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Performance Evaluation of Uplink Shared Channel for Cooperative Relay based Narrow Band Internet of Things Network

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Low Power Wide Area Network (LPWAN) is one of the fastest growing network techniques provides efficient communications for smart cities, e-Health, industry 4.0 and other applications. LPWAN enables long-rang communications for M2M and cellular IoT networks. Narrowband-IoT (NB-IoT) is a type of LPWAN developed by 3GPP to connect a wide stream of IoT services and devices. NB-IoT systems rely on the mechanism of repeating the same signal every specified period of time in order to improve radio coverage better than it is in LTE systems. Repetition process is used to enhance the coverage of NB-IoT and for upgrade throughput as well. However, increasing the repetition of the signal significantly may give a negative result relative to the bandwidth limits. A cooperative relay (CoR) can be used beside repetition mechanism to helps reduce bandwidth stress. Moreover, the use of CoR for NB-IoT in physical uplink shared channel with repetitions will enhance the throughput. This paper will evaluate the performance of the CoR to enhance physical uplink shared channel in NB-IoT. The NB-IoT system model is simulated bu MATLAB to demonstrate the use of Cooperative relay (CoR) scheme in NPUSCH for NB-IoT for performance evaluation and comparison of using CoR scheme by considering metrics like data rate, throughput, and delay. The results conclude that in using CoR in NB-IoT gives high performance in overall NoT network throughput. © 2022 IEEE.

Author keywords

(M2M; Channel Quality Indicator (CQI); CoR; Low Power Wide Area Network (LPWAN); LTE; NB-IoT; repetitions

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