

3GPP RAN #86
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RP-193101

Agenda Item 9.1.1

On the scope of NR-Light

Qualcomm

Background

- The proposed draft NR-Light WID [1] includes the following notes:

- Note2: Backward compatibility and coexistence with wideband UE should be ensured
- Note3: The work defined above should not overlap with LPWA use cases.

- It is not yet clear, from the above description or otherwise, whether NR-Light would **define a new device type**, or instead, it would **define a set of features that can be implemented in any device type, including eMBB UEs**

- In this contribution, we give our views on this topic

- [1] RP-102958, “New WID on support of low-complexity NR-Light devices”, Ericsson

Backward compatibility

- Before discussing device types, we note that there is an important decision to be made regarding backward compatibility as part of the NR-Light WI definition
 - There may be different ways of defining backward compatibility. For the purpose of the discussion in this contribution, we call a device type backward compatible according to the following criterion:
 - A Rel-17 NR-Light device is backward compatible with a Rel-15/16 gNB if :
 - A combination of
 - Forward compatibility features in the Rel-15/16 gNB, and
 - A choice of a sub-mode supported by the Rel-17 UE
 - will ensure that the UE can attach to a gNB and they can communicate with each other
- Examples for backward compatibility/incompatibility are given in the next slide

Backward compatibility (cont.)

- **Example 1: FDD Half-duplex**
 - **Not backward compatible**
 - Before capability exchange, the gNB doesn't know if this UE is half-duplex or not
 - It is not reasonable to assume that all Rel-15/16 gNBs will be upgraded to treat all FDD UEs as half-duplex before capability exchange
 - It is not reasonable to assume that FDD half-duplex UEs can support a full duplex submode used before capability exchange
- **Example 2: Reduced BW, Reduced number of Rx antennas**
 - **Backward compatible**, even when not Rel-15/16 compliant
 - Backward compatible because in Rel-15, the following forward compatibility features were added
 - Signaling of supported MIMO layers (# of Rx antennas)
 - Signaling of BW supported
 - Reference point A
- **Example 3: Reduced number of control blind decodes**
 - **May or may not be backward compatible**, depending on design details
 - Maybe backward compatible if blind decodes for common search space are not reduced
 - If common search space blind decodes used before capability exchange is reduced, it is not reasonable to assume that all gNBs will be upgraded to treat all UEs as having reduced blind decode capability

Recommendation

- Since FDD Half-duplex mode is an important NR-Light feature, and since at least FDD Half-duplex is not backward compatible, we recommend the following change in the WID

- Note 1: The NR-Light Work Item is to define a new “NR-Light UE” type
- Note 2: Backward compatibility for NR-Light UEs might not be ensured; however, maximizing backward compatibility when possible is a goal of the NR-Light WI
- Note 3: Coexistence with wideband UE should be ensured
- Note 4: The work defined above should not overlap with LPWA use cases
- Note 5: After the completion of the work, identify the subset of features, if any, as part of the Rel-17 Feature Group definitions, that may be implemented by non-NR-Light devices (e.g. eMBB UEs)

Further recommendations

- The following further recommendations are made for the NR-Light WID scope definition

- Note 6: The Work Item excludes defining any new subcarrier spacing or new waveforms
- Note 7: NR-Light UEs should support forward compatibility features defined in earlier releases
- Note 8: The NR-Light WI should focus on SA mode



Thank you

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