3GPP TSG RAN Meeting #102
Edinburgh, Scotland, December 11-15, 2023

RP-233475

Title: Network energy saving enhancements in Rel-19

Agenda: 9.1.1.5
Source: Samsung
Document for : Discussion

Motivation

- Network energy saving (NES) is of great importance for environmental sustainability and for operational cost savings
- TR38.864 has captured many techniques as beneficial for NES but to make Rel-18 NES scope manageable, only some of them are being specified in Rel-18, i.e., cell DTX/DRX, spatial element adaptation, and transmission power adaptation
- In addition, Rel-18 NES work item (with only four RAN1 meetings) supports just a basic functionality which leaves other potential enhancements to the next releases.
- So, Rel-19 NES should specify additional necessary enhancements including the leftovers identified beneficial through Rel-18 study and work items

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Potential objectives in [RP-232745]

- **On-demand SSB transmission for SCell for connected UEs**
  - Possible triggering methods (e.g., UE uplink wake-up-signal using an existing signal/channel, cell on/off indication via backhaul, SCell activation/deactivation signaling, etc.)

- **On-demand SIB1 transmission for idle UEs**
  - Possible triggering methods (e.g., UE uplink wake-up-signal using an existing signal/channel, cell on/off indication via backhaul, SCell activation/deactivation signaling, etc.)

- [SSB]/SIB1-less operation in multi-carrier scenario for (documented in TR38.864)
- Adaptation of common signal/channel transmissions (documented in TR38.864)
- Specify Cell DRX/DTX for UEs in idle/inactive modes (as an extension of Rel-18 cell DRX/DTX)
- Multi-TRP adaptation mechanisms
- UE group-common or cell-specific BWP configuration, adaptation and/or switching.
- Group cell switch
- Power domains studied in R18 (techniques D-2 ~ D-5)
- Low-power SSB/SIB1/Paging
- Extension of spatial and power domain techniques in 1) high load scenarios 2) Type-II codebook types
- Semi-static beam-specific broadcast channel configuration
- Scenario 2a for SSB-less
- It was also mentioned that some proposals for multi-carrier enhancements may be beneficial for network energy savings (e.g. cross-carrier HARQ, fast DL carrier switch, multi-carrier CSI)
- Extensions to network-controlled repeaters (NCR), e.g. backhaul/control link behavior for efficient interaction between NES-capable gNB and associated NCR, to consider the case where the gNB would operate with S/P-domain adaptation or cell DTX/DRX adaptation for NW energy saving

Potential WI scope

- **2-TU allocation for Rel-19 NES is expected and there seems a room to add more topics which were marked with blue color:**

- **On-demand SSB transmission for SCell for connected UEs**
  - Possible triggering methods (e.g., UE uplink wake-up-signal using an existing signal/channel, cell on/off indication via backhaul, Scell activation/deactivation signaling, etc.)
  - Adaptation of common channels/signals (e.g., enhancement of SSB transmission adaptation including transmission periodicity/occasion, triggered by gNB indication or UE request, etc.)

- **On-demand SIB1 transmission for idle/inactive UEs**
  - Possible triggering methods (e.g., UE uplink wake-up-signal using an existing signal/channel, cell on/off indication via backhaul, Scell activation/deactivation signaling, etc.)

- **Leftovers from Rel-18 work item (subject to Rel-18 progress)**
  - Enhancements on Cell DTX/DRX: Cell DTX/DRX adaptation based on UE indication
  - Enhancement on spatial/power domain adaptations: UE complexity and CSI payload reduction for multi-CSI reporting

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Thank you very much!