Advancing the Internet of Medical Things with a purpose-built 4G LTE Cat.1 USB Gateway

Thales Cinterion DGL61-W USB Device Gateway
To meet the needs of physicians and patients, medical device manufacturers need to deliver long life products that offer reliable, secure connectivity from anywhere. Devices need to operate 24/7, whether they’re moving from room to room in a hospital, deployed at home, or tucked in a suitcase for use on an international business trip.

This is where 4G cellular technology offers medical device makers significant competitive advantage.

LTE cellular networks have become ubiquitous around the world and mature 4G Low Power Wide Area Networks (LPWAN) provide the efficiency required for medical applications. They deliver proven reliability, even in locations that are deep underground, and they also provide low latency and built-in security mechanisms that help keep sensitive data safe.

From pacemakers and insulin pumps, to health monitoring hubs, MRI scanners, and surgical instruments, modern Internet of Medical Things (IoMT) applications are revolutionizing the way healthcare providers treat patients and meet modern standards of care. For instance, an average of 10 to 15 connected devices provide patient monitoring and care for each hospital bed in modern medical complexes, and a growing number of home health devices help treat everything from congestive heart failure to diabetes and sleep apnea. The IoMT is increasingly important in improving care and convenience while lowering health care costs, and it’s expected to grow at a CAGR of 19.9% by 2025.

The expanding IoMT

Advancing the IoMT with 4G LTE Cat.1 connectivity

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But what happens to deployed medical devices that rely on 2G and 3G connectivity as those networks sunset?

Today, 83% of the world population has 4G LTE coverage, with many areas reporting higher, such as in the U.S. where 99.8% of people have LTE coverage.

1 https://www.fiercehealthcare.com/tech/82-healthcare-organizations-have-experienced-iot-focused-cyber-attack-survey-finds
3 https://starfishmedical.com/blog/cellular-data-connectivity/#text=A%20per%20the%20FCC%202017%2C%20who%20have%20in%20broadband.
To ensure resilience and reliability, most connected medical devices today offer an inherent wireless connectivity solution as well as a USB port that can connect to a mobile gateway. When network issues occur, end users can plug in a USB gateway and instantly connect to next generation networks.

The problem is, 4G USB gateways have traditionally been designed for use with consumer devices, with a short product lifecycle in mind. They deliver lightning-fast LTE speeds and serve high bandwidth applications that quickly burn through battery life.

Though these 4G dongles are ideal for consumer applications, connected medical devices require greater efficiency and longer battery life versus speed and high bandwidth. Equally important, to recoup the massive investment required for cutting edge medical technology, devices need to operate reliably for a decade or more.

What’s more, in the highly regulated medical device manufacturing environment, products must meet rigorous requirements for highest quality process manufacturing and component traceability.

**IoMT success = long life + efficiency**

Just like industrial IoT use cases, medical devices require connectivity solutions engineered to meet rigorous requirements for efficiency plus high performance:

- Secure, reliable connectivity for 5+ years
- Reliable coverage indoors and in extreme temperature and moisture environments
- Easy and secure integration with healthcare systems and cloud platforms for fast deployment
- Remote lifecycle management solutions that keep equipment up to date and secure
- Optimized power management for long lasting battery-powered devices
- Full component traceability to meet medical industry requirements

First-of-its-kind 4G LTE Cat.1 USB Gateway for the IoMT

Cinterion DGL61-W USB Device Gateway: highly efficient, long life global connectivity

As a pioneer in the IoT healthcare sector for more than 15 years, global medical device makers trust Thales to deliver highest quality IoMT connectivity solutions and services.

Our latest innovation for medical devices, the Cinterion® DGL61-W USB Device Gateway, leverages our expertise in delivering low power, long life connectivity for industrial IoT use cases. Developed to work everywhere, the new dongle increases medical device flexibility enabling reliable use wherever it’s needed.

Retrofitting ease and manufacturing simplicity from one SKU

The new USB Device Gateway delivers the ultimate solution for retrofitting existing IoMT applications that rely on 2G/3G connectivity. The industrial-grade solution delivers out-of-the-box LTE Cat.1 4G connectivity, enabling speeds of 10 Mb/s downlink and 5 Mb/s uplink.

By providing global coverage from a single SKU, the USB Device Gateway also significantly simplifies the manufacturing and logistics of new healthcare devices.

An optional Thales eSIM takes manufacturing simplicity a step further, allowing mobile operator connectivity provisioning over the air, at the time of deployment.

Thales’s highly efficient custom Firmware Over The Air (FOTA) strategy keeps medical devices updated across their life span and helps improve on power consumption.
Custom antenna boosts connectivity and saves power

A specially designed internal dual antenna supports extended connectivity where network signal strength is weak improving performance up to 4.5 dB. Additionally, the antenna concept further improves on power consumption.

The gateway’s ultrarugged design, extended temperature range and optional wall mounting concept ensure stability and reliability.

Highest quality process manufacturing ensures traceability and global compliance

The DGL61-W USB Device Gateway is designed and made in Europe in NDAA- and TAA-compliant facilities. Consistent, reliable, and verifiable manufacturing and supply chain processes ensure products and components are fully traceable to meet stringent medical industry requirements.

What’s more, all Thales products come with Full Type and global carrier approvals plus expert Thales technical support to help speed time to market.
DGL61-W key advantages & features

- Single SKU covering the entire globe
- Superior performance due to dual internal antennas
- Purpose built for IoT devices
- 5+ year availability
- Simple plug & play solution
- Custom clip for mounting
- Embedded eSIM installed during manufacturing
- TAA-compliant
- Made in Europe
- Carrier approvals
- Expert technical support

Consumer USB dongle concerns

- Multiple dongles for multiple regions
- Single internal antenna requires external antenna for good RF performance
- Short consumer lifecycle
- Consumer-grade temperature ranges
- No alternative mounting options

Product Features

General Features

- AT commands (Hayes, TS 27.007, 27.005)
- Embedded TCP/UDP stack with IPv4/IPv6 support
- IP stack access via AT command and WWAN/MBIM
- IP services: TCP server/client, DNS, Ping, HTTP, SMTP, FTP
- Secure connectivity with TLS 1.2 engine
- Supply voltage range: 5V USB
- Dimensions: 4.5” x 2.9” x 0.75” (114.5 x 73.5 x 19.5mm)
- Operating temperature: -49°F to +131°F (-45°C to +55°C)
- Two Integrated Antennas

Specifications

- 3GPP Rel.9 Compliant Protocol Stack
- 12 Bands FDD-LTE: 700, 800, 850, 900, 1700/2100 (AWS), 1800, 1900, 2100, 2600 MHz (bands 1, 2, 3, 4, 5, 7, 8, 12, 18, 19, 20, 28)
- 7 Bands UMTS (WCDMA/FDD): 800, 850, 900, 1700/2100 (AWS), 1800, 1900 and 2100 MHz (bands 1, 2, 4, 5, 8, 9, 19)
- Quad Band GSM: 850, 900, 1800 and 1900 MHz
- SIM Application Toolkit, letter classes b, c, e with BIP and RunAT support

Java Open Platform

- Java ME 3.2 embedded
- Extended Memory: 18 MB RAM, 30 MB Flash File System
- Multi-threading programming
- Multi-application execution

Interfaces

- Micro SIM reader, 1.8V and 3.0V
- Component MIM prepared (optional)
- 4 operating status LED’s
- USB [B] 2.0 HS (Power over USB)
- USB cable length: 200mm (basic version)

Special Features

- Cinterion® IoT Suite Services: secure firmware updates, device performance
- Driver for Microsoft® 7™, 8™, 10™
- Driver for Linux
- Firmware upgrade via USB and FOTA
- Flexible wall-mounting concept

Approvals

- RED, GCF, CE, FCC, PTCRB, IC
- 3GPP operator approvals, e.g. AT&T
- RoHS, WEEE compliant