ACCELERCOMM
SUPERCHARGED WIRELESS

Use Case: 5G Smart Factory

Building the connected factory of the future

December 2021

www.accelercomm.com

USE CASE:

5G Smart Factory

THE CHALLENGE – HIGH DEMAND AND HIGH RELIABILITY

Controlling mobile robots that perform a number of tasks in a factory to improve productivity corresponds to a high demand scenario that requires excellent reliability.

In a factory environment, mobile robots interact with each other and with operators, and are used to execute multiple operations – assistance in work steps, collaboration with other robots, such as for car assembly, and transport of goods, materials and other objects. The mobile robots in this use case example contain two cameras, one for continuous high-definition video stream to a remote controller and a second one, which sends a video stream or image in predefined positions or actions *.

The uplink part of this service carries the majority of the communication requirements, while in the downlink, the controller sends commands and acknowledgements to the mobile robot. For safety and efficiency reasons, the communication between the mobile robot and the controller is characterized by high reliability, close to 99.999%.

The network in such a scenario is capacity limited. In the baseline assumption, it will require approximately 54 small cells to provide the necessary connectivity with the required targets, across an area of 14,400 m^2.

Parameter	Value
Service Modelled	Mobile Robots
Throughput requirement (UL / DL)	9 Mbps / 0.56 Mbps
Device density	0.1 devices/m^2
Demand density **	0.91 Mbps/km^2
Frequency band	3800 MHz
Bandwidth	40 MHz
Antennas (UE /BS)	4 / 16
Layers (UL / DL)	2 / 4
Average spectral efficiency (UL / DL)	6.1 b/s/Hz / 7.2 b/s/Hz

ACCELERCOMM™ 5G COMPLETE PHYSICAL LAYER DELIVERS:

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

* 5G ACIA, "A 5G traffic model for industrial use cases", November 2019

** 3GPP TS 22.104, "Service requirements for cyber-physical control applications in vertical domains"

Driving lower costs and lower power consumption network

THE SOLUTION IN DETAIL

Adopting AccelerComm's 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 (hence equipment cost and 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 0-15dB, resulting in up to 24.1% infrastructure equipment and power savings.*

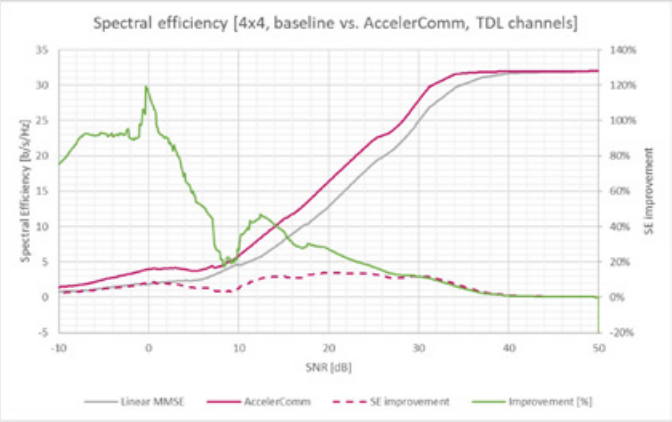
5G LDPC solution

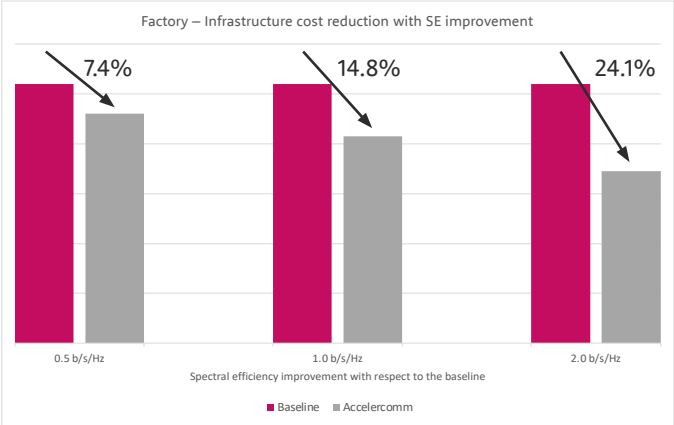
The AccelerComm™ LDPC implementation improves spectral efficiency, and delivers a low latency solution, high reliability solution with Block Error Rates (BLER) less than $1x10^{-6}$.

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.

24.1% 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 Factory deployments where network capacity is limited. As well as reducing the overall infrastructure cost, this technology delivers a resilient high-performance network to satisfy all requirements of the Smart Factory.
>
> Eric Dowek, Segment Marketing Manager, AccelerComm

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

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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**

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