Teldat-K/KF

LTE / Metro Ethernet Router

Figure 1: Router Teldat-K/KF

"The Teldat-K and Teldat KF routers are designed for branch offices with high speed accesses, whether these are fixed or mobile, with the added value of maximum processing capacity thus providing advanced features such as high speed routing, security and quality of service".

OVERVIEW

The Teldat-K/KF routers offer corporations access to high speed networks whether they are fixed (FTTH) or mobile (LTE) and at the same time provide maximum quality, security and compatibility. Depending on the network access, these are divided into two models with the following characteristics

- **Teldat-KF: WAN Ethernet Connectivity**
  - 4 x Gigabit-Ethernet LAN Switch.
  - Gigabit-Ethernet WAN Port.
- **Teldat-K: WWAN connectivity** (3G, 3.5G, LTE) as the main access or as backup for the WAN Ethernet
  - 4x Gigabit-Ethernet LAN Switch.
  - Gigabit-Ethernet LAN Port (with PoE)

  } Both options are exclusive
  - Embedded **WLAN** IEEE 802.11 a/b/g/n interface MIMO 2x2, with professional security (IEEE 802.11i)

Characteristics common to both models are:

- Embedded **WLAN** IEEE 802.11 a/b/g/n interface, with professional security (IEEE 802.11i).
- **USB Host** 2.0 port to connect 3G/4G external modems.
- Desktop format and ready for wall installation.
- Optional hardware encryption, optimizing transmission of encrypted traffic.
- External power supply (90-240Vac adaptor) or via Ethernet (PoE client integrated in 1xGigabit port).
- **The absence of fans** together with an innovative design mean they can be installed anywhere in the office.

Interfaces	Teldat-KF	Teldat-K
4x10/100/1000 Switch	Yes	Yes
3G/4G internal module	No	Yes
1x10/100/1000 Ethernet	Yes (WAN)	Optional as LAN (license) *
802.11 a/b/g/n WiFi	Optional (license)	Optional (license)
USB 2.0 port	Optional (license)	Optional (license)

* *1x10/100/1000 license in the Teldat-K disables the 4x10/100/1000*

With minimum performance impact, the device can transmit all or determined encrypted branch traffic flows, while maintaining maximum security levels in the communications. The router also has a "stateful" access list system (Firewalling based on states) and an Application Layer Gateway (ALG) function thus providing the maximum level of perimeter protection.

Teldat's hierarchic QoS System (Teldat BRS) allows priority, modeling and independent tagging in each traffic flow (VoIP, Data with priority 1, Data with priority 2, etc.), so it is appropriately handled in the transport network, simplifying the service level policy definitions (SLA) which are adapted to each of the branch applications.

The Teldat K has a command interface (CLI) fully adapted for professional use. Additionally the router possesses all the functions and features needed in the corporate sector for efficient, detailed and centralized management over the TeldaGES management platform.

Corporate management features are fully supported (SNMPv1/2/3 fully parameterized complying with MIB-2 and Teldat's MIB, FTP, TFTP, RADIUS, Syslog, etc), simplifying seamless integration in the company's existing communications management platform.

USER SCENARIOS

Integrated solution for Data and Voice convergency

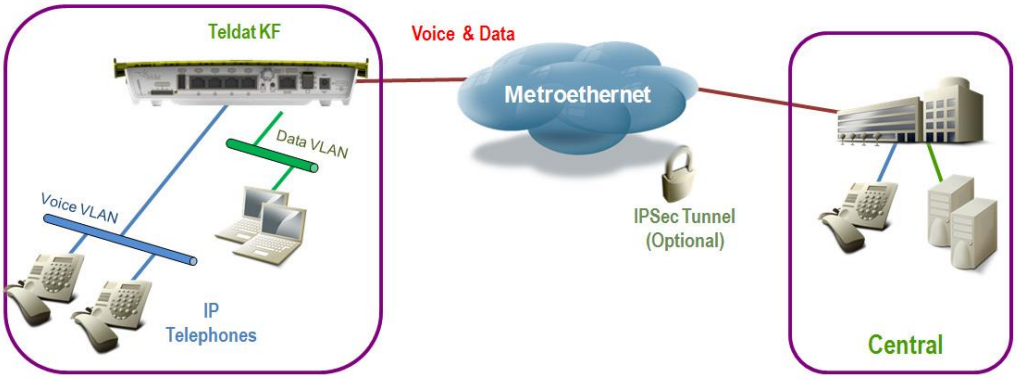

Figure 2. Data and Voice communications solution with the Teldat-KF

As shown in Figure 2, the Teldat-KF interconnects the head office voice and data applications with the Service Centers through the Metro Ethernet access. The Telephony over IP support means that the Teldat-K delivers top quality IP Telephony services to the IP extensions (SIP telephones).

Integrated Voice and Data solution with WWAN backup

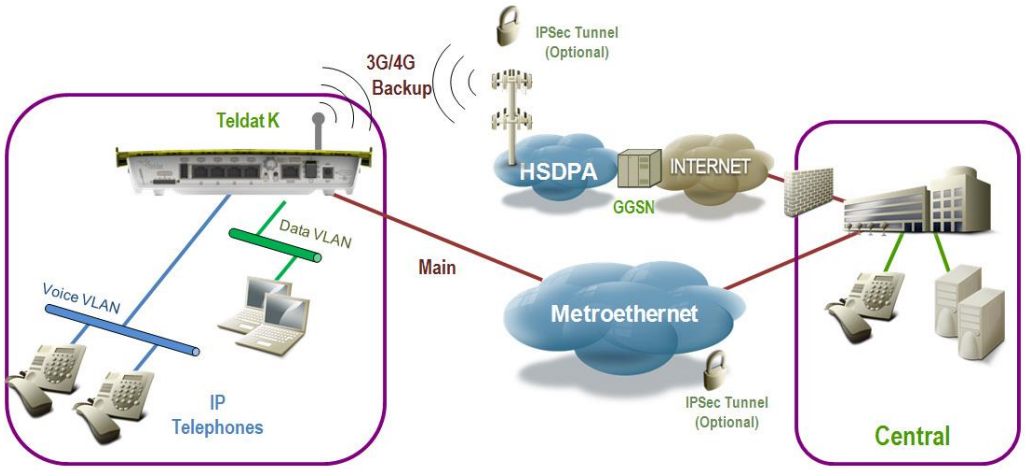

Figure 3. Data and Voice communications solution with the Teldat-K with WWAN backup

Figure 3 shows the backup solution added to the previous case. Should the main Metro Ethernet connection drop, the 3G/4G connection automatically activates.

Intelligent main line failure detection means that the line never actually drops as the 3G/4G backup activates due to degradation. For this either routing protocols can be used or the Teldat K can be configured to execute periodic polls over the line to detect packet loss rate, delays or jitter over a threshold, which triggers the backup line.

Integrated solution for Voice and Data convergence in WWAN networks

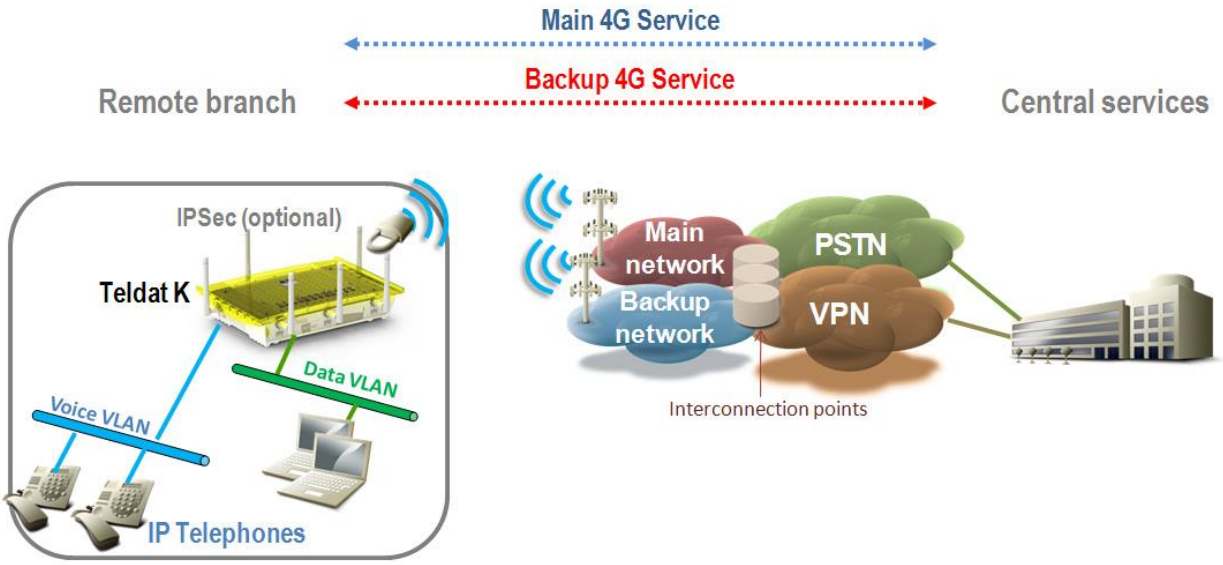

Figure 4. Communications solution for Data and Voice with the Teldat-K

As shown in Figure 4, the Teldat-K interconnects VoIP and Data aplications from the Service Centers through WWAN access, either permanently or on demand. To increase reliability, a second connection through an alternative mobile carrier can be used as backup, either through the internal WWAN module with the 2º SIM card or an external 3G/4G module via USB.

Simultaneous to data transmission over WWAN, the Teldat-K supports IP Telephony and GSM voice calls integrating voice and data communications in a single device and thereby allowing the Teldat-K to both manage the Data and Telephony service as well as maintaining the telephone service. Should the IP WWAN connectivity drop or suffer excessive degradation (the service drops or there is an unacceptable latency, jitter or error rate for Telephony over IP) the Teldat-K transmits all calls as voice over GSM to the public telephone network. The voice characteristics are fully interoperable with Teldat's Unified Communications and those from third parties (Alcatel, Aastra, Cisco, etc).

Dual backup: Backup for Access and device

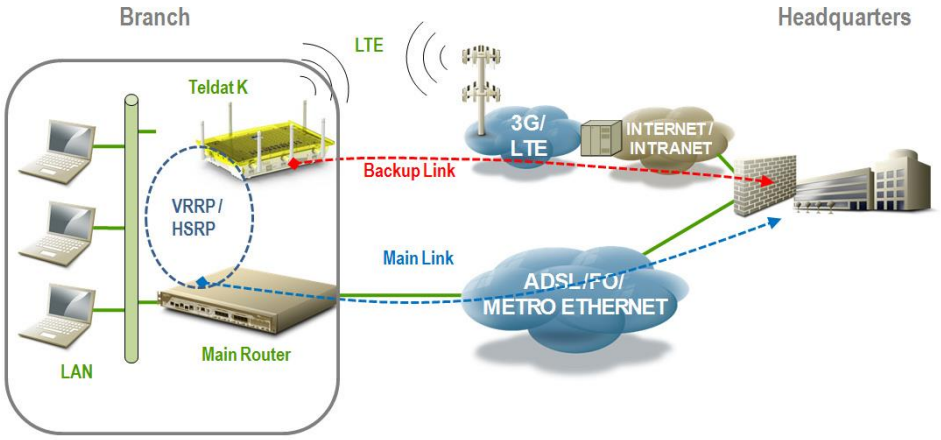

Figure 5. Backup Solution with two devices

The use of a dual device and double line in offices provide a much higher backup level as dependence on a single point of failure is eliminated. In normal conditions the fixed access is used unless there is a drop in that line or in the device it is connected to; in either case, the Teldat-K establishes the backup connection thus providing the branch office with service. The Teldat-K constantly synchronizes and monitors the main router through TVRP (a Teldat protocol that's 100% compatible with HSRP) or through standard VRRP. This backup is transparent to the devices and the office applications do not need any additional configuration.
As in the previous case, the Teldat-K can deliver Telephony service to the office, both calls via GSM as well as local telephone survival.

KEY CHARACTERISTICS

Ethernet Services

- ✓ WAN Ethernet: Gigabit-Ethernet 10/100/1000 port.
- ✓ Integrated Ethernet switch: 4 x Gigabit-Ethernet 10/100/1000 ports.
- ✓ Full independent SNMP management per Ethernet port.
- ✓ Full VLAN support (trunking, filtering, QinQ, etc.)

Integrated WWAN Communications Service

- ✓ Embedded 3G/4G interface (depending on the model), permanently monitored by the router's management motor.
- ✓ Fully managed router motor: Teldat 3G/4G interface commands and the interface are integrated in the generic network management platforms (SNMP management through the 3G interface Teldat MIB.)
- ✓ 3G/4G interface fully integrated in the router's Internetworking protocol architecture (CIT features) thus providing high quality and efficient 3G/VPN services.
- ✓ Three backup options for the main 4G service: Through the secondary SIM card, the external USB/3G modem and by connecting to an alternative APN (double PDP context).
- ✓ Protected against malicious attacks on the SIM card (internal SIM tray).
- ✓ Improved 3G/4G signal stability in areas with poor WWAN coverage: two SMA ports for external 3G antennas (Rx Diversity).
- ✓ Passive WWAN monitoring mechanisms (unnecessary to transmit polling traffic): Thanks to the constant monitoring the router carries out over the signal coverage, the connection to the mobile network, the IP connection and the detailed monitoring of the branch traffic transmitted and received over the WWAN link, the router can accurately and dynamically detect incidences in device performance and take the appropriate actions (WWAN backup, trap reports, etc) minimizing the time the communications service is unavailable.
- ✓ Active WWAN monitoring mechanisms (polling traffic): The router is also capable of detecting excessive degradation in the WWAN service using established parameters (delay, jitter and error rate) in order to execute the appropriate actions.
- ✓ Advanced WWAN diagnostics: In addition to the instant diagnostics from the radio interface, the router can capture relevant WWAN parameters such as signal coverage, offering reports on this evolution over time either on the device console or in the Teldat central network management platform (TeldaGES).
- ✓ Audio GSM calls supported, simultaneously with 3G data transmission for emergency telephony services.
- ✓ AT commands interface to complement the Teldat 3G interface commands for low level embedded communications module customization (SIM lock/unlock, etc).
- ✓ WWAN+: Proprietor management system to improve IP network protocols for use in cellular networks.

Corporate Services

- ✓ Border router for different dynamic routing domains (RIP, OSPF, BGP), administrative distance in IP routes, route filtering based on maps and policy-based routing (PBR) favor the implementation of corporate convergent services which combine Wireless WAN and landline access.
- ✓ VRF to adapt to complex or multiclient environments.
- ✓ Multi-HSRP and Multi-VRRP for network resilience and load balance applications.
- ✓ Link quality monitoring through the Teldat NSM/NSLA system adapts the routing policy based on link quality (RTT, erroneous frame rate and UDP jitter).
- ✓ Teldat's hierarchic QoS system. Flexible application for flow priority, traffic marking and classification means that efficient use is made of the network resources and an accurate definition of the service level agreements (SLAs).

- ✓ USB 2.0 port for connecting external 3G/4G modems.
- ✓ Absence of fans so the routers can be installed anywhere in the branch.

WWAN Communications Service through external USB-3G/4G Modem

- ✓ Simple migration of 3G architectures to 3.5 or 4G (LTE) architectures or future ones, thanks to the use of an external module permitting these to easily and quickly adapt to deployments of new mobile carrier technology.
- ✓ 3G/4G enabled in the field without internal intervention in the device; this only requires the USB port to be remotely enabled through a license. This permits you to unify the device pool with and without 3G/4G and defer the costs of 3G/4G connectivity to only those devices that require this and when they require it.
- ✓ WWAN+: Proprietor management system to improve IP network protocols for use in cellular networks.

Secure Communications

- ✓ Encryption processor incorporated; optimizes device performance in scenarios with IPSec tunnels.
- ✓ Fully parameterized IPSec Client/Server. Advanced IPSec features such as PKI encryption (Digital Certificates), extended authentication and Reverse-Route Injection guaranteeing compatibility with other commercial VPN solutions.
- ✓ Latest generation meshed topology VPN networks (Dynamic Multipoint VPN technology).
- ✓ IP filtering, MAC filtering and the SPI firewall protect the router from DoS attacks.

High Performance WLAN Module

- ✓ Embedded WLAN module (depending on the model) IEEE 802.11b/g/n MIMO 2x2.
- ✓ WiFi speed of up to 300Mbps
- ✓ Professional security (IEEE 802.11i/WPA-2).
- ✓ Configurable “Access-Point” and “Client” operation mode, either to reroute from the Wi-Fi terminals to the mobile network (access to Internet or to corporate VPN, depending on the service specifications, operating as “Access-Point”), or to connect the router to the branch WiFi network to access certain applications in the branch (“Client” mode).

Simple to install and deploy, suitable for massive deployments

- ✓ Power through Ethernet (integrated PoE client): Removes the need for an external power source near the router.
- ✓ The box can be adapted for wall installation, which together with the Ethernet power means the router can be installed at the best coverage point.
- ✓ Router configuration in a single text file (Teldat commands file), easily replicated.
- ✓ The Teldat-K/KF routers can be configured with a personalized default configuration for the service.
- ✓ Graphic configurators can be implemented for installers/operators, and customized depending on the specific needs of each service implemented with the Teldat-K/KF.

Efficient communications management

- ✓ Powerful Teldat command console, adapted for professional-class device management.
- ✓ A Syslog client reports any events detected by the Teldat Events Logging System.
- ✓ SNMPv3 agent provides the ability to send traps and read MIB2 and Teldat-MIB depending on the defined management communities. The Teldat-K can easily be integrated in the existing network management platform.
- ✓ Network clock synchronization (NTP Client).
- ✓ Intuitive and efficient management of Teldat-K routers through the Teldat network management platform (TeldaGES).
- ✓ Telnet, SSH2, FTP, TFTP and RADIUS Client.

IP Telephony

- ✓ IP telephony integrated server capable of managing up to 100 telephones with SIP, H323, Alcatel NOE or SCCP (Skinny) protocols.

TECHNICAL SPECIFICATIONS

General

Interfaces and connectors (availability of interfaces depends on the model and license)
1 x 10/100/1000M Gigabit Ethernet, RJ-45F (WAN)
4 x 10/100/1000M Gigabit Ethernet, RJ-45F (LAN)
1 x integrated LTE/HSPA+/HSPA/UMTS/EDGE/GPRS interface
- Double SIM tray (internal & external)
- 3 x connector for external 4G antenna (SMA connectors)

1 x WLAN 802.11n interface with two antenna connectors
1 x USB Host 2.0 interface for USB/3G modems
1 x Power switch

Ethernet Wan Port
10/100/1000-BaseT detection
Automatic semiduplex/duplex negotiation
MDI /MDI-X detection ("crossover detection")
Ethernet V2 / IEEE 802.3
LLC (802.2), ARP
IEEE 802.1Q (VLAN) up to 4096 VLANs
2 status and activity LEDs

Ethernet Switch
10/100/1000-BaseT detection
Automatic semiduplex/duplex negotiation
MDI /MDI-X detection ("crossover detection")
Ethernet V2 / IEEE 802.3
LLC (802.2), ARP
IEEE 802.1Q (VLAN) up to 4096 VLANs
Manageable Switch:
- EtherLike-MIB (RFC 2665)
- SNMP-REPEATER-MIB (RFC 2108)
- MAU-MIB (RFC 2668)

2 status and activity LEDs per port
LTE, HSPA+, HSPA, UMTS, GPRS compatible
Two external detachable antennas (SMA connector)
Passive detection of interface down (analysis of received traffic)
Active detection interface down (poll)
Advanced monitoring in the Radio Frequency interface
Simultaneous context for double APN (dual PDP)
Remote module firmware updating over the air
Automatic Handover
External SIM tray

Interfaz Wireless LAN Interface (requieres a license)
IEEE 802.11b/g/n
MIMO 2x2
Two external detachable antennas (SMA ports)

Console Port (optional)
RS-232 at 9600 bps (max. 115200 bps)
8 bits without parity and with one stop bit (8N1)

Power source
AC external adapter: 90 – 240 Vac; 50/60Hz (default)
DC external adapter: 18 – 75 Vdc (optional)
PoE power supply in port 1 x 10/100/1000

Dimensions
Length x Depth x Height
240 x 174 x 48 mm
Format: Desktop with possibility to wall mount

Environmental specifications
Temperature: 0 to 40 ºC (32 to 104ºF)
Relative Humidity: 5% to 95% (without condensation)
Altitude: 0 to 3000m. (0 to 10,000 ft)
Barometric pressure: 700 mbar to 1060 mbar

Noise
0 db (without fans)

Protocols and features

IP Protocol
IP, ARP, Proxy ARP
Static IP Routing, RIP I, RIP II, OSPFv2, BGP-4 & Policy Routing
BFD Protocol
Compatible with HSRP
RFC 2281 VRRP – Virtual Router Protocol
VRF-Lite
Quality of backup: Routing based on network quality measurements
Multi-path per IP packet (with static & dynamic routing)
Weighted balancing per TCP/IP session
Multicast: IGMP, IGMP-proxy, MOSPF
DHCP client, server & relay
DNS client & proxy. DNS cache. Dynamic upgrades in DNS (RFC 2136)
SNAT/DNAT/NAPT. Visible subnets, Port Mapping
PAT fire-walling
Multiple addresses per interface
Loopback Interfaces

PPP & PPPoE Protocols
PPP (RFC 1661), PAP/CHAP, IPCP
Multilink PPP
Multi-Class Extension a Multi-Link PPP (RFC 2686)
PPPoEoE, PPPoE Bridge + routing (PPPoE pass-through)
Multilink PPP over PPPoE

Renegotiation based on PADT

Data compression

IPHC compression
Van Jacobson & STA LZS compression algorithms

Quality of Service (QoS)

Packet marking (DiffServ) depending on the interface, subinterface, protocol, port and MAC and size
Congestion control: FIFO, queuing priority, BRS proprietary system, WFQ
Traffic modulation
Fragmentation in FR (FRF.12), PPP & MPPP

Security and VPNs

IPSec client & server. Fully parameterized, compatible with third party IPSec peers
IPSec security services: ESP & AH
IPSec operation modes: tunnel & transport
Encryption: RC4, DES, 3DES & AES
Authentication: SHA-1 & MD5
IKE Protocol
ISAKMP configuration method. Oakley groups 1, 2, 5, 15
NAT-Traversal
Reverse Route Injection (RRI)
Digital certificates X.509v3, LDAP, PKIX, PEM, DER
SCEP Protocol
TED Protocol
IPSec PMTU Discovery
GRE & multi-GRE encryption. GRE RC4
NHRP Protocol
Dynamic Multipoint IPSec VPNs (DMVPN)
Gateway Encryption Transport VPN (GET VPN - GDOI) RFC 3547
Radius Access Control (RFC 2138)
L2TP client (LAC), L2TP initiation & L2TP server (LNS)
L2TP/IPSec Server, compatible with Microsoft clients
Advanced IP filters
Advanced Firewall System (AFS)
- Statefull' Firewall
- Advanced packet classification and marking
- URL & content filtering

Bridge

Bridge over PPP (BCP)
STP "Spanning Tree Protocol" (IEEE 802.1d)
RSTP "Rapid Convergence Spanning Tree Protocol"(IEEE 802.1w)
Multiple bridge domains
Simultaneous bridging & routing
IEEE 802.1p CoS ("Class of Service")
PVST ("Per VLAN Spanning Tree Protocol") **[1]**
Source Routing, MAC & NetBIOS filtering

Telephony over IP (ToIP)

Signaling:
- SIP: RFC 3261, RFC 3262, RFC 3264, RFC 3265
- SIP transport over UDP, TCP and TLS
- X509 over TLS authentication
- SIP SDP: RFC2327
- SIP SDES: RFC4568
- H.323, H.245, H.225
- RAS
- UA-NOE (Alcaltel) (server function)
- SCCP (skinny) (server function)
- SIP and H323 modified AASTRA (server function)

Simultaneous telephone survival for SIP/H323/SCCP/UA-NOE/SIP (AASTRA)/ H323(ASTRA) terminals
Emergency switchboard functionality
PBX Features
- Supervised and blind transfers
- Simultaneous ringing in multiple terminals
- Hunt groups
- Call groups
- Overflow
- Forward if busy, no answer or unconditional
- Music on hold in streaming mode from the file

RTP, RTCP, SRTP
Data fragmentation FRF.12
Header compression CRTP
Numeric expansion and compression

Management

Command line interface via telnet & SSH
SNMP: MIB-2, Teldat-MIB
Events Logging System
Netflow V5 and V9
Syslog Client
NTP protocol
DynDNS Client
FTP & TFTP Software, BIOS & configuration upgrading
Internal Protocol Analyzer, compatible with Ethereal /WireShark
Default configuration switch
Radius Accounting (RFC 2139)
Integrated in Teldages (Teldat professional management platform)

Figure 6: Perspective view of Teldat-K router (with WLAN and WWAN antennas)

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