**3GPP TSG-RAN WG1 #102-e *R1-*** ***2005660***

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

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| *CR-Form-v12.0* |
| **DRAFT CHANGE REQUEST** |
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|  | **38.213** | **CR** | **-** | **rev** | **-** | **Current version:** | **15.10.0** |  |
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| *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)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network | **X** | Core Network |  |

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| ***Title:***  | Correction on the definition for timeline condition |
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| ***Source to WG:*** | CATT |
| ***Source to TSG:*** |  |
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| ***Work item code:*** | NR\_newRAT-Core |  | ***Date:*** | 2020-08-07 |
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| ***Category:*** | F |  | ***Release:*** | Rel-15 |
|  | *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-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* |
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| ***Reason for change:*** | 1. For overlapping of PUCCHs with at least one PUCCH with HARQ-ACK, timeline should be checked based on , which means there may or may not be PUSCH within the group of overlapping PUCCHs and PUSCHs, so it is proposed to add ‘if any’ for ‘all PUSCHs’ in the first and second bullets of timeline condition definition.
2. In the second bullet of timeline condition definition, it is not clear what ‘the UE PDSCH processing capability of the i-th SPS PDSCH release’ is. Since there is no such definition in the specification and the definition of N for the i-th SPS PDSCH release is directly defined in clause 10.2 based on the configuration of PDSCH processing capability, it is sufficient to refer to section 10.2 only without defining ‘the UE PDSCH processing capability of the i-th SPS PDSCH release’.
3. In the third bullet of timeline condition definition, SCS of PDCCH providing the SPS PDSCH release should be also considered to determine the reference for calculation.
4. When a PUCCH carrying CSI/SR overlaps with a PUSCH scheduled by an UL DCI, timeline should be checked based on , which means there may be no PDCCH(s) scheduling the PDSCHs and PDCCH(s) providing the SPS PDSCH releases for calculation, so it is proposed to add ‘if any’ for ‘PDCCHs scheduling the PDSCHs’ and ‘PDCCHs providing the SPS PDSCH releases’ in the third bullet of timeline condition definition when there is at least a PUSCH in the group of overlapping PUCCHs and PUSCHs.
5. Since there is restriction in section 9 that ‘A UE does not expect a PUCCH resource that results from multiplexing overlapped PUCCH resources, if applicable, to overlap with more than one PUSCHs if each of the more than one PUSCHs includes aperiodic CSI reports.’, it means there will be only one PUSCH with A-CSI that overlaps with a PUCCH. To align with section 9, ‘PUSCHs’ in ‘one or more aperiodic CSI reports multiplexed on PUSCHs’ should be changed into ‘PUSCH’.
6. Some typo corrections.
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| ***Summary of change:*** | 1. Add ‘if any’ for ‘all PUSCHs’ in the first and second bullets of timeline condition definition.
2. Remove the descripiton ‘and is selected based on the UE PDSCH processing capability of the i-th SPS PDSCH release’ in the second bullet of timeline condition definition.
3. Add SPS PDSCH release in the third bullet of timeline condition definition.
4. Add ‘if any’ for ‘PDCCHs scheduling the PDSCHs’ and ‘PDCCHs providing the SPS PDSCH releases’ in the third bullet of timeline condition definition when there is at least a PUSCH in the group of overlapping PUCCHs and PUSCHs.
5. Change ‘PUSCHs’ in ‘one or more aperiodic CSI reports multiplexed on PUSCHs’ into ‘PUSCH’.
6. Add ‘the’ for ‘i-th PDSCH’ in the first and second bullets of timeline condition definition, and put ‘s’ of ‘the PDCCHs scheduling the PDSCHs’ into parentheses since for the i-th PUSCH there may be one or more PDSCHs with corresponding PDCCHs scheduling in the third bullet of timeline condition definition when there is at least a PUSCH in the group of overlapping PUCCHs and PUSCHs.
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| ***Consequences if not approved:*** | Unclear or wrong timeline condition definition. |
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| ***Clauses affected:*** | 9.2.5 |
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|  | **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 ...  |
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| ***Other comments:*** | **Isolated impact analysis:**This CR has isolated impact on timeline condition definition for overlpping of PUCCHs or overlapping of PUCCH and PUSCH. If the network is implemented according to the CR and the UE is not, or the UE is implemented according to this CR but the network is not, there may be different understandings between gNB and UE for the timeline definition. However, we think the corrections in this CR are common understandings which may have no impact on both UE and gNB implementation. |
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| ***This CR's revision history:*** |  |

### 9.2.5 UE procedure for reporting multiple UCI types

This Subclause is applicable to the case that a UE has overlapping resources for PUCCH transmissions or for PUCCH and PUSCH transmissions and each PUCCH transmission is over a single slot without repetition. Any case that a PUCCH transmission is with repetitions over multiple slots is described in Subclause 9.2.6. If a UE is configured with multiple PUCCH resources in a slot to transmit CSI reports

- if the UE is not provided *multi-CSI-PUCCH-ResourceList* or if PUCCH resources for transmissions of CSI reports do not overlap in the slot, the UE determines a first resource corresponding to a CSI report with the highest priority [6, TS 38.214]

- if the first resource includes PUCCH format 2, and if there are remaining resources in the slot that do not overlap with the first resource, the UE determines a CSI report with the highest priority, among the CSI reports with corresponding resources from the remaining resources, and a corresponding second resource as an additional resource for CSI reporting

- if the first resource includes PUCCH format 3 or PUCCH format 4, and if there are remaining resources in the slot that include PUCCH format 2 and do not overlap with the first resource, the UE determines a CSI report with the highest priority, among the CSI reports with corresponding resources from the remaining resources, and a corresponding second resource as an additional resource for CSI reporting

- if the UE is provided *multi-CSI-PUCCH-ResourceList* and if any of the multiple PUCCH resources overlap, the UE multiplexes all CSI reports in a resource from the resources provided by *multi-CSI-PUCCH-ResourceList*, as described in Subclause 9.2.5.2.

A UE multiplexes HARQ-ACK information, with or without SR, and CSI resport(s) in a same PUCCH if the UE is provided *simultaneousHARQ-ACK-CSI*; otherwise, the UE drops the CSI report(s) and includes only HARQ-ACK information, with or without SR, in the PUCCH. If the UE would transmit multiple PUCCHs in a slot that include HARQ-ACK information and CSI report(s), the UE expects to be provided a same configuration for *simultaneousHARQ-ACK-CSI* each of PUCCH formats 2, 3, and 4.

If a UE would multiplex CSI reports that include Part 2 CSI reports in a PUCCH resource, the UE determines the PUCCH resource and a number of PRBs for the PUCCH resource or a number of Part 2 CSI reports assuming that each of the CSI reports indicates rank 1.

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 Subclauses 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, the i-th PDSCH, the PUCCH with corresponding HARQ-ACK transmission for the 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. is given by maximum of where for the i-th PDCCH providing the SPS PDSCH release with corresponding HARQ-ACK transmission on a PUCCH which is in the group of overlapping PUCCHs and PUSCHs, , is described in Subclause 10.2 and is selected based on the UE PDSCH processing capability of the i-th SPS PDSCH release 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, the PUCCH with corresponding HARQ-ACK transmission for the i-th SPS PDSCH release, 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 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, the PDCCHs scheduling the PDSCHs, or providing the SPS PDSCH release(s), 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, or the i-th SPS PDSCH release 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, or providing the i-th SPS PDSCH release, 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 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].

If a UE would transmit multiple overlapping PUCCHs in a slot or overlapping PUCCH(s) and PUSCH(s) in a slot, one of the PUCCHs includes HARQ-ACK information in response to an SPS PDSCH reception, and any PUSCH is not in response to a DCI format detection, the UE expects that the first symbol  of the earliest PUCCH or PUSCH satisfies the first of the previous timeline conditions with the exception that components associated to a SCS configuration for a PDCCH scheduling a PDSCH or a PUSCH are absent from the timeline conditions.

A UE does not expect a PUCCH or a PUSCH that is in response to a DCI format detection to overlap with any other PUCCH or PUSCH that does not satisfy the above timing conditions.

If there is one or more aperiodic CSI reports multiplexed on a PUSCH in the group of overlapping PUCCHs and PUSCHs and if symbol  is before symbol  that is a next uplink symbol with CP starting after  after the end of the last symbol of

- the last symbol of aperiodic CSI-RS resource for channel measurements, and

- the last symbol of aperiodic CSI-IM used for interference measurements, and

- the last symbol of aperiodic NZP CSI-RS for interference measurements, when aperiodic CSI-RS is used for channel measurement for triggered CSI report 

the UE is not required to update the CSI report for the triggered CSI report *.* is defined in [6, TS 38.214] and corresponds to the smallest SCS configuration among the SCS configurations of the PDCCHs scheduling the PUSCHs, the smallest SCS configuration of aperiodic CSI-RSs associated with DCI formats provided by the PDCCHs triggering the aperiodic CSI reports, and the smallest SCS configuration of the overlapping PUCCHs and PUSCHs and  for ,  for  and  for .

< Unchanged parts are omitted >