Robust and Fast Device Discovery in OFDMA-based Cellular Networks for Disaster Environment

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***Abstract*— Device-to-device (D2D) communication is a salient function of public safety networks for enabling communications, even in a disaster environment where the communication infrastructures are fully or partially destroyed. In order that devices directly communicate, they must first find and identify each other. Especially, in a disaster environment where wireless channel conditions may be very poor, discovery should be robust and fast for quick resume of the blocked communications again. In this paper, considering frequency selective fading which may lead to missing devices even though they exist, we propose a device discovery scheme using a simple physical layer waveform called signature. Typically, in a signature-based discovery under OFDMA-based system, a device advertises its presence by selecting a discovery channel and energizing subcarriers in the channel for a while (one subcarrier at a time). In the proposed scheme, we design discovery channels having well dispersed subcarriers to tolerate the frequency selectivity. By simulation, it is shown that not only successful discovery ratio of the proposed scheme is improved, but also our scheme is more frequency selective fading tolerant in comparison with other approaches.**

***Keyword*—Device discovery, Device-to-device communication, Disaster communication, PS-LTE**

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