-Karten, die diese Spannung nicht unterstützen.
	Este equipo es compatible con SIMs de 1,8 V y 3 V. No instale SIMs que no soporten estas tensiones.

	Never install the SIM cards when the device is switched on. Always disconnect the device from the main power supply before installing the SIM cards. Always disconnect the device before removing the casing to access the trays. When inserting the SIM cards, please protect yourself against electrostatic discharges (ESD). Do not touch the SIM card connectors.
	Installieren Sie keine SIM-Karten, solange das Gerät eingeschaltet ist. Trennen Sie das Gerät immer von der Stromversorgung, bevor Sie eine SIM-Karte installieren. Trennen Sie das Gerät immer von der Stromversorgung, bevor Sie das Gehäuse für einen Zugang zu den SIM-Halterungen öffnen. Schützen Sie sich gegen elektrostatische Entladung (ESD), wenn Sie eine SIM-Karte installieren. Berühren Sie die SIM-Karten-Kontakte nicht.
	No instale nunca las tarjetas SIM con el equipo encendido. Desconecte siempre el equipo de la red antes de instalar las tarjetas SIM. Desconecte siempre el equipo antes de desmontar la carcasa para acceder a las bandejas. Al insertar las tarjetas SIM, protéjase contra descargas electroestáticas (ESD). No toque los conectores de las tarjetas SIM.
	The SFP modules to be installed in the card socket should be class 1 devices complying with standard IEC-60825-1.
	SFP-Module, die im Kartenschacht installiert werden sollen, sollten Klasse-1-Geräte in Übereinstimmung mit IEC/EN 60825-1:2007 sein.
	Los módulos SFP que se instalen en el socket de la tarjeta deberían ser dispositivos de clase 1 de acuerdo con la norma IEC-60825-1.

4.3 WEEE information

	The crossed-out wheelie bin symbol indicates that the device must be disposed of separately from normal domestic waste at an appropriate waste disposal facility at the end of its useful service life. Das auf dem Gerät befindliche Symbol mit dem durchgekreuzten Müllcontainer bedeutet, dass das Gerät am Ende der Nutzungsdauer bei den hierfür vorgesehenen Entsorgungsstellen getrennt vom normalen Hausmüll zu entsorgen ist. El símbolo del contenedor con la cruz, que se encuentra en el aparato, significa que cuando el equipo haya llegado al final de su vida útil, deberá ser llevado a los centros de recogida previstos, y que su tratamiento debe estar separado del de los residuos urbanos.

4.4 REACH

In compliance with the REACH Candidate List, the delivered product and product packaging do not contain chemical substances above a concentration limit of 0.1% weight by weight (w/w). This declaration will be updated whenever any changes occur or other chemical substances are added to the REACH Candidate List. Information is currently provided to consumers upon request.

4.5 EC declaration of conformity

English (EN)	This equipment is in compliance with the essential requirements and other relevant provisions of: Directive 2014/53/EU (RED) or Directive 2014/30/EU (EMC) Directive 2014/35/EU (LVD) Directive 2009/125/EC (ErP) Directive 2011/65/EU (RoHS) of the European Parliament.
German (DE) Deutsch	Dieses Gerät entspricht den grundlegenden Anforderungen und den weiteren entsprechenden Vorgaben der Richtlinie Richtlinie 2014/53/EU (RED) oder Richtlinie 2014/30/EU (EMC) Richtlinie 2014/35/EU (LVD) Richtlinie 2009/125/EG (ErP) Richtlinie 2011/65/EU (RoHS) des Europäischen Parlaments.
Spanish (ES) Español	Este dispositivo cumple con los requisitos esenciales y con las normas correspondientes de las siguientes directivas: Directiva 2014/53/UE (RED) o Directiva 2014/30/UE (EMC) Directiva 2014/35/UE (LVD) Directiva 2009/125/CE (ErP) Directiva 2011/65/UE (RoHS) del parlamento Europeo.

Note

—Directive 2014/53/EU (RED) replaced Directive 1999/5/EC (R&TTE) on 13th June 2016.

—Directive 2014/30/EU (EMC) replaced Directive 2004/108/EC (EMC) on 20th April 2016.

—Directive 2014/35/EU (LVD) replaced Directive 2006/95/EC (LVD) on 20th April 2016.

The EC declaration of conformity and additional product documentation can be accessed here:

http://www.teldat.com

4.6 CE marking

This equipment is in conformity with CE procedures and marking.

4.7 National restrictions

In accordance with Article 10 of 2014/53/EU, we inform you that national restrictions and requirements may apply when it comes to authorization. These can change with time. Teldat S.A. recommends that you check with local authorities for the latest status of their national regulations.

This product is supplied with antennas in order to fulfill local regulations. Do not choose other antennas. To comply with power limits and RF exposure requirements, the antennas used for this transmitter must be installed in such a way that they are always separated from nearby persons by a minimum distance of, at least, 25 cm.

4.8 FCC statements

4.8.1 Interference

The model TLDPR04A1 contains FCC ID: XMR201805EC25AU and FCC ID: YUAWMCND03TD

This equipment model TLDPR04A1 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 of the following means:

- 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.

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

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.

This device is restricted to indoor use.

4.8.2 Radiation exposure

This equipment complies with the FCC radiation exposure limits specified for an uncontrolled environment. During installation and operation, keep a minimum distance of 20cm between the radiating equipment and your body.

4.8.3 Radio frequency interference requirements

This device is restricted to indoor use due to its operation in the 5.15 to 5.25 GHz frequency range.

The FCC requires this product to be used indoors to minimize any potential harmful interferences to co-channel Mobile Satellite systems.

High power radars are the primary users of the 5.25-5.35 GHz and 5.65-5.85 GHz frequency bands. These radar stations can cause interference with and/or damage this device.

4.9 Operating frequency

To check the operating frequencies working in the device, see Appendix *Radio WWAN specifications* on page 31 and *Radio WI-FI specifications* on page 32.

Appendix A Technical Information

A.1 Troubleshooting

The following table can help you solve problems when installing the device. If you cannot resolve the issue, contact your dealer for more information.

Symptom	Solution
No LED lights up on the router.	Check the power supply to the router (power source, ON/OFF switch, main power outlet).
You have forgotten the access password for the router.	Ignore the configuration through the RESET button (as explained in the relevant section).
None of the *LAN Switch* Port LEDs light up.	Check the Ethernet cable and the connection to the network.
None of the *Eth WAN* LEDs light up.	Check the Ethernet cable and the connection to the network.
The *SFP* LED never lights up in green.	Check the compatibility of the SFP plugged into the router. Check the appropriate license is available for use.
The *WLAN* LED never lights up in green.	Check the router's configuration and that of the remote station(s).
The *LTE* LED never lights up in green.	Check the SIM card installation and configuration (PIN number).
The *USB* LED never lights up in green.	Check that the device inserted in the USB connector is supported by the router. Please visit the Teldat website http://www.teldat.com to get the list of 3G USB modems that are supported. Check the appropriate license is available for its use.

A.2 Updating the software

The **RS123** can be updated to new releases. Please contact your distributor for further details on new releases.

There are various ways to update a Teldat router. For further information, please see manual: "Teldat *Dm748-I Software Updating*".

The software required to update Teldat routers is supplied in a format known as **distribution**. This consists of a single file, which contains all the files needed to update your device as well as in-depth information on the contents of the files.

A.3 Connecting to the device

A.3.1 Connecting using the local console (Aux connector)

The **RS123** has an USB Type B connection the front panel known as CONSOLE, which provides access to the device local console.

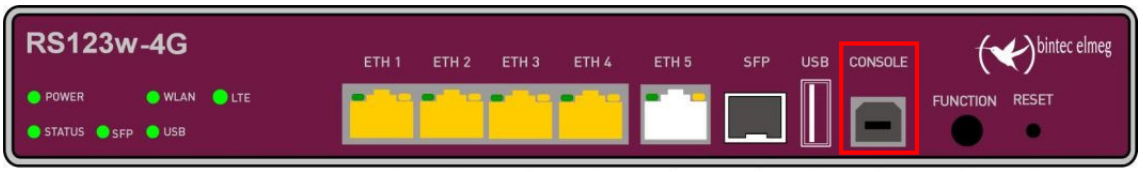


Fig. 19: **CONSOLE Connector**

To configure this, connect the CONSOLE port to your PC using a USB cable.

Note

The configuration for the terminal must be:

- Speed: 115200 bps.
- Eight data bits.
- One stop bit.
- No parity bit.
- No type of flow control.

A.4 Licenses

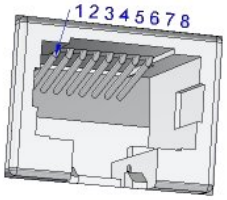
The **RS123** device offers a series of licenses, among which the following stand out:

SFP: Activation license for the SFP port.

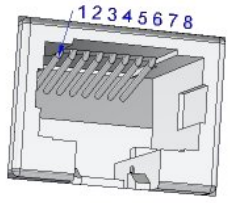
DPI: Activation license for the DPI feature (Layer 7 Visibility).

A.5 Connectors

A.5.1 LAN connector

RJ45 LAN	RJ45 PIN	FE Signals	GE Signals
	**1**	BI-DA+	BI-DA+
	2	BI-DA-	BI-DA-
	3	BI-DB+	BI-DB+
	4	--	BI-DC+
	5	--	BI-DC-
	6	BI-DB-	BI-DB-
	7	--	BI-DD+
	8	--	BI-DD-

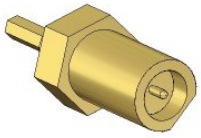
A.5.2 WAN connector

RJ45 WAN	RJ45 PIN	FE Signals	GE Signals
	**1**	BI-DA+	BI-DA+
	2	BI-DA-	BI-DA-
	3	BI-DB+	BI-DB+
	4	--	BI-DC+
	5	--	BI-DC-
	6	BI-DB-	BI-DB-
	7	--	BI-DD+
	8	--	BI-DD-

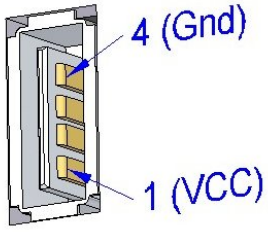
A.5.3 WWAN connector (female)

	PIN	ANT
	**Internal**	RF in/out
	External	GND

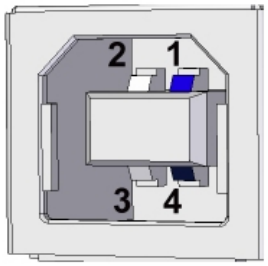
A.5.4 WLAN connector (male)

	PIN	ANT
	**Internal**	RF in/out
	External	GND

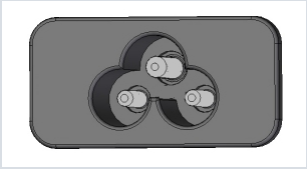
A.5.5 USB connector

USB Type A	PIN	USB
	**1**	VCC
	2	DATA-
	3	DATA+
	4	GND
	Shell	Shield

A.5.6 Configuration connector

USB Type B	PIN	USB
	**1**	VCC
	2	DATA-
	3	DATA+
	4	GND
	Shell	Shield

A.5.7 Power Supply connector

IEC C9	PIN
	L Earth N

A.6 Technical Specifications

A.6.1 Hardware architecture

PROCESSORS	Lantiq VRX288.
MEMORY	128 Mbytes in SDRAM.
STORAGE UNIT	FLASH Memory (32 Mbytes).

A.6.2 LAN interface

PROTOCOLS	Ethernet (802.3).
PORTS	4 port Switch managed with MDI/MDX autodetection.
SPEED	10/100/1000 Mbps (BaseT).
CONNECTOR	RJ45 female.

A.6.3 WAN interface (RJ45)

STANDARDS	Ethernet (802.3).
SPEED	10/100/1000 Mbps (BaseT).
CONNECTOR	RJ45 female.

A.6.4 WAN interface (SFP)

STANDARDS	IEEE 1000 Base-X.
SPEED	1000 Mbps full duplex.
CONNECTOR	SFP.

A.6.5 Wireless WAN interface

WWAN Standard/Bands	MC7304:
	• LTE:
	  • FDD. B1, B3, B7, B8, B20
	• WCDMA: B1, B2, B5, B8
	• GSM/GPRS/EDGE: Quad Band
	EC25-E:
	• LTE:
	  • FDD. B1, B3, B5, B7, B8, B20
	  • TDD: B38, B40, B41
	• WCDMA: B1, B5, B8
	• GSM/GPRS/EDGE: 900/1800 MHz
	EC25-AU:
	• LTE:
	  • FDD. B1, B2, B3, B4, B5, B7, B8, B28
	  • TDD. B40
	• WCDMA: B1, B2, B5 , B8

Speed (DL/UL)	MC7304:
	• LTE Cat 3. 100Mbps/50Mbps
	• HSPA+ Cat 24/6: 42Mbps/5.76Mbps
	• EDGE: 236Kbps
	EC25-E:
	• LTE Cat 4.
	  • FDD. 150Mbps/50Mbps
	  • TDD: 130Mbps/35Mbps
	• HSPA+ Cat 24/6: 42Mbps/5.76Mbps
	• EDGE: 236Kbps
	EC25-AU:
	• LTE Cat 4.
	  • FDD. 150Mbps/50Mbps
	• HSPA+ Cat 24/6: 42Mbps/5.76Mbps

CONNECTOR	Two SMA female connectors.
SIM Slots	1 Mini-SIM (2FF) ISO/IEC 7810:2003, ID-000 (1.8V / 3V)

A.6.6 Wireless LAN interface

WLAN standards	802.11n (MIMO 2x2); 802.11b; 802.11g; 802.11a; 802.11h.
Frequency bands 2.4 GHz in-door and outdoor (EU)	2400–2483.5 MHz: 20 dBm max EIRP allowed.
Frequency bands 2.4 GHz in-door and outdoor (USA)	2400–2473 MHz: 20 dBm max EIRP allowed.
Frequency bands 5 GHz indoor (EU), indoor and outdoor (USA)	5170-5330 MHz: 23 dBm max EIRP allowed
Frequency bands 5 GHz indoor and outdoor (EU/USA)	5490-5710 MHz: 30 dBm max EIRP allowed
Frequency bands 5 GHz indoor and outdoor (USA)	5735-5835 MHz: 30 dBm max EIRP allowed
WLAN modes	2.4 GHz: 802.11b only; 802.11g only, 802.11b/g/n mixed; 802.11b/g/n mixed long; 802.11b/g/b mixed short; 802.11b/g/n; 802.11g/n; 802.11n only; 5 GHz Operation: 802.11a only; 802.11a/n; 802.11n only.
Automatic Rate Selection (ARS)	Automatic usage of the optimized data rate.
Data rates for 802.11b,g (2.4 GHz)	11, 5.5, 2 and 1 Mbps (DSSS modulation). 54, 48, 36, 24, 18, 12, 9 and 6 Mbps (OFDM modulation).
Data rates for 802.11a,h (5 GHz)	54, 48, 36, 24, 18, 12, 9 and 6 Mbps (OFDM modulation).
Data rates for 802.11n, Long Guard (800ns), 20 MHz	MSC0 6,5 Mbps; MSC1 13 Mbps; MCS2 19,5 Mbps; MCS3 26 Mbps; MCS4 39 Mbps; MSC5 52 Mbps; MCS6 58,5 Mbps; MCS7 65 Mbps; MCS8 13 Mbps; MCS9 26 Mbps; MCS10 39 Mbps; MCS11 52 Mbps; MCS12 78 Mbps; MCS13 104 Mbps; MCS14 117 Mbps; MCS15 130 Mbps.
Data rates for 802.11n, Short Guard (400ns), 20 MHz	MSC0 7,2 Mbps; MSC1 14,4 Mbps; MCS2 21,7 Mbps; MCS3 28,9 Mbps; MCS4 43,3 Mbps; MSC5 57,8 Mbps; MCS6 121,5 Mbps; MCS7 135 Mbps; MCS8 27 Mbps; MCS9 54 Mbps; MCS10 81 Mbps; MCS11 108 Mbps; MCS12 162 Mbps; MCS13 216 Mbps; MCS14 243 Mbps; MCS15 270 Mbps.
Data rates for 802.11n, Long Guard (800ns), 40 MHz	MSC0 13,5 Mbps; MSC1 27 Mbps; MCS2 40,5 Mbps; MCS3 54 Mbps; MCS4 81 Mbps; MSC5 108 Mbps; MCS6 121,5 Mbps; MCS7 135 Mbps; MCS8 27 Mbps; MCS9 54 Mbps; MCS10 81 Mbps; MCS11 108 Mbps; MCS12 162 Mbps; MCS13 216 Mbps; MCS14 243 Mbps; MCS15 270 Mbps.
Data rates for 802.11n, Short Guard (400ns), 40 MHz	MSC0 15 Mbps; MSC1 30 Mbps; MCS2 45 Mbps; MCS3 60 Mbps; MCS4 90 Mbps; MSC5 120 Mbps; MCS6 135 Mbps; MCS7 150 Mbps; MCS8 30 Mbps; MCS9 60 Mbps; MCS10 90 Mbps; MCS11 120 Mbps; MCS12 180 Mbps; MCS13 240 Mbps; MCS14 270 Mbps; MCS15 300 Mbps.
Output power limitation (without antenna gain)	Adjustable in the following steps: 5, 8,11,14,16 dBm and maximum. Maximal power varies depending on data rate, frequency band and country setting.
Bandwidth (802.11n)	20/40 MHz (bundling two adjoining 20 MHz channels into one 40 MHz channel).
CONNECTOR	Two SMA-RP male connectors.

A.6.7 USB interface

3G USB MODEMS	Please visit the Teldat website at http://www.teldat.com to get a list of the supported 3G USB modems.
SPEED	The interface complies with the USB 2.0 (480 Mbps) standard; the end speed depends on the 3G USB modem used.
CONNECTOR	USB Type A.

A.6.8 Configuration interface

MODE	115200-8-N-1 without flow control.
CONNECTOR	USB Type B.

A.6.9 Power supply

INPUT VOLTAGE	110 - 240 V AC.
FREQUENCY	50 - 60 Hz.
INPUT CURRENT	0.7 A.
CONNECTOR	IEC C6.

A.6.10 Dimensions and weight

TYPE	Metallic housing with optional mounting in a 19-inch rack (bracket option).
LENGTH x WIDTH x HEIGHT	265mm x 170mm x 40mm.
WEIGHT	1.4 kg.

A.6.11 Environmental specifications

TEMPERATURE	OPERATING NORMALLY: 0 ºC to 40 ºC. STORED: -25 ºC to 70 ºC.
RELATIVE HUMIDITY	On: 10 % to 90 %, non-condensing.

Appendix B Radio Information

B.1 Radio WWAN specifications

LTE/WCDMA/GSM connectivity is provided by different WWAN modules. The exact module installed will depend on your particular router model.

This product is supplied with antennas. To comply with the regulations, do not choose other antennas.

Technology: LTE. MC7304 specifications.

Bands	Frequencies	Radiated Transmit Power
Band 1	Tx: 1920–1980 MHz Rx: 2110–2170 MHz	+23 dBm ± 1 dBm
Band 3	Tx: 1710–1785 MHz Rx: 1805–1880 MHz	+23 dBm ± 1 dBm
Band 7	Tx: 2500–2570 MHz Rx: 2620–2690 MHz	+21 dBm ± 1 dBm
Band 20	Tx: 832–862 MHz Rx: 791–821 MHz	+23 dBm ± 1 dBm

Technology: LTE. EC25-E specifications.

Bands	Frequencies	Conducted Transmit Power
Band 1	Tx: 1920-1980 MHz Rx: 2110-2170 MHz	+23 dBm ± 2 dB
Band 3	Tx: 1710–1785 MHz Rx: 1805–1880 MHz	+23 dBm ± 2 dB
Band 7	Tx: 2500–2570 MHz Rx: 2620–2690 MHz	+23 dBm ± 2 dB
Band 20	Tx: 832–862 MHz Rx: 791–821 MHz	+23 dBm ± 1 dB

Technology: UMTS(WCDMA)/ HSDPA/ HSUPA/ HSPA+/ DC-HSPA+:. MC7304 Specifications

Bands	Frequencies	Radiated Transmit Power
Band 1	Tx: 1920-1980 MHz Rx: 2110-2170 MHz	+23 dBm ± 1 dBm
Band 8	Tx: 880–915 MHz Rx: 925–960 MHz	+23 dBm ± 1 dBm

Technology: UMTS(WCDMA)/ HSDPA/ HSUPA/ HSPA+/ DC-HSPA+. EC25-E specifications.

Bands	Frequencies	Conducted Transmit Power
Band 1	Tx: 1920-1980 MHz Rx: 2110-2170 MHz	+24 dBm +1/-3 dB
Band 8	Tx: 880–915 MHz Rx: 925–960 MHz	+24 dBm +1/-3 dB

Technology: GSM / GPRS / EDGE. MC7304 Specifications

Bands	Frequencies	Radiated Transmit Power
EGSM 900 (900 MHz)	Tx: 880–915 MHz Rx: 925–960 MHz	+32 dBm ± 1 dBm
DCS 1800 (1800 MHz)	Tx: 1710–1785 MHz Rx: 1805–1880 MHz	+29 dBm ± 1 dBm

Technology: GSM / GPRS / EDGE. EC25-E specifications.

Bands	Frequencies	Conducted Transmit Power
EGSM 900 (900 MHz)	Tx: 880–915 MHz Rx: 925–960 MHz	+33 dBm ± 2 dB +27 dBm ± 3 dB (8-PSK)
DCS 1800 (1800 MHz)	Tx: 1710–1785 MHz Rx: 1805–1880 MHz	+30 dBm ± 2 dB +26 dBm ± 3 dB (8-PSK)

B.2 Radio WI-FI specifications

Wi-Fi Radio communications comply with standards 802.11a/b/g/n.

This product is supplied with antennas. To comply with the regulations, do not choose other antennas.

Standard	IEEE 802.11-2016 including 802.11a, 802.11b, 802.11g, 802.11n, 802.11i, 802.11e
Frequency bands	2,4 GHz/5 GHz
Channels and frequencies	EU: 802.11b/g/n-HT20: 2412 ~ 2472MHz (channels 1 to 13); EU: 802.11n-HT40: 2422 ~ 2462MHz (channels 3 to 11); EU: 802.11a /n-HT20/ac-VHT20: 5180~5240 MHz (channels 36 to 48), 5260~5320 MHz (channels 52 to 64), 5500~5700 MHz (channels 100 to 140); EU: 802.11n-HT40: 5190~5230 MHz (channels 38 and 46), 5270~5310 MHz (channels 54 and 62), 5510~5670 MHz (channels 102 to 134) ; USA: 802.11b/g/n-HT20: 2412 ~ 2462MHz (channels 1 to 11); USA: 802.11n-HT40: 2422 ~ 2452MHz (channels 3 to 9); USA: 802.11a /n-HT20: 5180~5240 MHz (channels 36 to 48), 5260~5320 MHz (channels 52 to 64), 5500~5700 MHz (channels 100 to 140), 5745~5825 MHz (channels 149 to 165);

	USA: 802.11n-HT40: 5190~5230 MHz (channels 38 and 46), 5270~5310 MHz (channels 54 and 62), 5510~5670 MHz (channels 102 to 134), 5755~5795 (channels 151 and 159) ;
Carrier frequencies stability	+- 2 ppm
Number of Channels	EU: 802.11a/n-HT20: 19 EU: 802.11n-HT40: 9 USA: 802.11a/n-HT20: 24 USA: 802.11n-HT40: 11
Type of modulation	802.11b: PSK, DBPSK, DSSS, and CCK 802.11g: BPSK, QPSK, 16QAM, 64QAM with OFDM 802.11a: BPSK, QPSK, 16QAM, 64QAM with OFDM 802.11n: BPSK, QPSK, 16QAM, 64QAM with OFDM
Transmission technology	CSMA/CA (Carrier-sense multiple access with collision avoidance)
Unwanted Emissions in the Spurious Domain Limit	1 GHz to 12,75 GHz < -30 dBm according to EN 301 893 and EN 300 328
TX power @ 2,4 GHz 802.11n 40 MHz (HT40)	MCS0/8 19 dBm; MCS1/9 19 dBm; MCS2/10 19 dBm; MCS3/11 19 dBm; MCS4/12 19 dBm; MCS5/13 19 dBm; MCS6/14 19 dBm; MCS7/15 19 dBm.
Receiver Sensitivity @ 2.4 GHz 802.11n 40 MHz (HT40)	MCS0 -92 dBm; MCS1 -91 dBm; MCS2 -89 dBm; MCS3 -86 dBm; MCS4 -82 dBm; MCS5 -79 dBm; MCS6 -77 dBm; MCS7 -75 dBm; MCS8 -91 dBm; MCS9 -91 dBm; MCS10 -89 dBm; MCS11 -85 dBm; MCS12 -82 dBm; MCS13 -78 dBm; MCS14 -77 dBm; MCS15 -74 dBm.
Receiver Sensitivity @ 5 GHz 802.11n 40 MHz (HT40)	MCS0 -91 dBm; MCS1 -89 dBm; MCS2 -87 dBm; MCS3 -84 dBm; MCS4 -81 dBm; MCS5 -78 dBm; MCS6 -76 dBm; MCS7 -74 dBm; MCS8 -90 dBm; MCS9 -89 dBm; MCS10 -87 dBm; MCS11 -83 dBm; MCS12 -80 dBm; MCS13 -77 dBm; MCS14 -75 dBm; MCS15 -73 dBm.
Receiver Sensitivity @ 5 GHz 802.11a/h	6 Mbps -95 dBm;9 Mbps -94dBm; 12 Mbps -93 dBm; 18 Mbps -90 dBm; 24 Mbps -88 dBm; 36 Mbps -84 dBm; 48 Mbps -82 dBm; 54 Mbps -81 dBm.
TX power @ 2,4 GHz 801.11b/g	1 Mbps 19 dBm; 2 Mbps 19 dBm; 5,5 Mbps 19 dBm; 11 Mbps 19 dBm; 6 Mbps 19 dBm;9 Mbps 19 dBm; 12 Mbps 19 dBm; 18 Mbps 19 dBm; 24 Mbps 19 dBm; 36 Mbps 19 dBm; 48 Mbps 19 dBm; 54 Mbps 19 dBm.
TX power @ 2,4 GHz 802.11n 20 MHz (HT20)	MCS0/8 19 dBm; MCS1/9 19 dBm; MCS2/10 19 dBm; MCS3/11 19 dBm; MCS4/12 19 dBm; MCS5/13 19 dBm; MCS6/14 19 dBm; MCS7/15 19 dBm.
Receiver Sensitivity @ 2.4 GHz 802.11b/g	1 Mbps -92 dBm; 2 Mbps -92 dBm; 5,5 Mbps -92 dBm; 11 Mbps -92 dBm; 6 Mbps -95 dBm;9 Mbps -95 dBm; 12 Mbps -94 dBm; 18 Mbps -92 dBm; 24 Mbps -90 dBm; 36 Mbps -85 dBm; 48 Mbps -83 dBm; 54 Mbps -80 dBm.
TX power @ 5 GHz 802.11n 40 MHz (HT40)	MCS0/8 19 dBm; MCS1/9 19 dBm; MCS2/10 19 dBm; MCS3/11 19 dBm; MCS4/12 19 dBm; MCS5/13 18 dBm; MCS6/14 17 dBm; MCS7/15 17 dBm.
TX power @ 5 GHz 802.11n 20 MHz (HT20)	MCS0/8 23 dBm; MCS1/9 23 dBm; MCS2/10 22 dBm; MCS3/11 21 dBm; MCS4/12 20 dBm; MCS5/13 19 dBm; MCS6/14 18 dBm; MCS7/15 18 dBm.
TX power @ 5 GHz 801.11a/h	MCS0 -95 dBm; MCS1 -94 dBm; MCS2 -92 dBm; MCS3 -88 dBm; MCS4 -85 dBm; MCS5 -81 dBm; MCS6 -80 dBm; MCS7 -78dBm; MCS8 -95 dBm; MCS9 -94

	dBm; MCS10 -91 dBm; MCS11 -87 dBm; MCS12 -84 dBm; MCS13 -81 dBm; MCS14 -79 dBm; MCS15 -77 dBm.
Receiver Sensitivity @ 2.4 GHz 802.11n 20 MHz	MCS0 -95 dBm; MCS1 -94 dBm; MCS2 -92 dBm; MCS3 -88 dBm; MCS4 -85 dBm; MCS5 -81 dBm; MCS6 -80 dBm; MCS7 -78dBm; MCS8 -95 dBm; MCS9 -94 dBm; MCS10 -91 dBm; MCS11 -87 dBm; MCS12 -84 dBm; MCS13 -81 dBm; MCS14 -79 dBm; MCS15 -77 dBm.
Receiver Sensitivity @ 5 GHz 802.11n 20 MHz (HT20)	MCS0 -96 dBm; MCS1 -93 dBm; MCS2 -91 dBm; MCS3 -88 dBm; MCS4 -85 dBm; MCS5 -81 dBm; MCS6 -79 dBm; MCS7 -77 dBm; MCS8 -94 dBm; MCS9 -92 dBm; MCS10 -90 dBm; MCS11 -87 dBm; MCS12 -84 dBm; MCS13 -80 dBm; MCS14 -78 dBm; MCS15 -76 dBm.