22nd IEEE International Conference on Factory Communication Systems

SPECIAL SESSION SS5 – Wireless System Performance for Industrial Premises

ORGANIZED BY:

Mahin Ahmed (mahin.ahmed@ieee.org) Silicon Austra Labs (SAL), Austria
Pablo Angueira (pablo.angueira@ehu.eus) University of the Basque Country (EHU), Spain
Andreas Springer (andreas.springer@jku.at) Johannes Kepler Universität Linz (JKU), Austria

DESCRIPTION

Industrial wireless connectivity is now central to automation, enabling sensing, control, optimization, and safety functions across factories, process plants, and logistics environments. As wireless systems increasingly support mission-critical and time-sensitive operations, rigorous performance evaluation under realistic conditions has become essential. Industrial premises deploy multi-radio environments where legacy and emerging technologies—DECT-NR+, IEEE 802.15.4z, 802.11ax/be/bn, 5G NR RedCap, and proprietary protocols—coexist and support heterogeneous requirements. These settings create challenges in spectrum coordination, cross-technology interaction, and performance predictability, requiring unified evaluation approaches and standardized metrics. This Special Session addresses methods and tools for assessing industrial wireless performance, including measurement procedures, testbeds, simulations, and characterization of radio impairments. The rapid evolution of industrial wireless standards highlights the need for reproducible processes, open datasets, and test architectures enabling comparable evaluation. Emerging approaches—wireless network digital twins, AI-driven adaptation, and context-aware intelligence—offer new ways to predict, validate, and optimize wireless behavior. Representative scenarios include:

- **Closed-loop and motion control** with strict latency/reliability
- **Large-scale sensing in metallic**, interference-heavy sites
- **AMRs and AGVs in dynamic, obstruction-rich** environments
- **Safety-critical wireless** emergency stop functions
- **Cobots requiring joint wireless-and-safety** evaluation
- **Hybrid wired–wireless and multi-radio** deployments

FOCUS

The Special Session focuses on (but is not limited to):

- Wireless system performance evaluation methods and testbeds
- Experiments, reproducibility frameworks, and open datasets
- Standardized metrics and benchmarking procedures
- Wireless perturbations: interference, multipath, noise sources, noise characterization, coexistence
- Channel characterization and modelling for industrial links
- Multi-radio environments and spectrum coordination for enhanced system performance
- Wireless Network Digital Twins for predictive analysis
- Contextual intelligence and situational awareness in NDTs
- Ultra-reliable and secure wireless for safety-critical functions
- Joint safety and cybersecurity evaluation frameworks
- Performance evaluation of DECT-NR+, 802.15.4z, Wi-Fi 7/8, 5G NR RedCap
- Evaluation of VLC, Li-Fi, and optical wireless
- Edge AI and ML for adaptive performance enhancement

PAPER SUBMISSION: Instructions for paper submission are included in the conference website: https://hs-offenburg.de/wfcs26

IMPORTANT DATES

Regular/SS submissions:

Hard Deadline: **February 1**, 2026
Notifications: **February 27**, 2026
Final versions: **March 6**, 2026

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