Wireless Communications and Mobile Computing

Special Issue on

Broadband Wireless Access for Rural and Remote Areas

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The limited availability of Internet broadband access in remote areas contrasts with the pervasive ultrahigh-speed Internet access available in all major urban areas, creating a digital divide that affects the Global North and the Global South alike. Even though there is demand for Internet broadband service in these regions, current solutions are not economically viable. Low population density, geographical barriers, and large distances constitute challenges that are hard to overcome with current technologies in a cost-efficient manner. Specifically, one major factor that hinders conventional 4G network coverage in remote areas is the usage of licensed bands. The high price of the spectrum and the low number of potential subscribers within the 4G cell coverage reduces the economic feasibility of network deployment in remote areas.

To overcome these challenges, new broadband wireless access technologies which are flexible enough to operate in both urban and rural areas are required. These technologies should address important use cases, including applications for agribusiness, road service, and remote Internet access. Although recent research has explored this subject, there are several fundamental and technological challenges that still need to be considered before 5G networks can be deployed in remote and rural scenarios. These challenges range from the physical to network layer and include coexistence and convergence with 5G New Radio (NR), as well as regulatory issues.

The goal of this special issue is to publish original research articles that present recent advances in different topics related to broadband wireless access for rural and remote areas. Submissions may focus on fundamental physical layer aspects, such as channel modeling, transceiver designs, and signal processing algorithms, as well as on wireless access solutions, networking aspects, and system level performance evaluation. Submissions related to 5G wireless communications are especially welcome. Review articles which describe either academic or industry views regarding the design of 5G systems for rural and remote areas are also encouraged.

Potential topics include but are not limited to the following:

- Channel and propagation modeling for rural and remote areas
- Physical layer design: coding, modulation, waveform, multiple-input and multiple-output (MIMO), and beamforming
- Medium access control frameworks for rural scenarios
- Networking and backhauling issues for rural and remote areas
- 5G and satellite networks integration for remote area applications
- Cognitive radio solutions (e.g., spectrum sensing and spectrum sharing)
- Relaying and cooperative communication schemes
- Opportunistic, dynamic, licensed spectrum access for rural and remote areas
- Low energy and long range Internet of Things (IoT) solutions (e.g., long range (LoRa), SigFox, and narrowband Internet of Things (NB-IoT))
- Coexistence and convergence with 5G NR and legacy systems
- Spectrum management, standardization, regulatory issues
- Business models for 5G deployment in rural and remote areas
- Impact of novel technical solutions on operating expenses (OPEX) and capital expenditures (CAPEX) for rural area scenarios

Authors can submit their manuscripts through the Manuscript Tracking System at https://mts.hindawi.com/submit/journals/wcmc/warra/.

Papers are published upon acceptance, regardless of the Special Issue publication date.

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