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Electronic Meeting, June 28 – July 2, 2021
Agenda: 4.3
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中国电信
CHINA TELECOM

Operator Customizable Network Sharing

China Telecom

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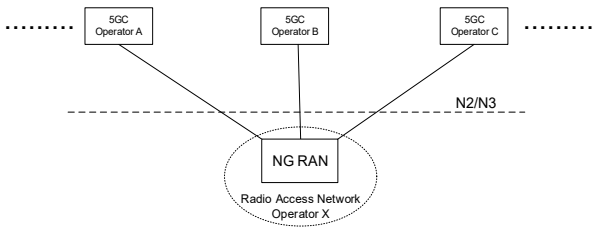
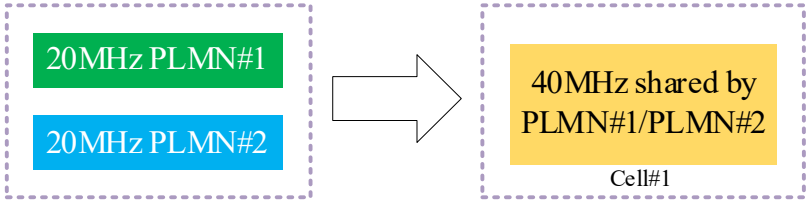
Trend of Network Sharing

- With the growing deployment of 5G, more and more operators tend to build 5G network cooperatively with MOCN network sharing architecture. The operators sharing 4G network basically will follow 4G mode and adopt the network sharing strategy to deploy their 5G network.
- By the cooperative deployment, operators can launch 5G network quickly with the CAPEX and OPEX reduction. Furthermore, the discontinuous intra-bands which belong to different operators can be combined into a wider band, this way can make full use of the valuable spectrum resource, especially for the low-frequency band, to provide high-capacity services for users.





Requirement for Customizable Network Sharing

- Up to now, China Telecom and China Unicom have deployed the largest sharing 5G network in the world. There are more than 300 of thousands sharing 5G base stations covering all of major cities in China.
- In actual sharing network operation, we found the cooperative operators may have their respective operation strategies. However, the existing network sharing functions can not enable the operators to configure the different parameters for a sharing cell according to their respective strategies on some aspects. In this case the existing network sharing functions need to be enhanced to meet the requirement of operator customizable configuration.

Issue 1：Customizable SUL Configuration(1/2)

- SUL is an important feature in Rel-16. By using SUL, UE can achieve the better uplink performance with configuration of two uplink link carriers. However, the existing SUL mechanism cannot support the different SUL configuration by operators.
- For example, the operator A and B shared a 5G cell, but each of them wants to configure their respective SUL in SIB to enhance the uplink performance, thus users of different operators can send the PRACH on different SUL band as shown Fig. 1.

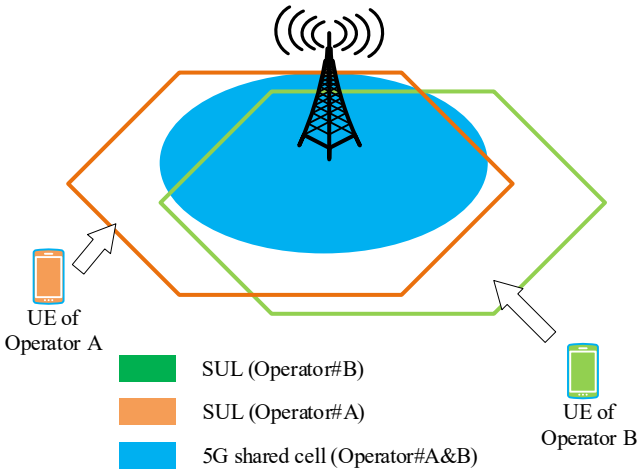


Fig. 1

Issue 1：Customizable SUL Configuration(2/2)

- Another case is the operator A and B shared a 5G cell, but only operator B has the additional lower band which can be used as the SUL band. Thus, the operator B can configure SUL to enable that only its users can achieve the better uplink performance as shown Fig 2.
- In order to highlight the operator differentiation, the customizable SUL configuration for network sharing should be supported.

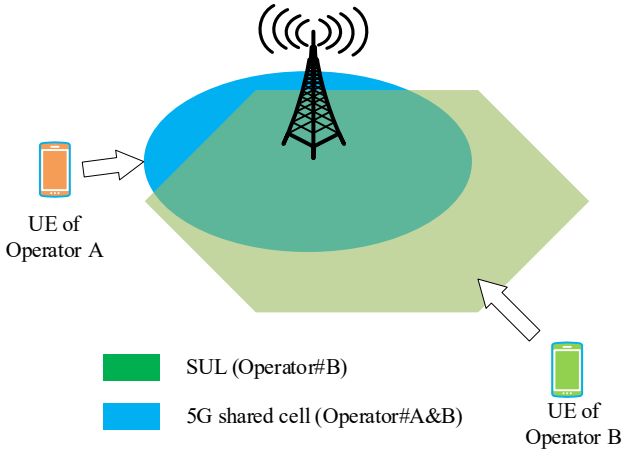
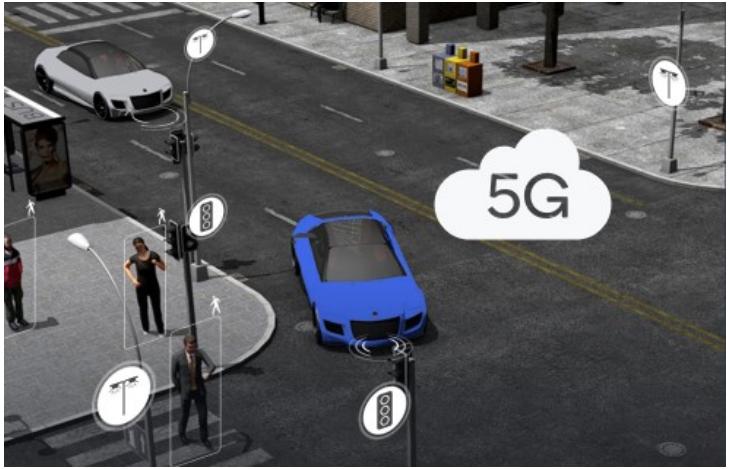


Fig. 2

Issue 2: Customizable Sidelink Configuration (1/2)

- The V2X/Sidelink functions can support the information exchange between UEs or between Vehicle and other things (such as Vehicle, Infrastructure, Network, etc) through the SL broadcast, groupcast, and unicast transmissions. And operators can expand their services into the automotive and vertical industries with V2X/Sidelink leveraging the cellular infrastructure.



Issue 2: Customizable Sidelink Configuration (2/2)

- However, the existing V2X/Sidelink functions cannot support the different configuration for operators.
- For example, if operator#A and operator#B want to indicate the different V2X/Sidelink resources for their respective sidelink users based on the sharing cell, the existing network sharing function cannot support this, shown in Fig.3.

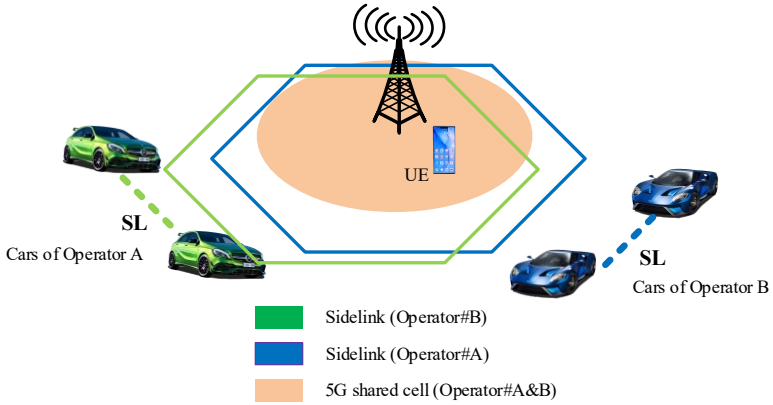


Fig. 3

Issue 3: UE Type Selection for Network Sharing

- With the existing network sharing system, operators cannot select the types of users which should be allowed to access to the sharing cell.
- For example, the operator B may share 5G NSA (EN-DC) network with operator A who deployed it, meanwhile operator B had its own LTE network, as shown in Fig.4.
- As the NSA sharing cell services the users of both operator A and B, it broadcasts both PLMN ID#A and PLMN ID#B in the SIB1. Thus both the legacy LTE UEs and NSA UEs of operator B can access to the sharing cell, it will result in the large amount of cell reselection for LTE only UEs which should be steered to the LTE only cell of operator#B.
- In existing network sharing mechanism, Operator A cannot choose the type of UE allowed to access the sharing cell, such as only allowing the NSA UEs to access the sharing cell and barring the LTE only UEs.

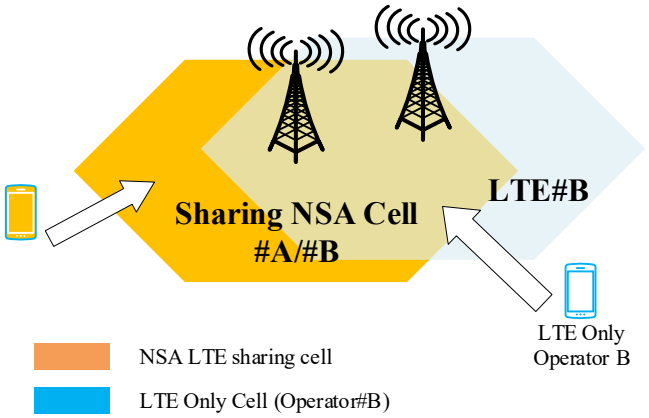


Fig.4

Scope of Work Item

- The objective of this work item is to enhance the network sharing functions to support the operator customizable configuration and meet the differentiated operation requirement.
- Detailed objectives of the work item are:
  1. Specify the items which should be customizable for operators [RAN2];
  2. Specify mechanisms to enable customizable configuration of SUL for operators [RAN2, RAN3];
  3. Specify mechanisms to enable customizable configuration of Sidelink for operators; [RAN2, RAN3]
  4. Specify mechanisms to differentiate the usage of the sharing EN-DC network between 4G and NSA users [RAN2];
  5. The necessary modification on NG/Xn/F1/E1 if any; [RAN3]

Thank you！