3GPP TSG-RAN WG3 #116-e R3-223677

Online, 9. – 19.05 2022

Agenda Item: 9.1.1.1

Source: Nokia (moderator)

Title: Summary of Offline Discussion on SON corrections (CB #SONMDT1)

Document for: Approval

# Introduction

**B: # SONMDT1\_SON**

**- SHR: Stage2 updates, SHR forwarding, stage3 updates on semantic description?**

**- UE History Information for MR-DC: The SN always sends the collected SN UHI to the MN in the SN change required, the SN released request acknowledge, and the SN release required messages? For the SCG UE information from the SN, if the stay time for one PSCell exceeds the maximum value, the SCG UE information contains several entries with the same PSCell identity? Stage2 updates and stage3 updates if needed**

**- PSCell change failure: Options for SCG failure context storage, text clean up**

**- Load balance enhancement: Align the semantics descriptions of the SSB Area PRB usage between Xn and F1? Add description on load balance for EN-DC scenario?**

**- Energy saving: Update stage 2 description section 5.13 in TS 36.410 and section 5.10 in TS 38.410 for Intra-system Energy saving? NGAP clauses 9.3.3.56/57/58 - keep "inter-RAT" and replace NG-RAN CGI with NR CGI (+ corresponding ASN.1 updates)? RAN3 to discuss whether to replace NG-RAN node by gNB in TS 38.300 clause 15.4.2.2.?**

**- Inter-system load balance: Update ‘PRB usage’ in section 15.5.1.5 of TS 38.300 and in section 22.4.1.2.4 of TS 36.300 for inter-system load balancing to clearly define RAN node behavior? Update the IE description and the semantic description for NR Composite Available Capacity IE? Name issue of Sub-IEs and sub-sub-IEs name? Misalignment among specs?**

**- RACH optimization: Update the description of the Neighbour NR Cells for SON List IE and the maxServedCellforSON range bound in clause 9.3.1.215 to indicate that they may be used by the gNB-DU for PRACH conflict resolution purposes (as opposed to SON purposes)? Add description on RACH optimization for EN-DC scenario,There is no procedure on signalling of RACH information from for CU/DU split scenario?**

**- CCO: CCO Issue Detection over Xn with one value? Update the range of Coverage Modification Item IE and SSB Coverage Modification Item IE? Fix presence of CCO Assistance Information? Stage2 and stage3 updates if needed**

**- Mobility enhancement: The HANDOVER REPORT is enhanced to separate the per-preparation Mobility Information from the post-execution Mobility Information? Stage2 and stage3 updates if needed**

**- Provide CRs if agreeable, split the work among topics**

(Nok - moderator)

Summary of offline disc [R3-223677](https://nokia.sharepoint.com/sites/c5g/projects/FAAS/Shared%20Documents/WP1-SON-MDT-AI-ML/3GPP%20Meetings/2022-05/RAN3%23116e/Draft%20contributions/Inbox/R3-223677.zip)

# For the Chairman’s Notes

Propose the following:

R3-20xxxa, R3-20xxxc merged

R3-20xxxc rev [in xxxg] – agreed

R3-20xxxd rev [in xxxh] – agreed

R3-20xxxe rev [in xxxi] – agreed

R3-20xxxf rev [in xxxj] – endorsed

Propose to capture the following:

**Agreement text…**

**Agreement text…**

**WA: carefully crafted text…**

Issue 1: no consensus

**Issue 2: issue is acknowledged; need to further check the impact on xxx. May be possible to address with a pure st2 change. To be continued…**

# Discussion (1st round)

## SCG MRO corrections

The solution agreed at RAN3 assumes that in case the S-RLF is reported from a pre-Rel.17 UE, the MN may inquiry the last serving SN if there was any PSCell change (or, more generally, if it considers that fault is due to its actions). The last serving SN responses only if it does not “consume” the report and the response does not contain any information – therefore, the MN must store the S-RLF context for some implementation-specific time. To address it, following solutions are considered:

1. In [34], it is proposed to keep the solution as is, with a clarification on the implementation-specific timer.
2. Also in [34], an options is discussed, but not preferred, that the last serving SN responses with the full information that it received from the MN; thus, the MN does not need to store the S-RLF context while waiting for the response.
3. In [1], it is proposed to make the last serving SN respond always, so that the MN does not need to store the information too long; this requires adding a flag in the message from the last serving SN.

**Question 1: Please, indicate which of the options listed above is preferred: no optimisation of resource usage at the MN (option 1), or optimisation according to one of the two other solutions (options 2 or 3)?**

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| --- | --- | --- |
| Company | Preferred option | Comment, if needed. |
| Nokia | (3) | Motivation why option 3 seems the best is provided in [1]. |
| Ericsson | (1) or possibly (2) | Because these new messages are also used for rel-17 UEs, we think that the solution should first be optimal for rel-17 UEs. For rel-17 UEs, no check is needed from the SN, because the MN is able to identify the node responsible for the failure, thanks to the *SCGFailureInformation* itself. Therefore, only a class-2 message is needed (SCG FAILURE INFORMATION REPORT). MN knows that it does not have to wait for a response in that case. If option (3) is chosen, it will also impact implementation for rel-17 UEs, and the message from SN to MN will always be sent, even if not needed |
| Deutsche Telekom | (1) | Slight preference for (1) due to simple implementation. |
| CATT | (1) | As we believe the current solution is as below:  If the response message is received by MN and MN is maintaining the UE context, MN can find UE context and then perform SCG failure analysis. Since only SCG failure happen and UE still connected with MN, MN would naturally keep the UE contexts. So, current solution can work well and we do not think the above solution is needed. |
| ZTE | (1) | We think the current solution can work well enough, with the implementation specific timer. Although it might need MN to store the SCGFailure related information for some time, we don’t think it is unacceptable. After all, this issue is not such a big deal, and we don’t even think this should be considered as ‘no optimisation’.  For option 2, it introduces quite some modification to the current solution, which is totally unnecessary at the very last of this release. |
| Huawei | 3 or none  Not 2 or 1 | 3 if any: 3 is the simplest signalling solution requiring no duplication of data.  1) This is a statistical function. MN will notice the storage time is too short and could adjust. Losing one event is not critical. We see no benefit of defining this in OAM. If it is not configured by OAM there is no need to capture anything and better to leave this to implementation  2) is duplicating data that the MN can store |
| China Telecom | (1) | Option 1 is simpler for implementation. |
| Lenovo | 1) | 1) is slightly preferred with less spec impact. |

Other corrections to concern:

1. [XnAP] Correction of the source and failed cell ID type and adding procedural text for those [12,37];
2. [XnAP] An edit of the description of the SCG Failure Transfer procedure, alternatives proposed in [18] and in [33];
3. [TS37340] Correction of the description in 10.18.1, alternatives proposed in [31] and in [6].

**Question 2: Please, indicate if you have concerns regarding any of the above corrections. In case of alternative proposals, please, indicate which one you prefer.**

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| --- | --- |
| Company | Comment, if there are any objections |
| Nokia | 1) is all right  2) is also all right, but details need to be reviewed once decision on the overall correction are decided  3) we think removal (voiding) of the chapter is likely the best way forward |
| InterDigital | 1) ok  2) these are also ok, but no strong opinion  3) Out of the proposals made, we agree most with [6], though we are open to voiding the chapter. |
| Ericsson | 1) ok  2) corrections is needed, but prefer to wait for Q1 output, which may also change this message. Preference for [18]  3) No strong view on voiding or reviewing this section. But we need to wait for Q1 conclusion first |
| Deutsche Telekom | 1) ok  2) Preference for [18], but consideration of Q1 output required.  3) Same view as InterDigital ([6] or voiding). |
| CATT | For 2:  In [18](R3-223480),the description as below is OK for too early and to wrong PSCell change failure type, but not accurate for too late PSCell change case:  *The purpose of the SCG Failure Transfer procedure is to indicate to the M-NG-RAN node that the root cause of the SCG failure has not occurred in the S-NG-RAN node.*  For too late PSCell change, most of times both MN and SN are responsible for the SCG failure. So the root cause of the SCG failure has definitely occurred in the S-NG-RAN node for too late PSCell change when SN triggering the SCG Failure Transfer procedure.  In our opinion, *SCG Failure Transfer* procedure only indicate that SN initiated intra-SN PSCell change without MN involvement has not occurred in the S-NG-RAN node.  For 3:  In [6](R3-223311), the FFS is removed. But we think the general description for the new added messages is needed as in [31] (R3-223622). |
| ZTE | 1) ok  2) ok  3) we are fine to edit the description. The correction provided in [33] seems better.  4) slightly prefer [31]. But some revision is needed. |
| Huawei | 1) why not just say that we use it – why do we explicitly say store?  2) we prefer [18].  3) we think removing the FFS is needed if the section is kept. Can follow majority whether to void or no. |
| China Telecom | 1) Agree with the corrections;  2) Corrections on SCG Failure Transfer procedure are needed, slightly prefer the wording in [33] (R3-223624)  3) Neutral, void or revision is both Ok for us. |
| Lenovo | 1) ok  2) changes in [18] or [33] are fine, the output of Q1 should be considered if needed  3) [6] or voiding is ok, the output of Q1 should be considered if needed. |

## SCG UHI corrections

In [7,14], it is proposed to clarify in stage-2 that once the UE stays in a cell longer than the max value of the dwell time, a new entry for this PSCell is opened in the SCG UHI.

In a CR that accompanies [7], it is also proposed to extend the number of cells in the SCG history and the max value for the dwell time – both to be able to record more changes in case entries for the same cell are multiplicated and to avoid too many multiplications.

**Question 3: Please indicate, if you disagree with this clarification.**

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| Company | Comment, if there are any objections |
| Nokia | We don’t think these are needed.  The purpose of the UHI is mainly PP. Therefore, it is important to know if the UE stayed shortly in a cell, not how long exactly it was irrespectively of the dwell time. Therefore, repeating of the same entry once the time reaches max value will likely serve no purpose. Therefore, making the list longer is not needed, either – it was decided to be 8 cell long to keep the overall UE UHI reasonable small IE.  We are neutral regarding extending the max time value, but we think it is better to keep it as long as the time for an entry for the MCG UHI. |
| InterDigital | Neutral |
| Ericsson | We agree that the clarification is needed, because the exact dwelling time is needed for correlation at MN. Multiple entries were the solution which was agreed to solve this issue. Also, use cases for SN UHI has been discussed for a long time, and SN UHI can be used for other purposes than ping pong. Therefore, extending time and number of entries will give a more accurate picture of the UE DC operations, at a very limited cost. Please keep in mind that UHI may be used in other features such as AI/ML in the future. That is why we need SN UHI to be as accurate as possible. |
| Deutsche Telekom | We think the clarification is needed to explain the meaning of multiple entries with same PSCell identity. |
| ZTE | It seems that we don't have any agreement indicating that SN will add a new PSCell entry with the same PSCell ID in case the Time Stay IE exceeds its limit. In addition,it may be hard for MN to align the UHI and MHI since RAN 2 has agreed that the stay time limit for PSCell is 4095 in MHI and this enhancement was not introduced in RAN2. This is enhancement rather than correction, and we have discussed this issue in several meetings but still cannot reach a consensus, so we prefer not to introduce the relevant contents at this stage. |
| Huawei | We are fine to add this to both stage2 and to thee semantics in stage3. Remember that the extended stay time is needed to enable the correlation in the MN  We are OK to extend the number of cells stored (to align with the legacy UHI) but we do not see the need to extend the stay time. If the stay time is extended, and the UEhistory is filled with the same PScell this is not a problem since it is clear the UE has stayed a very long time in the same cell. |
| China Telecom | Neutral. |
| Lenovo | Agree with ZTE. |

The overall description of SCG UHI handling has been proposed to be clarified: proposals are provided for the stage-2 in [7,14,31] or for stage-3 [24].

**Question 4: Please indicate, if you disagree with this clarification, or where and how to introduce it, if you have a preference.**

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| Company | Comment, if there are any objections |
| Nokia | Fine. Likely stage-2 is a better place for this clarification. |
| InterDigital | Preference is in stage 2. |
| Ericsson | Stage-2 clarification is needed |
| Deutsche Telekom | St2 is preferred. |
| CATT | First of all, we prefer to add MN and SN behaviour in stage 2 description rather than in stage3 which is aligned with legacy handling.  As for stage 2, the following needs modification:  *1.The resulting information is then used by SN in subsequent handover preparation.*  [7 and 31] has correct this issue, both are ok.  *2. The MN may retrieve the SCG UE history information via the SN Addition and SN Modification procedures.*  MN just subscribe SN UHI instead of retrieve as MN cannot retrieve SN UHI by SN Addition procedures.  *3. SN shall provide the SCG UE history information, if available, in the SN Addition, SN Modification, SN Release, and SN initiated SN Change procedures.*  SN cannot provide SN UHI in SN Addition procedures, so, it should be removed. |
| ZTE | [7]: In 10.6, we prefer to add “upon PSCell change” instead of “when the SCG UE history information changes”.  [14]: In 13.3, we agree that SN cannot provide SN UHI in the addition procedure, and this shall be corrected. However, the other added description is more like stage 3 description than stage 2 description. In stage 2, we normally include the behaviour description for both SN and MN. So we would suggest introducing some minor corrections based on the original contents.  [31]: In 13.3, we think SN UHI is not used by SN for PSCell change and “retrieve” is better than “subscribe”. We agree to delete “SN Addition”. |
| Huawei | We prefer stage2. In our proposal we clarify the three triggers for info and the relationship to the procedure |
| China Telecom | Stage2 is preferred. |
| Lenovo | Prefer stage 2 clarification |

## SHR corrections

In [13], it is discussed that the target node shall send to the source node not only the report from the UE, but also C-RNTI of the source cell and the Mobility Information (if provided).

**Question 5: Please, indicate, if you have any concern with the above functional correction.**

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| Company | Comment, if there are any objections |
| Nokia | We don’t quite understand the motivation… The SHR should contain enough information for the receiving node to identify the UE, so why the C-RNTI? Then, Mobility Information is meant again as a form of UE identification, so it overlaps with C-RNTI (and to be used in failure cases)? |
| Ericsson | Not sure this is needed. SHR can be fetched and received a long time after HO, therefore UE context based solutions should not be the baseline. And even if source C-RNTI might be of interest for implementation that keeps UE context, we are not sure how this information could be added by target if SHR is received from a 3rd node |
| CATT | For C-RNTI, we think UE context may have been removed in source node when SHR sent to source node, furthermore, MRO function is not based on UE context as legacy method. So, we do not think C-RNTI of the source cell is needed.  For Mobility Information, if SHR is fetched by other RAN node, we are not sure which node, source node or target node, shall be sent to at first. If other node first sent SHR to target node, it may be possible for target node to send SHR to source node with mobility Information later. If other node first sent SHR to source node, Mobility Information cannot be sent to source node. So, further consideration is needed. |
| ZTE | Not sure the enhancement is needed, the source RAN node enforces optimization based on SHR container received from the UE. |
| Huawei | We think reusing the RLF-framework is beneficial since you can determine whether this UE was handled in a special way by the source RRM, for example if this UE was considered a high speed UE and therefore assigned a special mobility strategy.  The report only contains target C-RNTI, but the source cell C-RNTI and mobility info may be provided (if target cell has stored it) to the source cell. |
| China Telecom | Not sure, more discussion is needed if we want to carry more information in the SHR report over Xn interface. |
| Lenovo | Same view as CATT, C-RNTI of the source cell is not needed. |

In addition, there are smaller corrections proposed:

1. In [24,33,36,37,40,41] it is proposed to add the semantics description for the SHR container in various specifications.
2. In [3,13,24] adding a proper stage-2 description of the SHR reporting is proposed. However, [3] proposes it in the 38.401, while [13,24] in 38.300.

**Question 6: Please, indicate, if you have any concern with the above corrections.**

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| Company | Comment, if there are any objections |
| Nokia | 1) is all right  2) is also all right in general, but we prefer to have it added in 38.300. And since it was mainly RAN2 feature, shouldn’t it be RAN2 to add this description? |
| InterDigital | 1) yes  2) We agree that it should be in 38.300 and that it is probably more a RAN2 feature, but are ok with adding this unless RAN2 is working on it in their current meeting. |
| Ericsson | 1) ok  2) 38.300 is the correct spec for this specification. However, looking at e.g. [13], it seems that many aspects are related to UE/network interaction. Therefore, it is better if this description is added first by RAN2 |
| Deutsche Telekom | 1) Fine with them  2) We also see the description in TS 38.300. Check with RAN2 is needed. |
| CATT | For 1), Semantics description for SHR is missing and should be added.  For 2), as discussed in last RAN3 meeting, SHR stage 2 description is in RAN2 scope. |
| ZTE | For 2)At least the Xn signalling part should be provided from RAN3 for stage 2. |
| Huawei | 1. OK 2. Prefer 38.300. We also think it is important this describes that the SHR may be retrieved in a third cell, and forwarded to target who forwards to source. This may be overlooked by RAN2. We could wait one meeting and propose this later if not included in RAN2 |
| China Telecom | 1. OK; 2. Stage-2 description of the SHR reporting is needed, we are fine with adding the stage-2 description in 38.300. |
| Lenovo | 1) ok  2) adding stage-2 description for SHR reporting in TS38.300 is needed, agree with Nokia and Ericsson that it should be added firstly by RAN2. Moreover, in [13], description for SHR transfer at network side is related with Q5, details need to be further check. |

## Inter-system MLB corrections

In [11], it is proposed to add a start-stop and failure indication mechanism to the inter-system load reporting.

**Question 7: Please, indicate, if you have any concern with the above functional corrections.**

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| Company | Comment, if there are any objections |
| Nokia | Start-stop is indeed needed.  However, the failure indication is questionable – what is the case where load measurement “fails”? And if it does happen, can’t the reporting node just skip the report? |
| Ericsson | We support the correction. In case of periodic reporting, we think that addition of “start” and “stop” indications during the initiation phase (Inter-system SON Information Request) provides a clean solution.  Concerning the proposed failure indication, we note that no “Unsuccessful operation” is specified in the signalling for Inter-System MLB.  It is true that if the reporting node skips the report, the receiving node could interpret that an implicit failure. However, Inter-System MLB – differently than the intra-system MLB counterpart - involves CN nodes in between the RAN nodes, so using an explicit indication from the reporting RAN node seems a better option, as it can provide more accurate information. If we agree on what the reporting node is allowed to do, we need to make sure that the requesting node agrees with that and does not make the full procedure fail. Alternative, we could seek some stage 2 clarifications. |
| CATT | OK  Similar with intra-system MLB, start-stop and failure indication is needed. |
| ZTE | As the start-stop and failure indication mechanism has not even introduced in Load Balancing Enhancements in Rel-17, the Inter-RAT MLB scenario should also be excluded. |
| Huawei | Stop can be achieved by setting the report periodicity to “single”. This should be enough. However, if a more explicit method is preferred it may be better to put it in the same IE (i.e. “none” or “stop”) than to add a new, since otherwise we have a “stop” IE and still need to provide the periodicity.  For the failure, no strong view but an option is to send an empty list. Another (and better option) is to add a third choice containing null – indicating that no cell is reported. Adding a new optional and making both optional is not nice. |

Other corrections:

1. In [10,24], the way the CAC is encoded in inter-system load reporting is corrected.
2. In [24,42], the number of RRC connections is modified so that it offers the available number of RRC connection in reference to the maximum number.
3. Also in [24], the semantics of the PRB usage are proposed to be corrected.
4. In [11], some IE names are corrected.

**Question 8: Please, indicate, if you have any concern with the above corrections.**

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| Company | Comment, if there are any objections |
| Nokia | All corrections are all right |
| Ericsson | CAC encoding: OK  Number of RRC connections: OK  Semantics of the PRB usage: OK  Some IE names: the changes proposed in [11] are alternative to changes in the names for the some of the same IEs as proposed in R3-223434 (Nokia - NGAP rapporteur corrections for SON). We should double-check which version is agreeable.  IEs names as impacted by [11]:   |  |  | | --- | --- | | 38.413 v17.0.0 | R3-223428 | | >Inter-system SON Information **Reply** | >Inter-system SON Information **Response** | | >>Inter-system SON Information **Reply** | >>Inter-system SON Information **Response** | | >Inter-system Resource Status | >Inter-system Resource Status **Request** | | >>Inter-system Resource Status **Request** | >>Inter-system Resource Status **Req** | | 9.3.3.55 Inter-system SON Information **Reply** | 9.3.3.55 Inter-system SON Information **Response** | | >Inter-system Resource Status | >Inter-system Resource Status **Response** | | 9.3.3.59 Inter-system Resource Status **Request** | 9.3.3.59 Inter-system Resource Status **Req** |   IEs names as impacted by R3-223434:   |  |  | | --- | --- | | 38.413 v17.0.0 | R3-223434 | | > Successful HO Report **List** | > Successful HO Report **Information** | | >> Cell State Indication | >>**Inter-system** Cell State Indication | | >**Inter-system** Resource Status | >Resource Status **Report** | | >> Cell Activation Request | >>**Inter-system** Cell Activation Request | | >**Inter-system** Resource Status | >Resource Status | | CHOICE Inter-system SON Information **Response** | CHOICE Inter-system SON Information **Reply** | | >> Cell Activation Reply | >>**Inter-system** Cell Activation Reply | | >**Inter-system** Resource Status | >Resource Status | | 9.3.3.56 Cell Activation Request | 9.3.3.56 **Inter-system** Cell Activation Request | | 9.3.3.57 Cell State Indication | 9.3.3.57 **Inter-system** Cell State Indication | | 9.3.3.58 Cell Activation Reply | 9.3.3.58 **Inter-system** Cell Activation Reply | |  |  | |
| ZTE | For 1), we acknowledge this issue, but prefer the way of correction in [24] (the details are given in [39]). Since we have defined the new IEs *E-UTRAN Composite Available Capacity Group* and *NR Composite Available Capacity Group* in 9.3.1.196 and 9.3.1.201 respectively in TS38.413, the reference to other specification is not needed.  Fine with 2) and 3).  4) is not necessary.  For [24], the details of correction are given in [39]. |
| Huawei | OK for 1) 3) and 4).  For 2), among the options, we prefer to keep the number of RRC connections and add additional if needed. |

## MLB corrections

Only minor issues have been identified:

1. In [36], the usage of the per-MIMO PRB reporting is clarified in F1AP.
2. In [37/38], the semantics of the SUL load reporting is corrected in XnAP.
3. In [17], the semantics of PRB reporting are aligned with other parts of the description in F1AP.
4. In [31], a very short description of load reporting in case of EN-DC is added to stage-2.

**Question 9: Please, indicate, if you have any concern with the above corrections.**

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| Company | Comment, if there are any objections |
| Nokia | All right for 1, 2 and 3.  Proposal in (4) is not correct. In general, we don’t think we need a special description of the load balancing with EN-DC. |
| InterDigital | Agree with Nokia |
| Ericsson | 1) ok to add the PRB usage to the procedural text. Further discussion is needed to agree on the exact wording  2) OK  3) OK  4) in 38.300, “Support for Mobility Load Balancing” is described in a chapter named “Self-optimisation”. There is no similar “umbrella” chapter in TS 37.340. However, agree with Nokia that the description is probably not needed in 37.340 |
| Deutsche Telekom | We share Nokia’s views. |
| ZTE | Fine with 1), 2) and 3).  For 4), it is not essential to specific the SON function of EN-DC in the TS 37.340. |
| Huawei | 1-3) OK  4) could be useful but may need to be revised |

## CHO MRO corrections

Following corrections are proposed:

1. In [2], it is discussed that the Mobility Information may be provided twice (in the HO REQUEST and in the SN STATUS TRANSFER), but may be reported only once – and it is not clear which of the two reports is to be included in the HANDOVER REPORT. Therefore, a separate CHO-related Mobility information is proposed to be added in the latter message.
2. In [19], it is proposed to remove from the TS 38.300 the case where DAPS HO is successful after the link to the source node fails – apparently, RAN2 handles it as part of a successful HO report.
3. Also in [19], it is proposed to remove the MeasObject container and to clarify the semantics of the ReportConfig container.
4. A smaller edit to the description of the SN STATUS TRANSFER is proposed in [33].

**Question 10: Please indicate, if you disagree with any of the above corrections, or have suggestions for amendments.**

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| Company | Comment, if there are any objections |
| Nokia | All proposals are all right. |
| Ericsson | 1) 2) ok  3) Not ok. *MeasObjectToAddMod* contains more than frequency and PCI. Not sure that everything can be retrieved from GCI  4) ok |
| CATT | For 1, we think Mobility Information is just a storage space used by source node. It is up to implementation for source node how to use it. Source node can identify what has been included in Mobility Information when receiving HANDOVER REPORT message. So, there is no needed in standard to indicate it.  For 2, we think the original description in 38.300 as below is correct:  *if DAPS HO is configured but an RLF is detected in the source cell with successful DAPS HO*  Actually, it is a too late handover which lead to RLF no matter RAN2 records the RLF in RLF report or SHR. So, we do not think it needs modification.  For 3), we think MeasObject is useful. Besides PCI and frequency, other configuration in MeasObject, such as ReferenceSignalConfig, is also important for CHO execution condition which shall be considered in optimization. So, we do not think it shall be removed.  For 4), the edit to the description of the SN STATUS TRANSFER is needed as SN STATUS TRANSFER has been enhanced to include MRO related information. |
| ZTE | For 1) The Mobility information will be updated in the SN STATUS TRANSFER message because the message will be transmitted to the target later than Handover request. Then the IE in the HANDOVER REPORT will be the latest one. |
|  |  |
| Huawei | All OK  For 1) we do not think both are needed, it is enough to have the latest one. But we are fine to select the solution with minimal impact, i.e. clarify to use the latest received or duplicating with a new IE.  For 3) the important par tis to remove duplicated information. Another solution is to remove the CGI – then it is clear we signal the configuration (CGI is not part of configuration). |
| Lenovo | For 1), not agree. The latest Mobility Information allocated in SN STATUS TRANSFER is included in the HANDOVER REPORT. The existing Mobility Information can be reused, we do not see the need to introduce a separate CHO-related Mobility information in SN STATUS TRANSFER message.  For 2), we agree that for the case “if DAPS HO is configured but an RLF is detected in the source cell with successful DAPS HO”, the UE will record a SHR rather than a RLF report. However, this case is still a too late handover, current stage 2 description shall be kept.  For 3), not agree, since MeasObject is useful.  For 4), agree |

## Energy saving corrections

**Signalling function description:** In 3568 and 3573 it is proposed to document the newly added inter-system energy saving functionality in respectively S1 and NG Configuration Transfer function description (TS 36.410, TS 38.410).

**Question 11: Please provide your view on the CRs in 3568 and 3573.**

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| Company | Comment |
| Nokia | We would prefer not to include the proposed changes in TS 3x.410. Inter-system configuration info transfer based on S1 and NG Configuration Transfer function exists since Rel-15 (for TNL discovery for EN-DC), so the inter-system aspect is not new in Rel-17. Also, the descriptions in TS 3x.410 are designed to avoid unnecessary details, and in that way avoid overlapping with other stage 2 spec like TS 3x.300. So our preference is to keep the descriptions general. |
| Ericsson | Agree with Nokia. Actual level of details is enough. Otherwise we’ll have to mention all features allowed by SON transfer |
| Deutsche Telekom | We support Nokia’s and Ericsson statements why the proposed changes should not be included. |
| ZTE | We agree with these CRs. The stage2 description of Intra-system energy saving function was captured into specs of F1/Xn interface, i.e,TS38.470 and TS38.420, it makes sense to add the stage2 description of Inter-system energy saving function for NG/S1 interface in Rel-17, i.e,TS38.410 and TS36.410. |
| Huawei | We agree with NOK |

**Supported inter-system use cases:** 3173 section 2.2 provides a discussion relative to inconsistent description in NGAP clauses 9.3.3.56/57/58. Two possible solutions are discussed:

* Solution 1: Replace "inter-RAT" with "inter-system" in the mentioned IEs (and hence provide support for scenario involving E-UTRA capacity booster cell not under control of an eNB but under control of an ng-eNB only)
* Solution 2: Keep "inter-RAT", and replace the NG-RAN CGI with NR CGI in the mentioned IEs (hence focus on NR capacity booster cell), + corresponding ASN.1 updates. This solution could also be completed by replacing "NG-RAN node" by "gNB" in TS 38.300 clause 15.4.2.2.

**Question 12: Please provide your preference and comments with regards to the solutions above.**

|  |  |  |
| --- | --- | --- |
| Company | Preferred solution (1 or 2) | Comment |
| Nokia | Solution 2 | As discussed in our paper 3173, we believe that both RAN (for the WID) and RAN3 made conscious decision to support "inter-RAT inter-system" energy saving in Rel-17. This came with the understanding that an E-UTRA capacity booster cell will be managed under control of an eNB (which doesn't preclude that the same physical cell is also under control of an ng-eNB), so X2 solution is sufficient for the E-UTRA capacity booster cell. |
| Ericsson |  | Replacing the NG-RAN CGI with NR CGI as suggested in Solution 2 is not in line with the final agreements taken, which intended to enable notification of cell state changes for both LTE and NR cells.  Changes in Solution 1 are not essential. “Inter RAT” may also be interpreted as “inter system”, namely inter RAT is a broader term, which covers the functionality specified |
| CATT | Prefer 1 | Solution 2 preclude the scenario that ng-eNB is deployed as a capacity booster cell which could be the really deployment scenario. |
| ZTE | solution 1 | For our understanding, the inter-system ES cases only cover the NG-RAN node (a gNB, providing NR services; or an ng-eNB, providing E-UTRAN services) owning capacity booster cells, and the eNB providing basic coverage. so, we think solution1 is right. |
| Huawei | Solution 1 |  |

## RACH optimization corrections

**TS 36.300:**

3175 is a CR to TS 36.300 proposing to add description on RACH optimization for EN-DC scenario.

**Question 13: Please provide your view on the CR in 3175.**

|  |  |
| --- | --- |
| Company | Comment |
| Nokia | OK. Stage 2 description is currently missing for the case of EN-DC. The description in 3175 is needed to provide a full solution. |
| InterDigital | OK |
| Ericsson | We do not see the need for such detailed description for EN-DC. All the CR could state is the following:  RACH optimisation is supported by UE reported information and by PRACH parameters exchange or NPRACH parameters (for NB-IoT) between eNBs and between eNBs and en-gNBs.  Note that the CR is also incorrect when stating “and by PRACH parameters exchange between en-gNBs.”. there is exchange of PRACH parameters between en-gNBs. |
| Deutsche Telekom | The CR is fine with us. |
| CATT | Agree |
| ZTE | OK, we are fine to add stage2 on RACH optimization for EN-DC. |
| Huawei | Agree to add Stage 2 description for RACH optimisation in EN-DC secondary cell. |
| Lenovo | ok |

**TS 38.401:**

3623 is a CR to TS 38.401 proposing to document signalling of RACH information over F1 for CU/DU split scenario.

**Question 14: Please provide your view on the CR in 3623.**

|  |  |
| --- | --- |
| Company | Comment |
| Nokia | OK. |
| InterDigital | OK |
| Ericsson | OK |
| Deutsche Telekom | Ok.  Minor editorial comment: In figure caption change “NG RAN” to “NG-RAN”. |
| CATT | Agree |
| ZTE | OK |
| Huawei | Agree to document signalling of RACH information over F1. |
| Lenovo | ok |

**F1AP:**

The following proposal is made in 3173 section 2.3: Update the description of the Neighbour NR Cells for SON List IE and the maxServedCellforSON range bound in clause 9.3.1.215 to indicate that they may be used by the gNB-DU for PRACH conflict resolution purposes (as opposed to SON purposes)? (TP in annex B of 3173).

**Question 15: Please provide your view on the proposed F1AP clarification.**

|  |  |
| --- | --- |
| Company | Comment |
| Nokia | Even though we have given Neighbour NR Cells for SON List IE a generic name so that it can possibly contain different kinds of information in the future, at present it contains the neighbour cell PRACH configuration which the DU can take into account to resolve PRACH conflicts. So, we think that the description in the Neighbour NR Cells for SON List IE and the maxServedCellforSON range bound shall be updated to indicate that they can be used by the DU for PRACH Conflict resolution purposes as opposed to “SON purposes”. |
| Ericsson | Not OK. We have agreed to keep the Neighbour NR Cells for SON List as generic. We already went through discussions to make this IE focused on PRACH optimization, but we decided otherwise. |
| Deutsche Telekom | We also prefer to keep the List IE generic, i.e., changes are not supported. |
| CATT | Agree |
| ZTE | Ok |
| Huawei | Agree to specify the purpose, which is the motive to introduce the IE. |
| Lenovo | ok |

The following procedural text update is made in 3063 (F1AP gNB-CU Conf Update, clause 8.2.5.2):

- If the *Neighbour NR Cells for SON List* IE is present in the *Cells for SON Item* IE, the gNB-DU may take the PRACH configuration of neighbour cells included in the *Neighbour NR Cells for SON List* IE into consideration when adjusting the PRACH configuration of the served cell These may include the appropriate frequency mode IEs within the *NR Mode Info Rel16* IE, the *SSB Positions in Burst* IE and the *NR Cell PRACH Configuration* IE..

**Question 16: Please provide your view on the proposed F1AP procedural text update.**

|  |  |
| --- | --- |
| Company | Comment |
| Nokia | We don’t think that clarifying this text is necessary. |
| InterDigital | This text was proposed because there are optional parameters that are not mentioned in the procedure text, which is something to be avoided. Very open to other formulations of text here. |
| Ericsson | We do not think this is needed |
| Deutsche Telekom | Text update not needed. |
| CATT | Agree |
| ZTE | Not necessary, the IE is defined clearly in the tabular. |
| Huawei | No need to describe the detailed content of the SON List. |
| Lenovo | Not needed |

## CCO corrections

**CCO Issue Detection over Xn**

3559 provides the argument that if a gNB detects a capacity issue, it can directly offload its UEs via handover procedure or change the cell selection/reselection parameter. So indication of a capacity problem to its neighbour is not needed. It is proposed to introduce a *CCO Issue Detection* indicator (optional, single code-point "coverage", extendible). A corresponding XnAP CR is submitted in 3560.

**Question 17: Please provide your view on introduction of the *CCO Issue Detection* indicator and other comments to the XnAP CR in 3560.**

|  |  |
| --- | --- |
| Company | Comment |
| Nokia | We understand from 3559 that the scenario intended by the proposal is the following: "*A gNB detects a coverage problem e.g. based on RLF Report, the gNB cannot change its coverage. This gNB indicates this coverage problem to its neighbors. The neighbors may make some adaption to accommodate the coverage problem.*" In this scenario we guess the *CCO Issue Detection* IE will be sent together with an unchanged *Cell Coverage State* IE (which is mandatorily present), but also believe we are quite far from the mechanism discussed during the WI phase. We also believe that this scenario is today covered by MDT. Also, the presence of radio measurements in the UE RLF Report makes it possible to detect coverage holes, and this information is needed in the node (or OAM system) that makes the coverage modification. Anyway, we don't believe that the proposed indicator (*CCO Issue Detection* IE) would be enough to perform a workable coverage correction. Furthermore, we don't believe that the proposal is a correction of the Rel-17 NR CCO function. |
| Ericsson | We believe that the CCO Issue Detection should be included over Xn with both the “coverage” and “cell edge capacity” values. It is in our view incorrect to state that if there is a cell edge capacity issue, the solution is to offload UEs. Such capacity issue is due to hotspots of UEs at cell edge, hence offloading UEs does not remove cell edge interference. Instead, the solution is to change the cell border.  Adding the CCO Issue Detection IE over Xn is a correction because without it is not possible for the receiving node to know the reason for the CCO change at sending node. Knowing such reason allows the receiving node to take opportune CCO measures. |
| Deutsche Telekom | We support the proposal, but we also share Ericsson’s view that both “coverage” and “cell edge capacity” values should be covered by the CCO Issue Detection IE. |
| ZTE | OK with the introduction of CCO Issue Detection over Xn. |
| Huawei | We think the issue is important to include but for cases where the cell configuration changes. If the problem is coverage related, the receiving node should not perform any action resulting in an increasing overlap between the cells. If the problems is instead cell edge problems, the receiving node could “follow” the change, maintaining the overlap between cells |

**Stage 2 updates**

3424 is a CR to TS 38.300 proposing updates of the text for CCO, and 3425 proposes stage 2 updates to TS 38.401.

**Question 18: Please provide your view on the CRs in 3424 and 3425.**

|  |  |
| --- | --- |
| Company | Comment |
| Nokia | For both CRs: We don't believe the proposed changes help to resolve the following issue indicated on the CR coverpage: "*Section 15.5.5.1 (General) does not clearly indicate what a CCO issue is*". However the term "CCO issue" is not part of the specification, and it is already clear that the objective of the NR CCO function is to "*detect and mitigate coverage and cell edge interference issues*". With the proposed CR, "*coverage and cell edge interference issues*" are turned into examples so the specification becomes less clear. But OK to include "resolve".  CR to TS 38.300: OK to replace "coverage state indicator" or "indicator" by "coverage state".  CR to TS 38.401: OK to clarify "affected cells and SSB beams". However no need to change the last sentence of clause 7.9.3: "*The gNB-DU informs the gNB-CU of the new coverage states adopted.*" |
| Ericsson | We support the changes |
| Deutsche Telekom | We are fine with both CRs. |
| CATT | Ok to change from indicator to coverage state. However, we think other change is not needed. |
| ZTE | We prefer to keep the original description agreed in last meeting. As the description in LTE (given in TS36.300) has not lead to any misunderstanding, it is better to keep aligned with LTE way. |
| Huawei | Similar view as NOK |
| Lenovo | Fine to replace "coverage state indicator" or "indicator" by "coverage state". |

**F1AP procedural text update**

3063 proposes enhancements of procedural text for F1AP gNB-CU Conf Update, clause 8.2.5.2:

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If the *Coverage Modification Notification* IE is contained in the GNB-DU CONFIGURATION UPDATE message, the gNB-CU shall, if supported, take it into account for Coverage and Capacity Optimization including changes in SSB coverage if the *SSB Coverage Modification List*. IE is included.

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If the *CCO Assistance Information* IE is contained in the GNB-CU CONFIGURATION UPDATE message, and the *NR CGI* IE contained in the *Affected Cells and Beams* IE is served by the gNB-DU, the gNB-DU may use it to determine a new cell and/or beam configuration including affected SSBs if the *Affected SSB List* IE is included.

If the *CCO Assistance Information* IE is contained in the GNB-CU CONFIGURATION UPDATE message and the *NR CGI* IE contained in the *Affected Cells and Beams* IE is not served by the gNB-DU, the gNB-DU may use it to adjust coverage of its cells including affected SSBs if the *Affected SSB List* IE is included.

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**Question 19: Please provide your view on the procedural text changes proposed in 3063.**

|  |  |
| --- | --- |
| Company | Comment |
| Nokia | GNB-DU CONFIGURATION UPDATE message:  "including changes in SSB coverage if the *SSB Coverage Modification List*. IE is included" - the proposed addition doesn't provide added clarity - in our view it is already clear that the gNB-CU will take the full information into account even if some of the contained IEs are optional.  GNB-CU CONFIGURATION UPDATE message:  OK to replace *CCO Assistance Information Item* by *Affected Cells and Beams*.  First occurrence of "including affected SSBs if the *Affected SSB List* IE is included": not needed, already covered by "cell and/or beam configuration", or misleading, because gNB-DU may need to change beam configuration if cell configuration is changed.  Second occurrence of "including affected SSBs if the *Affected SSB List* IE is included": We believe this proposal is misleading, because the gNB-DU may anyway needed to adjust coverage of SSB beams if cell coverage is changed. |
| InterDigital | We certainly did not want to be misleading, this is an attempt to describe the inclusion of optional parameters, and are open to other proposals that can not be seen as misleading. |
| Ericsson | We support the proposed changes |
| Deutsche Telekom | We share Nokia’s views on the proposed updates. |
| CATT | No strong opinion.  We have a feeling that the current procedure text is clear enough. No extra description is needed. |
| ZTE | The procedural text changes is not necessary, the current description is clear enough. |
| Huawei | The correction is OK (could possibly be moved to editorial)  For the rest we prefer to keep the text with similar concern as NOK |

**Other stage 3 corrections (F1AP)**

Miscellaneous stage 3 updates for CCO are proposed in 3063, 3313 and 3574. (And please indicate if the moderator missed CCO stage 3 updates submitted in other tdocs).

**Question 20: Please provide comments if you disagree with any of these miscellaneous corrections.**

|  |  |
| --- | --- |
| Company | Comment |
| Nokia | 3074: No issues found in the proposed changes. The CRs will need to be merged into a single F1AP CR for CCO and can then also be double-checked in second round. (Cover-page: "The CR has no BC impact" - however the CCO change is NBC which is not an issue because ASN.1 is not yet frozen - the impact statement is therefore not needed.) |
| InterDigital | No issues |
| Ericsson | 3063: The text saying “These may include the appropriate frequency mode IEs within the *NR Mode Info Rel16* IE, the *SSB Positions in Burst* IE and the *NR Cell PRACH Configuration* IE” is not needed. |
| ZTE | Fine with stage 3 updates in 3063, 3313 and 3574. |
| Huawei | No issues |

# Conclusion, Recommendations [if needed]

If needed

# References

1. R3-223102, Analysis and a proposal for correction of the Rel.17 SCG MRO mechanism (incl. draft CRs) (Nokia, Nokia Shanghai Bell)
2. R3-223103, A correction to the handling of the Mobility Information in case of CHO (incl. draft CR) (Nokia, Nokia Shanghai Bell)
3. R3-223137, (CR for 38.401) Correction on SON features enhancement (China Telecommunication)
4. R3-223173, Corrections on SON/MDT (Nokia, Nokia Shanghai Bell)
5. R3-223175, RACH optimisation in EN-DC secondary cell (Nokia, Nokia Shanghai Bell)
6. R3-223311, Correction on MRO for SN Change Failure (Lenovo)
7. R3-223419, Clarification of SCG UE UHI entries when Time Stay value is exceeded (Ericsson)
8. R3-223424, TS 38.300 corrections for CCO (Ericsson, Deutsche Telekom, Qualcomm Incorporated)
9. R3-223425, TS 38.401 corrections for CCO (Ericsson, Qualcomm Incorporated, Deutsche Telekom)
10. R3-223426, NGAP corrections for Inter-System Load Balancing (Ericsson, Deutsche Telekom, Qualcomm Incorporated)
11. R3-223428, NGAP Inter-System Load Balancing corrections for procedure and IEs (Ericsson)
12. R3-223432, MRO for SN change failure correction (Ericsson)
13. R3-223475, Delivery of Successful Handover Report (Huawei, Qualcomm)
14. R3-223476, Corrections to UE History Information in MR-DC (Huawei, CMCC, Qualcomm, Deutsche Telekom)
15. R3-223477, Corrections to UE History Information in MR-DC (Huawei, CMCC. Qualcomm, Deutsche Telekom)
16. R3-223478, Corrections to UE History Information in MR-DC (Huawei, CMCC, Qualcomm, Deutsche Telekom)
17. R3-223479, Corrections to Load Balancing Enhancements (Huawei)
18. R3-223480, Correction to MRO for SN Change Failure (Huawei, Deutsche Telekom, Qualcomm)
19. R3-223482, Corrections to MRO for mobility enhancement (Huawei, CMCC, Qualcomm)
20. R3-223483, Corrections to Mobility Enhancement Optimization (Huawei, CMCC, Qualcomm)
21. R3-223484, Corrections to Mobility Enhancement Optimization (Huawei, CMCC, Qualcomm)
22. R3-223559, CCO Issue Detection over Xn (Samsung, Verizon)
23. R3-223560, The inclusion of the CCO Issue Detection over Xn signalling (Samsung, Verizon)
24. R3-223566, Discussion on corrections for Rel-17 SON MDT (ZTE)
25. R3-223567, Correction on R17 SON MDT for 36.300 (ZTE,China Unicom, China Telecom)
26. R3-223568, Correction on R17 SON MDT for 36.410 (ZTE,China Unicom, China Telecom)
27. R3-223569, Correction on R17 SON MDT for 36.423 (ZTE,China Unicom, China Telecom)
28. R3-223571, Correction on R17 SON MDT for 38.300 (ZTE)
29. R3-223573, Correction on R17 SON MDT for 38.410 (ZTE,China Unicom, China Telecom)
30. R3-223574, Correction on R17 SON MDT for 38.473 (ZTE,China Unicom, China Telecom)
31. R3-223622, Correction to 37.340 for SON features enhancement (CATT)
32. R3-223623, Correction to 38.401 for SON features enhancement (CATT)
33. R3-223624, Correction to 38.423 for SON features enhancement (CATT)
34. R3-223668, Discussion on MRO SN change failure (ZTE, Samsung, China Telecom)
35. R3-223669, Correction for MRO SN change failure (ZTE, Samsung, China Telecom)
36. R3-223063, Correction of R17 SON features enhancement (InterDigital )
37. R3-223064, Correction of R17 SON features enhancement (InterDigital)
38. R3-223575, Correction on R17 SON MDT for 38.423 (ZTE)
39. R3-223576, Correction on R17 SON MDT for 38.413 (ZTE)
40. R3-223312, Correction on SON feature enhancements-XnAP (Lenovo)
41. R3-223313, Correction on SON feature enhancements-F1AP (Lenovo)
42. R3-223427, NGAP RRC Connections for Inter-System Load Balancing (Ericsson)
43. R3-223433, [DRAFT] Reply LS on User Consent Updating (Ericsson)