

Call for papers

IEEE Journal of Selected Topics in Signal Processing Special Issue: Advanced Signal Processing for Local and Private 5G Networks

Some enterprises, factories and other potential users have ultra-stringent communications performance requirements in terms of throughput, latency, reliability, availability, and device density, which cannot be met by 4G long term evolution (LTE) radio features. Instead, 5G new radio (NR) has the potential to deliver on such requirements, and shape both the industrial world as well as our daily lives, by providing spectrum flexibility, multi-Gbps peak data rates, ultra-low latencies, high reliability, and massive connectivity. By building dedicated networks with complete control over every aspect of the network, local and private 5G NR network can provide further optimized services securely and privately, with better performance over the controlled area than that of any public 5G NR deployment. To do so, a local and private 5G NR network must tailor its end-to-end radio behavior towards its performance goal by deploying many new features such as its flexible physical layer and protocols, flexible numerology, short transmission time and mini-slot, self-contained sub-frames, asynchronous HARQ, lean carrier, distributed MIMO, mmWave operations, connected inactive state, grant-free access, and importantly spectrum usage flexibility. Moreover, by leveraging system-level network slicing (NS), radio cloud, edge computing, and improved security and privacy, such a local and private 5G NR network can simultaneously provide different performance profiles for a variety of user needs within its area of service. To deploy these features, it is necessary to take account of local statistics including channel state information, communication and spectrum resources, and a heterogeneous environment, which are different from those of public networks. Considering potential applications across industry, business, utilities, and the public sector, and given the complexity of such deployment, this special issue aims to capture the latest research activities in local and private 5G networks from the signal processing perspective. Prospective authors are invited to submit original manuscripts on signal processing topics including, but not limited to:

- Channel modeling in local areas, enterprises, factories, and new scenarios
- Wireless data traffic characterization and forecasting
- Accurate localization and tracking
- Enhanced ultra-reliable low latency communications
- Ultra-efficient improved fronthaul and backhaul
- Time sensitive networking/communications and integration with 5G systems
- Local spectrum licensing with agile multi-band aggregation
- Multi-node coordination in the presence of uncoordinated systems
- Scheduling, resource management, and radio NS
- Intelligent signal processing for reduced interference
- Security in the presence of uncoordinated wireless and legacy devices and/or jammer

Submission Guidelines: Prospective authors should follow the instructions given on the IEEE J-STSP webpages <https://goo.gl/X9hBE5> and submit their manuscripts through <https://mc.manuscriptcentral.com/jstsp-ieee> according to the following schedule:

Submissions due: May 29, 2021

First review due: Jul. 28, 2021

Revised manuscript due: Aug. 29, 2021

Second review due: Sep. 29, 2021

Final decision: Oct. 22, 2021

Final manuscript due: Nov. 15, 2021

Publication: First Quarter, 2022

Guest Editors:

Kyeong Jin Kim, Lead GE, Mitsubishi Electric Research Laboratories, USA (email: kkim@merl.com)

Octavia A. Dobre, Memorial University, Canada (email: odobre@mun.ca)

David Lo'pez-Pe'rez, Huawei Technologies, France (email: dr.david.lopez@ieee.org)

H. Vincent Poor, Princeton University, USA (email: poor@princeton.edu)

Petar Popovski, Aalborg University, Denmark (email: petarp@es.aau.dk)

Theodoros A. Tsiftsis, Jinan University, China (email: theo_tsiftsis@jnu.edu.cn)

Miaowen Wen, South China University of Technology, China (email: eemwwen@scut.edu.cn)