3GPP TSG-RAN WG3 #117-e R3-225277

15th – 24th Aug 2022

Online

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **37.340** | **CR** | **draft** | **rev** | **-** | **Current version:** | **17.1.0** |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network | **x** | Core Network |  |

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| ***Title:*** | Coordination of CHO and intra-SN CPC for TS 37.340 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | ZTE, Nokia, Nokia Shanghai Bell, Huawei, Ericsson, Intel Corporation, CATT | | | | | | | | | |
| ***Source to TSG:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | LTE\_NR\_DC\_enh2-Core | | | | |  | ***Date:*** | | | 2022-08-31 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-17 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
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| ***Reason for change:*** | | RAN2 has agreed that when one conditional reconfiguration is executed, the other conditional reconfigurations shall be released by the UE. Therefore, in the signaling flows we need to clarify the coexistence of CHO and other conditional reconfigurations.  In case of CHO with SCG configuration and MN initiated conditional SN Change procedure, both source SN and target SN shall know of conditional configuration by existing IE and message.  So that, after conditional procedure is prepared, in TS 37.340 figures, DATA FORWARDING ADDRESS INIDCATION and XN-U ADDRESS INDICATION message shall be changed **from dash line to solid line**.  RAN2 has also agreed that the UE releases all conditional reconfigurations upon reconfiguration with sync of the SCG if CPC/CPA is configured. As a result, in case of CHO with SCG configuration and SN initiated intra-CPC or reconfiguration with sync of the SCG using SRB3 (when CPAC was configured), MN should be informed of the release of conditional reconfigurations. | | | | | | | | |
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| ***Summary of change:*** | | After Conditional procedure is prepared, in TS 37.340 figures, DATA FORWARDING ADDRESS INIDCATION and XN-U ADDRESS INDICATION message shall be changed from dash line to solid line.  Add notes to describe that SN needs to inform MN if one of the CPAC conditional reconfiguration or reconfiguration with sync of the SCG using SRB3 is executed in the UE. | | | | | | | | |
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| ***Consequences if not approved:*** | | The feature of CHO with SCG configuration cannot be fully supported. | | | | | | | | |
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| ***Clauses affected:*** | | 10.3, 10.5 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **X** |  | Other core specifications | | | | TS 36.423 CR1710, TS 38.423 CR0854 | | |
| ***affected:*** | |  | **x** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **x** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | Rev0: R3-224268  Rev1: Updated during the post-RAN3#117-e email discussion to reflect decisions made at RAN2 #119e | | | | | | | | |

## 10.3 Secondary Node Modification (MN/SN initiated)

### 10.3.1 EN-DC

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**SN initiated SN Modification with MN involvement**



Figure 10.3.1-2: SN Modification procedure - SN initiated with MN involvement

The SN uses the procedure to perform configuration changes of the SCG within the same SN, e.g. to trigger the release of SCG bearer(s) and the SCG RLC bearer of split bearer(s) (upon which the MN may release the bearer or maintain current bearer type or reconfigure it to an MCG bearer, either MN terminated or SN terminated), to trigger the release of SCG resources (e.g., release SCG lower layer resources but keep SN), and to trigger PSCell change (e.g. when a new security key is required or when the MN needs to perform PDCP data recovery). The MN cannot reject the release request of SCG bearer and the SCG RLC bearer of a split bearer and the release request of SCG resources. The SN also uses this procedure to activate or deactivate the SCG. The MN shall either accept modification of all of the requested SCG bearer(s) and the SCG RLC bearer of split bearer(s) and the request of activation or deactivation of the SCG, or fail the procedure. Figure 10.3.1-2 shows an example signalling flow for an SN initiated SgNB Modification procedure, with MN involvement.

1. The SN sends the *SgNB Modification Required* message including a NR RRC configuration message, which may contain bearer context related, other UE context related information and the new SCG radio resource configuration. The SN may request the SCG to be activated or deactivated. For bearer release or modification, a corresponding E-RAB list is included in the *SgNB Modification Required* message. In case of change of security key, the *PDCP Change* *Indication* indicates that a S-KgNB update is required. In case the MN needs to perform PDCP data recovery, the *PDCP Change* *Indication* indicates that PDCP data recovery is required. In case SN decides to trigger SCG release, the E-RABs to be modified list includes all the E-RABs of the UE with SCG resource indicated as not present for each E-RAB.

The SN can decide whether the change of security key is required.

NOTE 1a: In case SN includes the indication of full RRC configuration in *SgNB Modification Required* message to MN e.g. comprehension failure upon intra-CU inter-DU change, MN performs release and add of the NR SCG part of the configuration but does not release SN terminated radio bearers towards the UE.

NOTE 1b: In case that either CHO or any conditional reconfiguration is prepared, and if a prepared SN initiated intra-SN CPC procedure or reconfiguration with sync of the SCG using SRB3 is executed, the SN notifies the MN via the SgNB Modification Required message. The SgNB Modification Required message may include the SCG configuration that has been applied in the UE. The MN considers that a conditional reconfiguration, if any configured in the UE, has been released due to the execution of the (conditional) SCG reconfiguration.

2/3. The MN initiated SN Modification procedure may be triggered by the *SN Modification Required* message (e.g. to provide information such as data forwarding addresses, new SN security key, measurement gap, etc...)

NOTE 2: If only SN security key is provided in step 2, the MN does not need to wait for the reception of step 3 to initiate the RRC connection reconfiguration procedure.

4. The MN sends the *RRCConnectionReconfiguration* message including a NR RRC configuration messageto the UE including the new SCG radio resource configuration.

5. The UE applies the new configuration and sends the *RRCConnectionReconfigurationComplete* message, including an encoded NR RRC response message, if needed. In case the UE is unable to comply with (part of) the configuration included in the *RRCConnectionReconfiguration* message, it performs the reconfiguration failure procedure.

6. Upon successful completion of the reconfiguration, the success of the procedure is indicated in the *SgNB Modification Confirm* message containing the encoded NR RRC response message, if received from the UE.

7. If instructed, the UE performs synchronisation towards the PSCell of the SN as described in SN addition procedure. Otherwise, the UE may perform UL transmission after having applied the new configuration.

8. If PDCP termination point is changed for bearers using RLC AM, and when RRC full configuration is not used, the SN Status Transfer takes place between the MN and the SN (Figure 10.3.1-2 depicts the case where a bearer context is transferred from the SN to the MN).

NOTE 2a: The SN may not be aware that a SN terminated bearer requesting to release is reconfigured to a MN terminated bearer. The SN Status for the released SN terminated bearers with RLC AM may also be transferred to the MN.

9. If applicable, data forwarding between MN and the SN takes place (Figure 10.3.1-2 depicts the case where a bearer context is transferred from the SN to the MN).

10. The SN sends the *Secondary RAT Data Usage Report* message to the MN and includes the data volumes delivered to and received from the UE over the NR radio for the E-RABs to be released.

NOTE 3: The order the SN sends the *Secondary RAT Data Usage Report* message and performs data forwarding with MN is not defined. The SN may send the report when the transmission of the related bearer is stopped.

11. If applicable, a path update is performed.

### 10.3.2 MR-DC with 5GC

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**SN initiated SN Modification with MN involvement**



Figure 10.3.2-2: SN Modification procedure - SN initiated with MN involvement

The SN uses the procedure to perform configuration changes of the SCG within the same SN, e.g. to trigger the modification/release of the user plane resource configuration, to trigger the release of SCG resources (e.g., release SCG lower layer resources but keep SN), and to trigger PSCell changes (e.g. when a new security key is required or when the MN needs to perform PDCP data recovery). The MN cannot reject the release request of PDU session/QoS flows and the release request of SCG resources. The SN also uses the procedure to request the MN to provide more DRB IDs to be used for SN terminated bearers or to return DRB IDs used for SN terminated bearers that are not needed any longer. The SN also uses this procedure to activate or deactivate the SCG. Figure 10.3.2-2 shows an example signalling flow for SN initiated SN Modification procedure.

1. The SN sends the *SN Modification Required* message including an SN RRC reconfiguration message, which may contain user plane resource configuration related context, other UE context related information and the new radio resource configuration of SCG. The SN may request the SCG to be activated or deactivated. In case of change of security key, the *PDCP Change* *Indication* indicates that an SN security key update is required. In case the MN needs to perform PDCP data recovery, the *PDCP Change* *Indication* indicates that PDCP data recovery is required.

The SN can decide whether the change of security key is required.

NOTE 3a: In case that either CHO or any conditional reconfiguration is prepared, and if a prepared SN initiated intra-SN CPC procedure or reconfiguration with sync of the SCG using SRB3 is executed, the SN shall notify to the MN via the SN Modification Required message. The SN Modification Required message may include the new SCG configuration that has been applied in the UE. The MN considers that a conditional reconfiguration, if any configured in the UE, has been released due to the execution of the (conditional) SCG reconfiguration.

2/3. The MN initiated SN Modification procedure may be triggered by *SN Modification Required* message, e.g. when an SN security key change needs to be applied.

NOTE 3: For SN terminated bearers to be setup for which PDCP duplication with CA is configured in NR MCG side, the SN allocates up to 4 separate Xn-U bearers and the MN provides a logical channel ID for primary or split secondary path to the SN via the nested MN-initiated SN modification procedure.

4. The MN sends the MN RRC reconfiguration message to the UE including the SN RRC reconfiguration message with the new SCG radio resource configuration.

5. The UE applies the new configuration and sends the MN RRC reconfiguration complete message, including an SN RRC response message, if needed. In case the UE is unable to comply with (part of) the configuration included in the MN RRC reconfiguration message, it performs the reconfiguration failure procedure.

6. Upon successful completion of the reconfiguration, the success of the procedure is indicated in the *SN Modification Confirm* message including the SN RRC response message, if received from the UE.

7. If instructed, the UE performs synchronisation towards the PSCell configured by the SN as described in SN Addition procedure. Otherwise, the UE may perform UL transmission directly after having applied the new configuration.

8. If PDCP termination point is changed for bearers using RLC AM, and when RRC full configuration is not used, the SN Status Transfer takes place between the MN and the SN (Figure 10.3.2-2 depicts the case where a bearer context is transferred from the SN to the MN).

9. If applicable, data forwarding between MN and the SN takes place (Figure 10.3.2-2 depicts the case where a user plane resource configuration related context is transferred from the SN to the MN).

10. The SN sends the *Secondary RAT Data Usage Report* message to the MN and includes the data volumes delivered to and received from the UE as described in clause 10.11.2.

NOTE 4: The order the SN sends the *Secondary RAT Data Usage Report* message and performs data forwarding with MN is not defined. The SN may send the report when the transmission of the related QoS flow is stopped.

11. If applicable, a PDU Session path update procedure is performed.

## 10.5 Secondary Node Change (MN/SN initiated)

### 10.5.1 EN-DC

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**MN initiated conditional SN Change**

The MN initiated conditional inter-SN change procedure is used for CPC configuration and CPC execution.



Figure 10.5.1-3: Conditional SN Change – MN initiated

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### 10.5.2 MR-DC with 5GC

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**MN initiated conditional SN Change**

The Conditional Secondary Node Change procedure is initiated by the MN for CPC configuration and CPC execution.



Figure 10.5.2-3: Conditional SN change procedure - MN initiated

Figure 10.5.2-3 shows an example signalling flow for the conditional SN Change initiated by the MN:

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