3GPP TSG-RAN WG3 #128 R3-253804

St. Julian - Malta, 19 – 23 May. 2025

Agenda Item: 18.2. Support LP-WUS Indicating Paging Monitoring

Source: NTT DOCOMO INC.

Title: Summary of offline discussion on LP-WUS

Document for: Discussion, agreement

# Introduction

TBD

# Discussion

## **LS to RAN2 (UE\_ID)**

Work on the draft LS directly in draft folder:

<http://10.10.10.10/ftp/RAN/RAN3/Inbox/Drafts/CB%20%23%20LPWUS/LS%20to%20RAN2%20(UE_ID)>

## **TP to TS 38.420**

Work on the draft TP directly in draft folder:

<http://10.10.10.10/ftp/RAN/RAN3/Inbox/Drafts/CB%20%23%20LPWUS/TP%20to%20TS%2038.420>

## **Range of CN Subgroup ID**

#### 9.3.1.aaa LP-WUSPS Assistance Information

This IE provides the LP-WUS Paging Subgrouping information related to CN assigned subgrouping for a particular UE, as specified in TS 38.304 [24].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| LP-WUS CN Subgroup ID | M |  | INTEGER (0..30, …) |  |

* TP for TS 38.473 [R3-253256/HW]
* TP for TS 38.423 [R3-253233/Nokia]
* TP for TS 38.413 [R3-253255/HW]
* DCM: have a concern to capture it at this time because RAN1 now discusses among following alternatives which subgroup ID is used for common codepoint. In our understanding, 1/2/4 PO can be associated to one LO, and the common codepoint requires to reserve one subgroup ID **for each POs**, this means that up to 4 subgroup IDs would be reserved for the common codepoint.

Alt 1: (the last few codepoints are common codepoints)

Alt 2: (the codepoints for each PO are consecutive)

Alt 3: (PO index + subgroup index)

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## **Further Extended UE Identity Index**

During online session, it was agreed to introduce new Further Extended UE Identity Index and it includes 20 bits UE\_ID. Then, how to capture it in stage3 should be discussed. Also, F1AP/XnAP/NGAP should be aligned.

**Option 1 (based on R3-253257/Nokia for 38.423)**

#### 9.3.1.285 Extended UE Identity Index Value

This IE is used by the gNB-DU to calculate the Paging Frame and Paging Occasion for eDRX, and the UE\_ID based subgroup ID as specified in TS 38.304 [24].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Extended UE Identity Index Value | M |  | BIT STRING (SIZE(16)) |  |

<<<<<<<<<<<<<<<<<<<< Unmodified Text Omitted >>>>>>>>>>>>>>>>>>>>

9.2.3.x Further Extended UE Identity Index Value

This IE is used by the NG-RAN node to calculate the Paging Frame and Paging Occasion for eDRX, and the UE\_ID based subgroup ID for PEI and LP-WUS as specified in TS 38.304 [33].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **IE/Group Name** | **Presence** | **Range** | **IE type and reference** | **Semantics description** |
| Further Extended UE Identity Index Value | M |  | BIT STRING (SIZE(20)) | Encoded as 5G-S-TMSI mod 1048576. |

**Option 2 (based on R3-253257/HW for 38.473)**

#### 9.3.1.285 Extended UE Identity Index Value

This IE is used by the gNB-DU to calculate the Paging Frame and Paging Occasion for eDRX, and the UE\_ID based subgroup ID for PEI as specified in TS 38.304 [24].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Extended UE Identity Index Value | M |  | BIT STRING (SIZE(16)) |  |

<<<<<<<<<<<<<<<<<<<< Unmodified Text Omitted >>>>>>>>>>>>>>>>>>>>

#### 9.3.1.bbb Further Extended UE Identity Index Value

This IE is used by the gNB-DU to calculate the Paging Frame and Paging Occasion for eDRX, and the UE\_ID based subgroup ID for PEI and LP-WUS as specified in TS 38.304 [24].

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Further Extended UE Identity Index Value | M |  | BIT STRING (SIZE(20)) | Encoded as 5G-S-TMSI mod 1048576. |

**Option 3 (based on online discussion)**

#### 9.3.1.285 Extended UE Identity Index Value

This IE is used by the gNB-DU to calculate the Paging Frame and Paging Occasion for eDRX, and the UE\_ID based subgroup ID as specified in TS 38.304 [24] if LP-WUS is not supported by the UE.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Extended UE Identity Index Value | M |  | BIT STRING (SIZE(16)) |  |

<<<<<<<<<<<<<<<<<<<< Unmodified Text Omitted >>>>>>>>>>>>>>>>>>>>

#### 9.3.1.bbb Further Extended UE Identity Index Value

This IE is used by the gNB-DU to calculate the Paging Frame and Paging Occasion for eDRX, and the UE\_ID based subgroup ID for PEI and LP-WUS as specified in TS 38.304 [24] if LP-WUS is supported by the UE.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IE/Group Name | Presence | Range | IE type and reference | Semantics description |
| Further Extended UE Identity Index Value | M |  | BIT STRING (SIZE(20)) | Encoded as 5G-S-TMSI mod 1048576. |

* DCM: have no strong preference. But, we think Option 2 does not help anything. Option 3 clarifies which IE would be used, however, it seems too much, and it is already indicated in the IE description that legacy UE\_ID is ignored if new UE\_ID is present. Therefore, Option 1 seems enough.
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## **LS to SA2/RAN2 (paging loss issue)**

Question 1: Do we need to send the LS [R3-253643] to SA2 in this meeting?

* DCM: Basically, we think the LS is not unnecessary because RAN2 already concluded to rely on network implementation to resolve this issue and rapporteur has similar view. However, if we agree stage2 TP and attach it in the LS, it would be helpful for SA2 to avoid discussing whether/how to capture something regarding this issue.
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Question 2: Do we need to capture the note in TS 38.300?

E.g. **“it is up to the network implementation to avoid the paging loss issue for LP-WUS in non-homogeneous deployment”** in TS 38.300. TP would be provided in inbox, if necessary.

* DCM: this issue was raised by SA2 and RAN2/3 also acknowledged this issue, so that we should capture some notes in stage2 to indicate it.
* xxx

## **UE\_ID LP-WUS is allowed or not indication**

Proposal 4: RAN3 can consider to have a stage 2 TP to capture that the eDRX and LP-WUS may be used together by the gNB for RAN paging and CN paging. No further RAN3 signalling impact is foreseen. [R3-253255/HW]

* RAN3 can consider to have a stage 2 TP to capture that the eDRX and LP-WUS may be used together by the gNB for RAN paging and CN paging.

Proposal 2: RAN3 to discuss the scenario of CN indicating to NG-RAN whether UE-ID LPWUS should be allowed or not to prevent UE battery drain during LP-WUS monitoring and very long eDRX cycles. [R3-253746/Ericsson]

* RAN3 to acknowledge the issue on UE battery drain during LP-WUS monitoring and very long eDRX cycles.

Proposal 3: RAN3 to discuss whether the CN can indicate to RAN during Paging and NGAP context setup request that UE-ID based LP-WUS is not allowed (e.g. during an emergency PDU session). [R3-253457/Ericsson]

* RAN3 cannot accept paging delay because of LP-WUS during emergency PDU session is established and have a solution for this issue.
* FFS on how CN indicates to NG-RAN whether UE-ID LPWUS should be allowed or not.
* DCM: If both or either issue are/is acknowledged, we can have FFS on introduction of the indication. Otherwise, we will not have the FFS. For us, battery drain issue is very new so that currently we prefer to have more time to analyze it, but generally, having some function to control LP-WUS function from RAN. We are open to discuss emergency PDU session issue, but this issue was raised long ago and there is still no strong delay requirement from operators. If this issue is not captured, I suggest to agree “RAN3 concludes that the paging delay due to LP-WUS is acceptable in release 19”.s

# Conclusions

TBD