GSMA

PRIVATE NETWORKS

Private 5G network at the freeport of Riga

FREEPORT OF RIGA

Key partners
BCT, Druid, Nokia Networks

Transforming port operations with reliable and secure 5G connectivity

Impact & statistics

- Standalone (independent RAN and core)
- 50-hectare site coverage
- 22 Wi-Fi towers → 2 5G antennas
  - Spectrum allocation: 25 MHz in N77 band (3.8 GHz)
- 100 Mbps average throughput
- 10–20% faster container handling
- 0 connectivity downtime

Challenge

- Outdated Wi-Fi infrastructure nearing end of life, with no hardware support
- Frequent downtime and high maintenance burden
- Restricted data capacity for future automation
- Dependence on analogue radios with limited voice-only capability

Solution

LMT, Latvia's largest MNO, partnered with Druid Software to design and deploy the **first private 5G Standalone (SA) network in the Baltic region** at the BCT.

The solution consists of:

- A **dedicated 5G core network** (using Druid's Raemis™ platform)
- Two **high-power 50 W antennas** providing redundancy and complete site coverage
- Secure **SIM-based connectivity** for ruggedised tablets, smartphones and routers
- A **Push-to-X (PTx)** system enabling voice, video and image exchange across operational teams (nearing roll-out)

The Baltic Container Terminal (BCT) in the Freeport of Riga is one of the leading logistics hubs in the Baltic region, covering more than 50 hectares. The terminal handles thousands of containers a day, requiring seamless communication between cranes, loaders and operational control systems.

Challenge

Until recently, BCT relied on a Wi-Fi network with 22 access points mounted on 27-metre masts. Over time, this legacy system suffered from unstable coverage, poor handover between zones and limited data speeds (max 7 Mbps), resulting in connectivity dropouts for moving vehicles and inefficiencies in container handling.

Operational staff reported “black spots” where data connections failed entirely. These disruptions directly affected the NAVI terminal operating system, which coordinates real-time loading and unloading of ships. Inconsistent network performance led to longer vessel idle times and higher operational costs.

Solution

LMT, Latvia’s largest MNO, partnered with Druid Software to design and deploy the first private 5G Standalone (SA) network in the Baltic region at the BCT.

The 5G system integrates with BCT’s internal LAN, creating a secure, closed environment for data exchange and remote operations. Unlike Wi-Fi, which required 22 towers, the 5G solution achieved better coverage with just two antennas – a nearly 90% reduction in infrastructure footprint.

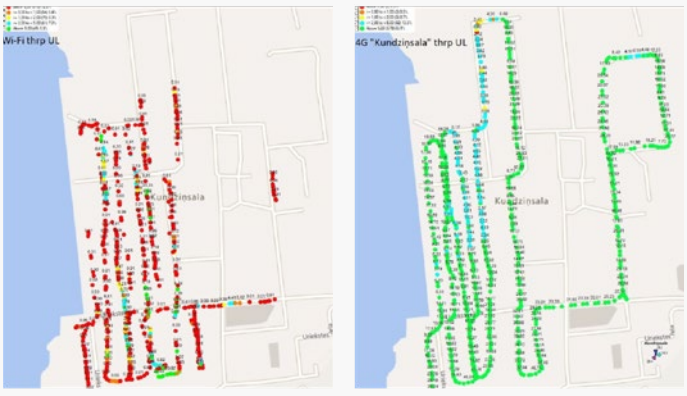
LMT performed detailed radio planning and testing over 12 months, focusing on business-critical use cases rather than blanket coverage to reduce costs. The managed service is operated from LMT’s Network Operations Centre, with 24/7 monitoring and Service-Level Agreements (SLAs) for reliability.

Where appropriate, existing infrastructure was used to keep costs down, such as the fibre link to control the port’s main gates – a major security concern.

Figure 1

WiFi vs 5G – upload speed

Source: LMT Innovations

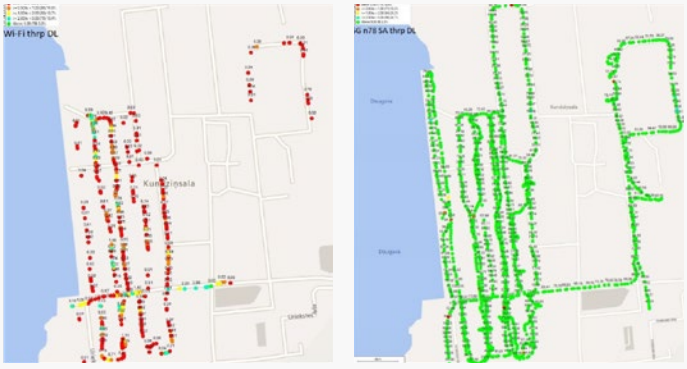


Before **After**

Figure 2

WiFi vs 5G – download speed

Source: LMT Innovations



Before **After**

Impact and benefits

Operational performance

Independent measurements showed that the 5G network provided **100 Mbps average throughput, low latency** and **zero session interruptions**, compared to near-zero Mbps in some Wi-Fi zones. This allowed:

- Continuous operation of NAVI terminal software
- Faster crane-to-server data transfer via secure 5G communications
- Real-time video and image exchange for maintenance teams
- Seamless push-to-talk communication replacing legacy analogue radios

BCT's operations team reported measurable improvements:

- **Container handling efficiency increased by 10–20%**
- **Vessel idle time was significantly reduced**
- **Maintenance and network management costs were lowered**

Business and strategic outcomes

- **Cost efficiency:** Comparable total cost of ownership to enterprise-grade Wi-Fi (hundreds of thousands of euros, not millions)
- **Data security:** Network access limited to SIM-authenticated devices, ensuring zero unauthorised use
- **Employee satisfaction:** Simplified operations and improved communication
- **Future-ready:** Scalable foundation for automation, AI and robotics

"Deploying a private 5G Private Network across BCT's expansive site delivered comprehensive coverage, faster data speeds and significant cost savings. Uninterrupted data flow minimised container handling time and boosted competitiveness."

Kārlis Vilciņš, Head of LMT System Integration Business

Other use cases and innovations

Building on this deployment, **LMT recently showcased several 5G maritime applications** at the Freeport of Riga, including:

- **Automated drone-based crane inspections** and **underwater drones** for water quality monitoring and oil spill response
- **Unmanned Surface Vehicles (USVs)** for cargo handling and environmental data collection
- **AI-based hydrography sensors** transmitting real-time data from ship to shore

These demonstrations attracted delegations from Germany, the United Arab Emirates (UAE), Italy and other countries, a clear sign of Latvia's leadership in **5G maritime innovation**.

"From 22 towers to just 2 antennas – same cost, better performance.

Kārlis Vilciņš
Head of LMT System Integration Business

Key takeaways

The Freeport of Riga project demonstrates how private 5G networks can deliver **enterprise-grade connectivity, resilience and efficiency,** even in complex industrial environments.

Lessons learned

- Partnerships are crucial: LMT collaborated closely with BCT, Druid Software and Nokia Networks to design an operationally viable system
- Incremental deployment reduces risk: Starting small with two antennas allowed rapid testing and scaling
- Trust and managed service models accelerate adoption

Success factors

- Strong business case: 5G matched the cost of enterprise Wi-Fi while delivering superior coverage
- Technology maturity: Proven integration with existing LAN systems and terminal software
- Ecosystem collaboration: Telco, enterprise and core vendor alignment

Scalability and future outlook

- BCT's private 5G deployment serves as a blueprint for ports globally.
- LMT has signed a Memorandum of Understanding with the Port of Hamburg to extend digital cooperation and maritime innovation in the Baltic Sea region.
- Next steps include the integration of autonomous vehicles and AI-driven predictive maintenance.

GSMA

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