

# LP-WUS/WUR in Rel-19

# Motivation

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**Specification support for LP-WUS/WUR should be introduced only if Rel-18 SI concludes that significant power saving can be achieved:**

- Rel-16 wake-up signal for RRC\_Connected UEs can provide 8 % ~ 50 % of power saving gain as compared to Rel-15 RRC\_Connected UEs [1]
- Rel-17 PEI (paging early indicator) for RRC\_Idle UEs can provide 1.88 % ~ 42.19 % of power saving gain as compared to Rel-15 RRC\_Idle UEs [2]

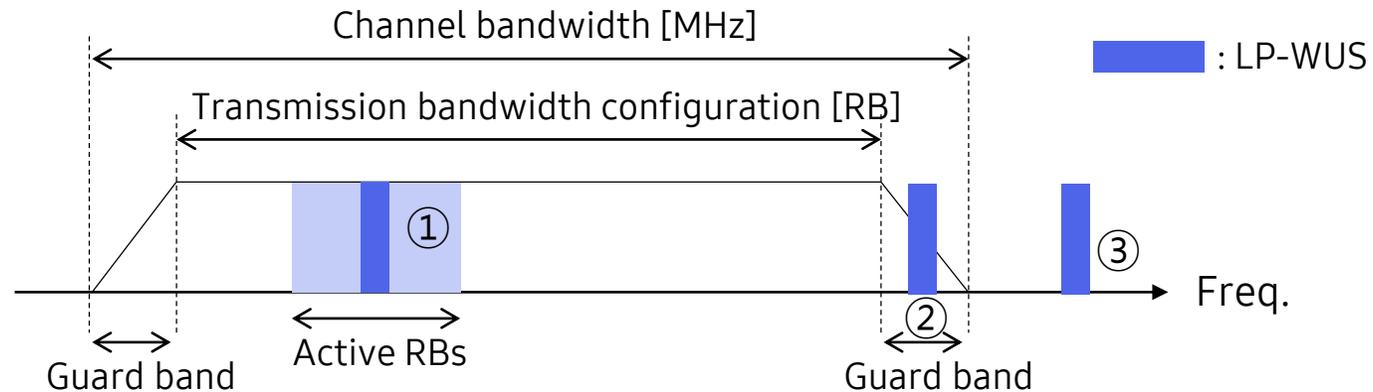
[1] TR38.840 v16.0.0, Study on User Equipment (UE) power saving in NR

[2] RAN1 chairman's notes, RAN1 #105-e

# Scenarios to be focused on: In-band operation

## Observations

- On-going Rel-18 study includes not only ① in-band operation but also ② guard-band/③ out-of-band operations
  - Guard-band: spectrum utilization of NR is higher than LTE, and there is not enough number of guard RBs
  - Out-of-band: securing a designated band for LP-WUS is challenging and it also makes gNB operation complicated



## Proposal: Rel-19 WI focuses on in-band operation only

- LP-WUS is operating in-band when it is located within a NR transmission bandwidth.

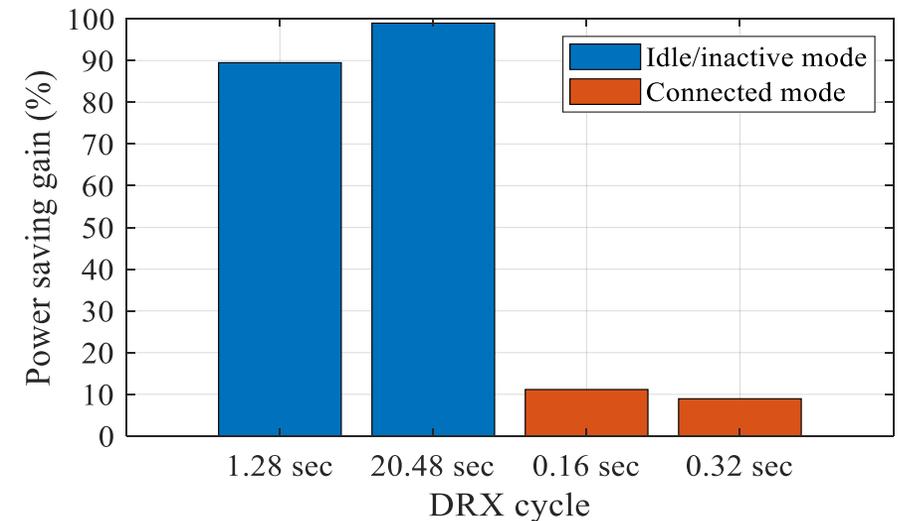
# Scenarios to be focused on: RRC Idle/Inactive mode

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## Observations

- Power saving gain in RRC Connected mode is quite marginal but lots of specification efforts are expected
- Motivation to support RRC Connected mode has not been justified
  - Main use case of using LP-WUS in RRC Connected mode is XR
  - XR power saving was discussed in Rel-17/18 but there was no consensus in RAN1
  - There is on-going work related to XR power saving in RAN2, i.e., DRX support of XR frame fates

**Proposals: Rel-19 WI focuses on RRC Idle/Inactive mode only**



# Potential WI scope

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Rel-19 LP-WUS/WUR scope is limited to in-band operation and RRC Idle/Inactive mode

Rel-19 LP-WUS/WUR specification supports only one of the waveforms among MC-OOK, MC-FSK and OFDM

Based on such limitations, potential WI scope can be the following:

- Specify LP-WUS and LP-SS [RAN1, RAN4]
- Specify L1 and L2 procedures
  - Synchronization procedure for UE to receive LP-WUS [RAN1, RAN2, RAN4]
  - UE behavior/procedures to monitor LP-WUS [RAN1, RAN2]
  - UE behavior after LP-WUS reception [RAN1, RAN2]
  - RRM measurement [RAN1, RAN4]
  - UE features
- Specify relevant RAN4 requirements