**3GPP TSG-RAN WG1 Meeting #112bis-e *R1-230xxxx***

 **E-meeting, 17 – 26 April, 2023**

|  |
| --- |
| *CR-Form-v12.2* |
| **[DRAFT]CHANGE REQUEST** |
|  |
|  | **38.213** | **CR** | **xxx** | **rev** | **-** | **Current version:** | **17.5.0** |  |
|  |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
|  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME | **x** | Radio Access Network | **x** | Core Network |  |

|  |
| --- |
|  |
| ***Title:***  | Draft CR on K1 timing for DCI format 1\_0 |
|  |  |
| ***Source to WG:*** | Moderator (Huawei), CATT |
| ***Source to TSG:*** | R1 |
|  |  |
| ***Work item code:*** | NR\_MBS-Core |  | ***Date:*** | 2023-04-17 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-17 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
|  |  |
| ***Reason for change:*** | In current specification, for Type-1 HARQ-ACK codebook, if a UE is configured to monitor DCI format 1\_1, or/and DCI format 1\_2, the additional K1 set is provided by corresponding higher layer parameters, and the K1 indication in DCI format 1\_0 is restricted to the intersection of the set of default slot timing value and the set of slot timing values provided by $K\_{1}$ for the active DL BWP of a corresponding serving cell. However, when the UE is configured to monitor PDCCH for multicast DCI formats for serving cell c, it’s not clear whether the set of slot timing values provided by $K\_{1}$ for the active DL BWP of a corresponding serving cell includes the $K\_{1}$ for multicast or not. |
|  |  |
| ***Summary of change:*** | If a UE is provided *dl-DataToUL-ACK* or *dl-DataToUL-ACK-r16* or *dl-DataToUL-ACK-DCI-1-2* or *dl-DataToUL-ACK-r17* or *dl-DataToUL-ACK-DCI-1-2-r17*, the UE does not expect to be indicated by DCI format 1\_0 a slot timing value for transmission of HARQ-ACK information that does not belong to the intersection of the set of slot timing values {1, 2, 3, 4, 5, 6, 7, 8} for SCS configuration of PUCCH transmission $μ\leq 3$, {7, 8, 12, 16, 20, 24, 28, 32} for $μ=5$, and {13, 16, 24, 32, 40, 48, 56, 64} for $μ=6$, and the set of slot timing values provided by $K\_{1}$ for the active DL BWP of a corresponding serving cell. **If the UE is configured to monitor PDCCH for multicast DCI formats for serving cell** $c$ **and is provided *fdmed-ReceptionMulticast* or is provided *type1CodebookGenerationMode* = 'mode1', the set of slot timing values provided by** $K\_{1} $**refers to** $K\_{1}$ **set for unicast DCI formats except for DCI format 1\_0; otherwise the set of slot timing values provided by** $K\_{1} $**refers to the union of** $K\_{1}$ **set for both of unicast DCI except for DCI format 1\_0 and multicast DCI formats.** |
|  |  |
| ***Consequences if not approved:*** | The definiation of ‘the set of slot timing values provided by K\_1 for the active DL BWP of a corresponding serving cell’ in the specification is not clear. |
|  |  |
| ***Clauses affected:*** | 9.1.2.1 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

9.1.2.1 Type-1 HARQ-ACK codebook in physical uplink control channel

For a serving cell $c$, an active DL BWP, and an active UL BWP, as described in clause 12, the UE determines a set of $M\_{A,c}$ occasions for candidate PDSCH receptions for which the UE can transmit corresponding HARQ-ACK information in a PUCCH in slot $n\_{U}$. If serving cell $c$ is deactivated, the UE uses as the active DL BWP for determining the set of $M\_{A,c}$ occasions for candidate PDSCH receptions a DL BWP provided by *firstActiveDownlinkBWP-Id*. The determination is based:

a) on a set of slot timing values $K\_{1}$ associated with the active UL BWP on the primary cell or, if the PUCCH transmission is indicated by a DCI format to be on the PUCCH-sSCell as described in clause 9A, on a set of slot timing values $K\_{1}$ associated with the active UL BWP on the PUCCH-sSCell

- If the UE is configured to monitor PDCCH for DCI format 1\_0 and is not configured to monitor PDCCH for either DCI format 1\_1 or DCI format 1\_2 for serving cell $c$, or the active DL BWP for serving cell $c$ is dormant BWP, $K\_{1}$ is provided by the slot timing values {1, 2, 3, 4, 5, 6, 7, 8} for SCS configuration of PUCCH transmission $μ\leq 3$, {7, 8, 12, 16, 20, 24, 28, 32} for $μ=5$, and {13, 16, 24, 32, 40, 48, 56, 64} for $μ=6$

- If the UE is configured to monitor PDCCH for DCI format 1\_1 and is not configured to monitor PDCCH for DCI format 1\_2 for serving cell $c$, $K\_{1}$ is provided by *dl-DataToUL-ACK* or *dl-DataToUL-ACK-r16* or *dl-DataToUL-ACK-r17*

- If the UE is configured to monitor PDCCH for DCI format 1\_2 and is not configured to monitor PDCCH for DCI format 1\_1 for serving cell $c$, $K\_{1}$ is provided by *dl-DataToUL-ACK-DCI-1-2* or *dl-DataToUL-ACK-DCI-1-2-r17*

- If the UE is configured to monitor PDCCH for DCI format 1\_1 and DCI format 1\_2 for serving cell $c$, $K\_{1}$ is provided by the union of *dl-DataToUL-ACK* or *dl-DataToUL-ACK-r16* or *dl-DataToUL-ACK-r17* and *dl-DataToUL-ACK-DCI-1-2* or *dl-DataToUL-ACK-DCI-1-2-r17*

- If an inapplicable value in *dl-DataToUL-ACK-r16* or *dl-DataToUL-ACK-r17* is provided, the value is excluded from $K\_{1}$

- If the UE is configured to monitor PDCCH for multicast DCI formats for serving cell $c$

- if the UE is provided *fdmed-ReceptionMulticast*, $K\_{1}$ for multicast is provided by the union of *dl-DataToUL-ACK* from *pucch-ConfigMulticast1/pucch-ConfigurationListMulticast1* or *pucch-ConfigMulticast2/pucch-ConfigurationListMulticast2* and *dl-DataToUL-ACK-MulticastDCI-Format4-1*

- if the UE is not provided *dl-DataToUL-ACK-ForDCI Format4-1*, $K\_{1}$ is provided by the union of *dl-DataToUL-ACK* from *pucch-ConfigurationListMulticast1* or *pucch-ConfigurationListMulticast2* and the slot timing values {1, 2, 3, 4, 5, 6, 7, 8}

- else if the UE is not provided *type1-Codebook-GenerationMode =* 'mode1', $K\_{1}$ is additionally provided by the union of *dl-DataToUL-ACK* from *pucch-ConfigMulticast1/pucch-ConfigurationListMulticast1* or *pucch-ConfigMulticast2/pucch-ConfigurationListMulticast2* and *dl-DataToUL-ACK-MulticastDCI-Format4-1*

- if the UE is not provided *dl-DataToUL-ACK-MulticastDCI-Format4-1*, $K\_{1}$ is additionally provided by the union of *dl-DataToUL-ACK* from *pucch-ConfigurationListMulticast1 or pucch-ConfigurationListMulticast2* and the slot timing values {1, 2, 3, 4, 5, 6, 7, 8}

- else if the UE is provided *type1-Codebook-GenerationMode =* 'mode1', the UE

- determines a first $K\_{1,UM}$ set as $K\_{1}∩K\_{1,M}$, where $K\_{1,M}$ is a set of slot timing values for the multicast DCI formats, a second $K\_{1,U\M}$ set as $K\_{1}\K\_{1,UM}$, and a third $K\_{1,M\U}$ set as $K\_{1,M}\K\_{1,UM}$

< Unchanged parts are omitted >

A UE does not expect to detect a DCI format switching a DL BWP within $N\_{3}$ symbols prior to a first symbol of a PUCCH transmission where the UE multiplexes HARQ-ACK information, where $N\_{3}$ is defined in clause 9.2.3.

If a UE is provided *dl-DataToUL-ACK* or *dl-DataToUL-ACK-r16* or *dl-DataToUL-ACK-DCI-1-2* or *dl-DataToUL-ACK-r17* or *dl-DataToUL-ACK-DCI-1-2-r17*, the UE does not expect to be indicated by DCI format 1\_0 a slot timing value for transmission of HARQ-ACK information that does not belong to the intersection of the set of slot timing values {1, 2, 3, 4, 5, 6, 7, 8} for SCS configuration of PUCCH transmission $μ\leq 3$, {7, 8, 12, 16, 20, 24, 28, 32} for $μ=5$, and {13, 16, 24, 32, 40, 48, 56, 64} for $μ=6$, and the set of slot timing values provided by $K\_{1}$ for the active DL BWP of a corresponding serving cell. If the UE is configured to monitor PDCCH for multicast DCI formats for serving cell $c$ and is provided *fdmed-ReceptionMulticast* or is provided *type1CodebookGenerationMode* = 'mode1', the set of slot timing values provided by $K\_{1} $refers to $K\_{1}$ set for unicast DCI formats except for DCI format 1\_0; otherwise the set of slot timing values provided by $K\_{1} $refers to the union of $K\_{1}$ set for both of unicast DCI except for DCI format 1\_0 and multicast DCI formats.

< Unchanged parts are omitted >