

3GPP TSG RAN Rel-18 workshop
Electronic Meeting, June 28 - July 2, 2021
Agenda: 4.1
RWS-210143



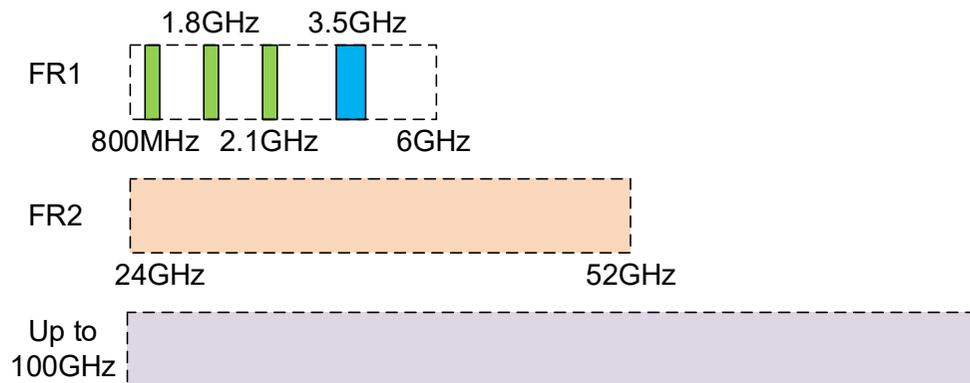
Multi Radio Multi Connectivity for Rel-18

China Telecom

Motivation for Multi Radio Multi Connectivity

■ Motivation

- » Due to the high 5G frequency bands up to 100GHz and with the gradual 4G frequency refarming, Multi-layer overlapping deployment will be a normal behaviour for future network.
- » The emergence of new applications and services, such as AR/XR, HD live video, requires not only **higher bandwidth and capacity**, but also **service continuity and lower latency** in mobility scenarios.
- » Multi Radio Multi Connectivity(MR-MC) can be considered as an approach to provide operator with more flexible, effective and uniform network control and radio resource management.



Motivation for Multi Radio Multi Connectivity

■ Motivation for Multi-layer deployment

- » Considering the Multi-layer overlapping deployment scenario and **higher bandwidth and capacity** requirements for new services in the future, MR-MC (>2 legs) will be a potential enhancement for Rel-18.
 - For CA, it aims to provide high rate and large capacity, but requires co-located and overlaid or higher backhaul quality. If it is hard to deploy ideal backhaul, CA might not solve the capacity issue.
 - For DC, two different nodes connected via a non-ideal backhaul can provide radio resources for a UE jointly. MN is often used for coverage and SN is for capacity.
 - For MR-MC, multi SNs can help increase bandwidth and capacity significantly in hotspot and overlapping areas.

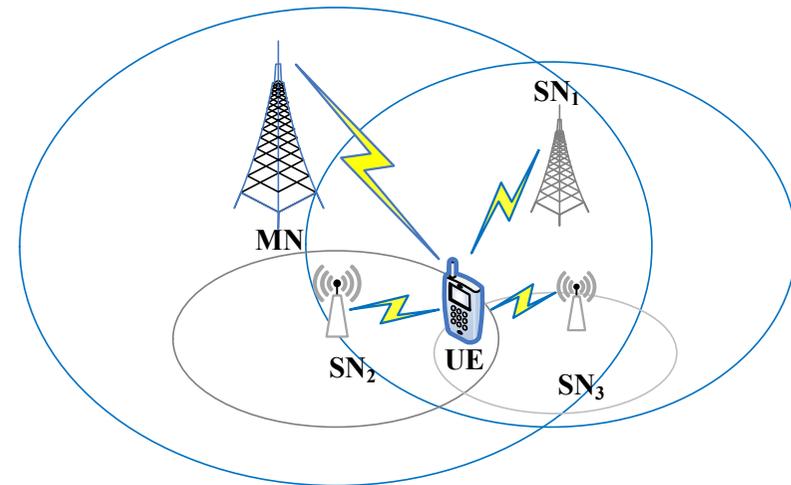


Fig. Multi-layer deployment

Motivation for Multi Radio Multi Connectivity

■ Motivation for Multi-layer deployment

- » MR-MC also focuses on guaranteeing **the service continuity and low latency** in mobility scenarios.
 - For high and low frequency hybrid network, when UE is moving across multi high frequency SNs (e.g. FR2 or up to 100GHz), frequent SCG changes may reduce the user experience.
 - Configuring a low frequency SN (e.g. FR1) together with high frequency SN(s) or preconfiguring multi SNs can help maintain the data rate and service continuity of the UE.
 - Fast and dynamic activation/ deactivation among multi SNs can help reduce latency comparing to SCG changes.

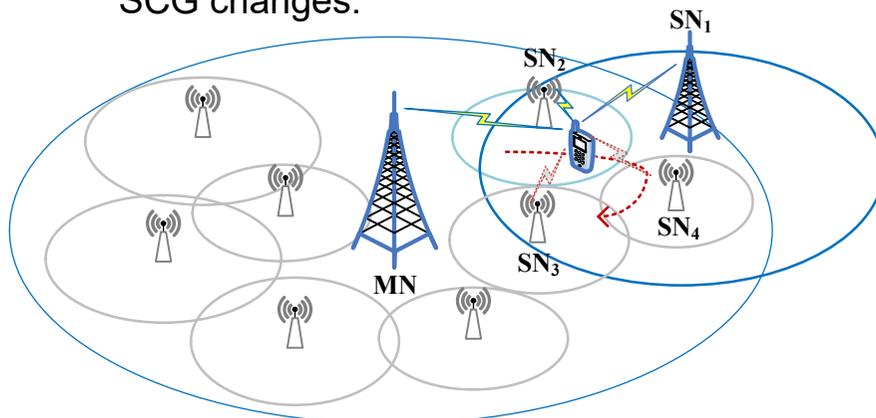


Fig. Low Freq SN + High Freq SN

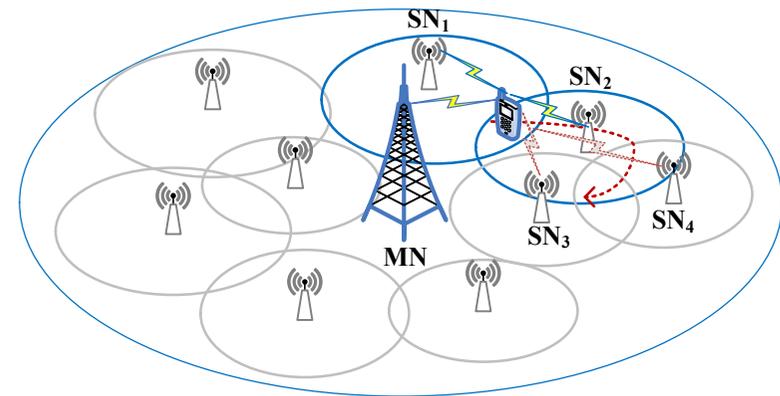
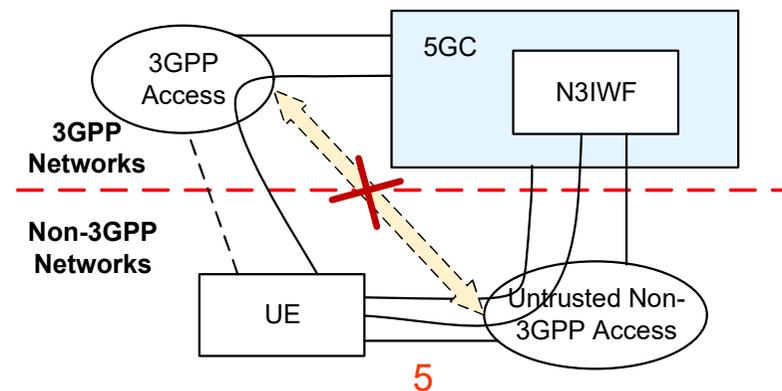


Fig. Multi High Freq SNs

Motivation for Multi Radio Multi Connectivity

■ Motivation for Multi-RAT integration

- » Multi-RAT integration can provide Ubiquitous Connection for network users.
 - With the development of Wi-Fi 6 (i.e. IEEE 802.11.ax), WLAN is still expected to be widely deployed by operators/vertical industry enterprise for increasing hotspot throughput and providing supplementary coverage for weak coverage areas, especially for indoor scenarios in the future.
 - Besides that non-3GPP access to 5GC (N3IWF) is already enabled in NR at the core network level, NR-WLAN aggregation at RAN level can achieve common radio resource control and management, and can be further considered and studied.



Scenarios for Multi Radio Multi Connectivity

- Scenarios and use cases for MR-MC
 - » Multi-layer deployment, e.g. multi-SN connectivity
 - » Multi-RAT integration, e.g. NR-LTE-WLAN aggregation

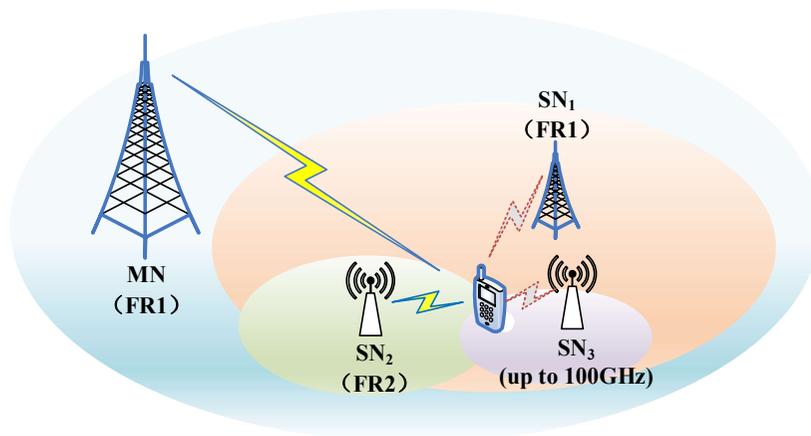


Fig. Multi-layer deployment

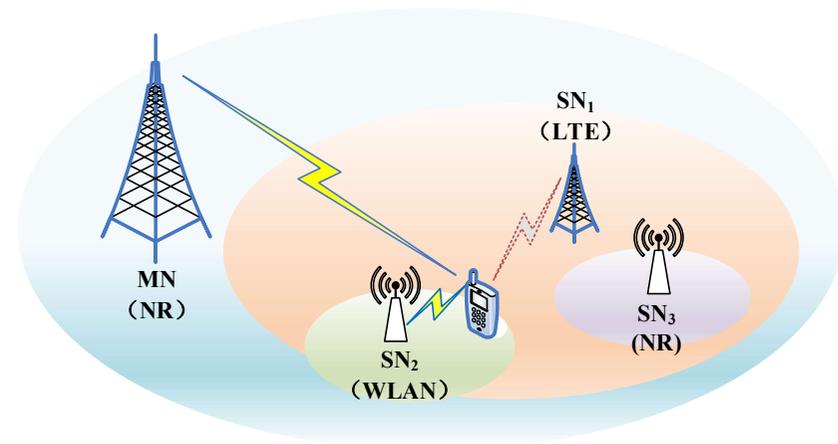


Fig. Multi-RAT integration

Potential Scope

Scope

» Specify the architecture, interface, user plane and control plane protocols for MR-MC, including [RAN2, RAN3]

- Overall architecture, air/network interface, UP and CP protocol for multi-SN connectivity scenario
- Overall architecture, air/network interface, UP and CP protocol for NR-WLAN aggregation scenario

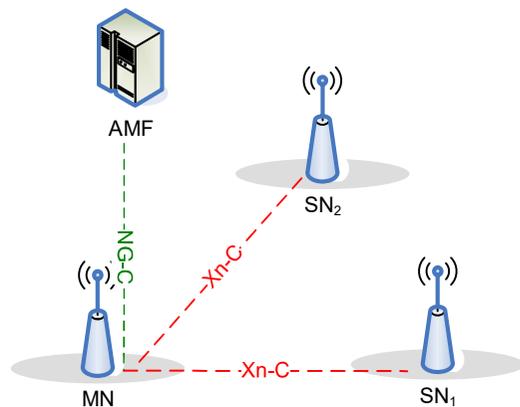


Fig. CP connectivity for multi-SN

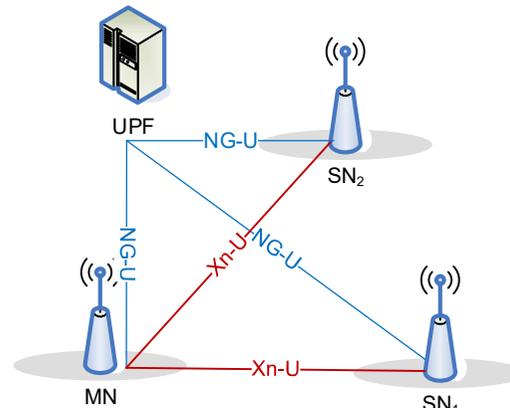


Fig. UP connectivity for multi-SN

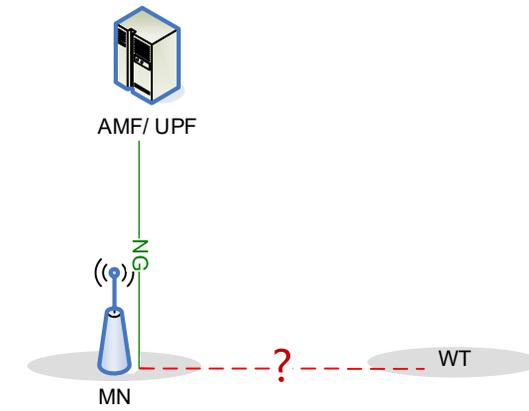


Fig. Architecture for NR-WLAN aggregation

Potential Scope

Scope

- » Specify the traffic steering, switching, aggregation, splitting, retransmission and duplication aspects for MR-MC, including [RAN2, RAN3]

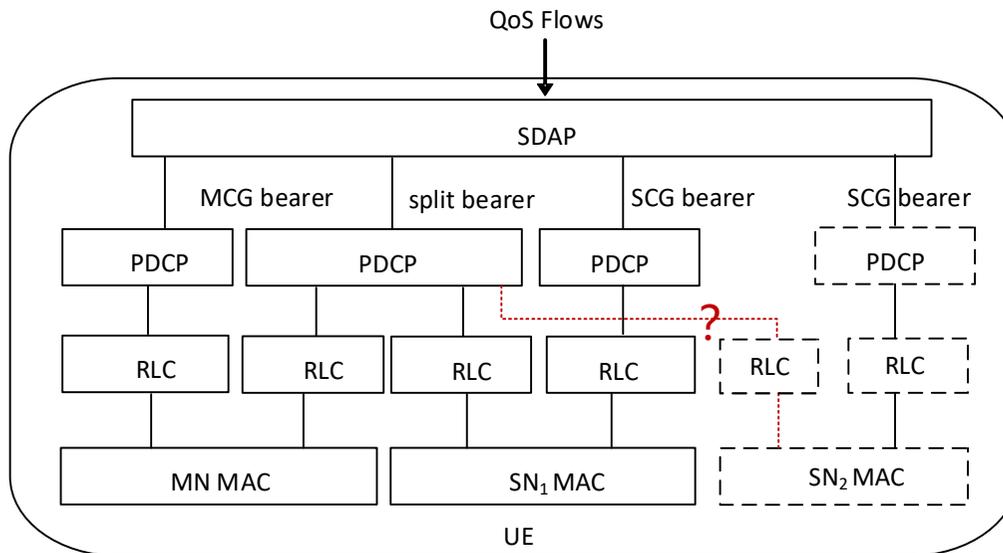


Fig. Radio Protocol Architecture for MCG, SCG and split bearers from UE side

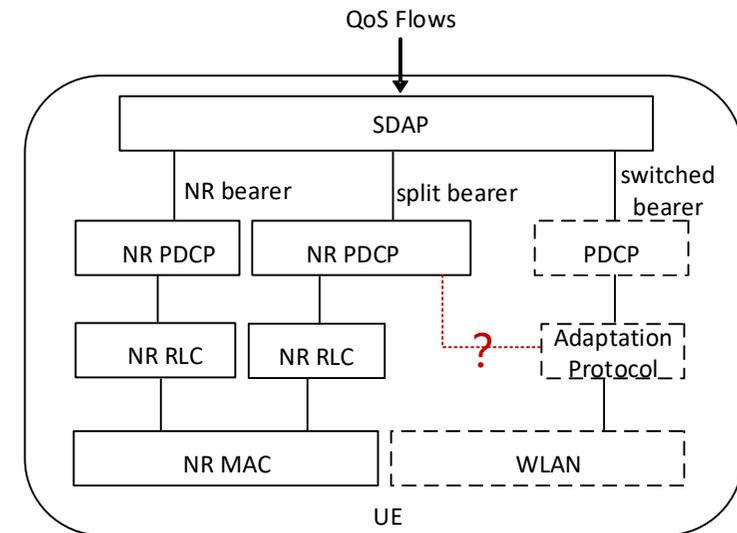


Fig. Radio Protocol Architecture for NR, split and switched bearers from UE side

Potential Scope

- Scope
 - » Specify mechanisms and signalling to enable MR-MC, including [RAN2, RAN3, RAN4]
 - Multi-layer/cell groups management, such as fast and dynamic SCell/ SCG activation and deactivation with selective (UL) activation [RAN2, RAN3]
 - UE capability management to support MR-MC [RAN2, RAN4]

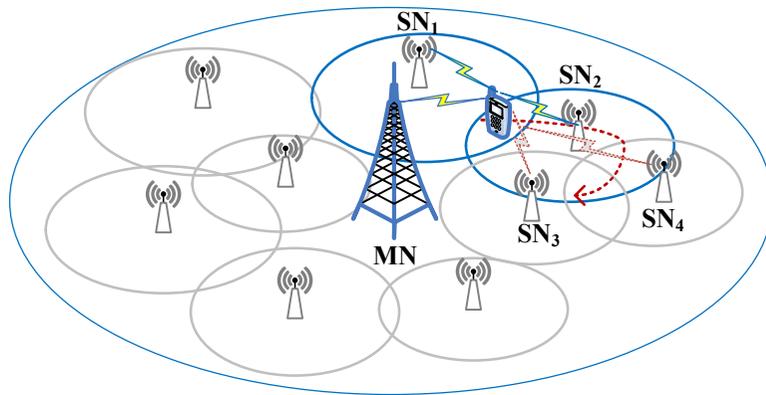


Fig. SN1/ SN2 activated

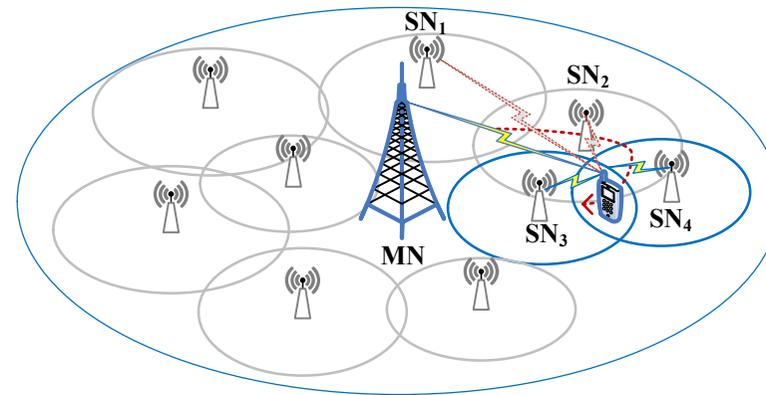


Fig. SN3/ SN4 activated



Thanks!
