**3GPP TSG-RAN3 Meeting #107-e R3-20xxxx**

**24 February - 6 March 2020 E-Meeting**

Source: ZTE

Title: Email Summary of

 CB # 87\_Email087 MobEnh\_CHO\_common\_condPSCellchg

Agenda Item: 15.3.1.1

Document for: Discussion and Decision

# Introduction

In RAN3#107-e, the following email discussion was allocated for the topic “conditional PScell change”:

15.3.1.1:

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| **CB: # 87\_Email087-MobEnh\_CHO\_common\_condPSCellchg****- Each UE associated X2AP/XnAP signaling connection is only associated to single candidate target PScell/SCG, and different candidate target PScell/SCG in the same target/serving SN is associated to different UE X2AP/XnAP signaling connection; existing SGNB RELEASE REQUEST (ACK) messages can be reused by MN to perform per PScell/SCG level cancel; SGNB RELEASE REQUEST (ACK) messages should be sent via the associated UE X2AP/XnAP signaling connection, i.e. different signaling connection is associated to different candidate target PScell/SCG; The existing SGNB RELEASE REQUIRED (CONFIRM) messages can be reused by SN to perform per PScell/SCG level cancel; SGNB RELEASE REQUIRED (CONFIRM) messages should be sent via the associated UE X2AP/XnAP signaling connection, i.e. different signaling connection is associated to different candidate target PScell/SCG; In MR-DC operation, “HANDOVER CANCEL” or “CONDITIONAL HANDOVER CANCEL” or alike new messages are not needed for candidate target PScell/SCG canceling, and the existing MN/SN initiated SN Release procedure suffices? (ZTE, CATT, NTT)?****- Enhance SN initiated SN modification procedure for SN initiated intra-SN conditional PSCell change, adding CPAC indication and multiple RRC container (CG-Config) in SgNB Modification Required message; Define new X2AP message SgNB Modification Complete to indicate the UE selected PSCell to MN; liaise RAN2 with above; Both DRB level and UE level DAPS HO are supported; Support UE level DAPS HO indicator in XnAP/X2AP and DRB level DAPS HO indicator in RRC container? (QC)****- other aspects? (Gg)****- if agreeable, merge/revise as needed; go for agreement**(ZTE)Summary of offline disc |

In this contribution, we shall further discuss those aspects and try to converge on a set of CRs if agreeable.

# Discussion

The following Tdocs are related:

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| [R3-200084](file:///C%3A%5C3GPP%5CRAN2-109%5CTSGR3_107_e%5CInbox%5CDrafts%5CCB%20%23%2087_Email087-MobEnh_CHO_common_condPSCellchg%5Cdocs%5CR3-200084.zip) | LS on Conditional PSCell addition/change (3GPP RAN2) | LS inRAN2 sees no RAN3 impact for intra-SN change without MN involvement |

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| R3-200320 | Further Discussion on Candidate Target PScell&SCG Cancel without MN&SN Change (ZTE) | discussion |
| R3-200321 | TS37.340 Stage2 Introduction of Rel-16 Mobility Enhancement in MR-DC (ZTE, CATT, NTT DOCOMO, INC.) | draftCRr, TS 37.340 v16.0.0, Rel-16, Cat. B |
| R3-200528 | (TP for [NR\_Mob\_enh] BL CR for TS 38.473)CPAC-F1 impact (CATT) | other |
| R3-200765 | (TP for NR\_Mob\_enh BL CR for TS 38.473) Introducing Intra-SN change (Google Inc.) | other |
| R3-200410 | SN initiated SN change (Qualcomm Incorporated) | discussionMove to 15.3.1.1 |

Based on “[R3-200410](file:///C%3A%5C3GPP%5CRAN2-109%5CTSGR3_107_e%5CInbox%5CDrafts%5CCB%20%23%2087_Email087-MobEnh_CHO_common_condPSCellchg%5Cdocs%5CR3-200410.zip)”(QC), there are RAN3 impacts due to SN initiated conditional intra-SN PScell change, such as UE capability coordination, resource coordination for single UL operation, security key change, QoS re-negotiation. In general, we agree to above observations, but we assume that there are also a subset of cases within “SN initiated conditional intra-SN PScell change” scenario, which does not require MN involvement, i.e. not trigger MN Modification Request/Ack. To reduce the Rel-16 scope further and guarantee timely WID closure, we suggest focusing on those subset of cases without MN involvement.

**Issue1: In Rel-16 WID, shall we focus on the subset of cases** **within “SN initiated conditional intra-SN PScell change”, which does not require MN involvement. The other MN involved cases within “SN initiated conditional intra-SN PScell change” scenarios together with other more scenarios can be done in Rel-17.**

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| **Company name** | **Comments** |
| ZTE | To reduce the Rel-16 scope further and guarantee timely WID closure, yes!  |
| Google | Yes |
| Nokia | Yes – this is de facto requested in the LS from RAN2! RAN2 may change their mind, but we shall not anticipate it! |
| CATT | Yes |
| Intel | Yes |
| Ericsson | Yes. This is RAN2 decision |
| QC | Yes, as long as SN is sure the PSCell change does not need coordination with MN. |
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Based on “[R3-200320](file:///C%3A%5C3GPP%5CRAN2-109%5CTSGR3_107_e%5CInbox%5CDrafts%5CCB%20%23%2087_Email087-MobEnh_CHO_common_condPSCellchg%5Cdocs%5CR3-200320.zip)”(ZTE), “[R3-200321](file:///C%3A%5C3GPP%5CRAN2-109%5CTSGR3_107_e%5CInbox%5CDrafts%5CCB%20%23%2087_Email087-MobEnh_CHO_common_condPSCellchg%5Cdocs%5CR3-200321.zip)”(ZTE/CATT/DCM), some stage2 level issues&descriptions were discussed and proposed. In general, for Rel-16, even though there might be no X2/Xn stage3 signaling impact due to SN initiated conditional intra-SN PScell change (we try to achieve this!), it is still justified to describe its system behaviors in stage2 level as usual, such as:

The SN initiated Modification procedure can be used for candidate PScell preparation, e.g. via SRB1;

The SN Release procedure can be used for candidate PScell cancel/release.

In addition, some basic concepts related to Rel-16 mobility enhancement are also proposed in future-proof way.

To avoid X2/Xn stage3 signaling impacts, ZTE proposes “Each UE associated X2AP/XnAP signaling connection is only associated to single candidate target PScell/SCG, and different candidate target PScell/SCG in the same target/serving SN is associated to different UE X2AP/XnAP signaling connection.”

**Issue2: For Rel-16 WID, shall we introduce TS37.340 stage2 CR, to capture the identified mobility enhancement specific conclusions? What level of details to be captured?**

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| **Company name** | **Comments** |
| ZTE | yes! otherwise, the support of “SN initiated conditional intra-SN PScell change” (a subset of cases) is missing in MR-DC stage2, people may get lost about RAN2/3 status. Take “[R3-200321](file:///C%3A%5C3GPP%5CRAN2-109%5CTSGR3_107_e%5CInbox%5CDrafts%5CCB%20%23%2087_Email087-MobEnh_CHO_common_condPSCellchg%5Cdocs%5CR3-200321.zip)”(ZTE/CATT/DCM) as baseline CR reference. |
| Google | As the scope is limited to the scenario without MN involvement, the proposed changes in R3-200321 is suggested to be revised as follows:In case of Intra-SN Conditional PSCell Change, the SN-initiated SN modification procedure is used to add the candidate PSCell, i.e. new PSCell/SCG in current serving SN, which UE may access upon configured execution condition(s) are met.As for the cancel of intra-SN Conditional PSCell Change, the SN-initiated SN modification procedure can also be used to carry the RRCReconfiguration message to release the conditional configuration instead of the SN-initiated SN release procedure.  |
| Nokia | In general, once the functionality is completed, such information in stage-2 could be useful. However, the update of 37.340 is less critical and does not block closing the WI. I would therefore prefer to postpone the discussion until we know what RAN2 decides (as far as I know, there may be some impact in RAN3 after all…). |
| CATT | Stage 2 for the SN initial intra-SN conditional PScell change is need for the specification clearly reflect the supporting scenarios |
| Intel | We don’t think we need to update TS 37.340 where the main focus is between MN and SN. The intra-SN PSCell change without MN involvement is just one scenario of an SN’s RRC reconfiguration that requires the UE to do random access again, which is already described in TS 37.340 Section 10.3 (either SN-initiated SN modification or directly via SRB3). There is no RAN3 signaling impact between MN and SN from the intra-SN PSCell change without MN involvement. What we need to update is TS 38.401, based on our CHO support for E1/F1. Then, people can imagine how it works by considering 38.401 together with 37.340 Section 10.3. |
| Ericsson | Agree with Intel this is covered by 10.3 already i.e. no difference from an inter-node point of view. The only difference is intra-SN and in RRC  |
| QC | Agree with Intel and Ericsson, that if we focus on the subset of cases highlighted in Issue 1, it seems to be covered by subsections “SN initiated SN Modification without MN involvement” in Section 10.3, 37.340. |
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**Issue3: For Rel-16 WID, is X2/Xn stage3 signaling zero-impact solution possible to support “SN initiated conditional intra-SN PScell change” (a subset of cases)? Could SN release procedure be used for candidate PScell cancel purpose?**

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| **Company name** | **Comments** |
| ZTE | yes! After UE is in MR-DC operation, whenever the serving SN prepares candidate PScell(s), it shall create new UE associated X2/Xn signaling connection with different SN APID + same MN APID. Hence MN and SN can always know which candidate PScell(s) is associated to which X2/Xn signaling connection, and can perform candidate modify and cancel/release if necessary later.  |
| Google | No. As for the cancel of intra-SN Conditional PSCell Change, the SN-initiated SN modification procedure can also be used to carry the RRCReconfiguration message to release the conditional configuration instead of the SN-initiated SN release procedure.  |
| Nokia | If we assume only subset of PSCell change scenarios is supported, such that does not involve the MN, then existing X2/Xn signaling is plenty enough! I don’t understand what needs to be cancelled in this case?  |
| CATT | Yes |
| Intel | No. This is for intra-SN PSCell change. Cancelling a candidate PSCell would happen within the same SN, where the reconfiguration to the UE would happen via TS 37.340 Section 10.3 (either SN-initiated SN modification or directly via SRB3). No need to update any.  |
| Ericsson | No. Cancelling a candidate PSCell within the same SN is equivalent to a reconfiguration from the MN point of view i.e. SN-initiated SN modification procedure |
| QC | Yes, it may be possible to have a solution with no X2/Xn impact if we focus on the subset of cases highlighted in Issue 1. As remarked in our response to Issue 2, these cases seem to be covered by subsections “SN initiated SN Modification without MN involvement” in Section 10.3, 37.340. In the call-flows (see, e.g., Fig 10.3.1-3, 37.340) the MN not involved. Even for cancellation of candidate PSCells, the MN need not be involved. In particular, the SN release procedure need not be used. In the example scenario when PSCell change criteria is met for a target PSCell, UE performs RACH and sends a reconfiguration complete message. Upon receiving this message, SN implicitly cancels the other target PSCells without informing MN. Note that in the subsections “SN initiated SN Modification without MN involvement” in Section 10.3, 37.340, the MN is not aware that the conditional PSCell change procedure has been initiated and multiple target PSCells prepared.  |
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Based on “R3-200528”(CATT) and “[R3-200765](file:///C%3A%5C3GPP%5CRAN2-109%5CTSGR3_107_e%5CInbox%5CDrafts%5CCB%20%23%2087_Email087-MobEnh_CHO_common_condPSCellchg%5Cdocs%5CR3-200765.zip)” (Google), some stage3 level F1 specific issues&descriptions were discussed and proposed. Both papers identify similar points that F1 procedure should also cover “conditional intra-SN PScell change” case, but provide different texts. Technically, they are correct and are supposed to be merged.

**Issue4: “**[**R3-200528**](file:///C%3A%5C3GPP%5CRAN2-109%5CTSGR3_107_e%5CInbox%5CDrafts%5CCB%20%23%2087_Email087-MobEnh_CHO_common_condPSCellchg%5Cdocs%5CR3-200528.zip)**”(CATT) and “**[**R3-200765**](file:///C%3A%5C3GPP%5CRAN2-109%5CTSGR3_107_e%5CInbox%5CDrafts%5CCB%20%23%2087_Email087-MobEnh_CHO_common_condPSCellchg%5Cdocs%5CR3-200765.zip)**”(Google) seem both technically correct, and how to merge the two TPs?**

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| **Company name** | **Comments** |
| ZTE | We tend to start from minimum, taking [R3-200528](file:///C%3A%5C3GPP%5CRAN2-109%5CTSGR3_107_e%5CInbox%5CDrafts%5CCB%20%23%2087_Email087-MobEnh_CHO_common_condPSCellchg%5Cdocs%5CR3-200528.zip)”(CATT) as starting point. ZTE would like to co-sign the final merged TP. |
| Google | As ASN.1 is yet to freeze and the intra-SN conditional PSCell change case shall be supported, in addition to adding procedural text (as also proposed by CATT), we still suggest either changing the IE name (a generalized IE name for CHO or CPC (Conditional PSCell Change)) or adding a separate value for CPC-initiation for the DU to distinguish them when preparing the CellGroupConfig. Since *reconfigurationWithSync* shall be included in the final RRCReconfiguration message in both cases, it is proposed to add also “and regard it as a reconfiguration with sync as defined in TS 38.331 [8]” in the procedure text. |
| Nokia | We agree that renaming the indicator on F1 into something like “conditional mobility” (like in Google’s proposal) is the best approach. |
| CATT | We would like to just change the text part for simply specifying. From F1 point view in our common understanding, the PScell change may be regard as inter-DU HO or inter-cell HO.  |
| Intel | No!. Why DU has to distinguish CHO is for PCell or PSCell? Please educate me.  |
| Google | To answer Intel’s question, in the CellGroupConfig prepared by the DU, the *CellGroupId* (0 identifies MCG while 1 identifies SCG) needs to be filled so that the DU may need to distinguish it by this IE or other info.  |
| Ericsson | Ok to rename the IE |

Based on RAN3 conclusions above, we propose to reply LS to RAN2 as below:

“RAN3 thanks RAN2 for decision about SN initiated conditional intra-SN PScell change.

RAN3 has agreed to support SN initiated conditional intra-SN PScell change without MN involvement in Rel-16, and continue working on conditional intra-SN PScell change with MN involvement in Rel-17.

For intra-SN PScell change without MN involvement, there is no impact on X2/Xn signaling but some impacts on F1 signaling. RAN3 also agreed to introduce TS37.340 DraftCR for stage2 purpose.”

**Issue5: To reply RAN2 LS about RAN3 conclusions on this topic?**

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| **Company name** | **Comments** |
| ZTE | Yes. ZTE would like to draft the reply LS to RAN2 as above. |
| Google | Yes. |
| Nokia | As written above, RAN2 may change their mind… I prefer to postpone sending the LS until the next meeting, to see if we don’t have to add some correction to the solution based on this meeting’s RAN2 progress (correction to a closed WI). |
| CATT | Yes,  |
| Intel | No need to reply to RAN2. |
| Ericsson | RAN2 does not expect RAN3 impact. No LS needed |
| QC | Yes.We can reply RAN2:* Not all the intra-SN PSCell change scenarios don’t need coordination with MN
* RAN3 assumes: there are a subset of intra-SN PSCell change scenarios which SN is sure coordinating with MN is no needed
* For the scenarios which SN is not sure whether coordination with MN is needed, the SN should use SN initiated modification procedure. To ensure timely completion of WI, these scenarios can be deferred to future releases.
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# Conclusion

In this contribution, we further discussed the topic “conditional PScell change”, and provided the following proposals:

**Proposal 1:**

# Reference

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