**3GPP TSG-SA WG4 Meeting #128 S4-241083**

**Jeju, South Korea, 20th May - 24th May 2024**

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| *CR-Form-v12.2* |
| **PSEUDO CHANGE REQUEST** |
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|  | **26.942** | **CR** | **—** | **rev** | **—** | **Current version:** | **0.1.1** |  |
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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:***  | [FS\_MediaEnergyGREEN]: Exposure of energy consumption to application service provider |
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| ***Source to WG:*** | Samsung Electronics Co. Ltd. |
| ***Source to TSG:*** | S4 |
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| ***Work item code:*** | FS\_MediaEnergyGREEN |  | ***Date:*** | 2024-05-10 |
|  |  |  |  |  |
| ***Category:*** | B |  | ***Release:*** | Rel-19 |
|  | *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-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
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| ***Reason for change:*** | Adding related work in 3GPP on energy consumption monitoring and exposure |
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| ***Summary of change:*** | Addition of new clause to introduce background and existing work in 3GPP on exposing energy consumption information to application service provider |
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| ***Consequences if not approved:*** | Insuffient study of FS\_MediaEnergyGreen.  |
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| ***Clauses affected:*** |  |
|  |  |
|  | **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:*** |  |

\* \* \* \* First 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".

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[22882] 3GPP TR 22.882: "Study on Energy Efficiency as service criteria".

[26501] 3GPP TS 26.501: "5G Media Streaming (5GMS); General description and architecture".

[26506] 3GPP TS 26.506: "5G Real-time Media Communication Architecture".

[26502] 3GPP TS 26.502: "5G multicast-broadcast services; User service architecture".

[22261] 3GGP TS 22.261: "Service requirements for the 5G system".

[22115] 3GPP TS 22.115: "Service aspects; Charging and billing".

\* \* \* \* Second change (all new text)\* \* \* \*

#### 4.2.2.X Exposure of energy consumption to Application Service Provider

##### 4.2.2.X.1 Introduction

This clause summarises a few use cases and potential requirements regarding exposure of energy consumption to the Application Service Provider described in TR 22.882 [22882] that are relevant to aspects documented in the present document, and media delivery features specified in TS 26.501 [26501], TS 26.506 [26506], and TS 26.502 [26502] in general.

##### 4.2.2.X.2 Service energy monitoring by an application server

Clause 5.5 of TR 22.882 [22882] describes a use case on service energy monitoring wherein a Application Service Provider monitors events resulting from energy consumption policy triggers in the 5G System. Monitoring of energy consumption information for services provisioned by the Application Service Provider helps it to formulate mechanisms to reduce energy costs, or control the overall use of the communication service to operate within the energy limit constraints negotiated with the network operator. For energy savings, the network operator may create a ‘maximum energy credit’ policy and inform the Application Service Provider when such policy is exceeded or expired, and may gate the services after such an expiry.

The Application Service Provider may negotiate with the network operator to create the maximum energy credit policy, and may request that the network operator monitors the aggregate energy consumption of the application. The Application Service Provider may monitor service aspects of the 3GPP system, e.g., through network exposure of information as described in TS 22.261 [22261] for QoS monitoring or TS 22.115 [22115] relating to credit limit policy and control.

Clause 5.5.6 of TR 22.882 [22882] describes potential requirements for the above use case. An extract of these requirements relevant to media delivery services is reproduced below.

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| [PR.5.5.6-1] Subject to operator’s policy, the 5G system shall support subscription policies that define a maximum energy credit limit for services.[PR.5.5.6-3] Subject to operator’s policy, the 5G system shall support a means to expose energy consumption to authorized third parties for services, such that the energy consumption information clearly identifies the 'approaching' enforcement of an energy credit limit. [PR.5.5.6-4] Subject to operator’s policy, the 5G system shall support a mechanism to perform energy consumption credit limit control for services. NOTE 1: The result of the credit control is not specified by this requirement. Examples include gating, increased charging rates, etc. |

##### 4.2.2.X.3 Service-level energy efficiency analysis for verticals

Clause 5.6 of TR 22.882 [22882] describes a use case of an Application Service Provider running three different enterprise applications over two network slices. The use case proposes exposure of data volume and energy consumption of different Network Functions participating in the delivery of the service for different time periods at the request ofthe Application Service Srovider. The Application Service Provider may use existing 3GPP procedures to infer Network Slice energy consumption and the number of PDU sessions per network slice.

When the Application Service Provider receives detailed analysis of data volume and energy consumption, it may identify issues associated with its applications or with the Network Functions.

Clause 5.6.6 of TR 22.882 [22882] describes potential requirements for the above use case. An extract of these requirements relevant to media delivery services is reproduced below.

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| [PR.5.6.6-1] The 5G system shall support energy consumption measurement of network functions and exposure to authorised 3rd party.NOTE: The granularity of energy consumption measurement could vary according to different situations, for example, when several services share a same network slice, etc. Energy consumption monitoring as described in the preceding requirement is done by means of averaging or applying a statistical model. The requirement does not imply that some form of 'real time' monitoring is required. |

##### 4.2.2.X.3 Application energy efficiency monitoring

Clause 5.8 of TR 22.882 [22882] describes a use case on Application service Energy Efficiency (AEE) monitoring, and refers to energy-demanding services such as XR and AI/ML as motivation for such monitoring. The 5G System Operator acquires the energy consumption information of related 5G System functions serving the application service provided by the Application Service Provider. Such information may include statistical data related to application service energy consumption within a given service area.

The use case proposes that such AEE information is provided to the Application Service Provider, so it may take appropriate actions such as adapting application service level to reduce energy consumption, application server relocation to an Edge Data Network, etc. Different application service levels are associated with different KPIs (e.g., corresponding to different levels of automation or video quality targets), and therefore an adaptation in service level to meet energy requirements usually leads to optimisation processes, if possible, or compromising on the service quality.

The AEE may be monitored and/or predicted by the 5G System and exposed to the Application Service Provider. The monitoring may be related to whether the AEE is sustainable for a given service area and time of the day. Further, the computation/prediction of AEE is based on input from existing 3GPP functions.

NOTE: Energy consumption and optimisation tasks in OAM cannot infer per-application or session energy monitoring and/or prediction because the information in OAM is limited to energy calculation per managed element (e.g., NG-RAN, UPF, network slice etc.).

Clause 5.8.6 of TR 22.882 [22882] describes potential requirements for the above use case. An extract of these requirements relevant to media delivery services is reproduced below.

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| [PR.5.8.6-1] Based on operator policy and service agreement between the operator and application service provider, the 5G system shall be able to derive energy efficiency information for one or more application services, and expose energy efficiency information notifications to the application service provider.NOTE: The granularity of energy efficiency information notifications could vary according to different situations, for example, application service energy consumption can be acquired based on means of averaging or applying a statistical model for the energy consumed by the application sessions within the application service in the service area, etc.[PR.5.8.6-2] Based on operator policy and service agreement between the operator and application service provider, the 5G system shall be able to provide means to predict the energy efficiency per application service, and expose the predicted energy efficiency information to the application service provider.[PR.5.8.6-3] Based on operator policy and service agreement between the operator and application service provider, the 5G system shall enable the application service provider to subscribe, update, and unsubscribe for energy efficiency information notifications. |

\* \* \* \* End of changes \* \* \* \*