**3GPP TSG-RAN RAN2 #121 R2-23xxxxx**

**Athens, Greece, 27th Feb – 3rd Mar, 2023**

**Agenda Item:**  **8.13.6 RACH enhancement**

**Source: Huawei (email rapporteur)**

**Title:** **Pre-meeting summary of 8.13.6 Report of [AT121][803][R18 SONMDT] RACH enhancement (Huawei)**

**Document for: Discussion and Decision**

# 1 Introduction

This is the email report of [AT121][803].

* **[AT121][803][R18 SON/MDT] RACH enhancement (Huawei)**

Discussion on proposal 5 in R2-2301923

Intended outcome: Report in R2-2302069

Deadline: 23:23 Athens local, Thursday March 2nd

Companies providing input to this email discussion are requested to leave contact information below.

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# 2 Discussion

## 2.1 Background

In the LS [1], it mentions the following:

*RAN3 believes that if RAN2 decides to support SN RA Report for EN-DC and (NG)EN-DC, the UE should report the PSCell identity outside the RACH report to help an eNB forward the report to the correct node without the need to decode the RACH report.*

During online discussions at RAN2#121, RAN2 made the following agreement:

1: To have “a list of SN RA report entries as a single NR container (i.e. NR RA-ReportList)”.

=> It is not supported in R18 that UE reports NR RACH Report to LTE cell when the UE is in standalone LTE.

This email scope is about the discussion on proposal 5 in R2-2301923 [2]:

**Proposal 5: For P3, if “a list of SN RA report entries as a NR container (i.e. NR *RA-ReportList*)” is selected, regarding how UE sets the list of PSCell identities, RAN2 to discuss the following alternatives:**

* **Alt 2a: List all PSCell identities that occur in *RA-ReportList***
* **Alt 2b: List unique PSCell identities, i.e. if a PSCell occurs more than once in *RA-ReportList*, it is recorded only once in the list of PSCell identities**

During online discusisons, one alternative is added, i.e. alt 2c, list the last PSCell identity (in *RA-ReportList*). So it is proposed to discuss these alternatives, and see if RAN2 can reach some consensuses.

## 2.2 Discussion on how UE sets the list of PSCell identities

The following alternatives are provided:

* **Alt 2a: List all PSCell identities that occur in NR *RA-ReportList***
* **Alt 2b: List unique PSCell identities, i.e. if a PSCell occurs more than once in NR *RA-ReportList*, it is recorded only once in the list of PSCell identities**
* **Alt 2c: List the last PSCell identity (in NR *RA-ReportList*)**

For Alt 2a and Alt 2b, the email rapporteur understands that LTE MN can receive the PSCell identities plus a single NR container, and then LTE MN can transfer them to the corresponding PSCells. The drawbacks may be that some unnecessary information may be transferred.

For example, if there are PSCell 1, 2 and 3 in NR *RA-ReportList*, and LTE MN transfers the NR *RA-ReportList* to PSCell 1, 2 and 3 separately. From PSCell 1 perspective, only one RA report (related to PSCell 1) is valid and the other two RA reports may be discarded.

For Alt 2c, the email rapporteur understands that LTE MN can receive the last PSCell identity plus a single NR container, and LTE MN transfers the container to that PSCell. The PSCell can decode the NR container, and then distribute the RA reports to other PSCells.

For example (the same assumption as above), if the last PSCell is PSCell 3, LTE MN only transfers the NR *RA-ReportList* to PSCell 3, and then PSCell 3 can transfer one RA report to PSCell 1 and one RA report to PSCell 2.

**Q1: Which of alternatives is preferred? Please provide your comments if any, e.g. pros/cons, new alternative, potential impacts to RAN3.**

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| **Company** | **Alt 2a/2b/2c** | **Comments** |
| CATT | 2b | Since it is agreed to have “a list of SN RA report entries as a single NR container, it is not necessary to provide duplicated PSCell IDs to the network. And in our understanding, Alt 2c will introduce much RAN3 complexity, the last PSCell has no duty to decode the NR container and then distribute the RA reports to other PSCells. |
| ZTE | Alt2a/2b, 2a preferred, but RAN3 shall be consulted | Our understanding on RAN3’s LS is to include the PSCell identities lists, therefore we prefer to list all PSCell identities associated to the RA-reportList included in the container since the last PSCell identity might not be the SN that is currently used by MN. However, considering different options may lead to different forwarding between NW interface, it is unclear whether NW shall continue forwarding the RA report that is irrelevant or discard it.  Also to allow receiving gNB to locate the lists that is relevant prefer to have all PSCell identities list to allow one-to-one mapping.  However, we shall further check with RAN3 so that they can have further discussion on the intended NW behavior. |
| Xiaomi | 2b | For 2a, we have not seen much benefits to have Uu signalling cost on the duplicate PScell identity outside of RA-reportList.  For 2c, we have no strong view on this, but it needs further check by RAN3 on the complexity of network behaviour. |
| Lenovo | Alt 2b | Alt 2b can reduce Uu signalling overhead compared with Alt 2a, and from NW point of view, it is clear and straightforward for the receiving node to transfer the RA report to the corresponding SN node separately. |
| Huawei, HiSilicon | Alt 2b | Between Alt 2a and Alt 2b, we think the NW side may have the same behaviour, and Alt 2b is better from Uu signalling overhead point of view.  For Alt 2c, as some companies explained, there may need some co-ordinations beween network nodes, and if there are some supports on Alt 2c in RAN2, we can check with RAN3 on the feasibility/impacts. |
| Samsung | 2b | It is quite possible that the eNB doesn’t have a Xn interface to the last PSCell or is unable to send the SN RACH report to the last PSCell. So a list of PSCell identities could be helpful, not to lose the SN RACH report. |
| Qualcomm | 2c | We provided technical arguments for why only last NR Cell identity is sufficient.  We are not okay with 2a/2b unless it is checked with RAN3 first. |
| Sharp | 2b or 2c(if feasible) | Recording the same PSCell ID multiple times is not needed, so Alt 2b is preferred compared with Alt 2a.  For Alt 2c, we are not sure if it is feasible as concerned by other companies, should consult RAN3 for the feasibility of Alt 2c, if RAN3 confirms 2c is feasible, we are also ok with 2c. |
| Nokia | 2b or 2c | As the use of the provided PSCell identity or identities depends on RAN3, RAN3’s preference should have a priority over RAN2’s preference. |
| ITRI | 2b, or 2c if feasible | In comparison with 2a, we prefer 2b as it introduces less Uu signalling overhead.  For 2c, we have no strong view but wonder if it is feasible and if it introduces much RAN3 complexity. We should consider RAN3’s comments. |
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The email rapporteur thinks that this discussion may need some co-ordinations between RAN2 and RAN3, because companies in RAN2 have slightly different understandings on the requirement from RAN3, and some of above alternatives may have RAN3 impacts.

**Q2: For alternatives listed in Q1, do companies agree to send a LS to RAN3 to check their preferences?**

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| **Company** | **Yes/No** | **Comments** |
| CATT | Yes | Especially if 2c is supported by majority in RAN2, we have to ask RAN3 for identification. |
| ZTE | Yes |  |
| Xiaomi | Yes | If we have no decision on the above alternatives, anyway we need to consult with RAN3 as it is requested by RAN3 and the complexity is mainly in the network interface exchange. |
| Lenovo | Yes |  |
| Huawei, HiSilicon | Yes | We support to send a LS to RAN3, and the content/actions can be further discussed (related to Q1). |
| Samsung | Yes |  |
| Qualcomm | Yes | Some clarification is needed from RAN3. In our view, solution 3 works properly.  In the LS, we should also include our agreement that  To have “a list of SN RA report entries as a single NR container (i.e. NR RA-ReportList)”. |
| Sharp | Yes |  |
| Nokia | Yes | In the LS it should be clarified that all options are feasible from RAN2 perspective, and RAN3 could select any of them independently RAN2’s preference. |
| ITRI | Yes | RAN3’s comments are needed. |
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# 3 Conclusion

[To be added]

# 4 Reference

[1] R2-2211164/R3-226053, Reply LS on SN RACH report status in R17, Source: RAN3, To: RAN2

[2] R2-2301923 Report of [Pre120][XXX][R18 SON/MDT] RACH enhancement Huawei