Smarter technology for all

3GPP TSG RAN Rel-18 workshop
Electronic Meeting, June 28 – July 2, 2021

RWS-210398

Network Power Savings in NR

Agenda Item:	4.3
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Motivation

NR energy efficiency enhancement compared to LTE

- Configurable SS/PBCH block (SSB) periodicity {5, 10, 20, 40, 80, 160} ms
- On-demand system information (SI) delivery

And yet, overall network power consumption is high

- Massive MIMO and operations in high frequency band require relatively higher power consumption per network node
  - Max 64 SSBs per 5ms window in FR2
  - Beam sweeping for paging and SIB1
- Densely deployed network nodes for coverage and capacity
  - E.g. ISD of 200m for UMi, ISD of 500m for UMa, ISD of 20m for indoor office

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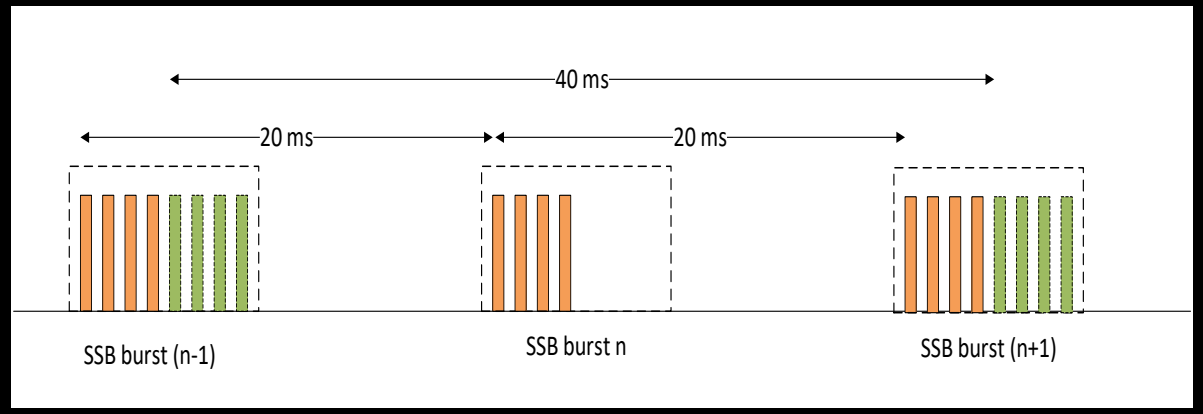
Enhancing Energy Efficiency in NR



e.g. Less frequent SSB transmissions towards directions/areas in no or fewer UEs

SSB periodicities for SSB subgroups	Reduction of SSB tx time for equal subgroup ratio	Reduction of SSB tx time for unequal subgroup ratio
[20, 40] ms	25% for [1:1] ratio	38% for [1:3] ratio
[20, 40, 80, 160] ms	53% for [1:1:1:1] ratio	61% for [1:3:1:3] ratio
Note: The baseline for comparison is 20ms periodicity for all SSBs within 5ms window.		

Beam sweeping optimization

- Adaptive beam sweeping of broadcast signals/channels based on sensing/other intelligences

Reduced “On” duration for gNB

- Wideband operation at gNB to reduce transmission/reception time

Enhanced offloading

- Flexibly turn on/off a network node and/or an antenna panel
  - Beam-level offloading
  - Cell-level offloading

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Proposed Study Objectives

Power modeling	• Study network power consumption model
Beam sweeping optimization	• Study mechanism to enable adaptive beam sweeping of broadcast signals/channels • Study impact on UE RRM measurement and legacy UE
Reduced “On” duration for gNB	• Study enhanced frequency domain multiplexing of signals and channels
Enhanced offloading	• Study whether enhanced offloading mechanism is needed to flexibly turn on/off a network node and an antenna panel
Energy efficiency trade-off between UE and network	• Study potential impact of network power saving techniques on UE power consumption

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thanks.

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