**3GPP TSG-CT WG1 Meeting #133e-bisC1-22XXXX**

**E-meeting, 17-21 January 2022**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **24.501** | **CR** | **3536** | **rev** | **2** | **Current version:** | **17.5.0** |  |
|  | | | | | | | | |
| *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)*.* | | | | | | | | |
|  | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME | **x** | Radio Access Network |  | Core Network |  |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** | Rejected NSSAI for the maximum number of UE reached with different PLMNs in RA | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei, HiSilicon | | | | | | | | | |
| ***Source to TSG:*** | C1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | eNS\_Ph2 | | | | |  | ***Date:*** | | | 2022-01-10 |
|  |  | | | |  | |  | | |  |
| ***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 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-15 (Release 15) Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | About the applicability of rejected NSSAI for the maximum number of UE reached with different PLMNs in an RA, CT1 has sent an LS C1-214895 to SA2 and was received a reply LS from SA2 (see C1-220104/S2-2109364) which includes following information:  "*SA2 would like to point out that the applicability of a rejected S-NSSAI and related Backoff timer is a general issue that should have a uniform behaviour from UE standpoint. As such, SA2 would like to clarify that:*  *1) When rejected S-NSSAIs are received in an RA that includes TAIs from different equivalent PLMNs, a UE shall behave according to the rejected S-NSSAI and its cause-code-related behaviour and respect any related backoff timers in all the cells of the TAIs of the RA, irrespective of the PLMN ID of the cells of these TAIs of the RA.*  *2) A UE shall apply the rejected S-NSSAI cause-code-related behaviour (if this is reasonable according to its cause code) and any related backoff timer in the cells outside the RA where the rejected S-NSSAI was received, only while camping on the cells belonging to the PLMN which indicated the rejected S-NSSAI.*"  Based on above yellow text, one can see that when the UE stays inside the current RA, the rejected NSSAI for the maximum number of UE reached is applicable to all of these PLMNs in the registration area (i.e. Option 1 indicated in CT1 LS C1-214895).  Based on above green text, one can see that when the UE moves out of the current RA, the rejected NSSAI for the maximum number of UE reached is applicable to the registered PLMN only (i.e. Option 2 indicated in CT1 LS C1-214895).  In the LS action, SA2 indicated that "*It is left to CT1 to decide how to achieve the above UE behaviour.*". For this, the UE just takes different handling based on the current location, i.e. whether inside the current RA or not. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | It proposes to specify the UE handling on the rejected NSSAI for the maximum number of UE reached with different PLMNs in the current RA as below:  If the UE receives a rejected NSSAI for the maximum number of UEs reached, the registration area contains TAIs belonging to different PLMNs, which are equivalent PLMNs, and the UE is in the current registration area, the UE shall treat the received rejected NSSAI for the maximum number of UEs reached as applicable to these PLMNs in this registration area. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The applicability of rejected NSSAI for the maximum number of UE reached with different PLMNs in an RA is unclear. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 4.6.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | |  | | | | | | | | |

\* \* \* First Change \* \* \* \*

### 4.6.1 General

The 5GS supports network slicing as described in 3GPP TS 23.501 [8]. Within a PLMN or SNPN, a network slice is identified by an S-NSSAI, which is comprised of a slice/service type (SST) and a slice differentiator (SD). Inclusion of an SD in an S-NSSAI is optional. A set of one or more S-NSSAIs is called the NSSAI. The following NSSAIs are defined in 3GPP TS 23.501 [8]:

a) configured NSSAI;

b) requested NSSAI;

c) allowed NSSAI;

d) subscribed S-NSSAIs; and

e) pending NSSAI.

The following NSSAIs are defined in the present document:

a) rejected NSSAI for the current PLMN or SNPN;

b) rejected NSSAI for the current registration area;

c) rejected NSSAI for the failed or revoked NSSAA; and

d) rejected NSSAI for the maximum number of UEs reached.

In roaming scenarios, rejected NSSAI for the current PLMN or SNPN, or rejected NSSAI for the current registration area, or rejected NSSAI for the maximum number of UEs reached includes one or more S-NSSAI for the current PLMN and also contains a set of mapped S-NSSAI(s) if available. An S-NSSAI included in the rejected NSSAI for the failed or revoked NSSAA is an HPLMN S-NSSAI.

In case of a PLMN, a serving PLMN may configure a UE with the configured NSSAI per PLMN. In addition, the HPLMN may configure a UE with a single default configured NSSAI and consider the default configured NSSAI as valid in a PLMN for which the UE has neither a configured NSSAI nor an allowed NSSAI.

In case of an SNPN, the SNPN may configure a UE with a configured NSSAI applicable to the SNPN if the UE is neither registering nor registered for onboarding services in SNPN. In addition, the credential holder may configure a single default configured NSSAI associated with the selected entry of the "list of subscriber data" or the PLMN subscription and consider the default configured NSSAI as valid in a SNPN for which the UE has neither a configured NSSAI nor an allowed NSSAI. If the UE is registering or registered for onboarding services in SNPN, the serving SNPN shall not provide a configured NSSAI to the UE.

The allowed NSSAI and the rejected NSSAI for the current registration area are managed per access type independently, i.e. 3GPP access or non-3GPP access, and is applicable for the registration area. If the UE does not have a valid registration area, the rejected NSSAI for the current registration area is applicable to the tracking area on which it was received. If the registration area contains TAIs belonging to different PLMNs, which are equivalent PLMNs, the allowed NSSAI and the rejected NSSAI for the current registration area are applicable to these PLMNs in this registration area.

The allowed NSSAI that is associated with a registration area containing TAIs belonging to different PLMNs, which are equivalent PLMNs, can be used to form the requested NSSAI for any of the equivalent PLMNs when the UE is outside of the registration area where the allowed NSSAI was received.

When the network slice-specific authentication and authorization procedure is to be initiated for one or more S-NSSAIs in the requested NSSAI or the network slice-specific authentication and authorization procedure is ongoing for one or more S-NSSAIs, these S-NSSAI(s) will be included in the pending NSSAI. When the network slice-specific authentication and authorization procedure is completed for an S-NSSAI that has been in the pending NSSAI, the S-NSSAI will be moved to the allowed NSSAI or rejected NSSAI depending on the outcome of the procedure. The AMF sends the updated allowed NSSAI to the UE over the same access of the requested S-NSSAI. The AMF sends the updated rejected NSSAI over either 3GPP access or non-3GPP access. The pending NSSAI is managed regardless of access type i.e. the pending NSSAI is applicable to both 3GPP access and non-3GPP access for the current PLMN even if sent over only one of the accesses. If the registration area contains TAIs belonging to different PLMNs, which are equivalent PLMNs, the pending NSSAI is applicable to these PLMNs in this registration area.

The rejected NSSAI for the current PLMN or SNPN is applicable for the whole registered PLMN or SNPN. The AMF shall only send a rejected NSSAI for the current PLMN when the registration area consists of TAIs that only belong to the registered PLMN. If the UE receives a rejected NSSAI for the current PLMN, and the registration area also contains TAIs belonging to different PLMNs, the UE shall treat the received rejected NSSAI for the current PLMN as applicable to the whole registered PLMN.

The rejected NSSAI for the failed or revoked NSSAA includes one or more S-NSSAIs that have failed the network slice-specific authentication and authorization or for which the authorization have been revoked, and are applicable for the whole registered PLMN or SNPN.

The rejected NSSAI for the maximum number of UEs reached is applicable for the whole registered PLMN or SNPN. The AMF shall send a rejected NSSAI including S-NSSAI(s) with the rejection cause "S-NSSAI not available due to maximum number of UEs reached", when one or more S-NSSAIs are indicated that the maximum number of UEs has been reached. If the timer T3526 associated with the S-NSSAI(s) was started upon reception of the rejected NSSAI for the maximum number of UEs reached, the UE may remove the S-NSSAI(s) from the rejected NSSAI including S-NSSAI(s) with the rejection cause "S-NSSAI not available due to maximum number of UEs reached", if the timer T3526 associated with the S-NSSAI(s) expires. If one or more S-NSSAIs are removed from the rejected NSSAI for the maximum number of UEs reached, the timer T3526 associated with the removed S-NSSAI(s) shall be stopped, if running. The UE shall not stop the timer T3526 if the UE selects an E-UTRA cell connected to EPC.

If the UE receives a rejected NSSAI for the maximum number of UEs reached, the registration area contains TAIs belonging to different PLMNs, which are equivalent PLMNs, and the UE is in the current registration area, the UE shall treat the received rejected NSSAI for the maximum number of UEs reached as applicable to these PLMNs in this registration area.

NOTE 1: Based on local policies, the UE can remove an S-NSSAI from the rejected NSSAI for the failed or revoked NSSAA when the UE wants to register to the slice identified by this S-NSSAI.

NOTE 2: Based on network local policy, network slice-specific authentication and authorization procedure can be initiated by the AMF for an S-NSSAI in rejected NSSAI for the failed or revoked NSSAA when the S-NSSAI is requested by the UE based on its local policy.

NOTE 3: At least one S-NSSAI in the default configured NSSAI or in the subscribed S-NSSAIs marked as default S-NSSAI is recommended as not subject to network slice-specific authentication and authorization, in order to ensure that at least one PDU session can be established to access service, even when Network Slice-specific Authentication and Authorization fails.

NOTE 4: The rejected NSSAI can be provided by the network via either Rejected NSSAI IE or the Extended rejected NSSAI IE.

\* \* \* End of Change \* \* \* \*