Rel-19 mobility enhancements

RP-233527
Agenda item: 9.1.2.1
3GPP TSG-RAN#102
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Background

- RAN#101 discussed the potential scope of Rel-19 mobility enhancement.
- The offline discussion summary was provided with the following observations [RP-232618]

- **Agreeable objectives:**
  - *Specify support for inter -CU Layer 2 Mobility (LTM)Measurements related enhancements for purpose of supporting LTM*
- **Possible objectives with strong interest:**
  - *Support of conditional mobility (including set of candidate cells, UE evaluated mobility conditions, ability for UE to perform subsequent mobility procedures without need for RRC configuration) along with short mobility interruption time (similar to that achievable with LTM).*
- **Need review in RAN#102 with consideration to Rel-18 WI outcome:**
  - *NR-DC cases supported by LTM. Note the following common understanding from the offline: LTM is important for MCG only case. In case of NR-DC then LTM on the SCG is the important case (e.g. in FR2), followed by LTM in MCG with SCG configured (SCG unchanged by MCG LTM)*

For Rel-19 mobility enhancements, the concrete objectives still need to be discussed

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Inter-CU LTM

- For inter-CU LTM, the following questions are postponed [RP-232618]

> - Specify support for inter -CU Layer 2 Mobility (LTM)
> - Next level questions still to be discussed/decided:
> - Whether to support cases where CU is acting as MN, and when CU is acting SN?
> - For case where CU is acting as SN, whether it is support for EN-DC and/or NR-DC?
> - In answering the above questions, focus should be practical deployments.

Observations

- It's obvious to support the case CU is acting as MN in DC, since it's same as handover in non-DC case.
- It's also important to support the case CU is acting as SN (i.e., PSCell change), since:
  - FR2 cells are typically deployed as SCG with DC; and,
  - LTM aims to provide fast handover, which is more beneficial for FR2 cells.
- It's reasonable to only focus on NR-DC, since Rel-19 is already the second release of 5G-Advanced and the later stage of 5G development, i.e., EN-DC will be replaced by NR-DC before Rel-19 commercial deployments.

For inter-CU LTM, both CUs acting as MN (handover) and SN (PSCell change) in NR-DC should be supported

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Conditional mobility

- For conditional mobility, the following question was identified [RP-232618]

> - Support of conditional mobility (including set of candidate cells, UE evaluated mobility conditions, ability for UE to perform subsequent mobility procedures without need for RRC configuration) along with short mobility interruption time (similar to that achievable with LTM).
> - Next Step question to consider the most appropriate approach to achieve this aim. For example, by specifying conditional triggering of LTM, or specifying support of Early TA or RACHless (as defined for LTM) to be used as part of layer 3 CHO, or possibly other approaches. If this questions cannot be concluded during the Rel-19 scoping discussion then it may be possible to start with a RAN2 study phase.

Observations

- In our view, the basic procedures for conditional mobility would become very similar, regardless of whether it's based on LTM or L3 CHO.
- However, L3 CHO has many practical problems such as radio resource waste during the procedure.
  - Therefore, L3 CHO with Early-TA/RACH-less would naturally inherit such problems as it is.
- On the other hand, LTM is a future-oriented mobility mechanism, so it's suitable for further enhancements.

For conditional mobility, the conditional triggering of LTM should be the baseline

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Potential objectives

- Specify support for inter-CU L1/L2-triggered Mobility (LTM) [RAN2, RAN3]
  - Support non-DC case and DC case, whereby LTM is supported between MN and MN (handover) and between SN and SN (PSCell change)
  - For DC scheme, NR-DC is prioritized.
- Measurements related enhancements for purpose of supporting LTM [RAN2, RAN1]
  - Specify event triggered L1 measurement reporting for triggering LTM
  - Specify support for CSI-RS measurements for LTM procedures and enable CSI-RS based beam management and/or other physical layer operations on candidate cells before LTM

- Specify support for conditional LTM [RAN2, RAN1, (RAN3)]
  - Specify event triggered LTM execution.
  - Specify even triggered Early TA acquisition, if needed.
  - Identify issues in existing CHO, e.g., in terms of radio resource efficiency, and specify corresponding enhancements, if any.
  - Specify inter-CU conditional LTM, with common inter-node signalling as inter-CU LTM

Rel-19 mobility enhancements should be approved

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