3GPP TSG-RAN WG3 #114-e R3-21xxxx

1-11 Nov 2021

Online

Agenda Item: 14.3

Source: ZTE

Title: (TP for CPAC BLCR to TS36.423) CPA and CPC replace and cancel

Document for: Approval

# Introduction

This TP is based on the following CB.

**CB: # MRDC3\_CPAC**

**- Check RAN2 progress**

**- Support preparation of single T-SN in SN initiated inter-SN CPC first to progress, and then discuss how to prepare multiple T-SNs as second priority? Check RAN2 progress and focus on open issues from last meeting**

**- CPAC replace and cancel procedure?**

**- Capture agreements as stage2/stage3 CRs and check details, split work, if needed**

**- List open issues for next meeting in the summary**

(Lenovo - moderator)

Summary of offline disc [R3-215864](file:///C%3A%5CUsers%5Ckordybac%5COneDrive%20-%20Nokia%5CS%C5%82u%C5%BCbowe%5C3GPP%5CWG3%20%23114%20211101%5CPrzygotowania%5CNaSpotkaniu%5CCB%20%23%20MRDC3_CPAC%5CPhase%202%5CInbox%5CR3-215864.zip).

# Text Proposal for TS36.423

**------------------------------------------------Start of the change--------------------------------------------------**

### 8.7.6 MeNB initiated SgNB Modification Preparation

#### 8.7.6.1 General

This procedure is used to enable an MeNB to request an en-gNB to modify the UE context at the en-gNB, or to query the current SCG configuration for supporting delta signalling in MeNB initiated SgNB change, or to provide the S-RLF-related information to the en-gNB.

The procedure uses UE-associated signalling.

#### 8.7.6.2 Successful Operation



Figure 8.7.6.2-1: MeNB initiated SgNB Modification Preparation, successful operation

The MeNB initiates the procedure by sending the SGNB MODIFICATION REQUEST message to the en-gNB. When the MeNB sends the SGNB MODIFICATION REQUEST message, it shall start the timer TDCprep.

The SGNB MODIFICATION REQUEST message may contain:

- within the *UE Context Information* IE (if the modification of the UE context at the en-gNB is requested);

- E-RABs to be added within the *E-RABs To Be Added Item* IE;

- E-RABs to be modified within the *E-RABs To Be Modified Item* IE;

- E-RABs to be released within the *E-RABs To Be Released Item* IE;

- the *SgNB UE Aggregate Maximum Bit Rate* IE;

- the *MeNB to SgNB Container* IE;

- the *SCG Configuration Query* IE;

- the *MeNB Resource Coordination Information* IE;

- the *Requested split SRBs IE*;

- the *Requested split SRBs release* IE;

- the *Requested fast MCG recovery via SRB3 IE*;

- the *Requested fast MCG recovery via SRB3 Release* IE.

If the SGNB MODIFICATION REQUEST message contains the *Serving PLMN* IE, the en-gNB may use it for RRM purposes.

If the SGNB MODIFICATION REQUEST message contains the *Handover Restriction List* IE, the en-gNB shall

- replace the previously provided Handover Restriction List by the received Handover Restriction List in the UE context;

- use this information to select an appropriate NR cell.

If the *SgNB UE Aggregate Maximum Bit Rate* IE is included in the SGNB MODIFICATION REQUEST message, the en-gNB shall:

- replace the previously provided SgNB UE Aggregate Maximum Bit Rate by the received SgNB UE Aggregate Maximum Bit Rate in the UE context;

- use the received SgNB UE Aggregate Maximum Bit Rate for non-GBR Bearers for the concerned UE as defined in TS 37.340 [32].

The allocation of resources according to the values of the *QCI* IE, *Allocation and Retention Priority* IE or *GBR QoS Information* IE included in the *Full E-RAB Level QoS Parameters* IE or in the *Requested SCG E-RAB Level QoS Parameters* IE shall follow the principles described for the E-RAB Setup procedure in TS 36.413 [4].

If the SGNB MODIFICATION REQUEST message contains the *MeNB Resource Coordination Information* IE, the en-gNB should forward it to lower layers and it may use it for the purpose of resource coordination with the MeNB, or to coordinate with sidelink resources used in the MeNB. The en-gNB shall consider the received *UL Coordination Information* IE value valid until reception of a new update of the IE for the same UE. The en-gNB shall consider the received *DL Coordination Information* IE value valid until reception of a new update of the IE for the same UE. If the *MeNB Coordination Assistance Information* IE is contained in the *MeNB Resource Coordination Information* IE, the en-gNB shall, if supported, use the information to determine further coordination of resource utilisation between the en-gNB and the MeNB.

If at least one of the requested modifications is admitted by the en-gNB, the en-gNB shall modify the related part of the UE context accordingly and send the SGNB MODIFICATION REQUEST ACKNOWLEDGE message back to the MeNB.

The en-gNB shall include the E-RABs for which resources have been either added or modified or released at the en-gNB either in the *E-RABs Admitted To Be Added List* IE or the *E-RABs Admitted To Be Modified List* IE or the *E-RABs Admitted To Be Released List* IE. The en-gNB shall include the E-RABs that have not been admitted in the *E-RABs Not Admitted List* IE with an appropriate cause value.

For each E-RAB successfully established or modified or released in the en-gNB, the en-gNB shall report to the MeNB, in the SGNB MODIFICATION REQUEST ACKNOWLEDGE message, the same value in the *EN-DC Resource Configuration* IE as received in the SGNB MODIFICATION REQUEST message.

The en-gNB shall, if included, choose the ciphering algorithm based on the information in the *NR* *UE Security Capabilities* IE and locally configured priority list of AS encryption algorithms and apply the key indicated in the *SgNB Security Key* IE as specified in the TS 33.401 [18].

For each E-RAB for which allocation of the PDCP entity is requested at the en-gNB:

- if applicable, the MeNB may propose to apply forwarding of downlink data by including the *DL Forwarding* IE within the *E-RABs To Be Added Item* IE of the SGNB MODIFICATION REQUEST message. For each E-RAB that it has decided to admit, the en-gNB may include the *DL Forwarding GTP Tunnel Endpoint* IE within the *E-RABs Admitted To Be Added Item* IE of the SGNB MODIFICATION REQUEST ACKNOWLEDGE message to indicate that it accepts the proposed forwarding of downlink data for this bearer. The MeNB may also provide for an applicable E-RAB to be released the *DL Forwarding GTP Tunnel Endpoint* IE and the *UL Forwarding GTP Tunnel Endpoint* IE within the *E-RABs To Be Released Item* IE of the SGNB MODIFICATION REQUEST message.

- if applicable, the en-gNB may include for each bearer in the *E-RABs Admitted To Be Added List* IE in the SGNB MODIFICATION REQUEST ACKNOWLEDGE message the *UL Forwarding GTP Tunnel Endpoint* IE to indicate that it requests data forwarding of uplink packets to be performed for that bearer.

- if applicable, the en-gNB may include for each bearer in the *E-RABs Admitted To Be Modified* List IE which is configured with the SN terminated split bearer option in the SGNB MODIFICATION REQUEST ACKNOWLEDGE message the *UL Configuration* IE to indicate that the MCG UL configuration of the UE has changed.

- if applicable, the en-gNB may include for each bearer in the *E-RABs Admitted To Be Added List* IE in the SGNB MODIFICATION REQUEST ACKNOWLEDGE message the *UL* *PDCP SN Length* IE and the *DL PDCP SN Length* IE to indicate the PDCP SN length for that bearer.

- If the *Bearer Type* IE for the concerned E-RAB is received by the en-gNB and is set to"non IP", then the en-gNB shall, if supported, not perform IP header compression for the concerned E-RAB.

- If the *Ethernet Type* IE for the concerned E-RAB is received by the en-gNB and is set to "True", the en-gNB shall take this into account to perform header compression appropriately for the concerned E-RAB.

For each E-RAB configured with SCG resources and the PDCP entity is hosted by the MeNB and

- requested to be modified,

- if the SGNB MODIFICATION REQUEST message includes the *MeNB UL GTP Tunnel Endpoint at PDCP* IE in the *E-RABs To Be Modified Item* IE, the en-gNB shall act as specified in TS 37.340 [32].

- if the SGNB MODIFICATION REQUEST message contains the *MeNB UL GTP Tunnel Endpoint at PDCP* IE the en-gNB shall use it as the new UL X2-U address.

- the en-gNB may include in the SGNB MODIFICATION REQUEST ACKNOWLEDGE message the *SgNB DL GTP Tunnel Endpoint at SCG* IE.

If, dependent on the configured bearer type, the *Full E-RAB Level QoS Parameters* IE or the *Maximum MCG admittable E-RAB Level QoS Parameters* IE or the *Requested SCG E-RAB level QoS Parameters* IE are included in the SGNB MODIFICATION REQUEST message for an E-RAB to be modified the en-gNB shall allocate respective resources and provide corresponding radio configuration information within the *SgNB to MeNB Container* IE as described in TS 37.340 [32].

If the SGNB MODIFICATION REQUEST message contains, for an E-RAB to be modified which is configured with the PDCP entity in the en-gNB, the *S1 UL GTP Tunnel Endpoint* IE, the en-gNB shall use it as the new UL S1-U address.

If the SGNB MODIFICATION REQUEST message contains an E-RAB to be modified which is configured with the MN terminated split bearer option, the MeNB may include the *UL Configuration* IEto indicate that the SCG UL configuration of the UE has changed.

If the SGNB MODIFICATION REQUEST message contains for an E-RAB to be modified which is configured with the PDCP enitiy in the en-gNB and MCG resources the *MeNB DL GTP Tunnel Endpoint at MCG* IE the en-gNB shall use it as the DL X2-U address.

If the SGNB MODIFICATION REQUEST message contains the *Subscriber Profile ID for RAT/Frequency Priority* IE, the en-gNB may use it for RRM purposes.

If the SGNB MODIFICATION REQUEST message contains the *Additional RRM Policy Index* IE, the en-gNB may use it for RRM purposes.

For an E-RAB to be modified which is configured with the PDCP entity in the en-gNB the en-gNB may include in the SGNB MODIFICATION REQUEST ACKNOWLEDGE message the *S1 DL GTP Tunnel Endpoint at the SgNB* IE.

If the SGNB MODIFICATION REQUEST ACKNOWLEDGE message contains the *SgNB Resource Coordination Information* IE, the MeNB may use it for the purpose of resource coordination with the en-gNB. The MeNB shall consider the received *UL Coordination Information* IE value valid until reception of a new update of the IE for the same UE. The MeNB shall consider the received *DL Coordination Information* IE value valid until reception of a new update of the IE for the same UE. If the *SgNB Coordination Assistance Information* IE is contained in the *SgNB Resource Coordination Information* IE, the MeNB shall, if supported, use the information to determine further coordination of resource utilisation between the en-gNB and the MeNB.

Upon reception of the SGNB MODIFICATION REQUEST ACKNOWLEDGE message the MeNB shall stop the timer TDCprep. If the SGNB MODIFICATION REQUEST ACKNOWLEDGE message has included the *SgNB to MeNB Container* IE the MeNB is then defined to have a Prepared SgNB Modification for that X2 UE-associated signalling.

If the *SCG Configuration Query* IE is included in the SGNB MODIFICATION REQUEST message, the en-gNB shall provide corresponding radio configuration information within the *SgNB to MeNB Container* IE as described in TS 37.340 [32].

If the SGNB MODIFICATION REQUEST message contains the *Requested split SRBs* IE, the en-gNB may use it to add split SRBs. If the SGNB MODIFICATION REQUEST message contains the *Requested split SRBs* *release* IE, the en-gNB may use it to release split SRBs.

If the *Requested Fast MCG recovery via SRB3* IE set to "true" is included in the SGNB MODIFICATION REQUEST message and the en-gNB decides to configure fast MCG link recovery via SRB3 as specified in TS 37.340 [32], the en-gNB shall, if supported, include the *Available fast MCG recovery via SRB3* IE set to "true" in the SGNB MODIFICATION REQUEST ACKNOWLEDGE message. If the *Requested Fast MCG recovery via SRB3 Release* IE set to "true" is included in the SGNB MODIFICATION REQUEST message and the en-gNB decides to release fast MCG link recovery via SRB3, the en-gNB shall, if supported, include the *Release fast MCG recovery via SRB3* IE set to "true" in the SGNB MODIFICATION REQUEST ACKNOWLEDGE message.

If the en-gNB receives for an E-RAB to be setup for which the PDCP entiy is allocated at the MeNB the *Secondary MeNB UL GTP Tunnel Endpoint at PDCP* IE and the *Duplication Activation* IE in the SGNB MODIFICATION REQUEST message, it may provide the *Secondary SgNB DL GTP Tunnel Endpoint at SCG* IE and the *LCID* IE to the MeNB in the SGNB MODIFICATION REQUEST ACKNOWLEDGE message if PDCP duplication is configured at the en-gNB.

If the SGNB MODIFICATION REQUEST message contains the *RLC Status* IE, the en-gNB shall assume that RLC has been reestablished at the MeNB and may trigger PDCP data recovery.

If the en-gNB applied a full configuration or delta configuration, e.g. as part of a mobility procedure involving a change of DU, the en-gNB shall inform the MeNB by including the *RRC config indication* IE in the SGNB MODIFICATION REQUEST ACKNOWLEDGE message.

If SGNB MODIFICATION REQUEST message contains the *UL PDCP SN Length* IE and the *DL PDCP SN Length* IE, the en-gNB shall, if supported, store this information and use it for lower layer configuration of the concerned MN terminated bearer.

If the *RLC Mode* IE is included for an E-RAB within the *E-RABs To be Added List* IE in the SGNB MODIFICATION REQUEST message, it indicates the mode that the MeNB used for the E-RAB when it was hosted at the MeNB.

If the SGNB MODIFICATION REQUEST message contains the *MeNB Cell ID* IE, the en-gNB may search for the target NR cell among the NR neighbour cells of the E-UTRAN cell indicated in *MeNB Cell ID* IE, as specified in the TS 37.340 [32].

If the SGNB MODIFICATION REQUEST ACKNOWLEDGE message contains the *RLC Status* IE, the MeNB shall assume that RLC has been reestablished at the en-gNB and may trigger PDCP data recovery.

The en-gNB may include the *Location Information at SgNB* IE in the SGNB MODIFICATION REQUEST ACKNOWLEDGE message, if respective information is available at the en-gNB.

If the *Location Information at* en-gNB *Reporting* IE set to "pscell" is included in the SGNB MODIFICATION REQUEST, the SgNB shall start providing information about the current location of the UE. If the *Location Information* *at SgNB* IE is included in the SGNB MODIFICATION REQUEST ACKNOWLEDGE, the MeNB shall store the included information so that it may be transferred towards the MME.

If the *Lower Layer presence status change* IE set to "release lower layers" is included in the SGNB MODIFICATION REQUEST message, the en-gNB shall act as specified in TS 37.340 [32].

If the *Lower Layer presence status change* IE set to "re-establish lower layers" is included in the SGNB MODIFICATION REQUEST message, the en-gNB shall act as specified in TS 37.340 [32].

If the *Lower Layer presence status change* IE set to "suspend lower layers" is included in the SGNB MODIFICATION REQUEST message, the en-gNB shall act as specified in TS 37.340 [32].

If the *Lower Layer presence status change* IE set to "resume lower layers" is included in the SGNB MODIFICATION REQUEST message, the en-gNB shall act as specified in TS 37.340 [32].

If the SGNB MODIFICATION REQUEST message contains the *IAB Node Indication* IE, the en-gNB shall, if supported, consider that the request is for an IAB node.

For each requested E-RAB configured as MN-terminated split bearer/SCG bearer, if the *QoS Mapping Information* IE is contained in the *GTP Tunnel Endpoint* IE in the SGNB MODIFICATION REQUEST ACKNOWLEDGE message, the MeNB shall, if supported, use it to set DSCP and/or flow label fields for the downlink IP packets which are transmitted from MeNB to SgNB through the GTP tunnels indicated by the *GTP Tunnel Endpoint* IE.

**Interactions with the MeNB initiated SgNB Modification procedure:**

If the en-gNB provides for an E-RAB to be setup for which the PDCP entiy is allocated at the MeNB the *Secondary SgNB DL GTP Tunnel Endpoint at SCG* IE and the *LCID* IE to the MeNB in the SGNB MODIFICATION REQUEST ACKNOWLEDGE message and the MeNB has not provided the *Secondary MeNB UL GTP Tunnel Endpoint at PDCP* IE and the *Duplication Activation* IE in the SGNB MODIFICATION REQUEST message, the MeNB shall trigger the MeNB initiated SgNB Modification procedure to provide the *Secondary MeNB UL GTP Tunnel Endpoint at PDCP* IE and the *Duplication Activation* IE to the SgNB.

**Interactions with the SgNB Reconfiguration Completion procedure:**

If the en-gNB admits a modification of the UE context requiring the MeNB to report about the success of the RRC connection reconfiguration procedure, the en-gNB shall start the timer TDCoverall when sending the SGNB MODIFICATION REQUEST ACKNOWLEDGE message to the MeNB. The reception of the SGNB RECONFIGURATION COMPLETE message shall stop the timer TDCoverall.

**Interaction with the Activity Notification procedure**

Upon receiving an SGNB MODIFICATION REQUEST message containing the *Desired Activity Notification Level* IE, the en-gNB shall, if supported, use this information to decide whether to trigger subsequent SgNB Activity Notification procedures, or stop or modify ongoing triggering of these procedures due to a previous request.

**Interaction with the SgNB initiated SgNB Modification Preparation procedure:**

If the MeNB receives the SGNB MODIFICATION REQUIRED message and the requested SN modification procedure needs further information from MeNB, the MeNB shall send SGNB MODIFICATION REQUEST message to en-gNB in response to a previously SgNB initiated SgNB Modification procedure.

#### 8.7.6.3 Unsuccessful Operation



Figure 8.7.6.3-1: MeNB initiated SgNB Modification Preparation, unsuccessful operation

If the en-gNB does not admit any modification requested by the MeNB, or a failure occurs during the MeNB initiated SgNB Modfication Preparation, the en-gNB shall send the SGNB MODIFICATION REQUEST REJECT message to the MeNB. The message shall contain the *Cause* IE with an appropriate value.

If the en-gNB receives a SGNB MODIFICATION REQUEST message containing the *MeNB to SgNB Container* IE that does not include required information as specified in TS 38.331 [31], the en-gNB shall send the SGNB MODIFICATION REQUEST REJECT message to the MeNB.

#### 8.7.6.4 Abnormal Conditions

If the en-gNB receives a SGNB MODIFICATION REQUEST message containing multiple *E-RAB ID* IEs (in the *E-RABs To Be Added List* IE and/or the *E-RABs To Be Modified List* IE) set to the same value, the en-gNB shall not admit the action requested for the corresponding E-RABs.

If the en-gNB receives an SGNB MODIFICATION REQUEST message containing multiple *E-RAB ID* IEs (in the *E-RAB To Be Released List* IE) set to the same value, the en-gNB shall initiate the release of one corresponding E-RAB and ignore the duplication of the instances of the selected corresponding E-RABs.

If the en-gNB receives a SGNB MODIFICATION REQUEST message containing, dependent on the configured bearer type, the *Full E-RAB Level QoS Parameters* IE or the *Requested SCG E-RAB Level QoS Parameters* IE which contains a *QCI* IE indicating a GBR bearer (as defined in TS 23.203 [13]), and which does not contain the *GBR QoS Information* IE, the en-gNB shall not admit the corresponding E-RAB.

If the supported algorithms for encryption defined in the *NR Encryption Algorithms* IE in the *NR* *UE Security Capabilities* IE in the *UE Context Information* IE, plus the mandated support of NEA0 in all UEs (TS 33.401 [18]), do not match any algorithms defined in the configured list of allowed encryption algorithms in the en-gNB (TS 33.401 [18]), the en-gNB shall reject the procedure using the SGNB MODIFICATION REQUEST REJECT message.

If the supported algorithms for integrity defined in the *NR Integrity Protection Algorithms* IE in the *NR* *UE Security Capabilities* IE in the *UE Context Information* IE do not match any algorithms defined in the configured list of allowed integrity protection algorithms in the en-gNB (TS 33.401 [18]), the en-gNB shall reject the procedure using the SGNB MODIFICATION REQUEST REJECT message.

If the timer TDCprep expires before the MeNB has received the SGNB MODIFICATION REQUEST ACKNOWLEDGE message, the MeNB shall regard the MeNB initiated SgNB Modification Preparation procedure as being failed and shall release the UE Context at the en-gNB.

If the MeNB has provided the en-gNB for an E-RAB to be setupr which the PDCP entiy is allocated at the MeNB the *Secondary MeNB UL GTP Tunnel Endpoint at PDCP* IE in the SGNB MODIFICATION REQUEST message, and the en-gNB does not provide the *Secondary SgNB DL GTP Tunnel Endpoint at SCG* IE to the MeNB in the SGNB MODIFICATION REQUEST ACKNOWLEDGE message, the MeNB shall assume that PDCP duplication was not configured at the en-gNB and releases duplication resources.

If the en-gNB provides for an E-RAB to be setup for which the PDCP entiy is allocated at the MeNB the *Secondary SgNB DL GTP Tunnel Endpoint at SCG* IE to the MeNB in the SGNB MODIFICATION REQUEST ACKNOWLEDGE message and the MeNB has not provided the *Secondary MeNB UL GTP Tunnel Endpoint at PDCP* IE in the SGNB MODIFICATION REQUEST message, and the MeNB does not trigger the MeNB initiated SgNB Modification procedure to provide the *Secondary MeNB UL GTP Tunnel Endpoint at PDCP* IE to the SgNB the en-gNB before the SgNB Reconfigurationi Completion procedure was triggered, the en-gNB shall trigger the release of the concerned E-RAB.

**Interactions with the SgNB Reconfiguration Completion and SgNB initiated SgNB Release procedure:**

If the timer TDCoverall expires before the en-gNB has received the SGNB RECONFIGURATION COMPLETE or the SGNB RELEASE REQUEST message, the en-gNB shall regard the requested modification RRC connection reconfiguration as being not applied by the UE and shall trigger the SgNB initiated SgNB Release procedure.

**Interaction with the SgNB initiated SgNB Modification Preparation procedure:**

If the MeNB, after having initiated the MeNB initiated SgNB Modification procedure, receives the SGNB MODIFICATION REQUIRED message, the MeNB shall refuse the SgNB initiated SgNB Modification procedure with an appropriate cause value in the *Cause* IE.

If the MeNB has a Prepared SgNB Modification and receives the SGNB MODIFICATION REQUIRED message, the MeNB shall respond with the SGNB MODIFICATION REFUSE message to the en-gNB with an appropriate cause value in the *Cause* IE.

**Interactions with the MeNB initiated SgNB Release procedure:**

If the timer TDCprep expires before the MeNB has received the SGNB MODIFICATION REQUEST ACKNOWLEDGE message, the MeNB shall regard the SgNB Modification Preparation procedure as being failed and may trigger the MeNB initiated SgNB Release procedure.

### 8.7.7 SgNB initiated SgNB Modification

#### 8.7.7.1 General

This procedure is used by the en-gNB to modify the UE context in the en-gNB.

The procedure uses UE-associated signalling.

#### 8.7.7.2 Successful Operation



Figure 8.7.7.2-1: SgNB initiated SgNB Modification, successful operation.

The en-gNB initiates the procedure by sending the SGNB MODIFICATION REQUIRED message to the MeNB. When the en-gNB sends the SGNB MODIFICATION REQUIRED message, it shall start the timer TDCoverall.

The SGNB MODIFICATION REQUIRED message may contain

- the *PDCP Change Indication* IE;

- the *SgNB to MeNB Container* IE.

- E-RABs to be modified within the *E-RABs To Be Modified Item* IE;

- E-RABs to be released within the *E-RABs To Be Released Item* IE;

- the *SgNB Resource Coordination Information* IE.

For the SN terminated split bearers, the en-gNB may include in the SGNB MODIFICATION REQUIRED message the *UL Configuration* IE to indicate that the MCG UL configuration of the UE has changed.

The en-gNB may include for each bearer in the *E-RABs to Be Modified* *List* IE in the SGNB MODIFICATION REQUIRED message the *New DRB ID Request* IE to request the MeNB to assign a new DRB ID for that bearer.

If the MeNB is able to perform the change requested by the en-gNB, the MeNB shall send the SGNB MODIFICATION CONFIRM message to the en-gNB. The SGNB MODIFICATION CONFIRM message may contain the *MeNB to SgNB Container* IE.

If the SGNB MODIFICATION REQUIRED message contains the *SgNB Resource Coordination Information* IE, the MeNB may use it for the purpose of resource coordination with the en-gNB. The MeNB shall consider the received *UL Coordination Information* IE value valid until reception of a new update of the IE for the same UE. The MeNB shall consider the received *DL Coordination Information* IE value valid until reception of a new update of the IE for the same UE. If the *SgNB Coordination Assistance Information* IE is contained in the *SgNB Resource Coordination Information* IE, the MeNB shall, if supported, use the information to determine further coordination of resource utilisation between the en-gNB and the MeNB.

If the en-gNB applied a full configuration or delta configuration, e.g. as part of a mobility procedure involving a change of DU, the en-gNB shall inform the MeNB by including the *RRC config indication* IE in the SGNB MODIFICATION REQUIRED message.

For each E-RAB successfully modified as requested by the en-gNB, the MeNB shall inform the en-gNB, in the SGNB MODIFICATION CONFIRM message, the same value in the *EN-DC Resource Configuration* IE as received in the SGNB MODIFICATION REQUIRED message.

Upon reception of the SGNB MODIFICATION CONFIRM message the en-gNB shall stop the timer TDCoverall.

If the SGNB MODIFICATION CONFIRM message contains the *MeNB Resource Coordination Information* IE, the en-gNB should forward it to lower layers and it may use it for the purpose of resource coordination with the MeNB, or to coordinate with sidelink resources used in the MeNB. The en-gNB shall consider the received *UL Coordination Information* IE value valid until reception of a new update of the IE for the same UE. The en-gNB shall consider the received *DL Coordination Information* IE value valid until reception of a new update of the IE for the same UE. If the *MeNB Coordination Assistance Information* IE is contained in the *MeNB Resource Coordination Information* IE, the en-gNB shall, if supported, use the information to determine further coordination of resource utilisation between the en-gNB and the MeNB.

If the MeNB receives for an E-RAB for which the PDCP entiy is allocated at the MeNB the *Secondary SgNB DL GTP Tunnel Endpoint at SCG* IE in the SGNB MODIFICATION REQUIRED message, it shall provide the *Secondary MeNB UL GTP Tunnel Endpoint at PDCP* IE to the en-gNB in the SGNB MODIFICATION CONFIRM message. If the *LCID* IE is included in the SGNB MODIFICATION REQUIRED message, the MeNB should take it into account.

If the SGNB MODIFICATION REQUIRED message contains the *RLC Status* IE, the MeNB shall assume that RLC has been reestablished at the en-gNB and may trigger PDCP data recovery.

If the *RLC Mode* IE is included for an E-RAB within the *E-RABs To Be Released List* IE (for E-RABs hosted at the en-gNB) in the SGNB MODIFICATION REQUIRED message, it indicates the mode that the en-gNB used for the E-RAB when it was hosted at the en-gNB.

The MeNB shall include only E-RABs with the following IE in *E-RABs Admitted To Be Modified List* IE:

- the *Secondary MeNB UL GTP Tunnel Endpoint at PDCP* IE.

If the *Location Information* *at SgNB* IE is included in the SGNB MODIFICATION REQUIRED, the MeNB shall store the included information so that it may be transferred towards the MME.

**Interaction with the MeNB initiated SgNB Modification Preparation procedure:**

If applicable, as specified in TS 37.340 [32], the en-gNB may receive, after having initiated the SgNB initiated SgNB Modification procedure, the SGNB MODIFICATION REQUEST message including the *DL Forwarding GTP Tunnel Endpoint* IE and the *UL Forwarding GTP Tunnel Endpoint* IE within the *E-RABs To Be Released List* IE.

If applicable, as specified in TS 37.340 [32], the en-gNB may receive, after having initiated the SgNB initiated SgNB Modification procedure, the SGNB MODIFICATION REQUEST message including the *SgNB Security Key* IE within the *UE Context Information* IE.

If applicable, as specified in TS 37.340 [32], the en-gNB may receive, after having initiated the SgNB initiated SgNB Modification procedure, the SGNB MODIFICATION REQUEST message including the *measGapConfig* IE as defined in TS 38.331 [31] within the *MeNB to SgNB Container* IE.

The en-gNB may receive, after having initiated the SgNB initiated SgNB modification procedure including the *New DRB ID Request* IE for an SN terminated bearer within the *E-RABs To Be Modified List* IE, the SGNB MODIFICATION REQUEST message to release and add the same bearer with a new DRB ID or with the same DRB ID but together with the *SgNB Security Key* IE within the *UE Context Information* IE.

The en-gNB may receive, after having initiated the SgNB initiated SgNB modification procedure, the SGNB MODIFICATION REQUEST message including the *SN triggered* IE.

#### 8.7.7.3 Unsuccessful Operation



Figure 8.7.7.3-1: SgNB initiated SgNB Modification, unsuccessful operation.

In case the requested modification cannot be performed successfully the MeNB shall respond with the SGNB MODIFICATION REFUSE message to the en-gNB with an appropriate cause value in the *Cause* IE.

The MeNB may also provide configuration information in the *MeNB to SgNB Container* IE.

#### 8.7.7.4 Abnormal Conditions

If the timer TDCoverall expires before the en-gNB has received the SGNB MODIFICATION CONFIRM or the SGNB MODIFICATION REFUSE message, the en-gNB shall regard the requested modification as failed and may take further actions like triggering the SgNB initiated SgNB Release procedure to release all en-gNB resources allocated for the UE.

If the value received in the *E-RAB ID* IE of any of the *E-RABs To Be Released Items* IE is not known at the MeNB, the MeNB shall regard the procedure as failed and may take appropriate actions like triggering the MeNB initiated SgNB Release procedure.

If the en-gNB does not receives for an E-RAB for which the PDCP entiy is allocated at the MeNB the *Secondary MeNB UL GTP Tunnel Endpoint at PDCP* IE to the en-gNB in the SGNB MODIFICATION CONFIRM message although the *Secondary SgNB DL GTP Tunnel Endpoint at SCG* IE was provided to the MeNB in the SGNB MODIFICATION REQUIRED message, it shall assume the setup of the secondary X2-U bearer as being failed.

**Interaction with the MeNB initiated SgNB Modification Preparation procedure:**

If the en-gNB, after having initiated the SgNB initiated SgNB Modification procedure, receives the SGNB MODIFICATION REQUEST message including other IEs than an applicable *SgNB Security Key* IE and/or applicable forwarding addresses or applicable measurement gap pattern or information applicable to release and add the same bearer with different DRB ID and/or the *SN triggered* IE set to "True"*,* the en-gNB shall

- regard the SgNB initiated SgNB Modification Procedure as being failed;

- stop the TDCoverall, which was started to supervise the SgNB initiated SgNB Modification procedure;

- be prepared to receive the SGNB MODIFICATION REFUSE message from the MeNB and;

- continue with the MeNB initiated SgNB Modification Preparation procedure as specified in section 8.7.6.

**Interaction with the MeNB initiated handover procedure:**

If the MeNB, after having initiated the handover procedure, receives the SGNB MODIFICATION REQUIRED message, the MeNB shall refuse the SgNB modification procedure with an appropriate cause value in the *Cause* IE.

### 8.7.8 SgNB Change

#### 8.7.8.1 General

This procedure is used by the en-gNB to change to another en-gNB.

The procedure uses UE-associated signalling.

#### 8.7.8.2 Successful Operation



Figure 8.7.8.2-1: SgNB Change, successful operation.

The en-gNB initiates the procedure by sending the SGNB CHANGE REQUIRED message to the MeNB including the *Target SgNB ID Information IE*. When the en-gNB sends the SGNB CHANGE REQUIRED message, it shall start the timer TDCoverall.

The SGNB CHANGE REQUIRED message may contain

- the *SgNB to MeNB Container* IE.

If the MeNB is able to perform the change requested by the en-gNB, the MeNB shall send the SGNB CHANGE CONFIRM message to the en-gNB. For each E-RAB configured with the PDCP entity in the en-gNB, the MeNB may include the *DL Forwarding GTP Tunnel Endpoint* IE and the *UL Forwarding GTP Tunnel Endpoint* IE within the *E-RABs To Be Released Item* IE to indicate that it requests data forwarding of uplink and downlink packets to be performed for that bearer.

The en-gNB may start data forwarding and stop providing user data to the UE and shall stop the timer TDCoverall upon reception of the SGNB CHANGE CONFIRM message.

#### 8.7.8.3 Unsuccessful Operation



Figure 8.7.8.3-1: SgNB Change, unsuccessful operation.

In case the request change cannot be performed successfully the MeNB shall respond with the SGNB CHANGE REFUSE message to the en-gNB with an appropriate cause value in the *Cause* IE.

#### 8.7.8.4 Abnormal Conditions

If the timer TDCoverall expires before the en-gNB has received the SGNB CHANGE CONFIRM or the SGNB CHANGE REFUSE message, the en-gNB shall regard the requested change as failed and may take further actions like triggering the SgNB initiated SgNB Release procedure to release all en-gNB resources allocated for the UE.

**Interaction with the MeNB initiated handover procedure:**

If the MeNB, after having initiated the handover procedure, receives the SGNB CHANGE REQUIRED message, the MeNB shall refuse the SgNB change procedure with an appropriate cause value in the Cause IE.

### 8.3.x CPC Cancel

#### 8.3.x.1 General

This procedure is used by the MeNB node to inform the en-gNB that a list of prepared PSCells are cancelled in the Targert en-gNB during a Conditional PSCell Change.

The procedure uses UE-associated signalling.

#### 8.3.x.2 Successful Operation



Figure 8.3.x.2-1: CPC Cancel

The MeNB initiates the procedure by sending the SGNB CHANGE CANCEL message to the en-gNB including the *Target en-gNB ID* IE and the *CPAC Cancellation Request* IE.

#### 8.3.A.3 Unsuccessful Operation

Not applicable.

#### 8.3.A.4 Abnormal Conditions

Void.

---------skip unchanged----------

9.1.4.2 SGNB ADDITION REQUEST ACKNOWLEDGE

This message is sent by the en-gNB to confirm the MeNB about the SgNB addition preparation.

Direction: en-gNB → MeNB.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| MeNB UE X2AP ID | M |  | eNB UE X2AP ID9.2.24 | Allocated at the MeNB. | YES | reject |
| SgNB UE X2AP ID | M |  | en-gNB UE X2AP ID9.2.100 | Allocated at the en-gNB. | YES | reject |
| **E-RABs Admitted To Be Added List** |  | *1* |  |  | YES | ignore |
| **>E-RABs Admitted To Be Added Item** |  | *1 .. <maxnoofBearers>* |  |  | EACH | ignore |
| >>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>EN-DC Resource Configuration | M |  | EN-DC Resource Configuration9.2.108 | Indicates the PDCP and Lower Layer MCG/SCG configuration. | – |  |
| >>CHOICE *Resource Configuration* | M |  |  |  |  |  |
| *>>>PDCP present in SN* |  |  |  | This choice tag is used if the *PDCP at SgNB* IE in the *EN-DC Resource Configuration* IE is set to the value "present". |  |  |
| >>>>S1 DL GTP Tunnel Endpoint at the SgNB | M |  | GTP Tunnel Endpoint 9.2.1 | en-gNB endpoint of the S1 transport bearer. For delivery of DL PDUs. | – |  |
| >>>>SgNB UL GTP Tunnel Endpoint at PDCP | C-ifMCGpresent |  | GTP Tunnel Endpoint 9.2.1 | en-gNB endpoint of the X2-U transport bearer at PDCP. For delivery of UL PDCP PDUs. | – |  |
| >>>>RLC Mode | C-ifMCGpresent |  | RLC Mode9.2.119 | Indicates the RLC mode. | – |  |
| >>>>DL Forwarding GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | Identifies the X2 transport bearer used for forwarding of DL PDUs | – |  |
| >>>>UL Forwarding GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | Identifies the X2 transport bearer used for forwarding of UL PDUs | – |  |
| >>>>Requested MCG E-RAB Level QoS Parameters | C-ifMCGandSCGpresent\_GBRpresent |  | E-RAB Level QoS Parameters 9.2.9 | Includes E-RAB level QoS parameters requested to be provided by the MCG. | – |  |
| >>>>UL Configuration | C-ifMCGandSCGpresent |  | 9.2.118 | Information about UL usage in the MeNB. | – |  |
| >>>>UL PDCP SN Length | O |  | PDCP SN Length9.2.133 | Indicates the PDCP SN length of the bearer for the UL. | YES | ignore |
| >>>>DL PDCP SN Length  | O |  | PDCP SN Length9.2.133 | Indicates the PDCP SN length of the bearer for the DL. | YES | ignore |
| >>>*PDCP not present in SN* |  |  |  | This choice tag is used if the *PDCP at SgNB* IE in the *EN-DC Resource Configuration* IE is set to the value "not present". |  |  |
| >>>>SgNB DL GTP Tunnel Endpoint at SCG | M |  | GTP Tunnel Endpoint 9.2.1 | SgNB endpoint of the X2-U transport bearer at the SCG. For delivery of DL PDCP PDUs. | – |  |
| >>>>Secondary SgNB DL GTP Tunnel Endpoint at SCG | O |  | GTP Tunnel Endpoint 9.2.1 | SgNB endpoint of the X2-U transport bearer at the SCG. For delivery of DL PDCP PDUs in case of PDCP duplication | – |  |
| >>>>LCID | O |  | 9.2.138 | LCID for the primary path in case of PDCP duplication | YES | ignore |
| E-RABs Not Admitted List | O |  | E-RAB List9.2.28 | A value for *E-RAB ID* shall only be present once in*E-RABs Admitted**List* IE and in *E-RABs Not Admitted List* IE. | YES | ignore |
| SgNB to MeNB Container | M |  | OCTET STRING | Includes the *CG-Config* message or the *CG-CandidateList message* as defined in TS 38.331[31].Note: This IE can be refined to allow with RAN2. | YES | reject |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID9.2.86 | Allocated at the MeNB | YES | reject |
| Admitted split SRBs | O |  | ENUMERATED (srb1, srb2, srb1&2, ...) | Indicates admitted SRBs | YES | reject |
| SgNB Resource Coordination Information | O |  | 9.2.117 | Information used to coordinate resources utilisation between en-gNB and MeNB. | YES | ignore |
| RRC config indication | O |  | 9.2.132 | Indicates the type of RRC configuration used at the en-gNB. | YES | reject |
| Location Information at SgNB | O |  | 9.2.142 | Contains information to support localisation of the UE | YES | ignore |
| Available fast MCG recovery via SRB3 | O |  | ENUMERATED (true, ...) | Indicates the fast MCG recovery via SRB3 isenabled. | YES | ignore |
| **Conditional PSCell Addition Information Acknowledge** | O |  |  |  | YES | ignore |
| **>Candidate PSCell ID List** |  | *1* |  |  | - | - |
| **>>Candidate PSCell ID Item** |  | *1 .. <maxnoofPSCellCandidate>* |  |  | - | - |
| >>>PSCell ID | M |  | Global en-gNB ID9.2.112 |  | - | - |
|  |  |  |  |  |  |  |

|  |  |
| --- | --- |
| **Range bound** | **Explanation** |
| maxnoofBearers | Maximum no. of E-RABs. Value is 256 |
| maxnoofPSCellCandidate | Maximum no. of PSCells for CPAC. Value is FFS. |

|  |  |
| --- | --- |
| **Condition** | **Explanation** |
| ifMCGpresent | This IE shall be present if, for the E-RAB admitted to be added, the *MCG resources* IE in the *EN-DC Resource Configuration* IE is set to the value "present". |
| ifMCGandSCGpresent | This IE shall be present if, for the E-RAB admitted to be added, the *MCG resources* and *SCG resources* IEs in the *EN-DC Resource Configuration* IE are set to the value "present". |
| C-ifMCGandSCGpresent\_GBRpresent | This IE shall be present if, for the E-RAB admitted to be added, the *MCG resources* and *SCG resources* IEs in the *EN-DC Resource Configuration* IE are set to the value "present", and the *GBR QoS Information* IE is present in the *Requested MCG E-RAB Level QoS Parameters* IE. |

**------------------------------------------------Next change--------------------------------------------------**

9.1.4.5 SGNB MODIFICATION REQUEST

This message is sent by the MeNB to the en-gNB to request the preparation to modify en-gNB resources for a specific UE, to query for the current SCG configuration, or to provide the S-RLF-related information to the en-gNB.

Direction: MeNB → en-gNB.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| MeNB UE X2AP ID | M |  | eNB UE X2AP ID9.2.24 | Allocated at the MeNB. | YES | reject |
| SgNB UE X2AP ID | M |  | en-gNB UE X2AP ID9.2.100 | Allocated at the en-gNB. | YES | reject |
| Cause | M |  | 9.2.6 |  | YES | ignore |
| Selected PLMN | O |  | PLMN Identity9.2.4 | The selected PLMN of the SCG in the en-gNB. | YES | ignore |
| Handover Restriction List | O |  | 9.2.3 |  | YES | ignore |
| SCG Configuration Query  | O |  | 9.2.103 |  | YES | ignore |
| **UE Context Information** |  | *0..1* |  |  | YES | reject |
| >NR UE Security Capabilities | O |  | 9.2.107 |  | – |  |
| >SgNB Security Key | O |  | 9.2.101 |  | – |  |
| >SgNB UE Aggregate Maximum Bit Rate | O |  | UE Aggregate Maximum Bit Rate9.2.12 |  | – |  |
| >Lower Layer presence status change | O |  | 9.2.145 |  | – |  |
| **>E-RABs To Be Added List** |  | *0..1* |  |  | – |  |
| **>>E-RABs To Be Added Item** |  | *1 .. <maxnoofBearers>* |  |  | EACH | ignore |
| >>>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>>DRB ID | M |  | 9.2.122 |  | – |  |
| >>>EN-DC Resource Configuration | M |  | EN-DC Resource Configuration9.2.108 | Indicates the PDCP and Lower Layer MCG/SCG configuration. | – |  |
| >>>CHOICE *Resource Configuration* | M |  |  |  |  |  |
| >>>>*PDCP present in SN* |  |  |  | This choice tag is used if the *PDCP at SgNB* IE in the *EN-DC Resource Configuration* IE is set to the value "present". | – |  |
| >>>>>Full E-RAB Level QoS Parameters | M |  | E-RAB Level QoS Parameters 9.2.9 | Includes E-RAB level QoS parameters as received on S1-MME. | – |  |
| >>>>>Maximum MCG admittable E-RAB Level QoS Parameters | C-ifMCGandSCGpresent\_GBR |  | GBR QoS Information 9.2.10 | Includes the GBR QoS Information admittable by the MCG. | – |  |
| >>>>>DL Forwarding  | O |  | 9.2.5 |  | – |  |
| >>>>>MeNB DL GTP Tunnel Endpoint at MCG | C-ifMCGpresent |  | GTP Tunnel Endpoint 9.2.1 | MeNB endpoint of the X2-U transport bearer at MCG. For delivery of DL PDCP PDUs. | – |  |
| >>>>>S1 UL GTP Tunnel Endpoint | M |  | GTP Tunnel Endpoint 9.2.1 | SGW endpoint of the S1-U transport bearer. For delivery of UL PDUs from the en-gNB. | – |  |
| >>>>>RLC Mode | O |  | RLC Mode9.2.119 | Indicates the RLC mode at the MeNB for PDCP transfer to en-gNB. | YES | ignore |
| >>>>>Bearer Type | O |  | 9.2.92 |  | YES | ignore |
| >>>>>Ethernet Type | O |  | 9.2.157 |  | YES | ignore |
| >>>>*PDCP not present in SN* |  |  |  | This choice tag is used if the *PDCP at SgNB* IE in the *EN-DC Resource Configuration* IE is set to the value "present". |  |  |
| >>>>>Requested SCG E-RAB Level QoS Parameters | M |  | E-RAB Level QoS Parameters 9.2.9 | Includes necessary E-RAB level QoS parameters requested to be provided by the SCG. | – |  |
| >>>>>MeNB UL GTP Tunnel Endpoint at PDCP | M |  | GTP Tunnel Endpoint 9.2.1 | MeNB endpoint of the X2-U transport bearer. For delivery of UL PDCP PDUs. | – |  |
| >>>>>Secondary MeNB UL GTP Tunnel Endpoint at PDCP | O |  | GTP Tunnel Endpoint 9.2.1 | MeNB endpoint of the X2-U transport bearer. For delivery of UL PDCP PDUs in case of PDCP duplication. | – |  |
| >>>>>RLC Mode | M |  | RLC Mode9.2.119 | Indicates the RLC mode to be used in the assisting node. | – |  |
| >>>>>UL Configuration | C-ifMCGandSCGpresent |  | 9.2.118 | Information about UL usage in the en-gNB. | – |  |
| >>>>>UL PDCP SN Length | O |  | PDCP SN Length9.2.133 | Indicates the PDCP SN length of the bearer for the UL. | YES | ignore |
| >>>>>DL PDCP SN Length | O |  | PDCP SN Length9.2.133 | Indicates the PDCP SN length of the bearer for the DL. | YES | ignore |
| >>>>>Duplication activation | O |  | 9.2.137 | Indicated the initial staus of PDCP duplication. | YES | ignore |
| **>E-RABs To Be Modified List** |  | *0..1* |  |  | – |  |
| **>>E-RABs To Be Modified Item** |  | *1 .. <maxnoofBearers>* |  |  | EACH | ignore |
| >>>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>>EN-DC Resource Configuration | M |  | EN-DC Resource Configuration9.2.108 | Indicates the PDCP and Lower Layer MCG/SCG configuration. | – |  |
| >>>CHOICE *Resource Configuration* | M |  |  |  |  |  |
| >>>>*PDCP present in SN* |  |  |  | This choice tag is used if the *PDCP at SgNB* IE in the *EN-DC Resource Configuration* IE is set to the value "present". |  |  |
| >>>>>Full E-RAB Level QoS Parameters | O |  | E-RAB Level QoS Parameters 9.2.9 | Includes E-RAB level QoS parameters to be modified as received on S1-MME | – |  |
| >>>>>Maximum MCG admittable E-RAB Level QoS Parameters | O |  | GBR QoS Information 9.2.10 | Includes the GBR QoS information admittable by the MCG | – |  |
| >>>>>MeNB GTP Tunnel Endpoint at MCG | O |  | GTP Tunnel Endpoint 9.2.1 | MeNB endpoint of the X2-U transport bearer at MCG. For delivery of DL PDCP PDUs. | – |  |
| >>>>>S1 UL GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | SGW endpoint of the S1-U transport bearer. For delivery of UL PDUs from the en-gNB. | – |  |
| >>>>>RLC Status | O |  | 9.2.131 | Indicates the RLC has been re-established.. |  |  |
| >>>>*PDCP not present in SN* |  |  |  | This choice tag is used if the *PDCP at SgNB* IE in the *EN-DC Resource Configuration* IE is set to the value "not present". |  |  |
| >>>>>Requested SCG E-RAB Level QoS Parameters | O |  | E-RAB Level QoS Parameters 9.2.9 | Includes E-RAB level QoS parameters requested to be provided by the SCG. | – |  |
| >>>>>MeNB UL GTP Tunnel Endpoint at PDCP | O |  | GTP Tunnel Endpoint 9.2.1 | MeNB endpoint of the X2-U transport bearer. For delivery of UL PDCP PDUs. | – |  |
| >>>>>UL Configuration | O |  | 9.2.118 | Information about UL usage in the en-gNB. | – |  |
| >>>>>UL PDCP SN Length | O |  | PDCP SN Length9.2.133 | Shall be ignored by the en-gNB if received. | YES | ignore |
| >>>>>DL PDCP SN Length | O |  | PDCP SN Length9.2.133 | Shall be ignored by the en-gNB if received. | YES | ignore |
| >>>>>Secondary MeNB UL GTP Tunnel Endpoint at PDCP | O |  | GTP Tunnel Endpoint 9.2.1 | MeNB endpoint of the X2-U transport bearer. For delivery of UL PDCP PDUs in case of PDCP duplication. | YES | ignore |
| **>E-RABs To Be Released List** |  | *0..1* |  |  | – |  |
| **>>E-RABs To Be Released Item** |  | *1 .. <maxnoofBearers>* |  |  | EACH | ignore |
| >>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>>EN-DC Resource Configuration | M |  | EN-DC Resource Configuration9.2.108 | Indicates the PDCP and Lower Layer MCG/SCG configuration. | – |  |
| >>>CHOICE *Resource Configuration* | M |  |  |  |  |  |
| >>>>*PDCP present in SN* |  |  |  | This choice tag is used if the *PDCP at SgNB* IE in the *EN-DC Resource Configuration* IE is set to the value "present". |  |  |
| >>>>>DL Forwarding GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | Identifies the X2 transport bearer used for forwarding of DL PDUs | – |  |
| >>>>>UL Forwarding GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | Identifies the X2 transport bearer. used for forwarding of UL PDUs | – |  |
| >>>>*PDCP not present in SN* |  |  |  | This choice tag is used if the *PDCP at SgNB* IE in the *EN-DC Resource Configuration* IE is set to the value "not present". |  |  |
| >Subscriber Profile ID for RAT/Frequency priority | O |  | 9.2.25 |  | YES | ignore |
| >Additional RRM Policy Index | O |  | 9.2.25a |  | YES | ignore |
| MeNB to SgNB Container | O |  | OCTET STRING | Includes the *CG-ConfigInfo* message as defined in TS 38.331 [31]. | YES | reject |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID9.2.86 | Allocated at the MeNB | YES | reject |
| MeNB Resource Coordination Information | O |  | 9.2.116 | Information used to coordinate resources utilisation between MeNB and en-gNB. | YES | ignore |
| Requested split SRBs | O |  | ENUMERATED (srb1, srb2, srb1&2, ...) | Indicates that resources for Split SRB are requested. | YES | ignore |
| Requested split SRBs release | O |  | ENUMERATED (srb1, srb2, srb1&2, ...) | Indicates that resources for Split SRB are requested to be released. | YES | ignore |
| Desired Activity Notification Level | O |  | 9.2.141 |  | YES | ignore |
| Location Information at SgNB reporting | O |  | ENUMERATED (pscell, ...) | Indicates that the user’s location information is to be provided. | YES | ignore |
| MeNB Cell ID | O |  | ECGI9.2.14 | Indicates the cell ID for PCell in MeNB. | YES | ignore |
| Requested Fast MCG recovery via SRB3 | O |  | ENUMERATED (true, ...) | Indicates that the resources for fast MCG recovery via SRB3 are requested. | YES | ignore |
| Requested Fast MCG recovery via SRB3 Release | O |  | ENUMERATED (true, ...) | Indicates that the resources for fast MCG recovery via SRB3 are requested to be released. | YES | ignore |
| SN triggered  | O |  | ENUMERATED (True, ...) |  | YES | ignore |
| IAB Node Indication | O |  | ENUMERATED (true, ...) |  | YES | reject |
| Conditional PSCell Modification Information Request | O |  |  |  | YES | ignore |
| >CPAC Indicator (FFS) | O |  | ENUMERATED (replace, ...) |  |  |  |
| >Maximum Number of PSCells To Prepare | O |  | INTEGER (1..FFS, ...) | Indicates the maximum number of PSCells that the target SN may prepare. |  |  |

|  |  |
| --- | --- |
| **Range bound** | **Explanation** |
| maxnoofBearers | Maximum no. of E-RABs. Value is 256 |

|  |  |
| --- | --- |
| **Condition** | **Explanation** |
| ifMCGandSCGpresent | This IE shall be present if, for the E-RAB requested to be added, the *MCG resources* and *SCG resources* IEs in the *EN-DC Resource Configuration* IE are set to the value "present". |
| ifMCGpresent | This IE shall be present if, for the E-RAB requested to be added, the *MCG resources* IE in the *EN-DC Resource Configuration* IE is set to the value "present". |
| C-ifMCGandSCGpresent\_GBR | This IE shall be present if, for the E-RAB requested to be added, the *MCG resources* and *SCG resources* IEs in the *EN-DC Resource Configuration* IE are set to the value "present", and *GBR QoS Information* IE is present in *Full E-RAB Level QoS Parameters* IE. |

9.1.4.6 SGNB MODIFICATION REQUEST ACKNOWLEDGE

This message is sent by the en-gNB to confirm the MeNB’s request to modify the en-gNB resources for a specific UE.

Direction: en-gNB → MeNB.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| MeNB UE X2AP ID | M |  | eNB UE X2AP ID9.2.24 | Allocated at the MeNB. | YES | ignore |
| SgNB UE X2AP ID | M |  | en-gNB UE X2AP ID9.2.100 | Allocated at the en-gNB. | YES | ignore |
| **E-RABs Admitted To Be Added List** |  | *0..1* |  |  | YES | ignore |
| **>E-RABs Admitted To Be Added Item** |  | *1 .. <maxnoofBearers>* |  |  | EACH | ignore |
| >>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>EN-DC Resource Configuration | M |  | EN-DC Resource Configuration9.2.108 | Indicates the PDCP and Lower Layer MCG/SCG configuration. | – |  |
| >>CHOICE *Resource Configuration* | M |  |  |  |  |  |
| >>>*PDCP present in SN*  |  |  |  | This choice tag is used if the *PDCP at SgNB* IE in the *EN-DC Resource Configuration* IE is set to the value "present". |  |  |
| >>>>S1 DL GTP Tunnel Endpoint at the SgNB | M |  | GTP Tunnel Endpoint 9.2.1 | SgNB endpoint of the S1 transport bearer. For delivery of DL PDUs. | – |  |
| >>>>SgNB UL GTP Tunnel Endpoint at PDCP | C-ifMCGpresent |  | GTP Tunnel Endpoint 9.2.1 | SgNB endpoint of the X2-U transport bearer at PDCP. For delivery of UL PDCP PDUs. | – |  |
| >>>>RLC Mode | C-ifMCGpresent |  | RLC Mode9.2.119 | Indicates the RLC mode to be used at the assisting node. | – |  |
| >>>>DL Forwarding GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | Identifies the X2 transport bearer used for forwarding of DL PDUs | – |  |
| >>>>UL Forwarding GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | Identifies the X2 transport bearer used for forwarding of UL PDUs | – |  |
| >>>>Requested MCG E-RAB Level QoS Parameters | C-ifMCGandSCGpresent\_GBRpresent |  | E-RAB Level QoS Parameters 9.2.9 | Includes E-RAB level QoS parameters requested to be provided by the MCG. | – |  |
| >>>>UL Configuration | C-ifMCGandSCGpresent |  | 9.2.118 | Information about UL usage in the MeNB. | – |  |
| >>>>UL PDCP SN Length | O |  | PDCP SN Length9.2.133 | Indicates the PDCP SN length of the bearer for the UL. | YES | ignore |
| >>>>DL PDCP SN Length | O |  | PDCP SN Length9.2.133 | Indicates the PDCP SN length of the bearer for the DL. | YES | ignore |
| >>>*PDCP not present in SN* |  |  |  | This choice tag is used if the *PDCP at SgNB* IE in the *EN-DC Resource Configuration* IE is set to the value "not present". |  |  |
| >>>>SgNB DL GTP Tunnel Endpoint at SCG | M |  | GTP Tunnel Endpoint 9.2.1 | Endpoint of the X2-U transport bearer at the SCG. For delivery of DL PDCP PDUs. | – |  |
| >>>>Secondary SgNB DL GTP Tunnel Endpoint at SCG | O |  | GTP Tunnel Endpoint 9.2.1 | Endpoint of the X2-U transport bearer at the SCG. For delivery of DL PDCP PDUs in case of PDCP duplication. | – |  |
| >>>>LCID | O |  | 9.2.138 | LCID for the primary path in case of PDCP duplication configured. | YES | ignore |
| **E-RABs Admitted To Be Modified List** |  | *0..1* |  |  | YES | ignore |
| **>E-RABs Admitted To Be Modified Item** |  | *1 .. <maxnoofBearers>* |  |  | EACH | ignore |
| >>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>EN-DC Resource Configuration | M |  | EN-DC Resource Configuration9.2.108 | Indicates the PDCP and Lower Layer MCG/SCG configuration. | – |  |
| >>CHOICE *Resource Configuration* | M |  |  |  |  |  |
| >>>*PDCP present in SN* |  |  |  | This choice tag is used if the *PDCP at SgNB* IE in the *EN-DC Resource Configuration* IE is set to the value "present". |  |  |
| >>>>S1 DL GTP Tunnel Endpoint | O |  | GTP Tunnel Endpoint 9.2.1 | SgNB endpoint of the S1 transport bearer. For delivery of DL PDUs. | – |  |
| >>>>SgNB UL GTP Tunnel Endpoint at PDCP | O |  | GTP Tunnel Endpoint 9.2.1 | SgNB endpoint of the X2-U transport bearer at PDCP. For delivery of UL PDCP PDUs. | – |  |
| >>>>Requested MCG E-RAB Level QoS Parameters  | O |  | E-RAB Level QoS Parameters 9.2.9 | Includes E-RAB level QoS parameters requested to be provided by the MCG. | – |  |
| >>>>UL Configuration | O |  | 9.2.118 | Information about UL usage in the MeNB. | – |  |
| >>>>UL PDCP SN Length | O |  | PDCP SN Length9.2.133 | Shall be ignored by the MeNB if received. | YES | ignore |
| >>>>DL PDCP SN Length | O |  | PDCP SN Length9.2.133 | Shall be ignored by the MeNB if received. | YES | ignore |
| >>>*PDCP not present in SN* |  |  |  | This choice tag is used if the *PDCP at SgNB* IE in the *EN-DC Resource Configuration* IE is set to the value "not present". |  |  |
| >>>>SgNB DL GTP Tunnel Endpoint at SCG | O |  | GTP Tunnel Endpoint 9.2.1 | SgNB endpoint of the X2-U transport bearer at the SCG. For delivery of DL PDCP PDUs. | – |  |
| >>>>Secondary SgNB DL GTP Tunnel Endpoint at SCG | O |  | GTP Tunnel Endpoint 9.2.1 | Endpoint of the X2-U transport bearer at the SCG. For delivery of DL PDCP PDUs in case of PDCP duplication. | YES | ignore |
| >>>>RLC Status | O |  | 9.2.131 | Indicates the RLC has been re-established. | YES | ignore |
| **E-RABs Admitted To Be Released List** |  | *0..1* |  |  | YES | ignore |
| **>E-RABs Admitted To Be Released Item** |  | *1 .. <maxnoofBearers>* |  |  | EACH | ignore |
| >>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>EN-DC Resource Configuration | M |  | EN-DC Resource Configuration9.2.108 | Indicates the PDCP and Lower Layer MCG/SCG configuration. | – |  |
| >>CHOICE *Resource Configuration* | M |  |  | Note: no further information contained in the IE container |  |  |
| E-RABs Not Admitted List | O |  | E-RAB List9.2.28 | A value for *E-RAB ID* shall only be present once in*E-RABs Admitted**List* IE and in *E-RABs Not Admitted List* IE. | YES | ignore |
| SgNB to MeNB Container | O |  | OCTET STRING | Includes the NR *CG-Config* or the *CG-CandidateList* message as defined in TS 38.331 [31]. Note: This IE can be refined to allow with RAN2. | YES | ignore |
| Criticality Diagnostics | O |  | 9.2.7 |  | YES | ignore |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID9.2.86 | Allocated at the MeNB | YES | ignore |
| SgNB Resource Coordination Information | O |  | 9.2.117 | Information used to coordinate resources utilisation between en-gNB and MeNB. | YES | ignore |
| Admitted split SRBs | O |  | ENUMERATED (srb1, srb2, srb1&2, ...) | Indicates admitted SRBs | YES | ignore |
| Admitted split SRBs release | O |  | ENUMERATED (srb1, srb2, srb1&2, ...) | Indicates admitted SRBs release | YES | ignore |
| RRC config indication | O |  | 9.2.132 | Indicates the type of RRC configuration used at the en-gNB. | YES | reject |
| Location Information at SgNB | O |  | 9.2.142 | Contains information to support localisation of the UE | YES | ignore |
| Available fast MCG recovery via SRB3 | O |  | ENUMERATED (true, ...) | Indicates the fast MCG recovery via SRB3 isenabled. | YES | ignore |
| Release fast MCG recovery via SRB3 | O |  | ENUMERATED (true, ...) | Indicates the fast MCG recovery via SRB3 is released. | YES | ignore |
| **Conditional PSCell Modification Information Acknowledge** | O |  |  | Note: This IE can be refined to allow with RAN2. | YES | ignore |
| **>Candidate PSCell ID List** |  | 1 |  |  | - | - |
| **>>Candidate PSCell ID Item** |  | 1 .. <maxnoofPSCellCandidate> |  |  | - | - |
| **>>>PSCell ID** | M |  | Global en-gNB ID9.2.112 |  | - | - |

|  |  |
| --- | --- |
| **Range bound** | **Explanation** |
| maxnoofBearers | Maximum no. of E-RABs. Value is 256 |

|  |  |
| --- | --- |
| **Condition** | **Explanation** |
| ifMCGandSCGpresent | This IE shall be present if, for the E-RAB admitted to be added, the *MCG resources* and *SCG resources* IEs in the *EN-DC Resource Configuration* IE are set to the value "present". |
| ifMCGpresent | This IE shall be present if, for the E-RAB admitted to be added, the *MCG resources* IE in the *EN-DC Resource Configuration* IE is set to the value "present". |
| C-ifMCGandSCGpresent\_GBRpresent | This IE shall be present if, for the E-RAB admitted to be added, the *MCG resources* and *SCG resources* IEs in the *EN-DC Resource Configuration* IE are set to the value "present", and the *GBR QoS Information* IE is present in the *Requested MCG E-RAB Level QoS Parameters* IE. |

#### 9.1.4.8 SGNB MODIFICATION REQUIRED

This message is sent by the en-gNB to the MeNB to request the modification of en-gNB resources for a specific UE.

Direction: en-gNB → MeNB.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| MeNB UE X2AP ID | M |  | eNB UE X2AP ID9.2.24 | Allocated at the MeNB. | YES | reject |
| SgNB UE X2AP ID | M |  | en-gNB UE X2AP ID9.2.100 | Allocated at the en-gNB. | YES | reject |
| Cause | M |  | 9.2.6 |  | YES | ignore |
| PDCP Change Indication | O |  | 9.2.109 |  | YES | ignore |
| **E-RABs To Be Released List** |  | *0..1* |  |  | YES | ignore |
| **>E-RABs To Be Released Item** |  | *1 .. <maxnoofBearers>* |  |  | EACH | ignore |
| >>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>Cause | M |  | 9.2.6 |  | – |  |
| >>RLC Mode | O |  | RLC Mode9.2.119 | Indicates the RLC mode at the en-gNB for PDCP transfer to MeNB. | YES | ignore |
| SgNB to MeNB Container | O |  | OCTET STRING | Includes the NR *CG-Config* or the *CG-CandidateList* message as defined in TS 38.331 [31]. Note: This IE can be refined to allow with RAN2. | YES | ignore |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID9.2.86 | Allocated at the MeNB | YES | reject |
| **E-RABs To Be Modified List** |  | *0..1* |  |  | YES | ignore |
| **>E-RABs To Be Modified Item** |  | *1 .. <maxnoofBearers>* |  |  | EACH | ignore |
| >>E-RAB ID | M |  | 9.2.23 |  | – |  |
| >>EN-DC Resource Configuration | M |  | EN-DC Resource Configuration9.2.108 | Indicates the PDCP and Lower Layer MCG/SCG configuration. | – |  |
| >>CHOICE *Resource Configuration* | M |  |  |  |  |  |
| >>>*PDCP present in SN* |  |  |  | This choice tag is used if the *PDCP at SgNB* IE in the *EN-DC Resource Configuration* IE is set to the value "present". |  |  |
| >>>>Requested MCG E-RAB Level QoS Parameters | O |  | E-RAB Level QoS Parameters 9.2.9 | Includes E-RAB level QoS parameters requested to be provided by the MCG. | – |  |
| >>>>UL Configuration | O |  | 9.2.118 | Information about UL usage in the MeNB. | – |  |
| >>>>UL PDCP SN Length | O |  | PDCP SN Length9.2.133 | Shall be ignored by the MeNB if received. | YES | ignore |
| >>>>DL PDCP SN Length | O |  | PDCP SN Length9.2.133 | Shall be ignored by the MeNB if received. | YES | ignore |
| >>>>SgNB UL GTP Tunnel Endpoint at PDCP | O |  | GTP Tunnel Endpoint 9.2.1 | SgNB endpoint of the X2-U transport bearer at PDCP. For delivery of UL PDCP PDUs. | – |  |
| >>>>S1 DL GTP Tunnel Endpoint at the SgNB | O |  | GTP Tunnel Endpoint 9.2.1 | en-gNB endpoint of the S1 transport bearer. For delivery of DL PDUs. | – |  |
| >>>>New DRB ID Request | O |  | ENUMERATED (True, …,) |  | YES | ignore |
| *>>>PDCP not present in SN* |  |  |  | This choice tag is used if the *PDCP at SgNB* IE in the *EN-DC Resource Configuration* IE is set to the value "not present". |  |  |
| >>>>SgNB DL GTP Tunnel Endpoint at SCG | O |  | GTP Tunnel Endpoint 9.2.1 | SgNB endpoint of the X2-U transport bearer at the SCG. For delivery of DL PDCP PDUs. | – |  |
| >>>>Secondary SgNB DL GTP Tunnel Endpoint at SCG | O |  | GTP Tunnel Endpoint 9.2.1 | SgNB endpoint of the X2-U transport bearer at the SCG. For delivery of DL PDCP PDUs for PDCP duplication. | – |  |
| >>>>RLC Status | O |  | 9.2.131 | Indicates the RLC has been re-established.. |  |  |
| >>>>LCID | O |  | 9.2.138 | Indicate the LCID of the primary path in case of PDCP duplication | YES | ignore |
| SgNB Resource Coordination Information | O |  | 9.2.117 | Information used to coordinate resources utilisation between the en-gNB and the MeNB. | YES | ignore |
| RRC config indication | O |  | 9.2.132 | Indicates the type of RRC configuration used at the en-gNB. | YES | reject |
| Location Information at SgNB | O |  | 9.2.142 | Contains information to support localisation of the UE | YES | ignore |
| Conditional PSCell Modification Information Required | O |  |  |  | YES | ignore |
| >CPAC Indicator | O |  | ENUMERATED (replace, ...) |  |  |  |
| >Candidate PSCell ID List |  | *0..1* |  |  | - | - |
| >>Candidate PSCell ID Item |  | *1 .. <maxnoofPSCellCandidate>* |  |  | - | - |
| >>>PSCell ID | M |  | Global en-gNB ID9.2.112 |  | - | - |

|  |  |
| --- | --- |
| Range bound | Explanation |
| maxnoofBearers | Maximum no. of E-RABs. Value is 256 |

#### 9.1.4.17 SGNB CHANGE REQUIRED

This message is sent by the en-gNB to the MeNB to request the change of en-gNB for a specific UE.

Direction: en-gNB → MeNB.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| MeNB UE X2AP ID | M |  | eNB UE X2AP ID9.2.24 | Allocated at the MeNB. | YES | reject |
| SgNB UE X2AP ID | M |  | en-gNB UE X2AP ID9.2.100 | Allocated at the en-gNB. | YES | reject |
| Target SgNB ID Information | M |  | 9.2.102 |  | YES | reject |
| Cause | M |  | 9.2.6 |  | YES | ignore |
| SgNB to MeNB Container | O |  | OCTET STRING | Includes the *CG-Config* message as defined in TS 38.331 [31]. | YES | reject |
| MeNB UE X2AP ID Extension | O |  | Extended eNB UE X2AP ID9.2.86 | Allocated at the MeNB. | YES | reject |
| Conditional PSCell Change Information Required | O |  |  |  | YES | ignore |
| >CPAC Indicator | M |  | ENUMERATED (replace, cancel...) |  |  |  |

#### 9.1.4.xx CPC CANCEL

This message is sent by the MeNB to the en-gNB to inform the cancellation of a list of prepared PSCells in the target SgNB during a Conditional PSCell Change.

Direction: MeNB → en-gNB.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description | Criticality | Assigned Criticality |
| Message Type | M |  | 9.2.13 |  | YES | reject |
| MeNB UE X2AP ID | M |  | eNB UE X2AP ID9.2.24 | Allocated at the MeNB. | YES | ignore |
| SgNB UE X2AP ID | M |  | en-gNB UE X2AP ID9.2.100 | Allocated at the en-gNB. | YES | ignore |
| Cause | M |  | 9.2.6 |  | YES | ignore |
| Target en-gNB ID Information | M |  | 9.2.102 |  | YES | reject |
| CPAC Cancellation Request | O |  |  |  | YES | reject |
| >CPAC Cancellation Indicator | M |  | ENUMERATED (true, ...) |  |  |  |
| >Cancelled PSCell ID List |  | 1 |  |  |  |  |
| >>Cancelled PSCell ID Item |  | 1 .. <*maxnoofPSCellCandidate*> |  |  |  |  |
| >>>PSCell ID | M |  | NR CGI 9.2.111 |  |  |  |

**------------------------------------------------End of change--------------------------------------------------**