**SA WG2 Meeting #143e S2-2100073**

**Feb 24th – March 9th, 2021 ; Elbonia (revision of S2-2100073)**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
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|  | **23.501** | **CR** |  | **rev** | **-** | **Current version:** | **16.7.0** |  |
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| *For* [***HELP***](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:***  | AMF support of Non-3GPP access |
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| ***Source to WG:*** | Nokia, Nokia Shanghai Bell |
| ***Source to TSG:*** | S2 |
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| ***Work item code:*** | 5GS\_Ph1, TEI16 |  | ***Date:*** | 2021-01-18 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | *Rel-16* |
|  | *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:*** | When a UE first registers over non -3GPP access, a “non-geographical” AMF may be selected that supports non-3GPP access and a subset of the UE requested slices. The UE may activate PDU Sessions over non-3GPP access.If, later on, the UE registers onto 3GPP access, another (new) AMF may be selected based on the 3GPP TA of the UE i.e. a geographically selected AMF. The N3IWF/TNGF used over non-3GPP access is now to be served by the new geographically selected AMF (see 23.502 § 4.12.8).23.502 § 4.12.8 specifies that “in step 18 of Figure 4.2.2.2.2-1, the new AMF modifies the NGAP association toward N3IWF”.For the case where the new AMF does not support non-3GPP access and this step 18 can’t take place the following is specified in 23.502:If the old AMF has PDU Sessions for another access type (different from the Access Type indicated in this step) and if the old AMF determines that there is no possibility for relocating the N2 interface to the new AMF, the old AMF returns UE's SUPI and indicates that the Registration Request has been validated for integrity protection, but does not include the rest of the UE contextThis hints towards the PDU Sessions established at the old AMF remain orphan (not considered by the new AMF). As the new AMF does not get the UE context it needs to trigger a new UE authentication, meaning a change of NAS security keys: the UE is even no more able to exchange NAS with the old AMF (over Non 3GPP access) (as there is an unique common NAS security-context per PLMN), meaning that it can no more exchange SM signalling over Non 3GPP access!!NOTE that the coverage of a non-3GPP access may be quite large as it may correspond to a whole SNPN or as the UE may keep non-3GPP access by using MOBIKE One solution is to mandate that when an AMF is deployed to support Non-3GPP access in a PLMN, all AMF in this PLMN support non-3GPP access.To make it less stringent the requirement is specified only on a per slice basis |
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| ***Summary of change:*** | When access to a slice in a network (PLMN or SNPN) is supported over non-3GPP acces, all AMF(s) serving this slice in that network are assumed to support non-3GPP access.Update clause 4.2.8.1 to support non-3GPP access to a SNPN |
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| ***Consequences if not approved:*** | Possible abrupt release of an on-going IMS voice call when a UE registers onto 3GPP access after having initiated an IMS Voice call over Non 3GPP access. This would not be acceptable Especially when this call would be an emergency call!! |
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| ***Clauses affected:*** | 4.2.8.1   |
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|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  |  |
| ***affected:*** |  | **X** |  Test specifications |  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications |  |
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| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

*FIRST CHANGE*

#### 4.2.8.1 General Concepts to Support Trusted and Untrusted Non-3GPP Access

The 5G Core Network supports connectivity of UEs via non-3GPP access networks, e.g. WLAN access networks.

Only the support of non-3GPP access networks deployed outside the NG-RAN is described in this clause.

The 5G Core Network supports both untrusted non-3GPP access networks and trusted non-3GPP access networks (TNANs).

An untrusted non-3GPP access network shall be connected to the 5G Core Network via a Non-3GPP InterWorking Function (N3IWF), whereas a trusted non-3GPP access network shall be connected to the 5G Core Network via a Trusted Non-3GPP Gateway Function (TNGF). Both the N3IWF and the TNGF interface with the 5G Core Network CP and UP functions via the N2 and N3 interfaces, respectively.

A non-3GPP access network may advertise the PLMNs for which it supports trusted connectivity and the type of supported trusted connectivity (e.g. "5G connectivity"). Therefore, the UEs can discover the non-3GPP access networks that can provide trusted connectivity to one or more PLMNs. This is further specified in clause 6.3.12 (Trusted Non-3GPP Access Network selection).

The UE decides to use trusted or untrusted non-3GPP access for connecting to a 5G PLMN by using procedures not specified in this document. Examples of such procedures are defined in clause 6.3.12.1.

When the UE decides to use untrusted non-3GPP access to connect to a 5G Core Network in a PLMN (or in a SNPN):

- the UE first selects and connects with a non-3GPP access network; and then

- the UE selects a PLMN (or SNPN) and an N3IWF in this PLMN (or SNPN). The PLMN (or SNPN)/N3IWF selection and the non-3GPP access network selection are independent. The N3IWF selection is defined in clause 6.3.6.

When the UE decides to use trusted non-3GPP access to connect to a 5G Core Network in a PLMN:

- the UE first selects a PLMN; and then

- the UE selects a non-3GPP access network (a TNAN) that supports trusted connectivity to the selected PLMN. In this case, the non-3GPP access network selection is affected by the PLMN selection.

A UE that accesses the 5G Core Network over a non-3GPP access shall, after UE registration, support NAS signalling with 5G Core Network control-plane functions using the N1 reference point.

When a UE is connected via a NG-RAN and via a non-3GPP access, multiple N1 instances shall exist for the UE i.e. there shall be one N1 instance over NG-RAN and one N1 instance over non-3GPP access.

A UE simultaneously connected to the same 5G Core Network over a 3GPP access and a non-3GPP access shall be served by a single AMF in this 5G Core Network.

When a UE is connected to a 3GPP access of a PLMN, if the UE selects a N3IWF and the N3IWF is located in a PLMN different from the PLMN of the 3GPP access, e.g. in a different VPLMN or in the HPLMN, the UE is served separately by the two PLMNs. The UE is registered with two separate AMFs. PDU Sessions over the 3GPP access are served by V-SMFs different from the V-SMF serving the PDU Sessions over the non-3GPP access. The same can be true when the UE uses trusted non-3GPP access, i.e. the UE may select one PLMN for 3GPP access and a different PLMN for trusted non-3GPP access.

The PLMN selection for the 3GPP access does not depend on the PLMN that is used for non-3GPP access. In other words, if a UE is registered with a PLMN over a non-3GPP access, the UE performs PLMN selection for the 3GPP access independently of this PLMN.

A UE shall establish an IPsec tunnel with the N3IWF or with the TNGF in order to register with the 5G Core Network over non-3GPP access. Further details about the UE registration to 5G Core Network over untrusted non-3GPP access and over trusted non-3GPP access are described in clause 4.12.2 and in clause 4.12.2a in TS 23.502 [3], respectively.

It shall be possible to maintain the UE NAS signalling connection with the AMF over the non-3GPP access after all the PDU Sessions for the UE over that access have been released or handed over to 3GPP access.

N1 NAS signalling over non-3GPP accesses shall be protected with the same security mechanism applied for N1 over a 3GPP access.

User plane QoS differentiation between UE and N3IWF is supported as described in clause 5.7 and TS 23.502 [3] clause 4.12.5. QoS differentiation between UE and TNGF is supported as described in clause 5.7 and TS 23.502 [3] clause 4.12a.5.

When access to a S-NSSAI is supported over non-3GPP acces in a network (PLMN or SNPN), all AMF(s) serving this S-NSSAI in that network are assumed to support non-3GPP access.

*NEXT CHANGE (2)*

*NEXT CHANGE (3)*

*NEXT CHANGE (4)*

*NEXT CHANGE (5)*

*END OF CHANGES*