

NR repeaters and Reconfigurable Intelligent Surface

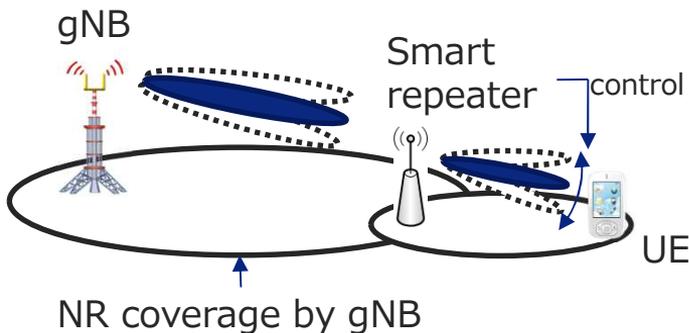
KDDI corporation

- Although many operators have already started to deploy NR in FR2, the propagation loss and blockages in FR2 make it difficult to spread the area coverage, and even within the area, there are many dead spots.
- IAB is positioned as a highly functional relay node and can expand coverage while securing system capacity by controlling resources. However, as an operator, it would be desirable to have a simpler way to expand coverage and prevent dead spots.
- A work item on NR based repeater in FR1 and FR2 without adaptive beamforming has already started to specify RF and EMC requirements. As a next step, especially in FR2, solutions with adaptive beamforming capability or adaptive change in the direction of radio wave reflection are expected to enable easy and efficient area deployment.

- Smart repeater. Here, we assume that it is NR repeater discussed in Release 17, with at least adaptive control of beamforming to UEs in FR2.
- Reconfigurable Intelligent Surface (RIS), which can control the direction of radio wave reflection, assuming the frequency band is FR2.

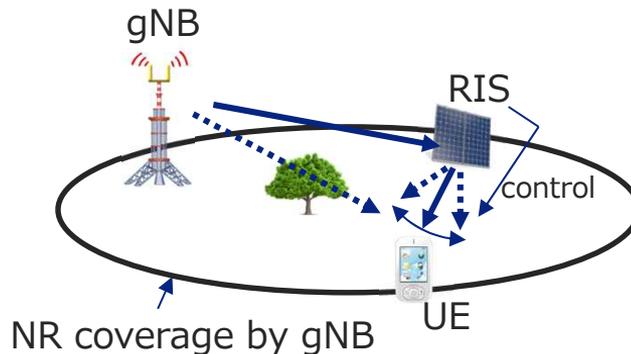
- Smart repeater

- Coverage expansion in outdoor
- Improvement of O2I penetration



- Reconfigurable Intelligent Surface

- Measures against dead spots in gNB coverage
- Improvement of the number of MIMO layers



- **Evaluation of performance gain, cost and specification impact for both smart repeater and RIS, considering**
 - Scenario
 - Features that smart repeater and RIS should have and how to implement them
- **Identification of possible enhancements, if needed.**
 - The enhancements include possible interfaces between gNB and smart repeater/RIS which realize adaptive control of beamforming/reflection direction to UEs.
 - It is assumed that the smart repeater and RIS will be discussed under the assumption that there will be no impact on legacy UEs. That is, the smart repeater and RIS are designed to be accessible by Rel-15/16/17 UEs.

Tomorrow, Together

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