**3GPP TSG-RAN WG2 Meeting #118-e Draft R2-2206363**

**Online, 9 – 20 May 2022**

**Agenda item: 6.3.2**

**Source: Samsung**

**Title: Report of [AT118-e][234][MUSIM] UE behavior for NAS-based busy indication in RRC\_INACTIVE (Samsung)**

**Document for: Report**

# 1 Introduction

This document is the report of the following offline discussion:

* [AT118-e][234][MUSIM] UE behavior for NAS-based busy indication in RRC\_INACTIVE (Samsung)

      Scope: Discuss how to capture NOTE about INACTIVE UE behaviour if it rejects RAN paging in 38.331 and come up with CR for this.

Intended outcome: Discussion report in [R2-2206363](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2206363.zip) and agreeable CR in [R2-2206169](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2206169.zip).

* Comment deadline: Wednesday W2, 0400 UTC (for collecting views)
* Rapporteur proposals: Wednesday W2, 0800 UTC (proposed resolution of issues)
* Document deadline: Wednesday W2, 1600 UTC (report or agreed CRs)
  + No extensions to this deadline for regular discussions. Discussions handling CRs may continue to short post-meeting email (based on chair decision).

# 2 Contact information

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| Company | Name | Email address |
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# 3 Discussion

RAN2 made the following agreement on INACTIVE UE behavior for NAS-based busy indication:

[R2-2205762](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205762.zip) Clarification on UE behavior for NAS-based busy indication in RRC\_INACTIVE Samsung Electronics Co., Ltd discussion Rel-17 LTE\_NR\_MUSIM-Core [R2-2202239](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2202239.zip)

*Observation 1: According to SA2 specification, IDLE UE may not send NAS-based busy indication even if it decides to reject the paging due to UE implementation constraints.*

*Observation 2: Current procedure text in the running RRC CR may mislead for UE to always resume RRC connection to accept or reject the RAN paging.*

*Proposal 1: Confirm that INACTIVE UE may not send NAS-based busy indication even if it decides to reject the RAN paging due to UE implementation constraints as in IDLE UE.*

*Proposal 2: If Proposal 1 is agreeable, RAN2 to discuss whether to capture it in the minutes or a note in the specification.*

- ZTE thinks if UE rejects RAN paging it should send Service Request, so would send busy indication. This could impact CT1 specification. QC disagrees and thinks this is up to UE implementation. This we could capture this. OPPO thinks this was not discussed before but can accept this. Nokia thinks sending busy it's still possible. MTK, LGE, Apple, Huawei, DENSO, Lenovo support P1. ZTE thinks that if NAS tells UE to go to CONNECTED, AS will follow.

- QC clarifies CT1 specs says this: " Upon being paged by the network, the Multi-USIM UE in CM-IDLE state attempts to send a Service Request message to this network including the Reject Paging Indication, unless it is unable to do so, e.g. due to UE implementation constraints." Samsung thinks INACTIVE UE is in CM-CONNECTED so this may not be sufficient. vivo thinks we could add a NOTE. Ericsson thinks NOTE is informative but procedural text would be different so would prefer procedural text. Intel agrees that strictly speaking this is correct but since AS-NAS interaction is not specified NOTE could be sufficient. Ericsson thinks we could add "as specified elsewhere" or similar. ZTE thinks for INACTIVE, CT1 specification says that if UE rejects RAN paging, it still sends Service Request.

* Capture NOTE about INACTIVE UE behaviour if it rejects RAN paging in 38.331. Can discuss exact wording for the NOTE offline. Should refer to CT1 specifications.

During the online discussion on May 10th 2022, it was pointed out [4] that according to CT1 specification [6] if MUSIM UE decides to reject the RAN paging, the UE **SHALL** initiate the service request procedure (aka NAS-based busy indication) i.e. see the relevant text below:

If the UE in 5GMM-CONNECTED mode with RRC inactive indication receives an indication from the lower layers about RAN paging and the MUSIM UE decides to reject the RAN paging, the UE shall initiate the service request procedure and set request type to "NAS signalling connection release" in the UE request type IE and service type to "signalling" in the SERVICE REQUEST message as specified in subclause 5.6.1.2 for case o of subclause 5.6.1.1. The UE may include its paging restriction preferences in the Paging restriction IE in the SERVICE REQUEST message as specified in subclause 5.6.1.2 for case o of subclause 5.6.1.1.

NOTE 3: The interworking between the NAS layer and the AS layer triggered by RAN paging is up to UE implementation.

But rapporteur's understanding is that the AS-NAS interaction for RAN paging reception is up to UE implementation as clarified in above NOTE. In other words, there seems no requirement for UE AS to always forward an indication about RAN paging to the upper layers if MUSIM UE decides to reject the RAN paging. Additionally the intent of this whole discussion is to check whether the UE SHALL always resume the RRC connection irrespective of whether it accepts or rejects the RAN paging according to the current RRC specification as mentioned in [1, 2, 3].

Thus, before discussing exact wording on the NOTE in our specification, it would be good to reach common understanding in RAN2 whether INACTIVE UE may not be able to send a Service Request message to the network including the Reject Paging indication as a response to the RAN paging due to UE implementation constraints.

**Q1: Which of the following options do you agree for INACTIVE UE behavior if it rejects RAN paging?**

* **Option 1:** **INACTIVE UE may not be able to send a Service Request message to the network including the Reject Paging indication as a response to the RAN paging due to UE implementation constraints**
* **Option 2: INACTIVE UE shall send a Service Request message to the network including the Reject Paging indication as a response to the RAN paging**

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| Company | Option 1/ Option 2 | Comments (if any) |
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Summary:

If the outcome of Q1 is Option 1, it seems necessary to discuss how to capture NOTE about INACTIVE UE behaviour if it rejects RAN paging in TS 38.331. Rapporteur would like to take the proposed TP in [3] as a baseline and suggest the following note in 38.331 i.e.

#### 5.3.2.3 Reception of the *Paging* *message* by the UE

Upon receiving the *Paging* message, the UE shall:

…

1> if in RRC\_INACTIVE, for each of the *PagingRecord*, if any, included in the *Paging* message:

2> if the *ue-Identity* included in the *PagingRecord* matches the UE's stored *fullI-RNTI*:

3> if the UE is configured by upper layers with Access Identity 1:

4> initiate the RRC connection resumption procedure according to 5.3.13 with *resumeCause* set to *mps-PriorityAccess*;

3> else if the UE is configured by upper layers with Access Identity 2:

4> initiate the RRC connection resumption procedure according to 5.3.13 with *resumeCause* set to *mcs-PriorityAccess*;

3> else if the UE is configured by upper layers with one or more Access Identities equal to 11-15:

4> initiate the RRC connection resumption procedure according to 5.3.13 with *resumeCause* set to *highPriorityAccess*;

3> else:

4> initiate the RRC connection resumption procedure according to 5.3.13 with *resumeCause* set to *mt-Access*;

NOTE: If a MUSIM UE in RRC\_INACTIVE decides not to accept the *Paging* message, it may not initiate the RRC connection resumption procedure, e.g. due to UE implementation constraints as specified in TS 24.501 [23].

Note that from rappporteur's understanding similar note needs to be specified in TS 36.331 as well i.e. only difference seems the CT1 specification order.

**Q2: Do you agree to capture above NOTE in TS 38.331/TS 36.331? If not, please suggest detailed wording for the NOTE.**

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| Company | Agree/disagree | Comments (if any) |
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Summary:

For any other questions not covered above, please feel free to indicate them into the following table.

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| Company | Discussion points | Comments |
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Summary:

# 4 Conclusion

TBD

# 5 Reference

[1] R2-2205762 Clarification on UE behavior for NAS-based busy indication in RRC\_INACTIVE Samsung Electronics Co., Ltd discussion Rel-17 LTE\_NR\_MUSIM-Core R2-2202239

[2] R2-2205542 Specifying UE behaviour for Paging cause for RAN based Paging Intel Corporation discussion Rel-17 LTE\_NR\_MUSIM-Core

[3] R2-2205173 UE behaviour for NAS busy indication in RRC\_INACTIVE Huawei, HiSilicon discussion Rel-17

[4] R2-2205336 Further Consideration on the Inactive State Busy Indication ZTE Corporation, Sanechips discussion Rel-17 LTE\_NR\_MUSIM-Core

[5] R2-2204617 Paging cause handling for RRC-INACTIVE Nokia, Nokia Shanghai Bells discussion Rel-17

[6] 3GPP TS 24.501 Non-Access-Stratum (NAS) protocol for 5G System (5GS); Stage 3; Release 17