

3GPP TSG RAN Rel-19 workshop

Taipei, June 15 – 16, 2023

Agenda Item: 5

RWS-230347



# Views on potential mmW enhancement in Rel-19

China Unicom

# Motivation on mmW enhancement in Rel-19

□ **Motivation 1:** The larger scale antenna array will be applied for mmW due to the needs for coverage enhancement, which will brings **large number of narrow BS beams**.

- Issue 1: Transmitting more CSI-RS over the air interface will lead to more UE power consumption and heavier RS overhead.



The UE will measure 2~8x CSI-RSs.  
Fig.1 BS will transmit more BM-CSI-RS to the UE.

- Issue 2: UE's RSRP will fluctuate violently due to frequently narrow beams switching under UE mobility scenario.

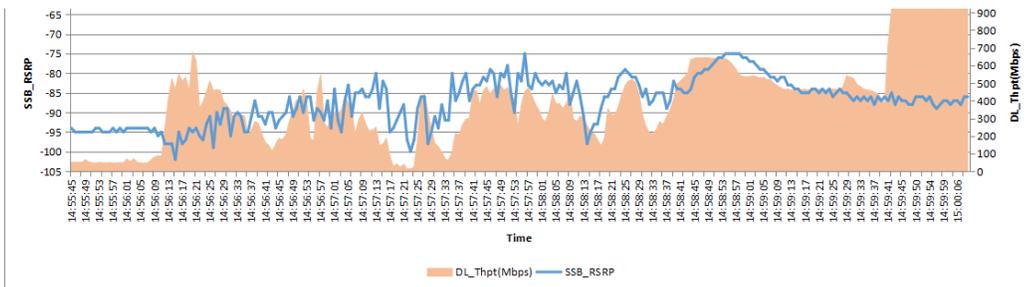


Fig.2 RSRP fluctuate will degrade the UL/DL throughput performance

□ **Motivation 2:** In NR-CA scenario, the NW need to **quickly (less than 100ms) activate the FR2 cell** to fulfill the users' large bandwidth services requirements.

- Issue: It will cost more than 500ms delay (SSB period\* sweeping times) for FR1 to activate the mmW cell now, which have negative impact on the user experience.

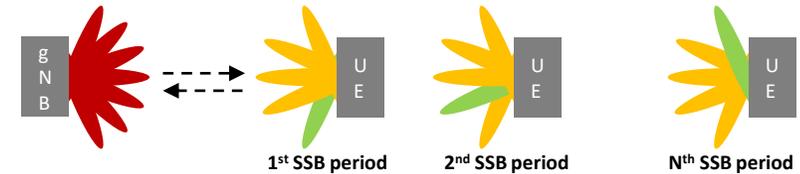


Fig.3 More than 640ms delay (32 SSB) for FR2 cell activation

□ **Motivation 3:** Failure recovery is not supported for CA case.

- Issue: If RLF is detected on Pcell, the re-establishment delay will be very long due to multi-beam mechanism for FR2.

□ **Motivation 4:** Short handover delay is needed for better experience.

- Issue: Handover delay for FR2 is longer comparing to FR1 due to longer searching time (8 beams for FR2 UE vs Omnidirectional beam for FR1).

# Scope and Objective

- Specify beam management and CSI enhancement to support for FR2 cell with large antenna array
  - BS overhead reduction / UE BM power saving / narrow BM tracking
- Specify fast activation mechanism for FR2 cell in NR-CA scenario.
  - Beam management enhancement in which both FR1 and FR2 are deployed in common direction scenario, e.g. FR1-assisted beam determination for FR2 cell.
  - Study necessary enhancement for FR2 RS.
- Fast failure detection and recovery in FR2 ONLY scenario
  - Enable fast failure detection for Pcell.
  - Enable fast failure recovery for Scell.
- Study/Specify mechanism for RRM measurement of FR2 handover process, targeting at reducing the measurement delay
- Specify reduced RRM requirements for FR2 handover process

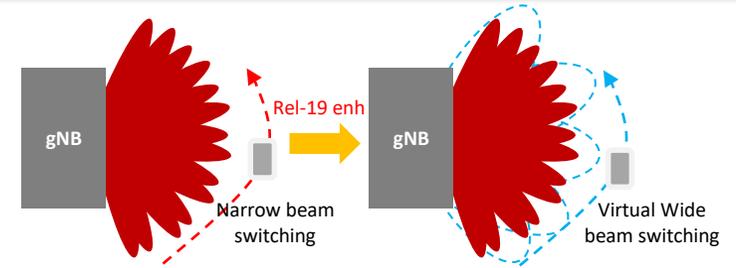


Fig.4 Reduce the negative impact of narrow beam switching on UE

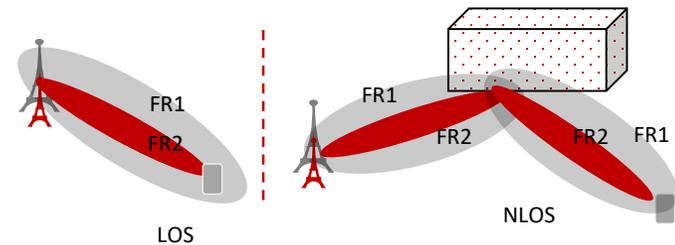


Fig.5 FR1-assisted FR2 beam selection (Co-direction deployment for NR-CA)

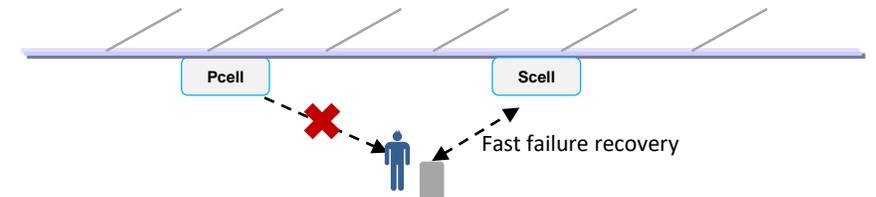


Fig.6 Support fast Scell Recovery in CA scenario



Fig.7 RRM measurement enhancement for FR2

Thanks