**3GPP TSG SA WG5 (Telecom Management) Meeting #130e *S5-202211***

**20-28 April 2020, E-meeting**

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| *CR-Form-v11.4* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **28.552** | **CR** | **0223** | **rev** | **1** | **Current version:** | **16.5.0** |  |
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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 |  | Radio Access Network | **x** | Core Network |  |

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| ***Title:*** | Modify PRB usage measurements | | | | | | | | | |
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| ***Source to WG:*** | ZTE, China Telecom | | | | | | | | | |
| ***Source to TSG:*** | S5 | | | | | | | | | |
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| ***Work item code:*** | 5G\_SLICE\_ePA | | | | |  | ***Date:*** | | | 2020/4/10 |
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| ***Category:*** | B |  | | | | | ***Release:*** | | | Rel-16 |
|  | *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:*** | | Dynamic spectrum sharing (DSS) provides a very useful migration path from LTE to NR by allowing LTE and NR to share the same carrier. DSS was included already in Rel-15 and further enhanced in Rel-16. (see to RP-193260).  NR can dynamically share with LTE in same spectrum bandwidth in TTI (the millisecond resolution). PRB usage needs to be measured on TTI precision. | | | | | | | | |
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| ***Summary of change:*** | | Update the measure precision of the PRB usage distribution. | | | | | | | | |
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| ***Consequences if not approved:*** | | The Distribution of DL/UL Total PRB Usage is not accuracy.  The monitoring of congestion condition caused by PRB resource may be missed. | | | | | | | | |
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| ***Clauses affected:*** | | 5.1.1.2.3, 5.1.1.2.4 | | | | | | | | |
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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:*** | |  | | | | | | | | |

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| **1st modified section** |

##### 5.1.1.2.3 Distribution of DL Total PRB Usage

a) This measurement provides the distribution of samples with total usage (in percentage) of physical resource blocks (PRBs) on the downlink in different ranges. This measurement is a useful measure of whether a cell is under high loads or not in the scenario which a cell in the downlink may experience high load in certain short times (e.g. in a millisecond) and recover to normal very quickly.

b) CC

c) Each measurement sample is obtained as: , where is total PRB usage at sample n for DL, which is a percentage of PRBs used, averaged during time period tn (e.g. a millisecond) with value range: 0-100%; is a count of full physical resource blocks and all PRBs used for DL traffic transmission shall be included;is the total number of PRBs available for DL traffic transmission during time period tn and n is the sample with time period tn during which the measurement is performed.



d) Distribution of total PRB usage is calculated in the time-frequency domain only. The reference point is the Service Access Point between MAC and L1. The distribution of PRB usage provides the histogram result of the samples collected during time period tn.

e) Depending on the value of the sample, the proper bin of the counter is increased. The number of samples during one measurement period is provided by the operator.

f) A set of integers. Each representing the (integer) number of samples with a DL total PRB percentage usage in the range represented by that bin.

g) RRU.PrbTotDlDist.BinX, which indicates the distribution of DL PRB Usage for all traffic.

h) NRCellDU

i) Valid for packet switched traffic

j) 5GS

k) One usage of this measurement is for monitoring the load of the radio physical layer.

##### 5.1.1.2.4 Distribution of UL total PRB usage

a) This measurement provides the distribution of samples with total usage (in percentage) of physical resource blocks (PRBs) on the uplink in different usage ranges. This measurement is a useful measure of whether a cell is under high loads or not in the scenario which a cell in the uplink may experience high load in certain short times (e.g. in a millisecond) and recover to normal very quickly.

b) CC

c) Each measurement sample is obtained as: , where is total PRB usage at sample n for UL, which is a percentage of PRBs used, averaged during time period tn (e.g. a millisecond) with value range: 0-100%; is a count of full physical resource blocks and all PRBs used for UL traffic transmission shall be included;is the total number of PRBs available for UL traffic transmission during time period tn and n is the sample with time period tn during which the measurement is performed.



Distribution of total PRB usage is calculated in the time-frequency domain only. The reference point is the Service Access Point between MAC and L1. The distribution of PRB usage provides the histogram result of the samples collected during time period tn.

Depending on the value of the sample, the proper bin of the counter is increased. The number of samples during one measurement period is provided by the operator.

d) A set of integers, each representing the (integer) number of samples with a UL PRB percentage usage in the range represented by that bin.

e) RRU.PrbTotUlDist.BinX, which indicates the distribution of UL PRB Usage for all traffic.

f) NRCellDU

g) Valid for packet switched traffic

h) 5GS

i) One usage of this measurement is for monitoring the load of the radio physical layer.

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| **End of modifications** |