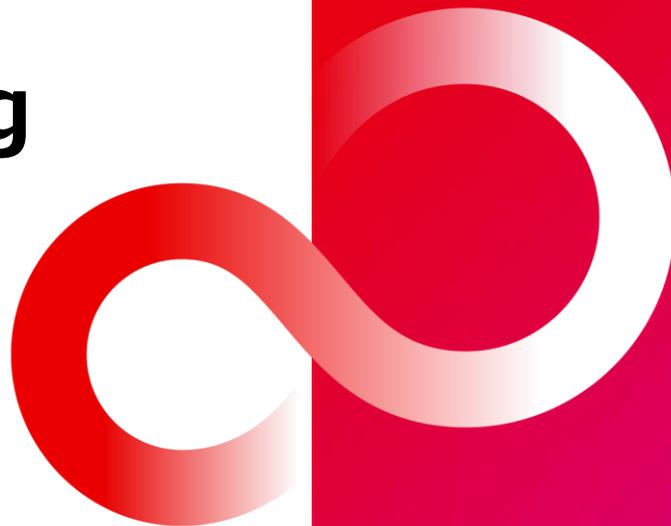


Taipei, June 15 - 16, 2023

Network Energy Saving in Rel-19

Agenda Item:	5
Source:	Fujitsu
Document for:	Discussion



Network energy saving is one of the most important factor in 5G-Advanced and beyond

- SDGs/Carbon neutrality
- Reduction of OPEX

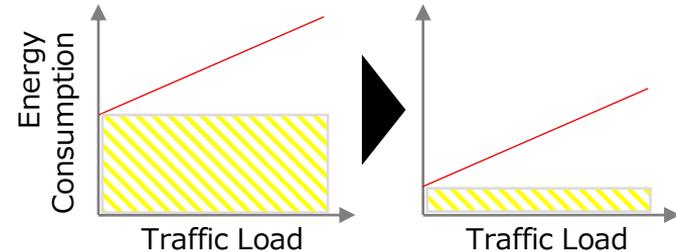
Rel-18 NES = Backward compatible solution

- DRX, DTX alignment
- Spatial + power domain enhancements
 - Turning off Tx elements



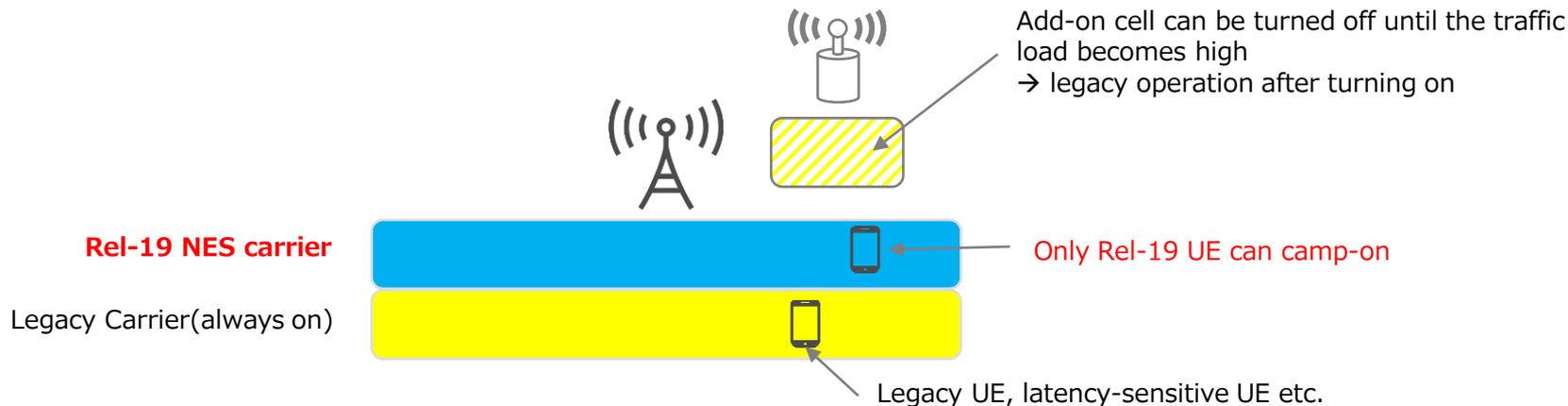
Limited energy saving gain is expected due to the full backward compatibility constraint

Target is low traffic load,
Aiming at reduction the biased power consumption



Main target of Rel-19 NES

- Backward compatibility is not maintained from single cell perspective
- However, from overall network perspective, backward compatibility is still maintained
 - Multi-frequency network is an important assumption for Rel-19 scenario



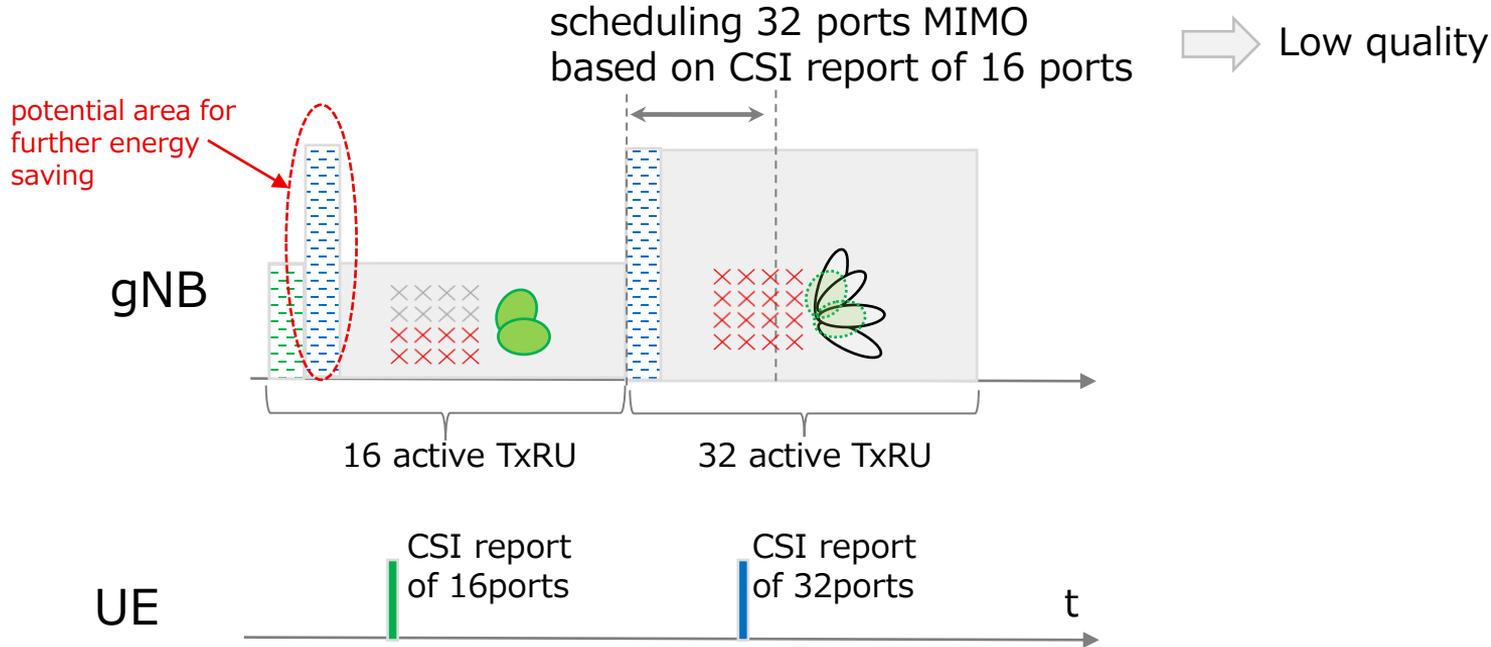
Goal of the design

- Guarantee gNB DTX at least for second order timescale, while capable UE can still camp-on
→ RU can be turned off more aggressively, and the basic hardware design of RU can be optimized assuming this mechanism

An example of enhancement

One example of the design change: MIMO enhancement for NES

- It is assumed that full port CSI is transmitted during the energy saving MIMO state
- This prevents TxRUs from entering deep sleep state



- **Rel-18 leftover**
 - if any, final decision after Rel-18 completion
- **Time domain (and frequency domain) enhancements**
 - Introduction of more energy efficient gNB DTX/DRX state
 - i.e. second order DTX/DRX, which enables deep sleep at gNB side
 - Common signals/channels can be re-designed → **This requires breaking backward compatibility**
 - Assumption is that at least one cell is operated as a legacy carrier to avoid the connection delay due to less opportunity of common signals/channels
 - Study more efficient MIMO operation in time domain
 - Avoid the transmission of large number of CSI-RS ports (e.g. 32 ports) during reduced port operation (e.g. 16 port)
- **Further discussion: Other enhancements that were studied but not included in Rel-18 WI**
 - The necessity of Uplink Wake-up signal needs further discussion
 - Currently the use case is not clear

Thank you

