**3GPP TSG-SA5 Meeting #138-e *S5-214222***

**e-meeting, 23 - 31 August 2021**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **28.310** | **CR** | **0017** | **rev** | **-** | **Current version:** | **17.1.0** |  |
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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:*** | Rel-17 CR 28.310 Update on the solutions for energy efficiency | | | | | | | | | |
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| ***Source to WG:*** | China Telecom | | | | | | | | | |
| ***Source to TSG:*** | S5 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | EE5GPLUS | | | | |  | ***Date:*** | | | 2021-08-13 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | F |  | | | | | ***Release:*** | | | Rel-17 |
|  | *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:*** | | 1. In the clause 6.1.1, for the split-gNBs scenario, the measurement of DVMNis lack of the PLMN granularity; 2. In table 6.2.3.1.3.2-1, there is not the performance measurements for the split gNBs scenario | | | | | | | | |
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| ***Summary of change:*** | | 1. Add the PLMN granularity to the measurement of DVMN for the split-gNBs scenario. 2. Add the measurement of DVMN for the split-gNBs scenario to the table 6.2.3.1.3.2-1 | | | | | | | | |
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| ***Consequences if not approved:*** | | 1. The PLMN granularity for the split-gNBs scenario will be missing, that will affect the measurement of DVMN; 2. The performance measurements for the split gNBs scenario will be missing in the table 6.2.3.1.3.2-1. | | | | | | | | |
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| ***Clauses affected:*** | | 6.1.1, 6.2.3.1.3.2 | | | | | | | | |
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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 ... | | |
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| ***Other comments:*** | | The approval of this CR depends on the approval of S5-214173 | | | | | | | | |
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| ***This CR's revision history:*** | |  | | | | | | | | |

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| **First change** |

# 6 Solutions for energy efficiency

## 6.1 Solutions for assessment of mobile network data energy efficiency

### 6.1.1 Energy efficiency of NG-RAN

Assessment of NG-RAN data EE is based on the high-level mobile network data EE KPI defined in clause 3.1 and clause 5.3 of ETSI ES 203 228 [2]:



For different gNB scenarios, the two following performance measurements may be used as the DVMN:

**- For split-gNBs scenario:**

1) DL PDCP SDU Data Volume per interface (cf. clause 5.1.3.6.2.3 of TS 28.552 [15]): This measurement provides the Data Volume (amount of PDCP SDU bits) in the downlink delivered from GNB-CU-UP to GNB-DU (F1-U interface), to external gNB-CU-UP (Xn-U interface) and to external eNB (X2-U interface). The measurement is calculated per QoS level (mapped 5QI or QCI in NR option 3) and per S-NSSAI and per PLMN ID, and reported per Interface (F1-U, Xn-U, X2-U);

2) UL PDCP SDU Data Volume per interface (cf. clause 5.1.3.6.2.4 of TS 28.552 [15]): This measurement provides the Data Volume (amount of PDCP SDU bits) in the uplink delivered to GNB-CU-UP from GNB-DU (F1-U interface), from external gNB-CU-UP (Xn-U interface) and from external eNB (X2-U interface). The measurement is calculated per QoS level (mapped 5QI or QCI in NR option 3) and per S-NSSAI and per PLMN ID, and reported per Interface (F1-U, Xn-U, X2-U);**- For non-split gNBs scenario:**

1) DL Cell PDCP SDU Data Volume (cf. clause 5.1.2.1.1.1 of TS 28.552 [15]): This measurement provides the Data Volume (amount of PDCP SDU bits) in the downlink delivered to PDCP layer. The measurement is calculated per PLMN ID and per QoS level (mapped 5QI) and per S-NSSAI;

2) UL Cell PDCP SDU Data Volume (cf. clause 5.1.2.1.2.1 of TS 28.552 [15]): This measurement provides the Data Volume (amount of PDCP SDU bits) in the uplink delivered from PDCP layer to higher layers. The measurement is calculated per PLMN ID and per QoS level (mapped 5QI) and per S-NSSAI;

The following PEE (Power, Energy and Environmental) measurement may be used as the ECMN:

- PNF Energy consumption (cf. clause 5.1.1.19.3 of TS 28.552 [15]): This measurement provides the energy consumed (in kilowatt-hours) by the subject gNB.

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| **End of first modified section** |

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| **Second modified section** |

##### 6.2.3.1.3 MnS Component Type C

###### 6.2.3.1.3.2 Performance measurements

Performance measurements related to D-SON (Distributed SON or Domain-Centralized) ES are captured in Table 6.2.3.1.3.2-1:

* **Table 6.2.3.1.3.2-1. Energy saving management related performance measurements**

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| Performance measurements | Description | Related targets |
| DRB.PdcpSduVolumeDL\_Filter | Data Volume (amount of PDCP SDU bits) in the downlink delivered to PDCP layer – see clause 5.1.2.1.1.1 of TS 28.552 [15], per configured PLMN ID and per QoS level (mapped 5QI) and per S-NSSAI.  In case of non-split gNBs. | NG-RAN data Energy Efficiency |
| DRB.PdcpSduVolumeUL\_Filter | Data Volume (amount of PDCP SDU bits) in the uplink delivered from PDCP layer to higher layers – see clause 5.1.2.1.2.1 of TS 28.552 [15], per configured PLMN ID and per QoS level (mapped 5QI) and per S-NSSAI.  In case of non-split gNBs. | NG-RAN data Energy Efficiency |
| DL Cell PDCP SDU Data Volume on X2 Interface | Data Volume (amount of PDCP SDU bits) in the downlink delivered on X2 interface in DC-scenarios – see clause 5.1.2.1.1.2 of TS 28.552 [15], per PLMN ID and per QoS level (mapped 5QI or QCI in NR option 3).  In case of non-split gNBs. | NG-RAN data Energy Efficiency |
| DL Cell PDCP SDU Data Volume on Xn Interface | Data Volume (amount of PDCP SDU bits) in the downlink delivered on Xn interface in DC-scenarios scenarios – see clause 5.1.2.1.1.3 of TS 28.552 [15], per PLMN ID and per QoS level (mapped 5QI) and per S-NSSAI.  In case of non-split gNBs. | NG-RAN data Energy Efficiency |
| UL Cell PDCP SDU Data Volume on X2 Interface | Data Volume (amount of PDCP SDU bits) in the uplink delivered on X2 interface in NSA scenarios – see clause 5.1.2.1.2.2 of TS 28.552 [15], per PLMN ID and per QoS level (mapped 5QI or QCI in NR option 3).  In case of non-split gNBs. | NG-RAN data Energy Efficiency |
| UL Cell PDCP SDU Data Volume on Xn Interface | Data Volume (amount of PDCP SDU bits) in the uplink delivered on Xn interface in SA scenarios – see clause 5.1.2.1.2.3 of TS 28.552 [15], per PLMN ID and per QoS level (mapped 5QI) and per S-NSSAI.  In case of non-split gNBs. | NG-RAN data Energy Efficiency |
| DRB.F1uPdcpSduVolumeDL\_Filter | Data Volume (amount of PDCP SDU bits) in the downlink delivered from GNB-CU-UP to GNB-DU (F1-U interface) – see clause 5.1.3.6.2.3 of TS 28.552 [15], per PLMN ID and per QoS level (mapped 5QI) and per S-NSSAI. In case of split gNBs | NG-RAN data Energy Efficiency |
| DRB.XnuPdcpSduVolumeDL\_Filter | Data Volume (amount of PDCP SDU bits) in the downlink delivered from GNB-CU-UP to external gNB-CU-UP (Xn-U interface) – see clause 5.1.3.6.2.3 of TS 28.552 [15], per PLMN ID and per QoS level (mapped 5QI) and per S-NSSAI. In case of split gNBs | NG-RAN data Energy Efficiency |
| DRB.X2uPdcpSduVolumeDL\_Filter | Data Volume (amount of PDCP SDU bits) in the downlink delivered from GNB-CU-UP to external eNB (X2-U interface) – see clause 5.1.3.6.2.3 of TS 28.552 [15], per PLMN ID and per QoS level (mapped 5QI). In case of split gNBs. | NG-RAN data Energy Efficiency |
| DRB.F1uPdcpSduVolumeUL\_Filter | Data Volume (amount of PDCP SDU bits) in the uplink delivered to GNB-CU-UP from GNB-DU (F1-U interface) – see clause 5.1.3.6.2.4 of TS 28.552 [15], per PLMN ID and per QoS level (mapped 5QI) and per S-NSSAI. In case of split gNBs | NG-RAN data Energy Efficiency |
| DRB.XnuPdcpSduVolumeUL\_Filter | Data Volume (amount of PDCP SDU bits) in the uplink delivered to GNB-CU-UP from external gNB-CU-UP (Xn-U interface) – see clause 5.1.3.6.2.4 of TS 28.552 [15], per PLMN ID and per QoS level (mapped 5QI) and per S-NSSAI. In case of split gNBs | NG-RAN data Energy Efficiency |
| DRB.X2uPdcpSduVolumeUL\_Filter | Data Volume (amount of PDCP SDU bits) in the uplink delivered to GNB-CU-UP from external eNB (X2-U interface) – see clause 5.1.3.6.2.4 of TS 28.552 [15], per PLMN ID and per QoS level (mapped 5QI). In case of split gNBs. | NG-RAN data Energy Efficiency |
| PNF Energy consumption | Energy consumed – see clause 5.1.1.19.3 of TS 28.552 [15] | NG-RAN data Energy Efficiency |

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| **End of second modified section** |