3GPP TSG-RAN WG2 Meeting #111 R2-200xxxx

Elbonia, Online, 17 – 28 August 2020

**Agenda item: 6.7.1**

**Source: Nokia, Nokia Shanghai Bell**

**Title: Report from [AT111-e][202][MOB] LTE and NR mobility Stage-2 corrections (Nokia)**

**WID/SID: LTE\_feMob-Core/NR\_Mob\_enh-Core - Release 16**

**Document for: Discussion and Decision**

# 1 Brief scope of the paper

This document aims at collecting companies’ views regarding the Stage-2 corrections related to Rel-16 Mobility enhancements:

**[AT111-e][202][MOB] LTE and NR mobility Stage-2 corrections (Nokia)**

Scope:

* Collect companies’ feedback for the Stage-2 contributions under 6.7.1, 6.7.3 and 7.4.1 marked for this email discussion
* Proponents may provide updated versions (if needed) under this email discussion (Tdoc numbers can be requested for this purpose from the session chair or the RAN2 secretary)

        Intended outcome:

* Discussion summary in [R2-2008132](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_111-e/Docs/R2-2008132.zip) (by email rapporteur).
* Email discussion report treated during the 2nd online session, but session chair may propose intermediate conclusions after summary is available

        Deadline for providing comments, for rapporteur inputs, conclusions and CR finalization:

* Deadline for companies' feedback:  Thursday 2020-08-20 09:00 UTC
* Deadline for rapporteur's summary (in [R2-2008132](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_111-e/Docs/R2-2008132.zip)):  Friday 2020-08-21 09:00 UTC
* Deadline for CR finalization (for agreed CRs): Wednesday 2020-08-26 07:00 UTC

# 2 Corrections to TS 37.340

## 2.1 Figures and description for CPC

[1], [2] and [3] suggest TS 37.340 changes to the figures and corresponding description for Conditional PSCell Change (CPC). There are various approaches presented: in [1] the names of the messages in section 10.3.1 of TS 37.340 are changed (to match the correct RAT nomenclature). In addition, ‘’if the SR3 is configured’’ is removed. The authors of [2] propose a new figure wherein RRCReconfigurationComplete (forwarded to the SN, embedded in RRC Transfer) is additionally shown. The authors of [3] introduce two new figures in section 10.3.2 of TS 37.340, to separately depict and describe CPC cases and remove the confusion in the existing figures (e.g. step 3a, not shown in the figures).

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| --- | --- | --- |
| **Question 1: Do you agree sections 10.3.1 and 10.3.2 of TS 37.340 require changes? If so, please indicate which CRs ([1], [2], [3]) are relevant and which other potential changes do you find necessary?** | | |
| **Company** | **CR or CRs** | **Comments** |
| Futurewei | Agree on [1],[2], partially [3] | We are fine with the changes proposed in [1]. In principle we support the Ericsson proposed change on diagram 10.3.2-4 [2]. We are fine to specify CPC separately as suggested in [3]. However, for without SRB3 case in [3], the changes including diagram 10.3.2-6 still does not precisely reflect the RAN2 agreement: “the UE needs to provide the CPC complete message to the SN via the MN upon CPC execution” and “the UE sends RRCReconfigurationComplete to the MN at execution of CPC”. Our understanding is “upon/at execution of CPC” means sending CPC complete message is at the same time CPC execution is triggered – sending the complete message is in parallel with CPC execution rather than after CPC execution is completed. Even if there is ambiguity on RAN2 agreement, based on the technical merit of lower latency without losing anything, sending completion message while execution starting should be a better choice. Therefore, we suggest: adopt the diagram 10.3.2-4 proposed in [2] as CPC specific diagram 10.3.2-6. Modify the procedure steps suggested in [3] as follows:  1. The SN initiates the procedure by sending the *SN Modification Required* to the MN including the SN RRC reconfiguration message.  2. The MN forwards the SN RRC reconfiguration message to the UE including it in the *RRC reconfiguration* message.  3. The UE replies with the *RRC reconfiguration complete* message by including the SN RRC reconfiguration complete message. The UE maintains connection with source PSCell after receiving CPC configuration, and starts evaluating the CPC execution conditions for the candidate PSCell(s).  4. If at least one CPC candidate PSCell satisfies the corresponding CPC execution condition, the UE detaches from the source PSCell, applies the stored corresponding configuration and sends an *ULInformationTransferMRDC* message to the MN which includes an embedded *RRCReconfigurationComplete* message to the new PSCell..  5. The MN forwards the SN RRC response message, if received from the UE, to the SN by including it in the *SN Modification Confirm* message.  6. The UE synchronises and performs random access procedure to the selected candidate PSCell. |
| MediaTek | Agree to [1], [2]  May agree to [3] | * Minor corrections in [1] can be agreed * For CPC procedure, we agree that the message flow needs to be modified. We prefer to have separate figures for CPC without MN involvement, as proposed in [2]. * If people don’t want to have separated figure, the modified Fig. 10.3.2-4 is also fine for us. |
| vivo | Agree with [1] and [2] | We have no strong view on the proposed changes in [3]. It seems that the texts in [3] may need more discussion as it could introduce more confusions as pointed by Huawei, and the issues mentioned by [3] seems already solved by [1] and [2]. |
| NEC | Agree with [1] and [2], acceptable for [3] with modifications | All changes proposed in [1] are OK.  All changes proposed in [2] are also OK but the lines for “3a” in Figure 10.3.2-4 should be dashed-line as they are specific to CPC.  For all changes in [3], no strong view to add separate figures and text for CPC. If they are to be added, some modifications below seem to be required;  - “ SN initiated Conditional (CPC) SN Modification without MN involvement “ in 10.3.2 should be “SN initiated Conditional PSCell Change (CPC) without MN involvement”. Also, “This procedure is supported for all the MR-DC options.” is not correct, as no SRB3 in NE-DC.  - In Figure 10.3.2-6, step 4 and step 5&6 should be put in opposite order, i.e. step 5&6 comes earlier than step 4 which is similar to legacy PSCell change case. This is aligned with the agreements, e.g. “Then the UE needs to provide the CPC complete message to the SN via the MN upon CPC execution.”. And can avoid confusion, e.g. current order looks the order is intentionally changed compared to legacy. |
| Samsung | Yes for [1][2] | We agree to changes in [1] and [2].  For changes in [3], we understand the intention, but the CR should be improved e.g. to indicate that 2nd complete corresponds to innermost embedded configuration |
| OPPO | Agree partially on [1], [2], [3] | In [1], perhaps we should keep the part of “if the SRB3 is configured”, and add another description of transmitting complete message for the case “if the SRB3 is not configured”.  In [2], suggest rewording to “The *RRCReconfigurationComplete* is forwarded to the SN and embedded in *RRC Transfer.*”  For [3], we are fine with the suggested change from Futurewei. |
| Ericsson |  | The current figure and text need to be corrected. Although we submitted a correction to the existing figure, we would prefer separating CPC and legacy. For the rel-16 case it is possible to have it in the same figure, but for rel-17 we think it will be too hard to read if everything is in the same figure. So we propose to introduce a new figure for intra-SN SN initiated PSCell change now (including corrections) and later add the rel-17 cases which we standardize. |
| CATT | Agree with [1] and [2]. | [3] is not needed. [2] has modified the figure to fix the problem in the figure which is sufficient.  In [2], cover page needs correcting; spec is 37.340 |
| Huawei, HiSilicon | Yes for [1][2] | [3] brings lots of impacts to stage-2. |
| Intel | Agree [1] and [2] | Agree CATT’s comments, [3] is not needed. |
| DOCOMO | Agree [1] and [2] | Agree with CATT and Intel. |
| Apple | Agree with [1][2] | We share CATT’s view. |
| Google | Yes for [1][2] | Some changes in [3] are not correct and bring more confusion. If the majority companies agree to have separate figures for CPC, then we need to fix these wrong changes. |
| CMCC | Agree on [1] and [2] | We agree to the changes in [1] and [2]. For changes in [3], we are fine to have separate figures and procedures for CPC, but detailed description may need future discussion. |
| ZTE | Agree with [1], partially agree with [2] and [3] | Share the same view as Ericsson that it’s better to separate CPC and legacy procedure.  And we think it’s better to coordinate with RAN3 to decide the overall procedure considering the Xn/X2 signaling is also involved (e.g. whether the *RRCReconfigurationComplete* forwarded to the SN is embedded in *RRC Transfer* or *SN Reconfiguration Complete*). |
| Nokia | Prefer [3] | However, we agree with the general problem underlined with Ericsson: these figures and descriptions shall be separated, especially considering the upcoming Rel-17 impact on the corresponding sections (showing all in one figure will not be doable).  The impact on 37.340 seems to be excessive in [3], but in fact all that has been done there is to extract this weird step 3a (not shown in the figure) and provide a corresponding description via separate figures for CPC. This ensures clarity. We are OK to consider suggested changes above. |
| LG | [1], [2], [3] | For [2], the CR [3] can be merged with this CR and the cover sheet needs to be update because of the spec number.  For [3], the separated description looks helpful, but it will be better that changed figures is updated for consistency with the legacy figures |
| QC | Agree with [1],[2]. Ok to consider [3] as well. | Agree with changes in [1] and [2]. Fig 10.3.2-4 in [2] is more detailed and better than fig 10.3.1-4 in [1]. These figures need to be aligned .We are also fine to introduce changes as proposed in [3] as clean approach but figures format need to be updated and fig 10.3.2-4 from [2] can be used. Under figure 10.3.2-4, description says “SRB3 is not used” instead of “SRB3 is used”. |

Summary:

* [1] and [2] seem to be agreeable to most companies
* There are split views on [3], although quite many companies see a need to separate CPC and non-CPC figures and descriptions (especially considering the upcoming Rel-17 changes).

**Proposal 1: R2-2007016 and R2-2007595 are agreed. In R2-2007595 a TS number is to be corrected in the cover page.**

**Proposal 2: Discuss further if CPC and non-CPC SN modification description and figures shall be separated, as proposed in R2-2007360.**

## 2.2 SCG handling in DAPS handover

The authors of [4] claim it is unclear how MR-DC configurations are handled in case of DAPS HO. It is proposed to add a subclause informing MR-DC is not supported together with DAPS. Thus, SCG configuration should be released before DAPS HO command is sent to the UE.

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| --- | --- | --- |
| **Question 2: Do you agree with what is proposed in [4] and the need of such TS 37.340 CR?** | | |
| **Company** | **Yes/No** | **Comments** |
| Futurewei | No | There reason MR-DC is not supported during DSPS is that tri-connectivity is not supported. Therefore, as long as MR-DC is suspended during DAPS, it should be fine. It should be the network deciding when to release the SCG – either before DAPS is started or after DAPS is completed. We don’t think the UE should autonomously release the SCG upon DAPS is conducted. The network should be able to act properly when to release SCG. |
| MediaTek | Yes | Our understanding about “MR-DC is not supported during DAPS HO” is that SCG should be released before DAPS is configured. We believe that the network should properly handle this, and it is good to have the proposed description in stage-2 specifications. |
| vivo | Yes | This is aligned with our agreement that DC is not supported during DAPS handover. I guess the proposed texts are not putting any restrictions on the UE, but rather to restrict the network configurations. |
| NEC | Yes | Good to add it. |
| Samsung | Yes | We agree to the intention. It would be better to clarify it since the network would not indicate DAPS handover to UE configured with MR-DC. |
| OPPO | Yes | Network should release SCG, similar to releasing SCells for CA, before DAPS HO. |
| Ericsson | Yes | A description is needed in 37.340 and this would cover e.g. the EN-DC case as well. |
| CATT | yes |  |
| Huawei, HiSilicon | yes | Same with our understanding, ok to clarify. |
| Intel | Partially yes | DAPS is configured via DRB-ToAddMod, which is handled after SCG/SCell configuration. Therefore the network can release SCG/SCells in DAPS HO command. |
| Apple | Yes | It’s correct and should be clarified in the spec. |
| Google | Partially yes | The network can release SCG/SCells before DAPS handover or in the DAPS handover command. |
| CMCC | Yes |  |
| ZTE | Yes | We think both SCG and SCells should be released before the HO command. If the release of SCG/SCells is configured in the HO command, it may introduce some ambiguity that SCG/SCells is just released for the target link but SCG/SCells in the source link are still kept, since the configuration included in the HO command is just applied for the target. And then we may need to add another clarification that the release of SCG/SCells is also applied for the source link in the stage-3 spec. So we think it’s better to clarify that SCG/SCells is released before the HO command. |
| Nokia | No | Agree with Intel. We do not think another reconfiguration (for releasing SCG) is needed and shall be clarified via [4]. We believe SCG shall be released via HO command. |
| LG | No | The proposed text is already captured in 38.300. Thus, we don’t think the proposed text is needed. |
| QC | Yes | Response to FW: there is no suspension of SCG in Rel-16. It can clarified that the release is done by the NW. |

Summary:

* [4] seems to be agreeable to most companies, at least the intention to clarify in TS 37.340 the MR-DC and DAPS co-existence.
* However, the text proposal in [4] assumes SCG configuration is released before DAPS HO command, while e.g. R2-2007309 express a different view.

**Proposal 3: A clarification on MR-DC and DAPS coexistence is added to TS 37.340. The exact text is agreed after discussing R2-2007309.**

## 2.3 Editorial change of CPC subsection

In [5] a minor correction fixing wrong indentation is proposed. Please share your view below only if you think this is not needed or shall be addressed in a different manner (i.e. not via a separate CR, covering just such tiny change).

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| **Question 3: Shall the editorial issue in [5] be addressed? Do we need a separate CR for such changes?** | | |
| **Company** | **Yes/No** | **Comments** |
| Futurewei | Yes. | Notify the editor of 37.340. |
| MediaTek | Yes. |  |
| vivo | Yes |  |
| NEC | Yes and No | Good to fix it but no need for a separate CR. |
| Samsung | Yes |  |
| OPPO | Yes | Notify the editor of 37.340. |
| Ericsson | Yes and No | Good to fix, but no need for a separate CR. Could be fixed in the CR in 2.1 or in a rapporteur CR. |
| CATT | yes | Agree with Ericsson that a separate CR is not needed. |
| Huawei, HiSilicon | Yes |  |
| Intel | The change is ok | Editorial change, and could be merged in to Rapporteur CR if any. |
| DOCOMO | Yes |  |
| Apple | Yes | It can be merged into Rapporteur’s CR. |
| CMCC | Yes |  |
| ZTE | Yes | It can be merged into Rapporteur’s CR. |
| Nokia | Yes | Agree such changes should be handled via joint editorial CR (or perhaps it is even enough to notify the 37.340 rapporteur) |
| LG |  | RAN2 can have one big editorial CR including this change. |
| QC | Yes | No need to have separate CR for this minor fix. |

Summary:

* The change in [5] is OK to all. However, shall be covered in the joint CR, comprising editorial changes to TS 37.340.

**Proposal 4: Change proposed in R2-2007542 is agreed and added to the joint editorial/rapporteur’s CR for TS 37.340.**

# 3 Corrections to TS 38.300 and 36.300

## 3.1 DAPS with MR-DC

[6] and [7] comprise corresponding changes to what has been described in [4]. [6] and [7] modify just the NOTEs, not the procedural text. [8] suggests a similar NOTE change to LTE Stage-2 specification. Do you think the CRs in [6], [7] and [8] are needed?

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| --- | --- | --- |
| **Question 4: Do you support changes in [6] and [7] or [8], modifying the NOTEs regarding DAPS and MR-DC coexistence?** | | |
| **Company** | **Yes/No** | **Comments** |
| Futurewei | No | The network should be able to act properly when to release SCG. It is not really needed to add more notes. |
| MediaTek | No | We believe that it is clear enough to have related description in stage-2 specification. |
| vivo | Yes | It is better to provide some guidance for the network implementation. |
| NEC | Yes |  |
| Samsung | Yes | We agree to the intention and prefer [6] and [7]. |
| OPPO | No | No strong view, but it seems the change is not essential. |
| Ericsson | Yes | This needs to be clarified, but the text should be updated to say that the SCells can be released in the HO command (whereas the SCG needs to be released before the HO command). |
| CATT | Yes | We agree with the intention and preffer [6] and [7] |
| Huawei, HiSilicon | No | We don’t agree with [6] and [7]. Actually we have submitted a paper to address this issue, and it is supposed to be treated online.  [R2-2007309](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_111-e/Docs/R2-2007309.zip) Discussion on releasing SCells Huawei, HiSilicon  Regarding this Scell release point, our proposal is “**Proposal 2: add clarification that UE releases all source MCG SCells if DAPS handover command is received.**” Which is in line with our previous agreement.  Ok with the change mentioned in [8], since no matter by handover command or by another RRCreconfiguration message, they are all indicated by network. |
| Intel | [8] is ok. | DAPS is configured via DRB-ToAddMod, which is handled after SCG/SCell configuration. Therefore the network can release SCG/SCells in DAPS HO command. And then [6] [7] are not needed. [8] is sufficient. |
| Apple | Yes | Agree to capture the reasonable NW implementation  As indicated by Intel, [6][7] exclude the case that the NW releases the CA/DC in DAPS HO command. Therefore, the wording should be updated to include this case. |
| Google | Yes for [8] | The network can release SCG/SCells before DAPS handover or in the DAPS handover command. Changes in [8] is more accurate than [6] and [7] because [6] and [7] only cover the cast that the network releases SCG/SCells before DAPS handover. |
| CMCC | Yes | No strong view. |
| ZTE | Yes | Some comments as 2.2.  And we prefer [6] and [7] to clearly clarify that SCells are released before the HO command, as the SCG release proposed in [4]. |
| Nokia | [8] is preferred | Agree with Huawei, the NOTE in [8] is high-level, matching the purpose of Stage-2 specification. Fine to discuss 7309 online, before taking the final decision how this clarification shall look like (i.e. whether [6], [7] or [8] is to be chosen. |
| LG | Yes but | It’s good to clarify the N/W behaviour. Then, if the proposed text in [6] and [7] is agreed, the proposed text in [8] is not needed due to redundant.  However, we think RAN2 may need to consider whether there is another issue to understand this change. This is because the network may send two RRC Reconfiguration messages in a same TTI i.e., one for other cell release and another for DAPS HO, the network may not ensure that other serving cells are released before sending the DAPS HO command. Thus, the proposed text needs to be updated more. |
| QC | No | Agree with Huawei. SCell release by using RRC signalling adds additional signalling and can also increase latency. Note that this has to be done prior to HO command which may delay DAPS HO. A simpler alternative is for the UE to autonomously release source SCells upon receiving DAPS HO command, as suggested in R2-2007309**.** This should be put in procedural text for both LTE and NR. |

Summary:

* It seems the update to the NOTEs or a new NOTE can be considered after RAN2 concludes on R2-2007309.

**Proposal 5: Decide whether changes in R2-2007698, R2-2007699 or R2-2007358 are agreed, after concluding the changes proposed in R2-2007309.**

## 3.2 Various corrections

CR in [9] suggests various corrections to MobEnh related description in TS 38.300. Please comment in the table below whether you are fine with these.

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| --- | --- | --- |
| **Question 5: Do you support changes in [9]? Please indicate which changes are possibly OK/NOK, if the entire CR is not acceptable.** | | |
| **Company** | **Yes/No** | **Comments** |
| Futurewei | Yes on change items: 1, 2, 3. | For change item 4, current note numbering seems not have impact on reading spec. OK not making the change.  For change item 5, it in general is ok. But adding the sentence “For DRBs configured with DAPS Handover” seems redundant. Consider the following changes:  For DRBs configured with DAPS Handover,  data forwarding after the source gNB receives the HANDOVER SUCCESS message from the target gNB follows the same behaviors as described above,  before the source gNB receives the HANDOVER SUCCESS message:  …. |
| MediaTek | Yes for changes #1 to #4 | For change #5, we share the same view as Futurewei above. |
| vivo | Yes for all changes |  |
| NEC | Yes | can support all changes, while prefer to merge all required small changes for eMOB into one CR. |
| Samsung | Yes | We are fine with these editorial changes. |
| OPPO | Yes on change items: 1, 2, 3. | For change 4 and 5, we share the same opinions as Futurewei. |
| Ericsson | Yes and No | The changes seem to be editorial. Could be included in a rapporteur CR as NEC proposes. Note that the change in 9.2.3.2.3 concerns data forwarding and while this change as such is OK with us, it should be coordinated with RAN3 delegates. |
| CATT | yes | Changes seem editorial changes. |
| Huawei, HiSilicon | yes | Ok with these editorial changes |
| Intel | Yes | The changes are ok. But editorial change. Would be good to have one 300CR to cover all editorial changes in this meeting. |
| Apple | Yes | We are fine with all the editorial changes.  For the first change in section 9.2.3.4.2, “HO REQUEST ACKNOWLEDGE” should be updated to “HANDOVER REQUEST ACKNOWLEDGE” to match to figure. |
| Google | Yes | The changes can be included in Rapporteur’s CR. |
| CMCC | Yes on change items: 1, 2, 3. | For change 4 and 5, we share the same opinion with Futurewei. |
| ZTE | Yes | The changes can be included in Rapporteur’s CR. |
| Nokia | Yes (all changes) | First of all, we do not agree all changes are just editorial (e.g. change 1 or 5 are not pure editorials). Secondly, NOTE numbering is not a critical thing, but it is a preference of the 38.300 rapporteur to update the numbering as we propose. Finally, change 5 is indeed related to the text which originates from RAN3. However, we think our changes still correctly reflect what RAN3 intended to say. Each company can check it with their RAN3 colleagues (no need to send any LS for such minor issue). |
| LG | Yes | OK for all changes. |
| QC | Yes |  |

Summary:

* The CR seems to be agreeable to most companies, with some reservations regarding change 4 and change 5 (explained further above, within Nokia’s comment)
* We suggest to agree the CR

**Proposal 6: The CR in R2-2007359 is agreed.**

## 3.3 UL data switching for DAPS

The authors of [10][11] suggest the description of DAPS operation should be updated, to reflect entirely the agreement made in the past: ‘’ the UE continues the downlink user data reception from the source eNB until releasing the source cell and continues the uplink user data transmission to the source eNB until successful random access procedure to the target eNB’’. Please share in the table below your view whether such changes are needed:

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| --- | --- | --- |
| **Question 6: Do you support changes in [10] and [11]?** | | |
| **Company** | **Yes/No** | **Comments** |
| Futurewei |  | Understand the motivation. But the change cannot be in the current form:  The proposed change “…and the uplink user data transmission to the source gNB until releasing the source cell” will be conflict with the agreed UL date TX behaviour in the following sentence. |
| MediaTek | No | Current text is clear that UE continues uplink data transmission to source until successful random access. Since UL data transmission will continue at the target after HO, it implies that UL switching performed as that point of time. |
| vivo | No | The stage-2 text does not have to be accurate as the stage-3. We discussed that the uplink user data switching is the switching of the PDCP PDU. This should be clear from the staget-3. The proposed change seems causing more confusion, as the uplink switching is an undefined UE behaviour in stage-2. |
| NEC | Yes | Agree that the current spec means that UE will stop data transmission to the source after UL switching, which is not aligned with the agreements and should be fixed. |
| Samsung | No | We agree to the intention and clarifying it further but the current text seems ok.  The proposed change seems incorrect since UE continues the uplink user data transmission to the source eNB unitil RA completion to the target. |
| OPPO |  | We share the same understanding as Futurewei. In addition, for the wording “uplink user data” and “uplink data switching”, can they directly mean PDCP data SDUs and none-ACKed data PDUs? |
| Ericsson | No | The proposed change does not clarify, rather the opposite, since the change seems to be contradictory. |
| CATT | No | We don’t see such clarification is necessary as it is already clear in stage 3 specification. |
| Huawei, HiSilicon | yes | We don’t think current wording reflects our previous agreement clearly.  In RAN2#107b, RAN2 have made the following agreement:  2 The UE keeps the UL HARQ (re)transmission of the source link after UL data transmission switching to the target eNB.  Our agreement is that UL HARQ new transmission is still allowed after RACH. So uplink data transmission can be still going on in source cell after RACH. |
| Intel | No | Do not see the need for the clarification. |
| Apple | No | We share Huawei’s view. The change is not correctly reflect RAN2 agreement, and UE is only allowed. To perform UL retransmission in the source cell after UL switching. |
| Google | No | The changes bring more confusion. |
| CMCC | No | We understand the intention, but current text seems clear enough. |
| ZTE | No | We think the current text is fine for stage-2 description. Do not see the need for the clarification. |
| Nokia | No | Do not see the need for such change. |
| LG | No but | RAN2 agreed that the PDCP Control PDU for ROHC and the RLC status report can be transmitted to the source cell even if the RACH procedure is successfully completed to the target cell.  However, the proposed text is not considered for the above agreement. Thus, we propose the text as below.   * In case of DAPS handover, the UE continues the downlink user data reception from the source gNB and the uplink user data transmission to the source gNB before successful random access procedure to the target gNB, and performs uplink data switching after successful random access procedure to the target gNB. After completion of random access procedure to the target gNB, the UE continues the uplink user data retransmission and control PDU transmission to the source gNB. |
| QC |  | During DAPS HO, UE continues to receive DL data until source is released. For UL data, after successful RACH to target cell, new PDCP and un-acknowledged PDCP data will be switched to target cell and UE can only send HARQ and RLC Re-Tx data to source cell. Intention is OK but some changes needed. No need to change existing text and add additional clarification by adding "after successful RACH completion, UE continues to transmit downlink data feedback and uplink re-transmissions to the source cell”. Also note that the cancellation mechanisms introduced by RAN1 are still applicable so some of source transmissions may be dropped. |

Summary:

* It seems just a single company (apart from the authors) supports the changes proposed in [10] and [11]. Few others appear to acknowledge the intention, but are not OK with the current CR
* We suggest not to agree [10] and [11] at this meeting. No related proposal is made.

## 3.4 ‘Not released’ versus ‘still available’

The authors of [12] propose to change the description in TS 38.300 by replacing ‘not released’ with ‘still available’. While the rapporteur finds this CR awkward, it is fair to ask the companies if they are willing to pursue such change.

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| **Question 7: Do you support a change in [12]?** | | |
| **Company** | **Yes/No** | **Comments** |
| Futurewei | Yes | “still available” is more precise since it means not only the source link is not released but also the link condition is still good enough. Therefore, we should use the wording from the RAN2 agreement. |
| MediaTek | No | We don’t see the need of this change; the original text is clear enough. |
| vivo | Yes | Agree with Futurewei. |
| NEC | No strong view | If companies have strong concern on “not released”, we can used the stage-3 wording “if radio link failure is not detected in the source” |
| Samsung | No | The companion RRC CR proposes to remove the text “release the source connection” in 5.3.10.3 of 38.331. If RRC CR is agreeable, then the CR seems reasonable. However, we do not support both CRs since the specification is already clear. |
| OPPO | No | We don’t see any difference by the change. |
| Ericsson | No | The current text is clear enough for stage-2 and does not need to be changed. The proposed change would not clarify since “still available” may be misinterpreted as it is not defined anywhere in the specs. |
| CATT | No strong view |  |
| Huawei, HiSilicon | yes | This change is more precise, and it is also in line with the wording in TS 36.300, “When DAPS handover fails, the UE falls back to source cell configuration, resumes the connection with source cell, and reports the DAPS handover failure via the source without triggering RRC connection re-establishment if the source link is still available” |
| Intel | No | DO not see the need for the change. |
| Apple | No | Current spec is clear enough. |
| Google | No | The current wording is fine. |
| CMCC | No strong view | We don’t see the difference for stage-2. |
| ZTE | No | Agree with Ericsson. |
| Nokia | No | ‘’Still available’’ is not a solid statement, such ambiguity shall be avoided. |
| LG | No | The current text is clear. |
| QC | No strong view |  |

Summary:

* The overwhelming majority of companies do not see a need for such change, which brings more uncertainty, as ‘availability’ is not a solid term
* We suggest not to agree [12]. No related proposal is made.

## 3.5 NOTEs for DAPS with CHO and release of DAPS

The authors of [13] and [14] propose the NOTEs to Stage-2 LTE and NR specifications, saying CHO cannot be configured with DAPS and another one, saying when DAPS is completed and what cannot be configured prior to completing DAPS. Please respond whether we need such NOTEs in LTE and NR Stage-2 specifications:

|  |  |  |
| --- | --- | --- |
| **Question 8: Do you think NOTEs in [13] and [14] are needed and should be agreed?** | | |
| **Company** | **Yes/No** | **Comments** |
| Futurewei | No | Network implementation should follow the principle that during an on-going DAPS execution, no other operations should be initiated. |
| MediaTek | Yes | This note ensures that UE needs not to consider situations such as receiving a handover command before source cell release for DAPS handover. It’s good to have such a note in stage-2 specifications. |
| vivo | Yes | It is better to provide a guidance for the network signalling combination. And we think the NOTE can also reduce the implementation complexity at the UE, as the UE does not need to implement the wrong configurations of RRC. |
| NEC | No | The corresponding agreements on not allowing “Inter-RAT handover” “sending UE to Inactive” before DAPS HO completion have been captured in stage-3 last meeting, so do not see strong needs to add note in stage-2. |
| Samsung | Yes | It would be good to capture this for clarification. |
| OPPO | Yes | To capture RAN2 agreements clearly. |
| Ericsson | Yes | These kind of limitations of DAPS handover needs to be specified in stage-2 since it concerns combinations of features/procedures, such as that DAPS combined with DC, CHO or RACH-less is not supported already specified in 36.300. |
| CATT | Yes | The notes can make the implementation clearer. |
| Huawei, HiSilicon | yes | Ok to clarify |
| Intel | Ok | Ok to clarify when the DAPS HO is completed. |
| Apple | Yes | It’s good to capture the RAN2 agreement clearly in the spec. |
| Google | Yes | OK to clarify the network behaviour to simplify the UE implementation. |
| CMCC | Yes | It could be better to have this clarification. |
| ZTE | Yes | It’s fine to have such clarification in stage-2 specs. |
| Nokia | No | Agree with NEC, we do not need to spread such NOTEs across all possible specifications. The behaviour should have been captured already in the ordinary procedural text. The only thing we may try to eventually clarify somewhere (preferably not via a NOTE) is to determine when DAPS HO is considered to be complete. |
| LG | Yes |  |
| QC | Yes | Agree with Ericsson comments. |

Summary:

* The majority of companies want to have such NOTEs (as proposed in [13] and [14] captured in the specifications.
* We suggest to agree [13] and [14], even though we are concerned with the tendency to insert more and more procedural behaviour into the NOTEs.

**Proposal 7: R2-2007496 and R2-2007497 are agreed.**

## 3.6 CHO Stage-2 corrections

In [15] various corrections to CHO are proposed (e.g. change the reference to CHO A3 and A5 events, etc.) Do you support the entire CR, only a subset of changes do not support it at all?

|  |  |  |
| --- | --- | --- |
| **Question 9: Do you support the changes proposed in [15]?** | | |
| **Company** | **Yes/No** | **Comments** |
| Futurewei | Yes 1, 2, 3.  No 4. | Fine with the proposed change items 1, 2, 3. For item 4 we should not remove the sentence. I would even suggest make it clear, keeping the sentence and only remove “i.e.”:  After source eNB sends CHO command to UE, the network is allowed to change source eNB configuration and network can add, modify or release a configured CHO configuration using RRC message until UE starts executing CHO. |
| MediaTek | Yes: 1, 2, 3  No: 4 | For change #4, we do not think current text has any implication about “bye message”; it simply means that UE should be prepared to receive reconfigurations before it executes CHO.  It’s true that the source cell has no idea when UE executes CHO, and this was the reason why we proposed “bye message”. Since “bye message” was not agreed, it is possible for source cell to send reconfiguration to a UE already left. Probably source cell will be informed by target cell via some inter-node message about UE’s CHO execution. |
| vivo | Yes: 3 | For the proposed change 1/2/4, it seems that nothing is wrong with the current text. For the change 2, we should avoid putting too much detail in the Stage-2. |
| NEC |  | No strong view. can go with majority |
| Samsung | Yes | We agree to the changes. |
| OPPO | Yes |  |
| Ericsson |  | Seems to be editorial. Could be included in a rapporteur CR. |
| CATT | No strong view | Seems editorial changes |
| Huawei, HiSilicon | Yes | For #4, we think that the confusing part is “UE starts executing CHO” is pure UE behaivour, so how can the source eNB know that? If it only refers to “source cell will be informed by target cell via some inter-node message” and it is a common understanding, we prefer to make it clearer or just remove the highlighted part.  After source eNB sends CHO command to UE, the network is allowed to change source eNB configuration and network can add, modify or release a configured CHO configuration using RRC message (i.e. until UE starts executing CHO. |
| Intel | No strong opinion | Seems editorial changes. |
| DOCOMO | Yes: 1, 2, 3  No: 4 | For4, agree with Futurewei |
| Apple | Yes: 1,2,3 | For change 4, at least UE will not receive the subsequent HO command after the UE starts executing CHO. |
| Google | Not strong view | Seems editorial changes |
| CMCC | Yes on 1,2,3 | For change 4, share similar view with Media Tek. |
| ZTE | Not strong view | Seems editorial changes. |
| Nokia | Only 3rd change OK | Other changes are not essential, the text is clear already. E.g. execution of CHO equals the execution of HO command. So it is an artificial text beautifying in our opinion. |
| LG | Yes |  |
| QC | Yes for 1 and 3. No for 2 and 4. | Note that 2 was discussed before and it was agreed to use “trigger” to cover legacy HO. For 4, the intention was to allow this behaviour as long as the UE is connected to the source; the NW implementation can estimate the switching time based on other signals (e.g. SRS) |

Summary:

* Not all changes in [15] appear to be OK to the companies. The predominant opinion was that changes 1, 2 and 3 are agreeable.
* We suggest to agree changes 1,2 and 3 from [15]

**Proposal 8: Changes 1,2 and 3 from R2-2007763 are agreed.**

And finally, in [16] there is a proposal to clarify that CHO does not apply to LTE-5GC case. Do companies think such clarification is useful and shall be agreed?

|  |  |  |
| --- | --- | --- |
| **Question 10: Do you support the change proposed in [16]?** | | |
| **Company** | **Yes/No** | **Comments** |
| Futurewei | Yes | It should be clarified. |
| vivo | Yes |  |
| NEC |  | It’s a good point. Although RAN2 has not discussed CHO applicability to LTE-5GC, we guess there seemed to be no specific issue to apply CHO for LTE-5GC as far as it is within 5GC (i.e. not LTE-EPC to/from LTE-5GC). It might be better to try to find any potential issues in applying the CHO to LTE-5GC. If any specific issues, RAN2 can conclude it is not applicable to LTE-5GC. Otherwise, can agree it is also applicable to LTE-5GC.  This is also impacting to RAN3, so it would be better to check with RAN3, only if RAN2 intends to support.  However, we can go with majority, if companies want to preclude it. |
| Samsung | Yes | The spec. number in the CR should be 36.300. |
| OPPO | Yes |  |
| Ericsson | No | In what way is CHO impacted by 5GC? Why is the restriction needed? RAN2 agreed to restrict it if issues were found, but no issues have been shown. |
| CATT |  | Agree with NEC, RAN2 may first try to find if there is specific issue for the CHO to LTE-5GC. Then it can be decided if RAN2 intends to support. Not clear why such restriction is needed. |
| Huawei, HiSilicon | Yes |  |
| Intel |  | To support CHO for eLTE, we need to mix the changes from LTE RRC and NR Xn interface. Not quite sure whether it can be done via NR Xn interface. Double check with RAN3 is needed. |
| DOCOMO |  | Agree with NEC. |
| Apple | Yes |  |
| Google |  | RAN3 uses NG-RAN and does not distinguish eLTE and NR in Xn specification 38.423. Technically, Xn can support CHO for eLTE. We don’t see any technical reason to prevent it. Can send a LS to request RAN3 to confirm the support. From RAN2 perspective, the UE capability for CHO can apply to LTE and eLTE if the UE supports eLTE. |
| CMCC |  | From RAN2 perspective, we don’t see the core network’s impact to CHO, but we could go with majority. |
| ZTE |  | Agree with NEC. RAN2 has not clearly conclude whether CHO is supported for LTE-5GC or not. We don’t see clear issues in RAN2, but we can check with RAN3 first. |
| Nokia | No | Not OK with the CR. However, NEC and Ericsson have a point. We could check with RAN3 if they see any issues in declaring CHO supported also for LTE-5GC. |
| LG | Yes |  |
| QC | No | As long as there is no issue identified, CHO can be supported for LTE/EPC and LTE/5GC cases. |

Summary:

* Most companies do not see a need to agree the CR in [16] and clarify CHO cannot be used in LTE-5GC.
* However, it shall be discussed (preferably involving RAN WG3) if such support is indeed ensured.

**Proposal 9: RAN2 is asked to discuss and possibly check with RAN WG3 if CHO in LTE-5GC can be supported.**

# 4 Conclusions

Based on the views expressed in the previous sections, we propose the following:

**Proposal 1: R2-2007016 and R2-2007595 are agreed. In R2-2007595 a TS number is to be corrected in the cover page.**

**Proposal 2: Discuss further if CPC and non-CPC SN modification description and figures shall be separated, as proposed in R2-2007360.**

**Proposal 3: A clarification on MR-DC and DAPS coexistence is added to TS 37.340. The exact text is agreed after discussing R2-2007309.**

**Proposal 4: Change proposed in R2-2007542 is agreed and added to the joint editorial/rapporteur’s CR for TS 37.340.**

**Proposal 5: Decide whether changes in R2-2007698, R2-2007699 or R2-2007358 are agreed, after concluding the changes proposed in R2-2007309.**

**Proposal 6: The CR in R2-2007359 is agreed.**

**Proposal 7: R2-2007496 and R2-2007497 are agreed.**

**Proposal 8: Changes 1,2 and 3 from R2-2007763 are agreed.**

**Proposal 9: RAN2 is asked to discuss and possibly check with RAN WG3 if CHO in LTE-5GC can be supported.**

# 5 List of referenced documents

[1] R2-2007016 Minor Correction for CPC Configuration Related Procedure, 3GPP TSG-RAN WG2 Meeting #111 electronic Online, August 17th - 28th, 2020

[2] R2-2007595 Correction of signalling flow for CPC, 3GPP TSG-RAN WG2 Meeting #111 electronic Online, August 17th - 28th, 2020

[3] R2-2007360 Corrections to CPC with and without SRB3 involved 3GPP TSG-RAN WG2 Meeting #111 electronic Online, August 17th - 28th, 2020

[4] R2-2007266 37.340\_CR0219(Rel-16) R2-2007266- SCG handling at DAPS HO 3GPP TSG-RAN WG2 Meeting #111 electronic Online, August 17th - 28th, 2020

[5] R2-2007542 Correction for editorial structure of CPC section 3GPP TSG-RAN WG2 Meeting #111 electronic Online, August 17th - 28th, 2020

[6] R2-2007698 Clarification on SCells and SCG release at DAPS HO 3GPP TSG-RAN WG2 Meeting #111 electronic Online, August 17th - 28th, 2020

[7] R2-2007699 Clarification on SCells and SCG release at DAPS HO 3GPP TSG-RAN WG2 Meeting #111 electronic Online, August 17th - 28th, 2020

[8] R2-2007358 Clarification on no DAPS HO in MR-DC 3GPP TSG-RAN WG2 Meeting #111 electronic Online, August 17th - 28th, 2020

[9] R2-2007359 Various corrections to NR Mobility enhancements description 3GPP TSG-RAN WG2 Meeting #111 electronic Online, August 17th - 28th, 2020

[10] R2-2008074 Correction on TS36.300 for uplink data switching in DAPS 3GPP TSG-RAN WG2 Meeting #111 electronic Online, August 17th - 28th, 2020

[11] R2-2008076 Correction on TS38.300 for uplink data switching in DAPS 3GPP TSG-RAN WG2 Meeting #111 electronic Online, August 17th - 28th, 2020

[12] R2-2008075 Correction on TS38.300 for source fallback in DAPS 3GPP TSG-RAN WG2 Meeting #111 electronic Online, August 17th - 28th, 2020

[13] R2-2007496 DAPS handover corrections 3GPP TSG-RAN WG2 Meeting #111 electronic Online, August 17th - 28th, 2020

[14] R2-2007497 DAPS handover corrections 3GPP TSG-RAN WG2 Meeting #111 electronic Online, August 17th - 28th, 2020

[15] R2-2007763 Correction on TS36.300 for CHO 3GPP TSG-RAN WG2 Meeting #111 electronic Online, August 17th - 28th, 2020

[16] R2-2007762 Correction on CHO for LTE-5GC 3GPP TSG-RAN WG2 Meeting #111 electronic Online, August 17th - 28th, 2020

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|  |  |
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