3GPP TSG-RAN Meeting #92e
Electronic Meeting, June 14-18, 2021

RP-211427

Agenda item: 9.7.4.9
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Discussion on expansion of R17 FeRRM WI scope

Background on R17 FeRRM scope (1/2)

- In RP-202022, some status of the discussion has been duplicated as below,
  - The following 3 topics have clear majority support with no significant technical concerns. The wording for the objectives requires finer retuning.
    - Topic 2.5 SRS antenna port switching (support: 14, concerns: 0)
    - Topic 2.11: HO with PSCell (support: 11, concerns: 0)
    - Topic 2.13: PUCCH SCell activation/deactivation (support: 10, concerns: 0)
  - The following 2 topics have received reasonable number of supports which is significantly higher than the concerns.
    - Topic 5.1: CMTC for CSI-RS L3 measurement (support: 7, concerns: 2)
    - Topic 2.15: TCI switching enhancement in REL-17 (support: 6, concerns: 3)
  - The following 3 topics remain as controversial with split opinions
    - Topic 2.14: IDLE mode requirement for SMTC2-LP (support: 3, concerns: 3)
    - Topic 2.4: RLM enhancement requirement (support: 3, concerns: 4)
    - Topic 5.2: Synchronization assumption for CSI-RS L3 measurement (support: 3, concerns: 4)
    - Topic 5.4: Dedicated CSI-RS measurement engine (support: 2, concerns: 2)
  - It is recommended to
    - Agree to introduce topic 2.5, 2.11 and 2.13 in RRM WID. The detailed objectives are subject to finer retuning
    - Due to clear majority view, further discuss topic 5.1 and 2.15 in intermediate round.
- Eventually, the top 3 topics have been captured in the formal WI scope of R17 FeRRM; however, we think the topic 5.1 and topic 2.15 is also worthwhile to be included in R17 scope.

Background on R17 FeRRM scope (2/2)

- In last RAN4 #99e meeting, some potential R17 topics have been identified, as summarized below,
  - (1) During discussion for HO with PSCell in R17 FeRRM, RAN4 identified the RRM requirement FR1+FR1 NR-DC scenario is missing in TS38.133 (observed in WF R4-2108344)
    - FFS: the baseline PSCell addition requirement for FR1+FR1 NR-DC would be discussed in TEI16 or full set of RRM requirements for FR1+FR1 NR-DC would be discussed in R17 WI?
  - (2) During discussion for HO with PSCell in R17 FeRRM, RAN4 proposed to let RAN plenary to determine if the scenario for HO with PSCell could be extended to include:
    - from NR SA to NE-DC (newly added)
    - from NR SA to NR-DC (newly added)
    - from LTE SA to EN-DC (newly added)
  - (3) During discussion for NeedForGap in R16 TEI, the session chairman note was:
    - Session chair: There is no consensus to do the work in Rel-16 TEI due to potentially larger scope and late stage of Rel-16. The WF is agreeable to RAN4 and provides a set of candidate objectives. WF is noted as no work is planned. Further discussion in the plenary is recommended on whether and how to handle this.
  - (4) During discussion for per-BC indication of per-FR measurement gap UE capabilities, the agreement was:
    - Agreements:
      - Do not introduce per-BC indication of per-FR measurement gap UE capabilities in Rel-16.
      - RAN4 has a common understanding that further enhancements to the per-FR measurement gap UE capabilities to address UE implementation constraints can be further studied in future (e.g. in Rel-17) and the work is subject to RAN plenary approval and available time budget.

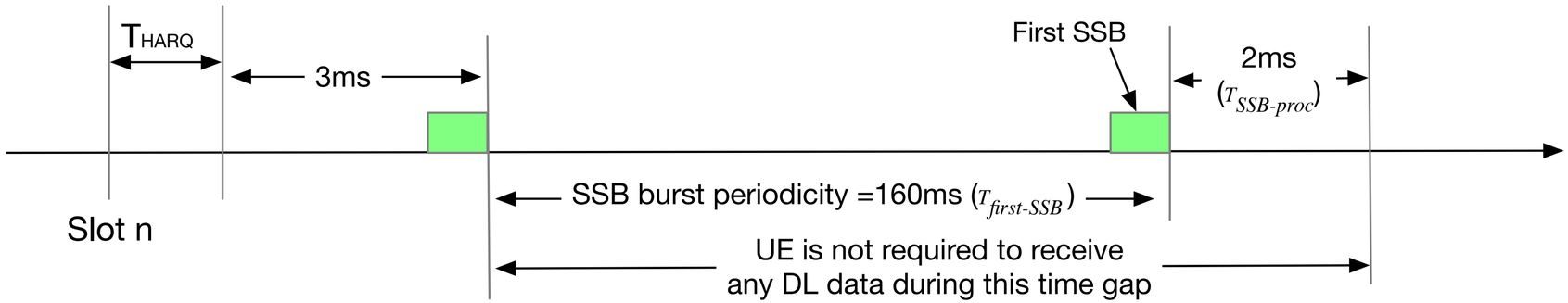
Candidate scope 1 | CMTC for CSI-RS L3 measurement

- Background
  - So far the timing limitation for CSI-RS L3 measurement is specified as a requirement applicability in RAN4, but it's not a real systematic solution for network and UE to configure and perform L3 CSI-RS measurement, respectively.
  - In our understanding, it's desirable to introduce clear timing window for L3 CSI-RS measurement, like SMTC for SSB based L3 measurement.

- ***Candidate scope 1: CMTC for CSI-RS L3 measurement***
  - ***CMTC for CSI-RS L3 measurement [RAN4, RAN2]***
    - ***RRM requirement based on CMTC for CSI-RS L3 measurement***
    - ***Signalling design for CMTC of CSI-RS L3 measurement***

Candidate scope 2 | TCI switching enhancement

- Background
  - In Rel-16 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). RAN4 to further discuss if UE behavior can be enhanced to receive DL data during the time gap of $T_{first\text{-}SSB}$ in Rel-17.



- ***Candidate scope 2: TCI switching enhancement***
  - ***TCI switching enhancement in REL-17 [RAN4, RAN1]***
    - ***Work on the feasibility of enhancement to maintain the UE reception and transmission during the period (or part of period) of MAC CE based TCI switching***
    - ***Work on the feasibility of enhancement to maintain the UE reception and transmission during the period (or part of period) of RRC based TCI switching***

Candidate scope 3 | Collision between SSB/CSI-RS based L1 and CSI-RS L3

- Background
  - In RAN4 #97e meeting, one conclusion has been made on collision between SSB/CSI-RS based L1 and CSI-RS based L3 measurements in approved WF R4-2017223:
    - Do not define CSI-RS measurement requirements in Rel-16 for the collision between CSI-RS based L3 measurement of neighbor cell and serving cell measurement for SSB/CSI-RS based RLM/BFD or other SSB/CSI-RS based L1 measurements
  - The measurement requirement of CSI-RS based L3 measurement shall be clarified in R17 in case of collision between SSB/CSI-RS based L1 and CSI-RS based L3

- ***Candidate scope 3: add following working scope into R17 FeRRM WI***
  - ***Measurement requirement for collision between SSB/CSI-RS based L1 and CSI-RS based L3 in REL-17 [RAN4]***
    - ***CSI-RS L3 measurement requirement in case of collision between SSB/CSI-RS based L1 and CSI-RS based L3 measurements***
    - ***SSB/CSI-RS based L1 measurement requirement in case of collision between SSB/CSI-RS based L1 and CSI-RS based L3 measurements***

Candidate scope 4 | CGI reading requirement for NR-U cell

- Background
  - In RAN4 #98e meeting, one conclusion has been made in approved WF R4-2103512:
    - Rel-16 CGI reading for Rel-16 NR-U
      - Do not include RRM requirements for the Rel-16 CGI reading feature in Rel-16 NR-U
  - However, the CGI reading feature is an important functionality especially on unlicensed carrier, and therefore it would be worthwhile to discuss the corresponding CGI reading requirement with CCA in REL-17.

- ***Candidate scope 4: CGI reading requirement for NR-U cell***
  - ***CGI reading requirement with CCA in REL-17 [RAN4]***
    - ***Specify delay requirement of CGI identification of an NR-U cell with autonomous gaps***
    - ***Specify requirement of interruption when identifying CGI of an NR cell with autonomous gaps***

Candidate scope 5 | FR1+FR1 NR-DC RRM

- Background
  - In RAN4 #99e meeting, during discussion for HO with PSCell in R17 FeRRM, RAN4 identified the RRM requirement FR1+FR1 NR-DC scenario is missing in TS38.133 (observed in WF R4-2108344)
    - FFS: the baseline PSCell addition requirement for FR1+FR1 NR-DC would be discussed in TEI16 or full set of RRM requirements for FR1+FR1 NR-DC would be discussed in R17 WI?

- ***Candidate scope 5: FR1+FR1 NR-DC RRM***
  - ***RAN Plenary to determine which alternative would be adopted:***
    - ***Alt 1: baseline PSCell addition requirement for FR1+FR1 NR-DC would be discussed in TEI16 and no need to add this topic into any R17 RAN4 WI.***
    - ***Alt 2: full set of RRM requirements for FR1+FR1 NR-DC would be discussed in R17 FeRRM WI.***
      - ***Specify and revise RRM requirements for FR1+FR1 NR-DC in REL-17 [RAN4]***

Candidate scope 6 | New MR-DC Scenario for HO with PSCell in FeRRM

- Background
  - In RAN4 #99e meeting, during discussion for HO with PSCell in R17 FeRRM, RAN4 proposed to let RAN plenary to determine if the scenario for HO with PSCell could be extended to include:
    - from NR SA to NE-DC (newly added)
    - from NR SA to NR-DC (newly added)
    - from LTE SA to EN-DC (newly added)

- ***Candidate scope 6: New MR-DC scenario for HO with PSCell in FeRRM:***
  - ***Study and, if necessary, to specify the following new scenarios for HO with PSCell in R17 FeRRM WI.***
    - ***from NR SA to NE-DC***
    - ***from NR SA to NR-DC***
    - ***from LTE SA to EN-DC***

Candidate scope 7 | RRM requirement with NeedForGap

- Background
  - In RAN4 #99e meeting, during discussion for NeedForGap in R16 TEI, the session chairman note was:
    - Session chair: There is no consensus to do the work in Rel-16 TEI due to potentially larger scope and late stage of Rel-16. The WF is agreeable to RAN4 and provides a set of candidate objectives. WF is noted as no work is planned. Further discussion in the plenary is recommended on whether and how to handle this.

- ***Candidate scope 7: RRM requirement with NeedForGap***
  - ***Specify and revise RRM requirements with NeedForGap in R17 [RAN4]***

Candidate scope 8 | Per-BC indication of per-FR MG UE capabilities

- Background
  - In RAN4 #99e meeting, during discussion for per-BC indication of per-FR measurement gap UE capabilities, the agreement was:
    - Agreements:
      - Do not introduce per-BC indication of per-FR measurement gap UE capabilities in Rel-16.
      - RAN4 has a common understanding that further enhancements to the per-FR measurement gap UE capabilities to address UE implementation constraints can be further studied in future (e.g. in Rel-17) and the work is subject to RAN plenary approval and available time budget.

- ***Candidate scope 8:***
  - ***Study and, if necessary, to specify RRM enhancements with Per-BC indication of per-FR MG UE capabilities in R17.***

Proposals to the candidate scopes

- TU situation
  - The existing R17 FeRRM WI has 1.5TU assigned but only contains 3 topics
  - There is some TU margin in the existing FeRRM WI to include more topics
    - Without increasing the TU budget, at most 3 topics could be selected to expand the current FeRRM WI scope
- ***Proposal: Select up to 3 candidate scopes from following list to expand the R17 FeRRM WI, and no need to have any new RAN4 led WI:***
  - ***Candidate scope 1: CMTC for CSI-RS L3 measurement***
  - ***Candidate scope 2: TCI switching enhancement***
  - ***Candidate scope 3: Collision between SSB/CSI-RS based L1 and CSI-RS L3***
  - ***Candidate scope 4: CGI reading requirement for NR-U cell***
  - ***Candidate scope 5: FR1+FR1 NR-DC RRM***
  - ***Candidate scope 6: Study and, if necessary, to specify New MR-DC Scenario for HO with PSCell in R17 FeRRM***
  - ***Candidate scope 7: RRM requirement with NeedForGap***
  - ***Candidate scope 8: Study and, if necessary, to specify Per-BC indication of per-FR MG UE capabilities in R17 FeRRM***

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