**SA WG2 Meeting #143eS2-210xxxx**

**Feb 24th – March 9th, 2021 ; Elbonia (revision of S2-210xxxx)**

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| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **23.502** | **CR** |  | **rev** | **-** | **Current version:** | **16.7.0** |  |
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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:*** | MA PDU sessions with connectivity over E-UTRAN/EPC and non-3GPP access to 5GC | | | | | | | | | |
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| ***Source to WG:*** | InterDigital | | | | | | | | | |
| ***Source to TSG:*** | S2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | ATSSS\_Ph2 | | | | |  | ***Date:*** | | | 2021-01-18 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***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:*** | | Objectives of ATSSS\_Ph2 WID in SP-200977  b) Support for UEs to establish MA PDU Sessions with a 3GPP access leg over EPC and a non-3GPP access leg over 5GC, according to the conclusions in TR 23.700-93, clause 8.3. | | | | | | | | |
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| ***Summary of change:*** | |  | | | | | | | | |
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| ***Consequences if not approved:*** | | No Support for UEs to establish MA PDU Sessions with a 3GPP access leg over EPC and a non-3GPP access leg over 5GC | | | | | | | | |
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| ***Clauses affected:*** | |  | | | | | | | | |
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|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **X** |  | Other core specifications | | | |  | | |
| ***affected:*** | |  | **x** | Test specifications | | | |  | | |
| ***(show related CRs)*** | |  | **x** | O&M Specifications | | | |  | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

*FIRST CHANGE*

## 4.22 ATSSS Procedures

### 4.22.1 General

This clause specifies the procedures that enable the support of Access Traffic Steering, Switching and Splitting (ATSSS), as defined in TS 23.501 [2], clause 5.32. These procedures can be applied only by ATSSS-capable UEs and 5GC networks.

The key enabler of ATSSS is the Multi Access-PDU (MA PDU) Session. As specified in TS 23.501 [2], clause 5.32.1, a MA PDU Session is a PDU Session associated with two independent N3/N9 tunnels between the PSA and RAN/AN and with multiple access types, i.e. with one 3GPP access and one non-3GPP access both connected to 5GC. A MA PDU Session may also be a PDU Session associated with one N3/N9 tunnel in 5GC and one S5/S8 tunnel in EPC, i.e. with one 3GPP access connected to EPC and one non-3GPP access connected to 5GC. The traffic of a MA PDU Session can be transferred over 3GPP access, or over non-3GPP access, or over both accesses. How the traffic is transferred over the available accesses of a MA PDU Session is governed by the applicable policy created by the 5GC network.

NOTE: A MA PDU Session with one 3GPP access connected to 5GC and one non-3GPP access connected to EPC is not supported.

The UE determines whether ATSSS is supported by the network based on the MA PDU Session Support indicator provided by the AMF during the Registration procedures, as specified in clause 4.22.9.1. If the network does not support ATSSS, the UE shall not initiate the following procedures in this network:

- establishment of a MA PDU Session (clause 4.22.2);

- establishment of a PDU Session with "MA PDU Network-Upgrade Allowed" indication (clause 4.22.3);

- addition of user-plane resources over one access for an existing MA PDU Session, which has been established over the other access in a different network (clause 4.22.7); or

- PDU Session Modification with Request Type of "MA PDU request" or with "MA PDU Network-Upgrade Allowed" indication after moving from EPC to 5GC (clause 4.22.6.3).

*NEXT CHANGE (2)*

### 4.22.2 UE Requested MA PDU Session Establishment

#### 4.22.2.1 Overview

Clause 4.22.2.1 and 4.22.2.2 specify the MA PDU Session establishment procedures with both 3GPP access and non-3GPP access connected to 5GC. Clause 4.22.2.X specifies the MA PDU Session establishment procedure with 3GPP access connected to EPC and non-3GPP access connected to 5GC.

*NEXT CHANGE (3)*

#### 4.22.2.X MA PDU Session establishment with 3GPP access connected to EPC

To establish a MA PDU Session with 3GPP access connected to EPC, the UE uses the procedure defined in TS 23.501 [x] clause 5.32.7.x.

*NEXT CHANGE (4)*

### 4.22.6 EPS Interworking

#### 4.22.6.1 General

This clause includes procedures for interworking with EPS.

#### 4.22.6.2 Impacts to EPS interworking procedures

##### 4.22.6.2.1 5GS to EPS handover using N26 interface

Based on the signalling flow in Figure 4.11.1.2.1-1, the procedure is performed with the following differences and modifications:

- Step 2 is also performed with all the SMF+PGW-Cs corresponding to MA PDU Sessions with allocated EBI(s).

- In step 12e, the AMF requests the release of the 3GPP access of the MA PDU Session which has resources established for 3GPP access, but not expected to be transferred to EPC, i.e. no EBI(s) allocated to the MA PDU Session by triggering Nsmf\_PDUSession\_UpdateSMContext service operation.

NOTE: When the SMF received the release request from the AMF, the SMF decides whether the MA PDU Session is completely released or released over a single access based on its local policy.

- In step 16, if the MA PDU Session is established in both 3GPP and non-3GPP accesses and the MA PDU Session is moved to EPS, and if the UE and the network does not support MA PDU Session with 3GPP access connected to EPC, the SMF triggers the MA PDU Session Release procedure over non-3GPP access. If UE and the network support MA PDU Session with 3GPP access connected to EPC, the SMF should keep the user-plane resources over non-3GPP access in 5GC and use the PDN Connection as the 3GPP access leg of the MA PDU Session.

##### 4.22.6.2.2 5GS to EPS idle mode mobility using N26 interface

Based on the signalling flow in Figure 4.11.1.3.2-1, the procedure is performed with the following differences and modifications:

- Step 5a is also performed with all the SMF+PGW-Cs corresponding to the MA PDU Sessions with allocated EBI(s).

- In step 12, if the MA PDU Session is established in both 3GPP and non-3GPP accesses and the MA PDU Session is moved to EPS, and if the UE and the network does not support MA PDU Session with 3GPP access connected to EPC, the SMF triggers the MA PDU Session Release procedure over non-3GPP access. If UE and the network support MA PDU Session with 3GPP access connected to EPC, the SMF should keep the user-plane resources over non-3GPP access in 5GC and use the PDN Connection as the 3GPP access leg of the MA PDU Session.

- In step 15a, the AMF also requests the release of the MA PDU Session which has resources established for 3GPP access, but not expected to be transferred to EPS, i.e. no EBI(s) allocated to the MA PDU Session by triggering Nsmf\_PDUSession\_UpdateSMContext service operation.

NOTE: When the SMF received the release request from the AMF, the SMF decides whether the MA PDU Session is completely released or released over a single access based on its local policy.

##### 4.22.6.2.3 EPS bearer ID allocation

Based on the signalling flow in Figure 4.11.1.4.1-1, additionally for the MA PDU Session, with the following differences and clarifications:

- In step 1, the following procedures and relevant steps are also initiated during the UE Requested MA PDU Session Establishment, the UE Requested PDU Session Establishment with Network Modification to MA PDU Session and the UE or network requested MA PDU Session Modification procedures.

- In step 2, if the QoS Flow(s) of the MA PDU Session is established and the MA PDU Session is established over 3GPP access and other existing conditions satisfies EPS interworking, the SMF requests EBI allocation for the QoS Flow(s) of the MA PDU Session.

##### 4.22.6.2.4 EPS bearer ID revocation

Based on the clause 4.11.1.4.3, additionally the following procedures are updated to revoke the EPS bearer ID(s) assigned to the QoS Flow(s) in the MA PDU Session:

- UE or network requested MA PDU Session Release (non-roaming and roaming with local breakout) in clause 4.22.10.2.

- UE or network requested MA PDU Session Release (home-routed roaming) in clause 4.22.10.3.

- UE or network requested MA PDU Session Modification (non-roaming and roaming with local breakout) in clause 4.22.8.2.

- UE or network requested MA PDU Session Modification (home-routed roaming) in clause 4.22.8.3.

- When the MA PDU Session is released over 3GPP access, the UE and the SMF locally release the EBI(s) for the MA PDU Session. The SMF notifies the AMF of the released EBI(s) by sending Nsmf\_PDUSession\_SMContextStatusNotify service operation if the MA PDU Session is established in the same PLMN. If the MA PDU Session is established in different PLMNs, the SMF notifies the release of the MA PDU Session and as a result, the AMF removes associated EBI(s).

##### 4.22.6.2.5 5GS to EPS mobility without N26 interface

Based on the signalling flow in Figure 4.11.2.2-1, the procedure is performed with the following differences and modifications:

- In step 10 (and step 13 in clause 4.11.2.4.1), if the MA PDU Session is established in both 3GPP and non-3GPP accesses and the MA PDU Session is moved to EPS, and if the UE and the network does not support MA PDU Session with 3GPP access connected to EPC, the PGW-C + SMF triggers the MA PDU Session Release procedure over non-3GPP access. PGW-C + SMF and UE locally release the context related to ATSSS operation, e.g., ATSSS rules and Measurement Assistance Information for the relevant session. If the UE and the network support MA PDU Session with 3GPP access connected to EPC, the UE includes a "MA PDU Request" indication and the MA PDU Session ID in the PCO, the SMF should keep the user-plane resources over non-3GPP access in 5GC and use the PDN Connection as the 3GPP access leg of the MA PDU Session.

- In step 13, during the additional PDN Connectivity Procedure, if the MA PDU Session is established in both 3GPP and non-3GPP accesses and if the UE and the network support MA PDU Session with 3GPP access connected to EPC, the UE includes a "MA PDU Request" indication and the MA PDU Session ID in the PCO, the SMF should keep the user-plane resources over non-3GPP access in 5GC and use the PDN Connection as the 3GPP access leg of the MA PDU Session. If the UE and the network does not support MA PDU Session with 3GPP access connected to EPC, and the MA PDU Session is moved to EPS, the PGW-C + SMF triggers the MA PDU Session Release procedure over non-3GPP access. PGW-C + SMF and UE locally release the context related to ATSSS operation, e.g., ATSSS rules and Measurement Assistance Information for the relevant session(s).

- Step 14 is also performed for the MA PDU session(s) transferred to EPS.

*NEXT CHANGE (5)*

*END OF CHANGES*