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. |
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## 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. |
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## 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. |
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# 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. |
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## 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. |
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## 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? |
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## 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. |
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## 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:

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| **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. |
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## 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?

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| **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 |  |
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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?

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| **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 |  |
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# 4 Conclusions

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

# 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

# Contact information

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