

3GPP TSG RAN #99

Rotterdam, Netherlands, March 20-23, 2023

Agenda: 9.1.2

RP-230321



# Motivation on power saving in sidelink relay

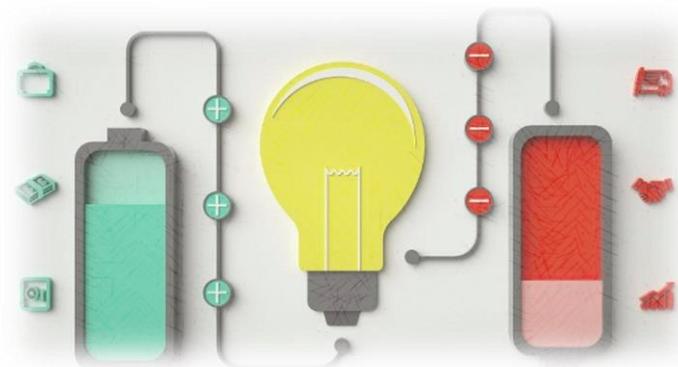
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China Telecom  
Mar-23

- Sidelink and sidelink relay technologies have been always hot topics since they were introduced to LTE standards in early releases. However, the actual commercial uses of sidelink/ sidelink relay seem very limited except for V2X or public safety scenarios. The sidelink/ sidelink relay features are currently not implemented in the commercial 4G/5G cellular networks .
- Considering wider range of applications and services in the future, there exist great challenges for operator to deploy future network with the trend towards millimeter wave or even Tera Hertz bands. On the other hand, the current smartphones are under utilized treasure and ready to be mined.
- U2N relay and multi-path relay were introduced in Rel-17 and Rel-18 to help network operator extend coverage as well as enhance reliability and throughput. Sidelink relay can be considered as a promising approach to improve network performance and reduce CAPEX in 5G-A or pre 6G.

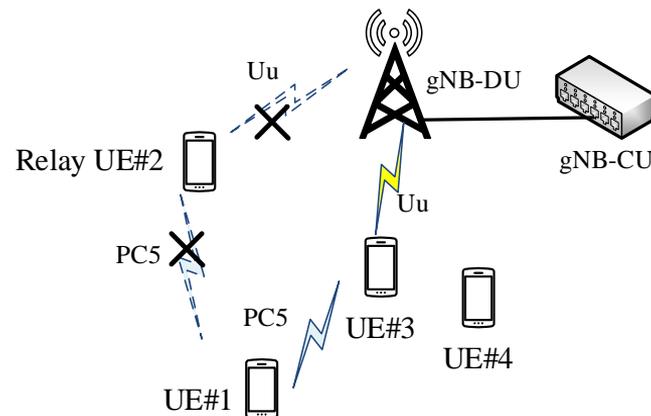
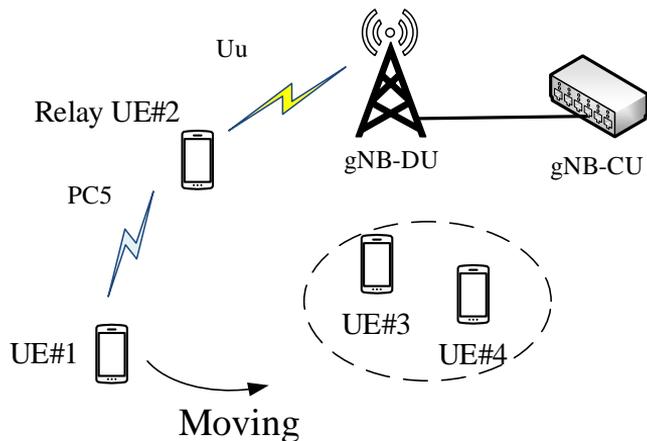


- Although sidelink relay could be a promising approach to improve network performance and reduce CAPEX in 5G-A, UE battery might be the bottleneck for the commercialization of sidelink relay in cellular network.
- Technically, sidelink relay is believed to improve power efficiency for remote UE. However, from relay UE's perspective, sidelink relay will obviously increase the power consumption of relay UE, which may reduce the willingness of UE as a relay node. If there are not sufficient relay UEs in the network, the gain of sidelink relay might be influenced.
- In order to promote the commercial and industrial development of sidelink relay technology, it is necessary to identify potential power consumption issues in sidelink relay scenarios, and enhance UE power saving techniques, including specific power saving techniques for remote UE and/or relay UE.



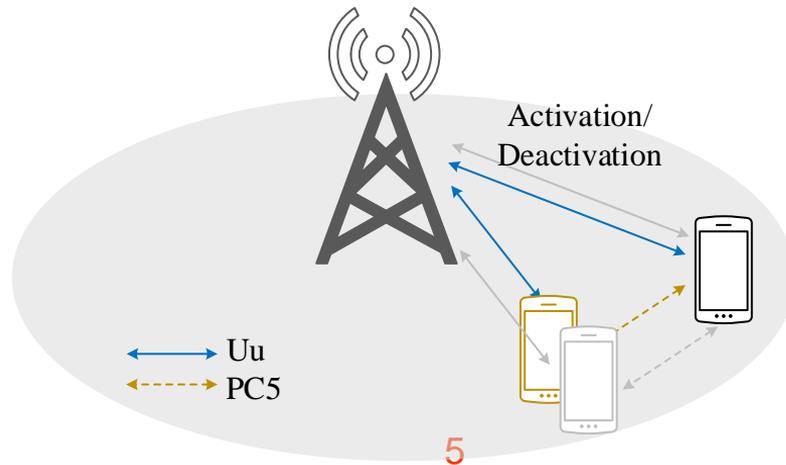
## ■ Potential issue 1

- » Due to the movement of remote/ relay UE, frequent relay reselection or connection re-establishment may occur, which may cause extra power consumption of the remote UE.
- » It is meaningful to identify potential solutions to reduce relay reselection or connection re-establishment for remote UE, such as CHO-like solution or pre-configuration of candidate relays.



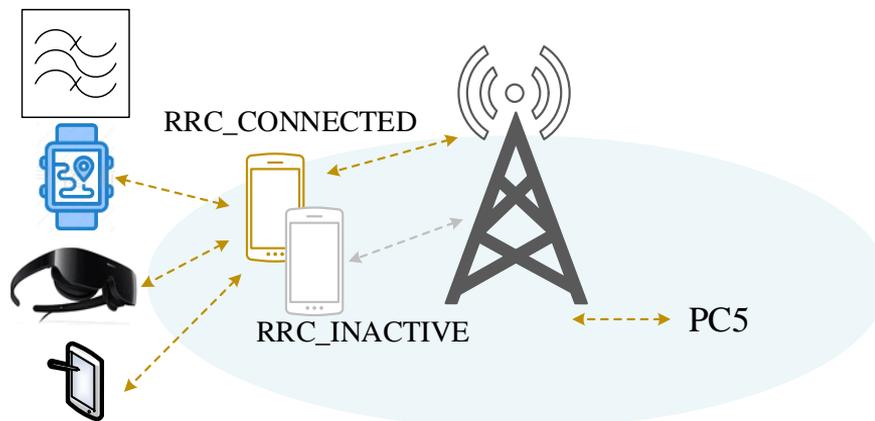
## ■ Potential issue 2

- » In multi-path relay, the direct/ indirect path might be add or release based on service requirements. When service requirements change rapidly, frequent path addition or release may cause extra power consumption of both remote UE and relay UE.
- » It is meaningful to support dynamic path activation/deactivation or path dormancy mechanism based on service requirements to reduce unnecessary UE power consumption in multi-path scenarios.



## ■ Potential issue 3

- » A UE in RRC\_CONNECTED state consumes much more power than in idle or inactive state. Besides, in some scenarios, the remote UE may have only small and infrequent signaling and/or data packets.
- » It is meaningful to study potential solutions to allow relay UE in RRC\_INACTIVE to perform unicast data transmission at least for remote UE's small data transmission scenario.



## ■ Summary

- » Sidellink relay can be considered as a promising approach to improve network performance and reduce CAPEX in 5G-A or pre 6G.
  - » In order to promote the commercial and industrial development of sidelink relay technology, it is necessary to identify potential power consumption issues in sidelink relay scenarios, and specify potential solutions to enhance power saving techniques for remote UE and/or relay UE.
- Proposal: Study and if necessary specify sidelink relay specific power saving techniques for remote UE and/or relay UE in Rel-19.

Thanks!

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