3GPP TSG RAN Meeting #102
Edinburgh, Scotland, December 11-15 2023

RP-233643

Mobility Enhancement in Rel-19

Agenda Item: 9.1.2.1

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Rel-19 Mobility Overview

- **Mobility Enhancement**
  - **Mobility evolution in 3GPP**
  - **Inter-CU LTM**
  - **Condition based LTM**
  - **Further enhancement on L1 measurement for LTM**

Mobility evolution in 3GPP

R12 LTE

- RP-132069(DC)
  - Two eNBs involved in DC
  - MCG Bearer/SCG Bearer/Split Bearer
  - RRC located in MeNB
- LTE/WLAN interworking

R13 LTE

- HeNB supported as seNB
- Support of SIPTO@LN and LIPA for DC
- Handover without SeNB change
- UL split bearer
- LWA

R14 LTE

- RACHless
- MBB(Make-before-break)
- eLWA

R15 5G

- MR-DC with the EPC
  - EN-DC
- MR-DC with the 5GC
  - NGEN-DC
  - NE-DC
  - NR-DC

R16 5G

- Conditional handover(CHO) for both LTE and NR
- SN initiated Intra-SN Conditional PSCell Change (CPC) for both NR MN and LTE MN

R17 5G

- CHO with one target SCG
- CPA
- Inter-SN CPC
- Deactivated/activated SCG

R18 5G

- Intra-DU LTM
- Intra-CU Inter-DU LTM
- Subsequent CPAC
- CHO with one or more candidate SCG

R19 5G

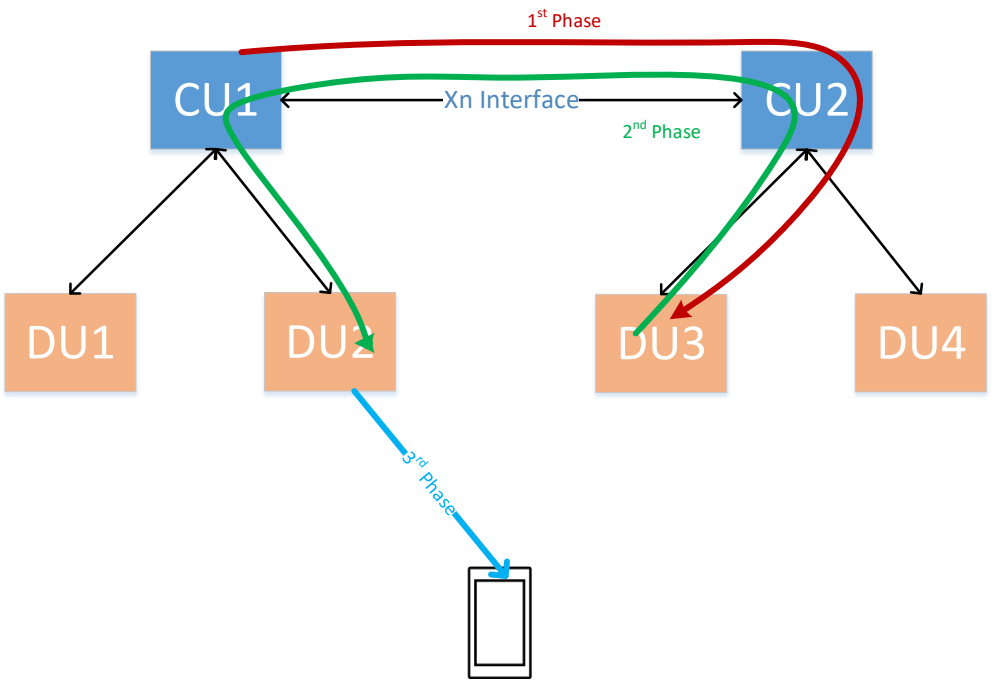
- ?

Inter-CU LTM

- **Motivation:**

  In Rel-18 LTM, only Intra-CU is supported for LTM. The feature of early TA is introduced to reduce interruption time during mobility. In addition, subsequent LTM is also supported to reduce signaling overhead. It is natural that we can extend to support Inter-CU LTM. The general procedure for Inter-CU is illustrated in the figure.

  - **First Phase**: Source CU/gNB initiates LTM preparation.
  - **Second Phase**: Target CU/gNB prepares LTM candidate cell configuration. RACH resource for Early TA acquisition may be included.
  - **Third Phase**: UE executes LTM upon reception of LTM cell switching command. UE continues keeping LTM cell configuration for subsequent LTM purpose.



- **Proposal:**
  - **Inter-CU LTM including subsequent LTM can be supported in Rel-19.**

Condition based LTM

- **Motivation**
  - In traditional L3 handover, condition-based handover is introduced to avoid missing the reception of handover command. Then, condition-based HO can improve the robustness. The missing of reception of LTM cell switching command may also happen as traditional L3 handover. If condition based LTM can be supported, the condition could be L1 condition. DU may be responsible for condition configuration.
  - In Rel-18 LTM, both RACH based early TA acquisition and UE based TA measurement are supported for RACH-less. In addition, zero TA and same TA as source are supported as well. If condition-based LTM can be supported, we can continue studying condition-based RACH-less LTM.

- **Proposal:**
  - **Condition based LTM can be supported in Rel-19.**

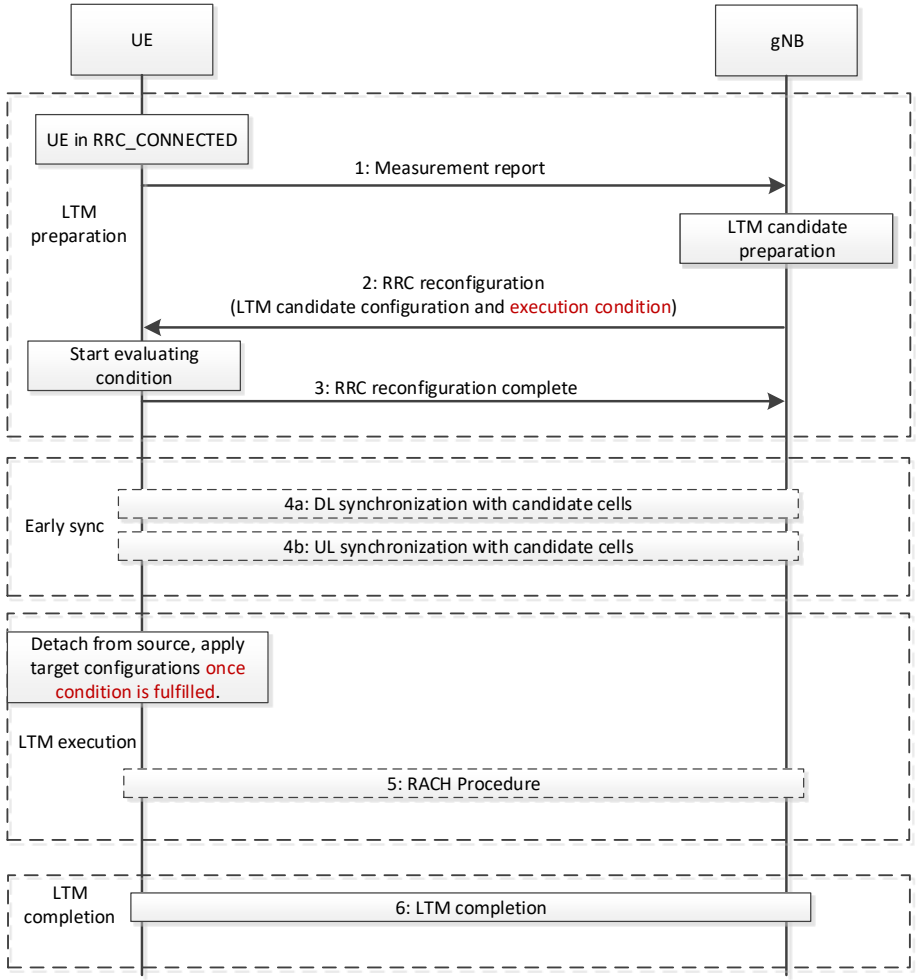


Fig. Condition based LTM (Intra-CU)

Further enhancement on L1 measurement for LTM

- **Motivation**
  - Only SSB based L1 measurement for LTM is supported, and only periodic, semi-persistent and aperiodic beam report is supported in Rel-18. The handover latency can be further reduced with UE based beam report, for example, by event-triggered beam report. On the other hand, TCI state with TRS shall be used in target cell after cell switch. CSI-RS based beam measurement and report before cell switch is beneficial for the configured/indication of TCI state with TRS to enable the fast data transmission in the target cell with narrow beam.

- **Proposal:**
  - **Support CSI-RS based L1 measurement for LTM**
  - **Support event-triggered beam report for LTM**

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thanks.