**3GPP TSG-CT WG1 Meeting #128-eC1-21xxxx\_was1037**

**Electronic meeting, 25 February – 5 March 2021**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
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|  | **24.526** | **CR** | **0113** | **rev** | **1** | **Current version:** | **17.1.0** |  |
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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 | **X** | Radio Access Network |  | Core Network |  |

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| ***Title:***  | Clarifications on PLMN URSP stored in USIM |
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| ***Source to WG:*** | Mediatek Inc., Qualcomm Incorporated |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | 5GProtoc17 |  | ***Date:*** | 2020-03-01 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-17 |
|  | *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)* |
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| ***Reason for change:*** | In 23.503 subclause 6.6.2.2:*The UE may be provisioned with URSP rules by PCF of the* ***HPLMN****. When the UE is roaming, the PCF in the* ***HPLMN*** *may update the URSP rule in the UE. For URSP rules, the UE shall support the provisioning from the PCF in the HPLMN, as specified in TS 24.501 [22]. In addition, the UE may be also pre-configured with URSP rules (e.g. by the operator).*In 24.501 appendix D.2.1.6:*The following* ***abnormal*** *cases can be identified:**a) Receipt of an instruction associated with a UPSI which has a* ***PLMN ID*** *part that is* ***not equal*** *to the PLMN ID of the UE's* ***HPLMN*** *and the instruction contains a UE policy part with a UE policy part type set to "URSP".**The UE shall set the UE policy delivery service cause to #111 (Protocol error, unspecified) for the instruction in the UE policy section management result IE of the MANAGE UE POLICY COMMAND REJECT message.*NOTE: the UE policy section identifiers (UPSIs) = PLMN ID + UE policy section code (UPSC)From 24.501 D.2.1.6 we know, for signalled URSP rule, the HPLMN provisioned URSP rule (***PLMN ID*** *part that is* ***equal*** *to the PLMN ID of the UE's* ***HPLMN***) is used by UE not matter what PLMN the UE is registered to, i.e., UE registered to VPLMN also uses the signalled URSP rule from HPLMN (***PLMN ID*** *part that is* ***equal*** *to the PLMN ID of the UE's* ***HPLMN***).However, for pre-configured URSP rule stored in USIM specified in 31.102, per PLMN URSP rules can be provisioned:From implementation point of view, how UE selects proper URSP rules is important, options including:1. UE selects the URSP rules for UE's HPLMN stored in EFURSP.
2. UE selects the URSP rules for UE's RPLMN stored in EFURSP.

In our view, the 1. UE selects the URSP rules for UE's HPLMN stored in EFURSP is the appropriate way for implementation because this approach is aligned with the handlings of signalled URSP rules.  |
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| ***Summary of change:*** | When there are multiple PLMNs' URSP rules provisioned in USIM, UE uses the HPLMN's URSP rules |
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| ***Consequences if not approved:*** | Not specifed how UE selects appropriate URSP rules. |
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| ***Clauses affected:*** | 4.2.2.2 |
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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:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

\*\*\* change \*\*\*

#### 4.2.2.2 Association between an application and either a PDU session or non-seamless non-3GPP offload by a UE

In order to send a PDU of an application, the upper layers require information on the PDU session (e.g. PDU address) via which to send a PDU of an application.

NOTE 0: If PAP/CHAP is used, it is recommended that the request from the upper layers includes a DNN.

When the upper layers request information of the PDU session via which to send a PDU of an application, information on the non-3GPP access outside of a PDU session shall be provided to the upper layers, without evaluating the URSP rules, if due to UE local configuration non-seamless non-3GPP offload is requested. Otherwise, the UE shall proceed in the following order:

a) the UE shall evaluate the URSP rules, except the default URSP rule, with a traffic descriptor matching the application information in increasing order of their precedence values, if any. If the traffic descriptor contains more than one traffic descriptor component type, each of a different type, all of them shall be matched. If the traffic descriptor contains more than one traffic descriptor component of the same traffic descriptor component type, at least one of the traffic descriptor components of the same traffic descriptor component type shall be matched with the application information. A URSP rule is determined not to be applicable when for any given component in the traffic descriptor no corresponding information from the application is available or the corresponding information from the application does not match any of the values in the traffic descriptor component as specified in subclause 6.6.2.1 of 3GPP TS 23.503 [2].

 If the UE finds the traffic descriptor in a non-default URSP rule matching the application information, and:

I) if there is one or more PDU sessions:

1) matching at least one of the route selection descriptors of the URSP rule except the preferred access type and the multi-access preference, if any, wherein a route selection descriptor with PDU session type IPv4v6 matches also with PDU session type IPv4 if the network has sent 5GSM cause value #50 "PDU session type IPv4 only allowed" in the PDU SESSION ESTABLISHMENT ACCEPT message, and a route selection descriptor with PDU session type IPv4v6 matches also with PDU session type IPv6 if the network has sent 5GSM cause value #51 "PDU session type IPv6 only allowed" in the PDU SESSION ESTABLISHMENT ACCEPT message; and

2) established without requesting any parameter for which the matching route selection descriptor of the URSP rule does not provide a route selection descriptor component, except:

i) the preferred access type;

ii) the multi-access preference; and

iii) the DNN, if one or more DNNs are included in the traffic descriptor, and the DNN provided by the application is the same as the DNN requested by the UE during the PDU session establishment.

 the UE shall provide information on the PDU session that matches the route selection descriptor of the lowest precedence value to the upper layers;

NOTE 1: It is up to the UE implementation which PDU session to select if there exist multiple PDU sessions matching the same route selection descriptor of the lowest precedence value.

II) otherwise:

1) the UE shall select a route selection descriptor with the next smallest precedence value which has not yet been evaluated;

2) if:

i) the selected route selection descriptor contains a non-seamless non-3GPP offload indication:

A) if the information on the non-3GPP access outside of a PDU session is available, it shall be provided to the upper layers and the UE shall stop selecting a route selection descriptor matching the application information.

B) if the information about the non-3GPP access outside of a PDU session is not available, or non-3GPP access is not available the UE shall proceed to step 4);

ii) the selected route selection descriptor includes a PDU session type or an SSC mode which is not supported by the UE, the UE shall proceed to step 4);

iii) the selected route selection descriptor contains a time window but the time does not match the time window, the UE shall proceed to step 4);

iv) the selected route selection descriptor contains location criteria but the UE location does not match the location criteria, the UE shall proceed to step 4);

v) the selected route selection descriptor includes the multi-access preference but the UE does not support ATSSS, the UE shall proceed to step 4);

va) the selected route selection descriptor includes an SSC mode which either has been rejected by the network with 5GSM cause value #68 "not supported SSC mode" for the same DNN (or no DNN, if no DNN was indicated by the UE) and the same S-NSSAI associated with (if available in roaming scenarios) a mapped S-NSSAI (or no S-NSSAI, if no S-NSSAI was indicated by the UE) or was not included in the Allowed SSC mode IE following a rejection with 5GSM cause value #68 "not supported SSC mode" for the same DNN (or no DNN, if no DNN was indicated by the UE) and the same S-NSSAI associated with (if available in roaming scenarios) a mapped S-NSSAI (or no S-NSSAI, if no S-NSSAI was indicated by the UE), the UE shall proceed to step 4); or

vi) the selected route selection descriptor does not contain a non-seamless non-3GPP offload indication, the URSP handling layer requests the UE NAS layer to establish a PDU session providing the following PDU session attributes based on the selected route selection descriptor:

A) SSC mode if there is a SSC mode in the route selection descriptor;

NOTE 2: The SSC mode 3 is only used when the PDU session type is IPv4, IPv6 or IPv4v6.

B) one S-NSSAI if the S-NSSAI is in the route selection descriptor; and the S-NSSAI is in the allowed NSSAI. If none of the S-NSSAI(s) in the route selection descriptor is in the allowed NSSAI, the UE shall proceed to step 4);

NOTE 3: If there are multiple S-NSSAIs in the route selection descriptor, an S-NSSAI is chosen among the S-NSSAIs based on UE implementation.

C) one DNN, if the DNN is in the route selection descriptor and there is no DNN in the matched traffic descriptor; and if the DNN is an LADN DNN and the UE is in the service area of that LADN;

NOTE 4: If one or more DNNs are included in the traffic descriptor of a URSP rule and one or more DNNs are included in the route selection descriptor, the route selection descriptor is ignored and the UE proceeds to step 4). If one or more DNNs are included in the traffic descriptor and no DNN is included in the route selection descriptor, the DNN provided by the application is selected as one of the PDU session attributes by the URSP handling layer to request the UE NAS layer.

NOTE 5: If there is no DNN in the traffic descriptor and there are multiple DNNs in the route selection descriptor, a DNN is chosen based on UE implementation.

D) the PDU session type of the route selection descriptor;

E) preferred access type or multi-access preference, if the preferred access type or the multi-access preference is in the route selection descriptor; and

NOTE 6: If a preferred access type or a multi-access preference is included in the traffic descriptor of a URSP rule, it is recommended that the UE establishes a PDU session based on the preferred access type or the multi-access preference.

 The UE NAS layer indicates the result of the PDU session establishment. Upon successful completion of the PDU session establishment, the UE NAS layer shall additionally indicate the attributes of the established PDU session (e.g. PDU session identity, SSC mode, S-NSSAI, DNN, PDU session type, access type, PDU address) to the URSP handling layer, and shall provide information (e.g. PDU address) of the successfully established PDU session to the upper layers. The UE shall stop selecting a route selection descriptor matching the application information. If the PDU session establishment is unsuccessful, the UE shall proceed to step 3);

3) Based on the rejection cause and if there is another value which can be used for the rejected component in the same route selection descriptor, the UE shall select another combination of values in the currently selected route selection descriptor by using this value of the rejected component and proceed to step 2), otherwise the UE shall proceed to step 4); and

4) if there is any route selection descriptor which has not yet been evaluated, the UE shall proceed to step 1). If all route selection descriptors for the matching non-default URSP rule have been evaluated and there is one or more non-default matching URSP rule which has not yet been evaluated, the UE shall proceed to step a). If all non-default matching URSP rules have been evaluated, the UE shall inform the upper layers of the failure.

b) if no non-default matching URSP rule can be found and if UE local configuration for the application is available, the UE shall perform the association of the application to a PDU session accordingly. If no matching PDU session exists, the UE NAS layer shall attempt to establish a PDU session using UE local configuration.

NOTE 7: Any missing information in the UE local configuration needed to build the PDU session establishment request can be the appropriate corresponding component from the default URSP rule with the "match-all" traffic descriptor.

NOTE 8: If a DNN was provided by the application, the DNN provided by the application is selected as one of the PDU session attributes by the URSP handling layer to request the UE NAS layer.

 If the PDU session establishment is successful, the UE NAS layer shall provide information (e.g. PDU address) of the successfully established PDU session to the upper layers. Otherwise, the UE shall go to step c);

c) if no non-default matching URSP rule can be found and if either UE local configuration for the application is not available or the PDU session establishment based on UE local configuration for the application was unsuccessful, the UE shall perform the association of the application to a PDU session or to non-seamless non-3GPP offload according to the default URSP rule with the "match-all" traffic descriptor, if any. If the association is unsuccessful, the UE shall inform the upper layers of the failure.

NOTE 9: If a DNN was provided by the application, the DNN provided by the application is selected as one of the PDU session attributes by the URSP handling layer to request the UE NAS layer. If one or more DNNs are included in the route selection descriptor of the default URSP rule and no DNN is provided by the application, the DNN in the route selection descriptor is selected as one of the PDU session attributes by the URSP handling layer to request the UE NAS layer. When there are multiple DNNs in the route selection descriptor, the DNN is selected based on UE implementation.

The HPLMN may pre-configure the UE with URSP in the ME or in the USIM and the SNPN(s) may pre-configure the UE with URSP in the ME, or the HPLMN and the SNPN(s) may provide URSP to the UE by signalling as described in annex D of 3GPP TS 24.501 [11]. The HPLMN pre-configured URSP in the ME and the HPLMN signalled URSP shall be stored in a non-volatile memory in the ME together with the SUPI from the USIM. The SNPN(s) pre-configured URSP in the ME and the SNPN(s) signalled URSP shall be stored per SNPN in a non-volatile memory in the ME together with the subscriber identifier and the associated SNPN identity of the SNPN in the "list of subscriber data" configured in the ME, and shall be used only when the selected SNPN identity matches the associated SNPN identity. If the UE has both pre-configured URSP(s) and signalled URSP, the UE shall only use the signalled URSP. For a UE not operating in SNPN access mode, if the UE has no signalled URSP, the UE shall:

- only use the pre-configured URSP rules of the HPLMN and ignore URSP rules of other PLMN(s) in the USIM, if there are pre-configured URSP rules of the HPLMN in the USIM; or

- use the pre-configured URSP rules in the ME if the UE has pre-configured URSP in the ME and:

- only pre-configured URSP rules of PLMN(s) other than HPLMN in the USIM; or

- no pre-configured URSP in the USIM.

The HPLMN pre-configured URSP in the ME shall be stored until a new URSP is configured by HPLMN or the USIM is removed. The SNPN(s) pre-configured URSP in the ME shall be stored until the entry of the "list of subscriber data" with the corresponding SNPN identity is updated or considered as "invalid".

For a UE not operating in SNPN access mode, the signalled URSP may be modified by the procedures defined in annex D of 3GPP TS 24.501 [11] and shall be stored until USIM is removed. The URSP can only be used if the SUPI from the USIM matches the SUPI stored in the non-volatile memory of the ME. If the SUPI from the USIM does not match the SUPI stored in the non-volatile memory of the ME, the UE shall delete the URSP.

For a UE operating in SNPN access mode, the signalled URSP may be modified by the procedures defined in annex D of 3GPP TS 24.501 [11] and shall be stored until the entry of the "list of subscriber data" with the corresponding SNPN identity is updated or considered as "invalid".

The UE may re-evaluate the URSP rules, to check if the change of the association of an application to a PDU session is needed, when:

NOTE 10: The time when the UE performs the re-evaluation is up to UE implementation. It is recommended that the UE performs the re-evaluation in a timely manner.

a) the UE performs periodic URSP rules re-evaluation based on UE implementation;

b) the UE NAS layer indicates that an existing PDU session used for routing traffic of an application based on a URSP rule is released;

c) the URSP is updated by the PCF;

d) the UE NAS layer indicates that the UE performs inter-system change from S1 mode to N1 mode;

e) the UE NAS layer indicates that the UE is successfully registered in N1 mode over 3GPP access or non-3GPP access;

f) the UE establishes or releases a connection to a WLAN access and transmission of a PDU of the application via non-3GPP access outside of a PDU session becomes available/unavailable;

g) the allowed NSSAI is changed; or

h) the LADN information is changed.

If the re-evaluation leads to a change of the association of an application to a PDU session, the UE may enforce such change immediately or when UE returns to 5GMM-IDLE mode.

NOTE 11: The time when the UE enforces the change of the association of an application to a PDU Session is up to UE implementation. It is recommended that the UE performs the enforcement in a timely manner.

The URSP handling layer may request the UE NAS layer to release an existing PDU session after the re-evaluation.

\*\*\* end of change \*\*\*