

Industrial Cellular Routers & Gateways

ICR-4453

Ultra High-Speed 5G Router & Powerful Edge Computing Gateway



Features

- 5G NR Cellular Connectivity, Sub-6GHz
- 3GPP Release 15, Support both NSA and SA modes
- Quad-core CPU with 1 GB RAM
- 2x SIM, eSIM Ready, TPM 2.0
- 5x Gigabit Ethernet (Optional 4x PoE+ PSE)
- SFP Connector for SFP modules up to 10 Gbps
- GNSS Receiver, Micro SD Card
- RS232, RS485, CAN BUS, 2x DI, 2x DO, USB Host
- Robust metal cover with wall and DIN mount options
- Wide operational temperature range
- Optional Dual-Band WiFi

Project based customization: SSD disc, Dual Concurrent WiFi AP, Bluetooth

Introduction



The ICR-4453 is an Ultra-high-speed 5G NR (New Radio) Router & Powerful Edge Computing Gateway focused on the global market. The 5G „gigabit“ speed and low latency, and high network availability is a real step to massive IoT and Enhanced mobile broadband (eMBB) applications - Mobile Internet access, Camera and security systems, Industrial systems, and many other high data demand applications. The router supports fallback via LTE (LTE-A Pro) and 3G networks for areas where 5G coverage is not developed yet.

The new router platform “v4” provides intelligence at the network edge with an extremely powerful Cortex A72 CPU at 1200 MHz, 4 GB eMMC memory, 4 MB flash memory, and 1024 MB RAM. The focus on high security underlines using TPM 2.0, and Tamper Button that ensure safe use in critical infrastructure systems.

The ICR-4453 is powered by the ICR-OS Linux operating system that provides a wide range of enhanced networking features. A secure Web interface allows users to configure and manage routers from remote locations. The router supports multiple configuration profiles, automatic firmware updates, etc. The router can be used as a powerful edge computing gateway because of the support of many ways of software customization. Users may insert Linux scripts and add new features by additional applications called Router Apps (User Modules).

There is an existing free library of Router Apps or the user may create own app using Advantech SDK. The gateway can easily run applications like Node-RED or Docker that open the way to a multi-container world.

The ICR-4453 is designed and manufactured for use in tough environmental conditions. Specifications include a wide operating temperature ranges from -40 up to +75 °C. It accepts input voltage range from 9 V DC to 48 V DC and is equipped with sleep mode for reducing electrical consumption.








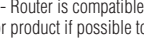
As a standard, ICR-4453 is equipped with five Ethernet 10/100/1000 Mbps (1x independent and 4x switch), SFP cage (independent port), one USB host 2.0, microSD reader, serial lines RS232 and RS485, CAN Bus, two binary inputs, and two binary outputs. This router contains two SIMs readers, which are placed on the rear side of the device. There is also the possibility to use one eSIM. ICR-4400 has two mPCIe connectors that can be used for two WiFi modules. The router is supplied in a robust metal casing for a wall mount (DIN mount is optional).

ICR-4453 is easy to manage using WebAccess/DMP, full-featured cloud-based management, provisioning, and monitoring tool for mass deployment. The WebAccess/VPN is a perfect way how to create secure virtual private networks on the Internet.



WebAccess/DMP WebAccess/VPN

Order Codes

| Model no. - Order Codes | REGION | 5x Gigabit Ethernet | 4x PoE PSE+ | SFP cage (up to 10 Gbps) | RS232 RS485 CAN BUS I/O | GNSS | 4x ANT | 2x SIM | WiFi 802ac | Operating Temperature |
|---|-------------|---------------------|-------------|--------------------------|-------------------------|------|--------|--------|------------|-----------------------|
|  ICR-4453 | EUROPE NAM* | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | NONE | -40 to +75 °C |
|  ICR-4453S | EUROPE NAM* | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | NONE | -40 to +75 °C |
|  ICR-4453W | EUROPE NAM* | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | 3x3 MIMO | -40 to +75 °C |
|  ICR-4453WS | EUROPE NAM* | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 3x3 MIMO | -40 to +75 °C |
|  ICR-4453W1 | EUROPE NAM* | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | 3x3 MIMO | -40 to +60 °C |
|  ICR-4453W1S | EUROPE NAM* | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 3x3 MIMO | -40 to +60 °C |
|  ICR-4453W3 | EUROPE NAM* | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | 2x2 MIMO | -40 to +75 °C |
|  ICR-4453W3S | EUROPE NAM* | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 2x2 MIMO | -40 to +75 °C |

* - Router is compatible with cellular networks in the indicated region. Importer/operator needs to check locale legislation (standards, national Telecom approvals etc.) and compare with standards available for product if possible to operate the router in target region legally.

Specifications

| System | |
|----------------|---|
| CPU | Quad-Core ARM Cortex-A72, 1200 MHz |
| Memory | RAM - 1024 MB eMMC - 4096 MB (838 MB for Router Apps, 512 MB for customer data) |
| Watchdog | HW Watchdog |
| RTC | Battery backup RTC |
| TPM | Trusted Platform Module (TPM) 2.0 |
| Interfaces | |
| Ethernet | 5× Ethernet (4+1), RJ45, 10/100/1000 Mbps *Optional 4× PoE PSE, IEEE 802.3at, 25.5 W |
| SFP Cage | 1× SFP cage (up to 10 Gbps) |
| Serial Lines | 1× RS232 (Tx, Rx, GND, RTS, CTS) 1× RS485 (A(-), B(+), GND) 1× CAN (CAN_H, CAN_L) (14-pin terminal block) |
| I / O | 2× Digital Input (3 mA consumption) 2× Digital Output (Open Drain, 48 V / 500 mA) (14-pin terminal block) |
| USB | 1× USB 2.0 Host Connector |
| MicroSD Card | 1× Micro SD Card Slot |
| Reset Button | Reboot / Factory reset |
| LED Indicators | System, 3-level signal strength, Data activity, SIM1/SIM2 status, 3G/4G/5G technology, 2× Input, 2× Output, User, ETH |

| GNSS | |
|----------------------|---|
| Antenna | 1× SMA connector, active (50 mA), passive |
| Systems | GPS, GLONASS, BeiDou, Galileo, QZSS, SBAS |
| Protocol | NMEA |
| Ac Time-to-First-Fix | Cold 25 s, Warm 10 s |

| Environmental | |
|--------------------------|--|
| Power Supply | 9 – 48 V DC (2-pin terminal block) |
| Consumption | Without WiFi Idle 4.6 W / Average 6.1 W / Peak 14 W With WiFi Idle 5.9 W / Average 8.1 W / Peak 16 W PoE PSE without WiFi Idle 4.9 W / Average 6.1 W / Peak 128 W PoE PSE with WiFi Idle 6.2 W / Average 8.1 W / Peak 130 W |
| Sleep Mode | Yes, 24 mW, 310 mW for PoE PSE |
| Operating Temperature | -40 to +75 °C -40 to +60 °C - ICR-4453W1, ICR-4453W1S |
| Storage Temperature | -40 to +85 °C |
| Humidity | 0 to 95 % |
| IP Cover | IP30 |
| Physical Characteristics | |
| Dimensions | 47 × 109 × 195 mm |
| Enclosure | Robust Metal Case, Grounding Screw |
| Mounting | Wall Mounting, DIN Rail (optional) |
| Weight | 1275 g |

| WiFi - optional (ICR-4453W, ICR-4453WS, ICR-4453W1, ICR-4453W1S) | |
|--|---|
| Antenna | 3× R-SMA connectors, 3×3 MIMO |
| Standards | IEEE802.11 ac/a/b/g/n 2.4 GHz / 5 GHz |
| Data Rate | Up to 600 Mbps @ 2.4 GHz Up to 1300 Mbps @ 5 GHz |
| Security | WEP, WPA, WPA2, WPA3, 802.1X |
| Modes | Access Point (unlimited clients), Station, Multirole STA & AP |

| WiFi - optional (ICR-4453W3, ICR-4453W3S) PLANNED | |
|--|---|
| Antenna | 2× R-SMA connectors, 2×2 MIMO |
| Standards | IEEE802.11 ac/a/b/g/n 2.4 GHz / 5 GHz |
| Data Rate | Up to 300 Mbps @ 2.4 GHz Up to 867 Mbps @ 5 GHz |
| Security | WEP, WPA, WPA2, WPA3, 802.1X |
| Modes | Access Point (unlimited clients), Station, Multirole STA & AP |

| Cellular Interface | |
|-----------------------|---|
| SIM Slots | 2× SIM (Mini SIMs – 2FF) 1× eSIM Ready |
| Antennas | 4× SMA connector |
| 5G NR frequency bands | 5G NSA Bands: n1/n2/n3/n5/n7/n8/n12/n20/n25/n28/n38/n40/n41/n48/n66/n71/n77/n78/n79 Transfer rate: 2.5 Gbps (DL), 650 Mbps (UL) 5G SA Bands: n1/n2/n3/n5/n7/n8/n12/n20/n25/n28/n38/n40/n41/n48/n66/n71/n77/n78/n79 Transfer rate: 2.1 Gbps (DL), 900 Mbps (UL) |
| LTE Parameters | Supported frequency bands: B1/B2/B3/B4(B66)/B5(B18/B19/B26)/B7/B8/B12(B17)/B13/B14/B20/B25/B26/B28/B29/B30/B32/B34/B38/B39/B40/B41/B42/B43/B46(LAA)/B48/B71 Transfer rate: 1 Gbps (DL), 211 Mbps (UL) |
| HSPA+/UMTS Parameters | Supported frequency bands: B1/B2/B3/B4/B5/B6/B8/B19 Transfer rate: 42 Mbps (DL), 5.76 Mbps (UL) |

| Software | |
|-----------------------------------|---|
| Operating System | ICR-OS (Linux based) |
| SW Customization | Router App (User Modules)* |
| Application Development | Open Linux, *Python, BASH, C/C++, *Node-RED, *Docker |
| Networking Features and Protocols | DHCP, NAT/PAT, SSH, VRRP, PPPoE, SNMP, SMTP, Dynamic DNS client, DNS proxy, VLAN, QoS, *DMVPN, NTP Client/Server, *Routing protocols RIP, BGP, OSPF, IS-IS, NHRP, Backup Routes, Port Forwarding, Host Port Routing, Ethernet Bridging, Load Balancing, IPv6 Dual Stack |
| Industrial Protocols and IoT | *Modbus RTU/TCP gateway, *IEC 60870-5-101 to 104 gateway, *DF1, *DNP3, *MQTT, *LWM2M |
| Security | HTTPS, SSH, SFTP, DMZ, Firewall (IP Filtering, MAC address filtering, Inbound and outbound Port filtering) VPN Tunneling – WireGuard, OpenVPN, *EasyVPN, IPsec with IKEv1 and IKEv2, GRE, L2TP, PPTP Authentication – RADIUS, TACACS+, 2FA, *SCEP Encryption – DES, 3DES, AES, RSA, MD5, SHA |
| Firmware Management | Automatic firmware updates – server, locally via LAN or remotely via WAN Over-the-Air cellular module firmware updates |
| Diagnostic/Log | Status – Signal Strength, Data Usage, Detailed Long Term Statistics One CLICK report – Current Configuration, Factory Identification, Routing Table Log – System Log, Reboot Log, Kernel Log Remote Diagnostics (via SSH) |
| Event Engine | StartUp script & Up/Down script (Own rules based on Digital Inputs, Network Parameters, Data Usage, Timer, Power, Device Temperature) Report Types: SMS, email, SNMP Trap |
| Configuration | Web server, SSH, Four configuration switchable profiles, Automatic configuration update from server, Backup & Restore configuration |
| Advanced Software Tools | WebAccess/DMP – Remote Device Provisioning, Monitoring & Management Platform WebAccess/VPN – Advanced Secure Networking Platform |

*Functionality is available with installed Router App (User Module)

| Standards & Regulations | |
|----------------------------|--|
| Radio | EN 301 511, EN 301 908-1, EN 301 908-2, EN 301 908-13, EN 303 413, EN 301 893, EN 300 328 |
| EMC | EN 301 489-1, EN 301 489-17, EN 301 489-19, EN 301 489-52, EN 610000-6-2, EN 55032, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6 |
| Safety | EN 62 368-1, IEEE 802.3 |
| Transportation | **E-mark |
| National | CE, UKCA |
| Mechanical | EN 60068-2-27, EN 60068-2-64, EN 60529 |
| Climatic | EN 60068-2-2, EN 60068-2-1, EN 60068-2-14, EN 60068-2-30 |
| Environmental | REACH, RoHS3, WEEE |
| Cellular Module Approvals* | Regulatory: GCF, CE, FCC, PTCRB, IC, JATE/TELEC, RCM Carrier: Deutsche Telekom, AT&T, FirstNet, T-Mobile, Verizon (planned), Telstra |

*- Approvals are valid for the integrated cellular module inside the router only. Cellular module approvals are not always applicable for the whole router – see “Standards and Regulations” chart for complete router approvals available. **- Models having ICR-4453W1, ICR-4453W1S order codes have no E8 certification.

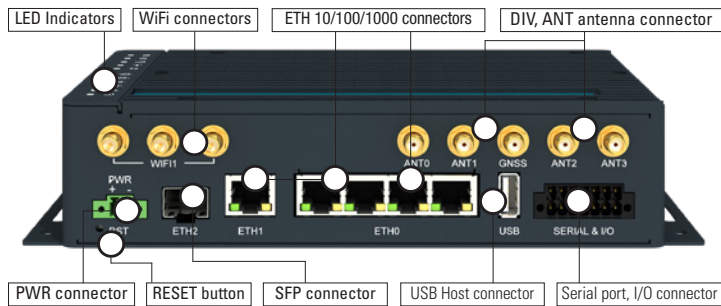
Accessories

| Part Number | Description | Included in the package |
|--------------------|--|-------------------------|
| BB-CON-WR2 | 2-pin PWR connector | ✓ |
| CON-ICR44-14 | 14-pin Serial / IO connector | |
| | Wall mount kit | |
| BB-DIN-ICR32 | DIN clip (2 pcs are necessary for the mounting) | Optional |
| RPS-ICR4-WR2-M | Wall mount Power supply, 12 V/1.5 A, EU, UK, US, AUS plugs | |
| RPS-ICR4-WR2-PSE | Desktop Power supply POE PSE, 48 V / 1.35 A, (without Power Cord) | |
| BB-PWRCORD-AUS | AUS Power Cord (for RPS-ICR4-WR2-PSE) | |
| BB-PWRCORD-EU | EU Power Cord (for RPS-ICR4-WR2-PSE) | |
| BB-PWRCORD-UK | UK Power Cord (for RPS-ICR4-WR2-PSE) | |
| BB-PWRCORD-US | US Power Cord (for RPS-ICR4-WR2-PSE) | |
| BB-KD-ETH | Ethernet cross cable, 1.5 m, Shielded | |
| BB-AW-A2458G-FSRPK | Antenna Wi-Fi, 2.4 & 5.8 GHz (3 pcs are recommended for full 3x3 MIMO performance) | |
| BB-AP-AGNSS-SMA | Antenna GNSS, magnetic 3dB, cable 3m | |
| ANT-LTE5G-025 | Antenna 5G/LTE, Terminal (4 pcs are recommended for full cellular 5G performance) | |
| BB-2J7B83BC-150 | Antenna 4in1 5G/LTE MIMO, Screw mount, 4x cable 1.5 m | |
| BB-2J7184BGFC-150 | Antenna 5in1 5G/LTE MIMO, GNSS, Screw mount, 5x cable 1.5m | |
| BB-2J6983MPA-150 | Antenna 2in1 5G/LTE MIMO, Magnetic and Adhesive mount, 2x cable 1.5 m (2 pcs are recommended for full cellular 5G performance) | |

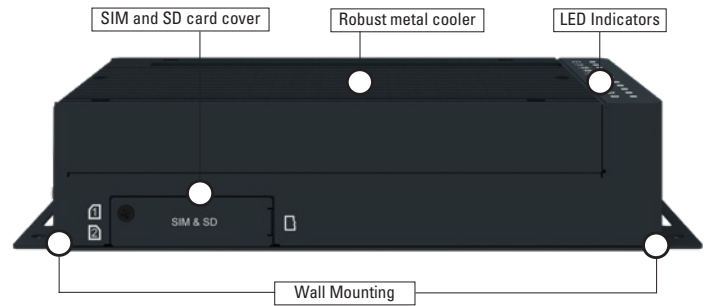
For more Antenna accessories visit www.advantech.com

Views

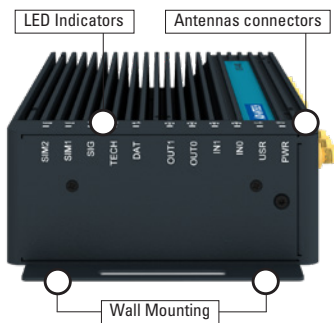
FRONT VIEW



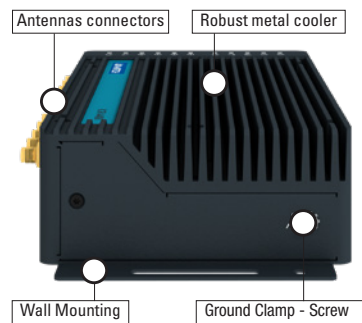
REAR VIEW



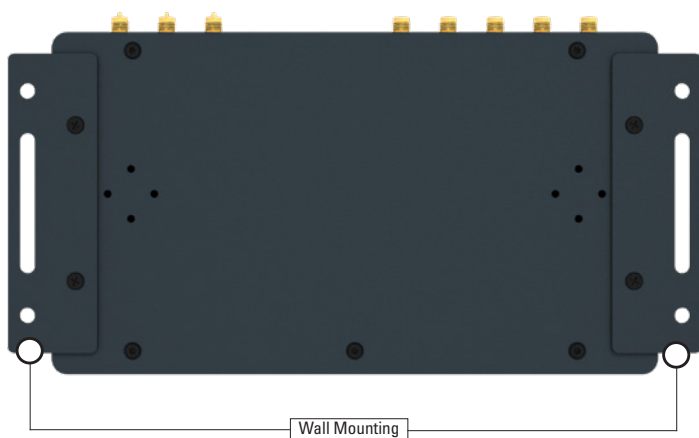
LEFT SIDE VIEW



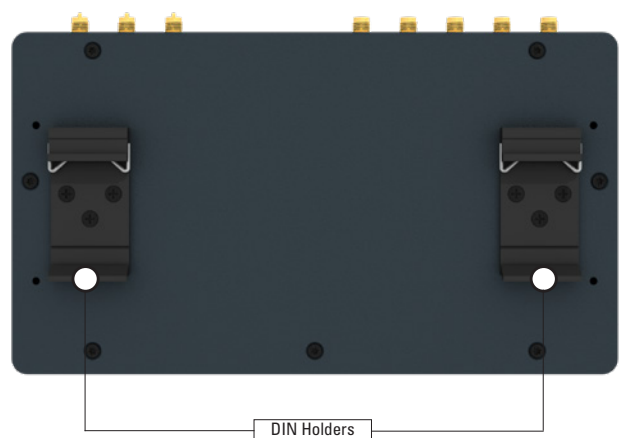
RIGHT SIDE VIEW



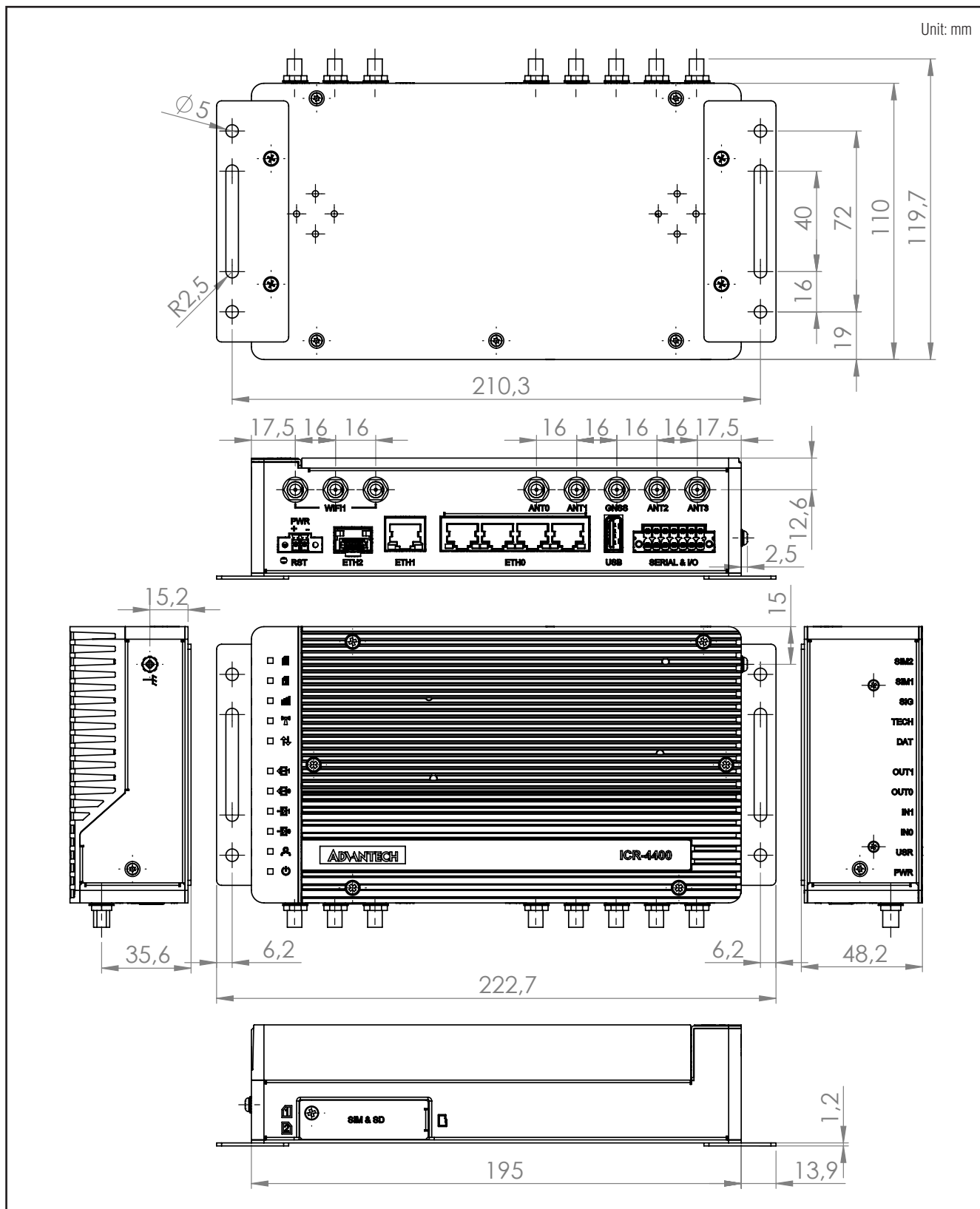
BOTTOM VIEW - WALL MOUNT KIT



BOTTOM VIEW - DIN HOLDERS

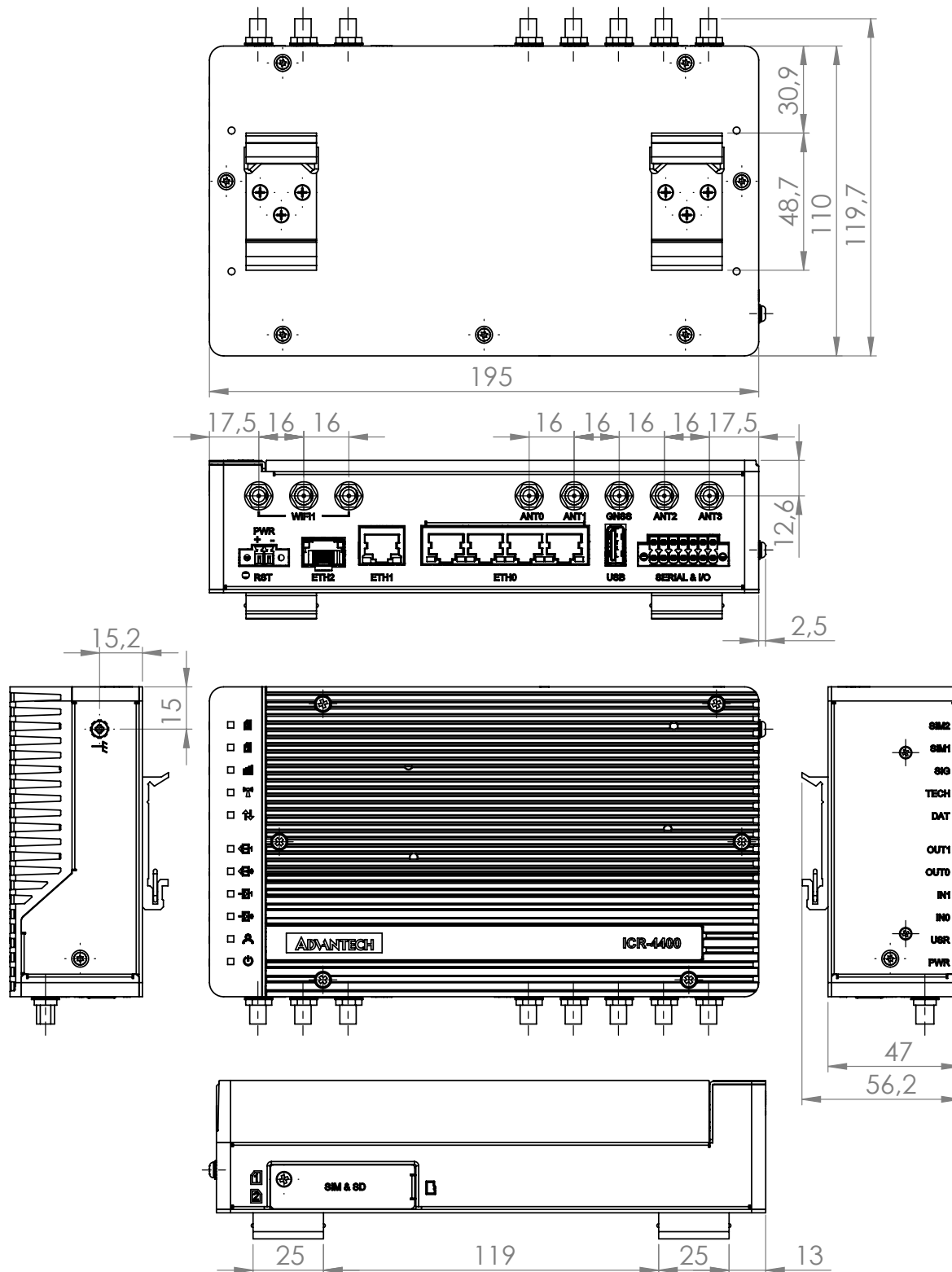


Dimensions - Technical Drawing - Wall Mount



Dimensions - Technical Drawing - DIN Holders

Unit: mm



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