

China Academy of Telecommunication Technology

3GPP TSG RAN Meeting #93-e

Electronic Meeting, September 13th - 17th, 2021

RP-212252

Views on Rel-18 XR

CATT

Motivations

Motivations

Capacity limitation

- The number of UEs can meet the QoS requirement of XR service is limited.
 - NR resource allocation disconnected with the traffic arrival of XR application
 - Link adaptation is limited by the low latency requirements of XR traffic

Power consumption

- For good user experience, power efficient operation of battery-powered XR devices is expected

Coverage enhancements

- XR coverage for cell edge UE

Mobility enhancements

- Seamless handover

Main topics

Capacity enhancement

Enhanced scheduling based DL/UL transmission with XR Application awareness. Enhancement of DL SPS and UL GF transmission to support low latency, high variation of XR traffic arrival.

Power saving

Rel-17 PDCCH skipping with traffic alignments

Coverage enhancement

HARQ enhancement for cell edge UEs

Mobility enhancement

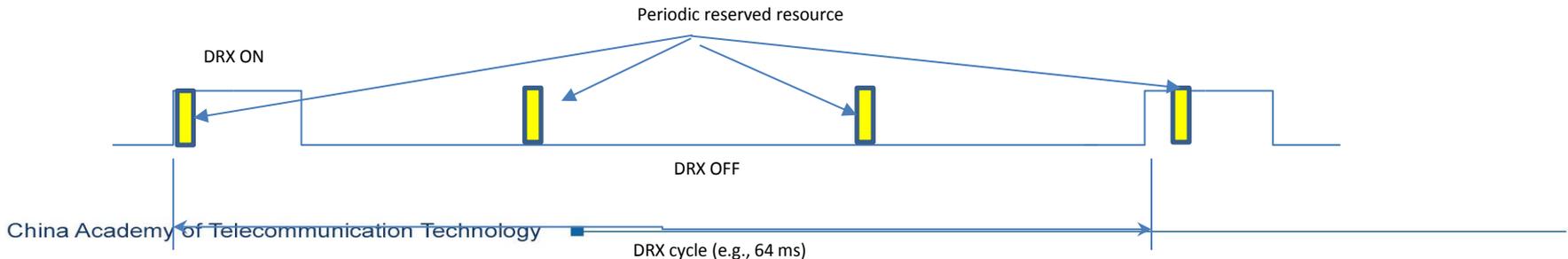
Support soft handover to ensure seamless service continuity during cell switchover

Capacity Enhancement – Scheduling awareness of XR

- XR-awareness scheduling –
 - Characteristics of XR applications are indicated by the scheduler for resource allocation
 - XR specific QoS – new 5 QI entries for XR by SA2/SA4
 - Periodic XR traffic arrival with network delay jitter
 - Low packet delay requirements –
 - Indication of XR packets to the gNB scheduler
- XR application indication primitive from application protocol to lower layer protocol
 - XR application is explicitly indicated to the low layer - XR application preparation during session establishment
 - XR-specific End-to-end bearer establishment
 - XR-specific radio bear indication
 - gNB scheduling acquisition of XR QoS parameters – averaged XR packet arrival rate and packet delay of each packet
- UE assistance of XR application information
 - UE feedback of the XR service during RRC CONNECTION Establishment
 - UE feedback on the XR-specific implementation to assist gNB scheduler for NR capacity enhancement
 - E.g., UE feedback the playout buffer size of XR application to provide additional gNB scheduling time of XR packet

XR-specific Resource Allocation

- Resource allocation is customized to the XR application
 - Periodic resource allocation with dynamic adaptation to the different XR packet size and variation of periodic packet arrival time due to network delay jitter
 - Interaction of XR-specific resource allocation to other NR configuration and service, such as DRX configuration
- Enhancement of DL resource allocation for XR application
 - SPS enhancement
 - Dynamic scheduling enhancement
- Enhancement of UL resource allocation for XR application
 - Configured Grant enhancement
 - Dynamic scheduling enhancement



UE Power Saving for XR

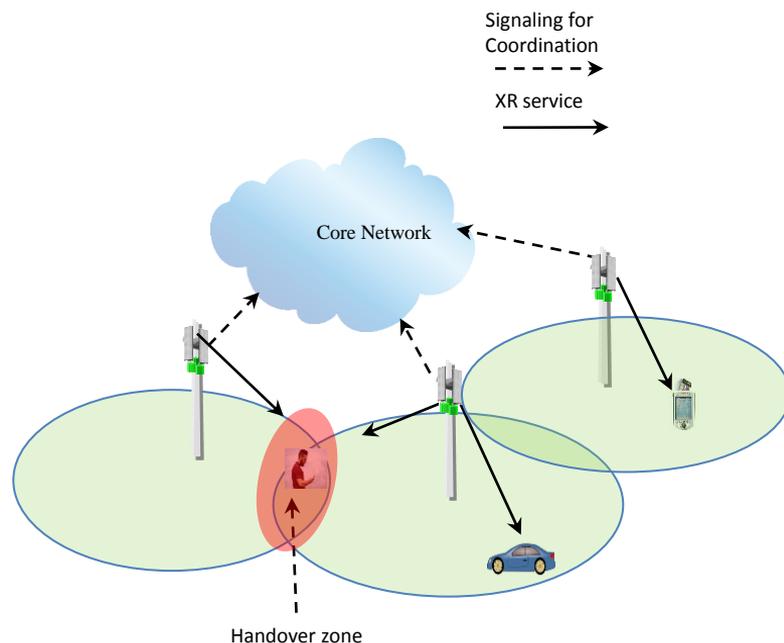
- Reuse/enhanced existing power saving techniques for XR service
 - Reuse/enhanced Rel-15/16/17 power saving techniques
 - C-DRX and DRX adaptation related enhancement
 - PDCCH monitoring reduction for periodic XR packet arrival with delay jitter
 - PDCCH skipping
 - Go-to-sleep signaling
- XR-specific resource allocation for UE power saving
 - Resource allocation with combination of different transmissions for XR in the same slot to allow UE micro sleep at the other slots
 - Alignment of DL PDSCH and UL PUSCH transmission in the same slot
 - Alignment of PUSCH and PUCCH transmission in the same slot
 - Resource allocation of XR service with interaction of UE's other service

Coverage Enhancement

- Provide seamless XR-service in all coverage area
 - XR-specific resource allocation for the bad coverage
 - Techniques for dynamic adaptation of NR transmission in bad coverage (low SINR) to meet the XR QoS requirements
 - Reuse/enhanced Rel-17 coverage enhancement techniques for XR service
- UE assistance
 - UE feedbacks on the NR coverage for the XR service
 - Event triggered NR transmission scheme for coverage enhancement
 - Coverage enhancement techniques are dynamically triggered when UE is in bad coverage area.

Mobility Enhancement for XR service

- Seamless XR service during the handover
 - Tolerable switching delay for XR service
 - Zero interruption time
- Techniques for zero-interruption time of XR service
 - Enhancement multi-TRP solutions during NR handover
 - Dual Radio connections of source and target cells before cell switch-over
 - Multiple Active Protocol stacks (DAPS) -
 - One protocol stack and one Active state machine at each TRP
 - Coordination among state machines for XR service transmission
 - Coordination of HARQ operation among source and target cells



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