3GPP TSG-RAN WG2 #113-e Tdoc DocNumber

Electronic meeting, January 25th – February 5th 2021

Agenda Item: 8.13.2.1

Source: Ericsson

Title: [AT113-e][887][NR/R17 SON/MDT]  Indication of candidate target cell (Ericsson)

Document for: Discussion, Decision

# 1 Introduction

This document captures the outcome of this email discussion:

* [AT113-e][887][NR/R17 SON/MDT]  Indication of candidate target cell (Ericsson)

- Based on the agreements that “In the RLF report for CHO, the UE includes of the latest radio measurement results. FFS: to indicate whether or not it is candidate target cell.”.

- Figure out the necessity of introducing the indication.

 Intended outcome: Agreeable WF

 Deadline: Thursday 04/02/2021

Companies inputs to this email discussion are appreciated by the 4th February 2021 1200 UTC.

Related to this topic, the following agreements has been reached in RAN2#113-e:

Agreements:

1 Include in the RLF report the “Time elapsed since CHO execution until connection failure”. How to convey this information is FFS. (email discussion 886, Qualcomm)

2 Reuse the following legacy timers in the RLF report also for CHO: timeUntilReconnection, timeSinceFailure.

3 In the RLF report for CHO, the UE includes of the latest radio measurement results. FFS: to indicate whether or not it is candidate target cell. (email discussion 887, Ericsson)

The objective of this email discussion is to clarify the following FFS: “to indicate whether or not it is candidate target cell”.

# 2 Discussion

In the email discussion [Post112-e][853][NR R17 SON/MDT] R17 Information needed in UE report for CHO cases (Ericsson) available in R2-2101451 (section 2.2 and section 2.3), majority of companies believed that it is beneficial to include the latest radio measurement results of the candidate target cells in the RLF-report. Hence the following question is asked:

**Q1: Do you see beneficial to include the latest radio measurement results of the candidate target cells in the RLF-report? Please provide also your explanation.**

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| **Company** | **Yes/No** | **Comments** |
| **Qualcomm** | Neighboring cell measurements should be sufficient. If target cell are best neighboring cell they will be reported by the UE in the neighboring cell measurements  | We believe that latest radio measurements of the candidate target cell can be part of the neighboring cell measurements. Furthermore, prioratizations of the candidate cell may not be needed, the network can use the configuration sent and obtained measurement to determine the radio measurements of the candidate target cells. Moreover, in our understanding, the network might be more be interested in knowing which cells are the best cells irrespective of whether they are part of candidate target cell list or not. |
| **oppo** | Yes  | The network needs to have candiate target cells in the RLF report to see if the candidate target cells were previously nominated well or not. |
| **vivo** | Yes | We need to discuss two issues separately.1. Firstly, whether the latest radio measurement results of the candidate target cells are needed. **(same as Q1)**
2. Secondly, how to make NW be aware of such information.

For issue a), we agree that the latest radio measurement results of the candidate target cells are needed, otherwise the NW cannot perform further optimization.For issue b), the controversial part is whether the neighboring cells would cover candidate target cells? If the answer is yes, then we don’t need to duplicate the measurement results, but if they are partially overlapped, it seems neccesarry to include the candidate target cells that are not covered by neighboring cells to the report. |
| **Lenovo&MM** | Yes | The measurement candidate cell may not included in current measurement result for the neighbor cell. If so, it is difficult for NW to optimize it.  |
| **Ericsson** | Yes | Radio measurements of candidate target cells are needed because that allows the network to figure out the radio qualities of the various candidate target cells. By knowing that, the network can for example exclude some cells from the list of candidate target cells, thereby reducing the resource wastage due to CHO.Whether the radio measurements of the candidate target cells and the radio measurements of the neighbouring cells should be in the same of different IE can be discussed later. |
| **Huawei,HiSilicon** | No | Agree with Qualcomm.The network mainly needs to know the most suitable cell(s) to optimize future CHO configurations. Clearly, if the candidate cells are not included, then they are less suitable than the list of cell which have been reported as UE anyway prioritizes the cells with the best measurement results to report. |
| **ZTE** | Yes | Share the view as majorities. |
| **Samsung** | Same view with Qualcomm |  |
| **CATT** | Maybe no | In our opinion, it seems redundant to report the latest radio measurements of the candidate target cell as it can be part of the neighbouring cell measurements. The list of candidate cells IDs can be included in RLF report to indicate the configured candidate target cells. |
| **Nokia, Nokia Shanghai Bell** | Neighbour cell measurements , optional flag to indicate which cell is CHO candidate  | It is our view that the Source cell still knows which cells were configured as CHO candidates and can extract and map the measurements from the RLF report.  A prioritization of candidate cell measurements would  potentially use up all the space in the RLF report  (        measResultNeighCells-r16 has a  maximum of 8 entries) and the network would not know which neighbor cells (if any) would have had an adequate radio quality. That is why we feel it is enough to report the neighbor cell measurements (as defined today) which can include both candidate and non candidate cells.  Optionally, a flag can be added to indicate which cell was a candidate cell ( for the case that Source cell no longer has the UE context).  If a candidate cell measurement is not part of the list, this is a clear indication that it was not a suitable candidate and other neighbor cells (which are included in the reported list) would have made for a better candidate.  |
| **Sharp** | Maybe yes | Agree with companies’ views that the measurements of candidate cells are useful to the network the further CHO configuration adjustment.  |
| **ITRI** | Yes | Including the latest measurement results of the candidate target cells in the RLF-report is beneficial for future CHO configutaiton optimization. With this information, network can see if a previously assigned candidate target cell is really a suitable candidate and if its execution condition is configured properly. |
| **CMCC** | Yes | Share the view with majorities. |

Rapporteur´s summary:

7/13 companies: Yes

1/13 companies: Maybe Yes

4/13 companies: No

1/13 companies: Maybe No

Given the above outcome, there is a majority of companies that prefer the UE including the latest radio measurement results of the candidate target cells in the RLF-report. However, since it is not a very large majority, Rapporteur proposes the following:

1. RAN2 tries to agree that the UE shall include the latest radio measurement results of the candidate target cells in the RLF-report.

The next question is on whether RAN2 sees beneficial to include indication of whether a cell measurement result included in the RLF-report is associated to a CHO candidate target cell or not.

Rapporteur notes that the answer to this question is strictly related to whether the source cell can keep the UE context for long time, i.e. at least until the RLF-report is sent, so that the network can retrieve the cell identities of the configured target cells and match them with the radio measurement results included in the RLF-report.

**Q2: Do you see beneficial to include an indication indicating whether a neighbor cell, included as part of neighbor cell measurement result, is associated to a CHO candidate target cell or not? Please provide your explanation**

* **Option 1: Yes**
* **Option 2: No**
* **Option 3: Wait for RAN3 to confirm whether the source cell can keep the UE context, at least up to the point the RLF-report is received by the source cell**

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| **Company** | **Preferred Option** | Comments |
| **Qualcomm** | Option 3  | Wait for RAN3. |
| **oppo** | Option 1 | In our opinion, it is very hard to say when the RLF-report could be received by the source gNB. Note that it is up to gNB implementation to decide whether to retrieve the RLF report from the UE or not, even though the rlf-InfoAvailable-r16 was set as true. Frankly, the UE might experience several times of handover before the RLF-report bing retrieved by the network via air interface at the end. Therefore, it is also hard to say how long time should the source gNB store the UE context, especially in cases there are lots of UE camping/accessing to the source gNB. |
| **vivo** | Option 3 | We understand oppo’s concern, but still would like to wait for RAN3 progress. |
| **Lenovo&MM** | Option 3 | Wait for RAN3 progress. |
| **Ericsson** | Option 1/3 | Considering that there is no constraint on when the RLF-report may be received by the network, it is very hard to assume that the source cell stores all the UE contexts for an in principle undefined amount of time.We are anyhow ok to wait for more RAN3 progress on this issue.  |
| **Huawei,HiSilicon** | Option 3 | Wait for RAN3. |
| **ZTE** | Opation 1/3 | Currently it is not required for NW to maintain the UE context after HO. Therefore assist information is needed for NW to know whether the collected neighboring cell measurements relates to candidate cell. But we are also fine to wait for RAN3’s progress. |
| **Samsung** | Option 3 | Depending on RAN3 input, we may need nothing |
| **CATT** | Option 1, with comments | First of all we don’t need to wait for R3 conclusion. R2 can go on with the discussions as the design itself shall not assume source cell stored everything even after a rather long time. Secondly although we think Option 1 is on the right direction of providng some indication info regarding whether the measurements are for CHO candidate or not, it is not sufficient. We think there is a need to also indicate a CHO ‎candidate target cell not included in the neighbour cells measurement. ‎This is a scenario that is likely to occur due to the ‎inappropriate network configuration of candidate target ‎cells. Therefore, the list of candidate cells IDs need to ‎be included in RLF report. If the network receives the RLF ‎report and finds that some candidate target cells are not ‎included in neighboring cells measurement, the network ‎may not configure these cells as candidate target cells ‎next time.‎ |
| **Nokia, Nokia Shanghai Bell** | Option 3 | Whether or not the Source cell still has the UE context can make a difference in what we need to log in the RLF report. |
| **Sharp** | Option 1 | We understand that the assumption of current design of RLF-report is there is no restriction when the source node will retrieve the RLF-report, i.e. we do not assume there is always UE context at the source node. But we are also fine to wait for RAN3’s confirmation if companies have concern.For how to implement option 1, we share CATT’s view. |
| **ITRI** | Opation 1/3 | If the network knows which measurement results are associate to CHO candidates, future configuration can be adjusted accordingly. In our understanding, there is no restriction on when network retrieves the RLF report from UE, so it may not be possible to assume that the network keeps all UE contexts upon reception of RLF report. However, we are fine to wait for RAN3’s progress and comments. |
| **CMCC** | Option 1 | We don’t think R3 can give us answer, since it is up to gNB’s implementation.  |

Rapporteur´s summary:

Option 1: 7/13

Option 2: 0/13

Option 3: 9/13

Given the above outcome, the common ground is to wait for RAN3 progress to confirm whether the source cell can keep the UE context, at least up to the point the RLF-report is received by the source cell.

1. Before agreeing on including an indication indicating whether a neighbor cell, included as part of neighbor cell measurement result, is associated to a CHO candidate target cell or not, RAN2 waits RAN3 to confirm whether the source cell can keep the UE context, at least up to the point the RLF-report is received by the source cell.

# 3 Conclusion

Based on the discussion in the previous sections we propose the following:

[Proposal 1 RAN2 tries to agree that the UE shall include the latest radio measurement results of the candidate target cells in the RLF-report.](#_Toc63345771)

[Proposal 2 Before agreeing on including an indication indicating whether a neighbor cell, included as part of neighbor cell measurement result, is associated to a CHO candidate target cell or not, RAN2 waits RAN3 to confirm whether the source cell can keep the UE context, at least up to the point the RLF-report is received by the source cell.](#_Toc63345772)