**3GPP TSG-RAN WG1 Meeting #110bis-eR1-22xxxx**

**e-Meeting, October 10-19, 2022**

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| *CR-Form-v12.2* | | | | | | | | |
| **[DRAFT] CHANGE REQUEST** | | | | | | | | |
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|  | **38.214** | **CR** |  | **rev** | **-** | **Current version:** | **17.3.0** |  |
|  | | | | | | | | |
| *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)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network | **x** | Core Network |  |

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| ***Title:*** | Draft CR on the max data rate for FDMed MBS and unicast to TS38.214 | | | | | | | | | |
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| ***Source to WG:*** | Moderator (CMCC), Huawei, HiSilicon, CBN, Qualcomm Incorporated | | | | | | | | | |
| ***Source to TSG:*** | R1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_MBS-Core | | | | |  | ***Date:*** | | | 2022-10-12 |
|  |  | | | |  | |  | | |  |
| ***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 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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
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| ***Reason for change:*** | | For UE supports TDMed/FDMed unicast and multicast/broadcast, it is not clear enough whether the current upper bound for the maximum data rate within a cell group or for a given cell is applied to multicast/broadcast. | | | | | | | | |
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| ***Summary of change:*** | | 1. Clarify that the current upper bound for the maximum data rate within a cell group is applied to the cases of unicast and/or multicast/broadcast in a given slot. 2. Clarify that the current upper bound for the maximum data rate for a given cell is applied to the transmission for multicast and is applied to the case of FDM-ed unicast and multicast/broadcast. | | | | | | | | |
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| ***Consequences if not approved:*** | | For the case of TDMed/FDMed unicast and multicast/broadcast, the upper bound for the maximum data rate is missing. | | | | | | | | |
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| ***Clauses affected:*** | | 5.1.3 | | | | | | | | |
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|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **X** | Other core specifications | | | |  | | |
| ***affected:*** | |  | **X** | Test specifications | | | |  | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | |  | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

### 5.1.3 Modulation order, target code rate, redundancy version and transport block size determination

To determine the modulation order, target code rate, and transport block size(s) in the physical downlink shared channel, the UE shall first

- read the 5-bit modulation and coding scheme field (*IMCS*) in the DCI to determine the modulation order (*Qm*) and target code rate (*R*) based on the procedure defined in Clause 5.1.3.1, and

- read '*redundancy version'* field (*rv*) in the DCI to determine the redundancy version.

and second

- the UE shall use the number of layers (ʋ), the total number of allocated PRBs before rate matching (*nPRB*) to determine to the transport block size based on the procedure defined in Clause 5.1.3.2.

The UE may skip decoding a transport block in an initial transmission if the effective channel code rate is higher than 0.95, where the effective channel code rate is defined as the number of downlink information bits (including CRC bits) divided by the number of physical channel bits on PDSCH.

When the UE is scheduled with multiple PDSCHs by a DCI, as described in clause 5.1.2.1, the bits of *rv* field and NDI field, respectively, in the DCI are one-to-one mapped to the scheduled PDSCH(s) indicated by the TDRA information field with the corresponding transport block(s) in the scheduled order, where the LSB bits of the *rv* field and NDI field, respectively, correspond to the last scheduled PDSCH indicated by the TDRA information field.

The UE is not expected to handle any transport blocks (TBs) in a 14 consecutive-symbol duration for normal CP (or 12 for extended CP) ending at the last symbol of the latest PDSCH transmission within an active BWP on a serving cell whenever

where, for the serving cell,

- S is the set of TBs belonging to PDSCH(s) that are partially or fully contained in the consecutive-symbol duration

- for the *i*th TB

*- Ci'* is the number of scheduled code blocks for as defined in [5, 38.212].

*- Li* is the number of OFDM symbols assigned to the PDSCH

*- xi* is the number of OFDM symbols of the PDSCH contained in the consecutive-symbol duration

- based on the values defined in Clause 5.4.2.1 [5, TS 38.212]

- is the starting location of RV for the th transmission

- of the scheduled code blocks for the transmission

- is the circular buffer length

- is the current (re)transmission for the *i*th TB

- corresponds to the subcarrier spacing of the BWP (across all configured BWPs of a carrier) that has the largest configured number of PRBs

- in case there is more than one BWP corresponding to the largest configured number of PRBs, *µ'* follows the BWP with the largest subcarrier spacing.

- corresponds to the subcarrier spacing of the active BWP

- RLBRM = 2/3 as defined in Clause 5.4.2.1 [5, TS 38.212]

- TBSLBRM as defined based on the parameters for unicast in Clause 5.4.2.1 [5, TS 38.212]

- X as defined for downlink max MIMO layer for unicast in Clause 5.4.2.1 [5, TS 38.212].

If the UE skips decoding, the physical layer indicates to higher layer that the transport block is not successfully decoded.

Within a cell group, a UE is not required to handle PDSCH(s) transmissions including unicast and/or multicast/broadcast in slot *sj* in serving cell-*j*, and for *j* = 0,1,2.. *J-1*, slot *sj* overlapping with any given point in time, if the following condition is not satisfied at that point in time:

where,

- *J* is the number of configured serving cells belonging to a frequency range

- for the *j-th* serving cell,

*- M* is the number of TB(s) transmitted in slot *sj*. If there are two PDSCH transmission occasions of the same TB (in time domain or in frequency domain) in the slot *sj*, each transmission occasion is counted separately.

*- Tslotμ(j)* =10-3/2*μ(j)*, where *μ(j)* is the numerology for PDSCH(s) in slot *sj* of the *j*-th serving cell.

- for the *m*-th TB,

*- A* is the number of bits in the transport block as defined in Clause 7.2.1 [5, TS 38.212]

*- C* is the total number of code blocks for the transport block defined in Clause 5.2.2 [5, TS 38.212].

*-*  is the number of scheduled code blocks for the transport block as defined in Clause 5.4.2.1 [5, TS 38.212]

- [Mbps] is computed as the maximum data rate summed over all the carriers in the frequency range for any signaled band combination and feature set consistent with the configured servings cells, where the data rate value is given by the formula in Clause 4.1.2 in [13, TS 38.306], including the scaling factor *f(i).*

For a *j-*th serving cell, if higher layer parameter *processingType2Enabled* of *PDSCH-ServingCellConfig* is configured for the serving cell and set to '*enable',* or if at least one *IMCS >* *W* for a PDSCH for unicast or multicast, where *W* = 28 for MCS tables 5.1.3.1-1 and 5.1.3.1-3, and *W* = 27 for MCS table 5.1.3.1-2, and *W* = 26 for MCS table 5.1.3.1-4, or for a j-th serving cell where UE supports FDM-ed unicast and MBS PDSCH, the UE is not required to handle PDSCH transmissions, if the following condition is not satisfied:

where

- is the number of symbols assigned to the PDSCH(s). For a PDSCH that consists of two PDSCH transmission occasions in time domain in one slot, is the number of symbols of one transmission occasion. For FDMed unicast and MBS PDSCHs in one slot, is the total number of symbols of the unicast and MBS PDSCHs with fully or partially-overlapped in time domain.

- M is the number of TB(s) in the PDSCH(s)

- where *μ* is the numerology of the PDSCH(s)

- for the *m*-th TB,

*- A* is the number of bits in the transport block as defined in Clause 7.2.1 [5, TS 38.212]

*- C* is the total number of code blocks for the transport block defined in Clause 5.2.2 [5, TS 38.212]

*-*  is the number of scheduled code blocks for the transport block as defined in Clause 5.4.2.1 [5, TS 38.212]

- [Mbps] is computed as the maximum data rate for a carrier in the frequency band of the serving cell for any signaled band combination and feature set consistent with the serving cell, where the data rate value is given by the formula in Clause 4.1.2 in [13, TS 38.306], including the scaling factor *f(i).*