**3GPP TSG-SA5 Meeting #137e *S5-213300rev1***

**e-meeting 10th - 19th May 2021**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **28.554** | **CR** | **0080** | **rev** | **-** | **Current version:** | **17.2.0** |  |
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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 Energy Consumption KPI pour 5G NF and 5G CN | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Orange, AT&T, Deutsche Telekom, Telefonica | | | | | | | | | |
| ***Source to TSG:*** | S5 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | EE5GPLUS | | | | |  | ***Date:*** | | | 30/04/2021 |
|  |  | | | |  | |  | | |  |
| ***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 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:*** | | No Energy Consumption (EC) KPI has been defined for 5G NFs and 5GC. | | | | | | | | |
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| ***Summary of change:*** | | Add EC KPI definitions for 5G NFs and 5GC. | | | | | | | | |
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| ***Consequences if not approved:*** | | It would not be possible to measure the energy consumption and hence the Energy Efficiency (EE) of 5GC. | | | | | | | | |
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| ***Clauses affected:*** | | 2, 6.7.X (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 ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

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| **1st change** |

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] Void.

[3] ITU-T Recommendation E.800: "Definitions of terms related to quality of service".

[4] 3GPP TS 24.501: " Non-Access-Stratum (NAS) protocol for 5G System (5GS); Stage 3".

[5] 3GPP TS 38.331: "NR; Radio Resource Control (RRC); Protocol specification".

[6] 3GPP TS 28.552: "Management and orchestration; 5G performance measurements".

[7] 3GPP TS 23.501: " System Architecture for the 5G System; Stage 2".

[8] ETSI ES 203 228 V1.2.1 (2017-04): "Environmental Engineering (EE); Assessment of mobile network energy efficiency".

[9] 3GPP TS 28.310: "Management and orchestration; Energy efficiency of 5G".

[A] ETSI 202 336-12 V1.2.1 (2019-02): "Environmental Engineering (EE); Monitoring and control interface for infrastructure equipment (power, cooling and building environment systems used in telecommunication networks); Part 12: ICT equipment power, energy and environmental parameters monitoring information model".

[B] ETSI GS NFV-IFA 027 V4.0.2 (2020-11): "Network Functions Virtualisation (NFV) Release 4; Management and Orchestration; Performance Measurements Specification".

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| **Next change** |

### 6.7.x 5G Energy Consumption (EC)

#### 6.7.x.1 NF Energy Consumption (EC)

##### 6.7.x.1.1 Definition

a) ECNF

b) This KPI describes the Energy Consumption (EC) of a 5G Network Function (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 version;

- ECPNF,measured represents the Energy Consumption (EC) of a PNF, measured according to ETSI ES 202 336-12 [A];

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



- ECVNFC,estimated represents the Energy Consumption (EC) of a VNF Component (VNFC), estimated. It is equal to the estimated Energy Consumption of the virtual compute resource on which it runs:



- ECvirtualCompute,estimated represents the Energy Consumption (EC) of a virtual compute resource, estimated. The Energy Consumption of a virtual compute resource X is estimated as a proportion of the Energy Consumption of the NFVI node on which the virtual compute resource runs, this proportion being obtained by dividing the vCPU mean usage of the virtual compute resource X (see [B] clause 7.1.2), by the sum of the vCPU mean usage of all virtual compute resources running on the same NFVI Node as X, as defined by the equation below:



- VCpuUsageMean is the mean vCPU usage of the virtual compute resource, provided by NFV MANO (see clause 7.1.2 of [A]),,

-  is the sum of the vCPU mean usage of all virtual compute resources running on the same NFVI Node, provided by NFV MANO (see clause 7.1.2 of [A]),

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

d) ManagedFunction

#### 6.7.x.2 5GC Energy Consumption (EC)

##### 6.7.x.2.1 Definition

a) EC5GC

b) This KPI describes the Energy Consumption (EC) of the 5G Core Network (CN). It is obtained by summing up the Energy Consumption of all the Network Functions (ECNF) that compose the 5G core network. For the Energy Consumption (EC) of Network Functions, see clause 6.7.x.1. The unit of this KPI is J.

c)



d) Subnetwork

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| **End of changes** |