

3GPP TSG RAN Meeting #101
Bangalore, India, September 11--15, 2023

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Source: Siemens, Bosch,
Fraunhofer IIS, Fraunhofer HHI
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RP-232528

Vertical Requirements on RAN Rel-19 for Industrial 5G – Sidelink Evolution

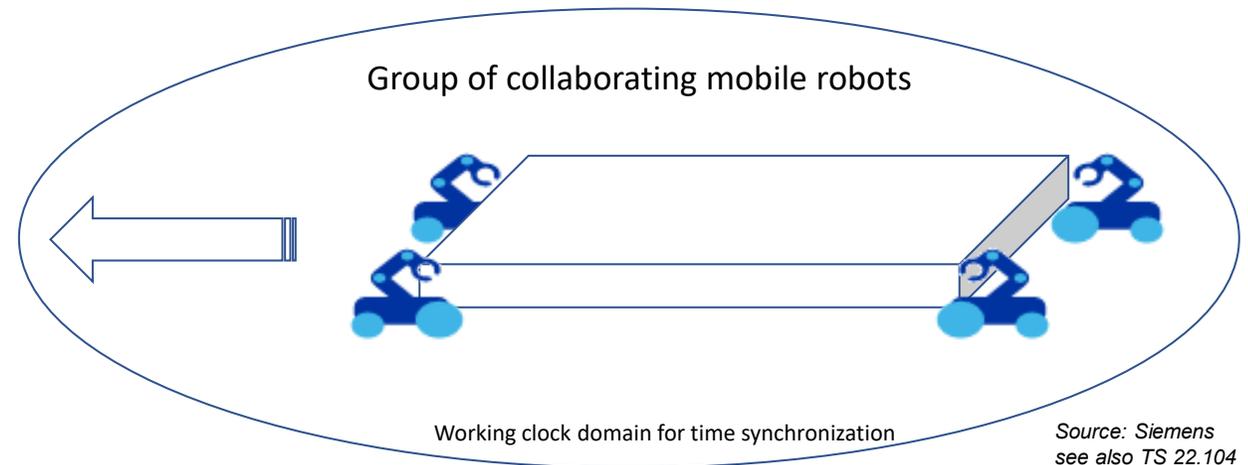
Siemens, Bosch, Fraunhofer IIS, Fraunhofer HHI

Cooperative Carrying Mobile Robots Use Case

In future smart factories, a group of mobile robots/AGVs is used to carry large or heavy work pieces and to move them from one place to another in the factory. The cooperative carrying is a demanding control application, which requires URLLC, periodic-deterministic communication, time synchronization, and multicast. The application controls the drives and movements of the mobile robots/AGVs in a coordinated way, so that the large or heavy work piece is carried smoothly and safely from one place to another. Sidelink communication is assumed to have performance advances for a moving group of UEs in direct wireless range.

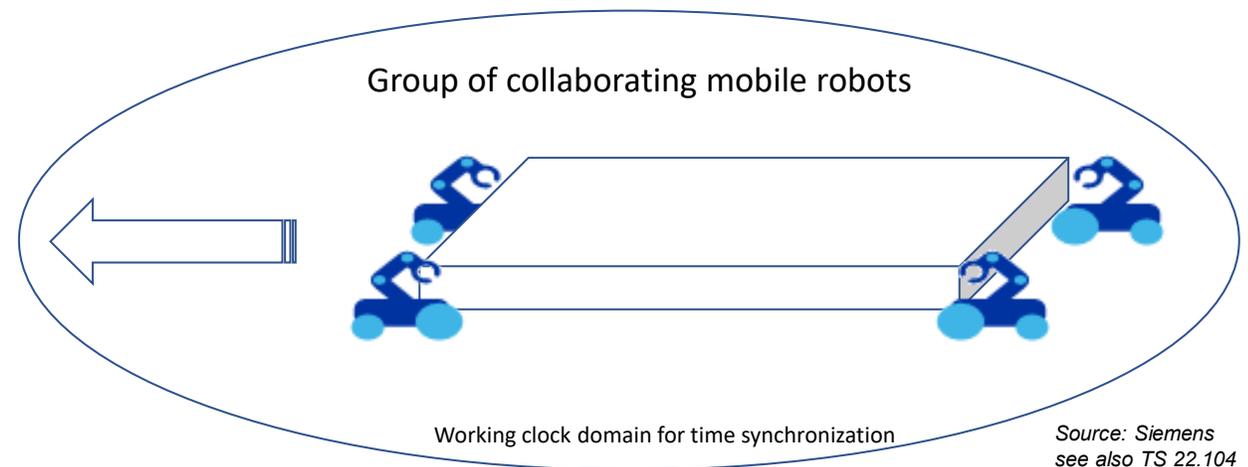
The corresponding 3GPP SA1 requirements are collected in TS 22.104.

Furthermore, 5G-ACIA described use cases and requirements for using sidelink in industrial factory applications in an upcoming whitepaper (to be published at <https://5g-acia.org/media/publications/>), see also Liaison Statement by 5G-ACIA ([RP-223475](#))



Sidelink Enhancements for Industrial Communication

- Support of NR sidelink for IIoT/factory applications in standalone NPNs
- Support of Industrial IoT (IIoT) and URLLC KPIs over sidelink
 - 1-5 ms max. latency;
 - 99.999% communication service availability (high reliability);
 - Support of (IEEE 802.1AS) time synchronization with $<1 \mu\text{s}$ clock synchronicity;
- Enhanced resource allocation for periodic-deterministic traffic over sidelink, considering TSC requirements (see TS 22.104)



Overall View on Rel-19 Content

Title	Brief Description and Key Objectives	Potential RAN WGs	Respective SA1 Requirements	Further dependencies on SA groups
Sidelink for Industrial Communication	Support of direct device communication/NR sidelink communication with Industrial IoT (IIoT) KPIs for IIoT/factory applications in Standalone NPNs Key Work Tasks includes defining 1. Support of Industrial IoT (IIoT) and URLLC KPIs over sidelink <ul style="list-style-type: none"> • 1-5 ms max latency • 99.999% communication service availability (high reliability) • Enhanced sildelink synchronization with <1 μs time sync accuracy 2. Enhanced resource allocation for periodic-deterministic traffic including TSC requirements	RAN1, RAN2	TS 22.104	Potentially SA2

Summary

- Rel-19 expected to further improve 5G-Advanced for Industrial 5G, including
 - Study and specify possible impacts of support of sidelink for industrial communications in order to further evolve sidelink
 - URLLC with 1-5 ms max latency
 - URLLC with 99.999% communication service availability / high reliability
 - Enhanced sidelink synchronization with $<1 \mu\text{s}$ time sync accuracy
 - Study and specify possible enhancements of resource allocation to support periodic-deterministic communication, with TSC requirements, over sidelink
- Relevant Requirements and KPIs are provided in TS 22.104.