**3GPP TSG-CT WG1 Meeting #137-eC1-225215**

**E-Meeting, 18th – 26th August 2022…………………………………………(was C1-224864)**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
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|  |  | **CR** | **0151** | **rev** | **1** | **Current version:** |  |  |
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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:***  | URSP re-evaluation after backoff timer expiry |
|  |  |
| ***Source to WG:*** | Samsung |
| ***Source to TSG:*** | CT1 |
|  |  |
| ***Work item code:*** | 5GProtoc18 |  | ***Date:*** | 2022-08-10 |
|  |  |  |  |  |
| ***Category:*** |  |  | ***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)* |
|  |  |
| ***Reason for change:*** | If PDU session establishment failed, application association with happens as below *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.*In case, PDU session is rejected with back off timer, UE doesn’t (re-)evaluate URSP and cause application to use the lower precedence Route selection descriptor, Trafffic descriptor or Failure even after the backoff timer is expired. |
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| ***Summary of change:*** | URSP re-evaluation shall happens when backoff timer is expired for the PDU session |
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| ***Consequences if not approved:*** | Application will use the lower precedence RSD/TD or may be facing failure (in case there is no matching URSP rules is left). |
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| ***Clauses affected:*** | 4.2.2.2 |
|  |  |
|  | **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:*** |  |

#### 4.2.2.2 Association between an application and a PDU session, non-seamless non-3GPP offload or 5G ProSe layer-3 UE-to-network relay 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; or

- information on the 5G ProSe layer-3 UE-to-network relay shall be provided to the upper layers, without evaluating the URSP rules, if due to UE local configuration 5G ProSe layer-3 UE-to-network relay 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 clause 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 an established connection to non-3GPP access, an established connection with a 5G ProSe layer-3 UE-to-network relay, or one or more established PDU sessions or any combinations of these, the UE shall evaluate the route selection descriptors of the URSP rule in increasing order as followings:

 if:

1) the route selection descriptor of the URSP rule contains a non-seamless non-3GPP offload indication and the information on the non-3GPP access outside of a PDU session is available;

 the UE shall provide information on the non-3GPP access outside of a PDU session to the upper layers;

1a) the route selection descriptor of the URSP rule contains a 5G ProSe layer-3 UE-to-network relay offload indication and the information on 5G ProSe layer-3 UE-to-network relay is available;

 the UE shall provide information on the 5G ProSe layer-3 UE-to-network relay to the upper layers; and

2) there is one or more PDU sessions:

i) for which the parameters associated with the PDU session or the parameters requested by the UE during the PDU session establishment procedure match 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;

- the 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;

- the route selection descriptor with PDU session type IPv4v6 matches also with PDU session type IPv6 or IPv4 if the UE requested the PDU session type IPv4v6 but the selected PDU session type is set to IPv4 or IPv6 in the PDU SESSION ESTABLISHMENT ACCEPT message; and

- if the UE is in a non-subscribed SNPN and the URSP rule is a part of the non-subscribed SNPN signalled URSP, or is in the HPLMN or the subscribed SNPN, then a route selection descriptor with an S-NSSAI matches the S-NSSAI of the PDU session, otherwise a route selection descriptor with an S-NSSAI matches the mapped S-NSSAI of the PDU session; and

ii) 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:

A) the preferred access type;

B) the multi-access preference;

C) the DNN, if no DNN is included in the route selection descriptor component and the DNN provided by the application is the same as the DNN requested by the UE during the PDU session establishment; and

D) the S-NSSAI, if the UE has only one S-NSSAI in the allowed NSSAI.

 the UE shall provide information on the PDU session that matches the route selection 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);

ia) the selected route selection descriptor contains a 5G ProSe layer-3 UE-to-network relay offload indication:

A) if the information on the 5G ProSe layer-3 UE-to-network relay is available and the UE supports acting as a 5G ProSe layer-3 remote UE as specified in 3GPP TS 24.501 [11], 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 5G ProSe layer-3 UE-to-network relay is not available or the UE does not support acting as a 5G ProSe layer-3 remote UE as specified in 3GPP TS 24.501 [11], 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 (SSC mode 2 or 3), 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 nor a 5G ProSe layer-3 UE-to-network relay 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 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 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 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;

NOTE 6: If a preferred access type or a multi-access preference is included in the route selection 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.

F) PDU session pair ID if there is a PDU session pair ID in the route selection descriptor; and

G) RSN if there is an RSN in the route selection descriptor;

 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

NOTE 7: if the rejection cause is provided with a back-off timer (ee 3GPP TS 24.501 [11] clause 6.2.7 and clause 6.2.8), the UE can select the same route selection descriptor values after the timer is stopped or expired and proceedto step 2.

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 and no DNN is included in the UE local configuration, 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 9: If there are multiple DNNs in the UE local configuration, a DNN is chosen based on UE implementation.

 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, to non-seamless non-3GPP offload or to 5G ProSe layer-3 UE-to-network relay 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 10: If a DNN was provided by the application and no DNN is included in the route selection descriptor of the default URSP rule, 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, 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 subscribed SNPN(s) may pre-configure the UE with URSP in the corresponding entry of the "list of subscriber data" stored in ME. The HPLMN or subscribed SNPN may pre-configure URSP(s) in the ME for non-subscribed SNPN(s) and associate the URSP(s) with the entry of the subscribed SNPN of the "list of subscriber data" or associate the URSP(s) with the corresponding PLMN subscription of the HPLMN. It is up to implementation how many pre-configured URSP(s) for non-subscribed SNPN(s) per entry of the "list of subscriber data" or per PLMN subscription can be stored in the ME.The HPLMN, the subscribed SNPN(s) and the non-subscribed 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 subscribed 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. If the UE accepts URSP rules signalled by a non-subscribed SNPN that the UE accesses using credentials from a credential holder (see 3GPP TS 24.501 [11] clause C.2 and D.2), the non-subscribed SNPN(s) signalled URSP shall be stored per non-subscribed SNPN and associated with the selected entry of the "list of subscriber data" or the selected PLMN subscription. It is up to implementation how many signalled URSP(s) for non-subscribed SNPN(s) per entry of the "list of subscriber data" or per PLMN subscription can be stored in the ME. Only the subscribed SNPN(s) pre-configured URSP and the subscribed SNPN(s) signalled URSP shall be used when the selected SNPN identity matches the associated subscribed SNPN identity.

If the UE registered to a subscribed SNPN or a PLMN, 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 operation 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.

When the UE is registered to a non-subscribed SNPN using credentials from a credentials holder:

a) if the UE has the non-subscribed SNPN signalled URSP associated with the selected entry of the "list of subscriber data" or the selected PLMN subscription, or the subscribed SNPN signalled URSP when the credentials holder is an SNPN or the HPLMN signalled URSP when the credentials holder is a PLMN, the UE shall evaluate URSP rules, if available, in accordance with the following order until a matching URSP rule is found:

1) the non-subscribed SNPN signalled non-default URSP rules associated with the selected entry of the "list of subscriber data" or the selected PLMN subscription stored in the ME;

2) if the credentials holder is:

- an SNPN, the subscribed SNPN signalled non-default URSP rules stored in the ME; or

- a PLMN, the HPLMN signalled non-default URSP rules stored in the ME;

3) UE local configuration for the application;

4) the non-subscribed SNPN signalled default URSP rule associated with the selected entry of the "list of subscriber data" or the selected PLMN subscription stored in the ME; or

5) if the credentials holder is:

- an SNPN, the subscribed SNPN signalled default URSP rule stored in the ME; or

- a PLMN, the HPLMN signalled default URSP rule stored in the ME;

NOTE X: If no matching URSP rule is found, the UE informs the upper layers of the failure.

b) otherwise, if the UE has

- URSP pre-configured for the non-subscribed SNPN associated with the selected entry of the "list of subscriber data" or the selected PLMN subscription;

- URSP pre-configured for the subscribed SNPN when the credentials holder is an SNPN or for the HPLMN when the credentials holder is a PLMN; or

- UE local configuration for the application;

then the UE shall evaluate URSP rules, if available, in accordance with the following order until a matching URSP rule is found:

1) the non-default URSP rules pre-configured for the non-subscribed SNPN and associated with the selected entry of the "list of subscriber data" or the selected PLMN subscription stored in the ME;

2) if the credentials holder is:

- an SNPN, the subscribed SNPN pre-configured non-default URSP rules stored in the ME; or

- a PLMN:

- the HPLMN pre-configured non-default URSP rules stored in the in USIM; or

- the HPLMN pre-configured non-default URSP rules stored in the in ME;

3) UE local configuration for the application;

4) the default URSP rule pre-configured for the non-subscribed SNPN and associated with the selected entry of the "list of subscriber data" or the selected PLMN subscription stored in the ME; or

5) if the credentials holder is:

- an SNPN, the subscribed SNPN pre-configured default URSP rule stored in the ME; or

- a PLMN:

- the HPLMN pre-configured default URSP rule stored in the in USIM; or

- the HPLMN pre-configured default URSP rule stored in the in ME.

NOTE Y: If no matching URSP rule is found, the UE informs the upper layers of the failure.

The HPLMN pre-configured URSP in the ME shall be stored until a new URSP is configured by HPLMN or the USIM is removed.

For a UE not operating in SNPN access operation 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 operation mode and registered to a subscribed SNPN, the subscribed SNPN 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".

For a UE operating in SNPN access operation mode and registered to a non-subscribed SNPN, the non-subscribed SNPN signalled URSP may be modified by the procedures defined in annex D of 3GPP TS 24.501 [11].

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 11: 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 or the configured NSSAI is changed; or

h) the LADN information is changed.

i) the UE NAS layer indicates that back-off timer T3396, T3584 or T35585 (see 3GPP TS 24.501 [11] clause 6.2.7 and clause 6.2.8) is stopped or expired.

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 12: 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.