3GPP TSG RAN Meeting #91-e
Electronic Meeting, March 16 - 26, 2021
Agenda Item: 9.13

RP-210392

China Mobile

Motivation of study for Flexible Spectrum Utilization/Elastic Cell in NR

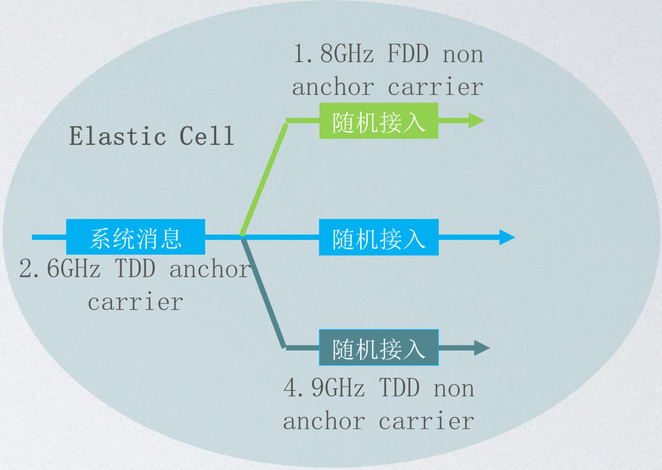
2021-03

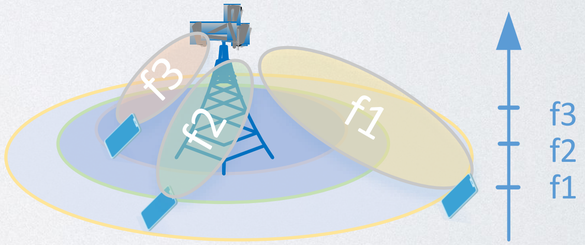
Motivation

- Enhancement for the flexible spectrum utilization is proposed to **explore the benefit of multiple carriers for both idle/inactive and connected mode**.
  - Multi-carrier operation supported in NR
    - SUL operating on lower frequency band is introduced to complement coverage of paired or unpaired NR systems;
      - UE benefits from SUL when UE in **Idle mode/inactive mode**, i.e., **from initial access phase**
      - All slots are defined as UL for SUL band
        - In RAN#90e, whether to introduce DL/UL configuration for SUL band has been discussed, with conclusion that not to in R15/R16, due to SUL band is just a band of full uplink resource.
    - CA increases both uplink and downlink user throughput by aggregating at least 2 carriers
      - UE benefits from CA when UE in **Connected mode**, i.e., **completing RRC connection** with the network
      - Both TDD, FDD and SDL carriers can be aggregated
- More and more spectrum, and hence more and more carriers are adopted for NR, e.g.FR1, FR2, >52.6GHz, with TDD, FDD, SDL, SUL, flexible spectrum utilization is desired to simplify the overhead of multiple carrier operation.

Possible Flexible Spectrum Utilization solution for NR

- Flexible spectrum utilization to support multiple carriers operation
  - Multiple carriers are configured in single cell
    - Different carriers, different number of carriers, regardless of intra-band carrier, or of inter-band carrier, can be configured in a cell, named **Elastic Cell**
    - System information of the cell can be broadcast only in one of the multiple carriers, i.e., so called anchor carrier, and one or more non anchor carriers can be visible and reachable by UE based on the system information broadcast in the anchor carrier, i.e., the anchor and all non anchor carrier can be chosen by UE for initial access.
      - This is just an extension of SUL scheme as a universal solution for multiple carrier operation, where additional resource selection for initial access in a cell is no longer limited to the carrier on SUL bands, but also can be the carriers on existing TDD/FDD bands
    - UE only needs to monitor paging on anchor carrier while the access carriers are selective to the UE
  - Similar but more flexible behavior as UE in CA
    - BWP like behavior for flexible carrier scheduling, with carrier aggregation for high data rate
    - Aggregated carriers can be SUL carriers





Potential study objectives

- Study mechanisms for supporting configuring multiple consecutive or non-consecutive spectrums in a cell, e.g., from perspectives of common system information, cell (re)selection, and inter-cell management, etc.
- Study mechanism for supporting idle/inactive state for flexible spectrum utilization/elastic cell, including,
  - Mechanism for cell selection/reselection procedure, as well as paging
  - Mechanism of initial access procedure, e.g., carrier selection in a cell
- Study possible enhancement of connected state for flexible multiple carrier operation
  - Physical channel and procedures enhancement for connected state to support BWP-like flexible carrier scheduling and aggregation
    - Current CA mechanism is maximally reused;
    - Potential control channel enhancement to support unified multiple carrier scheduling, including TDD/FDD/UL only/DL only carrier

Thank you