**3GPP TSG-SA WG2 Meeting #146-E *S2-2106004***

**, 16 – 27 August 2021**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
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|  |  | **CR** |  | **rev** |  | **Current version:** |  |  |
|  |
| *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:***  | Resolve ENs in NSAC support for EPC interworking |
|  |  |
| ***Source to WG:*** | Samsung, NTT DOCOMO |
| ***Source to TSG:*** | SA2 |
|  |  |
| ***Work item code:*** | eNS\_Ph2 |  | ***Date:*** |  |
|  |  |  |  |  |
| ***Category:*** |  |  | ***Release:*** |  |
|  | *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:*** | Resolve ENs in NSAC support for EPC interworking |
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| ***Summary of change:*** | It is clarified that * one NSACF can be in charge of registration and session admission control, or there are respective NSCAFs for registration and session admission control, depending on the deployement scenarios.
* Session continuity is not guaranteed if EPS counting is not performed.
* Based on the operator’s policy, the maximum number regarding the NSAC configured in the NSACF can be an integrated limit or an independent limit for each 5GC and EPC.
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| ***Consequences if not approved:*** | Unclear specifications |
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| ***Clauses affected:*** | 5.15.11.5 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  |  |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  |  |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  |  |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

\*\*\* 1st change \*\*\*

#### 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. Based on the operator’s policy, the maximum number of UEs and/or the maximum number of sessions configured in the NSACF can be an integrated limit or an independent limit for each 5GC and EPC.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). Otherwise, if maximum number of UEs and/or the maximum number of sessions is reached, following actions are performed:

- In case of integrated limit for both 5GC and EPC, the NSACF returns the response indicating that the maximum number with the network slice has been reached. The SMF+PGW-C rejects the PDN connection and may notify the selected S-NSSAI, back off timer and to the UE in the PCO parameter.

- In case of independent limit for each 5GC and EPC, the NSACF returns the response indicating the maximum number with the network slice has been reached and optionally including the slice availability in 5GC. The SMF+PGW-C rejects the PDN connection and may notify the selected S-NSSAI, back off timer and the slice availability in 5GC to the UE. In this case, back off timer is effective only to the EPS.

NOTE 1: Based on the slice availability notification, it is upto the UE implementation whether to attach to 5G or not.

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.

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. Depending on the deployement, one NSACF is in charge of registration and session admission control, or there are respective NSCAFs for registration and session admission control.

NOTE 2: 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. Mobility from EPC to 5GC does not guarantee all active PDU Session(s) can be transferred to the 5GC in certain circumstances where 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.

NOTE 3: If EPS counting is not required for a network slice, the session continuity is not guaranteed. Therefore, it is recommended for the service which requires the session continuity, EPS counting for the network slice is configured.

\*\*\* End of the changes \*\*\*