3GPP TSG-RAN WG3 Meeting #111-e [R3-2xxx](file:///C:\Users\Administrator\AppData\Local\Microsoft\Users\Administrator\AppData\Local\Microsoft\Windows\INetCache\Content.Outlook\HJUWF7CB\Inbox\R3-206924.zip)x

**E-meeting, 25 January – 4 February 2021**

Agenda Item: 30

Source: vivo(moderator)

Title: Summary of Offline Discussion on CB #18\_Basket\_USIM

Document for: Approval

# Introduction

**CB: # 18\_Basket\_USIM**

**- Introduce Paging Cause to support multi-USIM devices? Which network interfaces are impacted?**

**- No S1AP impact for EPS paging collision?**

**- If consensus, capture any general principles / descriptions / open issues / WA / agreements for upcoming RAN3 work (to be captured in Chair’s Notes)**

**- Avoid too much discussion on details unless there is full agreement**

(Vivo - moderator)

Summary of offline disc

# For the Chairman’s Notes

**To be added after email discussion.**

# Discussion

In RAN3#111e, two discussion papers are submitted [1][2]. This offline would like to make some consensus based on these two discussion papers.

## Signaling support for paging cause

At RAN3#110-e meeting, RAN3 has also begun discussion on the feasibility of paging cause with following agreements:

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| **A1:** From RAN3 point of view, it is feasible to include paging cause over network interfaces, assuming that the size of paging cause is limited. The final decision about whether to introduce paging cause can be decided by other groups. |

And SA2 has approved a new WID [3] at the last SA2 meeting with following objective:

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| The objective is to specify enhancements to 5GS and EPS functionality and procedures for the following aspects:  - A single paging cause with the meaning of “voice” for both EPS and 5GS according to the conclusions in TR 23.761 clause 8.1.  - NAS Busy Indication for both EPS and 5GS in RRC\_IDLE mode according to the conclusions in TR 23.761 clause 8.1.  - Enabling paging reception for EPS according to the conclusions in TR 23.761 clause 8.2.  Editor's note: The objective on enabling paging reception for EPS and the corresponding solution needs to be confirmed by RAN plenary.  - NAS-level leaving procedure for EPS according to the conclusions in TR 23.761 clause 8.3.  - Leaving procedure for 5GS.  NOTE 1: The decision to support NAS-based leaving or RRC-based leaving or both will be determined taking into account feedback from RAN2.  NOTE 2: The WID objectives will be further updated based on progress of work in other WGs and on open issues identified in the SA2.  Work will be done in collaboration with RAN2, RAN3 and SA3 WGs. |

Thus, companies are invited to provide their inputs for the following question.

**Question 1: Do you agree to introduce a *Paging Cause* to support multi-USIM devices, to align with SA2 WID objective on paging cause?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comment** |
| Huawei | Too early to discuss | It is too early for RAN3 to make such agreement given the following observations.   * The **note 2** in SA2 WID clearly indicates that “The WID objectives will be further updated based on progress of work in other WGs” * In the reply LS from RAN2 in R2-2010738, it is described that:   + *RAN2 haven’t decided on paging cause feasibility, including how it should be supported in RAN nodes at this meeting.*   + *…..*   + *The above overhead analysis may be changed based on SA3 feedback on security requirements for paging cause.* * SA3 has not come up with any conclusion on whether exposing paging cause in cleartext is allowed. In the reply LS from SA3 in S3-203356, it is described that:   + Security and privacy aspects of exposing paging cause in cleartext is one of the objectives of the SA3 study   Before other groups make final decision, it is not good way to make agreement at this early stage. |
| Nokia | Yes | As explained in Nokia tdocs 729/730/731 our understanding is that SA2 is the group to decide and SA2 has decided at last SA2. |
| ZTE | Too early to discuss | Agree with HW. More, I was heard that other group is considering UE capability associated paging, so RAN3 shall wait for other group’s progress. |
| Samsung | Yes | Agree introducing Paging Cause in principle. |
| vivo | Yes | Agree with Nokia. Based on SA2 WID, RAN3 can now identify the potential impact on RAN3 interfaces. |
| CATT | Yes, but | Agree with Samsung that introducing Paging Cause is necessary in principle. Because SA2 has concluded that “both EPS and 5GS, only the voice is supported to be indicated as the paging cause to the UE.”  But RAN3 discussion can start only after issues mentioned by HW are concluded. |

To introduce a *Paging Cause* for supporting multi-USIM devices, it is proposed in [1]:

***Proposal 1:* *It is proposed to add a new IE “Paging Cause” in the NG PAGING message, at least for voice support.***

***Proposal 2: It is proposed to add a new IE “Paging Cause” in the Xn PAGING message, at least for voice support.***

***Proposal 3: It is proposed to add a new IE “Paging Cause” in the F1/W1 PAGING message, at least for voice support.***

***Proposal 4: It is proposed to add a new IE “Paging Cause” in the S1 PAGING message, at least for voice support.***

And in [2], respectively:

***Proposal 1: Introduce a Paging Cause with codepoint “voice” over S1AP, NGAP, XnAP? CRs in [7], [8] are provided.***

If the ANS to Q1 is yes, then based on the above proposals in [1][2], companies are invited to provide their inputs for the following questions.

**Question 2: Which network interfaces are needed to introduce a *Paging Cause*?**

* **A: NGAP, XnAP, S1AP**
* **B: F1AP**
* **C: W1AP**

|  |  |  |
| --- | --- | --- |
| **Company** | **Option A, B, C** | **Comment** |
| Huawei | Too early to discuss |  |
| Nokia | At least A, B. | See Nokia baseline CRs proposed in tdocs 730 and 731. |
| ZTE | Too early to discuss |  |
| Samsung | At least A, B |  |
| vivo | At least A, B |  |
| CATT | Too early to discuss |  |

**Question 3: For the impacted network interface(s), do you agree the new IE *Paging Cause* should have at least one codepoint for voice, i.e., ENUMERATED (voice, …)?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comment** |
| Huawei | Too early to discuss |  |
| Nokia | Agree. | As proposed in tdocs730/731. |
| ZTE | Too early to discuss |  |
| Samsung | Yes | But RAN3 needs to wait for the final decision in RAN2/SA2 before agreeing on the details. |
| vivo | Agree | To align with SA2 WID. |
| CATT | Too early to discuss |  |

## Signaling support for paging collision in EPS

In [3], SA2 also has agreed that enabling paging collision reception for EPS according to the conclusions in TR 23.761 clause 8.2.

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| --- |
| The objective is to specify enhancements to 5GS and EPS functionality and procedures for the following aspects:  - A single paging cause with the meaning of “voice” for both EPS and 5GS according to the conclusions in TR 23.761 clause 8.1.  - NAS Busy Indication for both EPS and 5GS in RRC\_IDLE mode according to the conclusions in TR 23.761 clause 8.1.  - Enabling paging reception for EPS according to the conclusions in TR 23.761 clause 8.2.  Editor's note: The objective on enabling paging reception for EPS and the corresponding solution needs to be confirmed by RAN plenary. |

The conclusions in TR 23.761 are shown below, in which SA2 has agreed to introduce a solution based on an IMSI offset for solving the paging collision in EPS side.

|  |
| --- |
| 8.2 Conclusions for Key Issue #2: Enabling Paging Reception for Multi-USIM Device Editor's note: To be completed.  Based on the evaluation in clause 7.2 the following **interim** conclusions are agreed for the baseline functionality:  - For paging reception in EPS when the paging collision is detected, the following principles are agreed:  - Upon the UE detecting paging collisions between two networks, the UE initiates a TAU procedure to the MME of one network, to request an IMSI offset.  - UE may provide an IMSI offset to MME during TAU procedure.  NOTE: Details on the request e.g. offset range will be defined during the normative phase.  - The MME returns an IMSI offset to the UE in the TAU Accept.  - During CN paging delivery, the MME provides to the RAN the UE\_ID which is derived based on the IMSI and the IMSI offset. RAN and UE use the UE ID as the IMSI to calculate the PF/PO.  Editor's note: This conclusion needs to be confirmed in RAN plenary |

And the conclusion has been confirmed in RANP, as follows:

|  |
| --- |
| The detailed objectives of the Work Item are:   1. Specify, if necessary, enhancement(s) to address the collision due to reception of paging when the UE is in IDLE/INACTIVE mode in both the networks associated with respective SIMs [RAN2]    * RAT Concurrency: Network A can be NR or LTE. Network B can either be LTE or NR.    * Applicable UE architecture: Single-Rx/Single-Tx.   For objective 1, specification change should focus on NR side and the change on LTE side is only for IDLE mode (i.e. related to EPC enhancement in SA2)  <Omit> |

The above text marked in green shows that it is MME to calculate the final UE\_ID based on the legacy IMSI and an IMSI offset, and then MME provides the final UE\_ID to RAN for calculating PF/PO. And, as mentioned in [2], the current S1 PAGING message in below already support to include this final UE\_ID in the *UE Identity Index value*.

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9.1.6 PAGING

This message is sent by the MME and is used to page a UE in one or several tracking areas.

Direction: MME → eNB

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** | **Criticality** | **Assigned Criticality** |
| Message Type | M |  | 9.2.1.1 |  | YES | ignore |
| UE Identity Index value | M |  | 9.2.3.10 |  | YES | ignore |
| UE Paging Identity | M |  | 9.2.3.13 |  | YES | ignore |

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Consequently, it can conclude that the EPS paging collision solution can be implemented without impacting the S1AP paging message. Then the following proposal comes in [2]:

***Proposal 2****:* ***agree that the EPS paging collision agreed by SA2 can be implemented in stage 3 without impact to S1AP.***

Now, companies are invited to provide input for the following question.

**Question 4: Do you agree that there is no S1AP impact for EPS paging collision, i.e., IMSI offset solution?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comment** |
| Huawei | Yes |  |
| Nokia | Yes | As explained in Nokia tdoc 729 [2]. |
| ZTE | Yes |  |
| Samsung | Yes |  |
| vivo | Yes |  |
| CATT | Yes |  |

# Conclusion, Recommendations

The summary concludes with:

# References

1. [R3-210174](file:///D:\My%20Documents\Desktop\Daily%20blanket\RAN3%23111e\USIM\Docs\R3-210174.zip), Signaling Support for Paging Cause (vivo)
2. [R3-210729](file:///D:\My%20Documents\Desktop\Daily%20blanket\RAN3%23111e\USIM\Docs\R3-210729.zip), Support for Multi-USIM devices (Nokia, Nokia Shanghai Bell)
3. S2-2009247, New WID on system enablers for Multi-USIM devices
4. [R3-210175](file:///D:\My%20Documents\Desktop\Daily%20blanket\RAN3%23111e\USIM\Docs\R3-210175.zip), BLCR36413 for Multi-USIM devices support (vivo), draftCRr, TS 36.413 v16.4.0, Rel-17, Cat. B
5. [R3-210176](file:///D:\My%20Documents\Desktop\Daily%20blanket\RAN3%23111e\USIM\Docs\R3-210176.zip), BLCR37473 for Multi-USIM devices support (vivo), draftCRr, TS 37.473 v16.3.0, Rel-17, Cat. B
6. [R3-210177](file:///D:\My%20Documents\Desktop\Daily%20blanket\RAN3%23111e\USIM\Docs\R3-210177.zip), BLCR38413 for Multi-USIM devices support (vivo), draftCRr, TS 38.413 v16.4.0, Rel-17, Cat. B
7. [R3-210178](file:///D:\My%20Documents\Desktop\Daily%20blanket\RAN3%23111e\USIM\Docs\R3-210178.zip), BLCR38423 for Multi-USIM devices support (vivo), draftCRr, TS 38.423 v16.4.0, Rel-17, Cat. B
8. [R3-210179](file:///D:\My%20Documents\Desktop\Daily%20blanket\RAN3%23111e\USIM\Docs\R3-210179.zip), BLCR38473 for Multi-USIM devices support (vivo), draftCRr, TS 38.473 v16.4.0, Rel-17, Cat. B
9. [R3-210730](file:///D:\My%20Documents\Desktop\Daily%20blanket\RAN3%23111e\USIM\Docs\R3-210730.zip), Support for Multi-USIM devices (Nokia, Nokia Shanghai Bell), CR0560r, TS 38.413 v16.4.0, Rel-17, Cat. B
10. [R3-210731](file:///D:\My%20Documents\Desktop\Daily%20blanket\RAN3%23111e\USIM\Docs\R3-210731.zip), Support for Multi-USIM devices (Nokia, Nokia Shanghai Bell), CR0561r, TS 38.423 v16.4.0, Rel-17, Cat. B