**3GPP TSG-WG SA4 Meeting #124 *S4-230993***

**Berlin, Germany, May 22 – 26, 2023 (revision of S4-230872)**

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| *CR-Form-v12.2* |
| **Pseudo CHANGE REQUEST** |
|  |
|  | **26.506** | **CR** |   | **rev** | **-** | **Current version:** | **1.2.0** |  |
|  |
| *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)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network |  |

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|  |
| ***Title:***  | Add support of ANBR-based network assistance |
|  |  |
| ***Source to WG:*** | Huawei, HiSilicon |
| ***Source to TSG:*** | SA4 |
|  |  |
| ***Work item code:*** | GA4RTAR |  | ***Date:*** | 2023-05-12 |
|  |  |  |  |  |
| ***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 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:*** | For the 5G RTC architecture, the feature of network assistance enables UE to further improve the QoE of the real time services. Only the RTC-AF based network assistance is introduced in the current draft TS 26.506. This paper intends to further introduce the ANBR-based network assistance via interaction between the UE and the RAN.  |
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| ***Summary of change:*** | Add support of ANBR-based network assistance |
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| ***Consequences if not approved:*** | The feature of network assistance is not complete. |
|  |  |
| ***Clauses affected:*** | 2, 5.x, 5.y |
|  |  |
|  | **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 \* \* \* \*

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document in the same Release as the present document.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TR 26.998: "Support of 5G glass-type Augmented Reality / Mixed Reality (AR/MR) devices".

[3] 3GPP TS 26.119: "Media Capabilities for Augmented Reality".

[4] 3GPP TS 26.113: "Enabler for Immersive Real-time Communication".

[5] 3GPP TR 26.930: "Study on the enhancement for Immersive Real-Time communication for WebRTC".

[6] 3GPP TS 26.501: "5G Media Streaming (5GMS); General description and architecture".

[7] 3GPP TS 23.558: "Architecture for enabling Edge Applications".

[x] 3GPP TS 38.321: "NR; Medium Access Control (MAC) protocol specification".

[y] 3GPP TS 36.321: "LTE; Medium Access Control (MAC) protocol specification".

\* \* \* \* Second change \* \* \* \*

## 5.x Call flow for Over-the-top (OTT) RTC sessions (CS#1)

The RTC session is established between two endpoints using external signalling mechanisms. Each endpoint of the connection that is using the 5G system may benefit from 5G network support for the network path within that 5G network.

The following call flow applies.



Figure 5.x-1: Call flow for Over-the-top (OTT) RTC sessions (collaboration scenario 1)

The working assumptions are:

- The application on UE1 and the UE2 use an external WebRTC signalling server to establish the WebRTC session.

0. A provisioning session may have been created by the AP with the MNO.

Network assistance for the RTC session is achieved through the following steps:

1. The application on UE1 uses application-specific signalling functions to establish a WebRTC session with UE2.

2. The application informs the MSH about the new RTC session and shares information about the media streams and their associated 5-Tuples.

3. The MSH requests network assistance for the RTC session and provides the transport and bandwidth information to the Network Support AF.

4. The Network Support AF uses the N5 or N33 interface to request QoS allocation. It may request differential charging based on pre-existing provisioning for these sessions.

5. Confirmation of QoS allocation is notified to the Network Support AF and the MSH.

6. The Network Support AF will also subscribe to events related to the QoS flows of the RTC session with the PCF and SMF.

7. The Network Support AF receives notifications about any changes to the QoS flows of the RTC session from the PCF or the SMF.

8. The Network Support AF sends notifications to the MSH about changes to the session. This information may contain for example be bitrate recommendations.

9. Alternatively, the MSH may interact with the UE Modem to trigger to query the recommended bitrate on the uplink or downlink direction.

10. The UE Modem then sends the ANBRQ (Access Network Bit Rate Query) signalling to the RAN as defined in TS 38.321 [x] for NR access and TS 36.321[y] for LTE access.

11. The RAN, based on the network status, returns the recommended bitrate to the UE modem as requested. The recommended bit rate is in kbps at the physical layer at the time when the decision is made.

NOTE 1: The UE may determine the corresponding IP layer bitrate based on the long-term average of the IP packet sizes, L2 header sizes, and ROHC header sizes, but the translation methodologies and the estimation error levels required to implement accurate media bitrate adaptation have not been specified. The UE may determine the corresponding IP layer bitrate based on the long-term average of the IP packet sizes, L2 header sizes, and ROHC header sizes, but the translation methodologies and the estimation error levels required to implement accurate media bitrate adaptation have not been specified.

NOTE 2: The eNodeB may determine the corresponding IP layer bitrate based on the long-term average of the IP packet sizes, L2 header sizes, and ROHC header sizes, but the translation methodologies and the estimation error levels required to implement accurate media bitrate adaptation have not been specified.

NOTE 3: The recommended/queried bitrate as signalled over the LTE and NR access is defined to be in kbps at the physical layer. The uplink/downlink bitrate at the physical layer is $r\_{UL/DL}=\frac{\sum\_{k}^{}L\_{k}}{T}$,where$L\_{k}$is the bit-length of the *k*-th successfully transmitted/received TB by the UE within the window *T*. In TS 36.321[y] and 38.321[x], a window length of 2000 ms is applied.

12. The MSH forwards the bitrate recommendation to the RTC application.

13. The application may act on the bitrate recommendation, e.g. by reducing the uplink media bitrate.

14. The application may request UE2 to adjust the bitrate of the downlink media.

\* \* \* \* Second change \* \* \* \*

## 5.y Call flow for Network-supported RTC sessions (CS#2)

The MNO offers access to trusted ICE functionality to UEs that wish to participate in RTC sessions. The session establishment takes into account the configured trusted ICE functions.

The call flow is as follows.



Figure 5.y-1: Call flow for Network-supported RTC sessions (collaboration scenario 2)

The working assumptions are:

- The application on UE1 and UE2 use an external WebRTC signalling server to establish the WebRTC session.

0. A provisioning session may have been created by the AP with the MNO.

Call flow using network-supported RTC session is achieved through the following steps:

1. The AF uses the RTC-5 interface to provide the MSH with a list of trusted STUN/TURN servers that the UE may use for establishing RTC sessions.

2. The application queries the MSH for the list of trusted ICE servers.

3. The UE discovers and tests the ICE candidates to validate that they are suitable for the connection.

4. The application on UE1 and the remote UE2 use an external RTC signalling server to exchange information about ICE candidates and to exchange the SDP offer/answer.

Then, the WebRTC session is established using the most suitable ICE candidate.

5. The STUN or TURN server in ICE function, upon reception of the allocation request by the application (or WebRTC framework) may extract the 5-Tuple information for each of the media sessions and convey the information to the Network Support AF in 5G-RTC AF for requesting QoS assistance.

6. The Network Support AF uses the N5 interface to request QoS allocation. It may request differential charging based on pre-existing provisioning for these sessions.

7. Confirmation of QoS allocation is notified to the Network Support AF and the MSH.

8. The Network Support AF will also subscribe to events related to the QoS flows of the WebRTC session with the PCF and SMF.

9. The Network Support AF receives notifications about any changes to the QoS flows of the WebRTC session from the PCF or the SMF. Then, the Network Support AF sends notifications to the ICE function (STUN/TURN server).

10. The STUN/TURN server may forward the bitrate recommendation to the MSH, if the allocation session is still active.

11. Alternatively, the MSH may interact with the UE Modem to trigger to query the recommended bitrate on the uplink or downlink direction.

12. The UE Modem then sends the ANBRQ (Access Network Bit Rate Query) signalling to the RAN as defined in TS 38.321 [x] for NR access and TS 36.321 [y] for LTE access.

13. The RAN, based on the network status, returns the recommended bitrate to the UE modem as requested. The recommended bit rate is in kbps at the physical layer at the time when the decision is made.

NOTE 1: The UE may determine the corresponding IP layer bitrate based on the long-term average of the IP packet sizes, L2 header sizes, and ROHC header sizes, but the translation methodologies and the estimation error levels required to implement accurate media bitrate adaptation have not been specified. The UE may determine the corresponding IP layer bitrate based on the long-term average of the IP packet sizes, L2 header sizes, and ROHC header sizes, but the translation methodologies and the estimation error levels required to implement accurate media bitrate adaptation have not been specified.

NOTE 2: The eNodeB may determine the corresponding IP layer bitrate based on the long-term average of the IP packet sizes, L2 header sizes, and ROHC header sizes, but the translation methodologies and the estimation error levels required to implement accurate media bitrate adaptation have not been specified.

NOTE 3: The recommended/queried bitrate as signalled over the LTE and NR access is defined to be in kbps at the physical layer. The uplink/downlink bitrate at the physical layer is $r\_{UL/DL}=\frac{\sum\_{k}^{}L\_{k}}{T}$,where$L\_{k}$is the bit-length of the *k*-th successfully transmitted/received TB by the UE within the window *T*. In TS 36.321[y] and 38.321[x], a window length of 2000 ms is applied.

14. The application may act on the bitrate recommendation, e.g. by reducing the uplink media bitrate.

15. Media traffic is delivered to UE2. If TURN server is present in the configuration, RTC-4m interface is involved.

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