

How Hitachi Rail Enabled High-Speed Wireless Diagnostics with LinkBlu

Unlocking 9× faster wireless diagnostics on existing hardware.

Powered by DEWINE Labs.

Case Study · 08/2026



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About the customer

Hitachi Rail is committed to driving the transition to sustainable mobility and has a clear focus on partnering with customers to rethink mobility.

HITACHI

Its mission is to help every passenger, customer, and community enjoy the benefits of more connected, smooth, and sustainable transportation.

Its international expertise and experience covers every part of urban ecosystems, main lines and freight railways, from high-quality production and maintenance of rolling stock to digital signalling, payment systems and smart operations.

As part of the development of a new generation ETCS Level 1 product, Hitachi Rail wanted to make maintenance access more convenient for people working trackside. The goal was to add a Bluetooth Low Energy (BLE) feature at higher performance to make it work reliably in field operation.

*When rail infrastructure is mission-critical,
maintenance access cannot become a bottleneck.*

The existing BLE implementation, running on an off-the-shelf module, delivered only about 77 kbps throughput. That made wireless access too slow for efficient technician workflows.

Hitachi Rail therefore partnered with **DEWINE Labs** to improve wireless performance at the firmware level while keeping the existing hardware platform in place.

By replacing the default BLE firmware with LinkBlu, DEWINE Labs helped Hitachi Rail **increase throughput to 700+ kbps** on the same hardware, enabling a much more usable wireless diagnostics workflow.

Project snapshot

Customer

Hitachi Rail

Global rail
technology company

Headquarters

London,
United Kingdom

Industry

Rail technology
and digital mobility

Challenge

BLE throughput
limited to ~77 kbps,
hereby also limiting
wireless diagnostics

Solution

LinkBlu firmware
upgrade on the existing
BLE module, with no
hardware redesign.

Result

700+ kbps BLE throughput
on the same hardware,
which is approximately
9× faster than before.

The challenge

Speed up wireless access for maintenance workflows

Hitachi Rail was building a new generation ETCS Level 1 product and wanted to add Bluetooth Low Energy to make maintenance and accessibility easier for people working trackside.

The aim was simple: Enable secure, wireless data access for customers while keeping trackside workers safe.

The underlying hardware did not deliver the throughput required for a smooth user experience. The existing solution achieved **only around 77 kbps**, which was too slow for the intended workflow.

What Hitachi Rail needed

- Faster wireless access for technicians working trackside
- A BLE implementation capable of reaching the agreed throughput target of at least 600 kbps
- A solution that kept the existing hardware in place
- Lower technical risk to meet the product development targets



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*"With a leading-edge ETCS Level 1 solution,
we also aimed to be at the forefront of wireless connectivity.*

Therefore, we needed to speed up the throughput rate significantly."

– Tamara Demydenko, Hitachi Rail

The solution

Replacing default BLE firmware with LinkBlu



Hitachi Rail partnered with DEWINE Labs to improve the BLE performance of its existing module through a firmware-level upgrade. Instead of changing the hardware, DEWINE Labs replaced the default firmware with LinkBlu, a Bluetooth Low Energy firmware designed to improve throughput, reliability, and controllability in embedded and industrial systems.

This approach avoided hardware redesign. Instead, the existing BLE module remained in place while the firmware layer was replaced and optimized.

Key capabilities

High-throughput BLE communication

- Increased throughput from ~77 kbps to 700+ kbps on the same hardware.
- Enabled much faster transfer of logs and diagnostic data for maintenance workflows.

Firmware-level performance optimization

- Improved the software layer instead of forcing a hardware redesign.

Adaptive and modern BLE architecture

- Provides a high-performance, controllable BLE communication layer for embedded systems.
- Improves scheduling, data flow, and overall communication efficiency.
- Gives engineers greater visibility into system behavior and performance.
- Designed to meet the requirements of performance-critical and regulated environments, including modern cybersecurity standards.

**The solution: keep the module,
replace the firmware, and unlock the required speed.**

"By unlocking maximum performance of the existing hardware with DEWINE Labs' solution, our new product generation delivers speed without compromise."

– Tamara Demydenko, Hitachi Rail

The results

A 9× performance increase without hardware changes

Before LinkBlu

- ~77 kbps BLE throughput
- Wireless access too slow for efficient technician workflows
- The hardware was not optimized for higher-speed operation

After LinkBlu

- 700+ kbps BLE throughput
- Roughly 9× faster wireless data transfer than before
- A usable wireless diagnostics workflow for technicians and for the internal customer demonstration
- No hardware redesign required

Strategic impact

By improving the BLE stack at the firmware level, Hitachi Rail achieved:

- faster access to diagnostic and system data for maintenance workflows
- preservation and optimization of the existing hardware platform
- a wireless feature that sets a new benchmark for performance and reliability

BLE hardware is often not the limitation – the firmware is. Through a firmware-layer upgrade, Hitachi Rail unleashed the full capabilities of its hardware.

Industrial Bluetooth you can trust

DEWINE Labs develops Bluetooth Low Energy firmware for embedded and industrial systems where standard BLE stacks do not deliver the required performance or reliability.

LinkBlu replaces non-deterministic default BLE stacks with a high-performance and controllable communication layer running on existing Nordic Semiconductor hardware.

LinkBlu is deployed in:

- Rail infrastructure use cases
- Industrial automation and machinery
- Robotics and mobile systems
- Medical and regulated systems

For Hitachi Rail, LinkBlu delivered:

- 700+ kbps wireless throughput on existing hardware
- Faster technician access to diagnostic data
- Reduced redesign risk through a firmware-first approach
- A wireless feature ready to be demonstrated against agreed internal requirements



DEWINE Labs' solutions replace conventional non-deterministic BLE stacks with a deterministic dual-channel communication architecture, designed for real-time industrial control systems.

The architecture ensures predictable latency, traffic isolation, and stable behavior under interference while running on existing Nordic Semiconductor hardware.

Want to know more?

[Book a technical consultation](#)
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