**3GPP TSG-CT WG1 Meeting #141eC1-232675**

**eMeeting 17– 21 April 2023 *revision of C1-232047***

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
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|  | **24.501** | **CR** | **5176** | **rev** | **1** | **Current version:** | **18.2.1** |  |
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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 | **X** |

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| ***Title:***  | Mobility management for the support of optimised handling of temporarily available network slices |
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| ***Source to WG:*** | NTT DOCOMO, Nokia, Nokia Shanghai Bell, LG electronics, SHARP  |
| ***Source to TSG:*** | CT1 |
|  |  |
| ***Work item code:*** | eNS\_Ph3 |  | ***Date:*** | 2023-04-20 |
|  |  |  |  |  |
| ***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-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
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| ***Reason for change:*** | Stage 2 requirements for the support of optimised handling of temporarily available network slices were agreed in S2-2303870. This CR provides stage 3 implementing the requirements for the mobility management part. |
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| ***Summary of change:*** | Providing the mobility management procedural description for the support optimised handling of temporarily available network slices. |
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| ***Consequences if not approved:*** | Missing feature. |
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| ***Clauses affected:*** |  |
|  |  |
|  | **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 ...  |
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| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

### 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 S-NSSAIs and NSSAIs are defined in 3GPP TS 23.501 [8]:

a) configured NSSAI;

b) requested NSSAI;

c) allowed NSSAI;

d) subscribed S-NSSAIs;

e) pending NSSAI; and

f) alternative S-NSSAIs.

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). 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, NSSRG information if the UE has indicated that it supports the subscription-based restrictions to simultaneous registration of network slices feature, and S-NSSAI time validity information if the UE has indicated that it supports S-NSSAI time validity information. 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.

NOTE 1: The value(s) used in the default configured NSSAI are expected to be commonly decided by all roaming partners, e.g., values standardized by 3GPP or other bodies.

In case of an SNPN, the SNPN may configure a UE which is neither registering nor registered for onboarding services in SNPN with a configured NSSAI applicable to the SNPN, NSSRG information if the UE has indicated that it supports the subscription-based restrictions to simultaneous registration of network slices feature, and S-NSSAI time validity information if the UE has indicated that it supports S-NSSAI time validity information. 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, the rejected NSSAI for the current registration area, rejected NSSAI for the failed or revoked NSSAA and rejected NSSAI for the maximum number of UEs reached 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 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, and the access type over which the rejected NSSAI was sent. 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, the UE shall treat the received rejected NSSAI for the maximum number of UEs reached as applicable to these equivalent PLMNs when the UE is in this registration area.

If the UE has indicated that the UE supports network slice replacement feature and the AMF determines to provide the mapping information between the S-NSSAI to be replaced and the alternative S-NSSAI to the UE, the network shall provide the UE with the mapping information between the S-NSSAI to be replaced and the alternative S-NSSAI. The S-NSSAI to be replaced and the alternative S-NSSAI are managed per access type independently, i.e. 3GPP access or non-3GPP access, and are applicable for the registration area.

NOTE 2: 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 3: 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 4: At least one S-NSSAI in the default configured NSSAI or at least one 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 5: At least one S-NSSAI in the default configured NSSAI or at least one default S-NSSAI is recommended as not subject to network slice admission control, in order to ensure that at least one PDU session can be established to access service.

NOTE 6: The rejected NSSAI can be provided by the network via either Rejected NSSAI IE or the Extended rejected NSSAI IE.

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* Next Change \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

#### 4.6.2.X Mobility management for optimised handling of temporarily available network slices

The UE and the network may support optimised handling of temporarily available network slices.

If the UE has indicated that it supports S-NSSAI time validity information and the AMF supporting S-NSSAI time validity information determines that one or more S-NSSAIs in the configured NSSAI are temporarily available (see 3GPP TS 23.501 [8]), then the AMF may include the S-NSSAI time validity information for the S-NSSAI(s) in the Registration Accept message or the CONFIGURATION UPDATE COMMAND message. If the AMF determines that the S-NSSAI time validity information for an S-NSSAI in the configured NSSAI is changed, the AMF may provide the UE with a new S-NSSAI time validity information for that S-NSSAI via the CONFIGURATION UPDATE COMMAND message.

If the UE supports S-NSSAI time validity information, is configured with S-NSSAI time validity information for an S-NSSAI, and:

a) the S-NSSAI time validity information indicates that the S-NSSAI is available, then the UE may request the S-NSSAI in the requested NSSAI in the Registration Request message;

b) the S-NSSAI time validity information indicates that the S-NSSAI is not available, then:

i) the UE shall not include the S-NSSAI in the requested NSSAI in the Registration Request message;

ii) the UE shall remove the S-NSSAI from the stored allowed NSSAI (if any) and the stored partially allowed NSSAI (if any) in the non-volatile memory in the ME, as specified in annex C; and

iii) the S-NSSAI time validity information indicates that the S-NSSAI will not become available again, then the UE shall remove the S-NSSAI from the stored configured NSSAI in the non-volatile memory in the ME, as specified in annex C.

Editor's note [CR#5176, WID- eNS\_Ph3]: The behaviour of a supporting UE when the S-NSSAI time validity information indicates that the S-NSSAI becomes available again is FFS.

When the S-NSSAI time validity information of an S-NSSAI indicates that the S-NSSAI is not available, then:

a) if the AMF receives a requested NSSAI in the Registration REQUEST message with the S-NSSAI identifying the network slice, the AMF shall:

i) to a UE which has indicated that it supports S-NSSAI time validity information, provide:

1) a configured NSSAI including the S-NSSAI together with the S-NSSAI time validity information in the Registration Accept message if the S-NSSAI will become available again; or

2) a configured NSSAI not including the S-NSSAI in the Registration Accept message if the S-NSSAI will not become available again; or

ii) to a UE which has not indicated that it supports S-NSSAI time validity information, reject the S-NSSAI for the current PLMN or SNPN. If the registration request is accepted, the AMF shall include a configured NSSAI not including the S-NSSAI;

b) if the AMF detects that the S-NSSAI is included in the allowed NSSAI or the partially allowed NSSAI of a UE which has:

i) indicated that it supports S-NSSAI time validity information, the AMF shall locally remove the S-NSSAI from the allowed NSSAI (if any) and the partially allowed NSSAI (if any); or

ii) not indicated that it supports S-NSSAI time validity information, the AMF shall remove the S-NSSAI from the stored configured NSSAI (if any), allowed NSSAI (if any), and partially allowed NSSAI (if any) by sending the CONFIGURATION UPDATE COMMAND message.

When the S-NSSAI time validity information of an S-NSSAI indicates that the S-NSSAI becomes available again, the AMF shall update the configured NSSAI including the S-NSSAI to a UE which has not indicated that it supports S-NSSAI time validity information by sending CONFIGURATION UPDATE COMMAND message if the UE is subscribed to the S-NSSAI.

Editor's note [CR#5176, WID- eNS\_Ph3]: The behaviour of the AMF towards a supporting UE when the S-NSSAI time validity information indicates that the S-NSSAI becomes available again is FFS.