**3GPP TSG-RAN WG1 Meeting #105-e *R1-210xxxx***

**e-Meeting, May 10th - 27th, 2021**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **38.211** | **CR** | **-DRAFT** | **rev** | **-** | **Current version:** | **15.8.0** |  |
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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 channel properties assumption of UL transmission | | | | | | | | | |
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| ***Source to WG:*** | Sharp | | | | | | | | | |
| ***Source to TSG:*** | R1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR newRAT-Core | | | | |  | ***Date:*** | | | 2021-05-27 |
|  |  | | | |  | |  | | |  |
| ***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 can be 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-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | In clause 6.2 of TS38.211, channel properties assumption of UL transmission related to intra-slot frequency hopping (FH) is stated as below. According to the current description, for a physical channel, whether intra-slot FH is enabled or not for a physical channel is based on higher layer parameter.   |  | | --- | | If intra-slot frequency hopping is not enabled by higher layer parameter for a physical channel, the UE transmission shall be such that the channel over which a symbol on the antenna port used for uplink transmission is conveyed can be inferred from the channel over which another symbol on the same antenna port is conveyed if the two symbols correspond to the same slot.  If intra-slot frequency hopping is enabled by higher layer parameter for a physical channel, the UE transmission shall be such that the channel over which a symbol on the antenna port used for uplink transmission is conveyed can be inferred from the channel over which another symbol on the same antenna port is conveyed only if the two symbols correspond to the same frequency hop, regardless of whether the frequency hop distance is zero or not. |   However, for an uplink transmission, intra-slot FH is or isn’t enabled not only based on higher layer parameter but also based on other factors, e.g. DCI field or predefined rule in specification. UL transmissions related to whether intra-slot FH is enabled or is not enabled in Rel-15 were summaried as below.  **Case 1**: PUSCH transmission scheduled by RAR UL grant and Msg3 retransmission. Intra-slot FH is or isn’t enabled for the PUSCH transmission NOT by higher layer parameter but by a ‘frequency hopping flag’ field in the RAR UL grant or DCI format 0\_0.  **Case 2**: PUSCH transmission scheduled by DCI format and Type 2 PUSCH transmission. Higher layer parameter would first enable one of two FH modes, i.e. intra-slot FH and inter-slot FH. Even if intra-slot FH is enabled by higher layer parameter, whether intra-slot FH is enabled or not for PUSCH transmission is eventually based on ‘frequency hopping flag’ field in scheduling DCI format or activation DCI format.  **Case 3**: Type 1 PUSCH transmission. Intra-slot FH is or isn’t enabled by higher layer parameter for Type 1 PUSCH transmission.  **Case 4**: Common PUCCH transmission. Intra-slot FH is always enabled for PUCCH transmission in common PUCCH resources. It has nothing to do with higher layer parameter.  **Case 5**: Dedicated PUCCH transmission. Intra-slot FH is or isn’t enabled by higher layer parameter for PUCCH transmission in dedicated PUCCH resources.  Therefore, the current description of channel property assumption for UL transmission would cause ambitutity on those cases where intra-slot FH is enabled or is not enabled for a physical channel by factors other than higher layer parameter. | | | | | | | | |
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| ***Summary of change:*** | | Remove unnecessary limitation i.e. ‘by higher layer parameter’ in current description to cover all cases above. | | | | | | | | |
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| ***Consequences if not approved:*** | | Unclear UE/gNB behavior on how channel properties assumption of a physical channel should be for the cases when intra-slot FH is or isn’t enabled NOT by higher layer parameter for the physical channel. | | | | | | | | |
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| ***Clauses affected:*** | | 6.2 | | | | | | | | |
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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 the channel properties assumption for UL transmission when intra-slot FH is or isn’t enabled NOT by higher layer parameter for a physical channel. It is to remove unnecessary condition of enabling/not enabling intra-slot FH for a physical channel in order to cover all cases above. The correction is not expected to have any impact on UE and gNB’s implementations. | | | | | | | | |
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| ***This CR's revision history:*** | |  | | | | | | | | |

6.2 Physical resources

The frame structure and physical resources the UE shall use when transmitting in the uplink transmissions are defined in Clause 4.

The following antenna ports are defined for the uplink:

- Antenna ports starting with 0 for demodulation reference signals for PUSCH

- Antenna ports starting with 1000 for SRS, PUSCH

- Antenna ports starting with 2000 for PUCCH

- Antenna port 4000 for PRACH

If intra-slot frequency hopping is not enabled for a physical channel, the UE transmission shall be such that the channel over which a symbol on the antenna port used for uplink transmission is conveyed can be inferred from the channel over which another symbol on the same antenna port is conveyed if the two symbols correspond to the same slot.

If intra-slot frequency hopping is enabled for a physical channel, the UE transmission shall be such that the channel over which a symbol on the antenna port used for uplink transmission is conveyed can be inferred from the channel over which another symbol on the same antenna port is conveyed only if the two symbols correspond to the same frequency hop, regardless of whether the frequency hop distance is zero or not.