3GPP TSG-RAN WG2 #118-e R2-22xxxxx

Electronic meeting, 09th May– 20th May 2022

Agenda Item: 6.13.3

Source: Ericsson, Huawei

Title: Summary of RILs discussion

Document for: Discussion, Decision

#  Introduction

This contribution lists all the open issues that need to be discussed for SON/MDT with prioritizing the RILs with impact on the ASN.1 in section 1 and RILs without impact on the ASN.1 in section 2.

* **[AT118e][801][SON/MDT] Summary of RILs discussion (Ericsson, Huawei)**

For 1st round: Based on pre118 #801 email discussion, figure out the controversial RILs and RILs with easy agreeable proposals.

For 2nd round: Discuss NOKIA094, H073, Z422 and proposal 3-19 in R2-2206344 and try to get consensus on these issues.

 1st round Intended outcome: Report full of proposals…

 1st round Deadline: 11:23 UTC, Tuesday May 10th

 2nd round Intended outcome: Report full of proposals…

 2nd round Deadline: 11:23 UTC, Monday May 16th

Please provide your comments until Sunday May 15th, 13:00 UTC, so we could summarize and derive the conclusions for the Monday session.

# 2. Discussion

## 2.1 RILs with impact on ASN.1

The following RILs are considered with impact on ASN.1 and hence we prioritize them to conclude them latest in the next online session.

In C306 two different aspects related to the signalling based MDT protection is discussed. In the first part we agree that there is no need to condition the protection of the signalling based logged MDT procedure to the PLMN. However, the second part of the RIL discusses to change the *sigLogMeasConfigAvailable* flag to ENUMERATED {true} format. However, rapporteur believes the current implementation i.e., BOOLEAN format provides more valuable information to the network. We explain it in the following scenarios:

1-  T330 Timer is running i.e., the UE has the signaling based MDT configuration: flag will be set to true and network knows it should not override the configuration

2- T330 Timer expires but the UE still has the MDT results associated to the signaling based MDT configuration. We verify this case of interest under following implementation (ENUMERATED and BOOLEAN).

1. **Assuming that we implement the flag as ENUMERATED true**, then the UE sets the flag to true (not distinguishing from previous case (1)), then the network does not know that after fetching the reports, can it configure the UE with the new management-based MDT configuration or it may beach the rule of protection of signaling based MDT. In fact, it is not possible for the network to deduce whether the fetched report was the last report (since MDT stopped at the UE) or network should wait further for more s-based reports?
2. **Assuming that we implement the flag as BOOLEAN,** then the UE sets the flag to false the network knows that there will be no more s-based report and hence it can configure management based MDT without risking s-based MDT report. So network receives sufficient information to not breach the rule of protection of signaling based MDT.

3-T330 timer expired (no MDT configuration) and there is no signaling based MDT result. The flag will be absent, hence network can configure the UE with a management based MDT configuration.

Hence, rapporteur would like to ask companies to provide their view on the following question.

* **Q1: [C306] Do you agree that RAN2 should keep the *sigLogMeasConfigAvailable* flag with BOOLEAN format that is optionally present (as implemented in the current specification)?**

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| **Company** | **Agree/Disagree** | **Comments** |
| Qualcomm | Disagree | UE set the flag as “TRUE” if UE was configured with signaling-based MDT, UE set the flag to indicate the availability of the logged MDT report. Also, if there is more logged MDT report, UE indicates this to the NW in the logged MDT report. This information should be sufficient.  |
| Samsung | Disagree | We prefer to use ENUMERATED format.We assume RAN2 already discussed this aspect and reached the clear agreement in last meeting:*Only one explicit indication (e.g., sigLogMeasConfigAvailable) is used for signalling MDT protection:* *- the indication is included when UE has sig-based logged MDT config or if UE has sig-based logged MDT results, otherwise it is absence*Considering the agreement above, the ENUMERATED format is sufficient.For all protection cases, UE will set the indicator. For instance, if UE has signalling-based MDT results, it will also set the indicator.We think Boolean format is a minor optimization, which should not be pursued at this late stage. |
| Ericsson | Agree | Please note that according to the procedural text the UE includes the indication only when the UE has signalling based MDT configuration or when the UE has signalling based MDT results that is aligned with the agreement. However, the UE needs to set it to *true* when configuration exists and set it to *false* when only signalling based MDT reporty exists. This is essential to avioid breaching the signalling based MDT protection agreement. |
| Apple | Disagree | The explanation from the repporteur convinced us it is better to use ENUMERATED, as we don’t think we have agreed to the interpretation of the rapporteur.  |
| OPPO | Neutral | After the offline check with Ericsson, we think the solution given by Ericsson is Ok too.  |
| CATT | Disagree | We prefer to use ENUMERATED format. If the UE has sig-based logged MDT measurement configuration or sig-based logged MDT measurement results, the available indicator in complete message is present, and then the network will not configure the man-based logged MDT configuration to UE.[Ericsson] could you please mention when the network would know that it “can” configure the management-based MDT configuration?We think ENUMERATED solution is sub-optimal, since the network does not know when the last signaling based measurement result is delivered, and there is a risk to override the signaling based MDT with management-based MDT, unless we indicate that signalling based MDT is not available but still there is signalling based result, so network knows that after fetching the results it can configure management based MDT. |
| CMCC | Neutral |  |
| Huawei, HiSIlicon | Agree, but also open for Enumerated approach | Both approaches can lead to the same results at network sideWe think the intention of the flag is to let network have enough information so that signalling-based MDT is guaranteed.For BOOLEAN approach (already captured in the current specs), it can differentiate the two cases:We think the two approaches will lead to some differences for the two cases:* (1) no available signalling based MDT configuration but only signalling based MDT results
* (2) valid signalling based MDT configuration but no MDT results

For Boolean approach, the network can differentiate between two cases upon **the *sigLogMeasConfigAvailable* flag**, and then the network may have different actions for different cases, e.g. for (1), the network may initiate another logged MDT configuration after all MDT results have been sent from the UE; for (2), the network will wait until the UE releases its MDT configuration.For Enumerated approach, the network can not differentiate between two cases, and then it has uniform actions. It may not be as good as Boolean approach, but we can accept it if majority of companies prefer it.In addition, we think the following updates are needed if following Enumerated approach:2> if the *sigLoggedMeasType* in *VarLogMeasReport* is included:3> if T330 timer is running, or if the UE has logged measurements available for NR:4> include *sigLogMeasConfigAvailable* in the *RRCSetupComplete* message; |
| Nokia | Disagree | We conform with Samsung explanation. We agreed to have one explicit indication for configuring signaling based MDT. Boolean is optimization, that will cause further complexity to the NW (to always set the flag to false if it does not want to use protection) |
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**Conclusion**: **TBW**

Various RILs addressing MHI has been left for further discussion (i.e. E120, E121, E122, H098, NOKIA094, NOKIA093). Rapporteur proposes first discussing the principle that should be followed for the PSCell MHI. In legacy Rel.16 specification, the information associated to the last visited PCell X are added into the MHI at PCell X transition (e.g. when the UE moves from the PCell X to PCell Y), not when the UE enters the PCell X.
In the current Rel.17 specification, the PSCell MHI is handled in a similar way as the Rel.16 PCell MHI: the PSCells visited while connected to a certain PCell X are appended to the MHI within the nested structure upon PCell change, i.e., when the UE moves from PCell X to PCell Y, the UE includes into the MHI the PCell X information and all the PSCells visited while connected to the PCell X into the nested structure.
In order to ensure consistency between Rel.16 PCell MHI, and Rel.17 PCell MHI both from specification point of view, and from the UE point of view, Rapporteur believes that we should keep the above principle.

* **Q2: As implemented in the current Rel.17 specification, do you agree to adopt for the Rel.17 PSCell MHI the same principles as the Rel.16 PCell MHI? i.e., the PSCells visited while connected to a certain PCell X are appended to the MHI in the nested structure when the corresponding PCell X related entries are appended to the MHI (i.e., upon change of PCell X or when entering 'any cell selection').**

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| **Company** | **Agree/Disagree** | **Comments** |
| Qualcomm | Yes | Time spent Should be calculated upon transition from PSCell x to PSCell y. Therefore, it is added when transition happens.  |
| Samsung | Agree |  |
| Ericsson | Yes | Keeping the PCell handling in MHI untouched would benefit continuation of implementation of the legacy MHI part in the same way. |
| Apple  | Yes |  |
| OPPO | Yes |  |
| CATT | Yes |  |
| CMCC | Yes |  |
| Huawei, HiSIlicon | Agree | For time spent related to Pscell logging, we agree with Qualcomm.For time spent related to Pcell logging, we have more comments (see our reply to Q3-bits). |
| Nokia | No | Keeping the principle of Rel-16 (not-nested-MHI), where the visiting information is stored which leaving the PCell, would even increase implementation complexity, since all the concurrently occurring PScell visits need to be temporally buffered and in a second step with PCell change stored in the nested MHI data structure. It would be easier to open the nested structure with entry of PCell with two important advantages: 1) No temporally variable for buffering needed 2) TimeSpent for NoPSCell can be added easily, which is needed for spatiotemporal correlation of the two layers.We believe the easiest approach would be once the UE “opens” the entry for PSCell whenever being in RRC\_Connected, for the associated PCell. Upon releasing the PCell or changing it it should “close” the entry.In case, there is no PScell addition in the meantime, the entry for PSCell timeSpent would remain empty – indicating no PSCell. Otherwise, upon addition of any PScell, the entries for time and cell id would be filled accordingly. |
| Lenovo | Yes |  |
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**Conclusion**: **TBW**

In the following, it is discussed both cases in which the answer to Q2 above is “agree” and “disagree”.

If the outcome of Q2 is “agree”, it seems necessary that the UE maintains a temporary variable that temporarily stores visited PSCell entries for all the PSCells visited while connected to the PCell X. The temporary variable may also, include entries associated to “time without PSCells” with the corresponding time spent while not having no PSCells while being in RRC CONNECTED mode. Then, when the UE transits from the PCell X to the PCell Y or when the UE goes to ‘any cell selection’ state , the UE appends to the visitedCellInfoList of the variable VarMobilityHistoryReport, both the PCell X information (as in Rel.16) and within the new Rel.17 nested structure, all the associated PSCell entries stored in the temporarily variable.

* **Q3: If the outcome of Q2 is “agree”, do you agree to introduce a temporary variable that stores all the visited PSCells (including entries with no PSCell while being in RRC Connected mode) while the UE is connected to a certain PCell X)?**
	+ **When the UE transits from the PCell X to the PCell Y or it goes from PCellX to ‘any cell selection’ state, the UE appends to the visitedCellInfoList of the variable VarMobilityHistoryReport, both the PCell X information (as in Rel.16) and within the new Rel.17 nested structure, all the associated PSCell entries stored in the temporarily variable.**

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| **Company** | **Agree/Disagree** | **Comments** |
| Qualcomm | Disagree | UE implementation should handle it, there is no need for temporary variable.  |
| Samsung | Disagree | We also think that UE implementation can handle it accordingly so that there is no need to specify anything for temporary variable.  |
| Ericsson  | Agree, see comment | Of course UE implementation can handle it but the procedural text needs to be written in the RRC specification so that it is clear as to what information is included in the PSCell related MHI.Given the current state of the specification, we think a temporary variable as originally was designed (but removed by overlooking at the review phase) is essential. The current procedural text defines the exact UE behaviour i.e., to store the PSCell information in different scenarios (e.g., PSCell addition/remove/failure). Without explicitely defining the temporary varilable to keep the stored PSCell MHI according to the specified behaviour, we will end up in sever confutions both at the phase of specification and then in the phase of real implementation, which may result to inconsistent UE behaviours in providing PSCell MHI.To exemplify we quoted a part of the procedural text defining the UE behaviour when logging PSCell information. It is clear that leaving the temporary variable up to implementation would not be aligned with the procedural text quoted below. If the UE supports storage of mobility history information, the UE shall:1> If the UE supports PSCell mobility history information and upon addition of a PSCell:2> include an entry in *visitedPSCellInfoList* in variable *VarMobilityHistoryReport* possibly after removing the oldest entry, if necessary, according to following:3> set the field *timeSpent* of the entry according to following:4> if this is the first PSCell entry for the current PCell since entering the current PCell in RRC\_CONNECTED:5> include the entry as the time spent with no PSCell since entering the current PCell in RRC\_CONNECTED;4> else:5> include the time spent with no PSCell since last PSCell release or SCG failure since entering the current PCell in RRC\_CONNECTED;1> If the UE supports PSCell mobility history information and upon change, or release of a PSCell or upon declaring failure in a PSCell (SCG RLF or SCG HOF) while being connected to the current PCell:2> include an entry in *visitedPSCellInfoList* of the variable *VarMobilityHistoryReport* possibly after removing the oldest entry, if necessary, according to following:3> if the global cell identity of the previous PSCell is available:4> include the global cell identity of that cell in the field *visitedCellId* of the entry;3> else:4> include the physical cell identity and carrier frequency of that cell in the field *visitedCellId* of the entry;3> set the field *timeSpent* of the entry as the time spent in the previous PSCell while being connected to the current PCell;Hence we appreciate if companies provide their view on the benefic of leaving the temporary variable upto impelemntation, at the cost of confusion and vague procedural text.   |
| Apple | Disagree | No need to overspecify internal UE implementation |
| OPPO | Disagree | Up to UE implementation is OK |
| CATT | Agree | Agree with Ericsson, it is better to introduce a temporary variable for PSCell to make the text procedure clearer, as we describe how to set the PCell MHI information from the variable for PCell in R16. |
| CMCC | Agree | Same view with Ericsson and CATT. |
| Huawei, HiSilicon | Disagree | We think the temporary variable approach brings some complexities, and it may not be easy to complete it in this meeting.For this approach, we have one question: for R17 UE variable, there are two lists inside (one list for Pcell and the other list for PScell), and how the two lists are correlated? |
| Nokia | Disagree | As consequence of Q2 |
| Lenovo | Disagree | It is UE implementation |
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**Conclusion**: **TBW**

If the outcome of Q3 is “disagree”, Rapporteur wonders how the UE can log/store the visited PSCells while connected to PCell X. Rapporteurs notes that if RAN2 decides to follow the legacy Rel.16 approach, i.e. PCell X is added into the MHI when the UE moves from PCell X to PCell Y, there should be a way for the UE to log/store the visited PCells while connected to the PCell X and then append these visited PSCells into the MHI within the PCell X entry when the UE moves from PCell X to PCell Y. Otherwise, at the moment in which the UE visits a PSCell A, the PCell X has not been included yet into the MHI (according to the legacy PCell MHI) and the UE cannot append the visited PSCell A directly into the MHI (i.e. by doing that it will append the PSCell A into the wrong PCell entry). Given the above consideration, Rapporteur would like to ask the following question:

* **Q3-bis: If the outcome of Q2 is “agree”, and the outcome of Q3 is “disagree”, how should be captured in the specification that the UE logs/stores the visited PSCells while connected to the PCell X, so that those visited PSCells while connected to the PCell X can be appended to the MHI when the PCell X is included?**
	+ Note that it should be avoided that the UE appends directly a visited PSCell into the MHI, because at the moment of visiting such PSCell, the MHI does not contain yet the entry corresponding to the current PCell X

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| **Company** | **Comments** |
| Qualcomm | It is up to the UE implementation, “how UE provide this information”. Standard should dictate what is required. It should not dictate “how UE should implement this”. Off course until PCell ID and time spent on PCell is not added, the PSCell X information and time spent information is not added to the MHI. UE implementation can handle it properly. |
| Huawei, HiSilicon | Our suggestion is that:(1) no need to impact the UE variables(2) when UE is to add/change/remove the PScell, if the relevant Pcell has been added in the MHI, the UE just logs PScell info; else, the UE adds the Pcell info (except for timeSpent info)(3) for legacy behaviours of logging Pcell, it should be updated like: if the Pcell info has been added in the MHI, the UE only adds timeSpent info, otherwise, the legacy UE behaviours are applied |
| Nokia | As proposed in Q1 a proper recording would be once the UE “opens” the entry for PSCell whenever being in RRC\_Connected, for the associated PCell. Upon releasing the PCell or changing it should “close” the entry.In case, there is no PScell addition in the meantime, the entry for PSCell timeSpent would remain empty – indicating no PSCell. Otherwise, upon addition of any PScell, the entries for time and cell id would be filled accordingly. |
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If the outcome of Q2 is “disagree”, the alternative is to modify the legacy approach of PCell MHI handling. In R2-2204878, it is proposed that a PSCell entry should be added into the nested structure as soon as the UE enters the PSCell A while connected to PCell X, and this entry should then be modified with the timeSpent when the UE exits the PSCell A. However, Rapporteur notes that according to the current legacy approach when the UE enters the said PSCell A the MHI does not contain yet the PCell X, because that is added when the UE transits from PCell X to PCell Y.

Hence in order to realize this approach it is needed that when changing the PCell, the UE would need to add in the MHI the previous PCell information (as in Rel.16) and a new entry for the new PCell which is just entered, i.e. when the UE transits from PCell X to PCell Y, the UE includes in the MHI the information of the previous PCell X (as in legacy) and an entry for the new PCell Y which is left empty until the PCell Y is changed.
Rapporteur’s main concern is that this design changes the legacy principle, and the legacy handling of PCell MHI may be affected both from specification point of view, and UE implementation. Rapporteur also notes that this change might also be not backward compatible.

* **Q4: If the outcome of Q2 is “disagree”, do you agree to the legacy PCell MHI handling should be changed?**
	+ **i.e. when changing the PCell, the UE would need to add in the MHI the previous PCell information (as in Rel.16) and a new entry for the new PCell which is just entered, i.e. when the UE transits from PCell X to PCell Y, the UE includes in the MHI the information of the previous PCell X (as in legacy) and an entry for the new PCell Y which is left empty until the PCell Y is changed. While the UE is connected to the PCell Y, the UE appends into the PCell Y entry of the MHI the visited PSCells one by one**

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| **Company** | **Agree/Disagree** | **Comments** |
| Qualcomm | Disagree  | Leave it to UE implementation, how UE provides the required information.  |
| Nokia | Disagree | Adding PScell entries to the previous cells is awkward workaround for the UE and may lead to undefined UE implementation approaches.The nested 2D MHI data structure should be filled concurrently with the aligned visiting events like entering and leaving. I.e. Opening the new 2D structure with entering of PCell, while only CellID of PCell and concurrently PSCell are inserted (or ID for noPSCell) and timeSpent is inserted with cell change or connecting to a PSCell in case of single PCell connectivity). Waiting and leaving the created 2D-data structure empty until UE changes to PCell Y is not best practice. |
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In Z422, it is proposed to remove the msgA-SCS-From-prach-ConfigurationIndex, and use just msgA-SubcarrierSpacing both for the case in which the configured msgA-SubcarrierSpacing was used in the RA procedure and when it was not used.

Rapporteur notes that in order to pursue this change, it is necessary to introduce a new Rel-17 IE, namely SubcarrierSpacing-r17 IE, since the current legacy Rel.15 SubcarrierSpacing IE does not contain the values 1.25KHz and 5Khz. Additionally, it should be clarified in the specification that this new Rel.17 SubCarrierSpacing-r17 is only used for SON purposes, since for all the other NR operations the Rel.15 SubcarrierSpacing should be used. Rapporteur believes that this change brings extra specification work that is unnecessarily, and it is not clear what benefit the approach proposed in Z422 really brings.

* **Q5: [Z422] Do you see the need to remove the msgA-SCS-From-prach-ConfigurationIndex IE and only use the msgA-SubcarrierSpacing both for the case in which the configured msgA-SubcarrierSpacing was used in the RA procedure and when it was not used?**
	+ **Please note that if this change is pursued, it is necessary to introduce a new Rel.17 SubcarrierSpacing IE that contains the values 1.25KHz and 5Khz**

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| **Company** | **Agree/Disagree** | **Comments** |
| Qualcomm | Agree. |  |
| Samsung | Disagree | We follow rapporteur’s view. |
| Apple | Disagree |  |
| CATT | Disagree |  |
| CMCC | Disagree |  |
| Huawei, HiSilicon | Disagree | We agree with the rapporteur. |
| Nokia | Disagree | We agree with the rapporteur’s view. We don’t see the real gains for this complicated solution. |
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In E079 Ericsson has discussed that it would be beneficial if the UE includes in the SHR and/or in the RLF-Report the RA-InformationCommon associated to the source PCell, if there is an RLF in the source cell due to random access problem while performing a DAPS HO. Rapporteur thinks we have not discussed whether the UE should include RA-InformationCommon in case of source RLF in DAPS HO due to RA problems, as we do for the target cell. If this change is introduced, RAN2 would need to add an *ra-InformationCommonSource* IE in order to differentiate this information from the *ra-InformationCommon* IE which just includes target cell-related RA information.

* **Q6: [E079] Do you see benefits of including in the SHR and/or in the RLF-Report, the RA-InformationCommon associated to the source PCell if there is an RLF in the source cell while performing a DAPS HO?**
	+ **Yes, only in the SHR**
	+ **Yes, only in the RLF-Report**
	+ **Yes, both in the SHR and RLF-Report**
	+ **Neither in the SHR nor in the RLF-Report**

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| **Company** | **Preferred Option (a,b,c,d)** | **Comments** |
| Qualcomm | D | The concerning scenario is not very clear to us. At the MAC layer, only one RACH procedure can be supported at any given time. Now if we consider different DAPS HO cases:RLF reports scenarios:1. DAPS HO command (RACH with target cell will be initiated) -> RLF at the source (RLF should not concern RACH issues as simulations RACH is not supported) -> DAPS HO failure

RACH failure is concerned with the target cell. Simulations RACH is not supported. 1. DAPS HO command (RACH with target cell will be initiated) -> DAPS HO failure -> fallback to source cell -> RLF at the source

We do not concern about DAPS HO failure after fallback.SHR reports scenarios:1. DAPS HO command (RACH with target cell will be initiated) -> RLF at the source (RLF should not concern RACH issues as simulations RACH is not supported) -> Successful DAPS HO

Simulations RACH is not supported. 1. DAPS HO command (RACH with target cell will be initiated) -> Successful DAPS HO -> RLF at the source (RLF should not concern RACH issues as simulations RACH is not supported)

Capturing the RLF at source here is not relevant (it has nothing to do with successful DAPS HO failure). Furthermore, we cannot optimize RLF (at source) after successful DAPS HO.Therefore, we argue to exclude it from both RLF and SHR. |
| Samsung | C |  |
| Ericsson | C |  |
| Apple | D | This is not a correction |
| OPPO | D | Too late to be captured at this stage. Not sufficient discussion on that before. |
| CATT | D |  |
| CMCC | C |  |
| Huawei, HiSilicon | D | We agree with Qualcomm. If there are RLF in source and HOF in target during DAPS HO, or RLF in source and T304 triggering SHR, this solution will introduce two IEs RA-InformationCommon. This brings almost double siganlling overhead. |
| Nokia | D | It is unclear why such differentiation is needed |
| Lenovo | D | Don’t see the strong motivation to add RA-InformationCommon associated to the source PCell in a RLF report or SHR. |
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**Conclusion**: **TBW**

Related to H099, it is proposed some rules so that the MN/SN RACH report can be handled separately. That is because the UE may add RACH report for MN or SN based on the RA, and it may happen that the UE firstly does lots of RA on SN, and then the RA report list is full. In this case, it is impossible for the UE to log RA report for MN separately from the SN. Rapporteur highlights that this might require some ASN.1 effort that should be taken into account.

* **Q7: Do you see the need to define mechanisms for the UE to log RA-Report for MN separately from SN?**

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| **Company** | **Agree/disagree** | **Comments** |
| Qualcomm | Disagree | There is not need for it.  |
| Samsung | Disagree | RAN2 has not discussed separate handling. We do not support because there was sufficiently no technical discussion, e.g. separate availability indicator, separate IE/field, UE capability etc. |
| Ericsson | Disagree | There is no need. Agree with Samsung view |
| Apple | Disagree |  |
| OPPO | Disagree |  |
| CATT | Disagree |  |
| CMCC | Disagree |  |
| Huawei, HiSilicon | Agree | Proponent. This was not discussed before, and we think it provide some flexibilities for network. Otherwise, the mixed RACH reports may hide some useful reports. |
| Nokia | Disagree | We don’t see the need for that. It will only complicate logging at the UE without clear gains to do so, especially if the UE reports the RACH report only to the MN. The MN can always filter and forward the entries related to SN RACH attempts to SN.   |
| Lenovo | Disagree |  |
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**Conclusion**: **TBW**

## 2.2 RILs without impact on ASN.1

In H073 it has been discussed that the following procedural text says "if the successHO-Report in..." but it is unclear what it means if the UE actually does not have anything.

1> if the *successHO-ReportReq* is set to *true* and if the RPLMN is included in the *plmn-IdentityList* stored in *VarSuccessHO-Report*:

2> if the *successHO-Report* in the *VarSuccessHO-Report* concerns a DAPS handover:

Rapporteur understands that the scenario might be possible e.g., UE flags the availability of the successHO-Report but networks tries to fetch the report after 48 hours which may lead to the absence of the report at the time of fetching. However, rapporteur also thinks checking the availability of the successHO-Report in the VarSuccessHO-Report may not be needed, as the second condition concerning the RPLMN (yellow highlighted) would not allow the UE to move forward with the addition of the successHO-Report if there is not such report logged by the UE. In fact, if the sucessHO-Report is deleted from the VarSuccessHO-Report the UE also deletes the associated PLMN in the VarSuccessHO-Report which means the RPLMN will not be included in the report at the time of fetching and hence the UE will not proceed with adding successHO-Report to the UEInformationResponse message. Please note that such check for the RLF report (i.e., checking the availability of the RLF report) was not needed. The only place that such check is required is for MDT report wherein the PLMN is added VarLogMeasReport, right after receiving the MDT configuration from the network.

Hence Rapporteur proposes:

* Q8: Do companies agree that checking the availability of the successHO-Report at the time of receiving the sucessHO-ReportReq is not needed as RPLMN will not be included in the VarSuccessHO-Report when successHO-Report is deleted?

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| **Company** | **Agree/disagree** | **Comments** |
| Qualcomm | Disagree | It is better to check the availability of the successHO-Report at the time of receiving the sucessHO-ReportReq |
| Samsung | Disagree | We prefer Huawei’s suggestion in same way with other reporting mechanisms. |
| Ericsson | See comment | Both approachs work for us |
| Apple | See comments | We don’t think it is a big issue, but we are OK with the Huawei proposal if that’s the majority view |
| OPPO | Agree | We are OK with the rapporteur’s opinion. |
| CATT | Disagree | Prefer Huawei’s suggestion. |
| CMCC | Disagree | Prefer Huawei’s suggestion. |
| Huawei, HiSilicon | Disagree | The time between the reception of the availability indicator and the SHR report depends on network implementation. It is possible that the UE deletes the SHR before the SHR request.Therefore, it is reasonable to consider this. |
| Nokia | See comment | The explained use case by NW trying to fetch the report after 48h wouldn’t be Rel-17 specific issue (could happen also in legacy), thus, if this is the only identified use case, we believe the condition on checking RPLMN is sufficient as it does not let the UE forward in the procedures |
| Lenovo | Disagree | Agree with HW |
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In C327 it has been discussed that the CHO will not be executed for MobilityFromNR as the inter-RAT CHO is not supported in Rel-16 CHO feature, therefore, the *timeSinceCHO-Reconfig* is not available (S706 also provides a similar proposal). Similarly, for *choCandidateCellList,* it should be “failure handover” instead of “failure conditional handover”. Rapporteur agrees with changing the “failed conditional handover” to a failed handover. However, Rapporteur believes that the scenario of a UE being handed-over to LTE while being configured with CHO should be considered. This scenario has now been implemented in the rapporteur CR, so that the UE logs the time between receiving the last RRC Reconfiguration message including the CHO reconfiguration with sync until executing a normal HO (including mobility from NR) that is failed. 2> if configuration of the conditional handover is available in *VarConditionalReconfig* at the moment of the handover failure:

3> if the UE executed a conditional handover toward target PCell according to the *condRRCReconfig* of the target PCell:

4> set *timeSinceCHO-Reconfig* to the time elapsed between the execution of the last *RRCReconfiguration* message including *reconfigurationWithSync* for the target PCell of the failed conditional handover, and the reception in the source PCell of the last *conditionalReconfiguration* including the *condRRCReconfig* of the target PCell of the failed conditional handover;

3> else:

4> set *timeSinceCHO-Reconfig* to the time elapsed between the execution of the last *RRCReconfiguration* message including *reconfigurationWithSync* for the target PCell of the failed handover, and the reception in the source PCell of the last *conditionalReconfiguration* including the *condRRCReconfig*;

And specifically for Mobility from NR:

2> if configuration of the conditional handover is available in *VarConditionalReconfig* at the moment of the handover failure:

3> set *timeSinceCHO-Reconfig* to the time elapsed between the execution of the last *RRCReconfiguration* message including *reconfigurationWithSync* for the target PCell of the failed handover, and the reception in the source PCell of the last *conditionalReconfiguration* including the *condRRCReconfig*;

 In the case of Mobility From NR the UE performs a legacy HO and hence it can still log timeSinceCHOReconfig up to the moment of the failure

* Q9: [C327] Do companies agree to keep the current implementation that UE logs the timeSinceCHOReconfig for the scenarios that UE performs legacy handover (e.g., mobility from NR) while being configured with CHO configuration.

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| **Company** | **Agree/Disagree** | **Comments** |
| Qualcomm | Disagree | This was not agreed.  |
| Samsung | Disagree | Same view with Qualcomm. We assume that RAN2 has not discussed inter-RAT scenario at all. Thus, we do not support the proposal. |
| Ercisson | Agree | We think inter-RAT handover while the UE is configured with CHO configuration is the same scenario as UE being configured with CHO configuration and executing a normal/legacy HO. So it can be considered. |
| Apple | Disagree | Same view as Qualcomm and Samsung |
| OPPO | Disagree | Inter-RAT has not been discussed. Prefer to postpone to R18 |
| CATT | Disagree | The UE does not log the timeSinceCHOReconfig for the scenario that UE performs legacy handover (e.g., mobility from NR) while being configured with CHO configuration as no CHO execution occurs. |
| CMCC | No strong view | Agree the intention but maybe too late. |
| Huawei, HiSilicon | Disagree | Agree with the above companies with the same view. Besides, this will introduce the third definition for the timeSinceCHO-Reconfig and may be confusing for the network to know the real meaning. |
| Nokia | Disagree | RAN2 has already discussed and decided to postpone such combine handover cases (both CHO and HO command sent to UE). Also such logging defeats the purpose and can become confusing. CHO was configure but not executed, regular HO was executed instead. Postpone this discussion or define new timer, e.g. timeSinceCHOReconfigToHOexec  |
| Lenovo | Disagree | inter-RAT scenario is not agreed in R17  |
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**Conclusion**: **TBW**

In [E075] Ericsson has proposed that the *timeSinceFailure* as of now is not logged for the CEF report logged in the CEF report list while it is a mandatory IE that should be logged upon logging or reporting CEF report. Hence a solution should be accommodated in the procedural text to cover the existing gap in the CEF reporting. Therefore, rapporteur would like to ask companies to provide their view on the following identified solutions.

* Q10: [E075] Which of the following options do companies prefer on how the UE logs the timeSinceFailure in the case of CEF report list?
1. UE logs for each failure included in the CEF report list, the timeSinceFailure as the time between each failure (i.e., time between the current failure and the previous failure) in the CEF report list,
2. UE logs for each failure included in the CEF report list, the timeSinceFailure as the time between each failure and the time of reporting the whole CEF report list to the network (this is similar to the legacy procedure in which the timeSinceFailure is represented as the time elapsed between the failure and the reporting of the failure).

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| **Company** | **Option (a/b)** | **Comments** |
| Qualcomm | B | We do not want to change the definition of timeSinceFailure. There is no UE complexity issue in handling this. |
| Samsung | B | RAN2 has not discussed the time between failures in detail, e.g. considering use case.As in legacy, we prefer to have the time since failure for every CEF report in the CEF report list. |
| Ericsson |  | Both approaches work for us |
| Apple | B |  |
| OPPO | B | Agree with Qualcomm |
| CATT | B |  |
| CMCC | B |  |
| Huawei, HiSilicon | B |  |
| Nokia | B |  |
| Lenovo | B |  |
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**Conclusion**: **TBW**

Z406 and Z408 are related to the UE capabilities based inclusion of CHO and DAPS failure related information in the RLF report. This seems to be a straightforward implementation from the rapporteur’s point of view. However, it would be good to have an explicit agreement based on these RILs.

* Q11: [Z406, Z408] Do companies agree to update the procedural text to include CHO and DAPS related RLF report contents in the RLF report based on explicit UE capability information?

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| **Company** | **Agree/disagree** | **Comments** |
| Qualcomm | Agree |  |
| Samsung | Neutral | No strong opinion, but it seems not essential, i.e. anyway, UE will do based on its capability. |
| Ericsson | Neutral, see comment | We think all Rel 17 features are optional and hence there is no need to do such checked in every and each paragraph. Hence it may not needed to emphasis on it in every and each UE action in the procedural text. |
| Apple | Agree |  |
| OPPO | Agree  |  |
| CATT | Agree |  |
| CMCC | Neutral |  |
| Huawei, HiSilicon | Agree | We think both RILs are straightforward and reasonable. |
| Nokia | Neutral | Agree with Ericsson comment |
| Lenovo | Neutral |  |
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**Conclusion**: **TBW**

For H095, Huawei proposes to use network based solution. However, the RAN3 discussions have been for the SHR and based on the LS reply received in RAN2 and the agreements in RAN2, the current implementation seems to be correct.

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| From LS R2-2204405:  |

Of course, RAN2 can further change our specification if RAN3 agrees any network based solution for too early handover and too late handover related RLF cases as well.

* Q12: [H095] Do companies agree to stick to the agreement reached in RAN2#117, on the inclusion of CHO configuration in the RLF report for the case of too late CHO, unless a new LS is received from RAN3.

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| **Company** | **Agree/disagree** | **Comments** |
| Qualcomm | Disagree | RAN3 agreed to “Include candidate cell list and CHO execution condition(s) as optional in the SN STATUS TRANSFER message and HANDOVER REPORT message”.Therefore, the inclusion of CHO configuration in the RLF report for the case of too late CHO is not required, as the source is aware of too late RLF. We should minimize overhead over the air interface.  |
| Samsung | Disagree | We need not have CHO config in RLF Report, depending on RAN3 agreement. It would result in redundant signalling overhead. |
| Ericsson | Agree | Until RAN2 receives a new LS from RAN3, the status quo has not changed for the implementation. Thus, we feel that the specification should not changed under speculation about which scenarios might have been considered by RAN3 in their work.  |
| Apple | Disagree |  |
| OPPO | Agree | RAN3 states it is not mandatory for the source node keeps the UE context. |
| CATT | See comments | We understand the only scenario RAN3 supported is the UE executes handover successfully but RLF at target cell soon. During handover, the source node sends the CHO configuration related information to target node. In this case, the UE could not report the CHO configuration related information in RLF report as the target node has stored it. |
| CMCC | Agree | Share the view with Ericsson and CATT, no change is needed unless new RAN3 LS is received. |
| Huawei, HiSilicon | Disagree | Agree with Qualcomm and Samsung.For too late CHO RLF, the source node can realize RLF and store the CHO configuration as in legacy too late HO.For RLF in CHO target cell, in RAN3#114bis, they agreed that:**The Network-based solution is needed, e.g. for the case that an RLF occurred in CHO target cell after completing handover.** |
| Nokia | Agree |  |
| Lenovo | See comments | In case of too late CHO, if source node still stores CHO configurations, neither UE based nor RAN3 agreed NW based solution is needed. We can find that NW based solution agreed by RAN3 is especially for the case that a RLF occurred in CHO target cell after completing handover since the UE can’t include CHO configurations in RLF report for this case. Therefore, if UE context is released in source node, UE based solution can be used for CHOF case or too late CHO case. |
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**Conclusion**: **TBW**

For Z410, ZTE propose to extend the inclusion of *failedPSCellID* for the PSCell addition scenarios and restrict the inclusion of previousPSCellID to the PSCell change scenarios. Rapporteur would like to ask the companies their opinion on this topic.

* Q13: [Z410] As part of *SCGFailureInformation* logging, do companies agree to extend the inclusion of *failedPSCellID* for the PSCell addition scenarios and restrict the inclusion of previousPSCellID to the PSCell change scenarios.

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| **Company** | **Agree/disagree** | **Comments** |
| Qualcomm | Disagree | PSCell addition is always MN initiated. MN is always aware of PSCell addition failure if it happens. In the case of PSCell addition failure, MN can conclude failedPSCellID without including of cell ID in SCGFailureInformation.  |
| Samsung | Disagree | It’s a minor optimization. |
| Apple | Disagree |  |
| Ericsson | Agree | We think previousPSCellID is needed to be considered only for PSCell change scenario |
| CATT | Disagree |  |
| CMCC | Agree |  |
| Huawei, HiSilicon | Neutral | From RAN2 perspective, we think it is reasonable to consider the PSCell addition case. In addition, we think that there may be impacts to 37.340 and 38.300, and we are not sure whether there are RAN3 impacts. |
| Nokia | Disagree | Agree with Qualcomm |
| Lenovo | Neutral |  |
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**Conclusion**: **TBW**

In H074 it has been indicated that the user plane interruption time is not accurately covering all the possible scenarios e.g., when the UE didn’t receive any non-duplicated packet from the target RAN node. In order to address this issue, Rapporteur would like to ask companies to provide their view on the following options to capture the UPInterruptionTimeAtHO.

* Q14: [H074] RAN2 discuss what/if changes are needed to the current handling of the user plane interruption time, e.g.
	1. The UE includes the *upInterruptionTimeAtHO* only if a PDCP PDU was received from the source cell of the concerned HO, and a non-duplicated PDCP PDU was received from the target cell of the concerned HO
	2. The UE measure the time from the receiving last PDCP PDU packet in the source cell to the time of reporting *upInterruptionTimeAtHO*, if the UE did not receive any non-duplicated packet in the target cell.

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| **Company** | **Option (a/b)** | **Comments** |
| Qualcomm | A | B gives misleading information.  |
| Samsung | A | It is unclear if B is really time information to represent an interruption time (e.g. because of the time of reporting upInterruptionTimeAtHO).Thus, B is not in line with original motivation. |
| Apple | A |  |
| Ericsson | A | Agree with the above companies |
| CATT | A |  |
| CMCC | A |  |
| Huawei, HiSilicon | A | As rapporteur clarified in the summary paper, RAN2 didn’t cover the case that the UE hasn’t received non-duplicated DL packet. We agree option A to make the use case more clearly. |
| Nokia  | A |  |
| Lenovo | A |  |
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**Conclusion**: **TBW**

In NOKIA096, Nokia mentioned that from current procedural text it is not clear whether all the triggering conditions are applied to the DAPS HO or not. Rapporteur believes that SHR triggering conditions such as T304 threshold or T310 and T312 thresholds are not dependent to any HO type and hence are applicable to HO including the DAPS HO (namely, the specification does not preclude applying such thresholds to the DAPS HO). Hence rapporteur would like to ask companies whether they agree that no further changes are required in the specification

* Q15: [NOKIA096] Do companies agree that all the SHR triggering thresholds including T304, T310 and T312 thresholds are applicable to the DAPS HO, beside the sourceDAPS-FailureReporting (i.e., no changes to the current spec needed)?

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| --- | --- | --- |
| **Company** | **Agree/Disagree** | **Comments** |
| Qualcomm | Agree.  |  |
| Samsung | Agree |  |
| Apple | Agree |  |
| Ericsson | Agree |  |
| OPPO | Agree |  |
| CATT | Agree |  |
| CMCC | Agree |  |
| Huawei, HiSilicon | Agree |  |
| Nokia | Agree |  |
| Lenovo | Agree |  |
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**Conclusion**: **TBW**

In C326, CATT mentions that in SHR, the CHO candidate cells, those which were not logged as part of neighbor cell measurements, can be logged in CHOCandidateCellList, similar to the RLF report. Rapporteur believes there is no agreement to include the CHOCandidateCellList in the SHR report.

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| From RAN2#117:* Keep the CHO candidate cell list and the CHO configuration only in the RLF-Report (not in the SHR), as in the current running CR. This agreement can be revisit depending on RAN3 progress
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Hence Rapporteur would like to ask the companies the following question.

* Q16: [C326] Do companies agree to stick to the current agreement that the CHOCandidateCellList are not included in the SHR?

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| **Company** | **Agree/disagree** | **Comments** |
| Qualcomm | Agree (Revisit was not about revisiting if the CHO candidate cell list is added in SHR. It was about whether there is a need for including the candidate cell list and configuration in the RLF report) | We already agreed in the last meeting. Revisiting the agreement was about “whether we need to include CHO candidate cell list and the CHO configuration only in the RLF-Report “. As RAN3 has adopted a network-based solution, where they agreed to **“Include candidate cell list and CHO execution condition(s) as optional in the SN STATUS TRANSFER message and HANDOVER REPORT message”.“****We need to revisit whether there is still a need for reporting the candidate cell list and configuration in the RLF report.**  |
| Samsung | Agree |  |
| Apple | Agree |  |
| Ericson | Agree |  |
| OPPO | Agree |  |
| CATT | Disagree | If only the indicator that whether the neighbour cell is CHO candidate cell is included in SHR, the network will not get the full configured CHO target cells which could affect the network optimization. |
| CMCC | Neutral | Agree the intention, but maybe minor optimization.  |
| Huawei, HiSilicon | Agree | Although RAN3 discussed the NW-based solution only for CHO MRO, we believe it can naturally apply to the SHR case. Therefore, RAN2 is not needed to report the CHOCandidateCellList. |
| Nokia | Agree | Though we do not see harm to add it. |
| Lenovo | Agree |  |
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**Conclusion**: **TBW**

In H106, Huawei discusses that timeSinceCHOReconfig may not need to be set for the scenarios that RLF occurs and there is no CHO configuration. Rapporteur agrees with the scenarios, but believes that the current implementation already covers such scenarios as the current procedure says: “*if configuration of the conditional handover is available in VarConditionalReconfig at the moment of declaring the radio link failure*:”. Hence Rapporteur thinks no change is needed but RAN2 can confirm the scenario.

* Q17: [H106]: Do companies agree that *timeSinceCHOReconfig* will be logged when configuration of conditional handover is available in *VarConditionalReconfig* at the moment of declaring the radio link failure, or handover failure (i.e., no changes to the current spec)?

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| --- | --- | --- |
| **Company** | **Agree/disagree** | **Comments** |
| Qualcomm | Agree | Current implementation is sufficient. |
| Samsung | Agree |  |
| Apple | Agree |  |
| Ericsson | Agree | No change is needed |
| OPPO | agree |  |
| CATT | Agree |  |
| CMCC | Agree |  |
| Huawei, HiSilicon | Agree |  |
| Nokia | Agree |  |
| Lenovo | Agree |  |
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**Conclusion**: **TBW**

The RILs C322 an E076 highlight that the actions related to msg1 CBRA should be performed after the actions for msgA CBRA. That is because some fields should not be set again if their values are the same as the 2-step RA counterparts, e.g. the msg1-FrequencyStart should be set only if that is different than msgA-RO-FrequencyStart. This seems to require that the 2-step RA parameters should be set before the msg1 parameters. Hence rapporteur would like to ask the following question.

* Q18: [C322, E076] Do companies agree that setting of the 2-step parameters can be moved before the setting of the 4-step RA parameters.

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| **Company** | **Agree to move/disagree to move** | **Comments** |
| Qualcomm | Yes | As 2step RACH is performed first, therefore, the 2-step parameters should be set. We leave out common msg-1 parameters.  |
| Samsung | Agree |  |
| Apple | Agree |  |
| Ericsson | Agree | The procedural text would be clearer. Otherwise, it would be strange that when setting the msg1 related parameters the UE should check the values of the msgA parameters which however are not yet set. |
| OPPO  | AGREE |  |
| CATT | Agree |  |
| CMCC | Agree |  |
| Huawei, HiSilicon | Agree | The text that really matters is the content setting. The layout doesn’t affect or mess the filling in of 2-step or 4-step parameters. So it is optimized only for readability.  |
| Nokia | Agree | Yes, this is needed since 2-step RACH is first attempted |
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**Conclusion**: **TBW**

Related to H099, it is proposed whether to split into two if conditions the setting of the msg1-SubcarrierSpacing, wherein in the first “if” condition it is checked if msg1-SubcarrierSpacing is available, and in the second “if” condition it is checked if its value is different from the value of msgA-SubcarrierSpacing. Rapporteur´s view is that this seems to be a minor editorial correction.

* Q19: [H099] Do you see the need to split into two “if” conditions the setting of the msg1-SubcarrierSpacing, wherein in the first “if” condition it is checked if msg1-SubcarrierSpacing is available, and in the second “if” condition it is checked if its value is different from the value of msgA-SubcarrierSpacing.

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| **Company** | **Agree to split/Disagree to split (keep current spec)** | **Comments** |
| Qualcomm |  | We can recheck (the need for it) after making the changes corresponding to Q 18. |
| Samsung | Agree |  |
| Apple | Agree |  |
| Ericsson | Disagree | This seems just an editorial corrections that might not be necessary once the fix to Q18 is in place. |
| CATT |  | We can back to this question after the conclusion of Q18.  |
| CMCC |  | We can back to this question after the conclusion of Q18.  |
| Huawei, HiSilicon | Agree | Proponent. |
| Nokia | Disagree | Not sure if this editorial is needed. Agreeing to Q18 may resolve this issue |
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**Conclusion**: **TBW**

Related to the RIL H096, it is proposed to define a way to handle SN and MN RA-Report separately. However, rapporteur thinks this can be seen as an optimization and in addition the solution may require more discussion and decision. Hence given the limited time rapporteur would like to ask other companies view if they agree to postpone this topic.

* Q20: [H096] Do companies agree to postpone the discussion on designing the solutions for separately handling of SN and MN RA reports.

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| **Company** | **Agree/ Disagree** | **Comments** |
| Qualcomm | Agree | There is no need for separately handling of SN and MN RA reports.  |
| Samsung | Agree | We don’t think it’s beneficial. |
| Apple | Agree |  |
| Ericsson | Agree |  |
| OPPO | AGREE |  |
| CATT | Agree |  |
| CMCC | Agree |  |
| Huawei, HiSilicon | Disagree | Related to Q7. |
| Nokia | Agree | We don’t think that this is necessary. We can consider if separate handling brings any gains in Rel-18 |
| Lenovo | Agree |  |
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**Conclusion**: **TBW**

The RIL H070 and (also N026) points out that the UE experience a HO failure and if it was a CHO failure, the UE logs that the lastHO-type was a CHO failure. This has been agreed during the RIL implementation phase. However, one company wants to revisit this RIL mentioning that the agreement on including the last HO type is only made for the RLF. However rapporteur thinks inclusion of last HO type at the time of handover failure is beneficial as network may not know which handover type was executed e.g., CHO or a legacy HO. Hence rapporteur would like to ask the companies the following question:

* Q21: Do you agree that UE logs the last HO type when the UE experiences a reconfiguration with sync failure to distinguish the CHO form legacy HOs?

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| **Company** | **Agree/Disagree** | **Comments** |
| Qualcomm | Disagree | For CHO in the case of HoF, IEs in RLF are sufficient. Therefore, explicit indication is not required. Agreement to indicate DPAS-HO in the case of HoF was agreed only for DPAS HO. |
| Nokia | Agree | As CHO is one of the HO types, we understand it is natural to indicate the accurate type in the reporting |
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Concerning the RIL [H588] it has been pointed by ZTE that some of the SIBs are not supposed to be included in the RA report for the purpose of SI request procedure. Rapporteur believes since the Rel 17 features are not to be considered in the Rel 17 SON WI, it is appropriate to stick to this principle and exclude also the Rel 17 specified SIBs form RA-Report produced for the SI procedure. However, rapporteur would like to ask the following question.

* Q22: Which of the following options do you prefer?
	+ A) Exclude all the Rel 17 specified SIBs from the RA-Report generated for the SI request
	+ B) include all the Rel 17 specified SIBs in the RA-Report generated for SI request
	+ C) Include some specific SIBs, please indicate which ones

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| **Company** | **Agree with Option A, B, or C (if C please point specifically)** | **Comments** |
| Qualcomm | C | SIB 15, SIB 17 |
| Nokia | See comment | Usually, cross features implementation in RRC of a current release happens in a later release. More discussion is needed. |
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# Conclusions

**TBW**