**3GPP TSG-S4 Meeting # 130**

Orlando (FL-US), 18-22 November 2024 revision of S4-241758

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
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|  | **804** | **CR** | 10 | **rev** | **5** | **Current version:** | 18.1.0 |  |
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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:***  | FS\_AMD: WT4. Modem Usage Optimized Media Streaming |
|  |  |
| ***Source to WG:*** | Tencent |
| ***Source to TSG:*** | S4 |
|  |  |
| ***Work item code:*** | FS\_AMD |  | ***Date:*** | 24-11-22 |
|  |  |  |  |  |
| ***Category:*** |  |  | ***Release:*** | Rel-19 |
|  | *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:*** | Adding a general description |
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| ***Summary of change:*** | WT2.1: - Introduction and general description - overview of CTA-5005 |
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| ***Consequences if not approved:*** | Lack of progress |
|  |  |
| ***Clauses affected:*** | 2; 5.20(new) |
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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:*** |  |

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| **1st Change** |

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## 2 References

[W3C-Managed MSE] Media Source Extension, W3C Editor's Draft 26, October 2023,
<https://jyavenard.github.io/media-source/media-source-respec.html#dfn-endstreaming>

[W3C-MSE] Media Source Extension, W3C Working Draft 01, April 2024,
<https://www.w3.org/TR/media-source-2/>

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| **2nd Change** |

## 5.20 Optimising modem usage for media streaming

### 5.20.1 Description

#### 5.20.1.1 Background Data Transfer for 5G Media Streaming

In Release 18 TS 26.501 [15] and TS 26.510 [26510] added support for Background Data Transfer to the Dynamic Policies feature of the 5G Media Streaming System. This capability allows a UE to download content using downlink media streaming in non-real time ahead of consumption, or to uplink stream recorded content in non-real time when the content can be delivered with delay. Background Data Transfers occur during time intervals that are announced in advance by the Media AF and are scheduled at times expected to provide higher bandwidth and lower delivery cost due to the expected low traffic of the network during those time intervals.

#### 5.20.1.2 W3C Managed Media Source Extension

The Managed Media Source Extension [W3C-Managed MSE] is a UE platform solution which was recently proposed to W3C based on recently developments to optimise the efficiency of media segment requests. It is currently supported by the Safari web browser on iOS devices. Similar to the W3C Media Source Extension [W3C-MSE], it enables a user agent to expose a system-level API on the UE platform to assist with playback of media streams. The web application using this API appends media segments of media to the user agent's playback buffer using this API, and instructs the platform media player to decode and play back the buffered media.

In the case of [W3C MSE], the web application is in complete control of when to request the media segments from the network and when to append them to the user agent's media playback buffer, but it may not know about underlying system resources, such as memory consumption and modem power consumption. The Managed Media Source Extension works similarly to W3C MSE, but additionally it enables the user agent to provide hints to the web application on resource utilisation, in particular source buffer management, and when to make segment requests in order to maintain a healthy media playback buffer occupancy.

- The user agent may fire a startstreaming event recommending that the application begin streaming new media segments.

- The user agent may fire a stopstreaming event to indicate that enough media data is buffered.

These hint events help the application to utilise the platform resources more efficiently by, for example, keeping the modem turned on for a shorter total time. This may, in turn, result in lower battery consumption by the UE.

#### 5.20.1.3 Objective

The objective of this Key Issue is to study the way to use these two techniques in combination to improve the efficiency of 5G Media Streaming with respect to the device resources such as power consumption and memory consumption. In particular the following questions are the subject of this study:

1. Does the use of Managed Media Source Extension result in less battery consumption of the UE and does the device need to expose any standard APIs and/or QoS parameter to improve the efficiency of the Managed Media Source Extension hints?

2. Can the current Background Data Transfer feature utilise the network efficiency (and therefore the uptime of the UE modem) during a media streaming session, and are additional features of Background Data Transfer needed specifically for this purpose?

3. Does the combination of the above features provide any benefit?

### 5.20.2 Collaboration scenarios

#### 5.20.2.1 Collaboration scenario 1

The 5GMSd Client uses a Media Player that supports the Managed Media Source Extension.

### 5.20.3 Architecture mapping

The expected architecture is intended to combine Managed Media Source Extensions and Background Data Transfer to optimize modem usage. The objective is to define reference architectures that balance battery consumption and seamless media playback across scenarios where collaboration is internal to the device or involves network interactions. This is for further study.

### 5.20.4 High-level call flow

The high-level call flow is expected to include the following:

* The 5GMSd Client initialises a media playback session.
* The Managed Media Source Extension triggers events such as startstreaming or stopstreaming to guide the application on resource-efficient media segment requests.
* The 5GMSd Client schedules non-real-time content downloads during low-traffic intervals using Background Data Transfer.
* Dynamic adjustments to the content downloads based on device power states and network conditions, with minimal power consumption.

A full description of the call flow is for further study.

### 5.20.5 Gap analysis and requirements

The gap analysis is expected to identify the limitations of current APIs to support resource-aware streaming, mechanisms for Background Data Transfer synchronization.

This analysis is for further study.

### 5.20.6 Candidate solutions

Based on the above gap analysis, the candidate solutions may include Background Data Transfer enhancements, MSE including QoS parameters for segment scheduling.

Details are for further study.

### 5.20.7 Summary and conclusions

The combination of device-level media resource management with network-assisted scheduling is a promising feature of media delivery.

Further study is recommended to identify the current limitations and assess the potential of candidate solutions.