**3GPP TSG-SA5 Meeting #162 *S5-253903***

Goteborg, Sweden, 25 - 29 August 2025

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **28.554** | **CR** | **0240** | **rev** | **1** | **Current version:** | **19.4.1** |  |
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| *For* ***[HE](http://www.3gpp.org/3G_Specs/CRs.htm%22%20%5Cl%20%22_blank)******[LP](http://www.3gpp.org/3G_Specs/CRs.htm%22%20%5Cl%20%22_blank)*** *on using this form: comprehensive instructions can be found at <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:***  | Rel-19 CR 28.554 Add new KPI for high loads evaluation based on PRB usage distribution |
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| ***Source to WG:*** | China Unicom |
| ***Source to TSG:*** | S5 |
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| ***Work item code:*** | PM\_KPI\_5G\_Ph4 |  | ***Date:*** | 2025-07-11 |
|  |  |  |  |  |
| ***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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
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| ***Reason for change:*** | PRB usage is an significant metric for operators and vendors to accurately monitor the resource occupation rate. However, the current utilization KPIs in TS 28.554 remains limited to PDU session monitoring, failing to address time-frequency resource utilization metrics essential for comprehensive network performance evaluation. Moreover, PRB usage distribution related KPIs are important for detecting and analyzing transient overload conditions for cells where short-term resource congestion may significantly impact QoS and can’t be aware of based on the existing utilization KPIs in TS 28.554. |
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| ***Summary of change:*** | Add new KPIs for evaluating of utilization rate in the scenario when a cell may experience high load in a short period and recover to normal very quickly. |
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| ***Consequences if not approved:*** | There is no KPI for the evaluation for transient overload conditions. |
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| ***Clauses affected:*** |  |
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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:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

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| **1st Change** |

6.4.X High load ratio based on PRB usage distribution

a) PrbHighLoadRatio.

b) This KPI describes the high load ratio for a NRCellDU in a statistical period. The KPI can be obtained based on the measurement Distribution of DL Total PRB Usage defined in TS 28.552. The numerator of this KPI is the number of high load samples at which the DL PRB usage is larger than a certain threshold PRBTH1. And the denominator is the number of effective samples at which the DL PRB usage is larger than another threshold PRBTH2. This KPI can be used to evaluate the resource load of cells in transient high-load scenario and the result can be further used in the determination of network resource expansion.

b-1) Real, percentage, 0-1

b-2) RATIO

c) Below is the equation for high load ratio based on PRB usage distribution for NRCellDU:

$$\frac{\sum\_{}^{}}{\sum\_{}^{}}$$

 Where RRU.PrbTotDlDist is the distribution of samples with total usage (in percentage) of PRBs on the downlink in different ranges as defined in 5.1.1.2.3 in TS 28.552. PRBTH1 is a threshold representing high load. PRBTH2 is effective sample filtering threshold. Both PRBTH1 and PRBTH2 are vendor or operator specific.

d) NRCellDU

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| **2nd Change** |

# A.X Use case for high load ratio based on PRB usage distribution for NRCellDU

The high load ratio based on PRB usage distribution could provide operators with a more accurate measure of utilization rate and resource load by using the second or milisecond-level PRB usage data. In transient overload scenarios (e.g., high-speed rail or subway systems), the high load caused by massive user access and bursty traffic typically lasts only seconds—specifically when trains pass through a cell, while traffic volume remains extremely low during other periods. This KPI can help operators identify the actual high load ratio when these shot-duration, high-impact events occur. The KPI can be used either independently or alongside other KPIs to support network expansion decisions.

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| **End of Change** |