Celer Router

Installation Manual

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I Related Documents

Chapter 1 About This Guide

This is the installation guide for the **Celer Router** and contains information on how to correctly install the device in a working environment.

1.1 Supported Devices

The information included in this installation guide specifically pertains to the **Celer Router**.

1.2 Who Should Read This Manual?

This manual is intended for support personnel who are responsible for configuring, maintaining and monitoring the device.

1.3 When Should This Manual Be Read?

When you are ready to familiarize yourself with the device and its components, please refer to this guide for comprehensive information.

By reading this manual, you will gain a deeper understanding of your new device's functionalities.

1.4 What Is In This Manual?

This installation guide contains the following information:

- A description of the features available in the **Celer Router**.
- Detailed technical specifications.
- Requirements for the power supply.
- Compatibility of elements that can be connected during device operation.
- Step-by-step instructions on how to install and uninstall modules and power supplies.
- A detailed description of the device's LEDs and connectors.
- Helpful troubleshooting tips.

1.5 What Is Not In This Manual?

The information regarding the device software and its configuration is not included in this manual. To obtain instructions on configuring this device, please refer to the corresponding protocol manuals available at:

https://support.windbit.com.

1.6 How Is The Information Organized?

Each chapter focuses on a specific part of the hardware and its components. Detailed and technical specifications, along with relevant information about each component, can be found in the corresponding chapter.

1.7 Technical Support

In order to ensure optimal performance and stay up-to-date with the latest features, Windbit provides technical support and regular software upgrades.

Contact information:

Web: https://www.windbit.com

Tel.: +34 918 076 565

Fax: +34 918 076 566

Email: support@windbit.com

Chapter 2 Celer Router

2.1 Models

Please find below a comprehensive list of available **Celer Router** models:

Models	**Sales Code**	Wi-Fi	**WWAN**
TLDPH00P1	RWRCELZZZ	Yes	No
TLDPH01P1	RWCEL5NR RWCEL5NR-AI	Yes	Quectel RM520N-GL (5G, SA & NSA)
TLDPH02P1	RWRCELL06	Yes	Quectel EM06-E (4G, LTE Cat.6)
TLDPH03P1	RWRCELS06	Yes	Quectel EM06-A (4G, LTE Cat.6)

2.2 Power Supply

To learn more about the power supply for the **Celer Router**, please refer to *Components and Power Supply* on page 5.

2.3 Hardware Monitoring

The **Celer Router** features a LED panel for hardware monitoring purposes. These LEDs offer visual cues about the device's operational status and indicate connectivity, data flow, and other relevant information.

For additional details about the LED panel, please refer to *Components* on page 5.

Chapter 3 Components and Power Supply

The following chapter provides comprehensive information about the chassis and components of the **Celer Router**, including details about:

- Front and rear panel components.
- Assembly procedures.
- Power supply.
- RESET button.
- Data connection.
- SIM card installation.

3.1 Components

3.1.1 Front panel

The following figure shows the front panel of the device.

Fig. 1: **Front Panel**

The table below presents detailed information and descriptions for each connector:
Front panel components

Item	Description
Power	Power source connection. To obtain more details about Power Connection, please consult the following sections: - *Connecting the power supply* on page 10 - *POWER connector* on page 28 - *Electrical specifications* on page 39
ETH0	ETH0. 2.5 Gigabit Ethernet. For additional information regarding the LAN interface, please refer to the following sections: - *LAN connection* on page 15 - *LAN connectors* on page 28 - *LAN interface* on page 30
ETH1	ETH1. 2.5 Gigabit Ethernet. For more information about the LAN interface, please refer to the following sec-

	tions: - *LAN connection* on page 15 - *LAN connectors* on page 28 - *LAN interface* on page 30
Ant 0 Ant 1	WWAN Antenna connectors For further details on the antenna connections, please see the following sections: - *Connecting the WWAN antennas* on page 16 - *WWAN antenna connector* on page 29 - *Wireless WAN interface (Celer-LTE1 Celer-LTE2)* on page 32 - *Wireless WAN interface (Celer 5G)* on page 34

Furthermore, the front panel includes a set of LEDs that indicate the router's status.

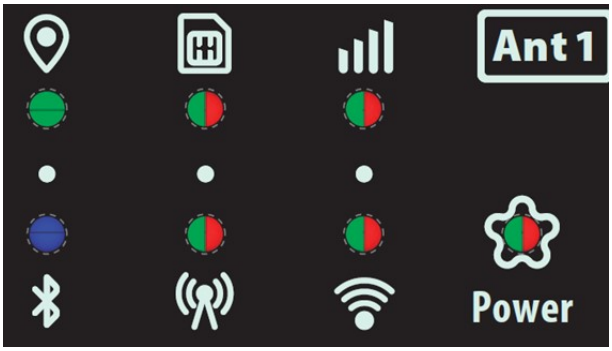


Fig. 2: **LEDs Panel**

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

LEDs

LED	Status	Description
Power 	Tricolor	Green -> Device powered on. Red -> System alert. Orange -> Heater is on. Off -> Device powered off.
GNSS 	Green	Off -> No GNSS lock. Blinking -> Obtaining lock. Steady -> GNSS locked.
Bluetooth	Blue	Blinking: • Rapid blinking. Pairing. • Slow blinking. Data activity. • Steady. Paired.

		Off -> Interface off.
SIM	Tricolor	Off -> System stopped. Red -> SIM error (No pin, No SIM, etc). Orange -> SIM2 Selected. Green -> SIM1 Selected.
Cell	Tricolor	Off -> System stopped. Red -> Interface is unavailable because it is installing, disabled (shutdown), or due to an auto-test failure. Orange -> Idle: Registered context not established Green -> Connected. Blinking: data activity.
Lvl	Tricolor	Coverage of the currently selected SIM: Off -> System stopped. Red -> Below -100 dBm. Orange -> Between -90 and -100 dBm Green -> Above -90 dBm.
WLAN	Tricolor	Off -> System stopped. Red -> disabled or down. Green -> Interface UP. Blinking: data activity.

3.1.2 Rear panel

Moving on to the rear panel, as illustrated in the following figure, the **Celer** SIM card slots can be found here.

Fig. 10: **Rear Panel**

The table below provides detailed information and descriptions for each connector:

Rear panel elements

Item	Description

WiFi	2 Wi-Fi Antenna connectors (SMA-RP) For further details on the antenna connections, please see the following sections: - *Connecting WLAN antennas* on page 17 - *WLAN antenna connector* on page 29 - *Wireless LAN interface* on page 37 - *WI-FI specifications* on page 43
BT	BlueTooth Antenna connector (SMA-RP) For additional information about the antenna connections, please consult the following sections: - *Connecting the BT antenna* on page 18 - *Bluetooth connector* on page 29 - *Bluetooth specifications* on page 44
Ant 2 Ant 3	WWAN Antenna connectors (SMA) The number of connectors depends on the specific device model (Ant2 is a dedicated GNSS antenna connector, and Ant3 does not exist in LTE models). To obtain more details about the antenna connections, please see the following sections: - *Connecting the WWAN antennas* on page 16 - *WWAN antenna connector* on page 29 - *Wireless WAN interface (Celer 5G)* on page 34 - *RF WAN (Celer 5G) specifications* on page 42
GNSS	GNSS Antenna connector. (SMA) Ant3 is a dedicated GNSS antenna connector in LTE devices. In 5G models, the fourth antenna of the 5G module also shares this connector. For more information regarding the GNSS interface, please refer to the following sections: - *Connecting the GNSS antenna* on page 17 - *GNSS connector* on page 29 - *GNSS interface* on page 38 - *GNSS specifications* on page 44
SIM1 SIM2	SIM Card 1-2. Slot where you can insert the SIM cards. Refer to *Installing the SIM Card* on page 19 for more information on SIM installation.
RST	Reset button. To understand how the reset button works, please see *RESET Button* on page 14 for further information.
GND	Ground Protection Screw. To obtain more details about Power Connection, please consult *Electrical specifications* on page 39.

3.2 Mounting Options

Note

It is recommended that the device be handled and installed by qualified service personnel to avoid any potential damage or malfunction.

3.2.1 Assembly: Recommendations

The **Celer** router features four holes in the lateral wings of the housing, allowing it to be easily mounted on either a wall or ceiling.

Wall-/Ceiling mounting

To install the device on a wall or ceiling, securely screw the **Celer** router into place using four screws.

Warning

Before drilling, thoroughly check the surrounding area for any nearby building installations. Damaging gas, electricity, water, or waste water lines can pose serious risks to your safety and may cause property damage.

- Attach the mount to the wall using four screws to ensure the device is firmly and securely mounted.
- Ensure that the device connections are easily accessible.

3.2.2 Outline drawing

Please refer to the following drawing for installation instructions:

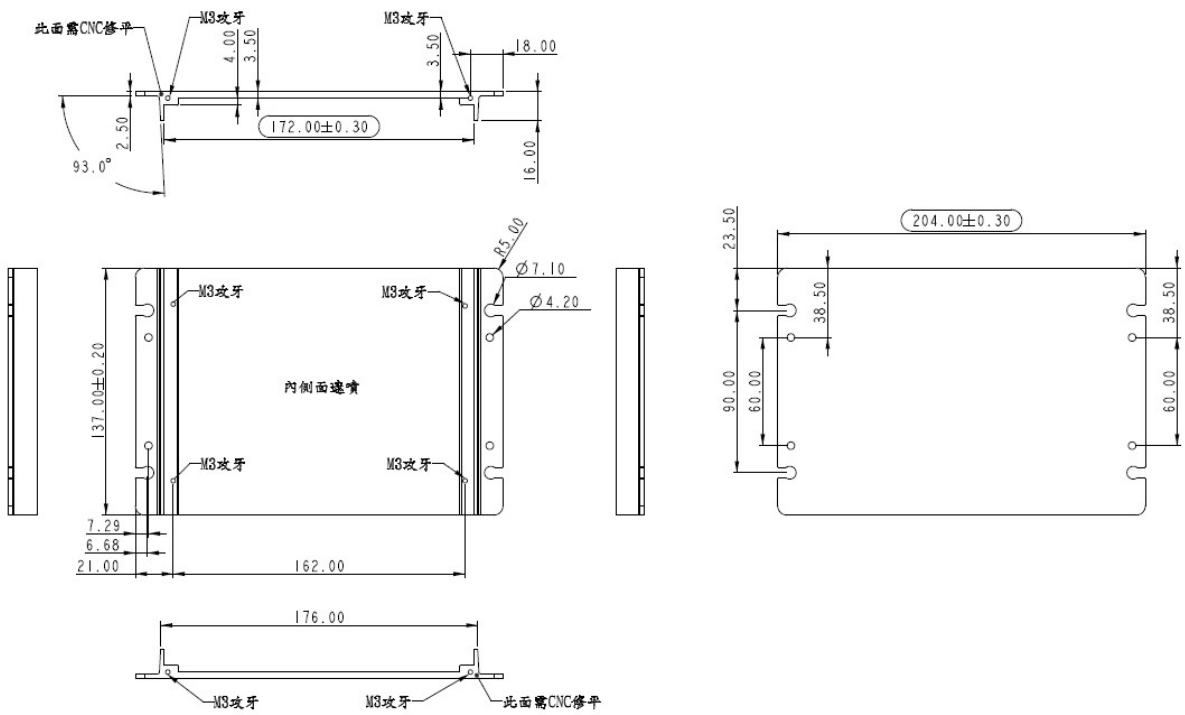


Fig. 11: **Outline drawing**

3.3 Power Source

Note

Before connecting the router, please carefully read the instructions provided below!

3.3.1 Connecting the power supply

To power the **Celer**, it supports a 12V to 24V nominal DC power source.

Note

It is important to ensure that the power input of the device is compatible with your power source.

If the temperature of the device is below 5 °C, a heater will activate and the device will not boot until the temperature has increased. While in this state, power consumption amounts to 27.5 W.

The power connector is conveniently located as shown in the image below:

Fig. 12: Power supply connector

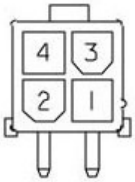
Please note that there is no on/off switch or fuse for the device. The power supply information can be found on a label located on one side of the device.

	To comply with safety regulations, it is necessary to install an external surcharge protection device for this equipment. This can be achieved by using a 5.0 A time-lag fuse or a previously approved 1-amp thermo-magnetic circuit breaker such as the ABB-S281-UC-K-1 or an equivalent model. It is crucial to ensure the correct polarity of the DC connection, as connecting it incorrectly may result in damaging the external line fuse.
	The **Celer**is equipped with one earth terminal located on the rear panel. It is essential to ground it using a cable with a section measuring at least 2 mm^2 (AWG14). This equipment must be properly grounded. Never deactivate the ground conductor or operate the equipment without a correctly installed ground. If you are unsure about the availability of suitable grounding, it is recommended to contact the appropriate electrical inspection authority or an electrician. During the installation or replacement of the unit, always establish the ground connection first and disconnect it last.

Fig. 13: Rear view, Protective Earth connection

3.3.1.1 Power connector pins

The router is equipped with a Molex Micro-Fit 3mm 2x2 female connector or an equivalent connector for power connection.

PIN	Signal	Micro-Fit 2x2
1	GND	
2	VCC	
3	IGN	
4	GPIO	

3.3.1.2 Power cable

Included with the router is a power cable that has one open-ended side. The estimated maximum power consumption for this equipment is 0.925 A when operating at 24 VDC or 1.85 A when operating at 12 VDC.

If a longer cable is needed, it must be certified for flammability with a CE or UL marking.

It is important to be cautious when dealing with electric current in power cables, telephone lines, and communication cables as it can be dangerous. Before installing, handling, or opening the equipment covers, make sure to connect and disconnect the cables according to the instructions provided in the following table in order to prevent electric shocks:

To connect	To disconnect
Ensure that the power supply cable is not yet connected to the device.	Disconnect the power supply cable from the power supply.
Connect all data cables.	Disconnect the power supply cable from the device.
Proceed to connect the power supply cable to the device.	Disconnect any data cables that may be connected.
Finally, connect the power supply cable to the power supply.	

3.3.2 Connecting the power cable in vehicle installation

When connecting electrical accessories, it is crucial to adhere to the vehicle manufacturer's recommendations. In the case of the device's power supply cable, it must be accurately connected to the vehicle's fuse box for proper functioning.

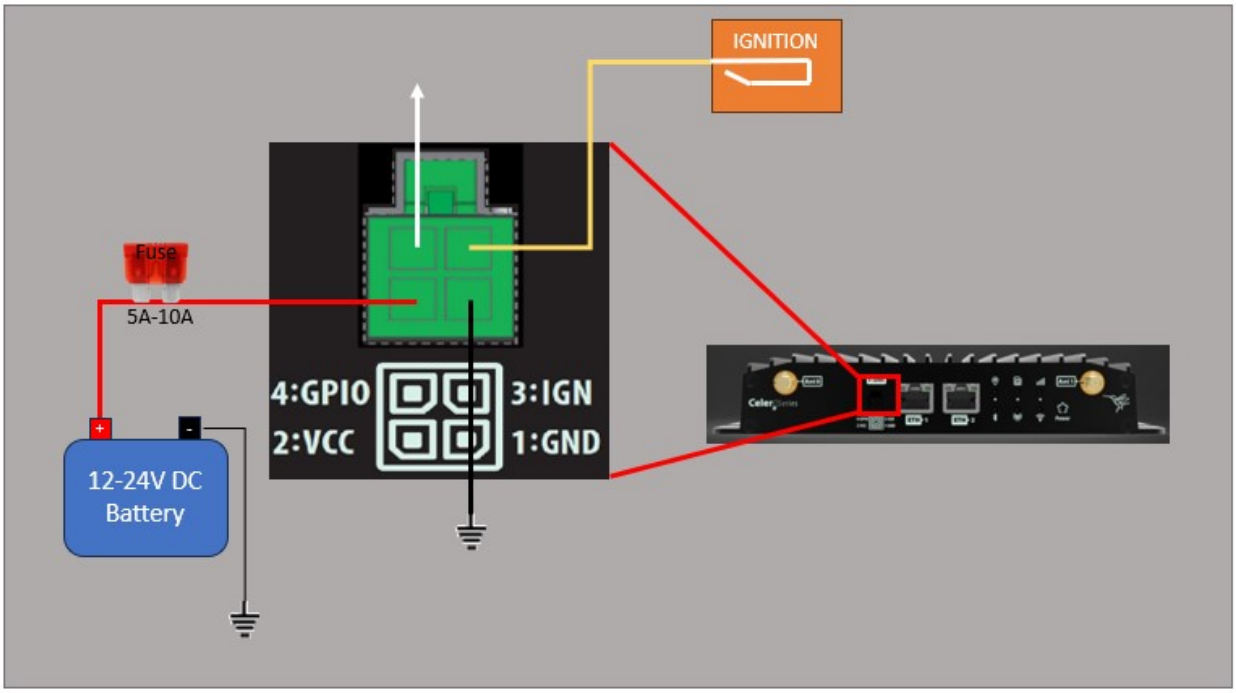


Fig. 14: **Cable connection in vehicle installation**

The recommended vehicle installation allows the Celer to operate with the vehicle. When the vehicle ignition is off, the router is off. If desired, you can configure a delay between the time the vehicle's ignition shuts off, and the time the Celer shuts down. A delayed shutdown is especially useful if you want to maintain a network connection while the vehicle's engine is shut off for short periods, such as in a delivery vehicle.

- Pin 1 (Ground)—Use the black wire in the DC cable to connect Pin 2 to ground.
- Pin 2 (Power) —Use the red wire in the DC cable to connect Pin 1 to the power source. Recommends using a continuous (unswitched) DC power source. Connect the power through the vehicle's fuse box.
- Pin 3 (Ignition Sense) — recommends always using the Ignition Sense wire (Pin 3) to turn the Celer off. It should not be turned off by disconnecting the power.

Here are some general tips:

- Start by disconnecting the positive battery cable from the vehicle's battery post.
- Look for an empty fuse slot in the fuse box that has a 5 A - 10 A fuse rating.
- Depending on the fuse box connectors, you can use suitable crimp connectors, fuse tap, or bare wires to seal the cable conductors.
- Connect the BATTERY (+) conductor to the fuse connector.
- Connect the GND conductor to a battery ground connector (-).
- If available, you can also connect the IGNITION conductor to the vehicle's ignition switch as an alternative. However, if you don't plan to use this feature or if there is another device controlling the system's power, connect the IGNITION signal to the BATTERY (+).
- It is recommended to install an approved vehicle circuit breaker as an extra precaution.
- Insert the new fuse into the empty fuse slot in the fuse box.
- Finally, connect the positive battery cable back to the vehicle's battery post.

To ensure a safe and compliant connection to the vehicle, it is essential that all components used in the connection are UL listed and adhere to the regulations enforced in the country where they are installed.

Furthermore, the cabling should be carefully separated from other vehicle wiring to prevent any interference, and it

should not come into contact with any sharp edges that could potentially damage the cables.

The power supply cable should run from the fuse panel to the router, following the vehicle wall. Importantly, the cable should ALWAYS be routed inside the vehicle cabin, avoiding crossing the vehicle's firewall protection.

3.3.3 Connecting the power cable in fixed installation

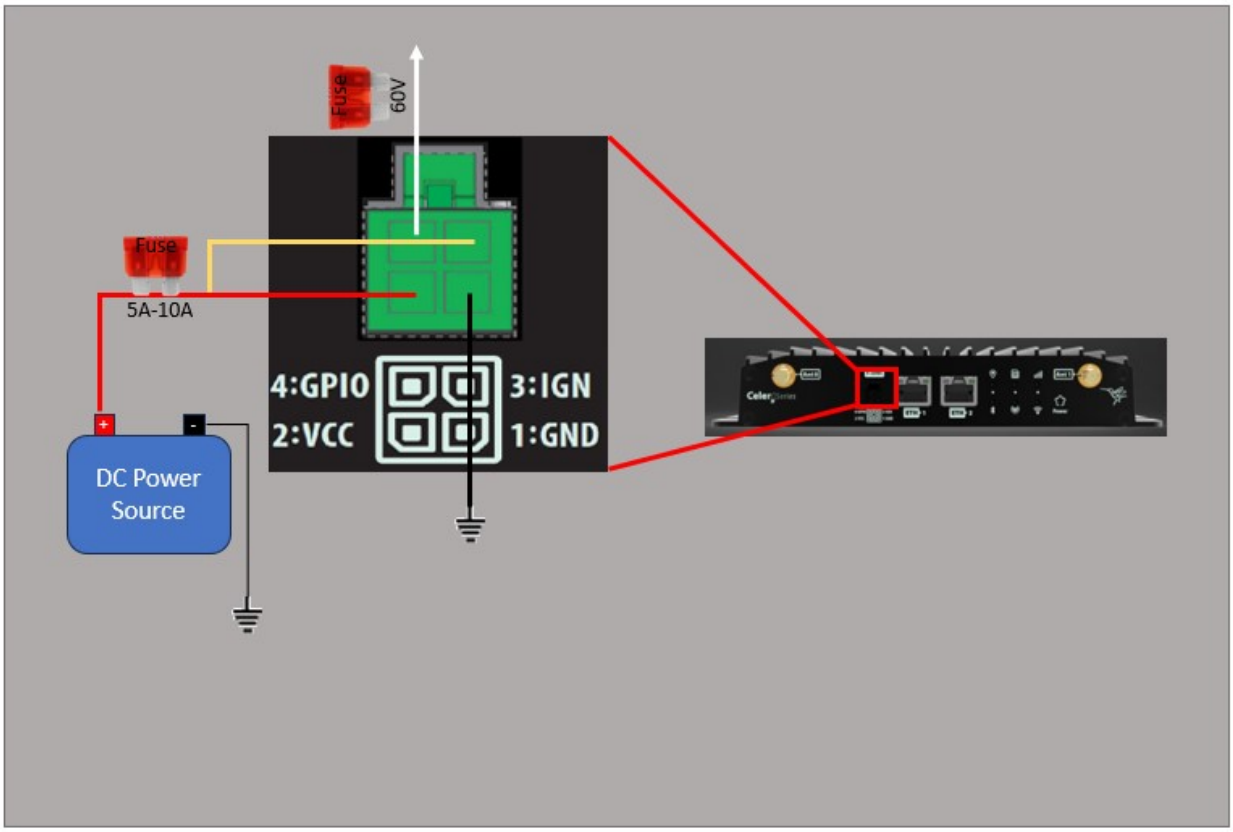


Fig. 15: **Cable connection in fixed installation**

For fixed installations, connect the wires as shown in the figure below. You can configure Low voltage disconnect to force the Celer into Standby mode when the voltage is low.

- Pin 1 (Ground)—Use the black wire in the DC cable to connect Pin 2 to ground.
- Pin 2 (Power) —Use the red wire in the DC cable to connect Pin 1 to the power source.
- Pin 3 (Ignition Sense)—Connected to power.

3.3.4 Connecting the power cable in fixed Installation with I/O Input

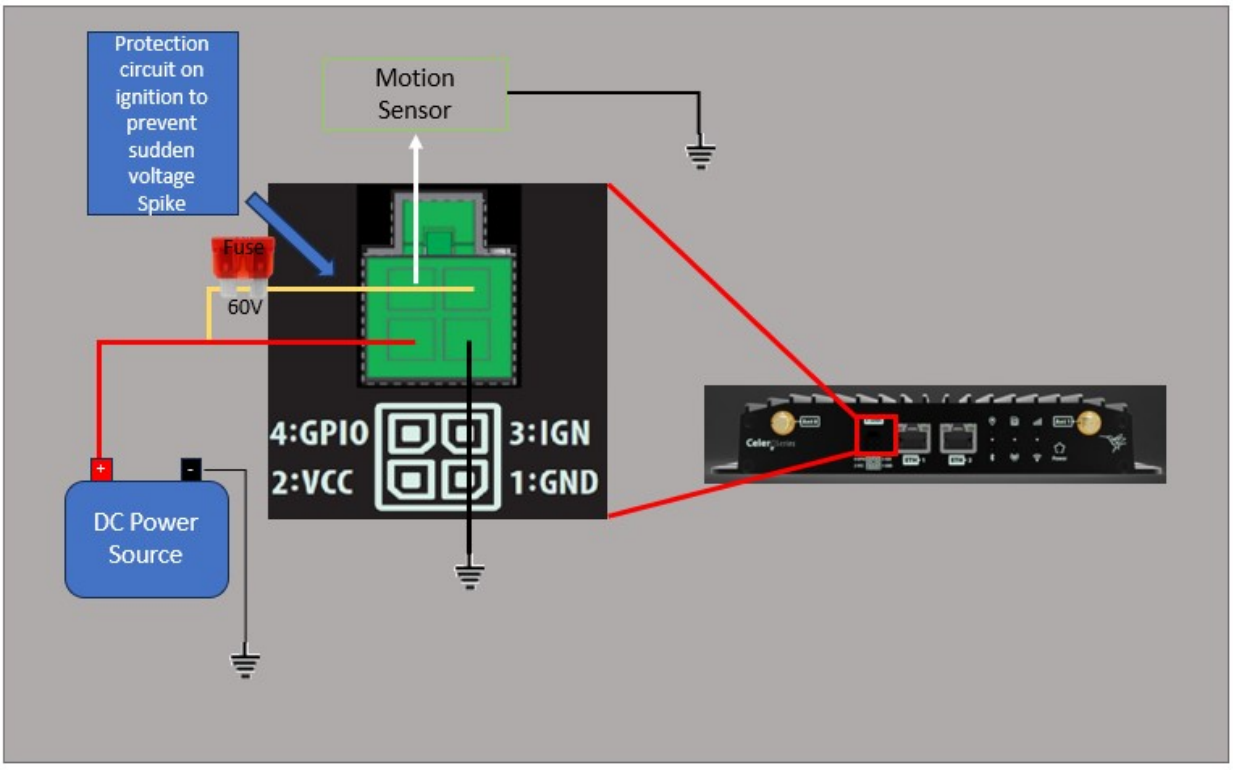


Fig. 16: **Cable connection for fixed installation with I/O as Input**

If you have a fixed installation where you want to use the I/O to monitor an external device such as a motion detector, remote solar panel, or a remote camera, refer to Figure below. You can configure the I/O line to wake the **Celer** up for a configured length of time, and use low voltage disconnect to put the **Celer** in Standby mode if the voltage falls below a configured value.

- Pin 1 (Ground)—Use the black wire in the DC cable to connect Pin 2 to ground.
- Pin 2 (Power) —Use the red wire in the DC cable to connect Pin 1 to the power source.
- Pin 3 (Ignition Sense)—Connected to power.
- Pin 4 (GPIO)—Use the white wire for I/O configurations.

3.3.5 Connecting the power cable to the device

3.3.5.1 Connecting

- Begin by disconnecting the power supply cable from the device.
- Connect the data cables.
- Locate the power connector on the front of the device.
- Insert the power cable connector into the power connector.

3.3.5.2 Disconnecting

- To disconnect, start by disconnecting the power supply cable from the device.
- Then, disconnect the data cables.

3.4 RESET Button

The reset button is concealed beneath the cover lid of the SIM cards. Remove the SIM card cover lid to gain access to the reset button. The RESET button serves various functions, which are explained below.

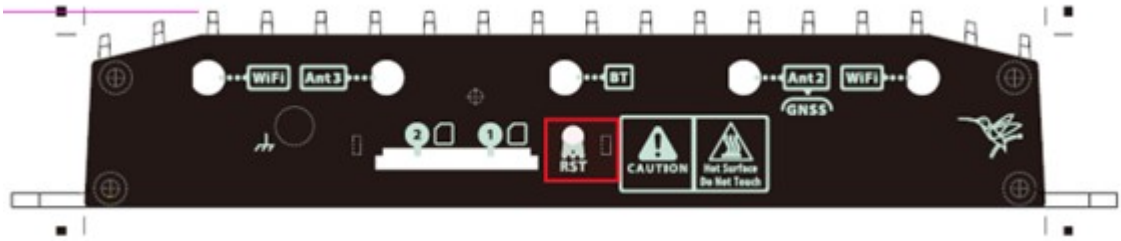


Fig. 17: **Reset button**

3.4.1 Rebooting the device

Pressing the RST button will initiate a restart of the device when it is functioning normally.

3.4.2 Default configuration

The RESET button on your device enables you to restore it to its default configuration. Follow these steps to boot the device with the default settings:

Once the default configuration is up and running, it will establish the following access IP address and mask settings:

- Press the RESET button and hold it pressed for more than 5 seconds.
- Release the Reset button and the device will reboot with default configuration.

IP address: 192.168.1.1

IP network mask: 255.255.255.0

Note

It's worth noting that some devices may have customized settings, which means the default configuration may differ from the example provided above.

3.5 Connecting Data

The **Celer Router** offers several data connections.

3.5.1 LAN connection

The **Celer** features two Gigabit Ethernet 10/100/1000/2500 BaseT ports with automatic MDI/MDIX.

Fig. 18: **Ethernet Ports**

Note

During booting and in BIOS mode, only the ETH0 connector is available.

3.5.2 Connecting the WWAN antennas

The **Celer** has two connectors for WWAN antennas on the front panel and two more antenna connectors on the rear panel for 5G models.

You can easily assemble or disassemble the antennas by plugging or unplugging them into the connectors located on the router's front and rear panels.

To learn more about the antenna connectors and supported RF bands, please refer to *Antenna connectors and bands (Celer 5G)* on page 34.

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

Note

It is crucial to install these antennas in the **Celer** router in order to enhance the signal quality received and transmitted by the cellular module.

Some cellular telephony technologies utilize antenna diversity to enhance signal quality. The **Celer** router family includes several WWAN connectors to facilitate this technique.

Fig. 19: **WWAN connectors**

When installing antennas via extension cords rather than directly connecting them to the router, it is crucial to maintain a minimum distance of 7 cm between the two components. The maximum recommended distance between them should not exceed 25 cm.

For optimal performance, it is advised to use radio frequency accessories (such as antennas and cables) that are recommended by Windbit.

Windbit offers a variety of suitable accessories for different locations, including antennas specifically designed for outdoor installation, antennas suitable for ceiling installation, and extension cables, among others.

3.5.2.1 Placing the antenna

The performance of devices can be significantly influenced by the orientation and location of their antennas relative to other wireless and radiation devices, such as communication devices and personal computers.

Antennas serve to transmit and receive radio signals, but their effectiveness is also impacted by various environmental conditions, including the distance between the device and the base station, physical obstructions, and interferences caused by radio frequencies (RF).

To achieve optimal coverage, please adhere to the following guidelines:

- When selecting a location for your antenna, try to avoid any physical obstacles that may obstruct the wireless signal. These obstacles, such as walls or objects, can degrade the signal quality. It is recommended to place the antenna above ground and facing the nearest base station.
- Take into consideration the density of materials surrounding the antenna. Keep it away from walls, metal screens, mirrors, and any other materials that may interfere with the signal reception.
- Avoid placing the antenna near columns or other objects that may cast shadows and reduce the coverage area.
- Ensure that the antenna is not in close proximity to metal pipes used for heating, air-conditioning, and other similar purposes.
- Please note that other wireless devices, such as telephones and microwaves, may cause temporary interference with radio signal quality.
- It is not advisable to install antennas in close proximity to racks that contain communication devices, computers, and similar equipment. To address this issue, we recommend using an extension cable to position the antenna outside of the rack.

The following recommendations apply to all wireless devices:

- Avoid touching or moving the antenna while the device is transmitting or receiving.
- Refrain from touching any equipment that contains radiation-emitting devices with antennas that are very close to or in contact with any exposed part of the body, especially the face and eyes, when it is transmitting.
- Do not install the device in potentially explosive areas.
- Be aware that wireless devices may cause interference with other devices. Avoid using the device in areas where medical equipment is installed.

3.5.3 Connecting WLAN antennas

The **Celer** is equipped with two SMA-RP connectors designed for WLAN (Wi-Fi) antennas.

To enhance the quality of the WLAN signal, external antennas need to be installed on the **Celer** since it lacks internal antennas.

Ensure that the antenna cable used for connecting the antennas is suitable for RF signal communications at frequencies of up to 2.4 GHz (5.7 GHz for 802.11a) and impedances of 50 Ohms. It is important to note that the quality and length of the antenna cable can impact the RF signal quality, both in transmission and reception, consequently affecting the device's coverage and data exchange rates.

The image below illustrates the location of the WLAN antenna connectors.

Fig. 20: **WLAN antenna connectors**

WLAN antenna requirements

Please note that the WLAN transmitter should not have antennas that are co-located or used together with any other antenna or transmitter. To assess its compliance with CE Radio standards, the device is evaluated with a 2dBi antenna gain.

To meet RF exposure limits, only antennas with a gain equal to or less than 5dBi for 2.4GHz, 7dBi for 5.15~5.35GHz and 5.47~5725GHz, and 10dBi for 5.725~5.85GHz can be used with this transmitter.

3.5.4 Connecting the GNSS antenna

The **Celer** LTE model comes with an SMA connector that allows for connection to an active GNSS antenna.

However, it should be noted that since the router lacks internal antennas, installing an active 3.3V external antenna on the **Celer** is necessary to optimize the GNSS signal quality.

For optimum radio frequency (RF) signal communications, it is essential to use a cable that is compatible with frequencies up to 1.5 GHz and impedances of 50 Ohms. Please keep in mind that the quality and length of the antenna cable can impact the transmission and reception of RF signals, thereby influencing the device's coverage and data exchange rates.

The following image shows the exact location of the GPS antenna connector.

Fig. 21: **GPS Connector**

3.5.5 Connecting the BT antenna

The **Celer** LTE model is equipped with a SMA-RP connector for connecting a Bluetooth antenna.

To ensure proper functionality, its is important to use a cable that is suitable for radio frequency (RF) signal communication with frequencies of up to 2.54 GHz and impedance of 50 Ohms. It should be noted that the quality and length of the antenna cable can impact the quality of the RF signals sent and received. This, in turn, can affect the device's coverage and data exchange rates.

The following image shows the location of the BT antenna connector.

Fig. 22: **BT Connector**

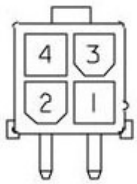
3.5.6 Connecting the I/O signal

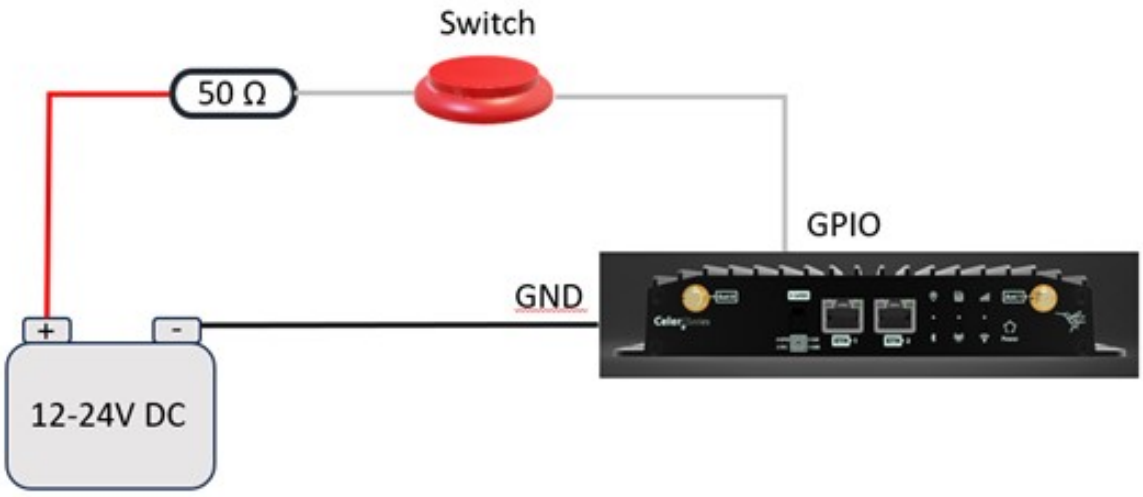
In the front panel of the **Celer**, there is a pin in the Molex Micro-fit connector of the PSU. This pin can be used for either one Digital Input or one Digital Output. See the image below for the exact location of the I/O pin.

Fig. 23: **I/O signal**

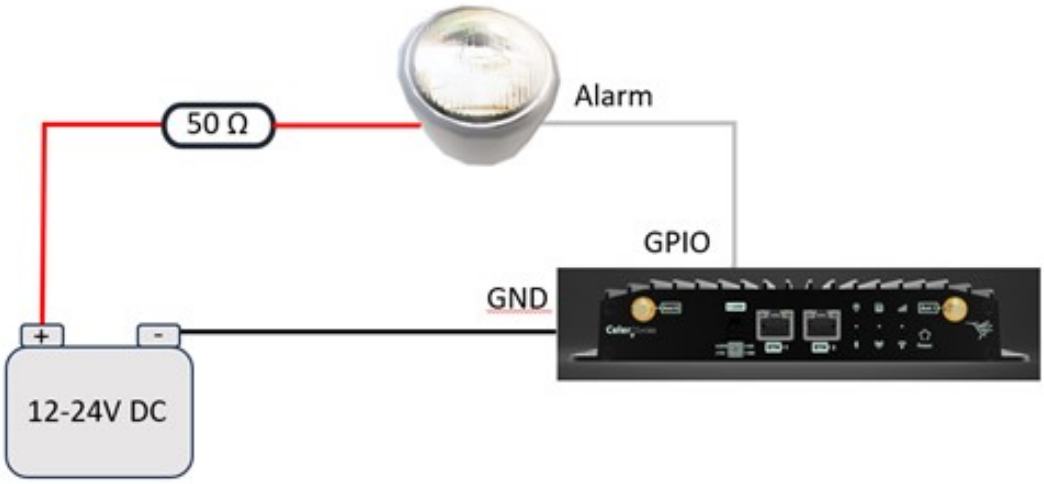
The table provided displays the I/O signal along with its corresponding pin assignment.

PIN	Signal	Molex Micro-fit

1	GND	
2	VCC	
3	IGN	
4	GPIO	



If desired, the GPIO can be utilized as a digital output to control an external light, among other applications. Follow the diagram below for proper connection.



For specific specifications regarding the signals, please refer to *GPIO as digital output specification* on page 39 and *GPIO as digital input specification* on page 39.

3.6 Installing the SIM Card

The **Celer Router** features a Wireless WAN interface that requires one or two SIM cards for operation.

On the front panel of the **Celer Router**, you will find two protected SIM trays, as shown in the following figure. The SIM card size is 4FF nano SIM form factor.

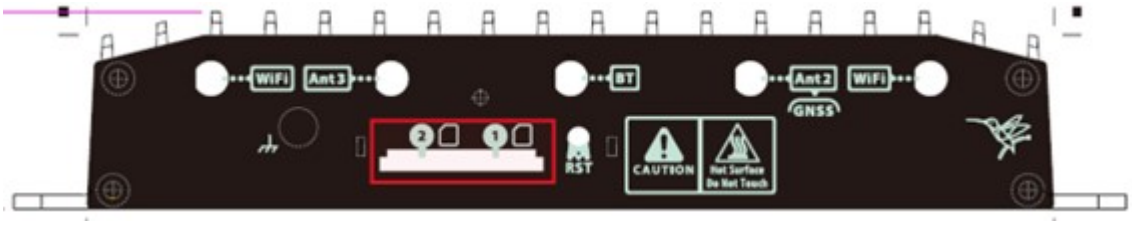


Fig. 24: SIM trays

The assignment for the SIM trays is as follows:

- SIM1: Right Slot
- SIM2: Left Slot

To insert or remove a SIM card in the internal SIM card slots, follow these steps:

(1) Begin by removing the SIM slot cover located on the front of the device. You can do this using a TORX T8 screwdriver to loosen the screw securing the cover. Once the screw is loose, simply remove the cover.

(2) Next, either press to insert the SIM card into the desired tray or press to remove it from the tray.

(3) Once the SIM card is in place or removed, reinsert the card slot cover and ensure it is secure by tightening the screw.

Warning

Never install the SIM cards while the device is powered on.

Prior to inserting the SIM cards, always disconnect the device from the main power supply.

Additionally, make sure to disconnect the device before removing the protective casing to access the trays.

When inserting the SIM cards, please take precautions to guard against electrostatic discharges (ESD).

Do not touch the SIM card connectors.

Chapter 4 Compliance

4.1 Manufacturer Information

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

4.2 Risk Identification

	WARNING: This signal word is used to indicate a potentially hazardous situation that could result in serious injuries or death if not avoided.

4.3 Safety Warnings

	High voltage. Life-threatening risk! Do not attempt to open this equipment while it is powered on.
	Voltaje peligroso. ¡Peligro de muerte! No abra este equipo cuando esté conectado a la corriente.
	To ensure safety, this equipment must be properly grounded at all times. Under no circumstances should the ground conductor be bypassed or the equipment operated without a suitable ground conductor installed. If you are unsure about the availability of suitable grounding, please contact the appropriate electrical inspection authority or consult an electrician. During installation or replacement of this unit, always prioritize making the ground connection first and disconnecting it last.
	Este equipo debe ser conectado a tierra. Nunca abandone la toma de tierra u opere el equipo en ausencia de una toma de tierra adecuada. Contacte con la autoridad eléctrica apropiada o con un electricista si tiene dudas sobre la situación de su toma de tierra. Cuando instale o reemplace el equipo, se debe conectar la conexión de tierra primero y desconectarla la última.
	This equipment has been designed to withstand an extended ambient temperature range of up to 70 °C (158 °F). Under these conditions, the metallic surface may become extremely hot and cause injury.
	Este equipo ha sido diseñado para funcionar con una temperatura ambiente de rango extendido de hasta 70 ºC (158 ºF) y bajo estas condiciones la superficie metálica puede alcanzar temperaturas que pueden causar daños.
	This equipment is specifically designed for installation and handling by trained service personnel and qualified individuals. Mishandling may result in damage or malfunctioning of the device.
	El equipo está diseñado para ser instalado por personal del servicio técnico y su manejo debe realizarlo personal cualificado. De lo contrario, el equipo puede resultar dañado y quedar inservible.
	To protect the sensitive components of this device from electrostatic surges and shocks, it is important to follow these guidelines. Firstly, always wear an antistatic wrist strap connected to the device's chassis when handling the equipment. Additionally, ensure that the device is placed on an antistatic mat. Moreover, it is crucial to prevent the device's components from coming into contact with objects such as necklaces, bracelets, rings, ties, and so on.
	Este equipo contiene componentes sensibles a las sobrecargas y descargas electroestáticas. Por eso, durante la manipulación del equipo, utilice una pulsera antiestática conectada al chasis del equipo y colóquelo sobre una esterilla antiestática. Evite también el contacto de colgantes, pulseras, anillos, corbatas, etc. con cualquier componente del equipo.

	For safety compliance, this equipment necessitates an external surcharge protection device. To meet regulatory requirements, please install a 5.0 A time-lag fuse or a previously approved 1-amp thermo-magnetic circuit breaker (such as ABB-S281-UC-K-1 or its equivalent) in the power line.
	Este equipo depende de un dispositivo externo para la protección frente a sobrecorrientes. La normativa de seguridad requiere instalar en la línea de alimentación o bien un fusible retardado de 5 A o bien un interruptor magnetotérmico homologado de 1 A (ABB-S281-UC-K-1 o equivalente).
	It should be noted that the electric current in power cables, telephone lines, and communication cables can pose a danger. To avoid electric shocks, follow the specific steps provided in the "Connect and Disconnect" section before installing, handling, or opening the covers of the equipment while connecting or disconnecting the cables.
	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”.
	Never install the SIM cards while the device is powered on. Prior to inserting the SIM cards, always disconnect the device from the main power supply. Additionally, make sure to disconnect the device before removing the protective casing to access the trays. When inserting the SIM cards, please take precautions to guard against electrostatic discharges (ESD). Do not touch the SIM card connectors.
	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.
	Prior to drilling, it is essential to ensure that there are no hidden pipes or cables. Damaging electricity cables, gas lines, water pipes, or sewage pipes can have serious consequences, including the risk of death or significant property damage. When selecting the installation location, it is advisable to choose a spot that minimizes the presence of obstacles or electrical appliances that can potentially disrupt the connection.
	Antes de taladrar, asegúrese de que no hay conductos o instalaciones. Roturas en tuberías de agua, gas, instalaciones eléctricas, o desagües pueden causar importantes daños materiales y hasta la muerte. Elija bien el lugar de instalación para que no haya obstáculos o electrodomésticos que perturben la conexión.
	To adequately secure the router against potential tensile forces, it is necessary to use hollow wall anchors when mounting on drywall.

	Para proteger el router de posibles fuerzas de tracción, instale tacos de anclaje para pared hueca cuando vaya a montar el dispositivo en pared.
	Properly securing the router to the ceiling support structure with plastic clips is crucial when mounting it on a suspended ceiling to ensure safety. The ceiling support structure should be capable of withstanding a permanent tensile force. Failure to install the router correctly can lead to it falling from the ceiling, posing a risk to both people and equipment.
	El refuerzo de los falsos techos debe poder aguantar fuerzas de tracción permanentes. Al realizar un montaje en un falso techo, asegúrese de que el router queda perfectamente acoplado al refuerzo usando los elementos de sujeción de plástico. Una instalación incorrecta puede poner en peligro a personas al provocar que el equipo caiga del techo.

4.4 WEEE Information

	The crossed-out wheelie bin symbol indicates that the device should be disposed of separately from regular domestic waste at the end of its useful service life. Kindly use an appropriate waste disposal facility. 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.

4.5 REACH

In accordance with the REACH Candidate List, the delivered product and its packaging do not contain chemical substances above a concentration limit of 0.1% weight by weight (w/w). This declaration will be regularly updated to reflect any changes or additions to the REACH Candidate List. Further information is available to consumers upon request.

4.6 EU Declaration of Conformity

English (EN)	Hereby, Teldat S.A. declares that the radio equipment type TLDPH01P1, TLDPH00P1, TLDPH02P1 is in compliance with: Directive 2014/53/EU (RED) Directives 2011/65/EU and 2015/863/EU (RoHS) of the European Parliament and Council.
German (DE) Deutsch	Hiermit erklärt Teldat S.A. die Übereinstimmung des Geräts TLDPH01P1, TLDPH00P1, TLDPH02P1 mit: Richtlinie 2014/53/EU (RED) Richtlinien 2011/65/EU und 2015/863/EU (RoHS) des Europäischen Parlaments.
Spanish (ES) Español	Por la presente, Teldat S.A. declara que el tipo de equipo radioeléctrico TLDPH01P1, TLDPH00P1, TLDPH02P1 cumple con: Directiva 2014/53/UE (RED) Directivas 2011/65/UE y 2015/863/UE (RoHS) del Parlamento Europeo y del Consejo.

The full text of the EU declaration of conformity is available at the following internet address::

http://www.teldat.com/conformity

4.7 CE Marking

This equipment conforms to CE procedures and marking requirements.

Pursuant to Article 10 of the 2014/53/EU legislation, we hereby notify you that there may be national regulations and restrictions that need to be complied with for the purposes of obtaining authorization. Please be aware that these requirements can change over time. Windbit strongly recommends consulting local authorities to stay up to date with the current national regulations.

BE	BG	CZ	DK	DE	EE	IE
EL	ES	FR	HR	IT	CY	LV
LT	LU	HU	MT	NL	AT	PL
PT	RO	SI	SK	FI	SE	

The WLAN frequency band 5.15-5.35 GHz is restricted to indoor use

RF Exposure warning

This device meets the EU requirements (2014/53/EU) on the limitation of exposure of the general public to electromagnetic fields by way of health protection.The device complies with RF specifications when the device used at 25 cm from your body.

4.8 FCC Marking

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.

CAUTION:

Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the equipment.

4.9 National Restrictions

The availability of some specific channels and / or operational frequency bands are country dependent and are firmware programmed at factory to match the intended destination. The firmware setting is not accessible by the end user.

RF Exposure warning

This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 25 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End-users and installers must be provide with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

4.10 Operating Frequency

To determine the operating frequencies of the device, refer to *Radio Information* on page 41.

Warning: Please note that operating within the 5150 to 5350 MHz frequency range is restricted to indoor use only.

Appendix A Technical Information

A.1 Troubleshooting

If you encounter any problems while installing the device, refer to the following table for troubleshooting. If you are unable to resolve the issue, please contact your dealer for further assistance.

Symptom	Solution
None of the LEDs on the router are lighting up.	Check the power supply to the router by verifying the power source, ON/OFF switch, and main power outlet.
You have forgotten the access password for the router.	Ignore the configuration through the RESET button (as described in the appropriate section).
The *LAN* LED fails to light up in green.	Inspect the Ethernet cable and the network connection.
The *W* LED fails to light up in green.	Check the SIM installation, PIN setting and network configuration, including APN and Authentication parameters. Verify the antenna connection by ensuring that the SMA connector is correctly threaded and tightly secured. Confirm the signal strength in the device's location and ensure that there is sufficient coverage. If using external antennas, try changing their positions and check if RSSI (Received Signal Strength Indicator) improves. Verify service availability in your area.
The *SIM* LED is not lighting up.	Make sure that the SIM card is inserted correctly in the designated tray. Verify that the SIM PIN is correct.
You are unable to connect to the device after updating the software.	It is possible that a failure in the uploading process caused damage to the current system software. In this case, the device will boot up with special software and configuration modes. To regain access to the device and restart the uploading process, please follow these steps: Firstly, access the device by entering the IP address 192.168.1.1. Secondly, use FTP to initiate the uploading process, and enter *root* as the username, leaving the password field blank. Thirdly, ensure that the IP address of your computer is configured to match the subnet of the router.

A.2 Maintenance

The **Celer Router** is designed to be highly reliable and long-lasting, thanks to its lack of moving parts. *This design eliminates the need for any maintenance.*

A.2.1 Cleaning

To keep your device clean, use a damp cloth specifically designed for anti-static purposes. Avoid using solvents and never use a dry cloth, as the build-up of electrostatic charge could potentially cause electronic failure. Additionally, ensure that no moisture enters the device, as it can cause damage.

A.2.2 Software updates

For the **Celer** router, software updates are available. For information on new versions, please contact your dealer.

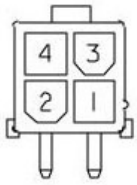
The software required to update our routers is provided in a format called **distribution**. This format includes a single file that contains all the necessary files for updating your device, along with comprehensive information about the contents of these files.

The **Celer** incorporates independent modules for the WWAN interface. The firmware for the modules is separate from the router software. To upgrade the Wireless LAN module, you will need the appropriate UPGRADE file, which can be obtained from your dealer based on the module in your device.

A.3 Connectors

A.3.1 POWER connector

The power connector used in the **Celer** device is a Molex Microfit 3.0 connector.

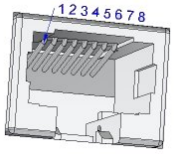
PIN	Signal	M12 4P A Code male
1	+ V DC	
2	+ V DC	
3	0 V	
4	0 V	

A.3.2 LAN connectors

The **Celer** router has two Ethernet interfaces, which can be used to connect individual PCs or other Ethernet switches.

The connection is made using an RJ45 female connector.

Here is the pin assignment for the connection:

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-

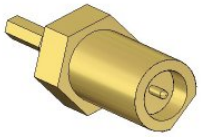
A.3.3 WWAN antenna connector

The **Celer** router is equipped with up to four SMA female connectors.

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

A.3.4 WLAN antenna connector

The **Celer** has two SMA-RP connectors installed.

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

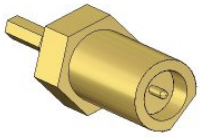
A.3.5 GNSS connector

The GNSS connector installed on the router is a SMA female connector.

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

A.3.6 Bluetooth connector

The Bluetooth connector installed on the router is a SMA-RP connector.

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

A.4 Technical Specifications

A.4.1 Hardware architecture

Processor	Qualcomm Arm Cortex A53 based four core processor.
Memory	DDR4 (1 GByte).
Storage unit	eMMC Memory (4 GBytes).

A.4.2 LAN interface

Protocols	Ethernet (802.3).
Ports	Port with MDI/MDX autodetection.
Speed	10/100/1000/2500 Mbps (BaseT).
Connector	RJ45, female.

A.4.3 Wireless WAN interface (Celer-LTE1 Celer-LTE2)

WWAN Standard/Bands	*EM06-E:*
	• LTE:
	  • 3GPP Release 11
	  • FDD. B1, B3, B5, B7, B8, B20, B28, B32
	  • TDD: B38, B40, B41
	  • 2xCA :
	  • B1 + B1/B5/B8/B20/B28;
	  • B3 + B3/B5/B7/B8/B20/B28;
	  • B7 + B5/B7/B8/B20/B28;
	  • B20 + B32;
	  • B38 + B38;
	  • B7 + B3/B7/B20;
	  • B40 + B40;
	  • B41 + B41
	• WCDMA:
	  • 3GPP Release 9
	  • B1, B3, B5, B8
	EM06-A:
	• LTE:
	  • 3GPP Release 11
	  • FDD. B2, B4, B5, B7, B12, B13, B25 ,B26, B29, B30, B66
	  • TDD: B41
	  • 2xCA :
	  • B2 + B2/B5/B12/B13/B29;
	  • B4 + B4/B5/B12/B13/B29;
	  • B5 + B5/B7/B25/B30/B66;
	  • B7 + B7/B12/B26;
	  • B12 + B12/B25/B30/B66;
	  • B13 + B66;
	  • B25 + B25/B26;
	  • B30 + B29;
	  • B66 + B29/B66;
	  • B41 + B41
	• WCDMA:
	  • 3GPP Release 9
	  • B2, B4, B5

Speed (DL/UL)	The data rates mentioned are theoretical and may vary depending on network conditions.
	EM06-E, EM06-A
	• LTE Cat 6.
	  • FDD: 300Mbps/50Mbps
	  • TDD: 222Mbps/26Mbps

	• HSPA+ Cat 24/6: 42Mbps/5.76Mbps
CONNECTOR	Two SMA female.
SIM Slot	2 Nano-SIM (4FF) ISO/IEC 7810:2003, ID-000 (1.8V / 3V)

A.4.3.1 Antenna connectors (Celer-LTE1 Celer-LTE2)

Connector	ANT3	ANT2	ANT1	ANT0
		GNSS	Diversity (RX)	Main (TX/RX)

Cellular Antenna List for TLDPH03P1

Antenna List	Manufacturer	Part No.	Antenna Type	Peak Gain
1	Grand-Tek Technology	103CG00000090	Dipole Antenna	2 dBi for WCDMA B2, LTE B2, B25,B41 0.8 dBi for WCDMA B4/LTE B4, B66 -0.2 dBi for WCDMA B5/ LTE B5 1.8 dBi for LTE B7 0.9 dBi for LTE B12 0 dBi for LTE B13, B26 -0.1 dBi for LTE B30

Note

The antenna connector is SMA type.

A.4.4 Wireless WAN interface (Celer 5G)

WWAN Standard/Bands	**Celer 5G**-*2, RM520N-GL:*
	• 5G-NR (Sub-6GHz):
	  • 3GPP Release 16 (NSA and SA modes)
	  • NSA bands: n1, n2, n3, n5, n7, n8, n12, n13, n14, n20, n25, n26, n28, n29, n30, n38, n40, n41, n48, n66, n71, n75, n76, n77, n78, n79
	  • SA bands: n1, n2, n3, n5, n7, n8, n12, n13, n14, n20, n25, n26, n28, n29, n30, n38, n40, n41, n48, n66, n71, n75, n76, n77, n78, n79
	  • Network Options: Option 2 for SA and Option 3/3a/3x for NSA EN-DC. DSS supported in all FDD bands
	  • EN-DC Combinations: Up to 5DL + 1FR1 and 2DL + 2FR1.
	  • UL modulation: 256QAM for FR1.
	  • DL modulation: 256QAM for FR1.
	  • SA UL 2 × 2 MIMO: n38, n41, n48, n77, n78, n79
	  • DL MIMO:
	  • DL 2 x 2 MIMO are supported on all bands
	  • SA DL 4 × 4 MIMO: n1, n2, n3, n7, n25, n30, n38, n40, n41, n48, n66, n70, n77, n78, n79
	  • NSA DL 4 × 4 MIMO: n1, n2, n3, n7, n25, n30, n66, n38, n40, n41, n48, n70, n77, n78, n79
	  • Subcarrier Spacing (SCS) modes: FDD can only support 15KHz, and TDD can only support 30KHz.
	  • BW per CC: Up to 100MHz.
	• LTE:
	  • 3GPP Release 16
	  • FDD: B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B29, B30, B32, B66, B71
	  • TDD: B34, B38, B39, B40, B41, B42, B43, B48
	  • LAA: B46
	  • UL modulation: up to 256QAM.
	  • DL modulation: up to 256QAM.
	  • Carrier Aggregation: DL: Up to 5CC, UL: 2CC intra-band continuous and inter-band CA.
	  • DL MIMO
	  • 2x2 DL MIMO are supported on all bands
	  • 4x4 DL MIMO can be supported on bands B1, B2, B3, B4, B7, B25, B30, B38, B40, B41, B42, B43, B48, B66
	• WCDMA:
	  • 3GPP Release 8 and Release 99
	  • B1, B2, B4, B5, B8, B19

Speed (DL/UL)	The data rates mentioned are theoretical and may vary depending on network conditions.
	RM520N-GL:
	• 5G-NR
	  • NSA: DL 3.3 Gbps; UL 600 Mbps
	  • SA: DL 2.4 Gbps; UL 900 Mbps

	• LTE:
	  • DL Cat 19 (Up to 1.6Gbps)
	  • UL Cat 18: 2CC intra-band contiguous and inter-band, 256QAM (Up to 200 Mbps)
	  • Supported BW: 1.4–20 MHz, per 3GPP specs for supported bands
	• HSPA+ Cat 24/6: 42Mbps/5.76Mbps

CONNECTOR	Four SMA female.
SIM Slots	2 Nano-SIM (4FF) ISO/IEC 7810:2003, ID-000 (1.8V / 3V)

A.4.4.1 Antenna connectors and bands (Celer 5G)

Bands used for each antenna connector.

Connector	ANT3	ANT2	ANT1	ANT0
GNSS	L5	L1		
3G / WCDMA		LMB DRX	LMB TRX	
4G / LTE	MHB PRX MIMO & UHB PRX MIMO & LAA PRX	LB TX1/DRX & MHB DRX & UHB DRX MIMO & LAA DRX	LB TX0/PRX & MHB TX0/PRX & UHB TX1/DRX	MHB TX1/DRX MIMO & UHB TX0/PRX
5G-NR / FR1	- Refarmed: MHB PRX MIMO & UHB PRX MIMO - n41 PRX MIMO - n77/n78/n79 PRX MIMO	- Refarmed: LB TX1 / DRX & MHB DRX & UHB DRX MIMO - n41 DRX - n77/n78/n79 DRX MIMO	- Refarmed: LB TX0 / PRX & MHB TX0 /PRX & UHB TX1/DRX - n41 TX0/PRX - n77/n78/n79 TX1/DRX	- Refarmed: MHB TX1/DRX MIMO & UHB TX0/PRX - n41 TX1/DRX MIMO - n77/n78/n79 TX0/PRX

Comments

- LB (Low Band): 617–960 MHz
- MHB (Middle High Band): 1452–2690 MHz
- UHB (Ultra High Band): 3400–3800 MHz
- n77/n78: 3300–4200 MHz
- n79: 4400–5000 MHz
- LAA (License Assisted Access): 5150-5925 MHz
- TX: Transmit
- PRX: Primary Reception
- DRX: Diversity Reception
- L1: 1575.42 MHz
- L5: 1176.45 MHz

This radio transmitter FCC ID: YUATLDPH00P1 has been approved by FCC to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Cellular Antenna List for TLDPH01P1

Antenna List	Manufacturer	Part No.	Antenna Type	Peak Gain
1	QUECTEL	YE0045AA	Dipole Antenna	-0.64 dBi for LTE B41, B42/ 5GNR n41, n77, n78 -0.82 dBi for WCDMA B2,B4/LTE B2, B4, B25, B66/5GNR n2, n25, n66, n70 -1.13 dBi for WCDMA B5/ LTE B5, B12, B13, B14, B26, B71/ 5GNR n5, n12, n13, n14, n26, n71 -2.70 dBi for LTE B7, B38/5GNR n7, n38 -5.7 dBi for LTE B30/ 5GNR n30 -5.81 dBi for LTE B43, B48/ 5GNR n48

Note

The antenna connector is SMA type.

A.4.5 Wireless LAN interface

WLAN standards	802.11 a/b/g/n/ac/ax MIMO 2x2 Dual-Band, Dual-Concurrent
Concurrent 2.4 and 5 GHz supported modes	

	2.4 GHz			5 GHz		
Scn	Mode	Tech	B/W	Mode	Tech	B/W
1	2x2	802.11n	40MHz	2x2	802.11ax	80MHz
2	2x2	802.11n	40MHz	1x1 1Rx	802.11ax Zero wait DFS	80MHz 80MHz
3	2x2	802.11ax	40MHz	2x2	802.11ac	40MHz

Frequency bands 2.4 GHz indoor and outdoor (EU)	2400-2483.5 MHz: max. 100 mW EIRP (20dBm).
Frequency bands 2.4 GHz indoor and outdoor (USA)	2400-2473 MHz: max. 100 mW EIRP (20dBm).
Frequency bands 5 GHz indoor (EU), indoor and outdoor (USA)	5170-5330 MHz; max. 200 mW EIRP allowed
Frequency bands 5 GHz indoor and outdoor (EU/USA)	5490-5710 MHz; max. 1000 mW EIRP allowed
Frequency bands 5 GHz indoor and outdoor (USA)	5735-5835 MHz; max. 1000 mW EIRP allowed
Modulation Techniques	DSSS, OFDM, DBPSK, DQPSK, CCK, 16 QAM, 64 QAM.
Automatic Rate Selection (ARS)	Available.
Transmission rate	Automatic.
Data rates	802.11b: 1, 2, 5.5, 11 Mbps. 802.11a/g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n: up to 150 Mbps-single 802.11n: up to 300 Mbps-2×2 MIMO 802.11ac: up to 192.6 Mbps (20 MHz channel) 802.11ac: up to 400 Mbps (40 MHz channel). 802.11ac: up to 866.7 Mbps (80 MHz channel) 802.11ax: 2.4GHz up to 458 Mbps, 5 GHz up to 1.2 Gbps.
Output power limitation	Adjustable
Output Power	@2.4GHz: Max. 19.98 dBm @5GHz: Max. 29.41 dBm

Bandwidth	802.11n: 20/40 MHz 802.11ac: 20/40/80 MHz 802.11ax: 20/40/80 MHz
Antenna connector	2 x SMA-RP

The FCC has approved this radio transmitter (FCC ID: YUATLDPH00P1) to operate with specific antenna types. The approved antenna types have a maximum permissible gain and meet the required antenna impedance. It is strictly prohibited to use antenna types not included in the approved list below, or those with a gain exceeding the maximum indicated for that type.

WiFi Antenna List

Antenna List	Manufacturer	Part No.	Antenna Type	Peak Gain
1	MASTER WAVE TECHNOLOGY CO., LTD.	98614PRSX000	Dipole Antenna	2.44 dBi for 2400 MHz 4.10 dBi for 5150~5250 MHz 4.10 dBi for 5250~5350 MHz 4.41 dBi for 5470~5725 MHz 4.73 dBi for 5725~5850 MHz

Note

The antenna connector is Reverse SMA type.

A.4.6 GNSS interface

Module	Quectel RM520N-GL.
Protocols	NMEA 0183.
Bands	• GPS L1 C/A: 1575.42MHz • Galileo E1: 1575.42MHz • QZSS L1: 1575.42MHz • GLONASS L1: 1597.5 - 1605.8MHz • BDS: 1561.098MHz • GPS/Galileo/QZSS L5: 1176.45MHz
Horizontal Position Accuracy	CEP-50: 1.35 m
TTFF (with AGNSS)	• Cold Start: 19.25 s • Warm Start: 0.94 s • Hot Start: 0.79 s
TTFF (without AGNSS)	• Cold Start: 27.93 s • Warm Start: 11.55 s • Hot Start: 1.09 s
Sensitivity	• Acquisition: -147 dBm • Tracking: -160 dBm • Reacquisition: -160 dBm
Connector	SMA female.
Antenna	3.3 V active or passive.

A.4.7 Bluetooth interface

Module	EFR32BG22
Protocols	Bluetooth 5.2
Band	2.4 GHz
Connector	SMA-RP.

Bluetooth Antenna List

Antenna List	Manufacturer	Part No.	Antenna Type	Peak Gain
1	MASTER WAVE TECHNOLOGY CO., LTD.	98143MRSX000	Dipole Antenna	5.17 dBi for Bluetooth

Note

The antenna connector is Reverse SMA type.

A.4.8 GPIO as digital output specification

Number of Outputs	1 on-board
Switching voltage	32 V d.c.
Switching current	0.25 A
Switching power	0.7 W d.c.
Insulation voltage	60 V d.c.
Connector	Molex Microfit
Comments	Polarity Must be considered! Surge protection is recommended due to possible connection to power sources.

A.4.9 GPIO as digital input specification

Number of Inputs	1 on-board
Minimum high voltage	9 V d.c. For use with 12 V (or higher) battery systems
Minimum low voltage	6 V d.c.
Maximum leakage current	< 1 mA
Insulation voltage	60 V d.c. Input to GND
Connector	Molex Microfit
Comments	Polarity must be considered! Surge protection is recommended due to possible connection to power sources.

A.4.10 Electrical specifications

Nominal Supply Voltage	12 V – 24 V d.c.
Nominal Power Consumption	7.5 W typical 27.5W maximum (cold start when heater is working) 23.5W maximum at full load (5G transmission at full power).
Inrush Current Characteristics	5.00A 12V
DC Voltage range	7V - 38 Vd.c
Earth Protection Reference	Zero Volts or Ground

For safe operation, the **Celer Router** devices have a protective earth connection. The earth lead should have a minimum cross-section of 2.5 mm and the distance between the device and the earth connection should be as short as possible.

A.4.11 Mechanical specifications

Equipment dimensions without cable (W x L x H)	ca. 204 x 139 x 36 mm
Weight	Approx. 1080 g.
Material	Paint-coated aluminum.
Noise	0 dB (fanless).
Ingress Protection Rating	IP40 (EN 60529) Solid particle protection > 1 mm.
LEDs	7 (GNSS, SIM, LVL, BT, WWAN, WLAN,Power).

A.4.12 Environmental specifications

Operating temperature range	–25 to +70 °C.
Cooling	Natural cooling, non-forced ventilation constraints for the equipment are necessary.
Storage temperature	min. -40 °C max. +85 °C.
Relative atmospheric humidity	95 %. max.
Altitude class	1400 meters max.
Pollution degree conformance	PD2
Shock and Vibration “Categories & Classes”:	Category 1 Class B of EN 61373
Rapid temperature variation class	H1
Fire behavior compliance	According to ECE R118

Appendix B Radio Information

In accordance with Article 10(8) of the Radio Equipment Directive 2014/53/EU, the tables below contain information regarding frequency bands and RF transmit power levels:

B.1 RF WAN (Celer-LTE1 Celer-LTE2) specifications

To enable LTE/WCDMA connectivity, your router is equipped with an additional module. The exact module installed will also depend on your router model.

Technology: LTE. EM06-E specifications.

Bands	Frequencies	Conducted Transmit Power (EIRP)
Band 1	Tx: 1920-1980 MHz Rx: 2110-2170 MHz	+27 dBm
Band 3	Tx: 1710–1785 MHz Rx: 1805–1880 MHz	+25.8 dBm
Band 7	Tx: 2500–2570 MHz Rx: 2620–2690 MHz	+26.8 dBm
Band 20	Tx: 832–862 MHz Rx: 791–821 MHz	+24.8 dBm
Band 28	Tx: 703–748 MHz Rx: 758–803 MHz	+25.9 dBm

Technology: LTE. EM06-A specifications.

Bands	Frequencies	Conducted Transmit Power
Band 2	Tx: 1850-1910 MHz Rx: 1930-1990 MHz	+23 dBm ± 2 dB
Band 4	Tx: 1710–1755 MHz Rx: 2110–2155 MHz	+23 dBm ± 2 dB
Band 5	Tx: 824–849 MHz Rx: 869–894 MHz	+23 dBm ± 2 dB
Band 7	Tx: 2500–2570 MHz Rx: 2620–2690 MHz	+26.33 dBm
Band 66	Tx: 1710–1780 MHz Rx: 2110–2200 MHz	+23 dBm ± 2 dB

Technology: UMTS(WCDMA)/ HSDPA/ HSUPA/ HSPA+/ DC-HSPA+. EM06-E specifications.

Bands	Frequencies	Conducted Transmit Power

Band 1	Tx: 1920-1980 MHz Rx: 2110-2170 MHz	+27 dBm
Band 3	Tx: 170–1785 MHz Rx: 1805–1880 MHz	+25.8 dBm
Band 8	Tx: 880–915 MHz Rx: 925–960 MHz	+24 dBm +1/-3 dB

Technology: UMTS(WCDMA)/ HSDPA/ HSUPA/ HSPA+/ DC-HSPA+. EM06-A specifications.

Bands	Frequencies	Conducted Transmit Power
Band 2	Tx: 1850-1910 MHz Rx: 1930-1990 MHz	+24 dBm +1/-3 dB
Band 4	Tx: 1710–1755 MHz Rx: 2110–2155 MHz	+24 dBm +1/-3 dB
Band 5	Tx: 824-849 MHz Rx: 869-894 MHz	+24 dBm +1/-3 dB

B.1.1 Regulatory model “TLDPH02P1” Compliance Notice

The conformity assessment procedure, as mentioned in Article 17 and detailed in Annex III of Directive 2014/53/EU, has been verified for the **Celer** with Regulatory Model "TLDPH02P1". This verification is based on the use of the following technologies and bands:

- LTE: B1, B3, B7, B20 and B28.

B.2 RF WAN (Celer 5G) specifications

For 5G-NR/LTE/WCDMA connectivity, your router is equipped with an additional module. The exact module installed will also depend on the model of your router.

The availability of some specific channels and / or operational frequency bands are country dependent and are firmware programmed at factory to match the intended destination. The firmware setting is not accessible by the end user.

The device is restricted to indoor use only when operating in the 5150 to 5350 MHz frequency range.

Technology: 5G-NR. RM520N-GL specifications.

Bands	Frequencies	Conducted Transmit Power
Band n1	Tx: 1920-1980 MHz Rx: 2110-2170 MHz	+26.53 dBm
Band n3	Tx: 1710–1785 MHz Rx: 1805–1880 MHz	+25.23 dBm
Band n7	Tx: 2500–2570 MHz Rx: 2620–2690 MHz	+26.33 dBm

Band n20	Tx: 832–862 MHz Rx: 791–821 MHz	+24.33 dBm
Band n28	Tx: 703–748 MHz Rx: 758–803 MHz	+24.83 dBm
Band n78	Tx/Rx: 3300–3800 MHz	+31.9 dBm

Technology: LTE. RM520N-GL specifications.

Bands	Frequencies	Conducted Transmit Power
Band 1	Tx: 1920-1980 MHz Rx: 2110-2170 MHz	+29.1 dBm
Band 3	Tx: 1710–1785 MHz Rx: 1805–1880 MHz	+29.1 dBm
Band 7	Tx: 2500–2570 MHz Rx: 2620–2690 MHz	+28.2 dBm
Band 20	Tx: 832–862 MHz Rx: 791–821 MHz	+28 dBm
Band 28	Tx: 703–748 MHz Rx: 758–803 MHz	+28 dBm

Technology: UMTS(WCDMA)/ HSDPA/ HSUPA/ HSPA+/ DC-HSPA+. RM520N-GL specifications.

Bands	Frequencies	Conducted Transmit Power
Band 1	Tx: 1920-1980 MHz Rx: 2110-2170 MHz	+26.53 dBm
Band 8	Tx: 880–915 MHz Rx: 925–960 MHz	+24 dBm +1/-3 dB

B.2.1 Regulatory model “TLDPH01P1” Compliance

The conformity assessment procedure, as mentioned in Article 17 and detailed in Annex III of Directive 2014/53/EU, has been verified for the **Celer** with Regulatory Model "TLDPH01P1". This verification is based on the use of the following technologies and bands:

- 5G-NR: n78.
- LTE: B1, B3, B7, B20 and B28.

B.3 WI-FI specifications

This product comes with internal antennas.

It is important to be aware that the availability of certain channels and operational frequency bands may vary depending on the country. To ensure compliance, the firmware of the device is programmed at the factory to align with the intended destination. It is worth noting that the firmware setting cannot be accessed or altered by end users.

Technology: WLAN 802.11a/b/g/n/ac/ax.

Number of Channels	• 2.4GHz.
	  • EU, 1 ~ 13
	  • USA: 1 ~ 11
	• 5GHz
	  • EU, USA: 36,40,44,48,52,56,60,64,100,104,108,112,116,120,124,128,132,136,140,149, 153,157,161,165

Tx Power	• 2.4GHz.
	  • 2412-2472 MHz: 19.98 dBm
	• 5GHz
	  • 5180-5240 MHz:
	  22.98 dBm for indoor use
	  15.96 dBm for in vehicle use
	  • 5260-5320 MHz: 22.97 dBm
	  • 5500-5700 MHz: 29.41 dBm

B.4 Bluetooth specifications

Technology: Bluetooth 5.2.

Tx Power	• 2402-2480 MHz: 9.98 dBm

B.5 GNSS specifications

Technology: GPS, GLONASS, BDS, Galileo, QZSS

Bands	• L1: 1559-1610 MHz