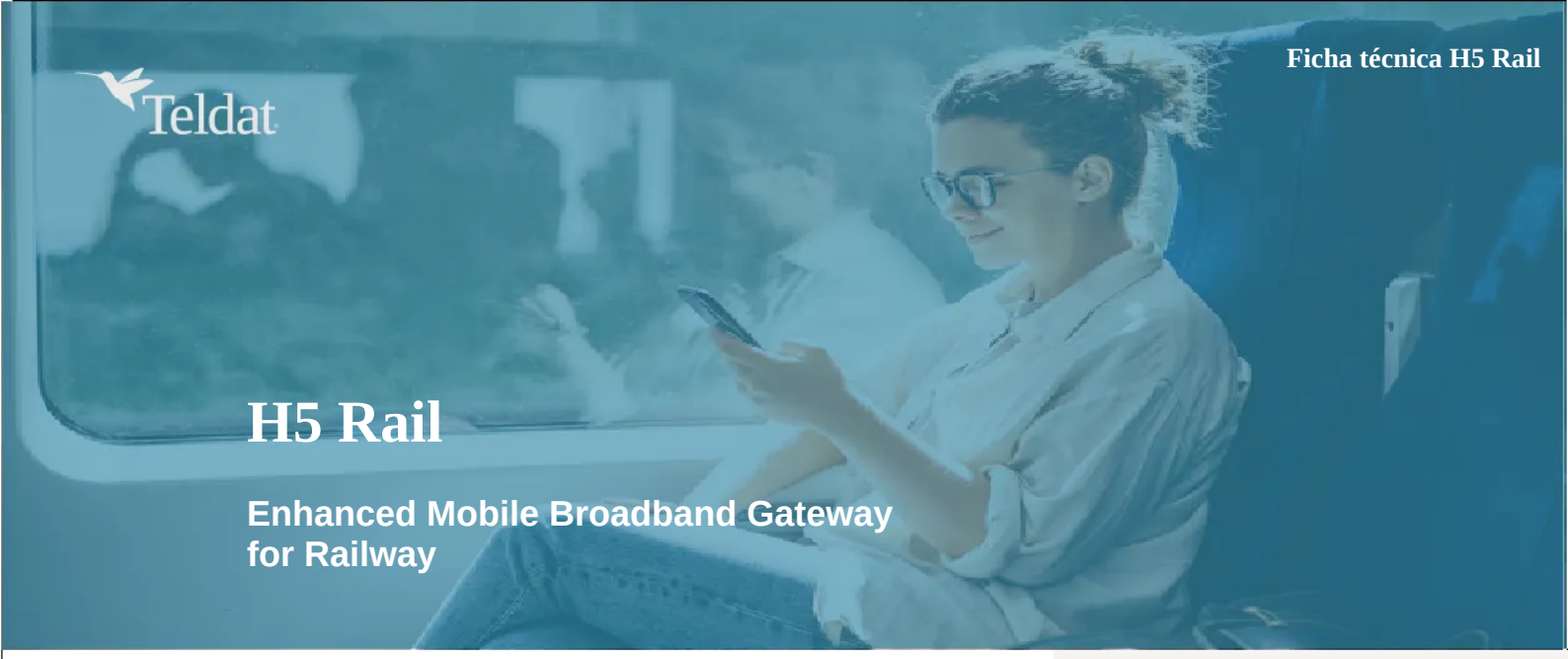


H5 Rail

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 5GNR 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.

Destacar

- **Up to 5G Radios with fallback to LTE Cat. 19**
- **Wi-Fi 6 broadband connectivity**
- **Dual SIM provisioning for each modem, plus eSIM**
- **GNSS positioning with Dead Reckoning & Geo-fencing**
- **be.OT: Next Generation FireWall IDS/IPS by Teldat**
- **Advanced Link Monitoring features**
- **4 x 2,5 GB Ethernet ports**

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
Digital I/O	Up to 4 PIN for I/O configurable
Ethernet interface	LAN/WAN 4 ports switch with 2.5Gb speed
USB Port	USB 3.0: Consol or USB host (optional)
Power supply (Dual Source)	Multi-range from 24 to 110 VDC
Serial Ports (Optional)	RS232 / RS485 Protocols

Competitive Advantage

Concurrent multiple WWAN interfaces	Up to 5 simultaneous WWAN links (5G/LTE and/or Wi-Fi) 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 ans 5 GHz) AP and client modes.
Embedded cybersecurity NGFW	The fully integrated NGFW firewall can provide IDS/IPS (with +800 firms) and Webfiltering (DNS/URL based) for cybersecurity protectrion from external attacs.
Customized Extended Feature	H5 Rail also enables a wide range of product variants by adding RS232/485 peripheral, Digital I/O, Artificial Intelligence TPU, and extended SSD memory.

Key Features

- **Broadband 5G Cellular Radio for NSA and SA.** 5GNR 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.** Multi-user 2x2 MiMo for concurrent dual-band Wi-Fi access (2,4GHz and 5GHz) that seamless integrates with HotSpot and WebFilter applications, creating a full solution for on-board Internet connectivity.
- **eSIM for dynamic remote operator configuration.** The eSIM embedded into the 5G modems does not require maual operations to change mobile operator provider. The eSIM zero-touch provisioning, executed remotely on the fly, allows reducing operational costs dramatically.
- **Cybersecurity embedded be.OT.** Teldat's Security Solutions of Operational Technology to on-board systems to protect the IT system from external attacks with IPS/IDS methos.
- **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.
- **Optimised hardware design for railway environment.** Designed to withstand vibrations and extreme temperature range (-25ºC to 70ºC), 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.

CARACTERíSTICA TéCNICA DEL HARDWARE

WWAN: 5G and Wi-Fi6

Up to 4 x 5G NR (Sub-6GH) NSA/SA, up to3,33 Gbps (DL) - QMA (f) connect0rs.
Fallback LTE. Cat. 19, up 2 Gbps (DL) / HSPA+ up 42 Mbps/5,76 Mbps (DL/UL).
Wi-Fi: 802.11ax/ac/b/g/n, MIMO2x2, dual-band 2.4-5 GHz - QMA(f) connectors.

LAN: Gigabit Ethernet Switch

4 ports up to 2.5 GbE LAN/WAN - M12-8-poles code X (f) connector
Duplex support, IEEE 802.3u link speed autonegotiation, VLAN and 802.1x
Port managed with MDI/MDX autodetection

SIM - eSIM

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

GNSS interface

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

Additional Inerfaces:

Serial RS232 / RS485 with M12-8pins, Code-A (m) connector.
Up to 4 digital I/0, with M12-4pins, Code-D (m) connector.
USD 3.0 with Micro USB type AB connector: consol and host (optional) modes.

Mechanical Specifications

Dimensions (L x W x H): 186 x 483 x 43,6 mm (1U on a rack). Weight ~5,5Kg.
Multi-range nominal input voltage from 24V to 110VDC.
2 x M12 4pins code A (m) connector. Maximum power consumption: 70W.

CARACTERíSTICA TéCNICA DEL SOFTWARE

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).

IP Services

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

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.

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.

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 WWAN functions

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

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).

Advanced GNSS functions

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

CARACTERíSTICA TéCNICAS ADICIONALES

Environmental

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

Certifications

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

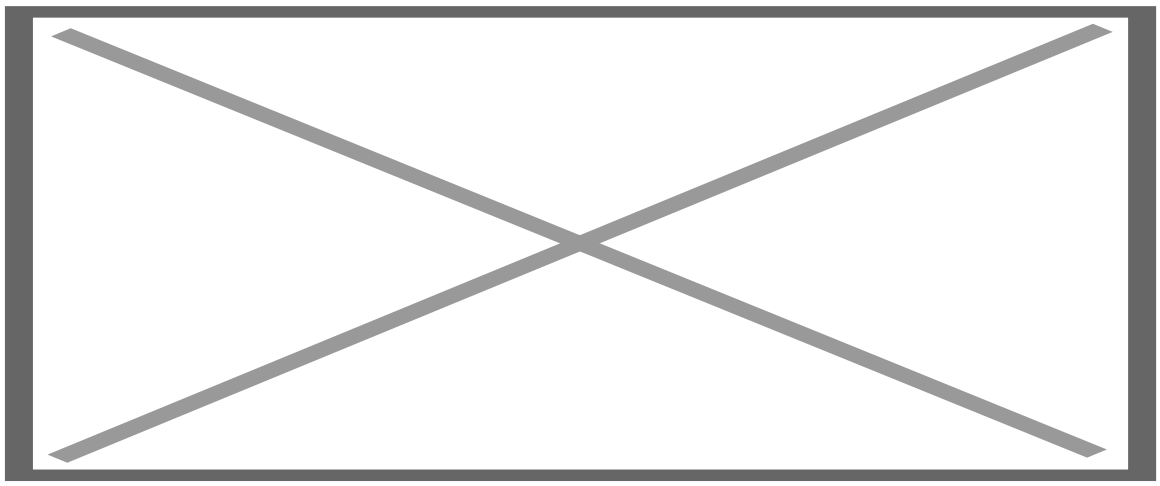
Bundle CNM & CNM Mobility

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.

NGFW: New Generation Firewall (*Roadmap)

Complete cybersecurity isolation for IPS/IDS and URL filtering.
More than 800 firms continuously updated and added.
On-premise or On-cloud based security for critical network & on-board WiFi.

Scenarios



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