**3GPP TSG-RAN WG2 Meeting #123bis** **R2-230xxxx**

**Xiamen, P.R. China, 9th-13th October, 2023**

**Agenda item: 7.3.1**

**Source: InterDigital (Rapporteur)**

**Title: [Post123][314][NES] 38.321 Running CR (InterDigital)**

**Document for: Discussion and Decision**

# Introduction

This document collects the comments received during the following email discussion on the draft MAC CR for NES.

* [POST123][314][NES] Running CR 38.321 (InterDigital)

Scope : Review running CR

Outcome: CR to be submitted to next meeting

Deadline: long

## Contact information:

|  |  |  |
| --- | --- | --- |
| Company | Delegate Name | Email |
|  |  |  |
|  |  |  |

# Discussions

Companies can provide comments and suggestions to the uploaded running CR here:

|  |  |  |
| --- | --- | --- |
| Company + Issue Number (e.g., ID001) | Issue | Comments and proposed changes |
|  |  |  |

# Alternative modelling

During RAN2#123, it was commented by two companies that they prefer an alternative modelling to capture the agreements for TS 38.321, whereby all UE behaviours in the non-active period is captured in a self-contained section without making any changes to other parts of the MAC specification. Such alternate modelling is provided by the rapporteur in Annex A.

Rapporteur thinks that such modelling could work, but may result in conflicting specifications, more changes, duplication of existing text (e.g. the C-DRX section), and potentially missed conflicts. From the rapporteur’s perspective, the following notes and issues are observed with a self-contained modelling in Annex A:

* This modelling is issuing conflicting behaviours to the UE in different sections, e.g. to transmit SR or to obtain a PDU for transmission in one section, even though no TB/SR can be transmitted in the non-active period, then to be told in a later section (5.x) that the UE shall not transmit SR or on CG.
* The existing SR sections specifies that the UE increments the counter and starts the prohibit timer, even though no SR transmission is made in the non-active period. This would be avoided if we added this condition on SR transmission in the SR section. With the modelling in Annex A, the UE is specified in one section (5.4.4) to increment the SR counter and start the SR prohibit timer, then is specified later in section (5.x) not to do those actions.
* Some text from the DRX section (5.7) needs to be duplicated to ensure the agreed cases where the UE shall monitor PDCCH during the non-active period is captured. A general statement that the UE doesn’t monitor PDCCH during the cell DTX non-active period is thus not sufficient. For example, it was agreed not to change the UE behaviour and that the UE monitors PDCCH when C-DRX retransmission timers are running, when an SR was transmitted and is pending, or when RA timers are running. Such behaviours are captured in detail already in section 5.7, and thus need to be duplicated if we don’t touch specification text in other sections outside of the new 5.x section. Note that in R2#123, it was agreed that the “We focus on the case where DTX in RRC can only be configured when C-DRX is configured. We will not optimize for the case where C-DRX is not configured” and thus there is no need to specify text already captured in the C-DRX section.
* Section 5.4.2.1 specifies delivering a PDU to the HARQ process upon obtaining the TB and generating new transmission for this HARQ process and starting the *configuredGrantTimer* and *cg-RetransmissionTimer*, even though no CG transmission can be made during the cell DRX non-active period. Therefore, the modelling in section 5.x needs to specify the UE not to obtain the PDU for an already delivered configured grant and not to start the *configuredGrantTimer* and *cg-RetransmissionTimer*, thus negating what’s already specified in 5.4.2.1.
* While it’s tidy to have all agreed NES behaviours in one section, it can cause potentially missed conflicts or more corrections down the line.

Companies can provide their view below on whether they prefer the modelling of section 5.x in Annex A instead of the TS 38.321 running draft CR uploaded version to this email discussion.

|  |  |  |
| --- | --- | --- |
| Company | Preferred modelling   (uploaded version or Annex A version) | Comments and proposed changes. |
|  |  |  |

# Conclusion

TBD

# References

1. RP-223540, “New WID: Network energy savings for NR”, Huawei
2. R2-2308393, “Running CR to 38.321 for Network energy savings”, InterDigital

# Annex A: Alternate modelling in a self-contained section

=====================================NEXT CHANGE===================================

* 5.x Cell Discontinuous Transmission and Reception

The MAC entity may be configured by RRC per Serving Cell with a periodic cell DTX and/or cell DRX pattern (i.e., Active and Non-Active Periods). The cell DTX functionality controls UE’s monitoring activity of PDCCH and configured downlink assignments in RRC\_CONNECTED. For all activated Serving Cells configured with cell DTX, the MAC entity may monitor PDCCH and configured downlink assignments using the cell DTX operation specified in this clause. The cell DRX functionality controls Scheduling Request and configured uplink grant transmission activity in RRC\_CONNECTED. For all activated Serving Cells configured with cell DRX, the MAC entity may transmit configured uplink grant transmissions and Scheduling Request using the cell DRX operation specified in this clause.

Editor’s note: FFS whether to support multiple cell DTX/DRX pattern configurations.

RRC controls cell DTX operation by configuring the following parameters in *CellDTX-Config*:

- *celldtx-onDurationTimer*: the active duration at the beginning of a cell DTX cycle;

- *celldtx-StartOffset*: defines the subframe where the cell DTX cycle starts;

- *celldtx-SlotOffset*: the delay before starting the *celldtx-onDurationTimer*;

- *celldtx-Cycle*: the cell DTX cycle period.

RRC controls cell DRX operation by configuring the following parameters in *CellDRX-Config*:

- *celldrx-onDurationTimer*: the active duration at the beginning of a cell DRX cycle;

- *celldrx-StartOffset*: defines the subframe where the cell DRX cycle starts;

- *celldrx-SlotOffset*: the delay before starting the *celldrx-onDurationTimer*;

- *celldrx-Cycle*: the cell DRX cycle period.

Editor’s note: TBC whether cell DTX/DRX is configured per serving cell. Instances of “for the Serving Cell” and “for each Serving Cell” will be removed if it is configured per MAC entity.

Editor’s note: TBC whether cell DTX/DRX parameters can be configured with different values per serving cell.

For each Serving Cell configured with *CellDTX-Config*, the MAC entity shall:

1> if cell DTX activation indication has been received from lower layers for this Serving cell, as specified in TS 38.213 [x]; or

1> if cell DTX deactivation indication has not been received from lower layers for this Serving cell, as specified in TS 38.213 [x]:

2> if [(SFN × 10) + subframe number] modulo (*celldtx-Cycle*) = (*celldtx-StartOffset*):

3> start *celldtx-onDurationTimer* for this serving cell after *celldtx-SlotOffset* from the beginning of the subframe.

1> if cell DTX deactivation indication has been received from lower layers for this Serving cell, as specified in TS 38.213 [x]:

2> stop *celldtx-onDurationTimer*, if running.

For each Serving Cell configured with *CellDRX-Config*, the MAC entity shall:

1> if cell DRX activation indication has been received from lower layers for this Serving cell, as specified in TS 38.213 [x]; or

1> if cell DRX deactivation indication has not been received from lower layers for this Serving cell, as specified in TS 38.213 [x]:

2> if [(SFN × 10) + subframe number] modulo (*celldrx-Cycle*) = (*celldrx-StartOffset*):

3> start *celldrx-onDurationTimer* for this serving cell after *celldrx-SlotOffset* from the beginning of the subframe.

1> if cell DRX deactivation indication has been received from lower layers for this Serving cell, as specified in TS 38.213 [x]:

2> stop celldtx-onDurationTimer, if running.

When *CellDTX-Config* is configured for a Serving Cell, the cell DTX Active Period includes the time while:

- *celldtx-onDurationTimer* is running for the associated Serving Cell; or

- cell DTX deactivation indication has been received from lower layers for this Serving cell, as specified in TS 38.213 [x].

When *CellDRX-Config* is configured for a Serving Cell, the cell DRX Active Period includes the time while:

- *celldrx-onDurationTimer* is running for the associated Serving Cell; or

- cell DRX deactivation indication has been received from lower layers for this Serving cell, as specified in TS 38.213 [x].

For each Serving Cell configured with *CellDTX-Config*, the MAC entity shall:

1> if the Serving Cell is not in the cell DTX Active Period:

2> not instruct the physical layer to receive transport block on the DL-SCH according to the configured downlink assignment;

2> not indicate the presence of any configured downlink assignment and deliver the stored HARQ information to the HARQ entity;

2> if drx-RetransmissionTimerDL, drx-RetransmissionTimerUL or drx-RetransmissionTimerSL (as described in clause 5.7) is not running on any Serving Cell in the DRX group; and

2> if ra-ContentionResolutionTimer (as described in clause 5.1.5) or msgB-ResponseWindow (as described in clause 5.1.4a) is not running; and

2> if a Scheduling Request is not sent on PUCCH and is not pending (as described in clause 5.4.4 or 5.22.1.5); and

2> if a PDCCH indicating a new transmission addressed to the C-RNTI of the MAC entity has been received after successful reception of a Random Access Response for the Random Access Preamble not selected by the MAC entity among the contention-based Random Access Preamble (as described in clauses 5.1.4 and 5.1.4a):

3> not monitor PDCCH for the MAC entity's C-RNTI, CI-RNTI, CS-RNTI, INT-RNTI, SFI-RNTI, SP-CSI-RNTI, TPC-PUCCH-RNTI, TPC-PUSCH-RNTI, TPC-SRS-RNTI, AI-RNTI, SL-RNTI, SLCS-RNTI and SL Semi-Persistent Scheduling V-RNTI.

For each Serving Cell configured with *CellDRX-Config*, the MAC entity shall:

1> if the Serving Cell is not in the cell DRX Active Period:

2> not instruct the physical layer to signal the SR on a PUCCH resource for SR;

2> not increment the SR counter for a pending SR;

2> not start the *sr-ProhibitTimer* for a pending SR;

2> not deliver any configured uplink grant and the associated HARQ information to the HARQ entity;

2> not obtain the MAC PDU to transmit from the Multiplexing and assembly entity for a configured uplink grant;

2> not instruct a HARQ process associated with a configured uplink grant to trigger a new transmission or a retransmission;

2> not start or restart the *configuredGrantTimer*, if configured;

2> not start or restart the *cg-RetransmissionTimer*, if configured.

===============================CHANGE ENDS=========================================