3GPP TSG-RAN WG4 Meeting #108
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Motivation paper for R19 RRM enhancement

Rel-19 RRM enh-4 | NR RRM enhancement WI for R19 (1/3)

- Rel-19 RRM enhancement for NR and MR-DC is an umbrella WI for RRM enhancement, aiming to include:
  - Leftover RRM related topics/issues from Rel-18 and earlier release:
    - **NR frequency range 2 (FR2) multi-Rx chain DL reception**
      - Potential L1/L3 measurement enhancements targeted for UEs with multi-Rx chain DL reception capability that are not limited to support of 4-layer DL MIMO, e.g., simultaneous L1 and L3, or L3 and data/control, or GBBR enhancement (further enhancement on beam selection criteria and measurement delay).
      - Dual TCI state switching based on R17/18 unified TCI framework
      - RRM requirement for the case of RTD > CP case
      - New scenarios for multi-Rx chain DL reception
        - CA/DC
        - Inter-cell multi-TRP (e.g., inter-cell GBBR)
    - **Further SCell activation enhancement based on R18 enhancement solutions**
      - Multiple SCell activation enhancement, including FR1, FR2-1 and FR2-2;
      - FR2-2 SCell activation enhancement;
      - Direct SCell activation enhancement, including FR1, FR2-1 and FR2-2;
      - Note: Rel-18 enhancement solutions include:
        - (1)report of L3 measurement during activation,
        - (2)beam sweeping factor reduction;
        - (3)activation delay reduction by using SSB periodicity.

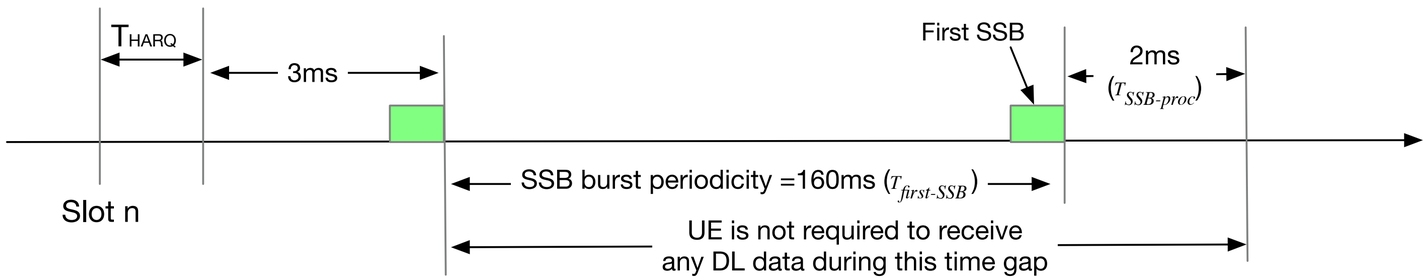
Rel-19 RRM enh-4 | NR RRM enhancement WI for R19 (2/3)

- Cont.
  - Leftover RRM related topics/issues from Rel-18 and earlier release:
    - **Requirement for SRS antenna port switching during whole slot**
      - Background: existing RRM requirement for SRS antenna port switching only considered SRS in last 6 symbols
      - R19 Enhancement:
        - Interruption requirement with SRS symbols during whole slot
        - Other possible RRM requirement impacts due to whole-slot SRS antenna port switching
    - **HO with PSCell for new scenarios**
      - Requirement design for scenarios not covered in R17 RRM enhancement
        - from NR SA to NE-DC
        - from NR SA to NR-DC
        - from LTE SA to EN-DC
    - **RRM requirement for MIMO evolution**
      - Unified TCI extension to multi-TRP
    - **Dynamic RTD/TTD status update**
      - Background: many RAN4 requirements are RTD/TTD dependent, e.g. RRM requirements applicability of multi-Rx, multi-TRP with dual TAGs, intra-frequency L1 measurement on neighbor cell and etc.
      - Solution and corresponding requirements for UE to indicate RTD/TTD status.
    - **Parallel measurement with NCSG**
      - Background: existing RRM requirement is only for UE to measure one carrier within each NCSG occasion
      - R19 Enhancement: RRM requirement for NCSG capable UE to support parallel measurement on at least two carriers simultaneously

Rel-19 RRM enh-4 | NR RRM enhancement WI for R19 (3/3)

- Cont.
  - All newly identified RRM enhancement during Rel-18
    - **FR2 RRM requirements delay reduction enhancements**
      - Background: With larger number of serving CCs in FR2, it would result into huge long measurement/detection delay to degrade mobility performance based on CSSF factor without MG.
      - R19 enhancement: Cell identification and measurement delay reduction in FR2 CA with large serving CC number
    - **TCI switching enhancement**
      - Background: In legacy TCI switching requirement, there was a time gap from "*slot n+ T_{HARQ} +(3 ms) / NR slot length*" to "*slot n+ T_{HARQ} +(3 ms +TO_k*($T_{first\text{-}SSB}$ + $T_{SSB\text{-}proc}$)) / NR slot length*". Since UE is not required to receive DL data during this time gap, it will probably impact the throughput performance in case the first SSB arrives 160ms later (analyzed in R4-2006616).
      - R19 enhancement: enhancement to use A-TRS for TCI T/F tracking to shorten the total switching delay.
    - **Other miscellaneous RRM features that are not in any other dedicated Rel-19 WI**

Note: More detailed scope will be shared toward the end of R18 when RAN4 will have a clearer view about the remaining important issues to be handled in R19.



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