**3GPP TSG-WG SA2 Meeting #156E  *S2-23xxxxx***

**Online, 17-21 Apr 2023 (*revision of*)**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **23.502** | **CR** | **-** | **rev** | **-** | **Current version:** | **18.1.0** |  |
|  |
| *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:***  | Support of network slice replacement |
|  |  |
| ***Source to WG:*** | ZTE, LG Electronics?, NEC? |
| ***Source to TSG:*** | S2 |
|  |  |
| ***Work item code:*** | eNS\_Ph3 |  | ***Date:*** | 2023-3-29 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | Rel-18 |
|  | *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)* |
|  |  |
| ***Reason for change:*** | This CR introduce the support of network slice replacement feature as concluded in TR 23.700 41.  |
|  |  |
| ***Summary of change:*** | This CR introduce a new clause to describe the procedure of network slice replacement for PDU Session. |
| ***--*** |  |
| ***Consequences if not approved:*** | Lack of support of this feature  |
|  |  |
| ***Clauses affected:*** | 4.3.5.x(new),4.16.4,4.16.5.1,5.2.5.4.2,5.2.8.2.2,5.2.8.2.3,5.2.8.2.5,5.2.8.2.6 |
|  |  |
|  | **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:*** |  |

##

## **FIRST CHANGE**

#### 4.3.5.x Change of Network Slice for PDU Session

Clause 4.3.5.x describes a procedure to change the S-NSSAI for PDU Sessions to ensure service continuity as described in clause 5.15.19 of TS 23.501 [2].



Figure 4.3.5.x-1: Change of Network Slice for PDU Session

The UE has an established PDU Session with the PDU Session Anchor (i.e. UPF1 in Figure 4.3.5.x-1). The PDU Session's User Plane involves at least the (R)AN and the PDU Session Anchor.

1a. When the AMF determines that the S-NSSAI is to be replaced by an alternative S-NSSAI(as described in clause 5.15.x of TS 23.501 [2]), the AMF performs UE Configuration Update procedure to include the Alternative S-NSSAI in the Allowed NSSAI and/or in the Configured NSSAI, if not included yet, and the mapping of the S-NSSAI and the corresponding Alternative S-NSSAI.

1b. The AMF invokes Nsmf\_PDUSession\_UpdateSMContext Request (SM Context ID, S-NSSAI, Alternative S-NSSAI) to the SMF of the PDU session associated with the S-NSSAI.

1c. The SMF response with Nsmf\_PDUSession\_UpdateSMContext Response.

2a. If the SMF determines that the SMF can serve the Alternative S-NSSAI, the SMF triggers PDU Session Modification procedure as described in clause 4.3.3.2 to change the S-NSSAI of the PDU Session to the Alternative S-NSSAI in UPF, RAN and UE. The difference are captured below:

 Step 2a, the S-NSSAI in N4 rules is set to Alternative S-NSSAI received from the AMF.

 Step 3b, the S-NSSAI in the N2 SM information and N1 SM container is set to Alternative S-NSSAI as received from the AMF.

NOTE 1: The S-NSSAI in PCF of the PDU Session is not changed.

2b. If the current PDU Session is of type SSC mode 2 and the Alternative S-NSSAI is served by different SMF, the SMF triggers the change of SSC mode 2 PDU Session anchor as described in clause 4.3.5.1, with the following differences:.

 Step 2, the PDU Session Release Command message in N1 SM Information contains the Alternative S-NSSAI as received from the AMF.

 Step 3, the UE triggers new PDU Session establishment procedure on the Alternative S-NSSAI and includes both, the Alternative S-NSSAI and Requested S-NSSAI in the PDU Session Establishment Request message to the AMF. The AMF sends both, the S-NSSAI and the corresponding Alternative S-NSSAI to the SMF. The SMF proceed with the new PDU Session on the Alternative S-NSSAI. The SMF provides the Requested S-NSSAI to PCF.

2c. If the current PDU Session is of type SSC mode 3 and the Alternative S-NSSAI is served by different SMF, the SMF triggers the change of SSC mode 3 PDU Session anchor as described in clause 4.3.5.2, with the following differences:

 Step 2-3a, the PDU Session Modification Command message to the UE in N1 SM Information contains the Alternative S-NSSAI as received from the AMF.

 Step 4, the UE triggers new PDU Session establishment procedure on the Alternative S-NSSAI and the UE includes both, the Alternative S-NSSAI and the Requested S-NSSAI in the PDU Session Establishment Request message to the AMF. The AMF sends both, the S-NSSAI and the corresponding Alternative S-NSSAI to the SMF. The SMF proceed with the new PDU Session establishment on the Alternative S-NSSAI. The SMF provides the Requested S-NSSAI to PCF.

## **Next Change**

##### 5.2.5.4.2 Npcf\_SMPolicyControl\_Create service operation

**Service operation name:** Npcf\_SMPolicyControl\_Create.

**Description:** The NF Service Consumer can request the creation of a SM Policy Association and provides relevant parameters about the PDU Session to the PCF.

**Inputs, Required:** SUPI (or PEI in the case of emergency PDU Session without SUPI), PDU Session id, DNN, S-NSSAI and RAT Type.

**Inputs, Optional:** Information provided by the SMF, such as PDU Session Type, Request Type, Access Type, the IPv4 address and/or IPv6 prefix, PEI, GPSI, User Location Information, UE Time Zone, Serving Network identifier (PLMN ID, or PLMN ID and NID, see clause 5.34 of TS 23.501 [2]), Charging Characteristics information, Session-AMBR, subscribed default QoS information (5QI, 5QI Priority Level, ARP), UE support of reflective QoS (see TS 23.501 [2], clause 5.7.5.1), Number of supported packet filters for signalled QoS rules for the PDU Session (see TS 23.501 [2], clause 5.7.1.4), 3GPP PS Data Off status, Trace Requirements and Internal Group Identifier (see clause 5.9.7 of TS 23.501 [2]), DN Authorization Profile Index, DN authorized Session AMBR, Framed Route information (as defined in Table 5.2.3.3.1-1), MA PDU Request indication, MA PDU Network-Upgrade Allowed indication, ATSSS capabilities of the MA PDU Session, QoS constraints from the VPLMN (see clause 4.3.2.2.2), Satellite Backhaul Category information, list of NWDAF instance Ids (used by AMF, SMF, UPF) and corresponding Analytics ID(s), PVS IP address(es) and/or PVS FQDN(s) and Onboarding Indication in the case of ON-SNPN (see clause 5.30.2.10.4.2 of TS 23.501 [2]), URSP rule enforcement that including Connection Capability , Alternative S-NSSAI.

NOTE: If SMF receives the DN authorized Session AMBR from the DN-AAA at PDU Session establishment, it includes the DN authorized Session AMBR within the Session-AMBR, instead of the subscribed Session-AMBR received from the UDM, in the request.

W-5GAN specific PDU Session information provided by the SMF is specified in TS 23.316 [53].

**Outputs, Required:** SM Policy Association ID defined in TS 29.512 [57]. Success or Failure.

**Outputs, Optional:** Policy information for the PDU Session as defined in TS 23.503 [20] and Policy Control Request Trigger(s) of SM Policy Association as defined in clause 6.1.3.5 of TS 23.503 [20].

See clause 5.8.2.2 of TS 23.501 [2] for allocation of IPv4 address and IPv6 prefix. The IPv6 prefix length is /64, or is shorter than /64 when Prefix Delegation applies.

See clause 4.16.4 for the detail usage of this service operation.

See clauses 4.22.2.1 and 4.22.3 for detailed usage of this service operation for ATSSS.

## **Next Change**

##### 5.2.8.2.2 Nsmf\_PDUSession\_Create service operation

**Service operation name:** Nsmf\_PDUSession\_Create.

**Description:** Create a new PDU Session in the H-SMF or SMF or create an association with an existing PDN connection in the home SMF+PGW-C.

**Input, Required:** SUPI, V-SMF ID or I-SMF ID, V-SMF SM Context ID or I-SMF SM Context ID, DNN, V-CN Tunnel Info or I-UPF Tunnel Info, addressing information allowing the H-SMF to request the V-SMF to issue further operations about the PDU Session or addressing information allowing the SMF to request the I-SMF to issue further operations about the PDU Session, Serving Network (PLMN ID, or PLMN ID and NID, see clause 5.18 of TS 23.501 [2]).

**Input, Optional:** S-NSSAI, Alternative S-NSSAI, PCO, Requested PDU Session Type, 5GSM Core Network Capability, Requested SSC mode, PDU Session ID, Number Of Packet Filters, UE location information, subscription get notified of PDU Session status change, PEI, GPSI, AN type, PCF ID, PCF Group ID, DNN Selection Mode, UE's Routing Indicator optionally with Home Network Public Key identifier or UDM Group ID for the UE, Always-on PDU Session Requested, Control Plane CIoT 5GS Optimisation Indication, information provided by V-SMF related to charging in home routed scenario (see TS 32.255 [45]), AMF ID, EPS Bearer Status, extended NAS-SM timer indication, DNAI list supported by I-SMF (from I-SMF to SMF), HO Preparation Indication. MA PDU request indication, MA PDU Network-Upgrade Allowed indication, Indication on whether the UE is registered in both accesses; QoS constraints from the VPLMN (see clause 4.3.2.2.2), Satellite backhaul category, Notification of the SM Policy Association Establishment and Termination, PCF binding information, Disaster Roaming service indication, HR-SBO request indication, VPLMN EASDF address, [ECS Address Configuration Information associated with PLMN ID of visited network].

**Output, Required:** Result Indication and if success a SM Context ID and in addition: QFI(s), QoS Profile(s), Session-AMBR, QoS Rule(s), QoS Flow level QoS parameters if any for the QoS Flow(s) associated with the QoS rule(s), H-CN Tunnel Info or PSA UPF Tunnel Info, Enable pause of charging indication, Selected PDU Session Type and SSC mode.

**Output, Optional:** PDU Session ID, S-NSSAI, Cause, PCO, UE IP address, IPv6 Prefix allocated to the PDU Session, information needed by V-SMF in the case of EPS interworking such as the PDN Connection Type, EPS bearer context(s), linked EBI, Reflective QoS Timer, Always-on PDU Session Granted, information provided by H-SMF related to charging in home routed scenario (see TS 32.255 [45]), DNAI(s) of interest for this PDU Session (from SMF to I-SMF), indication of multi-homing support (from SMF to I-SMF). MA PDU session Accepted indication, Indication on whether Small Data Rate Control applies or not, HR-SBO authorization result, VPLMN Specific Offloading Information for HR-SBO, HPLMN DNS Server address.

The V-SMF SM Context ID in the Input provides addressing information allocated by the V-SMF (to be used for service operations towards the V-SMF for this PDU Session).

The I-SMF SM Context ID in the Input provides addressing information allocated by the I-SMF (to be used for service operations towards the I-SMF for this PDU Session).

See clause 4.3.2.2.2 clause 4.11.1.2.2 clause 4.11.1.3.3 and clause 4.24 for details on the usage of this service operation.

See clauses 4.22.2.2 and 4.22.3 for detailed usage of this service operation for ATSSS.

See clause 6.7 of TS 23.548 [47] for HR-SBO request indication, HR-SBO authorization result, VPLMN EASDF address, VPLMN Specific Offloading Information for HR-SBO, HPLMN DNS Server address.

##### 5.2.8.2.3 Nsmf\_PDUSession\_Update service operation

**Service operation name:** Nsmf\_PDUSession\_Update.

**Description:** Update the established PDU Session.

This service operation is invoked by the V-SMF towards the H-SMF in the case of UE or serving network requested PDU Session Modification in order for the V-SMF to transfer the PDU Session Modification request. It can also be invoked by the V-SMF to indicate to the H-SMF that the access type of the PDU session can be changed. This service operation is also invoked by the V-SMF to insert or remove UL CL or BP controlled by the V-SMF.

This service operation is invoked by the I-SMF towards the SMF in the case of UE or serving network requested PDU Session Modification in order for the I-SMF to transfer the PDU Session Modification request. It can also be invoked by the I-SMF to indicate to the SMF that the access type of the PDU session can be changed. This service operation is also invoked by the I-SMF towards the SMF to insert or remove ULCL or BP controlled by the I-SMF or to report usage offloaded via UL CL or BP controlled by I-SMF.

This service operation is invoked by the H-SMF towards the V-SMF for both UE initiated and HPLMN initiated PDU Session Modification and PDU Session Release cases in order to have the SM PDU Session Modification request or SM PDU Session Release request sent to the UE. It can also be invoked by the H-SMF towards the V-SMF to release the 5GC and 5G-AN resources in e.g. handover from 5GC-N3IWF to EPS and from 5GS to EPC/ePDG, wherein the UE is not notified.

This service operation is invoked by the SMF towards the I-SMF for both UE initiated and SMF/PCF initiated PDU Session Modification and PDU Session Release cases in order to have the SM PDU Session Modification request or SM PDU Session Release request sent to the UE. It can also be invoked by the SMF towards the I-SMF to release the 5GC and 5G-AN resources in e.g. handover from 5GC-N3IWF to EPS and from 5GS to EPC/ePDG, wherein the UE is not notified. This service operation is also invoked by the SMF towards the I-SMF to provide updated N4 information or updated DNAI list of interest for this PDU Session when SMF receives updated PCC rules.

This service operation is invoked by the V-SMF or I-SMF and the H-SMF or SMF in the case of PDU Session Establishment authentication/authorization by a DN-AAA Server defined in clause 4.3.2.3: it is used to carry DN Request Container information between the DN-AAA Server and the UE.

**Input, Required:** SM Context ID.

**Input, Optional:** UE location information (ULI), UE Time Zone, AN type, indication of PDU Session Release, H-SMF SM Context ID (from H-SMF to V-SMF) or SMF SM Context ID (from SMF to I-SMF), QoS Rule and QoS Flow level QoS parameters if any for the QoS Flow associated with the QoS rule (from H-SMF to V-SMF or from SMF to I-SMF), EPS bearer context(s) and Linked EBI (from H-SMF to V-SMF or from SMF to I-SMF), N9 Tunnel Info (from V-SMF to H-SMF or from I-SMF to SMF), Information requested by UE for e.g. QoS (from V-SMF to H-SMF or from I-SMF to SMF), 5GSM Core Network Capability, Information necessary for V-SMF or I-SMF to build SM Message towards the UE (from H-SMF to V-SMF or from SMF to I-SMF), Trigger PDU release indication (V-SMF to H-SMF or from I-SMF to SMF), Start Pause of Charging indication, Stop Pause of Charging indication, DN Request Container information, indication that the UE shall not be notified, EBI Allocation Parameters (ARP list), Secondary RAT usage data, indication that the access type of the PDU session can be changed (V-SMF to H-SMF or from I-SMF to SMF) or from SMF to I-SMF), extended NAS-SM timer indication, DNAI list supported by I-SMF (from I-SMF to SMF), indication of multi-homing support (from SMF to I-SMF), indication of ULCL or BP insertion (from I-SMF to SMF), indication of ULCL or BP removal (from I-SMF to SMF), IPv6 prefix @local PSA (from I-SMF to SMF), DNAI(s) supported by local PSA (from I-SMF to SMF), Tunnel info of ULCL or BP (from I-SMF to SMF), N4 information (from I-SMF to SMF or from SMF to I-SMF), Handover Complete Indication, Relocation Cancel Indication. MA PDU request indication, MA PDU Network-Upgrade Allowed indication, Indication on whether the UE is registered in both accesses, MA PDU session Accepted indication, access for MA PDU Session Release, access type for GBR QoS flow, Indication of access unavailability (with access type), QoS Monitoring Indication (from SMF to I-SMF), QoS Monitoring reporting frequency(from SMF to I-SMF), QoS monitoring policy (from SMF to I-SMF), QoS Monitoring Result from (I-SMF to SMF), Notification of the SM Policy Association Establishment and Termination, PCF binding information, N9 forwarding tunnel to support the EAS session continuity required (from SMF to I-SMF), traffic filter for N9 forwarding (from SMF to I-SMF), value of the timer to detect the end of activity on the N9 forwarding tunnel to support the EAS session continuity (from SMF to I-SMF), EAS rediscovery indication, EAS information to be refreshed for EAS re-discovery, IP address of V-EASDF, ECS Address Configuration Information, Alternative S-NSSAI.

**Output, Required:** Result indication, <ARP, Cause> pair*.*

**Output, Optional:** UE location information, AN Type, SM information from UE (from V-SMF to H-SMF or from I-SMF to SMF), list of Rejected QoS Flows (from V-SMF to H-SMF or from I-SMF to SMF), a list of <ARP, EBI> pair, Secondary RAT Usage Data, DNAI(s) of interest for this PDU Session (from SMF to I-SMF), N4 Information (from SMF to I-SMF), QFI(s), QoS Profile(s), Session-AMBR, QoS Rule(s), QoS Flow level QoS parameters if any for the QoS Flow(s) associated with the QoS rule(s), EPS bearer context(s), linked EBI, DNAI(s) of interest for this PDU Session*.*

The H-SMF SM Context ID in the Input provides addressing information allocated by the H-SMF (to be used for service operations towards the H-SMF for this PDU Session).

The SMF SM Context ID in the Input provides addressing information allocated by the SMF (to be used for service operations towards the SMF for this PDU Session).

See clause 4.3.3.3 for an example usage of this service operation.

See clauses 4.22.6.3, 4.22.7, 4.22.8.3 and 4.22.10.3 for detailed usage of this service operation for ATSSS.

See clause 6.7.3 in TS 23.548 [74] for detailed usage of this service for EAS re-discovery.

## **Next Change**

##### 5.2.8.2.5 Nsmf\_PDUSession\_CreateSMContext service operation

**Service operation name:** Nsmf\_PDUSession\_CreateSMContext.

**Description:** It creates an AMF-SMF association to support a PDU Session.

**Input, Required:** SUPI or PEI, DNN, AMF ID (AMF Instance ID), RAT Type, Serving Network (PLMN ID, or PLMN ID and NID, see clause 5.18 of TS 23.501 [2]).

**Input, Optional:** PEI, S-NSSAI(s), Alternative S-NSSAI, PDU Session Id, N1 SM container, UE location information, UE Time Zone, AN type, H-SMF identifier/address, list of alternative H-SMF(s) if available, old PDU Session ID (if the AMF also received an old PDU Session ID from the UE as specified in clause 4.3.5.2), Subscription For PDU Session Status Notification, Subscription for DDN Failure Notification, NEF Correlation ID, indication that the SUPI has not been authenticated, PCF ID, PCF Group ID, Same PCF Selection Indication, DNN Selection Mode, UE PDN Connection Context, GPSI, UE presence in LADN service area, GUAMI, backup AMF(s) (if NF Type is AMF), Trace Requirements, Control Plane CIoT 5GS Optimisation indication, Small Data Rate Control Status, APN Rate Control Status. Backup AMF(s) sent only once by the AMF to the SMF in its first interaction with the SMF, UE's Routing Indicator optionally with Home Network Public Key identifier or UDM Group ID for the UE, EPS Bearer Status. Target ID (for EPS to 5GS handover), "Invoke NEF" flag, target DNAI, additional following for SM context transfer: SMF transfer indication, Old SMF ID, SM context ID in old SMF (see clause 4.26.5.3), HO Preparation Indication, indication of no NG-RAN change. MA PDU request indication, MA PDU Network-Upgrade Allowed indication, Indication on whether the UE is registered in both accesses, Satellite backhaul category, GEO Satellite ID, PVS FQDN(s) and/or PVS IP address(es) and Onboarding Indication in the case of ON-SNPN, Disaster Roaming service indication, HR-SBO allowed indication.

**Output, Required:** Result Indication and if successful SM Context ID.

**Output, Optional:** Cause, PDU Session ID, N2 SM information, N1 SM container, S-NSSAI(s).

When the PDU Session is for Emergency services for a UE without USIM, the AMF provides the PEI and not the SUPI as identifier of the UE. When the PDU Session is for Emergency services of an unauthenticated UE with an USIM, the AMF shall provide both the SUPI and the PEI and shall provide an indication that the SUPI has not been authenticated.

See clause 4.3.2.2.1 clause 4.3.2.2.2 clause 4.11.1.2.2 and clause 4.11.1.3.3 for details on the usage of this service operation.

See clauses 4.22.2.1 and 4.22.3 for detailed usage of this service operation for ATSSS.

See clause 6.7 of TS 23.548 [47] for HR-SBO allowed indication.

##### 5.2.8.2.6 Nsmf\_PDUSession\_UpdateSMContext service operation

**Service operation name:** Nsmf\_PDUSession\_UpdateSMContext.

**Description:** It allows to update the AMF-SMF association to support a PDU Session and/or to provide SMF with N1/N2 SM information received from the UE or from the AN, or allows to establish forwarding tunnel between UPFs controlled by different SMFs (e.g. by UPF controlled by old I-SMF and UPF controlled by new I-SMF).

**Input, Required:** SM Context ID.

**Input, Optional:** N1 SM container received from the UE, N2 SM information received from the AN (e.g. N3 addressing information, notification indicating that the QoS targets cannot be fulfilled for a QFI, Secondary RAT Usage Data), Operation Type (e.g. UP activate, UP deactivate, UP To Be Switched), Serving GW Address(es) and Serving GW DL TEID(s) for data forwarding during HO from 5GS to EPS, UE location information, AN type, UE Time Zone, H-SMF identifier/address, EBI(s) to be revoked, PDU Session(s) to be re-activated, Direct Forwarding Flag, ARP list, S-NSSAI, Data Forwarding Tunnel (setup/release), UE presence in LADN service area, Target ID, Target AMF ID, GUAMI, backup AMF(s) (if NF Type is AMF), Indication of Access Type can be changed, RAT Type. Backup AMF(s) sent only once by the AMF to the SMF in its first interaction with the SMF. Release indication and release cause, forwarding tunnel information, Handover Complete Indication, Relocation Cancel Indication. MA PDU request indication, MA PDU Network-Upgrade Allowed indication, Indication on whether the UE is registered in both accesses, access on which signalling was received, Subscription to DDN Failure Notification, NEF Correlation ID, MO Exception Data Counter, access for MA PDU Session Release, list of NWDAF IDs and corresponding Analytics ID(s), Satellite backhaul category, GEO Satellite ID, N9 forwarding tunnel to support the EAS session continuity required, target UL CL tunnel info for N9 forwarding tunnel to support the EAS session continuity, value of the timer to detect the end of activity on the N9 forwarding tunnel to support the EAS session continuity, CN based MT handling indication, Alternative S-NSSAI.

**Output, Required:** Result Indication.

**Output, Optional:** PDU Session ID, Cause,releasedEBI list, allocated EBI information, N2 SM information (e.g. QFI, UE location information, notification indication indicating that the QoS targets cannot be fulfilled), N1 SM container to be transferred to the AN/UE, type of N2 SM information. MA PDU session Accepted indication, list of NWDAF IDs and corresponding Analytics ID(s), source UL CL tunnel info for N9 forwarding tunnel info to support the EAS session continuity.

See clause 4.3.3.2 and clause 4.3.3.3 for an example usage of this service operation.

See clause 4.9.1.2.2 for the usage of the "UP To Be Switched" Operation Type.

For the use of the "EBI(s) to be revoked" information, see clause 4.11.1.4.1.

For the use of the "Direct Forwarding Flag", see clause 4.11.1.2.2.2.

For the use of the "Indication of Access Type can be changed", see clause 4.2.3.2.

For the use of "release indication and release cause", see clause 4.3.4.2.

For the use of the "forwarding tunnel information", see clause 4.23.4.3.

If the consumer NF is AMF and the SMF determines that some EBIs are not needed, the SMF will put the EBIs back in the released EBI list.

If the consumer NF is AMF and Inter-system mobility happens, the SMF sends allocated EBI information to AMF.

If the ARP of QoS flow is changed, the SMF uses this operation to update EBI-ARP information in the AMF.

If the AMF does not have PDU Session ID, the PDU Session ID is not required for Input and is required for Output.

If consumer NF is AMF and SMF includes N2 SM information in the Output, the SMF indicates type of N2 SM information.

The Small Data Rate Control Status is included if a PDU Session is being released and the UPF or NEF provided Small Data Rate Control Status for the AMF to store. APN Rate Control Status is included if a PDU Session is being released and the UPF or NEF provided APN Rate Control Status for the AMF to store.

NOTE: The N2 SM information is not interpreted by the AMF.

See clauses 4.22.6.3, 4.22.9 and 4.22.10.2 for detailed usage of this service operation for ATSSS.

## **END of CHANGES**