**3GPP TSG-RAN WG2 Meeting #130 R2-2503684**

**St.Julians, Malta, May 19th – 23rd , 2025**

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| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
|  |
|  | **38.314** | **CR** | **0034** | **rev** | **2** | **Current version:** | **18.0.0** |  |
|  |
| *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 |  | Radio Access Network | **X** | Core Network |  |

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|  |
| ***Title:***  | Introduction of number of UEs in RRC\_INACTIVE state with data transmission |
|  |  |
| ***Source to WG:*** | China Telecom, Huawei, HiSilicon, ZTE Corporation, Sanechips, CATT, Ericsson |
| ***Source to TSG:*** | R2 |
|  |  |
| ***Work item code:*** | PM\_KPI\_5G\_Ph4 |  | ***Date:*** | 2025-05-06 |
|  |  |  |  |  |
| ***Category:*** | B |  | ***Release:*** | Rel-19 |
|  | *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-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* *Rel-20 (Release 20)* |
|  |  |
| ***Reason for change:*** | In the reply LS R2-2501758[S5-250827], SA5 would like RAN2 to specify metrics that can measure the number of RRC\_INACTIVE UEs in a cell with ongoing SDT. SA5 notes that the specific definition in the tables of TS 38.314 clause 4.2.1.3 does not identify and restrict that the UE is in the RRC\_CONNECTED state, but instead can be used generically for both the connected state and inactive state. |
|  |  |
| ***Summary of change:*** | Section 4.2.1.3 and sub-sections are updated to support number of UEs in RRC\_INACTIVE state with data transmission. |
|  |  |
| ***Consequences if not approved:*** | The KPIs on number of UEs in RRC\_INACTIVE state with data transmission reqiured by SA5 are not supported in TS 38.314. |
|  |  |
| ***Clauses affected:*** | 4.2.1.3, 4.2.1.3.1 |
|  |  |
|  | **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:*** | R2-2502248; R2-2503035 in principle agreed in RAN2#129bis |

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| START OF CHANGES |

4.2.1.3 Number of active UEs

4.2.1.3.1 General

The objective of the measurement is to measure the number of active UEs per QoS level for OAM performance observability or for SON functions e.g., mobility load balancing. It is intended to be part of a calculation to determine the bitrate UEs achieve when they are active, i.e. when applications are transmitting and receiving data. The measurements are applicable for both non-split gNB and split gNB deployment scenario.

NOTE: Each measurement specified in section 4.2.1.3.2 through 4.2.1.3.9 is performed by the gNB for active UEs in RRC\_CONNECTED and the UEs in RRC\_INACTIVE with ongoing SDT procedure.

4.2.1.3.2 Mean number of Active UEs in the DL per DRB per cell

Protocol Layer: MAC, RLC

**Table 4.2.1.3.2-1: Definition for Mean number of Active UEs in the DL per DRB per cell**

|  |  |
| --- | --- |
| Definition | Mean number of Active UEs in the DL per DRB per cell. The DRBs are mapped with the same 5QI for NR SA or mapped with the same QCI for EN-DC. This measurement refers to UEs for which there is data available for transmission for the DL for DRBs.Detailed Definition:$M(T,drbid,p)=\frac{\left⌊\frac{\sum\_{∀i}^{}N(i,drbid)}{I(T,p)}\*10\right⌋}{10}$, whereexplanations can be found in the table 4.2.1.3.2-2 below. |

**Table 4.2.1.3.2-2: Parameter description for Mean number of Active UEs in the DL per DRB per cell**

|  |  |
| --- | --- |
| $$M(T,drbid,p)$$ | Mean number of Active UEs in the DL per DRB per cell, averaged during time period $T$. Unit: 0.1. |
| $$N(i,drbid)$$ | Number of UEs for which there is data available for transmission for the DL in MAC or RLC protocol layers for a Data Radio Bearer of traffic class at sampling occasion $i$.Data available for transmission includes data for which HARQ transmission has not yet terminated. |
| $$i$$ | Sampling occasion during time period $T$. A sampling occasion shall occur once every $p$ seconds. |
| $$p$$ | Sampling period length. Unit: second. The sampling period shall be at most 0.1 s. |
| $$I(T,p)$$ | Total number of sampling occasions during time period $T$.  |
| $$T$$ | Time Period during which the measurement is performed, Unit: second. |
| $$drbid$$ | The DRBs mapped with the same 5QI for NR SA or mapped with the same QCI for EN-DC. |

4.2.1.3.3 Max number of Active UEs in the DL per DRB per cell

Protocol Layer: MAC, RLC

**Table 4.2.1.3.3-1: Definition for Max number of Active UEs in the DL per DRB per cell**

|  |  |
| --- | --- |
| Definition | Maximum number of Active UEs in the DL per DRB per cell. The DRBs are mapped with the same 5QI for NR SA or mapped with the same QCI for EN-DC. This measurement refers to UEs for which there is data available for transmission for the DL for DRBs.Detailed Definition:$M(T,drbid,p)=\max\_{T}\left(N\left(i,drbid\right)\right)$, whereexplanations can be found in the table 4.2.1.3.3-2 below. |

**Table 4.2.1.3.3-2: Parameter description for Max number of Active UEs in the DL per DRB per cell**

|  |  |
| --- | --- |
| $$M(T,drbid,p)$$ | Maximum number of Active UEs in the DL per DRB per cell, averaged during time period $T$. Unit: Integer. |
| $$N(i,drbid)$$ | Number of UEs for which there is data available for transmission for the DL in MAC or RLC protocol layers for a Data Radio Bearer of traffic class at sampling occasion $i$.Data available for transmission includes data for which HARQ transmission has not yet terminated. |
| $$i$$ | Sampling occasion during time period $T$. A sampling occasion shall occur once every $p$ seconds. |
| $$p$$ | Sampling period length. Unit: second. The sampling period shall be at most 0.1 s. |
| $$T$$ | Time Period during which the measurement is performed, Unit: second. |
| $$drbid$$ | The DRBs mapped with the same 5QI for NR SA or mapped with the same QCI for EN-DC. |

4.2.1.3.4 Mean number of Active UEs in the UL per DRB per cell

Protocol Layer: MAC

**Table 4.2.1.3.4-1: Definition for Mean number of Active UEs in the UL per DRB per cell**

|  |  |
| --- | --- |
| Definition | Mean number of Active UEs in the UL per DRB per cell. The DRBs are mapped with the same 5QI for NR SA or mapped with the same QCI for EN-DC. This measurement refers to UEs for which there is data available for transmission for the UL for DRBs.Detailed Definition:$M(T,drbid,p)=\frac{\left⌊\frac{\sum\_{∀i}^{}N(i,drbid)}{I(T,p)}\*10\right⌋}{10}, $whereexplanations can be found in the table 4.2.1.3.4-2 below. |

NOTE: For this measurement, the expected accuracy is dependent on application scenario, cell load, UE configuration and how DRBs are distributed over logical channel groups.

**Table 4.2.1.3.4-2: Parameter description for Mean number of Active UEs in the UL per DRB per cell**

|  |  |
| --- | --- |
| $$M(T,drbid,p)$$ | Mean number of Active UEs in the UL per DRB per cell, averaged during time period $T$. Unit: 0.1. |
| $$N(i,drbid)$$ | Number of UEs for which there is data available for transmission for the UL in MAC or RLC protocol layers for a Data Radio Bearer of traffic class at sampling occasion $i$This is a gNB estimation that is expected to be based on Buffer Status Reporting, provided configured grants and progress of ongoing HARQ transmissions (by including data for which HARQ transmission has not yet terminated).In addition, the gNB can use the analysis of received data in the estimation. In such case, when DRB cannot be determined at the time of the sampling occasion, gNB can determine DRB after successful reception of data. |
| $$i$$ | Sampling occasion during time period $T$. A sampling occasion shall occur once every $p$ seconds. |
| $$p$$ | Sampling period length. Unit: second. The sampling period shall be at most 0.1 s.  |
| $$I(T,p)$$ | Total number of sampling occasions during time period $T$.  |
| $$T$$ | Time Period during which the measurement is performed, Unit: second. |
| $$drbid$$ | The DRBs mapped with the same 5QI for NR SA or mapped with the same QCI for EN-DC. |

4.2.1.3.5 Max number of Active UEs in the UL per DRB per cell

Protocol Layer: MAC

**Table 4.2.1.3.5-1: Definition for Max number of Active UEs in the UL per DRB per cell**

|  |  |
| --- | --- |
| Definition | Maximum number of Active UEs in the UL per DRB per cell. The DRBs are mapped with the same 5QI for NR SA or mapped with the same QCI for EN-DC. This measurement refers to UEs for which there is data available for transmission for the UL for DRBs.Detailed Definition:$M\left(T,drbid,p\right)=\max\_{T}\left(N\left(i,drbid\right)\right)$, whereexplanations can be found in the table 4.2.1.3.5-2 below. |

NOTE: For this measurement, the expected accuracy is dependent on application scenario, cell load, UE configuration and how DRBs are distributed over logical channel groups.

**Table 4.2.1.3.5-2: Parameter description for Max number of Active UEs in the UL per DRB per cell**

|  |  |
| --- | --- |
| $$M(T,drbid,p)$$ | Maximum number of Active UEs in the UL per DRB per cell, averaged during time period $T$. Unit: Integer. |
| $$N(i,drbid)$$ | Number of UEs for which there is data available for transmission for the UL in MAC or RLC protocol layers for a Data Radio Bearer of traffic class at sampling occasion $i$This is a gNB estimation that is expected to be based on Buffer Status Reporting, provided configured grants and progress of ongoing HARQ transmissions (by including data for which HARQ transmission has not yet terminated).In addition, the gNB can use the analysis of received data in the estimation. In such case, when DRB cannot be determined at the time of the sampling occasion, gNB can determine DRB after successful reception of data. |
| $$i$$ | Sampling occasion during time period $T$. A sampling occasion shall occur once every $p$ seconds. |
| $$p$$ | Sampling period length. Unit: second. The sampling period shall be at most 0.1 s.  |
| $$T$$ | Time Period during which the measurement is performed, Unit: second. |
| $$drbid$$ | The DRBs mapped with the same 5QI for NR SA or mapped with the same QCI for EN-DC. |

4.2.1.3.6 Mean number of Active UEs per cell

Protocol Layer: MAC, RLC

**Table 4.2.1.3.6-1: Definition for Mean number of Active UEs per cell**

|  |  |
| --- | --- |
| Definition | Mean number of Active UEs per cell. This measurement refers to UEs for which there is data available for transmission for the UL for DRBs, or there is data available for transmission for the DL for DRBs, or both.Detailed Definition:$M(T,p)=\frac{\left⌊\frac{\sum\_{∀i}^{}N(i)}{I(T,p)}\*10\right⌋}{10}, $whereexplanations can be found in the table 4.2.1.3.6-2 below. |

NOTE: For this measurement, the expected accuracy is dependent on application scenario, cell load, UE configuration and how DRBs are distributed over logical channel groups.

**Table 4.2.1.3.6-2: Parameter description for Mean number of Active UEs per cell**

|  |  |
| --- | --- |
| $$M(T,p)$$ | Mean number of Active UEs per cell, averaged during time period $T$. Unit: 0.1. |
| $$N(i)$$ | Number of UEs for which there is data available for transmission for the UL or for the DL or for both in MAC or RLC protocol layers at sampling occasion $i$For UL, this is a gNB estimation that is expected to be based on Buffer Status Reporting, provided configured grants and progress of ongoing HARQ transmissions (by including data for which HARQ transmission has not yet terminated). In addition, the gNB can use the analysis of received data in the estimation. |
| $$i$$ | Sampling occasion during time period $T$. A sampling occasion shall occur once every $p$ seconds. |
| $$p$$ | Sampling period length. Unit: second. The sampling period shall be at most 0.1 s.  |
| $$I(T,p)$$ | Total number of sampling occasions during time period $T$.  |
| $$T$$ | Time Period during which the measurement is performed, Unit: second. |

4.2.1.3.7 Max number of Active UEs per cell

Protocol Layer: MAC, RLC

**Table 4.2.1.3.7-1: Definition for Max number of Active UEs per cell**

|  |  |
| --- | --- |
| Definition | Maximum number of Active UEs per cell. This measurement refers to UEs for which there is data available for transmission for the UL for DRBs, or there is data available for transmission for the DL for DRBs, or both.Detailed Definition:$M(T,p)=\max\_{T}\left(N\left(i\right)\right)$, whereexplanations can be found in the table 4.2.1.3.7-2 below. |

NOTE: For this measurement, the expected accuracy is dependent on application scenario, cell load, UE configuration and how DRBs are distributed over logical channel groups.

**Table 4.2.1.3.7-2: Parameter description for Max number of Active UEs per cell**

|  |  |
| --- | --- |
| $$M(T,p)$$ | Maximum number of Active UEs per cell, averaged during time period $T$. Unit: Integer. |
| $$N(i)$$ | Number of UEs for which there is data available for transmission for the UL or for the DL or for both in MAC or RLC protocol layers at sampling occasion $i$For UL, this is a gNB estimation that is expected to be based on Buffer Status Reporting, provided configured grants and progress of ongoing HARQ transmissions (by including data for which HARQ transmission has not yet terminated). In addition, the gNB can use the analysis of received data in the estimation. |
| $$i$$ | Sampling occasion during time period $T$. A sampling occasion shall occur once every $p$ seconds. |
| $$p$$ | Sampling period length. Unit: second. The sampling period shall be at most 0.1 s.  |
| $$T$$ | Time Period during which the measurement is performed, Unit: second. |

4.2.1.3.8 Mean number of Active UEs per DRB per cell

Protocol Layer: MAC, RLC

**Table 4.2.1.3.8-1: Definition for Mean number of Active UEs per DRB per cell**

|  |  |
| --- | --- |
| Definition | Mean number of Active UEs per DRB per cell. The DRBs are mapped with the same 5QI for NR SA or mapped with the same QCI for EN-DC. This measurement refers to UEs for which there is data available for transmission for the UL for DRBs, or there is data available for transmission for the DL for DRBs, or both.Detailed Definition:$M(T,drbid,p)=\frac{\left⌊\frac{\sum\_{∀i}^{}N(i,drbid)}{I(T,p)}\*10\right⌋}{10}$, whereexplanations can be found in the table 4.2.1.3.8-2 below. |

NOTE: For this measurement, the expected accuracy is dependent on application scenario, cell load, UE configuration and how DRBs are distributed over logical channel groups.

**Table 4.2.1.3.8-2: Parameter description for Mean number of Active UEs per DRB per cell**

|  |  |
| --- | --- |
| $$M(T,drbid,p)$$ | Mean number of Active UEs per DRB per cell, averaged during time period $T$. Unit: 0.1. |
| $$N(i,drbid)$$ | Number of UEs for which there is data available for transmission for the UL or for the DL or for both in MAC or RLC protocol layers for a Data Radio Bearer of traffic class at sampling occasion $i$For UL, this is a gNB estimation that is expected to be based on Buffer Status Reporting, provided configured grants and progress of ongoing HARQ transmissions (by including data for which HARQ transmission has not yet terminated). In addition, the gNB can use the analysis of received data in the estimation. In such case, when DRB cannot be determined at the time of the sampling occasion, gNB can determine DRB after successful reception of data. |
| $$i$$ | Sampling occasion during time period $T$. A sampling occasion shall occur once every $p$ seconds. |
| $$p$$ | Sampling period length. Unit: second. The sampling period shall be at most 0.1 s.  |
| $$I(T,p)$$ | Total number of sampling occasions during time period $T$.  |
| $$T$$ | Time Period during which the measurement is performed, Unit: second. |
| $$drbid$$ | The DRBs mapped with the same 5QI for NR SA or mapped with the same QCI for EN-DC. |

4.2.1.3.9 Max number of Active UEs per DRB per cell

Protocol Layer: MAC, RLC

**Table 4.2.1.3.9-1: Definition for Max number of Active UEs per DRB per cell**

|  |  |
| --- | --- |
| Definition | Maximum number of Active UEs per DRB per cell. The DRBs are mapped with the same 5QI for NR SA or mapped with the same QCI for EN-DC. This measurement refers to UEs for which there is data available for transmission for the UL for DRBs, or there is data available for transmission for the DL for DRBs, or both.Detailed Definition:$M(T,drbid,p)=\max\_{T}\left(N\left(i,drbid\right)\right)$, whereexplanations can be found in the table 4.2.1.3.9-1 below. |

NOTE: For this measurement, the expected accuracy is dependent on application scenario, cell load, UE configuration and how DRBs are distributed over logical channel groups.

**Table 4.2.1.3.9-2: Parameter description for Max number of Active UEs per DRB per cell**

|  |  |
| --- | --- |
| $$M(T,drbid,p)$$ | Maximum number of Active UEs per DRB per cell, averaged during time period $T$. Unit: Integer. |
| $$N(i,drbid)$$ | Number of UEs for which there is data available for transmission for the UL or for the DL or for both in MAC or RLC protocol layers for a Data Radio Bearer of traffic class at sampling occasion $i$For UL, this is a gNB estimation that is expected to be based on Buffer Status Reporting, provided configured grants and progress of ongoing HARQ transmissions (by including data for which HARQ transmission has not yet terminated). In addition, the gNB can use the analysis of received data in the estimation. In such case, when DRB cannot be determined at the time of the sampling occasion, gNB can determine DRB after successful reception of data. |
| $$i$$ | Sampling occasion during time period $T$. A sampling occasion shall occur once every $p$ seconds. |
| $$p$$ | Sampling period length. Unit: second. The sampling period shall be at most 0.1 s.  |
| $$T$$ | Time Period during which the measurement is performed, Unit: second. |
| $$drbid$$ | The DRBs mapped with the same 5QI for NR SA or mapped with the same QCI for EN-DC. |

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| CHANGE END |

# RAN3 agreement (in green)

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|                                        **Number of UEs in RRC\_INACTIVE state** |
| E///: Loading balance should not be impacted. The changed made by RAN2 is not proper.HW: Should not impact legacy RAN3 feature. Either clarify in our RAN3 spec or send LS to RAN2 for clarificationSS: Current RAN3 spec is clear and fine to send LS to RAN2 for further clarification**The legacy RAN3 features including Mobility Load Balance and AI/ML Load Balance should not be impacted by the potential redefinition of Number of active UEs, namely Number of active UEs refers to RRC Connected only.****CB: # 3\_NumberofActiveUEs****- Work on the LS to RAN2 based on RAN3 agreement above to avoid impact on legacy RAN3 features in** [**R3-253755**](Inbox/R3-253755.zip)(moderator - Nok) |

# RAN3 progress on the reply LS (draft version)

**1. Overall Description:**

RAN3 thanks RAN2 for their LS relative to in principle agreed redefinition of the Number of Active UEs measurement in TS 38.314 (CR#0034r1 in R2-2503035).

RAN3 has agreed that the legacy RAN3 features including Mobility Load Balancing and AI/ML Load Balancing should not be impacted by the potential redefinition of Number of Active UEs, namely Number of Active UEs refers to RRC\_CONNECTED UEs only. Therefore, RAN3 kindly requests RAN2 to leave the existing measurement in TS 38.314 as it is, and to define a new separate measurement specific for the number of RRC\_INACTIVE UEs in a cell with ongoing SDT.

**2. Actions:**

**To RAN2 :** RAN3 respectfully requests RAN2 to take the above into account and further inform RAN3 about related updates of TS 38.314.

# Option 1 (a new section and general descriptions. Changes are highlighted)

4.2.1.3a Number of active UEs in RRC\_INACTIVE with ongoing SDT procedure

The objective of the measurement is to measure the number of active UEs in RRC\_INACTIVE with ongoing SDT procedure, and it is per QoS level for OAM performance observability. It is intended to be part of a calculation to determine the bitrate UEs achieve when they are active, i.e. when applications are transmitting and receiving data. The measurements are applicable for both non-split gNB and split gNB deployment scenario. Each measurement definition specified in section 4.2.1.3.2 through 4.2.1.3.9 is also applicable for a corresponding measurement of the UEs in RRC\_INACTIVE with ongoing SDT procedure.

# Option 2 (a new section and descriptions for each sub-section. Changes are highlighted)

#### 4.2.1.3a Number of active UEs in RRC\_INACTIVE with ongoing SDT procedure

##### 4.2.1.3a.1 General

The objective of the measurement is to measure the number of active UEs in RRC\_INACTIVE with ongoing SDT procedure, and it is per QoS level for OAM performance observability. It is intended to be part of a calculation to determine the bitrate UEs achieve when they are active, i.e. when applications are transmitting and receiving data. The measurements are applicable for both non-split gNB and split gNB deployment scenario.

4.2.1.3a.2 Mean number of Active UEs in the DL per DRB per cell

The measurement specified in section 4.2.1.3.2 is applicable for measurement on the UEs in RRC\_INACTIVE with ongoing SDT procedure.

##### 4.2.1.3a.3 Max number of Active UEs in the DL per DRB per cell

The measurement specified in section 4.2.1.3.3 is applicable for measurement on the UEs in RRC\_INACTIVE with ongoing SDT procedure.

##### 4.2.1.3a.4 Mean number of Active UEs in the UL per DRB per cell

The measurement specified in section 4.2.1.3.4 is applicable for measurement on the UEs in RRC\_INACTIVE with ongoing SDT procedure.

##### 4.2.1.3a.5 Max number of Active UEs in the UL per DRB per cell

The measurement specified in section 4.2.1.3.5 is applicable for measurement on the UEs in RRC\_INACTIVE with ongoing SDT procedure.

##### 4.2.1.3a.6 Mean number of Active UEs per cell

The measurement specified in section 4.2.1.3.6 is applicable for measurement on the UEs in RRC\_INACTIVE with ongoing SDT procedure.

##### 4.2.1.3a.7 Max number of Active UEs per cell

The measurement specified in section 4.2.1.3.7 is applicable for measurement on the UEs in RRC\_INACTIVE with ongoing SDT procedure.

##### 4.2.1.3a.8 Mean number of Active UEs per DRB per cell

The measurement specified in section 4.2.1.3.8 is applicable for measurement on the UEs in RRC\_INACTIVE with ongoing SDT procedure.

##### 4.2.1.3a.9 Max number of Active UEs per DRB per cell

The measurement specified in section 4.2.1.3.9 is applicable for measurement on the UEs in RRC\_INACTIVE with ongoing SDT procedure.

# Option 3 (a new section and almost copy/paste of the existing ones with minor updates. Changes are highlighted)

#### 4.2.1.3a Number of active UEs in RRC\_INACTIVE with ongoing SDT procedure

##### 4.2.1.3a.1 General

The objective of the measurement is to measure the number of active UEs in RRC\_INACTIVE with ongoing SDT procedure, and it is per QoS level for OAM performance observability. It is intended to be part of a calculation to determine the bitrate UEs achieve when they are active, i.e. when applications are transmitting and receiving data. The measurements are applicable for both non-split gNB and split gNB deployment scenario.

##### 4.2.1.3a.2 Mean number of Active UEs in the DL per DRB per cell

Protocol Layer: MAC, RLC

Table 4.2.1.3a.2-1: Definition for Mean number of Active UEs in the DL per DRB per cell

|  |  |
| --- | --- |
| Definition | Mean number of Active UEs in the DL per DRB per cell. The DRBs are mapped with the same 5QI for NR SA ~~or mapped with the same QCI for EN-DC~~. This measurement refers to UEs for which there is data available for transmission for the DL for DRBs.Detailed Definition:$M(T,drbid,p)=\frac{\left⌊\frac{\sum\_{∀i}^{}N(i,drbid)}{I(T,p)}\*10\right⌋}{10}$, whereexplanations can be found in the table 4.2.1.3a.2-2 below. |

Table 4.2.1.3a.2-2: Parameter description for Mean number of Active UEs in the DL per DRB per cell

|  |  |
| --- | --- |
| $$M(T,drbid,p)$$ | Mean number of Active UEs in the DL per DRB per cell, averaged during time period $T$. Unit: 0.1. |
| $$N(i,drbid)$$ | Number of UEs for which there is data available for transmission for the DL in MAC or RLC protocol layers for a Data Radio Bearer of traffic class at sampling occasion $i$.Data available for transmission includes data for which HARQ transmission has not yet terminated. |
| $$i$$ | Sampling occasion during time period $T$. A sampling occasion shall occur once every $p$ seconds. |
| $$p$$ | Sampling period length. Unit: second. The sampling period shall be at most 0.1 s. |
| $$I(T,p)$$ | Total number of sampling occasions during time period $T$.  |
| $$T$$ | Time Period during which the measurement is performed, Unit: second. |
| $$drbid$$ | The DRBs mapped with the same 5QI for NR SA ~~or mapped with the same QCI for EN-DC~~. |

##### 4.2.1.3a.3 Max number of Active UEs in the DL per DRB per cell

Protocol Layer: MAC, RLC

Table 4.2.1.3a.3-1: Definition for Max number of Active UEs in the DL per DRB per cell

|  |  |
| --- | --- |
| Definition | Maximum number of Active UEs in the DL per DRB per cell. The DRBs are mapped with the same 5QI for NR SA ~~or mapped with the same QCI for EN-DC~~. This measurement refers to UEs for which there is data available for transmission for the DL for DRBs.Detailed Definition:$M(T,drbid,p)=\max\_{T}\left(N\left(i,drbid\right)\right)$, whereexplanations can be found in the table 4.2.1.3a.3-2 below. |

Table 4.2.1.3a.3-2: Parameter description for Max number of Active UEs in the DL per DRB per cell

|  |  |
| --- | --- |
| $$M(T,drbid,p)$$ | Maximum number of Active UEs in the DL per DRB per cell, averaged during time period $T$. Unit: Integer. |
| $$N(i,drbid)$$ | Number of UEs for which there is data available for transmission for the DL in MAC or RLC protocol layers for a Data Radio Bearer of traffic class at sampling occasion $i$.Data available for transmission includes data for which HARQ transmission has not yet terminated. |
| $$i$$ | Sampling occasion during time period $T$. A sampling occasion shall occur once every $p$ seconds. |
| $$p$$ | Sampling period length. Unit: second. The sampling period shall be at most 0.1 s. |
| $$T$$ | Time Period during which the measurement is performed, Unit: second. |
| $$drbid$$ | The DRBs mapped with the same 5QI for NR SA ~~or mapped with the same QCI for EN-DC~~. |

##### 4.2.1.3a.4 Mean number of Active UEs in the UL per DRB per cell

Protocol Layer: MAC

Table 4.2.1.3a.4-1: Definition for Mean number of Active UEs in the UL per DRB per cell

|  |  |
| --- | --- |
| Definition | Mean number of Active UEs in the UL per DRB per cell. The DRBs are mapped with the same 5QI for NR SA ~~or mapped with the same QCI for EN-DC~~. This measurement refers to UEs for which there is data available for transmission for the UL for DRBs.Detailed Definition:$M(T,drbid,p)=\frac{\left⌊\frac{\sum\_{∀i}^{}N(i,drbid)}{I(T,p)}\*10\right⌋}{10}, $whereexplanations can be found in the table 4.2.1.3a.4-2 below. |

NOTE: For this measurement, the expected accuracy is dependent on application scenario, cell load, UE configuration and how DRBs are distributed over logical channel groups.

Table 4.2.1.3a.4-2: Parameter description for Mean number of Active UEs in the UL per DRB per cell

|  |  |
| --- | --- |
| $$M(T,drbid,p)$$ | Mean number of Active UEs in the UL per DRB per cell, averaged during time period $T$. Unit: 0.1. |
| $$N(i,drbid)$$ | Number of UEs for which there is data available for transmission for the UL in MAC or RLC protocol layers for a Data Radio Bearer of traffic class at sampling occasion $i$This is a gNB estimation that is expected to be based on Buffer Status Reporting, provided configured grants and progress of ongoing HARQ transmissions (by including data for which HARQ transmission has not yet terminated).In addition, the gNB can use the analysis of received data in the estimation. In such case, when DRB cannot be determined at the time of the sampling occasion, gNB can determine DRB after successful reception of data. |
| $$i$$ | Sampling occasion during time period $T$. A sampling occasion shall occur once every $p$ seconds. |
| $$p$$ | Sampling period length. Unit: second. The sampling period shall be at most 0.1 s.  |
| $$I(T,p)$$ | Total number of sampling occasions during time period $T$.  |
| $$T$$ | Time Period during which the measurement is performed, Unit: second. |
| $$drbid$$ | The DRBs mapped with the same 5QI for NR SA ~~or mapped with the same QCI for EN-DC~~. |

##### 4.2.1.3a.5 Max number of Active UEs in the UL per DRB per cell

Protocol Layer: MAC

Table 4.2.1.3a.5-1: Definition for Max number of Active UEs in the UL per DRB per cell

|  |  |
| --- | --- |
| Definition | Maximum number of Active UEs in the UL per DRB per cell. The DRBs are mapped with the same 5QI for NR SA ~~or mapped with the same QCI for EN-DC~~. This measurement refers to UEs for which there is data available for transmission for the UL for DRBs.Detailed Definition:$M\left(T,drbid,p\right)=\max\_{T}\left(N\left(i,drbid\right)\right)$, whereexplanations can be found in the table 4.2.1.3a.5-2 below. |

NOTE: For this measurement, the expected accuracy is dependent on application scenario, cell load, UE configuration and how DRBs are distributed over logical channel groups.

Table 4.2.1.3a.5-2: Parameter description for Max number of Active UEs in the UL per DRB per cell

|  |  |
| --- | --- |
| $$M(T,drbid,p)$$ | Maximum number of Active UEs in the UL per DRB per cell, averaged during time period $T$. Unit: Integer. |
| $$N(i,drbid)$$ | Number of UEs for which there is data available for transmission for the UL in MAC or RLC protocol layers for a Data Radio Bearer of traffic class at sampling occasion $i$This is a gNB estimation that is expected to be based on Buffer Status Reporting, provided configured grants and progress of ongoing HARQ transmissions (by including data for which HARQ transmission has not yet terminated).In addition, the gNB can use the analysis of received data in the estimation. In such case, when DRB cannot be determined at the time of the sampling occasion, gNB can determine DRB after successful reception of data. |
| $$i$$ | Sampling occasion during time period $T$. A sampling occasion shall occur once every $p$ seconds. |
| $$p$$ | Sampling period length. Unit: second. The sampling period shall be at most 0.1 s.  |
| $$T$$ | Time Period during which the measurement is performed, Unit: second. |
| $$drbid$$ | The DRBs mapped with the same 5QI for NR SA ~~or mapped with the same QCI for EN-DC~~. |

##### 4.2.1.3a.6 Mean number of Active UEs per cell

Protocol Layer: MAC, RLC

Table 4.2.1.3a.6-1: Definition for Mean number of Active UEs per cell

|  |  |
| --- | --- |
| Definition | Mean number of Active UEs per cell. This measurement refers to UEs for which there is data available for transmission for the UL for DRBs, or there is data available for transmission for the DL for DRBs, or both.Detailed Definition:$M(T,p)=\frac{\left⌊\frac{\sum\_{∀i}^{}N(i)}{I(T,p)}\*10\right⌋}{10}, $whereexplanations can be found in the table 4.2.1.3a.6-2 below. |

NOTE: For this measurement, the expected accuracy is dependent on application scenario, cell load, UE configuration and how DRBs are distributed over logical channel groups.

Table 4.2.1.3a.6-2: Parameter description for Mean number of Active UEs per cell

|  |  |
| --- | --- |
| $$M(T,p)$$ | Mean number of Active UEs per cell, averaged during time period $T$. Unit: 0.1. |
| $$N(i)$$ | Number of UEs for which there is data available for transmission for the UL or for the DL or for both in MAC or RLC protocol layers at sampling occasion $i$For UL, this is a gNB estimation that is expected to be based on Buffer Status Reporting, provided configured grants and progress of ongoing HARQ transmissions (by including data for which HARQ transmission has not yet terminated). In addition, the gNB can use the analysis of received data in the estimation. |
| $$i$$ | Sampling occasion during time period $T$. A sampling occasion shall occur once every $p$ seconds. |
| $$p$$ | Sampling period length. Unit: second. The sampling period shall be at most 0.1 s.  |
| $$I(T,p)$$ | Total number of sampling occasions during time period $T$.  |
| $$T$$ | Time Period during which the measurement is performed, Unit: second. |

##### 4.2.1.3a.7 Max number of Active UEs per cell

Protocol Layer: MAC, RLC

Table 4.2.1.3a.7-1: Definition for Max number of Active UEs per cell

|  |  |
| --- | --- |
| Definition | Maximum number of Active UEs per cell. This measurement refers to UEs for which there is data available for transmission for the UL for DRBs, or there is data available for transmission for the DL for DRBs, or both.Detailed Definition:$M(T,p)=\max\_{T}\left(N\left(i\right)\right)$, whereexplanations can be found in the table 4.2.1.3a.7-2 below. |

NOTE: For this measurement, the expected accuracy is dependent on application scenario, cell load, UE configuration and how DRBs are distributed over logical channel groups.

Table 4.2.1.3a.7-2: Parameter description for Max number of Active UEs per cell

|  |  |
| --- | --- |
| $$M(T,p)$$ | Maximum number of Active UEs per cell, averaged during time period $T$. Unit: Integer. |
| $$N(i)$$ | Number of UEs for which there is data available for transmission for the UL or for the DL or for both in MAC or RLC protocol layers at sampling occasion $i$For UL, this is a gNB estimation that is expected to be based on Buffer Status Reporting, provided configured grants and progress of ongoing HARQ transmissions (by including data for which HARQ transmission has not yet terminated). In addition, the gNB can use the analysis of received data in the estimation. |
| $$i$$ | Sampling occasion during time period $T$. A sampling occasion shall occur once every $p$ seconds. |
| $$p$$ | Sampling period length. Unit: second. The sampling period shall be at most 0.1 s.  |
| $$T$$ | Time Period during which the measurement is performed, Unit: second. |

##### 4.2.1.3a.8 Mean number of Active UEs per DRB per cell

Protocol Layer: MAC, RLC

Table 4.2.1.3a.8-1: Definition for Mean number of Active UEs per DRB per cell

|  |  |
| --- | --- |
| Definition | Mean number of Active UEs per DRB per cell. The DRBs are mapped with the same 5QI for NR SA ~~or mapped with the same QCI for EN-DC~~. This measurement refers to UEs for which there is data available for transmission for the UL for DRBs, or there is data available for transmission for the DL for DRBs, or both.Detailed Definition:$M(T,drbid,p)=\frac{\left⌊\frac{\sum\_{∀i}^{}N(i,drbid)}{I(T,p)}\*10\right⌋}{10}$, whereexplanations can be found in the table 4.2.1.3a.8-2 below. |

NOTE: For this measurement, the expected accuracy is dependent on application scenario, cell load, UE configuration and how DRBs are distributed over logical channel groups.

Table 4.2.1.3a.8-2: Parameter description for Mean number of Active UEs per DRB per cell

|  |  |
| --- | --- |
| $$M(T,drbid,p)$$ | Mean number of Active UEs per DRB per cell, averaged during time period $T$. Unit: 0.1. |
| $$N(i,drbid)$$ | Number of UEs for which there is data available for transmission for the UL or for the DL or for both in MAC or RLC protocol layers for a Data Radio Bearer of traffic class at sampling occasion $i$For UL, this is a gNB estimation that is expected to be based on Buffer Status Reporting, provided configured grants and progress of ongoing HARQ transmissions (by including data for which HARQ transmission has not yet terminated). In addition, the gNB can use the analysis of received data in the estimation. In such case, when DRB cannot be determined at the time of the sampling occasion, gNB can determine DRB after successful reception of data. |
| $$i$$ | Sampling occasion during time period $T$. A sampling occasion shall occur once every $p$ seconds. |
| $$p$$ | Sampling period length. Unit: second. The sampling period shall be at most 0.1 s.  |
| $$I(T,p)$$ | Total number of sampling occasions during time period $T$.  |
| $$T$$ | Time Period during which the measurement is performed, Unit: second. |
| $$drbid$$ | The DRBs mapped with the same 5QI for NR SA ~~or mapped with the same QCI for EN-DC~~. |

##### 4.2.1.3a.9 Max number of Active UEs per DRB per cell

Protocol Layer: MAC, RLC

Table 4.2.1.3a.9-1: Definition for Max number of Active UEs per DRB per cell

|  |  |
| --- | --- |
| Definition | Maximum number of Active UEs per DRB per cell. The DRBs are mapped with the same 5QI for NR SA ~~or mapped with the same QCI for EN-DC~~. This measurement refers to UEs for which there is data available for transmission for the UL for DRBs, or there is data available for transmission for the DL for DRBs, or both.Detailed Definition:$M(T,drbid,p)=\max\_{T}\left(N\left(i,drbid\right)\right)$, whereexplanations can be found in the table 4.2.1.3a.9-1 below. |

NOTE: For this measurement, the expected accuracy is dependent on application scenario, cell load, UE configuration and how DRBs are distributed over logical channel groups.

Table 4.2.1.3a.9-2: Parameter description for Max number of Active UEs per DRB per cell

|  |  |
| --- | --- |
| $$M(T,drbid,p)$$ | Maximum number of Active UEs per DRB per cell, averaged during time period $T$. Unit: Integer. |
| $$N(i,drbid)$$ | Number of UEs for which there is data available for transmission for the UL or for the DL or for both in MAC or RLC protocol layers for a Data Radio Bearer of traffic class at sampling occasion $i$For UL, this is a gNB estimation that is expected to be based on Buffer Status Reporting, provided configured grants and progress of ongoing HARQ transmissions (by including data for which HARQ transmission has not yet terminated). In addition, the gNB can use the analysis of received data in the estimation. In such case, when DRB cannot be determined at the time of the sampling occasion, gNB can determine DRB after successful reception of data. |
| $$i$$ | Sampling occasion during time period $T$. A sampling occasion shall occur once every $p$ seconds. |
| $$p$$ | Sampling period length. Unit: second. The sampling period shall be at most 0.1 s.  |
| $$T$$ | Time Period during which the measurement is performed, Unit: second. |
| $$drbid$$ | The DRBs mapped with the same 5QI for NR SA ~~or mapped with the same QCI for EN-DC~~. |