**3GPP TSG RAN WG1 Meeting #105-e R1-21XXXXX**

**e-Meeting, May 10th – 27th, 2021**

**Agenda item:** 7.1

**Source:** Moderator (Nokia)

**Title:** Summary of [105-e-NR-7.1CRs-03] Issue#7 DRX interaction with CPU occupancy

**Document for:** Discussion and Decision

# Introduction

This document is created to facilitate the email discussion [105-e-NR-7.1CRs-03] on DRX interaction with CPU occupancy. This thread is triggered by Issue #7 of [1] and originates from a draft CR to TS38.214 in [2] and accompanying discussion paper in [3].

|  |  |  |  |
| --- | --- | --- | --- |
| **Issue#** | **Tdoc#** | **Source** | **Issue description** |
| 7 | [R1-2105278](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_105-e/Docs/R1-2105278.zip)[R1-2105349](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_105-e/Docs/R1-2105349.zip) | Nokia, NSB | Clarification on how to determine the CPU occupation for periodic or semi-persistent CSI reporting, when a UE is configured with DRX. |

# Background

Sec. 5.2.1.6 of TS 38.214 defines the CPU occupancy rules; however, it does not provide any indication on the applicability of the rules in relation to DRX. This creates ambiguity of interpretation, as elaborated in [3], because a UE configured with DRX may assume that the CPU count is not affected by a DRX configuration, whereas another UE may assume that, for CPU(s) to be occupied “until the last symbol of the PUSCH/PUCCH carrying the report”, this reporting occasion has to occur in DRX active time.

Consequently, when a UE is configured with DRX, a gNB cannot be sure if CPU overbooking occurs, which would result in one or more reports not being updated.

# Company views

To facilitate the discussion, we can consider two separate issues:

**Issue 1. When DRX is configured, what is the interpretation of the end point of a CPU occupation, according to the following description?**

“For a CSI report with CSI-ReportConfig with higher layer parameter reportQuantity not set to 'none', the CPU(s) are occupied for a number of OFDM symbols as follows:

* A periodic or semi-persistent CSI report (excluding an initial semi-persistent CSI report on PUSCH after the PDCCH triggering the report) occupies CPU(s) from the first symbol of the earliest one of each CSI-RS/CSIIM/ SSB resource for channel or interference measurement, respective latest CSI-RS/CSI-IM/SSB occasion no later than the corresponding CSI reference resource, until the last symbol of the PUSCH/PUCCH carrying the report.
* ...
* An initial semi-persistent CSI report on PUSCH after the PDCCH trigger occupies CPU(s) from the first symbol after the PDCCH until the last symbol of the PUSCH carrying the report.”

**Alt 1. A CPU is occupied in each reporting period until the configured reporting occasion, regardless of whether the reporting occasion is inside or outside DRX active time.**

**Alt 2. A CPU is occupied until the reporting occasion that carries the CSI report, i.e., until the earliest reporting occasion in DRX active time.**

**Issue 2. When DRX is configured and a UE is outside DRX active time, a UE may “skip” a CSI calculation if it can predict the report will not be sent in the current reporting period (i.e., postpone calculation to a later reporting period) or there is no new CSI-RS/SSB measurement to process (i.e., an old CSI may be sent). Should CPU occupancy rules consider these special cases in which a CPU is not occupied?**

Please provide company’s view in the table below:

|  |  |
| --- | --- |
| **Company** | **View** |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

# Conclusion

To be added after the discussion.

# Reference

1. RAN1#105-e Session notes for 7.1 (Maintenance of Release 15 NR), Ad-hoc chair (Samsung)
2. [R1-2105278](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_105-e/Docs/R1-2105278.zip), “DRX interaction with CPU occupancy,” Nokia, Nokia Shanghai Bell

1. [R1-2105349](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_105-e/Docs/R1-2105349.zip), “Discussion on DRX interaction with CPU occupancy,” Nokia, Nokia Shanghai Bell