**3GPP TSG-SA5 Meeting #145-e *S5-225221rev1***

**Online, 15 - 24th August 2022**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **28.554** | **CR** | **0098** | **rev** | **-** | **Current version:** | **17.7.0** |  |
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| *For* [***HELP***](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 | **X** |

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| ***Title:***  | Correct 5G energy consumption definitions |
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| ***Source to WG:*** | Huawei |
| ***Source to TSG:*** | S5 |
|  |  |
| ***Work item code:*** | TEI17 |  | ***Date:*** | 2022-08-04 |
|  |  |  |  |  |
| ***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 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:*** | Energy consumption KPI definitions refer to wrong clauses.The method for calculating the EC KPIs is missing. |
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| ***Summary of change:*** | Correct the EC KPI definitions to refer to the right clauses.Add a reference to the method for calculating the EC KPIs. |
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| ***Consequences if not approved:*** | EC KPI definitions could be misinterpreted.The method to calculate the the EC KPIs would be left open to diverse interpretations, leading to possible interoperability issues. |
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| ***Clauses affected:*** | 6.7.3.1.1, 6.7.3.1.2, 6.7.3.1.3 |
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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 28.310 CR 0021 |
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| ***Other comments:*** | This CR is to be addressed and approved together with TS 28.310 CR 0021. |
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| ***This CR's revision history:*** |  |

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| **Start of Change** |

### 6.7.3 5G Energy Consumption (EC)

#### 6.7.3.1 NF Energy Consumption (EC)

##### 6.7.3.1.1 Definition

a) ECNF

b) This KPI describes the Energy Consumption (EC) of a 5G Network Function (NF). This KPI is obtained by summing up the energy consumption of PNF(s) and/or VNF(s) which compose the NF. The unit of this KPI is J.

c)



- How a 5GC NF is composed of VNFs and PNFs is implementation specific. In particular, whether a VNF instance (respectively PNF) is shared or not between more than one NF is implementation specific. Hence, the case where a VNF instance (resp. PNF) is shared between multiple NFs is out of scope of the present document;

- ECPNF represents the Energy Consumption (EC) of a PNF;

- ECVNF represents the Energy Consumption (EC) of a VNF. It is obtained by summing up the Energy Consumption (EC) of all its constituent VNFCs;

- In the present document:

# ECPNF is measured according to ETSI ES 202 336-12 [10],

# it is considered that ECVNF cannot be measured hence is estimated. Therefore the resulting ECNF KPI is defined as:



##### 6.7.3.1.2 Estimated Virtualized Network Function (VNF) energy consumption

a) ECVNF,estimated

b) A KPI that gives an estimation of the energy consumption of a VNF. This KPI is obtained by summing up the estimated energy consumption of its constituent Virtualized Network Function Components (VNFC). The unit of this KPI is J.

c) 

d) ManagedFunction

e) In this version of the document, the energy consumption of the VNFC is estimated as per clause 6.7.3.1.3.

##### 6.7.3.1.3 Estimated Virtualized Network Function Component (VNFC) energy consumption

a) ECVNFC,estimated

b) A KPI that gives an estimation of the energy consumption of a VNFC. In this version of the document, this KPI is obtained by taking the estimated energy consumption of the virtual compute resource instance on which the VNFC runs. The unit of this KPI is J.

c) 

d) ManagedFunction

e) In this version of the document, the energy consumption of the virtual compute resource instance is estimated based on its mean vCPU usage, as per clause 6.7.3.1.4. The method for calculating ECVNFC,estimated is described in TS 28.310 [9] clause 6.X.2.2.1.

##### 6.7.3.1.4 Estimated virtual compute resource instance energy consumption based on mean vCPU usage

a) ECvirtualCompute,estimated,VCpuUsageMean

b) A KPI that gives an estimation of the energy consumption of a virtual compute resource instance. The energy consumption of a virtual compute resource instance X is estimated as a proportion of the energy consumption of the NFVI node on which the virtual compute resource instance X runs. This proportion is obtained by dividing the vCPU mean usage of the virtual compute resource instance X, by the sum of the vCPU mean usage of all virtual compute resource instances running on the same NFVI Node as X. The unit of this KPI is J.

c) 

d) ManagedFunction

e)

- VCpuUsageMean is the mean vCPU usage of the virtual compute resource instance during the observation period, provided by ETSI NFV MANO (see clause 7.1.2 of ETSI GS NFV-IFA 027 [11]),

-  is sum of the vCPU mean usage of all virtual compute resource instances running on the same NFVI Node during the same observation period, all separately provided by NFV MANO (see clause 7.1.2 of ETSI GS NFV-IFA 027 [11]),

- ECNFVINode,measured is the energy consumption of the NFVI node on which the virtual compute resource runs, measured during the same observation period, as per ETSI ES 202 336-12 [10].

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| **End of Change** |