3GPP TSG-RAN WG2 Meeting #113bis Electronic R2-2104332

Elbonia, April 12 – April 19 2021

**Agenda item: 8.3.3**

**Source: Nokia (RAN2 VC)**

**Title: Summary of [AT113bis-e][231][MUSIM] Impacts of NAS-based busy indication (RAN2 VC)**

**WID/SID: LTE\_NR\_MUSIM-Core - Release 17**

**Document for: Discussion**

# 1 Introduction

This document is the report of the following email discussion:

* [AT113bis-e][231][MUSIM] Impacts of NAS-based busy indication (RAN2 VC)

Scope:

* + - Discuss whether the agreement to only support NAS-based busy indication creates issues with SA2/CT1 and determine whether LS needs to be sent to SA2/CT1.
    - If needed, provide draft LS to SA2/CT1 asking them for feedback

Intended outcome:

* + - Discussion summary in [R2-2104332](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2104331.zip) (by email rapporteur) and (if needed) draft LS in [R2-2104333](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_113bis-e/Docs/R2-2104331.zip)

Deadline for providing comments and for rapporteur inputs:

* + - Initial deadline (for companies' feedback): 2nd week Mon, UTC 1200
    - Initial deadline (for rapporteur's summary): 2nd week Mon, UTC 1600

Note that this email discussion was declared the day after online session as per following session notes made by the session chair (RAN2 VC, rapporteur of this discussion):

* [200] It was raised that this decision may have unforeseen impacts to SA2/CT1 so session chair declared email discussion [231] to attempt to clarify those.
* [200] discuss over email [231] what are the consequences of this decision, and if there are issues to ask from SA2/CT1, provide a draft reply LS.

# 2 Background

The following was decided in RAN2#113bis-e BO1 online session on Tuesday April 13th:

Agreements

1 Only support NAS-based busy indication (for IDLE and INACTIVE)

The agreement was made after a long debate on whether RAN2 would like to define RAN-based indication for INACTIVE (in contrast to NAS-based indication for IDLE). The discussion had also other alternatives such as 1) using RAN-based paging, 2) using RAN-based paging but allowing UE not to send busy indication in case it cannot do so (e.g. in case of emergency calls), and 3) not specifying busy indication for INACTIVE. Finally the discussion converged to a view that reusing NAS-based signalling could be sufficient as it 1) aligns behaviour in IDLE and INACTIVE (and thus both states support the procedure) and 2) there is only one procedure to consider for busy indication (which minimizes RAN2/SA2/CT1 effort).

**Observation 1:** The intent of the agreement was to minimize RAN2/SA2/CT1 work while support busy indication in INACTIVE.

After the session, some discussion ensued over reflector on whether this would impact SA2/CT1 since the busy indication would be delivered via Service Request, which may not currently support INACTIVE mode. Therefore, either that cannot be used or the same procedure as used for IDLE mode (which uses Service Request) cannot be used, which is contrary to the original intent of aligning procedures for IDLE and INACTIVE to save specification effort.

**Observation 2:** If the SA2/CT1 busy indication behaviour for IDLE cannot be reused for INACTIVE, the intent of the agreement may not be fulfilled.

Therefore, it should be understood whether the agreement makes sense or not. As RAN2 cannot say how much impact there would be to SA2/CT1, and LS would be necessary almost no matter which way the discussion goes.

**Observation 3:** Regardless of the actual procedure for busy indication in INACTIVE, RAN2 should send LS to SA2/CT1 to inform them of the decision and ask whether it poses any issues to them.

The following section then discusses the way forward in RAN2 with the agreement for using NAS-based busy indication for INACTIVE.

# 3 Discussion

There are at least the following three aspects to consider in this discussion:

1. Is it clear that the current agreement will pose issues to SA2 and CT1 (at least in its current form)?
2. Are there any ways to mitigate the technical concerns raised by some companies?
3. If LS is sent to SA2/CT1, what should be indicated and/or asked?

First, RAN2 should be clear on what the most important issues related to the agreement are: So far the issue raised was that Service Request cannot be sent in INACTIVE or CONNECTED, so using that for busy indication (as in IDLE) would require some changes in CT1 for Service Request. Companies should detail these expected issues in the table below and indicate if they disagree with some of the issues, and if new issues are found, those should be added.

**Question 1**: What are the potential issues the decision to use NAS-based busy indication in INACTIVE causes to SA2/CT1?

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| Answers to Question 1 | | |
| Description of potential SA2/CT1 issue | Agree [company] | Disagree: Why? [Company]: [Reason] |
| Service Request cannot be sent in INACTIVE or CONNECTED, so using that for busy indication (as in IDLE) would require some changes in CT1 for Service Request | Qualcomm/OPPO. Just to clarify that SR can be sent in 5GMM Connected mode but only for establishing UP resources for PDU sessions or for emergency services fallback. It can’t be sent in response to a paging otherwise. Also note that for CN, both RRC Inactive and RRC Connected are 5GMM Connected. |  |
| **Reason1**: SR can be sent in 5GMM Connected mode but only for establishing UP resources for PDU sessions or for emergency services fallback. It can’t be sent in response to a paging otherwise. Also note that for CN, both RRC Inactive and RRC Connected are 5GMM Connected (PS: Copy from QC comments).  **Reason2:** NAS should get the notification from AS every time receiving RAN paging, but in current spec, NAS is only informed of the RRC connection resumption upon receiving *RRCResume* message.  **3.13.4 Reception of the *RRCResume* by the UE**  The UE shall:  *Omit something here:*  1> enter RRC\_CONNECTED;  1> indicate to upper layers that the suspended RRC connection has been resumed; | OPPO  If reason2 is identified also, both CT1/SA2/RAN2 impact is foreseen. AS should indicate to NAS that RAN paging is receiving every time UE AS receiving RAN paging. |  |
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| EXAMPLE ISSUE: CAN'T USE SERVICE REQUEST IN CONNECTED | COMPANY1, COMPANY2 | COMPANY3: NOT RELEVANT FOR THIS WI  COMPANY4: ISSUE DESCRIPTION IS WRONG |

**Summary 1**: The following potential issues were identified:

* TBA1
* TBA2
* TBA3

**Proposal 1**: TBA

Next, it should be considered whether there are ways to mitigate any of these potential issues.

**Question 2**: Are there any ways to mitigate the issues that RAN2, SA2 and CT1 might face with the decision to use NAS-based busy indication for INACTIVE?

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| Answers to Question 2 | |
| Company | Proposed way to mitigate RAN2, SA2 or CT1 issues with NAS-based busy indication |
| Qualcomm | The only way seems to be to add a new trigger in CT1 specs for sending the Service Request in CN Connected mode. |
| OPPO | If NAS based busy indication is agreed, both CT1 and RAN2 should change the spec, no easy way to go. For CT1, new trigger is needed in CT1 specs for sending the Service Request in CN Connected mode. For RAN2, upon receiving RAN paging, a RAN paging indication should be sent to NAS. |
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**Summary 2**: The following ways to mitigate the identified potential issues are raised:

* TBA1
* TBA2
* TBA3

**Proposal 2:** TBA

Finally, it should be understood that if we send an LS to SA2/CT1, which should be included in it? I.e. what are the most important questions to ask, and what will need further time in RAN2 to be resolved.

**Question 3**: What are the questions that an LS to SA2/CT1 should ask?

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| Answers to Question 3 | | |
| Question to ask from SA2/CT1 | Agree [company] | Disagree: Why? [Company]: [Reason] |
| Service Request cannot be sent in INACTIVE or CONNECTED, so using that for busy indication (as in IDLE) would require some changes in CT1 for Service Request | Qualcomm (with the explanation in Q1)  OPPO (Agree QC) |  |
| Can a new trigger be introduced for sending SR in 5GMM Connected mode in response to RAN paging for busy indication? This is assuming that AS will deliver the necessary trigger reason to NAS upon reception of RAN paging. | Qualcomm  OPPO(Agree QC) |  |
| Are there any other impacts to NAS procedures other than the new trigger for this purpose? For example, can the new busy indication for CN paging in Idle mode be also used for RAN paging? | Qualcomm |  |
| Once NAS makes the decision to not send the busy indication, should NAS inform the decision to AS to stop the AS RAN paging response? | OPPO |  |
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| EXAMPLE QUESTION: HOW DIFFICULT WOULD IT BE TO MODIFY SERVCE REQUEST SO THAT IT CAN BE SENT IN RRC\_INACTIVE? | COMPANY1, COMPANY2 | COMPANY3: NOT RELEVANT QUESTION  COMPANY4: SEE BETTER WORDING FOR QUESTION BELOW |

**Summary 3**: The following ways to mitigate the identified potential issues are raised:

* TBA1
* TBA2
* TBA3

**Proposal 3:** TBA

Finally, in case there are proposals on how to better resolve the matter of busy indication for INACTIVE, those can still be indicated here. However, note that the bar is high on reverting the decision so any proposals should be based on technical analysis. Therefore, the responses to this question should build on top of the responses provided to the previous question(s).

**Question 4**: Are there better ways to resolve the busy indication for INACTIVE?

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| Answers to Question 4 | |
| Company | Alternative ways to resolve the busy indication + why they are better |
| Qualcomm | The other alternative, as discussed, is to use the Resume procedure or not to have any busy indication for RAN paging. We can discuss these options if SA2/CT1 respond negatively on RAN2 request for a new trigger. |
| OPPO | The same view with Qualcomm. |
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**Summary 4**: The following ways to mitigate the identified potential issues are raised:

* TBA1
* TBA2
* TBA3

**Proposal 4:** TBA

# 4 Conclusion

A total of **N** companies provided responses to the discussions. The proposed conclusions are:

**Proposal 1:** TBA

**Proposal 2:** TBA

**Proposal 3:** TBA

**Proposal 4:** TBA

# Annex – Contact Points

Respondents to the email discussion are kindly asked to fill in the following table.

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| --- | --- | --- |
| Company | Name | Email Address |
| RAN2 VC (Rapporteur) | Tero Henttonen | tero.henttonen@nokia.com |
| OPPO | Jiangsheng Fan | fanjiangsheng@oppo.com |
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