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

**Online, 17th – 27th May 2021**

**Agenda Item: 14.2**

**Source: Lenovo, Motorola Mobility (Moderator)**

**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**](file:///E%3A%5CRAN3%5CRAN3%20Meetings%5Ctsgr3_112-e%5CInbox%5CDrafts%5CCB%20%23%20MRDC2-SCG_activation_deactivation%5CInbox%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](file:///E%3A%5CRAN3%5CRAN3%20Meetings%5Ctsgr3_112-e%5CInbox%5CDrafts%5CCB%20%23%20MRDC2-SCG_activation_deactivation%5CInbox%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)

**Agreements:**

Activity Notification (easy)

RAN3 does not enhance Activity Notification for the sake of supporting SCG (de)activation.

F1 interface (easy)

F1 interface enhancement to support SCG (de)activation reuses the principle in Xn interface regarding:

* Codepoint design for SCG (de)activation for UE context setup
* Whether/how DU can reject the SCG (de)activation during UE context setup procedure
* Whether/how DU can reject the SCG (de)activation during UE context modification procedure

(Rephrase the exact wording in phase 2 considering phase 1 conclusion)

E1 interface (easy)

E1 interface enhancement to support SCG (de)activation is needed, e.g. let CU-UP be aware of the SCG state. FFS details, e.g. exact signaling and whether/how to reject SCG (de)activation.

SCG (de)activation during SN initiated SN modification (easy?):

* RAN3 supports SCG (de)activation during SN initiated SN modification.
* For SCG (de)activation during SN initiated SN modification, if the relevant RRC container is conveyed in the same SN modification required message to (de)activation the SCG, MN cannot reject the SCG (de)activation when accepting the SN modification request (i.e. partial rejection).

(Discuss in phase 2 or in future other aspects e.g. whether to reject with a new cause value, and if SCG (de)activation result needs to be indicated in the SN modification confirm message)

SCG (de)activation during MN initiated SN modification:

* For SCG (de)activation during MN initiated SN modification, SN can reject the SCG (de)activation when accepting SN modification request (i.e. partial rejection). FFS if SN can reject the SCG (de)activation using a reject message (i.e. full rejection) with a new cause value.

SCG (de)activation during SN addition:

* For SCG **activation** during SN addition, RAN3 agrees SN shall reply a reject message (i.e. full rejection) with a new cause value upon rejecting the SCG activation. FFS if SN can reject SCG activation when accepting SN addition (partial rejection).
* For SCG **deactivation** during SN addition, SN can reject the SCG deactivation when accepting SN addition (i.e. partial rejection). FFS if SN can reject SCG deactivation using a reject message (i.e. full rejection) with new cause value.

(Discuss in phase 2 or in future the codepoint design, i.e. if two codepoints are needed, for SCG (de)activation during SN addition)

**Open issue:**

* Which node is exactly responsible for the SCG activity detection and if any enhancement to E1/F1/Xn interface is needed.

# 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?**

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| **Company** | **Yes/No** | **Comments** |
| Nokia | ? | This depends on the overall design. Surely, for the addition itself, a single flag to indicate deactivation is allowed is enough. However, it disables later the SN to request deactivation – because the SN does not know if the MN supports the feature. Of course, the problem does not exists, if the SN can’t initiate deactivation.So the questions to answer are: - will the SN be allowed to initiate SCG deactivation?- is it important that the SN requests deactivation if the MN has not indicated deactivation is allowed in the Addition?Also, it is very important to note that even if the two code points are agreed, the SN shall not deactivate SCG at the Addition, unless it is explicitly allowed by the MN! The other way (SN admits Addition with SCG activated even though the MN allowed to deactivate SCG) is all right. |
| ZTE | Yes | The same codepoint structure of SN Modification can be used for efficient specification. Adding one extra codepoint will not have much impact on our specs. However, errors may be caused if Rel-15/Rel 16 MN sends request to Rel-17 SN with one codepoint indicator. |
| Lenovo, Motorola Mobility | Yes | We acknowledge the issue that if partial rejection is supported for SCG (de)activation during SN addition, two codepoints (i.e. one for SCG activation, another for SCG deactivation) in the SN addition request message are needed, so the SN can distinguish a Rel17 MN from legacy MN. For Rel17 MN, SN could use partial rejection.  |
| Samsung |  | We are OK to add codepoint for activation in SN addition. This design can also be aligned with Modification case. For the question raised by Nok, RAN2 agrees that SCG deactivation can be triggered by SN.  |
| E/// | No | In the addition procedure, MN sends the request, e.g., either with or without the new IE, SN does not have specific reason to reject the initial SCG state request. No partial rejection shall be allowed. And then no matter the MN is a legacy one or R17 MN, SN can simply follow the instruction given in the addition request message. Thus no confusion exists about whether to reject or not.  |
| **NEC** | **No** | **Easier way is to either accept or reject**  |
| Huawei | Yes, need to have two code points in the SN addition request. | As mentioned in [15], the SN need to know if MN is a legacy MN or Rel17 MN. |
| CATT | Yes | Two code points are clearer for the feature enabled in R17 different from R16. And align with other message, simple the specification |
| Qualcomm | No | Don’t see strong use case to support partial rejection. |
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Moderator’s observation:

(5/9) companies believe **if partial rejection is supported** for SCG (de)activation during SN addition, two codepoints (i.e. one for SCG activation, another for SCG deactivation) are needed for the SN to understand if the requesting MN is Rel17 MN or legacy MN.

(4/9) companies argue that partial rejection shall not be supported for SCG (de)activation during SN addition at the first place. Unfortunately, companies didn’t provide their view considering **what if partial rejection is supported**.

From moderator’s point of view, whether we need one or two codepoints in SN addition request message has dependency on if partial rejection is supported. For the sake of progress, we can have a WA as below:

**Proposal 1: RAN3 agrees on the Working Assumption that IF partial rejection is supported for SCG (de)activation during SN addition, two codepoints (i.e. one for SCG activation, another for SCG deactivation) are needed. (Can be made into agreement if partial rejection is supported).**

#### 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**

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| **Company** | **Option 1, 2** | **Comment** |
| Nokia | 2 | We assume that the problem concerns a scenario where the MN does not indicate the SCG may be deactivated? In this case the SN shall either reject the Addition or admit it with SCG activated (same as legacy).Reason: at the Addition, the SN does not yet have information allowing the deactivate SCG without clear permission from the MN. |
| ZTE | 1 | We shall keep our agreement in the last meeting to support partial rejection. In the last meeting, partial rejection is agreed, the FFS is to use either one codepoint or two codepoints. |
| Lenovo, Motorola Mobility | 2 | During SN addition, if MN wants SCG activated but SN eventually set SCG deactivated, it will make the whole SN addition pointless. For option 1, partial rejection could work, but as said, MN will probably reconfigure UE bearers according to the deactivated SCG, which is not efficient.  |
| LGE | 2 | The same view as Nokia.  |
| Samsung  | 1 | If going for 2, we need think about the following scenario:The SCG cell is in temporary unavailable status (e.g., the resource shortage for serving all the SCG bearers). The SN can accept the SCG addition request first so that the MN can configure SCG to the UE. After the temporary status is resolved, the SCG can be activated again, which can speed up the service over the SCG instead of triggering another SN addition procedure.  |
| E/// | 2 | MN is the one has better knowledge of current situation and instructs the SN about SCG state. |
| **NEC** | **2** | **There is no point to keep the UE context in SN if the request from the MN is for activate but it is not accepted by the SN.** |
| Huawei | 1 | In our understanding, the SCG resources are controlled by the SN. The SN know whether the bearers are SN terminated bearers, the SN can set the SCG deactivated if all the bearers involved the SN are MN terminated split bearer based on the condition of resources.We think we also need to consider the inter-MN mobility without SN change case. In this case, we think the SN can set the SCG deactivated if accepting SN addition. |
| CATT | 1 | Partial reject should be allowed. The SN may deactivation the new added SCG due to any reason. Such as resource issue, SN would buffer the data for later transfer, or No data expected for only include SN terminated SCG. Etc.  |
| Qualcomm | 2 | Don’t see strong use case for partial rejection.  |
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Moderator’s observation:

(4/10) companies believe partial rejection shall be supported for SCG activation during SN addition.

(6/10) companies believe partial rejection shall NOT be supported for SCG activation during SN addition.

From what moderator can observe, companies provided their view why one option is better than the other, but no strong argument why the other option cannot work from technical point of view.

**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**

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| **Company** | **Option 1, 2** | **Comment** |
| Nokia | 1 | We assume that the problem concerns a scenario where the MN indicates the SCG may be deactivated? In this case the SN may decide the admit the request with SCG activated.Reason: even if the MN doesn’t need SCG, activating it does no harm; on the other hand, the SN may have own reasons to keep SCG active (it hosts SCG, so e.g. implementation-specific). |
| ZTE | 1 | We shall keep our agreement in the last meeting to support partial rejection. In the last meeting, partial rejection is agreed, the FFS is to use either one codepoint or two codepoints. |
| Lenovo, Motorola Mobility | 2 | We don’t see strong reason why SN wants the SCG activated while MN requests the SCG deactivated. But we agree that there is no critical issue to set the SCG activated (i.e. partial rejection) neither.  |
| LGE | 1 |  |
| Samsung  | 1 |  |
| E/// | 2 | When the SCG is added with an initial state, MN knows current situation, e.g., incoming data load, UE status. No specific reason is seen for SN to change to another SCG state during addition procedure. The principle is to keep the solution simple and workable. |
| NEC | 2 | There is no point to keep the UE context in SN if the request from the MN is for deactivate but it is not accepted by the SN. |
| Huawei | 1 | For the SN terminated bearer, we think the SN know the data status. Therefore the SN can set the SCG activated if accepting SN addition. |
| CATT | 1 | Partial reject should be allowed. SN may change the SCG status at any time follow its rule  |
| Qualcomm | 2 | SN should respect MN’s decision. |

Moderator’s observation:

(6/10) companies believe partial rejection shall be supported for SCG deactivation during SN addition. I.e. if MN requests SCG deactivated, SN can set SCG activated once accepts the SN addition.

(4/10) companies believe partial rejection shall NOT be supported for SCG deactivation during SN addition. One company thinks partial rejection is also acceptable.

Majority companies believe partial rejection shall be supported for SCG deactivation during SN addition. There seems to be no strong argument why partial rejection does not work from technical point of view.

**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.**

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| **Company** | **Option 1, 2** | **Comment** |
| Nokia | - | One observation: the option 2 is invalid, because due to backward-compatibility one can’t force the SN to admit an Addition – it can always use the Rejection and it will be impossible to tell if the Rejection was due to the SCG activation state or for other reasons..  |
| Lenovo, Motorola Mobility | 1 | In our understanding, SN may reject the SN addition due to many reasons, and SCG state rejection could be one of them.  |
| E/// | 2 | As mentioned above, MN has the reason to send SCG state to SN. There is no point to trigger rejection procedure. |
| NEC | 1 | Today by default the SN Addition is SCG activation. Reject the SN addition is already in today specification, we don’t try to add thing. For the SCG activation/deactivation request in SN Addition, if the SN does not accept, it is simple also to reject the SN addition. |
| Qualcomm | 1 | Agree with NEC. |
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Moderator’s observation:

(4/5) companies believe if SN cannot set the SCG state as MN requested during SN addition, SN shall use full rejection (i.e. send a reject message) to MN.

(1/5) company believes we can mandate in the spec that SN shall not reject the SCG state requested by MN during SN addition.

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

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| **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?**

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| **Company** | **Yes, No** | **Comment** |
| Lenovo, Motorola Mobility | No | Since acknowledge/reject message already indicate if the requested SCG sate is accepted or not. |
| E/// | Neutral | Either to keep consistent with other procedures, or simply remove it. |
| NEC | No | Same as Lenovo. |
| Qualcomm | No | Agree with Lenovo |
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**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?**

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| **Company** | **Yes, No** | **Comment** |
| ZTE | No | We do not agree that SN can full reject the request due to activation/deactivation reason. If SN sends rejection message, it is legacy reason for rejection, so no new cause value is needed. |
| Lenovo, Motorola Mobility | Yes | We consider it not harmful to indicate the cause explicitly, e.g. SCGActivationFail, SCGDeactivationFail. |
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Moderator’s observation:

Considering Q2.1, Q2.2, Q2.3, there seems to be majority view that for SCG deactivation during SN addition, partial rejection can be supported, RAN3 can take that as start point.

For full rejection, SN can of course reject the SN addition as in legacy, while the question is whether to introduce a new cause value in the reject message. This can be FFS.

For SCG activation during SN addition, partial rejection and full rejection (with cause value) have comparable supporting companies, and no strong arguments were raised why the other option cannot work from technical point of view. There are of course pros and cons. RAN3 is suggested to continue the relevant discussion considering the conclusion for SCG deactivation during SN addition.

**Proposal 2: For SCG deactivation during SN addition, RAN3 agrees SN can reject SCG deactivation when accepting SN addition (i.e. partial rejection). FFS if SN can reject SCG deactivation using a reject message (i.e. full rejection) with new cause value.**

**Proposal 3: For SCG activation during SN addition, RAN3 agrees SN replies a reject message (i.e. full rejection) with a new cause value upon rejecting the SCG activation. FFS if SN can reject SCG activation when accepting SN addition (partial rejection).**

**Proposal 4: For SCG activation during SN addition, RAN3 confirms the understanding that if SN cannot set SCG deactivated when accepting SN addition, there is no need to indicate the SCG (de)activation result in the acknowledge message.**

### 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.

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| **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**

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| **Company** | **Option 1, 2** | **Comment** |
| Nokia | 2 | For the Modification procedure, partial rejection is not needed at all: if the MN requests the change of SCG, it shall not mix it with other modifications; then, the SN simply acknowledges or rejects the SCG change request. |
| ZTE | 1 | We shall keep previous agreement on partial rejection in SN modification procedure. |
| Lenovo, Motorola Mobility | 2 | We prefer option 2, more because we prefer a unified solution for SN (de)activation via SN modification either MN triggered or SN triggered. And considering the issue discussed in 3.1.3, we think full rejection shall be supported for SN (de)activation via SN initiated modification. But for MN initiated SN modification alone, we agree partial rejection could work. |
| LGE | 2 |  |
| Samsung  | 1 | Same reason as SN addition case.  |
| E/// | 1 | The MN Modification procedure is different with addition procedure. As mentioned in our paper, it is possible that MN sends the modification request with other changes which SN can accept. But with consideration of its own resources, SN is able to choose to deactivate the SCG. |
| NEC | 1, 2 | The full rejection shall be there in any case as it shall allow the receiver to reject any request if for any reason the receiver cannot proceed the procedure.The discussion here will be whether the SN can still keep the SCG status before it was requested to modify. We think it is ok e.g. if MN request to activate the deactivated SCG, if the SN does not accept for any reason, it can simply respond the SN Modification Request Acknowledge, and keep the SCG state same as deactivated,  |
| Huawei | 1 | The SCG resources are controlled by the SN. In EN-DC, the SN know whether the bearers are SN terminated bearers. We think the SN can set the SCG deactivated if all the bearers involved the SN are MN terminated split bearer based on the condition of resources. |
| CATT | 1 | For SCG status modification procedure, we propose the partial or full reject concept is not used. The modification may include SCG modification and other information.  |
| Qualcomm | 2 | Consistent with SN Addition |

Moderator’s observation:

(6/10) companies believe partial rejection shall be supported for SCG activation during MN initiated SN modification

(5/10) companies believe partial rejection shall NOT be supported for SCG activation during MN initiated SN modification. Two companies can also accept partial rejection.

**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**

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| --- | --- | --- |
| **Company** | **Option 1, 2** | **Comment** |
| Nokia | 2 | For the Modification procedure, partial rejection is not needed at all: if the MN requests the change of SCG, it shall not mix it with other modifications; then, the SN simply acknowledges or rejects the SCG change request.One exception can be addition of a bearer: such modification may contain the new bearer and activation indication. Then, since the modifications are related to each other, rejection of one means the other can’t be accepted either (or, is not needed). So partial rejection is not needed, either. |
| ZTE | 1 | We shall keep previous agreement on partial rejection in SN modification procedure. |
| Lenovo, Motorola Mobility | 2 | Same comment as in 3.1 |
| LGE | 2 |  |
| Samsung  | 1 | Option 2 cannot cover the case that new DL data is arriving when SCG deactivation request is sent from MN by modification procedure.  |
| E/// | 1 | Same as above |
| NEC | 1, 2 | Same as in 3.1  |
| Huawei | 1 | For the SN terminated bearer, the SN know the data status. Therefore the SN can set the SCG activated. |
| CATT | 1 | Same comment as in 3.1 |
| Qualcomm | 2 | Same as SN addition procedure, SN should respect MN decision on SCG state. |

Moderator’s observation:

(6/10) companies believe partial rejection shall be supported for SCG deactivation during MN initiated SN modification

(5/10) companies believe partial rejection shall NOT be supported for SCG deactivation during MN initiated SN modification. Two companies can also accept partial rejection.

**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?**

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| --- | --- | --- |
| **Company** | **Yes, No** | **Comment** |
| ZTE | No | There is no need to introduce a new cause value.  |
| Samsung  | Yes  | For example, when SN rejects the deactivation request, it can indicate the case of new data arrival.  |
| E/// | Yes | New cause values are beneficial to help MN make decision of another try later. The values could be UE overheating, UE power saving, out of coverage, and etc. |
| NEC | Yes | A cause value or any information to indicate the failure is ok. |
| Huawei | No | There is no need to introduce a new cause value. |
| CATT | Yes for deactivation | Cause value for deactivation is beneficial for MN  |
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Moderator’s observation:

(4/6) companies believe when SN accepts the MN initiated SN modification but rejects the SCG (de)activation requested by MN, SN can indicate the cause in the acknowledge message.

(2/4) companies believe there is no need to add the cause of SCG (de)activation rejection in the acknowledge message.

**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** |
| Nokia | 1 | The option 2 is invalid, because due to backward-compatibility one can’t force the SN to admit an Addition – it can always use the Rejection and it will be impossible to tell if the Rejection was due to the SCG activation state or for other reasons..  |
| ZTE | 2 | In the last meeting, we have agreed to use partial rejection for SN modification procedure. So MN shall not send rejection message to SCG activation/deactivation state. But we agree that MN can reject the SN modification request message due to legacy reason. |
| Lenovo, Motorola Mobility | 1 |  |
| LGE | 1 |  |
| E/// | 1 | Although we select partial rejection in Q3.1 and 3.2, some cause value is still required in the reject message considering serious issue happens for the UE, like overheating. |
| NEC | 1 | The full rejection shall be there in any case as it shall allow the receiver to reject any request if for any reason the receiver cannot proceed the procedure. |
| Qualcomm | 1 |  |
|  |  |  |

Moderator’s observation:

(6/7) companies believe that if partial rejection is not supported for SCG (de)activation during MN initiated SN modification, SN shall reply a reject message (i.e. full rejection) if cannot (de)activate SCG as MN requested.

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** |
| Nokia | No |  |
| Lenovo, Motorola Mobility | No |  |
| LGE | No |  |
| Qualcomm | No |  |
|  |  |  |
|  |  |  |
|  |  |  |

Moderator’s observation:

(3/3) companies believe in case partial rejection is not supported, there is no need to indicate the SCG (de)activation result in the acknowledge message.

**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** |
| Noka | Yes | A new Cause value could help statistics. See our TPs for example name and description. |
| ZTE | No | The MN can reject the request message by legacy cause, but cannot reject the request message due to SCG activation/deactivation cause. |
| Lenovo, Motorola Mobility | Yes | We consider it not harmful to indicate the cause explicitly, e.g. SCGActivationFail, SCGDeactivationFail. |
| LGE | Yes | New cause value is clearer for MN to know the situation |
| E/// | Yes | As said in Q3.4, new cause value is important for serious problem with generality.  |
| NEC | Yes |  |
| Qualcomm | Yes |  |

Moderator’s observation:

(5/6) companies believe in case full rejection is supported, a new cause value can be added in the reject message.

For SCG (de)activation during MN initiated SN modification, there seems to be majority view to support partial rejection, i.e. SN can reject the SCG (de)activation request from MN when accepting the MN initiated SN modification. RAN3 is suggested to start from there.

**Proposal 5: For SCG (de)activation during MN initiated SN modification, SN can reject the SCG (de)activation when accepting SN modification request (i.e. partial rejection). FFS if SN can reject the SCG (de)activation using a reject message (i.e. full rejection) with a new cause value.**

### 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** |
| Nokia | Yes | No problem expected. |
| ZTE | Yes | Although RAN2 has not made conclusion on SN initiated SCG (de)activation in RAN2 #113bis e-meeting, nearly all RAN2 contributions support SN initiated SCG (de)activation. Thus, RAN3 should support this procedure to keep align with RAN2. |
| Lenovo, Motorola Mobility | Yes | In case SN detects SCG activity and would like to activate SCG, it’s most straight forward for SN to trigger a SN modification required procedure. We don’t see the reason why not.  |
| LGE | Yes |  |
| Samsung | Yes |  |
| E/// | Yes |  |
| NEC | no | Since the final decision of triggering SCG activation/deactivation is in the MN side, a bit weak reason to have SN initiated SCG Modification procedure for activation/deactivation request |
| Huawei | Prefer No | Option 2 is enough, option 1 may lead to additional complexity. |
| CATT | Yes |  |
| Qualcomm | Yes |  |

Moderator’s observation:

(8/10) companies believe RAN3 shall support SCG (de)activation via SN initiated SN modification procedure.

(2/10) companies believe not.

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** |
| Nokia | Yes | This is the natural solution – if the MN rejects SCG state change, it shall not forward the container. On the other hand, the SN shall not mix several modifications in the same message. |
| ZTE | Yes |  |
| Lenovo, Motorola Mobility | Yes |  |
| LGE | Yes |  |
| Samsung | Yes | However, “Yes” does not have any implicit on whether the RRC container is sent to the UE or not. Then, we may need further discuss: whether the RRC container should be sent to the UE? |
| E/// |  | The latter question is about how to configure the UE which is related to RAN2. We suggest focusing on the coordination between MN and SN, i.e., the indicator for now. |
| CATT | Yes |  |
| Qualcomm | Yes | Need to be confirmed by RAN2 |
|  |  |  |

Moderator’s observation:

(7/8) companies believe RAN3 shall 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

(1/8) company believes this issue is related to RAN2, and better to postpone the discussion until more RAN2 input.

**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** |
| Nokia | No | It is not needed. The SN shall not mix multiple modifications in a single procedure, so the MN does not need to reject SCG change while accepting something else. |
| ZTE | No | We fully agree with the detail analysis in [2], for SN initiated SN modification required, MN is only allowed to use full rejection. Moreover, a new cause value shall be introduced in the rejection message. |
| Lenovo, Motorola Mobility | No |  |
| LGE | No |  |
| Samsung | No, but … | Here, the partial rejection cannot be supported because of RRC container transmission. However, we didn’t identify any difference in terms of scenarios compared to MN-initiated case. So, we may need further thinking on how to support partial rejection for SN-initiated case to keep our design align.  |
| E/// | Open | The question may be a bit misleading. We shall not preclude non-support of partial rejection because of for example inclusion of RRC container. Prefer to keep similar network design as MN-initiated procedure. |
| CATT |  | We need further study. The rejection should be allowed |
| Qualcomm | No |  |
|  |  |  |

Moderator’s observation:

(6/8) companies believe partial rejection does not really work for SCG (de)activation during SN initiated SN modification if the RRC container is provided in the same message as the SCG (de)activation indicator.

(3/8) companies indicate needs to further investigate this issue.

**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** |
| Nokia | No |  |
| ZTE | Yes | We have a principle that MN does not interpret SN RRC message from SN, but include it into MN RRC message as a container to UE directly. To support partial rejection for MN initiated SCG (de)activation, the above principle is kept.But assume to allow partial rejection for SN initiated SCG (de)activation, SN RRC message shall be modified otherwise UE behavior is not aligned with SCG state.So that, in order to keep above principle in Rel-15, only whole rejection is allowed for SN initiated SCG (de)activation.  |
| Lenovo, Motorola Mobility | Yes | Agree with the issue pointed out by ZTE. And we believe full rejection shall be used for SCG (de)activation via SN initiated SN modification. |
| LGE | No  |  |
| Samsung | Not so far |  |
| CATT |  | Agree with ZTE |
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For SCG (de)activation during SN initiated SN modification, there seems to be concerns about the handling of possible RRC container in the same SN modification required message to (de)activate the SCG. And the partial rejection does not really work in this case.

**Proposal 6: RAN3 supports SCG (de)activation during SN initiated SN modification.**

**Proposal 7: For SCG (de)activation during SN initiated SN modification, if the relevant RRC container is conveyed in the same SN modification required message to (de)activation the SCG, MN cannot reject the SCG (de)activation when accepting the SN modification request (i.e. partial rejection).**

### 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** |
| Nokia | No | This is up to RAN2.It is likely the solution will have a form of some “UE assistance information” which may then trigger (or not) a regular MN- or SN-initiated action. So, no point to bother about it in RAN3 yet. |
| ZTE | No | So far, we do not find the RAN3 impact for UE initiated SCG (de)activation. |
| Lenovo, Motorola Mobility | Yes | This issue is essentially about whether the SCG (de)activation initiated by UE will be handled differently from SCG (de)activation initiated by the peer node alone. In one example, if SN receives a Xn SCG activation request from MN, and understand it is actually initiated by UE (e.g. UL data arrival at SCG bearer), SN will probably not reject it, otherwise it will cause problem to UE, e.g. data loss.In any case, we believe identifying UE initiated SCG activation could help with accepting/rejecting SCG(de)activation request.  |
| LGE | No | Pending to RAN2 |
| Samsung |  | Wait for RAN2 progress first.  |
| E/// |  | What’s the benefit to differentiate whether this request is from SN or UE? Network should always have the final word but not prioritize the acceptance according to the origin. Wait for RAN2 for now. |
| NEC |  | We will need to wait until RAN2 decision then think about RAN3 impact. |
| Huawei | No | We think the corresponding node does not need to know the reasons of SCG activation. |
| CATT |  | So far we don’t see the necessary from RAN3 signalling. But we need check with RAN2 |
| Qualcomm | No | Up to RAN2 |

Moderator’s observation:

(9/10) companies believe this issue depends on RAN2 progress. Moderator would suggest to just wait for RAN2 progress.

### 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.

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| --- |
| 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** |
| Nokia | No | If the SCG state is to be signalled in the RRC container, perhaps also no SN-initiated modification is needed – the SN may just indicate the stage change in the RRC container? If we consider an explicit AP indication is needed for SN-initiated action, it is logical to be added to the HO procedure, too. However, we may leave it FFS for the time being. |
| ZTE | No | In the previous RAN3 meeting, we have agreed that RAN3 does not design inter-node explicit signaling to support handover, currently RAN2 agrees to use inter-node container which is also aligned with RAN3’s previous progress, so it is not needed to ask RAN2 to confirm. |
| Lenovo, Motorola Mobility | Yes | The issue is about whether we need XnAP IE to indicate SCG state during HO. If RAN2 includes SCG state in the RRC container, then there is no need of XnAP IE.  |
| LGE | No | FFS is better when it is clear in RAN2  |
| Samsung |  | Just follow RAN2 agreement.  |
| E/// | Yes to the first question, No to the second | In our paper [11], we prefer Option 1. RAN2 has agreed the inclusion of container from target MN to the UE, although there is no clear conclusion about HandoverPreparationInformation yet. An LS may not be required. In another way, RAN3 can consider this as a WA to give a good track.  |
| NEC |  | Wait for RAN2 progress. |
| Huawei | No, but | We think the target node does not need to know the SCG state. The target node can decide based on its own state.Also we think we need to wait the progress of RAN2. RAN2 has agreed that Only the MN can generate an RRC message with SCG (de)activation. If RAN2 only supports sending the SCG (de)activation via the RRC message, the target node can know the SCG state via the RRC Reconfiguration container in the HandoverPreparationInformation.  |
| CATT | Yes for in container. NO for ask RAN2 | If the SCG status include in the container, we don’t need explicit carry this information in XnAp |
| Qualcomm | Yes | No need to ask RAN2 |

Moderator’s observation:

All companies agree that it is RAN2 issue whether to indicate SCG state in the RRC container. Some companies acknowledged that if the SCG state is indicated in the RRC container, there is no need to provide SCG state as a IE in the Xn message.

Moderator would suggest to just wait for RAN2 progress before discussing.

### 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.

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| --- |
| **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** |
| Nokia | No | SN-initiated modification is enough. Activity notification which then triggers MN-initiated modification is too slow and generating unnecessary signalling. |
| ZTE | No | No, in previous meeting, we have agreed not to enhance this message. |
| Lenovo, Motorola Mobility | No |  |
| LGE | No |  |
| Samsung  | No |  |
| E/// | No |  |
| NEC | Yes | This can be a possibility to indicate the SN’s wish. |
| Huawei | No | The MN can use the exiting IEs to know the data transmission state in SN |
| CATT | Yes with condition | We should first have conclusion whether the SN modification requires is used or not. If No, the answer is Yes. |
| Qualcomm | Yes |  |

Moderator’s observation:

(8/10) companies believe there is no need to enhance Activity Notification

(2/10) companies believe it could be helpful to indicate the SCG (de)activation request in the Activity Notification. One company also believe such enhancement is not needed if we support SCG (de)activation using SN initiated SN modification.

**Proposal 8: RAN3 does not enhance Activity Notification for the sake of supporting SCG (de)activation.**

## 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~~ DU can reject the SCG (de)activation during UE context setup procedure**
* **Issue 3: Whether/how ~~CU-UP~~ DU can reject the SCG (de)activation during UE context modification procedure**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes, No** | **Comment** |
| Nokia | Yes | For the modification, the same principle applies: no need for mixing modifications, so no need for partial rejection. |
| ZTE | Yes | The detail can be discussed later. |
| Lenovo, Motorola Mobility | Yes |  |
| LGE | Yes |  |
| Samsung  | Yes |  |
| E/// | Yes |  |
| NEC |  | For issue 1: since the activation is by default supported, therefore only “deactivate” one codepoint is enough.For issue 2: in any case the gNB-DU can reject for any reason e.g. it cannot keep activated/deactivated state.For issue 3: in any case the gNB-DU can reject for any reason e.g. it cannot keep activated/deactivated state. |
| Huawei | Yes |  |
| CATT | Yes |  |
| Qualcomm | Yes |  |

Moderator’s observation:

(9/10) companies believe F1 interface enhancement to support SCG (de)activation can simply reuse the principle in Xn interface.

**Proposal 9: F1 interface enhancement to support SCG (de)activation reuses the principle in Xn interface regarding:**

* **Codepoint design for SCG (de)activation for UE context setup**
* **Whether/how DU can reject the SCG (de)activation during UE context setup procedure**
* **Whether/how DU can reject the SCG (de)activation during UE context modification procedure**

## 3.3 Issues related to E1 interface

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

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| --- |
| 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?**

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| --- | --- | --- |
| **Company** | **Yes, No** | **Comment** |
| Nokia | No? | This shall be still left FFS. However, considering that SCG activation is supposed to depend on the traffic load, it is rather the UP to indicate if SCG is or is not needed (activity indication). |
| ZTE | Yes | The detail can be discussed later. |
| Lenovo, Motorola Mobility | Yes |  |
| LGE | Yes |  |
| Samsung | Yes |  |
| E/// | Yes |  |
| NEC | Yes |  |
| Huawei | Yes |  |
| CATT | Yes |  |
| Qualcomm | Yes |  |

Moderator’s observation:

(9/10) companies believe E1 interface enhancement to support SCG (de)activation is needed, e.g. let CU-UP be aware of the SCG state.

**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** |
| ZTE | Yes | The detail can be discussed later. |
| Lenovo, Motorola Mobility | Yes |  |
| LGE |  | FFS |
| Samsung | No | CU-UP does not control the SCG. If UP knows the status of SCG, it can determine whether to send data to the DU. However, we didn’t identify the scenarios that needs signaling exchange between CU-CP and CU-UP to determine the SCG (de)activation.  |
| E/// | Open |  |
| NEC | Yes | For issue 1: since the activation is by default supported, therefore only “deactivate” one codepoint is enough.For issue 2: in any case the CU-UP can reject, e.g. it will not be able to assist the CU-CP when DL data arrive during deactivated state.For issue 3: in any case the CU-UP can reject. e.g. it will not be able to assist the CU-CP when DL data arrive during deactivated state. |
| Huawei | No | As the SCG is controlled by DU and CU-CP, for SCG activation, there seems no need to support SCG activation reject by the CU-UP |
| CATT | Open  | Need further study for the rejection |
| Qualcomm | Yes |  |
|  |  |  |

Moderator’s observation:

(4/9) companies believe E1 interface enhancement to support SCG (de)activation reuses the principle in Xn interface regarding.

(2/9) companies believe not

(3/9) companies are open

**Proposal 10: E1 interface enhancement to support SCG (de)activation is needed, e.g. let CU-UP be aware of the SCG state. FFS details, e.g. exact signaling and whether/how to reject SCG (de)activation.**

## 3.4 SCG activity detection

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

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| 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 DU**

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| --- | --- | --- |
| **Company** | **Option 1, 2, 3** | **Comment** |
| Nokia | ? | It shall be distributed: each PDCP host may indicate SCG may be deactivates, it is the SN-CU-CP to collect the indications and decide if SCG may be deactivated (e.g. if the MN indicates SCG may be deactivated, but the SN-CU-UP indicates there is traffic over SCG for SN-terminated bearers, the SCG shall be kept active). |
| ZTE | FFS | Discuss this issue in the next step. |
| Lenovo, Motorola Mobility | Option 1, 2, 3 | We believe MN/SN CU-CP can understand the SCG activity based on information from MN/SN CU-UP and SN DU |
| LGE | FFS |  |
| Samsung  |  | We are open for either one entity for detection or multiple entities for detection. We understand that the SCG (de)activation is highly related to the traffic carried by the SCG. It means that the criteria to determine the SCG (de)activation (especially to deactivate the SCG) should be traffic-related. For example, a traffic with the packet arrival rate of 1 packet per second should have different SCG (de)activation criteria compared to the traffic with the packet arrival rate of 10 packets per second. Thus, it is better to discuss whether we need define the traffic-related criteria to help the node detect the SCG activity. If such criteria is needed, CU-CP seems to be the best entity to set such criteria. For one entity case, it is easy since such criteria can be directly sent to the gNB-DU serving SCG. For multiple entity case, we also need consider the inter-operability issue. So, it is more beneficial to align the criteria among multiple entities.As an example for the criteria, it can set a timer to determine whether the SCG activity can be considered as deactivated.  |
| E/// | Open |  |
| NEC |  | We agree the principle that “it is gNB CU-CP that makes the decision on SCG (de)activation”.For DL data reception, it should be the SN CU-UP to detect.FFS for UL data reception. |
| Huawei | ? | We think the SN CU-CP can know the data transmission state based on the BEARER CONTEXT INACTIVITY NOTIFICATION from the CU-UP and based on the UE INACTIVITY NOTIFICATION from the DU. MN CU-CP can know the SCG activity based on the activation notification from the SN CU-CP.  |
| CATT |  | For the detection, different node will detect for different scenarios |
| Qualcomm | 2 for sure, FFS 1 and 3 |  |

**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.**

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| --- | --- | --- |
| **Company** | **Yes, No** | **Comment** |
| Nokia | No |  |
| ZTE | FFS | Discuss this issue in the next step. |
| Lenovo, Motorola Mobility | No | Not from what we can see. But we are open.  |
| LGE | FFS |  |
| Samsung | Yes | One possible enhancement is that the CP configures a timer to UP(s)/DU, such timer may be differ among entities based on the traffic carried by each entity. Actually, in existing specification, a similar timer is used to determine UE activity.  |
| E/// | Open |  |
| NEC |  | For E1, the existing DL Data Notification procedure can be reused without enhancement. |
| Huawei | No |  |
| CATT | FFS |  |
| Qualcomm | FFS |  |

Moderator’s observation:

It seems companies have different understanding on which node should be exactly responsible for the SCG activity detection. Some companies believe this should be discussed case by case.

Moderator would suggest to postpone the discussion to future meetings based on contributions.

# 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