**3GPP TSG-WG SA2 Meeting #166S2-2411779**

**Orlando, USA, 18 – 22 November 2024**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **23.502** | **CR** | **5045** | **rev** | **1** | **Current version:** | **19.1.0** |  |
|  |
| *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:***  | KI#1: Energy related information collection and exposure procedures |
|  |  |
| ***Source to WG:*** | vivo |
| ***Source to TSG:*** | SA2 |
|  |  |
| ***Work item code:*** | EnergySys |  | ***Date:*** | 2024-11-07 |
|  |  |  |  |  |
| ***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)* |
|  |  |
| ***Reason for change:*** | In the conclusion for KI#1 of TR 23.700-66, the support of network energy related information exposure is agreed. The procedures and services for supporting collection and exposure of the energy related information need to be added. |
|  |  |
| ***Summary of change:*** | The procedure for supporting network energy related information collection and exposure is added. The new services of the new network function are also added. |
|  |  |
| ***Consequences if not approved:*** | The network energy related information collection and exposure is not supported. |
|  |  |
| ***Clauses affected:*** | 4.X.Y (new), 5.2.X (new)  |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** | **x** |  |  Other core specifications  | TS 23.501 CR 5628 |
| ***affected:*** |  | **x** |  Test specifications | TS/TR ... CR ... |
| ***(show related CRs)*** |  | **x** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR’s revision history:*** | S2-2409980 |

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

### 4.X.Y Energy related information collection and exposure

The procedure is used by the EIF to collect the energy related information and expose the energy information to the Consumer NF.



Figure 4.X.Y-1: Energy related information collection and exposure

1. The Consumer NF (i.e., AF or internal 5GC NF) subscribes to the energy information exposure and provides the associated notification endpoint of the Consumer NF by sending Neif\_EnergyInfoExposure\_Subscribe.

If the Consumer is AF, the subscription is sent via NEF. If the event subscription is authorized by the NEF, the NEF sends the event subscription to the EIF via Neif\_EnergyInfoExposure\_Subscribe.

 Requested Energy related parameter(s) indicates which Energy related parameters are requested. The Reporting mode defines the type of reporting requested (e.g., periodic reporting or threshold-based reporting, for Energy related parameters as defined in clause 5.X.Y of TS 23.501 [2]). If the reporting mode is periodic reporting, the reporting periodicity is included; If the reporting mode is threshold-based reporting, the notification threshold is also included. Target of Reporting defines the granularities of the energy related parameters, e.g., SUPI, S-NSSAI, Application Identifier.

2. The EIF invokes Nudm\_UECM\_Get service operation to retrieve the appropriate SMF by providing UE ID, DNN, S-NSSAI and NF type = SMF and AMF.

The UDM provides a Nudm\_UECM\_Get response with the corresponding SMF ID and AMF ID.

3. The EIF sends the Nsmf\_EventExposure Subscription request to the SMF to subscribe to UPF data, including the following information:

- Notification Target Address (EIF address), Subscription Correlation ID.

- UPF Event ID (i.e. User Data Usage Measures).

- Event Filter Information, e.g., one or more of the following parameters: S-NSSAI, DNN, DNAI, UPF Id, Application Id(s) or Traffic Filtering Information.

- Target of Event Reporting

4-5 The SMF selects the UPFs it has to send the request to. The UPF reports the data volume with the requested granularity. One of the following two options may be applied.

Opion 4a-5a: The SMF sends the request to the UPF with Nupf\_EventExposure\_Subscribe (as defined in clause 5.2.26.2.3) to request the data volume of the required granulairities in the UPF (e.g. per PDU session, per-UE-per-QoS flow). The request includes the EIF address, UPF Event ID, Subsription Correlation Information, Event Filter Information, Target of Event Reporting.

 The UPF sends the data volume of the required granularity by invoking Nupf\_EventExposure\_Notify service operation to the EIF.

Option 4b-5b. The SMF selects the corresponding UPFs and request the data volume of the required granulairities in the UPF (e.g. per PDU session, per-UE-per-QoS flow).

SMF notifies the data volume to EIF by invoking Nsmf\_EventExposure\_Notify service operation, providing the data volume of the required granularities in the UPF and corresponding UPF ID(s).

6. The EIF invokes Namf\_EventExposure service operation to retrieve the NG-RAN node identifier serving the UE by providing UE ID.

7. The EIF sends the NG-RAN node identifier and UPF ID(s) serving the UE to the OAM, and collects the Node-level energy consumption information and Node-level data volume information from OAM, i.e., , ,, .

8. After the calculation and determination of the energy information in the EIF, the EIF sends the information to the Consumer NF via Neif\_EnergyInfoExposure\_Notify.

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

### 5.2.X EIF Services

#### 5.2.X.1 General

The following table shows the EIF Services and EIF Service Operations.

Table 5.2.X.1-1: NF services provided by the EIF

|  |  |  |  |
| --- | --- | --- | --- |
| Service Name | Service Operations | Operation Semantics | Example Consumer(s) |
| Neif\_EnergyInfoExposure | Subscribe | Subscribe/Notify | NEF, PCF, AMF, SMF, NWDAF, AF |
|  | Unsubscribe | Subscribe/Notify | NEF, PCF, AMF, SMF, NWDAF, AF |
|  | Notify | Subscribe/Notify | NEF, PCF, AMF, SMF, NWDAF, AF |

#### 5.2.X.2 Neif\_EnergyInfoExposure service

##### 5.2.X.2.1 General

**Service description:** The service provides the energy related information to the consumer NFs. There are several operations for this service:

- Notifying the energy related information to other NFs.

- Allow consumer NFs to subscribe and unsubscribe for energy related information.

The following service operations are defined for the Neif\_EnergyInfoExposure service:

- Neif\_EnergyInfoExposure\_Subscribe.

- Neif\_EnergyInfoExposure\_Unsubscribe.

- Neif\_EnergyInfoExposure\_Notify.

##### 5.2.X.2.2 Neif\_EnergyInfoExposure\_Subscribe service operation

**Service operation name:** Neif\_EnergyInfoExposure \_Subscribe

**Description:** the consumer subscribes to receive the energy related information from the network, or the subscription is updated if the same subscription is already existing in EIF.

**Inputs, Required:** Requested Energy related parameter(s) (e.g., Energy Consumption information) as defined in clause 5.X.Y of TS 23.501 [2], Reporting mode (e.g., periodic reporting or threshold based reporting), Target of Reporting (e.g., SUPI, UE address(es), S-NSSAI, Flow description(s), Application Identifier), Notification Target Address (+ Notification Correlation ID).

**Inputs, Optional:** External Application Identifier(s), Reporting granularity (i.e., per UE, per PDU Session, per QoS flow, per application), Reporting periodicity, Reporting Threshold, Indication on supported policy control or actions for network energy saving, Subscription Correlation ID (in the case of modification of the event subscription), Expiry time.

**Outputs, Required:** When the subscription is accepted: Subscription Correlation ID, Expiry time (required if the subscription can be expired based on the operator's policy)*.*

**Outputs, Optional:** First corresponding energy related information report is included, if available.

##### 5.2.X.2.3 Neif\_EnergyInfoExposure\_Unsubscribe service operation

**Service operation name:** Neif\_EnergyInfoExposure\_Unsubscribe

**Description:** the NF consumer deletes a subscription if already defined in EIF.

**Inputs, Required:** Subscription Correlation ID.

**Outputs, Required:** Operation execution result indication*.*

**Outputs, Optional:** None.

##### 5.2.X.2.4 Neif\_EnergyInfoExposure\_Notify service operation

**Service operation name:** Neif\_EnergyInfoExposure\_Notify

**Description:** EIF reports the energy related information to the consumer that has previously subscribed.

**Inputs, Required:** Energy related information as required granularities, Notification Correlation Information, time stamp.

**Inputs, Optional:** None.

**Outputs, Required:** Operation execution result indication*.*

**Outputs, Optional:** None.

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