**3GPP TSG-WG SA6 Meeting #45-bis-e *S6-212xxx***

**e-meeting, October 11 – 19, 2021 (revision of S6-212333)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.1* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **23.289** | **CR** | **0010** | **rev** | **1** | **Current version:** | **17.0.0** |  |
|  | | | | | | | | |
| *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)*.* | | | | | | | | |
|  | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network | **X** | Core Network | **X** |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** | Service continuity between 5G MBS delivery and unicast delivery | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei, HiSilicon | | | | | | | | | |
| ***Source to TSG:*** | SA6 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | MCOver5MBS | | | | |  | ***Date:*** | | | 2021-10-05 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-18 |
|  | *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)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Service continuity is an important feature for supporting MCX over 5G MBS.  Introduce the service continuity can minimize the packet loss for the case e.g., poor signalling strength.  This CR is to add the related solution for Service continuity between 5G MBS delivery and unicast delivery based on the conclusion of the TR. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | 1. Adding general description about Call connect and disconnect over 5G MBS in MCVideo context in section 7.X.Y.A1 2. Adding procedures and the associated Information flows for Service continuity between 5G MBS delivery and unicast delivery in section 7.X.Y.A2. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | No related content about Service continuity between 5G MBS delivery and unicast delivery in current TS. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 7.X (new), 7.x.y (new), 7.x.y.1 (new), 7.x.y.2 (new), 7.x.y.2.1 (new),7.x.y.3 (new), 7.x.y.3.1 (new), 7.x.y.3.2 (new), 7.x.y.3.3 (new), 7.x.y.3.3.1 (new) | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | | In rev1, the followings are included/clarified:  - In 7.X.Y.2.1, modify the last sentence, which are out of the realm of SA6;  - In 7.X.Y.2, specify network layer service continuity, solution can refer to SA2's solution, and for application layer service continuity, we can reuse the procedure for broadcast.  Correct the type of the headings. | | | | | | | | |

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

## 7.X MC service over 5G MBS

### 7.X.Y Service continuity between 5G MBS delivery and unicast delivery

#### 7.X.Y.1 General

This clause addresses the issue of MC service data delivery over MBS session, specifically, to maintain the service continuity when switching between 5G MBS delivery and unicast delivery.

#### 7.X.Y.2 Service continuity for multicast MBS session

##### 7.X.Y.2.1 General

Once the MC service UE has successfully joined the multicast MBS session, and started to receive the MC service data via the multicast MBS session, then the network mechanism specified in TS 23.247 [xx] will deliver the data from the MC service server via the 5GC Individual MBS traffic delivery method or the 5GC Shared MBS traffic delivery method towards the MC service UE(s). The usage of 5GC Individual MBS traffic delivery method or the 5GC Shared MBS traffic delivery method is transparent to the MC service server.

The MC service server may also switch between multicast and unicast by utilizing application layer mechanisms similar to switching between broadcast and unicast as specified in clause 7.x.y.3.

#### 7.X.Y.3 Service continuity for broadcast MBS session

##### 7.X.Y.3.1 General

Editor's Note: The description in this clause is for the transport only mode. Full service mode is FFS.

This solution provides the procedure which allows the MC service client to report the broadcast reception quality to the MC service server which is used to make the decision whether to resume the unicast delivery to the MC service UE(s) which suffering bad broadcast reception quality due to e.g., move out of the broadcast service area.

An MC service client monitors the broadcast MBS session to receive MC service data. Based on the received quality (e.g. radio level quality, RTP packet loss), the MC service client needs to inform the MC service server that the MC service client is able to receive the MC service media on the broadcast MBS session with sufficient quality or not.

This estimation of the broadcast reception quality may be dependent on for example the modulation and coding scheme (MCS) and measurements from the reference signals from the NG-RAN node(s), RTP packet loss, BLER of the received data.

##### 7.X.Y.3.2 Procedures

The procedure in figure 7.X.Y.3.2-1 illustrates the UE is receiving data via broadcast MBS session and suffers bad broadcast reception quality due to e.g., moving out of the broadcast service area. It shows only one of the receiving MC service clients receiving the broadcast MBS session.

Pre-conditions:

1. The MC group communication is ongoing and the MC service data (e.g., DL media, application layer control signalling) is transmitted via broadcast MBS session.

2. The MC service client is receiving the MC service data (e.g., DL media, application layer control signalling) via the broadcast MBS session.

3. The MC service client(s) already have the associated information (e.g., SDP) to receive the unicast delivery during the group communication establishment phase.



Figure 7.X.Y.3.2-1: Service continuity from broadcast to unicast

1. An MC service group communication session is ongoing and the DL data is transmitted over broadcast MBS session.

2. The MC service client detects that it suffers bad broadcast reception due to e.g., moving out of the broadcast service area of the announced TMGI. The MC service client may determine the broadcast reception quality by using the BLER of the received data. When no data is received, the quality estimation can consider the reference signals and the modulation and coding scheme (MCS).

3. The MC service client sends MBS listening status report which indicates the broadcast reception quality associated with the TMGI is not sufficient to receive data. The MC service client may also map the determined broadcast reception quality to a broadcast reception quality level. The broadcast reception quality level indicates at which specific broadcast reception quality level the MC service media has been received.

NOTE 1: It is implementation that the broadcast reception quality level can be determined per MBS session, per media stream or per MBS QoS flow level via e.g., measurements of radio level signalling such as the reference signals from the NG-RAN node(s), packet loss.

NOTE 2: The set of MBS reception quality levels and the mapping of the determined broadcast reception quality to those levels are implementation.

NOTE 3: The frequency of MC service UE sending listening reports can be limited to prevent signalling congestion. E.g. The MC service UE can stop monitoring the broadcast reception quality and send the MBS listening status report only once when it moves outside of the broadcast service area.

4. The MC service server based on the report from the participant, determines that the UE is not able to receive the data or the QoS requirements is not satisfied. The MC service server determines to send the MC service data (e.g., DL media, application layer control signalling) via the unicast delivery to the reported MC service client.

5. If the unicast QoS flow is not satisfied, the MC service server interacts with the 5GC to update the QoS requirements.

6. The MC service server sends the MC service data via the unicast delivery towards the MC service client which suffers bad broadcast reception quality.

7. The MC service client then receives the DL MC service via both the unicast delivery.

The procedure in figure 7.X.Y.3.2-2 illustrates the UE which is switched to unicast delivery after leaving the broadcast service area and again enters into the broadcast service area where the NG-RAN is broadcasting the MC service data of the ongoing group communication. The MC service client now is able to receive the broadcast data again. It shows only one of the receiving MC service clients receiving the broadcast MBS session.

Pre-conditions:

1. The MC group communication is ongoing and the MC service data (e.g., DL media, application layer control signalling) is transmitted via broadcast MBS session in the broadcast service areas.

2. The MC service client is receiving the MC service data (e.g., DL media, application layer control signalling) via the unicast delivery.

3. The MC service client has already received the broadcast MBS session service announcement, MapGroupToSessionStream information and enters into the broadcast service area again.



Figure 7.X.Y.3.2-2: Service continuity from unicast back to broadcast

1. An MC service group communication session is ongoing and the broadcast MBS session is used to deliver the MC service data of the group communication. The MC service client is receiving the MC service data via the unicast delivery.

2. The MC service client detects that it is able to receive the broadcast data due to e.g., moving into the broadcast service area of the announced TMGI. The MC service client may determine the broadcast reception quality by using the BLER of the received data. When no data is received, the quality estimation can consider the reference signals and the modulation and coding scheme (MCS).

3. The MC service client sends MBS listening status report which indicates the broadcast reception quality associated with the TMGI is sufficient to receive data. The MC service client may also map the determined broadcast reception quality to a broadcast reception quality level. The broadcast reception quality level indicates at which specific broadcast reception quality level the MC service media has been received.

NOTE 1: The set of MBS reception quality levels and the mapping of the determined broadcast reception quality to those levels are implementation.

NOTE 2: It is implementation that the broadcast reception quality level can be determined per MBS session, per media stream or per MBS QoS flow level via e.g., measurements of radio level signalling such as the reference signals from the NG-RAN node(s), packet loss.

4. Based on the MapGroupToSessionStream received before, the MC service client receives the DL MC service via both the broadcast MBS session and the unicast delivery.

NOTE 3: If any information about the broadcast MBS session stream has changed, the MC service server provides the MapGroupToSessionStream again.

5. The MC service server based on the report from the participant, determines to stop sending the MC service data (e.g., DL media, application layer control signalling) via the unicast delivery to the reported MC service client. After then, the MC service client receives the MC service data only via the broadcast MBS session.

##### 7.X.Y.3.3 Information flows

###### 7.X.Y.3.3.1 MBS listening status report

Table 7.X.Y.3.3.1-1 describes the information flow of MBS listening status report from the MC service client to the MC service server.

Table 7.X.Y.3.3.1-1: MBS listening status report

|  |  |  |
| --- | --- | --- |
| Information element | Status | Description |
| MBS session ID(s) | M | The identity of the broadcast MBS session(s) being monitored. It is the TMGI type. |
| MC service ID | M | Identity of the MC service user who is reporting the session status |
| MBS listening status | M | The broadcast listening status per TMGI. |
| MBS reception quality level | O | The reception quality level |
| Unicast listening status | O | The unicast listening status associated with the unicast delivery. |
| NOTE: The set of quality levels helps service continuity in broadcast scenarios. A reception quality level may help to make an efficient switching decision to unicast delivery. How these levels are used is implementation specific. | | |

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