**3GPP TSG-RAN WG2 Meeting #123bis** **R2-23xxxxx**

**Xiamen, China, 9th-13th October, 2023**

**Agenda item: 7.5.1**

**Source: LG Electronics Inc. (Rapporteur)**

**Title: [Post123bis][026][XR] 38.323 Running CR (LG)**

**Document for: Discussion and Decision**

# Introduction

This document collects the comments received during the following email discussion on PDCP running CR for XR.

* [POST123bis][026][XR] 38.323 Running CR (LG)

Scope:

- Review running CR

- Identify open issues

- Get inputs for subset of open issues (focus on more detailed open issues that would help with CR finalisation).

Deadline: long

# Contact information

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# Discussions

Companies can provide comments and suggestions to the PDCP running CR:

|  |  |  |  |
| --- | --- | --- | --- |
| Company + Issue Number (e.g., L001) | Issue | Comments and proposed changes | Rapporteur comment |
| VF\_001 | *Definition of the discardTimerForLowImportance in 7.3 is not aligned with the description* | This timer is configured only for DRBs. The duration of the timer is configured by upper layers TS 38.331 [3]. In the transmitter, a new timer is started upon reception of an SDU belonging to a lower importance PDU Set from upper layer if *psi-BasedDiscard is configured* |  |
| APPLE\_001 | Definition of Delay-critical PDCP SDU is not clear enough | **Delay-critical PDCP SDU**: the PDCP SDU for which the remaining time value till *discardTimer* expiry is less than a [threshold]. |  |
| V\_001 | Functions | Timer based PDU set discard:  I assume it should be “PDU set based discard”.  My understanding is: in case PDU set based discard is configured, no matter one PDCP SDU is discarded based on what reason (e.g. Timer based, or PSI based), the PDU(s) in the same PDU set should be discarded. Thus, it is not just “timer based PDU set discard”, while it should be “PDU set based discard” |  |
| V\_002 | “- if *psi-BasedDiscard* is activated, and the PDCP SDU belongs to a lower importance PDU Set:” | Suggest to:  “- if *psi-BasedDiscard* is activated, and the PDCP SDU belongs to a low~~er~~ importance PDU Set:”  Otherwise, the IE should be “*discardTimerForLowerImportance*” |  |
| V\_003 | Data volume calculation | I assume the else part should be in brackets as it is still FFS as below:  FFS what to report for the case of not PDU set discard configured  [OPPO]: We share a similar view as vivo. |  |
| O\_001 | *Definition of the discardTimerForLowImportance* in 7.3 | Only when psi-BasedDiscard is activated, this timer would be used (to more align with the description in 5.2.1 and our MAC CE-based agreement)  b) *discardTimerForLowImportance*  This timer is configured only for DRBs. The duration of the timer is configured by upper layers TS 38.331 [3]. In the transmitter, a new timer is started upon reception of an SDU belonging to a lower importance PDU Set from upper layer if *psi-BasedDiscard is activated*. |  |
| N\_01 | Transmit Operation | The identification of lower importance set cannot be left fully up to UE implementation. There needs to be at least a pointer towards TS 26.522.  [Xiaomi] Same concern with Nokia. |  |
| N\_02 | Second Discard Timer | The introduction of a second timer seems to contradict a previous agreement we had in RAN2: *PDU set discard is modelled using the existing PDCP discard timer for the uplink*  Isn’t it possible to use one timer with two values ? This would avoid tests like “without restarting the *discardTimer* or the *discardTimerForLowImportance*” |  |
| N\_03 | Transmit Operation | With the suggested text, after the OFF-signal, for the SDUs already in buffer the new, shorter timer will still apply. This may not be desirable. In order to avoid this, we could always start the legacy timer, and ignore the expiry of the new timer if the ON-signal no longer applies. That would also justify the introduction of the 2nd timer (see N\_02). |  |
| N\_04 | Definitions | Not convinced we need the two new definitions since they are used only in one place. |  |
| E\_01 | PSI and PDU Set discard dependence | PSI based discarding is a sub solution to PDU Set discarding. That has been clear from the first agreement and been the assumption in all discussions. However with current structure it seems one could activate PSI based discarding and not PDU Set discarding. Either we add a dependence that one cant activate PSI based discarding without PDU Set discarding configured or the text in 5.3 is changed to something like this:  *- if pdu-SetDiscard is configured* ***or psi-BasedDiscard is activated****:*  *- discard all PDCP SDUs belonging to the PDU Set to which the PDCP SDU belongs along with the corresponding PDCP Data PDUs;* |  |
| E\_02 | Data volume calculation is ambiguous | This formulation is problematic:  *the PDCP SDUs belonging to* ***the delay-critical PDU Set*** *for which no PDCP Data PDUs have been constructed;*  It is ambiguous, what happen when you have multiple delay critical PDU Sets in the buffer? This is something that will occur. We could add to the above formulation explicitly stating that it is the “*shortest remaining time delay-critical PDU Set”*, however this doesn’t solve the fundamental problem.  This highlights exactly the problem I tried to raise multiple times in the online session, the agreements are currently not complete. Currently we will only have one threshold to trigger the DSR and only one value as baseline (but it was not excluded that we can have more values reported, which is likely solution we need).  With only one value reported and one trigger threshold for the DSR then it is unclear how to handle when we get more delay critical PDU Sets in the buffer. Should these be reported at a later time, requiring some other trigger for the DSR e.g. when the first delay critical PDU Set is finished then trigger a new DSR for the next delay critical PDU Set (potentially this create a long delay until the values for this delay critical PDU Set is reported, since the DSR is not triggered when the PDU Set becomes a delay critical PDU Set), or should the new delay critical PDU Set be included in a new DSR together with the first delay critical PDU Set (with only one delay/buffer value reported this will be misleading for the scheduler), or should it not trigger any DSR at all? (Probably a solution that will not work at all.) |  |
| E\_03 | Cover page | The cover page shall be made correct, that is add other specs affected, clause affected, and describe the summary of changes. |  |
| E\_04 | The added NOTE 1:  NOTE 1: Identification of PDU Set importance is left up to UE implementation. | Shall have number 0, as renumbering of numbered items is “strongly deprecated” according to 21.801 Specification drafting rules.  The same is true for the added “b) *discardTimerForLowImportance*” in 7.3, that is no change of numbering of what is now b) *t-Reordering*. |  |
| E\_05 | Second discard timer. We agree with Nokia’s observation. | The solution, as used for many issues in MAC spec, is to use a “helper” variable for the timer. For example, *DISCARD\_TIMER*, compare to how *HARQ-RTT-TimerDL-NTN* is used in MAC. Maybe like this  - if *psi-BasedDiscard* is activated, *discardTimerForLowImportance* is configured, and the PDCP SDU belongs to a low~~er~~ importance PDU Set:  - start the *DISCARD\_TIMER* associated with this PDCP SDU with the value *discardTimerForLowImportance*;  - else:  - start the *DISCARD\_TIMER* associated with this PDCP SDU with the value *discardTimer* (if configured).  (then all actions at *discardTimer* expiry shall be at *DISCARD\_TIMER* expiry instead)  The 5.3 would then be something like:  When the successful delivery of a PDCP SDU is confirmed by PDCP status report, the transmitting PDCP entity shall discard the PDCP SDU along with the corresponding PDCP Data PDU.  When the *DISCARD\_TIMER* expires for a PDCP SDU, the transmitting PDCP entity shall:  - if *pdu-SetDiscard* is configured:  - discard all PDCP SDUs belonging to the PDU Set to which the PDCP SDU belongs along with the corresponding PDCP Data PDUs;  - else:  - discard the PDCP SDU along with the corresponding PDCP Data PDU.  And 7.3 would become (which also solves the numbering issue mentioned above)  a) *DISCARD\_TIMER*  This timer is configured only for DRBs. The duration of the timer is configured by upper layers TS 38.331 [3] in *discardTimer* or *discardTimerForLowImportance*.  In the transmitter, a new timer is started upon reception of an SDU from upper layer, see 5.2.1 above for which timer value to use. |  |
| H\_001 | Name of the new timer “*discardTimerForLowImportance*” | We don’t have strong view on the name of new timer, but it needs to be aligned with other running CRs, in 331 it is named as “*psi-DiscardTimer*” |  |
| H\_002 | Transmit Operation | Regarding to the following changes:  “if *psi-BasedDiscard* is activated, and the PDCP SDU belongs to a lower importance PDU Set:  - start the *discardTimerForLowImportance* associated with this PDCP SDU (if configured);”  If we understand correctly, the “psi-BasedDiscard” is the indicator to indicate wheter a DRB is configured with PDU set discarding for congestion alleviation. If so, the above text misses the other condition, that is the network has indicated the congestion happens by activating the newly defined discard timer.  So we would suggest to revise the above text either to add something like “and the XXX timer is activated” or directly replace “psi-BasedDiscard” with “*discardTimerForLowImportance*”(or other name for the newly defined timer) |  |
| H\_003 | NOTE1 in 5.2.1 | Should we use “NOTE 0” to avoid renumbering all of the following NOTEs? |  |
| H\_004 | Remaining time calculation | We also need to consider how to indicate the remaining time of the delay critical PDCP data volume to the lower layers. |  |
| H\_005 | “delay-critical PDU set” and “delay-critical PDCP SDUs” in 5.6 | Although there is a corresponding definition in 3.1, not sure it is a normal way to specify something. We think it would be more appropriate and clear if there was some text somewhere in the main part of specs, something like: “The UE shall consider PDCP SDU for which the remaining *discardTimer* value is less than a [threshold] as a delay-critical PDCP SDU”. |  |
| H\_006 | Description of *discardTimerForLowImportance* | The current text “In the transmitter, a new timer is started upon reception of an SDU belonging to a lower importance PDU Set from upper layer.” should add “and the *discardTimerForLowImportance* is activated” |  |
| NEC\_01 | Functions | “PSI based PDU set discard” should be “PSI based SDU discard”.  PDU set discard and SDU discard are two independent functions. PDU set discard is to handle whether UE discards all packets in PDU set when one PDU is discarded based on PDU-set discard indication. |  |
| NEC\_02 | 5.2.1 NOTE 1: | Suggest changing to “NOTE 1: Identification of low importance PDU Set ~~importance~~ is left up to UE implementation.” since RAN2#123bis agreement was “It is up to UE implementation to determine which PSI levels will apply the discard mechanism” |  |
| Xiaomi-1 | Definition of *discardTimerForLowImportance* | Do we need to introduce another new timer or reuse the legacy timer with a shorter value for PDCP SDU belongs to a lower importance PDU Set?  That need to be discussed further. |  |
| Xiaomi-2 | Comment on 5.6 Data volume calculation We do not need to add new definition of “delay-critical PDCP SDUs” and “Delay-critical PDU Set”.  And for PDU set, it only considers SDU, not the consider corresponding PDCP Data PDUs.  Delay-critical PDU Set: the PDU Set to which the delay-critical PDCP SDU belongs. | We prefer the original way in last post email discussing that people proposed. Then we do not need to add new definition of “delay-critical PDCP SDUs”.  A suggestion is as following:  For the purpose of MAC delay status reporting, the transmitting PDCP entity shall consider the following as delay-critical PDCP data volume:  - the PDCP SDUs for which no PDCP Data PDUs have been constructed for which the remaining discardTimer values are less than a [threshold];  - the PDCP Data PDUs that have not been submitted to lower layers and for which the remaining discardTimer values are less than a [threshold];  - for AM DRBs, the PDCP SDUs to be retransmitted according to clause 5.1.2 and clause 5.13 and for which the remaining discardTimer values are less than a [threshold];  - for AM DRBs, the PDCP Data PDUs to be retransmitted according to clause 5.5 and for which the remaining discardTimer values are less than a [threshold].  And to reflect the agreement “The data volume calculation to be reported in the DSR will consider the at size of the full remaining PDUs in the PDU set (if any PDU within the PDU set is with remaining time below the threshold), if the PDU set discard is configured.” Then to add a sentence would be enough.  Then we do not need to define “Delay-critical PDU Set”  If *pdu-SetDiscard* is configured, When the remaining discardTimer value is less than a [threshold] for a PDCP SDU, the transmitting PDCP entity shall take all PDCP SDUs belonging to the PDU Set along with the corresponding PDCP Data PDUs into consideration when calculation delay-critical PDCP data volume. |  |
| Xiaomi-3 | Comments on 5.2.1 | Logical mistake.  If NW does not configure a discard timer for low importance, in this case the legacy timer will be used.  Suggest to modify:  At reception of a PDCP SDU from upper layers, the transmitting PDCP entity shall:  - if *psi-BasedDiscard* is activated, and the PDCP SDU belongs to a lower importance PDU Set and if NW configures a discard timer for low importance:  - start the *discardTimerForLowImportance* associated with this PDCP SDU;  - else:  - start the *discardTimer* associated with this PDCP SDU (if configured). |  |

# Conclusion

TBD