KCell 5G R17 Gateway

User Guide

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DISCLAIMER

Kontron Europe GmbH
Gutenbergstraße 2
85737 Ismaning
Germany
www.kontron.com

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Revision History

Preliminary document: User Guide: “KCell 5G R17 Gateway”, Version v03
New document: User Guide: “KCell 5G R17 Gateway”, Version **v04**

Chapter	What is new
Throughout document	Removed GNSS and WiFi as these features are currently not supported.
6.1.	Added note on cable/wire length between gateway and external accessories.
7.1.	Updated mobile band support in Table 4.
7.3.	Revised Figure 5.

Preliminary document: User Guide: “KCell 5G R17 Gateway”, Version v02
New document: User Guide: “KCell 5G R17 Gateway”, Version v03

Chapter	What is new
7.4.	Added Table 8.

Preliminary document: User Guide: “KCell 5G R17 Gateway”, Version v01
New document: User Guide: “KCell 5G R17 Gateway”, Version v02

Chapter	What is new
7.1.	Updated mobile band support in Table 4. Added system characteristics in Table 4.

New document: User Guide: “KCell 5G R17 Gateway”, Version v01

Chapter	What is new
--	Initial document setup.

Terms and Conditions

Kontron warrants products in accordance with defined regional warranty periods. For more information about warranty compliance and conformity, and the warranty period in your region, visit https://www.kontron.com/.

Kontron sells products worldwide and declares regional General Terms & Conditions of Sale, and Purchase Order Terms & Conditions.

For contact information, refer to the corporate offices contact information on the last page of this user guide.

Customer Support

Find Kontron contacts by visiting https://www.kontron.com/.

Customer Service

As a trusted technology innovator and global solutions provider, Kontron extends its embedded market strengths into a services portfolio allowing companies to break the barriers of traditional product lifecycles. Proven product expertise coupled with collaborative and highly-experienced support enables Kontron to provide exceptional peace of mind to build and maintain successful products.
For more details on Kontron's service offerings such as: enhanced repair services, extended warranty, Kontron training academy, and more visit https://www.kontron.com/.

Customer Comments

If you have any difficulties using this user guide, discover an error, or just want to provide some feedback, contact Kontron Support. Detail any errors you find. We will correct the errors or problems as soon as possible and post the revised user guide on our website.

Symbols

The following symbols may be used in this user guide

⚠DANGER	**DANGER** indicates a hazardous situation which, if not avoided, will result in death or serious injury.
⚠WARNING	**WARNING** indicates a hazardous situation which, if not avoided, could result in death or serious injury.
NOTICE	**NOTICE** indicates a property damage message.
⚠CAUTION	**CAUTION** indicates a hazardous situation which, if not avoided, may result in minor or moderate injury **ATTENTION** indique une situation dangereuse qui, si elle n'est pas évitée, peut entraîner des blessures mineures ou modérées.
	**Electric Shock!** This symbol and title warn of hazards due to electrical shocks (> 60 V) when touching products or parts of products. Failure to observe the precautions indicated and/or prescribed by the law may endanger your life/health and/or result in damage to your material.

ESD Sensitive Device!
This symbol and title inform that the electronic boards and their components are sensitive to static electricity. Care must therefore be taken during all handling operations and inspections of this product in order to ensure product integrity at all times.

Caution: HOT Surface!
Do NOT touch! Allow to cool before servicing.
ATTENTION: Surface CHAUDE!
Ne pas toucher! Laissez refroidir avant de procéder à l'entretien.

Caution: Laser!
This symbol inform of the risk of exposure to laser beam and light emitting devices (LEDs) from an electrical device. Eye protection per manufacturer notice shall review before servicing.

NOTE: / REMARK: These terms indicate important details about the product or a specific product configuration. They also precede helpful hints and tips for daily use.

For Your Safety

Your new Kontron product was developed and tested carefully to provide all features necessary to ensure its compliance with electrical safety requirements. It was also designed for a long fault-free life. However, the life expectancy of your product can be drastically reduced by improper treatment during unpacking and installation. Therefore, in the interest of your own safety and of the correct operation of your new Kontron product, you are requested to conform with the following guidelines.

High Voltage Safety Instructions

As a precaution and in case of danger, the power connector must be easily accessible. The power connector is the product's main disconnect device.

Warning
All operations on this product must be carried out by sufficiently skilled personnel only.

Electric Shock!
Before installing a non hot-swappable Kontron product into a system always ensure that your mains power is switched off. This also applies to the installation of piggybacks. Serious electrical shock hazards can exist during all installation, repair, and maintenance operations on this product. Therefore, always unplug the power cable and any other cables which provide external voltages before performing any work on this product.

Earth ground connection to vehicle's chassis or a central grounding point shall remain connected. The earth ground cable shall be the last cable to be disconnected or the first cable to be connected when performing installation or removal procedures on this product.

Optical Safety Instructions

Laser!
This symbol inform of the risk of exposure to laser beam and light emitting devices (LEDs) from an electrical device. Eye protection per manufacturer notice shall review before servicing.

When a connector is removed during installation, testing, or servicing, or when an energized fiber is broken, a risk of ocular exposure to optical energy that may be potentially hazardous occurs, depending on the laser output power.

The primary hazards of exposure to laser radiation from an optical-fiber communication system are:
- Damage to the eye by accidental exposure to a beam emitted by a laser source
- Damage to the eye from viewing a connector attached to a broken fiber or an energized fiber

Special Handling and Unpacking Instruction

NOTICE

ESD Sensitive Device!
Electronic boards and their components are sensitive to static electricity. Therefore, care must be taken during all handling operations and inspections of this product, in order to ensure product integrity at all times.

⚠CAUTION

Handling and operation of the product is permitted only for trained personnel within a work place that is access controlled. Follow the "General Safety Instructions for IT Equipment" supplied with the product.

Do not handle this product out of its protective enclosure while it is not used for operational purposes unless it is otherwise protected.

Whenever possible, unpack or pack this product only at EOS/ESD safe work stations. Where a safe work station is not guaranteed, it is important for the user to be electrically discharged before touching the product with his/her hands or tools. This is most easily done by touching a metal part of your system housing.
It is particularly important to observe standard anti-static precautions when changing piggybacks, ROM devices, jumper settings etc. If the product contains batteries for RTC or memory backup, ensure that the product is not placed on conductive surfaces, including anti-static plastics or sponges. They can cause short circuits and damage the batteries or conductive circuits on the product.

Lithium Battery Precautions

If your product is equipped with a lithium battery, take the following precautions when replacing the battery.

⚠CAUTION

Danger of explosion if the battery is replaced incorrectly.
- Replace only with same or equivalent battery type recommended by the manufacturer.
- Dispose of used batteries according to the manufacturer's instructions.

General Instructions on Usage

In order to maintain Kontron's product warranty, this product must not be altered or modified in any way. Changes or modifications to the product, that are not explicitly approved by Kontron and described in this user guide or received from Kontron Support as a special handling instruction, will void your warranty.

This product should only be installed in or connected to systems that fulfill all necessary technical and specific environmental requirements. This also applies to the operational temperature range of the specific board version that must not be exceeded. If batteries are present, their temperature restrictions must be taken into account.

In performing all necessary installation and application operations, only follow the instructions supplied by the present user guide.

Keep all the original packaging material for future storage or warranty shipments. If it is necessary to store or ship the product, then re-pack it in the same manner as it was delivered.

Special care is necessary when handling or unpacking the product. See Special Handling and Unpacking Instruction.

Quality and Environmental Management

Kontron aims to deliver reliable high-end products designed and built for quality, and aims to complying with environmental laws, regulations, and other environmentally oriented requirements. For more information regarding Kontron's quality and environmental responsibilities, visit https://www.kontron.com/.

Disposal and Recycling

Kontron's products are manufactured to satisfy environmental protection requirements where possible. Many of the components used are capable of being recycled. Final disposal of this product after its service life must be accomplished in accordance with applicable country, state, or local laws or regulations.

WEEE Compliance

The Waste Electrical and Electronic Equipment (WEEE) Directive aims to:

- Reduce waste arising from electrical and electronic equipment (EEE)
- Make producers of EEE responsible for the environmental impact of their products, especially when the product become waste
- Encourage separate collection and subsequent treatment, reuse, recovery, recycling and sound environmental disposal of EEE
- Improve the environmental performance of all those involved during the lifecycle of EEE

Environmental protection is a high priority with Kontron.

Kontron follows the WEEE directive

You are encouraged to return our products for proper disposal.

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1/ Introduction

This user guide focuses on describing the special features of Kontron's KCell 5G R17 Gateway, also referred to as gateway within this user guide.

This user guide provides an overview of the gateway's features and available accessories to help users to set up, mount, operate, manage and maintain the gateway properly. Kontron’s 5G gateway helps users to manage high-speed global connectivity using static routing, dynamic routing as well as policy based routing providing reliable and good quality services.

For safety reasons Kontron recommends that new users to study the instructions within this user guide before switching on the power.

Figure 1: KCell 5G R17 Gateway

Key physical features are:

- Metal casing
- Dimensions (W×H×D): 100x42.5x100 mm
- Weight: 550g
- 6-pin industrial DC power socket
- Input voltage range: 9-50VDC
- 4 Cellular antenna connectors
- 2 SIM interfaces
- 1 USB-C port
- 2 Ethernet ports (10BASE-T/100BASE-TX/1000BASE-T/2.5GBASE-T)
- Mounting options: DIN rail, flat surface
- Operating temperature: -40°C to +85°

For further feature details please refer to Chapter 4/.

2/ General Safety Instructions

Please read this passage carefully and take careful note of the instructions, which have been compiled for your safety and to ensure to apply in accordance with intended regulations. If the following general safety instructions are not observed, it could lead to injuries to the operator and/or damage of the product; in cases of non-observance of the instructions Kontron Europe is exempt from accident liability, this also applies during the warranty period.

The product has been built and tested according to the basic safety requirements for low voltage (LVD) applications and has left the manufacturer in safety-related, flawless condition. To maintain this condition and to also ensure safe operation, the operator must not only observe the correct operating conditions for the product but also the following general safety instructions:

- The product must be used as specified in the product documentation, in which the instructions for safety for the product and for the operator are described. These contain guidelines for setting up, installation and assembly, maintenance, transport or storage.
- The on-site electrical installation must meet the requirements of the country's specific local regulations.
- If a power cable comes with the product, only this cable should be used. Do not use an extension cable to connect the product.
- To guarantee that sufficient air circulation is available to cool the product, please ensure that the ventilation openings are not covered or blocked. If a filter mat is provided, this should be cleaned regularly. Do not place the product close to heat sources or damp places. Make sure the product is well ventilated.
- Only connect the product to an external power supply providing the voltage type (AC or DC) and the input power (max. current) specified on the Kontron Product Label and meeting the requirements of the Limited Power Source (LPS) and Power Source (PS2) of UL/IEC 62368-1 .
- Only products or parts that meet the requirements for Power Source (PS1) of UL/IEC 62368-1 may be connected to the product's available interfaces (I/O).
- Before opening the product, make sure that the product is disconnected from the mains.
- Switching off the product does not disconnect it from the mains. Complete disconnection is only possible if the power cable is removed from the wall plug or from the product. Ensure that there is free and easy access to enable disconnection.
- The product may only be opened for the insertion or removal of add-on cards (depending on the configuration of the product). This may only be carried out by qualified operators.
- If extensions are being carried out, the following must be observed:
  - All effective legal regulations and all technical data are adhered to
  - The power consumption of any add-on card does not exceed the specified limitations
  - The current consumption of the product does not exceed the value stated on the product label.
- Only original accessories that have been approved by Kontron Europe can be used.
- Please note: safe operation is no longer possible when any of the following applies:
  - the product has visible damages or
  - the product is no longer functioning

  In this case the product must be switched off and it must be ensured that the product can no longer be operated.
- Handling and operation of the product is permitted only for trained personnel within a work place that is access controlled.
- This product is not suitable for use in locations where children are likely to be present

Additional Safety Instructions for DC Power Supply Circuits

- To guarantee safe operation, please observe that:
  - the external DC power supply must meet the criteria for LPS and PS2 (UL/IEC 62368-1)
  - no cables or parts without insulation in electrical circuits with dangerous voltage or power should be touched directly or indirectly
  - a reliable protective earthing connection is provided
  - a suitable, easily accessible disconnecting device is used in the application (e.g. overcurrent protective device), if the product itself is not disconnectable
  - a disconnect device, if provided in or as part of the product, shall disconnect both poles simultaneously
  - interconnecting power circuits of different products cause no electrical hazards
- A sufficient dimensioning of the power cable wires must be selected - according to the maximum electrical specifications on the product label - as stipulated by EN62368-1 or VDE0100 or EN60204 or UL61010-1 regulations.

2.1. Electrostatic Discharge (ESD)

A sudden discharge of electrostatic electricity can destroy static-sensitive devices or micro-circuitry.

Therefore, proper packaging and grounding techniques are necessary precautions to prevent damage. Always take the following precautions:

1. Transport ESD sensitive parts in ESD safe containers such as boxes or bags, until they arrive at an ESD safe workplace.
2. Always be properly grounded when touching sensitive components, or assembly.
3. Store ESD sensitive components in protective packaging or on antistatic mats.

2.2. Grounding Methods

By adhering to the guidelines below, electrostatic damage to the product may be avoided:

1. Cover workstations with approved antistatic material/mat. Always wear a wrist strap connected to workplace or heel straps.
2. Use properly grounded tools and equipment such as field service tools that are conductive.
3. Always handle ESD sensitive components by their edge or by their casing.
4. Avoid contact with pins, leads, or circuitry.
5. Switch off power and input signals before inserting and removing connectors or connecting test equipment.
6. Keep work area free of non-conductive materials such as ordinary plastic assembly aids and Styrofoam.

3/ Shipment and Packaging

3.1. Packaging

All parts are delivered together in a gateway specific cardboard package designed to provide adequate protection to absorb shock. Kontron recommends keeping the packaging to store or transport the gateway.

3.2. Unpacking

To unpack the gateway, perform the following:

1. Remove packaging.
2. Do not discard the original packaging. Keep the original packaging for future transportation or storage.
3. Check the delivery for completeness by comparing the delivery with the original order.
4. Keep the associated paperwork. It contains important information for handling the gateway.
5. Check the contents for visible shipping damage.

If you notice any shipping damage or inconsistencies between the contents and the original order, contact your Kontron representative for help and information.

3.3. Scope of Delivery

Check that your delivery is complete, and contains the items listed below. If you discover damaged or missing items, contact your dealer.

Table 1: Scope of delivery

Delivered item	Quantity	Description
KCell 5G	1	5G R17 gateway
DC terminal block	1	6-pin DC terminal block
DIN rail mounting kit	1	DIN-Rail clip and two screws
General safety instruction sheet	1	Important general safety instructions for set up and operation

3.4. Accessories

3.4.1. Mounting Kits

Table 2: Mounting kit accessories

Product Name/Product Group			Description
		WK25	Wall Mount Kit includes two wall mount plates and four (M3x5) screws to attach the plates to the gateway.

⚠CAUTION Horizontal mounting is only permitted with the heatsink facing upwards.

3.5. Product Identification Type Label

Figure 2: Type label example

TBD.

1 Module full name	5 Production date
2 Kontron material number	6 Electrical specification
3 Revision number	7 Compliance information
4 Serial number (SN) with bar code	8 QI code

4/ Gateway Features

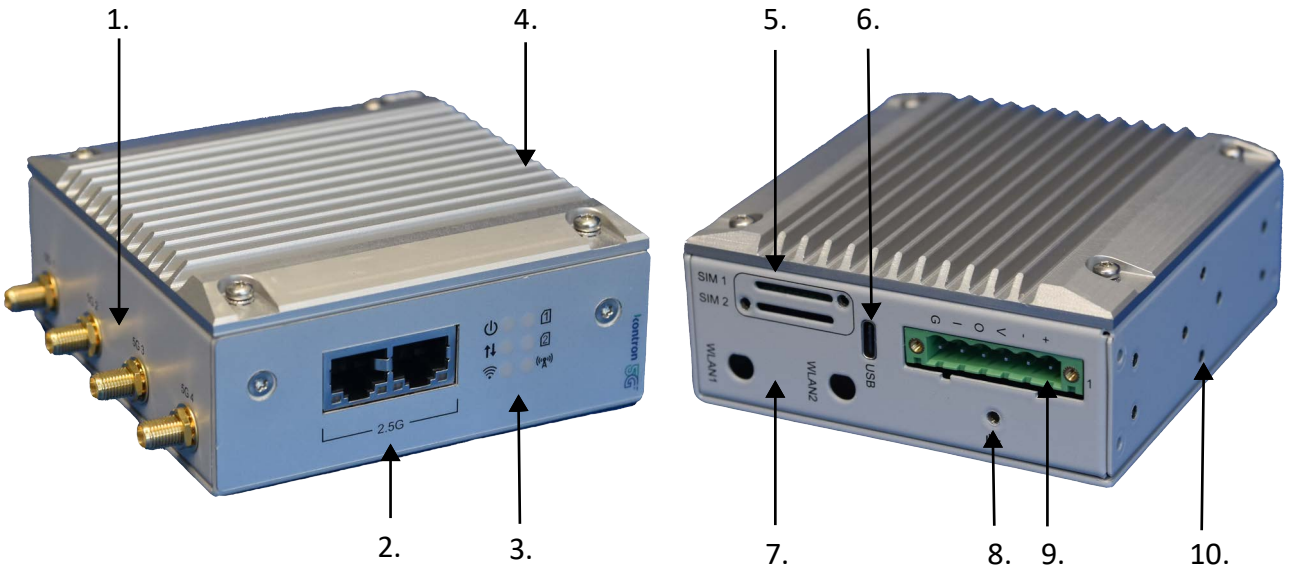


Table 3: Gateway features

No.	Description
1.	4x Cellular antenna SMA connectors 5G 1: RX/TX antenna 5G 2: RX antenna 5G 3: RX/TX antenna 5G 4: RX antenna
2.	2x RJ45 copper Ethernet ports 10BASE-T /100BASE-TX/1000BASE-T/2.5GBASE-T. Both ports are placed directly next to each other, shielded, equipped with EMI fingers and two yellow/green bi-color LEDs each that are used to indicate the connection and transmission status.
3.	6x Indicator LEDs Two rows with three LEDs each on the gateway's front panel indicating the following functions: - Power-On - Digital I/O activity - WiFi activity (not supported) - SIM1 inserted and active - SIM2 inserted and active - Cellular active
4.	Metal housing with heat sink
5.	2x SIM card holders (Mini-SIM 2FF) SIM cards are placed directly above each other, one facing up, one facing down, and are for 1.8V as well as 2.85V SIMs.
6.	USB-C connector USB 2.0 interface configured as device only.
7.	Not implemented: 2x WiFi antenna connectors (SMA)
8.	Ground stud

Table 3: Gateway features

<table>
<tr><th>No.</th><th>Description</th></tr>
<tr><td>9.</td><td>6-pin industrial DC power connector with digital I/O: Mating connectors are for example Phoenix-Contact MSTB 2,5/ 6-STF-5,08 Terminal Connectors with screw lock, order no. 1778027 or equivalent.
<table>
<tr><th>Pin</th><th>Label on Terminal</th><th>Signal name</th><th>Signal Description</th><th>Direction</th><th>Type</th></tr>
<tr><td>1</td><td>+</td><td>POWER</td><td>Power supply input (9V–50V/±10%)</td><td>I</td><td>PWR</td></tr>
<tr><td>2</td><td>-</td><td>GND</td><td>Ground</td><td>-</td><td>PWR</td></tr>
<tr><td>3</td><td>V</td><td>V_OUT</td><td>Fused input voltage as upper voltage for the open drain output</td><td>O</td><td>PWR
melting fuse 5A/slow</td></tr>
<tr><td>4</td><td>O</td><td>DIG_OUT</td><td>Current limited open drain output</td><td>O</td><td>OD-50V/0.1A
2A/self-resetting</td></tr>
<tr><td>5</td><td>I</td><td>DIG_IN</td><td>Digital input (f_{max}=250Hz)</td><td>I</td><td>I-50V
Impedance22k</td></tr>
<tr><td>6</td><td>G</td><td>GND</td><td>Ground</td><td>-</td><td>PWR</td></tr>
</table>
</td></tr>
<tr><td>10.</td><td>Screw holes for possible DIN rail mounting clip</td></tr>
</table>

For further technical specifications besides these gateway features please refer to Chapter 7/.

5/ Mounting

Before installing or removing the gateway read and observe the instructions within this user guide, including Chapter 2/ : General Safety Instructions. Kontron assumes no responsibility for any damage resulting from failure to comply with these requirements.

⚠CAUTION	Install the gateway in the power off state only.

⚠CAUTION	Horizontal mounting is only permitted with the heatsink facing upwards.

Note: Before installing the gateway consider the required orientation of the gateway within the installation environment and access to connectors, and antennas.

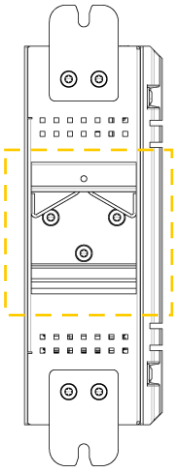
The gateway is fanless and passively cooled by a heatsink positioned on the top side of the gateway. When installing the gateway consider the ambient temperature in the installation environment around the gateway. To allow for adequate heat dissipation without obstructions ensure a clearance of at least 20mm around the gateway.

⚠CAUTION	**Prevent Overheating** Mount leaving a clearance of at least 20mm around the gateway, to ensure proper operation and prevent the gateway from overheating.

5.1. DIN-Rail Mounting

The DIN-Rail clip enables easy installation or removal of the gateway.

Figure 3: DIN-Rail Clip Upper Position



To install the gateway on a DIN-Rail, perform the following:

1. Fasten the DIN-Rail clip on the gateway in the upper position (Figure 3) using the three screws (M3x5) provided with the DIN-Rail clip.
2. Hook the top of the DIN-Rail clips over the DIN-Rail and push down slightly while moving the bottom of the gateway towards the DIN-Rail until the DIN-Rail clip snaps into place.
3. Check the gateway is securely attached to the DIN-Rail.

5.2. DIN-Rail Removal

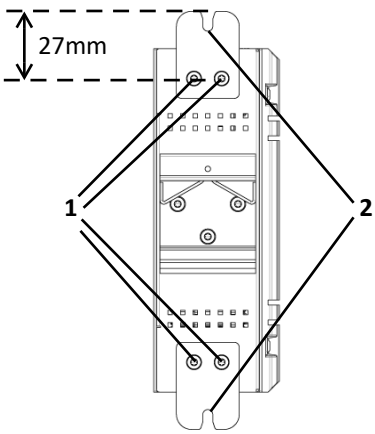
To remove the gateway from a DIN-Rail, perform the following:

1. Push the gateway down to free the bottom of the DIN-Rail clip from the DIN-Rail.
2. Rotate the bottom of the gateway away from the DIN-Rail.
3. Unhook the top of the DIN-Rail clip from the DIN-Rail by lifting upwards.
4. Remove the DIN-Rail clip by loosening and removing the three screws (M3x5). Retain the three screws with the removed DIN-Rail clip.

5.3. Wall or Flat Surface Mounting

To mount on a flat surface or wall use the Wall Mount Kit containing two wall mount plates and four (M3x5) screws, see Table 2. The gateway may be mounted vertically and horizontally. Horizontal mounting is only permitted with the heat-sink facing upwards.

Figure 4: Mounting with Wall Mount Plates (vertical and horizontal)



1 - 2 threaded screw holes
2 - Grove to mount with screw on a wall or flat surface

⚠CAUTION	Horizontal mounting is only permitted with the heatsink facing upwards.

⚠CAUTION	**Secure gateway properly.** Secure the wall mount plates using all four screws (M3x5) provided and mount on a wall or flat surface using two screws that match the mounting surfaces length requirements.

Note: The distance from the wall mount plate's mounting holes to the top of the wall mount plate is 27 mm.

To install on a wall or flat surface, perform the following:

1. Make sure the mounting surface is clean and smooth and meets the screw's thickness requirement.
2. Fasten the wall mount plates to the gateway (top and bottom) using the four screws (M3x5) provided. (Figure 4, 1).
3. Insert two screws (top and bottom) into the wall mount plate's groves (Figure 4, 2) and fasten firmly.
   Note: The two screws are not included in the Wall Mount Kit as their length depends on the mounting surface thickness.
4. Check the gateway is attached to the mounting surface securely.
5. If installed horizontally, check that the heatsink faces upwards.

6/ Starting Up

Before connecting the gateway to power and starting up, read and observe the instructions within this user guide, including Chapter 2/: General Safety Instructions. Kontron assumes no responsibility for any damage resulting from failure to comply with these requirements.

⚠CAUTION	Only connect the gateway to an external power supply providing the voltage type (DC) and the input power (max. current) specified on the Kontron Product Label and meeting the requirements of the Limited Power Source (LPS) and Power Source (PS2) of UL/IEC 62368-1.
⚠CAUTION	Before connecting to power, first connect the ground cable to the ground stud and ensure that the installation sites ground meets the grounding requirements specified in your local, national and international region.
⚠CAUTION	Ensure easy access to the power cable. If the operating environment restricts power cable access, guarantee disconnection using a separate cut-off fixture.
⚠CAUTION	When connecting the power follow the indicated polarity +/- .
NOTICE	To protect the gateway and any connected devices, a sufficient dimensioning of the power cable wires must be selected - according to the maximum electrical specifications on the product label - as stipulated by EN62368-1.

Note: When attaching power wires to the DC terminal block's power contact consider:
- DC terminal block pitch, 5.08 mm (0.2 inch)
- Wire strip length 7 mm (0.28 inch)
- Wire size range: Solid wire: 12~24 AWG and Stranded wire: 12~24 AWG
- Wire length 3 m (9.84 ft.) maximum

Also, before connecting the gateway as described in Section 6.1. and Section 6.2. please consider the following:
- Turn off the external DC power supply via a disconnecting device (fuse/circuit breaker), to ensure that no power flows during the connection procedure.
- Connect the ground stud to an appropriate earth connection.

6.1. Connecting the Accessories

For an initial, basic setup please connect the following accessories:
- Attach the RF antennas to the appropriate connectors labeled 5G1...5G4.
- Attach an Ethernet cable to an appropriate connector labeled 2.5G.
- Insert the (U)SIM card(s) into the card reader(s) labeled SIM1 and SIM2.

Note: In general, the maximum cable/wire length between the gateway and any external accessory like RF antenna, host PC, or DC power supply must be 3m. An exception is the Ethernet cable that can be up to 30m long.

Note: It is recommended to employ coax cables for RF antennas in particular when the gateway is installed in cabinets.

6.2. Connecting the Power Supply and Power-Up

Now, the gateway can be started up by connecting and turning on the external power supply:
- Plug the DC terminal block connector into the gateway's power connector.
- Turning-on the external DC power supply automatically activates the gateway.

6.3. Connecting to the Gateway via PC

To configure a PC connection and logon to the gateway please follow the steps described in Section 6.3.1.1..

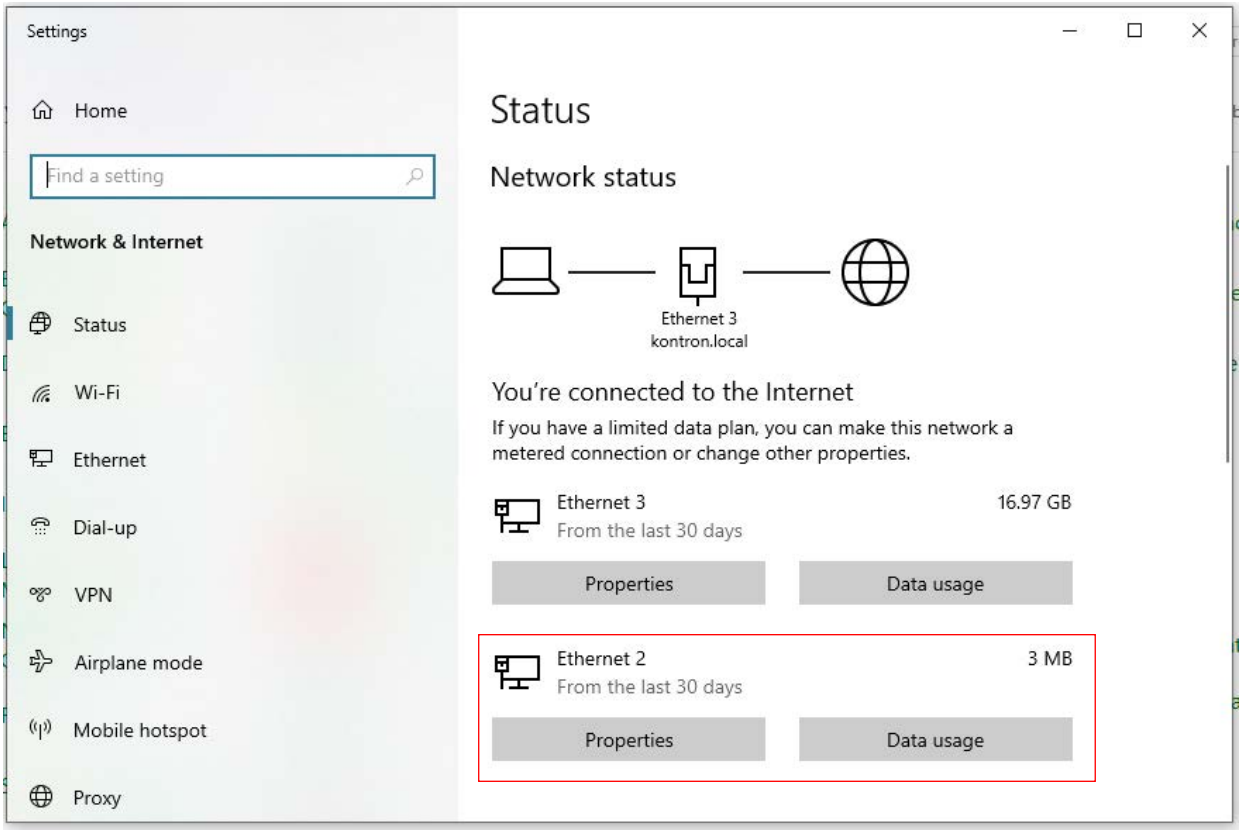
6.3.1. Configure the Computer

6.3.1.1. LAN Connection

› Ensure the Network connection is Enabled.
Go to Start — Control Panel —Network and Internet — Network and Sharing Center. Click on the Change adapter settings in the left panel, then right-click on Network Adapter, and select Enable.

› Check if IP and DNS are obtained automatically. Right-click on Network Adapter and select Properties. Then select Internet Protocol Version 4 and click Properties.

› If not selected, check to obtain an IP address and obtain DNS server address automatically. Click OK. Afterwards the new Ethernet connection should be visible in your network status:



6.3.2. Login

- To open the gateway's Web interface (OpenWRT), type the gateway's IP address (default: *http://192.168.224.1/*) into the URL field of your Internet browser.
- When prompted for authentication enter the username *admin* and enter the password located on the device information label/engraving.
- After logging in, you must set a new password for security reasons. You will not be able to interact with the gateway's WebUI until the default password is changed. The new password must consist of a minimum of 8 characters. Requirements: one uppercase letter, one lowercase letter, and one digit. After login the following status overview screen will be displayed:

Status

System

Hostname	KCell
Model	KCell 5G
Architecture	ARMv8 Processor rev 0
Firmware Version	00.123
Kernel Version	5.15.153-debug-g3b64a5465096-dirty
Local Time	1970-01-01 00:33:21
Uptime	0h 33m 18s
Load Average	1.16, 1.14, 1.02

- Finally, let's verify the mobile signal strength. Go to the *Status* — *Network* page and pay attention to the signal strength indication.

To achieve the best signal conditions and maximize cellular performance, try adjusting the antennas or changing the location of your device.

7/ Technical Specification

7.1. Key Features

Table 4: Key features

Key Feature	Description
Mobile	› 5G NR standalone (SA) and non-standalone (NSA) Sub-6 ¡V3GPP Release 17 › 200MHz, 3xCA, 20L LTE › 5G Sub-6GHz SA: – DL 200MHz, 4x4 MIMO, 256QAM, 4.95Gbps – UL 100MHz, 2x2 MIMO, 256QAM, 550Mbps › 5G Sub-6GHz NSA: – DL LTE 40MHz + NR 160MHz (2CC) – UL LTE 20MHz + NR 100MHz › 4G DL/UL Cat 20/13, 2.0Gbps/200Mbps › 5G bands (worldwide): – n1, n2, n3, n5, n7, n8, n12, n14(SA only), n18, n20, n25, n26, n28, n29(SDL), n30, n38, n40, n41, n48(SA only), n66, n70(SA only), n71, n75(SDL), n77, n78, n79 › 4G bands (worldwide): – B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B29(SDL), B30, B32(SDL), B34, B38, B39, B40, B41, B42, B43, B46(LAA), B48, B66, B68, B71 › 3G bands (worldwide) – B1, B2, B4, B5, B8 › Public Network and MPN bands support › Extensive EN-DC and LTE-CA support › Downlink Carrier Aggregation SA
Ethernet	› 2 x 2.5Gbit WAN/LAN Ethernet
TSN	› 3GPP Rel.17 time domain conversion › TSN-supporting Ethernet switch and ports › TSN Traffic prioritization
Network	› Routing: Static routing, Dynamic routing (BGP, OSPF v2, RIP v1/v2, EIGRP, NHRP), Policy based routing › Network protocols: TCP, UDP, IPv4, IPv6, ICMP, NTP, DNS, HTTP, HTTPS, SFTP, FTP, SMTP, SSL/TLS, ARP, VRRP, PPP, PPPoE, UPNP, SSH, DHCP, Telnet, SMPP, SMNP, MQTT, Wake On Lan (WOL), DHCP › Option: VoIP pass through support › TSN, OPC UA (client/server over TCP), MODBUS, Netconf › Custom partition for flexible IoT platforms
Security	› Secure boot, SELinux, Authentication, Firewall, Attack prevention, port and tag based VLAN separation, Mobile quota control, WEB filter, Access control › Firewall: Port forward, traffic rules, custom rules › VPN options: OpenVPN, Ipsec, GRE, PPTP/L2TP, Stunnel, DMVPN, SSTP, ZeroTier, WireGuard, Tinc, Tailscale
Monitoring & management	› WEB UI: LuCI web and extensions, custom › Option: KontronOS/KPort › FOTA › SSH
System characteristics	› CPU: Quad-core ARM Cortex A55, 2.2GHz › RAM: 2GB (including userspace) › Flash storage: 2GB (including userspace) › OpenWRT Linux

Table 4: Key features

Physical specifications	› Metal housing with heat sink › Dimensions (WxHxD): 100x42.5x100 mm › Weight: 550g › 6-pin DC power socket MSTB 2,5/ 6-GF-5,08 with screw lock › Input voltage range: 9-50VDC › 4 Cellular antenna connectors (SMA) › 2 SIM interfaces › 1 USB2 port › 2 Ethernet ports (RJ45) › Mounting options: DIN rail, flat surface › Operating temperature: -40°C to +85°C
Regulatory & approval	› RoHS mandates compliant, WEEE compliant › GCF, RED/CE, FCC

7.2. Environmental Characteristics

Table 5: Environmental specification

Environmental	
Operating Temperature	-40°C to +85°C (-40°F to 185°F)[1]
Storage Temperature	-40°C to +85°C (-40°F to 185°F)
Humidity	93% RH at 40°C (non-condensing)
Shock (according to IEC 60068-2-27)	15 g, 9 ms half sine, Shock Count: 3/direction, total 18
Vibration (according to IEC 60068-2-6)	10 Hz to 300 Hz, 2 g
MTBF	>85000 h @ 30°C ground benign (according to MIL-HDBK-217)

[1] **Note:** While the KCell 5G R17 Gateway will operate down to -40°C, it can only be switched on as of -37°C.

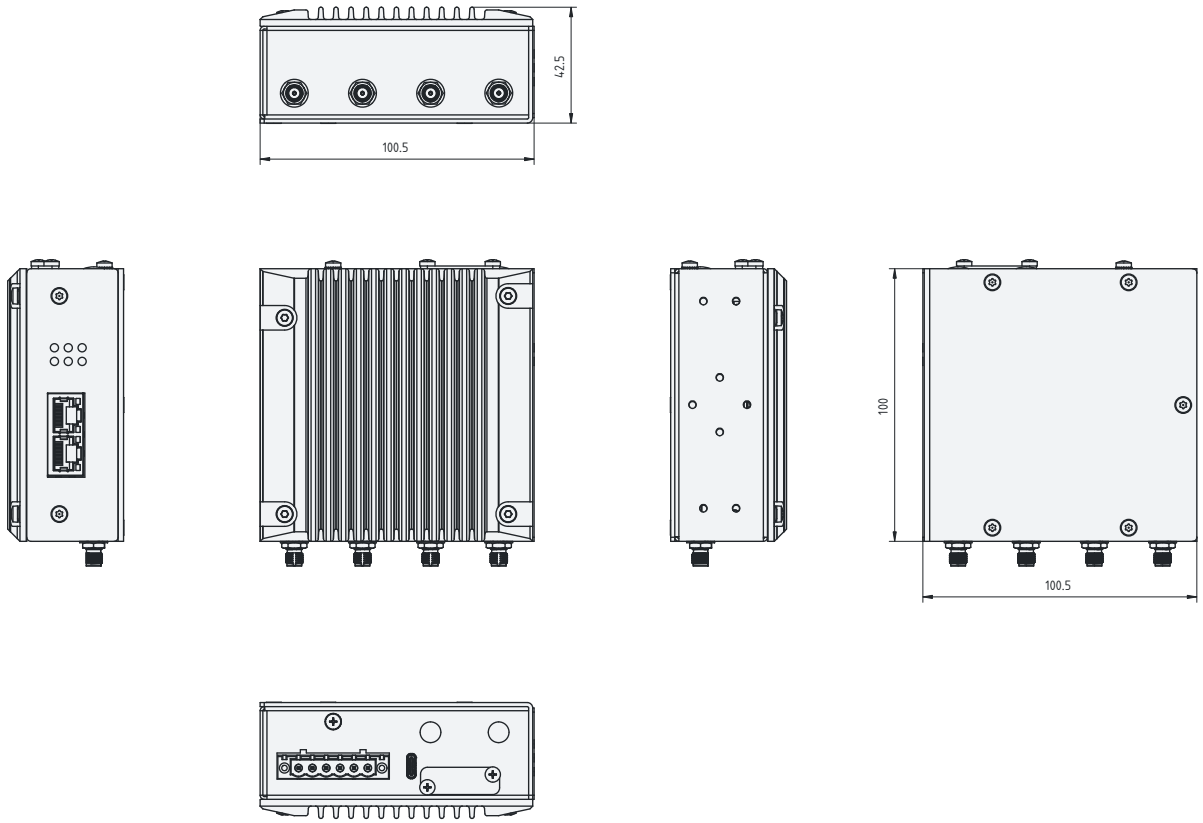
7.3. Mechanical Characteristics

Table 6: Mechanical specification

Mechanical	**KCell 5G**
Dimensions (H x D x W) (incl. heatsink)	100 mm x 100 mm x 42.5 mm
Weight incl. heatsink	550g
Color	Faceplate: Light Grey RAL7035 Chassis: Silver Pantone 877C
Heatsink	1x Heatsink (aligned with thermal pads positioned on chassis hot spots)
IP Protection	IP30
Installation	DIN-Rail Wall & flat surface mount (horizontal and vertical)

⚠CAUTION Horizontal mounting is only permitted with the heatsink facing upwards.

Figure 5: Mechanical dimensions



7.4. Power Supply

The gateway supports a 9 VDC to 50 VDC power input. The implemented external DC power supply must fulfill the specified electrical ratings in this user guide and comply with the safety requirements of UL/IEC 62368-1.

Table 7: Electrical specification

Power		KCell 5G
Input	Power Terminal	Power input on a removable 6-pin DC terminal block
	Voltage Range	9 VDC to 50 VDC
	Input Current[1]	0.15 A @ 24V (typical)
Power Consumption		9.86 W (typical)
Protection		Reverse power protection

[1] For further measurements dependent on LAN usage, temperature, and voltage please refer to Table 8.

Table 8 lists power supply ratings for data transfers measured at full RF TX power for LTE Band 7.

Table 8: Input current ratings dependent on LAN usage, temperature, and voltage

Feature	Input voltage	Ratings				
Connection		LAN1	LAN1	LAN1 / LAN2	LAN1 / LAN2	LAN1 / LAN2
Data transfer speed		1000MBit/s	2500MBit/s	2500MBit/s	2500MBit/s	2500MBit/s
Temperature		25°C	25°C	25°C	60°C	85°C
Power supply	9V	0.365A	0.414A	0.548A	0.6A	0.719A
	24V	0.124A	0.16A	0.195A	0.209A	0.254A
	50V	0.061A	0.072A	0.092A	0.101A	0.12A

⚠CAUTION	Only connect the gateway to an external power supply providing the voltage type (AC or DC) and the input power (max. current) specified on the Kontron Product Label and meeting the requirements of the Limited Power Source (LPS) and Power Source (PS2) of UL/IEC 62368-1.

⚠CAUTION	Before connecting to power connect the ground cable to the ground connector and ensure that the installation sites ground meets the grounding requirements specified in your local, national and international region.

⚠CAUTION	The DC power supply must be connected to a well-fused power source. If access to power is restricted, guarantee disconnection using a separate cut-off device.

NOTICE	After a brownout condition the used power supply must remain in the "off state" long enough to allow all internal voltages to discharge sufficiently. Failure to observe this required "off state" time may mean that parts of the gateway or peripherals work incorrectly or suffer a reduction of MTBF. The minimum "off state" time, to allow internal voltages to discharge sufficiently, is dependent on the power supply and additional electrical factors. To determine the required "off state" time, each case must be considered individually. For more information, contact Kontron Support.

NOTICE	To protect the gateway and any connected devices, a sufficient dimensioning of the power cable wires must be selected - according to the maximum electrical specifications on the product label - as stipulated by EN62368-1 .

Note: When attaching power wires to P1+/- and P2+/- on the DC terminal block consider:

- DC terminal block pitch, 5.08 mm (0.2 inch)
- Wire strip length 7 mm (0.28 inch)
- Wire size range: Solid wire: 12 to 24 AWG and Stranded wire: 12 to 24 AWG
- Wire length 3 m (9.84 ft.) maximum

7.5. Compliance (Regulatory and Type Approval Information) - TBD.

KCell 5G complies with the relevant requirements and the approximation of the laws relating to 'CE' and the standards that are constitutional parts of the declaration.

Table 9: CE compliance

CE Mark (Europe)	
Directives	2014/30/EU: Electromagnetic Compatibility 2014/35/EU: Low Voltage 2011/65/EU: RoHS II 2001/95/EC: General Product Safety
EMC	EN 55032/CISPR 32 Electromagnetic Compatibility of multimedia equipment- Emission Requirements EN 61000-6-4 Electromagnetic compatibility (EMC) Part 6-4: Generic standards - Emission standard for industrial environments EN 55035 Electromagnetic Compatibility of multimedia equipment- Immunity Requirements EN 61000-6-2 Electromagnetic Compatibility (EMC) Part 6-2: Generic standards - Immunity for industrial environments
Safety	EN 62368-1 Audio/video, information and communication technology equipment - Part 1: Safety requirements

Table 10: International compliance

USA/CANADA	
EMC	CFR 47 Part 15, Subpart B / ICES-003 Complies with part 15 FCC rules and regulations of title 47 of the CFR rules for class B products; under which an unintentional radiator may be operated, administrated and other conditions relating to the marketing of part 15 devices.
UKCA	
EMC	EN 55032/CISPR 32 Electromagnetic Compatibility of multimedia equipment- Emission Requirements EN 61000-6-4 Electromagnetic compatibility (EMC) Part 6-4: Generic standards - Emission standard for industrial environments EN 55035 Electromagnetic Compatibility of multimedia equipment- Immunity Requirements EN 61000-6-2 Electromagnetic Compatibility (EMC) Part 6-2: Generic standards - Immunity for industrial environments
Safety	EN 62368-1 Audio/video, information and communication technology equipment - Part 1: Safety requirements
International Certifications	
Safety	IEC 62368-1 Audio/video, information and communication technology equipment - Part 1: Safety requirements

Note: If the gateway is modified, the prerequisites for specific approvals may no longer apply.

Note: Kontron is not responsible for any radio television interference caused by unauthorized modifications of the delivered gateway or the substitution or attachment of connecting cables and equipment other than those specified by Kontron. The correction of interference caused by unauthorized modification, substitution or attachment is the user's responsibility.

8/ Advanced Usage

8.1. SSH Interface

TBD.

8.2. USB Enumeration

TBD.

9/ Maintenance

9.1. Hardware Maintenance

The gateway contains no user serviceable parts. Maintenance or repair of the gateway may only be carried out by qualified personnel authorized by Kontron.

Return the gateway to Kontron for maintenance and repair, see Section 11.1.: Returning Defective Merchandise.

9.2. Firmware Update

The update can be done via the OpenWrt Webpage as shown below:
TBD.

10/ Kontron OS

TBD.

11/ Technical Support

For technical support contact our Support Department:
- Email: support@kontron.com
- Phone: +49-821-4086-888

Make sure you have the following information available when you call:
- Product ID Number (PN),
- Serial Number (SN)

Note: The serial number can be found on the gateway's Type Label.

Be ready to explain the nature of your problem to the service technician.

11.1. Returning Defective Merchandise

All equipment returned to Kontron must have a Return of Material Authorization (RMA) number assigned exclusively by Kontron. Kontron cannot be held responsible for any loss or damage caused to the equipment received without an RMA number. The buyer accepts responsibility for all freight charges for the return of goods to Kontron's designated facility. Kontron will pay the return freight charges back to the buyer's location in the event that the equipment is repaired or replaced within the stipulated warranty period. Follow these steps before returning any product to Kontron.

6. Visit the RMA Information website: https://www.kontron.com/en/support-and-services
   Download the RMA Request sheet for Kontron Europe GmbH and fill out the form. Take care to include a short detailed description of the observed problem or failure and to include the product identification Information (Name of product, Product number and Serial number). If a delivery includes more than one product, fill out the above information in the RMA Request form for each product.
7. Send the completed RMA-Request form to the fax or email address given below at Kontron Europe GmbH. Kontron will provide an RMA-Number.
   Kontron Europe GmbH
   RMA Support
   Phone: +49 (0) 821 4086-0
   Fax: +49 (0) 821 4086 111
   Email: service@kontron.com
8. The goods for repair must be packed properly for shipping, considering shock and ESD protection.
   Note: Goods returned to Kontron Europe GmbH in non-proper packaging will be considered as customer caused faults and cannot be accepted as warranty repairs.
9. Include the RMA-Number with the shipping paperwork and send the product to the delivery address provided in the RMA form or received from Kontron RMA Support.

12/ Warranty

Kontron defines product warranty in accordance with regional warranty definitions. Claims are at Kontron's discretion and limited to the defect being of a material nature. To find out more about the warranty conditions and the defined warranty period for your region, following the steps below:

10. Visit Kontron for Term and Conditions: http://www.kontron.com/.
11. Click on your region's General Terms and Conditions of Sale.

12.1. Limitation/Exemption from Warranty Obligation

In general, Kontron shall not be required to honor the warranty, even during the warranty period, and shall be exempted from the statutory accident liability obligations in the event of damage caused to the product due to failure to observe the following:

- General safety instructions for IT equipment within this user guide
- Warning labels on the product and warning symbols within this user guide
- Information and hints within this user guide

Additionally, alterations or modifications to the product that are not explicitly approved by Kontron, described in this user guide, or received from Kontron Support as a special handling instruction will void your warranty.

Within the warranty period, the product should only be opened by Kontron. Removing the protection label and opening the product within the warranty period exempts the product from the statutory warranty obligation.

Due to their limited service life, parts which by their nature are subject to a particularly high degree of wear (wearing parts) are excluded from the warranty beyond that provided by law.

Appendix

Related Documents
Acronyms

About Kontron

Kontron is a global leader in IoT/Embedded Computing Technology (ECT) and offers individual solutions in the areas of Internet of Things (IoT) and Industry 4.0 through a combined portfolio of hardware, software and services. With its standard and customized products based on highly reliable state-of-the-art technologies, Kontron provides secure and innovative applications for a wide variety of industries. As a result, customers benefit from accelerated time-to-market, lower total cost of ownership, extended product lifecycles and the best fully integrated applications.

For more information, please visit: www.kontron.com

Global Headquarters

Kontron Europe GmbH

Gutenbergstraße 2
D-85737 Ismaning, Germany
Phone: +49 8214 4086-0
Mail: info@kontron.com

www.kontron.de

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