3GPP TSG-RAN WG2 Meeting #114 Electronic R2-210xxxx

Elbonia, 19 – 27 May 2021

**Agenda item: 5.4.1.1**

**Source: Apple**

**Title: DRAFT- Summary of [AT113-e][005][NR15] Connection Control II (Apple)**

**WID/SID: NR\_newRAT-Core**

**Document for: Discussion and Decision**

# 1 Introduction

This document reflects the content and outcome of the following email discussion:

* [AT114-e][005][NR15] Connection Control II (Apple)

Scope: Treat R2-2105503, R2-2106377, R2-2106378, R2-2106190, R2-2106191, R2-2105768, R2-2106414, R2-2106415, R2-2106416, R2-2105089, R2-2105090, R2-2105092, R2-2106135

Phase 1, determine agreeable parts, Phase 2, for agreeable parts Work on CRs / LS.

Intended outcome: Report and Agreed CRs / LS.

Deadline: Schedule A

***NOTE: Schedule A*** *(a schedule for main session for many offline dicussion):*

*A first round with* ***Deadline for comments Friday May 21 1000 UTC*** *to settle scope what is agreeable etc (phase 1).*

*A pre-final round with* ***Deadline for any functional and/or scope comments Wednesday May 26 1200 UTC.*** *At this point, non-agreeable parts shall be removed/excluded. (phase 2)*

*A final round (last 24h) for checking and smaller simplification / removal comments only including agreeable parts, with Deadline* ***EOM*** *(at this point all outcome documents need to be available in inbox with tdoc numbers).*

*Additional check-points etc if needed are defined by the Rapporteur. Offline discussion rapporteur must notify chairman / session chair if on-line comeback discussion is needed, if discussion doesn’t converge etc.*

The discussion covers the following documents from AI 5.4.1.1 Connection control:

|  |
| --- |
| DC Related - SCG failure  [R2-2105503](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2105503.zip) Further clarification on random access problem ZTE Corporation, Sanechips discussion Rel-15 NR\_newRAT-Core  [R2-2106377](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2106377.zip) CR on random access problem of MCG ZTE Corporation, Sanechips CR Rel-15 38.331 15.13.0 2692 - F NR\_newRAT-Core  [R2-2106378](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2106378.zip) CR on random access problem of MCG ZTE Corporation, Sanechips CR Rel-16 38.331 16.4.1 2693 - A NR\_newRAT-Core, NR\_unlic-Core  [R2-2106190](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2106190.zip) Correction on SCG failure reporting procedure Huawei, HiSilicon CR Rel-15 38.331 15.13.0 2680 - F NR\_newRAT-Core  [R2-2106191](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2106191.zip) Correction on SCG failure reporting procedure Huawei, HiSilicon CR Rel-16 38.331 16.4.0 2681 - A NR\_newRAT-Core  DC Related – SMTC and SCG change during handover  [R2-2105768](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2105768.zip) Clarification on NR-DC procedures Ericsson discussion Rel-15 NR\_newRAT-Core  [R2-2106414](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2106414.zip) Clarification on leftover issues for NR-DC Huawei, HiSilicon discussion Rel-15 NR\_newRAT-Core  [R2-2106415](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2106415.zip) Correction on PSCell SMTC timing reference in NR-DC Huawei, HiSilicon CR Rel-15 38.331 15.13.0 2694 - F NR\_newRAT-Core  [R2-2106416](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2106416.zip) Correction on PSCell SMTC timing reference in NR-DC Huawei, HiSilicon CR Rel-16 38.331 16.4.0 2695 - A NR\_newRAT-Core  [R2-2105089](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2105089.zip) Clarification on the Timing Reference of PSCell SMTC Configuration Apple, Xiaomi, ZTE Corporation, Sanechips, Samsung, CATT, Ericsson, OPPO CR Rel-16 38.331 16.4.1 2598 - F NR\_newRAT-Core, TEI16  [R2-2105090](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2105090.zip) Clarification on NR HO without SCG Configuration Change Apple discussion Rel-15 NR\_newRAT-Core  [R2-2105092](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2105092.zip) DRAFT LS on the NR HO without SCG Configuration Change Apple LS out Rel-15 NR\_newRAT-Core To:RAN4  [R2-2106135](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2106135.zip) Clarification on NR HO without SCG Configuration Change Apple CR Rel-16 37.340 16.5.0 0267 - F NR\_newRAT-Core, TEI16 |

# 2 Contact Points

Respondents to the email discussion are kindly asked to fill in the following table.

|  |  |  |
| --- | --- | --- |
| Company | Name | Email Address |
| Ericsson | Antonino Orsino | antonino.orsino@ericsson.com |
| Nokia |  | amaanat.ali@nokia.com |
| Huawei, HiSilicon | Zhenzhen Cao | caozhenzhen@huawei.com |
| ZTE | LiuJing | liu.jing30@zte.com.cn |
| CATT | Jing Liang | [liangjing@catt.cn](mailto:liangjing@catt.cn) |
| Apple | Fangli XU | fangli\_xu@apple.com |
| MediaTek | Felix Tsai | [Chun-fan.tsai@mediatek.com](mailto:Chun-fan.tsai@mediatek.com) |
| Intel | Sudeep Palat | Sudeep.k.palat@intel.com |

# 3 Discussion

## 3.1 DC Related – SCG failure

### 3.1.1. Issue-1: RACH failure detection while T304 is running

|  |
| --- |
| The contributions and CRs related to this topic are:  [R2-2105503](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2105503.zip) Further clarification on random access problem ZTE Corporation, Sanechips discussion Rel-15 NR\_newRAT-Core  [R2-2106377](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2106377.zip) CR on random access problem of MCG ZTE Corporation, Sanechips CR Rel-15 38.331 15.13.0 2692 - F NR\_newRAT-Core  [R2-2106378](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2106378.zip) CR on random access problem of MCG ZTE Corporation, Sanechips CR Rel-16 38.331 16.4.1 2693 - A NR\_newRAT-Core, NR\_unlic-Core |

The contribution (5503) provides the clarification on the random access failure detection of MCG and SCG in NR-DC while T304 is running, and the contribution also propose to apply the same operation on the LBT failure case.

* **Random access problem of MCG**

The contribution (R2-2105503) provides the following observations and proposals. And it proposed to agree the R15/R16 RRC CRs for the clarification.

* **Observation**

*Observation 1: According to the current NR specs, the UE shall not declare MCG RLF upon random access problem indication from MCG MAC while T304 is running. However, since T304 can be configured for both MCG and SCG, it’s not clear whether it means T304 of MCG, T304 of SCG, or both two cases.*

*Observation 2: In case that the UE detects random access problem indication from MCG MAC while T304 of SCG is running (i.e. during reconfiguration with sync of SCG), the random access problem in MCG is most probably triggered due to the radio link problem of MCG, e.g. out-of-sync uplink. So it’s preferred that the UE declares MCG RLF immediately to trigger the RRC re-establishment for MCG link recovery.*

* **Proposal**

*Proposal 1: RAN2 to clarify that the UE shall not declare MCG RLF upon random access problem indication from MCG MAC while T304 of the corresponding MAC is running, i.e. T304 of MCG is running, but not for T304 of SCG is running.*

*Proposal 2: RAN2 to clarify that the UE shall not declare MCG RLF upon consistent uplink LBT failure indication from MCG MAC while T304 of the corresponding MAC is running, i.e. T304 of MCG is running, but not for T304 of SCG is running.*

* **R15/R16 RRC CR**

*Proposal 3: Agree the CRs in [2][3] (*[*R2-2106377*](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2106377.zip)*,* [*R2-2106378*](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2106378.zip)*).*

#### **Question 3.1.1-1 (MCG RACH/LBT Failure): do you agree with the proposal ½ of R2-2105503?**

|  |  |  |
| --- | --- | --- |
| Company | Agree or not? | Comments |
| Ericsson | No | We do not see any issue with current specification, and we do not see the need to “clarify” anything. |
| Nokia | Disagree | This was clearly discussed in NR-U that LBT failure will just cause T304 expiry (if even that) and same applies to MCG failure happening due to SCG failure. We don’t see how UE could interpret this way. |
| OPPO | Disagree | We agree with observation and intention of the CR, but also intend to agree there is no such ambiguity issue |
| Huawei, HiSilicon |  | The proposals are more like observations, which we think are observed correctly, but RAN2 may not need to further clarify, to avoid the clarification to make new troubles. |
| CATT | No |  |
| ZTE (Mengjie) | Agree | Since the T304 can be configured for both MCG and SCG, it’s better to clearly describe that the T304 is related to which cell group, to avoid ambiguity issue. Otherwise it means both T304 for the MCG and T304 for the SCG cases.  Besides, in the current spec, if the T304 is just related to one cell group, it usually says “T304 for the corresponding SpCell” or “T304 of MCG” or ”T304 of SCG”. So we think the clarification should also be applicable to the MCG RLF detection. |
| Apple | No | We agree with the observations, but think current spec is clear, and further clarification is not needed. |
| MediaTek |  | P1/P2 is correct observation. The question is whether we need further clarification in the SPEC. |
| Intel | Agree | While there may not be much risk of wrong implementation, it is useful to be more precise here. |

#### **Question 3.1.1-2 (MCG RACH/LBT Failure): do you agree with the R15/R16 RRC CRs (proposal 3)?**

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| --- | --- | --- |
| Company | Agree or not? | Comments |
| Ericsson | No | It is really obvious that the part of text where the change is proposed is about the PCell and there will be no misunderstanding in this case. Thus, the change is not needed.  The UE shall:   1. upon T310 expiry in PCell; or 2. upon random access problem indication from MCG MAC while neither T300, T301, T304, T311 nor T319 are running; or 3. upon indication from MCG RLC that the maximum number of retransmissions has been reached:   2> if the indication is from MCG RLC and CA duplication is configured and activated, and for the corresponding logical channel *allowedServingCells* only includes SCell(s):  3> initiate the failure information procedure as specified in 5.7.5 to report RLC failure.  2> else:  3> consider radio link failure to be detected for the MCG, i.e. MCG RLF;  3> if AS security has not been activated:  4> perform the actions upon going to RRC\_IDLE as specified in 5.3.11, with release cause ‘other’;-  3> else if AS security has been activated but SRB2 and at least one DRB have not been setup:  4> perform the actions upon going to RRC\_IDLE as specified in 5.3.11, with release cause ‘RRC connection failure’; |
| Nokia | Disagree | CRs are not needed |
| Huawei, HiSilicon | No | Agree with Ericsson |
| OPPO | No |  |
| CATT | No |  |
| ZTE (Mengjie) | Agree | The same comment as above. |
| Apple | No |  |
| MediaTek | Agree | We agree with ZTE that T304 could be used for MCG or SCG and we usually clarify which T304 in the procedure text of 38.331. |
| Intel | Agree | As commented above. |

* **Random access problem of SCG**

The contribution (R2-2105503) provides the following observations and proposals. And it proposed to agree the R15/R16 RRC CRs for the clarification.

* **Observations**

*Observation 3: According to the current specs, upon detection of random access problem indication from MCG MAC while T304 is running, the UE shall not declare MCG RLF and can continue trying random access procedure until T304 expiry. However, if the UE detects random access problem indication from SCG MAC while T304 is running, the UE shall initiate SCG failure information procedure to report random access problem to the NW. The UE behaviour during reconfiguration with sync of SCG is not aligned with that during reconfiguration with sync of MCG.*

*Observation 4: Different companies have different implementations and understanding on the UE behaviour upon detection of random access problem from SCG MAC while T304 of SCG is running, i.e. whether to continue random access procedure or not. And no consensus was reached at last meeting.*

* **Proposals**

*Proposal 4: In Rel-15, different UE behaviour can be supported upon detection of random access problem indication from the SCG MAC while T304 of SCG is running, e.g. the UE may not declare SCG RLF and continue trying random access procedure until T304 expiry in SCG.*

*Proposal 5: From Rel-16, RAN2 clarify an unified UE behaviour upon detection of random access problem indication from the SCG MAC while T304 of SCG is running:*

* *Option 1: The UE behaviour should be aligned with the current spec, i.e. the UE shall declare SCG RLF and initiate SCG failure information procedure.*
* *Option 2: The UE behaviour should be changed as proposed in [4], i.e. the UE shall not declare SCG RLF, and continue trying random access procedure until T304 expiry in SCG.*

*Proposal 6: If the clarification is made for proposal 5, the similar clarification is also applicable to the UE behaviour upon detection of consistent uplink LBT failure indication from the SCG MAC while T304 of SCG is running.*

(Rapp NOTE: proposal 6 is to propose the same UE behavior on the LBT failure detection during the T304 running.)

#### **Question 3.1.1-3 (SCG RACH/LBT Failure):do you agree with the proposal 4 of R2-2105503?**

*Proposal 4: In Rel-15, different UE behaviour can be supported upon detection of random access problem indication from the SCG MAC while T304 of SCG is running, e.g. the UE may not declare SCG RLF and continue trying random access procedure until T304 expiry in SCG.*

|  |  |  |
| --- | --- | --- |
| Company | Agree or not? | Comments |
| Ericsson | No | As we already replied in the last RAN2 meeting, we do not need the need to have a change on this (but BTW is NBC) and current specification is not broken. This was already discussed in the last meeting and was not agreed. We do not intend to discuss again something that was not agreed.  From chairman’s note of RAN2#113-bis-e:  [R2-2104077](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113bis-e\Docs\R2-2104077.zip) Clarification on SCG failure information ZTE Corporation, Sanechips discussion Rel-15 NR\_newRAT-Core   * [005] Noted * [005] Upon initiating SCG failure information procedure, if T310/T312 for the PSCell expires before the SCG link is recovered, UE does not trigger another SCG failure information procedure   [R2-2104078](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113bis-e\Docs\R2-2104078.zip) CR on SCG failure information ZTE Corporation, Sanechips CR Rel-15 38.331 15.13.0 2545 - F NR\_newRAT-Core   * [005] Not pursued   [R2-2104090](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113bis-e\Docs\R2-2104090.zip) CR on SCG failure information ZTE Corporation, Sanechips CR Rel-16 38.331 16.4.1 2546 - A NR\_newRAT-Core, NR\_Mob\_enh-Core, NR\_unlic-Core   * [005] Not pursued   [R2-2104079](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113bis-e\Docs\R2-2104079.zip) CR on SCG failure information ZTE Corporation, Sanechips CR Rel-15 36.331 15.13.0 4629 - F NR\_newRAT-Core  Moved from 5.4.2   * [005] Not pursued   [R2-2104080](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113bis-e\Docs\R2-2104080.zip) CR on SCG failure information ZTE Corporation, Sanechips CR Rel-16 36.331 16.4.0 4630 - A NR\_newRAT-Core  Moved from 5.4.2   * [005] Not pursued |
| Nokia | Disagree | This was clearly discussed in NR-U that LBT failure will just cause T304 expiry (if even that) and same applies to MCG failure happening due to SCG failure. We don't see how UE could interpret this way. |
| Huawei,HiSilicon | No | Our view is that if different UE behaviours are introduced, the reported information would become unreliable to the network. |
| OPPO | No | Our understanding is align with observation3. But we also think for SCG maybe it is not so critical as MCG link i.e. when T304 is running UE can still declare SCG RLF. |
| CATT | No |  |
| ZTE (Mengjie) | Agree | Although we have discussed this issue at the last meeting (see offline [005] report in R2-2104633), no consensus was reached since companies have different understanding and implementations on the UE behaviour upon detection of SCG failure (5/12 companies share the same view with option 2 proposed below). So one possible way is to allow different UE implementations for Rel-15 UE (considering different UE vendors have implemented this) and to achieve an unified UE behaviour from Rel-16 UE. |
| Apple | Agree | We share ZTE’s view. Current UE implementation may be different, and no serious problem is caused. So we think we can live with the different UE implementation in R15. |
| MediaTek | Agree | But no SPEC change is needed. We don’t think different UE implementation will cause any IOT issue. |
| Intel | Agree | Agree that different implementations can be supported. |

#### **Question 3.1.1-4 (SCG RACH/LBT Failure): Which option in proposal 5 do you prefer from R16?**

*Proposal 5: From Rel-16, RAN2 clarify an unified UE behaviour upon detection of random access problem indication from the SCG MAC while T304 of SCG is running:*

* *Option 1: The UE behaviour should be aligned with the current spec, i.e. the UE shall declare SCG RLF and initiate SCG failure information procedure.*
* *Option 2: The UE behaviour should be changed as proposed in [4], i.e. the UE shall not declare SCG RLF, and continue trying random access procedure until T304 expiry in SCG.*

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| --- | --- | --- |
| Company | Option 1 or Option 2? | Comments |
| OPPO | Option1 |  |
| Ericsson | None | See 3.1.1-3 |
| ZTE (Mengjie) | Option 2 | Slightly prefer option 2 to align the SCG failure detection with the MCG failure detection. |
| Apple | Option 2 | We prefer the unified UE behaviour for the SCG failure and MCG failure detection. |
| MediaTek | Option 1 | Then no SPEC change is needed |
| Intel | Option 1 | Keep to the existing specified behaviour |

#### **Question 3.1.1-5 (SCG RACH/LBT Failure): Do you agree with the proposal 6 of R2-2105503?**

*Proposal 6: If the clarification is made for proposal 5, the similar clarification is also applicable to the UE behaviour upon detection of consistent uplink LBT failure indication from the SCG MAC while T304 of SCG is running.*

(Rapp NOTE: proposal 6 is to propose the same UE behavior on the LBT failure detection during the T304 running.)

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| --- | --- | --- |
| Company | Agree or not? | Comments |
| OPPO | No |  |
| Ericsson | None | See 3.1.1-3 |
| ZTE (Mengjie) | Agree | If we clarified any one of options in proposal 5, the same option should be applicable to the LBT failure detection. |
| ZTE | Agree |  |
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### 3.2.1. Issue-2: SCG failure reporting procedure (only if SCG is not suspended)

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| The contributions and CRs related to this topic are:  [R2-2106190](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2106190.zip) Correction on SCG failure reporting procedure Huawei, HiSilicon CR Rel-15 38.331 15.13.0 2680 - F NR\_newRAT-Core  [R2-2106191](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2106191.zip) Correction on SCG failure reporting procedure Huawei, HiSilicon CR Rel-16 38.331 16.4.0 2681 - A NR\_newRAT-Core |

The R15/R16 CRs clarify that the SCG failure information procedure is only triggered when the SCG is not suspended, which was agreed in RAN2#113bis-e meeting as follow:

* Upon initiating SCG failure information procedure, if T310/T312 for the PSCell expires before the SCG link is recovered, UE does not trigger another SCG failure information procedure

The change of the CR is in section 5.3.10.3, and copied below for your reference.

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#### **Question 3.1.2: do you agree with the R15/R16 CRs (R2-2106190, R2-2106191)?**

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| Company | Agree or not? | Comments |
| Ericsson | No | When we took the agreement on this in the last RAN2 meeting, the intention was to capture in the chairman’s note something that it was already obvious for the UE but to not capture anything in the specification.  Since no problem has been observed in the field and it seems that all the UEs behave correctly, we do not see the need to clarify this. Apart from this, current specification is already clear on this aspect since when the SCG failure procedure is triggered, the UE should suspend transmissions on the SRBs and DRBs and thus there is no possibility to send another SCGFailureInformation to the network.  We think this change is not needed. |
| Nokia | Disagree | Companies already had this common understanding and also nothing was really broken without the fix. Soo no need to capture anything to specification. We can live with the notes in the chairman’s notes from RAN2#113bis-e meeting. |
| Huawei, HiSilicon | Yes | Proponent.  To align RAN2 agreements with our specification; otherwise, they would be contradictory with each other.  Regarding Ericsson’s comments, the triggered SCGFailureInformation would be transmitted on MCG, not on SCG. |
| OPPO | Disagree | We think it is feasible to report another SCGFailureInformation as pointed out by Huawei but also think this is corner case. Even UE report it again, network will most likely ignore it or sensible UE’s implementation will not report it twice. |
| CATT | No | Agree with Nokia |
| ZTE (Mengjie) | Disagree | We have discussed this at the last meeting (see offline [005] report in R2-2104633). And the conclusion was to capture the above note in the meeting minutes and to have no spec changes. |
| Apple | No | Agree with Nokia |
| MediaTek | Disagree | The CR is unnecessary, because section 5.7.3.2 already says: "A UE initiates the procedure to report SCG failures when SCG transmission is not suspended..." |
| Intel | No | Agree with others that this change is not essential. It is already captured in chair’s notes and it is sort of guidance and hence we don’t see it essential to have normative text for this. |

## 3.2 DC Related - SMTC and SCG change during handover

In RAN2#113bis-e meeting, two issues were raised for NR-DC clarification and non-consensus was achieved during the meeting. Therefore, they were postponed to this RAN2 meeting. There are several contributions are focusing on the two issues.

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| [R2-2103859](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_113bis-e\Docs\R2-2103859.zip) NR-DC Clarification Apple discussion Rel-15 NR\_newRAT-Core, TEI15   * [005] noted * [005] reconfigurationWithSync is not mandatory in SCG config for handover without SCG change (no spec changes needed). * [005] Postponed discussion: whether in the case of HO without SCG change, if SCG reconfigurationWithSync is not included, the UE continues the transmission on SG during the handover or not or whether this can be left to UE implementation, and whether there is a need for TS clarification. * [005] Postponed: CRs for UE timing at NR-DC handover. Majority view seems to be that UE should apply the target PCell timing as the PSCell SMTC timing reference during the NR-DC handover |

### 3.2.1. Issue 1: PSCell SMTC timing reference during the NR-DC handover

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| --- |
| The contributions and CRs related to this topic are:  [R2-2105768](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2105768.zip) Clarification on NR-DC procedures Ericsson discussion Rel-15 NR\_newRAT-Core  [R2-2106414](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2106414.zip) Clarification on leftover issues for NR-DC Huawei, HiSilicon discussion Rel-15 NR\_newRAT-Core  [R2-2106415](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2106415.zip) Correction on PSCell SMTC timing reference in NR-DC Huawei, HiSilicon CR Rel-15 38.331 15.13.0 2694 - F NR\_newRAT-Core  [R2-2106416](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2106416.zip) Correction on PSCell SMTC timing reference in NR-DC Huawei, HiSilicon CR Rel-16 38.331 16.4.0 2695 - A NR\_newRAT-Core  [R2-2105089](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2105089.zip) Clarification on the Timing Reference of PSCell SMTC Configuration Apple, Xiaomi, ZTE Corporation, Sanechips, Samsung, CATT, Ericsson, OPPO CR Rel-16 38.331 16.4.1 2598 - F NR\_newRAT-Core, TEI16 |

All proposals in the contributions on this topic have the same proposal, i.e. UE should apply the **target** PCell timing as the PSCell SMTC timing reference during the NR handover with PSCell addition/change.

|  |  |
| --- | --- |
| Tdoc number | Proposals |
| R2-2105768 | Proposal 1: For NR to NR handover with NR PSCell addition/change, the timing reference of the PSCell SMTC configuration is based on the target PCell. |
| R2-2106414 | Proposal 2: The UE should apply the target PCell timing as the PSCell SMTC timing reference during the NR handover with PSCell addition and PSCell change (including SN change). |
| R2-2105089 | Clarify that during the NR handover with PSCell addition/change, if NW provides the PSCell SMTC configuration based on PCell timing, UE should apply the target PCell timing as the reference. |

Therefore, we can first confirm the following proposal:

**Proposal: UE applies the target PCell timing as the PSCell SMTC timing reference during the NR handover with PSCell addition/change.**

#### **Question 3.2.1-1: Do you agree to clarify the above proposal in spec ( i.e. target PCell timing as the reference)?**

|  |  |  |
| --- | --- | --- |
| Company | Agree or not? | Comments |
| Ericsson | Yes |  |
| Nokia | Yes |  |
| Huawei, HiSilicon | Yes | The proposal is align with our CRs in R2-2106415/R2-2106416, but not with R2-2105089. |
| OPPO | Yes |  |
| ZTE(LiuJing) | Yes |  |
| CATT | Yes |  |
| Apple | Yes |  |
| MediaTek | Yes, but | If no consensus on the CR, we are fine to fallback to R15 principle (only sync NW could do this kind of blind PSCell add/change) |
| Intel | Yes |  |

In current spec, NW can configure the PCell timing based PSCell SMTC configuration with two parameters, so the clarification should cover the two places.

1. **Configuration 1: RRCReconfiguration -> targetCellSMTC-SCG**

R2-2105089 provides the clarification in the field description of targetCellSMTC-SCG as follows:

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| --- |
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#### **Question 3.2.1-2: Do you agree the change in R2-2105089 for targetCellSMTC-SCG?**

|  |  |  |
| --- | --- | --- |
| Company | Agree or not? | Comments |
| Ericsson | Yes |  |
| Nokia | Yes, but | It would be better to align the scenarios to the smtc field description changes below. Problem is the terms reconf with sync and without sync are not used in smtc so it would be good to align the scenarios across to prevent any misunderstanding of scenarios.  Question for clarification: In NR-DC case, is it so assumed that always reconfiguration with sync for NR PCell means PCell change? If not then the PCell reference should be the source no? Where is this captured?  [Apple] Yes. I think it’s the common understanding that that always reconfiguration with sync for NR PCell means PCell change. |
| Huawwi, HiSilicon | Yes |  |
| OPPO | Yes |  |
| ZTE(LiuJing) | Yes | Considering PSCell change also involves SCG reconfiguration with sync. So maybe it is more precise to say:  “in case of no reconfiguration with sync of MCG, and UE applies the configuration based on the timing reference of target NR PCell in case of reconfiguration with sync of MCG.” |
| CATT | Yes | Agree with ZTE’s comment |
| Apple | Yes | Since this parameter is only provided by MN in MCG’s RRCReconfiguration, it’s clear that the “reconfiguration with sync” for MCG case.  But we are fine with ZTE’s suggestion if companies would like to indicate “MCG” clearly. |
| MediaTek | Yes with comment | ZTE suggestion is better the original one.  We were wondering why we cannot simple say that.  “When UE receives this field, UE applies the configuration based on the timing reference of (target) NR PCell for PSCell addition and PSCell change” |
| Intel | Yes | Agree with ZTE’s suggestion |

1. **Configuration 2: secondaryCellGroup -> SpCellConfig -> reconfigurationWithSync->smtc**

Both R2-2105089 and R2-2106415/ R2-2106416 provide the clarification in the field description of smtc as follows.

* Option 1: The change in R2-2105089

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| --- |
|  |

* Option 2: The change in R2-2106415/ R2-2106416

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The difference between two options is that in Option 2 the NW can use the smtc parameter to provide the PCell timing based PSCell SMTC configuration for NR PSCell change case.

According to current field description (copied below), NW only provide the PCell timing based *smtc* configuration for NR PSCell addition case, not for PSCell change case.

Therefore, in rapporteur’s view, the change in Option 2 is not only a timing clarification, but also to extend the applicable case to cover PSCell change. The change may introduce the NBC issue.

Graphical user interface, text, application, email

Description automatically generated

#### **Question 3.2.1-3: Do you agree the Option 1 (R2-2105089) or Option 2 (R2-2106415/ R2-2106416) for the clarification on smtc configuration?**

|  |  |  |
| --- | --- | --- |
| Company | Option 1 or Option2? | Comments |
| Ericsson | Option 1 (R2-2105089) | We are one of the proponent of the CR. |
| Nokia | Option 1 | Option 2 seems to discriminate the NR PSCell change case handling in EN-DC and NR-DC and that does not seem to be part of current discussion. |
| Huawei, HiSilicon | Option 2 | All these CRs agree that the UE should apply the target PCell timing for PSCell SMTC configuration in case of PSCell addition.  The difference between these CRs is whether the UE should apply target PCell timing for PSCell SMTC in the case of PSCell change.  We think the same timing should be applied for both PSCell addition and PSCell change, especially because the target SN sometimes may not be able to distinguish these two cases. For example, as we discussed during the INM offline discussion, the target MN may select to perform full configuration upon SN change, and in this case, the target MN will perform SCG release and add, and it will request the target SN to add a new PSCell. In this case, to UE, it is PSCell change, but to the target SN, it is actually a PSCell addition when generating the PSCell SMTC configuration. Therefore, if the timing reference is different in these two cases (PSCell addition and PSCell change), it will cause misalignment on timing reference between the target SN who is generating the configuration, and the UE who is using the configuration.  Furthermore, according to the proposal in R2-2105768, and coversheet in R2-2105089:  “But in NR-DC, in RAN2#113bis meeting, majority view is that UE should apply the target PCell timing as the PSCell SMTC timing reference during the NR handover with PSCell addition/change.”  I see actually proponents of R2-2105089 are also suggesting that the target PCell timing should be applied for PSCell SMTC timing reference, in case of PSCell change.  So I assume Option 2 (R2-2106415/ R2-2106416) is actually aligned with the intention. |
| OPPO | Option1 | The additional part of the option2 will cause NBC problem. And it is not clear why Huawei differentiate (NG)EN-DC case and NR-DC case. As for the coversheet of option1, the PSCell change is addressed in the change of field description of *RRCReconfiguration -> targetCellSMTC-SCG.*  [Huawei] not sure how NBC is defined here. Theoretically, all these CRs are in NBC nature regardless for PSCell addition and PSCell change. In the last meeting, people were ok to change the behaviour for NR-DC, we think basically assuming that changing NR-DC will not introduce NBC issues to vendors.  On the other hand, the comments here seem to be assuming that only targetCellSMTC-SCG (the Rel-16 addition) can be used for the case of PSCell change, and the legacy field is not applicable. Not sure if this is a common understanding of proponents of 2105089. If this is the case, we need to further clarify the status of Rel-15 NR-DC. |
| ZTE(LiuJing) | Option 1(R2-2105089) | We are one of the proponent of the CR.  Regarding the change in R2-2106415, from network perspective, SN itself may trigger **intra-SN** PSCell change. In this case, the “source PSCell” will be used as a timing reference. So the change on PSCell change may cause NBC problem.  [Huawei] This seems to be a different understanding, which means that PSCell SMTC can only be configured for the case of intra-SN PSCell change even for NR-DC? Is this a common understanding?  What is NBC problem here may need further clarification.  We actually have another question, do we intend to introduce different behaviors here for Rel-15 and Rel-16 UEs/Networks? |
| CATT | Option 1 | We are one of the proponent of the CR. |
| Apple | Option 1 | The intention of the CR is to clarify the current PCell timing based PSCell SMTC configuration case. But the additional part in option 2 introduced the new case for the configuration, which is not related to the timing clarification. |
| MediaTek | Option 1 | Option 2 simply makes that SN cannot provide SMTC based on its own timing (in case of intra-SN PSCell change). This is functional change, not a clarification on which reference cell to use. It is not acceptable to us.  Please note that this smtc field is provided by SN in SN RRC format. It makes much more sense to use SN PSCell as reference cell. Having say that, using this field for NR PSCell addition is also strange. It would result in a SN RRC message based timing of MN PCell. That is also why we have the new parameter targetCellSMTC-SCG in R16 that allow MN to provide this parameter in MN RRC format. Our preference is to remove PSCell addition part in this field as we have targetCellSMTC-SCG now. |
| Intel | Option 1 | Agree with others that option 2 goes beyond the original discussion. This additional case needs further discussion. |

### 3.2.2. Issue 2: HO with SCG but without SCG reconfigurationWithSync configuration

|  |
| --- |
| The contributions and CRs related to this topic are:  [R2-2105768](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2105768.zip) Clarification on NR-DC procedures Ericsson discussion Rel-15 NR\_newRAT-Core  [R2-2106414](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2106414.zip) Clarification on leftover issues for NR-DC Huawei, HiSilicon discussion Rel-15 NR\_newRAT-Core  [R2-2105090](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2105090.zip) Clarification on NR HO without SCG Configuration Change Apple discussion Rel-15 NR\_newRAT-Core  [R2-2105092](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2105092.zip) DRAFT LS on the NR HO without SCG Configuration Change Apple LS out Rel-15 NR\_newRAT-Core To:RAN4  [R2-2106135](file:///D:\Documents\3GPP\tsg_ran\WG2\TSGR2_114-e\Docs\R2-2106135.zip) Clarification on NR HO without SCG Configuration Change Apple CR Rel-16 37.340 16.5.0 0267 - F NR\_newRAT-Core, TEI16 |

In last RAN2 meeting, during the NR-DC clarification discussion, it was agreed that NW reconfigurationWithSync is not mandatory in SCG config for handover without SCG change (no spec changes needed). But the UE behavior on SCG during the handover with SCG but without SCG reconfigurationWithSync configuration is not clear.

The proposals on this topic in this meeting are summarized in the following table.

|  |  |
| --- | --- |
| Tdoc number | Proposals |
| R2-2105768 | Proposal 2: RAN2 confirms that, in the case of HO without SCG change, in case SCG reconfigurationWithSync is not included the UE continues the transmission on SCG during the handover (no change is required in TS 37.340). |
| R2-2106414 | Proposal 1: The UE can continue SCG transmission during handover without SCG change if SCG reconfigurationWithSync is not included. |
| R2-2105090 | Observation 1: There is no description to request UE to stop the transmission/reception on SCG link for the handover without SCG sync configuration.  Observation 2: UE’s transmission on SCG may be interrupted due to the RF retuning according to the target configuration for the handover without SCG sync configuration.  Proposal 1: Confirm that reconfigurationWithSync in SCG configuration is mandatory for the LTE handover with NR PSCell in EN-DC.  Proposal 2: For the handover without SCG sync configuration, it’s up to UE implementation to stop or continue the SCG transmission during the handover period.  *If proposal 2 is not agreeable, we should consult with RAN4 on the SCG transmission and interruption requirement [1].*  Proposal 2a: Send LS to RAN4 to consult the UE requirement on the SCG link during the handover without SCG sync configuration.  Proposal 3: Agree the TS 37.340 CR to clarify the UE operation during the handover without SCG sync configuration. |

**<HO with SPCell configuration in EN-DC>**

In last RAN2 meeting, it just discussed the HO without SCG sync configuration issue for NR-DC. In R2-2105090, it is proposed to confirm the SCG sync configuration is mandatory in HO with PSCell in EN-DC according to the LTE RRC spec description as follow.

**Proposal 1: Confirm that *reconfigurationWithSync* in SCG configuration is mandatory for the LTE handover with NR PSCell in EN-DC.**

|  |
| --- |
| 5.3.1.3 Connected mode mobility  ……  Before sending the handover message to the UE, the source eNB prepares one or more target cells. The source eNB selects the target PCell. The source eNB may also provide the target eNB with a list of best cells on each frequency for which measurement information is available, in order of decreasing RSRP. The source eNB may also include available measurement information for the cells provided in the list. The target eNB decides which SCells are configured for use after handover, which may include cells other than the ones indicated by the source eNB. If an SCG is configured, handover involves either SCG release or either SCG change (in case of DC) or an NR SCG reconfiguration with sync and key change (in case of EN-DC and NGEN-DC). In case the UE was configured with (EN-) DC or NGEN-DC, the target eNB indicates in the handover message whether the UE shall release the entire (NR) SCG configuration. Upon connection re-establishment, the UE releases the entire SCG configuration except for the DRB configuration, while E-UTRAN in the first reconfiguration message following the re-establishment either releases the DRB(s) or reconfigures the DRB(s) to MCG DRB(s).  …… |

#### **Question 3.2.2-1: Do you agree that reconfigurationWithSync in SCG configuration is mandatory for the LTE handover with NR PSCell in EN-DC?**

|  |  |  |
| --- | --- | --- |
| Company | Agree or not? | Comments |
| Ericsson | No with comment | We think that from TS 38.331 is already clear when the reconfiguration with sync should be signalled in the secondary cell group. For this reason, is not entirely true that reconfigurationWithSync in SCG configuration **is mandatory** for the LTE handover with NR PSCell in EN-DC.  From TS 38.331, we have:  -- Serving cell specific MAC and PHY parameters for a SpCell:  SpCellConfig ::= SEQUENCE {  servCellIndex ServCellIndex OPTIONAL, -- Cond SCG  reconfigurationWithSync ReconfigurationWithSync OPTIONAL, -- Cond ReconfWithSync  rlf-TimersAndConstants SetupRelease { RLF-TimersAndConstants } OPTIONAL, -- Need M  rlmInSyncOutOfSyncThreshold ENUMERATED {n1} OPTIONAL, -- Need S  spCellConfigDedicated ServingCellConfig OPTIONAL, -- Need M  …  }  ….   |  |  | | --- | --- | | Conditional Presence | Explanation | | *ReconfWithSync* | The field is mandatory present in the *RRCReconfiguration* message:  - in each configured *CellGroupConfig* for which the SpCell changes,  - in the *masterCellGroup* at change of AS security key derived from KgNB,  - in the *secondaryCellGroup* at:  - PSCell addition,  - SCG resume with NR-DC or (NG)EN-DC,  - update of required SI for PSCell,  - change of AS security key derived from S-KgNB while the UE is configured with at least one radio bearer with *keyToUse* set to *secondary* and that is not released by this *RRCReconfiguration* message,  Otherwise, it is optionally present, need M. The field is absent in the *masterCellGroup* in *RRCResume* and *RRCSetup* messages and is absent in the *masterCellGroup* in *RRCReconfiguration* messages if source configuration is not released during DAPS handover. | |
| Nokia | Agree | In this case there is always key change implied due to PCell HO, hence this is always forced upon SCG. |
| Huawei, HiSilicon | Yes | It is already clear in specifications. |
| OPPO | Yes | agree with Nokia |
| ZTE(LiuJing) | Yes, but | We originally thought that SCG reconfigurationWithSync is required due to key change caused by PCell handover. However, seems the condition pointed by Ericsson do allow network to not provide it (when all SCG radio bearer are MN terminated bearers).    - change of AS security key derived from S-KgNB while the UE is configured with at least one radio bearer with *keyToUse* set to *secondary* and that is not released by this *RRCReconfiguration* message,  If *reconfigurationWithSync* is not included, then SCG MAC/RLC will not reset. In this case, to avoid UE to deliver the old data (with old key) to CN, one possible way is to configure new LCHs associated with the bearers, and discard the data received from old LCH.  We are open to hear other company’s views. |
| CATT | No with comment | We agree with Ericsson, it is already clear in the specification. |
| Apple | Yes | It’s clearly indicated in LTE RRC spec as above to say the SCG sync configuration is needed. |
| MediaTek | Yes. but | The sentence in 5.3.1.3 indicates clearly implies this. But the comment from Ericsson/ZTE is also correct that there may be case that SCG reconfiguration with sync is not needed. We are open for discussion. |
| Intel | No | We agree with Ericsson comment that the current specification covers this case as not requiring reconfig with Sync on SCG. |

**<UE operation on SCG for NR-DC without SCG reconfigurationWithSync config >**

The analysis in all contributions indicate that according to current RAN2 spec UE may continue the transmission on SCG during the HO without SCG reconfigurationWithSync configuration, But in R2-2105090, it provides some examples which may lead to the serving frequency change and UE RF retuning, and UE may interrupt the SCG transmission for some time due to the RF retuning.

|  |
| --- |
| * *Example#1: Intra-node handover to change the PCell frequency*   *UE supports the bandcombination is {CC1, CC2, CC3}.*  *UE’s source configuration is {PCell-CC1, PSCell-CC3}, and NW performs the intra-node handover to change the PCell from CC1 to CC2, and the target configuration is {PCell-CC2, PSCell-CC3}.*  *Since the MN PCell change doesnot impact the SCG configuration, NW may trigger the NR handover without SCG sync configuration.*  *But in this case, UE’s RF chain may need to retune from {CC1,CC3} to {CC2, CC3}, which may lead to the interruption on SCG link.*   * *Example#2: intra-node handover to add/release MCG SCells*   *UE supports the bandcombination is {CC1, CC2, CC3}.*  *UE’s source configuration is {MCG PCell-CC1, MCG SCell-2, SCG PSCell-CC3}, and NW performs the intra-node handover to delete the MCG SCell, then the target configuration is {PCell-CC1, PSCell-CC3}.*  *Since the release of MCG SCell doesnot impact the SCG configuration, NW may provide the handover without SCG sync configuration.*  *But in this case, UE’s RF chain may need to retune from {CC1,CC2,CC3} to {CC1, CC3}, , which may lead to the interruption on SCG link.* |

#### **Question 3.2.2-1: Do you agree the UE may stop the SCG transmission during the HO without SCG reconfigurationWithSync, e.g. due to the RF retuning according to the configuration?**

|  |  |  |
| --- | --- | --- |
| Company | Agree or not? | Comments |
| Ericsson | No with comment | The whole point of avoiding having reconfiguration with sync on the SCG is because the UE can continue operations with the SN. This was at least the intention when this was discussed more or less one year ago.  Of course, if network configuration requires interruption of transmissions this is okay, but for the other cases we do not see why the UE would stop transmitting with the SN.  [Apple] According to the clarification, we need to clarify that NW is only allowed to provide the HO command without SCG sync configuration if the configuration does not lead to UE RF retuning. |
| Nokia | Agree | Yes, it is possible due to possible UE limitation |
| Huawei, HiSilicon | No | If there is some interruption defined by RAN4 in this case, the UE can just follow RAN4 specs.  [Apple] RAN4’s assumption is UE always perform the RACH procedure on PCell and PSCell during the NR-DC HO. So RAN4 has not consider this case (HO without PSCell RA) yet. If we would like to refer to RAN4 requirement, it’s better to inform RAN4 abou thtis case. |
| OPPO | No | If network has concern then it can also trigger reconfiguration with syn procedure otherwise it will not.  [Apple] we have no discussion and no agreement on the case of NW providing such configuration. |
| ZTE(LiuJing) | Agree, but | The observation looks reasonable. But we tend to agree with HW that no need to discuss the details in RAN2, UE can follow RAN4 requirements (if any).  [Apple] RAN4 has not consider this case and has not specify the requirement for this case yet. |
| CATT | No | We agree with HW  [Apple] RAN4 has not consider this case and has not specify the requirement for this case yet. |
| Apple | Yes | If NW provides the NR-DC configuration without SCG sync configuration which may lead to the RF retuning, e.g. two exmaples indicated in R2-2105090, UE cannot continue the SCG transmission without interruption. |
| MediaTek | Agree. but | We should not say “stop” SCG transmission but we should accept interruption if defined by RAN4. |
| Intel |  | We can leave it to RAN4. |

#### **Question 3.2.2-2: Do you agree to send LS to RAN4 to consult the UE requirement on the SCG link during the handover without SCG sync configuration?**

|  |  |  |
| --- | --- | --- |
| Company | Agree or not? | Comments |
| Ericsson | No | We do not really see the point to send an LS to RAN4. Is not clear what we want to achieve with this LS. |
| Nokia | Disagree | No need to discuss as there is no formal requirement to support this. We would prefer not to burden RAN4 with unnecessary work. |
| Huawei, HiSilicon |  | No strong view. |
| OPPO | No | We think this is purely RAN2 issue |
| ZTE(LiuJing) |  | The LS discussed in offline [030] also relates to this scenario. If anything is needed, we prefer to merge it into that LS. E.g. mention SCG RACH is not mandatory required, then it is up to RAN4 if additional UE requirement is needed. |
| CATT | No |  |
| Apple | Yes | Companies indicated that UE’s behavior should refer to RAN4 requirement. But unfortunately RAN4 hasnot considered/specified this case. RAN4’s assumption on the NR-DC HO is that the PCell and PSCell RACH will be triggered together.  If companies would like to refer to RAN4 spec, we need to send LS to trigger RAN4 to specify the requirement in this case. |
| MediaTek | No strong view. | We can ask RAN4 to define to interruption as they should do this their Rel-17 WI. Or companies could just propose this in RAN4. |
| Intel | No strong view |  |

#### **Question 3.2.2-3: Do you agree to clarify the agreed UE operation on SCG during the MR-DC HO in the spec, as proposed in R2-2106135?**

|  |  |  |
| --- | --- | --- |
| Company | Agree or not? | Comments |
| Ericsson | No | These changes are NBC (the first one in particular) and we are not okay to have them.  The current specification is quite flexible on this aspect, and we would like to keep it in this way. With Rel-15 implementations already out in the field for quite some time we are not okay with such kind of changes, unless issues in the field have been observed. |
| Nokia | Disagree | Probably good to do nothing really for this as there is no mandate for it in Rel-16 |
| OPPO | No |  |
| ZTE(LiuJing) | No | Tend to agree with Ericsson and Nokia, the current spec does not mandate UE behaviour anyway. |
| CATT | No | The first change is not needed, due to the NW will configure the reconfiguration with sync for SCG according to the specification correctly, and the UE will perform the RACH according to the configuration if configured with reconfiguration with sync  Second change is not needed due to it is up to UE implementation. |
| Apple | Yes | It’s better to address the UE behavior on this SCG during the MR-DC HO without SCG RACH sync procedure. Otherwise, UE may stop the SCG transmission during the handover procedure. |
| MediaTek | No |  |
| Intel | No | Not as proposed but we are open to clarify that UE does not stop transmission on SCG. |

# 4 Conclusion

TBD.