**3GPP TSG-RAN WG2 #109-e *R2-200xxxx***

**Electronic meeting, 24th February - 6th March, 2020**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **38.306** | **CR** | **4215** | **rev** | **1** | **Current version:** | **15.8.0** |  |
|  | | | | | | | | |
| *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:*** | Data rate for the case of single carrier standalone operation | | | | | | | | | |
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| ***Source to WG:*** | Ericsson | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_newRAT-Core | | | | |  | ***Date:*** | | | 2019-03-06 |
|  |  | | | |  | |  | | |  |
| ***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-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:*** | | RAN1 agreed a data rate definition for single carrier standalone operation on one carrier, as detailed in the LS R1-1913552. This should be captured in TS 38.306 as suggested by RAN1 in the aforementioned document.  **Impact analysis**  Impacted 5G architecture options: Standalone    Impacted functionality: Supported data rate    Inter-operability: If the network implements the CR and the UE does not, there is no inter-operability issue, if the UE is able to support the data rate described in R1-1913552. If the UE is not able to support the data rate described in R1-1913552, the establishment of RRC connection may fail.  If the UE implements the CR and the network does not, there is no inter-operability issue, since the UE would be able, in any case, to support the data rate described in R1-1913552 or smaller values. | | | | | | | | |
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| ***Summary of change:*** | | 4.1.2 Supported max data rate  - Added data rate requirement for the case of single carrier NR SA operation on one carrier | | | | | | | | |
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| ***Consequences if not approved:*** | | If the data rate for this case remains unspecified, extremely low data rate values may be adopted for initial access in NR, which could lead to T300 expiry and thus failure to establish the RRC connection. | | | | | | | | |
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| ***Clauses affected:*** | | 4.1.2 | | | | | | | | |
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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 ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
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| ***This CR's revision history:*** | | This CR was corrected to improve the wording in the proposed change. | | | | | | | | |

*START OF FIRST CHANGE*

# 4 UE radio access capability parameters

## 4.1 Supported max data rate

### 4.1.1 General

The DL and UL max data rate supported by the UE is calculated by band or band combinations supported by the UE. A UE supporting NR (NR SA, MR-DC) shall support the calculated DL and UL max data rate defined in 4.1.2.

### 4.1.2 Supported max data rate

For NR, the approximate data rate for a given number of aggregated carriers in a band or band combination is computed as follows.



wherein

J is the number of aggregated component carriers in a band or band combination

Rmax = 948/1024

For the j-th CC,

 is the maximum number of supported layers given by higher layer parameter *maxNumberMIMO-LayersPDSCH* for downlink and maximum of higher layer parameters *maxNumberMIMO-LayersCB-PUSCH* and *maxNumberMIMO-LayersNonCB-PUSCH* for uplink.

 is the maximum supported modulation order given by higher layer parameter *supportedModulationOrderDL* for downlink and higher layer parameter *supportedModulationOrderUL* for uplink.

is the scaling factor given by higher layer parameter *scalingFactor* and can take the values 1, 0.8, 0.75, and 0.4.

 is the numerology (as defined in TS 38.211 [6])

 is the average OFDM symbol duration in a subframe for numerology , i.e. . Note that normal cyclic prefix is assumed.

 is the maximum RB allocation in bandwidth  with numerology , as defined in 5.3 TS 38.101-1 [2] and 5.3 TS 38.101-2 [3], where  is the UE supported maximum bandwidth in the given band or band combination.

is the overhead and takes the following values

0.14, for frequency range FR1 for DL

0.18, for frequency range FR2 for DL

0.08, for frequency range FR1 for UL

0.10, for frequency range FR2 for UL

NOTE: Only one of the UL or SUL carriers (the one with the higher data rate) is counted for a cell operating SUL.

The approximate maximum data rate can be computed as the maximum of the approximate data rates computed using the above formula for each of the supported band or band combinations.

For single carrier NR SA operation, the UE shall support a data rate for the carrier that is no smaller than the data rate computed using the above formula, with and component is no smaller than 4.

NOTE: As an example, the value 4 in the component above can correspond to , and .

For EUTRA in case of MR-DC, the approximate data rate for a given number of aggregated carriers in a band or band combination is computed as follows.

Data rate (in Mbps) = 

wherein

J is the number of aggregated EUTRA component carriers in MR-DC band combination

is the total maximum number of DL-SCH transport block bits received within a 1ms TTI for j-th CC, as derived from TS36.213 [19] based on the UE supported maximum MIMO layers for the j-th CC, and based on the maximum modulation order for the j-th CC and number of PRBs based on the bandwidth of the j-th CC according to indicated UE capabilities.

The approximate maximum data rate can be computed as the maximum of the approximate data rates computed using the above formula for each of the supported band or band combinations.

For MR-DC, the approximate maximum data rate is computed as the sum of the approximate maximum data rates from NR and EUTRA.

*END OF FIRST CHANGE*