UL Coverage Enhancement for Massive Machine Type Communication in 5G

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(Pt9)Abstract—**Massive machine type communication (mMTC) is one key scenario in 5G deployment. Reducing the signaling overhead and enhancing the coverage are two important targets. To reduce the signaling overhead, UL grant free transmission is considered, where one user equipment (UE) transmits data directly on one resource unit within the preconfigured resource set without eNB′s scheduling. Repetition is the baseline method for coverage enhancement. To achieve efficient transmission, different repetition levels are configured for one UE and UE selects the repetition level for the transmission based on its measurement results. On the eNB side, eNB blindly decode the incoming data by assuming different repetition levels. In this case, eNB may successfully decode the data in earlier time before the repetition ends due to the inaccurately under-estimated channel estimation on the UE side and then performs the HARQ-ACK feedback earlier than the UE′s expectation. In this case, unnecessary retransmissions happen at UE side due to the miss detection of the HARQ-ACK. Unnecessary retransmissions lower the spectral efficiency and consume more power on the UE side. To avoid the early termination on the eNB side, we propose to use repetition-level specific sequence to scramble the data. Simulation results show by using the proposed method, the unnecessary retransmissions are totally eliminated and the spectral efficiency is improved by around 30% and the power saving is improved by around 35%.**

(Pt9)Keyword—**5G, mMTC, UL grant free, Repetition, Scrambling**

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