3GPP TSG-RAN WG2 #114-e draftR2-2106530

Electronic meeting, 19th – 27th May, 2021

Agenda Item: 8.12.3.1

Source: Ericsson

Title: Summary of [AT114-e][110][REDCAP] eDRX aspects (Ericsson)

Document for: Discussion, Decision

# Introduction

The document summarizes the following offline discussion:

* [AT114-e][110][RedCap] eDRX aspects (Ericsson)

Initial scope: Discuss PTW length + starting point and min eDRX cycle value

Initial intended outcome: Summary of the offline discussion with e.g.:

* + - List of proposals for agreement (if any)
    - List of proposals that require online discussions
    - List of proposals that should not be pursued (if any)

Initial deadline (for companies' feedback): Tuesday 2021-05-25 08:00 UTC

Initial deadline (for rapporteur's summary in R2-2106530): Tuesday 2021-05-25 12:00 UTC

Proposals marked "for agreement" in R2-2106530 not challenged until Tuesday 2021-05-25 22:00 UTC will be declared as agreed via email by the session chair.

For the rest the discussion will continue online in the Wednesday CB session.

# Minimum eDRX cycle length

Based on the tdocs submitted to RAN2#114-e, two different minimum lengths have been proposed for eDRX in Rel-17:

* 2.56 seconds, proposed in [3], [5], [9] and [13]
* 5.12 seconds, proposed in [1], [2], [7], [8], [10], [12] and [14]

**Discussion point 1: What should be the lower bound for extended DRX cycle in RRC\_IDLE and RRC\_INACTIVE?**

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| **Company** | **Lower bound for eDRX?** | **Comments / arguments** |
| Ericsson | 5.12 s | We think we can keep the existing lower bound from LTE. The use cases of shorter (=2.56 s) eDRX are not clear to us, remembering UE should request eDRX only when the MT traffic is delay tolerant. |
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# Paging transmission window

The configuration details of PTW have been discussed in previous meetings, e.g. during RAN2#113bis-e in Offline 101. However, no consensus has been sreached e.g. on whether the PTW for RRC\_INACTIVE can be of different length compared to PTW for RRC\_IDLE, and whether the starting location of PTW for RRC\_INACTIVE and RRC\_IDLE, i.e. for RAN paging and CN paging, respectively, should be the same.

The following related agreements were made in RAN2#113bis-e:

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| * RAN decides and configures eDRX via RRC for RRC\_INACTIVE (FFS on the need and details of coordination with the CN) * At least for eDRX cycle, the configurations of the eDRX for RRC\_IDLE and RRC\_INACTIVE can be different (FFS for PTW, e.g. length and starting point, when eDRX cycles are longer than 10.24s) |

Assuming that RAN paging cycle is always equal or shorter compared to CN paging cycle, it is possible there are paging frames where either RAN or CN paging may occur, or paging frames where only RAN paging may occur.

Illustration from [3] is copied below to clarify the existing LTE eDRX configuration, where A denotes start of a PH and B denotes the start of a PTW in the PH (i.e. the starting location PTW\_start in TS 36.304):



Figure 1. LTE eDRX according to [3].

On PTW length, the following have been proposed in the tdocs submitted to RAN2#114-e:

* Common PTW length is used for RRC\_IDLE and RRC\_INACTIVE, proposed in [1], [4], [6], [8], [10], [14]
* The PTW length can be configured to be different for RRC\_IDLE and RRC\_INACTIVE, proposed in [2], [3], [7], [9], [11], [12], [13]

The assumption is that common length, if agreed, would be configured for the CN paging, i.e. by AMF.

**Discussion point 2: Should it be possible for RAN to configure different PTW length for RAN paging compared to PTW length configured for CN paging?**

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| **Company** | **Yes / No** | **Comments / arguments** |
| Ericsson | Yes, shorter | In particular we think RAN should be able to configure a shorter PTW compared to the CN PTW when CN PTW is relatively long. This will benefit of UE power consumption as it doesn’t need to monitor for long CN PTW for RAN paging.  Whether RAN uses the same PTW or a different one should be up to RAN to decide.  We provided the following example in [R2-2105236](http://www.3gpp.org/ftp/tsg_ran/WG2_RL2//TSGR2_114-e/Docs//R2-2105236.zip):  *Let’s consider another example where the RAN paging cycle is 61.44 s and the CN paging cycle is 122.88 s. The CN has configured a PTW of 20.48 s. We expect that the PTW for RAN paging does not always need to be configured to the same length as the PTW for CN paging – and in such case it would benefit the UE power consumption to allow the possibility to configure different PTW lengths for RAN and CN paging. Thus, in the example, RAN should be able to configure a shorter PTW than 20.48 s, let’s say 10.24 s PTW is enough. In this case the UE can save power compared to always using 20.48 s PTW.*  We don’t see a reason why RAN should not be able to configure different length for RAN paging. |
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On PTW starting location, the following have been proposed in the tdocs submitted to RAN2#114-e:

* Common PTW starting locations are used, proposed in [1], [4], [6], [8], [10], [14]
* Leave configuration up to network implementation, or that starting point can be same or different, proposed in [2], [3], [9], [12]
* Use the LTE baseline, and update if needed resulting in overlapping PTWs, proposed in [7]
* Consider either configurable locations, which can be different, or fixed locations in the specification resulting in the same starting locations for RAN and CN PTWs [11]

As the eDRX cycles can be different for RAN and CN paging, the same PTW starting location discussion is relevant for the case where both RAN and CN paging would occur in the same PH (i.e. the PTWs would start in the same PH), see Figure 1.

**Discussion point 3: When RAN paging and CN paging coincide in the same paging hyperframe (PH), should both PTWs start at the same time?**

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| **Company** | **Yes / No** | **Comments** |
| Ericsson | Maybe | It would be possible to specify same starting location for PTW in case paging coincide in the same PH, as proposed in some of the submitted Tdocs.  But it is also possible to leave this configuration up to NW e.g. so that it has possibility to distribute PTWs of different UEs when needed.  We don’t have a strong view. |
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Depending on the outcome of DP2 and DP3, one remaining question e.g. in the case RAN configures a shorter PTW length is which PTW the UE should follow in the case when the PTWs fully overlap. As the UE is required to follow CN paging e.g. for possible state mismatch, it seems reasonable that the UE would in this case follow the CN configured PTW.

**Discussion point 4: Do you agree that when RAN paging and CN paging coincide in the same paging hyperframe and the PTWs overlap each other, UE should follow the CN PTW for paging monitoring?**

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| **Company** | **Yes / No** | **Comments** |
| Ericsson | Yes | In case it is agreed the starting locations are same and e.g. RAN PTW can be shorter then yes the UE should monitor according to CN PTW as the UE is in any case required to monitor for CN paging.  We can discuss later once the set of allowed eDRX cycles is agreed what to do e.g. for cases PTWs started in different PHs overlap (i.e. whether this is allowed or left up to NW to configure in a way it doesn’t happen). |
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# Summary

TBD

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