D2D-U: Device-to-Device Communications in Unlicensed Bands for 5G System

ABSTRACT

- Device-to-Device (D2D) communication, which enables direct communication between nearby mobile devices, is an attractive add-on component to improve spectrum efficiency and user experience by reusing licensed cellular spectrum in 5G system.
- In this paper, we propose to enable D2D communication in unlicensed spectrum (D2D-U) as an underlay of the uplink LTE network for further booming the network capacity. A sensing based protocol is designed to support the unlicensed channel access for both LTE and D2D users.

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- . We further investigate the subchannel allocation problem to maximize the sum rate of LTE and D2D users while taking into account their interference to the existing Wi-Fi systems.
- Specifically, we formulate the subchannel allocation as a many-to-many matching problem with externalities, and develop an iterative user-subchannel swap algorithm. Analytical and simulation results show that the proposed D2D-U scheme can significantly improve the system sum-rate.

EXISTING SYSTEM

- In light of these issues, the 3rd Generation Partnership Project (3GPP) has initialed the research on licensed assisted access (LAA) to integrate the unlicensed carriers with the licensed ones for data transmission.
- Based on the LAA scheme, the LTE-unlicensed (LTE-U) technology is proposed to extend LTE to the unlicensed spectrum by the existing carrier aggregation (CA) technology

PROPOSED SYSTEM

The major contributions of this paper are summarized as follows.

- We propose a feasible duty cycle based protocol for the LTE-U and D2D-U users to utilize the unlicensed spectrum.
- An approximated model is elaborated to evaluate the interference to Wi-Fi networks introduced by LTE-U and D2D-U users.
- We investigate the subchannel allocation problem by a many-to-many matching game with externality, and analyze its stability, convergence, complexity, and optimality.

Hardware requirements

- Processor - Pentium-IV
- Speed - 1.1 Ghz
- RAM - 256MB(min)
- Hard Disk - 20 GB
- Key Board - Standard Windows Keyboard
- Mouse - Two or Three Button Mouse
- Monitor - SVGA

SOFTWARE REQUIREMENTS

- Tool - Network Simulator-2
- Operating system - LINUX
- Front end - OTCL (Object Oriented Tool Command Language)

REFERENCES

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