**3GPP TSG-SA5 Meeting #141-e *S5-221236***

**e-meeting, 17 - 26 January 2022**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** | **0344** | **rev** |  | **Current version:** |  |  |
|  | | | | | | | | |
| *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 Description of MIMO PRB Usage for Cell | | | | | | | | | |
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| ***Source to WG:*** | China Unicom | | | | | | | | | |
| ***Source to TSG:*** | S5 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | ePM\_KPI\_5G | | | | |  | ***Date:*** | | | 2021-12-30 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | |  |
|  | *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-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
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| ***Reason for change:*** | | 5.1.1.30.3 PDSCH Time domian averaged maximum scheduled layer number is used as spatial factor in the formula of 5.1.1.2.11PDSCH PRB usage per cell for MIMO. 5.1.1.30.4 PUSCH time domian averaged maximum scheduled layer number is used as spatial factor in the formula of 5.1.1.2.12 PUSCH PRB usage per cell for MIMO. But the reference relation among the measurements is not explicitly specified. | | | | | | | | |
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| ***Summary of change:*** | | Specify the clause number and name of time domain averaged maximum scheduled layer number in the description of LM(T) used in the formula calculating PDSCH PRB usage per cell for MIMO and PUSCH PRB usage per cell for MIMO. Modify note for LM(T) accordingly. | | | | | | | | |
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| ***Consequences if not approved:*** | | The reference relation will not be clear. And some confusions maybe caused when using the measurements. | | | | | | | | |
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| ***Clauses affected:*** | | 5.1.1.2.11, 5.1.1.2.12 | | | | | | | | |
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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)*** | |  |  | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

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| **1st Change** |

##### 5.1.1.2.11 PDSCH PRB Usage per cell for MIMO

a) This measurement provides the total usage (in percentage) of physical resource blocks (PRBs) per cell for MIMO with time domain averaged maximum scheduled layer number as spatial factor in the downlink.

b) SI

c) This measurement is obtained as:



Where

denotes total PDSCH PRB usage per cell which is percentage of PRBs used, averaged during time period 𝑇 with integer value range: 0-100;

denotes the number of PDSCH PRBs multiplexed by *i* MIMO layers at sampling occasion *j*.

denotes total number of PDSCH PRBs available for sampling occasion j on single MIMO layer per cell;

*LM(T)* denotes the time-domain averaged maximum scheduled layer number of PDSCH in time period T defined in TS 28.552 clause 5.1.1.30.3;

NOTE: At every sampling occasion the maximum scheduled layer number of all PRBs included in PDSCH is collected as a sampling value and at the end of statistical duration the average of all non-zero sampling values is the measuremnt result as defined in TS 28.552 clause 5.1.1.30.3.

*T* denotes the time period during which measurement is performed;

*i* is an integer denoting a MIMO layer number that is scheduled in time period T;

*j* denotes sampling occasion (e.g. 1 slot) during time period T.

d) A single integer value from 0 to 100.

e) RRU.PrbTotDlMimo, *which indicates the PDSCH PRB Usage per cell for MIMO*

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 under MIMO scenario.

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| **2nd Change** |

##### 5.1.1.2.12 PUSCH PRB Usage per cell for MIMO

a) This measurement provides the total usage (in percentage) of physical resource blocks (PRBs) per cell for MIMO with time domain averaged maximum scheduled layer number as spatial factor in the uplink.

b) SI

c) This measurement is obtained as:

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Where

denotes total PUSCH PRB usage per cell which is percentage of PRBs used, averaged during time period 𝑇 with integer value range: 0-100;

denotes the number of PUSCH PRBs multiplexed by *i* MIMO layers at sampling occasion *j*.

denotes total number of PUSCH PRBs available for sampling occasion j on single MIMO layer per cell;

*LM(T)* denotes the time-domain averaged maximum scheduled layer number of PUSCH in time period T defined in TS 28.552 clause 5.1.1.30.4;

NOTE: At every sampling occasion the maximum scheduled layer number of all PRBs included in PUSCH is collected as a sampling value and at the end of statistical duration the average of all non-zero sampling values is the measuremnt result as defined in TS 28.552 clause 5.1.1.30.4.

*T* denotes the time period during which measurement is performed;

*i* is an integer denoting a MIMO layer number that is scheduled in time period T;

*j* denotes sampling occasion (e.g. 1 slot) during time period T.

d) A single integer value from 0 to 100.

e) RRU.PrbTotUlMimo, *which indicates the PUSCH PRB Usage per cell for MIMO*

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 under MIMO scenario.

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| **End of Change** |