**3GPP TSG-WG SA2 Meeting #143E e-meeting *S2-210xxxx***

**Elbonia, February 24 – March 09, 2021 (revision of S2-210xxxx)**

**Source: Huawei, HiSilicon**

**Title: New TS: On the MBS Session join and establishment of 5MBS**

**Document for: Approval**

**Agenda Item: 8.9**

**Work Item / Release: 5MBS / Rel-17**

*Abstract: This document adds MBS Session join and establishment to the new TS*

# Background and Introduction

In the skeleton of the new TS, there is a section for "MBS Session join and establishment".

# Proposal

It is proposed to capture the following changes vs. TS 23.247.

\* \* \* \* First change\* \* \* \*

# 7 MBS procedures

## 7.2 MBS procedures for multicast Session

### 7.2.1 MBS join and Session establishment procedure

#### 7.2.1.1 General

Session Join procedure is used by UEs to inform the 5GC of the UE interest in an MBS Session. During the Session Join procedure, the distribution area of the multicast session is adjusted if needed. Session Establishment procedure is initiated by the network when receiving the session Join request from the UE. The user plane management is also described in clause 6.6.

#### 7.2.1.2 MBS join and Session establishment procedure without involving MBSF

Before the MBS join:

* The content provider may send a request to register and reserve resources for a multicast group to the NEF and communicate the related multicast address as detailed in clause 7.1.1.
* The UE registers in the PLMN and request the establishment of a PDU session. The UE also indicates its capability to receive multicast data over the radio, and the AMF selects an SMF capable of handling multicast sessions based on locally configured data or a corresponding SMF capability stored in the NRF.
* The content provider announces the availability of multicast using higher layers (e.g., application layer). The announcement includes at least the multicast address of a multicast group that UE can join.

**UE**

**NG-RAN**

**AMF**

**SMF**

**UPF**

**Storage**

**MB-SMF**

**MB-UPF**

**Content Provider**

1a. UL NAS message (N1 SM container (PDU Session Modification Request))

1b. Nsmf\_PDUSession\_UpdateSMContext request

5. Namf\_N1N2MessageTransfer

3. Retrieve MB-SMF information

4. Request/response for QoS for multicast

6. N2 message request

7. Establishment of resources for 5GC shared MBS traffic delivery

8. Establishment of resources for 5GC Individual MBS traffic delivery

9. Multicast data

10a. Multicast data

11a. Bear selection

12a. Multicast data via PTP or PTM

Transmission via 5GC shared MBS traffic delivery

10b. Multicast data

11b. Multicast data via PDU Session

12b. Multicast data via PDU Session

Transmission via 5GC Individual MBS traffic delivery

2. Authorization check, see clause 6.1.1

Figure 7.2.1.2-1: PDU Session modification for multicast

1. To join the multicast group, the UE sends the PDU Session Modification Request either upon a request from higher layers or upon a detection by lower layers of UE joining a multicast group. The PDU Session Modification Request shall include information about multicast group, which UE wants to join, as specified in clause 6.4.

2. The SMF authorizes request, see clause 6.1.1.

3. If SMF has no information about the multicast context for the indicated multicast group, SMF checks at the Storage whether a multicast context for the multicast group (address) exists in the system. If the multicast context for the multicast group does not exist, then SMF creates it when the first UE joins the multicast group, stores the multicast context including itself as multicast controlling SMF in the Storage, and configures the UPF to handle the multicast data distribution (SMF and MB-SMF, and UPF and MB-UPF in this flow are then identical). If it is the first UE joining the multicast group, the MB-UPF may also have to join the multicast tree towards the content provider; the MB-SMF should request the MB-UPF to join the multicast tree when configuring the MB-UPF, see e.g. Step 15 and 26. If a multicast context already exists in the Storage, the SMF retrieves the related information, including information related to MB-SMF controlling the multicast ingress point.

Editor's note: Whether the Storage is UDR or other NF types is FFS.

Editor's note: More consideration on how to prevent denial of service attack type situation when first UE joining the multicast group, triggers the MB-UPF to join the multicast tree towards the content provider is FFS.

4. If SMF has no information about the multicast context for the indicated multicast group, SMF interacts with MB SMF to retrieve QoS information of the multicast QoS flow(s).

5. SMF requests the AMF to transfer a message to the RAN node using the Namf\_N1N2MessageTransfer service (N2 SM information (PDU Session ID, Multicast Context ID, MB-SMF ID, multicast QoS flow information), N1 SM container (PDU Session Modification Command (PDU Session ID, multicast information (Multicast Context ID, multicast QoS flow information, multicast address)) to:

- create a multicast context in the RAN, if it does not exist already; and

- inform about the relation between the multicast context and the UE's PDU session.

Based on operator policy, if the SMF is configured to prepare for unicast fall-back, the SMF maps the received QoS information of the multicast QoS flow into unicast QoS flow information of the PDU Session, and includes the information of the unicast QoS flows and the information about the association between those unicast QoS flows and the multicast QoS flows in the N2 SM information. If dedicated unicast QoS flows are required, the information includes the one about those dedicated unicast QoS flows. SMF also includes information about those unicast QoS flows in the N1 SM container.

Editor's note: Providing associated unicast QoS flows at this stage needs to be confirmed.

6. The N2 session modification request is sent to the RAN. The request is sent in the UE context using the PDU Session Resource Modify Request message enhanced with multicast related information, which includes a MBS Session ID, Multicast Session context ID, and multicast flow information such as multicast QoS Flow ID and associating QoS information. The RAN uses the multicast group identity to determine that the session modification procedures corresponds to one multicast group. In other words, the RAN learns what UEs are receiving the same multicast data from the multicast group identity. When the RAN receives a session modification request for previously unknown multicast group identity, the RAN configures resources to serve this multicast group.

7. Establishment of resources for 5GC shared MBS traffic delivery.

8. Establishment of resources for 5GC Individual MBS traffic delivery.

Editor's note: Details for Step 10 and step 11 are FFS.

9. MB-UPF receives multicast PDUs, either directly from the content provider or via the MBSF-U that can manipulate the data.

Editor's note: Terminology of the MBSF-U is FFS.

Step 13a to 15a are for 5GC shared MBS traffic delivery:

10a. MB-UPF sends multicast PDUs in the N3/N9 tunnel associated to the multicast distribution session to the RAN. There is only one tunnel per multicast distribution session and RAN node, i.e., all associated PDU sessions share this tunnel.

11a. The RAN selects PTM or PTP radio bearers to deliver the multicast PDUs to UEs that joined the multicast group.

12a. The RAN performs the transmission using the selected bearer.

Step 13b to 15b are for 5GC individual MBS traffic delivery:

10b. MB-UPF sends multicast PDUs in the N3/N9 tunnel associated to the multicast distribution session to UPF. There is only one tunnel per multicast distribution session and destination UPF, i.e., all associated PDU sessions share this tunnel.

11b. UPF forwards the multicast data via unicast.

12b. The RAN forwards the multicast data via unicast.

#### 7.2.1.3 MBS join and Session establishment procedure involving MBSF

Editor's note: Details are FFS.

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