**SA WG2 Meeting #166 *S2-24xxxxx***

**18 – 22 November, 2024, Orlando, USA**  (was\_S2-2410538)

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **23.502** | **CR** | **5116** | **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:*** | TS23.502 - UE Energy Credit | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | NEC | | | | | | | | | |
| ***Source to TSG:*** | SA2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | EnergySys | | | | |  | ***Date:*** | | | 2024-11-02 |
|  |  | | | |  | |  | | |  |
| ***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 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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | SP#105 approved the WID on Energy Efficiency and Energy saving in SP-241388 with the following requirements in WT2:.  *WT #2. The objective of this WT is to specify the enhancements for subscription and policy control to enable network energy savings as service criteria based in WT#1. The following enhancements will be specified:*  *- The definition of energy saving subscription information per UE that is stored as part of the subscription data in the UDM/UDR, to assist the network to perform energy saving strategies for the UE*  *- The detailed procedures for the PCF to receive UE subscription data and notification related to the energy related information to trigger making policy decisions (reusing the existing parameters).* | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Based on the WT2 requirements from the agreed Energy Efficiency and Energy saving WI and also based on solution #14 from TR23.700-66 on energy usage control, this CR introduces UE Energy Credit for UE energy usage control. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | A new agreed feature would not be implemented in the 3GPP specifications. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 4.16.4, 4.16.5.1, 4.16.5.2, 4.16.9, 5.2.12.2.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | |  | | | | | | | | |

\* \* \* start of 1st change \* \* \* \*

### 4.16.4 SM Policy Association Establishment



Figure 4.16.4-1: SM Policy Association Establishment

This procedure concerns both roaming and non-roaming scenarios.

In the non-roaming case the V-PCF is not involved. In the local breakout roaming case, the H-PCF is not involved. In the home routed roaming case, the V-PCF is not involved and the H-PCF interacts with the H-SMF.

This procedure is used in UE requests a PDU Session Establishment as explained in clause 4.3.2.2.1, for non-roaming and local breakout roaming. For home-routed roaming, as explained in clause 4.3.2.2.2.

For local breakout roaming, the interaction with HPLMN (e.g. step 3) is not used. In local breakout roaming, the V-PCF interacts with the UDR of the VPLMN.

1. The SMF determines that the PCC authorization is required and requests to establish an SM Policy Association with the PCF by invoking Npcf\_SMPolicyControl\_Create operation, including information about the PDU Session as specified in clause 5.2.5.4.2.

The SMF provides Trace Requirements to the PCF when it has received Trace Requirements and it has selected a different PCF than the one received from the AMF.

If the DNN Selection Mode indicates that the DNN is not explicitly subscribed, the PCF may use the local configuration instead of PDU Session policy control data in UDR.

The QoS constraints from the VPLMN are provided by the H-SMF to the H-PCF in the home routed roaming scenario as defined in clause 4.3.2.2.2.

If the SMF utilizes an NWDAF or in case the SMF has received information from AMF or UPF that are consumer of analytic services, the SMF includes the IDs of each of these NWDAFs serving the UE (for SMF, AMF and UPF), identified by the NWDAF instance Id. The Analytics ID(s) are also included per NWDAF service instance.

The SMF provides the request for notification of SM Policy Association establishment and termination to a DNN, S-NSSAI together with PCF for the UE binding information to the PCF if received from the AMF.

2. If the PCF does not have the subscriber's subscription related information, it sends a request to the UDR by invoking Nudr\_DM\_Query (SUPI, DNN, S-NSSAI, Policy Data, PDU Session policy control data, Remaining allowed Usage data, UE Energy Credit) service in order to receive the information related to the PDU Session. The PCF may request notifications from the UDR on changes in the subscription information by invoking Nudr\_DM\_Subscribe (Policy Data, SUPI, DNN, S-NSSAI, Notification Target Address (+ Notification Correlation Id), Event Reporting Information (continuous reporting), PDU Session policy control data, Remaining allowed Usage data, UE Energy Credit) service. If the PCF does not have the 5G VN group data for the group identified by Internal Group Identifier as indicated by SMF in Npcf\_SMPolicyControl\_Create, the PCF retrieves the 5G VN group data from UDR and subscribes to changes on the 5G VN group data, see similar way to how the PCF does it during UE Policy Association establishment as described in clause 4.16.11. If the PCF receives the Maximum Group Data Rate in 5G VN group data, the PCF performs the group related policy control as described in clauses 6.1.5 and 6.2.1.11 of TS 23.503 [20].

NOTE 1: For local breakout roaming, PDU Session policy control subscription information and Remaining allowed usage subscription information for monitoring control as defined in clause 6.2.1.3 of TS 23.503 [20] are not available in V-UDR and V-PCF uses locally configured information according to the roaming agreement with the HPLMN operator.

3. If the PCF determines that the policy decision depends on the status of the policy counters available at the CHF and such reporting is not established for the subscriber, the PCF initiates an Initial Spending Limit Report Retrieval as defined in clause 4.16.8.2. If policy counter status reporting is already established for the subscriber and the PCF determines that the status of additional policy counters is required, the PCF initiates an Intermediate Spending Limit Report Retrieval as defined in clause 4.16.8.3.

NOTE 2: The Nudr\_DM\_Query in step 2 may include the Spending Limit Information, i.e. the policy counters and their latest status. Thus the PCF can provide the SM policy to the SMF before contacting the CHF. The PCF may need to update the SMF depending on the statuses of the policy counters provided by the CHF.

NOTE 3: Potential inconsistencies between the policy counter and its status in the UDR and in the CHF can happen given that the CHF may update the policy counter and its status at any time, as such it is recommended that the PCF contacts the CHF if the policy counters and its status stored in the UDR is used, to be able to receive updated information from the CHF.

4. The PCF makes the authorization and the policy decision. The PCF may reject Npcf\_SMPolicyControl\_Create request when Validation condition is not satisfied. (see clause 6.1.2.4 of TS 23.503 [20]).

The PCF may invoke Nbsf\_Management\_Register service operation to create the binding information in BSF.

The PCF may report that a SM Policy Association is established as described in clause 4.16.14.2.

In the non-roaming case, the PCF may subscribe to Analytics from NWDAF as defined in clause 6.1.1.3 of TS 23.503 [20].

In the home-routed roaming scenario, the H-PCF ensures that the QoS constraints provided by the VPLMN are taken into account as described in TS 23.503 [20].

5. The PCF answers with a Npcf\_SMPolicyControl\_Create response; in its response the PCF may provide policy information defined in clause 5.2.5.4 (and in TS 23.503 [20]). The SMF enforces the decision. The SMF implicitly subscribes to changes in the policy decisions.

NOTE 4: After this step the PCF can subscribe to SMF events associated with the PDU Session.

If the PCF determines based on a local policy, that the PDU Session is potentially impacted by (g)PTP time synchronization service, or the PDU Session belongs to a 5GS DetNet router, the PCF can include a subscription for SMF event for "5GS Bridge/Router information" associated with the PDU Session into the Npcf\_SMPolicyControl\_Create response. In this case, if the SMF has stored the 5GS Bridge/Router information and has not reported the event to the PCF, the SMF initiates an SM Policy Association Modification procedure and notifies the PCF for the event of "5GS Bridge/Router information Notification".

\* \* \* end of 1st change \* \* \* \*

\* \* \* start of 2nd change \* \* \* \*

#### 4.16.5.1 SMF initiated SM Policy Association Modification

The SMF may initiate the SM Policy Association Modification procedure if a Policy Control Request Trigger is met.

NOTE 1: When SMF instance is changed within the same SMF set the callback URI can be updated via this procedure.



Figure 4.16.5.1-1: SMF initiated SM Policy Association Modification

For local breakout roaming, the interaction with HPLMN (e.g. step 2) is not used. In local breakout roaming, the V-PCF interacts with the UDR of the VPLMN.

1. When a Policy Control Request Trigger condition is met the SMF requests to update (Npcf\_SMPolicyControl\_Update) the SM Policy Association and provides information on the conditions that have been met as specified in clause 5.2.5.4.5.

If the SMF is notified by NRF that the stored PCF instance is not reachable, it should query the NRF for PCF instances within the PCF set and select another instance (see clause 6.3.1.0 of TS 23.501 [2]).

The QoS constraints from the VPLMN are provided by the H-SMF to the H-PCF in the home routed roaming scenario as defined in clause 4.3.2.2.2.

2. When an AF has subscribed to an event that is met due to the report from the SMF, the PCF reports the event to the AF or TSCTSF by invoking the Npcf\_PolicyAuthorization\_Notify service operation.

If the SMF has reported that new 5GS Bridge/Router information has been detected and no AF session exists for this PDU session yet:

- If integration with TSN applies (see clause 5.28 of TS 23.501 [2]), then the PCF informs a pre-configured TSN AF using the Npcf\_PolicyAuthorization\_Notify (User-plane Node ID, the port number of the DS-TT port, MAC address of the DS-TT Ethernet port for the PDU Session and UE-DS-TT Residence Time (if available)) service operation for the event of "5GS Bridge/Router information Notification" as described in clause 6.1.3.18 of TS 23.503 [20].

- Otherwise, i.e. if the integration with TSN does not apply, the PCF may inform discovered and selected TSCTSF (as described in clause 6.3.24 of TS 23.501 [2]) using the Npcf\_PolicyAuthorization\_Notify (User Plane Node ID, UE-DS-TT Residence Time (if available), the port number for the PDU session and MAC address of the DS-TT Ethernet port for Ethernet type PDU Session or IP address for IP type PDU Session, MTU size for IPv4 or IPv6 (if available)) service operation for the event of "5GS Bridge/Router information Notification" as described in clause 6.1.3.18 of TS 23.503 [20]. In the case of private IPv4 address being used for IP type PDU Session, the Npcf\_PolicyAuthorization\_Notify also contains DNN and S-NSSAI of the PDU Session.

NOTE 2: For a given DNN and S-NSSAI, it is assumed that the network only needs to deploy one or TSCTSF Set in this Release of the specification.

When the TSN AF or TSCTSF receives the Npcf\_PolicyAuthorization\_Notify message and no AF session exists for this PDU Session, the TSN AF shall use the Npcf\_PolicyAuthorization service described in clause 5.2.5.3 to request creation of a new AF session specific to the received MAC address of the DS-TT Ethernet port of the PDU Session, while the TSCTSF shall use the Npcf\_PolicyAuthorization service to request creation of a new AF session specific to the received MAC address of the DS-TT Ethernet port (if available, for Ethernet type PDU Session) or IP address (for IP type PDU Session) of the PDU Session. In the case of private IPv4 address being used for IP type PDU Session, the TSCTSF shall use the Npcf\_PolicyAuthorization service to request creation of a new AF session specific to the received IP address, DNN and S-NSSAI of the IP type PDU Session. The TSN AF or TSCTSF shall then use the Npcf\_PolicyAuthorization service to subscribe for notifications for 5GS Bridge/Router information Notification event over the newly established AF session. The TSN AF or TSCTSF may provide a Port or User-Plane Management Information Container for the PDU Session and related port number in the Npcf\_PolicyAuthorization creation request.

If the SMF has reported PMIC with port number or UMIC, then the PCF also provides these information elements to the TSN AF or TSCTSF.

When integration with TSN applies (see clause 5.28 of TS 23.501 [2]), the TSN AF calculates the bridge delay for each port pair, using the UE-DS-TT Residence Time of the DS-TT Ethernet port(s) for the 5GS bridge indicated by the 5GS user-plane Node ID.

3. If the PCF determines a change to policy counter status reporting is required, it may alter the subscribed list of policy counters using the Initial, Intermediate or Final Spending Limit Report Retrieval procedures as defined in clause 4.16.8.

4. The PCF makes a policy decision as described in TS 23.503 [20]. The PCF may determine that updated or new policy information needs to be sent to the SMF.

If the SMF reported accumulated usage for the PDU session in step 1 the PCF deducts the value from the remaining allowed usage for the subscriber, DNN and S-NSSAI in the UDR by invoking Nudr\_DM\_Update (SUPI, DNN, S-NSSAI, Policy Data, Remaining allowed Usage data, UE Energy Credit, updated data) service operation.

If the SMF reported accumulated usage for a MK(s) in step 1 the PCF deducts the value from the remaining allowed usage for the MK in the UDR by invoking Nudr\_DM\_Update (SUPI, DNN, S-NSSAI, Policy Data, Remaining allowed Usage data, UE Energy Credit, updated data (including MK(s))) service operation.

When new PCF instance is selected in step 1, the new PCF should invoke Nbsf\_Management\_Update service operation to update the binding information in BSF.

In the non-roaming case, the PCF may subscribe to Analytics from NWDAF as defined in clause 6.1.1.3 of TS 23.503 [20].

In the home-routed roaming scenario, the H-PCF ensures that the QoS constraints provided by the VPLMN are taken into account as described in TS 23.503 [20].

NOTE 3: For local breakout roaming, PDU Session policy control subscription information and Remaining allowed usage subscription information for monitoring control as defined in clause 6.2.1.3 of TS 23.503 [20] are not available in V-UDR and V-PCF uses locally configured information according to the roaming agreement with the HPLMN operator.

5. The PCF answers with a Npcf\_SMPolicyControl\_Update response with updated policy information about the PDU Session determined in step 4.

\* \* \* end of 2nd change \* \* \* \*

\* \* \* start of 3rd change \* \* \* \*

#### 4.16.5.2 PCF initiated SM Policy Association Modification

The PCF may initiate SM Policy Association Modification procedure based on internal PCF event or triggered by other peers of the PCF (AF, NWDAF, CHF, UDR and TSCTSF).



Figure 4.16.5.2-1: PCF initiated SM Policy Association Modification

This procedure may be triggered by a local decision of the PCF or based on triggers from other peers of the PCF (AF, NWDAF, CHF, UDR and TSCTSF):

An SM Policy Association is established, with the PCF as described in clause 4.16.4 before this procedure is triggered.

For local breakout roaming, the interaction with HPLMN (e.g. step 1b and step 2) is not used. In local breakout roaming, the V-PCF interacts with the UDR of the VPLMN.

1a. Alternatively, optionally, the AF, NEF or TSCTSF provides/revokes service information to the PCF e.g. due to AF session signalling, by invoking Npcf\_PolicyAuthorization\_Create Request or Npcf\_PolicyAuthorization\_Update Request or Npcf\_PolicyAuthorization\_Subscribe Request service operation. The PCF responds to the AF, NEF or TSCTSF.

1b. Alternatively, optionally, the CHF provides a Spending Limit Report to the PCF as described in clause 4.16.8. and responds to the CHF.

1c. Alternatively, optionally, the UDR notifies the PCF about a policy subscription change by invoking Nudr\_DM\_Notify (Notification correlation Id, Policy Data, SUPI, updated data, "PDU Session Policy Control Data" | "Remaining allowed Usage data", UE Energy Credit); if the PCF uses the 5G VN group data and subscribes to 5G VN group data change, the UDR notifies the PCF about the 5G VN group data change by invoking Nudr\_DM\_Notify (Notification correlation Id, Subscription Data, Group Data). The PCF responds to the UDR.

1d. Alternatively, optionally, some internal event (e.g. timer, or local decision based on analytics information requested and received from NWDAF) occurs at the PCF. The analytics (i.e. Analytics ID) which can be requested from NWDAF are described in clause 6.1.1.3 of TS 23.503 [20].

2. If the PCF determines a change to policy counter status reporting is required, it may alter the subscribed list of policy counters using the Initial, Intermediate or Final Spending Limit Report Retrieval procedures as defined in clause 4.16.8.

NOTE 1: The PCF ensures that information received in step 1 and 2 can be used by later policy decisions.

NOTE 2: For local breakout roaming, PDU Session policy control subscription information and Remaining allowed usage subscription information for monitoring control as defined in clause 6.2.1.3 of TS 23.503 [20] are not available in V-UDR and V-PCF uses locally configured information according to the roaming agreement with the HPLMN operator.

3. The PCF makes a policy decision. The PCF may determine that updated or new policy information need to be sent to the SMF. In the non-roaming case, the PCF may also decide to subscribe to a new Analytics ID from NWDAF as described in clause 6.1.1.3 of TS 23.503 [20].

If the AF provided a Background Data Transfer Reference ID in step 1a, the PCF may retrieve it from the UDR by invoking the Nudr\_DM\_Query (BDT Reference Id, Policy Data, Background Data Transfer) service.

4. If the PCF has determined that SMF needs updated policy information in step 3 or if the PCF has received a Port Management Information Container for the PDU Session and related port number from the AF or TSCTSF in step 1a, the PCF issues a Npcf\_SMPolicyControl\_UpdateNotify request with possibly updated policy information about the PDU Session.

If the PCF has received a subscription for 5GS Bridge/Router information Notification in Step 1a, the PCF can include a subscription for SMF event for "5GS Bridge/Router information" associated with the PDU Session into the Npcf\_SMPolicyControl\_UpdateNotify request. In this case, if the SMF has stored the 5GS Bridge/Router information and has not reported the event to the PCF, the SMF notifies the PCF for the event of "5GS Bridge/Router Information ".

If the PCF has received a Npcf\_PolicyAuthorization\_Unsubscribe request to unsubscribe for 5GS Bridge/Router information Notification, the PCF can remove the subscription for SMF event for "5GS Bridge/Router information" associated with the PDU Session and issue a Npcf\_SMPolicyControl\_UpdateNotify request with the updated policy information about the PDU Session.

NOTE 3: If the TSCTSF receives a Requested 5GS delay and the TSCTSF does not have the 5GS Bridge/Router information for the AF-session, the TSCTSF can subscribe for the 5GS Bridge/Router information from the PCF by triggering a Npcf\_PolicyAuthorization\_Subscribe request.

If the PCF has received a subscription to notification on BAT offset along with the TSC Assistance Container from TSCTSF in step 1a, the PCF can include a subscription to notification on BAT offset associated with the PDU Session into the Npcf\_SMPolicyControl\_UpdateNotify request.

5. The SMF acknowledges the PCF request with a Npcf\_SMPolicyControl\_UpdateNotify response.

If the Npcf\_SMPolicyControl\_UpdateNotify request is received from new PCF instance in the PCF Set, the SMF store the SM policy association towards the new PCF instance.

\* \* \* \* end of 3rd change \* \* \* \*

\* \* \* \* start of 4th change \* \* \* \*

### 4.16.9 Update of the subscription information in the PCF



Figure-4.16.9-1: Procedure for update of the subscription information in the PCF

NOTE: The V-PCF is not used for session management related policy decisions in this procedure.

0. The PCF performs the subscription to notification to the profile modified in the UDR by invoking Nudr\_DM\_Subscribe (Policy Data, SUPI, Notification Target Address (+ Notification Correlation Id), Event Reporting Information (continuous reporting), one or several of the following: "PDU Session Policy Control data", "Remaining allowed Usage data", UE Energy Credit or "UE context Policy Control data") service.

1. The UDR detects that the related subscription profile has been changed.

2. If subscribed by the PCF, the UDR notifies the PCF on the changed profile by invoking Nudr\_DM\_Notify (Notification Correlation Id, Policy Data, SUPI, updated data and one or several of the following data subtypes "PDU Session Policy Control Data" or "Remaining allowed Usage data", UE Energy Credit or "UE Context Policy Control data") service.

3. The PCF stores the updated profile.

4. If the updated subscriber profile requires the status of new policy counters available at the CHF then an Initial/Intermediate Spending Limit Report Retrieval is initiated by the PCF as defined in clauses 4.16.8,2 and 4.16.8.3. If the updated subscriber profile implies that no policy counter status is needed an Intermediate Spending Limit Report Request Retrieval is initiated by the PCF to unsubscribe or, if this is the last policy counter status, a Final Spending Limit Report Retrieval is initiated by the PCF as specified in clause 4.16.8.4.

5. PCF makes an authorization and policy decision.

6. The PCF provides new session management related policy decisions to the SMF, using the Policy related interaction in PDU Session Modification procedure in clause 4.16.6, new access and mobility related policy information to the AMF using the AM Policy Association Modification procedure in clause 4.16.2 or new UE policy information to the AMF using the UE Policy Association Modification procedure in clause 4.16.12.

\* \* \* \* end of 4th change \* \* \* \*

\* \* \* \* start of 5th change \* \* \* \*

5.2.12.2.1 General

The operations defined for Nudr\_DM service use following set of parameters defined in this clause:

- Data Set Identifier: uniquely identifies the requested set of data within the UDR (see clause 4.2.5).

- Data Subset Identifier: it uniquely identifies the data subset within each Data Set Identifier. As specified in the procedures in clause 4, e.g. subscription data can consist of subsets particularised for specific procedures like mobility, session, etc.

- Data Keys defined in Table 5.2.12.2.1-1

For Nudr\_DM\_Subscribe and Nudr\_DM\_Notify operations:

- The Target of Event Reporting is made up of a Data Key and possibly a Data Sub Key both defined in Table 5.2.12.2.1-1. When a Data Sub Key is defined in the table but not present in the Nudr\_DM\_Subscribe this means that all values of the Data Sub Key are targeted.

- The Data Set Identifier plus (if present) the (set of) Data Subset Identifier(s) corresponds to a (set of) Event ID(s) as defined in clause 4.15.1

An NF Service Consumer may include an indicator when it invokes Nudr\_DM Query/Create/Update service operation to subscribe the changes of the data, to avoid a separate Nudr\_DM\_Subscribe service operation.

Depending on the use case, it is possible to use a Data Key and/or one or multiple Data sub keys to further identify the corresponding data, as defined in Table 5.2.12.2.1-1 below.

**Table 5.2.12.2.1-1: Data keys**

|  |  |  |  |
| --- | --- | --- | --- |
| **Data Set** | **Data Subset** | **Data Key** | **Data Sub Key** |
|  | Access and Mobility Subscription data | SUPI | Serving PLMN ID and optionally NID |
|  | SMF Selection Subscription data | SUPI | Serving PLMN ID and optionally NID |
|  | UE context in SMF data | SUPI | PDU Session ID or DNN |
| Subscription Data (see clause 5.2.3.3.1) | SMS Management Subscription data | SUPI | Serving PLMN ID and optionally NID |
|  | SMS Subscription data | SUPI | Serving PLMN ID and optionally NID |
|  | Session Management Subscription data | SUPI | S-NSSAI |
|  |  |  | DNN |
|  |  |  | Serving PLMN ID and optionally NID |
|  | Slice Selection Subscription data | SUPI | Serving PLMN ID and optionally NID |
|  | Group Data  (NOTE 5) | Internal Group Identifier or  External Group Identifier | - |
|  | Identifier translation | GPSI |  |
|  |  | SUPI | Application Port ID, MTC Provider Information, AF Identifier |
|  | Intersystem continuity Context | SUPI | DNN |
|  | LCS privacy | SUPI | - |
|  | LCS mobile origination | SUPI | - |
|  | UE reachability | SUPI | - |
|  | Group Identifier Translation | Internal Group Identifier or  External Group Identifier | - |
|  | UE context in SMSF data | SUPI | - |
|  | V2X Subscription data | SUPI | - |
|  | A2X Subscription data | SUPI | - |
|  | ProSe Subscription data | SUPI | - |
|  | Ranging/SL Positioning subscription data | SUPI | - |
|  | User consent | SUPI | Purpose |
|  | ECS Address Configuration Information (See Table 4.15.6.3d-1) | SUPI, Internal group identifier or external group identifier or any UE | DNN, S-NSSAI, (Serving) PLMN ID (NOTE 7) |
|  | MBS Subscription data  (see clause 6.4.3 of TS 23.247 [78]) | SUPI | - |
|  | Ranging/Sidelink Positioning Subscription data | SUPI | - |
|  | Ranging/Sidelink Positioning privacy | SUPI | - |
|  | Operator Determined Barring data (see clause 2.3 of TS 23.015 [90] and TS 29.505 [91]) | SUPI | - |
|  | Shared data | Shared Data ID | - |
| Application data | Packet Flow Descriptions (PFDs) (NOTE 11) | Application Identifier |  |
|  | AF traffic influence request information for traffic routing | AF transaction internal ID |  |
|  | (See clause 5.6.7 and clause 6.3.7.2 of TS 23.501 [2]) | For non-roaming and LBO:  S-NSSAI and DNN , accompanied with Internal Group Identifier(s) and/or Subscriber Category(s) or SUPI or "any UE" indication  For HR-SBO:  HPLMN S-NSSAI and DNN and either: HPLMN ID and IP address, or SUPI, or "any UE" indication and HPLMN ID.  (NOTE 4) (NOTE 6) (NOTE 12) |  |
|  | AF traffic influence request information for service function chaining | AF transaction internal ID |  |
|  | (See clause 5.6.16 and clause 6.3.7.2 of TS 23.501 [2]) | S-NSSAI and DNN  and  Internal Group Identifier or SUPI or "any UE" indication (NOTE 4) |  |
|  | Background Data Transfer  (NOTE 3) | Internal Group Identifier or SUPI |  |
|  | Service specific information (See clause 4.15.6.7) | S-NSSAI and DNN  or  Internal Group Identifier or SUPI or "any UE" indication (NOTE 4) or "PLMN ID(s) of inbound roamer" |  |
|  | UE ID mapping information (See clause 4.3.5 of TS 23.586 [88]) | GPSI or Application Layer ID |  |
|  | EAS Deployment Information  (See clause 7.1 of TS 23.548 [74]) | DNN and/or S-NSSAI | Application Identifier and/or Internal Group Identifier |
|  | ECS Address Configuration Information (See Table 4.15.6.3d-1)  (NOTE 13) | DNN, S-NSSAI and "any UE" indication |  |
|  | AM influence information (See clause 4.15.6.9.3) | AF transaction internal ID |  |
|  |  | S-NSSAI and DNN  and/or  Internal Group Identifier or SUPI or "any UE" indication or any inbound roaming UEs (NOTE 4, NOTE 8) |  |
|  | AF request for QoS information (See clause 4.15.6.14) | AF transaction internal ID |  |
|  |  | S-NSSAI and DNN  and/or  Internal Group Identifier or SUPI or "any UE" indication (NOTE 4) |  |
| Policy Data | UE context policy control data  (See clause 6.2.1.3 of TS 23.503 [20]) | SUPI |  |
|  | PDU Session policy control data | SUPI | S-NSSAI |
|  | (See clause 6.2.1.3 of TS 23.503 [20]) |  | DNN |
|  | Policy Set Entry data  (See clause 6.2.1.3 of TS 23.503 [20]) | SUPI (for the UDR in HPLMN) |  |
|  |  | PLMN ID (for the UDR in VPLMN) |  |
|  | Remaining allowed Usage data | SUPI | S-NSSAI |
|  | (See clause 6.2.1.3 of TS 23.503 [20]) |  | DNN |
|  | UE Energy Credit  (See clause 6.2.1.3 of TS 23.503 [20]) | SUPI |  |
|  | Sponsored data connectivity profiles (See clause 6.2.1.6 of TS 23.503 [20]) | Sponsor Identity |  |
|  | Background Data Transfer data  (See clause 6.2.1.6 of TS 23.503 [20]) | Background Data Transfer Reference ID. (NOTE 2) |  |
|  |  | None. (NOTE 1) |  |
|  | Network Slice Specific Control Data  (See clause 6.2.1.3 of TS 23.503 [20]) | S-NSSAI |  |
|  | 5G VN Group Specific Control Data (See clause 6.2.1.3 of TS 23.503 [20]) | S-NSSAI and DNN  and/or  Internal Group Identifier |  |
|  | Operator Specific Data | SUPI or GPSI |  |
|  | Planned Data Transfer with QoS requirements data  (See clause 6.2.1.6 of TS 23.503 [20]) | PDTQ Reference ID. (NOTE 10) |  |
|  |  | None. (NOTE 9) |  |
| Exposure Data | Access and Mobility Information | SUPI or GPSI | PDU Session ID or |
| (see clause 5.2.12.1) | Session Management information | SUPI or GPSI | UE IP address or DNN |
|  | DNAI mapping information | DNN and/or S-NSSAI |  |
| NOTE 1: Retrieval of the stored Background Data Transfer data for all ASP identifiers in the UDR requires Data Subset but no Data Key or Data Subkey(s).  NOTE 2: Update of a Background Data Transfer data in the UDR requires a Data key to refer to a Background Data Transfer data as input data.  NOTE 3: The Background Data Transfer includes the Background Data Reference ID and the ASP Identifier that requests to apply the Background Data Reference ID to the UE(s). Furthermore, the Background Data Transfer includes the relevant information received from the AF as defined in clause 6.1.2.4 of TS 23.503 [20].  NOTE 4: When the Data Key targets "any UE", then the request to UDR applies on Application data that applies on all subscribers of the PLMN. For encoding, see TS 29.519 [82].  NOTE 5: Group Data includes 5G VN group configuration, DNN and S-NSSAI specific Group Parameters and any other data related to a group stored in the UDR.  NOTE 6: If a list of Internal Group IDs is used, the AF traffic influence request information request applies to the UEs that belong to every one of these groups, i.e. a single UE needs to be a member of every group in the list of Internal Group IDs.  NOTE 7: When the Data Key targets "PLMN ID", then the request to UDR applies on subscription data about subscribers roaming in this PLMN.  NOTE 8: In LBO roaming scenarios, when the AF request targets "any inbound roaming UEs", the AM influence information applies to the roaming subscribers from a PLMN or from any PLMN.  NOTE 9: Retrieval of the stored Planned Data Transfer with QoS requirements data for all ASP identifiers in the UDR requires Data Subset but no Data Key or Data Subkey(s).  NOTE 10: Update of a Planned Data Transfer with QoS requirements data in the UDR requires a Data key to refer to a Planned Data Transfer with QoS requirements data as input data.  NOTE 11: Each PFD (as defined in TS 23.503 [20]) may be complimented with a source NF type which indicates the type of NF that has generated the PFD (i.e. AF or NWDAF). Absence of a source NF type indicates that the AF is the source of the PFD.  NOTE 12: Further information about HR-SBO case and how these keys are used, see clause 4.3.6.1.  NOTE 13: The ECS Address Configuration Information as part of application data is used for HR roaming case as defined in clause 6.5.2.6 of TS 23.548 [74]. | | | |

The content of the UDR storage for (Data Set Id= Application Data, Data Subset Id = AF TrafficInfluence request information) is specified in clause 5.6.7, Table 5.6.7-1 of TS 23.501 [2]. This information is written by the NEF and read by the PCF(s). PCF(s) may also subscribe to changes onto this information.

\* \* \* \* end of 5th change \* \* \* \*