**3GPP TSG RAN WG1 #117 R1-24xxxxx**

**Fukuoka City, Fukuoka, Japan, May 20th - 24th, 2024**

**Agenda Item: 7**

**Source: Moderator (ZTE)**

**Title: Summary on Msg3 retransmission timing**

**Document for: Discussion**

**Introduction**

This document contains the summary of draft CR R1-2404238 for Msg3 retransmission timing. During online discussion, companies agree that the timing of Msg3 retransmission is missing in current specification but prefer to resolve this issue by updating specification in TS 38.214.

**Discussion (round 1)**

**Text proposal**

|  |  |  |
| --- | --- | --- |
| ***Reason for change:*** | In RAN1#105-e meeting, the cell specific Koffset was agreed to be always used for the Msg3 retransmission scheduled by DCI.

|  |
| --- |
| Agreement:The K\_offset value signaled in system information is always used for* The transmission timing of RAR / fallbackRAR grant scheduled PUSCH
* The transmission timing of Msg3 retransmission scheduled by DCI format 0\_0 with CRC scrambled by TC-RNTI
* The transmission timing of HARQ-ACK on PUCCH to contention resolution PDSCH scheduled by DCI format 1\_0 with CRC scrambled by TC-RNTI
	+ FFS: The transmission timing of HARQ-ACK on PUCCH to contention resolution PDSCH scheduled by DCI format 1\_0 with CRC scrambled by C-RNTI
* The transmission timing of HARQ-ACK on PUCCH to MsgB scheduled by DCI format 1\_0 with CRC scrambled by MsgB-RNTI
	+ FFS: The transmission timing of HARQ-ACK on PUCCH to MsgB scheduled by DCI format 1\_0 with CRC scrambled by C-RNTI

FFS: how to treat additional transmission timings related to fallback DCI formats FFS: how to update this formulation with beam-specific K\_offset if beam-specific K\_offset is agreed to be supportedNote: The mapping ordering and steps may be revisited if multiple CG PUSCH occasions in one CG period is supported |

However, in current spec, the above timing of Msg3 retransmission scheduled by DCI format 0\_0 with CRC scrambled by TC-RNTI is not reflected. |
|  |  |
| ***Summary of change:*** | For the timing specification of PUSCH scheduled by DCI, add the case of PUSCH scheduled by DCI format 0\_0 with CRC scrambled by TC-RNTI and specify that Kcell,offset is used in this case. |
|  |  |
| ***Consequences if not approved:*** | Timing of msg3 retransmission is not defined in NTN case. |

|  |
| --- |
| 6.1.2.1 Resource allocation in time domain**< Unchanged text omitted >**When the UE is scheduled to transmit a transport block and no CSI report by a DCI or by a RAR UL grant or fallbackRAR UL grant, or the UE is scheduled to transmit a transport block and a CSI report(s) on PUSCH by a DCI, the '*Time domain resource assignment'* field value *m* of the DCI or the *PUSCH time resource allocation* field value *m* of the RAR UL grant or of the fallbackRAR UL grant provides a row index *m* + 1to an allocated table. The determination of the used resource allocation table is defined in Clause 6.1.2.1.1. The indexed row defines the slot offset *K2*, the start and length indicator *SLIV*, or directly the start symbol *S* and the allocation length *L*, the PUSCH mapping type, the number of slots used for TBS determination (if *numberOfSlotsTBoMS* is present in the resource allocation table), and the number of repetitions (if *numberOfRepetitions* is present in the resource allocation table) to be applied in the PUSCH transmission.When the UE is scheduled to transmit a PUSCH with no transport block and with a CSI report(s) by a '*CSI request'* field on a DCI, the '*Time domain resource assignment'* field value *m* of the DCI provides a row index *m* + 1to the allocated table as defined in Clause 6.1.2.1.1. The indexed row defines the start and length indicator SLIV, or directly the start symbol *S* and the allocation length *L*, and the PUSCH mapping type to be applied in the PUSCH transmission and the *K2* value is determined as , where  are the corresponding list entries of the higher layer parameter- *reportSlotOffsetListDCI-0-2* or *reportSlotOffsetListDCI-0-2-r17*, if PUSCH is scheduled by DCI format 0\_2 and *reportSlotOffsetListDCI-0-2* or *reportSlotOffsetListDCI-0-2-r17* is configured;- *reportSlotOffsetListDCI-0-1* or *reportSlotOffsetListDCI-0-1-r17*, if PUSCH is scheduled by DCI format 0\_1 and *reportSlotOffsetListDCI-0-1* or *reportSlotOffsetListDCI-0-1-r17* is configured;- *reportSlotOffsetList* or *reportSlotOffsetList-r17*, otherwise;in *CSI-ReportConfig* for the  triggered CSI Reporting Settings and  is the *(m+1)*th entry of  including the omitted CSI Reporting Settings triggered for non-active DL BWPs, where the UE does not expect that *(m+1)* is larger than 16.- The slot *Ks* where the UE shall transmit the PUSCH is determined by *K2* as *Ks* =, if UE is configured with *ca-SlotOffset* for at least one of the scheduled and scheduling cell, $K\_{s}=\left⌊n⋅\frac{2^{μ\_{PUSCH}}}{2^{μ\_{PDCCH}}}\right⌋+K\_{2}+K\_{cell,offset}⋅\frac{2^{μ\_{PUSCH}}}{2^{μ\_{K\_{cell,offset}}}}$, if the scheduling DCI is DCI format 0\_0 with CRC scrambled by TC-RNTI, $K\_{s}=\left⌊n⋅\frac{2^{μ\_{PUSCH}}}{2^{μ\_{PDCCH}}}\right⌋+K\_{2}+K\_{offset}⋅\frac{2^{μ\_{PUSCH}}}{2^{μ\_{K\_{offset}}}}$, otherwise, where $K\_{cell,offset}$ and $K\_{offset}$ are parameters configured by higher layer as specified in clause 4.2 of [6 TS 38.213], and where $μ\_{K\_{cell,offset}}$ and $μ\_{K\_{offset}}$ are the subcarrier spacing configurations for $K\_{cell,offset}$ and $K\_{offset}$, respectively, with a value of 0 for frequency range 1, *n* is the slot with the scheduling DCI, K*2* is based on the numerology of PUSCH,  and  are the subcarrier spacing configurations for PUSCH and PDCCH, respectively.- $N\_{slot, offset, PDCCH}^{CA}$ and $μ\_{offset,PDCCH} $are the$ N\_{slot, offset}^{CA}$ and the, respectively, which are determined by higher-layer configured *ca-SlotOffset* for the cell receiving the PDCCH,$ N\_{slot, offset, PUSCH}^{CA}$ and$ μ\_{offset,PUSCH}$ are the $N\_{slot, offset}^{CA}$ and the,respectively, which are determined by higher-layer configured *ca-SlotOffset* for the cell transmitting the PUSCH, as defined in clause 4.5 of [4, TS 38.211], and- for PUSCH scheduled by DCI format 0\_1, if *pusch-RepTypeIndicatorDCI-0-1* is set to 'pusch-RepTypeB', the UE applies PUSCH repetition Type B procedure when determining the time domain resource allocation. For PUSCH scheduled by DCI format 0\_2, if *pusch-RepTypeIndicatorDCI-0-2* is set to 'pusch-RepTypeB', the UE applies PUSCH repetition Type B procedure when determining the time domain resource allocation. Otherwise, the UE applies PUSCH repetition Type A procedure when determining the time domain resource allocation for PUSCH scheduled by PDCCH, by RAR UL grant, or by fallbackRAR UL grant.- for PUSCH scheduled by DCI format 0\_1 or DCI format 0\_2, if *numberOfSlotsTBoMS* is present and larger than 1, the UE applies TB processing over multiple slots procedure when determining the time domain resource allocation.- For PUSCH repetition Type A and TB processing over multiple slots, the starting symbol *S* relative to the start of the slot, and the number of consecutive symbols *L* counting from the symbol *S* allocated for the PUSCH are determined from the start and length indicator *SLIV* of the indexed row:if  thenelse where, and- For PUSCH repetition Type B, the starting symbol *S* relative to the start of the slot, and the number of consecutive symbols *L* counting from the symbol *S* allocated for the PUSCH are provided by *startSymbol* and *length* of the indexed row of the resource allocation table, respectively.- For PUSCH repetition Type A and TB processing over multiple slots, the PUSCH mapping type is set to Type A or Type B as defined in Clause 6.4.1.1.3 of [4, TS 38.211] as given by the indexed row. - For PUSCH repetition Type B, the PUSCH mapping type is set to Type B.**< Unchanged text omitted >** |

**Companies’ views**

Regarding the draft CR above, the following questions are provided:

Question 1: Do you agree that the timing of Msg3 retransmission is missing in current spec?

|  |  |
| --- | --- |
| Company | Comment |
|  |  |
|  |  |
|  |  |
|  |  |

Question 2: Do you agree with the text proposal in section 2.1? Or any other wording?

|  |  |
| --- | --- |
| Company | Comment |
|  |  |
|  |  |
|  |  |
|  |  |

**Summary**

The final proposals will be added later.

**References**

1. R1-2404238 Correction on timing of Msg3 retransmission in NTN ZTE