

H5 Rail

Enhanced Mobile Broadband Gateway for Railway

Introduction

H5Rail is a ruggedized multi service communications platform that has been designed to fulfil the demand created by the evolution of the WWAN technologies and their applications that require wider bandwidth and higher capacity.

The router is equipped with multiple 5G NR and WiFi6 modems to be enabled in multiple combinations according to the use case. This high degree of flexibility guarantees, in turn, connectivity backup and resilience with concurrent multi sim/multi operator operations.

H5 Rail guarantees solid Ground to Train communications as well as to provide high speed Internet services to passengers onboard.

Interfaces

Cellular module	Up 5G-NR (SA/NSA) LTE Cat. 19 fallback
Wi-Fi module	Wi-Fi 6 802.11ax/ac/b/g/n
Location system (GNSS)	GPS/GLONAS/BeiDu /Galileo (with dead reckoning)
Digital I/O	2x M12, 4 pins, D-coded
Ethernet interface	3 x 2.5 Gbps + 1 x 1Gbps M12 8 pin (X-coded)
USB Port (2.0)	1 x microUSB type A/B connector
Power supply (Single Input)	Multi-range from 24 to 110 VDC

Highlight

- Up to 4 x 5G Radios with fallback to LTE Cat. 19
- Wi-Fi 6 broadband connectivity
- Dual SIM provisioning for each modem, plus eSIM (Consumer)
- GNSS positioning with Dead Reckoning & Geo-fencing
- be.OT: Next Generation FireWall IDS/IPS by Teldat
- Advanced Link Monitoring features
- 3 x 2.5 Gbps + 1 x 1Gbps Individual ethernet interfaces (M12 8 pin connectors)



Competitive Advantages

Concurrent multiple WWAN interfaces	Up to 4 simultaneous WWAN links (5G/LTE) with bandwidth aggregation and load-balancing to ensure maximum availability and application continuity.
State-of-the-art WWAN Technologies	With 5G-NR (fallback LTE Cat. 19) and Wi-Fi 6 802.11ax/ac/b/g/n in dual band (2,4GHz and 5 GHz) AP and client modes.
Cybersecurity NGFW	Teldat's NGFW firewall can provide IDS/IPS (with +800 firms) and Webfiltering (DNS/URL based) for cybersecurity protection from external attacks.
Customized Extended Feature	H5 Rail can support a range of product variants by adding optional components such as Digital I/O, an Artificial Intelligence TPU, and extended SSD storage.

Key Features

- **Broadband 5G Cellular Radio for NSA and SA.** 5G NR provides higher performance and improved efficiency to empower new user experiences and connect new industries. Where 5G is not accessible, the router falls back to LTE Cat. 19 maintaining broadband connectivity.
- **Wi-Fi 6 (802.11a/b/g/n/ac/ax) in AP or Client mode** Dual-band 2x2 MIMO Wi-Fi 6 in AP or client mode with dual band Wi-Fi access (2,4 GHz and 5 GHz), integrating with HotSpot and WebFilter. Ideal for vehicle connectivity and the architecture is ready for a Wi-Fi 7 upgrade.
- **eSIM for dynamic remote operator configuration.** The eSIM embedded into the 5G modems does not require manual operations to change mobile operator provider. The eSIM zero-touch provisioning, executed remotely on the fly, allows reducing operational costs dramatically.
- **Ciberseguridad de OT embebida.** Soluciones de Seguridad de Teldat de Tecnología Operativa a los sistemas de a bordo para proteger el sistema informático de ataques externos con métodos IPS/IDS.
- **Location-based (GNSS) dynamic behaviour.** Ideal for passenger journey information or telemarketing applications, GNSS provides real-time train's geolocation information via TCP port in NMEA standard. Enhanced by Dead-reckoning it allows tracking in dead spots.
- **Modular radio with up to 4 concurrent 5G connections.** Supports up to 4 WWAN modules (5G/LTE). Each module can operate independently or as backup providing concurrent multi-operator services and therefore allowing operator redundancy for critical communications.
- **Dual-SIM for each 5G modem (up to 8 SIMs).** Dual SIM slot for each of the 4 5G modems to increase connection availability, using any telecommunications operator and back it up with a second one in case of the primary connection is lost.
- **Bandwidth aggregation/load balancing.** Concurrent use of multiple WAN interfaces (LTE, Wi-Fi, satellite, etc.) to distribute and aggregate load from multiple services on different interfaces, thus optimizing coverage areas and enhancing overall performance.
- **Optimized hardware design for railway environment.** Designed to withstand vibrations and extreme temperature range (-25°C to 70°C), it also provides a multi-range power supply from 24 to 110 VDC for rolling stock either being trains and trams.
- **Hardware design certified for Railways.** Certified according to railway standards (EN 50155, EN 50121-3-2, EN 45545-2, EN 301 908-1, EN 301 511) can work in extreme harsh environments.

HARDWARE TECHNICAL FEATURE

WWAN: 5G and Wi-Fi6 / Wi-Fi7

Up to 4 x 5G NR (Sub-6GHz) NSA/SA, up to 3,33 Gbps (DL) - QM (f) connectors.
 Fallback LTE. Cat. 19, up to 2 Gbps (DL) / HSPA+ up to 42 Mbps/5,76 Mbps (DL/UL).
 Wi-Fi: 802.11ax/ac/b/g/n, MIMO2x2, dual-band 2.4-5 GHz - QM (f) connectors.

SIM - eSIM

Dual-SIM with two physical slot-trays (Format 2FF) per modem
 Additional one eSIM per modem

Additional Inerfaces:

2 digital I/O, with M12-4pins, Code-D (m) connector.
 Hasta 4 I/O digitales, con conector M12-4pins, Code-D (m).
 USB 3.0 with Micro USB type AB connector: consol and host (optional) modes.

Ethernet Interfaces

3 x Ethernet M12, 8 pins, X-coded - 10/100/1000/2.5G Base-T
 1 x Ethernet M12, 8 pins, X-coded - 10/100/1000 Base-T
 Ethernet ports with autosensing and MDI/MDI-X

GNSS interface

Active GPS antenna with FME and NMEA protocol
 GPS/GLONASS/BeiDou/Galileo: Up to 32 channels simultaneous tracking.
 Acquisition: -147dBm . Tracking: -163dBm. Reacquisition: -158dBm

Mechanical Specifications

Dimensions 444 x 220 x 44 mm plus 40 mm -> mounting kit (2 x 20 mm).
 Weight ~5,0Kg.
 Multi-range nominal input voltage from 24V to 110VDC.
 1 x M12 4pins code A (m) connector. Maximum power consumption: 70W (single power input).

SOFTWARE TECHNICAL FEATURE

IP Protocols

Multicast: IGMP (v1, v2, v3), PIM-SM, MSDP, MLD, MLDv2 PSLA service probes.
 ARP, proxy ARP, detección de MTU, NAT, ECMP, BFD RIP, OSPF, BGP.
 High availability: VRRP , TVRP HSRP compatible).

Security

IPSec in transport and tunnel mode, DMVPNs, Pre-shared authentic RSA.
 Certificates: CSR, SCEP , X.509v3, PKIX , LDAP revocation.
 Static and dynamic access lists and session based firewall DoS/DDoS attack.

Management

User friendly GUI, CLI configuration and storage in a plain text file.
 Assignment of user/group licenses, RADIUS & TACACS+ compatible AAA support.
 Protocols: Netflow , RMON V5 and V9, SNMPv1, v2 y v3, Syslog support, TRDP.

Specific Wi-Fi functions

Hotspot Gateway function for hotspot service support.
 WLAN controller function for Teldat's built-in APs.
 Location-based dynamic function (AP or client mode).

IP Services

Telnet, DHCP, DNS, FTP, SFTP, and SSH server and client NTP, LDAP, Syslog, SCP client.
 TFTP server DHCP, dynDNS relay

Quality of Services

Classification, marking, BW management, BW prioritisation and limitation.
 Up to 32 classes 16 queues per interface.
 Priority Queuing (PQ), Low latency (LLQ), by weight/type WFQ , CBWFQ.

Specific WWAN functions

Automatic hand-over (passive and active probe-based detection).
 Advanced link monitoring (packet error, latency, jitter).
 Quadruple SIM and module associated with the hand-over mechanism.

Advanced GNSS functions

Geo-fencing for location-based dynamic behavior.
 Location-based link/route activation.
 Dead reckoning for continuous tracking in blind spots.

ADDITIONAL TECHNICAL FEATURE

Environmental

Operating temperature range: EN 50155 OT3 from 25 °C to +70 °C.
 Storage temperature: min. 40 °C max. +75 °C.
 Relative atmospheric humidity: from 5% to 95%.

Bundle CNM & CNM Mobility

Global centralized device management tool for real-time information.
 Coverage, signal strength, bandwidth or throughput among others.
 Remote equipment management based on a flexible licensing offer.

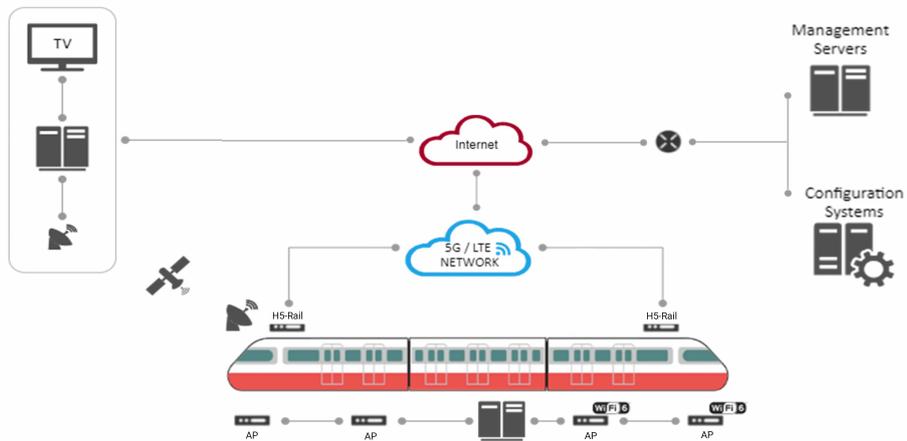
Certifications

Regulatory: CE (EU)/RED. Materials: RoHS, REACH.
 Railway compliances: EN50155, EN61373, EN50121-3-2, EN301-511, EN301-908-1.
 Fire & Smoke: EN45545.

Additional Specifications

Dying Gasp support
 Complete integration with Teldat's SD-WAN and NGFW solution (beSafe Pro)
 Serial/CAN(1 x RS-232/485) 1 x M12 8 Pin A-coded (selection via software)

Scenarios



Teldat Group