Manual

CAR-A-WAN.rail

Rail vehicle optimized 3G/4G router with integrated WLAN hotspot

CAWv6S7455TR, CAWv6S7455PR, CAWvRAP

CAR-A-WAN.rail - User Manual

October 2019

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Content

1   Visualization

The abbreviation CAW stands for CAR-A-WAN.rail in this manual. Version v6 is not used in this manual.

The following pictograms are used in this manual:

⚠️	Indicates instructions which, if not observed, endanger your health, functionality or safety.
i Hinweis	Indicates additional information and tips.
♻️	Recycling label
🗑️	Identification of assemblies or parts that must be disposed of as hazardous waste. Never dispose of these components in the trash.
❗	This device is intended for use in vehicles. This applies in all countries of the EU and other countries following the EU Directive 1999/5/EC without any exception, except France. There, WLAN outdoors within the frequency range between 2545-2483.5 MHz shall be limited to 10mW e.i.r.p..
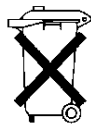
2 Warranty terms

The receipt is considered proof of the first purchase and should be kept in a safe place. It is required for the claiming of warranty services.

If the product is sold to another user, he is entitled to warranty services for the rest of the warranty period. The proof of purchase, as well as this declaration, should pass into its possession upon transfer.

We guarantee that this device is in good working order and technically complies with the descriptions in the enclosed documentation.

The warranty period for electronic vehicle components corresponds to the minimum period specified by the legislator.

This warranty does not apply to the following cases:

- Defects caused by freight damage, accidents, natural disasters, abuse, vandalism, improper use, incorrect maintenance or incorrect repair by third parties.

- In case of modifications, unauthorized interventions, faulty operation, other devices or accessories, incorrect installation, or modifications not approved by us.

- Failure to follow the instructions in the documentation supplied.

- Incompatibility of the product due to technical innovations or regulations that may occur after the purchase.

- When using product components which are not authorized by us or which are incompatible and which lead to malfunctions.

- For phenomena which occur in connection with the normal ageing process of the product (wearing parts).

- For defects caused by external devices.

The warranty period for parts replaced and/or repaired under this warranty shall expire together with the original warranty for the product.

Devices sent in without accessories will be replaced without accessories. In order to avoid damage in transit, a return of the device will only be accepted if it is in the original packaging.

Any travel costs incurred are generally excluded from the warranty.

IPmotion GmbH makes no warranties, express or implied, with respect to this device and its quality, performance, merchantability or fitness for a particular purpose.

Some jurisdictions do not allow the exclusion of implied warranties. In this case, the validity of all explicit and / or implicit warranties is limited to the warranty period.

With the expiration of this period, all guarantees lose their validity. Some countries do not allow the limitation of the validity of implied warranties by law, so the above limitation does not apply.

3 Limitation of liability

Claims for damages are excluded unless they are based on intent or gross negligence on the part of IPmotion GmbH or its employees. The liability according to the product liability law remains unaffected. We are under no circumstances liable for:

Claims brought against you by third parties due to loss or damage.

Loss or damage to your records or data, or the cost of recovering those records.

Economic consequential damage, including lost profits or savings or collateral damage, also in the event that the employees of IPmotion GmbH have been informed of the possibility of such damage.

In no event shall IPmotion GmbH be liable for any incidental, indirect, special, consequential or other damages of any kind. This includes, without limitation, damages for loss of profit, business interruption, loss of business information or any other loss arising out of the use of the CAR-A-WAN.rail or in any way related to the CAR-A-WAN.rail, whether based on contract, damages, negligence, strict liability, or other claims, even if IPmotion GmbH has been advised in advance of the possibility of such damages.

This exclusion also includes any liability which may arise from claims of third parties against the first purchaser.

Some countries do not allow the exclusion or limitation of incidental or consequential damages by law, so the above statement does not apply.

4 Safety and security

4.1 General safety instructions

Please read and observe the user manual and the safety instructions listed in this chapter carefully before carrying out any further steps such as transport, storage, connection, commissioning, etc.

Work on the router and antennas must only be carried out by authorised specialist personnel.

4.2 Improper installation

Improper installation can lead to damage to the unit or the vehicle!

Special knowledge and skills are required for the installation of the system. It is strongly recommended that installation be carried out by a specialist workshop.

4.3 24V connection

Only use the supplied adapter plug to connect to the 24V DC on-board power supply of your vehicle.

When connecting the CAR-A-WAN.rail, the power supply of the CAR-A-WAN.rail must be protected by a 2A slow blow fuse (T) which cannot be switched on again.

4.4   Mobile radio antennas

The installation of mobile radio antenna cables on vehicles is not recommended without expert knowledge and suitable tools.

Poorly assembled or arbitrarily shortened or extended high-frequency antenna cables can have poor reception and transmission performance and interfere with other equipment.

Unadjusted, minimal bending radii of antenna cables can lead to breakage of the core of antenna cables. Poor reception and transmission power can be the result.

4.5   Device attachment

The router is intended for mounting in rail vehicles. Special wall brackets and mounting rails in accordance with DIN EN 60715 TH 15 or DIN EN 60715 G 32 and DIN EN 60715 TH 35 are available to which the CAR-A-WAN.rail can be attached. See also chapters 7.4 and 15.

> Never set up or operate the device in a damp environment. Liquids must also be kept away from the device.
>
> The router must not be mounted near heat sources, as the aluminium housing must be able to dissipate heat.

4.6   Risk of injury

> Unsuitable installation locations, missing or insufficiently fixed brackets can cause injuries in the event of a traffic accident.

4.7 Risk of damage & injury during installation

When removing panels, sharp or pointed tools can cause injury and material damage.

Always loosen parts carefully. Do not apply direct pressure to the connection cable.

4.8 Damage to important vehicle parts

When drilling mounting holes or driving in sheet metal screws, important vehicle parts or lines can be damaged.

Ensure that there is sufficient clearance behind the screw and drill holes.

4.9   Maintenance, service and malfunctions

Repairs may only be carried out by qualified personnel.

Only spare parts that do not alter the safety regulations of the CAR-A-WAN.rail may be used.

The operating system is an integral part of the certification process. When using an operating system not released by IPmotion, there is a risk that the certification will become invalid. If necessary, the tests underlying the certification must be carried out again and, if necessary, the prerequisite for this must be reassessed.

Software updates should only be installed according to instructions and when the power supply has been secured. An interruption of the power supply can lead to a total failure of the CAR-A-WAN.rail in the event of a software update.

Software updates should only be carried out with sufficiently fast mobile phone coverage, since the transmission time can be longer than the follow-up time of the CAR-A-WAN.rail due to the size of the updates and can therefore be aborted prematurely.

5 Introductory remarks

This manual is intended to provide basic information about the router with integrated wireless LAN hotspot to be installed in the vehicle, namely the operating principle, the application of the various functions and what to do in the event of malfunctions.

This manual also contains information on configuration, handling and installation.

The contents of this device description may change due to advances in technology. We have made every effort to ensure that the content is correct and clear.

Should we nevertheless have made mistakes, we are grateful for any information.

We assume no liability for errors in this description and the resulting consequences.

The CAR-A-WAN.rail is designed to connect computers, laptops, netbooks, smartphones, electronic cash registers with Internet cash function and other TCP/IP-capable devices such as webcams from the vehicle to the Internet:

▪ wired via LAN

▪ wireless via WLAN

The CAR-A-WAN.rail independently dials into the Internet and, if necessary, reconnects in the event of a disconnection. Furthermore, dial-in rules can be taken into account, such as a roaming lock or minimum signal quality.

The WLAN antenna 2 (connected to W2 and W2M) functions as a WLAN Ethernet client and establishes the mobile radio connections automatically if the WPA2 connection of a stored WLAN (e.g. that of the platform or other service points) is correct.

In the Plus version, the second WAN connection can be

▪ parallel or

▪ alternatively

In the Trio version, the second or third WAN connection can be

- parallel or
- alternatively

to secure the availability of the connection.

Three concurrent connections are used as a parallel connection and new connection requests are distributed across the three connections, maintaining a path once taken to terminate the individual WAN connection previously used.

If these WAN connections have been established as a 3G connection (HSPA) and a connection switches to LTE, all traffic can be redirected to the faster, alternative connection while the slower connection is disabled. The higher-value connection speed is allowed to dial in.

6   System description

The Linux router CAR-A-WAN.rail connects local devices connected via LAN or WLAN to the Internet using up to three data modems. System rules, such as user-defined rules, control the dial-in behavior.

The power management controls the follow-up time and the almost complete disconnection from the 24V DC power supply, or correct cold starts during a manual restart or triggered watchdog of the embedded PC. The supply with operating voltage puts the CAR-A-WAN.rail into the operating state.

Two SIM cards are switchable, each connected to a 3G / LTE modem, LEDs (inside the housing) signal the operating states; one LED can be seen on the outside to signal the operating state and an existing remote maintenance readiness (option), a speaker can emit warning tones, an optional, tactile switch can trigger the reset of the router.

The modems transfer their operating heat to the aluminium housing. Plug connections for the connection of power supply and antennas facilitate installation and allow installation and removal without tools.
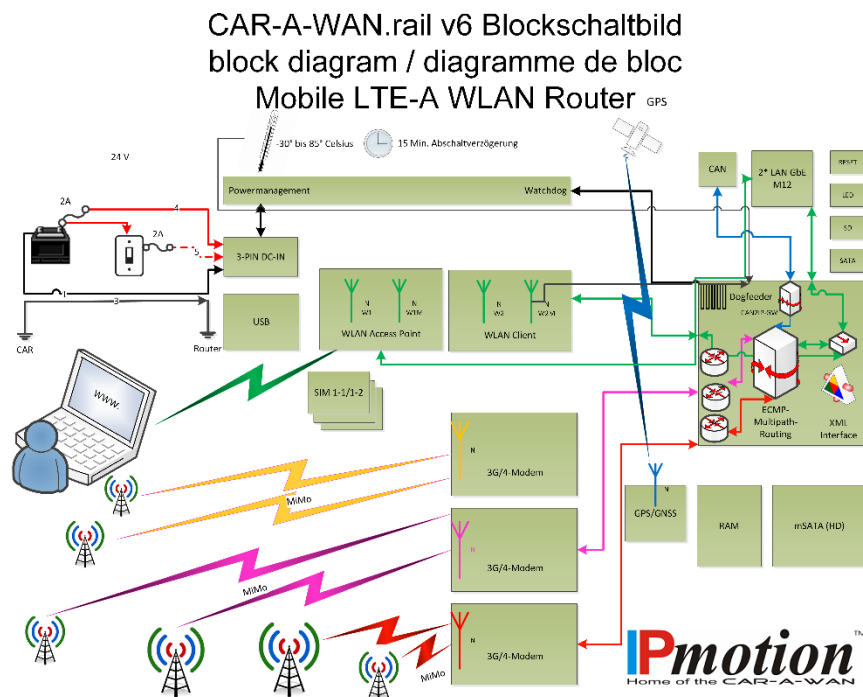
7 Device description CAR-A-WAN.rail

In this chapter, the corresponding device elements are explained and you receive the instructions for operation as well as all information on the device connections.

7.1 Elements on the long side
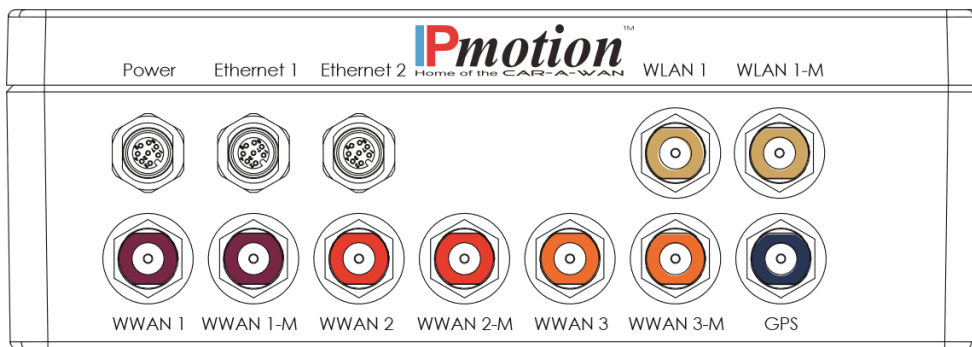
ℹ Hinweis	WWAN means Wireless Wide Area Network, also known as 3G (UMTS), LTE, 4G.

ℹ Hinweis	M stands for MIMO. MIMO technology increases reliability and data throughput.

On the long side of the device there are (from left to right) connections for power supply, 2* LAN (M12 10/100/1000 MBit/s), the WLAN antennas and in the second row the connections for the mobile radio modems (WWAN 1-3) and their MIMO connections WWAN 1-3, last GPS.

Power supply (M12, Power):

The power supply connection contacts permanent plus 12-24V DC, switching plus, ground and earthing.

LAN connections (M12, Ethernet1-2):

The Ethernet1 and WLAN interfaces are mutually bridged, i.e. you can also connect your devices to LAN instead of WLAN. Devices connected to the LAN can communicate with devices connected to the WLAN. The clients are not isolated from each other with the factory configuration. The Ethernet2 interface is not yet configured on delivery.

Antenna connections (N):
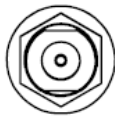
Since the N-antenna connectors do not have any coding, but only a correct assignment guarantees the function of the CAR-A-WAN.rail, we recommend making the cable ends distinguishable before assembly when laying the antenna cables.

We recommend colour coding using a band of insulating tape similar to the FAKRA codes used in automotive engineering:

bordeaux (RAL 4004) -> WWAN1

carmine red (RAL 3002) -> WWAN2
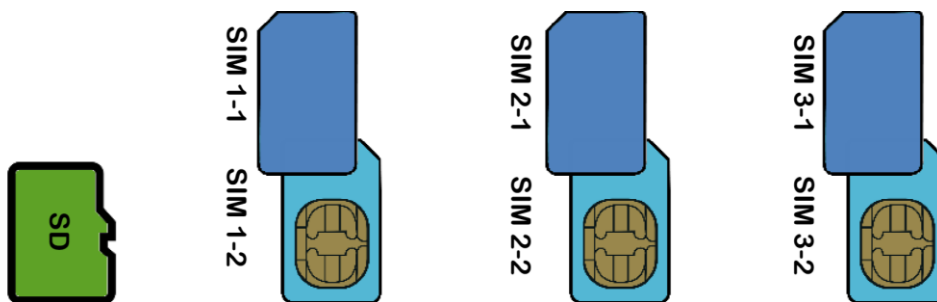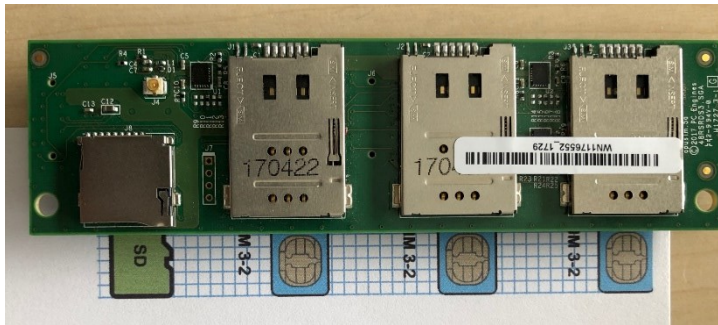
pastel orange (RAL 2003) -> WWAN3

bright blue (RAL 5005) -> GPS

beige (RAL 1001) -> WLAN

You will find sources of supply for the matching colors at the end of this document, see 15

7.2   SIM card holder in router housing

The SIM card holders are located below and above a small, socketed board in the router housing.

The SIM cards in **Mini-SIM** format can only be inserted into the SIM card holders when the housing has been opened. Please do not insert any smaller Sim cards (Micro or Nano, these are too small and have no contact). The use of Sim card adapters is not recommended. Please take this into account when purchasing and handling SIM cards.

There are two SIM card holders per modem on the board; one is visible from above and holds the default SIM card; the second SIM card holder is located directly below. A SIM card inserted there can be used by switching after a reboot.

If only one SIM card is used, slide it into the visible holder 1-1, 2-1 or 3-1, with the notch in front and the gold contacts down, until you feel it click into place. When using two SIM cards per modem, start with SIM card 1-2, 2-2 or 3-2.

If possible, before inserting the SIM cards, touch the housing at the terminals to the ground strap to dissipate electrostatic charges. Avoid direct contact with the circuit board.

Hinweis

Please do <u>not</u> use <u>only</u> the lower SIM card slot. Always assign an activated SIM card to at least the upper SIM card slot.

7.3 The identification label

The label stuck in the middle on the outside of the short sides contains information about:

- Manufacturer
- Device model
- MAC address of the LAN interfaces
- MAC address of the WLAN interface(s)
- Serial number
- CE and barcode marking
- Customer-specific identification number, if applicable

7.4 Wall bracket (optional)

Wall brackets can be screwed on at the back

Mounting rails DIN EN 60715 TH 15

Mounting rails DIN EN 60715 G 32

Mounting rails DIN EN 60715 TH 35

7.5 Optical signalling of CAR-A-WAN-.112 (option)

LED lights up red =
the power supply is applied

LED lights up green =
the CAR-A-WAN- is online and a VPN
connection is active; remote
maintenance possible

7.6 Acoustic messages of the CAR-A-WAN.rail

None at the moment.

None at the moment.

8 Storage and unpacking

8.1 Storage of the CAR-A-WAN.rail

If the device is not installed immediately, the following should be noted:

Always leave the device and accessories in their original packaging and store them.

Recommended ambient temperatures for storage in packaging are between -30° C and +75° C.

The device and the packaging must be protected from moisture.

8.2 Unpacking the CAR-A-WAN.rail

Remove shipping cartons and packaging material.

Check the delivery for completeness using the delivery note. If the delivery is incomplete or if you have received an incorrect delivery, the supplier must be informed immediately.

Also check the delivery for transport damage. Complaints about transport damage must be made immediately:

Keep all shipping cartons and packaging materials in a safe place for inspection.

Please inform the manufacturer or your supplier immediately.

Inform the transport company immediately.

9 Installation and Connection

All environmental and operating conditions specified in the technical data must be observed in order to guarantee the proper functioning of the CAR-A-WAN.rail.

When installing the CAR-A-WAN.rail, the following must be observed:

Only make modifications to the on-board electrical system of your vehicle yourself if you have the necessary specialist knowledge.

Make sure that the ventilation of the CAR-A-WAN.rail is ensured.

Pay attention to the bend radii of antenna cables. Knots and too narrow bending radii can lead to breaks in the antenna cable and conductors.

Bring cables to room temperature before laying them.

The device is equipped with colour-coded system screw connections which correspond to the drawing on the device cover. This makes it more difficult to reverse the polarity on the device.

9.1 Power supply of the CAR-A-WAN.rail

The connection diagram (Fig. 4) and the following information must be observed:

Fig. 4: Connection to the on-board electrical system

Fuse:	2 times 2A slow-blow, each after continuous plus and switching plus
Cable cross-section:	min. 0.50 mm² / max. 0.75 mm²
Imax at 24V	Typical 700 mA, but not more than 1,2A

9.2 Specification 12V/24V power supply socket

Please note the marking on the part.

Cable assignment: 1 = Continuous plus
2 = Switching plus
3 = Ground
4 = Earth

Plug: **SACC-M12MS-4PL SH**
(PHOENIX= 1424666, GTIN=4055626375939)

For operation, operating voltage must be applied to continuous plus and switching plus. This can be done in the plug if necessary.

9.3 Installation sequence

Wall bracket

Mount one wall bracket (outside the passenger compartment) or two wall brackets (inside the passenger compartment) so that the CAR-A-WAN.rail is securely attached and can be reached with a power supply cable.

Power supply

Install the power supply cable, starting with ground, then "ignition", then continuous positive, or plug the prepared and fused power supply cable for the accessory socket into the same.

Check the device for max. 30 seconds by applying voltage to the device. Several LEDs (green) on the side of the board facing away from the SIM card holders must begin to light up; the number of LEDs then decreases, at least one LED lights up or flickers when accessing the mass memory. Disconnect the device from the supply voltage by releasing and pulling out the plug by pressing on the top of the plug. Switching off the ignition is not sufficient, as the device has a tracking electronics.

With optional LED on the housing: Check the device for max. 30 seconds by applying voltage to the device. The LED on the front face must light red; with the connection to the Internet and the setup of the maintenance VPN, the colour changes to green.

Preparation of SIM cards - preliminary consideration

Have your SIM cards ready now. It is recommended to define the assignment of SIM card and module number in advance. In the plus version with a total of two modules, module 1 is addressed approx. 30 seconds before the second module and prepared for dial-in. With the trio version, the whole thing takes 30 seconds longer.

If the modules are online, they are used for data transfer; however, as long as connections are not terminated (e.g. due to poor signal quality), data paths remain in operation.

For a VPN, for example, use a data connection that is not quite as fast, but is all the more stable. This should be activated first. If you need the VPN immediately after starting your PC, you should prefer it to an occasionally faster, but fluctuating data connection.

We deliver the CAR-A-WAN.rail without the SIM pin set at the factory and recommend deactivating the SIM pin query if only you have access to the router and the SIM cards.

Hinweis

By means of optional, sealable cross hole screws, opening attempts on the CAR-A-WAN.rail can be easily identified.

Deactivating the SIM pin

Please deactivate the SIM pin of your SIM cards with the help of your telephone. If this should not succeed (with some SIM cards this is the case), then we must keep in mind that we must communicate the PIN to the CAR-A-WAN.rail later for durable storage and that the exchange of the SIM cards among themselves must be omitted, if we are not to be locked by mistake the cards by the portable radio operator.

 Please do not insert SIM cards yet!

Lay antenna cable - do not damage!

Some important tips for finding the right place for the antenna(s):

- First try to find the optimal way for the antenna with a cord, also consider the bending radii of the cables.

- If this is successful, you can now test the antenna finally, read the chapter by monitoring the signal strength level in the web administration.

- Measure the required cable length and, if necessary, have the cable assembled by us.

- Temper the cables so that plastics, for example, are not laid too cold. Otherwise there is a risk of cable breakage. Temperatures below +5 degrees Celsius are unsuitable even for simple PVC cables. The insulation, which is often thicker in the high-frequency range, should not be damaged at room temperature (15 - 20 degrees Celsius).

10 Device operation and administration

10.1 Using CAR-A-WAN.rail Web Administration

For changes to the basic settings of the CAR-A-WAN.rail, an administration website is available which can be accessed directly. All you need is an up-to-date web browser and a network connection to CAR-A-WAN.rail.

A user on a computer can change the configuration values, but should have basic knowledge of the configuration of routers or WLAN access points. Before you configure or administer the CAR-A-WAN.rail, you should have the following information at hand:

- SIM PIN (see 0), assigned to your SIM card, to your SIM cards

- APN

- Desired SSID / password of the WPA encryption

Launch CAR-A-WAN.rail Admin-Web

http://[IP address of CAR-A-WAN.rail]

Default setting:

- http://10.10.10.1 or http://router.admin

- User: [is not shown here] / Default password: [is not shown here]

- Select language (German/English)

The information can be found in your accompanying documents for the CAR-A-WAN.

In the printout of the device master data sheet (here the Web variant) you will find the passwords for WLAN and Web of your device in the "Notes" section on the second page.
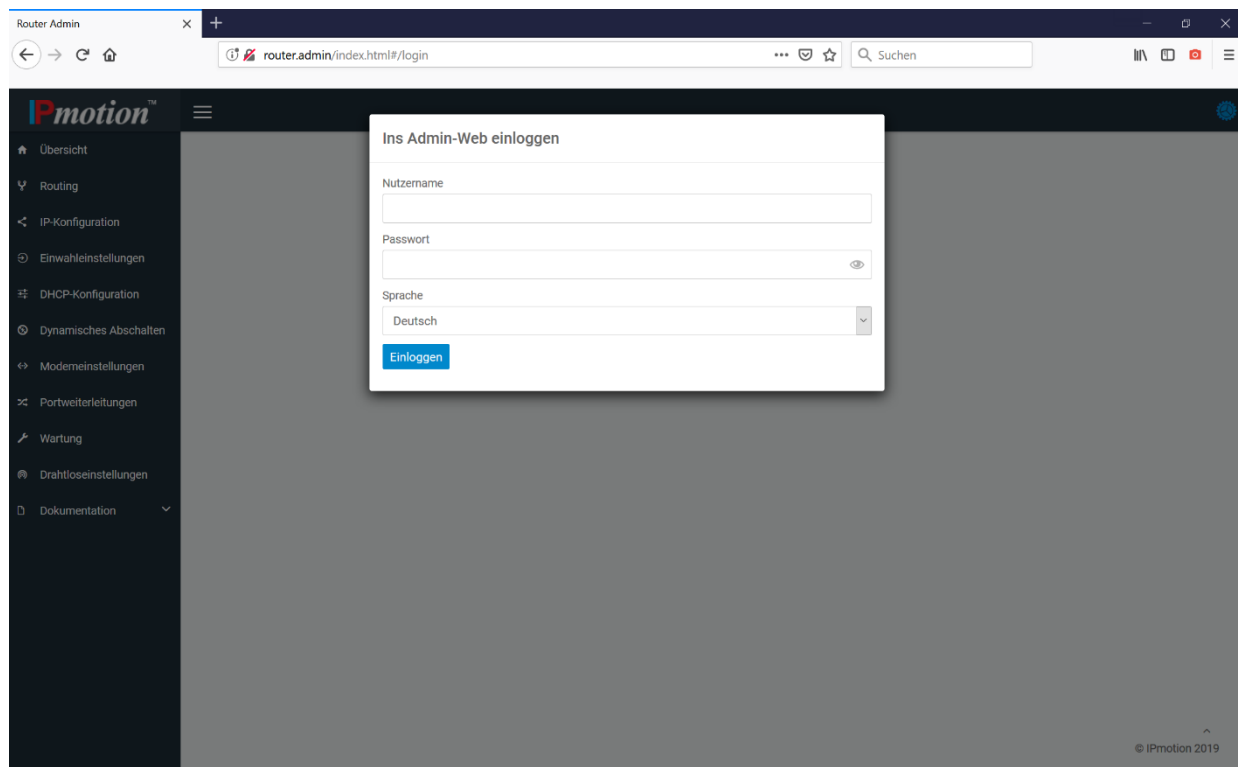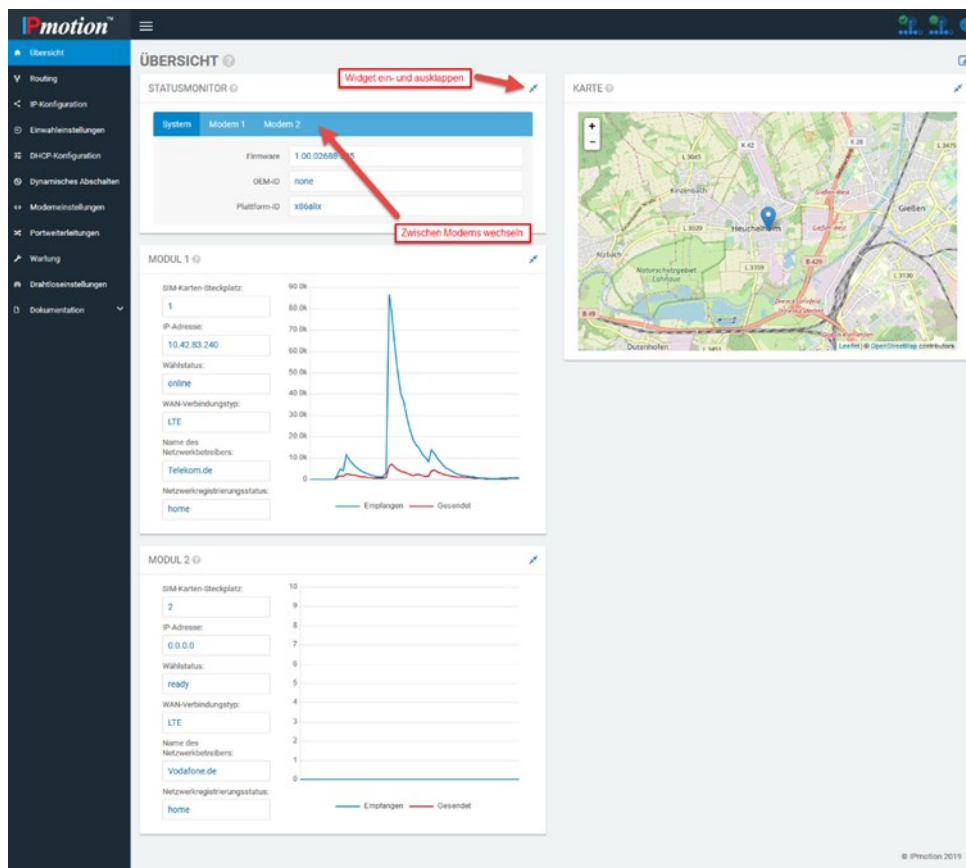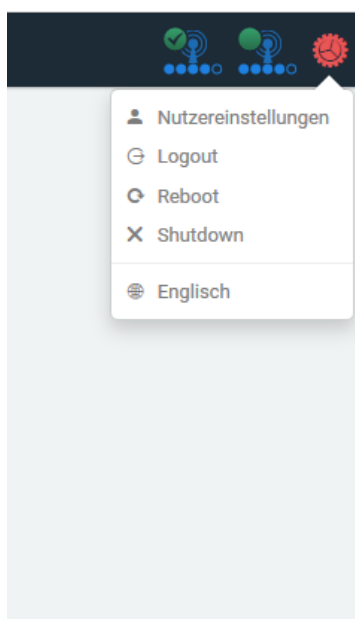
Fig. 5: Login Admin-Web

You can call up further information on possible settings and terms in the menus at any time using the question mark symbol.

User settings / password change

The Settings button (top right) takes you to the user settings. In this dialog you can change the password of the administrator. An empty password is not permitted.

Please note that the CAR-A-WAN.rail documentation can be downloaded from the website without verification of the person. If you do not change the administrator password, anyone can configure the router from the LAN.

We therefore strongly recommend that you set a password at the very beginning so that misuse can be ruled out.

Please write down this password and keep it in a safe place. The CAR-A-WAN.rail does not have an integrated process for resetting your chosen password.

Password resets require an intervention on the operating system of the CAR-A-WAN.rail and are chargeable services.

Dial-up settings

The following module settings are basically independent of each other, i.e. the modules can be configured independently of each other.

However, it can be determined for both from when a dial-in has to take place and under which conditions it has to be omitted.

If a check mark is set for "Hang up slow connection", the slower connection type (2G/3G) is hung up if the other module has established a faster connection type (3G/4G).

Furthermore, connections are only established or maintained with a minimum quality.

The value -1 (in words: minus one) deactivates the minimum signal strength for dial-in.

Modem settings

The menu for configuring the data modules allows changes to be made to the authentication for dialing in and the way commands are passed between the CAR-A-WAN.rail and the integrated data modules. All other fields which are not described in detail here can only be changed after request by the IPmotion support and can result in a malfunction of the CAR-A-WAN.rail up to a total failure.

▪ *SIM PIN* (PIN of the SIM card is displayed hidden. Please make sure that password managers of your web browser do not recognize this value as a password to be saved. This is a common error source, which can be recognized by the module status "Power" instead of "Ready" or "Online")

- *Provider APN:* Network identifier within the provider

- *Username & Password (*You get this information from your mobile provider, settings under "Advanced settings")

- *Allow automatic dial-in* (This setting controls whether the module is allowed to dial-in when it is *"Ready"* and has logged in with a mobile phone provider.

  - *Always* (The dial-in is always carried out again if the connection has been interrupted by driving.)

  - *Never* (A manual dial-in can only be done by the CAR-A-WAN.rail Monitor.)

  - *When not roaming* (Please select this option if you want to prevent dialing into a foreign network (abroad). This option may not interrupt an existing dial-in, it only prevents new dial-ins.)

- *PIN string* (If no PIN is used for the SIM card, i.e. the PIN has been deactivated, the content of this field must be deleted.

Wireless settings

Here the optional access point for wireless LAN can be switched on or off, the network identification can be changed and the channel number can be set.

Please note that depending on your order and the country of use, only certain channels can be used. Please contact us if you need to change this setting.

IP configuration
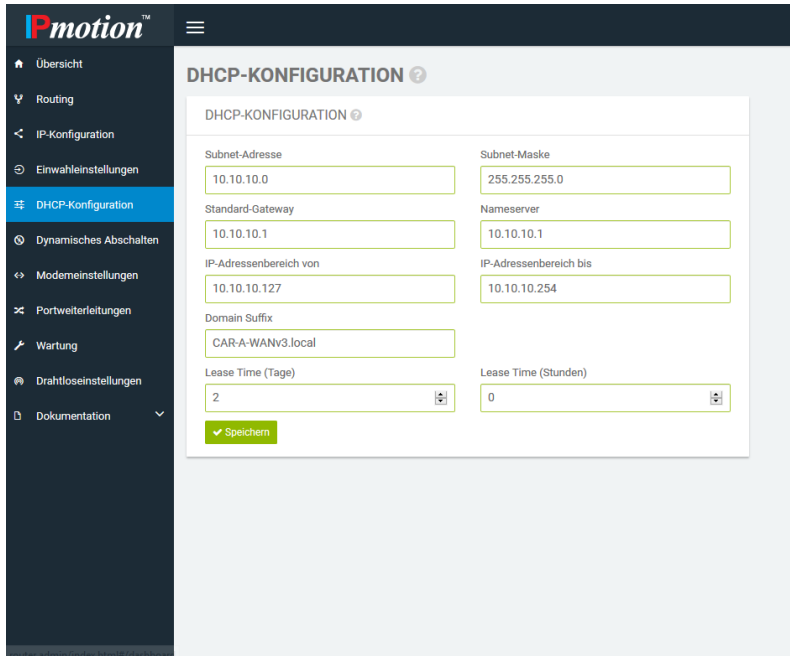

The CAR-A-WAN.rail has a configurable network interface in the "IP configuration" menu.

A second, routable interface is not provided in the standard configuration, but is conceivable in principle, e.g. if the host access point for WLAN is deactivated and the WLAN card functions as a transition to other networks.

The field "NAT" is only available if a second interface is available.

DHCP configuration

The DHCP configuration is carried out automatically to match the IP address entered under "IP configuration".

Fig. 12: DHCP configuration

DNS

The CAR-A-WAN comes with its own DNS server, which is bound to the router's address and is always switched on. This DNS has the peculiarity that it does not direct its queries to the DNS servers of the respective mobile phone providers, but directly queries the root servers and from there, with the typical mobile phone runtime, the previously determined responsible DNS servers of the hosts to be reached.

By its very nature, this query is slower than a query from mobile providers, but offers advantages when using multiple, parallel WAN connections: This avoids DNS queries from the Internet running into the void because they were made via the Internet (seen from the other side - via the other mobile phone provider) instead of via the switching mobile phone provider.

Alternatively, an external DNS server can also be stored in the DHCP configuration menu, which is then passed on to the clients, such as Google (8.8.8.8).

In addition, here is a short list of DNS servers that are freely accessible and, in contrast to Google, anonymous:

(see also: https://www.kuketz-blog.de/empfehlungsecke/#dns):

Digital courage
DNS server (DNSSEC / DNS over TLS):
IPv4: 46.182.19.48
IPv6: 2a02:2970:1002::18
Server location: Germany

dismail.de
DNS server (DNSSEC / DNS over TLS):
IPv4: 80.241.218.68
IPv6: 2a02:c205:3001:4558::1
Server location: Germany
Special feature: Advertising and tracking filter list

AS250.net Foundation
DNS Server 1 (DNSSEC):
IPv4: 194.150.168.168
Server Location: Germany

DNS server 2 (DNSSEC):
IPv4: 194.150.168.169
Server location: Germany
Special feature: Advertisement and tracking filter list

Port forwarding
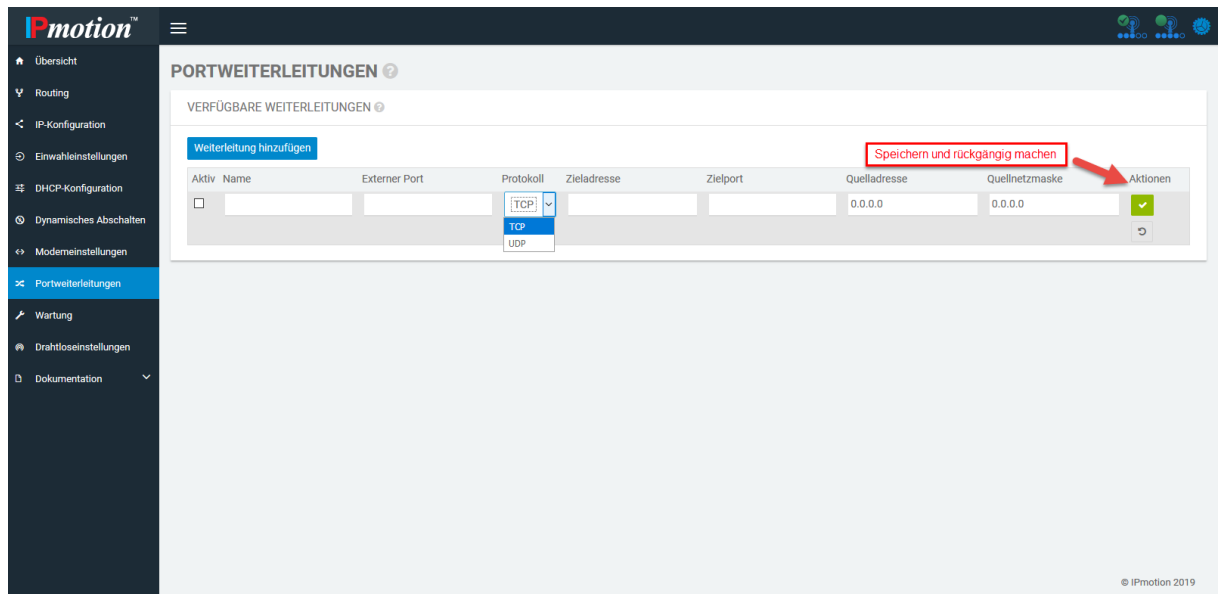
Port forwarding set up in this menu can be switched on and off by clicking on "Active". However, applications can only be accessible from the outside if the provider enables internal routing and provides a public IP address. This is usually not the case, so that special services such as *MDEX.de* must be used to securely publish device-internal services on the Internet or Intranet.

Dynamic shutdown
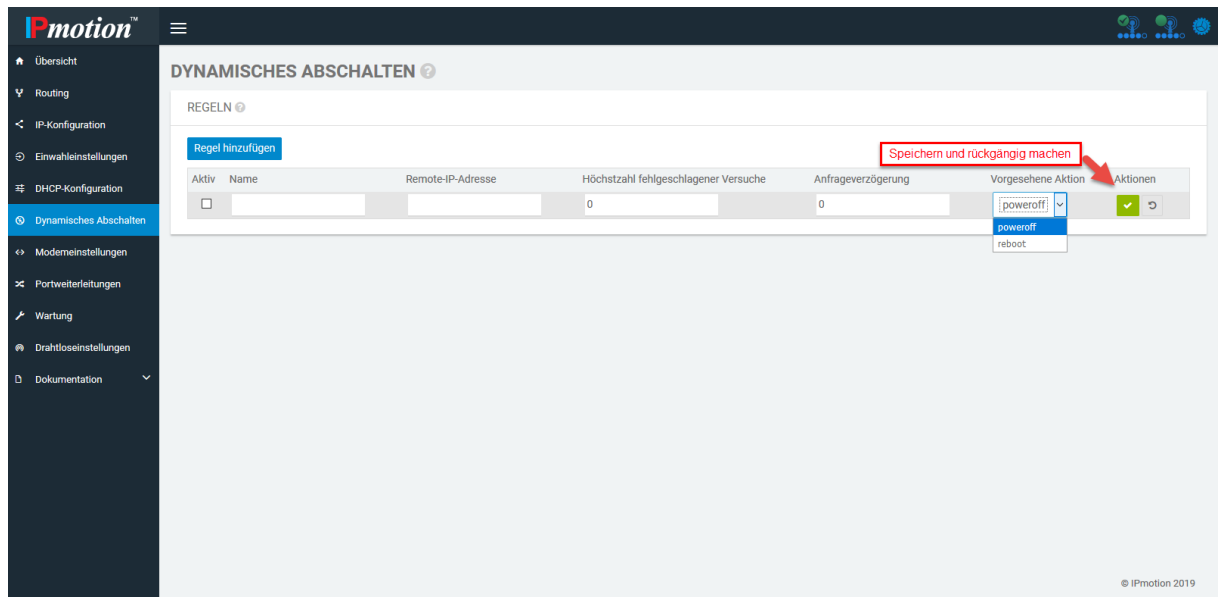
Operating modes and messages

The most important operating modes of the router can be described as follows:

- o *off*

- o *On, Offline*

- o *On, Online*

- o *On, Roaming*

- o *On, waiting for shutdown*

- o *update sequence*

10.2 Commissioning of the CAR-A-WAN.rail

In order to guarantee error-free commissioning, the following action points must be observed:

▪ Check the presence of SIM cards

▪ Check the position of antennas.

▪ Check the input fuses and switch on the power supply.

▪ Wait about 60 seconds.

▪ Turn on your PC and connect to WLAN or LAN

| | If all steps have been completed successfully, the router must be in the On state. |

▪ Now configure the SIM PIN(s) via the admin website, see chapter Modem settings.

▪ The factory settings do not provide for a PIN.

▪ The SIM1-1 is configured for Telekom, the SIM2-1 for Vodafone and the SIM3-1 for O2.

▪ Insert the SIM cards into the corresponding slots as follows:

▪
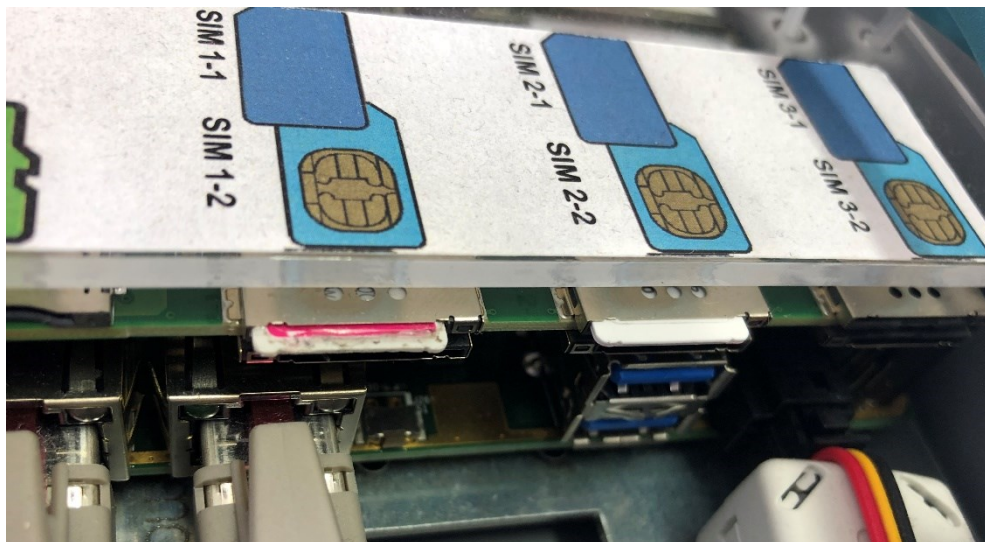
   – SIM 1 as default SIM card 1 in e.g. slot 1-1 with golden contact surface downwards until it clicks into place.

    – <u>SIM 2</u> analogue with golden contact surface upwards <u>in slot 1-2 until it snaps into place</u>

▪ Carry out a warm start of the device via the admin website (gear symbol, reboot) or briefly interrupt the power supply.

▪ Use your PC to check the online connection.

i Hinweis	The router should be visible in the WLAN after about one minute and online after about 90 seconds.

The router can now remain ready for operation in this state.

11 Troubleshooting

> ⚠️ Troubleshooting work on the CAR-A-WAN.rail hardware must only be carried out by authorised specialist personnel.

If the router does not work properly, please try to solve the problem using the table below:

Issue	Possible cause	remedy
The router cannot be started, no warning message.	The network for the router does not exist or is switched on.	Make sure that all connections have been made and confirm this with appropriate voltage measurements. Check the mains input fuse of the CAR-A-WAN.rail.
I do not see the WLAN of the CAR-A-WAN, although my operating system offers WLAN connections.	The WLAN of the CAR-A-WAN is switched off or other WLANs occupy the same channel or adjacent channels.	Connect to the CAR-A-WAN via a LAN cable and navigate to the administration website and switch on the WLAN or change the channel (see chapter).
I can't reach the administration website.	You have set up a Web proxy in the Internet connections of the Web browser.	Disable the web proxy or bypass the proxy server for local addresses.

The module(s) cannot be dialed in, but they seem to have reception because they have signal strength (see chapter Device operation and The signal strength indicator shows neither Home nor Roaming (see chapter Dial-up settings).	Possibly the modules see generally available mobile radio networks, but could not register in these.	Make sure → that the data-enabled SIM cards are inserted correctly (see chapter), → that the SIM cards may not require a SIM PIN, but this is not correctly configured. → that the router has been restarted after inserting the SIM cards or reconfiguring the SIM PIN settings, see chapter SIM card holder in router housing

The modules cannot be dialled in successfully even though they are registered in the network and the signal strength is sufficient*. *The signal strength sufficient for dial-in is individual and depends on the network technology (3G/LTE), modem, antenna used, including cables and provider. You can set a global minimum value yourself, see chapter Device operation and , Dial-up settings	The APN is wrong, the SIM card is not yet activated or blocked by the provider. The prepaid card has no credit.	Make sure that the provider-specific data (APN/Username/Password) has been correctly transferred to the CAR-A-WAN. Note: As of September 2019, user name and password cannot yet be transferred: Please carry out an update, see chapter Using CAR-A-WAN.rail Web Administration, Maintenance, Update or inform the support about the serial number. → that the SIM card is suitable for use, contact the hotline of your mobile phone provider if necessary.
The PC can be dialled into the VPN, but network resources are not available.	The IP address of the CAR-A-WAN.rail is the same as that of the VPN server.	Change the IP address of the CAR-A-WAN.rail under Routing. Restart the router, see chapter Device operation and , IP configuration
The signal strength is too weak, although a mobile phone/USB stick with the same SIM card indicates a good signal strength.	The antenna cable is broken or the bending radius of the antenna cable is too small.	Replace the router or the antennas or the antenna cable.

If the error image registered by you cannot be found in the CAR-A-WAN.rail table, please contact our service department and provide the following information:

- Model number, serial number

- Date on which the problem occurred

- Detailed description of the problem

12 Service protocol

Always enter all setting changes made to the CAR-A-WAN.rail in the service log.

Date:	Changes to settings, such as passwords, etc.:	Performed by:

13   Service hotline

Should you encounter problems with the CAR-A-WAN.rail contrary to expectations or require safety-relevant information, please contact our Service Hotline at the telephone or fax number:

Phone no.:   +49 641-350999-30

Fax No: +49 641–350999-90

If it is not possible to establish a telephone connection, we have set up an e-mail contact for you:

support@IPmotion.de

You can also contact the area or branch you are interested in directly at the following Internet address.

https://www.IPmotion.de/contact

14 Technical data

14.1 Specification CAR-A-WAN.rail

WWAN bands	LTE bands: B1 (2100), B2 (1900), B3 (1800), B4 (AWS), B7 (2600), B12 (700ac), B13 (700c), B20 (800DD), B5 (850), B25 (1900), B26 (US 850 Ext), B29 (US 700de Lower), B41 (TDD 2500), B30 (2300 WCS) UMTS bands: B1 (2100), B2 (1900), B8 (900), B4 (AWS), B3 (1800), B5 (850)
LTE regions:	Europe, North America, South America, Asia, Africa

Antenna gain with 8 meter low-loss cable RG58 < = 0 dBi

WLAN bands	IEEE 802.11b/g/n/ac 2.4 GHz/5Ghz
Size:	153,6mm x 56,0mm x 201,5mm (only housing with QLS connectors) 153,6mm x 70mm x 201,5mm (with optional bracket)
Power consumption:	10 Watt at 24 V
Ground (with 3 modems):	2750 gram
Protection class:	IP 30
Operating temperature:	-35 to 75 degrees Celsius
Storage temperature:	-40 to 90 degrees Celsius

14.2 Specification Ethernet (M12, A-coded, CAT5e)

| M12		RJ45
6		1 WH-OG
4		2 OG
5		3 WH-GN
8		6 GN
1		5 WH-BU
7		4 BU
2		7 WH-BN
3		8 BN
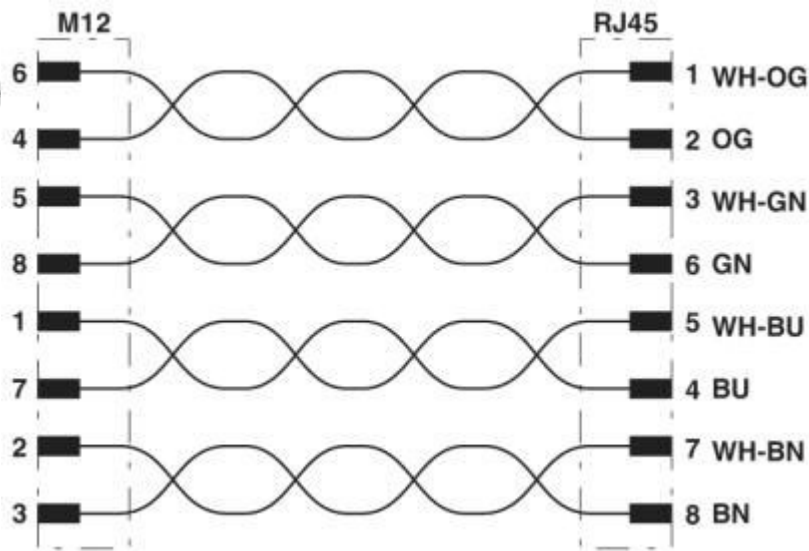
15   Accessories

Below you will find accessories which have been specially approved and tested for this router by IPmotion GmbH:

Accessories:	Function:	Article number:
Connector Power supply	Replacement for supplied plug	4046356616843
Wall brackets, can be screwed on at the back	attachment	tbd
Mounting rails DIN EN 60715 TH 15	attachment	tdb
Mounting rails DIN EN 60715 G 32	attachment	tbd
Mounting rails DIN EN 60715 TH 35	attachment	tbd
LTE-MIMO antennas with GPS, EN 50155	outdoor aerial	4260031731137
LTE MIMO antenna, EN 50155	outdoor aerial	4260031731120
WLAN indoor antenna, EN 50155	indoor antenna	4260031731151

16 Recycling the CAR-A-WAN.rail
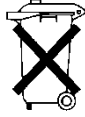
> IPmotion GmbH takes back all CAR-A-WAN.rail for recycling free of charge.
>
> Our modular concept allows the recycling of individual components (aluminium housings/PVC mountings), as well as the independent feeding of the electronic components for material separation.

Simply request the recycling kit for recycling by sending an email to recycling@IPmotion.de and quoting at least one IMEI number or serial number on the back of the router.

This kit will be sent to you free of charge throughout Europe and consists of a package, a questionnaire and a return label. For your expenditure we refund you 5, - EUR plus VAT.

We will also provide you with a non-binding upgrade offer, as on average the modems supplied can be exchanged for such more powerful radio technologies within three years of the initial purchase.

17   Marking of the CAR-A-WAN.rail

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Hinweis

IPmotion GmbH marks the product variants of a CAR-A-WAN.rail v6 on the lid as follows:

EN 50155

TYPE: CAWv6SW7455TR
SN:
LAN-MAC:
WLAN-MAC:
IMEI 1:
IMEI 2:

CE0681

Made in Germany by
IPmotion GmbH
Postfach 1155
35488 Heuchelheim
+49 641 350999-0
info@IPmotion.de

TYPE = Product variant

SN = Serial number

MAC = MAC address of the LAN/WLAN interface

IMEI = Unique identification of the radio module(s)

18   Declaration of conformity

The CAR-A-WAN.rail series CE marked routers comply with the following harmonized standards and EU directives:

Electromagnetic compatibility: **tbd**

Mobile phone compliance: **tbd**

Product safety/health: **tbd**