**3GPP TSG-RAN WG3 #112e** ***Draft R3-212644***

**Online, 17th – 27th May 2021**

**Agenda Item: 14.2**

**Source: Lenovo, Motorola Mobility**

**Title: Summary of offline discussion on SCG activation and deactivation**

**Document for: Discussion and Approval**

# 1 Introduction

**CB: # MRDC2-SCG\_activation\_deactivation**

**- Further discussion on the open issues left in** [**R3****-211132**](Inbox%5CR3-211132.zip) **and check RAN2 progress**

**- How to handle the SCG (de) activation failure case? Partial rejection or full rejection? New cause value?**

**- Detail codepoint for the new IE of (de) SCG activation?**

**- How to support SN initiated SCG (de) activation?**

**- The MN/SN may reject the SN/MN’s request for the SCG to be deactivated? Whether the MN can reject the SCG activation request from the SN is FFS?**

**- SCG activity detection solution?**

**- Impact on F1 and E1 interfaces?**

**- Whether it’s needed to distinguish UE triggered SCG activation from NW (i.e. MN or SN) triggered SCG activation, e.g. in SN modification request/required message?**

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

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

(Len - moderator)

Summary of offline disc [R3-212644](Inbox%5CR3-212644.zip)

The offline discussion will comprise 2 phases

* Phase 1: Try to identify easy agreements and controversial issues for Phase 2 discussion
	+ Deadline: 19th May, 4am UTC
* Phase 2: Discussing controversial issues identified in Phase 1 and try to make progress

# 2 For the Chairman’s Notes (Phase 1)

# 3 Discussion (Phase 1)

## 3.1 Issues related to Xn/X2 interfaces

First of all, to facilitate the relevant discussion and for clarification, we refer to the term partial rejection and full rejection with the meaning of below:

* **Partial rejection:** The concerned RAN node accepts the SN addition/modification procedure initiated by the peer RAN node (e.g. by sending a SN addition/modification request acknowledge message), but rejects the SCG (de)activation as the peer RAN node requested.
* **Full rejection:** The concerned RAN node rejects the SN addition/modification procedure initiated by the peer RAN node due to the rejection of SCG (de)activation as the peer RAN node requested (e.g. by sending a SN addition/modification request reject message).

### 3.1.1. MN initiated SN addition procedure

In the last RAN3#111e meeting, the following agreements and open issues were listed for MN initiated SN addition procedure.

|  |
| --- |
| **Xn interface: MN initiated SN addition procedure:****Add a new IE in the SN addition request message to indicate at least the de-activation, while the detail code of this new IE is FFS.**E.g., if the IE is set to 1 or not existed, the SCG is requested to activate. If the IE is set to 0, the SCG is requested to de-activate.**Add a new IE in the SN addition response message to indicate at least the de-activation result, while the detail code of this new IE is FFS.**E.g., if the IE is set to 0, the SCG is de-activated. If the IE is set to 1, the SCG is activated. Open issue 1: During SN addition procedure, if the request of SCG (de)activation is rejected:1) SN uses the response message including “SCG deactivation” result is sufficient;2) or SN allows to use the reject message including new Cause value; 3) or SN allows to uses the reject message as legacy (without new Cause) |

#### 3.1.1.1 SCG (de)activation indicator design

In the legacy, when MN initiates SN addition, the SCG state is by default activated when added, and there is no specific indicator in the SN addition Xn/X2 message indicating SCG state (i.e. activated). In Release 17, SCG state can be either activated or deactivated after SN addition, and RAN3 has agreed to introduce a new IE to indicate the SCG state in Xn/X2 message. With respect to the exact code point design, there are different views.

* **Option 1**: [1][7][21][24] believe RAN3 can follow the legacy principle, i.e. only one code point for SCG deactivation is needed, and absence of this new IE means SCG activation by default as legacy.
* **Option 2**: [4][14][15][25] believes two code points are needed to indicate SCG activation and SCG deactivation respectively.
	+ In particular, [15][25] don’t think Option 1 can work. In case of Option 1, upon SN addition with SCG activation, SN will not be able to tell if the initiating MN is a legacy MN or Rel17 MN (due to no explicit SCG activation indicator), and thus cannot decide whether can reject the SCG activation (e.g. indicating the SCG activation result) in the SN addition request acknowledge message. In moderator’s understanding, such observation assumes partial rejection is adopted.

* **Option 3**: [11] proposes one compromise to combine option 1 and option 2, i.e. the new IE has two code points indicating SCG activation and SCG deactivation respectively, and the absence of such IE means SCG activation.

As mentioned in [15][25], which option to use seems dependent on the outcome of full/partial rejection discussion. From moderator perspective, it would be better to postpone the down-selection among option 1, 2, 3 after the decision of full/part rejection. On the other hand, it is still worth checking if it is common understanding among companies that if partial rejection is adopted for SCG activation during SN addition, option 2 will be the way to go.

**Question 1: Do companies agree that for SCG activation during SN addition, if partial rejection (i.e. SN can set SCG deactivated when accepting SN addition) is supported, one code point for SCG activation is needed to help SN understand if partial rejection is allowed?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

#### 3.1.1.2 Full rejection or partial rejection

The next issue is whether full rejection or partial rejection shall be adopted for SCG (de)activation during SN addition.

[1] thinks full rejection shall be used in case of SCG activation (i.e. SN cannot deactivate SCG if MN requests SCG activation during SN addition), while partial rejection can be considered in case of SCG deactivation (i.e. SN ca activate SCG if MN requests SCG deactivation during SN addition).

[7][20] believes full rejection shall be used for both SCG activation and SCG deactivation during SN addition. In one example, if SN rejects the SCG activation during SN addition, that could make the SN addition pointless. In general, there seems to be no clear reason why SN would reject the SCG activation and SCG deactivation during SN addition.

[4][14][15][25] thinks partial rejection shall be used for both SCG activation and SCG deactivation during SN addition. Some company believes partial rejection is a more efficient way of signaling, and can be a unified solution applicable to all other scenarios (e.g. SCG (de)activation during SN modification).

[10] believes SN shall not reject the SCG deactivation if accept SN addition, but can reject the SCG activation if accept SN addition.

[11] thinks the SN shall not reject the SCG state requested by MN during SN addition. From moderator point of view, that means the spec shall mandate the SN to accept the SCG state requested by MN during SN addition.

Companies’ views are still diverging, and in some papers the reason to support full/partial rejection is not very clear neither. Thus, before down-selecting the solution, moderator believes it would be helpful to first analyze the technical issues if SN can or cannot set the SCG deactivated/activated if MN request SCG activated/deactivated during SN addition.

In the Q2.1 and Q2.2, companies are encouraged to respond to the view from the other camp.

**Question 2.1: For SCG activation during SN addition, companies are kindly asked which option below is preferred. Companies are encouraged to comment the reason, and if the other option cannot work properly and thus not acceptable.**

* **Option 1: SN can set the SCG deactivated if accepting SN addition (i.e. partial rejection)**
* **Option 2: SN cannot set the SCG deactivated if accepting SN addition**

|  |  |  |
| --- | --- | --- |
| **Company** | **Option 1, 2** | **Comment** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

**Question 2.2: For SCG deactivation during SN addition, companies are kindly asked which option below is preferred. Companies are encouraged to comment the reason, and if the other option cannot work properly and thus not acceptable.**

* **Option 1: SN can set the SCG activated if accepting SN addition (i.e. partial rejection)**
* **Option 2: SN cannot set the SCG activated if accepting SN addition**

|  |  |  |
| --- | --- | --- |
| **Company** | **Option 1, 2** | **Comment** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

**Question 2.3: for companies selecting Option 2 in Q2.1 or Q2.2, i.e. not supporting partial rejection, the next question would be whether RAN3 needs to define the SN addition request reject procedure due to the fact that SN cannot activate or deactivate the SCG as MN requested. Companies are kindly asked which option below is preferred.**

* **Option 1: If SN cannot activate or deactivate the SCG as MN requested during SN addition, SN shall send a SN addition request reject message to MN (i.e. full rejection)**
* **Option 2: Specify that SN shall accept the SCG state requested by MN during SN addition. Thus, there will be no SN addition request reject message sent due to SCG state rejection.**

|  |  |  |
| --- | --- | --- |
| **Company** | **Option 1, 2** | **Comment** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

Another related question is that, if partial rejection is not used (i.e. for companies selecting Option 2 in Q2.1 and/or Q2.2), there seems no need to indicate the SCG (de)activation result in the SN addition response message. Because accepting SN addition will automatically mean the SCG state requested by MN is accepted by SN. On the other hand, in the last meeting, RAN3 agreed to indicate at least the de-activation result in the SN addition response message

|  |
| --- |
| **Add a new IE in the SN addition response message to indicate at least the de-activation result, while the detail code of this new IE is FFS.**E.g., if the IE is set to 0, the SCG is de-activated. If the IE is set to 1, the SCG is activated.  |

Therefore, companies are kindly asked whether the previous RAN3 agreement still holds if partial rejection is not used.

**Question 2.4: for companies selecting Option 2 in Q2.1 or Q2.2, i.e. not supporting partial rejection, another question would be whether a new IE in the SN addition request acknowledge message indicating the (de)activation result is still needed?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes, No** | **Comment** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

**Question 2.5: for companies selecting Option 1 in Q2.3, i.e. supporting full rejection, do companies agree that a new cause value shall be used in the reject message to indicate the reason of rejecting? If yes, what is the cause value?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes, No** | **Comment** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

### 3.1.2 MN initiated SN modification procedure

In the last RAN3 meeting, the following agreements and open issues were made related to MN initiated SN modification procedure. Basically, when MN wants to activate or deactivate the SCG, it can initiate a SN modification procedure towards the peer SN. It is agreed that a new IE with two code points will be used in the SN modification request message indicating SCG activation or deactivation. However, it is still unclear, whether full rejection or partial rejection shall be adopted in case SN cannot (de)activate the SCG as MN requested.

|  |
| --- |
| **MN initiated SN modification procedure****Add a new IE, e.g., “SCG activation requested” with two codepoints in the SN modification request message in order to indicate the SCG is requested to activate or de-activate.****Add a new IE, e.g., “SCG activation result” with two codepoints in the SN modification response message in order to indicate the SCG is activated or de-activated.**Open issue 2: During SN modification procedure, if the request of SCG (de)activation is rejected:1) SN uses the response message including “SCG (de)activation” is sufficient;2) or SN allows to use the reject message including new Cause value; 3) or SN allows to use the reject message as legacy (without new Cause). |

[1][20] believe full rejection shall be adopted for SN to reject the SCG (de)activation during MN initiated SN modification. In particular [1] thinks one Xn/X2 message carrying both SCG state change and bearer change is an optimized case but complicated, and thus shall not be considered in Rel17. For the case Xn/X2 message only carries SCG state change, full rejection can be easily used. [20] aims at a unified solution (i.e., full/partial rejection) for SCG (de)activation during both MN initiated SN modification, and SN initiated SN modification. If SN modification required message carries both SCG (de)activation and relevant RRC container, using partial rejection will create the situation that MN rejects the SCG (de)activation requested by SN over Xn/X2 interface but sends the relevant RRC configuration to UE, which is contradictory. Thus, [20] believes it’s simpler to use full rejection for SCG (de)activation during both MN initiated SN modification, and SN initiated SN modification.

[10] also thinks if the MN initiated SN modification is only about SCG state change, SN can reject it using full rejection. On the other hand, if the MN initiated SN modification includes both SCG state change and relevant bearer modification, SN can reject in case of SCG deactivation, but shall not reject in case of activation.

[4][7][14] believe partial rejection shall be used for SN to reject the SCG (de)activation during MN initiated SN modification. Partial rejection is seen as a more efficient way of signaling, and can be a unified solution applicable to all other scenarios (e.g. SCG (de)activation during SN addition).

[11] thinks both partial and full rejection can be supported for SN to reject the SCG (de)activation during MN initiated SN modification. Besides, rejection cause can be added in both N MODIFICATION REQUEST ACKNOWLEDGE (in case of partial rejection) and SN MODIFICATION REQUEST REJECT message (in case of full rejection).

Similar to the SN addition case, companies’ views are still diverging, and in some papers the reason to support full/partial rejection is not very clear neither. Thus, before down-selecting the solution, moderator believes it would be helpful to first analyze the technical issues if SN can or cannot set the SCG deactivated/activated if MN requests SCG activated/deactivated during MN initiated SN modification.

In the Q3.1 and Q3.2, companies are encouraged to respond to the view from the other camp.

**Question 3.1: For SCG activation during MN initiated SN modification, companies are kindly asked which option below is preferred. Companies are encouraged to comment the reason, and if the other option cannot work properly and thus not acceptable.**

* **Option 1: SN can set the SCG deactivated if accepting SN modification request (i.e. partial rejection)**
* **Option 2: SN cannot set the SCG deactivated if accepting SN modification request**

|  |  |  |
| --- | --- | --- |
| **Company** | **Option 1, 2** | **Comment** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

**Question 3.2: For SCG deactivation during MN initiated SN modification, companies are kindly asked which option below is preferred. Companies are encouraged to comment the reason, and if the other option cannot work properly and thus not acceptable.**

* **Option 1: SN can set the SCG activated if accepting SN modification request (i.e. partial rejection)**
* **Option 2: SN cannot set the SCG activated if accepting SN modification request**

|  |  |  |
| --- | --- | --- |
| **Company** | **Option 1, 2** | **Comment** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

**Question 3.3: for companies selecting Option 1 in Q3.1 or Q3.2, i.e. supporting partial rejection, do companies agree that a new cause value shall be used in the acknowledge message to indicate the reason of rejecting? If yes, what is the cause value?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes, No** | **Comment** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

**Question 3.4: for companies selecting Option 2 in Q3.1 or Q3.2, i.e. not supporting partial rejection, the next question would be whether RAN3 needs to define the SN modification request reject procedure due to the fact that SN cannot activate or deactivate the SCG as MN requested. Companies are kindly asked which option below is preferred.**

* **Option 1: If SN cannot activate or deactivate the SCG as MN requested during MN initiated SN modification, SN shall send a SN modification request reject message to MN (i.e. full rejection)**
* **Option 2: Specify that SN shall accept the SCG state requested by MN during MN initiated SN modification. Thus, there will be no SN modification request reject message sent due to SCG state rejection.**

|  |  |  |
| --- | --- | --- |
| **Company** | **Option 1, 2** | **Comment** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

Another related question is that, if partial rejection is not supported (i.e. for companies selecting Option 2 in Q2.1 or Q2.2), there seems no need to indicate the SCG (de)activation result in the SN modification response message. Because accepting SN modification request will automatically mean the SCG state requested by MN is accepted by SN. On the other hand, in the last meeting, RAN3 agreed to indicate the SCG (de)activation result in the SN modification response message

|  |
| --- |
| **Add a new IE, e.g., “SCG activation result” with two codepoints in the SN modification response message in order to indicate the SCG is activated or de-activated.** |

Therefore, companies are kindly asked whether the previous RAN3 agreement still holds if partial rejection is not supported.

**Question 3.5: for companies selecting Option 2 in Q3.1 or Q3.2, i.e. not supporting partial rejection, another question would be whether a new IE in the SN modification request acknowledge message indicating the (de)activation result is still needed?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes, No** | **Comment** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

**Question 3.6: for companies selecting Option 1 in Q3.4, i.e. supporting full rejection, do companies agree that a new cause value shall be used in the reject message to indicate the reason of rejecting? If yes, what is the cause value?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes, No** | **Comment** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

### 3.1.3 Support of SN initiated SCG (de)activation

In the previous RAN2 meeting, RAN2 agreed that SN can request the SCG activation and deactivation. Then the following question is how to support it.

RAN2#113-e Agreement

1a SCG activation can be requested by MN/SN/UE. FFS on how to accept/reject the procedure. FFS which signalling is used.

1b SCG deactivation can be requested by MN/SN. FFS whether UE can request deactivation. FFS on how to accept/reject the procedure. FFS which signalling is used.

There are basically two alternative solutions:

* Option1: SN triggered SN modification procedure
* Option 2: Activity Notification + MN triggered SN modification procedure

[7][15] believe Option 2 is the better choice because via Activity Notification, MN is aware of the current traffic in both MN and SN and is able to make the right SCG (de)activation decision.

[1][4][11][20][25] assume Option 1 shall be supported, but have different views on whether MN can reject the SCG (de)activation required by SN, and how to reject.

From moderator understanding, Option 2 is any way supported given that RAN3 already supports SCG (de)activation via MN initiated SN modification. Then, the question is whether RAN3 wants to support SCG (de)activation via SN initiated SN modification procedure.

**Question 4.1: Companies are kindly asked if RAN3 shall support SCG (de)activation via SN initiated SN modification procedure? And if any critical issue is foreseen?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes, No** | **Comment** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

For companies think RAN3 shall support SCG (de) activation via SN initiated SN modification procedure, the next question would be whether MN can reject the SCG (de)activation required by SN, and how to reject. The intuitive thinking would be to reuse, the principle, if agreed, for SCG (de)activation via MN initiated SN modification procedure. On the other hand, the handling of RRC container in SN initiated SN modification procedure is different than the MN initiated SN modification case.

As raised in [20], if the SCG (de)activation is triggered by SN via SN modification required procedure, in the same SN modification required Xn message, it will probably contain an indicator indicating the requested SCG state as well as a RRC container containing RRC configurations related to SCG (de)activation. If MN accepts the required SN modification but rejects the SCG (de)activation (i.e. partial rejection), it will create a contradictive situation that MN will forward the RRC configuration related to SCG (de)activation to UE over Uu interface, while reject the SCG (de)activation over Xn interface. Of course, the RRC configuration related to SCG (de)activation can be reconfigured later by SN, but it creates unnecessary complexity.

On the other hand, [1] thinks one Xn/X2 message carrying both SCG state change and bearer change is an optimized case but complicated, and thus shall not be considered in Rel17. For the case Xn/X2 message only carries SCG state change, full rejection can be easily used.

**Question 4.2: For companies selecting Yes in Q4.1, shall RAN3 consider the case that the SN modification required message carries both an indicator indicating SCG (de)activation to MN and a RRC container containing relevant SN RRC configuration to UE?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes, No** | **Comment** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

**Question 4.3: For companies selecting Yes to Q4.2, do companies think partial rejection can work considering the relevant SN RRC configuration will be sent to UE?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes, No** | **Comment** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

**Question 4.4: For companies selecting Yes in Q4.1, is there any other issue, besides the RRC container issue raised in Q4.2 and Q4.3, preventing reusing the same principle as the SCG (de)activation via MN initiated SN modification case in terms of whether/how to reject the SCG (de)activation required by SN?**

* **Yes, please list the issue**
* **No, then the same principle, once agreed, for SCG (de)activation via MN initiated SN modification will be reused for SCG (de)activation via SN initiated SN modification, i.e. whether/how MN rejects the SCG (de)activation required by SN**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes, No** | **Comment** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

### 3.1.4 Support of UE initiated SCG (de)activation

RAN2 has also agreed to support SCG activation requested by UE. RAN2 is still discussing the exact solution, e.g. via a random access to PSCell.

RAN2#113-e Agreement

1a SCG activation can be requested by MN/SN/UE. FFS on how to accept/reject the procedure. FFS which signalling is used.

With respect to RAN3 impact, one issue worth discussion is if the UE triggered SCG activation has to be distinguished from MN or SN triggered SCG activation. For example, it could be beneficial for the MN to understand if the received SCG activation request from SN is triggered by SN itself or triggered by UE, MN might treat them differently.

**Question 5: Companies are kindly asked if the SCG activation initiated by UE shall be distinguished from MN/SN initiated SCG activation from the Xn/X2 signaling perspective?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes, No** | **Comment** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

### 3.1.5 Indicating SCG state during Handover procedure

In the last RAN3 meeting, one FFS point is left to see if X2/Xn handover procedure needs to be enhanced to support SCG (de)activation.

|  |
| --- |
| FFS: Whether X2/Xn Handover procedure needs to be enhanced to support of SCG (de)activation. |

There are two possible solutions to let target node be aware of the current SCG state (i.e. activated or deactivated):

* Option 1: Add SCG state indicator in the RRC container (e.g. HandoverPreparationInformation) of the Handover Request message
* Option 2: Add SCG state indicator in the XnAP part of the Handover Request message

[7][14] believe Option 1 should be the way to go especially considering, RAN2 agreed to indicate the SCG state in the RRCReconfiguration message to be sent to the UE by the source MN

RAN2#113bis-e Agreement

7 During handover preparation, the target MN can indicate the SCG state in the RRCReconfiguration message to be sent to the UE by the source MN.

From moderator perspective, Option 1 is more about the RRC container design, and in the legacy HandoverPreparationInformation can already convey access stratum configuration. Thus, for the time being maybe RAN3 can assume the current SCG state can be included in the HandoverPreparationInformation, and ask RAN2 to confirm.

**Question 6: Companies are kindly asked if RAN3 can assume the current SCG state can be indicated in the HandoverPreparationInformation during handover procedure, and ask RAN2 to confirm?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes, No** | **Comment** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

### 3.1.6 Activity Notification

In RAN3#110e meeting, it is FFS whether any enhancement to Activity Notification is needed to support SCG (de)activation.

|  |
| --- |
| **Activity Notification message sent from SN to MN, can be used for the MN to make final decision on SCG (de)activation. It is FFS whether no spec impacts or the Activity Notification message shall be enhanced, e.g., add a new SCG (de)activation suggestion IE.** |

[15][21][23][24] think that the legacy Activity Notification can be used to let the MN to be aware of the traffic in relevant SCG bearers at SN.

[14] thinks Activity Notification can be enhanced to require SCG (de)activation.

**Question 7: Companies are kindly asked if enhancement to Activity Notification message is needed to request SCG (de)activation?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes, No** | **Comment** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

## 3.2 Issues related to F1 interface

In the last RAN3 meeting, the following agreements and open issues were made for F1 interface.

|  |
| --- |
| **F1 interface: UE context setup procedure****Add a new IE in the UE context setup request message to indicate at least the de-activation, while the detail code of this new IE is FFS.**E.g., if the IE is set to 1 or not existed, the SCG is requested to activate. If the IE is set to 0, the SCG is requested to de-activate.**Add a new IE in the UE context setup response message to indicate at least the de-activation result, while the detail code of this new IE is FFS.**E.g., if the IE is set to 0, the SCG is de-activated. If the IE is set to 1, the SCG is activated. Open issue 3: During UE context setup procedure, if the request of SCG (de)activation is rejected:1) gNB-DU uses the response message including “SCG (de)activation” is sufficient;2) or gNB-DU allows to use the reject message including new Cause value; 3) or gNB-DU allows to use the reject message as legacy (without new Cause).F1 interface: UE Context Modification**Add a new IE, e.g., “SCG activation requested” with two codepoints in the UE Context Modification request message in order to indicate the SCG is requested to activate or de-activate.****Add a new IE, e.g., “SCG activation result” with two codepoints in the UE Context Modification response message in order to indicate the SCG is activated or de-activated.**Open issue 4: During UE Context Modification procedure, if the request of SCG (de)activation is rejected:1) gNB-DU uses the response message including “SCG (de)activation” is sufficient;2) or gNB-DU allows to use the reject message including new Cause value; 3) or gNB-DU allows to use the reject message as legacy (without new Cause). |

From moderator’s understanding, the open issues related to i.e. the code point design for UE Context setup request, whether/how to reject the SCG (de)activation during UE context setup procedure and UE context modification procedure, can reuse the principle, if agreed, for Xn interface.

**Question 8: Companies are kindly asked if the principle, if agreed, for Xn interface can be reused for F1 interface regarding the following issues?**

* **Issue 1: Codepoint design for SCG (de)activation for UE context setup**
* **Issue 2: Whether/how CU-UP can reject the SCG (de)activation during UE context setup procedure**
* **Issue 3: Whether/how CU-UP can reject the SCG (de)activation during UE context modification procedure**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes, No** | **Comment** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

## 3.3 Issues related to E1 interface

In the last RAN3 meeting, the following open issues were made for F1 interface.

|  |
| --- |
| Open issue 5: Whether E1AP shall be enhanced to support of SCG (de)activation, if included, the Bearer Context Setup procedure enhancement shall be aligned with X2/Xn/F1AP. Open issue 6: Whether E1AP shall be enhanced to support of SCG (de)activation, if included, the Bearer Context Modification enhancement shall be aligned with X2/Xn/F1AP. |

[8][16][21] consider it beneficial to let CU-UP be aware of the SCG state. For example, if the SCG is deactivated, CU-UP might temporarily buffer received DL data packet without delivering them to DU until the SCG is activated again. Besides, if the CU-UP receives a SCG deactivation indicator from CU-CP, upon DL data arrival at SCG bearer, CU-UP may reject the SCG deactivation

**Question 9.1: Companies are kindly asked if E1 interface shall be enhanced to support SCG (de)activation, e.g. let CU-UP be aware of the SCG state?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes, No** | **Comment** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

**Question 9.2: For companies selecting Yes in Q9.1, do companies agree that the principle, if agreed, for Xn interface can be reused for E1 interface regarding the following issues?**

* **Issue 1: Codepoint design for SCG (de)activation for bearer context setup**
* **Issue 2: Whether/how CU-UP can reject the SCG (de)activation during bearer context setup procedure**
* **Issue 3: Whether/how CU-UP can reject the SCG (de)activation during bearer context modification procedure**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes, No** | **Comment** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

## 3.4 SCG activity detection

In RAN3#110e meeting, it was suggested to further clarify which node detects the SCG activity.

|  |
| --- |
| Open issue 8: Which node detects the SCG activity in order to help MN make decision on SCG (de-)activation. |

[25] believes in order to detect the SCG activity, the MN side should collect information from MN-CU-UP(s) which use SCG resource, and the SN side should collect information from SN-CU-UP(s) and SN-DU. Apparently, the SCG activity needs inputs from multiple entities. A resultant issue is how to solve the inter-operability issue among multiple entities. To solve this issue, two options can be considered:

* Option 1: configure a timer for SCG activity detection to all the involved entities, and such timer should be node specific since it is related to the traffic served by each node.
* Option 2: the SCG activity is detected by one node only, which can be SN (for aggregated gNB)/SN-DU(for disaggregated gNB) since the SCG resource is located at the SN-DU.

From moderator’s understanding, regardless of the MN or SN triggered SCG (de)activation, it is gNB CU-CP that makes the decision on SCG (de)activation and whether to accept/reject SCG (de)activation request. To do that, CU-CP has to understand the current SCG activity e.g. via Xn/E1/F1 interface. As raised in [25], it could be worth clarifying whether the SCG activity detection is done by one node only (e.g. SN-DU) and then informs other nodes, or the SCG activity detection is done at multiple nodes and relevant information is collected by CU-CP.

**Question 10.1: Companies are kindly asked to clarify which node(s) should be responsible of SCG activity detection and then inform relevant CU-CP?**

* **Option 1: MN CU-UP**
* **Option 2: SN CU-UP**
* **Option 3: SN CU-DU**

|  |  |  |
| --- | --- | --- |
| **Company** | **Option 1, 2, 3** | **Comment** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

**Question 10.2: Companies are kindly asked if enhancement to E1/F1/Xn/X2 interface is needed for MN/SN CU-CP to better understand the detected SCG activity? If yes, please list possible enhancements.**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes, No** | **Comment** |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

# 3 Conclusion

# Reference

1. R3-211563 Principles for activation and deactivation of SCG resources (Nokia, Nokia Shanghai Bell) discussion
2. R3-211564 (TP to TS 38.423, LTE\_NR\_DC\_enh2-Core) Adding first procedures for the fast SCG activation/deactivation (Nokia, Nokia Shanghai Bell) other
3. R3-211565 (TP to TS 36.423, LTE\_NR\_DC\_enh2-Core) Adding first procedures for the fast SCG activation/deactivation (Nokia, Nokia Shanghai Bell) other
4. R3-211600 TP for SCG BL draftCR to TS37.340 (ZTE) discussion
5. R3-211601 TP for SCG BL CR to TS38.423 and TS36.423 (ZTE) other
6. R3-211602 TP for SCG BL CR to TS38.473 and TS38.463 (ZTE) other
7. R3-211675 SCG Activation / deactivation discussion on X2/Xn (NEC) discussion
8. R3-211676 SCG Activation / deactivation discussion on E1 (NEC) discussion
9. R3-211677 SCG Activation / deactivation discussion on F1 (NEC) discussion
10. R3-211759 SCG activation/deactivation procedure (Qualcomm Incorporated) discussion
11. R3-211784 Efficient SCG (de)activation (Ericsson) discussion
12. R3-211785 Introduction of SCG (de)activatio over X2 (Ericsson) CR1597r, TS 36.423 v16.5.0, Rel-17, Cat. B
13. R3-211786 Introduction of SCG (de)activation over Xn (Ericsson) CR0598r, TS 38.423 v16.5.0, Rel-17, Cat. B
14. R3-211830 Discussion on efficient Activation/Deactivation Mechanism for SCG (CATT) discussion
15. R3-211910 (TP to SCG TS 38.423/38.473 BL CRs) Remaining open issues on SCG activation and deactivation (Huawei) other
16. R3-211911 (TP to SCG TS 38.463 BL CR) SCG activation and deactivation in E1 (Huawei, InterDigital) other
17. R3-211912 (TP to SCG TS 38.401 BL CR) SCG activation and deactivation in disaggregated NG-RAN architecture (Huawei, InterDigital) other
18. R3-211963 CR to TS 38.423 for efficient Activation/Deactivation Mechanism for SCG (CATT) CR0610r, TS 38.423 v16.5.0, Rel-17, Cat. B
19. R3-211964 CR to TS 38.473 for efficient Activation/Deactivation Mechanism for SCG (CATT) CR0756r, TS 38.473 v16.5.0, Rel-17, Cat. B
20. R3-212174 Discussion on SCG (de)activation rejection (Lenovo, Motorola Mobility) discussion
21. R3-212175 Miscellaneous issues on SCG activation and deactivation (Lenovo, Motorola Mobility) discussion
22. R3-212176 Support of SCG Activation and Deactivation (Lenovo, Motorola Mobility) CR0575r1, TS 38.463 v16.5.0, Rel-17, Cat. B
23. R3-212248 SCG deactivation and re-activation (InterDigital ) discussion
24. R3-212391 Open issues on Activation/Deactivation for One SCG and SCells (LG Electronics) discussion
25. R3-212537 Discussion on SCG activation and deactivation (Samsung) discussion
26. R3-212538 BL CR to TS38.473 on SCG (de-)activation (Samsung) CR0773r, TS 38.473 v16.5.0, Rel-17, Cat. B

# Annex