**3GPP TSG RAN WG1 #102-e R1-200xxxx**

**e-Meeting, August 17th – 28th, 2020**

**Agenda item:** 7.2.2.2.3

**Source:** Moderator (Huawei)

**Title:** TP for NR-U maintenance email thread 102-e-NR-unlic-NRU-HARQ-01

**Document for:** Discussion and Decision

1. Analysis

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| --- | --- |
| Reasons for change | The UCI multiplexing timeline based on a request for a Type-3 HARQ-ACK codebook report without scheduling a PDSCH is not specified in the UE procedure for reporting multiple UCI types. |
| Summary of changes | Introduce the UCI multiplexing timeline based on a request for a Type-3 HARQ-ACK codebook report without scheduling a PDSCH in the UE procedure for reporting multiple UCI types. |
| Specs/Sections impacted | TS38.213 V16.2.0 section 9.2.5 |
| Consequences if not approved | The UE may follow an incorrect UCI multiplexing timeline when reporting multiple UCI types and when it receives a request for a Type-3 HARQ-ACK codebook report without scheduling a PDSCH. |

1. Text proposal

================== Start of text proposal for TS38.213 V16.2.0 ===================

9.2.5 UE procedure for reporting multiple UCI types

<Unchanged parts are omitted>

If a UE would transmit multiple overlapping PUCCHs in a slot or overlapping PUCCH(s) and PUSCH(s) in a slot and, when applicable as described in Clauses 9.2.5.1 and 9.2.5.2, the UE is configured to multiplex different UCI types in one PUCCH, and at least one of the multiple overlapping PUCCHs or PUSCHs is in response to a DCI format detection by the UE, the UE multiplexes all corresponding UCI types if the following conditions are met. If one of the PUCCH transmissions or PUSCH transmissions is in response to a DCI format detection by the UE, the UE expects that the first symbol  of the earliest PUCCH or PUSCH, among a group overlapping PUCCHs and PUSCHs in the slot, satisfies the following timeline conditions

-  is not before a symbol with CP starting after after a last symbol of any corresponding PDSCH, is given by maximum of where for the i-th PDSCH with corresponding HARQ-ACK transmission on a PUCCH which is in the group of overlapping PUCCHs and PUSCHs, , is selected for the i-th PDSCH following [6, TS 38.214], is selected based on the UE PDSCH processing capability of the i-th PDSCH and SCS configuration , where corresponds to the smallest SCS configuration among the SCS configurations used for the PDCCH scheduling the i-th PDSCH (if any), the i-th PDSCH, the PUCCH with corresponding HARQ-ACK transmission for i-th PDSCH, and all PUSCHs in the group of overlapping PUCCHs and PUSCHs.

-  is not before a symbol with CP starting after after a last symbol of any corresponding SPS PDSCH release or of a DCI format 1\_1 indicating SCell dormancy as described in Clause 10.3 or of a DCI format 1\_1 indicating a request for a Type-3 HARQ-ACK codebook report without scheduling PDSCH. is given by maximum of where for the i-th PDCCH providing the SPS PDSCH release or the DCI format 1\_1 with corresponding HARQ-ACK transmission on a PUCCH which is in the group of overlapping PUCCHs and PUSCHs, , is described in Clause 10.2 and is selected based on the UE PDSCH processing capability of the i-th SPS PDSCH release or the DCI format 1\_1 and SCS configuration , where corresponds to the smallest SCS configuration among the SCS configurations used for the PDCCH providing the i-th SPS PDSCH release or the DCI format 1\_1, the PUCCH with corresponding HARQ-ACK transmission for i-th SPS PDSCH release or the DCI format 1\_1, and all PUSCHs in the group of overlapping PUCCHs and PUSCHs.

- if there is no aperiodic CSI report multiplexed in a PUSCH in the group of overlapping PUCCHs and PUSCHs,  is not before a symbol with CP starting after after a last symbol of

- any PDCCH with the DCI format scheduling an overlapping PUSCH, and

- any PDCCH scheduling a PDSCH or SPS PDSCH release or a DCI format 1\_1 indicating a request for a Type-3 HARQ-ACK codebook report without scheduling PDSCH with corresponding HARQ-ACK information in an overlapping PUCCH in the slot

If there is at least one PUSCH in the group of overlapping PUCCHs and PUSCHs, is given by maximum of where for the i-th PUSCH which is in the group of overlapping PUCCHs and PUSCHs, , , and are selected for the i-th PUSCH following [6, TS 38.214], is selected based on the UE PUSCH processing capability of the i-th PUSCH and SCS configuration , where corresponds to the smallest SCS configuration among the SCS configurations used for the PDCCH scheduling the i-th PUSCH (if any), the PDCCHs scheduling the PDSCHs with corresponding HARQ-ACK transmission on a PUCCH which is in the group of overlapping PUCCHs/PUSCHs, and all PUSCHs in the group of overlapping PUCCHs and PUSCHs.

If there is no PUSCH in the group of overlapping PUCCHs and PUSCHs, is given by maximum of where for the i-th PDSCH with corresponding HARQ-ACK transmission on a PUCCH which is in the group of overlapping PUCCHs, , is selected based on the UE PUSCH processing capability of the PUCCH serving cell if configured.   is selected based on the UE PUSCH processing capability 1, if PUSCH processing capability is not configured for the PUCCH serving cell. is selected based on the smallest SCS configuration between the SCS configuration used for the PDCCH scheduling the i-th PDSCH (if any) with corresponding HARQ-ACK transmission on a PUCCH which is in the group of overlapping PUCCHs, and the SCS configuration for the PUCCH serving cell.

- if there is an aperiodic CSI report multiplexed in a PUSCH in the group of overlapping PUCCHs and PUSCHs,  is not before a symbol with CP starting after after a last symbol of

- any PDCCH with the DCI format scheduling an overlapping PUSCH, and

- any PDCCH scheduling a PDSCH, or SPS PDSCH release, or providing a DCI format 1\_1 indicating SCell dormancy or a DCI format 1\_1 indicating a request for a Type-3 HARQ-ACK codebook report without scheduling PDSCH with corresponding HARQ-ACK information in an overlapping PUCCH in the slot

where corresponds to the smallest SCS configuration among the SCS configuration of the PDCCHs, the smallest SCS configuration for the group of the overlapping PUSCHs, and the smallest SCS configuration of CSI-RS associated with the DCI format scheduling the PUSCH with the multiplexed aperiodic CSI report, and for , for and for

- , , , , , and are defined in [6, TS 38.214], and and are defined in [4, TS 38.211].

================== End of text proposal for TS38.213 V16.2.0 ===================