3GPP RAN#102 RP-233511
December 11-15, 2023, Edinburgh, Scotland
Agenda Item: 9.2.5

Views on Conclusion for LP- WUS and WUR

Qualcomm Incorporated

Background

- Waveform is one of fundamental design choices for LP-WUS and LP-SS affecting other design choices.
- RAN#101 identified following possible directions to narrow down waveform candidates.
  - Direction 1:
    - Waveform-option-1: OOK-1 and/or OOK-4, as described in section 7.2.1.1 (A)(D) in TR38.869.
    - Waveform-option-3: Harmonized design that accommodates OOK-1/OOK-4 and OFDM waveform, i.e., specified overlayed OFDM sequences over OOK symbol
    - For RRC IDLE/INACTIVE, in addition to existing PSS/SSS, LP-SS (, i.e., OOK-1 and/or OOK-4 waveform with/without overlayed OFDM sequences with potential further down selection in WI phase) for LP-WUR that cannot receive existing PSS/SSS, is supported for synchronization and/or RRM for serving cell.
  - Direction 2:
    - Waveform-option-3: Harmonized design that accommodates OOK-1/OOK-4 and OFDM waveform, i.e., specified overlayed OFDM sequences over OOK symbol
    - For RRC IDLE/INACTIVE, in addition to existing PSS/SSS, LP-SS (, i.e., OOK-1 and/or OOK-4 waveform with/without overlayed OFDM sequences with potential further down selection in WI phase) for LP-WUR that cannot receive existing PSS/SSS, is supported for synchronization and/or RRM for serving cell.

Waveform for LP-WUS/LP-SS

- In direction 1, RAN1 will down select between Option 1 and Option 3 during Rel-19 WI.
- In direction 2, RAN1 start WI from Option 3.
- For the progress of WI, it would be good to down select it as Direction 2 w/ the following condition in RAN#102 and scoping Rel-19 WI accordingly.

Condition for Overlayed OFDM sequence

- In going with Direction 2 (Option 3), there have been a concern on potential eco-system fragmentation with the introduction of overlayed OFDM sequence. The overlayed OFDM sequence in theory could be used at least for following two purposes:
  - 1) Detection performance improvement of underlying LP-WUS by utilizing the structure of known overlay OFDM sequence.
  - 2) Carrying additional information to enable advanced LP-WUR (aka OFDM based LP-WUR) with additional features.
- We think the purpose should be 1) only, and not 2), because the latter would effectively introduce two different air-interface designs for LP-WUS; To avoid this issue, we make following proposal:

Proposal 1: RAN supports waveform Option 3 for Rel-19 LP-WUS/WUR (Direction 2) with the condition that overlayed OFDM sequence is used only for detection performance improvement rather than carrying additional information.

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