



Converged wireless access for reliable 5G MTC for factories of the future

Clear5G

MAIN OBJECTIVES

Clear5G aims to investigate and demonstrate some of the key enablers necessary to support Machine Type Communications (MTC) traffic in 5G networks, in particular in the Factories-of-the-Future (FoF) environment. Specific objectives include:

- Define, investigate and develop physical layer enhancements for reliable MTC supporting massive numbers of devices, achieving extreme low latency and reduced signalling and control overhead.
- Design and implement Medium Access Control layer enhancements for integrated convergent access supporting low latency, high reliability, massive connection density, and high energy and spectrum efficiency.
- Design, configure and optimize radio network architectures and management mechanisms to fulfil the needs of FoF applications in terms of latency, wireless networking heterogeneity, reliability, scalability and manageability.
- Provide security enhancements at the physical layer, contributing to the overall security solutions in a FoF environment.
- Validate and demonstrate the performance of the project use cases in a realistic environment using testbed facilities both in Europe and Taiwan.
- Support the ongoing 5G Standardization.

USE CASES (or APPLICATIONS)

The Clear5G applications focus on FoF environments employing time-critical processes, relying on timely delivered data from massive numbers of sensors, and having to make and execute decisions in less than milliseconds.

Indicative examples include:

- Remote maintenance of sensors monitoring machines' status, machine reconfiguration for product customization, goods inventory, and zero defect assembly line with continuous check quality during production.
- Closed loop control systems.
- Large factory plants covered by cellular systems.

TECHNICAL AND RESEARCH CHALLENGES

Clear5G will deliver technical solutions addressing the challenges of massive deployment of connected devices, security, ultra-low latency and ultra-high reliability in FoF applications, like remote maintenance and closed loop control systems. The requirements of these complex scenarios will be met through the convergence of different wireless technologies, enabled by protocol and architecture enhancements proposed by Clear5G.

Clear5G will focus on providing physical, medium access control, and architectural enhancements to meet the strict requirements of FoF applications in terms of KPIs: latency, reliability, connection density, spectrum, and energy efficiency, thus contributing to the ITU-R objectives (e.g., 1000 fold connection density) for the next generation mobile network.

EXPECTED IMPACT

Clear5G contributes to strengthen manufacturing capabilities of both Europe and Taiwan. More specifically, Clear5G investigates and demonstrates some of the key enablers necessary

to support MTC traffic in 5G networks, in particular in the FoF environment. In addition, Clear5G will become a bridge between the 5G PPP and the FoF PPP activities, enabling their strong cooperation and synchronization in terms of factory related standardization activities.

To ensure that the highest possible impact of the project findings is achieved, Clear5G will actively contribute to the most relevant and most impacting standardization bodies and groups.

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ARGELA

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