

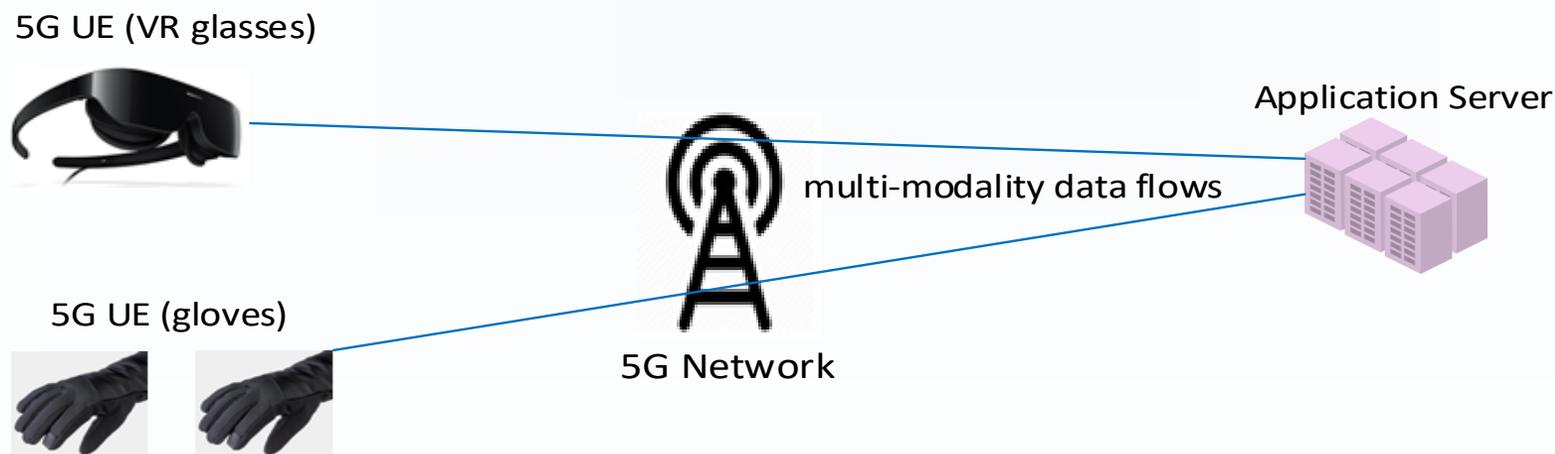
**3GPP TSG RAN Rel-19 workshop
Taipei, June 15 - June 16, 2023**

RWS-230082

Agenda Item: 5
Source: Spreadtrum Communications
Title: XR enhancements for Rel-19
Document for: Discussion and decision

Issue1: Supporting of Multi-modal flows

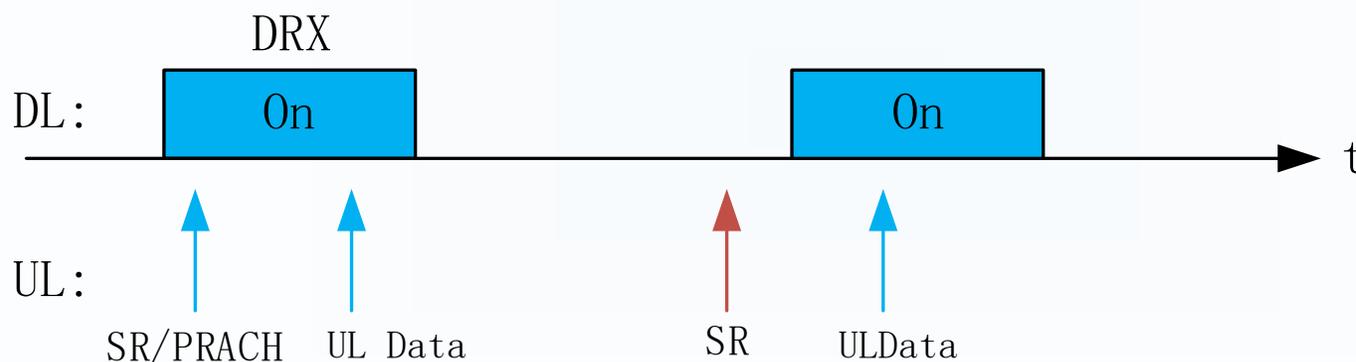
- The multi-modal flows are introduced in SA for single UE case and multiple UEs case. The synchronization among multi-modal flows is critical. To meet the synchronization requirement, SA2 introduced a common id and QoS monitoring for multi-modal flows.
- The study for synchronized transmission of multi-modal flows in RAN is also needed to meet this requirement. E.g., some enhancements for scheduling for multiple QoS flows. Some assistance information needs to be specified for the synchronized transmission.
- For multiple UEs case, in order to guarantee the synchronized transmission within multiple UEs, it would be beneficial to keep these UEs stay in one cell. Therefore, coordinated access control and coordinated mobility for a set of UEs with same multi-modal (XRM) application is needed.



Proposal 1: To enhance the support of multi-modal flows in RAN.

Issue2: Further power saving enhancement

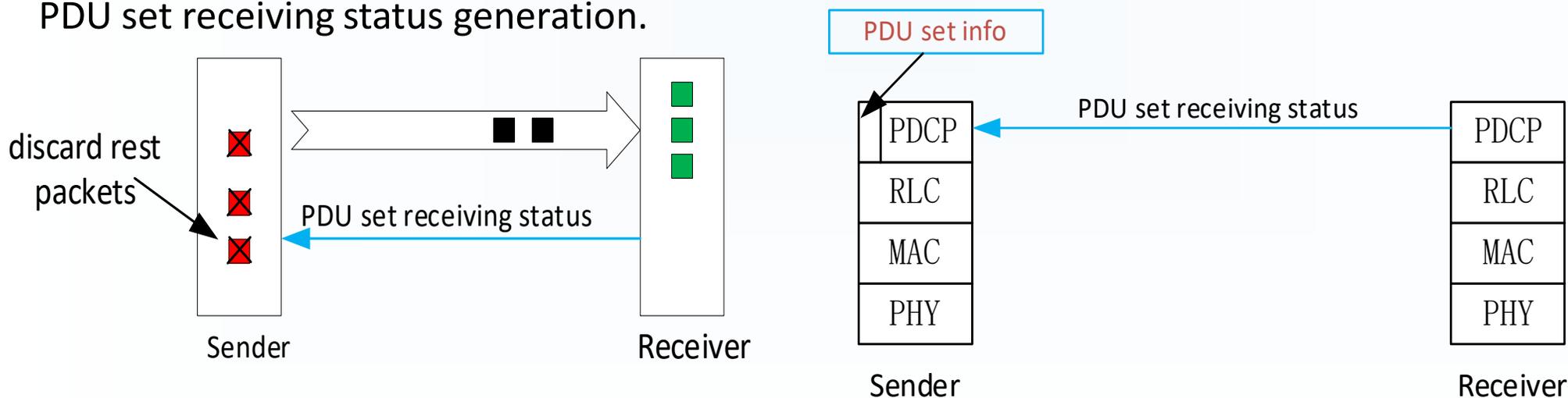
- The DRX enhancement for periodic DL traffic is introduced in R18 for UE power saving.
- The transmission coordination of UL and DL traffic can be considered for further power saving gain. E.g., the UL transmission of non-XR UL service can align with DRX-on duration as possible if the PDB of the UL service is allowed. The SR/RACH procedure for the UL transmission can occur before or within the DRX-on duration only if the corresponding subsequent UL transmission can locate within the DRX-on duration.



Proposal 2: The alignment between UL and DL transmission can be considered for further UE power saving enhancement.

Issue3: Further capacity improvement

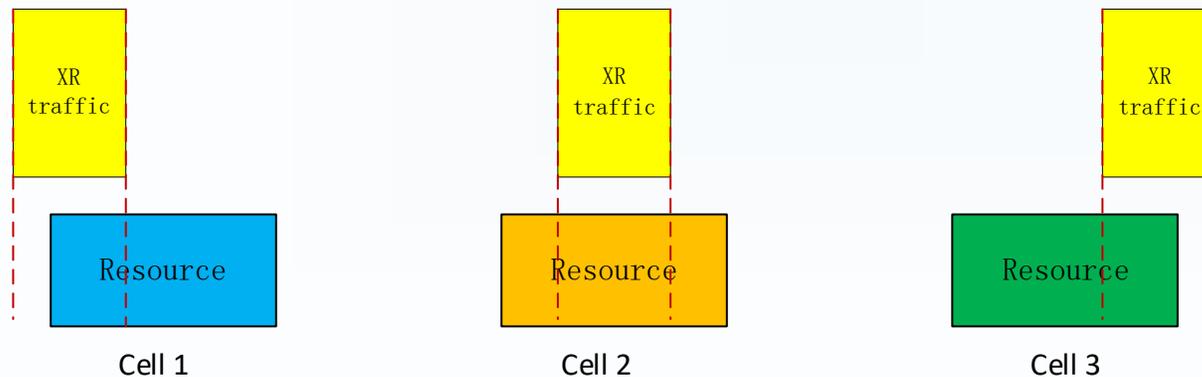
- The PDU Set Integrated Handling Indication (PSIHI) is introduced to indicate whether all PDUs are needed. For the case that not all PDUs are needed, the sender can stop transmitting of the rest packets of the same PDU set if enough packets are received successfully, which can improve the network capacity.
- The PDU set receiving status report is needed for the sender to decide whether to continue transmitting or not for one PDU set. PDU set receiving status report should be sent to sender by the receiver timely.
- The PDU set info(e.g. PDU Set Sequence Number) should be transmitted to receiver for the PDU set receiving status generation.



Proposal 3: PDU discard based on PDU set receiving status can be introduced for capacity improvement.

Issue4: Handover enhancement considering resource match

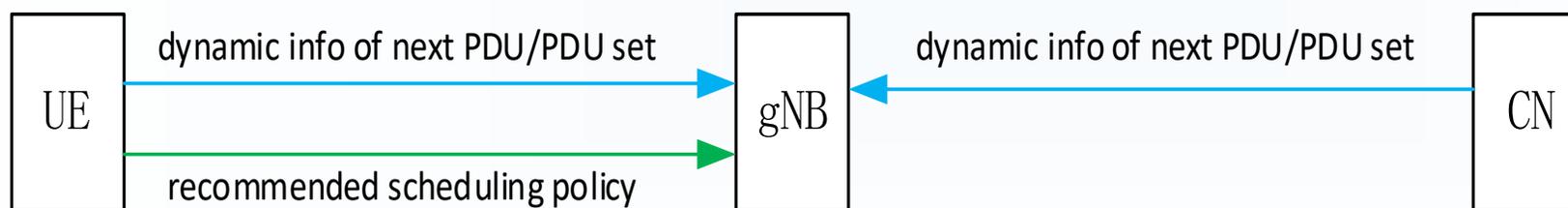
- The allocated radio resource for the same XR traffic of UE in different cells may be different due to different congestion status or resource allocation policies. As a result, the allocated radio resource can not match the XR traffic very well in some cells, which will degrade the performance of XR traffic.
- During the handover procedure, in order to guarantee the QoS performance of UE in the target cell after the handover, the matching degree information between XR traffic and allocated radio resource in candidate target cells needs to be considered in the determining of target cell in source gNB.



Proposal 4: Enhance handover procedure to consider the matching information between XR traffic and radio resource in target cell.

Issue5: Further XR awareness

- The application-layer can predict the dynamical information of XR traffic which will be beneficial for the power saving and capacity enhancement in RAN.
- The application-layer can indicate whether the transmission of the next PDU/PDU set/burst is needed or not based on its processing status/policy.
- The following further XR awareness can be considered:
 - UE/UPF provides dynamic info of next PDU/PDU set (e.g. inter-burst time, arrival time/PDU Set Importance)
 - UE can indicate gNB the recommended scheduling policy for the subsequent DL PDU/PDU set/burst.



Proposal 5: Study the further XR awareness including dynamic info of next PDU/PDU set and recommended scheduling policy.

Objectives for Rel-19 XR

- ❑ **Enhance the support of multi-modal flows [RAN2,RAN3].**
 - Study synchronized transmission of multi-modal flows.
 - Study coordinated access control and coordinated mobility for UEs with same multi-modal application.
- ❑ **Power saving enhancement [RAN2].**
 - Specify the alignment between UL SR/RACH/data transmission and DL transmission/DRX on.
- ❑ **Further capacity improvement [RAN2,RAN3].**
 - Specify the PDU set receiving status report mechanism in the case not all PDUs of one PDU set are needed.
 - Specify the transmission of the PDU Set info (e.g. PDU set SN) in Uu .
- ❑ **Handover enhancement [RAN3].**
 - Specify the enhancement of handover procedure to consider the matching information between XR traffic and radio resource in target cell.
- ❑ **Further XR awareness [RAN2,RAN3].**
 - Specify procedure for UE/UPF to provide dynamic info of next PDU/PDU set (e.g. inter-burst time, arrival time/PDU Set Importance).
 - Specify procedure for UE to indicate gNB the recommended scheduling policy for subsequent DL PDU/PDU set/burst(s).

Thanks

