

Use Case:
Smart Sea port 5G

**Building the sustainable
smart port of the future**



April 2022



USE CASE:

Hamburg Smart Sea Port testbed in the European 5G MONARCH project

THE CHALLENGE – HIGH DEMAND FOR 5G RAN

Adapting traditional business models to be more efficient, and socially and environmentally sustainable is becoming increasingly important. This applies to all industries across diverse and multidimensional sectors and activities, of which ports are a key example. By introducing 5G technology into processes and ecosystems ports are increasingly evolving towards the Smart Port of the future, with real-time control and monitoring using always- connected sensors, devices, for applications such as automated ground vehicles (AGVs) and remote-controlled cranes that assist in loading/unloading the containers and moving them around the port, as well as CCTV cameras, body worn cameras, sensors for equipment, shipment, and environmental data.

With high levels of data traffic, including multiple high-definition video streams, the capacity requirements are in excess of 25Mbps, whereas the average spectral efficiency is relatively low, with the SINR range for connected devices being between 0-10dB.

This means that this Smart Port scenario is capacity limited – the resources available are depleted before reaching the maximum possible coverage of the cell.

The AccelerComm™ 5G complete physical layer solution resolves this, by enabling high spectral efficiency, to deliver a resilient, low power, performant, and cost-effective network that satisfies sustainability and business goals.

THE CURRENT PORT SCENARIO

Parameter	Value
Throughput requirement (UL / DL)	25 Mbps / 25 Mbps
Device density	20 devices/km ²
Demand density	5 Gbps/km ²
Frequency band	3800 MHz
Bandwidth	40 MHz
Antennas (UE /BS)	4 / 16
Layers (UL / DL)	2 / 4
Average spectral efficiency (UL / DL)	3.9 b/s/Hz / 5.8 b/s/Hz

ACCELERCOMM™ 5G PHYSICAL LAYER DELIVERS:

- Best spectral efficiency
- High reliability
- Network cost savings
- Network power savings

Driving lower costs and lower power consumption network

THE SOLUTION IN DETAIL

Adopting AccelerComm's complete physical layer solution results in an increase in the average cell spectral efficiency, which in turn brings an improvement in network performance and potentially also results in a large potential reduction in the required number of sites (and hence power) to provide coverage.

5G equalization solution

The AccelerComm™ 5G equalization IP contains a unique algorithm, which improves the spectral efficiency by between 0.5-2b/s/Hz in the operating SINR region of 0-10dB, resulting in up to 33.7% infrastructure equipment and power savings.*

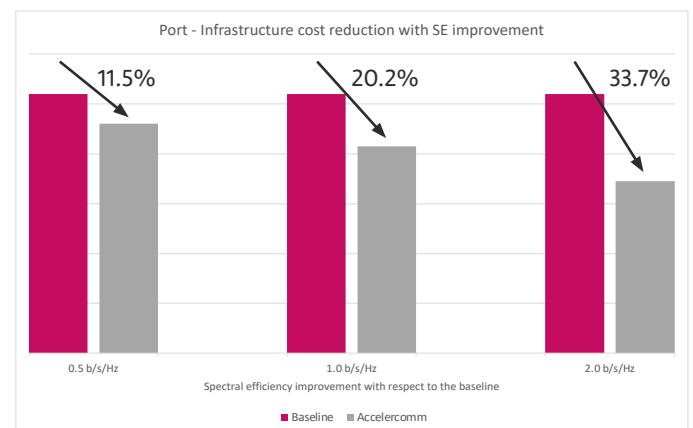
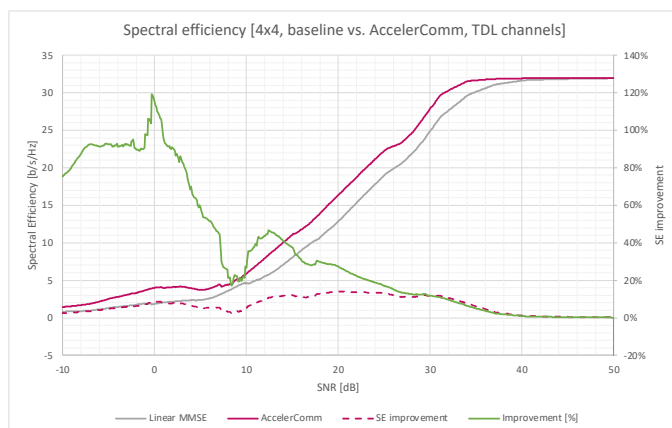
5G LDPC solution

The AccelerComm™ LDPC implementation that improves spectral efficiency, and delivers a low latency solution, high reliability solution with Block Error Rates (BLER) less than 1×10^{-6} .

Without the BLER error floor experienced by other decoders, even at high signal to noise ratios, ultra-high reliability services can be supported.

Integrated solution

These functional blocks are configurable and are embedded within a complete in-line physical layer IP solution that enables low risk and fast integration into silicon.



* Reference: Real Wireless research, October 2021

AccelerComm™ configurable 5G NR IP for differentiated performance



Best spectral efficiency in all conditions

Benefits all SINR ranges, with a considerable improvement in the low and medium operational SINR range, which leads to significant OPEX (power) and CAPEX (equipment costs) savings.

**33.7% Infrastructure
power and equipment
cost savings**



Most reliable performance

A unique algorithm removes the BLER floor experience by other decoders, even at high signal to noise ratios. Ultra low BLER drives.

**99.999% service
availability**

“ It’s clear to see that adopting the AccelerComm™ solution provides a number of advantages for Smart Ports, where there are high performance requirements, and where spectral efficiency improvement affects the majority of the devices inside the cell.

As well as reducing the overall infrastructure cost, this technology helps to deliver a high-performance network to provide the foundation on which to innovate and deliver on the vision of the Smart Port.

Eric Doweck, Segment Marketing Manager, AccelerComm

For more information on this solution, or to arrange a demo, please contact info@accelercomm.com



AccelerComm™ is a semiconductor IP-core company that provides patented physical layer solutions. Our team has a proven track-record of signal processing and IP expertise, from developing and optimizing algorithms through to their implementation and delivery in FPGA and ASIC architectures. With more than 100 published IEEE papers and numerous citations for our work in 3GPP RAN1, we are having a significant impact on the mobile communications world.

Find out more about us at [accelercomm.com](https://www.accelercomm.com)

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