**3GPP TSG-CT WG1 Meeting #125-eC1-204771**

**Electronic meeting, 20-28 August 2020**

**Source: ZTE**

**Title: Discussion on user case that the UE changes the slice(s) it is currently registered to**

**Agenda item: 16.2.6**

**Document for: Approval**

# Introduction

The issue of excluding the S-NSSAI(s) in the pending NSSAI during the registration procedure was approved in S2-2003475. In subclause 5.15.5.2.1of TS 23.501, it states:

“The UE shall not include in the Requested NSSAI any of the S-NSSAIs from the Pending NSSAI the UE stores, regardless of the Access Type.”

During CT1 #124e, discussion focused on the user cases that UE initiates registration procedure to change the slice(s) it is currently registered to during NSSAA. This paper discusses the valid cases and clarifies the behaviors of the UE and AMF in such cases.

# 2 Discussion

## 2.1 User case 1: registration to slice(s) over a second access

There is an example to describe the procedure:

1. The UE has successfully registered to the PLMN over 3GPP access, stored an allowed NSSAI for 3GPP access = *{A, B}*, and stored a pending NSSAI for both 3GPP access and non-3GPP access *= {C, D}*. The NSSAA procedures for *{C, D}* are ongoing.
2. The UE wants to register and obtain services for slices *{C, D, E, F}* over non-3GPP access. The UE finds that *{C, D}* are in the pending NSSAI, the UE only provides a requeted NSSAI = *{E, F}.* The AMF decides to initiate a new NSSAA procedures for S-NSSAI {*E*}. Now the NSSAA procedures for {*C, D, E*} are ongoing.
3. The AMF sends an allowed NSSAI for non-3GPP access = {*F*} and pending S-NSSAI = {*C, D, E*} to the UE in the registration accept message over non-3GPP access.
4. The UE replaces and stores the allowed NSSAI for non-3GPP access = *{F}*. The UE replaces and stores the pending NAASI = *{C, D, E}.*
5. When the NSSAA procedures for pending NSSAI = *{C, D, E}* are successfully completed, the AMF initiates a UCU procedure to provide the updated allowed NSSAI for 3GPP access = *{A, B, C, D, E}* and the updated allowed NSSAI for non-3GPP access = *{C, D, E, F}*. The UE replaces and stores the allowed NSSAI for each access. The stored pending NSSAI is empty.

Note: As described in 4.6.2.1:

“*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.*”

Further the network doesn’t record the access type via which the S-NSSAI subject to NSSAA is requested. Thus upon success of NSSAAs, the network povides updated allowed NSSAI for both accesses.

**Observation:**

1. For step2: Align with the conclusion of SA2 that “The UE shall not include any of the S-NSSAIs from the Pending NSSAI in the Requested NSSAI, regardless of the Access Type.”.
2. For step5: Clarify that if the UE has registered in the same PLMN over the 3GPP access and non-3GPP access, upon success of NSSAA, the S-NSSAI in pending NSSAI will be moved to the allowed NSSAI for both accesses. The updated allowed NSSAI is provided by the AMF via both 3GPP access and non-3GPP access. Clarification should be added in subclause 4.6.1.

## 2.2 User case 2: change the registration to slice(s) in the same access

There is an example to describe the procedure:

1. The UE has successfully registered to the PLMN over 3GPP access, stored an allowed NSSAI for 3GPP access = *{A, B}*, and stored a pending NSSAI for both 3GPP access and non-3GPP access *= {C, D}.* The NSSAA procedures for *{C, D}* are ongoing.
2. The UE wants to register and obtain services for slices {*A, C, E, F*} over 3GPP access. The UE finds that {*C* } is in the pending NSSAI, the UE only provides a requeted NSSAI = {*A, E, F}.* The AMF decides to initiate a new NSSAA procedures for S-NSSAI {*E*}. Now the NSSAA procedures for {*C, D, E*} are ongoing.
3. The AMF sends an allowed NSSAI for 3GPP access = *{A, F}* and pending S-NSSAI = *{C, D, E}* to the UE in the registration accept message over 3GPP access.
4. The UE replaces and stores the allowed NSSAI for 3GPP access = *{A, F}*. The UE replaces and stores the pending NAASI = *{C, D, E}.*
5. When the NSSAA procedures for pending NSSAI = *{C, D, E}* are successfully completed, the AMF initiates a UCU procedure to provide the updated allowed NSSAI for 3GPP access = *{A, C, D, E, F}.*
6. If the UE doesn’t want to register to slice *{D},* upon completion of NSSAA for slice *{D},* the UE initiates the registration procedure and provides a requeted NSSAI = *{A, C, E, F}.* The AMF provide a updated allowed NSSAI = *{A, C, E, F}.*

**Observation:**

1. For step2: Align with the conclusion of SA2 that “The UE shall not include any of the S-NSSAIs from the Pending NSSAI in the Requested NSSAI, regardless of the Access Type.”
2. For step6: Clarify that “For the slice identified by an S-NSSAI included in pending NSSAI, the UE shall deem that it has not been registered to such slice. The UE shall not initiate the registration procedure for mobility and periodic registration update to indicate that it will not request S-NSSAI(s) included in pending NSSAI.”. A note should be added in subclause 5.5.1.3.2.

## 2.3 User case 3: mobility and periodic registration is initiated during NSSAA

There is an example to describe the procedure:

1. The UE wants to register and obtain services for slices *{A, B}* over 3GPP accessa. The UE initiates the registration procedure and provides a requeted NSSAI = {*A, B}.* The AMF decides to initiate NSSAA procedures for S-NSSAI {*A, B*} and no allowed NSSAI is sent to the UE.
2. The AMF sends no allowed NSSAI for 3GPP access and pending S-NSSAI = *{A,B}* to the UE in the registration accept message over 3GPP access. The UE stores the pending NSSAI.
3. The NSSAAs for slices *{A, B}* are ongoing. A certain condition listed in subclause of 5.5.1.3.2 triggers the UE to initiate the registration procedure for mobility and periodic registration update. The UE doesn't want to change the slice(s) it is currently registered to. The UE does not include the requested NSSAI in the REGISTRATION REQUEST message.
4. The AMF finds that the NSSAAs for slices *{A, B}* are ongoing. The AMF sends "NSSAA to be performed" indicator in the 5GS registration result IE and pending NSSAI = {*A, B}.*

**Observation:**

1. For step1: Align with the conclusion of SA2 that “The UE shall not include any of the S-NSSAIs from the Pending NSSAI in the Requested NSSAI, regardless of the Access Type.”
2. For step3/4: Add a case in subclause 5.5.1.3.4 to clarify the AMF behaviour.

# 3 Conclusion

The alignment with conclusion of SA2 should be add in C1-205091.

The clarification should be add in TS 24.501 according the observations for the cases above in C1-204770.

# References

[1] C1-202472: “Discussion on including pending S-NSSAI(s) in the requested NSSAI”

[2] S2-2003475: “Handling of pending NSSAI”