**3GPP TSG-SA2 Meeting #161 *S2-2403419***

**26th February – 1st March, 2024 Athens, Greece *S2-2402190***

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **23.502** | **CR** | **4752** | **rev** | **1** | **Current version:** | **18.4.0** |  |
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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:***  | Forwarding of URSP Rule Enforcement Information for LBO roaming |
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| ***Source to WG:*** | Samsung, Intel |
| ***Source to TSG:*** | SA2 |
|  |  |
| ***Work item code:*** | eUEPO |  | ***Date:*** | 2024-02-16 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***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-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
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| ***Reason for change:*** | In SA2#156e, the forwarding of UE reporting of URSP rule enforcement has been agreed where the PCF for the UE and the PCF for the Session are different. The agreed procedure is applied for non-roaming case and for Home-Routed roaming case (i.e. where both the PCF for the UE and the PCF for the Session are in HPLMN).However, the procedure for LBO roaming i.e. where the PCF for the UE is in HPLMN and the PCF for the Session is in VPLMN is not addressed. |
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| ***Summary of change:*** | It is proposed to add the LBO roaming scenario (i.e. where the PCF for the UE is in HPLMN and the PCF for the Session is in VPLMN) as a new procedure for the forwarding of UE reporting of URSP rule enforcement. |
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| ***Consequences if not approved:*** | Incomple functionality in deployments where the PCF serving the PDU session is located in VPLMN and the PCF for the UE is located in HPLMN. |
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| ***Clauses affected:*** | 4.16.16.2 (clause number correction), 4.16.16.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:*** | Correct the clause number: 4.16.16.1 to 4.16.16.2 |
|  |  |
| ***This CR's revision history:*** |  |

\* \* \* Start of Change \* \* \*

### 4.16.16 Awareness of URSP Rule Enforcement

#### 4.16.16.1 General

Awareness of URSP rule enforcement is specified in clause 6.6.2.4 of TS 23.503 [20].

The content of this clause describes the PCF procedures necessary to realize this functionality.

#### 4.16.16.2 Forwarding of URSP Rule Enforcement Information (for non-roaming and HR roaming)

This procedure applies when the PCF serving the PDU session receives URSP rule enforcement information from the SMF and forwards this information to the (H-)PCF serving the UE (see clause 6.1.3.18 of TS 23.503 [20]) for non-roaming and HR roaming.



Figure 4.16.16.2-1: Forwarding of URSP Rule Enforcement Information (for non-roaming or HR roaming)

1. The UE Policy Association is established, as described in clause 4.16.11.

2. If the (H-)PCF indicates the UE to send reporting of URSP rule enforcement as described in clause 6.6.2.4 of TS 23.503 [20], then depending on operator policies in the (H-)PCF, the (H-)PCF may subscribe to the BSF, then step 3 follows, or provides its PCF binding information to the AMF in step 1 with the indication to be notified about the PCF for the PDU Session for a UE, then step 4 follows.

3. The (H-)PCF for the UE determines that URSP rules depend on the UE reporting of URSP rule enforcement, it then subscribes to the BSF to be notified when a PCF for the PDU Session for this SUPI is registered in the BSF, by invoking Nbsf\_Management\_Subscribe (SUPI; DNN). Steps 4 and 5 are repeated for each PCF registered for a PDU Session to a SUPI included in the Nbsf\_Management.

4. The (H-)SMF establishes a SM Policy Association as described in clause 4.16.4. The allocated UE address/prefix, SUPI, DNN, S-NSSAI and the PCF address is registered in the BSF, as described in clause 6.1.1.2.2 of TS 23.503 [20].

5a. If the (H-)PCF for the UE subscribed to the BSF in step 3, then the BSF notifies that a PCF for the PDU Session is registered in the BSF, by invoking Nbsf\_Management\_Notify (UE address(es), PCF address, PCF instance id, PCF Set ID, level of binding). When there are multiple PDU Sessions to the same UE the BSF provides multiple notification to the PCF.

5b. If the (H-)PCF for the UE sent the request to notify that a PCF for the PDU Session is available to the AMF in step 1, then the PCF for the PDU Sessions sends Npcf\_PolicyAuthorization\_Notify (EventID set to SM Policy Association established, UE address, PCF address, PCF instance is, PCF Set ID) to the PCF indicated in the PCF binding information provided by the SMF.

6. The (H-)PCF for the UE subscribes to notifications of event "UE reporting Connection Capabilities from associated URSP rule" as defined in clause 6.1.3.18 of TS 23.503 [20], using Npcf\_PolicyAuthorization\_Subscribe (EventId set to "UE reporting Connection Capabilities from associated URSP rule", EventFilter set to at least "list of Connection Capabilities") and immediate reporting flag set to the PCF for the PDU Session. The response includes the NotificationCorrelationId and any Connection Capabilities if already available at the PCF for the PDU Session.

7. If not already installed, the PCF installs the Policy Control Request Trigger to detect "UE reporting Connection Capabilities from associated URSP rule" in the SMF.

8. When the (H-)SMF receives a UE report of URSP rule enforcement via PDU session establishment/modification as described in clauses 4.3.2 and 4.3.3 (step 8a) and the Policy Control Request Trigger is met, it then reports the received information traffic to the PCF serving the PDU Session, by invoking Npcf\_SMPolicyControl\_Update as defined in clause 6.1.3.5 of TS 23.503 [20] (step 8b).

9. The (H-)PCF for the UE is notified on the "UE reporting Connection Capabilities from associated URSP rule" by Npcf\_PolicyAuthorization\_Notify (NotificationCorrelationId, EventId set to "UE reporting Connection Capabilities from associated URSP rule", EventInformation including the Connection Capabilities) as defined in clause 6.1.3.18 of TS 23.503 [20].

10. The (H-)PCF for the UE checks operator policies and then may make policy control decisions based on awareness of URSP rule enforcement as described in clause 6.1.6 of TS 23.503 [20].

11. The SM Policy Association is terminated as described in clause 4.16.6. The allocated UE address/prefix, SUPI, DNN, S-NSSAI and the PCF address are deregistered in the BSF.

12a. If the (H-)PCF for the UE subscribed to the BSF, then the BSF notifies that the PCF serving a PDU Session is deregistered in the BSF, by invoking Nbsf\_Management\_Notify (Binding Identifier for the PDU Session).

12b. If the (H-)PCF for the UE sent the request to notify that a PCF for the PDU Session is available to the AMF in step 1, then the PCF for the PDU Session sends Npcf\_PolicyAuthoritation\_Notify (EventID set to SM Policy Association termination, Notification Correlation Id).

\* \* \* Second change \* \* \*

#### 4.16.16.X Forwarding of URSP Rule Enforcement Information (for LBO roaming)

This procedure applies when the PCF serving the PDU session receives URSP rule enforcement information from the SMF and forwards this information to the V-PCF serving the UE in VPLMN and V-PCF forwards the information to the H-PCF serving the UE in HPLMN for LBO roaming scenario (see clause 6.1.3.18 of TS 23.503 [20]) where the H-PCF for the UE is located in HPLMN and the PCF serving the PDU session for LBO roaming and the V-PCF for the UE is located in VPLMN.



Figure 4.16.16.X-1: Forwarding of URSP Rule Enforcement Information (for LBO roaming)

1. The UE Policy Association is established among the AMF, V-PCF and H-PCF, as described in clause 4.16.11. During this procedure, the H-PCF for the UE requests to forward the UE reporting Connection Capabilites from an associated URSP rule for LBO roaming PDU Session, the H-PCF sends the PCRT to the V-PCF.

2. If the H-PCF for the UE indicates the UE to send reporting of URSP rule enforcement as described in clause 6.6.2.4 of TS 23.503 [20] and H-PCF for the UE has requested to forward the UE reporting Connection Capabilites from an associated URSP rule for LBO roaming PDU Session as in the step 1, then depending on operator policies in the V-PCF, the V-PCF may subscribe to the BSF in VPLMN, then step 3 follows, or provides its PCF binding information to the AMF in step 1 with the indication to be notified about the PCF for the PDU Session for a UE, then step 4 follows.

3 to 7. The same as the step 3 to 7 of Figure 4.16.16.1-1 with replacing PCF with V-PCF. The SMF in this figure is located in VPLMN while the H-PCF for the UE is located in HPLMN.

8. If the UE supports the UE capability of reporting URSP enforcement and sends the indication to the H-PCF for the UE at the step 1, and detects the application matching a URSP rule including the Connection Cababilities, the UE reports the Connection Capability to the SMF during the PDU Session Establishement/Modification request to the SMF for LBO roaming scenario.

When the SMF receives a UE report of URSP rule enforcement via PDU Session Establishment/Modification as described in clauses 4.3.2 and 4.3.3 (step 8a) and the Policy Control Request Trigger is met, it then reports the received information traffic to the PCF serving the PDU Session, by invoking Npcf\_SMPolicyControl\_Update as defined in clause 6.1.3.5 of TS 23.503 [20] (step 8b).

9. The same step as the step 9 of Figure 4.16.16.1-1 with replacing PCF with V-PCF.

10 to 11. The same steps as the step 11 to 12 of Figure 4.16.16.1-1 with replacing PCF with V-PCF. The SMF in this figure is located in VPLMN.12. If the V-PCF has received the request to forward the UE reporting Connection Capabilites from an associated URSP rule for LBO roaming PDU Session from the H-PCF in the step 1 and the V-PCF for the UE is notified on the "UE reporting Connection Capabilities from associated URSP rule" by Npcf\_PolicyAuthorization\_Notify in the step 9, the V-PCF reports the received the information from the PCF for the PDU Session to the H-PCF.

13. The (H-)PCF for the UE checks operator policies and then may make policy control decisions based on awareness of URSP rule enforcement as described in clause 6.1.6 of TS 23.503 [20], and also the H-PCF may take an appropriate action as described in clause 6.6.2.4 of 23.503 [20].

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