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]. |
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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 right2) is also all right, but details need to be reviewed once decision on the overall correction are decided3) we think removal (voiding) of the chapter is likely the best way forward |
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## 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. |
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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. |
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## 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)? |
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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 right2) 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? |
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## 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? |
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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 |
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## 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], 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. |
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## 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. |
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## 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. |
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**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.**

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| 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.  |
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## 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.**

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| 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. |
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**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.**

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| Company | Comment |
| Nokia | OK.  |
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**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.**

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| 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”.  |
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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.**

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| Company | Comment |
| Nokia | We don’t think that clarifying this text is necessary.  |
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## 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.**

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| 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. |
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**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.**

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| 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.*" |
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**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.**

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| 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. |
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**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.**

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| 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.) |
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# 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)