**3GPP TSG-SA5 Meeting #140e *S5-216341rev1***

**15 Nov to 24 Nov 2021, E-meeting**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  | **28.554** | **CR** | **0088** | **rev** | **-** | **Current version:** | **17.4.0** |  |
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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 |  | Core Network | **X** |

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|  |
| ***Title:***  | Add definition of 5GC energy efficiency (EE) KPI |
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| ***Source to WG:*** | China Telecom |
| ***Source to TSG:*** | S5 |
|  |  |
| ***Work item code:*** | EE5GPLUS |  | ***Date:*** | 15/11/2021 |
|  |  |  |  |  |
| ***Category:*** | B |  | ***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 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-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:*** | There is no definition of the energy efficiency (EE) KPI for 5GC. |
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| ***Summary of change:*** | A definition of generic 5GC energy efficiency KPI and energy efficiency of the 5GC based on the useful output of 5GC user plane is introduced. |
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| ***Consequences if not approved:*** | There would be no definition of EE KPI for 5GC, making the definition of the EE KPI incomplete. |
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| ***Clauses affected:*** | 6.7.4, 6.7.4.1, 6.7.4.2 (New) |
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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** |

6.7.4 5GC Energy Efficiency (EE)

6.7.4.1 Generic 5GC Energy Efficiency (EE) KPI



, where:

- ‘Useful Output of 5GC’ (UsefulOutput5GC) is the useful output of 5GC. It can be defined differently, depending on which 5GC network functions are considered;

- ‘Energy Consumption of 5GC’ (EC5GC) is the Energy Consumption of 5GC.

For one unit of EC5GC, the higher UsefulOutput5GC is, the higher the generic 5GC EE KPI is, i.e. the more energy efficient the 5GC is.

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| **Next change** |

6.7.4.2 Energy Efficiency of 5GC based on the useful output of 5GC user plane

a) EE5GC,UO,UP,DV

b) A KPI that shows the energy efficiency of 5GC. This KPI is based on the useful output of 5GC user plane. The useful output of the 5GC user plane is obtained by summing up UL and DL data volumes at N3 interface(s).



This KPI is obtained by the sum of UL and DL data volumes at N3 interface(s), divided by the energy consumption of 5GC. The unit of this KPI is bit/J.

c)



d) SubNetwork

e) In case of redundant transmission paths over the N3 interface for high reliability communication (cf. TS 23.501 [7] clause 5.33.2), it is expected that the data volume is counted once. In particular:

- In case of Dual Connectivity based end to end Redundant User Plane Paths (cf. TS 23.501 [7] clause 5.33.2.1), in which a UE may set up two redundant PDU Sessions over the 5G network, the Data Volume related to only one PDU session is to be considered;

- In case of redundant transmission with two N3 tunnels between the PSA UPF and a single NG-RAN node (cf. TS 23.501 [7] figure 5.33.2.2-1) which are associated with a single PDU Session, the Data Volume related to only one N3 tunnel is to be considered;

- In case of two N3 and N9 tunnels between NG-RAN and PSA UPF for redundant transmission (cf. TS 23.501 [7] figure 5.33.2.2-2) associated with a single PDU Session, the Data Volume related to only one N3 tunnel is to be considered.

For the measurement of the energy efficiency of the 5G core network, the 3GPP management system in charge of collecting the data volume measurements listed here above shall consider them only once in case of redundant transmission over the N3 interface.

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| **End of change** |