**3GPP TSG-RAN WG3 Meeting #129 R3-255839**

**Bengaluru, India, 25 – 29 August 2025**

**Title:** (TP to BL CR for TS 38.401) Conditional LTM

**Source:** ZTE Corporation, Nokia, China Telecom, LG Electronics, NEC, Ericsson, CATT, Huawei, Samsung, Google, Ofinno

Agenda item: 13.3

**Document for:** Discussion and Decision

# Introduction

In this RAN3 #129meeting, we have achieved the following agreement on Conditional LTM.

**To convert the working assumptions into agreement:**

**- To introduce one codepoint in the legacy LTM indicator IE, namely “C-LTM”.**

**- To introduce a new IE with a list of candidate cells for L1 execution condition.**

**In case of L3 measurement report-triggered early RACH, to reuse the F1AP CU-DU Mobility Initiation procedure to notify the source DU to initiate early RACH procedure to the candidate cells.**

**To remove the TAT value IE in the UE CONTEXT SETUP RESPONSE message in the BLCR.**

**The source DU sends the TA values and the remaining time of the TA timers, and TAG ID of candidate cells and target cell to the CU by the UE CONTEXT MODIFICATION RESPONSE message after receiving the successful cell change notification from the CU.**

**The CU reuses the UE Context Modification procedure to transfer the TA values and the remaining time of the TATs, and TAG ID to the target DU.**

This TP is used to capture above agreements.

# TP to 38.401

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8.2.1.x Conditional intra-CU LTM (Intra-gNB-DU)

This procedure is used for the case when the UE moves within the same gNB-DU during NR operation for conditional LTM. Figure 8.2.1.x-1 shows the intra-gNB-DU conditional LTM procedure for intra-NR.



**Figure 8.2.1.x-1: Conditional intra-CU LTM (Intra-gNB-DU)**

1. The UE sends a *MeasurementReport* message (L3 measurement result) to the gNB-DU containing measurements of neighbouring cells. The gNB-DU sends an UL RRC MESSAGE TRANSFER message conveying the received *MeasurementReport* message to the gNB-CU.

2. The gNB-CU determines to initiate conditional LTM configuration.

3. The gNB-CU sends a UE CONTEXT MODIFICATION REQUEST message to the gNB-DU for each candidate cell, containing conditional LTM indication, one candidate cell ID and the CSI resource configuration for subsequent LTM. The gNB-CU may provide the LTM configuration ID mapping list to the gNB-DU. The gNB-CU may request PRACH resources from the gNB-DU. The gNB-CU may request the gNB-DU to provide the lower layer configuration for the purpose of generating the reference configuration or provide the lower layer reference configuration to the gNB-DU. The gNB-CU may inform the gNB-DU about intra-DU L2 reset configuration. If the gNB-CU decides to initiate the L1 event-triggered conditional LTM, it also provides a list of candidate cells to which the L1 event-triggered conditional LTM is applied and requests the gNB-DU to generate the corresponding L1-based execution condition(s).

4. If the gNB-DU accepts the request of conditional LTM configuration, it responds with a UE CONTEXT MODIFICATION RESPONSE message including the generated lower layer RRC configurations for the accepted candidate cell. If the L1-based execution conditions are requested, the gNB-DU also provides a list of execution conditions generated for other candidate cells.

NOTE 1: Steps 3 and 4 may be initiated multiple times for conditional LTM candidate cell preparation of multiple cells including the source cell.

5. The gNB-CU sends a UE CONTEXT MODIFICATION REQUEST message to the gNB-DU which may include the LTM configuration ID mapping list and/or the updated CSI resource configuration. The gNB-CU may inform the gNB-DU about intra-DU L2 reset configuration.

6. The gNB-DU responds with a UE CONTEXT MODIFICATION RESPONSE message which may include an updated lower layer configuration, e.g., containing the updated CSI report configuration of the source cell. If the L1-based execution conditions are requested, the gNB-DU also provides a list of execution conditions generated for other candidate cells.

NOTE 2: In case of subsequent conditional LTM, the CU-initiated UE Context Modification procedure may be invoked per each candidate cell to transfer to the gNB-DU the updated CSI resource configuration.

7. The gNB-CU sends a DL RRC MESSAGE TRANSFER message to the gNB-DU, which includes the generated *RRCReconfiguration* message with the conditional LTM configuration.

8. The gNB-DU forwards the received *RRCReconfiguration* message to the UE.

9. The UE responds to the gNB-DU with an *RRCReconfigurationComplete* message.

10. The gNB-DU forwards the *RRCReconfigurationComplete* message to the gNB-CU via an UL RRC MESSAGE TRANSFER message.

10a. If the early synchronization for conditional LTM is triggered based on L3 measurement report, the gNB-CU sends a CU-DU MOBILITY INITIATION REQUEST message to the gNB-DU to trigger early synchronization to the candidate cell(s).

11. Early TA acquisition to the candidate cell(s) may be performed as specified in TS 38.300 [2].

12. The gNB-DU sends the LTM Candidate Timing Advance Command MAC CE to the UE.

13. The execution condition(s) to trigger initiation of conditional LTM is fulfilled in the UE.

NOTE 3: The gNB-DU may decide to trigger an LTM Cell Switch Command MAC CE to the UE towards a candidate cell with conditional LTM candidate configuration.

14. The gNB-DU detects the UE access as specified in TS 38.300 [2].

15. The gNB-DU sends an ACCESS SUCCESS message to inform the gNB-CU of which cell the UE has successfully accessed. The gNB-DU also sends a Downlink Data Delivery Status frame to inform the gNB-CU about the unsuccessfully transmitted downlink data to the UE if any. Downlink packets, which may include PDCP PDUs not successfully transmitted in the previous serving cell, are sent from the gNB-CU to the gNB-DU.

16. The UE sends an *RRCReconfigurationComplete* message to the gNB-DU.

17. The gNB-DU forwards the *RRCReconfigurationComplete* message to the gNB-CU via an UL RRC MESSAGE TRANSFER message.

18. The gNB-CU may send the UE CONTEXT MODIFICATION REQUEST message to the gNB-DU to release the resources of prepared cells.

19. The gNB-DU responds with a UE CONTEXT MODIFICATION RESPONSE message.

8.2.1.y Conditional intra-CU LTM (Inter-gNB-DU)

This procedure is used for the case when the UE moves from one gNB-DU to another gNB-DU within the same gNB-CU during NR operation for Conditional LTM. Figure 8.2.1.y-1 shows the inter-gNB-DU Conditional LTM procedure for intra-NR.



**Figure 8.2.1.y-1: Conditional intra-CU LTM (Inter-gNB-DU)**

1. The UE sends a *MeasurementReport* message (L3 measurement result) to the source gNB-DU containing measurements of neighbouring cells. The source gNB-DU sends an UL RRC MESSAGE TRANSFER message conveying the received *MeasurementReport* message to the gNB-CU.

2. The gNB-CU determines to initiate conditional LTM configuration.

3. The gNB-CU sends a UE CONTEXT SETUP REQUEST message to the candidate gNB-DU(s) for each candidate cell, containing conditional LTM indication, one candidate cell ID and the CSI resource configuration for subsequent conditional LTM. The gNB-CU may provide the LTM configuration ID mapping list to the candidate gNB-DU(s). The gNB-CU may request PRACH resources from the candidate gNB-DU(s). The gNB-CU may request the candidate gNB-DU(s) to provide the lower layer configuration for the purpose of generating the reference configuration or provide the lower layer part of the reference configuration to the candidate gNB-DU(s). If the gNB-CU decides to initiate the L1 event-triggered conditional LTM, it also provides a list of candidate cells to which the L1 event-triggered conditional LTM is applied and requests the gNB-DU to generate the corresponding L1-based execution condition(s).

4. If the candidate gNB-DU accepts the request of conditional LTM configuration, it responds with a UE CONTEXT SETUP RESPONSE message including the generated lower layer RRC configurations for the accepted target candidate cell. If the L1-based execution conditions are requested, the candidate gNB-DU also provides a list of execution conditions generated for other candidate cells.

NOTE 1: The CU-initiated UE Context Modification procedure may be initiated for preparing candidate cells in the source gNB-DU as specified in step 3 and 4 in 8.2.1.4 Intra-gNB-DU conditional LTM.

5. The gNB-CU sends a UE CONTEXT MODIFICATION REQUEST message to the source gNB-DU including the information related to early sync and the LTM configuration ID mapping list for the accepted target candidate cell(s). The gNB-CU may send the updated CSI resource configuration to the source gNB-DU. The gNB-CU may inform the source gNB-DU about intra-DU L2 reset configuration.

6. The source gNB-DU responds with a UE CONTEXT MODIFICATION RESPONSE message which includes an updated lower layer configuration, e.g., containing the updated CSI report configuration of the source cell. If the L1-based execution conditions are requested, the source gNB-DU also provides a list of execution conditions generated for the candidate cells.

7. The gNB-CU may send a UE CONTEXT MODIFICATION REQUEST message for each candidate cell accepted in the candidate gNB-DU(s), containing the information for subsequent conditional LTM or for updating the configurations of candidate cells. The gNB-CU may also provide the lower layer part of the reference configuration to the candidate gNB-DU(s). The gNB-CU may inform the candidate gNB-DU(s) about intra-DU L2 reset configuration.

8. The candidate gNB-DU responds with a UE CONTEXT MODIFICATION RESPONSE message including the updated lower layer configuration, e.g., containing the updated CSI report configuration of the requested candidate cell. If the L1-based execution conditions are requested, the candidate gNB-DU also provides a list of execution conditions generated for other candidate cells.

NOTE 2: Step 7 may also be triggered after step 18 for subsequent conditional LTM.

9. The gNB-CU sends a DL RRC MESSAGE TRANSFER message to the source gNB-DU, which includes the generated *RRCReconfiguration* message with the conditional LTM configuration.

10. The source gNB-DU forwards the received *RRCReconfiguration* message to the UE.

11. The UE responds to the source gNB-DU with an *RRCReconfigurationComplete* message.

12. The source gNB-DU forwards the *RRCReconfigurationComplete* message to the gNB-CU via an UL RRC MESSAGE TRANSFER message.

12a. If the early synchronization for conditional LTM is triggered based on L3 measurement report, the gNB-CU sends a CU-DU MOBILITY INITIATION REQUEST message to the source gNB-DU to trigger early synchronization to the candidate cell(s).

13. Early TA acquisition to the candidate cell(s) may be performed as specified in TS 38.300 [2].

14. The candidate gNB-DU sends a DU-CU TA INFORMATION TRANSFER message to the gNB-CU, which includes the TA values, and the associated PRACH resource information.

15. The gNB-CU forwards the TA value and the associated PRACH resource information to the source gNB-DU in the CU-DU TA INFORMATION TRANSFER message.

16. The source gNB-DU sends the LTM Candidate Timing Advance Command MAC CE to the UE.

17. The execution condition(s) to trigger initiation of conditional LTM is fulfilled in the UE.

NOTE 3: The source gNB-DU may decide to trigger a LTM Cell Switch Command MAC CE to the UE towards a candidate cell with conditional LTM candidate configuration.

18. The target gNB-DU detects the UE access as specified in TS 38.300 [2].

19. The target gNB-DU sends an ACCESS SUCCESS message to inform the gNB-CU of which cell the UE has successfully accessed. The target gNB-DU also sends a Downlink Data Delivery Status frame to inform the gNB-CU.

20. The UE sends an *RRCReconfigurationComplete* message to the target gNB-DU.

21. The target gNB-DU forwards the *RRCReconfigurationComplete* message to the gNB-CU via an UL RRC MESSAGE TRANSFER message.

22. The gNB-CU sends a UE CONTEXT MODIFICATION REQUEST message to source gNB-DU to inform that the UE executed an inter-DU Conditional LTM and indicate to stop the data transmission for the UE. The source gNB-DU sends a Downlink Data Delivery Status frame to inform the gNB-CU about the unsuccessfully transmitted downlink data to the UE if any. Downlink packets, which may include PDCP PDUs not successfully transmitted in the source gNB-DU, are sent from the gNB-CU to the target gNB-DU.

NOTE 4: The step 22 may happen before step 21, as soon as the gNB-CU knows which cell the UE has successfully accessed.

23. The source gNB-DU responds to the gNB-CU with a UE CONTEXT MODIFICATION RESPONSE message, which includes the TA values, the remaining time of the TAT values, and the optional TAG ID pointer of candidate cell(s).

24. The gNB-CU sends a UE CONTEXT MODIFICATION REQUEST message to transfer the TA values, the remaining time of the TAT values, and the optional TAG ID pointer of candidate cell(s) to the target gNB-DU.

25. The target gNB-DU responds to the gNB-CU with a UE CONTEXT MODIFICATION RESPONSE message

26. The gNB-CU may send the UE CONTEXT RELEASE COMMAND message to the source gNB-DU to release the resources of prepared cells.

27. The source gNB-DU responds with a UE CONTEXT RELEASE COMPLETE message.

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