**3GPP TSG-SA2 Meeting #146-e** ***S2-2106430r3***

**Online, , 16th Aug 2021 - 27th Aug 2021**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **23.501** | **CR** | **3220** | **rev** | **-** | **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 |  | Radio Access Network |  | Core Network | **x** |

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| ***Title:*** | NSAC procedure in EPS when APN maps to more than one S-NSSAI. | | | | | | | | | |
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| ***Source to WG:*** | NEC | | | | | | | | | |
| ***Source to TSG:*** | SA2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | eNS\_Ph2 | | | | |  | ***Date:*** | | | 2021-08-09 |
|  |  | | | |  | |  | | |  |
| ***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)* | |
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| ***Reason for change:*** | | If an APN is mapped to more than one S-NSSAI then during a PDN connection establishment procedure for an APN in EPS, then the PGW-C+SMF:  i) may choose first an S-NSSAI which is not subject to EPS couting.  ii) if the APN is mapped to more than one S-NSSAI and NSAC procedure fails for the S-NSSAI, then the PGW-C+SMF may try another S-NSSAI for the PDN connection establishment procedure. | | | | | | | | |
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| ***Summary of change:*** | | If an APN is mapped to more than one S-NSSAI then during a PDN connection establishment procedure for an APN in EPS, then the PGW-C+SMF:  i) may choose first an S-NSSAI which is not subject to EPS couting.  ii) if the APN is mapped to more than one S-NSSAI and NSAC procedure fails for the S-NSSAI, then the PGW-C+SMF may try another S-NSSAI for the PDN connection establishment procedure. | | | | | | | | |
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| ***Consequences if not approved:*** | | The PGW-C+SMFwill not retry another S-NSSAI for an APN if the NSAC procedure fails for the first selected S-NSSAI for the APN. | | | | | | | | |
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| ***Clauses affected:*** | | 5.15.11.5 | | | | | | | | |
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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:*** | |  | | | | | | | | |

5.15.11.5 Support of Network Slice Admission Control and Interworking with EPC

If EPS counting is required for a network slice, the Network Slice Admission Control for maximum number of UEs and/or for maximum number of PDU Sessions per network slice is performed at the time of PDN connection establishment in case of EPC interworking. To support the NSAC for maximum number of UEs and/or for maximum number of PDU Sessions per network slice in EPC, the SMF+PGW-C is configured with the information indicating which network slice is subject to NSAC. During PDN connection establishment in EPC, the SMF+PGW-C selects an S-NSSAI associated with the PDN connection as described in clause 5.15.7.1. If the selected S-NSSAI by the SMF+PGW-C is subject to the NSAC, the SMF+PGW-C triggers interaction with NSACF to check the availability of the network slice, before the SMF+PGW-C provides the selected S-NSSAI to the UE. If the network slice is available, the SMF+PGW-C continues to proceed with the PDN connection establishment procedure.

The NSACF performs the following for checking network slice availability prior to returning a response to the SMF+PGW-C:

If:

- the UE identity is already included in the list of UE IDs registered with a network slice (if Network Slice Admission Control for maximum number of UEs is applicable) and the current number of PDU sessions is below the maximum number (if Network Slice Admission Control for maximum number of sessions is applicable); or

- the UE identity is not included in the list of UE IDs registered with a network slice and the current number of UE registration did not reach the maximum number (if Network Slice Admission Control for maximum number of UEs is applicable), and the current number of PDU sessions did not reach the maximum number (if Network Slice Admission Control for maximum number of sessions is applicable);

then the NSACF responds to the SMF+PGW-C with the information that the network slice is available. The NSACF includes the UE identity in the list of UE IDs if not already on the list and increases the current number of UE registration (if Network Slice Admission Control for maximum number of UEs is applicable) and increases the current number of PDU sessions (if Network Slice Admission Control for maximum number of sessions is applicable).

NOTE: If the APN is mapped to more than one S-NSSAI and the first selected S-NSSAI is not available (e.g. either current number of UE registration reached maximum or current number of PDU sessions reached maximum), then based on the operator policy the PGW-C+SMF can try another mapped S-NSSAI for the PDN connection establishment procedure.

When the UE with ongoing PDN connection(s) moves from EPC to 5GC, the SMF+PGW-C triggers a request to decrease the number of the UE registration in NSACF and the AMF triggers a request to increase the number of the UE registration in NSACF when the UE is registered in the new AMF. If there are more than one PDN connections associated with the S-NSSAI, the NSACF may receive multiple requests for the same S-NSSAI from different SMF+PGW-Cs. When the UE with ongoing PDU session(s) moves from 5GC to EPC, the SMF+PGW-C triggers a request to increase the number of the UE registration in NSACF and the old AMF triggers a request to decrease the number of the UE registration in NSACF when the UE is deregistered in old AMF. If there are more than one PDU sessions associated with the S-NSSAI, the NSACF may receive multiple requests for the same S-NSSAI from different SMF+PGW-Cs. The NSACF maintains a list of UE IDs based on the requests from SMF+PGW-C(s) and AMF, and adjusts the current number of registrations accordingly.

When the UE with ongoing PDN connection(s) moves from EPC to 5GC, or from 5GC to EPC, the session continuity is guaranteed as the admission was granted at the time of PDN connection establishment, i.e. the number of PDU session is not counted again in 5GC.

Editor's note: NSAC mechanism during the mobility between EPC and 5GC can be revisited to make it align with 5GC mechanism, i.e. mobility between AMFs.

If the PDN connection associated with S-NSSAI is released in EPC, the SMF+PGW-C triggers a request (i.e. decrease) to NSACF for maximum number of PDU sessions per network slice control. The NSACF determines to decrease the current number of registrations and remove the UE identity from the list of UE IDs if the PDN connection(s) associated with S-NSSAI are all released in EPC.

Editor's note: It is FFS whether one NSACF is in charge of registration and session admission control, or there are respective NSCAFs for registration and session admission control, depending on the deployment scenarios.

NOTE: Network Slice Admission Control in EPC is not performed for the attachment without PDN connectivity.

If EPS counting is not required for a network slice, the Network Slice Admission Control for maximum number of UEs and/or for maximum number of PDU Sessions per network slice is performed when the UE moves from EPC to 5GC, i.e. when the UE performs mobility Registration procedure from EPC to 5GC (Network Slice Admission Control for maximum number of UEs per network slice) and/or when the PDN connections are handed over from EPC to 5GC (Network Slice Admission Control for maximum number of PDU Sessions per network slice). The SMF+PGW-C is configured with the information indicating the network slice is subject to NSAC only in 5GS. The PDN connection interworking procedure is performed as described in clause 5.15.7.1.

Editor's note: It is FFS whether and how to support session continuity if either the current number of UE registration or the current number of PDU sessions reaches the maximum number when the UE moves from EPC to 5GC.