**3GPP TSG SA WG2 Meeting #149E *S2-2200443r03***

**Elbonia, February 14 – 25, 2022**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **23.501** | **CR** | **3503** | **rev** | **-** | **Current version:** | **15.12.0** |  |
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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 | **X** | Radio Access Network |  | Core Network | **X** |

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| ***Title:***  | SSC mode support by the UEs |
|  |  |
| ***Source to WG:*** | Ericsson |
| ***Source to TSG:*** | SA2 |
|  |  |
| ***Work item code:*** | TEI15, 5GS\_Ph1 |  | ***Date:*** | 2022-01-28 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-15 |
|  | *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:*** | Clarifies which SSC modes are optional or mandatory to support in the UE. Based on the LS received from CT6 in S2-2108269. |
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| ***Summary of change:*** | Specifies that SSC mode 1 is mandatory while SSC modes 2 and 3 are optional to support in the UE. Further states that the PDU Session release with reconnect can be used independent of SSC mode.  |
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| ***Consequences if not approved:*** | Unclear requirements in the UE. |
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| ***Clauses affected:*** | 5.6.9, 5.6.9.1, 5.6.9.2, 5.6.9.2.1, 5.6.9.2.2, 5.6.9.2.3, 5.6.9.3 |
|  |  |
|  | **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:*** |  |

\*\*\*\* First Change \*\*\*\*

### 5.6.9 Session and Service Continuity

#### 5.6.9.1 General

The support for session and service continuity in 5G System architecture enables to address the various continuity requirements of different applications/services for the UE. The 5G System supports different session and service continuity (SSC) modes defined in this clause. The SSC mode associated with a PDU Session does not change during the lifetime of a PDU Session. The following three modes are specified with further details provided in the next clause:

- With SSC mode 1, the network preserves the connectivity service provided to the UE. For the case of PDU Session of IPv4 or IPv6 or IPv4v6 type, the IP address is preserved.

- With SSC mode 2, the network may release the connectivity service delivered to the UE and release the corresponding PDU Session(s). For the case of IPv4 or IPv6 or IPv4v6 type, the release of the PDU Session induces the release of IP address(es) that had been allocated to the UE.

- With SSC mode 3, changes to the user plane can be visible to the UE, while the network ensures that the UE suffers no loss of connectivity. A connection through new PDU Session Anchor point is established before the previous connection is terminated in order to allow for better service continuity. For the case of IPv4 or IPv6 or IPv4v6 type, the IP address is not preserved in this mode when the PDU Session Anchor changes.

NOTE: In this Release of the specification, the addition/removal procedure of additional PDU Session Anchor in a PDU Session for local access to a DN is independent from the SSC mode of the PDU Session.

#### 5.6.9.2 SSC mode

##### 5.6.9.2.1 SSC Mode 1

For a PDU Session of SSC mode 1, the UPF acting as PDU Session Anchor at the establishment of the PDU Session is maintained regardless of the access technology (e.g. Access Type and cells) a UE is successively using to access the network.

In the case of a PDU Session of IPv4 or IPv6 or IPv4v6 type, IP continuity is supported regardless of UE mobility events.

In this Release of the specification, when IPv6 multihoming or UL CL applies to a PDU Session of in SSC mode 1, and the network allocates (based on local policies) additional PDU Session Anchors to such a PDU Session, these additional PDU Session Anchors may be released or allocated, and the UE does not expect that the additional IPv6 prefix is maintained during the lifetime of PDU Session.

SSC mode 1 may apply to any PDU Session type and to any access type.

A UE supporting PDU Connectivity shall support SSC mode 1.

##### 5.6.9.2.2 SSC Mode 2

If a PDU Session of SSC mode 2 has a single PDU Session Anchor, the network may trigger the release of the PDU Session and instruct the UE to establish a new PDU Session to the same data network immediately. The trigger condition depends on operator policy e.g. request from Application Function, based on load status, etc. At establishment of the new PDU Session, a new UPF acting as PDU Session Anchor can be selected.

Otherwise, if a PDU Session of SSC mode 2 has multiple PDU Session Anchors (i.e. in the case of multi-homed PDU Sessions or in the case that UL CL applies to a PDU Session of SSC mode 2), the additional PDU Session Anchors may be released or allocated.

SSC mode 2 may apply to any PDU Session type and to any access type.

SSC mode 2 is optional to be supported in the UE.

NOTE 1: Features depending on SSC mode 2 will not work with the lack of support for SSC mode 2 in the UE.

NOTE 2: In UL CL mode, the UE is not involved in PDU Session Anchor re-allocation, so that the existence of multiple PDU Session Anchors is not visible to the UE.

##### 5.6.9.2.3 SSC Mode 3

For PDU Session of SSC mode 3, the network allows the establishment of UE connectivity via a new PDU Session Anchor to the same data network before connectivity between the UE and the previous PDU Session Anchor is released. When trigger conditions apply, the network decides whether to select a PDU Session Anchor UPF suitable for the UE's new conditions (e.g. point of attachment to the network).

In this Release of specification, SSC mode 3 only applies to IP PDU Session type and to any access type.

In the case of a PDU Session of IPv4 or IPv6 or IPv4v6 type, during the procedure of change of PDU Session Anchor, the following applies:

a. For a PDU Session of IPv6 type, the new IP prefix anchored on the new PDU Session Anchor may be allocated within the same PDU Session (relying on IPv6 multi-homing specified in clause 5.6.4.3), or

b. The new IP address and/or IP prefix may be allocated within a new PDU Session that the UE is triggered to establish.

After the new IP address/prefix has been allocated, the old IP address/prefix is maintained during some time indicated to the UE via NAS signalling (as described in TS 23.502 [3] clause 4.3.5.2) or via Router Advertisement (as described in TS 23.502 [3] clause 4.3.5.3) and then released.

If a PDU Session of SSC mode 3 has multiple PDU Session Anchors (i.e., in the case of multi-homed PDU Sessions or in the case that UL CL applies to a PDU Session of SSC mode 3), the additional PDU Session Anchors may be released or allocated.

SSC mode 3 is optional to be supported in the UE.

NOTE: Features depending on SSC mode 3 will not work with the lack of support for SSC mode 3 in the UE.

#### 5.6.9.3 SSC mode selection

SSC mode selection is done by the SMF based on the allowed SSC modes -including the default SSC mode) in the user subscription as well as the PDU Session type and if present, the SSC mode requested by the UE.

The operator may provision a SSC mode selection policy (SSCMSP) to the UE as part of the URSP rule -see TS 23.503 [45] clause 6.6.2). The UE shall use the SSCMSP to determine the type of session and service continuity mode associated with an application or group of applications for the UE as described in TS 23.503 [45] clause 6.6.2.3. If the UE does not have SSCMSP, the UE can select a SSC mode based on UE Local Configuration as described in TS 23.503 [45], if applicable. If the UE cannot select a SSC mode, the UE requests the PDU Session without providing the SSC mode.

NOTE 1: The UE can use the SSC Mode Selection component of the URSP rule with match-all traffic descriptor if there is no SSC mode in the UE local configuration.

The SSC mode selection policy rules provided to the UE can be updated by the operator by updating the URSP rule.

The SMF receives from the UDM the list of allowed SSC modes and the default SSC mode per DNN per S-NSSAI as part of the subscription information.

If a UE provides an SSC mode when requesting a new PDU Session, the SMF selects the SSC mode by either accepting the requested SSC mode or rejecting the PDU Session Establishment Request message with the cause value and the SSC mode(s) allowed to be used back to UE based on the PDU Session type, subscription and/or local configuration. Based on that cause value and the SSC mode(s) allowed to be used, the UE may re-attempt to request the establishment of that PDU Session with the SSC mode allowed to be used or using another URSP rule.

If a UE does not provide an SSC mode when requesting a new PDU Session, then the SMF selects the default SSC mode for the data network listed in the subscription or applies local configuration to select the SSC mode.

SSC mode 1 shall be assigned to the PDU Session when static IP address/prefix is allocated to the PDU Session based on the static IP address/prefix subscription for the DNN and S-NSSAI. The SMF shall inform the UE of the selected SSC mode for a PDU Session.

The UE shall not request and the network shall not assign SSC mode 3 for the PDU Session of Unstructured type or Ethernet type.

NOTE 2: To avoid issues for UEs not supporting all SSC modes, the operator can, in the subscription data and local configuration, include at least SSC mode 1 in the allowed SSC modes, and set default SSC mode to 1 (since all UEs supporting PDU sessions are mandated to support SSC mode 1). Still the 5GC can trigger PDU session release with a cause code indicating reactivation due to e.g., restoration or user plane path optimization purposes though this may cause interruption of the service.

\*\*\*\* End of Changes \*\*\*\*