**3GPP TSG RAN WG3#129 R3-255782**

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

Agenda Item: 13.2

Source: Lenovo

Title: SoD for CB on inter-CU LTM DC

Document for: Approval

# Introduction

The contribution provides summary of offline discussion on inter-CU LTM DC:

**CB: # MobilityEnh \_LTMNR-DC**

**- Check with potential agreements and capture the agreements.**

**- Check with the stage-2 inter-MCG LTM with SCG.**

**- update and check with TPs.**

(moderator-Lenovo)

Summary of offline discuss in [R3-255782](Inbox\R3-255782.zip)

# For the Chairman’s Notes

Propose the following:

**Security handling**

**Proposal 1: For security update for inter-CU SCG LTM, the a list of { KSN, sk-counter} is provided on the granularity of Rel-19 set ID.**

**Proposal 2: The MN provides a list of R19 set IDs to the candidate SN via the SN Addition Request message. MN sends R19 set ID for the candidate cell along with a list of { KSN, sk-counter} in the SN Modification Request message.**

**Proposal 3: The MN sends the R19 set ID for each candidate PSCell to the source SN and other candidate SNs via the SN Modification Request message.**

**LTM Cancel**

**Proposal 4: The candidate PSCells to be cancelled is included in the SN Modification Required message.**

**Proposal 5: The MN may inform the source SN about the cancellation of the prepared candidate PSCells at a candidate SN using SN modification request message.**

**Inter-CU LTM and LTM with SCG**

**Proposal 6: To support inter- or intra-CU MCG LTM with SCG, introduce a new XnAP IE to indicate to the candidate SN that the SN Addition/Modification preparation procedure is triggered as part of a MCG LTM procedure.**

**Proposal 7: To support inter- or intra-CU MCG LTM with SCG, introduce a new F1AP IE to indicate to the DU of a candidate SN that the UE Context Setup/Modification procedure is triggered as part of a MCG LTM procedure.**

**Access Control**

**Proposal 8: Remove the FFS: FFS whether Handover Success is used from the target-SN to the MN to notify that UE has successfully accessed to the target SN.**

**Data Forwarding**

**Proposal 9: SN Change Confirm message is used to notify the list of data forwarding addresses to the source SN.**

**SCG Reference configuration**

**Proposal 10: The SCG reference configuration is provided by an implicit way in the CG-Config RRC container in the SN Addition Request Acknowledge message from the candidate SN to the MN, no RAN3 impact is foreseen.**

**Text Proposals**

Stage 2: R3-255904 was R3-255605 (CATT)

Stage 3:

- R3-255903 (new) TS 38.423 (LGE)

- F1AP for P7, will merged to TP for F1AP in CB for LTM inter-CU - Huawei

# Discussion

## Security handling

**WA: Different candidate PSCells in the same SN can have different Rel-19 set IDs. FFS on the solutions. Try to reuse the same solution for inter-CU LTM.**

During online discussion, it was agreed that

***Different candidate PSCells in the same SN can have different Rel-19 set IDs.***

In addition, according to RAN2 agreement, a list of sk-counters is linked to a Rel-19 set ID configured by the SN, which implies that SK-Counters is provided on the granularity of Rel-19 set ID.

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| **RAN2 #129bis agreement**   * NW configures the corresponding sk-Counter in all LTM candidate configurations, and UE uses the configured value for generating the SN key when security key update is performed in MCG. * A list of sk-counters is linked to a Rel-19 set ID configured by the SN. |

***Proposal 1-1: For security update for inter-CU SCG LTM, the list of KSN and associated SK-Counter values is provided on the granularity of Rel-19 set ID.***

In the SoD of inter-SN SCG LTM [1], there are three options.

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| **Inter-SN SCG LTM**   * Option 1: MN allocates the Rel-19 set IDs for candidate PSCell * Option 2: Source SN allocates the Rel-19 set IDs for candidate PSCell * Option 3: MN sends Rel-19 set IDs to the S-SN and C-SN via SN modification message (sync-up info) |

***Proposal 1-2a: For Rel-19 Set ID allocation for inter-CU SCG LTM, the MN allocate the Rel-19 Set ID, along with the associated KSN and SK-Counter List, for each candidate PSCell to the candidate SN, then candidate SN update the Rel-19 set ID and the associated KSN and associated SK-Counter list to the MN.***

***Proposal 1-2b: The MN provides a list of R19 set IDs to the candidate SN via the SN Addition Request message. MN sends R19 set ID for the candidate cell along with a list of {security key, sk-counter} pairs in the SN Modification Request message.***

***Proposal 1-3: The MN sends the R19 set ID for each candidate PSCell to the source SN and other candidate SNs via the SN Modification Request message, so that the source SN and other candidate SNs can deliver the value to their DUs for LTM cell switch or subsequent LTM cell switch.***

***Proposal 1-4: If the SK-Counter is received by the RRCReconfigurationComplete message from UE, the MN indicates the received SK-Counter value to the SN via SN Reconfiguration Complete message.***

## LTM Cancel

**FFS on whether LTM modification/cancel related procedures are needed.**

**Case 1: candidate SN initiated LTM cancellation**

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| Likewise, for the inter-SN SCG LTM, it is possible that the candidate SN decides to cancel some of the prepared candidate PSCells. For example, the candidate SN may send an SN Modification Required message to the MN to indicate the cancellation of the prepared candidate PSCells. There are two options:   * Option 1: the SN Modification Required message includes an indicator indicating the candidate PSCells to be cancelled. * Option 2: the SN Modification Required message includes the updated full list of candidate PSCells prepared at the candidate SN. By comparing the updated full list of candidate PSCells and the previous list of candidate PSCells during the LTM preparation, the MN obtains which candidate PSCell(s) is released at the candidate SN. For example, the absence of a previously prepared candidate PSCell in the list of candidate PSCells indicates the cancellation of the candidate PSCell.   The similar approach was discussed in R17 CPAC, and the option 2 was finally adopted. One benefit of the option 2 is that it is safer to add some prepared PSCells from the suggested PSCell list by the candidate SN if the group agrees to support it in future. |

***Proposal 2-1a: the SN Modification Required message includes an indicator indicating the candidate PSCells to be cancelled.***

***Proposal 2-1b: An indicator including the updated full list of candidate PSCells prepared at the candidate SN may be included in the SN Modification Required message sent from the candidate SN to the MN.***

***Proposal 2-2: The MN may inform the source SN about the cancellation of all the prepared candidate PSCells at a candidate SN using SN modification request***

**Case 2: source SN initiated cancellation**

Same as above.

## inter-CU LTM and LTM with SCG

***Proposal 3-1: To support inter- or intra-CU MCG LTM with SCG, introduce a new XnAP IE to indicate to the candidate SN that the SN Addition/Modification preparation procedure is triggered as part of a MCG LTM procedure.***

***Proposal 3-2: To support inter- or intra-CU MCG LTM with SCG, introduce a new F1AP IE to indicate to the DU of a candidate SN that the UE Context Setup/Modification procedure is triggered as part of a MCG LTM procedure.***

***Proposal 3-3: The following points for stage 2 are to be discussed:***

* ***The target MN should not add more than one target SN (or more than one candidate PSCell) in response to one Handover Request message from the source MN. Therefore the additional SN Addition Request messages (i.e., the step 2 and thus the step 3) to other potential target SN(s) are not necessary***
* ***Correspondingly, the target MN does not need to send SN Release Request message(s) (i.e., the step 20d in the figure) to those target SN(s) since they won’t be prepared as part of the MCG LTM with SCG***
* ***Figure change and corresponding procedure texts change***

## Access Success

**MN uses SN modification request message to notify the Source SN that UE has successfully accessed to the target SN. FFS whether Handover Success is used from the target-SN to the MN to notify that UE has successfully accessed to the target SN.**

**Proposal 4-1: Remove the FFS: FFS whether Handover Success is used from the target-SN to the MN to notify that UE has successfully accessed to the target SN.**

***Proposal 4-2: MN uses SN modification request message or SN release request message to notify the Source SN that UE has successfully accessed to the target SN.***

## Data Forwarding

**Enhance XN-U ADDRESS INDICATION message and define IE to cover Inter-CU MCG LTM case. FFS on Inter-SN LTM case.**

**Proposal 5-1a: Assuming that MN always provides the data forwarding address via the SN Modification Request message, no need to introduce a data forwarding indicator in the Xn-U Address Indication message for the inter-SN SCG LTM.**

**Proposal 5-1b: SN Change Confirm message should be used to notify the list of data forwarding addresses to the source SN.**

## SCG reference configuration

**The** **SCG reference configuration is provided by an implicit way in the CG-Config RRC container in the SN Change Required message.** **FFS on the SN Addition Request Acknowledge message from the source SN/candidate SN to the MN.**

***Proposal 6-1: The SCG reference configuration is provided by an implicit way in the CG-Config RRC container in the SN Addition Request Acknowledge message from the candidate SN to the MN, no RAN3 impact is foreseen.***

## others

**Proposal 7-1: The accepted PSCells per candidate SN should be included in the SN Change Confirm message.**

# Conclusion, Recommendations [if needed]

If needed

# References

|  |  |  |
| --- | --- | --- |
| [R3-255011](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255011.zip) | LS on RAN2 agreements for SP CSI-RS activation/deactivation (RAN2(CATT)) | LS in |
| [R3-255027](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255027.zip) | Reply LS on security handling for inter-CU LTM in non-DC cases (SA3(Huawei)) | LS in |
| [R3-255426](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255426.zip) | [DRAFT] Reply LS on security handling for inter-CU LTM in non-DC cases (Huawei) | LS out To: SA3 CC: RAN2 |
| [R3-255625](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255625.zip) | Fetching reference configuration from candidate gNB in inter-CU LTM (Huawei, Google, Nokia, Jio Platforms, CATT, CMCC, NTT Docomo, Lenovo, China Telecom, Samsung) | discussion |
| [R3-255724](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255724.zip) | Support for Semi-persistent CSI-RS transmission (Ericsson, Jio Platforms, Verizon Wireless, ZTE, Ofinno) | discussion |
| [R3-255532](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255532.zip) | PRACH resources for RACH-less LTM (Ericsson, Jio Platforms, Lenovo, NTT DoCoMo) | discussion |
| [R3-255138](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255138.zip) | TP (BL CR TS 38.300, TS 38.473, TS 38.423) Remaining issues on Inter-CU LTM procedure (Nokia) | other |
| [R3-255374](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255374.zip) | (TP for TS38.401) On support of inter-CU LTM (China Telecom) | other |
| [R3-255197](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255197.zip) | (TP to BL CR for TS 38.423 and 38.473 on Inter-CU LTM) Remaining Rel-19 inter-CU LTM issues (NEC) | other |
| [R3-255268](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255268.zip) | Completion of Inter-CU LTM (Ericsson) | discussion |
| [R3-255424](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255424.zip) | (TP for LTM BLCR for TS38.300): Inter-CU LTM (Huawei) | other |
| [R3-255149](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255149.zip) | (TP to 38.423, 38.473) Inter-CU LTM (ZTE Corporation) | other |
| [R3-255659](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255659.zip) | (TP to BLCR for TS38.423 and TS38.473) Inter-gNB-CU LTM (Samsung) | discussion |
| [R3-255301](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255301.zip) | Signalling enhancements for Inter-CU LTM handover (Qualcomm India Pvt Ltd) | discussion  moved from 13.3 |
| [R3-255421](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255421.zip) | Discussion on inter-CU LTM (NTT DOCOMO INC..) | discussion |
| [R3-255604](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255604.zip) | Discussion for general issues in Inter-CU LTM (CATT) | discussion |
| [R3-255403](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255403.zip) | [TP to BLCR for TS 38.401] Inter-CU LTM (Lenovo) | other |
| [R3-255614](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255614.zip) | Discussions on finalizing the essential aspects of Inter-CU LTM (LG Electronics Inc.) | discussion |
| [R3-255550](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255550.zip) | gNB-DU initiated LTM resource reconfiguration (Rakuten Mobile Inc, Qualcomm Inc, NTT DOCOMO INC) | discussion |
| [R3-255150](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255150.zip) | (TP to BL CR for TS 38.300, 38.473, 38.423) Rel-19 Set ID assignment (ZTE Corporation) | other |
| [R3-255375](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255375.zip) | Discussion on inter-CU LTM in DC scenario (China Telecom) | discussion |
| [R3-255139](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255139.zip) | Discussion on Inter-CU LTM with Dual Connectivity (Nokia) | discussion |
| [R3-255660](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255660.zip) | Additional Discussion on inter-gNB-CU LTM (Samsung) | discussion |
| [R3-255198](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255198.zip) | (TP to BL CR for TS 38.423 and 37.340 on Inter-CU LTM with DC) Remaining issues of Rel-19 inter-CU LTM in DC scenario (NEC) | other |
| [R3-255404](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255404.zip) | [TP to BLCR for TS 38.423] Inter-CU LTM in DC (Lenovo) | other |
| [R3-255418](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255418.zip) | (TP to BL CR 38.423) Clarification on inter-CU LTM and LTM with SCG in NR-DC (Google) | other |
| [R3-255419](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255419.zip) | (TP to BL CR 37.340 and 38.473) Clarification on inter-CU LTM and LTM with SCG in NR-DCs (Google) | other |
| [R3-255283](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255283.zip) | Open Issues on Access Success for Inter-SN SCG LTM (Ofinno, LLC) | discussion |
| [R3-255281](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255281.zip) | Remaining Issues on Data Forwarding for SN initiated Inter-SN LTM (Ofinno, LLC) | discussion |
| [R3-255282](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255282.zip) | (TP for TS 38.423) Cell Switch Notification for LTM DC Scenario (Ofinno, LLC) | other |
| [R3-255269](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255269.zip) | (TP for LTM BL CR for TS 38.423, TS 38.473, TS 38.300, TS 38.401) – Support for inter-CU LTM (Ericsson) | other |
| [R3-255405](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255405.zip) | [TP to BLCR for TS 38.423] Inter-CU LTM in DC - text update (Lenovo) | other |
| [R3-255425](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255425.zip) | (TP for LTM BLCR for TS38.473):Inter-CU LTM (Huawei) | other |
| [R3-255440](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255440.zip) | (TP for LTM CR for TS38.423): LTM Resource Lifecycle Management in inter-CU LTM (Jio Platforms) | discussion |
| [R3-255533](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255533.zip) | (TP to BL CR for TS 38.423) – PRACH Resources for RACH-less LTM (Ericsson, Jio Platforms, Lenovo, NTT DoCoMo) | other |
| [R3-255534](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255534.zip) | (TP to BL CR for TS 38.473) – PRACH Resources for RACH-less LTM (Ericsson, Jio Platforms, Lenovo, NTT DoCoMo) | other |
| [R3-255601](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255601.zip) | Inter-CU LTM Robustness Enhancements (Jio Platforms) | discussion |
| [R3-255605](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255605.zip) | (TP to BL CR for TS37.340) Discussion for Inter-CU LTM in DC (CATT) | discussion |
| [R3-255615](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255615.zip) | (TP for NR\_Mob\_Ph4 TS 38.423) Inter-CU LTM (LG Electronics Inc.) | other |
| [R3-255626](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255626.zip) | (TP for LTM BLCR for TS38.423): Fetching reference configuration from candidate gNB in inter-CU LTM (Huawei, Google, Nokia, Jio Platforms, CATT, CMCC, NTT Docomo, Lenovo, China Telecom, Samsung) | other |
| [R3-255627](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255627.zip) | (TP for LTM BLCR for TS38.300): Fetching reference configuration from candidate gNB in inter-CU LTM (Huawei, Google, Nokia, Jio Platforms, CATT, CMCC, NTT Docomo, Lenovo, China Telecom, Samsung) | other |
| [R3-255628](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255628.zip) | Clarification on the single UE XnAP association in inter-CU LTM (Huawei, NEC, LG Electronics) | discussion |
| [R3-255629](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255629.zip) | (TP for LTM BLCR for TS38.300): Clarification on the single Xn UE association in inter-CU LTM (Huawei, NEC, LG Electronics) | other |
| [R3-255630](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255630.zip) | (TP for LTM BLCR for TS38.423): Clarification on the single Xn UE association in inter-CU LTM (Huawei, NEC, LG Electronics) | other |
| [R3-255725](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255725.zip) | (TP to BL CR for TS 38.423) Support for Semi-persistent CSI-RS transmission (Option 1) (Ericsson, Jio Platforms, Verizon Wireless, ZTE) | other |
| [R3-255726](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255726.zip) | (TP to BL CR for TS 38.473) Support for Semi-persistent CSI-RS transmission (Option 1) (Ericsson, Jio Platforms, Verizon Wireless, ZTE) | other |
| [R3-255727](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255727.zip) | (TP to BL CR for TS 38.423) Support for Semi-persistent CSI-RS transmission (Option 2) (Ericsson, Jio Platforms, Verizon Wireless, ZTE) | other |
| [R3-255728](file:\D:\3GPP%20WG%20tdoc\TSGR3_129\Docs\R3-255728.zip) | (TP to BL CR for TS 38.473) Support for Semi-persistent CSI-RS transmission (Option 2) (Ericsson, Jio Platforms, Verizon Wireless, ZTE) | other |

# Appendix

**Previous meeting agreements:**

*RAN3#123bis:*

*Prioritize to support inter-CU LTM over Xn interface, and RAN3 specify the inter-CU LTM solutions for standalone scenario first.*

*Reuse existing Xn Handover Request and Handover Request ACK for Inter-CU LTM initial preparation.*

*Confirm the case that inter-CU LTM is not configured in both MCG and SCG at the same time.*

*Early data forwarding can be supported for inter-CU LTM.*

*Cell Switch Notification from source DU to target DU (in different gNB from source) for LTM execution.*

*RAN3#124:*

*Source gNB-CU initiates the handover preparation procedure for inter-gNB-CU LTM.*

*Introduce a new procedure on Xn to transfer the TA information.*

*A new XnAP class 2 procedure, namely LTM Cell Switch Notification is introduced on Xn to forward the target Cell ID and target TCI state ID(s) from the source gNB-CU to the target gNB-CU.*

*Reuse Handover Success procedure over Xn for Rel-19 Inter-CU LTM, to tell the source CU that the UE has accessed to the target Cell.*

*The Handover Cancel message is reused by the source gNB to release the reserved resource for LTM candidate cells in the candidate gNBs.*

*Early data forwarding can be triggered before the Source gNB triggers a MAC CE Command to the UE to change cells, timing is left to implementation.*

*Early sync configuration (TCI state and RACH configuration) can be obtained during the LTM preparation phase through the handover request and handover request acknowledge messages.*

*A candidate gNB can initiate cancellation of configured LTM candidate cell(s) of its own. Details are FFS.*

*FFS on the LTM modification procedures.*

*FFS on whether to reuse the existing XnAP UE CONTEXT RELEASE message at the source gNB if no LTM candidate cell(s) exist in the source gNB.*

*RAN3#125:*

*Introduce a new UE associated Class-1 XnAP procedure to update the LTM configurations for subsequent LTM.*

*Change the name of LTM Cell Switch Notification message to Cell Switch Notification message.*

*Reuse the Early Status Transfer and SN Status Transfer message for inter-CU LTM.*

*Adopt Class-2 procedure for candidate gNB-initiated LTM cancellation. Down select from Option1 and Option3 in the next meeting:*

*Option 1: Reuse CHO Cancel*

*Option 2: Rename CHO Cancel*

*Option 3: Introduce new procedure*

*RAN3#125bis:*

*Current SSB information in Xn Setup and Configuration Update procedures can be reused for LTM preparation phase.*

*WA: For inter-CU LTM mobility, a separate LTM request message (i.e. HANDOVER REQUEST message) is used for each candidate cell.*

*The error handling of multiple UE associations need to be considered.*

*The LTM Configuration IDs are allocated by the source CU.*

*WA: Reuse the existing XnAP UE CONTEXT RELEASE message at the source gNB if no LTM candidate cell(s) exist in the source gNB.*

*Follow F1AP, the source gNB-CU sends the CSI resource configuration of candidate cells to candidate gNB-CUs via Handover Request message for subsequent LTM, and the candidate gNB-CU sends the CSI report configuration to the source gNB-CU via Handover Request ACK message.*

*How the source gNB-CU sends the reference configuration to all candidate gNBs is pending on RAN2 progress.*

*Confirm the name of the new procedure as “LTM Configuration Update”.*

*Introduce a new procedure for candidate gNB-initiated LTM cancellation.*

*Allow UE association in-between candidate CUs (in case the Xn connectivity existed) for subsequent LTM. When and how to establish the UE association is FFS.*

*RAN3#126:*

*RAN3 move forward on Legacy framework with PDCP change/switch for inter-CU LTM in this release, not considering the PDCP anchor based solution.*

*The source CU can request candidate CU to provide CSI-RS configuration in HANDOVER REQUEST message, and candidate CU signals the CSI-RS configuration in HANDOVER REQUEST ACKNOWLEDGEMENT message.*

*The source CU generates common CSI-RS Resource Configuration and sends it to candidate CU in LTM CONFIGURATION UPDATE message, the candidate CU signals the CSI-RS Report Configuration in LTM CONFIGURATION UPDATE ACKNOWLEDGEMENT message.*

*Turn the WA into agreement: For inter-CU LTM mobility, a separate LTM request message (i.e. HANDOVER REQUEST message) is used for each candidate cell.*

*To support subsequent LTM, the LTM Configuration Update procedure is reused to establish UE association between the new source gNB and the other candidate gNB(s) after each inter-CU LTM Cell Switch.*

*Confirm the message name as LTM Cancel for candidate gNB-initiated LTM cancellation.*

*Turn the WA into agreement: Reuse the existing XnAP UE CONTEXT RELEASE message at the source gNB if no LTM candidate cell(s) exists in the source gNB.*

*Late data forwarding may be initiated after the source gNB decides to trigger the LTM Cell Switch Command to the UE, when exactly it is initiated is left to implementation?*

*RAN3#127:*

*For both inter-CU and intra-CU cases:*

*For the network Semi-Persistent CSI-RS coordination, source gNB-DU/source gNB triggers the activation/deactivation of the CSI-RS transmission in the candidate cell.*

*For the activation/deactivation procedure, a class 1 procedure is needed from the source gNB-DU/source gNB. FFS for reusing existing one or a new one.*

*The candidate gNB-CU responds the full SSB Time/Frequency Configuration (in SSB Information IE) of candidate cells to the source gNB-CU in the Handover Request ACK message.*

*The source gNB-CU sends the pair of (gNB ID, new ID of early RACH configuration resource (to be further discussed)) to the candidate gNB-CU to request early RACH configuration.*

*WA: Introduce a new non-UE associated class 2 procedure on Xn, namely TA information Transfer message, to transfer the TA information from the candidate gNB-CU to the source gNB-CU.*

*RAN3 agree the following scenarios to support LTM with NR-DC:*

*1.SN initiated inter-CU SCG LTM without MCG changes (high priority)*

*2.Inter-CU MCG LTM without SN release*

*3.Inter-CU MCG LTM with SN release*

*4.Inter-CU MCG LTM with SN addition*

*The format of the new introduced IE is same with the gNB-DU ID.*

*The source gNB can generate reference configuration and provide a reference configuration for LTM in a Handover Request and LTM configuration update message.*

*The candidate gNB indicates whether a LTM candidate configuration is a complete candidate configuration in the Handover Request Acknowledge and LTM configuration update acknowledge message.*

*FFS on whether the source gNB can request a candidate gNB to provide a reference configuration.*

*WA: Use a single UE association for multiple LTM handover request to the same candidate gNB.*

*Reuse the LTM Configuration Update procedure to sync up configurations among candidate gNBs for subsequent LTM, including early sync configuration, configuration ID, and data forwarding addresses, etc.*

*It is up to the network implementation when the sync up is performed: during the preparation step, or during the cell switch execution step, or after successful cell switch.*

*Normal data forwarding may be initiated after the source gNB decides to trigger the LTM cell switch for the UE, and when exactly it is initiated is left to implementation.*

*For SN initiated inter-CU SCG LTM, the source SN initiates the inter-CU SCG LTM preparation procedure by sending an SN Change Required message to the MN.*

*The MN requests each candidate SN to allocate resources for the UE via SN Addition request message.*

*Within the list of cells suggested by the source SN, the candidate SN provides the SCG part configuration of each candidate PSCell and may also provide the L1 RS (e.g. a list of SSB or a list of CSI-RS) configuration for L1 measurement, early UL sync configuration or TCI-state configuration, to the MN, via SN addition request ACK message.*

*In order to support subsequent inter-CU SCG LTM, the MN needs to transfer the common CSI resource configuration and the collected information of candidate cells to the candidate SN(s), via SN modification request message. Accordingly, the candidate SN(s) responds with the updated candidate SCG configuration to the MN via SN modification request ACK message.*

*The Cell Switch Notification message can be reused from the source SN to the target SN via the MN. The detailed IE can be further discussed.*

*RAN3#127bis:*

*Reuse the LTM configuration update procedure to transfer UE’s 5G security capabilities and/or UE’s UP security policy from the new serving gNB to the other candidate gNBs in subsequent LTM.*

*The new NCC value needs to be sent from gNB-CU to the gNB-DU via UE context modification procedure.*

*Introduce two new Class-1 UE-associated procedures over F1AP to support the source gNB-DU to trigger the activation/deactivation of the SP CSI-RS transmission in the candidate cell(s).*

*Introduce a new class-1 UE-associated procedures over XnAP for the SP CSI-RS activation/deactivation.*

*Open issues on the granularity of the CSI-RS resource/resource set, and need to be checked with RAN2 progress.*

*For the initial inter-CU LTM preparation, the source gNB computes the KgNB\*(s) (per candidate cell) for the candidate gNB, and forwards the {KgNB\*, NCC} pair(s) to the candidate gNB via a Handover Request message as legacy.*

*The new source gNB needs to provide the new KgNB\*(s) to the corresponding candidate gNB via a LTM configuration update procedure. FFS on the procedure design either per cell or per gNB.*

*Whether to define additional information from CU to DU to deliver NCC value.*

*Turn the WA into agreement: Introduce a new non-UE associated class 2 procedure on Xn, namely TA information Transfer message, to transfer the TA information from the candidate gNB-CU to the source gNB-CU.*

*Include the following information in the TA information transfer message:*

*Candidate Cell ID*

*TA value*

*Preamble index*

*RA-RNTI*

*FFS on the XnAP IDs.*

*Turn the WA into agreement: Use a single UE association (e.g. identified by a pair of {Source NG-RAN node UE XnAP ID IE and Target NG-RAN node UE XnAP ID IE}) for multiple LTM handover request to the same candidate gNB.*

*For subsequent LTM, the candidate gNB uses the old target UE XnAP ID (the target UE AP ID it previously allocated between it and the old serving gNB) to identify the UE context when receiving the LTM Configuration Update message from the new serving gNB. FFS on how to deliver the old target UE XnAP ID(s) to the new serving gNB.*

*Data Forwarding Information IE is a list including multiple data forwarding addresses from each candidate gNB(s).*

*RAN3#128:*

*WA: RAN3 agrees that, for both F1AP and XnAP, the activation and deactivation of CSI-RS transmission in LTM candidate cells are performed at the level of individual CSI-RS Resource IDs.*

*Add description in Stage 2 TS 38.401 for describing that CU can request Candidate DU to provide CSI-RS configuration in UE CONTEXT SETUP REQUEST message, and Candidate DU signals the CSI-RS configuration in UE CONTEXT SETUP RESPONSE message.*

*For Inter-CU LTM, LTM CONFIGURATION UPDATE procedure is per node level basis with a list of cells, and security key is per cell.*

*Remove Note in TS 38.300 BL CR “Editor’s Note: step 6 and 7 are optional.”*

*Update the online agreement to: CU can request Candidate DU to provide CSI-RS configuration in UE CONTEXT SETUP REQUEST and UE CONTEXT MODIFICATION REQUEST message, and Candidate DU signals the CSI-RS configuration in UE CONTEXT SETUP RESPONSE and UE CONTEXT MODIFICATION RESPONSE message.*

*Reuse the CSI-RS coordination procedure over F1AP and XnAP for source gNB/gNB-DU to activate or deactivate the SP CSI-RS resource for CSI acquisition in candidate cell.*

*In Xn interface, candidate gNB provides the LTM CFRA Resource Configuration of each candidate cell to source gNB for LTM cell switch command generation.*

*Source gNB generate the UE Based TA Measurement Configuration, and transfer it to all candidate gNB(s) via LTM Configuration Update message.*

*Include the Rel-19 set IDs of source cell and each candidate cell(s) in UE Context Modification Request message. Introduce Rel-19 set IDs into LTM Security Information IE.*

*FFS on the Rel-19 Set ID(s) assignment among CUs, down select from Option1 and Option2:*

*Option 1: Source gNB sends the Rel-19 Set ID(s) or Rel-19 set ID range assigned to the candidate gNB in the HANDOVER REQUEST message, then candidate gNB assigns Rel-19 set ID(s) to its own candidate cells and feedback via HANDOVER REQUEST ACKNOWLEDGE message.*

*Option 2: Candidate gNB provides Rel-19 set ID per candidate cell in HANDOVER REQUEST ACKNOWLEDGE message, then source gNB may update the Rel-19 set ID to ensure that the Rel-19 set IDs under different candidate gNB-CU are different.*

*FFS on the procedure to be used for source gNB to transfer Rel-19 set ID per candidate cell to the candidate gNB.*

*FFS on whether gNB-DU/gNB provides the report type (periodic or semi-persistent) of the CSI-RS resources in both F1AP and XnAP.*

*FFS on whether the TCI State/QCL-info List needs to be included in CSI-RS COORDINATION procedure.*

*FFS on whether to include the SP CSI-RS and SSB mapping in the HANDOVER REQUEST ACKKNOLEDGE message and UE Context Modification Request message.*

*FFS on whether to add a new IE for SP CSI-RS resource for CSI acquisition in the corresponding procedure of SP CSI-RS resource for L1 RSRP measurement in F1AP and XnAP.*