3GPP TSG RAN Meeting #93e
Electronic Meeting, Sept 13- Sept 17, 2021

RP-212376

ZTE
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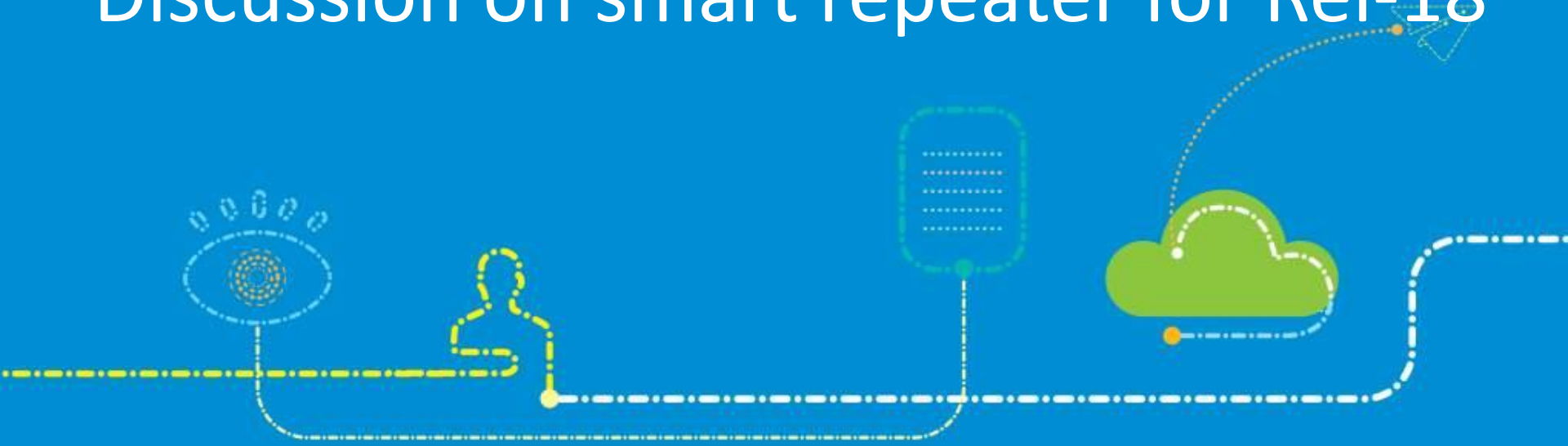
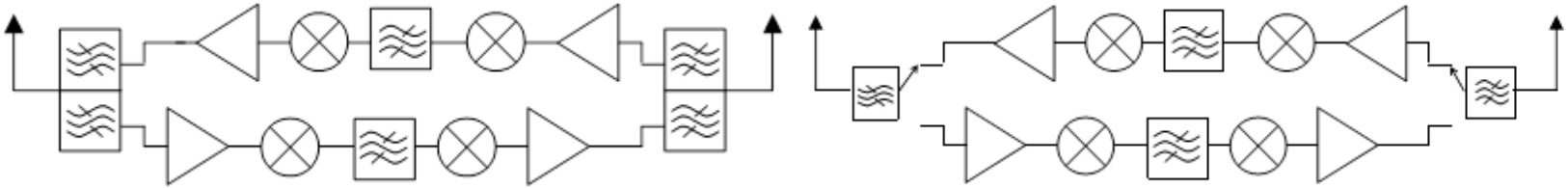
Source: ZTE, Sanechips
Agenda: 9.0.2

Discussion on smart repeater for Rel-18



Background on smart repeater

- In Rel-17, RF repeater (modelled as below) has been introduced for NR to improve the coverage of cellular network deployments, which is typically non-generative and simply amplify-and-forward everything that they receive.



- With the motivation to optimize the system performance including potential alleviation of interference and further improvement on coverage, smart repeater has been proposed and identified as one potential area to improve the network topology [RWS-210659] and following major merits are claimed:
    - Simplified protocol stack comparing to legacy relay/IAB-DU and gNB
    - Side control from gNB to enable “smart” operation with dynamic changes on Tx/Rx of repeater

- The following recommendation has been in the **[RAN93e-R18Prep-04]** email discussion:
  - **The investigation on smart repeater is considered with following assumptions:**
    - Smart repeater should be transparent to UE [Non-controversial]
    - FR2 with TDD and both outdoor and O2I scenarios are prioritized, other scenarios can be investigated but optimizations for these scenarios may not be considered [Non-controversial]
    - Only single hop stationary repeater is considered [Non-controversial]
  - **With following guidance on the technical related aspect:**
    - The side control information design including beamforming information configuration, timing and TDD configuration is the starting point [Non-controversial]
    - More discussion is needed on others, e.g., on-off, Bandwidth information, Power control, Co-channel related issues/RF requirement, and the need of joint study on side control information for both smart repeater and RIS. [Controversial]
    - In addition to the side control information, the need of standardization on management of smart repeater (e.g. including authentication/authorization and interference management) can also be investigated. [Controversial]
  - **Whether this R18 item will be supported or not along with the decision on SI/WI will be concluded in later stage.**
- Regarding smart repeater in Rel-18, in our views:
  - The determination of scenarios should be only for coverage limited cases.
  - For side control information, benefits should be justified per feature and the legacy solution (including implementation) should be considered.
  - Management of additional network entity : all procedures (e.g., registration, authentic, OMA) will be terminated at RAN side via implementation, to avoid uncontrollable negative impacts on system performance including unmanageable interference and unpredictable load for scheduling, e.g., performance degradation for cell-center UE
  - Joint consideration on side control information for smart repeater and RIS (to identify the common part) [RP-212385]

Potential objectives for smart repeater

- Study and identify essential side control information between gNB and Smart repeater[RAN1]
  - Identify the basic assumption for smart repeater including antenna configuration/power class
  - Performance evaluation in outdoor and O2I case for FR2 for stationary smart repeater with single hop.
    - Impacts on network throughput/implementation complexity should be considered.
- Specify gNB-Smart repeater interface on the following aspects according to the investigation
  - Details of side control information (e.g. beamforming information)
  - Mechanism including channel to deliver the side control information

Thanks

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